Oracle® Database
Installing Oracle GoldenGate

21c (21.1.0)

F25358-02

April 2022

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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*].

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc`.

Accessible Access to Oracle Support

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

Related Information

The Oracle GoldenGate Product Documentation Libraries are found at

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

For additional information on Oracle GoldenGate, refer to:

https://www.oracle.com/middleware/technologies/goldengate.html

https://www.oracle.com/database/technologies/high-availability/oracle-database-maa-best-practices.html

Part I

Installing Oracle GoldenGate

This chapter describes how to install Oracle GoldenGate for the first time and includes instructions to download 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

Ensure that you install your product on a supported hardware or software configuration. For more information, see the certification document for this release.

Oracle tests and verifies the performance of your product on all certified systems and environments. As new certifications occur, they are added to the proper certification document. 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.

Here are some additional details about the supported platforms:

- Cross Endian Support: Most Oracle GoldenGate products support cross endian replication, which means that the source and target database can be a different platform (or even endian) than the actual server where Oracle GoldenGate is installed.

- Fully Certified Criteria: Oracle GoldenGate certifications are often phased in, for a particular new release of the product, Oracle typically supports Oracle databases first and then the various non-Oracle and Big Data technologies. In some cases, Oracle GoldenGate may support the data store you are looking for, but you may need to check the certification matrix for a previous release. Platforms that are in the certification matrix

are platforms where either full regression testing is done or where basic validation is performed for continuity purposes.

- Fully Supported by Inference: There are other technologies that are supported for Oracle GoldenGate that may not be explicitly listed in the certification matrix. For example, Oracle certify its technologies based on a combination of Chipset, Operating System, Data Store Type, and Data Store Version. As long as these four criteria are met, support is available.

- Fully Supported through Open Source Compatibility: There are a number of Open Source technologies that Oracle GoldenGate is certified with such as Big Data and non-Oracle databases. Sometimes, users may have open source environments and need Oracle GoldenGate to provide support with such unique infrastructures, such as Apache HBase on Azure Data Lake. In such cases, Oracle GoldenGate does support any unique open source enviroment if the Chipset, Operating System, Open Source Framework and Framework Version are certified by Oracle GoldenGate. For example, in case of Apache HBase, Oracle GoldenGate support needs to check the version of Apache HBase, for which Oracle GoldenGate is certified, and if that version happens to be running on some Cloud, then Oracle GoldenGate will be supported. In each of these Open Source examples (that are not explicitly certified), Oracle GoldenGate support is available using the base open source configurations, such as Apache on certified hardware. However, Oracle may not be obligated to support each possible infrastructure combination that users may select.

- Java JDBC Support: Many SQL, NoSQL and Big Data technologies support Java JDBC capabilities. Oracle GoldenGate for Big Data enables replication of transactions into any JDBC compliant drivers. Individual drivers may vary in terms of performance and metadata coverage, so there is no specific guarantee that Oracle GoldenGate JDBC support will work with every JDBC driver, but most common JDBC drivers and commercial implementations usually work with Oracle GoldenGate JDBC and these are supported. If you don't find your technology in the certification matrix, but you know that there is a JDBC drive available, then it could be that you may have both technical compatibility and a supported configuration.

- Managed and Unmanaged Data Stores: With the advent of managed Cloud services such as native cloud services, many data stores are now available with automated lifecycle, patching, and other conveniences. In many cases, managed data stores are fully compatible and consistent with Oracle GoldenGate certifications and support. However, in some cases, a cloud vendor may turn-off or restrict access to features that Oracle GoldenGate requires for full features compatibility, particularly with Oracle GoldenGate Extract capabilities. If you have a question about a third party cloud managed service for a data store that Oracle GoldenGate may usually support, but you do not see that managed service listed in the Oracle GoldenGate certification matrix, directly contact Oracle GoldenGate product management.

Operating System Requirements

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

- Memory Requirements
- Disk Requirements
- Network

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, then 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.

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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. Ensure that you have adequate disk space for the downloaded file, expanded files, and installed files, which can be up to 2GB.

Temporary Disk Requirements

When total cached transaction data exceeds the `CACHESIZE` setting of the `CACHEMGR` parameter, Extract begins writing cache data to temporary files located in the Oracle GoldenGate installation directory. For Classic Architecture, this is in the installation's `dirtmp` folder, and for Microservices Architecture, it is the `/var/temp` folder for that deployment.

The cache manager assumes that all of the free space on the file system is available. These directories can fill up quickly if there are many transactions 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.

> **Note:**
>
> 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 long the consumed trails are kept on the 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:

- Use the fastest network possible and install redundancies at all points of failure for optimal performance and reliability, especially in maintaining low latency on the target.

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

  See Reverse Proxy Support in *Oracle GoldenGate Security Guide*.

- 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.

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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++ Redistributable Packages for Visual Studio 2013 and Microsoft Visual C++ Redistributable for Visual Studio 2015, 2017, and 2019. 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++ 2015, 2017, and 2019 package from

- For Oracle GoldenGate for Oracle to be installed on a remote hub server, download and install the Oracle Database 21c 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 Microservices deployment can be installed with security enabled or disabled. If security is enabled, then some minimal pieces of information are required for proper configuration depending on the whether self-signed certificates are used or provided. See How to Create Deployments in *Using the Oracle GoldenGate Microservices Architecture*.

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

> **Note:**
>
> Oracle customers with an active support contract and running supported versions of Oracle products (including Oracle GoldenGate) receive assistance from Oracle when running those products on VMware virtualized environments.
>
> If Oracle identifies the underlying issue is not caused by Oracle's products or is being run in a computing environment not supported by Oracle, Oracle will refer customers to VMware for further assistance and Oracle will provide assistance to VMware as applicable in resolving the issue.
>
> This support policy does not affect Oracle or VMware licensing policies.

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

You can download Oracle GoldenGate from the Oracle GoldenGate Downloads page: https://www.oracle.com/middleware/technologies/goldengate-downloads.html.

Part II

Installing Oracle GoldenGate for Oracle Databases

Learn how to install Oracle GoldenGate with Oracle Databases.

> **✎ Note:**
>
> From Oracle GoldenGate 21c onward, Oracle GoldenGate Classic Architecture for Oracle Database has been deprecated and may be desupported and unavailable in a future release. Oracle recommends using Oracle GoldenGate Microservices Architecture.

Topics:

- Installing Oracle GoldenGate Microservices
- Integrating Oracle GoldenGate Microservices Architecture into a Cluster
  If you installed Oracle GoldenGate in a cluster, take the following steps to integrate Oracle GoldenGate within the cluster solution.

1
Installing Oracle GoldenGate Microservices

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

1. Install the Oracle GoldenGate MA.

2. Set the necessary environment variables: `ORACLE_HOME`, `LD_LIBRARY_PATH`, `TNS_ADMIN`, `JAVA_HOME`.

   Note that from the Oracle GoldenGate 21c release onward, `ORACLE_HOME` and `LD_LIBRARY_PATH` do not point to any database directories. With the unified build feature, these environment variables now point to the `OGG_HOME` (sub)directories as the Oracle Database Client Software is embedded in Oracle GoldenGate.

3. Deploy an Oracle GoldenGate instance using the Oracle GoldenGate Configuration Assistant (oggca).

MA is installed using OUI. You can also use a command line silent installation using OUI. For steps to use the OGGCA.sh utility, see How to Create Deployments.

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:

- Performing an Interactive Installation with OUI
  Use the graphical user interface to install Oracle GoldenGate with prompts for 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 Performing an Interactive Installation with OUI

Use the graphical user interface to install Oracle GoldenGate with prompts for required installation information.

These instructions apply to new installations and upgrades:

1. Create a temporary staging directory where you will install Oracle GoldenGate. For example, `mkdir /u01/stage/oggsc`.

2. Extract the installation ZIP file into the temporary staging directory. For example:

   `unzip ./fbo_ggs_Linux_x64_services.zip -d ./`*`temp directory`*

3. From the expanded directory, run the `fbo_ggs_Linux_x64_services_shophome/ Disk1/runInstaller` program on UNIX or Linux.

   The OUI Install Wizard is started.

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

5. On the **Specify Installation Details** page, specify the following:

   a. For **Software Location**, specify the location where Oracle GoldenGate software will 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.

   b. Click **Next**.

6. On the **Summary** page, confirm that there is enough space for the installation and that the installation selections are correct.

   a. (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.

   b. 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.

   c. 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.

1.2 Performing a Silent Installation with OUI

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

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

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

The Oracle GoldenGate response file contains a standard set of Oracle configuration parameters in addition to parameters that are specific to Oracle GoldenGate. These parameters correspond to the fields in the interactive session. The response file location is *unzipped_directory*/fbo_gg_Linux_x64_services_shiphome/Disk1/response.

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

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

2

Integrating Oracle GoldenGate Microservices Architecture into a Cluster

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

Oracle GoldenGate Microservices Architecture provides REST-enabled services with features including remote configuration, administration, and monitoring through HTML5 web pages, command line interfaces, and APIs.

For more information about installing and using Oracle GoldenGate in a cluster, see the Oracle GoldenGate Microservices Architecture with Oracle Real Application Clusters Configuration Best Practices technical brief.

Part III

Installing Oracle GoldenGate for Heterogeneous Databases

Learn how to install Oracle GoldenGate Microservices 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.

Topics:

Installing for all Platforms

Learn about installing Oracle GoldenGate for Microservices for heterogeneous databases.

Topic:

Installing Oracle GoldenGate Microservices Architecture

Learn about installing Oracle GoldenGate Microservices Architecture for heterogeneous platforms.
See the following sections to know more about:

3

Installing Oracle GoldenGate for DB2 z/OS Database

Learn about the requirements and how to install Oracle GoldenGate for DB2 z/OS database.
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](#)

3.1 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.

3.2 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

3.3 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.

3.4 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 3-1 shows the other required operating system privileges for Oracle GoldenGate:

Table 3-1   Operating System Privileges

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

3.5 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 for Oracle GoldenGate delivery. Because this Oracle GoldenGate release is a fully-remote distribution, the former Oracle GoldenGate DB2 Remote product is no longer shipped separately. However, Windows is not supported in Oracle GoldenGate for DB2 z/OS in this release. If you still require delivery to z/OS from Windows, then Oracle GoldenGate DB2 Remote 12.2 is still available.

- UNIX System Services (USS) is no longer required (as in prior releases) except for a few installation procedures.

- Windows only: To apply data to a DB2 target from Windows, Oracle GoldenGate DB2 Remote v12.2 must be used. Capture is not support in this scenario.

- Install Oracle GoldenGate DB2 Remote on a remote system for remote delivery to the DB2 target system. In this configuration, Replicat connects to the target DB2 database by using the ODBC API that is supplied in DB2 Connect . This configuration requires DB2 LUW to be installed on the remote system.

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

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

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

1. For the intermediary system, select any platform that Oracle GoldenGate supports for the DB2 for LUW database. This is the system on which Oracle GoldenGate is installed.

2. Install and run DB2 for LUW on the selected remote system so that the Replicat process can use the supplied DB2 Connect driver.

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

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

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

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

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

3.6 Installing Extract Components on DB2 z/OS

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.

To install the components needed for Oracle GoldenGate for DB2 z/OS for Extract:

1. Ensure that 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. Ensure that 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, then any WLM-established address space can run stored procedures.

    b. Grant access to users to create procedures in specific WLM address spaces.

    c. Grant access to users to create procedures in specific schemas. Use the `GRANT` statement with the `CREATIN` option for the appropriate schema.

    d. Grant access to users to create packages for procedures in specific collections. Use the `GRANT` statement with the `CREATE` option for the appropriate collection.

    e. Grant access to refresh the WLM environments to the appropriate people.

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.sql` 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 `zOSPrograms.tar` on the DB2 z/OS system in EBCDIC and is suitable for use through native DB2 z/OS tools such as `SPUFI`.

   Edit the following two lines 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.

4

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

4.1 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.

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

For supported database versions, review the Certification Matrix.

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

4.2 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.

4.3 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	`create table test( id int, name char(100)) charset utf8;`
Column	`create table test ( id int, name1 char(100) charset gbk, name2 char(100) charset utf8));`

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
  ```

4.4 Other Programs and Settings for MySQL

From Oracle GoldenGate 19c onward, OpenSSL shared libraries are required and must be installed. If you are using Oracle GoldenGate for 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 for 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 `PATH` variable. This is required for both Linux and Windows.

4.5 Installing for MySQL

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

5
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

5.1 Operating System Privileges for Oracle GoldenGate Processes for SQL Server

Assign operating system privileges according to the following instructions:

- Manager Running on Windows

5.1.1 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, when 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, then the process attempts to log in 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.

5.2 Other Programs and Settings

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

- Install the Microsoft ODBC Driver 17 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

  > **Note:**
  >
  > Do not install the Microsoft ODBC Driver 18 as it is not supported by Oracle GoldenGate.

  When installing Oracle GoldenGate on Linux, follow the instructions for installing Microsoft ODBC Driver 17 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#17, refer to the content listed under the RedHat Enterprise Server section.

- Installation of the Oracle GoldenGate CDC cleanup task 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.

- Installing Microsoft ODBC Drivers for Linux

5.2.1 Installing Microsoft ODBC Drivers for Linux

The Microsoft ODBC Drivers for Linux are required to connect to a remote source or target SQL Server database. The following tasks are required to install the Linux drivers.

1. Edit the file `/etc/passwd`, to grant temporary shell access to the root user.

   ```
   $ sudo vi /etc/passwd
   ```

2. In the file `/etc/passwd`, change the value for the root user from `/usr/sbin/nologin` to `/bin/bash`. Save and close the file.

3. Using Microsoft's RedHat Enterprise Server installation instructions for adding the ODBC Drivers for Linux, perform the following steps with default values by answering `'y'` when prompted.

   ```
   $ sudo su

   $ #RedHat Enterprise Server 7
   $ curl https://packages.microsoft.com/config/rhel/7/prod.repo
   > /etc/yum.repos.d/mssql-release.repo

   $ exit
   $ sudo yum remove unixODBC-utf16 unixODBC-utf16-devel #to avoid
   conflicts
   ```

```
$ sudo ACCEPT_EULA=Y yum install msodbcsql17
$ sudo ACCEPT_EULA=Y yum install mssql-tools
$ echo 'export PATH="$PATH:/opt/mssql-tools/bin"' >> ~/.bash_profile
$ echo 'export PATH="$PATH:/opt/mssql-tools/bin"' >> ~/.bashrc
$ source ~/.bashrc
```

4. After installing the Linux drivers, you can reset the original shell access values for the root user.

```
$ sudo vi /etc/passwd
```

5. Change the value for the root user from `/bin/bash` to `/usr/sbin/nologin`. Save and close the file.

5.3 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

5.3.1 SQL Server Supported Versions

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

- Oracle GoldenGate Extract supports SQL Server installed on Windows. SQL Server Enterprise edition of versions 2014, 2016, 2017, and 2019, and SQL Server Standard editions of versions 2016 with Service Pack1 (or above), 2017, and 2019 are supported.

- (Extract) For SQL Server 2014, 2016, and 2017, Microsoft has identified and fixed several important issues that directly affect the SQL Server Change Data Capture feature. This situation impacts the ability for Oracle GoldenGate to correctly capture data. The current known issues that require Microsoft patches include KB3030352, KB3166120, and KB4073684. If you are using SQL Server 2014, 2016, or 2017 as a source database, Oracle highly recommends that you apply the latest Service Pack or Cumulative Update for your version of SQL Server.

- Oracle GoldenGate Delivery supports SQL Server installed on Windows. SQL Server Enterprise and Standard editions of versions 2014, 2016, 2017, and 2019 are supported.

- Oracle GoldenGate supports remote capture and delivery for Azure SQL database managed instance and remote delivery for Azure SQL Database.

- Oracle GoldenGate supports remote capture and delivery for Amazon RDS for SQL Server.

5.3.2 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`.

5.3.3 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 2014 (120) 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.

- Replicat performance consideration: Beginning with SQL Server 2016, Microsoft changed the default setting for the database option `TARGET_RECOVERY_TIME` from 0 to 60 seconds. It has been demonstrated in internal testing that this can reduce the Replicat's throughput. If you experience Replicat throughput degradation, consider adjusting the `TARGET_RECOVERY_TIME` setting to 0.

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.

- (AlwaysOn) Capture from databases configured in asynchronous-commit mode of an AlwaysOn Availability group are not supported.

5.3.4 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.

5.3.5 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: 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 2014 instance in OLEDB mode may lead to a memory leak issue (Microsoft article 2881661). Microsoft has provided a fix in SQL Server 2014 CU1 (Microsoft article 2931693). To avoid a possible memory leak, you may choose one of the following options:

- 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.

5.4 Where to Install Oracle GoldenGate

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 running on Windows, you can install Oracle GoldenGate on the database server or on a remote Linux or Windows server.

5.5 Installing for SQL Server

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

Part IV

Installing Patches for Oracle GoldenGate

Installing patches is different from upgrading to a new release of Oracle GoldenGate.

Topics:

*   Patching for Microservices Architecture
    Learn about patching for Microservices Architecture using OPatch.

6

Patching for Microservices Architecture

Learn about patching for Microservices Architecture using OPatch.

Topics:

- Patching Oracle Platform with OPatch

6.1 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:

1. Ensure that the Oracle GoldenGate version on which you are installing the patch or from which you are rolling back the patch is Oracle GoldenGate release 21c for Oracle.

2. Use the latest version of OPatch. If you do not have the latest version, then 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.