**Oracle® GoldenGate**
PostgresSQL Installation and Setup Guide
11$g$ Release 2
**E29642-01**

August 2012

**ORACLE**®

Oracle GoldenGate PostgreSQL Installation and Setup Guide 11g Release 2

**E29642-01**

**CHAPTER 1**

# System requirements and preinstallation instructions

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

## Overview of Oracle GoldenGate for PostgreSQL

Oracle GoldenGate for PostgreSQL supports the mapping, manipulation, filtering, and delivery of data from other types of databases to a PostgreSQL database. Oracle GoldenGate does not support the capture of data from PostgreSQL to other PostgreSQL databases or to other kinds of databases.

## Supported Platforms

To find out which Oracle GoldenGate builds are available for a specific combination of database version and operating system, log onto http://support.oracle.com and select the **Certifications** tab. For assistance, click **Tips for Finding Certifications**.

An e-mail and password are required to enter this site.

## Operating system requirements

This section explains the requirements of Oracle GoldenGate to work within the host operating system of the target PostgreSQL database.

### Memory requirements

The amount of memory that is required for Oracle GoldenGate depends on the number of concurrent processes that will be running. At minimum on a PostgreSQL target system, there is at least one Replicat process that applies the replicated data to the target database. Depending on the amount or type of data that you are applying to the PostgresSQL target, you may decide to use additional Replicat processes. Oracle GoldenGate supports up to 5,000 concurrent processes per instance of Oracle GoldenGate. Each process needs approximately 25-55 MB of memory, or more depending on the size of the transactions and the number of concurrent transactions.

The actual amount of physical memory that is used by any Oracle GoldenGate process is controlled by the operating system, not the Oracle GoldenGate program. The Oracle GoldenGate cache manager takes advantage of the memory management functions of the operating system to ensure that Oracle GoldenGate processes work in a sustained and efficient manner. For more information about evaluating Oracle GoldenGate memory requirements, see the CACHEMGR parameter in the Oracle GoldenGate *Windows and UNIX Reference Guide*.

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### Disk requirements

● 50-150 MB, depending on the platform. This includes space for the compressed download file and space for the uncompressed files. You can delete the download file after the installation is complete.

● 40 MB for the working directories and binaries for each instance of Oracle GoldenGate that you are installing on the system. For example, to install two builds of Oracle GoldenGate into two separate directories, allocate 80 MB of space.

● 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 to contain the 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 the Oracle GoldenGate *Administration Guide*.

● To prevent trail activity from interfering with business applications, assign a separate disk or file system to contain the trail files. Trail files accumulate but can be purged according to rules set with the PURGEOLDEXTRACTS parameter. Trail files can reside on drives that are local to the Oracle GoldenGate installation, or they can reside on NAS or SAN devices. You will specify the location of the trails when you configure Oracle GoldenGate.

### Network

● 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 the Oracle GoldenGate *Windows and UNIX Administrator's Guide* for details on how to configure the Manager process to handle the required ports.

● Configure your firewalls to accept connections through the Oracle GoldenGate ports.

### Operating system privileges

● 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 processes must operate as an operating system user that has privileges to read, write, and delete files and subdirectories in the Oracle GoldenGate directory. In addition, the Manager process requires privileges to control the other Oracle GoldenGate processes.

● Dedicate the Oracle GoldenGate operating system users to Oracle GoldenGate. Sensitive information might be available to anyone who runs an Oracle GoldenGate process.

### Itanium requirements

To install Oracle GoldenGate on a Microsoft Itanium system, the vcredist_IA64.exe runtime library package must be installed. You can download this package from the Microsoft website. This package includes VisualStudio 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.
```

### Console

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.

### Other programs

- Before installing Oracle GoldenGate on a Windows system, install and configure the Microsoft Visual C ++ 2005 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.

## Database requirements

This section explains the requirements for Oracle GoldenGate to be able to connect to the PostgreSQL target database.

- Create a database user that is dedicated to Oracle GoldenGate. It can be the same user for all of the Oracle GoldenGate Replicat processes that must connect to the PostgreSQL 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.

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● This user connects to the PostgreSQL database through a supplied ODBC driver. You will take steps to license this driver during installation.

## PostgreSQL supported and non-supported objects and operations

● Capture (extraction) of DML operations from PostgreSQL is not supported.
● DDL (data definition language) operations are not supported.
● PostgreSQL array semantics are not supported.
● See Table 1 for supported and non-supported data types, followed by support limitations.

**Table 1     Oracle GoldenGate support for PostgreSQL data types**

| Name | Alias | Description | Supported |
|------|-------|-------------|-----------|
| Bigint | int8 | Signed 8-byte integer | Yes |
| Bigserial | serial8 | Autoincrementing 8-byte integer | Yes |
| bit [(n)] | | Fixed-length bit string | Yes |
| bit varying [(n)] | varbit [(n)] | Variable-length bit string | Yes |
| Boolean | bool | Logical boolean (true/false) | Yes |
| Box | | Rectangular box on a plane | **No** |
| Bytea | | Binary data ("byte array") | Yes |
| character varying [(n)] | varchar [(n)] | Variable-length character string | Yes |
| character [(n)] | char [(n)] | Fixed-length character string | Yes |
| Cidr | | IPv4 or IPv6 network address | Yes |
| Circle | | Circle on a plane | **No** |
| Date | | Calendar date (year, month, day) | Yes |

**Table 1    Oracle GoldenGate support for PostgreSQL data types**

| Name | Alias | Description | Supported |
|---|---|---|---|
| double precision | float8 | Double precision floating-point number (8 bytes) | Yes |
| Inet | | IPv4 or IPv6 host address | Yes |
| Integer | int, int4 | Signed 4-byte integer | Yes |
| interval [fields] [(p)] | | Time span | Yes |
| Line | | Infinite line on a plane | **No** |
| Lseg | | Line segment on a plane | **No** |
| Macaddr | | MAC (Media Access Control) address | Yes |
| Money | | Currency amount | Yes |
| numeric [(p [,s])] | decimal [(p [,s])] | Exact numeric of selectable precision | Yes |
| Path | | Geometric path on a plane | **No** |
| Point | | Geometric point on a plane | **No** |
| Polygon | | Closed geometric path on a plane | **No** |
| Real | float4 | Single precision floating-point number (4 bytes) | Yes |
| Smallint | int2 | Signed 2-byte integer | Yes |
| Serial | serial4 | Autoincrementing 4-byte integer | Yes |
| Text | | Variable-length character string | Yes |
| time [(p)] [without time zone] | | Time of day (no time zone) | Yes |

**Table 1    Oracle GoldenGate support for PostgreSQL data types**

| Name | Alias | Description | Supported |
|------|-------|-------------|-----------|
| `time [(p)] [with time zone]` | `timetz` | Time of day, including time zone | Yes |
| `timestamp [(p)] [without time zone]` | | Date and time (no time zone) | Yes |
| `timestamp [(p)] [with time zone]` | `Timestamptz` | Date and time, including time zone | Yes |
| `Tsquery` | | Text search query | **No** |
| `Tsvector` | | Text search document | **No** |
| `txid_snapshot` | | User-level transaction id snapshot | **No** |
| `Uuid` | | Universally unique identifier | Yes |
| `Xml` | | XML data | **Limited** |

# Limitations of data type support

This section describes limitations of Oracle GoldenGate delivery support for PostgresSQL as a target database.

### Array type

PostgreSQL array type is not supported.

### Character data

Character data cannot contain a U+0000 character, such as in 'abc\0abc', which is a 7 character data with a U+0000 in the middle. PostgreSQL treats U+0000 as an invalid character.

### timestamptz data type

PostgreSQL timestamp with timezone column type is recognized as SQL_VARCHAR and therefore Oracle GoldenGate writes the data in the native format of the source database, rather than normalizing it to its PostgreSQL form. As a result, some replicated timestamp data might not be compatible with Oracle GoldenGate column-conversion functions and FILTER clauses.

Examples of accepted timestamp with timezone values:

"2011-05-05 05:05:12-07", "2011-05-05 05:05:12-7", "2011-05-05 05:05:12-07:00", "2011-05-05 05:05:12-700"

# Oracle GoldenGate features with support limitations for PostgreSQL

This section explains the limitations of support for certain Oracle GoldenGate features when operating on a PostgreSQL target database.

### SQLEXEC

SQLEXEC cannot be used to execute PostgreSQL functions; however, SQLEXEC can be used to issue queries against the PostgreSQL database.

### DBOPTIONS with LIMITROWS

The LIMITROWS option of the DBOPTIONS parameter is not supported for PostgreSQL, because PostgreSQL does not have a clause to limit the rows affected by UPDATE or DELETE operations. LIMITROWS prevents multiple rows from being updated or deleted by the same Replicat SQL statement when the target table does not have a primary or unique key.

### NODYNSQL parameter

NODYNSQL is supported except for non-printable characters or the Text datatype. Oracle GoldenGate abends when NODYNSQL is used.

### Reverse utility

The Reverse utility is not supported for PostgreSQL.

**CHAPTER 2**

# Installing Oracle GoldenGate

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These instructions are for installing Oracle GoldenGate for the first time. To upgrade Oracle GoldenGate from one version to another, go to the following link, then select View Library under the correct release, and then download the *Upgrade Guide*.

http://www.oracle.com/technetwork/middleware/goldengate/documentation/index.html

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.

The installation process takes a short amount of time.

## Installation overview

To install Oracle GoldenGate, the following steps are required:

Downloading Oracle GoldenGate

Preparing to install Oracle GoldenGate within a cluster

Installing Oracle GoldenGate on Linux and UNIX

Installing Oracle GoldenGate on Windows

Integrating Oracle GoldenGate into a cluster

## Downloading Oracle GoldenGate

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

1. Navigate to http://edelivery.oracle.com.

2. On the **Welcome** page:
   ❍ Select your language.
   ❍ Click **Continue**.

3. On the **Export Validation** page:
   ❍ Enter your identification information.
   ❍ Accept the **Trial License Agreement** (even if you have a permanent license).
   ❍ Accept the **Export Restrictions**.
   ❍ Click **Continue**.

4. On the **Media Pack Search** page:
   ❍ Select the **Oracle Fusion Middleware** Product Pack.
   ❍ Select the platform on which you will be installing the software.

      ❍  Click **Go**.

  *5.*  In the **Results List**:

      ❍  Select the Media Pack that you want to download.

      ❍  Click **Continue**.

  *6.*  On the **Download** page:

      ❍  Click **Download** for each component that you want. Follow the automatic download process to transfer the mediapack.zip file to your system.

> **NOTE**    Before installing the software, review the release notes for any new features, new requirements, or bug fixes that affect your current configuration. Review the readme file for known issues.

## 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 is Oracle-certified.

### Deciding where to install Oracle GoldenGate binaries and files in the cluster

The best practice is the 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. On UNIX or Linux, you can create symbolic links to them from the installation directory on each node.

    ❍  br

    ❍  dirchk

    ❍  dirdat

    ❍  dirtmp

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

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

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# 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 "Preparing to install Oracle GoldenGate within a cluster" on page 9 for more information.

## Installing the Oracle GoldenGate files

1. Extract the Oracle GoldenGate mediapack.zip file to the system and directory where you want Oracle GoldenGate to be installed.

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
   ```

# 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. See "Preparing to install Oracle GoldenGate within a cluster" on page 9 for more information.

## Installing Oracle GoldenGate into a Windows Cluster

1. Log into one of the nodes in the cluster.

2. Choose a drive for the Oracle GoldenGate installation location. This drive must be a resource within the same cluster group that contains the database instance.

3. Ensure that this cluster group is owned by the cluster node that you are logging into.

4. Install Oracle GoldenGate according to the following instructions.

## Installing the Oracle GoldenGate files

1. Unzip the downloaded file(s) by using WinZip or an equivalent compression product.

2. 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.

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*3.* From the Oracle GoldenGate folder, run the GGSCI program.

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

```
CREATE SUBDIRS
```

*5.* Issue the following command to exit GGSCI.

```
EXIT
```

## 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

*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.

## 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.

### To install Manager as a Windows service

*1.* (Recommended) Log on as the system administrator.

*2.* Click **Start** > **Run**, and 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** program with the following syntax:

```
install <option> [...]
```

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**Where:** <option> is one of the following:

**Table 2    INSTALL options**

| Option | Description |
|---|---|
| ADDEVENTS | Adds Oracle GoldenGate events to the Windows Event Manager. By default, Oracle GoldenGate errors are generic. To produce more specific error content, copy the following files from the Oracle GoldenGate installation directory to the SYSTEM32 directory.<br>category.dll<br>ggsmsg.dll |
| ADDSERVICE | Adds Manager as a service with the name that is specified with the MGRSERVNAME parameter in the GLOBALS file, if one exists, or by the default of GGSMGR. ADDSERVICE configures the service to run as the Local System account, the standard for most Windows applications because the service can be run independently of user logins and password changes. To run Manager as a specific account, use the USER and PASSWORD options.[1]<br>The service is installed to start at system boot time (see AUTOSTART). To start it after installation, either reboot the system or start the service manually from the Services applet of the Control Panel. |
| ADDDRIVERS | Installs the PostgreSQL ODBC drivers into the Windows registry so that a DSN can be created with the ODBC Administrator. |
| DELETEDRIVERS | Removes the Windows registry information that is related to the PostgreSQL ODBC drivers. |
| AUTOSTART | Sets the service that is created with ADDSERVICE to start at system boot time. This is the default unless MANUALSTART is used. |
| MANUALSTART | Sets the service that is created with ADDSERVICE to start manually through GGSCI, a script, or the Services applet of the Control Panel. The default is AUTOSTART. |
| USER <name> | Specifies a domain user account that executes Manager. For <name>, include the domain name, a backward slash, and the user name, for example HEADQT\GGSMGR.<br>By default, the Manager service is installed to use the Local System account. |
| PASSWORD <password> | Specifies the password for the user that is specified with USER. |

[1] A user account can be changed by selecting the Properties action from the Services applet of the Windows Control Panel.

4. (Windows Server 2008) 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** program 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.

## Integrating 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.

### General requirements in a cluster

1. Register the Oracle GoldenGate Manager process (and only Manager) as a cluster-
   managed resource as you would any other application. Manager must be the only
   Oracle GoldenGate process that the cluster-management software starts and stops,
   because it is the parent process that manages all other processes.

2. If the cluster uses a virtual IP address, you may need to obtain an available fixed IP
   address for the Manager process. The VIP must be an available IP address on the
   public subnet and cannot be determined through DHCP. In the parameter files of the
   Extract data pumps, specify the VIP of the remote Manager as the input value of the
   RMTHOST parameter. Other Oracle GoldenGate products that access Manager also
   should use the VIP.

3. 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.

5. Configure Oracle GoldenGate as directed in this documentation.

### 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

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**CHAPTER 3**

# Preparing the system for Oracle GoldenGate

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## Configuring ODBC on UNIX and Linux

You configure ODBC on UNIX and Linux by:

● Specifying the path to the database libraries
● Setting the path to the ODBC driver library and initialization file

### Specifying the path to the database libraries

To point the ODBC driver manager to the database libraries, create an odbc.ini file that contains the DSN information. This file can be stored anywhere on the system. You will be instructed to set the path to this file in "Setting the path to the ODBC driver library and initialization file".

This file must contain an [ODBC Data Sources] section at the beginning, followed by a list of DSNs for this installation. Each DSN must be described in its own section, and the Driver entry within each DSN section is mandatory. The following is an example of the required entries.

```
[ODBC Data Sources]
postgre=DataDirect 6.1 PostgreSQL Wire Protocol

[ODBC]
IANAAppCodePage=4
InstallDir=/home/fin/fin13004/postgres/v11201_120402

[postgre]
Driver=/home/fin/fin13004/postgres/v11201_120402/lib/GGpsql25.so
Description=DataDirect 6.1 PostgreSQL Wire Protocol
Database=fin
HostName=12.345.6.789
PortNumber=5432
LogonID=postgres
Password=postgre
```

### Setting the path to the ODBC driver library and initialization file

Set the paths to the following components that are used by Replicat:

● Set the environment variable ODBCINI to the path of the odbc.ini file. This is the file you created in "Specifying the path to the database libraries" that directs the ODBC driver where to find the database libraries.
● Set the shared-library environment variable to the path of the lib sub-directory of the Oracle GoldenGate installation directory. This sub-directory is where the ODBC driver (libodbc.so) and the license files are stored and where Replicat looks for them.

**To set the variables in Korn shell**

```
PATH=<absolute path>:$PATH
export PATH <ODBCINI | shared libraries variable>=<absolute path>:
   $<ODBCINI | shared libraries variable>
export <ODBCINI | shared libraries variable>
```

**To set the variables in Bourne shell**

```
export PATH=<absolute path>:$PATH
export <ODBCINI | shared libraries variable>=<absolute path>:
   $<ODBCINI | shared libraries variable>
```

**To set the variables in C shell**

```
setenv PATH <absolute path>:$PATH
setenv <ODBCINI | shared libraries variable> <absolute path>:
   $<ODBCINI | shared libraries variable>
```

**Where:**

❍ `<absolute path>` is the full path to the odbc.ini file or the full path to the Oracle GoldenGate lib subdirectory, depending on which variable you are setting.

❍ `<shared libraries variable>` is one of the following:

**UNIX/Linux library path variables per platform**

| Platform | Environment variable |
| --- | --- |
| IBM AIX | LIBPATH |
| HP-UX | SHLIB_PATH |
| Sun Solaris | LD_LIBRARY_PATH |
| HP Tru64 (OSF/1) | |
| LINUX | |

**Example**  `export LD_LIBRARY_PATH=/ggs/lib:$LD_LIBRARY_PATH`

**NOTE**  To view the libraries that are required by an Oracle GoldenGate process, use the ldd <process> shell command before starting the process. This command also shows an error message for any that are missing.

## Configuring ODBC on Windows

You configure ODBC on Windows by:

● Updating the Windows Registry with the driver information
● Creating a data source name (DSN)

### Updating the Windows Registry with the driver information

The path to the ODBC driver must be added to the ODBC.INI and ODBCINST.INI keys under HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ in the Windows Registry. Oracle GoldenGate

automates this process.

1. At the Windows command prompt, change directories to the Oracle GoldenGate installation directory.

2. Run the install program with the following input:

```
install adddrivers
```

### Creating a data source name (DSN)

The DSN stores information about how to connect to the database.

1. On the Windows system, open the **Control Panel** folder.

2. Open the **Administrative Tools** folder.

3. Open **Data Sources (ODBC).** The **ODBC Data Source Administrator** dialog box is displayed.

4. Select the **System DSN** tab, and then click **Add**.

5. Under **Create New Data Source**, select the PostgreSQL driver.

6. Click **Finish**. The **Create a New Data Source** wizard is displayed.

7. 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 PostgreSQL database and its host.

8. Click **OK** to close the dialog.

9. Repeat these steps on the other systems where Oracle GoldenGate will interact with PostgreSQL.

## Specifying the DSN in the Replicat parameter file

Specify the DSN with the TARGETDB parameter in the Replicat parameter file. For more information about this parameter, see the Oracle GoldenGate *Windows and UNIX Reference Guide*.

## Preparing tables for processing

The following table attributes must be addressed in an Oracle GoldenGate environment.

### 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.

### 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.

#### 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 a computed column.

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 explicitly excluded by means of parameters in the Oracle GoldenGate configuration.

> **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.

#### 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 Extract TABLE parameter and the Replicat MAP parameter. The specified key will override any existing primary or unique key that Oracle GoldenGate finds. For more information, see the Oracle GoldenGate *Windows and UNIX Reference Guide*.

## Controlling character set conversion

Replicat converts the character set of the source data to the character set of the target data when the two are different. To ensure that Replicat uses the correct character set for the target data, set the PostgreSQL environment variable PGCLIENTENCODING to the correct

character set. Replicat sets the session character set to that value. If PGCLIENTENCODING is not set, Replicat sets the character set for the applied data to that of the target server.

For more information about how Oracle GoldenGate handles character sets, locale, and other aspects of globalization support, see the Oracle GoldenGate *Windows and UNIX Administrator's Guide*.

**CHAPTER 4**

# Uninstalling Oracle GoldenGate

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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.

## Uninstalling Oracle GoldenGate from Linux or UNIX

1. Run the command shell.

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

3. Change directories to the Oracle GoldenGate installation directory.

4. Run GGSCI.

5. Stop all Oracle GoldenGate processes.

6. Stop the Manager process.

7. Log into the database with the DBLOGIN command, and then remove the Replicat checkpoint table by running the DELETE CHECKPOINTTABLE command.

8. Make certain all processes are stopped (including GGSCI).

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

## Removing Oracle GoldenGate from Windows Cluster

1. Working from the node in the cluster that owns the cluster group that contains the Manager resource, run GGSCI and then stop any Extract and Replicat processes that are still running.

2. Use the Cluster Administrator tool to take the Manager resource offline.

3. Right click the resource and select **Delete** to remove it.

4. Click **Start** > **Run**, and type cmd in the **Run** dialog box to open the command console.

5. Change directories to the Oracle GoldenGate installation directory.

6. Run the install program using the following syntax.

```
install deleteevents deleteservice deletedrivers
```

This command stops Oracle GoldenGate events from being reported to the Windows Event Manager, removes the Manager service, and removes the ODBC driver information from the HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBCINST.INI key in the Windows Registry.

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*7.* Delete the CATEGORY.DLL and GGSMSG.DLL files from the Windows SYSTEM32 folder.

*8.* Move the cluster group to the next node in the cluster, and repeat from step 4.

*9.* Follow the instructions in "Uninstalling Oracle GoldenGate from Windows (non-cluster)".

## Uninstalling Oracle GoldenGate from Windows (non-cluster)

*1.* (Suggested) 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.* From the Oracle GoldenGate installation folder, run GGSCI.

*3.* Stop all Oracle GoldenGate processes.

*4.* Stop the Manager program or service.

> **NOTE**  Skip step 5 through step 8 if you already performed them when removing Oracle GoldenGate from a Windows cluster.

*5.* Click **Start** > **Run**, and 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 program using the following syntax.

```
install deleteevents deleteservice deletedrivers
```

This command stops Oracle GoldenGate events from being reported to the Windows Event Manager, removes the Manager service, and removes the ODBC driver information from the HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBCINST.INI key in the Windows Registry.

*8.* Delete the CATEGORY.DLL and GGSMSG.DLL files from the Windows SYSTEM32 folder.

*9.* Log into the database with the DBLOGIN command, and then remove the Replicat checkpoint table by running the DELETE CHECKPOINTTABLE command.

*10.* Make certain all processes are stopped (including GGSCI) and then remove the Oracle GoldenGate files by removing the installation directory.

**APPENDIX 1**

# Oracle GoldenGate installed components

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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.

## 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 3    Programs and utilities**

| Program | Description |
| --- | --- |
| convchk | Converts checkpoint files to a newer version. |
| ddlgen | Generates target database table definitions based on source database DDL. Used primarily on the NonStop platform. |
| defgen | Generates data definitions and is referenced by Oracle GoldenGate processes when source and target tables have dissimilar definitions. |
| emsclnt | Sends event messages created by Collector and Replicat on Windows or UNIX systems to EMS on NonStop systems. |
| extract | Performs capture from database tables or transaction logs or receives transaction data from a vendor access module. |
| ggmxinstall | Oracle GoldenGate installation script for the SQL/MX database. |
| 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. |

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**Table 3    Programs and utilities (continued)**

| Program | Description |
| --- | --- |
| install | Installs Oracle GoldenGate as a Windows service and provides other Windows-based service options. |
| keygen | Generates data-encryption keys. |
| logdump | A utility for viewing and saving information stored in extract trails or files. |
| mgr | (Manager) Control process for resource management, control and monitoring of Oracle GoldenGate processes, reporting, and routing of requests through the GGSCI interface. |
| 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. |

## 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 4    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 datastore 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 4    Subdirectories (continued)**

| Directory | Description |
| --- | --- |
| dirchk | Contains the checkpoint files created by Extract and Replicat processes, which store current read and write positions to support data accuracy and fault tolerance. Written in internal Oracle GoldenGate format. |
| | File name format is <group name><sequence number>.<ext> where <sequence number> is a sequential number appended to aged files and <ext> is either cpe for Extract checkpoint files or cpr for Replicat checkpoint files. |
| | Do not edit these files. |
| | Examples: |
| | ext1.cpe |
| | rep1.cpr |
| dirdat | The default location for Oracle GoldenGate trail files and extract files that are created by Extract processes to store extracted data for further processing by the Replicat process or another application or utility. Written in internal Oracle GoldenGate format. |
| | File name format is a user-defined two-character prefix followed by either a six-digit sequence number (trail files) or the user-defined name of the associated Extract process group (extract files). |
| | Do not edit these files. |
| | Examples: |
| | rt000001 |
| | finance |
| dirdef | The default location for data definitions files created by the DEFGEN utility to contain source or target data definitions used in a heterogeneous synchronization environment. Written in external ASCII. File name format is a user-defined name specified in the DEFGEN parameter file. |
| | These files may be edited to add definitions for newly created tables. If you are unsure of how to edit a definitions file, contact Oracle GoldenGate technical support. |
| | Example: |
| | defs.dat |
| dirjar | Contains the Java executable files that support Oracle GoldenGate Monitor. |
| dirout | This directory is not used any more. |

**Table 4    Subdirectories (continued)**

| Directory | Description |
|---|---|
| dirpcs | Default location for status files. File name format is <group>.<extension> where <group> is the name of the group and <extension> is either pce (Extract), pcr (Replicat), or pcm (Manager). |
| | These files are only created while a process is running. The file shows the program name, the process name, the port number, and the process ID. |
| | Do not edit these files. |
| | Examples: |
| | mgr.pcm |
| | ext.pce |
| dirprm | The default location for Oracle GoldenGate parameter files created by Oracle GoldenGate users to store run-time parameters for Oracle GoldenGate process groups or utilities. Written in external ASCII format. File name format is <group name/user-defined name>.prm or mgr.prm. |
| | These files may be edited to change Oracle GoldenGate parameter values after stopping the process. They can be edited directly from a text editor or by using the EDIT PARAMS command in GGSCI. |
| | Examples: |
| | defgen.prm |
| | finance.prm |
| dirrec | Not used by Oracle GoldenGate. |
| dirrpt | The default location for process report files created by Extract, Replicat, and Manager processes to report statistical information relating to a processing run. Written in external ASCII format. |
| | File name format is <group name><sequence number>.rpt where <sequence number> is a sequential number appended to aged files. |
| | Do not edit these files. |
| | Examples: |
| | fin2.rpt |
| | mgr4.rpt |
| dirsql | Used by the TRIGGEN utility to store SQL scripts before TRIGGEN 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 the Oracle Wallet that supports Oracle GoldenGate Monitor. This directory is not installed until the utility that creates the wallet is run. |
| UserExitExamples | Contains sample files to help with the creation of user exits. |

# 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 OS platform.

**Table 5     Other 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 INSTALL program. |
| chkpt_<db>_create.sql | Script that creates a checkpoint table in the local database. A different script is installed for each database type. |
| db2cntl.tpl | Template for use with Replicat when creating a control file for the IBM LOADUTIL bulk-load utility. |
| ddl_access.tpl | Template used by the DDLGEN utility to convert source DDL to Microsoft Access DDL. |
| ddl_cleartrace.sql | Script that removes the DDL trace file. (Oracle installations) |
| ddl_db2.tpl | Template used by the DDLGEN utility to convert source DDL to DB2 DDL (Linux, UNIX, Windows). |
| ddl_db2_os390.tpl | Template used by the DDLGEN utility to convert source DDL to DB2 DDL (z/OS systems). |
| 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_informix.tpl | Template used by the DDLGEN utility to convert source DDL to Informix DDL. |

**Table 5    Other files (continued)**

| Component | Description |
| --- | --- |
| ddl_mss.tpl | Template used by the DDLGEN utility to convert source DDL to SQL Server DDL. |
| ddl_mysql.tpl | Template used by the DDLGEN utility to convert source DDL to MySQL DDL. |
| ddl_nopurgeRecyclebin.sql | Empty script file for use by Oracle GoldenGate support staff. |
| ddl_nssql.tpl | Template used by the DDLGEN utility to convert source DDL to NonStop SQL DDL. |
| ddl_ora9.sql<br>ddl_ora10.sql<br>ddl_ora11.sql<br>ddl_ora10upCommon.sql | Scripts that run programmatically as part of Oracle GoldenGate DDL support; do not run these scripts. |
| ddl_oracle.tpl | Template used by the DDLGEN utility to convert source DDL to Oracle DDL. |
| 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<br>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_sqlmx.tpl | Template used by the DDLGEN utility to convert Tandem Enscribe DDL to NonStop SQL/MX DDL. |
| 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<br>ddl_staymetadata_on.sql | Scripts that control whether the Oracle DDL trigger collects metadata. This script runs programmatically; do not run it manually. |
| ddl_sybase.tpl | Template used by the DDLGEN utility to convert source DDL to Sybase DDL. |

**Table 5    Other files (continued)**

| Component | Description |
| --- | --- |
| ddl_tandem.tpl | Template used by the DDLGEN utility to convert source DDL to NonStop SQL DDL. |
| ddl_trace_off.sql<br>ddl_trace_on.sql | Scripts that control whether DDL tracing is on or off. |
| ddl_tracelevel.sql | Script that sets the level of tracing for the DDL support feature. (Oracle installations) |
| debug files | Debug text files that may be present if tracing was turned on. |
| demo_<db>_create.sql<br>demo_more_<db>_create.sql<br>demo_<db>_insert.sql<br>demo_more_<db>_insert.sql<br>demo_<db>_lob_create.sql<br>demo_<db>_misc.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. |

**Table 5    Other files (continued)**

| Component | Description |
| --- | --- |
| icudt38.dll<br>icuin38.dll<br>icuuc38.dll | Windows shared libraries for International Components for Unicode. |
| jagent.bat | Windows batch file for the Java Agent for Oracle GoldenGate Monitor. |
| jagent.log<br>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. |
| 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) |
| 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. |
| 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. |
| prvtclkm.plb | Supports the replication of Oracle encrypted data. |
| pw_agent_util.bat<br>pw_agent_util.sh | Script files that support the Oracle GoldenGate Monitor Agent. |
| role_setup.sql | Script that creates the database role necessary for Oracle GoldenGate DDL support. (Oracle installations) |

**Table 5    Other files (continued)**

| Component | Description |
|-----------|-------------|
| sqlldr.tpl | Template for use with Replicat when creating a control file for the Oracle SQL*Loader bulk-load utility. |
| start.prm<br>stop.prm | z/OS paramlib members to start and stop the Manager process. |
| startmgr<br>stopmgr | z/OS Unix System Services scripts to start the Manager process from GGSCI. |
| startmgrcom<br>stopmgrcom | z/OS system input command for the Manager process. |
| 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. |

## 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 the type of database.

Do not change the names or attributes of the columns in this table. You can change table storage attributes as needed.

**Table 6    Checkpoint table definitions**

| Column | Description |
|--------|-------------|
| GROUP_NAME (primary key) | The name of a Replicat group using this table for checkpoints. There can be multiple Replicat groups using the same table. |
| GROUP_KEY (primary key) | A unique identifier that, together with GROUPNAME, uniquely identifies a checkpoint regardless of how many Replicat groups are writing to the same table. |
| SEQNO | The sequence number of the checkpoint file. |
| RBA | The relative byte address of the checkpoint in the file. |

**Table 6    Checkpoint table definitions**

| Column | Description |
| --- | --- |
| AUDIT_TS | The timestamp of the checkpoint position in the checkpoint file. |
| CREATE_TS | The date and time when the checkpoint table was created. |
| LAST_UPDATE_TS | The date and time when the checkpoint table was last updated. |
| CURRENT_DIR | The current Oracle GoldenGate home directory or folder. |