Oracle® GoldenGate

SQL/MX Installation and Setup Guide

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CHAPTER 1

System requirements and preinstallation instructions

Overview of GoldenGate for NonStop SQL/MX

GoldenGate supports log-based extraction and replication from a source NonStop SQL/MX database to:

- other supported databases using standard connection methods for those databases.
- a target NonStop SQL/MX database through an HP NonStop OSS ODBC driver. Replicat is installed on the target NonStop SQL/MX database system. Replicat reads data sent from the source to a trail on the target and applies the data to the database through ODBC.

GoldenGate for NonStop SQL/MX supports data filtering, mapping, and transformation unless noted otherwise in this documentation.

Supported platforms

SQL/MX source and target databases running on NonStop Server H06.

Operating system requirements

System configuration - source and target

- Install the Open System Services (OSS) environment.
- Download the HP ODBC/MX Client from the NonStop eServices Portal, and follow the vendor's instructions to install and configure it. This includes creating a data source on both systems for GGSCI (to make database logins) and also on the target for Replicat to make database connections.

Disk requirements

- GoldenGate must be installed on a physical disk drive, not on virtual disks that are maintained by NonStop SMF (Storage Management Foundation).
- Assign the following free disk space on the NonStop source system and the intermediary Windows system, if used:

- 50 MB for the GoldenGate installation files. 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 GoldenGate that you are installing on the system. For example, to install two builds of GoldenGate into two separate directories, allocate 80 MB of space.
- Additional disk space on any system that hosts GoldenGate trails, which contain the working data. The space that is consumed by the trails varies, depending on the volume of data that will be processed. A good starting point is 1 GB.
- To install GoldenGate into a cluster environment, install the GoldenGate binaries and files on a shared file system that is available to all cluster nodes.

TCP/IP

- 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 GoldenGate processes and to which GoldenGate will be connecting. Host names are easier to use.
- GoldenGate requires the following unreserved and unrestricted TCP/IP ports:
  - One port for communication between the Manager process and other GoldenGate processes.
  - A range of ports for local GoldenGate communications: can be the default range starting at port 7840 or a customized range of up to 256 other ports.
- Keep a record of the ports you assigned to GoldenGate. You will specify them with parameters when configuring the Manager process.
- Configure your firewalls to accept connections through the GoldenGate ports.
- If possible, grant unrestricted FTP access to GoldenGate for transfers of data, parameters, and reports between source and target systems. Otherwise, provide for another transfer method. A secure transfer method is also required to resolve support cases.
- If possible, provide a connection between your source and target systems and a site where files can be staged for transfer to and from the GoldenGate Software FTP Support Site (ftp://support.goldengate.com).

Third-party programs

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

Database requirements

Database configuration

The Extract process requires a program named VAMSERV to capture transaction data from the audit trails. This program is extracted into the installation subvolume when you install

GoldenGate for NonStop SQL/MX and may need to be installed on other nodes if they contain table partitions.

Database user

- Create a database user that is dedicated to GoldenGate. It can be the same user for all of the GoldenGate processes that must connect to a database:
  - Extract (source database)
  - Replicat (target database)
  - DEFGEN (source or target database)
- To preserve the security of your data, and to monitor GoldenGate processing accurately, do not permit other users, applications, or processes to log on or operate as the GoldenGate database user.
- On a source NonStop system, the Extract process uses the native NonStop SQL/MX API with embedded SQL to log on to a source NonStop SQL/MX database. This API does not log in to the database, so no connection authentication is required. The API passes the catalog and schema names through the GoldenGate API in the format of <catalog>@<schema>. You specify the connection information in the Extract parameter file. It can also be used in GoldenGate user exits if needed.
- On a target NonStop system, the Replicat process uses an ODBC connection to connect to a target NonStop SQL/MX database. You specify the connection information in the Replicat parameter file.

SQL/MX Access Privileges

- The NSK user (groupID.userID) or OSS alias userID that will be dedicated to GoldenGate requires specific access privileges at the SQL/MX data level: table, view, or stored procedure. Access privileges are granted through the SQL/MX command interface with a GRANT statement. For more information on the GRANT command, see the SQL/MX documentation.

Table 1 Database user privileges

Privilege	Extract user	Replicat user	DEFGEN user	DDLGEN user
SELECT	X	X	X	X
DELETE		X		
INSERT		X		
UPDATE		X		
REFERENCES		X		

Supported data types

- CHAR
- VARCHAR
- REAL
- DOUBLE

- NUMERIC
- SMALLINT
- LARGEINT
- DECIMAL
- VARCHAR(1)-(4040)
- FLOAT
- PIC
- DATE
- TIME
- TIMESTAMP
- SYSKEY

Limitations of support

The original SYSKEY values are not preserved on the target. The target database generates a new unique value.

Supported objects and operations

- GoldenGate supports the extraction and replication of DML operations on tables that contain rows of up to 512 KB in length.
- GoldenGate supports the maximum number of columns per table that is supported by the database. GoldenGate supports the maximum column size that is supported by the database.

Non-supported objects and operations

- Extraction or replication of DDL (data definition language) operations
- GoldenGate SQLEXEC functionality
- GoldenGate BATCHSQL functionality
- NonStop SQL/MX distributed transactions
- PURGEDATA operations
- Updates to primary keys. NonStop SQL/MX does not allow updates to primary keys.

Supported and non-supported object names and case

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

Object names and owners

Source and target object names must be fully qualified in GoldenGate parameter files, as in fin.emp.

Case sensitivity

If a database is case-sensitive, GoldenGate supports the case sensitivity of database

names, owner names, object names, column names, and user names.

If a database is case-insensitive, or if it supports case-sensitivity but is configured to be case-insensitive, GoldenGate converts all names to upper case.

To preserve case-sensitivity

Case-sensitive names must be specified in GoldenGate parameter files exactly as they appear in the database. 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 database to a case-sensitive database, the source object names must be entered in the Replicat `MAP` statements in upper case, to reflect the fact that they were written to the trail as uppercase by Extract.

For example:

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

Supported characters

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

Table 2 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
^	Carot symbol
( )	Open and close parentheses
_	Underscore
-	Dash

Table 2 Supported non-alphanumeric characters in object names and non-key column names[1]

Character	Description
+	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 GoldenGate depends on the definition of a given table and whether there are any overrides by means of a KEYCOLS clause. 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 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

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

Table 3 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 GoldenGate

Installation overview

These instructions are for installing GoldenGate for the first time. Installing GoldenGate installs all of the components required to run and manage GoldenGate processing (exclusive of any components required from other vendors, such as drivers or libraries) and it installs the GoldenGate utilities. The installation process takes a short amount of time.

Upgrades

To upgrade GoldenGate from one version to another, follow the instructions on the GoldenGate support site at http://download.oracle.com/docs/cd/E15881_01/index.htm.

New installations

To install GoldenGate for the first time, the following steps are required:

- Downloading GoldenGate
- Installing the software

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

Downloading GoldenGate

1. Navigate to http://edelivery.oracle.com.
2. Select a language.
3. Click **Continue**.
4. Fill in the **Export Validation** form and check the box to agree to the license agreement.
5. Click **Continue**.
6. Select the **Oracle Fusion Middleware** Product Pack, and select the platform on which you will be installing the GoldenGate software.
7. Click **Go**. A list of Oracle Fusion Middleware products for the selected platform is displayed.
8. Select the appropriate Oracle GoldenGate Media Pack.

9. Click **Continue**. The Media Pack contents are displayed, including software builds and documentation.
10. Click **Download** next to each desired component, and follow the automatic download process to transfer the mediapack.zip file to your system.

Installing GoldenGate on a NonStop system

Installing the GoldenGate files

1. FTP the SQL/MX ODBC version of GoldenGate to the NonStop OSS environment in binary mode, and place it in the directory where you want GoldenGate to be installed.

   NOTE Do not use the generic ODBC GoldenGate build. It must be the SQL/MX version.

2. Run gzip with the following command.

   ```
   gzip -d <filename>
   ```

   The file is now decompressed and has a .tar extension.

3. Run tar with the following command.

   ```
   tar -xvof <filename>
   ```

   All GoldenGate files are placed in the current directory.

4. From the GoldenGate subvolume, run the GGSCI program.

   ```
   GGSCI
   ```

5. In GGSCI, issue the following command.

   ```
   CREATE SUBDIRS
   ```

6. Issue the following command to exit GGSCI.

   ```
   EXIT
   ```

7. If this is a **source** NonStop system, perform step 8 and step 9.
8. Run the ggmxinstall script to SQL compile the Extract program on the system and install the VAMSERV object module in the NSK space.

   ```
   ggmxinstall <destination>
   ```

   Where: <destination> is the destination NSK volume and subvolume in OSS format, preferably the GoldenGate installation location. The volume must be a real volume name, not an SMF logical volume name.

9. After ggmxinstall completes, log on to TACL as SUPER.SUPER and FUP LICENSE the newly installed VAMSERV object. The VAMSERV process is similar to the existing AUDSERV process currently used for the GoldenGate for NonStop product used with SQL/MP and Enscribe databases.

Configuring Manager and other processes

- To use GoldenGate, you must configure the Manager process. You must specify a TCP/IP port for Manager to use, and you can specify optional parameters that control dynamic port assignments, trail file maintenance, and other properties.
- To begin using GoldenGate, you need to create and configure at least one Extract and Replicat group. Your instructions for these groups determine which data to capture and replicate, and how that data is processed.
- To configure these processes, and to customize GoldenGate, see the *GoldenGate for Windows and UNIX Administrator Guide*.

Uninstalling GoldenGate

This procedure assumes that you no longer need the data in the GoldenGate trails, and that you no longer need to preserve the current GoldenGate environment. To preserve your current environment and data, make a backup of the GoldenGate directory and all subdirectories before starting this procedure.

To uninstall GoldenGate from a NonStop system

1. Run the command shell.
2. (Suggested) Log on as the system administrator, or as a user with permission to issue GoldenGate commands, and to delete files and directories from the operating system.
3. Change directories to the GoldenGate installation directory.
4. Run GGSCI.
5. Stop all GoldenGate processes.
6. Stop the Manager process.
7. Exit GGSCI.
8. Remove the GoldenGate files by removing the installation directory.
9. Drop any GoldenGate-related objects from the database as needed.

CHAPTER 3

Preparing the system for GoldenGate processing

Preparing tables for processing

The following table attributes must be addressed in a GoldenGate environment.

Disabling triggers and cascade delete constraints

Disable triggers and cascade delete constraints on target tables, or alter them to ignore changes made by the GoldenGate database user. GoldenGate replicates DML that results from a trigger or cascade delete 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. 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

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 GoldenGate determines the kind of row identifier to use

GoldenGate selects a row identifier to use in the following order of priority:

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

3. If none of the preceding key types exist (even though there might be other types of keys defined on the table) 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 GoldenGate in a key or those that are excluded from the GoldenGate configuration.

   NOTE If there are other, non-usable keys on a table (such as one that includes a virtual column), or if there are no keys at all on the table, GoldenGate logs an appropriate message to the report file. Constructing a key of all of the columns impedes the performance of GoldenGate on the source system. On the target, this key causes Replicat to use a larger, less efficient WHERE clause.

How to specify your own key for GoldenGate to use

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 GoldenGate finds.

Logging to TMF

Log the source tables that will be processed by GoldenGate to the TMF Master Audit Trail (MAT). GoldenGate reads the audit trails generated by TMF-enabled applications that use the SQL/MX database.

Defining the ODBC data source

If replicating data from a Windows or UNIX-based system to a NonStop system, perform the following steps on the NonStop target to edit the $SYSTEM.SYSTEM.ODBCDSN ODBC configuration file. You will edit this file so that it contains an entry for the DSN to which GoldenGate will connect.

To edit $SYSTEM.SYSTEM.ODBCDSN

1. Log into the NonStop system and select a TACL prompt.
2. Edit or Tedit the following system file, which defines the ODBC data sources. A default data source named TDM_Default_DataSource, with default connection settings, is included in this file by default.

Linking catalog names to an Extract group

GoldenGate supports two-part table names (schema.table) in table mappings and commands, but NonStop SQL/MX names require support for three parts, including a catalog (catalog.schema.table). To map the catalog portion of a table name, you must link it to an Extract group. Only one catalog can be linked to an Extract group. To use more than one catalog in the GoldenGate configuration, you must create an Extract group for each one.

To link a catalog to an Extract group

In the Extract parameter file, use the SOURCEDB and USERID parameters as one entry.

- Supply the catalog name with SOURCEDB.
- Supply the default schema with USERID.

```
SOURCEDB <catalog> USERID <schema>
```

> **NOTE** The API that is used by Extract does not log in to the database, so no authentication password is required.

Figure 1 Template for ODBC configuration file

```
TACL> Edit $SYSTEM.SYSTEM.ODBCDSN

[ODBC]
TraceFlags = 6
TraceStart = 0
TraceFile = trlog

[ODBC Data Sources]
TDM_Default_DataSource = NonStop ODBC/MX 2.3
<dsn> = NonStop ODBC/MX 2.3

DataSourceName = <Driver>

[TDM_Default_DataSource]
Description = Default Data Source
Catalog = CAT
Schema = SCH
DataLang = 0
FetchBufferSize = SYSTEM_DEFAULT
Server = TCP:xxx.xxx.xxx.xxx/xxxx
SQL_ATTR_CONNECTION_TIMEOUT = SYSTEM_DEFAULT
SQL_LOGIN_TIMEOUT = SYSTEM_DEFAULT
SQL_QUERY_TIMEOUT = NO_TIMEOUT

[<dsn]
Description = <text string describing data source>
Catalog = <target catalog>
Schema = <target schema>
Server = TCP:<ip address or domain name>/<ip port>
```

1. Add your DSN name to the [ODBC Data Sources] list, as shown in bold in the list in Figure 1.
2. Add a section similar to the one shown in bold in Figure 1 to define your data source connection with the following items:
   - **[<dsn>]**: Replace <dsn> in the heading with your data source name.
   - **Description**: Add a text string description, if needed.
   - **Catalog**: Add the target catalog.
   - **Schema**: Add the target schema.
   - **Server**: Add the NSK server. The server is where the ODBC/MX server is running and must be in the format of TCP:<IP address or domain name>/<IP port> as shown in Figure 1.

- Add the other parameters only if you want them to be something other than the default settings specified under TDM_Default_DataSource.

  NOTE The data source name in the ODBCDSN file must exactly match the data source name defined in the ODBC/MX service (names are case-sensitive).

3. Save the file and then exit from the edit session.

For more information about the $SYSTEM.SYSTEM.ODBCDSN file and how to configure ODBC for SQL/MX, see the HP NonStop Open System Services ODBC/MX Client Driver documentation.

Configuring ODBC to prevent timeouts

Change the ODBC connection timeout from the SYSTEM_DEFAULT of ten minutes to NO_TIMEOUT by following this procedure.

To change timeouts

1. From OSH, run mxci and set the mode to mxcs.

```
/G/DEV01/SUPERDEV 1>mxci
>>mode mxcs;
```

2. Issue the following command to show current settings.

```
info ds *,detail;

   Name: \SYSA.$MX.TDM_Default_DataSource
   CpuList: ALL
   InitPri.........Same as Assoc Server
   CurrentState..................STARTED
   ConnectedServers...................0
   AvailableServers...................4
   LastStateChg.............Apr 12 15:36
   LastUpdate...............Apr 12 14:56
   IdleServer.........................4
   IdleTimeout............SYSTEM_DEFAULT
   MaxServer........................100
   ConnTimeout............SYSTEM_DEFAULT
   InitServer.........................4
   StartAutomatic.....................ON
   Trace..............................OFF
   SQLPrepareStat.....................OFF
   ConnInfoStat.......................ON
   SQLExecuteStat.....................OFF
   SessionInfoStat....................ON
   SQLExecDirectStat..................OFF
   SQLStmtStat........................OFF
   SQLFetchStat.......................OFF
```

3. Change the IdleTimeout and ConnTimeout to NO_TIMEOUT as follows:

```
CS>alter ds "TDM_Default_DataSource", IdleTimeout NO_TIMEOUT;
CS>>alter ds "TDM_Default_DataSource", ConnTimeout NO_TIMEOUT;
```

4. Restart the NonStop SQL/MX server.

Specifying Replicat connection authentication

Provide connection authentication for Replicat to use on the target database.

To specify Replicat authentication

In the Replicat parameter file, use the TARGETDB and USERID parameters as one entry.

- Supply the data source name with TARGETDB.
- Supply the user name and password with USERID.

```
TARGETDB <DSN> USERID <user>, PASSWORD <password>
```

Definitions file

To replicate data between source and target NonStop SQL/MX databases, you must supply source data definitions to the Replicat process, even though the two databases might be identical in version and structure. There are slight differences in the way that metadata is returned to GoldenGate by the native API from the source database and by ODBC from the target database.

To supply data definitions

1. Create a data definitions file with the DEFGEN utility.
2. Specify the name of the definitions file with the SOURCEDEFS parameter in the Replicat parameter file.

APPENDIX 1

GoldenGate installed components

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

GoldenGate Programs and Utilities

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

Table 4 Programs and utilities

Program	Description
cobgen	Generates source definitions based on COBOL layouts. Used for 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 GoldenGate for Datawise on Stratus.
ddlgen	Generates target database table definitions based on source database DDL.
defgen	Generates data definitions and is referenced by 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 extraction from database tables or transaction logs or receives transaction data from a vendor access module.
ggmxinstall	GoldenGate installation script for SQL/MX.
ggsci	User interface to GoldenGate for issuing commands and managing parameter files.

Table 4 Programs and utilities (continued)

Program	Description
ggsmgr.jcl ggsmgr.proc ggsmgrst.jcl ggsmgrst.proc	Start the GoldenGate Manager process from a batch job or the operator console on a z/OS system.
install	Installs 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 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.
triggen	Generates scripts that create the GoldenGate log table and logging triggers to support the trigger-based extraction method.
vamserv	Started by Extract to read the TMF audit trails generated by TMF-enabled applications using the NonStop SQL/MX database.

GoldenGate subdirectories

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

Table 5 Subdirectories

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 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 GoldenGate trail files and extract files created by Extract processes to store records of extracted data for further processing, either by the Replicat process or another application or utility. Written in internal 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 GoldenGate technical support. Example: defs.dat
dirout	This directory is not used any more.

Table 5 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 GoldenGate parameter files created by GoldenGate users to store run-time parameters for 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 GoldenGate parameter values. 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 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	The default location for scripts created by the TRIGGEN utility to contain SQL syntax for creating GoldenGate logging triggers and GoldenGate log tables. Written in external ASCII format. File name format is a user-defined name or the defaults of GGSLOG (table-creation script) or the table name (trigger-creation script), with the extension of .sql. These scripts can be edited if needed. Examples: ggslog.sql account.sql

Table 5 Subdirectories (continued)

Directory	Description
dirtmp	The default location for storing large transactions when the size exceeds the allocated memory size. Do not edit these files.
dirver	A GoldenGate Veridata directory. Not used unless this software is installed in the GoldenGate location.

Other GoldenGate files

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

Table 6 Other files

Component	Description
bcpfmt.tpl	Template for use with Replicat when creating a run file for the Microsoft BCP/DTS bulk-load utility.
blowfish.txt	Blowfish encryption software license agreement.
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_disable.sql	Script that disables the GoldenGate DDL trigger. (Oracle installations)
ddl_enable.sql	Script that enables the GoldenGate DDL trigger. (Oracle installations)

Table 6 Other files (continued)

Component	Description
ddl_informix.tpl	Template used by the DDLGEN utility to convert source DDL to Informix DDL.
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_nssql.tpl	Template used by the DDLGEN utility to convert source DDL to NonStop SQL DDL.
ddl_ora9.sql	A script that gets tablespace information from an Oracle 9 database.
ddl_ora10.sql	A script that disables the Oracle recyclebin and gets tablespace information from an Oracle 10 database.
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_remove.sql	Script that removes the DDL extraction trigger and package. (Oracle installations)
ddl_setup.sql	Script that installs the 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 GoldenGate DDL support feature exists and is functioning properly. (Oracle installations)
ddl_sybase.tpl	Template used by the DDLGEN utility to convert source DDL to Sybase DDL.
ddl_tandem.tpl	Template used by the DDLGEN utility to convert source DDL to NonStop SQL DDL.
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.

Table 6 Other files (continued)

Component	Description
demo_<db>_create.sql	Script that creates demonstration tables in the database associated with the GoldenGate installation.
demo_<db>_insert.sql	Script that inserts initial test data into the demonstration tables.
demo_<db>_misc.sql	Script that simulates transaction activity on the demonstration tables.
ENCKEYS	User-created file that stores encryption keys. Written in external ASCII format.
exitdemo.c	User exit example.
ggmessage.dat	Data file that contains error, informational, and warning messages that are returned by the 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 GoldenGate.
ggsmsg.dll	Windows dynamic link library used by the INSTALL program.
GLOBALS	User-created file that stores parameters applying to the GoldenGate instance as a whole.
help.txt	Help file for the GGSCI command interface.
LGPL.txt	Lesser General Public License statement. Applies to free libraries from the Free Software Foundation.
libodbc.so	ODBC file for Ingres 2.6 on Unix.
libodbc.txt	License agreement for libodbc.so.
libxml2.dll	Windows dynamic link library containing the XML library for GoldenGate's 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 GoldenGate DDL marker table. (Oracle installations)

Table 6 Other files (continued)

Component	Description
marker_status.sql	Script that confirms successful installation of the DDL marker table. (Oracle installations)
odbcinst.ini	Ingres 2.6 on Unix ODBC configuration file.
params.sql	Script that contains configurable parameters for DDL support. (Oracle installations)
pthread-win32.txt	License agreement for pthread-VC.dll.
pthread-VC.dll	POSIX threads library for Microsoft Windows.
role_setup.sql	Script that creates the database role necessary for GoldenGate DDL support. (Oracle installations)
sampleodbc.ini	Sample ODBC file for Ingres 2.6 on UNIX.
sqlldr.tpl	Template for use with Replicat when creating a control file for the Oracle SQL*Loader bulk-load utility.
start.prm 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.
zlib.txt	License agreement for zlib compression library.

GoldenGate checkpoint table

When database checkpoints are being used, 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 7 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.
LAST_UPDATE_TS	The date and time when the checkpoint table was last updated.
CURRENT_DIR	The current GoldenGate home directory or folder.

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