

# Oracle® Fusion Middleware

## Installing Oracle GoldenGate



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ORACLE®

Oracle Fusion Middleware Installing Oracle GoldenGate, 12c (12.3.0.1)

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# Preface

This preface includes the following topics:

- [Audience](#)
- [Documentation Accessibility](#)
- [Related Information](#)
- [Conventions](#)

## Audience

This guide is intended for interested in understanding how to install Oracle GoldenGate.

## 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

<https://docs.oracle.com/en/middleware/goldengate/index.html>

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:

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

# Part I

## Getting Started with the Installation

The instructions in this book are for installing Oracle GoldenGate for the first time. Additionally, they are for downloading the base release of a new version of Oracle GoldenGate.

To download and install subsequent patches to the base release, go to the Patches and Updates tab of My Oracle Support at:

<http://support.oracle.com>

To upgrade Oracle GoldenGate, see [Overview of Upgrading Oracle GoldenGate](#):

 **Note:**

Oracle GoldenGate 18c (18.1.0) is not released for SQL Server and DB2 for i. However, the documentation may include information associated with these databases.

**Topics:**

- [What is Required?](#)  
Learn about the requirements for the system and database resources that support Oracle GoldenGate.
- [What are the Prerequisites?](#)  
Learn about what you need to do before installing.

# 1

## What is Required?

Learn about the requirements for the system and database resources that support Oracle GoldenGate.

### Topics:

- [Verifying Certification and System Requirements](#)
- [Operating System Requirements](#)
- [Understanding and Obtaining the Oracle GoldenGate Distribution](#)

### 1.1 Verifying Certification and System Requirements

Make sure that you install your product on a supported hardware or software configuration. For more information, see the certification document for your release on the *Oracle Fusion Middleware Supported System Configurations* page.

Oracle has tested and verified the performance of your product on all certified systems and environments; whenever new certifications occur, they are added to the proper certification document right away. New certifications can occur at any time, and for this reason the certification documents are kept outside of the documentation libraries on the Oracle Technology Network.

### 1.2 Operating System Requirements

This section outlines the operating system resources that are necessary to support Oracle GoldenGate.

- [Memory Requirements](#)
- [Disk Requirements](#)
- [Network](#)
- [Operating System Privileges](#)
- [Other Operating System Requirements](#)
- [Additional Considerations](#)
- [Installing the Oracle GoldenGate Files](#)
- [Windows Console Character Sets](#)

#### 1.2.1 Memory Requirements

##### All Platforms

The amount of memory that is required for Oracle GoldenGate depends on the amount of data being processed, the number of Oracle GoldenGate processes running, the amount of RAM available to Oracle GoldenGate, and the amount of disk space that is

available to Oracle GoldenGate for storing pages of RAM temporarily on disk when the operating system needs to free up RAM (typically when a low watermark is reached). This temporary storage of RAM to disk is commonly known as **swapping** or **paging** (herein referred to as swapping). Depending on the platform, the term *swap space* can be a swap partition, a swap file, a page file (Windows) or a shared memory segment (IBM for i).

Modern servers have sufficient RAM combined with sufficient swap space and memory management systems to run Oracle GoldenGate. However, increasing the amount of RAM available to Oracle GoldenGate may significantly improve its performance, as well as that of the system in general.

Typical Oracle GoldenGate installations provide RAM in multiples of gigabytes to prevent excessive swapping of RAM pages to disk. The more contention there is for RAM the more swap space that is used.

Excessive swapping to disk causes performance issues for the Extract process in particular, because it must store data from each open transaction until a commit record is received. If Oracle GoldenGate runs on the same system as the database, the amount of RAM that is available becomes critical to the performance of both.

RAM and swap usage are controlled by the operating system, not the Oracle GoldenGate processes. The Oracle GoldenGate cache manager takes advantage of the memory management functions of the operating system to ensure that the Oracle GoldenGate processes work in a sustained and efficient manner. In most cases, users need not change the default Oracle GoldenGate memory management configuration.

For more information about evaluating Oracle GoldenGate memory requirements, see the `CACHEMGR` parameter in the *Reference for Oracle GoldenGate*. Also, see Tuning the Performance of Oracle GoldenGate in *Administering Oracle GoldenGate*.

### Windows Platforms

For Windows Server environments, the number of process groups that can be run are tightly coupled to the *non-interactive* Windows desktop heap memory settings. The default settings for Windows desktop heap may be enough to run very small numbers of process groups. As you approach larger amounts of process groups, more than 60 or so, you have two choices:

- Adjust the non-interactive value of the SharedSection field in the registry based on information from Microsoft (Windows desktop heap memory).
- Increase the number of Oracle GoldenGate homes and spread the total number of desired process groups across these homes.

For more information on modifying the Windows Desktop Heap memory, review the following Oracle Knowledge Base document (Doc ID 2056225.1).

## 1.2.2 Disk Requirements

Disk space requirements vary based on the platform, database, and Oracle GoldenGate architecture to be installed.

- [Disk Requirements for Oracle GoldenGate Installation Files](#)
- [Temporary Disk Requirements](#)
- [Other Disk Space Considerations](#)

### 1.2.2.1 Disk Requirements for Oracle GoldenGate Installation Files

The disk space requirements for a Oracle GoldenGate installation vary based on your operating system and database. You should ensure that you have adequate disk space for the downloaded file, expanded files, and installed files, which can be up to 2GB.

### 1.2.2.2 Temporary Disk Requirements

By default, the Oracle GoldenGate Classic Architecture maintains data that it writes to disk in the `dirtmp` sub-directory of the Oracle GoldenGate installation directory. When total cached transaction data exceeds the `CACHESIZE` setting of the `CACHEMGR` parameter, Extract will begin writing cache data to temporary files. The cache manager assumes that all of the free space on the file system is available. This directory can fill up quickly if there is a large transaction volume with large transaction sizes. To prevent I/O contention and possible disk-related Extract failures, dedicate a disk to this directory. You can assign a name to this directory with the `CACHEDIRECTORY` option of the `CACHEMGR` parameter.

It is typically more efficient for the operating system to swap to disk than it is for Extract to write temporary files. The default `CACHESIZE` setting assumes this. Thus, there should be sufficient disk space to account for this, because only after the value for `CACHESIZE` is exceeded will Extract write transaction cached data to temporary files in the file system name space. If multiple Extract processes are running on a system, the disk requirements can multiply. Oracle GoldenGate writes to disk when there is not enough memory to store an open transaction. Once the transaction has been committed or rolled back, committed data is written to trail files and the data are released from memory and Oracle GoldenGate no longer keeps track of that transaction. There are no minimum disk requirements because when transactions are committed after every single operation these transactions are never written to disk.

#### Important:

Oracle recommends that you do not change the `CACHESIZE` because performance can be adversely effected depending on your environment.

### 1.2.2.3 Other Disk Space Considerations

In addition to the disk space required for the files and binaries that are installed by Oracle GoldenGate, allow an additional 1 GB of disk space on any system that hosts the Oracle GoldenGate trail (or trails). A trail is a set of self-aging files that contain the working data at rest and during processing. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.

Disk space is also required for the Oracle GoldenGate Bounded Recovery feature. Bounded Recovery is a component of the general Extract checkpointing facility. It caches long-running open transactions to disk at specific intervals to enable fast recovery upon a restart of Extract. At each bounded recovery interval (controlled by the `BRINTERVAL` option of the `BR` parameter) the disk required is as follows: for each

transaction with cached data, the disk space required is usually 64k plus the size of the cached data rounded up to 64k. Not every long-running transaction is persisted to disk. For complete information about Bounded Recovery, see the `BR` parameter in *Reference for Oracle GoldenGate*.

## 1.2.3 Network

The following network resources must be available to support Oracle GoldenGate.

- For optimal performance and reliability, especially in maintaining low latency on the target, use the fastest network possible and install redundancies at all points of failure.
- Configure the system to use both TCP/IP and UDP services, including DNS. Oracle GoldenGate supports IPv4 and IPv6 and can operate in a system that supports one or both of these protocols.
- Configure the network with the host names or IP addresses of all systems that will be hosting Oracle GoldenGate processes and to which Oracle GoldenGate will be connecting. Host names are easier to use.
- Oracle GoldenGate requires some unreserved and unrestricted TCP/IP ports, the number of which depends on the number and types of processes in your configuration. See *Administering Oracle GoldenGate* for details on how to configure the Manager process to handle the required ports.
- Keep a record of the ports that you assigned to Oracle GoldenGate processes. You specify them with parameters when configuring deployments for the Microservices Architecture and for the Manager and pumps with the Classic Architecture.
- Configure your firewalls to accept connections through the Oracle GoldenGate ports.

## 1.2.4 Operating System Privileges

The following are the privileges in the operating system that are required to install Oracle GoldenGate and to run the processes.

- The person who installs Oracle GoldenGate must be granted read and write privileges on the Oracle GoldenGate software home directory.
- To install on Windows, the person who installs Oracle GoldenGate must log in as an Administrator.
- The Oracle GoldenGate Extract and Replicat processes, and configuring deployments using the `oggca.sh` script must operate as an operating system user that has read, write, and delete privileges files and subdirectories in the Oracle GoldenGate directory. In addition, the `oggca.sh` process requires privileges to control the other Oracle GoldenGate processes.
- In classic capture mode, the Extract process reads the redo logs directly and must operate as an operating system user that has read access to the log files, both online and archived. On UNIX systems, that user must be a member of the group that owns the Oracle instance.
- Oracle recommends that you dedicate the Extract and Replicat operating system users to Oracle GoldenGate. Sensitive information might be available to anyone

who runs an Oracle GoldenGate process, depending on how database authentication is configured.

## 1.2.5 Other Operating System Requirements

The following additional features of the operating system must be available to support Oracle GoldenGate.

- To use Oracle GoldenGate user exits, install the C/C++ Compiler, which creates the programs in the required shared object or DLL.
- Gzip to decompress the Oracle GoldenGate installation files. Otherwise, you must unzip the installation on a PC by using a Windows-based product, and then FTP it to the AIX, DB2 for i, or DB2 z/OS platforms.
- For best results on DB2 platforms, apply high impact (HIPER) maintenance on a regular basis staying within one year of the current maintenance release. The HIPER process identifies defects that could affect data availability or integrity. IBM provides Program Temporary Fixes (PTF) to correct defects found in DB2 for i and DB2 z/OS.
- Before installing Oracle GoldenGate on a Windows system, install the Microsoft Visual C++ 2010 SP1 Redistributable Package and the Microsoft Visual C++ 2013 Redistributable Package (vcredist\_x64.exe). These packages install runtime components of Visual C++ Libraries that are required for Oracle GoldenGate processes. To download the Visual C++ 2010 SP1 package, go to <https://www.microsoft.com/en-us/download/details.aspx?id=13523>. To download the Visual C++ 2013 package, go to <https://www.microsoft.com/en-us/download/details.aspx?id=40784>.

## 1.2.6 Additional Considerations

Oracle GoldenGate fully supports virtual machine environments created with any virtualization software on any platform unless otherwise noted. When installing Oracle GoldenGate into a virtual machine environment, select a build that matches the database and the operating system of the virtual machine, not the host system.

 **Note:**

Oracle has not certified any of its products on VMware virtualized environments. Oracle Support assists you if you are running Oracle products on VMware for issues that either are known to occur on the native OS or can be demonstrated not to be as a result of running on VMware.

## 1.2.7 Installing the Oracle GoldenGate Files

To install the Oracle GoldenGate files:

1. Extract the Oracle GoldenGate installation file to the system and directory where you want to install Oracle GoldenGate.
2. Run the command shell.
3. Change directories to the new Oracle GoldenGate directory.

4. From the Oracle GoldenGate directory, run the GGSCI program.

```
GGSCI
```

5. In GGSCI, issue the following command to create the Oracle GoldenGate working directories.

```
CREATE SUBDIRS
```

6. Issue the following command to exit GGSCI.

```
EXIT
```

## 1.2.8 Windows Console Character Sets

The operating system and the command console must have the same character sets. Mismatches occur on Microsoft Windows systems, where the operating system is set to one character set, but the DOS command prompt uses a different, older DOS character set. Oracle GoldenGate uses the character set of the operating system to send information to GGSCI command output; therefore a non-matching console character set causes characters not to display correctly. You can set the character set of the console before opening a GGSCI session by using the following DOS command:

```
chcp codepagenumber
```

For example, `chcp 437`.

For a code page overview, see [https://msdn.microsoft.com/en-us/library/windows/desktop/dd317752\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/dd317752(v=vs.85).aspx) and the list of code page identifiers [https://msdn.microsoft.com/en-us/library/windows/desktop/dd317756\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/dd317756(v=vs.85).aspx).

## 1.3 Understanding and Obtaining the Oracle GoldenGate Distribution

For complete information about how to obtain Oracle Fusion Middleware software, see Obtaining Product Distributions in *Planning an Installation of Oracle Fusion Middleware*.

To obtain Oracle GoldenGate follow these steps:

1. Go to the Oracle GoldenGate download page in the Oracle Technology Network: <http://www.oracle.com/technetwork/middleware/goldengate/downloads/index.html>
2. Find the Oracle GoldenGate release you want and download the ZIP file onto your system.

# 2

## What are the Prerequisites?

Learn about what you need to do before installing.

### Topics:

- [Oracle Universal Installer Requirements for Oracle Database Installations](#)
- [Setting Library Paths for Dynamic Builds on Linux or UNIX](#)

## 2.1 Oracle Universal Installer Requirements for Oracle Database Installations

The Oracle Universal Installer (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 database environment in which Oracle GoldenGate will operate. To use OUI to install Oracle GoldenGate, the following requirements must be satisfied before running the installer.

- OUI is a graphical Java application. The host platform must be Java-enabled. The required Java Runtime Environment (JRE) is automatically installed with OUI.
- If this is the first time you are installing an Oracle product with OUI, you are prompted to create the Oracle central inventory, which also creates a subdirectory for Oracle GoldenGate to contain inventory information. This subdirectory typically requires 150 kilobytes of disk space.

## 2.2 Setting Library Paths for Dynamic Builds on Linux or UNIX

Oracle GoldenGate uses shared libraries. When you install Oracle GoldenGate on a Linux or UNIX system, you must use the following steps before you run GGSCI or any other Oracle GoldenGate process.

If you will be running an Oracle GoldenGate program from outside the Oracle GoldenGate installation directory on your system:

- (Optional) Add the Oracle GoldenGate installation directory to the `PATH` environment variable.
- (Required) Add the Oracle GoldenGate installation directory to the `shared-libraries` environment variable.

For example, given an Oracle GoldenGate installation directory of `/users/ogg`, the second command in the following example requires these variables to be set:

Command	Requires Oracle GoldenGate libraries in environment variable?
users ./ogg> ./ggsci NO	No
users> ./ogg/ggsci YES	Yes

### To Set the Variables in Korn Shell

```
PATH=installation_directory:$PATH
export PATH
shared_libraries_variable=absolute_path_of_installation_directory:$shared_libraries_variable
export shared_libraries_variable
```

### To Set the Variables in Bourne Shell

```
export PATH=installation_directory:$PATH
export
shared_libraries_variable=absolute_path_of_installation_directory:$shared_libraries_variable
```

### To Set the Variables in C Shell

```
setenv PATH installation_directory:$PATH
setenv shared_libraries_variable
absolute_path_of_installation_directory:$shared_libraries_variable
```

Where *shared\_libraries\_variable* is one of the variables shown in [Table 2-1](#):

**Table 2-1 UNIX and Linux Library Path Variables Per Platform**

Platform	Environment variable
IBM AIX	LIBPATH
HP-UX	SHLIB_PATH
Sun Solaris	LD_LIBRARY_PATH
LINUX	

The following is an example of how to set the path in Bourne shell:

```
=> export LD_LIBRARY_PATH=/ggs/12.3:$LD_LIBRARY_PATH
```



#### Note:

To view the libraries that are required by an Oracle GoldenGate process, use the `ldd goldengate_process` shell command before starting the process. This command shows an error message for any that are missing.

# Part II

## Installing the Oracle GoldenGate Microservices Architecture

This part helps you get started with installing the Oracle GoldenGate Microservices Architecture with an Oracle Database.

 **Note:**

Heterogeneous databases are not supported.

**Topics:**

- [Installing the Oracle GoldenGate Microservices Architecture](#)

# 3

## Installing the Oracle GoldenGate Microservices Architecture

The Oracle GoldenGate Microservices Architecture (MA) installation with an Oracle Database is a three-step process:

1. Install the Oracle GoldenGate MA.
2. Set the necessary environment variables.
3. Deploy an Oracle GoldenGate instance using the configuration assistant.

MA is installed using OUI. You can also use a command line silent installation using OUI.

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 if the product was installed using OUI.

### Topics:

- [Performing an Interactive Installation with OUI](#)  
Interactive installation provides a graphical user interface that prompts for the required installation information.
- [Performing a Silent Installation with OUI](#)  
Silent installation from the command console can be used if the system does not have an X-Windows interface or to perform an automated installation.

### 3.1 Performing an Interactive Installation with OUI

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

These instructions apply to new installations and upgrades.

1. Create a temporary staging directory into which you will install Oracle GoldenGate. For example, `mkdir /u01/stage/oggsc`.
2. Extract the installation ZIP file into the temporary staging directory.
3. From the expanded directory, run the `fbo_ggs_Linux_x64_services_shophome/Disk1/runInstaller` program on UNIX or Linux.

The OUI Install Wizard is started.

4. On the **Select Installation Option** page, select the Oracle Database for your environment, and then click **Next** to continue.
5. On the **Specify Installation Details** page, specify the following:
  - For **Software Location**, specify a new Oracle GoldenGate installation directory. The default location is under the installing user's home directory and 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.

- Click **Next** to continue. If this is an upgrade to an existing Oracle GoldenGate installation, OUI prompts that the selected software location has files or directories. Click **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 subdirectory.
    - Click **Next** to continue.
  7. On the **Summary** page, confirm that there is enough space for the installation and that the installation selections are correct.
    - (Optional) 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.
    - Click **Install** to begin the installation or **Back** to go back and change any input specifications. When upgrading an existing Oracle GoldenGate installation, OUI notifies you that the software location has files or directories. Click **Yes** to continue.
    - 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).

You are notified when the installation is finished.

8. Click **Close** to complete the installation.

## 3.2 Performing a Silent Installation with OUI

Silent installation from the command console can be used if the system does not have an X-Windows interface or to perform an automated installation.

Silent installations can ensure that multiple users in your organization use the same installation options when they install your Oracle products.

You perform a silent installation by running a response file. You can create a response file by selecting the **Save Response File** option during an interactive OUI session or by editing a template, as shown in [Example 3-1](#). To run a response file, issue the following command.

```
-silent -nowait -responseFile absolute_path_to_response_file
```

 **Note:**

When saving to a response file, the administrator password is not saved for security reasons. You must edit the response file and enter this password field if you want to reuse the response file for installation on other systems.

The response files and the template are stored in the response sub-directory of the Oracle GoldenGate installation directory. The Oracle GoldenGate response file contains a standard set of Oracle configuration parameters in addition to parameters that are specific to Oracle GoldenGate. These parameters correspond to the fields in the interactive session.

**Example 3-1 Oracle GoldenGate Response File Template**

```
#####
## Copyright(c) Oracle Corporation 2017. All rights reserved.    ##
##                                                                ##
## Specify values for the variables listed below to customize    ##
## your installation.                                           ##
##                                                                ##
## Each variable is associated with a comment. The comment      ##
## can help to populate the variables with the appropriate      ##
## values.                                                       ##
##                                                                ##
## IMPORTANT NOTE: This file should be secured to have read    ##
## permission only by the oracle user or an administrator who  ##
## own this installation to protect any sensitive input values. ##
##                                                                ##
#####

#-----
# Do not change the following system generated value.
#-----
oracle.install.responseFileVersion=/oracle/install/
rspfmt_ogginstall_response_schema_v12_3_0

#####
##                                                                ##
## Oracle GoldenGate installation option and details            ##
##                                                                ##
#####

#-----
# Specify the installation option.
# Specify ORAl2c for installing Oracle GoldenGate for Oracle Database 12c and
#           ORAl1g for installing Oracle GoldenGate for Oracle Database 11g
#-----
INSTALL_OPTION=

#-----
# Specify a location to install Oracle GoldenGate
#-----
SOFTWARE_LOCATION=

#####
##                                                                ##
## Specify details to Create inventory for Oracle installs      ##
##                                                                ##
```

```
## Required only for the first Oracle product install on a system.      ##  
##                                                                    ##  
#####  
  
#-----  
# Specify the location which holds the install inventory files.  
# This is an optional parameter if installing on  
# Windows based Operating System.  
#-----  
INVENTORY_LOCATION=  
  
#-----  
# Unix group to be set for the inventory directory.  
# This parameter is not applicable if installing on  
# Windows based Operating System.  
#-----  
UNIX_GROUP_NAME=
```

# Part III

## Installing the Oracle GoldenGate Classic Architecture

This part explains how to install the Oracle GoldenGate Classic Architecture with the various supported databases.

**Topics:**

- [Installing Classic Oracle GoldenGate for Oracle Database](#)
- [Installing Oracle GoldenGate for Heterogeneous Databases](#)
- [Installing with DB2 LUW Databases](#)
- [Installing with DB2 for i Databases](#)
- [Installing with DB2 z/OS Databases](#)
- [Installing with MySQL Databases](#)
- [Installing with SQL Server Databases](#)
- [Installing with Teradata Databases](#)

# 4

## Installing Classic Oracle GoldenGate for Oracle Database

This chapter includes the instructions for installing the Oracle GoldenGate Classic Architecture for Oracle Database for the first time. Installing Oracle GoldenGate installs all of the components that are required to run and manage the processing (excluding any components required from other vendors, such as drivers or libraries) and it installs the Oracle GoldenGate utilities.

### Topics:

- [Setting ORACLE\\_HOME and ORACLE\\_SID](#)
- [Database Requirements](#)
- [Installing Oracle GoldenGate for Oracle Database](#)

### 4.1 Setting ORACLE\_HOME and ORACLE\_SID

Make certain that the `ORACLE_HOME` and `ORACLE_SID` system environment variables are set to the correct Oracle instance. The Oracle GoldenGate processes refer to them when connecting to the database.

#### [Specifying Oracle Variables on UNIX and Linux Systems](#)

#### [Specifying Oracle Variables on Windows Systems](#)

- [Specifying Oracle Variables on UNIX and Linux Systems](#)
- [Specifying Oracle Variables on Windows Systems](#)

#### 4.1.1 Specifying Oracle Variables on UNIX and Linux Systems

If there is one instance of Oracle Database on the system, set the `ORACLE_HOME` and `ORACLE_SID` environment variables at the system level. If you cannot set them that way, use the following `SETENV` statements in the parameter file of every Extract and Replicat group that will be connecting to the instance. The `SETENV` parameters override the system settings and allow the Oracle GoldenGate process to set the variables at the session level when it connects to the database.

```
SETENV (ORACLE_HOME = path_to_Oracle_home_location)
```

```
SETENV (ORACLE_SID = SID)
```

If there are multiple Oracle instances on the system with Extract and Replicat processes connecting to them, you must use a `SETENV` statement in the parameter file of each process group. As input to the `SETENV` parameter, use the `ORACLE_HOME` and `ORACLE_SID` environment variables to point Oracle GoldenGate to the correct Oracle instance. For example, the following parameter file excerpts shows two Extract groups, each capturing from a different Oracle instance.

Group 1:

```
EXTRACT edbaa
SETENV (ORACLE_HOME = "/home/oracle/ora/product")
SETENV (ORACLE_SID = "oraa")
USERIDALIAS tiger1
RMTHOST sysb
RMTRAIL /home/ggs/dirdat/rt
TABLE hr.emp;
TABLE hr.salary;
```

#### Group 2:

```
EXTRACT orab
SETENV (ORACLE_HOME = "/home/oracle/ora/product")
SETENV (ORACLE_SID = "orab")
USERIDALIAS tiger1
RMTHOST sysb
RMTRAIL /home/ggs/dirdat/st
TABLE fin.sales;
TABLE fin.cust;
```

## 4.1.2 Specifying Oracle Variables on Windows Systems

If there is one instance of Oracle on the system, the Registry settings for `ORACLE_HOME` and `ORACLE_SID` should be sufficient for Oracle GoldenGate. If those settings are incorrect in the Registry and cannot be changed, you can set an override as follows.

1. On the Desktop or Start menu, right-click **My Computer**, and then select **Properties**.
2. In Properties, click the **Advanced** tab.
3. Click **Environment Variables**.
4. Under System Variables, click **New**.
5. For the Variable Name, enter `ORACLE_HOME`.
6. For the Variable Value, enter the path to the Oracle binaries.
7. Click **OK**.
8. Click **New** again.
9. For the Variable Name, enter `ORACLE_SID`.
10. For the Variable Value, enter the instance name.
11. Click **OK**.

If there are multiple Oracle instances on the system with Extract and Replicat processes connecting to them, use these steps:

1. Use the preceding procedure (single Oracle instance on system) to set the `ORACLE_HOME` and `ORACLE_SID` system variables to the first Oracle instance.
2. Start all of the Oracle GoldenGate processes that will connect to that instance.
3. Edit the existing `ORACLE_HOME` and `ORACLE_SID` variables to specify the new information., then repeat the procedure for the next Oracle instance.
4. Start the Oracle GoldenGate processes that will connect to that instance.
5. Repeat the edit and startup procedure for the rest of the Oracle instances.

## 4.2 Database Requirements

This section contains Oracle GoldenGate requirements that are specific to the Oracle Database. These apply to both capture modes unless explicitly noted.

- Classic Extract captures all the columns by default. These behaviors do not affect like to like replications. However, with a replication to data warehouse, all the columns might have to be updated. If you are using the `DBMS_LOB.LOADFROMFILE` procedure to update a LOB column only and your supplemental log is on all the columns, Integrated Extract captures the key columns and LOB improving performance.

If you are converting from Classic Extract to Integrated Extract, you must use one of the following parameters to ensure that the Extract operates correctly:

- Use `KEYCOLS` to add all columns (except LOB).
- Use `LOGALLSUPCOLS` to control the writing of supplementally logged columns.
- Ensure that your database has minimal supplemental logging enabled.
- Database user privileges and configuration requirements are explained in Establishing Oracle GoldenGate Credentials in *Using Oracle GoldenGate for Oracle Database*.
- If the database is configured to use a bequeath connection, the `sqlnet.ora` file must contain the `bequeath_detach=true` setting.
- Oracle Databases must be in `ARCHIVELOG` mode so that Extract can process the log files.

## 4.3 Installing Oracle GoldenGate for Oracle Database

Oracle GoldenGate for Oracle Database is installed from the Oracle Universal Installer (OUI). OUI is a graphic installation program that prompts you for the input required to install the Oracle GoldenGate binaries and working files. It also sets the correct database environment that Oracle GoldenGate will operate in.

You can use OUI on any of the Linux, UNIX, and Windows platforms supported by OUI and Oracle GoldenGate.

An instance of Oracle GoldenGate can be installed for only one major Oracle Database version in any given Oracle home. For example, if you have Oracle Database 11.2 and 12.1, you must have separate Oracle GoldenGate installations for each one. This does not apply to data patch levels within the same major release. 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.

1. Copy the Oracle GoldenGate installation file to the system and directory where you want to install Oracle GoldenGate, and then extract it
2. Install using one of these installation methods:
  - [Performing an Interactive Installation with OUI](#)

- [Performing a Silent Installation with OUI](#)
  - [Specifying a Custom Manager Name for Windows](#)
  - [e](#)
3. From this directory, run the GGSCI program, `ggsci.exe`. For Linux and UNIX, open a command shell to run `ggsci.sh`.

For Windows, it may be necessary to run `ggsci.exe` as an Administrator based on the systems User Account Control settings. Right-click the executable file then select **Run as administrator**.

 **Note:**

The path *cannot* contain any spaces.

4. In GGSCI, issue the following command to create the Oracle GoldenGate working directories.

```
CREATE SUBDIRS
```

- [Performing an Interactive Installation with OUI](#)
- [Performing a Silent Installation with OUI](#)
- [Specifying a Custom Manager Name for Windows](#)
- [Installing Manager as a Windows Service](#)

### 4.3.1 Performing an Interactive Installation with OUI

The interactive installation provides a graphical user interface that prompts for the required installation information. These instructions apply to new installations as well as upgrades. However, to perform an upgrade to Oracle GoldenGate, follow the instructions in *Upgrading Oracle GoldenGate*, which includes a prompt to run OUI at the appropriate time.

1. Expand the installation file.
2. From the expanded 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 version 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 that is empty and has the amount of disk space shown on the screen or in the existing Oracle GoldenGate installation location (if you are upgrading an existing Oracle GoldenGate installation). The default location is under the 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 local storage on each node in the cluster to provide high availability options for upgrading and software patching. See [Installing Oracle GoldenGate Within a Cluster](#) for more information about installing Oracle GoldenGate in a cluster.

- (Optional) Select **Start Manager** to perform configuration functions, such as creating the Oracle GoldenGate subdirectories in the installation location, 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 interprocess 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.
  - Click **Next** to continue. If this is an upgrade to an existing Oracle GoldenGate installation, OUI prompts that the selected software location has files or directories. Click **Yes**.
5. 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.
  6. 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. See [Performing a Silent Installation with OUI](#).
  7. Click **Install** to begin the installation or **Back** to go back and change any input specifications. When upgrading an existing Oracle GoldenGate installation, OUI notifies you that the software location has files or directories. Click **Yes** to continue. You are notified when the installation is finished.
  8. 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 Oracle GoldenGate.

## 4.3.2 Performing a Silent Installation with OUI

These instructions apply to new installations, as well as upgrades. However, to perform an upgrade to Oracle GoldenGate, follow the instructions in [Overview of Upgrading Oracle GoldenGate](#), which include a prompt to run OUI at the appropriate time.

You can perform a silent installation from the command console if the system has no X-Windows interface or to perform an automated installation. Silent installations can ensure that multiple users in your organization use the same installation options when they install your Oracle products.

You perform a silent installation by running a response file. You can create a response file by selecting the **Save Response File** option during an interactive OUI session or by editing a template, as shown in [Example 4-1](#). To run a response file, issue the following command.

```
-silent -nowait -responseFile absolute_path_to_response_file
```

The response files and the template are stored in the response subdirectory of the Oracle GoldenGate installation directory. The Oracle GoldenGate response file contains a standard set of Oracle configuration parameters in addition to parameters that are specific to Oracle GoldenGate. These parameters correspond to the fields in the interactive session.



**Note:**

If you are upgrading an existing Oracle GoldenGate installation with the silent option, you might get the following warning:

```
WARNING:OUI-10030:You have specified a non-empty directory to install this
product. It is recommended to specify either an empty or a non-existent
directory.
```

```
You may, however, choose to ignore this message if the directory contains
Operating System generated files or subdirectories like lost+found. Do you
want to proceed with installation in this Oracle Home?
```

Press **ENTER** to continue.

**Example 4-1 Oracle GoldenGate Response File Template**

```
#####
## Copyright(c) Oracle Corporation 2018. All rights reserved.      ##
##                                                                    ##
## Specify values for the variables listed below to customize      ##
## your installation.                                              ##
##                                                                    ##
## Each variable is associated with a comment. The comment        ##
## can help to populate the variables with the appropriate        ##
## values.                                                         ##
##                                                                    ##
## IMPORTANT NOTE: This file should be secured to have read      ##
## permission only by the oracle user or an administrator who    ##
## own this installation to protect any sensitive input values.  ##
##                                                                    ##
#####

#-----
# Do not change the following system generated value.
#-----
oracle.install.responseFileVersion=/oracle/install/
rspfmt_ogginstall_response_schema_v12_1_2
```

```

#####
##                                     ##
## Oracle GoldenGate installation option and details           ##
##                                     ##
#####

#-----
# Specify the installation option.
# Specify ORAl2c for installing Oracle GoldenGate for Oracle Database 12c or
#       ORAl1g for installing Oracle GoldenGate for Oracle Database 11g
#-----
INSTALL_OPTION=

#-----
# Specify a location to install Oracle GoldenGate
#-----
SOFTWARE_LOCATION=

#####
##                                     ##
## Specify details to Create inventory for Oracle installs     ##
## Required only for the first Oracle product install on a system. ##
##                                     ##
#####

#-----
# Specify the location which holds the install inventory files.
# This is an optional parameter if installing on
# Windows based Operating System.
#-----
INVENTORY_LOCATION=

#-----
# Unix group to be set for the inventory directory.
# This parameter is not applicable if installing on
# Windows based Operating System.
#-----
UNIX_GROUP_NAME=

```

### 4.3.3 Specifying a Custom Manager Name for Windows

If you plan to install the Manager process as a Windows service and if either of the following is true, then you must specify a custom name for the Manager service:

- You are installing the Manager as a Windows service and want to use a service name other than the default, which is `GGSMGR`.
- You want to have multiple Manager processes running as Windows services on this system. Each Manager service on a system must have a unique name.

Specify a custom Manager service name:

1. From the Oracle GoldenGate installation directory, run `ggsci.exe` from the Oracle GoldenGate directory.
2. Issue the following command.

```
EDIT PARAMS ./GLOBALS
```

 **Note:**

The `./` portion of this command must be used, because the `GLOBALS` file must reside at the root of the Oracle GoldenGate installation file.

3. In the file, add the following line, where `name` is a unique, one-word name for the Manager service.

```
MGRSERVNAME name
```

4. Save the file. The file is saved automatically with the name `GLOBALS`, but without a file extension. Do not move this file because it is used during installation of the Windows service and during data processing.

### 4.3.4 Installing Manager as a Windows Service

By default, Manager is not installed as a service and can be run by a local or domain account. However, when run this way, Manager will stop when the user logs out. When you install Manager as a service, you can operate it independently of user connections, and you can configure it to start manually or at system startup.

Installing Manager as a service is required on a Windows Cluster, but optional otherwise.

To install Manager as a Windows service:

1. (Recommended) Log on as the system administrator.
2. Click **Start**, then **Run**, and then type `cmd` in the Run dialog box.
3. Go to the directory that contains the Manager program that you are installing as a service, then run the `INSTALL` utility with the following syntax:

```
install option [...]
```

Where `option` is one of the following:

**Table 4-1** `INSTALL` Utility Options

Option	Description
ADDEVENTS	Adds Oracle GoldenGate events to the Windows Event Manager.
ADDSERVICE	Adds Manager as a service with the name that is specified with the <code>MGRSERVNAME</code> parameter in the <code>GLOBALS</code> file, if one exists, or the <code>GGSMGR</code> default. The <code>ADDSERVICE</code> configures the service to run as the Local System account, the standard for most Windows applications because the service can be run independently of user logins and password changes. To run Manager as a specific account, use the <code>USER</code> and <code>PASSWORD</code> options. <sup>1</sup>  The service is installed to start at system boot time (see <code>AUTOSTART</code> ). To start it after installation, either reboot the system or start the service manually from the Services applet in the Control Panel.

**Table 4-1 (Cont.) INSTALL Utility Options**

Option	Description
AUTOSTART	Sets the service that is created with ADDSERVICE to start at system boot time. This is the default unless MANUALSTART is used.
MANUALSTART	Sets the service that is created with ADDSERVICE to start manually through GGSCI, a script, or the Services applet in the Control Panel. The default is AUTOSTART.
USER <i>name</i>	Specifies a domain user account that executes Manager. For the <i>name</i> , include the domain name, a backward slash, and the user name, for example HEADQT\GGSMGR . By default, the Manager service is installed to use the Local System account.
PASSWORD <i>password</i>	Specifies the password for the user that is specified with USER.

<sup>1</sup> A user account can be changed by selecting the **Properties** action from the Services applet of the Windows Control Panel.

4. If Windows User Account Control (UAC) is enabled, you are prompted to allow or deny the program access to the computer. Select **Allow** to enable the `INSTALL` utility to run.

The `INSTALL` utility installs the Manager service with a local system account running with administrator privileges. No further UAC prompts will be encountered when running Manager if installed as a service.

 **Note:**

If Manager is not installed as a service, Oracle GoldenGate users will receive a UAC prompt to confirm the elevation of privileges for Manager when it is started from the GGSCI command prompt. Running other Oracle GoldenGate programs also returns a prompt.

# 5

## Installing Oracle GoldenGate for Heterogeneous Databases

Learn how to install the Oracle GoldenGate Classic Architecture in Linux, UNIX, and Windows environments for heterogeneous databases. Consult the chapter for your database to meet any prerequisites and learn about any installation considerations, then use these steps to install.

### Topics:

- [Installing on all Platforms](#)
- [Specifying a Custom Manager Name for Windows](#)
- [Installing Manager as a Windows Service](#)

### 5.1 Installing on all Platforms

1. Copy the Oracle GoldenGate installation file to the system and directory where you want to install Oracle GoldenGate, and then extract it.
2. From this directory, run the GGSCI program, `ggsci.exe`. For Linux and UNIX, open a command shell to run `ggsci.sh`.

For Windows, it may be necessary to run `ggsci.exe` as an Administrator based on the systems User Account Control settings. Right-click the executable file then select **Run as administrator**.

#### Note:

The path *cannot* contain any spaces.

3. In GGSCI, issue the following command to create the Oracle GoldenGate working directories.

```
CREATE SUBDIRS
```

4. Exit GGSCI.

```
EXIT
```

### 5.2 Specifying a Custom Manager Name for Windows

If you plan to install the Manager process as a Windows service and if either of the following is true, then you must specify a custom name for the Manager service:

- You are installing the Manager as a Windows service and want to use a service name other than the default, which is `GGSMGR`.

- You want to have multiple Manager processes running as Windows services on this system. Each Manager service on a system must have a unique name.

Specify a custom Manager service name:

- From the Oracle GoldenGate installation directory, run `ggsci.exe` from the Oracle GoldenGate directory.
- Issue the following command.

```
EDIT PARAMS ./GLOBALS
```

 **Note:**

The `./` portion of this command must be used, because the `GLOBALS` file must reside at the root of the Oracle GoldenGate installation file.

- In the file, add the following line, where *name* is a unique, one-word name for the Manager service.

```
MGRSERVNAME name
```

- Save the file. The file is saved automatically with the name `GLOBALS`, but without a file extension. Do not move this file because it is used during installation of the Windows service and during data processing.

## 5.3 Installing Manager as a Windows Service

By default, Manager is not installed as a service and can be run by a local or domain account. However, when run this way, Manager will stop when the user logs out. When you install Manager as a service, you can operate it independently of user connections, and you can configure it to start manually or at system startup.

Installing Manager as a service is required on a Windows Cluster, but optional otherwise.

To install Manager as a Windows service:

- (Recommended) Log on as the system administrator.
- Click **Start**, then **Run**, and then type `cmd` in the Run dialog box.
- Go to the directory that contains the Manager program that you are installing as a service, then run the `INSTALL` utility with the following syntax:

```
install option [...]
```

Where *option* is one of the following:

**Table 5-1** `INSTALL` Utility Options

Option	Description
ADDEVENTS	Adds Oracle GoldenGate events to the Windows Event Manager.

**Table 5-1 (Cont.) INSTALL Utility Options**

Option	Description
ADDSERVICE	Adds Manager as a service with the name that is specified with the <code>MGRSERVNAME</code> parameter in the <code>GLOBALS</code> file, if one exists, or the <code>GGSMGR</code> default. The <code>ADDSERVICE</code> configures the service to run as the Local System account, the standard for most Windows applications because the service can be run independently of user logins and password changes. To run Manager as a specific account, use the <code>USER</code> and <code>PASSWORD</code> options. <sup>1</sup>  The service is installed to start at system boot time (see <code>AUTOSTART</code> ). To start it after installation, either reboot the system or start the service manually from the Services applet in the Control Panel.
AUTOSTART	Sets the service that is created with <code>ADDSERVICE</code> to start at system boot time. This is the default unless <code>MANUALSTART</code> is used.
MANUALSTART	Sets the service that is created with <code>ADDSERVICE</code> to start manually through <code>GGSCI</code> , a script, or the Services applet in the Control Panel. The default is <code>AUTOSTART</code> .
<code>USER name</code>	Specifies a domain user account that executes Manager. For the <i>name</i> , include the domain name, a backward slash, and the user name, for example <code>HEADQT\GGSMGR</code> .  By default, the Manager service is installed to use the Local System account.
<code>PASSWORD password</code>	Specifies the password for the user that is specified with <code>USER</code> .

<sup>1</sup> A user account can be changed by selecting the **Properties** action from the Services applet of the Windows Control Panel.

4. If Windows User Account Control (UAC) is enabled, you are prompted to allow or deny the program access to the computer. Select **Allow** to enable the `INSTALL` utility to run.

The `INSTALL` utility installs the Manager service with a local system account running with administrator privileges. No further UAC prompts will be encountered when running Manager if installed as a service.

 **Note:**

If Manager is not installed as a service, Oracle GoldenGate users will receive a UAC prompt to confirm the elevation of privileges for Manager when it is started from the `GGSCI` command prompt. Running other Oracle GoldenGate programs also returns a prompt.

# 6

## Installing with DB2 LUW Databases

This chapter describes the requirements and how to install Oracle GoldenGate with a DB2 LUW database.

### Topics:

- [Disk Requirements for DB2 LUW](#)
- [Database Configuration for DB2 LUW](#)
- [Database User for Oracle GoldenGate Processes for DB2 LUW](#)
- [Choosing an Installation System for DB2 LUW](#)
- [Choosing and Configuring a System for Remote Capture or Delivery](#)

### 6.1 Disk Requirements for DB2 LUW

Assign the following free disk space:

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.
- Allow at least an additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.
- By default, Oracle GoldenGate maintains data that it swaps to disk in the `dirtmp` sub-directory of the Oracle GoldenGate installation directory. The cache manager assumes that all of the free space on the file system is available. This directory can fill up quickly if there is a large transaction volume with large transaction sizes. To prevent I/O contention and possible disk-related Extract failures, dedicate a disk to this directory. You can assign a name and size to this directory with the `CACHEDIRECTORY` option of the `CACHEMGR` parameter. The `CACHESIZE` option of `CACHEMGR` sets a soft limit for the amount of virtual memory (cache size) that is available for caching transaction data. See *Reference for Oracle GoldenGate* for the default values of these options and detailed explanations, in case system adjustments need to be made.

### 6.2 Database Configuration for DB2 LUW

- The Oracle GoldenGate Extract process calls the `DB2READLOG` function in the Administrative API to read the transaction log files of a DB2 LUW source database. In addition to `DB2READLOG`, Extract uses a small number of other API routines to check the source database configuration on startup.

- The Oracle GoldenGate Replicat process uses the DB2 CLI interface on a DB2 LUW target database. For instructions on installing this interface, see the DB2 documentation.
- The database can reside on a different server from the one where Oracle GoldenGate is installed, so long as the database is defined locally. For example, the following enables you to use database `mydb` locally with data that is on `abc123`:

```
catalog tcpip node abc123 remote abc123.us.mycompany.com server 00000catalog db
mydb as abc123 at node abc123 AUTHENTICATION server
```

- The DB2 Universal Database has an internal trace facility called `db2trc`, which acquires Interprocess Communication resources (IPC) (both semaphore and shared memory). Even though a DB2 trace is not turned on, it may issue `semget()` calls to the operating system. These calls fail since no IPC resources are acquired so you must issue the following command on the DB2 client:

```
db2trc alloc
```

- For best performance for DB2 clients with a local database, Oracle recommends that you create a local node catalog instead of TCP/IP when connecting Oracle GoldenGate to a database that resides on the same machine. This is because local node uses IPC, which is much faster than a TCP/IP node that uses a socket API to access the local database.

## 6.3 Database User for Oracle GoldenGate Processes for DB2 LUW

- Create a database user that is dedicated to Oracle GoldenGate. It can be the same user for all of the Oracle GoldenGate processes that must connect to a database:
  - Extract (source database)
  - Replicat (target database)
  - `DEFGEN` (source or target database)
- To preserve the security of your data, and to monitor Oracle GoldenGate processing accurately, do not permit other users, applications, or processes to log on as, or operate as, the Oracle GoldenGate database user. It is recommended that you store the login credentials in an Oracle GoldenGate credential store. The credential store makes use of local secure storage for the login names and passwords, and permits you to specify only an alias in the Oracle GoldenGate parameter files. For more information about this option, as well as alternative security options, see *Administering Oracle GoldenGate*.
- Assign system administrator (`SYSADM`) or database administrator (`DBADM`) authority to the database user under which Extract runs. To give the Extract user `DBADM` authority, a user with `SYSADM` authority can issue the following grant statement.

```
GRANT DBADM ON DATABASE TO USER user
```

This authority can also be granted from the `User and Group Objects` folder in the DB2 Control Center. The database tab for the user that is assigned to an Oracle GoldenGate process should have the Database Administrative Authority box checked.

 **Note:**

If the Extract user does not have the required authority, Extract will log the following errors and stop.

```
[SC=-1224:SQL1224N A database agent could not be started to
service a request, or was terminated as a result of a database
system shutdown or a force command.
SQL STATE #5032: The CONNECT statement is invalid, because the
database manager was stopped after this application was started]
```

- Grant at least the following privileges to the database user under which Replicat runs:
  - Local CONNECT to the target database
  - SELECT on the system catalog views
  - SELECT, INSERT, UPDATE, and DELETE on the target tables

## 6.4 Choosing an Installation System for DB2 LUW

To install Oracle GoldenGate for DB2 LUW, you can use either of the following configurations:

- Install Oracle GoldenGate on the DB2 LUW database server [Installing on all Platforms](#).
- Install Oracle GoldenGate on another server, and configure Oracle GoldenGate to connect remotely to the database server through DB2 Connect. All of the Oracle GoldenGate functionality that is supported for DB2 LUW is supported in this configuration. To use this option, proceed to [Choosing and Configuring a System for Remote Capture or Delivery](#).

### To Use Remote Delivery to the DB2 LUW System Using DB2Connect

1. For the intermediary system, select any supported for the DB2 for LUW database to be the system that Oracle GoldenGate is installed on.
2. Install and run DB2 for LUW on the selected remote system so that the Replicat process can use the supplied DB2 Connect driver.
3. Catalog the DB2 target node in the DB2 for LUW database on the remote system by using the following DB2 command:

```
catalog tcpip node db2_node_name remote DNS_name
server DB2_port-number
```

4. Add the target DB2 database to the DB2 for LUW catalog on the intermediary system by using the following DB2 command:

```
catalog db database_name as database_alias at node db_node_name
```

 **Note:**

Refer to the IBM DB2 LUW documentation for more information about these commands.

5. Install Oracle GoldenGate, see [Installing on all Platforms](#).
6. Specify the DB2 target database name with the Replicat parameter `TARGETDB` when you configure the Oracle GoldenGate processes.

## 6.5 Choosing and Configuring a System for Remote Capture or Delivery

In a remote installation, you install Oracle GoldenGate on a server that is remote from the source or target database server. This server can be any Linux, UNIX, or Windows platform that Oracle GoldenGate supports for the DB2 for LUW database. The Oracle GoldenGate build must match the version of DB2 LUW that is running on the installation server.

In this configuration, the location of the database is transparent to Extract and Replicat. Extract can read the DB2 logs on a source DB2 LUW database server, and Replicat can apply data to a target DB2 LUW server.

### To Configure Remote Capture or Delivery:

1. Install and run DB2 for LUW on the remote server that has DB2 Connect.
2. Catalog the remote server in the DB2 source or target database by using the following DB2 command:

```
catalog tcpip node db2_node_name remote remote_DNS_name
```

3. Catalog the DB2 target node in the DB2 for LUW database on the remote server by using the following DB2 command:

```
catalog tcpip node db2_node_name remote remote_DNS_name
server remote_port_number
```

4. Add the DB2 source or target database to the DB2 catalog on the remote server by using the following DB2 command:

```
catalog db database_name as database_alias at node db_node_name
```

 **Note:**

Refer to the IBM DB2 LUW documentation for more information about these commands.

5. Download and install the Oracle GoldenGate build that is appropriate for the DB2 LUW database on the remote server.

# 7

## Installing with DB2 for i Databases

Learn about the requirements and how to install Oracle GoldenGate with a DB2 for i database.

With Oracle GoldenGate for IBM DB2 for i, you can replicate data to and from similar or dissimilar supported DB2 for i versions, or you can replicate data between a DB2 for i database and a database of another type. Oracle GoldenGate for DB2 for i supports the filtering, mapping, and transformation of data unless otherwise noted in this documentation.

Oracle GoldenGate for DB2 for i runs directly on a DB2 for i source system to capture data from the transaction journals for replication to a target system. To apply data to a target DB2 for i database, Oracle GoldenGate can run directly on the DB2 for i target system or on a remote Windows or Linux system. If installed on a remote system, Replicat delivers the data by means of an ODBC connection, and no Oracle GoldenGate software is installed on the DB2 for i target.

### Note:

The DB2 for i platform uses one or more **journals** to keep a record of transaction change data. For consistency of terminology in the supporting administrative and reference Oracle GoldenGate documentation, the terms **log** or **transaction log** may be used interchangeably with the term journal where the use of the term journal is not explicitly required.

### Topics:

- [Disk Requirements](#)
- [Memory Requirements](#)
- [Oracle GoldenGate Security Privileges](#)
- [General Requirements](#)
- [Installing on DB2 for i](#)

## 7.1 Disk Requirements

This section outlines the disk requirements for Oracle GoldenGate.

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.
- Allow sufficient disk space for virtual memory. The default set by the Oracle GoldenGate cache manager is 64 GB on 64-bit systems. See [Memory Requirements](#) for additional information about memory management.

- An additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.

## 7.2 Memory Requirements

The amount of memory that is required for Oracle GoldenGate depends on the amount of data being processed, the number of Oracle GoldenGate processes running, the amount of main storage (RAM, or physical memory) available to Oracle GoldenGate, and the amount of auxiliary storage (disk space, available as shared memory segments) that is available to Oracle GoldenGate for caching transaction data that exceeds available physical memory.

The amount of main storage that is used by Oracle GoldenGate is controlled by the operating system, not the Oracle GoldenGate processes. The Oracle GoldenGate cache manager takes advantage of the memory management functions of the operating system to ensure that the Oracle GoldenGate processes work in a sustained and efficient manner.

On the DB2 for i platform, to provide enough shared memory segments to the Oracle GoldenGate cache manager, the recommended setting for the `PASE_MAXSHR64` environment variable is a value of 513 (128GB) or higher. If you use the DB2 for i native Oracle GoldenGate commands, `PASE_MAXSHR64` is set to provide 128GB of shared memory segments to the cache manager automatically. If not using the DB2 for i native commands, you can set this environment variable before starting the DB2 for i PASE session. For more information about evaluating Oracle GoldenGate memory requirements, see the `CACHEMGR` parameter in *Reference for Oracle GoldenGate*.



### Note:

If `PASE_MAXSHR64` is not set, you may encounter a warning message stating that the virtual memory is less than the recommended amount. Unless you have very large long-running transactions or a very large number of concurrent transactions, you may ignore this message.

## 7.3 Oracle GoldenGate Security Privileges

This section outlines the security privileges that Oracle GoldenGate requires on a source DB2 for i system and on a Windows or Linux target system.

- [Oracle GoldenGate Security Privileges](#)
- [Oracle GoldenGate Security Privileges on a DB2 for i Source System](#)

### 7.3.1 Oracle GoldenGate Security Privileges

The person who installs Oracle GoldenGate must have read and write privileges on the Oracle GoldenGate installation directory, because steps will be performed to

create some sub-folders and run some programs. On a Windows system, the person who installs Oracle GoldenGate must log in as Administrator.

Manager, Replicat, and Collector (program name is `server`) are active. Manager controls the other processes and interacts with Collector to receive incoming data, while Replicat applies data to the target DB2 for i database through ODBC.

Oracle GoldenGate processes must be assigned a user account that is dedicated to Oracle GoldenGate and cannot be used by any other program. One user account can be used by all of the Oracle GoldenGate processes. This account must have privileges to read, write, and delete files and directories within the Oracle GoldenGate installation directory.

If the Extract user profile does not have the required authority, Extract will log the following errors and stop.

```
[SC=-1224:SQL1224N A database agent could not be started to service a request, or was terminated as a result of a database system shutdown or a force command.SQL STATE 55032: The CONNECT statement is invalid, because the database manager was stopped after this application was started]
```

The user profile must be specified with the `USERID` parameter when you configure the parameter files and in the `DBLOGIN` command prior to issuing any GGSCI commands that interact with the database.

## 7.3.2 Oracle GoldenGate Security Privileges on a DB2 for i Source System

The person who installs Oracle GoldenGate must have read and write privileges on the Oracle GoldenGate installation directory, because steps will be performed to create some sub-folders and run some programs. This person also must have authority to the `RSTOBJ` command, plus the ability to create a library if desired. For ease of installation, it is recommended that the user installing the product has `*ALLOBJ` authority

On an DB2 for i source system, the Manager and Extract processes are active. The `DEFGEN` utility also may be active if you are replicating data to a dissimilar target system. On an DB2 for i target system, the Replicat process is active unless you install Replicat on a remote Windows or Linux system. All processes run on both systems in a bidirectional configuration.

The Oracle GoldenGate processes must be assigned a user profile account that is dedicated to Oracle GoldenGate and cannot be used by any other program. One user profile can be used by all of the Oracle GoldenGate processes. This profile need only be granted permission to the objects that Oracle GoldenGate will be operating upon. If specific change data is not to be seen by Oracle GoldenGate, do not include it in any of the journals that the Oracle GoldenGate user profile is allowed to access. All Oracle GoldenGate processes must have privileges to read, write, and delete files and directories within the Oracle GoldenGate installation directory.

The Manager process must have privileges to control all other Oracle GoldenGate processes (DB2 for i `*JOBCTL` authority).

Assign `*USE` authority to all objects on the system that the Extract user profile must have access to. Assign `*CHANGE` authority to all objects on the system that the Replicat user profile must have access to. This can be accomplished by either granting `*ALLOBJ` authority to the user, or by setting the individual authority to the objects (`FILE`, `LIBRARY`

and JOURNAL objects) that the user must access. This includes the objects in the QSYS2 library where the SQL catalog resides. These authorities must be granted through the native DB2 for i interface through a 5250 terminal session or through the DB2 for i Operations Navigator product available from IBM.

The Extract and Replicat database user profiles must be specified with the USERID parameter when you configure the parameter files and in the DBLOGIN command prior to issuing any GGSCI commands that interact with the database.

## 7.4 General Requirements

- Portable Application Solution Environment (PASE) must be installed on the system.
- OpenSSH is recommended to be installed on the system. OpenSSH is part of the IBM Portable Utilities licensed program and allows SSH terminal access to the system in the same manner as other Linux system.
- The IBM DB2 for i Program temporary fixes (PTFs) that are required by release for Oracle GoldenGate are detailed in the following tables:

IBM i6.1 Group PTF	Level	Name	Notes
SF99610	13058	Cumulative PTF	Other required PTF: 5761SS1, SI51061 Check with command: DSPPTF LICPGM(5761SS1) SELECT(SI51061)
SF99601	30	DB2 for i	.
SF99609	153	Group HIPER	.
SF99354	15	TCP/IP	.
SF99562	24	JAVA	Java agent requires product 5761JV1 option 12 (Java SE 6 64-bit)

IBM i7.1 Group PTF	Level	Name	Notes
SF99710	15142	Cumulative PTF	Other required PTF: 5770SS1, SI51060 Check with command: DSPPTF LICPGM(5770SS1) SELECT(SI51060)
SF99707	11	Technology refresh	.
SF99701	26	DB2 for i	.
SF99709	99	Group HIPER	.
SF99367	7	TCP/IP	.
SF99572	12	JAVA	Java agent requires product 5761JV1 option 12 (Java SE 6 64-bit)

IBM i7.2 Group PTF	Level	Name	Notes
SF99720	16127	Cumulative PTF	Other required PTF: 5761SS1, SI51061 Check with command: DSPPTF LICPGM(5761SS1) SELECT(SI51061)
SF99717	4	Technology refresh	.
SF99702	12	DB2 for i	.
SF99719	67	Group HIPER	.
SF99767	2	TCP/IP	.
SF99716	9	JAVA	Java agent requires product 5761JV1 option 12 (Java SE 6 64-bit)

These required PTFs are the levels at which Oracle GoldenGate has been tested against for the 12c releases. In order to check the group PTF levels, you must use the `WRKPTFGRP` command from a 5250 terminal session and check for the specific PTFs with the commands shown in the preceding tables. The specific extra PTFs must be at least temporarily applied.

## 7.5 Installing on DB2 for i

Follow these steps to install Oracle GoldenGate on an DB2 for i system.

### Note:

The user profile running the install must have authority to the `RSTOBJ` command.

1. On the system where Oracle GoldenGate is to be installed, create a directory for Oracle GoldenGate.
 

```
- MKDIR DIR('/GoldenGate')
```
2. You can create a library for Oracle GoldenGate on the installation system, or you can create it through the installation script that you will run later in these steps.
 

```
- CRTLIB LIB(goldengate) TEXT('Oracle GoldenGate Product Library') ASP(1)
```
3. Unzip the downloaded file on your system.
4. FTP the resulting tar file from that system to the folder that you created on the DB2 for i installation system.

```
ftp IBMi_IP_address
.
User (system:(none)):userid
.
331 Enter password.
. Password: password .
230 userid logged on. .
ftp> bin
.
```

```
ftp> cd goldengate
.
ftp> put install_file
.
ftp> quit
```

5. (If you created a library) From a 5250 terminal session, change your current library to the Oracle GoldenGate library.

```
CHGCURLIB Oracle_GoldenGate_library
```

6. Run a QP2TERM terminal session.

```
- CALL QP2TERM
```

7. Extract the installation objects from the tar file.

```
tar -xf tar_file
```

8. In the Oracle GoldenGate directory, run the shell script `ggos400install`.

```
ggos400install goldengate
```

The default is to install the required objects into the current library (set in the preceding steps), but you can create a library by using the `-c` option. Additional options are available.

 **Note:**

There must be a separate Oracle GoldenGate library for each Oracle GoldenGate directory. The install script checks for this condition and will prevent installation to the same library that another installation is using. The reason for this is to prevent mismatches between the Oracle GoldenGate installation and the `OGGPRCJRN *SRVPGM` object.

**Syntax:**

```
./ggos400install [-h] [-f] [-u userid] [[-a aspname] | [-n aspnum]] [-c|-l  
library name]
```

**Options:**

- `-h` shows this usage help.
- `-f` forces a change to a new installation library. This argument only affects an existing installation.
- `-u userid` specifies the userid that will own the installation.
- `-a aspname` specifies the name of the ASP where objects will be restored. If no `aspname` is provided, the system asp is assumed. This option cannot be used with `-n`.
- `-n aspnum` specifies the number of the user asp where the objects will be restored. This option cannot be used with `-a`.
- `-c library` specifies the name of the library where the objects will be restored. The library will be created.

- `-l library` specifies the name of the library where the objects will be restored. The library must exist. If a library is not specified for a new installation, the installer will attempt to use the current library of the user that is running the installer. If a library is not specified for an existing installation, the installer will attempt to use the library that is set in the `oggprcjrn.srvpgm` link.

 **Note:**

If Oracle GoldenGate is reinstalled, you must run `ggos400install` again. On a reinstall, `ggos400install` will recognize the prior configuration, so no arguments are needed. If the `oggprcjrn.srvpgm` link is changed or removed, `ggos400install` must be run again with the Oracle GoldenGate installation library specified by the link.

9. Exit QP2TERM.

- F3

 **Note:**

On an DB2 for i system, it is not necessary to create any working directories in the Oracle GoldenGate installation directory. The `ggos400install` script performs this task.

10. Install Oracle GoldenGate on the DB2 for i database server, see [Installing on all Platforms](#).

# 8

## Installing with DB2 z/OS Databases

Learn about the requirements and how to install Oracle GoldenGate with a DB2 z/OS database.

### Topics:

- [System Services](#)
- [Memory Requirements](#)
- [Disk Requirements for DB2 z/OS](#)
- [Operating System Privileges for DB2 z/OS](#)
- [Database Configuration for DB2 z/OS](#)
- [Database User for Oracle GoldenGate Processes](#)
- [Choosing an Installation Operating System](#)
- [Installing on DB2 z/OS](#)
- [Installing Oracle GoldenGate Extract Components on DB2 z/OS](#)

### 8.1 System Services

The following system services must be enabled on the host system.

- Activate UNIX System Services (USS) in full function mode rather than in minimum mode. You can use the DB2 z/OS UNIX Configuration Wizard for this purpose. Refer to the IBM UNIX System Services Planning manual for more information. The UNIX customization includes the following:
  - Make the Language Environment run-time library (RTL) available to Oracle GoldenGate and other C programs by including it in the link list or Link Pack Area (LPA), or by adding it to the `STEPLIB` environment variable. RTL consists of data sets `SCEERUN` and `SCEERUN2`. If you are using `STEPLIB`, define the `SCEERUN` data sets to `LLA` to make loading the run-time modules faster. See the UNIX System Services Planning documentation for more information.
- Install Recoverable Resource Manager Services (RRS) for the best performance. Depending on the attachment type, the user by which Oracle GoldenGate runs might need one of the following permissions on the DSNR resource class:
  - If using RRSAF, assign `RACF ACCESS(READ)` to the RRSAF resource. IBM recommends using RRSAF because it has several advantages over CAF, including support for two-phase commit, thread reuse, and control over accounting intervals.
  - If using CAF, assign `RACF ACCESS(READ)` to the `BATCH` environment. If using CAF, it is possible for Oracle GoldenGate to hold locks on the system catalog until it receives a transaction commit.
- Oracle GoldenGate supports Sysplex data sharing.

## 8.2 Memory Requirements

Oracle GoldenGate requires the following memory resources on the local system.

### On the remote system

The amount of memory that is required for Oracle GoldenGate depends on the amount of data being processed, the number of Oracle GoldenGate processes running, the amount of RAM available to Oracle GoldenGate, and the amount of disk space that is available to Oracle GoldenGate for storing pages of RAM temporarily on disk when the operating system needs to free up RAM (typically when a low watermark is reached). This temporary storage of RAM to disk is commonly known as **swapping** or **paging**. Depending on the platform, the term **swap space** can be a swap partition, a swap file, or a shared memory segment (IBM i platforms).

Modern servers have sufficient RAM combined with sufficient swap space and memory management systems to run Oracle GoldenGate. However, increasing the amount of RAM available to Oracle GoldenGate may significantly improve its performance, as well as that of the system in general.

Typical Oracle GoldenGate installations provide RAM in multiples of gigabytes to prevent excessive swapping of RAM pages to disk. The more contention there is for RAM the more swap space that is used.

Excessive swapping to disk causes performance issues for the Extract process in particular, because it must store data from each open transaction until a commit record is received. If Oracle GoldenGate runs on the same system as the database, the amount of RAM that is available becomes critical to the performance of both.

RAM and swap usage are controlled by the operating system, not the Oracle GoldenGate processes. The Oracle GoldenGate cache manager takes advantage of the memory management functions of the operating system to ensure that the Oracle GoldenGate processes work in a sustained and efficient manner. In most cases, users need not change the default Oracle GoldenGate memory management configuration.

For more information about evaluating Oracle GoldenGate memory requirements, see the `CACHEMGR` parameter in the *Reference for Oracle GoldenGate*.

### On the DB2 host system

Allocate approximately 10-50 MB of virtual memory for each Oracle GoldenGate log reader, `oggreadx`, that is invoked depending on the size of the log buffer. There is one invocation per Extract process on the remote system. To adjust the maximum log buffer size, use the `TRANLOGOPTIONS BUFSIZE` parameter in the Extract parameter file. (Only applicable if you are installing stored procedures.) When using TSO to access USS, give the TSO user enough memory allocation to start the Oracle GoldenGate GGSCI process. If the `CEE3536S Not enough storage was available for the WSA error` message occurs, increase the TSO user memory or ask your TSO administrator to do it.

## 8.3 Disk Requirements for DB2 z/OS

This section outlines the disk requirements needed to support Oracle GoldenGate on DB2 z/OS.

### On the remote system

Assign the following free disk space:

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.
- Allow at least an additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.
- By default, Oracle GoldenGate maintains data that it swaps to disk in the `dirtmp` sub-directory of the Oracle GoldenGate installation directory. The cache manager assumes that all of the free space on the file system is available. This directory can fill up quickly if there is a large transaction volume with large transaction sizes. To prevent I/O contention and possible disk-related Extract failures, dedicate a disk to this directory. You can assign a name and size to this directory with the `CACHEDIRECTORY` option of the `CACHEMGR` parameter. The `CACHESIZE` option of `CACHEMGR` sets a soft limit for the amount of virtual memory (cache size) that is available for caching transaction data. See *Reference for Oracle GoldenGate* for the default values of these options and detailed explanations, in case system adjustments need to be made.

#### On the DB2 host system

(Only applicable if you are installing stored procedures.) Assign a zFS (zSeries file systems) or hierarchical file system volume. To determine the size of the Oracle GoldenGate download file, examine the size of `zOSPrograms.zip` on the remote DB2 system after extracting the installation image.

## 8.4 Operating System Privileges for DB2 z/OS

The remote host requires privileges to use the `chmod +rw` command on the subdirectories in the Oracle GoldenGate product directory.

Table 8-1 shows the other required operating system privileges for Oracle GoldenGate:

**Table 8-1 Operating System Privileges**

DB2 z/OS User Privilege	Extract	Stored Procedures	Replicat
CONNECT to the remote DB2 subsystem <sup>1</sup>	X	X	X
ACCESS(READ) to the bootstrap data set (BSDS)		X <sup>2</sup>	
ACCESS(READ) to resource BPX.FILEATTR.APF in CLASS(FACILITY)		X	
ACCESS(READ) to resource BPX.JOBNAME in CLASS(FACILITY) <sup>3</sup>	X	X	X

<sup>1</sup> Requires access to either the CAF or the RRSAP protected access profile in the DSNR RACF resource class, depending upon the MVSATTACHTYPE value in the ODBC initialization file.

<sup>2</sup> Non-data sharing only.

<sup>3</sup> In IBM DB2 10 for z/OS 1.13 and later.

## 8.5 Database Configuration for DB2 z/OS

Configure the following database components to support Oracle GoldenGate.

- Install a DB2 ODBC driver. The Oracle GoldenGate Extract and Replicat processes use ODBC (Open Database Connectivity) to connect to the DB2 subsystem. For information about ODBC, see the *DB2 for z/OS ODBC Guide and Reference* documentation.
- Install and configure the DB2 ODBC dynamic load library.
- Grant Oracle GoldenGate `EXECUTE` privilege on the plan that is specified in the ODBC initialization file (the default is `DSNACLI`).
- You might need to insert the name of the local DB2 subsystem into the `SYSIBM.LOCATIONS` table, which contains the remote DB2 server locations. Use a statement similar to the following (the example uses the name `DB2A`).

```
INSERT INTO SYSIBM.LOCATIONS (LOCATION, PORT) VALUES ('DB2A', '446');
```

## 8.6 Database User for Oracle GoldenGate Processes

Oracle GoldenGate requires a database user account. Create this account and assign privileges according to the following guidelines.

- By default, the user who starts the Manager process becomes the default DB2 primary authorization ID for all of the Oracle GoldenGate processes that any users start in that Oracle GoldenGate instance. You can assign a different user to any process by means of JCL or UNIX variables.
- To monitor Oracle GoldenGate processing accurately, do not permit other applications or processes to operate as the Oracle GoldenGate user.
- Assign the DB2 privileges listed in [Table 8-2](#) to the user by which Extract and Replicat will be running (default is the user who starts Manager). These are in addition to any permissions that DB2 ODBC requires. All Extract privileges apply to initial-load and log-based Extract processes, except where noted.

**Table 8-2 Privileges Needed by Oracle GoldenGate for DB2 z/OS**

User privilege	Extract	Replicat
MONITOR2 (does not apply to initial-load Extract)	X	

**Table 8-2 (Cont.) Privileges Needed by Oracle GoldenGate for DB2 z/OS**

User privilege	Extract	Replicat
SELECT ON the following SYSIBM tables: SYSTABLES SYSCOLUMNS SYSTABLEPART SYSKEYS SYSINDEXES SYSCOLAUTH SYSDATABASE SYSFORIGNKEYS SYSPARMS SYSRELS SYSROUTINES SYSSYNONYMS SYSTABAUTH SYSAXRELS	X	X
SELECT on source tables <sup>1</sup>	X	
INSERT, UPDATE, DELETE on target tables		X
CREATE TABLE <sup>2</sup>		X
EXECUTE on ODBC plan (default is DSNACLI)	X	
Privileges required by <code>SQLEXEC</code> procedures or queries that you will be using. <sup>3</sup>	X	X

<sup>1</sup> SELECT on source tables required only if tables contain LOB columns, or for an initial-load Extract, if used.

<sup>2</sup> Required if using `ADD CHECKPOINTTABLE` in GGSCI to use the database checkpoint feature.

<sup>3</sup> `SQLEXEC` enables stored procedures and queries to be executed by an Oracle GoldenGate process.

## 8.7 Choosing an Installation Operating System

Oracle GoldenGate for DB2 for z/OS operates remotely on zLinux, AIX or Intel Linux systems. To capture data, a small component must be installed on the DB2 z/OS system that contains the DB2 instance that will allow Oracle GoldenGate to read the DB2 log data.

To install Oracle GoldenGate on a remote zLinux, AIX or Linux system, you have the following options for connecting to DB2 on the z/OS system:

- DB2 Connect v10.5 or greater
- IBM Data Server Driver for ODBC and CLI v10.5 or greater
- IBM Data Server Client v10.5 or greater
- IBM Data Server Runtime Client v10.5 or greater

Consider the following:

- Extract uses Open Database Connectivity (ODBC) to connect to the DB2 subsystem on the z/OS system. If one of the other drivers is not already installed, the IBM Data Server Driver for ODBC and CLI is the most lightweight driver and is recommended for most configurations, although the other drivers are suitable also.
- To capture DB2 log data, the log reader component must be installed in a Library (PDSE) on the z/OS system. Load Libraries (PDS) are not supported. The library must be authorized program facility (APF) helps your installation protect the system. APF-authorized programs can access system facility (APF) authorized. The log read component is called through SQL from the remote system and since it is APF authorized, an authorized Workload Manager (WLM) environment must also be used to run these programs since the default DB2 supplied WLM environment is not able to run authorized workload.
- No special requirements beyond what capture already has are necessary for Oracle GoldenGate delivery. Because this Oracle GoldenGate release is a fully-remote distribution, the former Oracle GoldenGate DB2 Remote product is no longer shipped separately. However, Windows is not supported in Oracle GoldenGate for DB2 z/OS in this release. If you still require delivery to z/OS from Windows, then Oracle GoldenGate DB2 Remote 12.2 is still available.
- UNIX System Services (USS) is no longer required (as in prior releases) except for a few installation procedures.
- Windows only: To apply data to a DB2 target from Windows, Oracle GoldenGate DB2 Remote v12.2 must be used. Capture is not support in this scenario.
- Install Oracle GoldenGate DB2 Remote on a remote system for remote delivery to the DB2 target system. In this configuration, Replicat connects to the target DB2 database by using the ODBC API that is supplied in DB2 Connect . This configuration requires DB2 LUW to be installed on the remote system.

 **Note:**

All of the Oracle GoldenGate functionality that is supported for DB2 for z/OS is supported by DB2Connect. In addition, ASCII character data is converted to EBCDIC automatically by DB2 Connect.

- Although it is possible to install Oracle GoldenGate on zLinux, AIX, and Intel based Linux, the best performance is seen with a system that has the lowest network latency to the z/OS system that you use. Although it is possible to run over a wide area network, the performance suffers due to the increased network latency. Oracle recommends using a zLinux partition on the same physical hardware as the z/OS system that is running DB2 using Hipersockets or a VLAN between the partitions. Otherwise, systems connected with OSA adapters in the same machine room, would be the next best choice. Alternatively, the fastest Ethernet connection between the systems that is available would be acceptable.

### Using the Remote Delivery to the DB2 z/OS using DB2Connect

1. For the intermediary system, select any platform that Oracle GoldenGate supports for the DB2 for LUW database. This is the system on which Oracle GoldenGate is installed.
2. Install and run DB2 for LUW on the selected remote system so that the Replicat process can use the supplied DB2 Connect driver.

3. Catalog the DB2 target node in the DB2 for LUW database on the remote system by using the following DB2 command:

```
catalog tcpip node db2_node_name remote DNS_name server DB2_port-number
```

4. Add the target DB2 database to the DB2 for LUW catalog on the intermediary system by using the following DB2 command:

```
catalog db database_name as database_alias at node db_node_name
```

See the IBM DB2 LUW documentation for more information about these commands.

## 8.8 Installing on DB2 z/OS

Install Oracle GoldenGate in UNIX System Services on your DB2 z/OS system, see [Installing on all Platforms](#).

## 8.9 Installing Oracle GoldenGate Extract Components on DB2 z/OS

Follow these steps to install the components needed for extract Oracle GoldenGate for DB2 z/OS on a z/OS system:

The Oracle GoldenGate z/OS objects require a minimum hardware platform of z10, a minimum OS release of 1.12, and a minimum DB2 release of 10.1.

1. A library (PDSE) must exist on the z/OS system and it must be in the authorized libraries list. This library is the location where the Oracle GoldenGate objects will reside.
2. A WLM environment must exist and be APF authorized that references the PDSE from the preceding step. Oracle recommends that NUMTCB for the WLM environment be 10-40 for stored procedures. This depends on the maximum number of Extracts that are running concurrently against the database and on how much throughput each requires. If you want flexibility in selecting NUMTCB, you specify it in the startup JCL for the WLM, but not in the creation panel.
3. You can set up security for the WLM application environments and for creating stored procedures by completing the following:
  - a. (Optional) Specify which WLM-established address spaces can run stored procedures. If you do not complete this step, any WLM-established address space can run stored procedures.
  - b. Grant access to users to create procedures in specific WLM address spaces.
  - c. Grant access to users to create procedures in specific schemas. Use the `GRANT` statement with the `CREATIN` option for the appropriate schema.
  - d. Grant access to users to create packages for procedures in specific collections. Use the `GRANT` statement with the `CREATE` option for the appropriate collection.
  - e. Grant access to refresh the WLM environments to the appropriate people.
4. Ensure that the ID that is used to run the JCL startup procedure for the WLM application environment has permission to use RRSAF. Each time one of the DB2 WLM address spaces is started, it uses RRSAF to attach to DB2. See the [DB2 11 for z/OS Installation and Migration Guide](#)

5. From the Linux or UNIX installation of Oracle GoldenGate for DB2 z/OS there is a ZIP file called `zOSPrograms.zip`. Copy `zOSPrograms.zip` in binary mode to your z/OS system into an HFS directory.
6. On your z/OS system in USS or OMVS, change directories to the directory containing `zOSPrograms.zip`.
7. Restore the `zOSPrograms.tar` file with the `unzip zOSPrograms.zip` command.
8. Restore the objects with names with the prefixes `ogg[ir]b[0-9]`, `oggib`, and `oggrb` in the `tar -xovf zOSPrograms.tar` directory.

9.  **Note:**

In this command, the copy target is double-quote forward-slash forward-slash single-quote authorized PDSE name single-quote double quote. The `-x` is an uppercase capital X *not* a lowercase x.

Copy the objects to the authorized PDSE. Use the `cp -X ogg[ir][ab][0-9]*` `"/'authorized_PDSE_name'"` where `authorized_PDSE_name` is the name of the APF authorized PDSE intended for the Oracle GoldenGate objects.

10. Using your SQL tool of choice, you must create the SQL procedures so that Oracle GoldenGate can call the Extract process. The Oracle GoldenGate stored procedures should have permission granted to only those users that are used for replication.

There is an example SQL script provided in the Oracle GoldenGate install directory that contain the SQL statements to setup the stored procedures on the DB2 for z/OS instance. The `demo_db2_setupb_os390.sql` script is for v11.1 and can be run from any SQL tool on any platform that can connect to your DB2 for z/OS instance. This script should be run on the v11.1 instance you are using with your Extract.

The following two lines should be edited before running the scripts:

- The `OUT BUFFER BLOB` line must be modified to be at least a large as the largest `TRANLOGOPTIONS BUF SIZE` value that is being used in your Extracts. Oracle does not recommended that you make the BLOB size any larger than necessary.
- The `WLM ENVIRONMENT` line must be modified to use the correct name for the WLM environment that you are using.

 **Note:**

The `oggifi0001` schema name is configurable using the `TRANLOGOPTIONS REMOTESCHEMA schemaname` parameter. The procedure names are not configurable. The external name must match the program name of the object stored in the PDSE and remember to change the WLM environment to match the name of the WLM environment setup for the Oracle GoldenGate stored procedures.

 **Note:**

The out buffer BLOB size should be sized so that it is not smaller than the value of `TRANLOGOPTIONS BUFSIZE`. You may set the size of the buffer BLOB to be equal to the `TRANLOGOPTIONS BUFSIZE` value to limit memory resources used on the z/OS system. The exact value of the buffer depends heavily on the workload being processed by the Extract so heavier loads may require a larger buffer to enable Extract to be able to keep up with the application.

# 9

## Installing with MySQL Databases

Learn about the requirements and how to install Oracle GoldenGate with a MySQL database.

### Topics:

- [Disk Requirements for MySQL Database](#)
- [Database Character Set](#)
- [Database Storage Engine](#)
- [Supported Version](#)
- [Database User for Oracle GoldenGate Processes for MySQL](#)
- [Deciding Where to Install Binaries and Files in the Cluster](#)
- [Setting up for MySQL Cluster](#)

### 9.1 Disk Requirements for MySQL Database

Assign free disk space according to the following instructions.

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.
- To install Oracle GoldenGate into a cluster environment, install the Oracle GoldenGate binaries and files as the Oracle user on a shared file system that is available to all cluster nodes, see [Setting up for MySQL Cluster H](#).
- Allocate an additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.
- [Temporary Disk Requirements](#)

#### 9.1.1 Temporary Disk Requirements

By default, Oracle GoldenGate maintains data that it swaps to disk in the `dirtmp` sub-directory of the Oracle GoldenGate installation directory. The cache manager assumes that all of the free space on the file system is available. This directory can fill up quickly if there is a large transaction volume with large transaction sizes. To prevent I/O contention and possible disk-related Extract failures, dedicate a disk to this directory. You can assign a name and size to this directory with the `CACHEDIRECTORY` option of the `CACHEMGR` parameter. The `CACHESIZE` option of `CACHEMGR` sets a soft limit for the amount of virtual memory (cache size) that is available for caching transaction data. See

Reference for Oracle GoldenGate for the default values of these options and detailed explanations, in case system adjustments need to be made.

## 9.2 Database Character Set

MySQL provides a facility that allows users to specify different character sets at different levels.

Level	Example
Database	<pre>create database test charset utf8;</pre>
Table	<pre>create table test( id int, name char(100)) charset utf8;</pre>
Column	<pre>create table test ( id int, name1 char(100) charset gbk, name2 char(100) charset utf8));</pre>

### Limitations of Support

- When you specify the character set of your database as utf8mb4/utf8, the default collation is utf8mb4\_unicode\_ci/utf8\_general\_ci. If you specify collation\_server=utf8mb4\_bin, the database interprets the data as binary. For example, specifying the CHAR column length as four means that the byte length returned is 16 (for utf8mb4) though when you try to insert data more than four bytes the target database warns that the data is too long. This is the limitation of database so Oracle GoldenGate does not support binary collation. To overcome this issue, specify collation\_server=utf8mb4\_bin when the character set is utf8mb4 and collation\_server=utf8\_bin for UTF-8.
- The following character sets are **not** supported:

```
armscii8
keybcs2
utf16le
geostd8
```

## 9.3 Database Storage Engine

Requirements for the database storage engine are as follows:

- Oracle GoldenGate supports the InnoDB storage engine for a source MySQL database.
- On a target MySQL database, the Oracle GoldenGate Replicat process connects to the database through the MySQL native API.
- The NDB cluster engine is supported.

## 9.4 Supported Version

Oracle GoldenGate for MySQL supports MySQL, 5.5, 5.6, and 5.7, as well as Delivery to Amazon Aurora MySQL 5.6 and greater. The DDL feature is supported on MySQL 5.7.10 and later.

## 9.5 Database User for Oracle GoldenGate Processes for MySQL

Requirements for the database user for Oracle GoldenGate processes are as follows:

- Create a database user that is dedicated to Oracle GoldenGate. It can be the same user for all of the Oracle GoldenGate processes that must connect to a database:
  - Extract (source database)
  - Replicat (target database)
  - DEFGEN (source or target database)
- To use DDL the MySQL user must have privileges to install the database plugins. Additionally, the user requires insert privileges on the source user.
- To preserve the security of your data, and to monitor Oracle GoldenGate processing accurately, do not permit other users, applications, or processes to log on as, or operate as, the Oracle GoldenGate database user.
- Keep a record of the database users. They must be specified in the Oracle GoldenGate parameter files with the `USERID` parameter.
- The Oracle GoldenGate user requires read access to the `INFORMATION_SCHEMA` database.
- The Oracle GoldenGate user requires the following user privileges.

**Table 9-1 Oracle GoldenGate database user privileges for MySQL**

Privilege	Extract	Replicat
INSERT, UPDATE, DELETE on target tables		X
CREATE TABLE		X <sup>1</sup>
EXECUTE		X <sup>2</sup>
SELECT ANY TABLE	X	X
or SELECT ON <i>database.table</i>		

<sup>1</sup> If using the checkpoint table feature (recommended)

<sup>2</sup> To execute stored procedures

- To capture binary log events, an Administrator must provide the following privileges to the Extract user:
  - Read and Execute permissions for the directory where the MySQL configuration file (`my.cnf`) is located
  - Read permission for the MySQL configuration file (`my.cnf`)
  - Read and Execute permissions for the directory where the binary logs are located
  - Read and Execute permission for the `tmp` directory

## 9.6 Deciding Where to Install Binaries and Files in the Cluster

Oracle GoldenGate can be used with the NDB Cluster distributed database system underlying the MySQL Cluster or any cluster-management solution that has the ability to automate failover.

You will need to install at least some Oracle GoldenGate objects on shared storage. Select cluster-aware shared storage that is independent of, but available to, all nodes of the cluster.

The best practice is to install Oracle GoldenGate entirely on shared storage. This allows you to start the Oracle GoldenGate processes from any of the nodes without having to make changes to the parameter files. If the active node fails, the processes can be started quickly on another node, using the processing checkpoints that are preserved in the installation directory.

If you decide to install the Oracle GoldenGate binaries and files on each node, rather than on shared storage, the following must be true:

- The Oracle GoldenGate installation must have the same location path on every node
- At minimum, install the following directories on the shared storage to support Oracle GoldenGate recovery requirements. You can create symbolic links to them from the installation directory on each node.

- `dirchk`
- `dirdat`

These directories are among those created when you issue `CREATE SUBDIRS` during installation.

- The parameter files in the `dirprm` directory, if not placed on the shared drive, must be identical on all nodes. To resolve environment settings that must be different from one node to the other, you can set environment settings so they are inherited from the local Manager process or reference a node-specific Oracle GoldenGate macro file. Because this scenario can be difficult to enforce, the inherent concerns can be avoided by storing the parameter files on the shared drive.

See [Integrating into a Cluster](#) after you install Oracle GoldenGate.

## 9.7 Setting up for MySQL Cluster

The following procedures show how you can set up Oracle GoldenGate to work for MySQL cluster.

- [General Requirements in a Cluster](#)
- [Step 1: Install MySQL Cluster](#)
- [Step 2: Start MySQL Cluster](#)
- [Step 3: Install Oracle GoldenGate](#)

## 9.7.1 General Requirements in a Cluster

These instructions apply generically and may not be applicable to your specific cluster system.

You must meet the following requirements when integration Oracle GoldenGate into a cluster:

1. Register the Oracle GoldenGate Manager process (and only Manager) as a cluster-managed resource as you would any other application. Manager must be the only Oracle GoldenGate process that the cluster-management software starts and stops, because it is the parent process that manages all other processes.
2. If the cluster uses a virtual IP address, you may need to obtain an available fixed IP address for the Manager process. The VIP must be an available IP address on the public subnet and cannot be determined through DHCP. In the parameter files of the Extract data pumps, specify the VIP of the remote Manager as the input value of the `RMTHOST` parameter. Other Oracle GoldenGate products that access Manager also should use the VIP.
3. Make certain that all nodes in the cluster have synchronized system clocks. The clocks must be synchronized with the clock on the system where Extract is executed. Oracle GoldenGate compares the time of the local system to the commit timestamps to make critical decisions. For information about synchronizing system clocks, consult your system administrator.
4. When you configure Manager, add the `AUTOSTART` and `AUTORESTART` parameters so that Manager starts the replication processes automatically. You can, when needed, control Extract, Replicat, and other Oracle GoldenGate processes from within the Oracle GoldenGate user interfaces.
5. Mount the shared drive on one node only. This prevents processes from being started on another node. Use the same mount point on all nodes.
6. Configure Oracle GoldenGate as appropriate for your environment.

## 9.7.2 Step 1: Install MySQL Cluster

Install MySQL Cluster as described in the MySQL document *Installing MySQL Cluster on Linux* at:

<https://dev.mysql.com/doc/refman/5.7/en/mysql-cluster-install-linux.html>

### Note:

Oracle GoldenGate now supports MySQL Cluster/NDB storage mode only. Therefore, the following setup is needed in the configuration file (for example, `my.cnf`):

```
default-storage-engine=ndbcluster
```

After you create MySQL database and tables, you can check the status to make sure correct engine and data type is used as in this example:

```
show table status where Name='te';
```

## 9.7.3 Step 2: Start MySQL Cluster

To use Oracle GoldenGate for MySQL Cluster, you need to disable the `NDB-LOG-UPDATE-AS-WRITE` and `NDB-LOG-UPDATED-ONLY` parameters inside their respective MySQL database configuration files (`my.cnf/my.ini`) or by using the `mysqld` command. Extract must be positioned to a point in time where the disabled options are already in effect; for example:

```
mysqld --default-file=/rdbms/mysql/myssqlcluster/my_cluster/conf/my.cnf -uroot --  
datadir=/rdbms/mysql/myssqlcluster/my_cluster/mysql_data--ndbcluster --ndb-log-  
update-as-write=0 --ndb-log-updated-only=0 --default-storage-engine=ndbcluster --  
max_allowed_packet=1G
```

The `--ndb-log-updated-only` option for MySQL does the following:

- Logs complete rows.
- Logs only column data that has been updated; that is, column data whose value has been set, regardless of whether or not the value was actually changed. This is the default behavior. If you need to log full rows, you can do so by setting `--ndb-log-updated-only` to `0` or `OFF`.

The `--ndb-log-update-as-write` option logs changed data as `UPDATE` operations.

## 9.7.4 Step 3: Install Oracle GoldenGate

Install Oracle GoldenGate, see [Installing on all Platforms](#).

To support the cluster environment, install Oracle GoldenGate on a shared file system that can be accessed by all of the cluster nodes.

# 10

## Installing with SQL Server Databases

This chapter contains the procedures for installing Oracle GoldenGate for Microsoft SQL Server. Installing Oracle GoldenGate installs all of the components that are required to run and manage the processing (excluding any components required from other vendors, such as drivers or libraries) and it installs the Oracle GoldenGate utilities.

### Topics:

- [Operating System Privileges](#)
- [Other Programs and Settings](#)
- [SQL Server Requirements](#)
- [Where to Install Oracle GoldenGate](#)
- [Installing on SQL Server](#)

### 10.1 Operating System Privileges

Assign operating system privileges according to the following instructions:

- [Manager](#)
- [Extract and Replicat](#)

#### 10.1.1 Manager

The Manager process can run as a Windows service, or it can run interactively as the current user. The Manager process requires:

- Full control permissions over the files and folders within the Oracle GoldenGate directories.
- Full control permissions over the trail files, if they are stored in a location other than the Oracle GoldenGate directory.
- (Classic Extract) For a source capture installation of Oracle GoldenGate, Manager requires Read permissions on the SQL Server database transaction log files and transaction log backups.
- (Classic Extract) If you are running a source capture in Archived Log Mode from a middle tier Windows server, Manager requires Read permissions to the network share where the transaction log backups are written, and Read permissions on the transaction log backups.
- Membership in the server's local Administrators Group (on all nodes in a cluster).
- If you are running Manager as a Windows service with an Extract or Replicat that is connected to a remote database using Windows Authentication, the process attempts to login to the database with the account that the Manager is running under. Ensure that the Manager's service account has the correct access to the remote SQL Server instance.

The programs that capture and replicate data, Extract and Replicat, run under the Manager account and inherit the Manager's operating system level privileges.

## 10.1.2 Extract and Replicat

See [Database User for Oracle GoldenGate Processes](#).

## 10.2 Other Programs and Settings

In addition to [Additional Considerations](#), you must observe the following program and settings information for Oracle GoldenGate for SQL Server:

- To install capture on a remote Windows server, for a Classic Extract in archived log mode or for a remote CDC Extract, set the remote server's time and time zone to that of the database server.
- (Classic Extract) To capture from a source SQL Server 2008/2008 R2/2012/2014 Standard Edition database, the SQL Server Replication features must be installed and a Distributor must be configured.
- SQL Server Client Tools Connectivity features must be installed on the server where Oracle GoldenGate is to be installed. This feature is normally installed by default when installing an instance of SQL Server, but for a Windows server that is to be used for a remote Replicat, a Classic Extract running off the database server in an Archived Log Mode, or a remote CDC Extract, the required client connectivity drivers can be obtained through the SQL Server installation media or from the following links:

Microsoft SQL Server 2008 SP4 Feature Pack:

<https://www.microsoft.com/en-us/download/details.aspx?id=44277>

Microsoft SQL Server 2008 R2 SP3 Feature Pack:

<https://www.microsoft.com/en-us/download/details.aspx?id=44272>

For SQL Server 2012, 2014, and 2016, install the Microsoft SQL Server 2012 Native Client, which is part of the Microsoft SQL Server 2012 Feature Pack:

<https://www.microsoft.com/en-us/download/details.aspx?id=29065>

- Oracle GoldenGate fully supports all virtual machine environments. When you install Oracle GoldenGate into a virtual machine environment, select a build that matches the database and the operating system of the virtual machine, not the host system.

## 10.3 SQL Server Requirements

To operate with SQL Server databases, Oracle GoldenGate requires the following setup in the database instance.

- [Instance Requirements](#)
- [Database Requirements](#)
- [Table Requirements](#)
- [Database Connection](#)
- [Database User for Oracle GoldenGate Processes](#)

- [Encrypting and Storing User Credentials](#)

## 10.3.1 Instance Requirements

Note the following requirements when you configure an Oracle GoldenGate for SQL Server instance:

- Classic Extract supports SQL Server Enterprise and Standard editions of versions 2008, 2008R2, 2012, and 2014.
- CDC Extract supports SQL Server Enterprise editions of versions 2008, 2008 R2, 2012, 2014, 2016, and Standard Edition of SQL Server 2016 with Service Pack 1 (or above).
- (CDC Extract) – For SQL Server 2012, 2014, and 2016, Microsoft has identified and fixed an issue where some `UPDATE` operations may be written incorrectly to a CDC staging table as an `INSERT` followed by a `DELETE`, rather than a `DELETE/INSERT` pair. This may cause downstream replication issues, such as a primary key violation. We recommend that you apply the Microsoft fix for this issue: <https://support.microsoft.com/en-us/help/3030352>
- Oracle GoldenGate Delivery supports SQL Server Enterprise and Standard editions of versions 2008, 2008 R2, 2012, 2014, and 2016.
- The SQL Server server name (`@@SERVERNAME`) must not be NULL.
- (CDC Extract) In order for Oracle GoldenGate to capture transactional data, the source SQL Server instance, the SQL Server Agent must be running on the source SQL Server instance in order for the CDC Capture job to load change data to the CDC tables.
- (CDC Extract) If you are using SQL Server 2016, before you enable supplemental logging, ensure that you have applied the following bug fix from Microsoft: <https://support.microsoft.com/en-us/help/3166120/fix-could-not-find-stored-procedure-sys-sp-cdc-parse-captured-column-list-error-in-sql-server-2016> If this fix is not applied to your SQL Server instance, issuing `ADD TRANSDATA` against a table for the database may incorrectly report that supplemental logging succeeded, when in fact it may not have, and no records will be captured for the table.
- (Classic Extract) To capture data from a source SQL Server Standard Edition database, you must install the SQL Server Replication features, configure a Distributor and create a distribution database.
- If data capture a `TEXT`, `NTEXT`, `IMAGE`, or `VARCHAR(MAX)`, `NVARCHAR(MAX)` and `VARBINARY(MAX)`, and columns exceed the SQL Server default size, set for the "max text repl size", Oracle GoldenGate adjust the data as the target needed.

## 10.3.2 Database Requirements

This section contains Oracle GoldenGate requirements that are specific to the Oracle Database. These apply to both capture modes unless explicitly noted.

- Classic Extract captures all the columns by default. These behaviors do not affect like to like replications. However, with a replication to data warehouse, all the columns might have to be updated. If you are using the `DBMS_LOB.LOADFROMFILE` procedure to update a LOB column only and your supplemental log is on all the columns, Integrated Extract captures the key columns and LOB improving performance.

If you are converting from Classic Extract to Integrated Extract, you must use one of the following parameters to ensure that the Extract operates correctly:

- Use `KEYCOLS` to add all columns (except LOB).
- Use `LOGALLSUPCOLS` to control the writing of supplementally logged columns.
- Ensure that your database has minimal supplemental logging enabled.
- Database user privileges and configuration requirements are explained in *Establishing Oracle GoldenGate Credentials in Using Oracle GoldenGate for Oracle Database*.
- If the database is configured to use a bequeath connection, the `sqlnet.ora` file must contain the `bequeath_detach=true` setting.
- Oracle Databases must be in `ARCHIVELOG` mode so that Extract can process the log files.

### 10.3.3 Table Requirements

Tables to be included for capture and delivery must include only the data types that are listed in Supported SQL Server Data Types:

- Oracle GoldenGate supports capture of transactional DML from user tables, and delivery to user tables and writeable views.
- DDL operations are not supported.
- Source tables for an Enterprise Edition database do not require a primary key.
- (Classic Extract) Source tables for a Standard Edition database do require a primary key.
- Oracle GoldenGate supports the maximum permitted table names and column lengths for tables that are tracked by SQL Server Change Data Capture for Enterprise Edition, and for tables that are articles of a publication for SQL Server transactional replication.
- The sum of all column lengths for a table to be captured from must not exceed the length that SQL Server allows for enabling Change Data Capture for the table. If the sum of all column lengths exceeds what is allowed by SQL Server procedure `sys.sp.cdc_enable_table`, then `ADD TRANDATA` cannot be enabled for that table. The maximum allowable record length decreases as more columns are present, so there is an inverse relationship between maximum record length and the number of columns in the table.

### 10.3.4 Database Connection

Oracle GoldenGate uses ODBC and OLE DB to connect to a database:

- ODBC: The Extract process uses ODBC to connect to a source SQL Server database to obtain metadata and perform other process queries. The Replicat process uses ODBC to connect to a target SQL Server database to obtain metadata, but can optionally use it for its delivery of transactions as well. ODBC must be properly configured.
- OLE DB: By default, the Replicat process attempts to use OLE DB to connect to a target SQL Server database to perform DML operations. Thus, there are always least two Replicat connections, ODBC for metadata and OLE DB for DML. If you are using the ODBC drivers from Microsoft that do not support OLEDB, then you

must set the Replicat to run with the `DBOPTIONS USEODBC` parameter. `DBOPTIONS USEODBC` is required for Replicat when connecting to an Azure SQL Database target.

### Limitations of Support

- For SQL Server 2008/2008R2, use the SQL Server Native Client 10.0 driver. The older SQL Server driver (`SQLSRV32.DLL`) does not support newer SQL Server data types.
- For SQL Server 2012/2014/2016, use the SQL Server Native Client 11.0 driver.
- Using the SQL Server Native Client 11 OLE DB driver to connect to a SQL Server 2012 or a SQL Server 2014 instance in OLEDB mode may lead to a memory leak issue (Microsoft article 2881661). Microsoft has provided a fix in SQL Server 2012 SP1 CU7 (Microsoft article 2894115) and SQL Server 2014 CU1 (Microsoft article 2931693). To avoid a possible memory leak, you may choose one of the following options:
  - For SQL Server 2012, upgrade the SQL Native Client 11.0 driver to the SP1 CU7 level.
  - For SQL Server 2014, a possible memory leak still may exist after installing SQL Server 2014 CU1 on a new Windows system. This does not occur when you upgrade from SQL Server 2012 SP1 CU7 to SQL Server 2014 CU1.
- For SQL Server 2014/2016, only the SQL Server Native Client 11.0 driver is supported. The ODBC Driver 11/13 for SQL Server is not supported.
- An AlwaysOn Availability Group Listener connection is not supported.

## 10.3.5 Database User for Oracle GoldenGate Processes

The following database users and privileges are required for Oracle GoldenGate to capture from and apply to a SQL Server database.

- [User that Enables Supplemental Logging](#)
- [Extract and Replicat Users for SQL Server](#)

### 10.3.5.1 User that Enables Supplemental Logging

A database user must issue the `ADD TRANDATA` command to enable supplemental logging on the source database in an Oracle GoldenGate configuration. A database login command (`DBLOGIN`) is issued from GGSCI before `ADD TRANDATA` is issued.

- The database user that enables `TRANDATA` must have `sysadmin` rights.

(CDC Extract) Extract can run with `dbowner` permissions. However, you need `sysadmin` right to issue `ADD HEARTBEATTABLE`, `DELETE HEARTBEATTABLE`, `INFO HEARTBEATTABLE` commands. *sysadmin*

### 10.3.5.2 Extract and Replicat Users for SQL Server

The Oracle GoldenGate Extract processes capture data from a source SQL Server database for initial loads, from the transaction log and transaction log backups for a Classic Extract, and from the CDC tables for a CDC Extract. The Replicat process applies the data to a target SQL Server database. These processes can use either Windows Authentication or SQL Server Authentication to connect to a database.

- To use Windows authentication, the Extract and Replicat processes inherit the login credentials of the Manager process, as identified by the Log On account specified in the Properties of the Manager service. This account must have the privileges listed here.

Oracle GoldenGate Process	Manager privileges if using the Local System account	Manager privileges if using the local or domain account
Classic Extract (source system)	The <code>BUILTIN\Administrators</code> account must be a member of the SQL Server fixed server role <code>System Administrators</code> .	The account must be a member of the SQL Server fixed server role <code>System Administrators</code> .
CDC Extract (source system)	The <code>BUILTIN\Administrators</code> account must be at least a member of the source database role <code>db_owner</code> .	The account must be at least a member of the <code>db_owner</code> fixed database role of the source database.
Replicat (target sdstem)	The <code>BUILTIN\Administrators</code> account must be at least a member of the <code>db_owner</code> fixed database role of the target database.	The account must be at least a member of the <code>db_owner</code> fixed database role of the target database.

- If you are using SQL Server authentication, you must specify the user and password with the `USERID` parameter (including the `PASSWORD` option) in the Extract or Replicat parameter file, or use the Oracle GoldenGate credential store and specify a user alias with the `USERIDALIAS` parameter.
- To use SQL Server authentication, create a dedicated SQL Server login for Extract and Replicat and assign the privileges listed here.

Classic Extract connecting using SQL Server Authentication	CDC Extract connecting using SQL Server Authentication	Replicat connecting using SQL Server Authentication
The account must be a member of the SQL Server fixed server role <code>System Administrators</code> .	The account must at least be a member of the <code>db_owner</code> fixed database role of the source database.	The account must at least be a member of the <code>db_owner</code> fixed database role of the target database.

### 10.3.6 Encrypting and Storing User Credentials

If you are using SQL Server authentication instead of Windows authentication, as you set up and install Oracle GoldenGate, you occasionally must log into the database by using the `DBLOGIN` command in the GGSCI command interface. An example is when you add supplemental logging with the `ADD TRANDATA` command.

Encrypting the login password is a recommended security measure. However, using a secure password in the standard `DBLOGIN` command requires first encrypting it by using the `ENCRYPT PASSWORD` command. To avoid having to encrypt the password each time that you issue `DBLOGIN`, and to protect the user ID from exposure, you can create an Oracle GoldenGate credential store before you start setup and configuration.

When you use a credential store, you only have to supply an alias for the login credential whenever you log in with `DBLOGIN`. The credential store also makes the work of specifying login credentials for the Extract and Replicat processes easier and more secure when configuring the parameter files. You can create basic entries in the credential store at first and then use the management commands to expand it as needed.

## 10.4 Where to Install Oracle GoldenGate

Oracle GoldenGate capture for SQL Server supports real-time mode and archived log mode. For Classic Extract, real-time capture requires that Oracle GoldenGate is installed on the source database server. For Classic Extract in archived log mode, Oracle GoldenGate may be installed on the source database server or on a remote Windows server. CDC Extract supports real-time capture from the local database server or from a remote Windows server.

To apply to a SQL Server database, you can install Oracle GoldenGate on the database server or on a remote Windows server.

## 10.5 Installing on SQL Server

Additional database preparation is required before running the Oracle GoldenGate processes, see [Preparing the System for Oracle GoldenGate](#). Follow these steps to install Oracle GoldenGate on a Windows system or in the appropriate location in a cluster, see [Installing on all Platforms](#). These instructions apply to all versions of SQL Server.

# 11

## Installing with Teradata Databases

Learn about the requirements and how to install Oracle GoldenGate with a Teradata database.

### Topics:

- [Supported Platforms for a Replication Server](#)
- [Disk Requirements for Teradata Database](#)
- [Operating System Privileges for Teradata](#)
- [Database Requirements for Teradata](#)
- [Installing on Teradata](#)

### 11.1 Supported Platforms for a Replication Server

In a Teradata environment, you install Oracle GoldenGate on a server that is separate from the one where the Teradata target databases are installed. This machine will be the replication server and must be a platform that is supported by Oracle GoldenGate for the Teradata database.

Some notes about choosing a replication server or servers:

- The replication server can exist in the same location as the source or target server, or it can be remote from one or both.
- If possible, install Oracle GoldenGate on a multi-node cluster server to minimize the impact of any Oracle GoldenGate outages that are caused by server failure.

For additional configuration considerations, see *Teradata Replication Services Using Oracle GoldenGate* at <https://www.info.teradata.com/download.cfm?ItemID=1005496> before installing Oracle GoldenGate.

### 11.2 Disk Requirements for Teradata Database

The recommended hardware configuration for the Oracle GoldenGate replication server is:

- Four 300-GB disks
- 4 dual-core CPUs
- 8 GB of RAM

Assign the following free disk space:

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.

- Allow at least an additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on the volume of data that is processed. See *Creating a Trail in Administering Oracle GoldenGate* for the guidelines about sizing trails.
- To install Oracle GoldenGate into a cluster environment, install the Oracle GoldenGate binaries and files on a shared file system that is available to all cluster nodes.

## 11.3 Operating System Privileges for Teradata

The Manager process requires an operating system user that has privileges to control Oracle GoldenGate processes and to read, write, and purge files and subdirectories in the Oracle GoldenGate directory. The Replicat processes require privileges to access the database.

## 11.4 Database Requirements for Teradata

This section contains Oracle GoldenGate requirements that are specific to the Teradata database.

- [Database Configuration for Teradata](#)
- [Database User for Oracle GoldenGate Processes for Teradata](#)

### 11.4.1 Database Configuration for Teradata

Follow these requirements for database configuration:

- Install an appropriate ODBC (Open Database Connectivity) driver for the database version that you are using, see [What is Required?](#).
- Configure ODBC on each target system including the creation of a data source name (DSN). A DSN stores information about how to connect to the database, see the *ODBC Driver for Teradata User Guide* at:  
<http://www.info.teradata.com/>

### 11.4.2 Database User for Oracle GoldenGate Processes for Teradata

Follow these requirements for the database user for Oracle GoldenGate processes:

- Create a database user that is dedicated to Oracle GoldenGate. It can be the same user for all of the Oracle GoldenGate processes that must connect to a database:
  - Replicat (target database)
  - The `DEFGEN` utility (source or target database)
- To preserve the security of your data, and to monitor Oracle GoldenGate processing accurately, do not permit other users, applications, or processes to log on as, or operate as, the Oracle GoldenGate database user.
- For Oracle GoldenGate to replicate to a target Teradata database, grant `SELECT`, `INSERT`, `UPDATE`, and `DELETE` on all of the target tables to the Replicat database user.

## 11.5 Installing on Teradata

Install Oracle GoldenGate on the Teradata database server, see [Installing on all Platforms](#).

# Part IV

## Understanding Components and Other Environments

Learn about the Oracle GoldenGate components that are installed and how to install in clustered environments.

**Topics:**

- [Understanding Classic Architecture Components](#)
- [Understanding Classic Architecture Components](#)
- [Oracle GoldenGate in Clustered Environments](#)

## Understanding Classic Architecture Components

**Topics:**

- [Oracle GoldenGate Classic Architecture Programs and Utilities](#)
- [Oracle GoldenGate Subdirectories](#)
- [Other Oracle GoldenGate Files](#)

## Oracle GoldenGate Classic Architecture Programs and Utilities

This section describes programs installed in the Oracle GoldenGate installation directory.

 **Note:**

Some programs may not exist in all installations. For example, if only capture or delivery is supported by Oracle GoldenGate for your platform, the Extract or Replicat program will not be installed, respectively.

**Table 1 Oracle GoldenGate Installed Programs and Utilities**

Program	Description
convchk	Converts checkpoint files to a newer release.

**Table 1 (Cont.) Oracle GoldenGate Installed Programs and Utilities**

Program	Description
convprm	Converts parameter files that do not use SQL-92 rules for quoted names and literals to updated parameter files that use SQL-92 rules. SQL-92 format for quoted object names and literals was introduced as the default with the 12c release of Oracle GoldenGate.
defgen	Generates data definitions and is referenced by Oracle GoldenGate processes when source and target tables have dissimilar definitions.
extract	Performs capture from database tables or transaction logs or receives transaction data from a vendor access module.
ggcmd	Associated program of ggsci. Launches and monitors external applications, such as the JAgent of Oracle GoldenGate Monitor. Integrates those applications into the GGSCI environment.
ggsci	User interface to Oracle GoldenGate for issuing commands and managing parameter files.
install	Installs Oracle GoldenGate as a Windows service and provides other Windows-based service options.
keygen	Generates data-encryption keys.
logdump	A utility for viewing and saving information stored in extract trails or files.
mgr	(Manager) Control process for resource management, control and monitoring of Oracle GoldenGate processes, reporting, and routing of requests through the GGSCI interface.
oggerr	Manages Oracle GoldenGate error messages.
replicat	Applies data to target database tables.
reverse	A utility that reverses the order of transactional operations, so that Replicat can be used to back out changes from target tables, restoring them to a previous state.
server	The Collector process, an Extract TCP/IP server collector that writes data to remote trails.

## Oracle GoldenGate Subdirectories

Learn about the subdirectories of the Oracle GoldenGate Classic Architecture installation directories; it does *not* apply to the Oracle GoldenGate Microservices Architecture.

**Table 2 Oracle GoldenGate Classic Architecture Installed Subdirectories**

Directory	Description
br	Contains the checkpoint files for the bounded recover feature.
cfg	Contains the property and XML files that are used to configure Oracle GoldenGate Monitor.

**Table 2 (Cont.) Oracle GoldenGate Classic Architecture Installed Subdirectories**

Directory	Description
dirbdb	Contains the data store that is used to persist information that is gathered from an Oracle GoldenGate instance for use by the Oracle GoldenGate Monitor application or within Oracle Enterprise Manager.
dirchk	<p>Contains the checkpoint files created by Extract and Replicat processes, which store current read and write positions to support data accuracy and fault tolerance. Written in internal Oracle GoldenGate format.</p> <p>File name format is <i>group_name+sequence_number.ext</i> where <i>sequence_number</i> is a sequential number appended to aged files and <i>ext</i> is either <i>cpe</i> for Extract checkpoint files or <i>cpr</i> for Replicat checkpoint files.</p> <p>Do not edit these files.</p> <p>Examples:</p> <p>ext1.cpe repl.cpr</p>
dircrd	Contains credential store files.
dirdat	<p>The default location for Oracle GoldenGate trail files and extract files that are created by Extract processes to store extracted data for further processing by the Replicat process or another application or utility. Written in internal Oracle GoldenGate format.</p> <p>File name format is a user-defined two-character prefix followed by either a six-digit sequence number (trail files) or the user-defined name of the associated Extract process group (extract files).</p> <p>Do not edit these files.</p> <p>Examples:</p> <p>rt000001 finance</p>
dirdef	<p>The default location for data definitions files created by the <code>DEFGEN</code> utility to contain source or target data definitions used in a heterogeneous synchronization environment. Written in external ASCII. File name format is a user-defined name specified in the <code>DEFGEN</code> parameter file.</p> <p>These files may be edited to add definitions for newly created tables. If you are unsure of how to edit a definitions file, contact Oracle GoldenGate technical support.</p> <p>Example:</p> <p>defs.dat</p>
dirdump	Contains trace, or dump, files that support the internal activity logging mechanism. This directory is only applicable to the Classic Architecture, see What is the Oracle GoldenGate Classic Architecture.
dirjar	Contains the Java executable files that support Oracle GoldenGate Monitor.

**Table 2 (Cont.) Oracle GoldenGate Classic Architecture Installed Subdirectories**

Directory	Description
dirpcs	<p>Default location for status files. File name format is <i>group.extension</i> where <i>group</i> is the name of the group and <i>extension</i> is either <i>pce</i> (Extract), <i>pcr</i> (Replicat), or <i>pcm</i> (Manager).</p> <p>These files are only created while a process is running. The file shows the program name, the process name, the port number, and the process ID.</p> <p>Do not edit these files.</p> <p>Examples:</p> <p><i>mgr.pcm</i> <i>ext.pce</i></p>
dirprm	<p>The default location for Oracle GoldenGate parameter files created by Oracle GoldenGate users to store run-time parameters for Oracle GoldenGate process groups or utilities. Written in external ASCII format. File name format is <i>group name/user-defined name.prm</i> OR <i>mgr.prm</i>.</p> <p>These files may be edited to change Oracle GoldenGate parameter values after stopping the process. They can be edited directly from a text editor or by using the <code>EDIT PARAMS</code> command in GGSCI.</p> <p>Examples:</p> <p><i>defgen.prm</i> <i>finance.prm</i></p>
dirrec	Not used by Oracle GoldenGate.
dirrpt	<p>The default location for process report files created by Extract, Replicat, and Manager processes to report statistical information relating to a processing run. Written in external ASCII format.</p> <p>File name format is <i>group name+sequence number.rpt</i> where <i>sequence number</i> is a sequential number appended to aged files.</p> <p>Do not edit these files.</p> <p>Examples:</p> <p><i>fin2.rpt</i> <i>mgr4.rpt</i></p>
dirsql	Contains training scripts and any user-created SQL scripts that support Oracle GoldenGate.
dirtmp	The default location for storing transaction data when the size exceeds the memory size that is allocated for the cache manager. Do not edit these files.
dirwlt	Contains Oracle GoldenGate wallet files.
UserExitExamples	Contains sample files to help with the creation of user exits.

## Other Oracle GoldenGate Files

Learn about other files, templates, and objects created or installed in the `root` Oracle GoldenGate installation directory.

**Table 3 Other Oracle GoldenGate Installed Files**

<b>Name</b>	<b>Description</b>
bcpfmt.tpl	Template for use with Replicat when creating a run file for the Microsoft BCP/DTS bulk-load utility.
bcrypt.txt	Blowfish encryption software license agreement.
cagent.dll	Contains the Windows dynamic link library for the Oracle GoldenGate Monitor C sub-agent.
category.dll	Windows dynamic link library used by the <code>INSTALL</code> utility.
chkpt_db_create.sql	Script that creates a checkpoint table in the local database. A different script is installed for each database type.
db2cnt1.tpl	Template for use with Replicat when creating a control file for the IBM <code>LOADUTIL</code> bulk-load utility.
ddl_cleartrace.sql	Script that removes the DDL trace file. (Oracle installations)
ddl_ddl2file.sql	Script that saves DDL from the marker table to a file.
ddl_disable.sql	Script that disables the Oracle GoldenGate DDL trigger.
ddl_enable.sql	Script that enables the Oracle GoldenGate DDL trigger.
ddl_filter.sql	Script that supports filtering of DDL by Oracle GoldenGate. This script runs programmatically; do not run it manually.
ddl_nopurgeRecyclebin.sql	Empty script file for use by Oracle GoldenGate support staff.
ddl_oral1.sql ddl_oral2.sql	Scripts that run programmatically as part of Oracle GoldenGate DDL support; do not run these scripts.
ddl_pin.sql	Script that pins DDL tracing, the DDL package, and the DDL trigger for performance improvements.
ddl_purgeRecyclebin.sql	Script that purges the Oracle recycle bin in support of the DDL replication feature.
ddl_remove.sql	Script that removes the DDL extraction trigger and package.
ddl_session.sql ddl_session1.sql	Supports the installation of the Oracle DDL objects. This script runs programmatically; do not run it manually.
ddl_setup.sql	Script that installs the Oracle GoldenGate DDL extraction and replication objects.
ddl_status.sql	Script that verifies whether or not each object created by the Oracle GoldenGate DDL support feature exists and is functioning properly.
ddl_staymetadata_off.sql ddl_staymetadata_on.sql	Scripts that control whether the Oracle DDL trigger collects metadata. This script runs programmatically; do not run it manually.
ddl_trace_off.sql ddl_trace_on.sql	Scripts that control whether DDL tracing is on or off.
ddl_tracelevel.sql	Script that sets the level of tracing for the DDL support feature.
debug files	Debug text files that may be present if tracing was turned on.

**Table 3 (Cont.) Other Oracle GoldenGate Installed Files**

<b>Name</b>	<b>Description</b>
demo_db_scriptname.sql	Scripts that create and populate demonstration tables for use with tutorials and basic testing.
demo_more_db_scriptname.sql	
.dump files	Dump files created by Oracle GoldenGate processes for tracing purposes.
ENCKEYS	User-created file that stores encryption keys. Written in external ASCII format.
exitdemo.c	User exit example.
exitdemo_utf16.c	User exit example that demonstrates how to use UTF16 encoded data in the callback structures for information exchanged between the user exit and the process.
freeBSD.txt	License agreement for FreeBSD.
ggmessage.dat	Data file that contains error, informational, and warning messages that are returned by the Oracle GoldenGate processes. The version of this file is checked upon process startup and must be identical to that of the process in order for the process to operate.
ggserr.log	File that logs processing events, messages, errors, and warnings generated by Oracle GoldenGate.
ggsmsg.dll	Windows dynamic link library used by the <code>install</code> program.
GLOBALS	User-created file that stores parameters applying to the Oracle GoldenGate instance as a whole.
help.txt	Help file for the GGSCI command interface.
icudtxx.dll	Windows shared libraries for International Components for Unicode, where <code>xx</code> is the currently used version.
icuinx.dll	
icuucxx.dll	
jagent.bat	Windows batch file for the JAgent for Oracle GoldenGate Monitor.
jagent.log	Log files for the Oracle GoldenGate Monitor Agent.
jagentjni.log	
jagent.sh	UNIX shell script for the JAgent for Oracle GoldenGate Monitor
LGPL.txt	Lesser General Public License statement. Applies to free libraries from the Free Software Foundation.
libodbc.so	ODBC file for Ingres 2.6 on UNIX.
libodbc.txt	License agreement for <code>libodbc.so</code> .
libxml2.dll	Windows dynamic link library containing the XML library for the Oracle GoldenGate XML procedures.
libxml2.txt	License agreement for <code>libxml2.dll</code> .
marker_remove.sql	Script that removes the DDL marker table.
marker_setup.sql	Script that installs the Oracle GoldenGate DDL marker table.

**Table 3 (Cont.) Other Oracle GoldenGate Installed Files**

Name	Description
marker_status.sql	Script that confirms successful installation of the DDL marker table.
notices.txt	Third-party software license file.
odbcinst.ini	Ingres 2.6 on UNIX ODBC configuration file.
params.sql	Script that contains configurable parameters for DDL support.
pthread-win32.txt	License agreement for pthread-VC.dll .
pthread-VC.dll	POSIX threads library for Microsoft Windows.
prvtclkm.plb	Supports the replication of Oracle encrypted data.
pw_agent_util.bat pw_agent_util.sh	Script files that support the Oracle GoldenGate Monitor Agent.
role_setup.sql	Script that creates the database role necessary for Oracle GoldenGate DDL support.
sampleodbc.ini	Sample ODBC file for Ingres 2.6 on UNIX.
sqlldr.tpl	Template for use with Replicat when creating a control file for the Oracle SQL*Loader bulk-load utility.
tcperrs	File containing user-defined instructions for responding to TCP/IP errors.
usrdecs.h	Include file for user exit API.
xerces-c_2_8.dll	Apache XML parser library.
zlib.txt	License agreement for zlib compression library.

## Understanding Classic Architecture Components

### Topics:

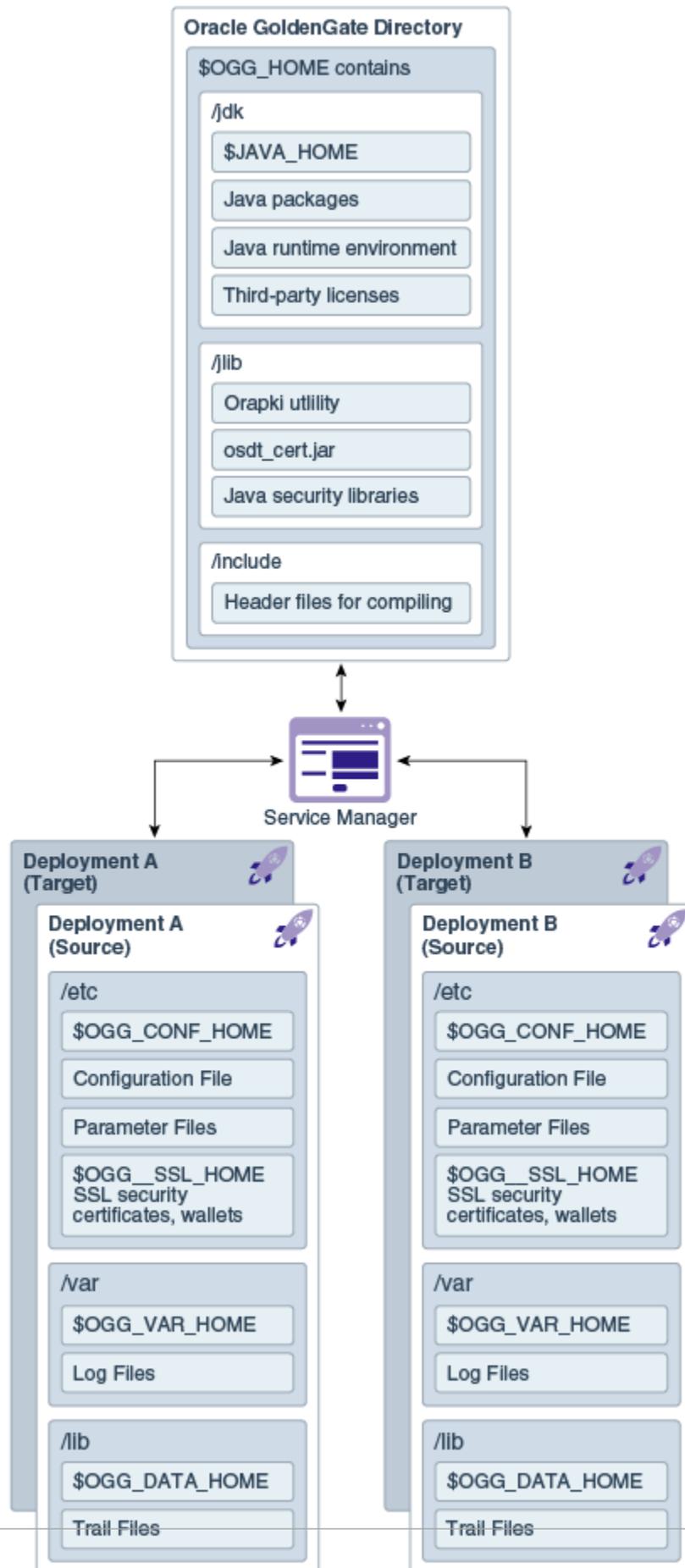
- [What are the Key Microservices Architecture Directories and Variables?](#)  
The Microservices Architecture is designed with a simplified installation and deployment directory structure.

## What are the Key Microservices Architecture Directories and Variables?

The Microservices Architecture is designed with a simplified installation and deployment directory structure.

This directory structure is based on the Linux Foundation Filesystem Hierarchy Standard. Additional flexibility has been added to allow parts of the deployment subdirectories to be placed at other locations in the file system or on other devices, including shared network devices. The design is comprised of a read only home

directory where you install Oracle GoldenGate and create a custom deployment specific directories as in the following:



The following table describes the key MA directories and the variables that are used when referring to those directories in an Oracle GoldenGate installation. When you see these variables in an example or procedure, replace the variable with the full path to the corresponding directory path in your enterprise topology.

Directory Name	Variable	Description	Default Directory Path
Oracle Database home	ORACLE_HOME	The Oracle Database home that is created on a host computer is the directory that you choose to install the product. This read-only directory contains binary, executable, and library files for the product.	/ database_install_location
Oracle GoldenGate home	OGG_HOME	The Oracle GoldenGate home that is created on a host computer is the directory that you choose to install the product. This read-only directory contains binary, executable, and library files for the product.	/ ogg_install_location
Deployment configuration home	OGG_CONF_HOME	The location in which each deployment information and configuration artifacts are stored.	/ ogg_deployment_location/etc/conf
Deployment security home	OGG_SSL_HOME	The location in which each deployment security artifacts (certificates, wallets) are stored.	/ ogg_deployment_location/etc/ssl
Deployment data home	OGG_DATA_HOME	The location in which each deployment data artifacts (trail files) are stored.	/ ogg_deployment_location/var/lib/data
Deployment variable home	OGG_VAR_HOME	The location in which each deployment logging and reporting processing artifacts are stored.	/ ogg_deployment_location/var
Deployment etc home	OGG_ETC_HOME	The location in which your deployment configuration files are stored including parameter files.	/ ogg_deployment_location/etc

You can change the default location of all of these to customize where you want to store these files.

In a configuration where the `OGG_VAR_HOME` is a local directory and the `OGG_HOME` is a shared read-only remote directory, many deployments with local `OGG_VAR_HOME` can share one read-only shared `OGG_HOME`.

This directory design facilitates a simple manual upgrade. To upgrade, you stop the services and then set the `OGG_HOME` in the web interface (or via a REST command) and then restart the processes. On the restart, Oracle GoldenGate picks up the updated environment variables. You simply switch a deployment to use a new Oracle GoldenGate release by changing the `OGG_HOME` directory path in your Service Manager to a new Oracle GoldenGate home directory, which completes the upgrade. You then must restart the MA servers, Extract processes, and Replicat processes.

In addition to many of the [Oracle GoldenGate Classic Architecture Programs and Utilities](#), the following table describes the programs and utilities exclusive to the MA.

Name	Description	Default Directory
<code>adminclient</code>	The Admin Client is a standalone command line interface used to create processes, rather than using the MA UI.	<code>\$OGG_HOME/bin</code>
<code>adminsrvr</code>	The Administration Server supervises, administers, manages, and monitors processes operating within an Oracle GoldenGate deployment for both active and inactive processes.	<code>\$OGG_HOME/bin</code>
<code>distsrvr</code>	A Distribution Server is a service that functions as a networked data distribution agent in support of conveying and processing data and commands in a distributed deployment.	<code>\$OGG_HOME/bin</code>
<code>extract</code>	Extract data process.	<code>\$OGG_HOME/bin</code>
<code>oggca.sh</code>	The MA Configuration Assistant.	<code>\$OGG_HOME/bin</code>
<code>orapki</code>	Utility to manage public key infrastructure elements, such as wallets and certificate revocation lists,	<code>\$OGG_HOME/bin</code>
<code>pmsrvr</code>	The Performance Metrics Server uses the metrics service to collect and store instance deployment performance results.	<code>\$OGG_HOME/bin</code>
<code>recvsrvr</code>	A Receiver Server is the central control service that handles all incoming trail files.	<code>\$OGG_HOME/bin</code>
<code>replicat</code>	Replicat data process.	<code>\$OGG_HOME/bin</code>
<code>ServiceManager</code>	A Service Manager acts as a watchdog for other services available with the MA.	<code>\$OGG_HOME/bin</code>

<b>Name</b>	<b>Description</b>	<b>Default Directory</b>
crypto		\$OGG_HOME/lib
htdocs	The MA HTML pages for all servers.	\$OGG_HOME/lib
info	The various help files that support the MA HTML pages for all servers.	\$OGG_HOME/lib
sql	An SQL directory that contains the healthcheck, legacy, and sharding utilities.	\$OGG_HOME/lib
utl	A utility directory that contains the install, logging, reverseproxy, and sharding utilities.	\$OGG_HOME/lib

# 12

## Oracle GoldenGate in Clustered Environments

Learn about installing and integrating Oracle GoldenGate in a clustered environment. For more information about installing and using Oracle GoldenGate in a cluster, see the Oracle Maximum Availability Architecture Best Practices at:

<http://www.oracle.com/technetwork/database/features/availability/fusion-middleware-maa-155387.html>.

### Topics:

- [Installing Oracle GoldenGate Within a Cluster](#)
- [Installing into a Windows Cluster](#)
- [Integrating into a Cluster](#)

### 12.1 Installing Oracle GoldenGate Within a Cluster

Oracle GoldenGate can be used with any cluster-management solution that has the ability to automate failover. The Oracle Clusterware solution provides the advantage of being able to be used with or without an Oracle RAC database, which enables you to include any non-database servers that are running Oracle GoldenGate.

- [Deciding Where to Install Oracle GoldenGate Binaries and Files in the Cluster](#)
- [Example Oracle Cluster Storage](#)

#### 12.1.1 Deciding Where to Install Oracle GoldenGate Binaries and Files in the Cluster

 **Note:**

This section is applicable to Oracle GoldenGate Classic Architecture only.

To ensure High Availability with Oracle GoldenGate it is recommended install the Oracle GoldenGate binaries on local storage for each node in the cluster. With a local node installation it is possible to patch and upgrade the Oracle GoldenGate software on one or more nodes in the cluster without affecting the node where Oracle GoldenGate is currently running. Then at a predetermined time, Oracle GoldenGate can be switched to one of the upgraded nodes.

To enable Oracle GoldenGate to run on any of the clustered nodes there is a requirement to place certain directories on shared storage. This provides the ability of the GoldenGate processes to restart from its last known position when running on a different node in the cluster.

When running Oracle GoldenGate in this manner follow these recommendations:

- The Oracle GoldenGate installation must have the same location path on every node.
- At minimum, install the following directories on the shared storage to support Oracle GoldenGate recovery requirements. On UNIX or Linux, you can create symbolic links to them from the installation directory on each node.
  - br
  - dirchk
  - dirdat
  - dirbdb
  - dirprm

These directories are among those created when you issue `CREATE SUBDIRS` during installation.

## 12.1.2 Example Oracle Cluster Storage

You will need to install at least some Oracle GoldenGate directories on shared storage. Select cluster-aware shared storage that is independent of, but available to, all nodes of the cluster. You could use any of the following example Oracle cluster storage options:

- Oracle Database File System (DBFS) reates a standard file system interface on top of files and directories that are stored in database tables. DBFS is similar to NFS in that it provides a shared network file system that looks like a local file system and has both a server component and a client component. Because the files are stored inside the database they are protected using the database backup and recovery features, along with High Availability using Oracle Data Guard.
- Oracle Storage Management Cluster File System is a multi-platform, scalable file system, and storage management technology that extends Oracle Automatic Storage Management functionality to provide a POSIX compatible file system.
- Oracle ZFS - Using an Oracle ZFS Appliance that can be mounted from each node in the cluster using the NFS protocol.

## 12.2 Installing into a Windows Cluster

1. Log into one of the nodes in the cluster.
2. Choose a drive for the Oracle GoldenGate installation location. This drive must be a resource within the same cluster group that contains the database instance.
3. Ensure that this cluster group is owned by the cluster node that you are logging into.
4. Install Oracle GoldenGate according to Installing the Oracle GoldenGate Files.

## 12.3 Integrating into a Cluster

If you installed Oracle GoldenGate in a cluster, use the following steps to integrate Oracle GoldenGate within the cluster solution:

- [General Requirements in a Cluster](#)
- [Adding as a Windows Cluster Resource](#)

## 12.3.1 General Requirements in a Cluster

These instructions apply generically and may not be applicable to your specific cluster system.

You must meet the following requirements when integration Oracle GoldenGate into a cluster:

1. Register the Oracle GoldenGate Manager process (and only Manager) as a cluster-managed resource as you would any other application. Manager must be the only Oracle GoldenGate process that the cluster-management software starts and stops, because it is the parent process that manages all other processes.
2. If the cluster uses a virtual IP address, you may need to obtain an available fixed IP address for the Manager process. The VIP must be an available IP address on the public subnet and cannot be determined through DHCP. In the parameter files of the Extract data pumps, specify the VIP of the remote Manager as the input value of the `RMTHOST` parameter. Other Oracle GoldenGate products that access Manager also should use the VIP.
3. Make certain that all nodes in the cluster have synchronized system clocks. The clocks must be synchronized with the clock on the system where Extract is executed. Oracle GoldenGate compares the time of the local system to the commit timestamps to make critical decisions. For information about synchronizing system clocks, consult your system administrator.
4. When you configure Manager, add the `AUTOSTART` and `AUTORESTART` parameters so that Manager starts the replication processes automatically. You can, when needed, control Extract, Replicat, and other Oracle GoldenGate processes from within the Oracle GoldenGate user interfaces.
5. Mount the shared drive on one node only. This prevents processes from being started on another node. Use the same mount point on all nodes.
6. Configure Oracle GoldenGate as appropriate for your environment.

## 12.3.2 Adding as a Windows Cluster Resource

When installing Oracle GoldenGate in a Windows cluster, follow these instructions to establish Oracle GoldenGate as a cluster resource and configure the Manager service correctly on all nodes.

- In the cluster administrator, add the Manager process to the group that contains the database instance to which Oracle GoldenGate will connect.
- Make sure all nodes on which Oracle GoldenGate will run are selected as possible owners of the resource.
- Make certain the Manager Windows service has the following dependencies (configurable from the Services control panel):
  - The database resource
  - The disk resource that contains the Oracle GoldenGate directory
  - The disk resource that contains the database transaction log files

- The disk resource that contains the database transaction log backup files

# Part V

## Uninstalling Oracle GoldenGate

This part describes how to remove Oracle GoldenGate processes and files from your local system in Linux, UNIX, and Windows environments.

It assumes that you no longer need the data in the Oracle GoldenGate trails, and that you no longer need to preserve the current Oracle GoldenGate environment. To preserve your current environment and data, make a backup of the Oracle GoldenGate directory and all subdirectories before starting this procedure.

### Topics:

- [Uninstalling Oracle GoldenGate with Oracle Database](#)
- [Uninstalling Oracle GoldenGate for Heterogeneous Databases](#)
- [Uninstalling Oracle GoldenGate Microservices Architecture](#)

# 13

## Uninstalling Oracle GoldenGate with Oracle Database

Learn about removing Oracle GoldenGate with Oracle Database.

### Topics:

- [Stopping Processes](#)
- [Removing the DDL Environment](#)
- [Removing Database Objects](#)
- [Uninstalling Oracle GoldenGate Using Oracle Universal Installer](#)
- [Uninstalling Oracle GoldenGate Manually](#)

### 13.1 Stopping Processes

This procedure stops the Extract and Replication processes. Leave Manager running until directed to stop it.

#### On all Systems:

1. Run the command shell.
2. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
3. Change directories to the Oracle GoldenGate installation directory.
4. Run `ggsci`.
5. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

6. Stop the Manager process.

```
STOP MANAGER
```

### 13.2 Removing the DDL Environment

(Valid when the DDL trigger is being used to support DDL replication.) This procedure removes all of the Oracle GoldenGate DDL objects from the DDL schema on a source system.

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
2. Run `ggsci` from your Oracle GoldenGate directory.
3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

4. Log in to SQL\*Plus as a user that has SYSDBA privileges.
5. Disconnect all sessions that ever issued DDL, including those of Oracle GoldenGate processes, SQL\*Plus, business applications, and any other software that uses Oracle. Otherwise the database might generate an ORA-04021 error.
6. Run the `ddl_disable` script to disable the DDL trigger.
7. Run the `ddl_remove` script to remove the Oracle GoldenGate DDL trigger, the DDL history and marker tables, and other associated objects. This script produces a `ddl_remove_spool.txt` file that logs the script output and a `ddl_remove_set.txt` file that logs environment settings in case they are needed for debugging.
8. Run the `marker_remove` script to remove the Oracle GoldenGate marker support system. This script produces a `marker_remove_spool.txt` file that logs the script output and a `marker_remove_set.txt` file that logs environment settings in case they are needed for debugging.

## 13.3 Removing Database Objects

Follow these instructions to remove Oracle GoldenGate objects that are configured within an Oracle Database. Specific steps and commands may not apply to your configuration.

### On a Source System:

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
2. Run `ggsci` from your Oracle GoldenGate directory.
3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

4. Stop the Manager process.

```
STOP MANAGER
```

5. In GGSCI, log into the database with the `DBLOGIN` (or the `MININGDBLOGIN` command if you need to remove a database logging server from a downstream mining database). `[MINING]DBLOGIN` requires privileges granted in the `dbms_goldengate_auth.grant_admin_privilege` procedure.

```
[MINING]DBLOGIN USERIDALIAS alias
```

6. In GGSCI, run any or all of the following commands, depending on your configuration.

- Disable schema-level supplemental logging (wildcards are not allowed):

```
DELETE SCHEMATRANDATA schema [NOSCHEDULINGCOLS | ALLCOLS]
```

- Disable table-level supplemental logging.

```
DELETE TRANDATA [container.]schema.table [NOSCHEDULINGCOLS | ALLCOLS]
```

- (Bidirectional configuration) Remove the Oracle trace table.

```
DELETE TRACETABLE [container.]schema.table
```

- (Classic capture configuration) Disable log retention and remove the underlying Oracle Streams capture process. `DBLOGIN` requires privileges shown in Log Retention Options.

```
UNREGISTER EXTRACT group LOGRETENTION
```

- (Integrated capture configuration) Remove the database logmining server from an Oracle mining database.

```
DELETE EXTRACT group
UNREGISTER EXTRACT group DATABASE
```

7. Run the following Oracle procedure to remove the privileges from the Oracle GoldenGate administration users for both classic and integrated processes.

```
dbms_goldengate_auth.revoke_admin_privilege('ggadm')
```

#### On a Target System:

1. Stop Replicat.

```
STOP REPLICAT group
```

2. Log into the database.

```
DBLOGIN USERIDALIAS alias
```

3. (Integrated Replicat) Delete the Replicat group, which also deletes the inbound server from the target database.

```
DELETE REPLICAT group
```

4. (Nonintegrated Replicat) Remove the Replicat checkpoint table by running the DELETE CHECKPOINTTABLE command.

```
DELETE CHECKPOINTTABLE [container.]schema.table
```

## 13.4 Uninstalling Oracle GoldenGate Using Oracle Universal Installer

Follow these instructions to uninstall Oracle GoldenGate through an interactive session of Oracle Universal Installer (OUI).

### WARNING:

Before removing Oracle GoldenGate through OUI, follow the instructions in [Removing the DDL Environment](#) (if using trigger-based DDL capture) and [Removing Database Objects](#). These procedures require the use of Oracle GoldenGate commands and scripts, which are removed by the OUI uninstaller.

The following items are removed in this process.

- The Oracle GoldenGate home directory in the Oracle central inventory.
- The Oracle GoldenGate installation directory.
- The Oracle GoldenGate Manager service, if installed on Windows.
- The Oracle GoldenGate Windows Registry entries

To remove Oracle GoldenGate from the system:

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.

2. Run `ggsci` from your Oracle GoldenGate directory.

3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

4. Stop the Manager process.

```
STOP MANAGER
```

5. Run the following script from the Oracle GoldenGate installation directory.

UNIX and Linux:

```
OGG_home/deinstall/deinstall.sh
```

Windows:

```
OGG_home/deinstall/deinstall.bat
```

## 13.5 Uninstalling Oracle GoldenGate Manually

Follow these instructions to remove the Oracle GoldenGate environment from the system manually through the operating system.

- [Manually Removing Oracle GoldenGate Windows Components](#)
- [Manually Removing the Oracle GoldenGate Files](#)

### 13.5.1 Manually Removing Oracle GoldenGate Windows Components

This procedure does the following:

- removes Oracle GoldenGate as a Windows cluster resource from a source or target Windows system,
- stops Oracle GoldenGate events from being reported to the Windows Event Manager,
- and removes the Manager service.

Perform these steps on source and target systems.

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and to delete files and directories from the operating system.

2. (Cluster) Working from the node in the cluster that owns the cluster group that contains the Manager resource, run `ggsci` and make certain that all Extract and Replicat processes are stopped. Stop any that are running.

```
STATUS ER *  
STOP ER *
```

3. (Cluster) Use the Cluster Administrator tool to take the Manager resource offline.
4. (Cluster) Right click the resource and select **Delete** to remove it.
5. Click **Start** then **Run**, and then type `cmd` in the Run dialog box to open the command console.

6. Change directories to the Oracle GoldenGate installation directory.
7. Run the `INSTALL` utility with the following syntax.  

```
install deleteevents deleteservice
```
8. (Cluster) Move the cluster group to the next node in the cluster, and repeat from Step 5.

## 13.5.2 Manually Removing the Oracle GoldenGate Files

Perform these steps on all systems to remove the Oracle GoldenGate installation directory.

1. In GGSCI, verify that all processes are stopped. Stop any that are running.

```
STOP ER *  
STATUS ER *  
STOP MANAGER  
STATUS MANAGER
```

2. Exit GGSCI.

```
EXIT
```

3. Remove the Oracle GoldenGate installation directory.

# 14

## Uninstalling Oracle GoldenGate for Heterogeneous Databases

Learn how to uninstall Oracle GoldenGate for heterogeneous databases.

### Topics:

- [Stopping Processes](#)
- [Removing Oracle GoldenGate Database Objects](#)
- [Uninstalling Oracle GoldenGate from a Source DB2 for i System](#)
- [Uninstalling Oracle GoldenGate from a Linux Remote System](#)
- [Removing Oracle GoldenGate from a Windows Remote System](#)
- [Removing Oracle GoldenGate Windows Components](#)

### 14.1 Stopping Processes

This procedure stops the Extract and Replication processes. Leave Manager running until directed to stop it.

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
2. Run GGSCI from the Oracle GoldenGate directory.
3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

### 14.2 Removing Oracle GoldenGate Database Objects

Follow these instructions to remove supplemental logging and any Oracle GoldenGate CDC Cleanup objects from the source database in the Oracle GoldenGate capture configuration, and to remove the Replicat checkpoint table in the apply configuration. Specific steps and commands may not apply to your configuration.

#### On a Source System:

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
2. Run `ggsci.exe` from the Oracle GoldenGate directory.
3. Stop all Oracle GoldenGate processes if not already done.

```
.
```

```
STOP ER *
```

4. Stop the Manager process.

```
..
```

```
STOP MANAGER
```

—

5. Issue the following command to log into the source database, see SOURCEDB.

```
DBLOGIN SOURCEDB data_source{, USERID user, PASSWORD password | USERIDALIAS  
alias}
```

6. Use this command to remove the Extract tables that you enabled for supplemental logging, see DELETE TRANDATA. You can use a wildcard to specify multiple table names.

```
DELETE TRANDATA owner.table
```

7. Remove any heartbeat table entries by running the DELETE HEARTBEATTABLE command.

#### On a Target System:

1. Stop Replicat.

```
STOP REPLICAT group
```

.

2. Issue the following command to log into the target database, see SOURCEDB.

```
DBLOGIN SOURCEDB DSN{USERID user, PASSWORD password | USERIDALIAS alias}
```

3. Remove the Replicat checkpoint tables and heartbeat by running the DELETE CHECKPOINTTABLE and DELETE HEARTBEATTABLE commands.

```
DELETE CHECKPOINTTABLE schema.table  
DELETE HEARTBEATTABLE
```

## 14.3 Uninstalling Oracle GoldenGate from a Source DB2 for i System

1. (Suggested) Log on to the operating system as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.

2. From the Oracle GoldenGate installation directory, run GGSCI.

3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

4. Stop the Manager process.

```
STOP MANAGER
```

5. Log into the database with the DBLOGIN command.

```
DBLOGIN SOURCEDB database, USERID db_user [, PASSWORD pw [encryption options]]
```

#### Note:

Only BLOWFISH encryption is supported for DB2 for i systems.

6. Run the `DELETE TRANDATA` command to end the journaling of tables.

```
DELETE TRANDATA { schema.table [JOURNAL library/journal] |
library/file [JOURNAL library/journal] }
```

7. From an IBM 5250 terminal emulator, find the Oracle GoldenGate installation library. This library can be seen as the name in the `oggprcjrn.srvpgm` soft-link after `qsys.lib`. In the following example, the installation library is `OGGLIB`:

```
oggprcjrn.srvpgm->/qsys.lib/qsys.ogglib/oggprcjrn.srvpgm
```

8. Delete the Oracle GoldenGate installation library. Specify "I" (ignore) for any prompts about unsaved journal receivers.

```
clrlib library
dltlib library
```

9. Remove the Oracle GoldenGate files by removing the installation directory.

## 14.4 Uninstalling Oracle GoldenGate from a Linux Remote System

Follow these instructions to remove Oracle GoldenGate from a remote Linux machine where Replicat is installed.

1. Run the command shell of the operating system.
2. (Suggested) Log on to the operating system as the system administrator or as a user with permission to issue Oracle GoldenGate commands and delete files and directories from the operating system.
3. Change directories to the Oracle GoldenGate installation directory.
4. Run GGSCI.
5. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

6. Stop the Manager process.

```
STOP MANAGER
```

7. Log into the database with the `DBLOGIN` command.

```
DBLOGIN SOURCEDB database, USERID db_user [, PASSWORD pw [encryption_options]]
```



### Note:

Only `BLOWFISH` encryption is supported for DB2 for i systems.

8. Remove the Replicat checkpoint table by running the `DELETE CHECKPOINTTABLE` command.

```
DELETE CHECKPOINTTABLE owner.table
```

9. Remove the Oracle GoldenGate files by removing the installation directory.

## 14.5 Removing Oracle GoldenGate from a Windows Remote System

Follow these instructions to remove Oracle GoldenGate from a remote Windows machine where Replicat is installed.

- [Removing Oracle GoldenGate from a Windows Cluster](#)
- [Removing Oracle GoldenGate from a Remote Windows System](#)

### 14.5.1 Removing Oracle GoldenGate from a Windows Cluster

1. Working from the node in the cluster that owns the Windows Cluster group that contains the Manager resource, run GGSCI and then stop any Extract and Replicat processes that are still running.
2. Use the Windows Cluster Administrator tool to take the Manager resource offline.
3. Right click the resource and select **Delete** to remove it.
4. Click **Start**, then **Run**, and type `cmd` in the Run dialog box to open the command console.
5. Change directories to the Oracle GoldenGate installation directory.
6. Run the INSTALL utility using the following syntax.

```
install deleteevents deleteservice
```

This command stops Oracle GoldenGate events from being reported to the Windows Event Manager and removes the Manager service.

7. Move the Windows Cluster group to the next node in the cluster, and repeat from 4.
8. Follow the instructions in [Removing Oracle GoldenGate from a Remote Windows System](#).

### 14.5.2 Removing Oracle GoldenGate from a Remote Windows System

**On all systems:**

1. (Suggested) Log on to the operating system as the system administrator or as a user with permission to issue Oracle GoldenGate commands and to delete files and directories from the operating system.
2. From the Oracle GoldenGate installation folder, run GGSCI.
3. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

4. Stop the Manager process.

```
STOP MANAGER
```

5.

 **Note:**

Skip Steps 5 through 8 if you already performed them when removing Oracle GoldenGate from a Windows Cluster

6. Click **Start**, then **Run**, and type `cmd` in the Run dialog box to open the command console.
7. Change directories to the Oracle GoldenGate installation directory.
8. Run the INSTALL utility using the following syntax.

```
install deleteevents deleteservice
```

This command stops Oracle GoldenGate events from being reported to the Windows Event Manager and removes the Manager service.

9. Log into the database with the `DBLOGIN` command.

```
DBLOGIN SOURCEDB database, USERID db_user [, PASSWORD pw [encryption options]]
```

 **Note:**

Only `BLOWFISH` encryption is supported for DB2 for i systems.

10. Remove the Replicat checkpoint table by running the `DELETE CHECKPOINTTABLE` command.
 

```
DELETE CHECKPOINTTABLE owner.table
```
11. Remove the Oracle GoldenGate files by removing the installation directory.

## 14.6 Removing Oracle GoldenGate Windows Components

(Valid for Windows installations) This procedure does the following:

- Removes Oracle GoldenGate as a Windows cluster resource from a source or target Windows system.
- Stops Oracle GoldenGate events from being reported to the Windows Event Manager.
- Removes the Manager service.

Perform these steps on source and target systems.

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and to delete files and directories from the operating system.
2. Run GGSCI and make certain that all Extract and Replicat processes are stopped. Stop any that are running.

```
STATUS ER *
STOP ER *
```

3. (Cluster) Use the Cluster Administrator tool to take the Manager resource offline.

4. (Cluster) Right click the resource and select **Delete** to remove it.
5. Click **Start** then **Run**, and then type `cmd` in the Run dialog box to open the command console.
6. Change directories to the Oracle GoldenGate installation directory.
7. Run the `INSTALL` utility with the following syntax.  

```
install deleteevents deleteservice
```
8. (Cluster) Move the cluster group to the next node in the cluster, and repeat from step 5.

# Uninstalling Oracle GoldenGate Microservices Architecture

By removing a deployment, you can delete various components of the deployment, including, Extracts, Replicats, paths, and configuration files. However, the Service Manager is not deleted.

1. Run the `oggca` program from the following location: `$OGG_HOME/bin`
2. Select **Existing Service Manager** from the **Select Service Manager Options** screen. Click **Next**
3. Select **Remove Existing Oracle GoldenGate Deployment** from the Configuration Options screen.
4. Select the deployment you need to remove from the **Deployment Name** list box. Also select the **Delete Deployment Files from Disk** check box if you want to remove all the deployment files (including configuration files) from the host.

## Note:

When you remove a deployment or uninstall Oracle GoldenGate MA, the system does not automatically stop processes. As a result, you may have to stop processes associated with the deployment and you must clean files manually. For details, see “Files to be Removed Manually After Removing Deployment”.

5. Enter the Administration account user name and password and click **Next**.
6. See the list of settings that are deleted with the deployment and click **Finish**.

### Files to be Removed Manually After Removing Deployment

It's mandatory to delete some files manually only in case there's a Service Manager registered but you have to unregister it and register a new one. To remove files manually, you must have `root` or `sudo` privileges. The files to be deleted include:

Operating System	Files to be Removed Manually to Unregister an Existing Service Manager
Linux 6	<ul style="list-style-type: none"> <li>• <code>/etc/init.d/OracleGoldenGate</code></li> <li>• <code>/etc/rc.d/*OracleGoldenGate</code></li> <li>• <code>/etc/rc*.d/*OracleGoldenGate</code></li> <li>• <code>/etc/oggInst.loc</code></li> </ul>
Linux 7	<ul style="list-style-type: none"> <li>• <code>/etc/systemd/system/OracleGoldenGate.service</code></li> </ul>