Oracle® GoldenGate
c-tree Installation and Setup Guide
11*g* Release 1 Patch Set 1 (11.1.1.1)
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Oracle GoldenGate c-tree Installation and Setup Guide 11g Release 1 Patch Set 1 (11.1.1.1)

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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 c-tree

Oracle GoldenGate for c-tree supports the synchronization of data between identical source and target c-tree databases without mapping, filtering, or manipulation. Data is passed as-is from source to target. Oracle GoldenGate propagates raw (binary) key data and record data from source to target without making adjustments for metadata or data types. Oracle GoldenGate does not support replication between c-tree and a source or target database of another type.

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

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 the source system, there is a primary Extract process that captures source data and a secondary Extract data-pump process that transfers data across the network. At minimum on the target system is at least one Replicat process that applies the replicated data to the target database. In some cases, these processes might all operate on the same system, depending on the required configuration.

● The Oracle GoldenGate GGSCI command interface fully supports up to 300 concurrent Extract and Replicat processes per instance of Oracle GoldenGate. An instance of Oracle GoldenGate equates to one Manager process, which is the main controller process.

● Each Extract and Replicat process needs approximately 25-55 MB of memory, or more depending on the size of the transactions and the number of concurrent transactions.

Use the CACHEMGR parameter to control the amount of virtual memory and temporary disk

space that is available for caching uncommitted transaction data.

Disk requirements

Assign the following free disk space:

- 50-150 MB, depending on the database and 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 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. Start with 1 GB and adjust as needed. See also the following guidelines.

Storage for Oracle GoldenGate trails

To prevent trail activity from interfering with business applications, assign a separate disk or file system to contain the trail files. These files are created during processing to store all of the data that is captured by Oracle GoldenGate. The default size is 10 megabytes, but can be changed during the configuration process. 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.

For trails that are stored at the source location, there should be enough space to handle data accumulation should the network connection fail. In a typical configuration, a secondary Extract process (known as a data pump) sends data from a local trail over the network, and it will fail when the network does. However, the primary Extract that reads the transaction logs and writes to the local trail will continue to do so. This Extract should not be stopped during a failure; otherwise, transaction data might be missed if the transaction logs recycle or get removed from the system before the data is completely captured. There must be enough disk space to hold the data accumulation.

For trails at the target location, provide enough disk space to handle data accumulation according to the purge rules set with the PURGEOLDEXTRACTS parameter. Even with PURGEOLDEXTRACTS in use, data will always accumulate on the target because it is transferred across the network faster than it can be applied to the target database.

To estimate required trail space

1. Estimate the longest time that the network could be unavailable. Plan to store enough data to withstand the longest possible outage, because otherwise you will need to resynchronize the source and target data if the outage outlasts disk capacity.

2. Estimate how much transaction log volume your business applications generate in one hour.

3. Use the following formula to calculate the required disk space.

[log volume in one hour] x [number of hours downtime] x .4 = trail disk space

This equation uses a multiplier of 40 percent because only about 40 percent of the data in a transaction log is needed by Oracle GoldenGate.

> **NOTE** This formula is a conservative estimate, and you should run tests once you have configured Oracle GoldenGate to determine exactly how much space you need.

Network

● Configure the system to use TCP/IP services, including DNS.

● 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.

● 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.

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

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

Other programs

● 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

Database configuration

Oracle GoldenGate requires little database configuration because it acts only as a

transport for c-tree data and does not interact with the database itself. On the source system, the c-tree replication API passes data changes to the Extract process. On the target, the Replicat process delivers the data to the c-tree replication API, which applies the data without the involvement of Replicat. See "Preparing the system for Oracle GoldenGate" on page 12 for required database setup.

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:
  - ❍ Extract (source database)
  - ❍ Replicat (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.

Server alias

Specify the c-tree server alias with the SOURCEDB and TARGETDB parameters when you configure the Oracle GoldenGate processes.

Supported c-tree data types

Oracle GoldenGate supports all c-tree data types.

Supported objects and operations for c-tree

- Oracle GoldenGate supports files that contain any number of records. Oracle GoldenGate supports a key of up to 1024 bytes and record data of up to 10000 bytes for a total of 11024 data bytes.
- Oracle GoldenGate supports the maximum number of fields per file that the database supports.
- Oracle GoldenGate propagates raw (binary) key data and record data from source to target without making adjustments for metadata/data types.

Limitations of support

The c-tree database server only generates replication logs for database files that have been created correctly, and only for ISAM-level or above operations. For example, c-tree index files created with support for NULL key detection enabled are not eligible for replication. There may be other disqualifying conditions that make a file ineligible for replication, and therefore unable to be captured by Oracle GoldenGate.

Even if a file is created with the correct parameters for replication, low-level operations on the file do not appear in the server transaction logs, and thus they are not sent to the target by Oracle GoldenGate. The DELBLD or DeleteKeyBlind() function is an example of a low-level file operation that is not replicated. Oracle GoldenGate does not detect or report such conditions to the user.

Non-supported objects and operations for c-tree

- Replication to and from other types of databases.
- Updates to primary keys.
- Extraction or replication of DDL (data definition language) operations
- Mapping, filtering, or manipulation of data. Oracle GoldenGate does not have access to data definitions and other metadata that is required to support those functions.
- The BATCHSQL and SQLEXEC features of Oracle GoldenGate.

Supported and non-supported object names and case

The following will help you verify whether the name of a supported object qualifies or disqualifies it for inclusion in an Oracle GoldenGate configuration.

Object names and owners

Source and target object names must be fully qualified in Oracle GoldenGate parameter files, as in fin.emp. Oracle GoldenGate supports character case as follows.

Case sensitivity

The following are general guidelines for the case-sensitivity of object names as it relates to Oracle GoldenGate. These guidelines may or may not apply to your databases, depending on whether the database or the underlying operating system supports case-sensitivity. Keep in mind that case-sensitivity (or lack thereof) may apply to the source database but not the target, or to the target but not the source.

- If the system or database is case-sensitive, Oracle GoldenGate supports the case sensitivity of database names, owner and schema names, object names, column names, and user names.
- If the system or database is case-insensitive (or is configured for case-insensitivity), Oracle GoldenGate converts all names to upper case.

To preserve case-sensitivity in an Oracle GoldenGate configuration

In Oracle GoldenGate parameter files, specify case-sensitive names exactly as they appear in the database. In TABLE and MAP parameters, enclose case-sensitive names in double quotes if the other database (the source or target of the case-sensitive objects) is not case-sensitive.

If replicating from a case-insensitive source to a case-sensitive target, enter the source names in upper case in the Replicat MAP statements, to reflect the fact that Extract writes them to the trail as uppercase.

For example:

```
MAP SALES.CUSTOMER, TARGET "Sales.Account";
```

Supported characters

Oracle GoldenGate supports alphanumeric characters in the names of objects, key columns, and non-key columns. Oracle GoldenGate also supports the following characters in columns that are not being used by Oracle GoldenGate as a key.

Table 1   Supported non-alphanumeric characters in object names and non-key column names[1]

Character	Description
~	Tilde
< >	Greater-than and less-than symbols
/	Forward slash
\	Backward slash
!	Exclamation point
@	At symbol
#	Pound symbol
$	Dollar symbol
%	Percent symbol
^	Caret symbol
( )	Open and close parentheses
_	Underscore
-	Dash
+	Plus sign
=	Equal symbol
|	Pipe
[ ]	Begin and end brackets
{ }	Begin and end curly brackets (braces)

[1] The type of key that is being used by Oracle GoldenGate depends on the definition of a given table and whether there are any overrides by means of a KEYCOLS clause. Oracle GoldenGate will use a primary key, if available, or a unique key/index (selection is dependent on the database). In the absence of those definitions, all columns of the table are used, but a KEYCOLS clause overrides all existing key types. For columns that are being used by Oracle GoldenGate as a key, the characters in the names must be valid for inclusion in a WHERE clause. This list is all-inclusive; a given database platform may or may not support all listed characters.

Non-supported characters

Oracle GoldenGate does not support the following characters in object or column names.

Table 2   Non-supported characters in object and column names[1]

Character	Description
&	Ampersand
*	Asterisk
?	Question mark
:	Colon
;	Semi-colon
,	Comma
' '	Single quotes
" "	Double quotes
'	Accent mark (Diacritical mark)
.	Period
	Space

[1] This list is all-inclusive; a given database platform may or may not support all listed characters.

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, follow the instructions on:

http://www.oracle.com/technology/software/products/goldengate/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
● Setting library paths for dynamic builds
● Installing the Oracle GoldenGate software
● Configuring Manager and other processes

> **NOTE**   Before proceeding, make certain that you have reviewed the System Requirements in this guide.

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**.

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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.

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:

Command	Requires GG libraries in environment variable?
$ users/ogg > ./ggsci	No
$ users > ./ogg/ggsci	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 following:

UNIX/Linux library path variables per platform

Platform[1]	Environment variable
IBM AIX	LIBPATH
IBM z/OS	
HP-UX	SHLIB_PATH
Sun Solaris	LD_LIBRARY_PATH[2]
HP Tru64 (OSF/1)	
LINUX	

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

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

Example   `export LD_LIBRARY_PATH=/ggs/10.0:$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.

Installing Oracle GoldenGate on Linux and UNIX

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`

Configuring Manager and other processes

To configure Oracle GoldenGate to support your business requirements, see the Oracle

GoldenGate *Windows and UNIX Administrator's Guide.* It contains instructions to:

- Configure the Manager process with a TCP/IP port and other optional parameters that control dynamic port assignments, trail file maintenance, automatic startup, and other properties.
- Configure Extract and Replicat processes to support reporting, high availability, disaster recovery, and other topologies.
- Configure security to control user access, file security, and data encryption.
- Configure integration, manipulation, and conversion features that enable you to customize Oracle GoldenGate and support the delivery of data across heterogeneous environments.
- Configure utilities and other tools that support Oracle GoldenGate.

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CHAPTER 3

Preparing the system for Oracle GoldenGate

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Enabling replication

To enable c-tree source files for replication, do one of the following:

● Turn on the REPLICATE attribute by setting one or more REPLICATE parameters in the c-tree ctsrvr.cfg server configuration file. This file accepts a wildcard to specify the fileset that you want Oracle GoldenGate to capture. For example, REPLICATE test* captures all files with names that start with "test." If the server is already running, you must stop and then start it again.

● To turn on REPLICATE without stopping and starting the server, use the ADD TRANDATA command from the GGSCI interface.

Figure 1   Sample c-tree ctsrvr.cfg server configuration file

```
SERVER_NAME             GG_SRCTST
CTSTATUS_SIZE           -2048000
COMM_PROTOCOL           F_TCPIP
CONNECTIONS             1600
LOCK_HASH               32
LOG_SPACE               480
CHECKPOINT_INTERVAL     40000000
PAGE_SIZE               32768
CACHE_LINE              32
DAT_MEMORY              200000000
IDX_MEMORY              100000000
FILES                   8000
ADMIN_ENCRYPT
GUEST_LOGON             NO
LOGON_FAIL_LIMIT        3
LOGON_FAIL_TIME         30
COMPATIBILITY           FDATASYNC
;COMPATIBILITY          SYNC_LOG
COMPATIBILITY           LOG_WRITETHRU
COMPATIBILITY           COMMIT_READ_LOCK
CHECKPOINT_FLUSH        37
TRANSACTION_FLUSH       10000
COMPATIBILITY           EXTENDED_TRAN_ONLY
COMMIT_DELAY_USEC       500
NODEQ_SEARCH            400
DIAGNOSTICS             SNAPSHOT_SHUTDOWN
LOG_TEMPLATE            2
SKIP_MISSING_FILES      yes
LOCAL_DIRECTORY         /home1/ydama/ggtest/data/
MEMORY_FILE             /home1/ydama/ggtest/b24data/cxd*.dat
MEMORY_FILE             /home1/ydama/ggtest/b24data/cxd*.idx
```

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```
RECOVER_DETAILS        YES
COMPATIBILITY TDATA_WRITETHRU
COMPATIBILITY TINDEX_WRITETHRU
REPLICATE /home1/ydama/ggtest/data/air.dat
REPLICATE /home1/ydama/ggtest/data/art.dat
REPLICATE /home1/ydama/ggtest/data/adq.dat
REPLICATE /home1/ydama/ggtest/data/ac*.dat
```

Retaining log data

To capture data for replication, the Extract process (by means of the log reader) requires access to the active and inactive transaction logs.

1. Set the KEEP_LOGS parameter in the c-tree server configuration file to either of the following values, to ensure that the log reader can process the active logs before they are deleted.

   ❍ -1, which keeps all logs and ensures the availability of any logs that Extract might need. The system administrator can delete the logs manually, as needed.

   ❍ A positive number that indicates the number of logs to keep. This number should be the largest number of logs that could possibly be required if the log reader stops or slows down.

   During processing, you can use the following command to determine the oldest log that Extract needs.

   ```
   INFO EXTRACT <group> SHOWCH
   ```

   For information on how to interpret the results of this command, see the Oracle GoldenGate *Windows and UNIX Reference Guide.*

2. Extract requires access to the log that contains the beginning of the oldest open transaction and all logs thereafter. The inactive logs provide a secondary data source should the online logs recycle before Extract is finished with them. If you cannot retain inactive logs, configure the active logs to retain enough data so that Extract can capture what it needs before the logs recycle. Allow for Extract backlogs that are caused by network outages and other external factors, as well as long-running transactions. The recommended retention period is at least 24 hours worth of transaction data, including both active and inactive logs (if enabled). You might need to do some testing to determine the best retention time given your data volume and business requirements.

If data that Extract needs during processing is not retained, either in online or archived logs, one of the following corrective actions might be required:

● alter Extract to capture from a later point in time for which log data is available (and accept possible data loss on the target).

● resynchronize the source and target files, and then start the Oracle GoldenGate environment over again.

Configuring the size of the transaction buffer

Use the following options of the TRANLOGOPTIONS parameter to increase extraction performance, if necessary.

● READBUFFER <size> specifies a length, in bytes, of the buffer that is maintained by c-tree to contain replication log data. This buffer is used by default as a performance feature. When Extract requests data that is in the buffer, a noticeable performance gain can usually be observed.

● READTIMEOUT <milliseconds> specifies a timeout, in milliseconds, that determines how long the c-tree replication engine waits to send a change record to the transaction buffer (controlled by READBUFFER) if one is not present at its current position. If a change record has not arrived before the timeout interval elapses, an error is returned by the database. The timeout specified by this parameter determines how long Extract must wait for the next record when one is not present.

For default values and other details, see the Oracle GoldenGate *Windows and UNIX Reference Guide*.

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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.

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. 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
cobgen	Generates source definitions based on COBOL layouts. Used for Oracle GoldenGate for Datawise on Stratus.
convchk	Converts checkpoint files to a newer version.
ddlcob	Generates target DDL table creation statements based on COBOL layouts. Used for Oracle GoldenGate for Datawise on Stratus.
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.

Table 3   Programs and utilities (continued)

Program	Description
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.
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.

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 large transactions when the size exceeds the allocated memory size. 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 ddl_ora10.sql ddl_ora11.sql 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 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 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 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 demo_more_<db>_create.sql demo_<db>_insert.sql demo_more_<db>_insert.sql demo_<db>_lob_create.sql 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.
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.
icudt38.dll icuin38.dll icuuc38.dll	Windows shared libraries for International Components for Unicode.

Table 5   Other files (continued)

Component	Description
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.
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 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)
sqlldr.tpl	Template for use with Replicat when creating a control file for the Oracle SQL*Loader bulk-load utility.

Table 5   Other files (continued)

Component	Description
start.prm stop.prm	z/OS paramlib members to start and stop the Manager process.
startmgr stopmgr	z/OS Unix System Services scripts to start the Manager process from GGSCI.
startmgrcom 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.
AUDIT_TS	The timestamp of the checkpoint position in the checkpoint file.
CREATE_TS	The date and time when the checkpoint table was created.

Table 6   Checkpoint table definitions

Column	Description
LAST_UPDATE_TS	The date and time when the checkpoint table was last updated.
CURRENT_DIR	The current Oracle GoldenGate home directory or folder.

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