

Oracle® Fusion Middleware

Installing Oracle GoldenGate



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

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Oracle Fusion Middleware Installing Oracle GoldenGate, 19c (19.1.0)

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Preface

This preface includes the following topics:

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

Audience

This guide is intended for users responsible for installing and managing Oracle GoldenGate Classic Architecture and Microservices Architecture for Oracle and various heterogeneous databases.

Conventions

The following text conventions are used in this document:

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

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>.

Accessible Access to Oracle Support

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

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](#)

Part I

Installing Oracle GoldenGate

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>

Topics:

- [What is Required?](#)
Learn about the requirements for the system and database resources that support Oracle GoldenGate.

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](#)

Verifying Certification and System Requirements

Make sure that you are installing 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 and are available on Oracle Technology Network.

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](#)
- [Security and Other Considerations](#)
- [Windows Console Character Sets](#)

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).

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](#)

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.

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 is significantly larger on disk.

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.

Note:

`CACHEMGR` is an internally self-configuring and self-adjusting parameter. It is rare that this parameter requires modification. Doing so unnecessarily may result in performance degradation. It is best to acquire empirical evidence before opening an Oracle Service Request and consulting with Oracle Support.

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.

Other Disk Space Considerations

In addition to the disk space required for the files and binaries that are installed by Oracle GoldenGate, allow additional disk space to hold the Oracle GoldenGate trails. Trails can be created up to 2GB in size, with a default of 500MB. The space required depends upon the selected size of the trails, the amount of data being captured for replication, and how often consumed Trails are removed from disk. The recommended minimum disk allocated for Trails may be computed as:

$((\text{transaction log size} * 0.33) * \text{number of log switches per day}) * \text{number of days to retain trails}$

Based on this equation, if the transaction logs are 1GB in size and there is an average of 10 log switches per day, it means that Oracle GoldenGate will capture 3.3GB data per day. To be able to retain trails for 7 days, the minimum amount of disk space needed to hold the trails is 23GB.

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.

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.
- You can configure Oracle GoldenGate Microservices Architecture to use a reverse proxy. Oracle GoldenGate MA includes a script called `ReverseProxySettings` that generates configuration file for only the NGINX reverse proxy server.

See Reverse Proxy Support in *Securing the Oracle GoldenGate Environment*.
- Configure the system to use both TCP 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.
- Oracle GoldenGate requires some unreserved and unrestricted TCP/IP network 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.

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, Replicat, and Manager processes, and configuring deployments using the `oggca.sh` script must operate as an operating system user that has read, write, and delete privileges on 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 or transaction logs directly. It must operate as an operating system user that has read access to the log files, both online and archived.
- 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.

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++ 2013 Redistributable Package and the Microsoft Visual C++ 2017 Redistributable Package. These packages install runtime components of Visual C++ Libraries that are required for Oracle GoldenGate processes.

Download and install the x64 version of Visual C++ 2013 package from :

<https://support.microsoft.com/en-us/help/4032938/update-for-visual-c-2013-redistributable-package>

Download and install the x64 version of Visual C++ 2017 package from

<https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads>

- For Oracle GoldenGate for Oracle to be installed on a remote hub server, download and install the Oracle Database 19c client for the operating system platform where Oracle GoldenGate will be installed and ensure that you install the Administrator version of the client.

Security and Other Considerations

An Oracle GoldenGate MA deployment can be installed with security enabled or disabled. If enabled, there are some minimal pieces of information that are required for proper configuration depending on the whether self-signed certificates are used or provided. See *How to Create Deployments in Using the Oracle GoldenGate Microservices Architecture*.

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.

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).

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.

Part II

Installing Oracle GoldenGate for Oracle Databases

Learn how to install Oracle GoldenGate Microservices and Classic architectures with Oracle Databases.

Topics:

- [Installing Oracle GoldenGate Microservices](#)
- [Installing Oracle GoldenGate Classic](#)

1

Installing Oracle GoldenGate Microservices

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.

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*.

Topics:

- [Prerequisites](#)
Learn about what you need to do before installing.
- [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 line interface can be performed if your system does not have an X-Windows or graphical interface or you want to perform the installation in an automated way.

Prerequisites

Learn about what you need to do before installing.

Topics:

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

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](#)

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
RMTTRAIL /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
RMTTRAIL /home/ggs/dirdat/st
TABLE fin.sales;
TABLE fin.cust;
```

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**.

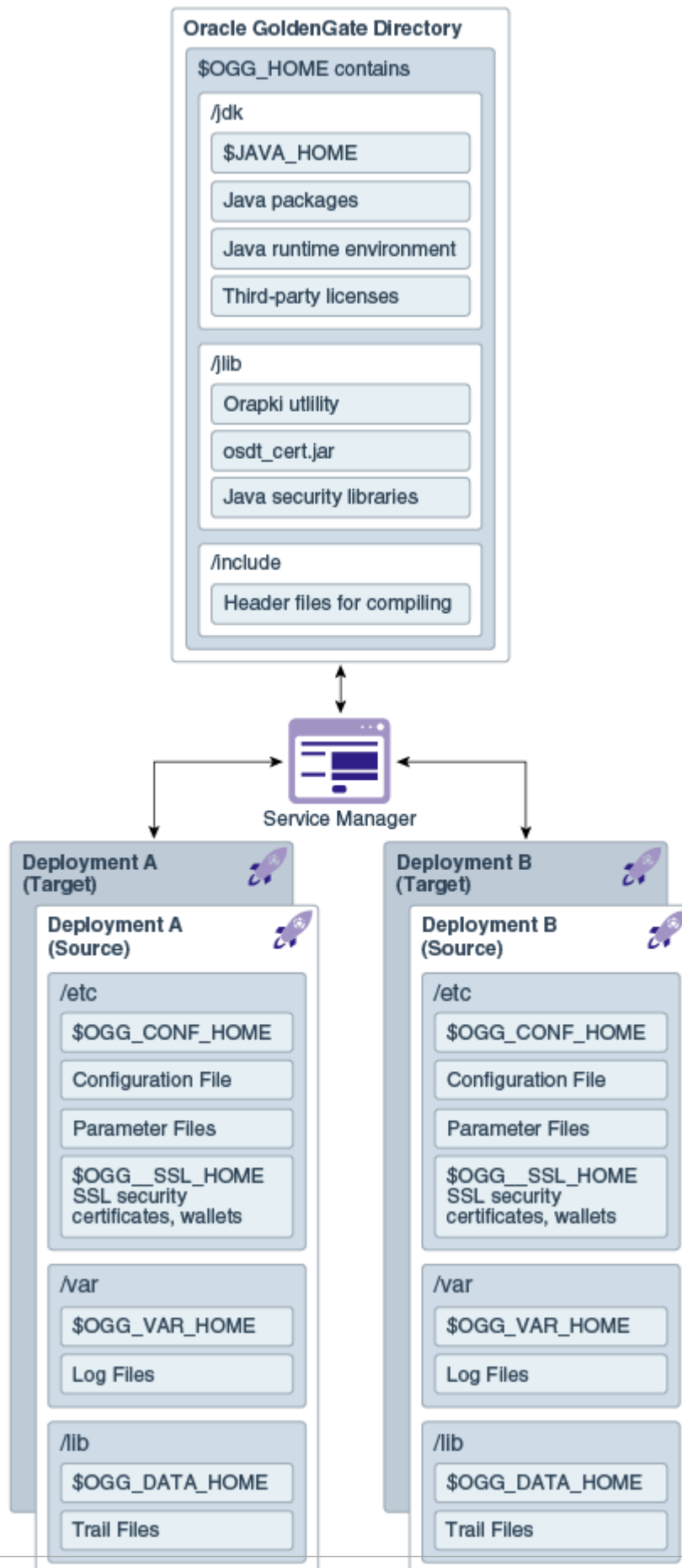
If there are multiple Oracle instances on the system with Extract and Replicat processes connecting to them, use these steps:

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.

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_lo cation
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_locatio n
Deployment configuration home	OGG_CONF_HOME	The location in which each deployment information and configuration artifacts are stored.	/ ogg_deployment_loca tion/etc/conf
Deployment security home	OGG_SSL_HOME	The location in which each deployment security artifacts (certificates, wallets) are stored.	/ ogg_deployment_loca tion/etc/ssl
Deployment data home	OGG_DATA_HOME	The location in which each deployment data artifacts (trail files) are stored.	/ ogg_deployment_loca tion/var/lib/data
Deployment variable home	OGG_VAR_HOME	The location in which each deployment logging and reporting processing artifacts are stored.	/ ogg_deployment_loca tion/var
Deployment etc home	OGG_ETC_HOME	The location in which your deployment configuration files are stored including parameter files.	/ ogg_deployment_loca tion/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>
<code>crypto</code>		<code>\$OGG_HOME/lib</code>
<code>htdocs</code>	The MA HTML pages for all servers.	<code>\$OGG_HOME/lib</code>
<code>info</code>	The various help files that support the MA HTML pages for all servers.	<code>\$OGG_HOME/lib</code>
<code>sql</code>	An SQL directory that contains the healthcheck, legacy, and sharding utilities.	<code>\$OGG_HOME/lib</code>

Name	Description	Default Directory
utl	A utility directory that contains the install, logging, reverseproxy, and sharding utilities.	\$OGG_HOME/lib

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. For example:

```
unzip ./fbo_ggs_Linux_x64_services.zip -d ./temp_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 version for your environment, then click **Next**.
5. On the **Specify Installation Details** page, specify the following:
 - For **Software Location**, specify the location where Oracle GoldenGate software is to be installed. This will be your Oracle GoldenGate Home (`OGG_HOME`) after the installation is complete. If you have the `$OGG_HOME` environment variable set, this should be the path displayed. The specified directory cannot be a registered home in the Oracle Central Inventory.
 - Click **Next**.
6. 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.

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

Performing a Silent Installation with OUI

Silent installation from the command line interface can be performed if your system does not have an X-Windows or graphical interface or you want to perform the installation in an automated way.

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

Silent installations are driven by using a response file. Response files can be saved by selecting the **Save Response File** option during an interactive Oracle Universal Installer session or by editing the `oggcore.rsp` template located in the response directory after unzipping the binaries.

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. The response file location is `unzipped_directory/fbo_gg_Linux_x64_services_shiphome/Disk1/response`.

To perform the installation using a response file, issue the following command:

```
unzipped_directory/fbo_gg_Linux_x64_services_shiphome/Disk1/runInstaller -  
silent -nowait -responseFile absolute_path_to_response_file
```


2

Installing Oracle GoldenGate Classic

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

Topics:

- [Prerequisites](#)
Learn about what you need to do before installing.
- [Installing Classic Oracle GoldenGate](#)
Learn how to install the Oracle GoldenGate Classic Architecture for Oracle Database for the first time.

Prerequisites

Learn about what you need to do before installing.

Topics:

- [Setting ORACLE_HOME and ORACLE_SID](#)
- [Database Requirements](#)

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](#)

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
RMTTRAIL /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
RMTTRAIL /home/ggs/dirdat/st
TABLE fin.sales;
TABLE fin.cust;
```

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.

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.
- Oracle Databases must be in `FORCE LOGGING` mode to ensure that all transactional data is written to Redo.
- 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*.

Installing Classic Oracle GoldenGate

Learn how to install 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:

- [Installing Oracle GoldenGate Classic for Oracle Database](#)

Installing Oracle GoldenGate Classic 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.

 **Note:**

The path *cannot* contain any spaces.

2. Install using one of these installation methods:
 - Performing an Interactive Installation with OUI.
 - Performing a Silent Installation with OUI.
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**.

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

```
CREATE SUBDIRS
```

5. Exit GGSCI.

```
EXIT
```

- [Performing an Interactive Installation with OUI](#)
- [Performing a Silent Installation with OUI](#)

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.

 **Note:**

The software location path cannot contain any spaces.

- (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.

Performing a Silent Installation with OUI

These instructions apply to new installations, as well as upgrades.

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. To run a response file, issue the following command.

```
runInstaller -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.

Part III

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 for all Platforms](#)
- [Specifying a Custom Manager Name for Windows](#)
- [Installing Manager as a Windows Service](#)
- [Installing Oracle GoldenGate for DB2 LUW Databases](#)
Learn how to install Oracle GoldenGate for DB2 LUW databases.
- [Installing Oracle GoldenGate for DB2 for i Databases](#)
- [Installing Oracle GoldenGate for DB2 z/OS Databases](#)
- [Installing Oracle GoldenGate for MySQL Databases](#)
Learn about the requirements and how to install Oracle GoldenGate for MySQL databases.
- [Installing Oracle GoldenGate for PostgreSQL Databases](#)
Learn about the requirements and how to install Oracle GoldenGate for PostgreSQL databases.
- [Installing Oracle GoldenGate for SQL Server Databases](#)
Learn about the requirements and how to install Oracle GoldenGate for SQL Server databases.
- [Installing Oracle GoldenGate for Sybase Databases](#)
Learn about the requirements and how to install Oracle GoldenGate for Sybase databases.
- [Installing Oracle GoldenGate for Teradata Databases](#)
- [Installing Oracle GoldenGate for Oracle TimesTen Databases](#)

Installing for all Platforms

1. Copy the Oracle GoldenGate installation file to the system and directory where you want to install Oracle GoldenGate, and then unzip it.

Note:

The installation path *cannot* contain any spaces.

2. From this directory, run GGSCI. 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**.

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

```
CREATE SUBDIRS
```

4. Exit GGSCI.

```
EXIT
```

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.

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 1 `INSTALL` Utility Options

Option	Description
<code>ADDEVENTS</code>	Adds Oracle GoldenGate events to the Windows Event Manager.
<code>ADDSERVICE</code>	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. ¹ 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.
<code>AUTOSTART</code>	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.
<code>MANUALSTART</code>	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> .

¹ 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.

3

Installing Oracle GoldenGate for DB2 LUW Databases

Learn how to install Oracle GoldenGate for DB2 LUW databases.

Topics:

- [Choosing an Installation System for DB2 LUW](#)
- [Choosing and Configuring a System for Remote Capture or Delivery](#)

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 for 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 DB2 Connect

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_nameserver 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 for all Platforms](#).
6. Specify the DB2 target database name with the Replicat parameter `TARGETDB` when you configure the Oracle GoldenGate processes.

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.

4

Installing Oracle GoldenGate for DB2 for i Databases

Learn how to install Oracle GoldenGate for DB2 for i databases.

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, 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 for DB2 for i](#)

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*.

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.

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](#)

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.

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.

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.

Installing for DB2 for i

Follow these steps to install Oracle GoldenGate for a 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 -l 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 `oggprcjrnl.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 for all Platforms](#).

5

Installing Oracle GoldenGate for DB2 z/OS Databases

Learn about the requirements and how to install Oracle GoldenGate for DB2 z/OS databases.

Topics:

- [System Services](#)
- [Memory Requirements](#)
- [Disk Requirements for DB2 z/OS](#)
- [Operating System Privileges for DB2 z/OS](#)
- [Choosing an Installation Operating System](#)
- [Installing Extract Components on Db2 z/OS](#)
- [Using Shared Memory Manager for Extract](#)

System Services

Activate UNIX System Services (USS) only if required to install the executables for the Extract support modules.

Oracle GoldenGate supports Sysplex data sharing.

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 BUF SIZE` parameter in the Extract parameter file.

When setting up the Wotkload Manager (WLM) environment for the Extract log read components, it is recommended to set `NUMTCB` in the range of 10-40 depending on your environment. This is based on the IBM general guidelines available here:

https://www.ibm.com/support/knowledgecenter/en/SSEPEK_11.0.0/perf/src/tpc/db2z_assignprofunc2wlmappenv.html

Disk Requirements for DB2 z/OS

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.

Operating System Privileges for DB2 z/OS

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

Table 5-1 shows the other required operating system privileges for Oracle GoldenGate:

Table 5-1 Operating System Privileges

DB2 z/OS User Privilege	Extract	Stored Procedures	Replicat
CONNECT to the remote DB2 subsystem.	X	X	X

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.

Installing Extract Components on Db2 z/OS

The Oracle GoldenGate Db2 z/OS Extract uses SQL objects to access and read the Db2 log. These Oracle GoldenGate Db2 z/OS objects require a minimum hardware platform of z10, a minimum operating system release of 1.13, and a minimum Db2 release of 11. The components consist of executable load modules, SQL stored procedures and functions, and external programs called via the stored procedures. these components are:

1. External programs (authorized) includes the following programs:
 - a. oggib001 – Initialization and utility program
 - b. oggrb001 – Log read program functionality
 - c. oggmt001 – Stand-alone program that monitors ECSA and 64-bit memory
 - d. oggjt001 – Setup program for the oggmt001 startup JCL run from oggib001 program
 - e. oggfr001 – Utility for use by a DBA under guidance from Oracle Support
2. SQL stored procedure and function includes `demo_db2_setupb_os390.sql` with the `OGGINITB` and `OGGREADB SQL`.
3. JCL procedure, `oggtask.jcl`

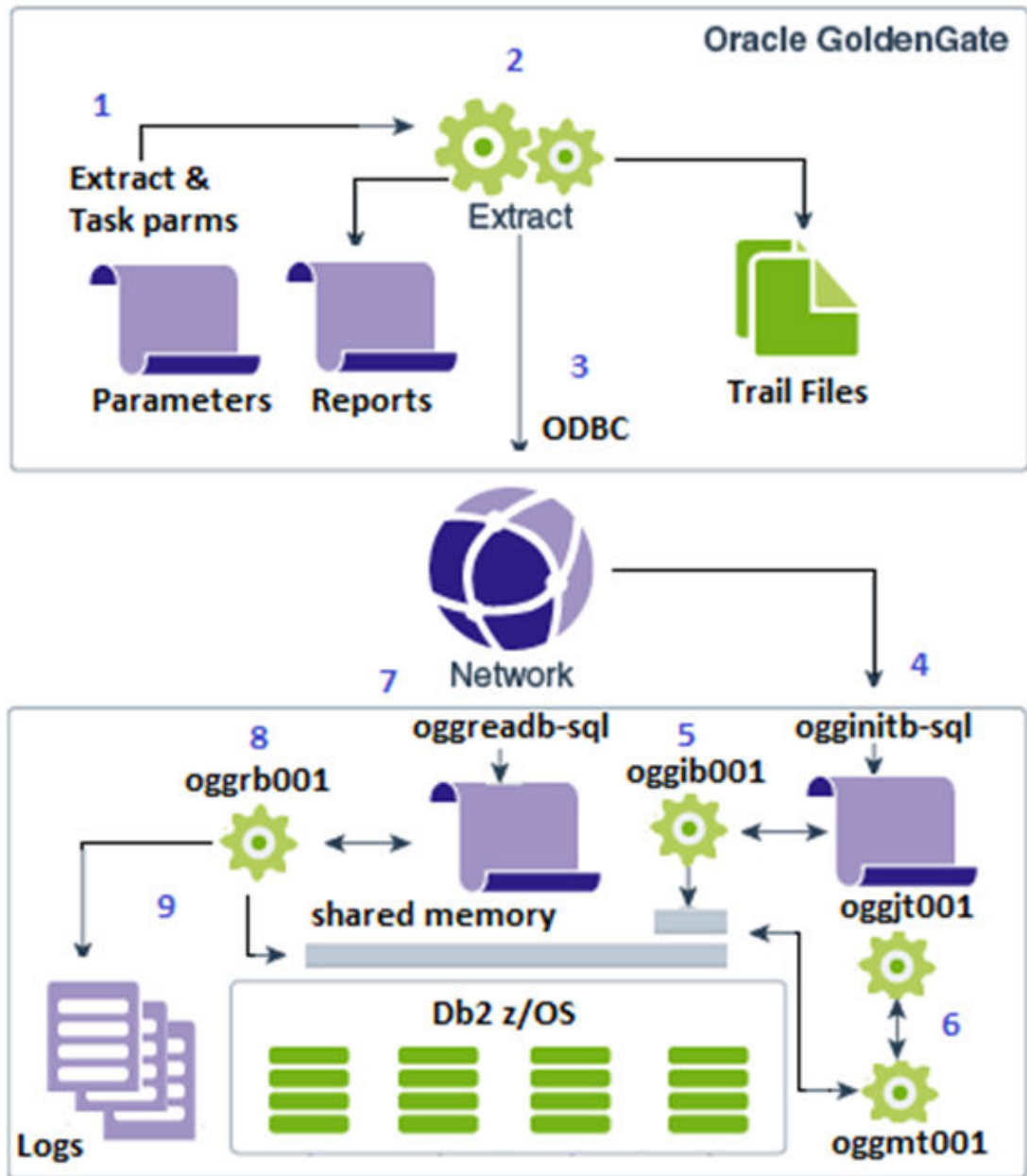


Note:

These external names, SQL and JCL names are the default names, which you can edit and update. This process is discussed in the subsequent sections.

The Replication Process for Db2 z/OS Extract figure illustrates the replication process for the Db2 z/OS Extract and its mainframe components.

Figure 5-1 Replication Process for Db2 z/OS Extract



The process starts and runs as shown using the numbers 1 through 9 in the figure, which is given below:

1. Extract reads the parameters, including the JCL parameters, from the parameter file created during installation.
2. Extract reports the startup information and prepares to write the trail files.
3. ODBC is used to gather information from the Db2 database and start replication.
4. The OGGINITB SQL stored procedure starts to prepare shared memory and to gather other data needed for replication.

5. The OGGIB001 external program called by the SQL stored procedure starts the memory monitor task using the OGGJT001 job setup program.
6. The OGGMT001 memory monitor task starts monitoring the ECSA and 64-bit shared memory.
7. The OGGREADB SQL Function calls the external program OGGRB001.
8. The OGGRB001 external program repeatedly calls the Db2 log read program to create a result set that returns 1 to many log record buffers to the Extract.
9. When a log record result set is complete, OGGRB001 ends after sending the result set to the Extract.

Extract repeats steps 7 to 9 until shut down or abnormal termination. If the memory task fails to start, OGGI001 program returns a flag indicating there was a JCL error or setup issue and Extract manages its own memory. If the memory task starts properly, the memory task tests constantly changing fields in the 48-byte ECSA shared memory. These fields stop changing if the Extract terminates for any reason. At that point, the memory manager waits in case the Extract or network is slow and releases the memory before shutting down after a configured time limit.

To install the components needed for Oracle GoldenGate for Db2 z/OS for Extract:

1. Ensure that a library (PDSE) exists on the Db2 z/OS system and an entry for it is made in the authorized library list. This library is the location where the Oracle GoldenGate external program objects will reside.
2. Ensure that an APF-authorized WLM environment exists that references the PDSE from the preceding step. Oracle recommends that NUMTCB value for the WLM environment be 10-40 for stored procedures. The NUMTCB value depends on the maximum number of Extracts that are running concurrently against the database and on how much throughput each Extract requires. If you want flexibility in setting 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, then 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.
 - f. Add additional RACF authority to the appropriate people, allowing the WLM procedures to start the memory manager job.
4. Ensure the ID used to run the WLM startup JCL procedure has permission to use RRSF. Each time one of the Db2 WLM address spaces is started, it uses RRSF to attach to Db2. See the [Db2 11 for z/OS Installation and Migration Guide](#)
5. In the Linux or UNIX installation of Oracle GoldenGate for Db2 z/OS, there is a ZIP file called zOSPrograms.zip. Unzip zOSPrograms.zip to zOSPrograms.tar and copy zOSPrograms.tar in binary mode to your Db2 z/OS system into an HFS directory.
6. On your Db2 z/OS system in USS or OMVS, change directories to the directory containing zOSPrograms.tar.

- Restore the objects with the command: `tar -xovf zOSPrograms.tar`.

 **Note:**

In this command, the copy target is double-quote 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[irmj][abt][0-9]* "/'/authorized_PDSE_name'/" where authorized_PDSE_name is the name of the APF authorized PDSE, which is intended for the Oracle GoldenGate objects. Using this command installs the objects with the default names.`
- Installing the scripts with different names allows you to conform with system protocols, or it allows you to run multiple versions of Oracle GoldenGate. To install the scripts with different names, it is recommended to create a shell script that renames the programs before copying them to the PDSE. An example of the shell script is given in the following code snippet.

```
#!/bin/bash
# Copy new programs renaming them to version 21.12 names.
cp oggib001 oggi2112
cp oggrb001 oggr2112
cp oggmt001 oggm2112
cp oggjt001 oggj2112
cp -X oggi2112 "/'/SYS4.WLMDSNA.AUTHLOAD' "
cp -X oggr2112 "/'/SYS4.WLMDSNA.AUTHLOAD' "
cp -X oggm2112 "/'/SYS4.WLMDSNA.AUTHLOAD' "
cp -X oggj2112 "/'/SYS4.WLMDSNA.AUTHLOAD' "
```

You can run the script using `chmod +x` command. You can copy and reuse this script for new versions.

- You must create the SQL procedures using your SQL tool of choice so that Oracle GoldenGate can call the Extract objects. The Oracle GoldenGate stored procedures should have permission granted to only those users that use them for replication.

An example SQL script in the Oracle GoldenGate install directory contains the SQL statements to set up the stored procedures on the Db2 z/OS instance. The `demo_db2_setupb_os390.sql` script is for Db2 v11.1 and higher and can run from any SQL tool on any platform that can connect to your Db2 z/OS instance. This script must run on the Db2 instance that you use with your Extract. The script provided in the remote installation directory is in ASCII format. The same script is restored through `zOSPrograms.tar` on the Db2 z/OS system in EBCDIC and is suitable for use through native Db2 z/OS tools such as `SPUFI`.

Edit the following line before running the scripts:

- Modify the `WLM ENVIRONMENT` line to use the correct name for the WLM environment that you will use for Oracle GoldenGate.

 **Note:**

The oggifi0001 schema name is configurable using the `TRANLOGOPTIONS REMOTESCHEMA schemaname` parameter. The procedure names are not configurable. Each of the external names in the script and the PDSE can be renamed as long as the script names and the PDSE object names match. Changing these names is part of the procedure that allows migration to new versions or if specific naming procedures must be adhered to on Db2 z/OS. The following table contains a check list of components that you may wish to edit and/or update:

Table 5-2 List of Editable Components

Component	From	Rename	Where
oggib001	tar file		authorized PDSE
oggrb001	tar file		authorized PDSE
oggmt001	tar file		authorized PDSE & proc library
oggjt001	tar file		authorized PDSE & Extract parm
oggpr001	tar file		procedure library & Extract parm
proclib	MVS		add Extract parm if needed
step libraries	MVS		WLM and oggpr001 procedure library
remoteschema			demo_db2_setupb_os390.s q1 and Extract parm
WLM name	MVS		demo_db2_setupb_os390.s q1
external program			demo_db2_setupb_os390.s q1

 **Note:**

Remember to perform all these steps after every new patch installation.

Using Shared Memory Manager for Extract

Oracle GoldenGate Extract starts a separate task, or job, from the WLM to monitor shared memory usage. This memory consists of a small 48 to 64 byte ECSA area, and a large 64-bit area based on the Extract buffer size.

Specific fields in shared memory get updated for every read performed by the Extract. These fields are updated whether or not the script returns any data. The monitor checks those fields to ensure the Extract has not become inactive. If the Extract is inactive, the shared memory is released, and the monitor ends. You can control the Memory Manager using the `remote_memory_options` parameter in the Extract's parameter file.

You can specify multiple sub-parameters to configure the monitor task. You can configure the wait interval and inactive time the monitor uses by specifying sub-parameters of the remote memory options, as shown in the following example:

```
remote_memory_options wait_interval 2000 inactive_time 01:00
```

The wait interval is expressed in hundredths of seconds in the example and causes the monitor to wait 20 seconds between each memory check. If the monitor has checked for 1 hour (format HH:MM) and the Extract is still inactive, then the monitor will shut down after releasing the shared memory. If the Extract returns to an active state during that hour, the monitor will reset its state and continue monitoring.

The `wait_interval` can have values from 100 to 6000 and the default is 1000. The `inactive_time` can be from 00:10 to 12:00 and the default is 00:30. If the monitor does not start properly, the Extract displays a warning message in the Extract report and the Extract continues the processing. The Extract will attempt to release ECSA memory when it shuts down.

The remote memory parameter has three options to make this feature work. The syntax for these parameters is:

- `task_procedure proc name`
- `task_library proc library`
- `task_setup task setup program`

Example:

```
remote_memory_options task_procedure OGGPR001
remote_memory_options task_library TEST.PROCLIB
remote_memory_options task_setup OGGJT001
```

You may specify multiple options in a single command, as shown below:

```
remote_memory_options task_procedure OGGPR001 task_library TEST.PROCLIB
task_setup OGGJT001
```



Note:

The values for the remote memory parameter are case insensitive.

The default values are procedure name `OGGPR001` and the task setup program `OGGJT001`. There is no default for task library as the procedure might be installed in one of the MVS system default procedure libraries. The task library parameter is only needed if the procedure is not in a system default library.

The memory task will start with a simple JOB card and an `EXEC` procedure name with parameters passed from the Extract. Some z/OS systems may require various other parameters on the job card. The JOB parameters can also be modified using the remote memory parameter, as shown in the example given below.

```
remote_memory_options task_jobname [valid MVS job name (see below)]
remote_memory_options task_acct_info [valid MVS acct value (see below)]
```

```
remote_memory_options task_programmer [valid MVS programmer name, Can use
single quotes]
remote_memory_options task_class [valid MVS job class A to Z or 0 to 9]
remote_memory_options task_msgclass [valid MVS msgclass A to Z or 0 to 9]
remote_memory_options task_msglevel [valid MVS message level n or (,n) or
(n,n) n=valid digit]
remote_memory_options task_priority [valid MVS priority 0-15]
```

You can specify the JOB name using two valid characters and an asterisk, such as AA*. The default JOB name is GG*. The asterisk is replaced by six random numbers when it is specified. Otherwise, if you specify a one to eight byte character name, it must be a valid MVS job name.

Specify account values in any of the following valid MVS formats:

- OTXI
- 'MY ACCT'
- (ACCT,1234,ABC)

For parameters, like `acct_info` and `programmer`, that allow special characters, you must enclose those in single quotes. In addition, the MVS rules about using double single quotes or ampersands within quotes continue to apply. The Extract does minimal validation for these parameters and leaves the complete validation to the MVS process. Extract will accept the first one if you specify duplicate parameters and ignore any duplicates.

A sample procedure JCL file will be included in the `zOSPrograms.zip` file. The JCL has the following format:

```
/*=====
/* EXAMPLE JCL FOR RUNNING THE COMMON MEMORY MONITOR PROCEDURE
/* ADDRESS SPACE NEEDING AN AUTHORIZED LOAD LIBRARY
/* NOTE: THE PROGRAM OGGMT001 CAN BE RENAMED IN THE LIBRARY BUT THE
/*      NEW NAME MUST MATCH THE PROGRAM NAME IN THIS JCL
/*=====
//OGGDSNNA PROC RGN=0K TR=,EX=,MEM=,LEN=,SEC=,DUR=,VER=
//OGGDSNNX EXEC PGM=OGGMT001,REGION=&RGN,TIME=NOLIMIT,
// PARM='&TR &EX &MEM &LEN &SEC &DUR &VER'
/*-----
/* REPLACE &PREFIX.**.AUTHLOAD LIBRARIES WITH SITE SPECIFIC FILE(S)
/* ALSO REPLACE THE CEE LIBRARY WITH SITE SPECIFIC FILE
/* DSNN COULD REPRESENT A DB2 SPECIFIC LOAD LIBRARY IF ONE EXISTS
/*-----
//STEPLIB DD DISP=SHR,DSN=&PREFIX..WLMDSNN.USER.AUTHLOAD
//          DD DISP=SHR,DSN=CEE.SCEERUN
//SYSPRINT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
```

Modify the libraries marked with `PREFIX` so that they work in your system. If you renamed the program `OGGMT001` you copied from the `zOSPrograms.tar` file, you must change it in the JCL. The null parameters on the `PROC` statement are there for information purposes. The job setup program supplies those values using information passed from the Extract. You may also specify as many step library dataset names as required. The JCL procedure supplied in the `zOSPrograms.tar` file gives an example using more than one step library.

6

Installing Oracle GoldenGate for MySQL Databases

Learn about the requirements and how to install Oracle GoldenGate for MySQL databases.

Topics:

- [Supported Databases](#)
- [Database Storage Engine](#)
- [Database Character Set](#)
- [Other Programs and Settings for MySQL](#)
- [Installing for MySQL](#)

Supported Databases

Oracle GoldenGate for MySQL supports capture and delivery for MySQL, Amazon Aurora MySQL, Amazon RDS for MariaDB, Amazon RDS for MySQL, Azure Database for MySQL, and MariaDB.

Note:

- Amazon RDS for MariaDB and MariaDB 10.4 are supported starting with bundle patch 19.1.0.0.200714.
- Azure Database for MySQL is supported starting with bundle patch 19.1.0.0.200414.

For supported database versions, review the certification matrix available at:

<https://www.oracle.com/technetwork/middleware/ias/downloads/fusion-certification-100350.html>

DDL replication is only supported for local capture on MySQL 5.7.10 and greater.

- [Limitations of Support](#)

Limitations of Support

Following are the limitations of support for Oracle GoldenGate for MySQL:

- MySQL databases enabled with binary log transaction compression are not supported with Oracle GoldenGate Extract.
- MySQL databases enabled with binary log encryption are not supported with Oracle GoldenGate Extract.

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.

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
```

Other Programs and Settings for MySQL

Oracle GoldenGate 19c for MySQL is packaged with MySQL client libraries 8.0.17 and requires OpenSSL 1.1.1 be installed on the Oracle GoldenGate server.

- If Oracle GoldenGate is installed on a MySQL 8.0 (versions less than 8.0.34) database server, then add the MySQL installation's `home\bin` directory to the `PATH` or `LD_LIBRARY_PATH` environment variable as shown.

For Linux:

```
export LD_LIBRARY_PATH=mysql_home/bin:$PATH
```

For Windows:

```
set PATH=mysql_home\bin;%PATH%
```

- If Oracle GoldenGate is installed on a MySQL (versions 5.6, 5.7, 8.0.34+) or MariaDB database server, or installed on a hub server, then install OpenSSL 1.1.1 and add its installation location to the `PATH` or `LD_LIBRARY_PATH` environment variable.

This is required for both Linux and Windows systems and the environment variable must include the directory containing the following files:

- `libssl.so.10` and `libcrypto.so.10` files for Linux systems
- `libcrypto-1_1-x64.dll` and `libssl-1_1-x64.dll` files for Windows systems

OpenSSL 1.1.1 binaries are available through [openssl.org](https://www.openssl.org) or by installing a MySQL 8.0 product that includes the OpenSSL 1.1.1 libraries, such as Connector/ODBC 8.0 version 8.0.33.

Installing for MySQL

Install Oracle GoldenGate for your MySQL system, see [Installing for all Platforms](#).

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Installing Oracle GoldenGate for PostgreSQL Databases

Learn about the requirements and how to install Oracle GoldenGate for PostgreSQL databases.

Topics:

- [Operating System Privileges](#)
- [Other Programs and Settings](#)
- [Where to Install Oracle GoldenGate](#)
- [Installing for PostgreSQL](#)
- [Installing the DataDirect driver for PostgreSQL](#)

Operating System Privileges

See [Operating System Privileges](#) for general information about the operating system requirements.

Other Programs and Settings

PostgreSQL libpq Module

For Oracle GoldenGate installations beginning with release version 19.1.0.0.220419 and after, required PostgreSQL `libpq` libraries are now packaged with the Oracle GoldenGate installation and do not need to be installed separately.

For Oracle GoldenGate installations prior to release version 19.1.0.0.220419, PostgreSQL `libpq` libraries need to be manually installed where Oracle GoldenGate is to be installed. Perform the instructions below to install the correct `libpq` module when running Oracle GoldenGate release versions prior to 19.1.0.0.220419.

The steps to install the PostgreSQL `libpq` module are:

1. Follow the steps to install the required PostgreSQL package available at: <https://www.postgresql.org/download/>.
2. Select the **Linux** operating system family and **Red Hat/Rocky/CentOS Linux** distribution from the **Packages and Installers** drop-down list.
3. Select the PostgreSQL version based on the highest version of PostgreSQL that will be used with Oracle GoldenGate.
4. Select the platform where Oracle GoldenGate will be installed, such as **Red Hat Enterprise, CentOS, Scientific, or Oracle version 7**.
5. Select the architecture as **x86_64** from the **Architecture** drop-down list.

This will provide the PostgreSQL setup scripts needed to install the required package(s).

6. Install the repository RPM and the `libs` module. For example:

```
# Install the repository RPM:
sudo yum install -y https://download.postgresql.org/pub/repos/yum/reporpm/
EL-7-x86_64/pgdg-redhat-repo-latest.noarch.rpm

# Install PostgreSQL libs module:
sudo yum install -y postgresql12-libs
```

Database Software for Capture Requirements

To capture from a PostgreSQL database, Oracle GoldenGate requires the `test_decoding` database plug-in be installed for the database. This plug-in might not have been installed by default when the database was installed.

Ensure that the `postgresqlversion#-contrib` package is installed on the database server. For example:

```
sudo yum install postgresql12-contrib
```

Additional Programs and Settings

Configure the `LD_LIBRARY_PATH` and `OGG_HOME` environment variables prior to installing Oracle GoldenGate.

- For Oracle GoldenGate installations prior to release version 19.1.0.0.220419, set the following environment variables before installing Oracle GoldenGate:

1. `OGG_HOME` – The planned Oracle GoldenGate installation path.
2. `LD_LIBRARY_PATH` – Includes the `$OGG_HOME/lib` and PostgreSQL `libpq` directories.

Example:

```
export OGG_HOME=<path_to_install_GoldenGate>
export LD_LIBRARY_PATH=$OGG_HOME/lib:/usr/pgsql-12/lib
```

- For Oracle GoldenGate installations of release version 19.1.0.0.220419 and after, set the following environment variables before installing Oracle GoldenGate:

1. `OGG_HOME` – The planned Oracle GoldenGate installation path.
2. `LD_LIBRARY_PATH` – Includes the `$OGG_HOME/lib` directory.

Example:

```
export OGG_HOME=<path_to_install_GoldenGate>
export LD_LIBRARY_PATH=$OGG_HOME/lib
```

- When installing Oracle GoldenGate on a remote server (one different from where the database is running), set the remote server's time and time zone to that of the source database server so that Oracle GoldenGate Extract can correctly position by time when creating the Extract with the `BEGIN` option, otherwise, position by a valid `LSN` value.

Where to Install Oracle GoldenGate

Oracle GoldenGate for PostgreSQL must be installed on a supported operating system as per the [Certification Matrix](#), and can be installed on the database server itself or on an application hub server, based on your preference.

Installing for PostgreSQL

To install Oracle GoldenGate for your PostgreSQL system. See [Installing for all Platforms](#).

Installing the DataDirect driver for PostgreSQL

After installing Oracle GoldenGate for PostgreSQL, the Extract and Replicat processes use a DataDirect ODBC driver to connect to a PostgreSQL database. This driver is packaged with Oracle GoldenGate and needs to be installed and configured separately.

Installing for Linux

After installing Oracle GoldenGate for PostgreSQL on Linux, the DataDirect driver is automatically installed, but an `ODBCINI` variable needs to be set.

1. For Classic Architecture, create a new session variable called `ODBCINI` and assign it the path of the `odbc.ini` file, which defaults to `/etc/odbc.ini`.

```
export ODBCINI=/etc/odbc.ini
```

8

Installing Oracle GoldenGate for SQL Server Databases

Learn about the requirements and how to install Oracle GoldenGate for SQL Server databases.

Topics:

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

Operating System Privileges for Oracle GoldenGate Processes for SQL Server

Assign operating system privileges according to the following instructions:

- [Manager Running on Windows](#)
- [Extract and Replicat](#)

Manager Running on Windows

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.
- 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.

Extract and Replicat

See *Configuring a Database Connection* in *Using Oracle GoldenGate for Heterogeneous Databases* to know the Extract and Replicat configuration for a database connection and users.

Other Programs and Settings

Observe the following program and settings information for Oracle GoldenGate for SQL Server:

- Install either the Microsoft ODBC Driver 17 or Microsoft ODBC Driver 18 for the operating system where Oracle GoldenGate is to be installed:

For Oracle GoldenGate on Windows, install the driver available at the following link:

<https://docs.microsoft.com/en-us/sql/connect/odbc/download-odbc-driver-for-sql-server?view=sql-server-2017>

For Oracle GoldenGate on Linux, install the driver available at this link, and follow the instructions for RHEL and Oracle Linux packages:

<https://learn.microsoft.com/en-us/sql/connect/odbc/linux-mac/installing-the-microsoft-odbc-driver-for-sql-server?view=sql-server-2017>

Note:

Support for Microsoft ODBC Driver 18 was added with Oracle GoldenGate release 19.1.0.0.221021. Versions prior to release 19.1.0.0.221021 do not support the Microsoft ODBC Driver 18 for SQL Server.

- Installation of the Oracle GoldenGate CDC cleanup tasks requires the Microsoft `sqlcmd` Utility. Download instructions for Windows and Linux systems can be found at:
<https://docs.microsoft.com/en-us/sql/tools/sqlcmd-utility?view=sql-server-ver15>
- To install capture on a remote Linux or Windows server, set the remote server's time and time zone to that of the database server, or use LSN based positioning for the Extract.

SQL Server Requirements

To operate with SQL Server databases, Oracle GoldenGate supports the following instance, database, and other configurations and settings.

- [SQL Server Supported Versions](#)
- [Instance Requirements](#)
- [Database Requirements](#)
- [Table Requirements](#)
- [Database Connectivity](#)
- [Encrypting and Storing User Credentials](#)

SQL Server Supported Versions

The following are the requirements to configure an Oracle GoldenGate for SQL Server instance:

- Oracle GoldenGate Extract supports SQL Server installed on Windows. SQL Server Enterprise Edition of versions 2012, 2014, 2016, 2017, and 2019, and SQL Server

Standard Editions of versions 2016 with Service Pack1 (or higher), 2017, and 2019 are supported.

- (Extract) For SQL Server 2014, 2016, and 2017, Microsoft has identified and fixed several important issues that directly affect the SQL Server Change Data Capture feature. This situation impacts the ability for Oracle GoldenGate to correctly capture data. The current known issues that require Microsoft patches include KB3030352, KB3166120, and KB4073684. If you are using SQL Server 2014, 2016, or 2017 as a source database, Oracle highly recommends that you apply the latest Service Pack or Cumulative Update for your version of SQL Server.
- Oracle GoldenGate Delivery supports SQL Server installed on Windows. SQL Server Enterprise and Standard editions of versions 2012, 2014, 2016, 2017, and 2019 are supported.
- Oracle GoldenGate supports remote capture and delivery for Azure SQL database managed instance and remote delivery for Azure SQL Database.
- Oracle GoldenGate supports remote capture and delivery for Amazon RDS for SQL Server.

Instance Requirements

- The SQL Server server name (`@@SERVERNAME`) must not be `NULL`.
- (Extract) For Oracle GoldenGate to capture transactional data, the SQL Server Agent must be running on the source SQL Server instance and the SQL Server Change Data Capture job must be running against the database. If SQL Server Transactional Replication is also enabled for the database, then the SQL Server Log Reader Agent must be running.
- If your data for `TEXT`, `NTEXT`, `IMAGE`, or `VARCHAR(MAX)`, `NVARCHAR(MAX)` and `VARBINARY(MAX)` columns will exceed the SQL Server default size set for the `max text repl size` option, then extend the size. Use `sp_configure` to view or adjust the current value of `max text repl size`.

Note:

For Amazon RDS for SQL Server, to adjust instance settings, you need to use Parameter Groups instead of `sp_configure`.

Database Requirements

Observe the following requirements and limitations for supporting Oracle GoldenGate:

- Only user databases are supported for capture and delivery.
- Ensure that `Auto Update Statistics` is enabled for the database.
- The database must be set to the compatibility level of the SQL Server instance version. Database compatibility levels below SQL Server 2012 (110) are not supported.
- Oracle GoldenGate supports SQL Server databases configured with Transparent Data Encryption (TDE).
- (Extract) The source database can be set to any recovery model that supports the change data capture feature in Microsoft SQL Server.

- If the source database was created by restoring a backup from a different instance you must synchronize the database owner SID with the SID on the new instance. Alternatively, you can use `sp_changedbowner` to set the restored database to a current login.
- (AlwaysOn) Extract supports capturing from the primary database, or a read-only, synchronous-commit mode. Asynchronous-commit mode are not supported for capture.

Limitations:

- Oracle GoldenGate does not support capture or delivery of system databases.
- Oracle GoldenGate does not support capture from contained databases.
- Source database names cannot exceed 121 characters. This limitation is due to the SQL Server stored procedures that are used to enable supplemental logging.
- If you are configuring the Oracle GoldenGate heartbeat functionality, the SQL Server database name must not exceed 107 characters.
- Capture from SQL Server databases enabled with In-Memory OLTP (in-memory optimization) is not supported. When you add a Memory Optimized Data file group to your database, Oracle GoldenGate is not allowed to enable supplemental logging for any table in the database. Conversely, if supplemental logging has been enabled for any table in the database prior to the creation of a Memory Optimized Data file group, SQL Server does not allow a Memory Optimized Data file group to be created.
- SQL Server 2014, 2016, 2017, and 2019 provide the option of delayed transaction durability for transactions. However, transactions against a table configured with supplemental logging (`TRANDATA`) by Oracle GoldenGate will always be fully durable.
- (AlwaysOn) Capture from asynchronous-commit mode of an AlwaysOn Availability group are not supported.

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.
- Oracle GoldenGate supports the maximum permitted table names and column lengths for tables that are tracked by SQL Server Change Data Capture.
- 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.

Database Connectivity

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: OLE DB: By default, the Replicat process attempts to use OLE DB to connect to a target SQL Server database to perform DML operations. If the driver used only supports ODBC, then the Replicat will apply DML via ODBC. To use OLE DB in an ODBC-only driver, install the Microsoft OLE DB Driver 18 for SQL Server. Using OLE DB allows the use of the `DBOPTIONS USEREPLICATIONUSER` parameter, which supports the `Not for Replication` flag of certain table properties.
- Using the Microsoft 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 Server instance to at least Cumulative Update 7 of Service Pack 1.
 - For SQL Server 2014, upgrade the SQL Server instance to at least Cumulative Update 1.
 - Use a Microsoft supported ODBC driver.
- For Azure SQL Database, use a Microsoft supported ODBC driver.
- Always On availability group listeners are supported and are required to support read-only routing for capture against a synchronous mode secondary replica.

Encrypting and Storing User Credentials

As you set up and install Oracle GoldenGate, you occasionally must log into the database by using the `DBLOGIN` command in the Admin Client or GGSCI command interface. For example, 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. You can create an encryption profile using the Admin Client to set up your credential store.

To know more about setting up security, see [How to Configure an Encryption Profile?](#)

Where to Install Oracle GoldenGate

Oracle GoldenGate Capture for SQL Server supports change data capture installed on a local or remote, Windows or Linux server. Oracle GoldenGate for SQL Server installed on Windows supports local and remote Capture and Delivery for SQL Server running on Windows. For Oracle GoldenGate installed on Linux, only remote Capture and Delivery are supported for SQL Server running on Windows. Oracle GoldenGate does not support SQL Server running on Linux.

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

Installing for SQL Server

To install Oracle GoldenGate for SQL Server, follow the instructions in [Installing for all Platforms](#).

9

Installing Oracle GoldenGate for Sybase Databases

Learn about the requirements and how to install Oracle GoldenGate for Sybase databases.

Install Oracle GoldenGate for your Sybase system, see [Installing for all Platforms](#).

- [Setting Library Paths for Dynamic Builds on UNIX](#)
- [Operating System Privileges](#)
- [Console Character Set](#)

Setting Library Paths for Dynamic Builds on UNIX

Oracle GoldenGate uses shared libraries. When you install Oracle GoldenGate on a UNIX system, the following must be done *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 a UNIX 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.

When Oracle GoldenGate connects remotely to the database server through SQL*Net, the following are required:

- Replicat: The Oracle client library and the Oracle GoldenGate build must have the same Oracle version, bit type (64-bit or IA64), and operating system version.
- Extract: The Oracle client library and the Oracle GoldenGate build must have the same Oracle version, bit type (64-bit or IA64), and operating system version. In addition, both operating systems must be the same endian.

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

Table 9-1 Command Requiring Library Variable

Command	Requires GG libraries in environment variable?
<code>\$ users/ogg > ./ggsci</code>	No
<code>\$ users > ./ogg/ggsci</code>	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 9-2](#):

Table 9-2 UNIX/Linux Library Path Variables per Platform

Platform ¹	Environment variable
IBM AIX	LIBPATH
IBM z/OS	
HP-UX	SHLIB_PATH
Sun Solaris	LD_LIBRARY_PATH ²
LINUX	

¹ A specific platform may or may not be supported by Oracle GoldenGate for your database.

² In 64-bit environments with 32-bit Oracle databases, Oracle GoldenGate requires the LD_LIBRARY_PATH to include the 32-bit Oracle libraries.

Example

```
export LD_LIBRARY_PATH=/ggs/12.0:$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 also shows an error message for any that are missing.

Operating System Privileges

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

- To install on Windows, the person who installs Oracle GoldenGate must log in as Administrator.
- To install on UNIX, the person who installs Oracle GoldenGate must have read and write privileges on the Oracle GoldenGate installation directory.
- The Oracle GoldenGate Extract, Replicat, and Manager processes must operate as an operating system user that has privileges to read, write, and delete files and subdirectories

in the Oracle GoldenGate directory. In addition, the Manager process requires privileges to control the other Oracle GoldenGate processes.

- The Extract process must operate as an operating system user that has read access to the transaction log files, both online and archived. If you install the Manager process as a Windows service during the installation steps in this documentation, you must install as Administrator for the correct permissions to be assigned. If you cannot install Manager as a service, assign read access to the Extract process manually, and then always run Manager and Extract as Administrator.
- Dedicate the Extract, Replicat, and Manager operating system users to Oracle GoldenGate. Sensitive information might be available to anyone who runs an Oracle GoldenGate process.

Console Character Set

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 OS_character_set
```

If the characters do not display correctly after setting the code page, try changing the console font to Lucida Console, which has an extended character set.

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Installing Oracle GoldenGate for Teradata Databases

Learn about the requirements and how to install Oracle GoldenGate for Teradata databases. To install Oracle GoldenGate for Teradata, follow the instructions in [Installing for all Platforms](#).

Topics:

- [Supported Platforms for a Replication Server](#)
- [Operating System Privileges for Teradata](#)
- [Installing ODBC Drivers for Teradata](#)
- [Installing for Teradata](#)

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.

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.

Installing ODBC Drivers for Teradata

Install a supported Teradata ODBC driver based on the database version and operating system where Oracle GoldenGate will be installed. Use the following link to find the available Teradata ODBC drivers:

<https://downloads.teradata.com/download/connectivity>

Review the README instructions provided by Teradata and complete the required driver installation steps.

Installing for Teradata

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

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Installing Oracle GoldenGate for Oracle TimesTen Databases

Learn how to install Oracle GoldenGate for Oracle TimesTen databases.

Topics:

- [System Requirements and Preinstallation Instructions](#)
- [Installing for Oracle TimesTen](#)

System Requirements and Preinstallation Instructions

This chapter contains the requirements for the system and database resources that support Oracle GoldenGate.

Topics:

- [Supported Database Architectures](#)
- [Supported Platforms and Database Versions](#)
- [Oracle TimesTen Client Libraries Installation](#)
- [Client-only Instance Installation](#)
- [Operating System Privileges](#)
- [Database Requirements](#)

Supported Database Architectures

Oracle GoldenGate for Oracle TimesTen supports the Classic and Scaleout architectures of the TimesTen database.

Supported Platforms and Database Versions

Oracle GoldenGate Oracle TimesTen supports installing Oracle GoldenGate on Linux.

For supported platform and database version information, review the certification matrix:

<https://www.oracle.com/technetwork/middleware/ias/downloads/fusion-certification-100350.html>.

Oracle TimesTen Client Libraries Installation

The Oracle TimesTen client libraries need to be installed on the server where GoldenGate is to be installed. If Oracle GoldenGate is installed on the Oracle TimesTen database server, then the required libraries are already available. However, if you are installing Oracle GoldenGate on a non-database server, then you must separately install and configure the client libraries and ODBC connection information.

For Linux platforms, the full TimesTen installation is the only available option that also provides the client libraries. To download Oracle TimesTen, visit:

<https://www.oracle.com/database/technologies/timesten-downloads.html>

Before beginning to install Oracle GoldenGate with Oracle TimesTen, you must also set the `LD_LIBRARY_PATH` variable:

1. Download the *TimesTen Scaleout and TimesTen Classic/Cache 18.x for Linux x86 (64-bit) build*.
2. Extract the Oracle TimesTen installation files to the designated location, based on the instructions provided in *Oracle TimesTen In-Memory Database Installation Guide*.
3. Set the `LD_LIBRARY_PATH` system variable to include the TimesTen installation's `lib` directory. This system variable must be set to install and run Oracle GoldenGate. Example:

```
export LD_LIBRARY_PATH=/installpath/tt18.1.2.2.0/lib:$LD_LIBRARY_PATH
```

Client-only Instance Installation

For non-database server environments where you plan to install Oracle GoldenGate, after installing the Oracle TimesTen client libraries, follow the TimesTen document instructions to create a client-only instance of TimesTen.

1. Perform the following:

```
[oracle@tt_installation_dir]$ ./tt18.1.2.1.0/bin/ttInstanceCreate - clientonly
```

2. Follow the instance installation prompts, taking note of where the TimesTen instance is installed. This information will be required when setting up a Replicat's ODBC connection to TimesTen.
3. Set the `TIMESTEN_HOME` system variable to the TimesTen instance path.

Example:

```
export TIMESTEN_HOME=/instancepath/tt181
```

Operating System Privileges

The operating system privileges for using Oracle GoldenGate for Oracle TimesTen are:

- You need read and write privileges on the Oracle GoldenGate installation directory.
- Oracle GoldenGate Replicat and Manager processes must operate as an operating system user that has privileges to read, write, and delete files and subdirectories in the Oracle GoldenGate directory. In addition, the Manager process requires privileges to control all other Oracle GoldenGate processes.
- Dedicate the Replicat and Manager operating system users to Oracle GoldenGate to avoid access to sensitive information to other users who run Oracle GoldenGate processes.

Database Requirements

This section describes the database requirements for using Oracle GoldenGate for Oracle TimesTen.

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

Database User for Oracle GoldenGate Processes

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



Note:

Times Ten is only supported as a target.

- 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)
 - DEFGEN (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 Oracle TimesTen database, grant `SELECT`, `INSERT`, `UPDATE`, and `DELETE` on all the target tables to the Replicat database user.
- For creating heartbeat and checkpoint tables, grant `CREATE TABLE` to the Replicat database user.

Installing for Oracle TimesTen

To install Oracle GoldenGate for Oracle TimesTen on a Linux platform, follow the instructions in the section [Installing for all Platforms](#).

Part IV

Installing Patches for Oracle GoldenGate

Installing patches is different from upgrading to a new release of Oracle GoldenGate. This chapter describes the steps to prepare and install patches for Microservices Architecture and Classic Architecture.

Topics:

- [Installing Patches for Oracle GoldenGate Microservices Architecture](#)
- [Patching for Classic Architecture](#)

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Installing Patches for Oracle GoldenGate Microservices Architecture

Learn about patching for Microservices Architecture using OPatch.

Patches for Oracle GoldenGate can be found on My Oracle Support when available, and are located under the Patches and Updates section of MOS.

Cumulative and one-off patches for Oracle GoldenGate can be applied on top of a base release or previously patched release, or they may be a one-off patch that should be applied to a specific Oracle GoldenGate version. The instructions in subsequent topics apply to both types of patches.

Topics:

- [Downloading Patches for Oracle GoldenGate](#)
- [Patching Oracle GoldenGate Microservices Architecture Using OPatch](#)
- [Uninstalling the Patch for Microservices Using OPatch](#)

Downloading Patches for Oracle GoldenGate

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

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

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

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

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

 **Note:**

Before installing the software, see [Release Notes for Oracle GoldenGate](#) for any new features, parameter changes, upgrade requirements, known issues, or bug fixes that affect your current configuration.

Patching Oracle GoldenGate Microservices Architecture Using OPatch

Perform the following prerequisites before installing the patch:

1. Download and install the most recent release of OPatch, and keep note of the installation directory where you installed the OPatch release.
Details from where to download OPatch is available at: [How To Download And Install The Latest OPatch\(6880880\) Version \(Doc ID 274526.1\)](#)
2. Download the Oracle GoldenGate patch and maintain a location for storing the contents of the patch ZIP file. This location or the absolute path is referred to as *patch_top_dir* in subsequent steps.
3. Navigate to the *patch_top_dir* directory and run the following command to extract the contents of the patch ZIP file to the location you created previously.

```
$ cd patch_top_dir
$ unzip patch_number_version_platform.zip
```

4. Navigate to the unzipped patch directory:
5. Set the `ORACLE_HOME` environment variable to the Oracle GoldenGate installation directory:
6. Set the `PATH` environment variable to include the locations of the `$ORACLE_HOME` and OPatch directories.

```
$ export ORACLE_HOME=GoldenGate_Installation_Path
$ export PATH=$PATH:$ORACLE_HOME:/OPatch
```

7. Verify the Oracle inventory, which OPatch accesses to install the patches. To verify the inventory, run the following command:

```
$ opatch lsinventory
```

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

8. Run the OPatch prerequisites check and verify that it passes.

```
$ opatch prereq CheckConflictAgainstOHWithDetail -ph ./
```

If any errors are displayed, identify the error type. OPatch categorizes conflicts or errors in the following types:

- Conflicts with a patch already applied to the `ORACLE_HOME`: In this case, stop the patch installation and contact Oracle Support Services.
 - Conflicts with a patch already applied to the `ORACLE_HOME` that is a subset of the patch you are trying to apply: In this case, continue with the patch installation because the new patch contains all the fixes from the existing patch in the `ORACLE_HOME`. The subset patch will automatically be rolled back prior to the installation of the new patch.
9. Before patching Oracle GoldenGate, if you have any deployments for the installation, ensure that you shut down all processes such as Extracts, Replicats, and Distribution paths, and stop all services for the deployments.

This can be done in the Administration Service's and Service Manager's WebUI, or in the Admin Client.

If using the Admin Client, perform the following steps to connect to each deployment and stop all processes.

10. If using the Admin Client, connect to each deployment and stop all processes.
 - a. Start the Admin Client and connect to the deployment.

```
$ /GoldenGate_Installation_Path/bin/adminclient
OGG (not connected) 1>CONNECT https://host:srv_mgrport
DEPLOYMENT <deployment-name> AS <user> PASSWORD <password>
```

- b. Stop the Extract and Replicat processes and the Distribution Paths.

```
STOP ER *
STOP DISTPATH ALL
```

- c. Stop the services for the deployment and verify that they are all stopped:

```
STOP SERVICE *
STATUS SERVICE *
```

- d. Exit the Admin Client and stop the Service Manager:

```
OGG (https://host:port deployment-name) exit

    ##Command for Service Manager not registered as a service/
daemon
    $ export OGG_VAR_HOME=OGG_SRVMGR_DIRECTORY/var
    $ export OGG_ETC_HOME=OGG_SRVMGR_DIRECTORY/etc
    $ OGG_SRVMGR_DIRECTORY/bin/stopSM.sh

    ##Command for Service Manager registered as a service/daemon
    $ sudo systemctl stop OracleGoldenGate
```

11. Disconnect all user sessions to the deployment as well as close all running Oracle GoldenGate programs, including Admin Client.

Perform the following steps to install the patch:

12. Install the patch by running the following command:

```
$ opatch apply
```

When the `OPatch` command starts, it validates the patch and ensures that there are no conflicts with the software already installed in `ORACLE_HOME` of the Oracle GoldenGate release.

13. After the patch installation completes, run the following command to verify that the Oracle inventory contains the installed patch:

```
$ opatch lsinventory
```

14. After the patch installation completes, start the Service Manager, the services, and Oracle GoldenGate processes.

- a. Start the Service Manager:

```
##Command for Service Manager not registered as a service/daemon
$ export OGG_VAR_HOME=OGG_SRVMgr_DIRECTORY/var
$ export OGG_ETC_HOME=OGG_SRVMgr_DIRECTORY/etc
$ OGG_SRVMgr_DIRECTORY/bin/startSM.sh
```

```
##Command for Service Manager registered as a service/daemon
$ sudo systemctl start OracleGoldenGate
```

- b. Start the Admin Client and connect to the deployment.

```
$ /GoldenGate_Installation_Path/bin/adminclient
OGG (not connected) 1>CONNECT https://host:srvmgr_port DEPLOYMENT
deployment-name AS user PASSWORD password
```

- c. Start services for the deployment and verify that they are all running:

```
START SERVICE *
STATUS SERVICE *
```

- d. Start the Extract, Replicat and Distribution paths:

```
START ER *
START DISTPATH ALL
```

Uninstalling the Patch for Microservices Using OPatch

To uninstall the patch, follow these steps:

1. Install the latest OPatch version, set the required environment variables, and stop the Oracle GoldenGate processes and services. The patch installation steps are documented in the previous topic.
2. Navigate to the `patch_top_dir/patch_number` directory:

```
$ cd patch_top_dir/patch_number
```

3. Uninstall the patch by running the following command:

```
$ opatch rollback -id patch_number
```

4. Start the services from the Oracle GoldenGate home.

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Patching for Classic Architecture

Patches for Oracle GoldenGate for Oracle Database can be found on My Oracle Support when available, and are located under the Patches and Updates section of MOS.

Cumulative and one-off patches for Oracle GoldenGate can be applied on top of a base release or previously patched release, or they may be a one-off patch that should be applied to a specific Oracle GoldenGate version. The instructions in the subsequent topic apply to both types of patches.

Learn to prepare and install patches using OPatch for Classic Architecture.

Topic:

- [Downloading Patches for Oracle GoldenGate](#)
- [Patching Oracle GoldenGate Classic Architecture for Oracle Database Using OPatch](#)
- [Patching Oracle GoldenGate for Non-Oracle Databases](#)
- [Uninstalling the Patch for Oracle and Non-Oracle Databases Using OPatch](#)

Downloading Patches for Oracle GoldenGate

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

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

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

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

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

 **Note:**

Before installing the software, see *Release Notes for Oracle GoldenGate* for any new features, parameter changes, upgrade requirements, known issues, or bug fixes that affect your current configuration.

Patching Oracle GoldenGate Classic Architecture for Oracle Database Using OPatch

This topic lists the prerequisites and the steps to be performed for patching Oracle GoldenGate Classic Architecture for Oracle database only, using OPatch.

Perform the following prerequisites before installing the patch:

1. Download and install the most recent release of OPatch, and keep a note of the installation directory where you installed the latest release of OPatch.

Details from where to download OPatch is available at: [How To Download And Install The Latest OPatch\(6880880\) Version \(Doc ID 274526.1\)](#)

2. Download the Oracle GoldenGate patch and maintain a location for storing the contents of the patch ZIP file. This location or the absolute path is referred to as *patch_top_dir* in the subsequent steps.
3. Navigate to the *patch_top_dir* directory and run the following command to extract the contents of the patch ZIP file to the location you created previously.

```
$ cd patch_top_dir
$ unzip patch_number_version_platform.zip
```

4. Navigate to the unzipped patch directory:

```
$ cd patch_top_dir/patch_number_dir
```

5. Set the ORACLE_HOME environment variable to the Oracle GoldenGate installation directory:

```
$ export ORACLE_HOME=GoldenGate_Installation_Path
```

6. Set the PATH environment variable to include the locations of the \$ORACLE_HOME and OPatch directories.

```
$ export PATH=$PATH:$ORACLE_HOME:/OPatch
```

7. Run the following command to verify the Oracle inventory, which OPatch accesses to install the patches:

```
$ opatch lsinventory
```


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

8. Run the OPatch prerequisites check and verify that it passes.

```
$ opatch prereq CheckConflictAgainstOHWithDetail -ph ./
```

If any errors are displayed, identify the error type. OPatch categorizes conflicts in the following types:

- Conflicts with a patch already applied to the `ORACLE_HOME`: In this case, stop the patch installation and contact Oracle Support Services.
 - Conflicts with a patch already applied to the `ORACLE_HOME` that is a subset of the patch you are trying to apply: In this case, continue with the patch installation because the new patch contains all the fixes from the existing patch in the `ORACLE_HOME`. The subset patch will automatically be rolled back prior to the installation of the new patch.
9. Before patching Oracle GoldenGate, ensure that you shut down all processes such as Extracts and Replicats, and stop all other services such as the Oracle GoldenGate Monitor JAgent and Performance Metrics Service.
 - a. Use the Oracle GoldenGate Software Command Interface (`ggsci`) in the GoldenGate Software Home to stop all processes.

```
$ ./ggsci
```

- b. Stop the Extract and Replicat processes and the Distribution Paths.

```
GGSCI> STOP ER *
```

- c. If monitoring is enabled, stop the GoldenGate Monitor JAgent and Performance Metrics Service.

```
GGSCI> STOP PMSRVR
GGSCI> STOP JAGENT
```

- d. Stop the Manager process.

```
GGSCI> STOP MGR!
```

- e. Re-check to verify that all processes have stopped.

```
GGSCI> INFO ALL
```

- f. Exit the Oracle GoldenGate Software Command Interface.

```
GGSCI> EXIT
```

Perform the following steps to install the patch:

10. Install the patch by running the following command:

```
$ opatch apply
```

When the `OPatch` command starts, it validates the patch and ensures that there are no conflicts with the software already installed in `ORACLE_HOME` of the Oracle GoldenGate release.

11. After the patch installation completes, run the following command to verify that the Oracle inventory contains the installed patch:

```
$ opatch lsinventory
```

12. Start the Manager, followed by the other services such as GoldenGate Monitor JAgent and Performance Metrics Service, and the Oracle GoldenGate processes.
 - a. Use Oracle GoldenGate Software Command Interface (`ggsci`) in the GoldenGate Software Home to start all processes and services.

```
$ ./ggsci
```

- b. Start the Manager process.

```
GGSCI> START MGR
```

- c. If monitoring was enabled, start the GoldenGate Monitor JAgent and Performance Metrics Service.

```
GGSCI> START PMSRVR
```

```
GGSCI> START JAGENT
```

- d. Start the Extracts and the Replicats.

```
GGSCI> START ER *
```

- e. Check the status and verify that all processes and services are running.

```
GGSCI> INFO ALL
```

Patching Oracle GoldenGate for Non-Oracle Databases

The following steps guide you to install patches for any of the non-Oracle databases released for Oracle GoldenGate.

1. (Source and target systems) Back up the current Oracle GoldenGate installation directory on the source and target systems, and any working directories that you have installed on a shared drive in a cluster (if applicable).
2. (Source and target systems, as applicable) Expand the patch version 19c (19.1.0) of Oracle GoldenGate into a new directory on each system (not the current Oracle GoldenGate directory). Do not create the sub-directories, just complete the steps to the point where the installation files are expanded.
3. (Source system) Stop user activity on objects in the Oracle GoldenGate configuration.
4. (Source system) In GGSCI on the source system, issue the `SEND EXTRACT` command with the `LOGEND` option until it shows there is no more data in transaction log to process.

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

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

```
GGSCI> STOP EXTRACT group
```

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

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

7. (Target systems) In GGSCI, stop all Replicat processes:

```
GGSCI> STOP REPLICAT group
```

8. (Source and target systems) In GGSCI, stop Manager on the source and target systems.

```
GGSCI> STOP MANAGER
```

9. (Source for MySQL with DDL replication enabled) Ensure that there are no new DDL operations during the patching process, then stop the metadata server by executing the following:

```
./ddl_install.sh stop user-id password port-number
```

10. (Source and target systems) Move the expanded Oracle GoldenGate files from the new directory to your existing Oracle GoldenGate directory on the source and target systems.
11. (DB2 for i) Run `ggos400install` without arguments. No arguments are necessary for an upgrade, however, if you change the library, the old library is left on the system until you remove it. For more information about `ggos400install`, see *Installing DB2 for i in Installing Oracle GoldenGate* .

12.  **Note:**

(Only for the Oracle GoldenGate for SQL Server Extract) Before performing this step, review the steps for [Patching Oracle GoldenGate for SQL Server - Extract Requirements](#) .

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

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

13. (Source for MySQL with DDL replication enabled) Restart the `metadata_server` by executing the following:

```
./ddl_install.sh start user-id password port-number
```

Also see:

- [Patching Oracle GoldenGate for SQL Server - Extract Requirements](#)
- [Patching Oracle GoldenGate MySQL with DDL Replication Enabled](#)

Patching Oracle GoldenGate for SQL Server - Extract Requirements

You must follow the existing patching procedures in [Patching Oracle GoldenGate for Heterogeneous Databases](#). In addition, you must re-run `ADD TRANDATA` for each table that is already enabled for `TRANDATA` using these steps:

1. Stop all Oracle GoldenGate processes
2. Follow normal patch procedures for binary replacement but do not start any Oracle GoldenGate processes. See [Patching Oracle GoldenGate for Non-Oracle Databases](#) for details.
3. Manually stop the SQL Server CDC Capture job for the database. If the job is processing a large transaction, it may take some time before it actually stops.
4. Ensure that the Extract is stopped.
5. Using GGSCI, run `ADD TRANDATA` again for every table that you previously enabled it for, including the heartbeat tables and any Replicat checkpoint table used as a `FILTERTABLE` object for active/active configurations.

 **Note:**

Do not run the `DELETE TRANDATA` command.

6. Manually restart the SQL Server CDC Capture job.
7. Manually restart the Oracle GoldenGate processes such as Extract, Replicat, and Manager.

Patching Oracle GoldenGate MySQL with DDL Replication Enabled

For patching Oracle GoldenGate MySQL with DDL replication enabled, user requires additional steps:

1. Stop the metadata server by executing the DDL install script with `stop` option.
2. Replace the `metadata_server` executable in the installation directory.
3. Start the metadata server running currently by running `ddl` install script with `start` option:

```
./ddl_install.sh stop user-id password port-number
```

```
./ddl_install.sh start user-id password port-number
```

 **Note:**

The DDL operations issued in between starting and stopping the `metadata_server` would be lost.

Uninstalling the Patch for Oracle and Non-Oracle Databases Using OPatch

To uninstall the patch, follow these steps:

1. Install the latest OPatch version, set the required environment variables, and stop the Oracle GoldenGate processes and services. The patch installation steps are documented in the previous topic.

2. Navigate to the *patch_top_dir/patch_number* directory:

```
$ cd patch_top_dir/patch_number
```

3. Uninstall the patch by running the following command:

```
$ opatch rollback -id patch_number
```

4. Start the services and processes from the Oracle GoldenGate home.

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

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Uninstalling Oracle GoldenGate Microservices Architecture

Learn how to uninstall Oracle GoldenGate Microservices Architecture for Oracle platforms.

Topics:

- [Uninstalling Microservices Architecture for Oracle Platforms](#)

Uninstalling Microservices Architecture for Oracle Platforms

Topics:

- [Removing Deployments and Service Manager](#)
- [Files to be Removed Manually](#)
- [Uninstalling Microservices Architecture with Oracle Universal Installer](#)

Removing Deployments and Service Manager

Learn how to remove a deployment using OGGCA.

Topics:

- [Removing Deployments and Service Manager Using Oracle GoldenGate Configuration Assistant](#)
- [Using Oracle GoldenGate Configuration Assistant - Silent](#)

Removing Deployments and Service Manager Using Oracle GoldenGate Configuration Assistant

To remove a deployment using Oracle GoldenGate Configuration Assistant (OGGCA), perform the following steps:

1. Connect to the Administration Server of all deployments to be removed, and stop any running Extracts and Replicats.
2. In Linux systems, run the command `./oggca.sh` from the `$OGG_HOME/bin` directory to launch the Oracle GoldenGate Configuration Assistant (OGGCA). In Windows systems, right-click the `oggca.bat` file and select **Run as administrator**. This file is located in the `OGG_HOME\bin` directory.
3. Select the **Existing Service Manager** option and click **Next**.
4. Select **Remove Existing Oracle GoldenGate** deployment and click **Next**.
5. Follow the steps in the OGGCA wizard to remove the deployment.
6. Repeat the steps to remove multiple deployments and the Service Manager.

Using Oracle GoldenGate Configuration Assistant - Silent

To run the Configuration Assistant in silent mode, execute it with the `-silent -responseFile fullPathToResponseFile` flags.

The properties expected to be set in the response file for removing a deployment are:

```
CONFIGURATION_OPTION,
DEPLOYMENT_NAME,
ADMINISTRATOR_USER,
ADMINISTRATOR_PASSWORD,
HOST_SERVICEMANAGER,
PORT_SERVICEMANAGER,
SECURITY_ENABLED,
REMOVE_DEPLOYMENT_FROM_DISK
```

Files to be Removed Manually

Files to be Removed Manually After Removing Deployment

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

Uninstalling Microservices Architecture with Oracle Universal Installer



Note:

It's important to remove all deployments prior to uninstalling Oracle GoldenGate home directory.

To uninstall Oracle GoldenGate Microservices Architecture with Oracle Universal Installer, perform the following tasks:

1. Move to the following directory:
`/$OGG_HOME/deinstall/`
2. Run the command:
 On UNIX and Linux: `./deinstall.sh`
 On Windows: `\deinstall.bat`
3. See [Files to be Removed Manually](#) to know more about the steps that you may need to perform manually.

Silent Uninstallation

If you want perform a silent uninstallation, use the command:

```
deinstall.sh -silent
```

Make sure that you've set the `OGG_HOME` variable correctly as the uninstallation is silent so you will not be prompted.

See the following example for a silent uninstalation:

```
OS> ./deinstall.sh
ALERT: Ensure all the processes running from the current Oracle Home are
shutdown prior to running this software uninstallation script.Proceed with
removing Oracle GoldenGate home:
/net/xyz02/scratch/scott/view_storage/scott_x19200x/local/ggtest/
install_200714
      (yes/no)? [no] yes
Starting Oracle Universal Installer...
Checking swap space: must be greater than 500 MB.
Actual 11648 MB
PassedPreparing to launch Oracle Universal Installer from /tmp/
OraInstall2020-08-19_10-52-30AM.
      Please wait ...
Oracle Universal Installer, Version 12.2.0.1.4 ProductionCopyright (C) 1999,
2016, Oracle. All rights reserved.Starting deinstallDeinstall in progress
(Wednesday, August 19, 2020 10:52:33 AM
PDT)..... 100%
Done.Deinstall successful
      OS> ./deinstall.sh -silentALERT:
Ensure all the processes running from the current Oracle Home are shutdown
prior to running this software uninstallation script. Starting Oracle
Universal Installer... Checking swap space: must be greater than 500 MB.
Actual 11647 MB
      Passed Preparing to launch Oracle Universal Installer from /tmp/
OraInstall2020-08-19_10-43-25AM.
      Please wait ...
Oracle Universal Installer, Version 12.2.0.1.4 Production Copyright (C) 1999,
2016, Oracle. All rights reserved.
Starting deinstall
Deinstall in progress (Wednesday, August 19, 2020 10:43:29 AM PDT)
      ..... 100% Done.
Deinstall successful
```

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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](#)

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
```

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.

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 logmining 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. `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
```

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
```

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](#)

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.

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.

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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](#)

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 *
```

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. Remove any heartbeat table entries by running the `DELETE HEARTBEATTABLE` command.
7. For a CDC Capture configuration, remove the Oracle GoldenGate CDC Cleanup job and objects if they were created.
 - a. Open a command prompt and change to the Oracle GoldenGate installation folder.
 - b. Run the `ogg_cdc_cleanup_setup.bat` file as follows:

```
ogg_cdc_cleanup_setup.bat dropJob userid password database_name
servername\instancename schema
```

The `userid password` must be a valid SQL Server login and password for a `sysadmin` user. `database_name servername\instancename` are the source database name and instance name. If only server name is listed, then the default instance will be connected to. `schema` is the schema name listed in the `GLOBALSfile`, with the `GGSCHEMA` parameter. This schema should be the same for all Oracle GoldenGate objects, including supplemental logging, checkpoint tables, heartbeat tables, and the Oracle GoldenGate CDC Cleanup job.

For example:

```
ogg_cdc_cleanup_setup.bat dropJob ggsuser ggspword db1 server1\inst1 ogg
```

8. Use this command to remove supplemental logging from tables that were enabled with it, see `DELETE TRANDATA`. Remove supplemental logging for any filter tables used for bi-directional replication as well. You can use a wildcard to specify multiple table names.

```
DELETE TRANDATA owner.table
```

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
```

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.

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.

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](#)

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](#).

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.

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.

A

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 A-1 Oracle GoldenGate Installed Programs and Utilities

Program	Description
convchk	Converts checkpoint files to a newer release.
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.

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

Program	Description
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 A-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.
dirdb	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</p> <p>repl.cpr</p>
dircrd	Contains credential store files.

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

Directory	Description
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 9-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> <pre>rt000001 finance</pre>
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> <pre>defs.dat</pre>
dirdmp	<p>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.</p>
dirjar	<p>Contains the Java executable files that support Oracle GoldenGate Monitor.</p>
dirpcs	<p>Default location for status files. File name format is <code>group.extension</code> where <code>group</code> is the name of the group and <code>extension</code> is either <code>pce</code> (Extract), <code>pcr</code> (Replicat), or <code>pcm</code> (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> <pre>mgr.pcm ext.pce</pre>
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 <code>group name/user-defined name.prm</code> or <code>mgr.prm</code>.</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> <pre>defgen.prm finance.prm</pre>
dirrec	<p>Not used by Oracle GoldenGate.</p>

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

Directory	Description
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>FIN2.rpt</p> <p>MGR4.rpt</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 A-3 Other Oracle GoldenGate Installed Files

Name	Description
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.
db2cntl.tpl	Template for use with Replicat when creating a control file for the IBM LOADUTIL 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.

Table A-3 (Cont.) Other Oracle GoldenGate Installed Files

Name	Description
ddl_nopurgeRecyclebin.sql	Empty script file for use by Oracle GoldenGate support staff.
ddl_ora11.sql ddl_ora12.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	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.
demo_db_scriptname.sql demo_more_db_scriptname.sql	Scripts that create and populate demonstration tables for use with tutorials and basic testing.
.dmp 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.

Table A-3 (Cont.) Other Oracle GoldenGate Installed Files

Name	Description
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 icuinx.dll icuucxx.dll	Windows shared libraries for International Components for Unicode, where <i>xx</i> is the currently used version.
jagent.bat	Windows batch file for the JAgent for Oracle GoldenGate Monitor.
jagent.log jagentjni.log	Log files for the Oracle GoldenGate Monitor Agent.
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.
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.
ogg_cdc_cleanup_setup.bat	Available for Oracle GoldenGate for SQL Server. Its used in creating the Oracle GoldenGate CDC Cleanup job for SQL Server.
ogg_create_cdc_cleanup_job.sql	Available for Oracle GoldenGate for SQL Server. Its used in creating the Oracle GoldenGate CDC Cleanup job for SQL Server.
pthread-win32.txt	License agreement for <code>pthread-VC.dll</code> .
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.

Table A-3 (Cont.) Other Oracle GoldenGate Installed Files

Name	Description
usrdecs.h	Include file for user exit API.
xerces-c_2_8.dll	Apache XML parser library.
zlib.txt	License agreement for <code>zlib</code> compression library.