

## **Oracle® Fusion Middleware**

Upgrading Oracle GoldenGate for Windows and UNIX

12c (12.2.0.1)

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Describes the procedures to upgrade Oracle GoldenGate for Windows and UNIX.

Oracle Fusion Middleware Upgrading Oracle GoldenGate for Windows and UNIX, 12c (12.2.0.1)

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# Contents

|  |      |
|--|------|
| <b>Preface</b> .....   | v    |
| Audience .....   | v    |
| Documentation Accessibility .....  | v    |
| Related Documents .....  | v    |
| Conventions .....  | vi   |
| <br><b>1 Overview of Upgrading Oracle GoldenGate</b>   |      |
| 1.1 Who Should Perform the Upgrade.....  | 1-1  |
| 1.2 Before You Upgrade .....   | 1-1  |
| 1.3 Upgrade Considerations if Using Character-Set Conversion .....                             | 1-2  |
| 1.4 Upgrade Considerations if Using Quoted Object Names.....                                   | 1-2  |
| 1.4.1 Overview of the convprm Tool .....   | 1-2  |
| 1.4.2 Running convprm.....   | 1-3  |
| <br><b>2 Upgrading to Release 12c (12.2.0.1) for Oracle Database</b>                           |      |
| 2.1 Overview of the Upgrade Procedure for Oracle Database .....                                | 2-1  |
| 2.2 Upgrading a Configuration That Includes DDL Support .....                                  | 2-2  |
| 2.3 Upgrading a Configuration That Includes Oracle Berkeley DB .....                           | 2-2  |
| 2.4 Understanding the Scope of the Upgrade Procedure.....                                      | 2-3  |
| 2.4.1 Extract Upgrade Considerations .....   | 2-3  |
| 2.4.2 Replicat Upgrade Considerations .....  | 2-3  |
| 2.5 Understanding and Obtaining the Oracle GoldenGate Distribution.....                        | 2-3  |
| 2.6 Preparing to Patch.....  | 2-4  |
| 2.7 Installing the Patch .....   | 2-4  |
| 2.8 Performing the Upgrade to Oracle GoldenGate Release 12c (12.2.0.1) for Oracle Database ... | 2-5  |
| 2.9 Installing Oracle GoldenGate from OUI.....   | 2-10 |
| 2.9.1 Upgrading Oracle GoldenGate from OUI.....  | 2-10 |
| <br><b>3 Upgrading to Release 12c (12.2.0.1) for Heterogeneous Databases</b>                   |      |
| 3.1 Overview of the Upgrade Procedure for Heterogeneous Databases .....                        | 3-1  |
| 3.2 Downloading Oracle GoldenGate .....  | 3-2  |
| 3.3 Performing the Upgrade to Oracle GoldenGate 12c (12.2.0.1) for Heterogeneous Databases     | 3-3  |

## **4 Deploying New Features of Release 12c (12.2.0.1)**

|       |   |     |
|-------|---|-----|
| 4.1   | Upgrading Extract from Classic Mode to Integrated Mode (Oracle).....              | 4-1 |
| 4.2   | Upgrading from Oracle Nonintegrated Replicat to Integrated Replicat (Oracle)..... | 4-2 |
| 4.3   | Upgrading to Coordinated Replicat (All Databases).....                            | 4-3 |
| 4.3.1 | Procedure Overview .....  | 4-3 |
| 4.3.2 | Performing the Switch to Coordinated Replicat .....                               | 4-4 |
| 4.4   | Deploying Feature Upgrades That Require Only Parameter Changes.....               | 4-6 |

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# Preface

This guide contains instructions for upgrading Oracle GoldenGate for Windows and UNIX.

## 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>.

### Access to Oracle Support

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<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## Related Documents

The Oracle GoldenGate documentation set includes the following components:

### Windows, UNIX, and Linux Platforms

- *Installing and Configuring Oracle GoldenGate for DB2 for i*
- *Installing and Configuring Oracle GoldenGate for DB2 LUW*
- *Installing and Configuring Oracle GoldenGate for DB2 z/OS*
- *Installing and Configuring Oracle GoldenGate for Informix*
- *Installing and Configuring Oracle GoldenGate for MySQL*
- *Installing and Configuring Oracle GoldenGate for NonStop SQL/MX*
- *Installing and Configuring Oracle GoldenGate for SQL Server*
- *Installing and Configuring Oracle GoldenGate for Oracle TimesTen*
- *Installing and Configuring Oracle GoldenGate for Oracle Database*

- *Installing and Configuring Oracle GoldenGate for Sybase*
- *Installing and Configuring Oracle GoldenGate for Teradata*
- *Administering Oracle GoldenGate for Windows and UNIX*
- *Reference for Oracle GoldenGate for Windows and UNIX*
- *Logdump Reference for Oracle GoldenGate*
- *Upgrading Oracle GoldenGate for Windows and UNIX*
- *Error Messages Reference for Oracle GoldenGate for Windows and UNIX*

## Conventions

The following text conventions are used in this document:

| Convention             | Meaning  |
|------------------------|--|
| <b>boldface</b>        | Boldface type indicates graphical user interface elements associated with an action, such as "From the File menu, select <b>Save</b> ." Boldface also is used for terms defined in text or in the glossary.  |
| <i>italic</i>          | Italic type indicates placeholder variables for which you supply particular values, such as in the parameter statement: <code>TABLE <i>table_name</i></code> . Italic type also is used for book titles and emphasis.  |
| monospace<br>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: <code>{<i>option1</i>   <i>option2</i>   <i>option3</i>}</code> .  |
| [ ]                    | Brackets within syntax indicate an optional element. For example in this syntax, the <code>SAVE</code> clause is optional: <code>CLEANUP REPLICAT <i>group_name</i> [, <i>SAVE count</i>]</code> . Multiple options within an optional element are separated by a pipe symbol, for example: <code>[<i>option1</i>   <i>option2</i>]</code> .                           |

---

# Overview of Upgrading Oracle GoldenGate

This manual contains instructions for upgrading Oracle GoldenGate from version 11g to version 12c. This chapter contains an overview of this process and important pre-upgrade considerations that should be addressed.

This chapter includes the following sections:

- [Section 1.1, "Who Should Perform the Upgrade"](#)
- [Section 1.2, "Before You Upgrade"](#)
- [Section 1.3, "Upgrade Considerations if Using Character-Set Conversion"](#)
- [Section 1.4, "Upgrade Considerations if Using Quoted Object Names"](#)

## 1.1 Who Should Perform the Upgrade

Upgrades to Oracle GoldenGate should be performed by an administrator who has thorough knowledge of the commands that are necessary to control processes and obtain status information.

## 1.2 Before You Upgrade

Before performing the upgrade procedure, read the *Release Notes for Oracle GoldenGate for Windows and UNIX* to determine whether the new release affects the following in your configuration:

- New default process behavior.
- Parameters that changed or were deprecated.
- Parameters that were added to support a desired new feature or database type.
- Parameter default values that have changed.
- New data type support that might require changes to TABLE or MAP statements.
- Interaction with native database components that might require database change.

You can prevent startup delays that can cause lag by having all of your parameter changes made ahead of time, so that they are ready when you restart the processes. You should not make parameter changes while a process is running, but you can:

1. Make a copy of the parameter file.
2. Make edits to the copy.
3. After you shut down the processes during the upgrade procedure, copy the old parameter file to a new name (to save it as backup).

4. Copy the new parameter file to the old parameter file's name.

---

**Note:** The sample files provided with the Oracle GoldenGate installation are overwritten with each upgrade. If you modify any Oracle delivered sample files, Oracle recommends that you make a copy of these file then modify the copy to avoid issues with changed files being overwritten.

---

## 1.3 Upgrade Considerations if Using Character-Set Conversion

The Replicat parameter `TRAILCHARSET` is renamed to `SOURCECHARSET` in version 12c (12.2.0.1), but Oracle GoldenGate continues to support `TRAILCHARSET` as an alias. When upgrading Oracle GoldenGate, you can keep `TRAILCHARSET` or change it to `SOURCECHARSET`. One of those parameters is required to support character-set conversion from a pre-11.2.1 Extract if you are not upgrading that Extract at this time. If you are upgrading both Extract and Replicat to version 12c (12.2.0.1), the information about the source character set is written to the trail automatically, and neither `TRAILCHARSET` nor `SOURCECHARSET` is needed.

## 1.4 Upgrade Considerations if Using Quoted Object Names

As of version 12c (12.2.0.1), Oracle GoldenGate treats strings that are within single quotes as literals. Oracle GoldenGate has supported double-quoted object names since version 11.2 but did not fully implement the rule of single quotes for literals until version 12. Supporting double quotes for object names and single quotes for literals brings Oracle GoldenGate into compliance with SQL-92 rules and is now enabled by default. The `USEANSISQLQUOTES` parameter, which forced the SQL-92 standard in previous releases, is now deprecated.

The change to default SQL-92 rules affects object names in parameter files, input to `SQLEXEC` clauses, `OBEY` files, conversion functions, user exits, and commands. You have the following options as a result of this change:

- Retain non-SQL-92 quote rules: Oracle GoldenGate retains backward compatibility to enable the retention of current parameter files that do not conform to SQL-92 rules. To retain non-SQL-92 rules, add the `NOUSEANSISQLQUOTES` parameter to the `GLOBALS` file before you perform the upgrade and retain that parameter going forward. `NOUSEANSISQLQUOTES` affects Extract, Replicat, `DEFGEN`, and `GGSCI`.
- Upgrade your parameter files to use SQL-92 rules: Oracle GoldenGate provides the `convprm` conversion tool which you can run to convert your parameter files to be in conformance with SQL-92 rules. Run the `convprm` tool before you start the upgrade process.

### 1.4.1 Overview of the `convprm` Tool

The following describes the `convprm` tool:

- It is a command line program which can be run either manually or scripted.
- It converts string literals from double-quoted character strings to single-quoted character strings, but leaves double-quoted object names intact. It can distinguish between an object name and a string literal even when both are represented as a sequence of characters delimited with double quotes.
- It escapes quotation marks. Quotation marks must be escaped when the character that is used to delimit the string appears in the literal string itself. For example, the



sentence "This character "" is a double quote" contains an escaped quote mark. The sentence 'This character ' is a single quote' contains an escaped single quote mark. When converting from double quotes to single quotes, `convprm` removes one of the repeated double quotes from escaped double quotes and escapes the single quotes that are embedded in the character sequence.

- It issues a warning message if `NOUSEANSISQLQUOTES` is specified in the `GLOBALS` file. The message states that the converted parameter file is incompatible with `NOUSEANSISQLQUOTES`, but the parameter file was updated anyway.
- It recursively converts the files that are included through an `OBEY` or `INCLUDE` parameter.
- It creates a backup of the initial parameter file in the same directory as the original file. The backup has the name of the original file with the `.bck` suffix. The creation of a backup file can be disabled when you run the `convprm` tool.
- It converts the character set. The character set for the new parameter file is taken from the `CHARSET` parameter in the original parameter file. Absent that parameter, the character set is taken from the `CHARSET` parameter in the `GLOBALS` file. Absent a `GLOBALS` parameter, the new parameter file is written in the character set of the local operating system.

Table 1–1 provides examples of the conversion outcome.

**Table 1–1 Comparison of Input Requirements for [NO]USEANSISQLQUOTES**

| Input variable   | String literal with old syntax | String literal with new syntax |
|--|--------------------------------|--------------------------------|
| Double quotes are escaped in the old syntax but not in the new syntax. | "abc""def"                     | 'abc"def'                      |
| Single quotes are escaped in the new syntax but not in the old syntax. | "abc'def"                      | 'abc"def'                      |

## 1.4.2 Running convprm

To use the `convprm` tool:

1. Run `convprm` with the following syntax:

```
convprm [options] input_files
```

where:

- `{-h | --help}` displays usage.
- `{-v | --version}` displays version information.
- `{-i | --follow-include}` recursively converts files included through an `OBEY` or `INCLUDE` parameter.
- `{-n | --no-backup}` does not create a copy of the original file.
- `{-s | --silent}` does not display status messages.
- `{-q | --quotes}` performs quote conversion. This is the default.
- `{-d | --dry-run}` does not change the parameter file or create a backup file. It only prints out what would happen as the result of the conversion.
- `input_files` is a list of the parameter files that are to be converted. Separate each file name with a white space, for example:

```
convprm [options] extfin extacct exthr
```

2. Examine the parameter file to make certain the conversion completed successfully. Status messages are displayed at the beginning, during, or at the end of the file conversion process.

On errors, the process abends in the same way as other Oracle GoldenGate executables. All error messages that cause the converter to fail are sent to the Oracle GoldenGate error log.

If you are currently using the `USEANSISQLQUOTES` parameter, you may remove it or leave it in the parameter files. It is now the default.

---

# Upgrading to Release 12c (12.2.0.1) for Oracle Database

These instructions are for upgrading Oracle GoldenGate to version 12c for an Oracle Database.

This chapter includes the following sections that must be performed in order to successfully upgrade:

- [Section 2.1, "Overview of the Upgrade Procedure for Oracle Database"](#)
- [Section 2.2, "Upgrading a Configuration That Includes DDL Support"](#)
- [Section 2.3, "Upgrading a Configuration That Includes Oracle Berkeley DB"](#)
- [Section 2.4, "Understanding the Scope of the Upgrade Procedure"](#)
- [Section 2.5, "Understanding and Obtaining the Oracle GoldenGate Distribution"](#)
- [Section 2.6, "Preparing to Patch"](#)
- [Section 2.7, "Installing the Patch"](#)
- [Section 2.8, "Performing the Upgrade to Oracle GoldenGate Release 12c \(12.2.0.1\) for Oracle Database"](#)
- [Section 2.9, "Installing Oracle GoldenGate from OUI"](#)

## 2.1 Overview of the Upgrade Procedure for Oracle Database

The upgrade instructions perform a minimal upgrade that deploys only the updated core functionality, without implementing any of the major new 12c (12.2.0.1) features at this time, such as Integrated Replicat, updated globalization support, new SQL-92 defaults, and enhanced security features. It is best practice to perform a minimal upgrade first, so that you can troubleshoot more easily in the event that any problems arise. Once you know your environment is upgraded successfully, you can implement the new functionality.

The upgrade instructions also take into consideration the steps to take if you are upgrading the source or target database at the same time that you are upgrading Oracle GoldenGate. Taken into account are the following pre-upgrade requirements:

- Allow the Oracle GoldenGate processes to finish processing all current DML and DDL data in the Oracle GoldenGate trails.
- Disable the DDL trigger if there is no native DDL support.
- When upgrading your database in parallel with an Oracle GoldenGate upgrade, you must upgrade the database first.

## 2.2 Upgrading a Configuration That Includes DDL Support

This section contains considerations and steps you should take when DDL support is active in the current Oracle GoldenGate environment. DDL support in Oracle GoldenGate v12 offers two options:

- Integrated mode in version 12c of Oracle GoldenGate supports two DDL capture methods:
  - If the source database is Oracle 11.2.0.4 or later, DDL capture support is integrated into the database logmining server and does not require the use of the Oracle GoldenGate DDL trigger and supporting objects, as long as the database `COMPATIBLE` parameter is set to 11.2.0.4 or higher.
  - If the source database is earlier than Oracle 11.2.0.4, the Oracle GoldenGate trigger and supporting DDL objects must be used when Extract is in integrated mode.
- Classic capture requires the use of the Oracle GoldenGate DDL trigger and supporting objects regardless of the Oracle version of the source database.

Table 2–1 shows possible DDL upgrade paths and guidelines.

**Table 2–1 Possible Upgrade Paths to 12c and Requirements for DDL Support**

| Upgrade from:  | To: Classic capture 12c using trigger method   | To: Integrated capture 12c, no trigger <sup>1</sup>   |
|--|--|---|
| Classic capture using trigger method (all 11.2.1 database versions)    | <p>Cannot be used for a container database.</p> <p>Upgrade Oracle GoldenGate per these upgrade instructions.</p> | <p>Can be used for a container database.</p> <ol style="list-style-type: none"> <li>1. Source database must be 11.2.0.4 or higher.</li> <li>2. Source database <code>COMPATIBLE</code> setting must be 11.2.0.4 or higher.</li> <li>3. Upgrade Oracle GoldenGate per these upgrade instructions.</li> </ol> |
| Integrated capture using trigger method (all 11.2.1 database versions) | <p>Cannot be used for a container database.</p> <p>No DDL upgrade path.</p>                                      | <p>Can be used for a container database.</p> <ol style="list-style-type: none"> <li>1. Source database must be 11.2.0.4 or higher.</li> <li>2. Source database <code>COMPATIBLE</code> setting must be 11.2.0.4 or higher.</li> <li>3. Upgrade Oracle GoldenGate per these upgrade instructions.</li> </ol> |

<sup>1</sup> An upgrade of the database to 11.2.0.4 or 12.1 automatically takes a data dictionary snapshot in the redo stream as part of the patch set upgrade.

## 2.3 Upgrading a Configuration That Includes Oracle Berkeley DB

When you are upgrading Oracle GoldenGate from release 12.1.2.1.0 to 12.2.0.1.0 and have enabled monitoring and created the data store (`CREATE DATASTORE` in GGSCI), the best practice is to delete the data store before performing the upgrade (`DELETE DATASTORE` in GGSCI). After the upgrade, recreate the data store can (`CREATE DATASTORE` in GGSCI).

You can upgrade without first deleting the data store as long as you do not start any Manager processes before you delete then recreate data store. Otherwise, Manager will fail to start after the upgrade.

## 2.4 Understanding the Scope of the Upgrade Procedure

Before performing the upgrade, review the following information about upgrading Extract and Replicat. Even though you may only be upgrading the source or target, rather than both, all processes are involved in the upgrade. All processes must be stopped in the correct order for the upgrade, regardless of which component you upgrade, and the trails must be processed until empty.

Oracle recommends that you begin your upgrade with the target rather than the source to avoid the necessity of adjusting the trail file format.

### 2.4.1 Extract Upgrade Considerations

If you are using trigger-based DDL support, you must rebuild the DDL objects, even if you plan to use the new triggerless DDL support in integrated capture. After the upgrade, when Oracle GoldenGate is running successfully again, you can follow the steps in this documentation to remove the trigger and DDL objects. See [Section 2.2, "Upgrading a Configuration That Includes DDL Support"](#) for DDL upgrade considerations.

If you are upgrading multiple Extract processes that operate in a consolidation configuration (many sources to one target), follow these steps fully to upgrade one Extract at a time.

If you are using integrated capture, you will need to roll over the local and remote trails at the appropriate point in the upgrade steps. The 11.2.1 integrated Extract (version 1) captures `TIMESTAMP WITH LOCAL TIME ZONE` data as UTC, but the 12c (12.2.0.1) integrated Extract (version 2) captures it as the local time of the database time zone.

### 2.4.2 Replicat Upgrade Considerations

All Replicat installations should be upgraded at the same time. It is critical to ensure that all trails leading to all Replicat groups on all target systems are processed until empty, according to the upgrade instructions.

---

**Caution:** The hash calculation used by the `@RANGE` function to partition data among Replicat processes has been changed. This change is transparent, and no re-partitioning of rows in the parameter files is required, so long as the upgrade is performed as directed in these instructions. To ensure data continuity, make certain to allow all Replicat processes on all systems to finish processing all of the data in their trails before stopping those processes, according to the upgrade instructions. Note that if the Replicat processes are not upgraded all at the same time, or the trails are not cleaned out prior to the upgrade, rows may shift partitions as a result of the new hash method, which may result in collision errors.

---

## 2.5 Understanding and Obtaining the Oracle GoldenGate Distribution

For complete information about how to obtain Oracle Fusion Middleware software, see "Understanding and Obtaining Product Distributions" in *Oracle Fusion Middleware Installation Planning Guide for Oracle Identity and Access Management*.

To download the Oracle WebLogic Server and Coherence software for development or evaluation, see the following location on the Oracle Technology Network (OTN):

<http://www.oracle.com/technetwork/middleware/fusion-middleware/downloads/index.html>

For more information about locating and downloading Oracle Fusion Middleware products, see the *Oracle Fusion Middleware Download, Installation, and Configuration Readme Files* on OTN.

To obtain Oracle GoldenGate, follow these steps:

1. Go to Oracle Technology Network.
2. Find the Oracle GoldenGate 12c (12.2.0.1) release and download the ZIP file onto your system.

## 2.6 Preparing to Patch

Once the patch is downloaded, you need to prepare your environment before you can install it (you need to meet these prerequisites prior to deinstalling, too). To do so, ensure that your system meets the following requirements:

1. Ensure that the Oracle GoldenGate version on which you are installing the patch or from which you are rolling back the patch is Oracle GoldenGate release 12c (12.2.0.1) for Oracle.
2. Use the latest version of OPatch. If you do not have the latest version, follow the instructions outlined in the My Oracle Support note 224346.1, available at:

<https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=224346.1>

For information about OPatch, see *Oracle Fusion Middleware Patching Guide for Identity and Access Management*.

3. Set the `ORACLE_HOME` environment variable to the Oracle GoldenGate installation directory, which is referred to as `ORACLE_HOME`.
4. Set the `PATH` environment variable to include the location of the unzip executable, and the `ORACLE_HOME` and the `ORACLE_HOME/OPatch` directories present in the Oracle GoldenGate home.
5. Verify the Oracle Inventory, which OPatch accesses to install the patches. To verify the inventory, run the following command:

```
$ opatch lsinventory
```

If the command displays any errors, contact Oracle Support and resolve the issue.

## 2.7 Installing the Patch

To install the patch, use this procedure:

1. Maintain a location for storing the contents of the patch ZIP file. In the rest of the document, this location (absolute path) is referred to as `PATCH_TOP_DIR`.
2. Extract the contents of the patch ZIP file to the location you created in step 1.

For example:

```
$ PATCH_TOP_DIR p14309369_112101_Solaris86-64.zip
```

3. Stop Oracle GoldenGate by doing the following:
  - a. Run GGSCI.

- b. Stop Manager by running the command:

```
STOP MANAGER
```

- c. Stop all Oracle GoldenGate processes by running the command:

```
STOP ER *
```

4. Navigate to the `PATCH_TOP_DIR/Patch_number` directory:

```
$ cd PATCH_TOP_DIR/Patch_number
```

5. Install the patch by running the following command:

```
$ opatch apply
```

---

**Note:** When OPatch starts, it validates the patch and ensures that there are no conflicts with the software already installed in the `ORACLE_HOME` of the Oracle GoldenGate release. OPatch categorizes conflicts into the following types:

- **Conflicts with a patch already applied to the `ORACLE_HOME`.**  
In this case, stop the patch installation and contact Oracle Support Services.
  - **Conflicts with a patch already applied to the `ORACLE_HOME` that is a subset of the patch you are trying to apply.** In this case, continue with the patch installation because the new patch contains all the fixes from the existing patch in the `ORACLE_HOME`. The subset patch will automatically be rolled back prior to the installation of the new patch.
- 

6. If the patch includes new parameters, edit the respective parameter files.
7. Set `ORACLE_HOME` back to the Oracle database home directory.
8. Start the processes from the Oracle GoldenGate home by doing the following:

- a. Ensure GGSCI is running.

- b. Start Manager by running this command:

```
START MANAGER
```

- c. Start all Oracle GoldenGate processes by running this command:

```
START ER *
```

## 2.8 Performing the Upgrade to Oracle GoldenGate Release 12c (12.2.0.1) for Oracle Database

These instructions contain the procedure for performing the minimal upgrade.

Before proceeding, make certain you have reviewed the following preparation information in this manual:

- [Section 1, "Overview of Upgrading Oracle GoldenGate"](#)
- [Section 2.1, "Overview of the Upgrade Procedure for Oracle Database"](#)
- [Section 2.2, "Upgrading a Configuration That Includes DDL Support"](#)
- [Section 2.4, "Understanding the Scope of the Upgrade Procedure"](#)

---

**Note:** If you are using integrated capture and plan to upgrade from trigger-based DDL capture to new native DDL capture, **do not** remove the DDL trigger until prompted. Extract needs to mine DDL to the point where the redo COMPATIBLE level is advanced to 11.2.0.4 (or higher). For example, if Extract is behind by a week when the database is upgraded to 11.2.0.4, Extract does not immediately switch to native DDL capture. It must be allowed to process the pre-11.2.0.4 redo first, then Extract upgrades to native DDL capture automatically.

---

1. (Source system) The new Extract might need to start processing from the normal recovery checkpoint, rather than the bounded recovery checkpoint, if the first record of the oldest open transaction at the time that you stop Extract is in a log that is not on the system. Use the following command in GGSCI to determine the oldest archive log that you might need to restore when Extract starts. The Recovery Checkpoint field shows the oldest log needed for recovery.

```
GGSCI> INFO EXTRACT group, SHOWCH
```

You have two options:

- You can restore the archives back to, and including, the one shown in the recovery checkpoint shown with `INFO EXTRACT`.
- You can clear out the long-running transactions that apply to the Extract that you are upgrading. This can be done by skipping the transactions or by forcing them to the trail as committed transactions. Skipping a transaction may cause data loss, and forcing a transaction to the trail may add unwanted data to the trail if the transaction is rolled back. To skip or force a transaction, follow these steps:

- a. View open transactions with the following command in GGSCI. Record the transaction ID of any transaction that you want to clean up.

```
GGSCI> SEND EXTRACT group, SHOWTRANS
```

- b. Clean up old transactions with the `SEND EXTRACT` command, using either the `SKIPTRANS` option to skip a transaction or the `FORCETRANS` option to force a transaction in its current state to the trail as a committed transaction.

```
GGSCI> SEND EXTRACT group, {SKIPTRANS | FORCETRANS} transaction_ID  
[THREAD n] [FORCE]
```

- c. After you are finished cleaning up the long-running transactions, force a Bounded Recovery checkpoint.

```
GGSCI> SEND EXTRACT group, BR BRCHECKPOINT IMMEDIATE
```

---

**Note:** A forced checkpoint is necessary because the skipped or forced transaction is not cleaned up from the Bounded Recovery checkpoint and will be shown if `SHOWTRANS` is issued again. This is a known issue. For more information about `SEND EXTRACT`, see *Reference for Oracle GoldenGate for Windows and UNIX*.

---

2. (Source system) Stop user activity that generates both DDL and DML on objects in the Oracle GoldenGate configuration. After DDL and DML are stopped, run the following query. Record the current SCN from the query result.



```
select current_scn from v$database;
```

---

**Note:** You can avoid stopping DML operations when performing the Oracle GoldenGate upgrade, but you should stop DML when there is a requirement to run any SQL, such as DDL or any other upgrade SQL scripts as specified in Step 7, 17, and 19.

---

3. Record the current SCN from the query result.
4. (Source system, if currently using classic capture) In GGSCI on the source system, issue the `SEND EXTRACT` command with the `LOGEND` option until it shows there is no more redo data to capture.

(Source system if using integrated capture) Wait for the Extract recovery checkpoint to progress past the current SCN from the query result. To determine whether Extract is past that SCN in its checkpoints, view the Extract report file.

```
GGSCI> SEND EXTRACT group LOGEND
```

5. (Source system) In GGSCI, stop Extract and data pumps.

```
GGSCI> STOP EXTRACT group
```

6. (Source system if not upgrading Target) If you are not upgrading Replicat on the target systems at this time, add the following parameter to the Extract parameter file to specify the version of Oracle GoldenGate that is running on the target. This parameter causes Extract to write a version of the trail that is compatible with the older version of Replicat. Before making the changes to the extract parameter file, please take a backup of the Oracle GoldenGate parameter files on source

```
{EXTTRAIL | RMTTRAIL} file_name FORMAT RELEASE major.minor
```

Where *version* specifies an Oracle GoldenGate release, *version. major* is the major version number, and *.minor* is the minor version number. For example, 11.2 or 12.1. Ensure that you include the period in *major.minor*.

7. (Source system, *only if* currently using trigger-based DDL capture support) Follow these steps:

- a. Run `SQL*Plus` and log in as a user that has `sysdba` privileges.
- b. Disconnect all sessions that ever issued DDL to avoid an ORA-04021 error. Ensure that no DDL sessions can be started for the duration of this upgrade.
- c. From the Oracle GoldenGate directory, run the `ddl_disable` script to disable the Oracle GoldenGate DDL trigger.
- d. Run the `ddl_remove` script to remove the Oracle GoldenGate DDL trigger and other associated objects and provide the name of the Oracle GoldenGate DDL schema.

A `ddl_remove_spool.txt` log file is generated that logs the script output and a `ddl_remove_set.txt` file that logs current user environment settings for use in debugging.

- e. Run the `marker_remove` script to remove the Oracle GoldenGate marker support system and provide the name of the Oracle GoldenGate DDL schema.

A `marker_remove_spool.txt` file is generated that logs the script output and a `marker_remove_set.txt` file for use in debugging.

8. (Target systems) In GGSCI on each target system, issue the `SEND REPLICAT` command with the `STATUS` option until it shows a status of "At EOF" to indicate that it finished processing all of the data in the trail. This must be done on all target systems until all Replicat processes return "At EOF."  
  
GGSCI> `SEND REPLICAT group STATUS`
9. (Target systems) In GGSCI, stop all Replicat processes.  
  
GGSCI> `STOP REPLICAT group`
10. (Source and target systems) In GGSCI, stop Manager on the source and target systems.  
  
GGSCI> `STOP MANAGER`
11. When updating target systems only, or if updating the target side before the source side, you *must* use `STOP` to stop all data pumps and any primary Extracts that write directly to those targets on any source running on this target. Any static collectors that may have been started that must be stopped, as well. To verify that there are no server processes running, use process checking shell commands, such as `ps` and `grep`.
12. (Source and target systems) Back up the current Oracle GoldenGate installation directory on the source and target systems, and any working directories that you have installed on a shared drive in a cluster (if applicable). You do not need to backup up the `dirdat` folder because the trail files in this directory can be recreated.
13. If you want to upgrade the source or target database, or both, do so at this time according to the Oracle database upgrade instructions for the new version. Ensure that you start and mount the databases after the upgrade though *do not* permit DML or DDL transactions on the objects in the Oracle GoldenGate configuration.
14. (Source and target systems) If you are using an Oracle GoldenGate version prior to 11.2.1, grant write permission to the installation user on the existing Oracle GoldenGate directory.

For example, on UNIX or Linux, run the following command:

```
$ chmod -R u+w existing_Oracle_GoldenGate_directory
```

15. (Source and target systems) Install Oracle GoldenGate release 12c (12.2.0.1) using Oracle Universal Installer (OUI) into a new Oracle GoldenGate directory on the source and target systems. Ensure that you unselect the **Start Manager** option during the OUI installation; otherwise, this may overwrite your existing parameter files. See *Installing and Configuring Oracle GoldenGate for Oracle Database* for instructions.

---

---

**Note:** Oracle recommends that you install with the interactive OUI option for upgrade purposes, rather than use the silent installation.

---

---

16. (Target systems, if upgrading Replicat from version 11.2.1.0.0 or earlier) In GGSCI on each target system, issue the following commands to upgrade the Replicat checkpoint tables on those systems. This step updates the table definition to add columns that support the 12c (12.2.0.1) release.

```
GGSCI> DBLOGIN [{SOURCEDB} data_source] [, database@host:port] [{USERID {/ |  
user id} [, PASSWORD password] [algorithm ENCRYPTKEY {keyname | DEFAULT}]  
[USERIDALIAS alias [DOMAIN domain]]}
```

```
GGSCI> UPGRADE CHECKPOINTTABLE [owner.table]
```

---

**Note:** *owner.table* can be omitted if the checkpoint table was created with the name listed with CHECKPOINTTABLE in the GLOBALS file.

---

17. (Source system) On the source system, run the `ulg.sql` script as `sysdba`. This script converts the existing supplemental log groups to the new format required by the new release. This step is required even if you plan to use the new triggerless capture method. The script should run without error; if errors occur, contact Oracle Support.
18. (Source and target systems) Updates to the trail version, the checkpoint storage format, and integrated capture require that you perform the following steps:
  - a. In GGSCI, alter the primary Extract process and the associated data-pump Extract processes to write to a new trail sequence number. The command should return "Rollover performed."
 

```
GGSCI> ALTER EXTRACT group ETROLLOVER
```
  - b. In GGSCI, issue the `INFO EXTRACT` command with `DETAIL` for the primary Extract and the data pumps to verify the trail sequence number.
 

```
GGSCI> INFO EXTRACT group, DETAIL
```
  - c. In GGSCI, reposition the data pumps and the Replicat processes to start at the new trail sequence number.
 

```
GGSCI> ALTER EXTRACT pump, EXTSEQNO seqno, EXTRBA RBA
```

```
GGSCI> ALTER REPLICAT group, EXTSEQNO seqno, EXTRBA RBA
```
19. (Source system) If you plan to use new trigger-based DDL support for Oracle Database, use the following sub-steps to rebuild the Oracle GoldenGate DDL trigger environment to a clean state:
  - a. Run `SQL*Plus` and log in as a user that has `sysdba` privileges.
  - b. Run the `marker_setup` script to reinstall the Oracle GoldenGate marker support system and provide the name of the Oracle GoldenGate schema.
  - c. Run the `ddl_setup` script and provide the name of the Oracle GoldenGate DDL schema.
  - d. Run the `role_setup` script to recreate the Oracle GoldenGate DDL role.
  - e. Grant the role that you created to all Oracle GoldenGate users under which the following Oracle GoldenGate processes run: Extract, Replicat, GGSCI, and Manager. You may need to make multiple grants if the processes have different user names.
  - f. Run the `ddl_enable.sql` script to enable the Oracle GoldenGate DDL trigger.
20. You may now restart DDL and DML activity on the source database.
21. If you made copies of the parameter files to make parameter changes, move the new parameter files into the Oracle GoldenGate directory where the old parameter files were stored then rename them to the same names as the old parameter files. If you are using case-sensitivity support, ensure that you either add `NOUSEANSISQLQUOTES` to your parameter files, or that you ran the `convprm` utility to convert the quotes as required. See ["Upgrade Considerations if Using](#)

[Character-Set Conversion](#)" on page 1-2 for more information.

22. In GGSCI, start the Oracle GoldenGate processes on the source and target systems in the following order.

```
GGSCI> START MANAGER
GGSCI> START EXTRACT group
GGSCI> START EXTRACT pump
GGSCI> START REPLICAT group
```

If you need to restore any log files, Extract will abend with an error that indicates the log to restore. Restore the logs back to, and including that log, and then restart Extract.

## 2.9 Installing Oracle GoldenGate from OUI

This section contains instructions for installing Oracle GoldenGate by running the Oracle Universal Installer (OUI). The OUI is a graphic installation program that prompts you for the input required to install the Oracle GoldenGate binaries and working files, and set the correct database environment in which Oracle GoldenGate will operate.

You can use OUI on any of the Linux, UNIX, and Windows platforms that OUI supports and which Oracle GoldenGate supports.

OUI is supported for Oracle versions 11g and later. An instance of Oracle GoldenGate can be installed for only one Oracle version in any given Oracle home. You can install multiple instances of Oracle GoldenGate for the same or different database versions on the same host.

The installer registers the Oracle GoldenGate home directory with the central inventory that is associated with the selected database. The inventory stores information about all Oracle software products installed on a host, provided the product was installed using OUI.

### 2.9.1 Upgrading Oracle GoldenGate from OUI

The interactive installation provides a graphical user interface that prompts for the required installation information.

1. Unzip and untar the installation file.
2. From the unzipped directory, run the **runInstaller** program on UNIX or Linux, or `run setup.exe` on Windows.
3. On the **Select Installation Option** page, select the Oracle GoldenGate build to install, and then click **Next** to continue.
4. On the **Specify Installation Details** page, specify the following:
  - For **Software Location**, specify the Oracle GoldenGate installation directory. It can be a new or existing directory (for any GoldenGate version prior to 12.1.2.0.0) that is empty and has the amount of disk space shown on the screen or existing Oracle GoldenGate Installation location (in case of upgrading existing Oracle GoldenGate Installation). The default location is under installing user's home directory, but Oracle recommends changing it to a local directory that is not mounted and has no quotas. The specified directory cannot be a registered home in the Oracle central inventory. If installing in a cluster, install Oracle GoldenGate on shared storage that is accessible by all of the cluster nodes.

- (Optional) Select **Start Manager** to perform configuration functions, such as creating the Oracle GoldenGate subdirectories in the installation folder, setting library paths, and starting Manager on the specified port number. To proceed, a database must exist on the system. When Start Manager is selected, the **Database Location and Manager Port** fields are displayed.
  - For Database Location, the database version in the specified location must be Oracle Database 12c if you are installing Oracle GoldenGate for Oracle Database 12c or Oracle Database 11g if you are installing Oracle GoldenGate for Oracle Database 11g. The database must have a registered home in the Oracle central inventory. The installer registers the Oracle GoldenGate home directory with the central inventory.
  - For Manager Port, accept the default port number or enter a different unreserved, unrestricted port number for the Manager process to use for inter-process communication. The default port is the first available one starting with 7809. If you are installing multiple instances of Oracle GoldenGate on the same system, each must use a different port number.
- 5. Click **Next** to continue. In case of upgrading existing Oracle GoldenGate Installation, OUI prompts that the selected Software location has files or directories. Click on **Yes**.
- 6. The **Create Inventory** page is displayed if this is the first Oracle product to be installed from OUI on a host that does not have a central inventory.
  - For **Inventory Directory**, specify a directory for the central inventory. It can be a new directory or an existing directory that is empty and has the amount of disk space shown on the screen. The directory cannot be on a shared drive.
  - Select an operating system group in which the members have write permission to the inventory directory. This group is used to add inventory information to the Oracle GoldenGate subfolder.
- 7. On the **Summary** page, confirm that there is enough space for the installation and that the installation selections are correct. Optionally, click **Save Response File** to save the installation information to a response file. You can run the installer from the command line with this file as input to duplicate the results of a successful installation on other systems. You can edit this file or create a new one from a template.
- 8. Click **Install** to begin the installation or **Back** to go back and change any input specifications. When Upgrading existing Oracle GoldenGate Installation, OUI will notify that the software location has files or directories. Click **Yes** to continue. You are notified when the installation is finished.
- 9. If you created a central inventory directory, you are prompted to run the `INVENTORY_LOCATION/orainstRoot.sh` script. This script must be executed as the root operating system user. This script establishes the inventory data and creates subdirectories for each installed Oracle product (in this case, Oracle GoldenGate).



---

## Upgrading to Release 12c (12.2.0.1) for Heterogeneous Databases

These instructions are for upgrading Oracle GoldenGate in the following database environments:

- DB2 LUW
- Informix
- MySQL
- PostgreSQL
- SQL/MX
- SQL Server
- Sybase
- Teradata

This chapter includes the following sections that must be performed in order to successfully upgrade:

- [Section 3.1, "Overview of the Upgrade Procedure for Heterogeneous Databases"](#)
- [Section 3.2, "Downloading Oracle GoldenGate"](#)
- [Section 3.3, "Performing the Upgrade to Oracle GoldenGate 12c \(12.2.0.1\) for Heterogeneous Databases"](#)

### 3.1 Overview of the Upgrade Procedure for Heterogeneous Databases

The upgrade instructions perform a minimal upgrade only to deploy the updated core Oracle GoldenGate functionality, without implementing any of the major new 12c (12.2.0.1) features at this time, such as coordinated Replicat, updated globalization support, new SQL-92 defaults, and enhanced security features. The best practice is to perform a minimal upgrade first, so that you can trouble shoot more easily in the event that any problems arise. Once you know your environment is upgraded successfully, you can implement the new functionality.

If you are upgrading multiple Extract processes that operate in a consolidation configuration (many sources to one target), follow these steps fully to upgrade one Extract at a time.

All Replicat installations should be upgraded at the same time. It is critical to ensure that all trails leading to all Replicat groups on all target systems are processed until empty, according to these instructions.

---

**Caution:** The hash calculation used by the `@RANGE` function to partition data among Replicat processes has been changed. This change is transparent, and no re-partitioning of rows in the parameter files is required, so long as the upgrade is performed as directed in these instructions. To ensure data continuity, make certain to allow all Replicat processes on all systems to finish processing all of the data in their trails before stopping those processes, according to the upgrade instructions. Note that if the Replicat processes are not upgraded all at the same time, or the trails are not cleaned out prior to the upgrade, rows may shift partitions as a result of the new hash method, which may result in collision errors.

---

## 3.2 Downloading Oracle GoldenGate

Download the appropriate Oracle GoldenGate build to each system that will be part of the Oracle GoldenGate configuration.

1. Using a browser, navigate to <http://support.oracle.com>.
2. Log in with your Oracle ID and password.
3. Select the **Patches and Upgrades** tab.
4. On the Search tab, click **Product or Family**.
5. In the **Product** field, type **Oracle GoldenGate**.
6. From the Release drop-down list, select the release version that you want to download.
7. Make certain that **Platform** is displayed as the default in the next field, and then select the platform from the drop-down list.
8. Leave the last field blank.
9. Click **Search**.
10. In the Patch Advanced Search Results list, select the patch that best meets your search criteria, making certain that the Oracle GoldenGate patch that you select corresponds to the version of the database that will be used.

When you select the build, a dialog box pops up under the build description, and then you are advanced to the download page.

11. Click the Patch file name link for each patch that you want to download. The File Download dialog box appears.
12. Select either **Open with** or **Save File**:

| To...                               | Select...   |
|-------------------------------------|---|
| Extract the patch immediately       | <b>Open with</b> , then select the desired file extraction utility and extract the files to a location on your file system. |
| Save the patch for later extraction | Select <b>Save file</b> , then save to a directory on your file system.   |



---

**Note:** Before installing the software, see *Release Notes for Oracle GoldenGate for Windows and UNIX* for any new features, parameter changes, upgrade requirements, or bug fixes that affect your current configuration. Review the readme file for known issues.

---

### 3.3 Performing the Upgrade to Oracle GoldenGate 12c (12.2.0.1) for Heterogeneous Databases

Even though you may only be upgrading Extract or Replicat, rather than both, all processes are involved in the upgrade. All processes must be stopped in the correct order for the upgrade, regardless of which component you upgrade, and the trails must be processed until empty.

---

**WARNING:** (Sybase database) To proceed with these instructions and upgrade to Oracle GoldenGate version 12c (12.2.0.1) for Sybase, the Sybase page size must be at least 4K.

---

1. (Source and target systems) Back up the current Oracle GoldenGate installation directory on the source and target systems, and any working directories that you have installed on a shared drive in a cluster (if applicable).
2. (Source and target systems, as applicable) Expand version 12c (12.2.0.1) of Oracle GoldenGate into a new directory on each system (not the current Oracle GoldenGate directory). Do not create the sub-directories; just complete the steps to the point where the installation files are expanded.
3. (Source system) Stop user activity on objects in the Oracle GoldenGate configuration.
4. (Source system) In GGSCI on the source system, issue the `SEND EXTRACT` command with the `LOGEND` option until it shows there is no more data in transaction log to process.  

```
GGSCI> SEND EXTRACT group LOGEND
```
5. (Source system) In GGSCI, stop Extract and data pumps.  

```
GGSCI> STOP EXTRACT group
```
6. (Target systems) In GGSCI on each target system, issue the `SEND REPLICAT` command with the `STATUS` option until it shows a status of "At EOF" to indicate that it finished processing all of the data in the trail. This must be done on all target systems until all Replicat processes return "At EOF."  

```
GGSCI> SEND REPLICAT group STATUS
```
7. (Target systems) In GGSCI, stop all Replicat processes.  

```
GGSCI> STOP REPLICAT group
```
8. (Source and target systems) In GGSCI, stop Manager on the source and target systems.  

```
GGSCI> STOP MANAGER
```
9. If you want to upgrade the source or target database, or both, do so at this time according to the upgrade instructions provided by the database vendor. Make certain to start the databases after the upgrade, but do not permit transactions on the objects in the Oracle GoldenGate configuration.

10. (Source and target systems) Move the expanded Oracle GoldenGate files from the new directory to your existing Oracle GoldenGate directory on the source and target systems.
11. (DB2 for IBM i) Run `ggos400install` without arguments. For an upgrade, no arguments are necessary; however, if you change the library, the old library is left on the system until you remove it. For more information about `ggos400install`, see *Installing and Configuring Oracle GoldenGate for DB2 for i*.
12. (Target systems, if upgrading Replicat from version 11.2.1.0.0 or earlier only) In GGSCI on each target system, issue the following commands to upgrade the Replicat checkpoint tables on those systems. This step updates the table definition.

```
GGSCI> 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]  
}
```

```
GGSCI> UPGRADE CHECKPOINTTABLE [owner.table]
```

---

---

**Note:** *owner.table* can be omitted if the checkpoint table was created with the name listed with CHECKPOINTTABLE in the GLOBALS file.

---

---

13. (Source and target systems) Updates to the trail version, the checkpoint storage format, and integrated capture require that you perform the following steps:
  - a. In GGSCI, alter the primary Extract process and the associated data-pump Extract processes to write to a new trail sequence number. The command should return "Rollover performed."
14. (SQL/MX, only if upgrading from Oracle GoldenGate version 10.4.x) From the Oracle GoldenGate installation directory on the source system, run the `convchk` program for the primary SQL/MX Extract to convert the checkpoints to the new format.

```
GGSCI> ALTER EXTRACT group ETROLLOVER
```

- b. In GGSCI, issue the `INFO EXTRACT` command with `DETAIL` for the primary Extract and the data pumps to verify the trail sequence number.

```
GGSCI> INFO EXTRACT group, DETAIL
```

- c. In GGSCI, reposition the data pumps and the Replicat processes to start at the new trail sequence number.

```
GGSCI> ALTER EXTRACT pump, EXTSEQNO seqno, EXTRBA RBA
```

```
GGSCI> ALTER REPLICAT group, EXTSEQNO seqno, EXTRBA RBA
```

```
./convchk group
```

If the checkpoints are not converted, the primary SQL/MX Extract process abends at startup and ignores all data in the transaction log.

15. (Source system if not upgrading Extract) Add the `SOURCECHARSET` parameter to the Replicat parameter file. Specify the character set of the source database with this

parameter. For more information, see *Reference for Oracle GoldenGate for Windows and UNIX*.

16. (Source system if not upgrading Replicat) If you are not upgrading Replicat on the target systems at this time, add the following parameter to the Extract parameter file to specify the version of Oracle GoldenGate that is running on the target. This parameter causes Extract to write a version of the trail that is compatible with the older version of Replicat.

```
{EXTTRAIL | RMTTRAIL} file_name FORMAT RELEASE major.minor
```

where: *version* specifies an Oracle GoldenGate release version. *major* is the major version number, and *minor* is the minor version number, such as 11.2. Make certain to include the dot.

17. (Oracle GoldenGate upgrades on DB2 z/OS) You might need to re-set the "a" attribute for the Extract process and its DLLs to APF-authorize them to use the privileged API. For more information, see the installation instructions in *Installing and Configuring Oracle GoldenGate for DB2 z/OS*.
18. If you made copies of the parameter files to make parameter changes, move the new parameter files into the Oracle GoldenGate directory where the old parameter files were stored, and give them the same names as the old parameter files. If using case-sensitivity support, make certain that you either added NOUSEANSISQLQUOTES to your parameter files, or that you ran the convprm utility to convert the quotes as required. See ["Upgrade Considerations if Using Character-Set Conversion"](#) on page 1-2 for more information.
19. In GGSCI, start the Oracle GoldenGate processes on the source and target systems in the following order.
 

```
GGSCI> START MANAGER
GGSCI> START EXTRACT group
GGSCI> START EXTRACT pump
GGSCI> START REPLICAT group
```
20. If you need to restore any log files, Extract will abend with an error that indicates the log to restore. Restore the logs back to, and including that log, and then restart Extract.



---

## Deploying New Features of Release 12c (12.2.0.1)

This chapter contains instructions for deploying advanced new features of Oracle GoldenGate after the initial upgrade has been performed successfully. At this point, you can make configuration changes that support the new features that you want to use. See *Release Notes for Oracle GoldenGate for Windows and UNIX* for information about new features in version 12c (12.2.0.1).

---

**Note:** These instructions assume that you tested 12c (12.2.0.1) and that all processes are running properly post-upgrade.

---

This chapter contains the following topics.

- [Section 4.1, "Upgrading Extract from Classic Mode to Integrated Mode \(Oracle\)"](#)
- [Section 4.2, "Upgrading from Oracle Nonintegrated Replicat to Integrated Replicat \(Oracle\)"](#)
- [Section 4.3, "Upgrading to Coordinated Replicat \(All Databases\)"](#)
- [Section 4.4, "Deploying Feature Upgrades That Require Only Parameter Changes"](#)

### 4.1 Upgrading Extract from Classic Mode to Integrated Mode (Oracle)

Extract in integrated mode receives logical change records (LCRs) from a database logmining server. These instructions assume that Extract is currently running in Oracle GoldenGate version 11g classic capture mode and that you want to upgrade to integrated capture mode, either with the current trigger-based capture method or with the new triggerless method of mining DDL through the logmining server.

---

**Note:** If you are using the `LOGRETENTION` option, where Extract works with the Oracle Recovery Manager (RMAN) to manage the logs, this upgrade automatically disables that feature and log retention is managed as part of integrated capture.

---

1. Back up the current Oracle GoldenGate working directories.
2. While the Oracle GoldenGate processes continue to run in their current configuration, so that they keep up with current change activity, copy the Extract parameter file to a new name.

3. Perform the following configuration tasks on the server where Extract will be running:
  - Grant the appropriate privileges to the Extract user. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
  - Configure server resources to support shared memory for the logmining server. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
  - Edit the new parameter file to add the required parameters to support integrated capture. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
  - (If this will be a downstream mining deployment) Prepare the mining database. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
4. To support the upgrade to integrated capture, the transaction log that contains the start of the oldest open transaction must be available on the system where Extract will be running. To determine the oldest open transaction, issue the `SEND EXTRACT` command with the `SHOWTRANS` option. You can use the `FORCETRANS` or `SKIPTRANS` options of this command to manage specific open transactions, with the understanding that skipping a transaction may cause data loss and forcing a transaction to commit to the trail may add unwanted data if the transaction is rolled back by the user applications. Review these options in *Reference for Oracle GoldenGate for Windows and UNIX* before using them.  
  

```
GGSCI> SEND EXTRACT group, SHOWTRANS
GGSCI> SEND EXTRACT group, { SKIPTRANS ID [THREAD n] [FORCE] |
FORCETRANS ID [THREAD n] [FORCE] }
```
5. Follow the instructions for switching from classic capture to integrated capture in *Administering Oracle GoldenGate for Windows and UNIX*.

---

---

**Note:** (Oracle database 11.2.0.4) Make certain to set the `ENABLE_GOLDENGATE_REPLICATION` database initialization parameter to `TRUE` before restarting Oracle GoldenGate processes. Otherwise, the database may not support some integration features of Oracle GoldenGate (classic or integrated).

---

---

## 4.2 Upgrading from Oracle Nonintegrated Replicat to Integrated Replicat (Oracle)

When operating in integrated mode with an Oracle target, Replicat constructs and transmits logical change records (LCRs) to an inbound server in the target database, which takes advantage of parallel apply capabilities to apply the data to the target database.

---

---

**Note:** Do not configure the switch between Replicat modes to occur immediately after Extract recovers from a failure or is repositioned to a different location in the transaction log.

---

---

1. Back up the current Oracle GoldenGate working directories on the target system where the Replicat that you want to upgrade is located.

2. While the Oracle GoldenGate processes continue to run in their current configuration, so that they keep up with current change activity, copy the Replicat parameter file to a new name.
3. Perform the following configuration tasks:
  - Grant the appropriate privileges to the Replicat user. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
  - (Optional) Edit the new parameter file to add the `DBOPTIONS` parameter with the `INTEGRATEDPARAMS` option to specify parallelism. The default is 4. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.

```
GGSCI> EDIT PARAMS group
```
4. Follow the instructions for switching from nonintegrated Replicat to integrated Replicat in *Administering Oracle GoldenGate for Windows and UNIX*.

---

**Note:** (Oracle database 11.2.0.4) Make certain to set the `ENABLE_GOLDENGATE_REPLICATION` database initialization parameter to `TRUE` before restarting Oracle GoldenGate processes. Otherwise, the database may not support some integration features of Oracle GoldenGate (classic or integrated).

---

## 4.3 Upgrading to Coordinated Replicat (All Databases)

This procedure upgrades a regular Replicat configuration (non-coordinated) to a coordinated configuration. This procedure assumes you are replacing a configuration that partitions data across multiple Extract and Replicat processes with a configuration that uses one Extract and one coordinated Replicat. The coordinated Replicat replaces the need for parallel Replicat processes. A coordinated Replicat requires only one trail, so there is no need for parallel Extract processes or data pumps.

---

**Note:** Integrated Replicat is the recommended Replicat for Oracle Database release 11.2.0.4 and greater rather than Coordinated Replicat.

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For more information about coordinated Replicat, see *Administering Oracle GoldenGate for Windows and UNIX*.

### 4.3.1 Procedure Overview

This procedure makes use of the `EVENTACTIONS` parameter with a `STOP` action, which enables all of the Replicat processes to stop at the same point in the trail. The `EVENTACTIONS` action is triggered by a transaction that contains an `INSERT` to a dummy table. The `INSERT` causes each process to finish processing everything up to, and including, the event transaction and then stop cleanly. An additional event action of `IGNORE` is specified for Replicat to prevent the parallel Replicat processes from attempting to insert the same record to the target. The result of this procedure is that all processes stop at the same point in the data stream: after completing the `INSERT` transaction to the dummy table.

After the processes stop, you move all of the `TABLE` statements to one primary Extract group. You move the same `TABLE` statements to the data pump that reads the trail of the Extract group that you retained. You move all of the `MAP` statements to a new coordinated Replicat group that reads the remote trail that is associated with the retained data pump. Once all of the `MAP` statements are in one parameter file, you edit

them to add the thread specifications to support a coordinated Replicat. (This can be done ahead of time.) Then you drop the Replicat group and add it back in coordinated mode with the same name.

### 4.3.2 Performing the Switch to Coordinated Replicat

To perform the switch to coordinated Replicat:

1. Review the configuration requirements for using a coordinated Replicat in *Administering Oracle GoldenGate for Windows and UNIX*. Do not create the Replicat group until prompted by these instructions.
2. Back up the current parameter files of all of the Extract groups, data pumps, and Replicat groups. You will be editing them.
3. Create a working directory outside the Oracle GoldenGate directory. You will use this directory to create and stage new versions of the parameter files. If needed, you can create a working directory on the source and target systems.
4. In the working directory, create a parameter file for a coordinated Replicat. Copy the MAP parameters from the active parameter files of all of the Replicat groups to this parameter file, and then add the thread specifications and any other parameters that support your required coordinated Replicat configuration.
5. If using parallel primary Extract groups, select one to keep, and then save a copy of its current parameter file to the working directory.
6. Copy all of the TABLE statements from the other Extract groups to the new parameter file of the primary Extract that you are keeping.
7. In the working directory, save a copy of the parameter file of the data pump that is linked to the primary Extract that you are keeping.
8. Copy all of the TABLE statements from the other data pumps to the copied parameter file of the kept data pump.
9. In the source database, create a simple dummy table on which a simple INSERT statement can be performed. For this procedure, the name `schema.event` is used.
10. Edit the active parameter files (not the copies) of all primary and data-pump Extract groups to add the following `EVENTACTIONS` parameter to each one.

```
TABLE schema.event, EVENTACTIONS (STOP);
```

11. Edit the active parameter files (not the copies) of all of the Replicat groups to add the following `EVENTACTIONS` parameter to each one.

```
MAP schema.event, TARGET schema.event, EVENTACTIONS (IGNORE, STOP);
```

12. Stop the Oracle GoldenGate processes gracefully in the following order:

- Stop all Replicat processes.
- Stop all data pumps.
- Stop all Extract processes.

13. Restart the Oracle GoldenGate processes in the following order so that the `EVENTACTIONS` parameters take effect:

- Start all Extract processes.
- Start all data pumps.
- Start all Replicat processes.



14. On the source system, issue a transaction on the `schema.event` table that contains one `INSERT` statement. Make certain to commit the transaction.
15. In GGSCI, issue the `STATUS` command for all of the primary Extract and data pump processes on the source system, and issue the same command for all of the Replicat processes on the target system, until the commands show that all of the processes are `STOPPED`.

```
STATUS EXTRACT *
STATUS REPLICAT *
```

16. Replace the active parameter files of the primary Extract and data pump that you kept with the new parameter files from the working directory.
17. Delete the unneeded Extract and data pump groups and their parameter files.
18. Log into the target database by using the `DBLOGIN` command.

```
GGSCI> DBLOGIN {USERID {/ | userid}[, PASSWORD password]
           [algorithm ENCRYPTKEY {keyname | DEFAULT}]} |
USERIDALIAS alias [DOMAIN domain]
```

19. Delete all of the Replicat groups and their active parameter files.
20. Copy or move the new coordinated Replicat parameter file from the working directory to the Oracle GoldenGate directory.
21. In GGSCI, issue the `INFO EXTRACT` command for the data pump and make note of its write checkpoint position in the output (remote) trail.

```
INFO EXTRACT pump, DETAIL
```

22. Add a new coordinated Replicat group with the following parameters.

```
ADD REPLICAT group, EXTTRAIL trail, EXTSEQNO sequence_number, EXTRBA rba,
COORDINATED MAXTHREADS number [, CHECKPOINTTABLE owner.table]
```

where:

- *group* is the name of the coordinated Replicat group. The name must match that of the new parameter file created for this group.
  - `EXTTRAIL trail` is the name of the trail that the data pump writes to.
  - `EXTSEQNO sequence_number` is the sequence number of the trail as shown in the write checkpoint returned by the `INFO EXTRACT` that you issued for the data pump.
  - `EXTRBA rba` is the relative byte address in the trail as shown in the write checkpoint returned by `INFO EXTRACT`. Together, these position Replicat to resume processing at the correct point in the trial.
  - `MAXTHREADS number` specifies the maximum number of threads allowed for this group. This value should be appropriate for the number of threads that are specified in the parameter file.
  - `CHECKPOINTTABLE owner.table` provide the option to specify a checkpoint table specifically for this Replicat group, rather than use the checkpoint table specified with the `GLOBALS` parameter `CHECKPOINTTABLE`.
23. Start the primary Extract group.
  24. Start the data pump group.
  25. Start the coordinated Replicat group.

## 4.4 Deploying Feature Upgrades That Require Only Parameter Changes

This procedure guides you through changes that are necessary to update the Oracle GoldenGate parameter files to add parameters that support new features and remove parameters that are no longer required.

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**Note:** Some new features replace existing parameters with new ones. Make certain to remove the parameters that are no longer needed.

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Use this procedure to implement the following new features:

- Enhanced encryption support for user passwords and trail files: You need to make parameter changes and add the required security structures to implement this new functionality. See *Release Notes for Oracle GoldenGate for Windows and UNIX* and *Administering Oracle GoldenGate for Windows and UNIX*.
- Conflict Detection and Resolution (CDR) enhancements: See *Release Notes for Oracle GoldenGate for Windows and UNIX* for changes to CDR resolution behavior. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about conflict detection and resolution.
- Capture from and apply to an Oracle container database: You need to specify three-part object names and register Extract with the appropriate containers. See *Installing and Configuring Oracle GoldenGate for Oracle Database*.
- Other parameter changes listed in *Release Notes for Oracle GoldenGate for Windows and UNIX*.

To implement the new features:

1. Back up the current Oracle GoldenGate working directories on the source and target systems.
2. While the Oracle GoldenGate processes continue to run in their current configuration, so that they keep up with current change activity, copy the parameter files to new names.
3. Edit the new parameter files to add the new parameters. Do not change group names or the trail name.
4. Stop user activity on the source tables.
5. In GGSCI on the source system, issue the `SEND EXTRACT` command with the `LOGEND` option until it confirms that Extract finished processing all of the data in the transaction log.

```
GGSCI> SEND EXTRACT group LOGEND
```

6. In GGSCI, issue `SEND EXTRACT` with the `ROLLOVER` option to cause Extract to roll over the trail to a new file the next time it starts.

```
GGSCI> SEND EXTRACT group ROLLOVER
```

7. In GGSCI, stop Extract.
8. Allow user activity on the source tables.
9. In GGSCI on the target system, issue the `SEND REPLICAT` command with the `STATUS` option until it shows a status of "At EOF" to indicate that Replicat finished processing all of the data in the trail.

```
GGSCI> SEND REPLICAT group STATUS
```

10. In GGSCI, stop the data pump on the source system and stop Replicat on the target.

```
GGSCI> STOP REPLICAT group
```

11. Copy the edited new parameter file(s) back to the original name(s).

12. In GGSCI, on the target system, start Replicat.

```
GGSCI> START REPLICAT group
```

13. In GGSCI, on the source system, start Extract.

```
GGSCI> START EXTRACT group
```

14. In GGSCI, start the data pump on the source system.

```
GGSCI> START REPLICAT group
```

