

Oracle® Fusion Middleware

Installing and Configuring Oracle GoldenGate for Oracle
TimesTen

12c (12.2.0.1)

E66648-01

November 2015

Contains instructions for installing and performing initial
setup of Oracle GoldenGate for Oracle TimesTen databases.

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Preface

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

This guide helps you get started with installing Oracle GoldenGate on a TimesTen database system and performing initial setup. Refer to the other Oracle GoldenGate documentation listed in this Preface for additional information to configure, run, and manage your Oracle GoldenGate environment.

Audience

This guide is intended for installers, database administrators, and system administrators who are installing, configuring and running Oracle GoldenGate.

Documentation Accessibility

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

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Related Documents

The Oracle GoldenGate documentation set includes the following components:

Windows, UNIX, and Linux Platforms

- *Installing and Configuring Oracle GoldenGate for DB2 for i*
- *Installing and Configuring Oracle GoldenGate for DB2 LUW*
- *Installing and Configuring Oracle GoldenGate for DB2 z/OS*
- *Installing and Configuring Oracle GoldenGate for Informix*
- *Installing and Configuring Oracle GoldenGate for MySQL*

- *Installing and Configuring Oracle GoldenGate for NonStop SQL/MX*
- *Installing and Configuring Oracle GoldenGate for SQL Server*
- *Installing and Configuring Oracle GoldenGate for Oracle TimesTen*
- *Installing and Configuring Oracle GoldenGate for Oracle Database*
- *Installing and Configuring Oracle GoldenGate for Sybase*
- *Installing and Configuring Oracle GoldenGate for Teradata*
- *Administering Oracle GoldenGate for Windows and UNIX*
- *Reference for Oracle GoldenGate for Windows and UNIX*
- *Logdump Reference for Oracle GoldenGate*
- *Upgrading Oracle GoldenGate for Windows and UNIX*
- *Error Messages Reference for Oracle GoldenGate for Windows and UNIX*

Conventions

The following text conventions are used in this document:

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

System Requirements and Preinstallation Instructions

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

- [Section 1.1, "Overview of Oracle GoldenGate for Oracle TimesTen"](#)
- [Section 1.2, "Verifying Certification and System Requirements"](#)
- [Section 1.3, "Operating System Requirements"](#)
- [Section 1.4, "Database Requirements"](#)

1.1 Overview of Oracle GoldenGate for Oracle TimesTen

Oracle GoldenGate for Oracle TimesTen supports the delivery of data from other types of databases to a TimesTen database.

High-speed Oracle GoldenGate replication can be used to refresh a TimesTen cache environment with minimal latency. In addition, with its heterogeneous support, Oracle GoldenGate enables the TimesTen data store to be used as a data integration point for other data sources.

Oracle GoldenGate supports the mapping, filtering, and manipulation of data from other sources to the TimesTen database. Oracle GoldenGate does not support the extraction of data from TimesTen to other TimesTen data stores or to other kinds of databases.

1.2 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.

1.3 Operating System Requirements

This section describes the operating system requirements for running Oracle GoldenGate for Oracle TimesTen.

1.3.1 Processor Requirements

At least a dual-core central processing unit is required. A quad-core processor is preferred.

1.3.2 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 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 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 *Reference for Oracle GoldenGate for Windows and UNIX*.

1.3.3 Disk Requirements

The disk requirements for using Oracle GoldenGate for Oracle TimesTen are:

- 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. For more information, see [Section 2.2, "Understanding and Obtaining the Oracle GoldenGate Distribution."](#)
- To install Oracle GoldenGate into a cluster environment, install the Oracle GoldenGate binaries and files on a shared file system that is available to all cluster nodes.
- 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 for Windows and UNIX*.

1.3.4 Network Requirements

The network requirements for using Oracle GoldenGate for Oracle TimesTen are:

- Configure the system to use TCP/IP services, including DNS. Oracle GoldenGate supports IPv4 and IPv6 and can operate in a system that supports one or both of these protocols.
- Configure the network with the host names or IP addresses of all systems that will be hosting Oracle GoldenGate processes and to which Oracle GoldenGate will be connecting. Host names are easier to use.
- Oracle GoldenGate requires some unreserved and unrestricted TCP/IP ports, the number of which depends on the number and types of processes in your configuration. See *Administering Oracle GoldenGate for Windows and UNIX* 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. You will specify them with parameters when configuring the Manager process.
- Configure your firewalls to accept connections through the Oracle GoldenGate ports.

1.3.5 Operating System Privileges

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

- To install on UNIX, the person who installs Oracle GoldenGate must have read and write privileges on the Oracle GoldenGate installation directory.
- The Oracle GoldenGate 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. Sensitive information might be available to anyone who runs an Oracle GoldenGate process.

1.3.6 Itanium Requirements

To install Oracle GoldenGate on an Intel Itanium system, the `vcredist_IA64.exe` runtime library package must be installed. You can download this package from the Microsoft website. This package includes Visual Studio DLLs necessary for Oracle GoldenGate to operate on the Itanium platform. If these libraries are not installed, Oracle GoldenGate generates the following error:

```
The application failed to initialize properly (0xc0150002). Click on Ok to terminate the application.
```

1.3.7 Console Character Set

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

```
chcp OS_character_set
```

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

1.3.8 Other Programs

Other programs you can use with Oracle GoldenGate for Oracle TimesTen are:

- Before installing Oracle GoldenGate on a Windows system, install and configure the Microsoft Visual C++ 2010 SP1 Redistributable Package. Make certain it is the SP1 version of this package, and make certain to get the correct bit version for your server. This package installs runtime components of Visual C++ Libraries. For more information, and to download this package, go to <http://www.microsoft.com>.
- 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.

1.4 Database Requirements

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

1.4.1 Database User for Oracle GoldenGate Processes

- Create a database user that is dedicated to Oracle GoldenGate. It can be the same user for all of the Oracle GoldenGate processes that must connect to a database:
 - Replicat (target database)
 - DEFGEN (source or target database)
- To preserve the security of your data, and to monitor Oracle GoldenGate processing accurately, do not permit other users, applications, or processes to log on as, or operate as, the Oracle GoldenGate database user.
- Keep a record of the database users. They must be specified in the Oracle GoldenGate parameter files with the `USERID` parameter.

1.4.2 Limitations and Non-supported Items for Oracle TimesTen

The limitations and non-supported items for Oracle TimesTen are:

- Capture (extraction) of DML operations is not supported.
- Capture and replication of DDL (data definition language) operations is not supported.
- 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.
- Oracle GoldenGate supports timestamp data from 0001/01/03:00:00:00 to 9999/12/31:23:59:59. If a timestamp is converted from GMT to local time, these limits also apply to the resulting timestamp. Depending on the time zone,

conversion may add or subtract hours, which can cause the timestamp to exceed the lower or upper supported limit.

- Modifying the Primary Key Column value is not supported.
- Limitations on Automatic Heartbeat Table support are as follows:
 - Oracle GoldenGate supports only Delivery on TimesTen so no mechanism is required to populate/update the heartbeat tables using any event/job schedulers.
 - The `ALTER HEARTBEATTABLE` command is not supported and if used is ignored.
 - The `ADD HEARTBEATTABLE` command with the `FREQUENCY`, `PURGE_FREQUENCY`, or `RETENTION_TIME` option is not supported. When any of these options are specified with the `ADD HEARTBEATTABLE` command, a warning is displayed that the option is ignored.
 - Since TimesTen does not have any internal event/job schedulers, automatic purging of heartbeat history tables *cannot* occur. As such, you should explicitly drop or truncate the corresponding heartbeat objects to suit your environment.

Installing Oracle GoldenGate

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.

- [Section 2.1, "Installation Overview"](#)
- [Section 2.2, "Understanding and Obtaining the Oracle GoldenGate Distribution"](#)
- [Section 2.3, "Setting Library Paths for Dynamic Builds on UNIX"](#)
- [Section 2.4, "Preparing to Install Oracle GoldenGate Within a Cluster"](#)
- [Section 2.5, "Installing Oracle GoldenGate on Linux and UNIX"](#)
- [Section 2.6, "Installing Oracle GoldenGate on Windows"](#)
- [Section 2.7, "Integrate Oracle GoldenGate into a Cluster"](#)

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

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

<http://support.oracle.com>

To upgrade Oracle GoldenGate from one version to another, follow the upgrade instructions at:

<http://docs.oracle.com/goldengate/c1221/gg-winux/index.html>

2.1 Installation Overview

To installing Oracle GoldenGate, use the following steps:

- [Understanding and Obtaining the Oracle GoldenGate Distribution](#)
- [Setting Library Paths for Dynamic Builds on UNIX](#)
- [Preparing to Install Oracle GoldenGate Within a Cluster](#)
- [Installing Oracle GoldenGate on Linux and UNIX](#)
- [Installing Oracle GoldenGate on Windows](#)
- [Integrate Oracle GoldenGate into a Cluster](#)

2.2 Understanding and Obtaining the Oracle GoldenGate Distribution

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

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

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

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

To obtain Oracle GoldenGate follow these steps:

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

2.3 Setting Library Paths for Dynamic Builds on UNIX

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

1. Make certain that the database libraries are added to the shared-library environment variables of the system. This procedure is usually performed at database installation time. Consult your Database Administrator if you have any questions.
2. If you will be running an Oracle GoldenGate program from outside the Oracle GoldenGate installation directory on a UNIX system:
 - (Optional) Add the Oracle GoldenGate installation directory to the `PATH` environment variable.
 - (Required) Add the Oracle GoldenGate installation directory to the `shared-libraries` environment variable.

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

Table 2–1 Environment Variables

Command	Requires libraries in environment variable?
<code>\$ users/ogg > ./ggsci</code>	No
<code>\$ users > ./ogg/ggsci</code>	Yes

To Set the Variables in Korn Shell

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

To Set the Variables in Bourne Shell

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

To Set the Variables in C Shell

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

Where *shared_libraries_variable* is one of the variables shown in [Table 2-1](#):

Table 2-2 UNIX/Linux Library Path Variables Per Platform

Platform	Environment variable
IBM AIX	LIBPATH
HP-UX	SHLIB_PATH
Sun Solaris	LD_LIBRARY_PATH ¹
LINUX	

¹ In 64-bit environments with 32-bit Oracle databases, Oracle GoldenGate requires the LD_LIBRARY_PATH to include the 32-bit Oracle libraries.

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

```
export LD_LIBRARY_PATH=/ggs/11.0:$LD_LIBRARY_PATH
```

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

2.4 Preparing to Install Oracle GoldenGate Within a Cluster

This topic covers the installation requirements that apply when Oracle GoldenGate will be installed in a cluster environment. Oracle GoldenGate can be used with any cluster-management solution that has the ability to automate failover.

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

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

- The Oracle GoldenGate installation must have the same location path on every node
- At minimum, install the following directories on the shared storage to support Oracle GoldenGate recovery requirements. These directories are among those created when you issue `CREATE SUBDIRS` during installation. On UNIX or Linux, you can create symbolic links to them from the installation directory on each node.
 - `dirchk`

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

See [Section 2.7, "Integrate Oracle GoldenGate into a Cluster"](#) after you install Oracle GoldenGate.

2.5 Installing Oracle GoldenGate on Linux and UNIX

Follow these steps to install Oracle GoldenGate for Oracle on a Linux or UNIX system or in the appropriate location in a cluster. See [Section 2.4, "Preparing to Install Oracle GoldenGate Within a Cluster"](#) for more information.

These steps install the Oracle GoldenGate binaries and working directories.

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

```
GGSCI
```

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

```
CREATE SUBDIRS
```

6. Issue the following command to exit GGSCI.

```
EXIT
```

2.6 Installing Oracle GoldenGate on Windows

Follow these steps to install Oracle GoldenGate for Oracle on a Windows system or in the appropriate location in a cluster.

[Section 2.6.1, "Installing the Oracle GoldenGate Files"](#)

[Section 2.6.2, "Specifying a Custom Manager Name"](#)

[Section 2.6.3, "Installing Manager as a Windows Service"](#)

2.6.1 Installing the Oracle GoldenGate Files

To install the Oracle GoldenGate files, do the following:

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

4. Unzip the downloaded file(s) by using WinZip or an equivalent compression product.
5. Move the files in binary mode to a folder on the drive where you want to install Oracle GoldenGate. *Do not* install Oracle GoldenGate into a folder that contains spaces in its name, even if the path is in quotes. For example:


```
C:\ "Oracle GoldenGate" is not valid.
C:\Oracle_GoldenGate is valid.
```
6. From the Oracle GoldenGate folder, run the GGSCI program.
7. In GGSCI, issue the following command to create the Oracle GoldenGate working directories.

```
CREATE SUBDIRS
```

8. Issue the following command to exit GGSCI.

```
EXIT
```

2.6.2 Specifying a Custom Manager Name

You must specify a custom name for the Manager process if either of the following is true:

- You want to use a name for Manager other than the default of GGSMGR.
- There will be multiple Manager processes running as Windows services on this system. Each Manager on a system must have a unique name. Before proceeding further, note the names of any local Manager services.

To specify a custom Manager name, follow these steps:

1. From the directory that contains the Manager program, run GGSCI.
2. Issue the following command.

```
EDIT PARAMS ./GLOBALS
```

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

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

```
MGRSERVNAME name
```

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

2.6.3 Installing Manager as a Windows Service

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

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

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

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

Where: *option* is one of the following:

Table 2–3 *INSTALL* Options

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

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

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

2.7 Integrate Oracle GoldenGate into a Cluster

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

[Section 2.7.1, "General Requirements in a Cluster"](#)

[Section 2.7.2, "Adding Oracle GoldenGate as a Windows Cluster Resource"](#)

2.7.1 General Requirements in a Cluster

When installing Oracle GoldenGate in a cluster, do the following:

1. Register the Oracle GoldenGate Manager process (and only Manager) as a cluster-managed resource as you would any other application. Manager must be the only Oracle GoldenGate process that the cluster-management software starts and stops, because it is the parent process that manages all other processes.
2. If the cluster uses a virtual IP address, you may need to obtain an available fixed IP address for the Manager process. The VIP must be an available IP address on the public subnet and cannot be determined through DHCP. In the parameter files of the Extract data pumps, specify the VIP of the remote Manager as the input value of the `RMTHOST` parameter. Other Oracle GoldenGate products that access Manager also should use the VIP.
3. When you configure Manager, add the `AUTOSTART` and `AUTORESTART` parameters so that Manager starts the replication processes automatically. You can, when needed, control Extract, Replicat, and other Oracle GoldenGate processes from within the Oracle GoldenGate user interfaces.
4. Mount the shared drive on one node only. This prevents processes from being started on another node. Use the same mount point on all nodes.

2.7.2 Adding Oracle GoldenGate as a Windows Cluster Resource

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

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

Preparing Oracle Times Ten for Oracle GoldenGate

This chapter contains steps to configure the Oracle TimesTen database properly to support Oracle GoldenGate.

This chapter contains the following sections:

- [Section 3.1, "Configuring the ODBC Driver"](#)
- [Section 3.2, "Preparing Tables for Processing"](#)
- [Section 3.3, "Next Steps in the Deployment"](#)

3.1 Configuring the ODBC Driver

Follow these directions to configure ODBC (Open Database Connectivity), which Replicat will use to connect to the target database. Establish a system data source name (DSN) on each Windows system where Oracle GoldenGate will interface with an Oracle TimesTen database. A DSN stores information about how to connect to the target database.

To Create a DSN on Windows

1. Install the Oracle TimesTen Client driver on the target Windows system. (Note: The TimesTen Data Manager production ODBC driver is installed by default on Windows systems.)
2. On the Windows system, open the **Control Panel** folder.
3. Open the **Administrative Tools** folder.
4. Open **Data Sources (ODBC)**. The **ODBC Data Source Administrator** dialog box is displayed.
5. Select the **System DSN** tab, and then click **Add**.
6. Under **Create New Data Source**, select the **TimesTen Client Driver**.
7. Click **Finish**. The **Create a New Data Source** wizard is displayed.
8. Supply the following:
 - For **Client DSN**, type a name for the DSN of the client name, up to 32 alpha-numeric characters, excluding special keyboard characters except for the underscore and dash.
 - (Optional) For **Description**, type a description of this DSN.

- For the rest of the fields in this dialog, supply the correct information for the Oracle TimesTen Server and its host. For detailed instructions, or if you have any problems, see the Oracle TimesTen documentation.
- 9. Click **OK** to close the dialog.
- 10. Repeat these steps on the other systems where Oracle GoldenGate will interact with Oracle TimesTen.

3.2 Preparing Tables for Processing

This section describes the table attributes you must address in an Oracle GoldenGate environment.

[Section 3.2.1, "Disabling Triggers and Cascade Constraints"](#)

[Section 3.2.2, "Assigning Row Identifiers"](#)

3.2.1 Disabling Triggers and Cascade Constraints

Disable triggers, cascade delete constraints, and cascade update constraints on the target tables, or alter them to ignore changes made by the Oracle GoldenGate database user. Oracle GoldenGate replicates DML that results from a trigger or cascade constraint. If the same trigger or constraint gets activated on the target table, it becomes redundant because of the replicated version, and the database returns an error. Consider the following example, where the source tables are `emp_src` and `salary_src` and the target tables are `emp_targ` and `salary_targ`.

1. A delete is issued for `emp_src`.
2. It cascades a delete to `salary_src`.
3. Oracle GoldenGate sends both deletes to the target.
4. The parent delete arrives first and is applied to `emp_targ`.
5. The parent delete cascades a delete to `salary_targ`.
6. The cascaded delete from `salary_src` is applied to `salary_targ`.
7. The row cannot be located because it was already deleted in step 5.

3.2.2 Assigning Row Identifiers

Oracle GoldenGate requires some form of unique row identifier on the source and target tables to locate the correct target rows for replicated updates and deletes.

3.2.2.1 How Oracle GoldenGate Determines the Kind of Row Identifier to Use

Unless a `KEYCOLS` clause is used in the `TABLE` or `MAP` statement, Oracle GoldenGate selects a row identifier to use in the following order of priority:

1. Primary key
2. First unique key alphanumerically that does not contain a timestamp or non-materialized computed column.

Note: If there are other, non-usable keys on a table or if there are no keys at all on the table, Oracle GoldenGate logs an appropriate message to the report file. Constructing a key from all of the columns impedes the performance of Oracle GoldenGate on the source system. On the target, this key causes Replicat to use a larger, less efficient WHERE clause.

3. If none of the preceding key types exist (even though there might be other types of keys defined on the table) Oracle GoldenGate constructs a pseudo key of all columns that the database allows to be used in a unique key, excluding those that are not supported by Oracle GoldenGate in a key or those that are excluded from the Oracle GoldenGate configuration.

3.2.2.2 Using KEYCOLS to Specify a Custom Key

If a table does not have one of the preceding types of row identifiers, or if you prefer those identifiers not to be used, you can define a substitute key if the table has columns that always contain unique values. You define this substitute key by including a KEYCOLS clause within the Replicat MAP parameter. The specified key will override any existing primary or unique key that Oracle GoldenGate finds. For more information, see *Reference for Oracle GoldenGate for Windows and UNIX*.

3.3 Next Steps in the Deployment

Because of its flexibility, Oracle GoldenGate offers numerous features and options that must be considered before you start any processes. To further configure Oracle GoldenGate to suit your business needs, see the following:

- For additional configuration guidelines to achieve specific replication topologies, see *Administering Oracle GoldenGate for Windows and UNIX*. This guide also contains information about:
 - Oracle GoldenGate architecture
 - Oracle GoldenGate commands
 - Oracle GoldenGate initial load methods
 - Configuring security
 - Using customization features
 - Mapping columns that contain dissimilar data
 - Data filtering and manipulation
- For syntax options and descriptions of Oracle GoldenGate GGSCI commands and Oracle GoldenGate parameters shown in this guide, see *Reference for Oracle GoldenGate for Windows and UNIX*.

Uninstalling Oracle GoldenGate

This chapter contains procedures for removing Oracle GoldenGate from the host system. It contains these sections:

- [Section 4.1, "Stopping Processes"](#)
- [Section 4.2, "Removing Oracle GoldenGate Windows Components"](#)
- [Section 4.3, "Removing the Checkpoint Table"](#)
- [Section 4.4, "Manually Removing the Oracle GoldenGate Files"](#)

This procedure 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.

4.1 Stopping Processes

This procedure stops the Oracle GoldenGate processes. Leave Manager running until directed to stop it.

On all systems:

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

```
STOP REPLICAT *
```

6. Stop the Manager process.

```
STOP MANAGER
```

4.2 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, and removes the Manager service. Perform these steps on source and target systems.

1. Log on as the system administrator or as a user with permission to issue Oracle GoldenGate commands and to delete files and directories from the operating system.
2. (Cluster) Working from the node in the cluster that owns the cluster group that contains the Manager resource, run GGSCI and make certain that all Replicat processes are stopped. Stop any that are running.


```
STATUS REPLICAT *
STOP REPLICAT *
```
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.

4.3 Removing the Checkpoint Table

Perform these steps to remove the checkpoint table that is stored in the target database and used by Replicat to store its processing checkpoints.

1. Stop Replicat.


```
STOP REPLICAT group
```
2. Log into the database with the `DBLOGIN` command.


```
DBLOGIN SOURCEDB database, USERIDALIAS alias
```
3. Delete the Replicat group.


```
DELETE REPLICAT group
```
4. Delete the Replicat checkpoint table.


```
DELETE CHECKPOINTTABLE schema.table
```

4.4 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.


```
STATUS MANAGER
STATUS ER *
STOP MANAGER
STOP ER *
```
2. Exit GGSCI.


```
EXIT
```

3. Remove the Oracle GoldenGate installation directory.

Oracle GoldenGate Installed Components

This appendix describes the programs, directories, and other components created or used by the Oracle GoldenGate software in the Oracle GoldenGate installation directory. Additional files not listed here might be installed on certain platforms. Files listed here might not be installed on every platform.

This appendix contains the following sections:

- [Section A.1, "Oracle GoldenGate Programs and Utilities"](#)
- [Section A.2, "Oracle GoldenGate Subdirectories"](#)
- [Section A.3, "Other Oracle GoldenGate Files"](#)
- [Section A.4, "Oracle GoldenGate Checkpoint Table"](#)

A.1 Oracle GoldenGate Programs and Utilities

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

Note: Some programs may not exist in all installations. For example, if only capture or delivery is supported by Oracle GoldenGate for your platform, the extract or replicat program will not be installed, respectively. Likewise, special files might be installed to support a specific database.

Table A-1 Oracle GoldenGate Installed Programs and Utilities

Program	Description
convchk	Converts checkpoint files to a newer version.
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 version 12c of Oracle GoldenGate.
defgen	Generates data definitions and is referenced by Oracle GoldenGate processes when source and target tables have dissimilar definitions.
emscInt	Sends event messages created by Collector and Replicat on Windows or UNIX systems to EMS on NonStop systems.
ggmxinstall	Oracle GoldenGate installation script for the SQL/MX database.

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

Program	Description
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.
ggsmgr.jcl ggsmgr.proc ggsmgrst.jcl ggsmgrst.proc	Start the Oracle GoldenGate Manager process from a batch job or the operator console on a z/OS system. Installed to support DB2 z/OS databases.
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.
vamserv	Started by Extract to read the TMF audit trails generated by TMF-enabled applications. Installed to support the NonStop SQL/MX database.

A.2 Oracle GoldenGate Subdirectories

This section describes the subdirectories of the Oracle GoldenGate installation directory and their contents.

Note: Some directories may not exist in all installations.

Table A-2 Oracle GoldenGate 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.

Table A–2 (Cont.) Oracle GoldenGate Installed Subdirectories

Directory	Description
dirchk	<p>Contains the checkpoint files created by Extract and Replicat processes, which store current read and write positions to support data accuracy and fault tolerance. Written in internal Oracle GoldenGate format.</p> <p>File name format is <i>group_name+sequence_number.ext</i> where <i>sequence_number</i> is a sequential number appended to aged files and <i>ext</i> is either <i>cpe</i> for Extract checkpoint files or <i>cpr</i> for Replicat checkpoint files.</p> <p>Do not edit these files.</p> <p>Examples:</p> <p>ext1.cpe</p> <p>repl.cpr</p>
dircrd	Contains credential store files.
dirdat	<p>The default location for Oracle GoldenGate trail files and extract files that are created by Extract processes to store extracted data for further processing by the Replicat process or another application or utility. Written in internal Oracle GoldenGate format.</p> <p>File name format is a user-defined two-character prefix followed by either a six-digit sequence number (trail files) or the user-defined name of the associated Extract process group (extract files).</p> <p>Do not edit these files.</p> <p>Examples:</p> <p>rt000001</p> <p>finance</p>
dirdef	<p>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.</p> <p>These files may be edited to add definitions for newly created tables. If you are unsure of how to edit a definitions file, contact Oracle GoldenGate technical support.</p> <p>Example:</p> <p>defs.dat</p>
dirdmp	Contains trace, or dump, files that support the internal activity logging mechanism.
dirjar	Contains the Java executable files that support Oracle GoldenGate Monitor.

Table A–2 (Cont.) Oracle GoldenGate Installed Subdirectories

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

A.3 Other Oracle GoldenGate Files

This section describes other files, templates, and objects created or installed in the root Oracle GoldenGate installation directory.

Note: Some files may not be installed in your environment, depending on the database and operating system platform.

Table A-3 Other Oracle GoldenGate Installed Files

Component	Description
bcpfmt.tpl	Template for use with Replicat when creating a run file for the Microsoft BCP/DTS bulk-load utility.
bcrypt.txt	Blowfish encryption software license agreement.
cagent.dll	Contains the Windows dynamic link library for the Oracle GoldenGate Monitor C sub-agent.
category.dll	Windows dynamic link library used by the <code>INSTALL</code> utility.
chkpt_db_create.sql	Script that creates a checkpoint table in the local database. A different script is installed for each database type.
db2cntl.tpl	Template for use with Replicat when creating a control file for the IBM <code>LOADUTIL</code> bulk-load utility.
ddl_cleartrace.sql	Script that removes the DDL trace file. (Oracle installations)
ddl_ddl2file.sql	Script that saves DDL from the marker table to a file.
ddl_disable.sql	Script that disables the Oracle GoldenGate DDL trigger. (Oracle installations)
ddl_enable.sql	Script that enables the Oracle GoldenGate DDL trigger. (Oracle installations)
ddl_filter.sql	Script that supports filtering of DDL by Oracle GoldenGate. This script runs programmatically; do not run it manually.
ddl_nopurgeRecyclebin.sql	Empty script file for use by Oracle GoldenGate support staff.
ddl_ora11.sql ddl_ora12.sql	Scripts that run programmatically as part of Oracle GoldenGate DDL support; do not run these scripts.
ddl_pin.sql	Script that pins DDL tracing, the DDL package, and the DDL trigger for performance improvements. (Oracle installations)
ddl_purgeRecyclebin.sql	Script that purges the Oracle recyclebin in support of the DDL replication feature.
ddl_remove.sql	Script that removes the DDL extraction trigger and package. (Oracle installations)
ddl_session.sql ddl_session1.sql	Supports the installation of the Oracle DDL objects. This script runs programmatically; do not run it manually.
ddl_setup.sql	Script that installs the Oracle GoldenGate DDL extraction and replication objects. (Oracle installations)
ddl_status.sql	Script that verifies whether or not each object created by the Oracle GoldenGate DDL support feature exists and is functioning properly. (Oracle installations)
ddl_staymetadata_off.sql ddl_staymetadata_on.sql	Scripts that control whether the Oracle DDL trigger collects metadata. This script runs programmatically; do not run it manually.
ddl_trace_off.sql ddl_trace_on.sql	Scripts that control whether DDL tracing is on or off.

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

Component	Description
ddl_tracelevel.sql	Script that sets the level of tracing for the DDL support feature. (Oracle installations)
debug files	Debug text files that may be present if tracing was turned on.
demo_db_scriptname.sql demo_more_db_ scriptname.sql	Scripts that create and populate demonstration tables for use with tutorials and basic testing.
.dmp files	Dump files created by Oracle GoldenGate processes for tracing purposes.
ENCKEYS	User-created file that stores encryption keys. Written in external ASCII format.
exitdemo.c	User exit example.
exitdemo_utf16.c	User exit example that demonstrates how to use UTF16 encoded data in the callback structures for information exchanged between the user exit and the process.
freeBSD.txt	License agreement for FreeBSD.
ggmessage.dat	Data file that contains error, informational, and warning messages that are returned by the Oracle GoldenGate processes. The version of this file is checked upon process startup and must be identical to that of the process in order for the process to operate.
ggserr.log	File that logs processing events, messages, errors, and warnings generated by Oracle GoldenGate.
ggsmsg.dll	Windows dynamic link library used by the 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 icuinx.dll icuucxx.dll	Windows shared libraries for International Components for Unicode, where xx is the currently used version.
jagent.bat	Windows batch file for the Java Agent for Oracle GoldenGate Monitor.
jagent.log jagentjni.log	Log files for the Oracle GoldenGate Monitor Agent.
jagent.sh	UNIX shell script for the Java Agent 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.hist	File created by Replicat if markers were passed from a NonStop source system.
marker_remove.sql	Script that removes the DDL marker table. (Oracle installations)

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

Component	Description
marker_setup.sql	Script that installs the Oracle GoldenGate DDL marker table. (Oracle installations)
marker_status.sql	Script that confirms successful installation of the DDL marker table. (Oracle installations)
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. (Oracle installations)
pthread-win32.txt	License agreement for pthread-VC.dll .
pthread-VC.dll	POSIX threads library for Microsoft Windows.
prvtckm.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	
role_setup.sql	Script that creates the database role necessary for Oracle GoldenGate DDL support. (Oracle installations)
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.
start.prm	z/OS parmlib members to start and stop the Manager process.
stop.prm	
startmgr	z/OS Unix System Services scripts to start the Manager process from GGSCI.
stopmgr	
startmgrcom	z/OS system input command for the Manager process.
stopmgrcom	
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.

A.4 Oracle GoldenGate Checkpoint Table

When database checkpoints are being used, Oracle GoldenGate creates a checkpoint table with a user-defined name in the database upon execution of the `ADD CHECKPOINTTABLE` command, or a user can create the table by using the `chkpt_db_create.sql` script (where *db* is an abbreviation of the type of database that the script supports). For a description of this table, see *Administering Oracle GoldenGate for Windows and UNIX*.

