Oracle® Fusion Middleware Installing Oracle GoldenGate





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



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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:

((transaction log size * 0.33) * number of log switches per day) * 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.



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 and the list of code page identifiers 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
- 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:

- 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.

1.1 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.

1.1.1 Setting ORACLE HOME and ORACLE SID

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

Specifying Oracle Variables on UNIX and Linux Systems

Specifying Oracle Variables on Windows Systems

- Specifying Oracle Variables on UNIX and Linux Systems
- Specifying Oracle Variables on Windows Systems

1.1.1.1 Specifying Oracle Variables on UNIX and Linux Systems

If there is one instance of Oracle Database on the system, set the <code>ORACLE_HOME</code> and <code>ORACLE_SID</code> environment variables at the system level. If you cannot set them that way, use the following <code>SETENV</code> statements in the parameter file of every Extract and Replicat group that will be connecting to the instance. The <code>SETENV</code> 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
```

```
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;
```



1.1.1.2 Specifying Oracle Variables on Windows Systems

If there is one instance of Oracle on the system, the Registry settings for <code>ORACLE_HOME</code> and <code>ORACLE_SID</code> 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.

- 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.
- For the Variable Name, enter ORACLE_HOME.
- 6. For the Variable Value, enter the path to the Oracle binaries.
- 7. Click OK.
- 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:

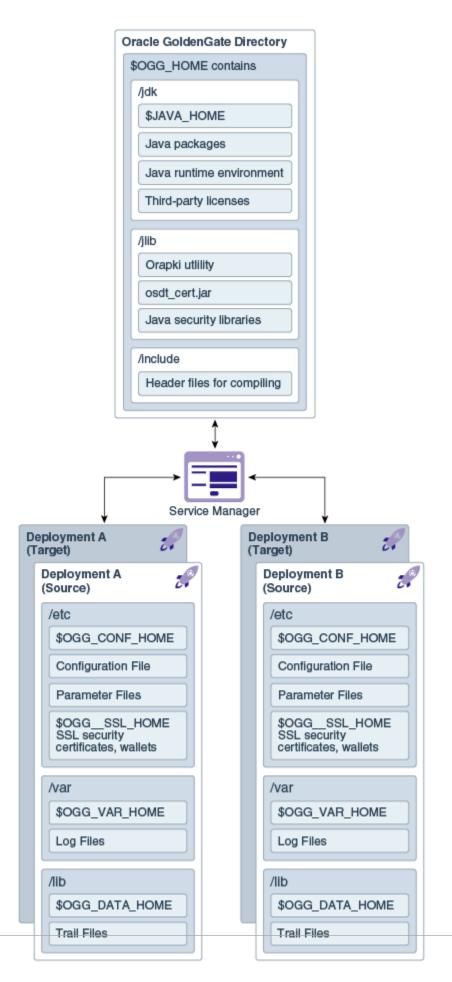
- 1. Use the preceding procedure (single Oracle instance on system) to set the ORACLE HOME and ORACLE SID system variables to the first Oracle instance.
- Start all of the Oracle GoldenGate processes that will connect to that instance.
- Edit the existing ORACLE_HOME and ORACLE_SID variables to specify the new information., then repeat the procedure for the next Oracle instance.
- 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.

1.1.2 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 readonly directory contains binary, executable, and library files for the product.	/ database_install_ location
Oracle GoldenGate home	OGG_HOME	The Oracle GoldenGate home that is created on a host computer is the directory that you choose to install the product. This read- only directory contains binary, executable, and library files for the product.	/ ogg_install_locat ion
Deployment configuration home	OGG_CONF_HOME	The location in which each deployment information and configuration artifacts are stored.	/ ogg_deployment_lo cation/etc/conf
Deployment security home	OGG_SSL_HOME	The location in which each deployment security artifacts (certificates, wallets) are stored.	/ ogg_deployment_lo cation/etc/ssl
Deployment data home	OGG_DATA_HOME	The location in which each deployment data artifacts (trail files) are stored.	/ ogg_deployment_lo cation/var/lib/ data
Deployment variable home	OGG_VAR_HOME	The location in which each deployment logging and reporting processing artifacts are stored.	/ ogg_deployment_lo cation/var
Deployment etc home	OGG_ETC_HOME	The location in which your deployment configuration files are stored including parameter files.	/ ogg_deployment_lo cation/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
adminclient	The Admin Client is a standalone command line interface used to create processes, rather than using the MA UI.	<pre>\$OGG_HOME/bin</pre>
adminsrvr	The Administration Server supervises, administers, manages, and monitors processes operating within an Oracle GoldenGate deployment for both active and inactive processes.	\$OGG_HOME/bin
distsrvr	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.	\$OGG_HOME/bin
extract	Extract data process.	<pre>\$OGG_HOME/bin</pre>
oggca.sh	The MA Configuration Assistant.	<pre>\$OGG_HOME/bin</pre>
orapki	Utility to manage public key infrastructure elements, such as wallets and certificate revocation lists,	\$OGG_HOME/bin
pmsrvr	The Performance Metrics Server uses the metrics service to collect and store instance deployment performance results.	<pre>\$OGG_HOME/bin</pre>
recvsrvr	A Receiver Server is the central control service that handles all incoming trail files.	<pre>\$OGG_HOME/bin</pre>
replicat	Replicat data process.	<pre>\$OGG_HOME/bin</pre>
ServiceManager	A Service Manager acts as a watchdog for other services available with the MA.	<pre>\$OGG_HOME/bin</pre>



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

1.2 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.

- On the Select Installation Option page, select the Oracle Database version for your environment, then click Next.
- 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.
- 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.

1.3 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 <code>unzipped_directory/fbo_gg_Linux_x64_services_shiphome/Disk1/response</code>.

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



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.

2.1 Prerequisites

Learn about what you need to do before installing.

Topics:

- Setting ORACLE_HOME and ORACLE_SID
- Database Requirements

2.1.1 Setting ORACLE_HOME and ORACLE_SID

Make certain that the <code>ORACLE_HOME</code> and <code>ORACLE_SID</code> 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

2.1.1.1 Specifying Oracle Variables on UNIX and Linux Systems

If there is one instance of Oracle Database on the system, set the <code>ORACLE_HOME</code> and <code>ORACLE_SID</code> environment variables at the system level. If you cannot set them that way, use the following <code>SETENV</code> statements in the parameter file of every Extract and Replicat group that will be connecting to the instance. The <code>SETENV</code> 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;
```

2.1.1.2 Specifying Oracle Variables on Windows Systems

If there is one instance of Oracle on the system, the Registry settings for <code>ORACLE_HOME</code> and <code>ORACLE_SID</code> 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**.
- 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.

2.1.2 Database Requirements

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

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

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

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

2.2 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

2.2.1 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.



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 <code>ggsci.exe</code> 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



2.2.1.1 Performing an Interactive Installation with OUI

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

- Expand the installation file.
- 2. From the expanded directory, run the runInstaller program on UNIX or Linux, or run setup.exe on Windows.
- 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.



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 Database11g. 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.

2.2.1.2 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
- Installing for PostgreSQL
 Learn about the requirements and how to install Oracle GoldenGate for
 PostgreSQL.
- 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 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.



The installation path *cannot* contain any spaces.

2. From this directory, run GGSCI. For Linux and UNIX, open a command shell to run qqsci.sh.



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

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 then 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



The $\,$. / portion of this command must be used, because the <code>GLOBALS</code> 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
ADDEVENTS	Adds Oracle GoldenGate events to the Windows Event Manager.
ADDSERVICE	Adds Manager as a service with the name that is specified with the MGRSERVNAME parameter in the GLOBALS file, if one exists, or the GGSMGR default. The ADDSERVICE 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 USER and PASSWORD options. ¹
	The service is installed to start at system boot time (see AUTOSTART). To start it after installation, either reboot the system or start the service manually from the Services applet in the Control Panel.
AUTOSTART	Sets the service that is created with ADDSERVICE to start at system boot time. This is the default unless MANUALSTART is used.
MANUALSTART	Sets the service that is created with ADDSERVICE to start manually through GGSCI, a script, or the Services applet in the Control Panel. The default is AUTOSTART.
USER name	Specifies a domain user account that executes Manager. For the $name$, 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.
PASSWORD password	Specifies the password for the user that is specified with USER.

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.



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.



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

3.1 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

- For the intermediary system, select any supported for the DB2 for LUW database to be the system that Oracle GoldenGate is installed on.
- Install and run DB2 for LUW on the selected remote system so that the Replicat process can use the supplied DB2 Connect driver.
- 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



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.

3.2 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.
- 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



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

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



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.



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

4.1 Disk Requirements

This section outlines the disk requirements for Oracle GoldenGate.

- To determine the size of the Oracle GoldenGate download file, view the Size column before downloading your selected build from Oracle Software Delivery Cloud. The value shown is the size of the files in compressed form. The size of the expanded Oracle GoldenGate installation directory will be significantly larger on disk.
- Allow sufficient disk space for virtual memory. The default set by the Oracle GoldenGate cache manager is 64 GB on 64-bit systems. See Memory Requirements for additional information about memory management.
- An additional 1 GB of disk space on any system that hosts Oracle GoldenGate trails, which are files that contain the working data. You may need more or less than this amount, because the space that is consumed by the trails depends on

the volume of data that will be processed. See the guidelines for sizing trails in *Administering Oracle GoldenGate*.

4.2 Memory Requirements

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

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

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



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.

4.3 Oracle GoldenGate Security Privileges

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

- Oracle GoldenGate Security Privileges
- Oracle GoldenGate Security Privileges on a DB2 for i Source System

4.3.1 Oracle GoldenGate Security Privileges

The person who installs Oracle GoldenGate must have read and write privileges on the Oracle GoldenGate installation directory, because steps will be performed to create some sub-folders and run some programs. On a Windows systen, 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.

4.3.2 Oracle GoldenGate Security Privileges on a DB2 for i Source System

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

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

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

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

Assign *USE authority to all objects on the system that the Extract user profile must have access to. Assign *CHANGE authority to all objects on the system that the Replicat user profile must have access to. This can be accomplished by either granting *ALLOBJ authority to the user, or by setting the individual authority to the objects (FILE, LIBRARY and JOURNAL objects) that the user must access. This includes the objects in the OSYS2



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.

4.4 General Requirements

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

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

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



IBM i7.2 Group PTF	Level	Name	Notes
SF99720	16127	Cumulative PTF	Other required PTF: 5761SS1, SI51061Check 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.

4.5 Installing for DB2 for i

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



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.



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.
- -1 library specifies the name of the library where the objects will be restored. The library must exist. If a library is not specified for a new installation, the installer will attempt to use the current library of the user that is running the installer. If a library is not specified for an existing installation, the installer will attempt to use the library that is set in the oggprcjrn.srvpgm link.

Note:

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

9. Exit QP2TERM.

- F3

Note:

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

 Install Oracle GoldenGate on the DB2 for i database server, see Installing for all Platforms.



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

5.1 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.

5.2 Memory Requirements

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

On the remote system

The amount of memory that is required for Oracle GoldenGate depends on the amount of data being processed, the number of Oracle GoldenGate processes running, the amount of RAM available to Oracle GoldenGate, and the amount of disk space that is available to Oracle GoldenGate for storing pages of RAM temporarily on disk when the operating system needs to free up RAM (typically when a low watermark is reached). This temporary storage of RAM to disk is commonly known as **swapping** or **paging**. Depending on the platform, the term **swap space** can be a swap partition, a swap file, or a shared memory segment (IBM i platforms). Modern servers have sufficient RAM combined with sufficient swap space and memory management systems to run Oracle GoldenGate. However, increasing the amount of RAM available to Oracle GoldenGate may significantly improve its performance, as well as that of the system in general.

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

Excessive swapping to disk causes performance issues for the Extract process in particular, because it must store data from each open transaction until a commit

record is received. If Oracle GoldenGate runs on the same system as the database, the amount of RAM that is available becomes critical to the performance of both. RAM and swap usage are controlled by the operating system, not the Oracle GoldenGate processes. The Oracle GoldenGate cache manager takes advantage of the memory management functions of the operating system to ensure that the Oracle GoldenGate processes work in a sustained and efficient manner. In most cases, users need not change the default Oracle GoldenGate memory management configuration. For more information about evaluating Oracle GoldenGate memory requirements, see the CACHEMGR parameter in the *Reference for Oracle GoldenGate*.

On the DB2 host system

Allocate approximately 10-50 MB of virtual memory for each Oracle GoldenGate log reader, oggreadx, that is invoked depending on the size of the log buffer. There is one invocation per Extract process on the remote system. To adjust the maximum log buffer size, use the TRANLOGOPTIONS BUFSIZE parameter in the Extract parameter file. 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: lhttps://www.ibm.com/support/knowledgecenter/en/SSEPEK_11.0.0/perf/src/tpc/db2z assignprocfunc2wlmappenv.html

5.3 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.

5.4 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

5.5 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

- 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.

5.6 Installing Extract Components on DB2 z/OS

Follow these steps to install the components needed for Oracle GoldenGate for DB2 z/OS for Extract:

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

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



- 4. Ensure that the ID that is used to run the JCL startup procedure for the WLM application environment has permission to use RRSAF. Each time one of the DB2 WLM address spaces is started, it uses RRSAF to attach to DB2. See the DB2 11 for z/OS Installation and Migration Guide
- 5. From the Linux or UNIX installation of Oracle GoldenGate for DB2 z/OS there is a ZIP file called zOSPrograms.zip. 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.
- 7. 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.

- 8. Copy the objects to the authorized PDSE. Use the cp -X ogg[ir][ab][0-9]* "//'authorized_PDSE_name'" Where authorized_PDSE_name is the name of the APF authorized PDSE intended for the Oracle GoldenGate objects.
- 9. Using your SQL tool of choice, you must create the SQL procedures so that Oracle GoldenGate can call the Extract process. The Oracle GoldenGate stored procedures should have permission granted to only those users that are used for replication.

There is an example SQL script provided in the Oracle GoldenGate install directory that contain the SQL statements to setup the stored procedures on the DB2 for z/OS instance. The $demo_db2_setupb_os390.sq1$ script is for DB2 v11.1 and higher can be run from any SQL tool on any platform that can connect to your DB2 for z/OS instance. This script should be run on the DB2 instance you are using with your Extract.. The script in that was provided in the remote installation directory is in ASCII, the same script is restored through <code>zOSPrograms.tar</code> on the DB2 z/OS system in EBCDIC and is suitable for use through native DB2 z/OS tools such as <code>SPUFI</code>.

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

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



Note:

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

Note:

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



Installing Oracle GoldenGate for MySQL

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

To install Oracle GoldenGate for MySQL, follow the instructions in Installing for all Platforms.

Topics:

- Supported Databases
- Database Storage Engine
- Database Character Set
- Other Programs and Settings for MySQL
- Installing for MySQL

6.1 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.



- 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.

6.2 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.

6.3 Database Character Set

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

Level	Example
Database	create database test charset utf8;
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
```

6.4 Other Programs and Settings for MySQL

From Oracle GoldenGate 19c, OpenSSL shared libraries are required and must be installed. If you are using Oracle GoldenGate to extract from MySQL 8.0 and Oracle GoldenGate is installed on the local database server, then add the MySQL installation path to the PATH variable as follows:

For Windows:

```
PATH=MYSQL_HOME\bin; %PATH%
```

For Linux:

```
export PATH=MYSQL_HOME/bin:$PATH
```

If you need to set up Oracle GoldenGate to extract from MySQL 5.7 or earlier or are installing Oracle GoldenGate on a remote server, then you need to install OpenSSL

and add its installation location to the ${\tt PATH}$ variable. This is required for both Linux and Windows.

6.5 Installing for MySQL

Install Oracle GoldenGate for your MySQL system, see Installing for all Platforms.



Installing for PostgreSQL

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

Topics:

- Operating System Privileges
- Other Programs and Settings
- PostgreSQL Requirements
- Where to Install Oracle GoldenGate
- Installing Oracle GoldenGate Files for PostgreSQL

7.1 Operating System Privileges

Assign operating system privileges according to the instructions provided in this section.

Topics:

- Manager
- Extract and Replicat

7.1.1 Manager

- The Manager process in each Oracle GoldenGate installation requires a dedicated port for communication between itself and other local Oracle GoldenGate processes. To specify this port, use the PORT parameter in the Manager parameter file. The default port number for Manager is 7809. You must specify either the default port number (recommended, if available) or as required. The port must be unreserved and unrestricted. Each Manager instance on a system must use a different port number.
- The Manager process can run interactively as the current user, it requires:
 - Full control permissions over the files and folders within the Oracle GoldenGate directories.
 - Full control permissions over the trail files, if stored in a location other than the Oracle GoldenGate directory.

The programs that capture and replicate data (Extract and Replicat) run under the Manager account and inherit the Manager's privileges.

7.1.2 Extract and Replicat

See Extract and Replicat User Considerations for PostgreSQL in *Using Oracle GoldenGate for Heterogeneous Databases*

7.2 Other Programs and Settings

Following are the other program and settings information for Oracle GoldenGate for PostgreSQL:

- To install capture on a remote Linux server, set the remote server's time and time zone to that of the source database server so that Oracle GoldenGate positions the Extract at the specified position. Remote server is the server where Oracle GoldenGate is installed. So the timezone of the server where Oracle GoldenGate is installed, should match with the timezone of the source database for the Extract to be able to position correctly.
- Oracle GoldenGate fully supports virtual machine environments created with any
 virtualization software on any platform. 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.

7.3 PostgreSQL Requirements

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

Topics:

- Database Requirements
- Table Requirements
- Database Configuration
- Encrypting and Storing User Credentials

7.3.1 Database Requirements

The database should meet the following requirements:

- Only user databases are supported for capture and delivery.
- Oracle GoldenGate does not support capture from archived logs.
- The following attributes in the PostgreSQL database configuration file, \$PGDATA/ postgresql.conf, needs to be modified.

```
wal_level = logical  # minimal, replica, or logical
max_replication_slots = 10  # max number of replication
slots
max_wal_senders = 10  # (change requires restart)
```

Oracle GoldenGate Capture for PostgreSQL requires one replication slot per Extract, so you need to increase the max_replication_slot number by one for each Extract it configures. The max_wal_senders value should be greater than or equal to max_replication_slots value. After these changes to the postgresgl.conf configuration file, the database needs to be restarted.



• LIBPQ (PostgreSQL installation/lib) and data direct library (dd_odbc_home/lib) are required, so you need to set the LD_LIBRARY_PATH.

```
export ODBCINI=/scratch/jitiwari/work/Postgres/odbc.ini
export PG_HOME=/scratch/jitiwari/work/postgresinstal
export DD_ODBC_HOME=/scratch/jitiwari/work/
Postgres/7.1
export LD_LIBRARY_PATH=$PG_HOME/lib:$DD_ODBC_HOME/
lib:$LD_LIBRARY_PATH
```

Set the ODBC.ini file. Refer to the following example:

```
scott@slc10ujz Postgres> cat odbc.ini
[ODBC Data Sources]
PGDSN=DataDirect 7.1 PostgreSQL Wire Protocol
postgres=DataDirect 7.1 PostgreSQL Wire Protocol
scott=DataDirect 7.1 PostgreSQL Wire Protocol
[ODBC]
IANAAppCodePage=4
InstallDir=/scratch/user/work/Postgres/7.1
[PGDSN]
Driver=/scratch/user/work/Postgres/7.1/lib/GGpsql25.so
Description=DataDirect 7.1 PostgreSQL Wire Protocol
Database=postgres
HostName=localhost
#HostName=10.250.53.112
PortNumber=5432
LogonID=postgres
Password=welcome
```

The PostgreSQL client libraries need to be installed on the machine where Extract
is installed and run. The version of the installed client libraries should not be lower
than the version of the PostgreSQL database from which the data is captured. It is
recommended that the version of client libraries exactly matches the PostgreSQL
database version.

For example, you must install postgresql11-libs-11.7-1PGDG.rhel7.x86_64.rpm on the machine where Extract is run if the Extract is configured from PostgreSQL database version 11.7.

Ensure that if there are any older (or multiple) versions of PostgreSQL client libraries installed on the machine, then the correct version of the libraries is used for the Extract.

In case of remote capture and apply, Oracle GoldenGate for PostgreSQL requires client libraries to exist on the hub server where Oracle GoldenGate is installed. If the hub server does not contain a PostgreSQL database for the same supported version, then the PostgreSQL client needs to be installed. The PostgreSQL Client library version must match with the database server version. This way Oracle GoldenGate for PostgreSQL has the necessary libraries to run. For example, Oracle GoldenGate capturing data from PostgreSQL database 10 must have PostgreSQL client libraries version 10 or above installed on hub server.



Limitations:

 Oracle GoldenGate does not support capture or delivery to or from system databases.

7.3.2 Table Requirements

Tables to be included for capture and delivery must meet the following requirements and must only include data types listed under section 1.5 Supported/Unsupported data types and operations.

- Oracle GoldenGate for PostgreSQL supports capture of transactional DMLs from user tables, and delivery to user tables.
- Oracle GoldenGate for PostgreSQL does not support capture from views.
- Oracle GoldenGate for PostgreSQL does not support capture from partitioned tables, however delivery to the partitioned tables is supported.
- Globalization is supported for object names (table /schema/database/column names) and column data.
- The support of range and precision for floating-point numbers depends on the
 host machine. In general, the precision is accurate to 16 significant digits,
 but you should review the database documentation to determine the expected
 approximations. Oracle GoldenGate rounds or truncates values that exceed the
 supported precision.
- Capture from views is not supported, but the underlying tables can be extracted and replicated.

7.3.3 Database Configuration

- DataDirect ODBC: The PostgreSQL capture process uses DataDirect ODBC driver to connect to a source PostgreSQL database to fetch the metadata. PostgreSQL Replicat process uses DataDirect ODBC driver to connect to the target PostgreSQL database.
- Native libPQ library: Capture also uses libpq library of PostgreSQL to fetch the changed data form the WAL logs.

7.3.4 Encrypting and Storing User Credentials

While using PostgreSQL authentication, you may need to log into the database using <code>DBLOGIN</code> in the GGSCI command interface. An example is when you add supplemental logging with <code>ADD TRANDATA</code>.

Encrypting the login password is recommended, however, using a secure password in the standard <code>DBLOGIN</code> command requires encrypting it through the previous use of the <code>ENCRYPT PASSWORD</code> command. To avoid encrypting the password each time you use <code>DBLOGIN</code>, and also to protect the user ID from exposure, you can create an Oracle GoldenGate credential store before performing any setup and configuration.

The credential store enables you to simply supply an alias for the login credential whenever you log in with DBLOGIN. It 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



now and then use the management commands to expand it later as needed. For more information, see *Administering Oracle GoldenGate*

7.4 Where to Install Oracle GoldenGate

Oracle GoldenGate for PostgreSQL can be installed on certified platforms. You may install Oracle GoldenGate on database server or separate system and may use the remote connect functionality.

Refer to the cert matrix for certified platforms details.

7.5 Installing Oracle GoldenGate Files for PostgreSQL

To install the Oracle GoldenGate files, do the following:

- 1. Unzip the downloaded files by using gunzip or n equivalent compression product.
- Move the files in binary mode to a folder on the drive where you want to install Oracle GoldenGate.
- 3. From the Oracle GoldenGate folder, run the GGSCI program.
- In GGSCI, issue the following command to create the Oracle GoldenGate working directories.

```
ggsci> CREATE SUBDIRS
```

5. Issue the following command to exit GGSCI.

```
ggsci>EXIT
```



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

8.1 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

8.1.1 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.

8.1.2 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.

8.2 Other Programs and Settings

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

SQL Server Client Tools Connectivity features must be installed on the server
where Oracle GoldenGate is to be installed. This feature is normally installed by
default when installing an instance of SQL Server. For a server that is to be used
for a remote Extract or Replicat, you can obtain the required client connectivity
drivers from the SQL Server installation media or from the following:

For SQL Server 2014, 2016, 2017, and 2019 install a supported Microsoft ODBC driver for your version of SQL Server and for the operating system where Oracle GoldenGate is to be installed:

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

If installing Oracle GoldenGate on Linux, follow the instructions for installing Microsoft ODBC Driver for SQL Server on Linux and MAC OS, available at https://docs.microsoft.com/en-us/sql/connect/odbc/linux-mac/installing-the-microsoft-odbc-driver-for-sql-server?view=sql-server-2017 and refer to the content listed under the RedHat Enterprise Server section. If the GoldenGate on Linux installation is to support a source SQL Server database for capture, include the optional mssql-tools in the installation, which will be needed to create the Oracle GoldenGate SQL Server CDC cleanup tasks.

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

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

 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.

8.3 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

8.3.1 SQL Server Supported Versions

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

Note:

- SQL Server 2019 Standard and Enterprise editions are supported starting with bundle patch 19.1.0.0.200414.
- Azure SQL Database Managed Instance is supported starting with the bundle patch 19.1.0.0.200414.
- Amazon RDS for SQL Server is supported starting with bundle patch 19.1.0.200714.
- Extract supports SQL Server Enterprise edition on Windows, of versions 2012, 2014, 2016, 2017, and 2019 and Standard Edition of SQL Server 2016 with Service Pack 1 (or above), SQL Server 2017, and SQL Server 2019.
- (Extract) For SQL Server 2012, 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
 2012, 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 Enterprise and Standard editions on Windows, of versions 2012, 2014, 2016, 2017 and 2019.
- Oracle GoldenGate supports remote capture and delivery for Azure SQL Database
 Managed Instance and remote delivery for Azure SQL Database.

8.3.2 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.

8.3.3 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.



8.3.4 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.

8.3.5 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.



8.3.6 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 <code>DBLOGIN</code> command requires first encrypting it by using the <code>ENCRYPT PASSWORD</code> command. To avoid having to encrypt the password each time that you issue <code>DBLOGIN</code>, 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?

8.4 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.

8.5 Installing for SQL Server

To install Oracle GoldenGate for SQL Server, follow the instructions in Installing for all Platforms.



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

9.1 Supported Platforms for a Replication Server

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

9.2 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.

9.3 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.

9.4 Installing for Teradata

Install Oracle GoldenGate for the Teradata database server, see Installing for all Platforms.

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

10.1 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

10.1.1 Supported Database Architectures

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

10.1.2 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.

10.1.3 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:

- Download the Times Ten Scaleout and Times Ten 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_LIBARY_PATH system variable to include the TimesTen installation's 1ib 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
```

10.1.4 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
```

10.1.5 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.



10.1.6 Database Requirements

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

Database User for Oracle GoldenGate Processes

10.1.6.1 Database User for Oracle GoldenGate Processes

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



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.

10.2 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:

- Patching for Microservices Architecture
 Learn about patching for Microservices Architecture using OPatch.
- · Patching for Classic Architecture



Patching for Microservices Architecture

Learn about patching for Microservices Architecture using OPatch.

Topics:

Patching Oracle Platform with OPatch

11.1 Patching Oracle Platform with OPatch

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

- Ensure that the Oracle GoldenGate version on which you are installing the patch or from which you are rolling back the patch is Oracle GoldenGate release 19c for Oracle.
- 2. Use the latest version of OPatch. If you do not have the latest version, follow the instructions outlined in the My Oracle Support note 224346.1, available at:

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

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

```
$ opatch lsinventory
```

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

Patching for Classic Architecture

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

Topic:

- Downloading Patches for Oracle GoldenGate
- Preparing to Patch Oracle GoldenGate for Oracle Database
- · Patching for Oracle Platforms
- Patching Oracle GoldenGate for Heterogeneous Databases

12.1 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.
- 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.
- From the Release drop-down list, select the release version that you want to download.
- Make certain that **Platform** is displayed as the default in the next field, and then select the platform from the drop-down list.
- 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.
- 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:

То	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.



То	Select
Save the patch for later extraction	Select Save file , then save to a directory on your file system.



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.

12.2 Preparing to Patch Oracle GoldenGate for Oracle Database

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

- Ensure that the Oracle GoldenGate version on which you are installing the patch or from which you are rolling back the patch is Oracle GoldenGate release 19c for Oracle.
- 2. Use the latest version of OPatch. If you do not have the latest version, follow the instructions outlined in the My Oracle Support note 224346.1, available at:

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

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

```
$ opatch lsinventory
```

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

12.3 Patching for Oracle Platforms

To install the patch, use this procedure:

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

For example:

\$ PATCH_TOP_DIR p14309369_112101_Solaris86-64.zip



- 3. Stop Oracle GoldenGate by doing the following:
 - a. Run GGSCI.
 - **b.** Stop Manager by running the command:

STOP MANAGER

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

STOP ER *

4. Navigate to the PATCH_TOP_DIR/Patch_number directory:

\$ cd PATCH_TOP_DIR/Patch_number

5. Install the patch by running the following command:

\$ opatch apply

Note:

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

- Conflicts with a patch already applied to the ORACLE_HOME. In this case, stop the patch installation and contact Oracle Support Services.
- Conflicts with a patch already applied to the ORACLE_HOME that is a subset of the patch you are trying to apply. In this case, continue with the patch installation because the new patch contains all the fixes from the existing patch in the ORACLE_HOME. The subset patch will automatically be rolled back prior to the installation of the new patch.
- 6. If the patch includes new parameters, edit the respective parameter files.
- Set ORACLE_HOME back to the Oracle database home directory.
- 8. Start the processes from the Oracle GoldenGate home by doing the following:
 - a. Invoke GGSCI.
 - **b.** Start Manager by running this command:

START MANAGER

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

START ER *

d. Exit GGSCI.

12.4 Patching Oracle GoldenGate for Heterogeneous Databases



The following steps guide you to install patches for any of the heterogeneous 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).
- (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

12.4.1 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
- Follow normal patch procedures for binary replacement but do not start any Oracle GoldenGate processes. See Patching Oracle GoldenGate for Heterogeneous 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.



Do not run the DELETE TRANDATA command.

6. Manually restart the SQL Server CDC Capture job.



Manually restart the Oracle GoldenGate processes such as Extract, Replicat, and Manager.

12.4.2 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.

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

- 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 start user-id password port-number
```

Note:

The DDL operations issued in between starting and stopping the metadata server would be lost.



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



Uninstalling Oracle GoldenGate Microservices Architecture

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

Topics:

Uninstalling Microservices Architecture for Oracle Platforms

13.1 Uninstalling Microservices Architecture for Oracle Platforms

Topics:

- Removing a Deployment
- Files to be Removed Manually
- · Uninstalling Microservices Architecture with Oracle Universal Installer

13.1.1 Removing a Deployment

Learn how to remove a deployment using OGGCA.

Topics:

- Removing a Deployment Using Oracle GoldenGate Configuration Assistant
- Using Oracle GoldenGate Configuration Assistant Silent

13.1.1.1 Removing a Deployment Using Oracle GoldenGate Configuration Assistant

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

- 1. Stop the ER processes
- 2. Run the command ./ oggca.sh from \$OGG_HOME/bin/ to bring up the Oracle GoldenGate Configuration Assistant.
- 3. Select the Remove Deployment option.
- Follow the steps in the OGGCA wizard to remove the deployment.

13.1.1.2 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

13.1.2 Files to be Removed Manually

1. Run the Oracle GoldenGate Configuration Assistant wizard:

\$OGG_HOME/bin

- Select Existing Service Manager from the Select Service Manager Options screen. Click Next
- **3.** Select **Remove Existing Oracle GoldenGate Deployment** from the Configuration Options screen.
- 4. Select the deployment you need to remove from the **Deployment Name** list box. Also select the **Delete Deployment Files from Disk** check box if you want to remove all the deployment files (including configuration files) from the host.
- 5. Enter the Administration account user name and password and click **Next**.
- 6. See the list of settings that are deleted with the deployment and click **Finish**.

13.1.3 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:

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 peform 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 uninstalltaion:

```
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
```



14

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

14.1 Stopping Processes

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

On all Systems:

- Run the command shell.
- 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.
- Change directories to the Oracle GoldenGate installation directory.
- 4. Run ggsci.
- 5. Stop all Oracle GoldenGate processes.

```
STOP ER *
```

Stop the Manager process.

STOP MANAGER

14.2 Removing the DDL Environment

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

- 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.
- 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.

14.3 Removing Database Objects

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

On a Source System:

- 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
```

- 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

14.4 Uninstalling Oracle GoldenGate Using Oracle Universal Installer

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

WARNING:

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

The following items are removed in this process.

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



To remove Oracle GoldenGate from the system:

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

14.5 Uninstalling Oracle GoldenGate Manually

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

- Manually Removing Oracle GoldenGate Windows Components
- Manually Removing the Oracle GoldenGate Files

14.5.1 Manually Removing Oracle GoldenGate Windows Components

This procedure does the following:

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

Perform these steps on source and target systems.

- 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 <code>ggsci</code> 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.

14.5.2 Manually Removing the Oracle GoldenGate Files

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

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

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

2. Exit GGSCI.

EXIT

3. Remove the Oracle GoldenGate installation directory.



15

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

15.1 Stopping Processes

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

- 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.
- Stop all Oracle GoldenGate processes.

STOP ER *

15.2 Removing Oracle GoldenGate Database Objects

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

On a Source System:

- 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.
- 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}
```

- 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
serverl\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.

 ${\tt DBLOGIN~SOURCEDB~DSN\{USERID~user,~PASSWORD~password~|~USERIDALIAS~alias\}}$



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

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

15.3 Uninstalling Oracle GoldenGate from a Source DB2 for i System

- (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]]
```



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 been 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.



15.4 Uninstalling Oracle GoldenGate from a Linux Remote System

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

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

```
STOP ER *
```

6. Stop the Manager process.

STOP MANAGER

7. Log into the database with the DBLOGIN command.

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



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.

15.5 Removing Oracle GoldenGate from a Windows Remote System

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

- Removing Oracle GoldenGate from a Windows Cluster
- · Removing Oracle GoldenGate from a Remote Windows System



15.5.1 Removing Oracle GoldenGate from a Windows Cluster

- 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.
- 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.

15.5.2 Removing Oracle GoldenGate from a Remote Windows System

On all systems:

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

STOP ER *

4. Stop the Manager process.

STOP MANAGER

Note:

5.

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]]



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.

15.6 Removing Oracle GoldenGate Windows Components

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

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

Perform these steps on source and target systems.

- 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

A.1 Oracle GoldenGate Classic Architecture Programs and Utilities

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



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.



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

Program	Description
install	Installs Oracle GoldenGate as a Windows service and provides other Windows-based service options.
keygen	Generates data-encryption keys.
logdump	A utility for viewing and saving information stored in extract trails or files.
mgr	(Manager) Control process for resource management, control and monitoring of Oracle GoldenGate processes, reporting, and routing of requests through the GGSCI interface.
oggerr	Manages Oracle GoldenGate error messages.
replicat	Applies data to target database tables.
reverse	A utility that reverses the order of transactional operations, so that Replicat can be used to back out changes from target tables, restoring them to a previous state.
server	The Collector process, an Extract TCP/IP server collector that writes data to remote trails.

A.2 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	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.
	File name format is <code>group_name+sequence_number.ext</code> where <code>sequence_number</code> is a sequential number appended to aged files and <code>ext</code> is either <code>cpe</code> for Extract checkpoint files or <code>cpr</code> for Replicat checkpoint files.
	Do not edit these files.
	Examples:
	ext1.cpe
	repl.cpr
dircrd	Contains credential store files.



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

Directory	Description
dirdat	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.
	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).
	Do not edit these files.
	Examples:
	rt000001
	finance
dirdef	The default location for data definitions files created by the DEFGEN 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 DEFGEN parameter file.
	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.
	Example:
	defs.dat
dirdmp	Contains trace, or dump, files that support the internal activity logging mechanism. This directory is only applicable to the Classic Architecture, see What is the Oracle GoldenGate Classic Architecture.
dirjar	Contains the Java executable files that support Oracle GoldenGate Monitor.
dirpcs	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).
	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.
	Do not edit these files.
	Examples:
	mgr.pcm
	ext.pce
dirprm	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 group name/user-defined name.prm or mgr.prm.
	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 EDIT PARAMS command in GGSCI.
	Examples:
	defgen.prm
	finance.prm
dirrec	Not used by Oracle GoldenGate.



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

Directory	Description
dirrpt	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.
	File name format is group name+sequence number.rpt where sequence number is a sequential number appended to aged files.
	Do not edit these files.
	Examples:
	FIN2.rpt
	MGR4.rpt
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.
UserExitEx amples	Contains sample files to help with the creation of user exits.

A.3 Other Oracle GoldenGate Files

Learn about other files, templates, and objects created or installed in the \mathtt{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 INSTALL 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_oral1.sql ddl_oral2.sql	Scripts that run programmatically as part of Oracle GoldenGate DDL support; do not run these scripts.
ddl_pin.sql	Script that pins DDL tracing, the DDL package, and the DDL trigger for performance improvements.
ddl_purgeRecyclebin.sq	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.s ql	Scripts that control whether the Oracle DDL trigger collects metadata. This script runs programmatically; do not run it
ddl_staymetadata_on.sq	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	Scripts that create and populate demonstration tables for use with tutorials and basic testing.
demo_more_db_scriptnam e.sql	
.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.



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

Name	Description
ggserr.log	File that logs processing events, messages, errors, and warnings generated by Oracle GoldenGate.
ggsmsg.dll	Windows dynamic link library used by the install program.
GLOBALS	User-created file that stores parameters applying to the Oracle GoldenGate instance as a whole.
help.txt	Help file for the GGSCI command interface.
icudtxx.dll	Windows shared libraries for International Components for
icuinxx.dll	Unicode, where xx is the currently used version.
icuucxx.dll	
jagent.bat	Windows batch file for the JAgent for Oracle GoldenGate Monitor.
jagent.log	Log files for the Oracle GoldenGate Monitor Agent.
jagentjni.log	
jagent.sh	UNIX shell script for the JAgent for Oracle GoldenGate Monitor
LGPL.txt	Lesser General Public License statement. Applies to free libraries from the Free Software Foundation.
libodbc.so	ODBC file for Ingres 2.6 on UNIX.
libodbc.txt	License agreement for libodbc.so.
libxml2.dll	Windows dynamic link library containing the XML library for the Oracle GoldenGate XML procedures.
libxml2.txt	License agreement for libxml2.dll.
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 pthread-VC.dll.
pthread-VC.dll	POSIX threads library for Microsoft Windows.
prvtclkm.plb	Supports the replication of Oracle encrypted data.
pw_agent_util.bat	Script files that support the Oracle GoldenGate Monitor Agent.
pw_agent_util.sh	



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

Name	Description
role_setup.sql	Script that creates the database role necessary for Oracle GoldenGate DDL support.
sampleodbc.ini	Sample ODBC file for Ingres 2.6 on UNIX.
sqlldr.tpl	Template for use with Replicat when creating a control file for the Oracle SQL*Loader bulk-load utility.
tcperrs	File containing user-defined instructions for responding to TCP/IP errors.
usrdecs.h	Include file for user exit API.
xerces-c_2_8.dll	Apache XML parser library.
zlib.txt	License agreement for zlib compression library.

