

Oracle® Fusion Middleware

Using Oracle GoldenGate Microservices Architecture



19c (19.1.0)

E98070-04

May 2024

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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Oracle Fusion Middleware Using Oracle GoldenGate Microservices Architecture, 19c (19.1.0)

E98070-04

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Preface

The *Using the Oracle GoldenGate Microservices Architecture* guide describes how to use the web interface and REST commands available with Microservices Architecture (MA) to perform data replications tasks.

Audience

This guide is intended for administrators and users who are familiar with Oracle GoldenGate concepts and architecture and who are interested in learning to use the microservices and REST commands for performing various Oracle GoldenGate data replication tasks.

Documentation Accessibility

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Related Information

The Oracle GoldenGate Product Documentation Libraries are found at

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

Additional Oracle GoldenGate information, including best practices, articles, and solutions, is found at:

[Oracle GoldenGate A-Team Chronicles](#)

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, such as "From the File menu, select Save ." Boldface also is used for terms defined in text or in the glossary.

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

1

Preparing for Oracle GoldenGate Microservices

Learn about the preliminary tasks to perform for setting and using Oracle GoldenGate Microservices.

Topics:

Preparing the Database

Configure the Oracle Database for Oracle GoldenGate replication.

Before starting any Oracle GoldenGate services or processes, ensure that the Oracle Database is configured correctly and started. To start the database, perform the following tasks:

1. On the Linux platform, enter:

```
sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Thu Jan 5 16:38:53 2018

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Connected to an idle instance.

SQL> startup
ORACLE instance started.

Total System Global Area 1560281088 bytes
Fixed Size          2924784 bytes
Variable Size       503320336 bytes
Database Buffers   1040187392 bytes
Redo Buffers       13848576 bytes
Database mounted.
Database opened.
SQL> ALTER DATABASE ADD SUPPLEMENTAL LOG DATA;

Database altered.

SQL> ALTER DATABASE FORCE LOGGING;

Database altered.

SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount
```



```
ORACLE instance started.

Total System Global Area 1560281088 bytes
Fixed Size          2924784 bytes
Variable Size       503320336 bytes
Database Buffers   1040187392 bytes
Redo Buffers       13848576 bytes
Database mounted.
SQL> alter database archivelog;

Database altered.

SQL> alter database open;

Database altered.

SQL> alter system set enable_goldengate_replication=true;

System altered.
```

 **Note:**

If you use the Integrated Extract and/or Integrated Replicat features, it is advised to set the `streams_pool_size` parameter.

2. Exit the SQL prompt once you create the users.

Prerequisites for Database Sharding

If you want to use database sharding with Oracle GoldenGate, you must follow these steps:

1. Set the `STREAMS_POOL_SIZE` to at least 1200 MB.
2. Load Oracle GoldenGate sharding PL/SQL packages prior to deploying, which in turn adds the `ggadmin` schema.
3. Install a client wallet for database to communicate through the PL/SQL `utl_http` routines with Oracle GoldenGate service endpoints.

Setting Environment Variables

You can set the Microservices-specific environment variables while performing the deployment tasks:

- Oracle GoldenGate Configuration Assistant (OGGCA)
- SSL/TLS Security (Optional)

The following environment variables are set for the Oracle GoldenGate Configuration Assistant, `oggca.sh`:

ORACLE_HOME

```
export ORACLE_HOME=database_install_location
```

OGG_HOME

```
export OGG_HOME=ogg_install_location
```

LD_LIBRARY_PATH

```
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
```

TNS_ADMIN

```
export TNS_ADMIN=$ORACLE_HOME/network/admin
```

PATH

```
export PATH=$OGG_HOME/bin:$PATH
```

Oracle_SID

Oracle Database SID

An additional environment variable is required to set up a secure deployment:

JAVA_HOME

```
export JAVA_HOME=$OGG_HOME/jdk
```

See Components of Oracle GoldenGate Microservices Architecture.

For different platforms the library path variable is different. Following list provides the variable name for different platforms:

- Linux: LD_LIBRARY_PATH
- IBM i and AIX: LIBPATH
- Solaris: SHLIB_PATH
- Windows: PATH

**Note:**

For using any command line utility, you must set up the OGG_HOME, OGG_VAR_HOME, and OGG_ETC_HOME variables correctly in the environment.

Data Replication Task Roadmap

There are a number of tasks you must perform to set up data replication.

The phases to build the distribution path are listed in the following table.

Task	Description
Run the Oracle GoldenGate Configuration Assistant (oggca) to create and configure secure and non-secure deployments	See Setting Up Secure and Non-Secure Deployment
Login to Service Manager	When you log in to Service Manager, you can see the status of other servers (Administration Server, Distribution Server, Performance Metrics Server, and Receiver Server). See How to Connect to Service Manager
Add Credential Store	Set up the user id and password to connect to the database before you create an Extract. See How to Add Database Credentials . You can also set up your domain alias while setting up the Credentials configuration.
Add Extracts	How to Add Extracts
Register the Extract	You need to register an Extract when creating an Integrated Extract. See How to Add Extracts .
Add Distribution Path	See How to Add a Distribution Path
Add Replicats	See How to Add Replicats
Start the Extract	See How to Add an Extract
Start the Distribution Path	See How to Add a Distribution Path
Start the Replicat	See How to Add a Replicat
Check the Receiver Server for path details	See Monitoring Paths
Monitor Extracts and Replicats	See Monitoring Paths and Tuning Network Parameters and Monitoring Server Performance
Monitor the Performance Metrics	See Monitoring Performance

2

Setting Up Secure or Non-Secure Deployments

You can choose to set up a secure or non-secure deployment. A secure deployment involves making RESTful API calls and conveying trail data between the Distribution Server and Receiver Server, over SSL/TLS. You can use your existing wallets and certificates, or you can create new ones.

When first creating the SSL/TLS security certificates, you must ensure that the SSL/TLS security environment variables are set as described in [Setting Environment Variables](#).

For a non-secure deployment, the RESTful API calls occur over plain-text HTTP and conveyance between Distribution Server and Receiver Server is performed using the UDT, ogg://, and ws:// protocols.

This section describes the steps to configure a non-secure deployment and prerequisites and tasks to configure a secure deployment.

Topics:

How to Add Secure or Non-Secure Deployments

Adding deployments is the first task in the process of setting up a data extraction and replication platform. Deployments are managed from the Service Manager.

After completing the Oracle GoldenGate Microservices installation, you can add an initial and subsequent deployments using the Configuration Assistant (OGGCA) wizard.



Note:

Oracle recommends that you have a single Service Manager per host, to avoid redundant upgrade and maintenance tasks with Oracle GoldenGate releases.

You can use the Configuration Assistant wizard to add multiple deployments to a Service Manager, which enables you to upgrade the same Service Manager with new releases or patches. The source and target deployments serve as endpoints for setting up the distribution path for data replication. A target deployment is added the same way as the source deployment but for a different database user or a different database.

1. From the `OGG_HOME` directory, run the `$OGG_HOME/bin/oggca.sh` program on UNIX or Linux.
The Oracle GoldenGate Configuration Assistant (oggca) is started. Run this program, each time you want to add a deployment.
2. In the **Select Service Manager Options** step:
 - a. Select whether you want to use an existing Service Manager or a new one. Only one Service Manager per host is supported.
 - b. Enter or browse to the directory that you want to use for your deployment. Oracle recommends that you do *not* use your Oracle GoldenGate installation directory.

- c. Enter the hostname or IP Address of the server.
 - d. Enter a unique port number that you want to contact your Service Manager on or use the default, which is used in the URL to connect to it. Ensure that the port is unreserved and unrestricted. Each service must use a different port number.
 - e. (Optional) You can register the Service Manager to run as a service so as to avoid manually starting and stopping it.

You can choose to run *one* Service Manager as a service (daemon). If there is an existing Service Manager registered as a service and you select a new Service Manager to register as a service, an alert is displayed indicating that you cannot register the new one as a service. All other Service Managers are started and stopped using scripts installed in the `bin` directory of the deployment. You cannot register an existing Service Manager as a service.
 - f. (Optional) You can choose to integrate your deployment with an Oracle Grid Infrastructure for Oracle Database by selecting the option “Integrate with XAG”. This option cannot be used when running your Service Manager as a service.
3. In the **Configuration Options** step, you can add or remove deployments.

Select the appropriate option.
 4. In the **Deployment Details** step:
 - a. Enter the deployment name using these conventions:
 - Must begin with a letter.
 - Can be a standard ASCII alphanumeric string not exceeding 32 characters.
 - Cannot include extended ASCII characters.
 - Special characters that are allowed include underscore (`'_'`), hyphen (`'/'`), dash (`'-'`), period (`'.'`).
 - Cannot be “ServiceManager”.
 - b. Select **Enable Sharding** to use the database sharding feature in your deployment. The schema must be `ggadmin`.
 - c. Enter or select the Oracle GoldenGate installation (home) directory. If you have set the `$OGG_HOME` environment variable, the directory is automatically populated. Otherwise, the parent directory of the `oggca.sh` script is used.
 - d. Click **Next**.
 5. On the **Select Deployment Directories** page:
 - a. Enter or select a deployment directory where you want to store the deployment registry and configuration files. When you enter the deployment directory name, it is created if it doesn't exist. Oracle recommends that you do *not* locate your deployment directory inside your `$OGG_HOME` and that you a separate directory for easier upgrades. The additional fields are automatically populated based on the specified deployment directory.
 - b. You can customize the deployment directories so that they are named and located differently from the default.
 - c. Enter or select different directories for the various deployment elements.
 - d. Click **Next**.
 6. On the **Environment Variables** page:

Enter the requested values for the environment variables. Double-click in the field to edit it. You can copy and paste values in the environment variable fields. Make sure that you tab or click outside of the field after entering each value, otherwise it's not saved. If you have set any of these environment variables, the directory is automatically populated.

OGG_HOME

The directory where you installed Oracle GoldenGate.

ORACLE_HOME

The directory where your Oracle database or Oracle client software is installed.

LD_LIBRARY_PATH

The library directories in your \$OGG_HOME, OUI, database installation, and database network. The default is \$OGG_HOME/lib.

TNS_ADMIN

The directory that contains the Oracle Net Services configuration. The default is \$ORACLE_HOME/network/admin.

ORACLE_SID

The Oracle system identifier (SID) is a unique identifier that is used to distinguish this instance from other Oracle Database instances that you may create later and run concurrently on your system.

STREAMS_POOL_SIZE

This appears only if you enable sharding, are using Integrated Extract or Integrated Replicat. Use the default or set your pool size value that is at least 1200MB.

You can add additional environment variables to customize your deployment or remove variables. For instance, you can enter the following variable to default to another international charset: ENV_LC_ALL=zh_CN.UTF-8

Click **Next**.

7. On the **Administrator Account** page:
 - a. Enter a user name and password that you want to use to sign in to the Oracle GoldenGate Microservices Service Manager and the other servers. This user is the security user for this deployment. For details on the different types of users, see [How to Add Users](#). If you are using an existing Service Manager, you must enter the same log in credentials that were used when adding the first deployment.
 - b. Select the check box that allows you to enable a strong password policy for your new deployment. If you select this option, then the password must adhere to restrictions, otherwise an error occurs, which requires you to specify a stronger password.
 - c. Click **Next**.
8. On the **Security Options** page:
 - a. You can choose whether or not you want to secure your deployment. Oracle recommends that you enable SSL/TLS security. If you do not want to use security for your deployment, deselect the check box. This operation exposes the option **This non-secure deployment will be used to send trail data to a secure deployment**. Select this check box if the non-secure target deployment is meant to communicate with a secure source deployment.

However, you must enable security if configuring for Oracle GoldenGate sharding support.

- b. The option **This deployment will be used for target-initiated distribution paths** allows the Receiver Server to create a target initiated path for environments such as DMZ or Cloud to on-premise, where the Distribution Server in the source Oracle GoldenGate deployment cannot open network connections in the target environment to the Receiver Server due to network security policies.

To know conceptual details, see: [Overview of Target-Initiated Paths](#).

- c. (Optional) You can specify a client wallet location so that you can send trail data to a secure deployment. This option is useful when Distribution Server from the source deployment is unsecured whereas the Receiver Server on the target deployment is secured. In this case, the sender may be configured for public access whereas the Receiver Server requires authentication and authorization, which is established using PKI before the incoming data is applied. For more information, see [Creating a Self-Signed Root Certificate](#)

and [Creating a Distribution Server User Certificate in the *Securing the Oracle GoldenGate Environment*](#).

- d. For your Server, select one of the options, and then provide the required file locations. When using an existing wallet, it must have the appropriate certificates already imported into it. If you choose to use a certificate, enter the corresponding pass phrase. When using a self-signed certificate, a new Oracle Wallet is created in the new deployment and these certificates are imported into it. For certificates, enter the location of the private key file and the pass phrase.
 - e. For your Client, select one of the options, and then provide the required information as you did for your server.
 - f. Click **Next**.
9. (If Security is enabled) On the **Advanced Security Settings** page, the TLS 1.1 and TLS 1.2 options are available. TLS 1.2 is selected by default.

When you open the Advanced Security Settings for the first time with TLS 1.2, the following cipher suites are listed:

```
TLS_RSA_WITH_AES_128_CBC_SHA256
TLS_RSA_WITH_AES_128_GCM_SHA256
TLS_RSA_WITH_AES_256_CBC_SHA256
TLS_RSA_WITH_AES_256_GCM_SHA384
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
TLS_DHE_RSA_WITH_AES_128_CBC_SHA256
TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
TLS_DHE_RSA_WITH_AES_256_CBC_SHA256
TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256
TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384
TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384
TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256
TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256
```

TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384
TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384

- a. Use the arrows to add or remove cipher suites.
- b. Use **Up** and **Down** to reorder how the cipher suites are applied
- c. Click **Next**.

 **Note:**

For more information on TCP/IP encryption options with `RMTHOST`, see `RMTHOST` in *Reference for Oracle GoldenGate*

10. (If Sharding is enabled) On the **Sharding Options** page:

- a. Locate and import your Oracle GoldenGate Sharding Certificate. Enter the distinguished name from the certificate that will be used by the database sharding code to identify itself when making REST API calls to the Oracle GoldenGate MA services.
- b. Enter a unique name for the certificate.
- c. Click **Next**.

11. On the **Port Settings** page:

- a. Enter the Administration Server port number, and then when you leave the field the other port numbers are populated in ascending numbers. Optionally, you can enter unique ports for each of the servers.
- b. Select **Enable Monitoring** to use the Performance Metrics Server.
- c. Click inside the Performance Metrics Server port fields to populate or enter the ports you want to use.

 **Note:**

Ensure that you choose available ports for TCP and UDP for performance monitoring. After the deployment is done, you can change the TCP port from the Service Manager console. For more information on `PMSRV`, see `ENABLEMONITORING`

- d. Select the type of datastore that you want the Performance Metrics Server to use, the default Berkeley Database (BDB) data store or Open LDAP Lightning Memory-Mapped Database (LMDB). You can also designate the Performance Monitor as a Critical Service.

For BDB information, see [Oracle Berkeley DB 12c Release 1](#) For LMDB information, see <http://www.lmdb.tech/doc/>.

- e. Select the location of your datastore. BDB and LMDB are in-memory and disk-resident databases. The Performance Metrics server uses the datastore to store all performance metrics information.
- f. Click **Next**.

 **Note:**

The `oggca` utility does not validate whether or not the port you entered is currently in use or not, so you must manually ensure that the ports are free and will not be reassigned to other processes.

12. In the **Replication Settings** step:
 - a. Enter the Oracle GoldenGate default schema you want to use to perform the replication settings. For example, `ggadmin`.
 - b. Click **Next**.
13. On the **Summary** page:
 - a. Review the detailed configuration settings of the deployment before you continue.
 - b. (Optional) You can save the configuration information to a response file. You can run the installer from the command line using this file as an input to duplicate the results of a successful configuration on other systems. You can edit this file or a new one from the provided template.

 **Note:**

When saving to a response file, the administrator password is not saved for security reasons. You must edit the response file and enter the password if you want to reuse the response file for use on other systems.

- c. Click **Finish** to the deployment.
 - d. Click **Next**.
14. On the **Configure Deployment** page:

Displays the progress of the deployment creation and configuration.

 - a. If the Service Manager is being registered as a service, a pop-up appears that directs you how to run the script to register the service. The Configuration Assistant verifies that these scripts have been run. If you did not run them, you are queried if you want to continue. When you click **Yes**, the configuration completes successfully. When you click **No**, a temporary failed status is set and you click **Retry** to run the scripts.

Click **Ok** after you run the script to continue.
 - b. Click **Next**.
15. On the **Finish** page:

Click **Close** to close the Configuration Assistant.

How to Add Users

Each deployment has its own list of users, and when you add users, you add them to that deployment.

You can create users from the Service Manager or the Administration Server. See [How to Create Users from the Administration Server](#) for steps to create users from the Administration Server.

The only user that can manage the services in Service Manager is the user that was originally added as the security user when you initially add the deployment to the Service Manager. The other users are specific to the MA deployment and the security user needs to create users to every MA deployment individually.

You can create users for that deployment by performing the following steps:

1. Log in to either the Service Manager or the Administration Server.
2. From the left navigation pane, select Administrator.
3. Click Users (+). The maximum length of the characters for users created from the Microservices web interface and the REST API is 512 characters. In RESTAPI, there are no pattern restrictions for the user name for both Basic and Certificate type users. However, when you use the Microservices web interface, certain restrictions apply for creating a Basic type user:
 - The user name must start with an alphabetic character and contain only alphanumeric characters.
 - Symbols that can be used are: at sign (@), period (.), dash(-), comma(,), underscore(_), number sign(#), dollar sign(\$), plus sign (+), backslash (\), slash (/), equal sign (=), less than sign (<), or greater than sign(>)
4. Enter a unique user name.
5. Select one of these roles:

Role ID	Privilege Level
User	Allows information-only service requests, which do not alter or effect the operation of either the Microservices. Examples of Query/Read-Only information include performance metric information and resource status and monitoring information.
Operator	Allows users to perform only operational actions, such as creating, starting and stopping resources. Operators cannot alter the operational parameters or profiles of the Microservices server.
Administrator	Grants full access to the user, including the ability to alter general, non-security related operational parameters and profiles of the server.
Security	Grants administration of security related objects and invoke security related service requests. This role has full privileges.

6. Enter information that describes the user.
7. Select the type of user as Basic or Certificate from the Type list box.
8. Enter the password twice to verify it. There is a default password verifier that requires a minimum length and pattern for the password.
9. Click **Submit**.

The user is registered

Users cannot be changed. You must delete a user, and then add it again.

3

Working with Deployments

Once you log into your Service Manager instance, you can create deployments or edit existing ones. You can work with multiple deployments from a single Service Manager instance.

After you have completed the Oracle GoldenGate Microservices installation, you need to create a deployment (secure or non-secure) using the Oracle GoldenGate Configuration Assistant (OGGCA). You can use this wizard to add multiple deployments to one Service Manager.

Oracle recommends the usage of a secure configuration within Oracle GoldenGate Microservices. There are two options for setting up a secure Microservices deployment:

- Run Microservices on loopback address and front it with an HTTPS reverse proxy (nginx). See [Reverse Proxy Support](#).
 - Interoperability between Oracle GoldenGate Classic and Oracle GoldenGate Microservices is configured through the `ogg` protocol using data pump Extract from Oracle GoldenGate Classic with `SOCKSPROXY`.
- Run Oracle GoldenGate Microservices with TLS version 1.2 enabled on all services.

Topics:

How to Connect to a Service Manager

The Service Manager is the primary watchdog service within Oracle GoldenGate Microservices that enables controlling the deployments and associated services running on the host machine.

The ServiceManager can be configured in three different modes:

- Manually
- As a Daemon
- Integrated with XAG agent

Note:

If the Service Manager is registered as a system daemon, then the Service Manager, Administration Server (AS), Distribution Server (DS), Receiver Server (RS), and the Performance Metrics Server are automatically started when the host is (re)started.

Login to Service Manager

To start using your Oracle GoldenGate Microservices deployment, you have to connect to the Service Manager:



Note:

When you log into the Service Manager for the first time, it is recommended to change the password.

1. Open a web browser and connect to the Service Manager that you created with Oracle GoldenGate Configuration Assistant. The URL is similar to `http://localhost:9001`, where 9001 is the port where you have deployed your Service Manager instance. For a secure deployment, the URL is similar to `https://localhost:9001`.
2. Enter the user name and password you created during deployment and sign in.

In the Service Manager, you can check if the Service Manager and all the other servers are all up and running. Use the links to connect you to their specific interfaces, review details, and administer your deployments.

For more information on setting up the Service Manager as a daemon service, see [How to Create Secure and Non-Secure Deployments](#).

Quick Tour of the Service Manager

When you complete the Oracle GoldenGate Microservices installation, the Service Manager opens up at the specified URL. This page acts as an access point for performing deployment, configuring the Administration Server, Distribution Server, Receiver Server, Performance Metrics Server, and the Admin Client.

The Service Manager home page is a dashboard where you can see the services that have been deployed and access inventory and configuration information pertaining to your deployments. You can also view the status of your deployments, and start and stop services.

Now, that you have an overview of the Service Manager, let's go through some of the actions you can perform using the Service Manager home page.

Action	Task
View the service status	Review Status Changes
Start and stop deployments	Starting and Stopping Deployments and Services
Access various servers	<p>You can click the respective links to access the following:</p> <ul style="list-style-type: none"> • Administration Server to add, modify, and delete Extracts and Replicats. • Distribution Server to add, modify, and delete Paths • Performance Metrics Server to Review Messages and Review Status Changes • Receiver Server to view details of the path, including path network statistics and file I/O statistics.
Access details for Administration Server, Distribution Server, Performance Metrics Server, and Receiver Server	Click Details for the server for which you need to see the details. See View and Edit Services Configuration .
Application Navigation pane	Click the icon to expand and access the Service Manager or the Diagnosis home pages.

How to Start and Stop the Service Manager

The start and stop process of the Service Manager within Oracle GoldenGate Microservices is different based on how the Service Manager is configured within your environment.

The following provide context on how the start and stop processes can be done for the Service Manager:

- If the Service Manager is configured in manual mode then there are scripts in the `$DEPLOYMENT_BASE/ServiceManager/bin` directory that can be run to start or stop the Service Manager.

Run the scripts to start or stop the Service Manager from the following locations:

- To start the Service Manager: `OGG_Deployment_Home/bin/startSM.sh`
- To stop the Service Manager: `OGG_Deployment_Home/bin/stopSM.sh`

- If the Service Manager is configured as a daemon, the scripts required to start or stop for manual interaction are not created. The operating system is responsible for starting or stopping the Service Manager.

For OEL 6:

```
stop/start/status for Service Manager
/etc/init.d/OracleGoldenGate start
/etc/init.d/OracleGoldenGate stop
/etc/init.d/OracleGoldenGate status
```

For OEL 7:

```
systemctl start OracleGoldenGate
systemctl status OracleGoldenGate
systemctl stop OracleGoldenGate
```

- If the Service Manager is configured to run with the XAG agent in an Oracle Cluster Ready Service (CRS); then the start and stop process is handled by the CRS stack.

How to Change Deployment Details and Configuration

You can review and change the selected service (server) configuration.

Details Tab

Use to review the selected deployment configuration. All the deployment directories that you configured with the Configuration Assistant are displayed. For Oracle database, the only directory that you can edit is the Oracle GoldenGate home (`OGG_HOME`). This allows you to use a different installation than the one you originally configured.

Configuration Tab

Use to review and change the selected deployment environment variables. The environment variables that you configured for your deployment are displayed. You can add new variables, modify existing variables, and delete selected variables.

When using Oracle GoldenGate Microservices on an AIX operating with Oracle database RU11 and higher, the `AIXTHREAD_STK` value needs to be set to atleast 1048576 (1 MB). You can set the `AIXTHREAD_STK` value from this tab, as follows:

Add an environment variable for `AIXTHREAD_STK` for the deployment.

Restart the deployment.

Check the Extract report file to these updates.

The Extract thread `IXAsyncTrans` is set to a minimum size of 2M.

The default stack size on AIX is 196,608 bytes for 64-bit applications.

Certificates

Use this tab to manage certificates for client and CA certificates.

How to Interpret the Log Information

You can review all of the messages logged for your Service Manager with this page.

Using the Table

An updated log of Extract and Replicat server messages is displayed. You can sort the list by date or severity by clicking on the adjacent arrow. Also, you can refresh this log and choose how many pages you want to view.

To search, you select Date, Severity, or Message, and then select the appropriate options to construct your search.

Notice the **Notifications** tab at the bottom of the page. It displays server messages, which are not updated in the log due to transaction errors. For example, failure to log in to the database using the database credentials.

How to Enable and Use Debug Logging

You can enable debug logging and download debug log files from this page.

Enabling Debug Logging:

To enable debug logging:

1. Click the Debug Log option from the Navigation Pane of the Service Manager page.
2. Click the Enable Debug Log option to start logging debug information.

Using the Debug Log

You can use the access and use the debug log file from this page:

1. Click the **Download Log File** option to save a local copy of the debug log
2. Click the **Load Debug Log File** option to view the debug log on this page.
3. Search for specific entries in the debug log using the **Search By** box, if required. You can click **Refresh** to get the latest log information, if it doesn't get refreshed automatically.

How to Start and Stop Service Manager and Deployments

The Service Manager is the central hub from where you can start and stop deployments and other microservices such as Administration Server, Distribution Server, Performance Metrics Server, and Receiver Server.

To start and stop servers you need security admin privileges. In some cases, you may choose to only have incoming trail sources and thereby choose to stop or disable the Distribution Server. In a DMZ setup, you may choose to disable Administration Server.

Using Service Manager Start or Stop a Deployment

 **Note:**

If Oracle GoldenGate Service Manager is registered as a system daemon, then the Service Manager along with the other servers, are automatically started when the host is (re)started.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Using Scripts to Start and Stop a Deployment

The Service Manager deployment include startup and shutdown scripts (`startSM.sh` and `stopSM.sh`) for starting and stopping the deployment locally from the command line.

Here are the steps to access and run the scripts:

1. Ensure that your environment variables, mainly the `ETC_HOME` and the `VAR_HOME`, are set up correctly. See [How to Add Secure or Non-Secure Deployments](#) for environment variable setup.
2. Navigate to `DEPLOYMENT_HOME/bin` directory for the Service Manager.

 **Note:**

If you selected to run the Service Manager as a system daemon, then these script files will not be in this location. Instead, the bin directory would contain the file, `oggInst.loc`, which is used to register the Service Manager as a daemon.

3. Run the following command to stop the Service Manager:

```
./stopSM.sh
```

4. Run the following command, to start or restart the Service Manager:

```
./startSM.sh
```

How to Remove a Deployment

You can remove a deployment using OGGCA or in silent mode.

Topics:

How to Remove a Deployment: GUI

You can remove a deployment using the Oracle GoldenGate Configuration Assistant wizard.

To remove a deployment:

Note:

When you remove a deployment or uninstall Oracle GoldenGate Microservices, the system does not automatically stop processes. As a result, you may have to stop processes associated with the deployment and you must clean files manually.

1. Run the Oracle GoldenGate Configuration Assistant wizard:

```
$OGG_HOME/bin
```
2. Select **Existing Service Manager** from the **Select Service Manager Options** screen. Click **Next**.
3. Select **Remove Existing Oracle GoldenGate Deployment** from the Configuration Options screen.
4. Select the deployment you need to remove from the **Deployment Name** list box. Also select the **Delete Deployment Files from Disk** check box if you want to remove all the deployment files (including configuration files) from the host.
5. Enter the Administration account user name and password and click **Next**.
6. See the list of settings that are deleted with the deployment and click **Finish**.

To remove a Service Manager:

1. Run Oracle GoldenGate Configuration Assistant wizard:

```
$OGG_HOME/bin
```
2. Select **Existing Service Manager** from the **Select Service Manager Options** screen. Click **Next**.
3. If there are no other deployments to remove, then the option to remove the Service Manager is available in the drop down. Select **Remove Service Manager Deployment** from the Configuration Options screen.
4. Click **Finish**.

Files to be Removed Manually After Removing Deployment

It's mandatory to delete some files manually only in case there's a Service Manager registered but you have to unregister it and register a new one. To remove files manually, you must have `root` or `sudo` privileges. The files to be deleted include:

Operating System	Files to be Removed Manually to Unregister an Existing Service Manager
Linux 6	<ul style="list-style-type: none"> • /etc/init.d/OracleGoldenGate • /etc/rc.d/*OracleGoldenGate • /etc/rc*.d/*OracleGoldenGate • /etc/oggInst.loc
Linux 7	/etc/systemd/system/ OracleGoldenGate.service

The following commands are executed to stop the Service Manager:

```
systemctl stop OracleGoldenGate
systemctl disable OracleGoldenGate *
```

Note:

If the Service Manager is not registered as a service (with or without the integration with XAG), OGGCA stops the Service Manager deployment, otherwise, a script called `unregisterServiceManager` is created, and when executed by the user, it runs the `systemctl` commands and deletes the mentioned files.

How to Remove a Deployment: Silent Mode

You can remove a deployment silently using the Oracle GoldenGate Configuration Assistant (oggca) from the Oracle GoldenGate Home bin directory.

By removing a deployment, you can delete various components of the deployment, including, Extracts, Replicats, paths, and configuration files. However, the Service Manager is not deleted.

To remove a deployment silently:

1. Ensure that you have a deployment response file. To get the deployment response file, run the OGGCA and the save the response file.
2. Update the following lines within the deployment response file:

```
CONFIGURATION_OPTION=REMOVE
ADMINISTRATOR_PASSWORD=*****
CREATE_NEW_SERVICEMANAGER=false
```

3. Run the OGGCA program from the following location using the `-silent` and `-responseFile` options. Providing the exact path to the deployment response is needed.

```
$OGG_HOME/bin/oggca.sh -silent -responseFile
path_to_response_file/response_file.rsp
```

Example:

```
$OGG_HOME/bin/oggca.sh -silent -responseFile
/home/oracle/software/ogg_deployment.rsp
```

View and Edit Services Configuration

The services configuration and restart options for Administration Server, Distribution Server, Performance Metrics Server, and Receiver Server can be viewed and edited from the Services Manager.

You can access the services configuration for each of the servers, from the Service Manager home page. Click the Details button for the server that you need to check the service configuration for. The Service Configuration page is displayed. This page allows you to view and edit the service configuration and the restart options for the corresponding server. The configuration and restart options for all the servers are the same.

The following table explains the Service Configuration and Restart Options on the Services Configuration page.

Service Configuration Options	Description
Port	Port Number for the corresponding server
Enable Legacy Protocol	Enables legacy communication for services that are compatible.
Enabled Async Operation	Enables asynchronous RESTful API method execution
Default Sync Wait	The default time a service will wait before responding with an asynchronous REST API response
Enabled Task Manager	Enable task management for services that provide it.
U-Mask	File mode creation mask
Quiet	Starts the service in quiet mode.
Enabled	Indicates that the service is managed by Service Manager.
Status	Indicates that the service is running.
Restart Options	Description
Enabled	If set to true, then it restart a task if it gets terminated.
On Success	If set to false, then the task is only restarted if it fails.
Delay	The time (in minutes) to pause between discovering that a process is terminated abruptly and restarting it.
Retries	The maximum number of trials to restart the service, before aborting the retry effort.
Window	The time interval in which the retries are counted. The default is 120 minutes.
Disable on Failure	If set to true, the task is disabled after it fails all execution attempts in an execution window.

4

Working with Data Replication

You can perform all data replication tasks from the Administration Server home page. You can add Extracts and Replicats after creating your deployments.

Before you begin creating Extract processes, you need to:

- Add trandata or schematrandata
- Enable supplemental logging for SQL Server CDC capture
- Create and enable heartbeat tables.

Before creating Replicats, you need to:

- Create the checkpoint table

You'll also create a user with the admin role from the Administration Server. The initial user created during deployment is a security admin role. The security admin user should not do other tasks. So, you need to create users with the admin role and this user is used to create Extract and Replicat processes.

Users in Service Manager deployment are different from Administration Sever deployment. Service Manager deployment. users are created from the Service Manager web interface, and normal deployment users are created from the Administration Server web interface. Users in Service Manager deployment have control of Service Manager functions like stopping, starting, enabling, and disabling services. Users created from the Administration Server can create Extract, Replicat, and other processes.

Topics:

Quick Tour of the Administration Server Home Page

When you click the Administrator Server link on the Service Manager home page, the login page for the Administration Server is displayed. After logging in, you can configure Extract and Replicat processes from this Web UI.

The Administration Server home page is used to add Extracts and Replicats. The table on the home page displays the severity of critical events. You can also use the left-navigation pane to access various configuration details, a list of severity issues with their diagnosis, and a list of administrators.

Now, that you have an overview of the Administration Server home page, let's understand some of the key actions that you can perform from this page.

Action	Description
View the home page in tabular format	Use the Table Layout swivel to turn the tabular format on and off.
View Extracts and Replicats	The statistical representation the home page displays current state of Extracts and Replicats (Starting, Running, Stopped, Abended, Killed)
Add an Extract	See How to Add an Extract for a Deployment

Action	Description
Create a Replicat	See How to Add a Replicat
Stop and start Extracts	Using Extract Actions
Stop and start Replicats	See Using Replicat Actions
View and search critical events	Monitor severity of events using the Critical Events table and also search for specific events, if required.

How to Add a Database Credential

To create and run Extract and Replicat processes, you need to set up database credentials.

1. Launch the Administration Server interface and log in.
2. Click **Configuration** from the **Application Navigation** pane.
3. Click the + sign next to Credentials, and set up your new credential alias, then click **Submit**.
4. Click the Login icon to verify that the new alias can correctly log in to the database.

If an error occurs, click the **Alter Credential** icon to correct the credential information, and then test the log in.

You can edit existing credentials to change the user name and password. Delete a credential by clicking the trash icon.

When you successfully log into your database, you can add and manage checkpoint tables, transaction information, and heartbeat tables. All of the tables can be searched using the various search fields. As you type, the table is filtered and you can use the search button with the search text.

Before Creating an Extract

As a prerequisite to create the primary Extract, you must perform the actions described in this topic.

ADD TRANDATA or ADD SCHEMATRANDATA

To enable supplemental logging at the table level, use the `ADD TRANDATA` command and for schema level, use `ADD SCHEMATRANDATA`. For details, see `ADD TRANDATA` and `ADD SCHEMATRANDATA`. You can skip `ADD TRANDATA` in case of initial load without CDC.

Enable Supplemental Logging for SQL Server CDC

To capture tables in case of CDC capture, you need to enable supplemental logging for the tables. See [Enabling Supplemental Logging old \(CDC Extract\)](#).

Create Heartbeat Table for SQL Server CDC

You need to create the heartbeat table for SQL Server CDC. To create the heartbeat table:

1. From the Administration Server, select **Configuration** from the navigation pane.
2. Select the + sign next to the Heartbeat section of the Database tab. You'll need to enter the values for the heartbeat frequency, retention time, and purge frequency.

You can create the heartbeat table using the `ADD HEARTBEATTABLE` command from the Admin Client or GGSCI. See `ADD HEARTBEATTABLE`.

How to Add Extracts

Set up database credentials to create and run Extracts using the steps in [How to Add a Database Credential](#).

1. Log in to the Administration Server using the Oracle GoldenGate user credentials.
2. From the Overview page of the Administration Server, click the + sign next to Extract.
3. Choose the type of Extract to create and click **Next**. The types of Extract are:
 - Integrated Extract
 - Classic Extract
 - Initial Load Extract

Note:

An Initial Load Extract cannot be started from a secure deployment. You can only start it in a non-secure deployment.

4. Enter and select the required information, which is designated with an asterisk (*). For all Extracts the Process Name, Credential Domain, and Credential Alias are required. A description is optional. The **Create new credential** option is common to all Extracts.

You can configure the following additional required and optional details based on the type of Extract you selected to create:

Options	Description	Database
Basic Information		
Process Name	Name of the Extract process. The name of the Extract process can be up to 8 characters.	All databases
Description	Description of the Extract process being created.	All databases
Intent	Describes the purpose of creating the Extract. The default option is Unidirectional. Other options are High Availability, Disaster Recovery, N-Way, which are informational only.	All databases
Begin	Used to set the beginning location in the redo or transaction log from which the Extract will start to capture data. Available options are Now, Custom Time, CSN or Position in Log, and EOF depending on the supported database.	All databases
Trail Name	A two character trail name.	All databases

Options	Description	Database
Trail Subdirectory, Size, Sequence, and Offset	You can further configure the trail details.	All databases
Remote	<p>Enable this option if the Extract trail is remote.</p> <p>For Oracle databases, enable this option if the Extract trail is to be written directly to a remote Oracle GoldenGate Classic installation.</p> <p>For MySQL, setting this option enables the <code>TRANLOGOPTIONS ALTLOGDEST REMOTE</code> parameter to support a remote Extract, and is not related to trails.</p>	Oracle, MySQL
Registration Information		
CSN	Commit Sequence Number (CSN) value	Oracle
Share	<p>Choose the method to share the LogMiner data dictionary. Options are:</p> <ul style="list-style-type: none"> Automatic: This option allows the system to choose the method for sharing the dictionary . None: Choosing this option, will not allow the dictionary to be shared. Extract: Choose this option to allow sharing the logminer dictionary for specific Extract. 	Oracle
Optimized	Enable this option to optimize the Extract registration.	Oracle
Downstream Capture	Enable this option to set up a downstream Extract for log mining.	Oracle
Register Only	Use this option to just register the Extract and not add the Extract. The registration creates the replication slot when you register the Extract or use the Register Only option.	PostgreSQL
Source Database Credential		
Create new credential	If you haven't set up your database login credentials, you can create and save the database login credentials from here.	All
Credential Domain	Create a domain for the database.	All
Credential Alias	Specify a credential for the database login.	All


Options	Description	Database
User ID	Specify a user name for logging into the database.	All
Password, Verify Password	Enter the password used to login to the database and reenter the password to verify.	All
Credential Domain	Saves the credential user under the specified domain name. Enables the same alias to be used by multiple Oracle GoldenGate installations that use the same credential store. The default domain is Oracle GoldenGate.	All databases
Credential Alias	Specifies an alias for the user name. Use this option if you do not want the user name to be in a parameter file or command. If ALIAS is not used, the alias defaults to the user name, which then must be used in parameter files and commands where a login is required. You can create multiple entries for a user, each with a different alias, by using the ADD USER option with ALIAS.	All databases

Downstream Mining

Mining Credential Domain	Domain name of the downstream mining database.	Oracle
Mining Credential Alias	Alias for the mining downstream database.	Oracle
No UserID	Enable this option if there is no source database connection. Selecting this option enables the ADG fetch options.	Oracle
ADG Fetch Credential Domain	Domain name for the ADG fetch database.	Oracle
ADG Fetch Credential Alias	Domain alias for the ADG fetch database.	Oracle

You must enter the options for Managed Processes while creating all types of Extract processes. The following table provides these options:

Option	Description
Profile Name	Provides the name of the autostart and autorestart profile. You can select the default or custom options. If you have already created a profile, then you can select that profile also. If you select the Custom option, then you can set up a new profile from this section itself.

Option	Description
Critical to deployment health	(Oracle only) Enable this option if the profile is critical for the deployment health.
<div style="border: 1px solid #0070C0; padding: 10px; background-color: #E6F2FF;"> <p> Note:</p> <p>This option only appears while creating the Extract or Replicat and not when you set up the managed processes in the Profiles page.</p> </div>	
Auto Start	Enables autostart for the process.
Startup Delay	Time to wait in seconds before starting the process
Auto Restart	Configures how to restart the process if it terminates
Max Retries	Specify the maximum number of retries to try to start the process
Retry Delay	Delay time in trying to start the process
Retries Window	The duration interval to try to start the process
Restart on Failure only	If true the task is only restarted if it fails
Disable Task After Retries Exhausted	If true then the task is disabled after exhausting all attempts to restart the process.

5. Click **Next**.
6. You can edit the parameter file in the text area to list the table details that you are interested in capturing. For example, `table source.table1;`

You can select **Register Extract in the background** to register the Extract in the background asynchronously.
7. You can select Register Extract in the background to register the Extract in the background asynchronously.
8. Click **Create and Run** to create and start the Extract. If you select **Create**, the Extract is created but you need to start it using the Extract drop-down on the Overview page.

You are returned to the Overview page of the Administration Server. Select the Action list if you want to look at the Extract details such as process information, checkpoint, statistics, parameters, and report.

Using Extract Actions

Once you create an Extract, you can monitor various details associated with the Extract from the Administration Server home page.

You can change the status of the Extract process using the Action button to:

Action	Result
Details	<p>Displays the following tabs:</p> <ul style="list-style-type: none"> • Process Information: The status of the selected process including the type, credentials, and trail. • Checkpoint: The checkpoint log name, path, timestamp, sequence, and offset value. You can monitor the input details, such as when starting, at recovery, and the current state. The checkpoint output values display the current checkpoint details. • Statistics: The active replication maps along with replication statistics based on the process type. You sort the list to view the entire statistical data, daily, or hourly basis. • Parameters: The parameters configured when the process was added. You can edit the parameters by clicking the pencil icon. Make sure that you apply your changes. • Report: A detailed report of the process including parameter settings and a log of the transactions. You could copy the report text and save it to a file so that you can share or archive it.
Start/Stop	The Extract starts or stops immediately.
Start/Stop (in the background)	The Extract is started or stopped using a background process.
Start with Options	Allows you to change the Extract CSN options, then starts the Extract.
Alter	This option is available only when the Extract is stopped. Allows you to change when the Extract begins, the description, and the intent. It does not start the Extract.
Delete	This option displays only when the Extract is stopped. Deletes the Extract if you confirm the deletion.

When you change the status, the list options change accordingly. As status are changing, the icons change to indicate the current and final status. The events are added to the Critical Events table. Additionally, progress pop-up notifications appear at the bottom of the page.

Before Creating Replicat

Before you start creating Replicat, create the checkpoint table.

Once you connect to the database, you can create the checkpoint table. To create the checkpoint table:

1. From the Administration Server, go the Configuration page using the navigation pane.

2. Click the + sign next to the Checkpoint section on the Database tab.
3. Enter the checkpoint table name in the Checkpoint Table box. The table name must be a two-part or three-part value. For example, GGADMIN.CHKP1.

You can add the checkpoint table using the `ADD CHECKPOINTTABLE` command from the Admin Client or GGSCI. See `ADD CHECKPOINTTABLE`

How to Add a Replicat

You can add Replicats for the target deployment from the Administration Server.

Make sure that you have configured your deployments correctly, checked your database credentials, and created an Extract before you set up your Replicat. For details see [Working with Deployments and Services](#). Once you've set up your source and target deployment, you can create and run the Replicat by following these steps:

1. Click the + sign next to Replicats on the Administration Server home page.

The Add Replicat page is displayed.

2. Select a Replicat type and click **Next**.

The types of Replicat are:

- Integrated Replicat
- Nonintegrated Replicat
- Coordinated Replicat
- Parallel Replicat: If you select this option, then select an integrated or nonintegrated parallel Replicat.

3. Enter the required Replicat options on the Replicat Options page and click **Next**. To know more about the Replicat options, see the online help.

4. For managed processes, the options to enter are:

Option	Description	Extract Type
Intent	What you want the Extract to be used for, such as High Availability or the Unidirectional default.	Classic, Integrated, and Initial Load
Begin	How you want the Extract to start. At a custom time that you select, a database CSN, or the Now default.	Classic and Integrated
Trail Name	A two character trail name.	Classic and Integrated
Trail Subdirectory, Size, Sequence, and Offset	You can further configure the trail details.	Classic and Integrated
Remote	Set if the trail is not on the same server.	Classic and Integrated
Thread Number	Set to a specific redo log number. The default is 1.	Classic

Option	Description	Extract Type
Encryption Profile	Provide the name of the encryption profile for the Extract. If no encryption profile is created, then the default encryption profile is selected, by default	Classic, Integrated, and Initial Load.
Encryption Profile Type	Provide the type of Key Management Service being used. Oracle Key Vault is selected by default.	Classic, Integrated, and Initial Load.
Managed Options	X	X
Profile Name	Provides the name of the autostart and autorestart profile. You can select the default or custom options.	Classic, Integrated, and Initial Load.
Critical to deployment health	Enable this option if the profile is critical for the deployment health.	Classic, Integrated, and Initial Load.
Auto Start	Enables autostart for the process.	Enables autostart for the process.
Max Retries	Specify the maximum number of retries to try to start the process	Classic, Integrated, and Initial Load.
Retry Delay	Delay time in trying to start the process	Classic, Integrated, and Initial Load.
Retries Window	The duration interval to try to start the process	Classic, Integrated, and Initial Load.
Restart on Failure only	If true the task is only restarted if it failes	Classic, Integrated, and Initial Load.
Disable Task After Retries Exhausted	If true then the task is disabled after exhausting all attempts to restart the process.	Classic, Integrated, and Initial Load.

5. Click **Create and Run** to create and run the Replicat.

Creating a Parallel Replicat

You can create a parallel Replicat from the user interface or the command line interface.

Before you start creating the parallel Replicat, make sure that you've select the checkpoint table.

Creating a Non-Integrated Parallel Replicat with the Administration Server

1. Log into the Administration Server.
2. Click Application Navigation on the top-left corner.
3. Select **Configuration**. Make sure that the database credentials are correct and the database user is connected. See [How to Add a Database User](#) for details.
4. Click the + sign to add a checkpoint table.
5. Enter the `schema.name` of the checkpoint table that you would like to create, and then click **Submit**.

6. Validate that the table was created correctly by logging out of the Credential Alias using the log out database icon, and then log back in.
Once the log in is complete, your new checkpoint table is listed.
7. Click **Overview** to return to the main Administration Server page.
8. Click the **+** sign next to **Replicats**.
9. Select **Nonintegrated Replicat** then click **Next**.
10. Enter the required information making sure that you complete the Credential Domain and Credential Alias fields before completing the Checkpoint Table field, and then select your newly created Checkpoint Table from the list.
11. Click **Next**, and then click **Create and Run** to complete the Replicat creation.

Creating a Non-Integrated Parallel Replicat with the Admin Client

1. Go the `bin` directory of your Oracle GoldenGatehome directory.

```
cd $OGG_HOME/bin
```

2. Start the Admin Client.

```
adminclient
```

The Admin Client command prompt is displayed.

```
OGG (not connected) 12>
```

3. Connect to the Service Manager deployment source:

```
connect https://localhost:9500 deployment Target1 as oggadmin password welcome1
```

You must use `http` or `https` in the connection string; this example is a non-SSL connection.

4. Add the Parallel Replicat, which may take a few minutes to complete:

```
add replicat R1, parallel, exttrail bb checkpointtable ggadmin.ggcheckpoint
```

You could use just the two character trail name as part of the `ADD REPLICAT` or you can use the full path, such as `/u01/oggdeployments/target1/var/lib/data/bb`.

5. Verify that the Replicat is running:

```
info replicat R1
```

Messages similar to the following are displayed:

```
REPLICAT  R1          Initialized   2016-12-20 13:56   Status RUNNING
NONINTEGRATED
Parallel
Checkpoint Lag      00:00:00 (updated 00:00:22 ago)
Process ID         30007
Log Read
Checkpoint File ./ra000000000First Record RBA 0
```

Basic Parameters for Parallel Replicat

The following table lists the basic parallel Replicat parameters and their description.

Parameter	Description
MAP_PARALLELISM	Configures number of mappers. This controls the number of threads used to read the trail file. The minimum value is 1, maximum value is 100 and the default value is 2.
APPLY_PARALLELISM	Configures number of appliers. This controls the number of connections in the target database used to apply the changes. The default value is 4.
MIN_APPLY_PARALLELISM MAX_APPLY_PARALLELISM	The Apply parallelism is auto-tuned. You can set a minimum and maximum value to define the ranges in which the Replicat automatically adjusts its parallelism. There are no defaults. Do <i>not</i> use with APPLY_PARALLELISM at the same time.
SPLIT_TRANS_REC	Specifies that large transactions should be broken into pieces of specified size and applied in parallel. Dependencies between pieces are still honored. Disabled by default.
COMMIT_SERIALIZATION	Enables commit FULL serialization mode, which forces transactions to be committed in trail order.
Advanced Parameters	
LOOK_AHEAD_TRANSACTIONS	Controls how far ahead the Scheduler looks when batching transactions. The default value is 10000.
CHUNK_SIZE	Controls how large a transaction must be for parallel Replicat to consider it as large. When parallel Replicat encounters a transaction larger than this size, it will serialize it, resulting in decreased performance. However, increasing this value will also increase the amount of memory consumed by parallel Replicat.

Example Parameter File

```

replicat repA
userid ggadmin, password ***
MAP_PARALLELISM 3
MIN_APPLY_PARALLELISM 2
MAX_APPLY_PARALLELISM 10
SPLIT_TRANS_RECS 1000
map *.* , target *.*;

```

Using Replicat Actions

Various Replicat actions can be performed from the Administration Server Overview page.

You can change the status of the Replicat process using the Actions button to:

Action	Result
Details	<p>Displays the Process Information page that has the following details:</p> <ul style="list-style-type: none"> • Statistics: Displays the active replication maps along with replication statistics based on the type of Replicat. • Parameters: Displays the parameters configured when the Replicat was added. You can change these parameters to adjust your Replicat. • Report: Displays the details about the Replicat including the parameters with which the replicat is running, and run time messages. • Checkpoint: Displays the checkpoint log name, path, timestamp, sequence, and offset value. You can click the Checkpoint Detail icon to view elaborate information about the checkpoint.
Start/Stop	The Replicat starts or stops immediately.
Start/Stop (in the background)	The Replicat is started or stopped using a background process.
Start with Options	Allows you to change the Replicat start point, CSN, filter duplicates, and threads options, then starts the Replicat.
Force Stop	The Replicat is immediately, forcibly stopped.
Alter	Allows you to change when the Replicat begins, the description, and the intent. It does not start the Replicat.
Delete	Deletes the Replicat if you confirm the deletion.

When you change the status, the list options change accordingly. As status are changing, the icons change to indicate the current and final status. The events are added to the Critical Events table. Additionally, progress pop-up messages appear in the bottom of your browser.

How to Use the Master Keys and Encryption Keys

You can set the master keys and encryption keys using the **Key Management** tab in the **Configuration** page of the Administration Server.

Using Master Keys

If you want to encrypt your data, then create a Master Key by clicking the + sign in the Master Key section. The master key is generated automatically.

You can change the status of the key to Available or Unavailable, by clicking the edit icon in the Master Key table. You can also delete the Master Key from the table by clicking the delete icon.

For details on the Master Key concept, see [Encrypting Data with the Master Key and Wallet Method](#).

Using the Encryption Keys

To use this method of data encryption, you configure Oracle GoldenGate to generate an encryption key and store the key in a local `ENCKEYS` file. The `ENCKEYS` file must be secured through the normal method of assigning file permissions in the operating system. This procedure generates an AES encryption key and provides instructions for storing it in the `ENCKEYS` file.

To generate the `ENCKEYS` files, click the + sign in the Encryption Keys section. The Encryption Keys is generated.

For details on the Encryption Keys concept, see the Encrypted the Data with the `ENCKEYS` Method.

How to Access the Parameter Files

The Global parameters, Extract, Replicat parameter files are available in the Parameter Files section of the Administration Server.

You use the Administration Server Configuration page and Parameter Files tab to work with your various parameter files.

You use the different parameter file options:

1. Select the **Configuration** option from the Administration Server left-navigation pane.
2. Select the **Parameter Files** tab.

A list of existing parameter files is displayed along with the `GLOBALS` parameter file.

3. If you select any of the parameter files, you are presented with the option to edit or delete the selected file. If you want to change the `GLOBALS` parameter file, you need to stop and restart all of the services.
4. Click + add parameter files.
5. Enter the file name and the required parameters. Make sure to enter the file name with the `.prm` extension.
6. Click **Submit**. The new parameter file is displayed in the list of parameter files.

The actual location of the parameter files on the disk can be determined using the following step:

1. Identify the GoldenGate Deployment ETC Home:
 - a. Go to Service Manager Overview page.
 - b. Click the deployment from the Deployments section for which you need to find the parameters file.
 - c. Under the Deployment Detail window, navigate to the Oracle GoldenGate deployment `/etc` home directory.
 - d. Go into the `/config/ogg` directory where the parameter file is located.

The following example shows how to navigate to your parameter file location:

```
[oracle ~]$ cd /opt/app/oracle/gg_deployments/Atlanta/etc
[oracle etc]$ cd conf/ogg[oracle ogg]$ lsEXT_DEMO.prm GLOBALS REP_DEMO.prm
```

Setting Up Automated Tasks

The Administration Server performs the commands that were executed by the GGSCI utility in previous releases. However, the Administration Service provides enhanced capabilities to perform these tasks, while still being compatible with GGSCI.

Purging Trails

The Purge Trail page works the same way as the Manager `PURGEOLDEXTRACTS` parameter in the Classic Architecture. It allows you to purge trail files when Oracle GoldenGate has finished processing them. Automating this task ensures that the trail files are periodically deleted to avoid excessive consumption of disk space.

From the Tasks tab, when you select the Purge Trail page, it allows you to configure the Administration Service purge trail process.

1. Add a Purge Trail task by clicking the + sign .
2. Enter the **Operation Name** of the Administration Service task. The operation name is case sensitive. For example, you can create an operation with the name **TASK1** and another operation named **task1**.
3. Enter the trail path or trail name in the **Trail** field.
4. Click the + sign to add the trail to the **Selected Trails** list.
5. If you don't need to use Checkpoints, disable the option **Use Checkpoints**.
6. Set the **Keep Rule** value to specify the maximum number of hours, days, or number of files for which the Purge Trails task needs to be active.
7. Specify the number of hours or days when the purge trails task has to run, in the Purge Frequency field and click Submit.
8. Use the Purge Trails task table to edit or delete the task, as required.

Also see `PURGE EXTTRAIL`.

Purging Tasks

You can automatically purge processes associated with an Administration Service.

From the Tasks tab, click Purge Tasks.

1. Enter the **Operation Name** that you need to set up for automatic purging.
2. Select the Extract or Replicat task (initial load process) **Process Name** for the operation. The list contains all processes so ensure that you select the correct task.
3. Select the Extract or Replicat task (initial load) **Process Type** for the operation.
4. If you enable **Use Stop Status**, the status of the task is used to perform the purge task.
5. Enter the hours or days after which you need to purge the process and click **Submit**.
6. Edit or delete the purge process task using the relevant icon from the Purge Tasks table.

Reporting Lag

You can manage lag reports from the Lag Report tab. To do so:

1. From the Tasks tab, click Lag Report.

2. The Action column contains all the options to delete, alter, refresh, and view the lag report task details.
3. Select the required option.
4. If you select the Alter Task option, you are presented with options to edit the lag report. The options are:
 - Enabled: To keep processing the lag report task.
 - Check Every (in minutes): To set a time interval to check the lag report.
 - Report: To log report for the task.
 - If Exceeds: To specify a threshold after which a warning would be initiated.
 - Warning: To allow a warning to be generated incase the lag threshold exceeds the specified limit.
 - When Exceeds: The lag threshold after which the warning is triggered.
5. Click Submit.

Review Critical Events

You can review and search for critical events from the Administration Server home page, once you set up the distribution path.

Once you set up the Extracts and Replicats along with the Distribution path, you are able to see the critical events associated with them.

Search for Critical Events from the Review Critical Events Table

The Review Critical Events table displays the severity, error code, and error messages for critical events. You can view 20 error messages on a single page and you can also search for specific events.

Additionally, you can examine events in depth from the Performance Metrics Server. For details see [Quick Tour of the Performance Metric Server home page](#).

How to Configure Managed Processes

Oracle GoldenGate Administration Server provides options to set up profiles for managed Extract and Replicat (ER) processes. These processes are assigned auto-start and auto-restart properties to control their life cycles.

You can create profiles for managed processes using the Administration Server or the Admin Client. To create a profile in the Administration Server, perform the following tasks:

1. Click Profile from the Administration Server navigation pane.
2. In the Managed Process Settings tab, you can click + sign to start creating a profile. There's also a default profile preset on this page.
3. Enter the details for the profile options including the Profile Name, Description, Auto Start and Auto Restart options. See the following table for Auto Start and Auto Restart options

Option	Description	Extract Type
Intent	What you want the Extract to be used for, such as High Availability or the Unidirectional default.	Classic, Integrated, and Initial Load
Begin	How you want the Extract to start. At a custom time that you select, a database CSN, or the Now default.	Classic and Integrated
Trail Name	A two character trail name.	Classic and Integrated
Trail Subdirectory, Size, Sequence, and Offset	You can further configure the trail details.	Classic and Integrated
Remote	Set if the trail is not on the same server.	Classic and Integrated
Thread Number	Set to a specific redo log number. The default is 1.	Classic
Encryption Profile	Provide the name of the encryption profile for the Extract. If no encryption profile is created, then the default encryption profile is selected, by default	Classic, Integrated, and Initial Load.
Encryption Profile Type	Provide the type of Key Management Service being used. Oracle Key Vault is selected by default.	Classic, Integrated, and Initial Load.
Managed Options	X	X
Profile Name	Provides the name of the autostart and autorestart profile. You can select the default or custom options.	Classic, Integrated, and Initial Load.
Critical to deployment health	Enable this option if the profile is critical for the deployment health.	Classic, Integrated, and Initial Load.
Auto Start	Enables autostart for the process.	Enables autostart for the process.
Max Retries	Specify the maximum number of retries to try to start the process	Classic, Integrated, and Initial Load.
Retry Delay	Delay time in trying to start the process	Classic, Integrated, and Initial Load.
Retries Window	The duration interval to try to start the process	Classic, Integrated, and Initial Load.
Restart on Failure only	If true the task is only restarted if it failes	Classic, Integrated, and Initial Load.
Disable Task After Retries Exhausted	If true then the task is disabled after exhausting all attempts to restart the process.	Classic, Integrated, and Initial Load.

How to Access Extract and Replicat Log Information

The diagnosis of Extract and Replicat transactions provides information about the severity of a transaction along with the timestamp. This information is helpful in case you need to determine if and when a particular issue occurred including the cause of the issue.

The Extract and Replicat log information is available on the Diagnosis page of Administration Server. To access the Diagnosis page, click the **left navigation page** of the Administration Server and select **Diagnosis**.

Using the Table

An updated log of Extract and Replicat server messages is displayed. You can sort the list by date or severity by clicking on the adjacent arrow. Also, you can refresh this log and choose how many pages you want to view.

To search, you select Date, Severity, or Message, and then select the appropriate options to construct your search.

Notice the **Notifications** tab at the bottom of the page. It displays server messages, which are not updated in the log due to transaction errors. For example, failure to log in to the database using the database credentials.

How to Create Users from the Administration Server

Oracle GoldenGate Microservices users can be created from the Administration Server, once you log in using the credentials created at the time of configuring the deployment.

This is an optional step with which you can easily identify if replication (setup) is working or not. To create a user, perform the following tasks:

1. Click **Administrator** from the left navigation pane of the Administration Server.
2. Click **+** to add a user.
3. Enter the required credentials in the fields.
4. Make sure that you select a role from the **Role** drop-down list. The available roles are: Administrator, Security, User, and Operator.
5. Click **Submit**.

The new user is listed in the Users table including the role and information that you supplied.

5

Working with Paths

The path between a source and target deployment can be set using the Distribution Server. You can also create target-initiated distribution paths from the Receiver Server.

This section discusses the steps to create a path once the Extracts and Replicats are configured in the Administration Server.

Topics:

Quick Tour of the Distribution Server Home Page

The Distribution Server is accessible from the Service Manager home page.

From the Service Manager home page, click the Distribution Server. The Distribution Server Overview page is displayed where you can view the path that connects the extract and replicat.

You can add paths from the Distribution Server home page. It also offers a dashboard view of the paths, where you can perform various actions.

Action	Task
Add paths	See Adding New Paths
View path details	See Using the Path Actions
Start or Stop the path	See Using the Path Actions
Reposition the path	See Using the Path Actions
Enable sharding using filters	See Using the Path Actions and also Adding New Paths
Set or customize the DML filtering	See Using the Path Actions and also Adding New Paths
Set the DDL filtering	See Using the Path Actions and also Adding New Paths
Set or customize Procedure filtering	See Using the Path Actions and also Adding New Paths
Customize Tag filtering	See Adding New Paths
Delete a Path	See Using Path Actions

How to Add a Distribution Path


A path is created to send the transaction of data from the Extract to the Replicat. You can create a new path from the Distribution Service.

To add a path to set the trail for the source deployment:

1. Log in to the **Distribution Service**.
2. Click the plus (+) sign next to Path on the Distribution Service home page.

The Add Path page is displayed.

3. Enter the details as follows:

Options	Description
Path Name	Select a name for the path.
Description	Provide a description. For example, the name of the Extract and Replicat names.
Reverse proxy enabled?	Select to use reverse proxy. To know more about configuring you reverser proxy servers, see Reverse Proxy Support in <i>Securing the Oracle GoldenGate Environment</i>
Use Basic Authentication	Select to add a credential to the target URI creating basic MA authentication.
Use Digest Authorization	Select this option to set the Distribution Service to use digest authorization to communicate with the Receiver Service.
<div data-bbox="948 716 1468 947" style="border: 1px solid #0070C0; padding: 10px; background-color: #E6F2FF;"> <p> Note:</p> <p>Both the Distribution Service and Receiver Service must have Digest Authorization for the path, otherwise the path is killed.</p> </div>	
Source: <i>Trail Name</i>	Select the Extract name from the drop-down list, which populates the trail name automatically. If it doesn't, enter the trail name that you provided while adding the Extract.
Generated Source URI:	A URI is automatically generated for the trail based on the Extract information you provided. You can edit this URI by clicking the pencil, then modifying the source. Typically, you will need to edit the URI if you want to use reverse proxy.
Target Authentication Method	Select the authentication method for the target URI. Authentication options are OAuth , Certificate , UserID Alias . Use the OAuth if the source and target deployments are IDCS-enabled. This option uses the client credentials for authentication from the Distribution Service to the Receiver Service.

Options	Description
Target	<p>Enter the target endpoint of the path.</p> <p>From the drop-down list, select your data transfer protocol. The default option is wss (secure web socket). Specify the following details when you select this option:</p> <ul style="list-style-type: none"> • Target Host: Enter the URL of the target host, for example, localhost, if the target is on the same system. • Port Number: You may enter the port number of the Receiver Service and the trail name of the Replicat you created earlier. However, it's not mandatory. The port is the Manager port number for Classic Architecture. • Trail Name: Path takes the source trail and sends the date to a target trail given here, which can be consumed by any Replicats created later. • Domain: Name of the target domain. • Alias: User alias of the target domain. <p>You can also choose ogg or ws (web socket) protocol.</p> <p>For the ogg protocol, you need to specify only the target host, port number, and trail file name.</p> <p>For the ws protocol, the options are the same as the wss protocol.</p>
Generated Target URI	<p>A target URI is automatically generated for the trail based on the target authentication method and target you provided. You can edit this URI by clicking the pencil, then modifying the target.</p>
Target Encryption Algorithm	<p>Select the encryption algorithm for the target trail. Options include NONE, AES128, AES192, AES256.</p>
Target Encryption Keyname	<p>Specify a logical name for the encryption key based on the specified type of target encryption algorithm.</p>
Enable Network Compression	<p>Set the compression threshold value if you enable this option.</p>
Compression Threshold	<p>Option appears when you enable the network compression. Specify the compression threshold value.</p>
Sequence Length	<p>The length of the trail sequence number.</p>
Trail Size (MB)	<p>The maximum size of a file in a trail.</p>
Encryption Profile	<p>Name of the encryption profile associated with the path.</p>
Configure Trail Format	<p>Toggle this switch to enable and configure the trail file format.</p>
Type	<p>Select one of these types of trail file formats:</p> <ul style="list-style-type: none"> • Plain Text • XML • SQL

Options	Description
Compatible With	Select the utility that is compatible with the trail file. Options are: <ul style="list-style-type: none"> • BCP • SQLLOADER • COMCAST
Timestamp Precision	Specify the timestamp precision value for the trail file.
Extra Columns	Includes placeholders for additional columns at the end of each record. Use this option when a target table has more columns than the source table. Specify a value between 1 and 9.
Include SYSKEY	Select this option incase your Replicat configuration includes tables with <code>SYSKEY</code> .
Quote Style	Select the quote style depending on the database requirements.
Include Column Name?	Enable this option to include column names in the trail file.
Null Is Space?	Select this option to indicate that any null values in the trail file is a space.
Include Place Holder?	Outputs a placeholder for missing columns.
Include Header Fields?	Select to include header fields in the trail file.
Delimiter	An alternative delimiter character.
Use Qualified Name?	Select to use the fully qualified name of the parameter file.
Include Transaction Info?	Enable to to include transaction information.
Encryption Profile	Section
Begin	Select the point from where you need to log data. You can select the following options from the drop-down list: <ul style="list-style-type: none"> • Now • Custom Time • Position is Log (default)
Source Sequence Number	Select the sequence number of the trail from source deployment Extract.
Source RBA Offset	This setting provides the Relative Byte Address (RBA) offset value which is the point in the trail file (in bytes) from where you want the process to start.
Critical	The default value is false. If set to true, this indicates that the distribution path is critical to the deployment.
Auto Restart	The default value is false. If set to true, the distribution path restarts automatically if it's terminated.
Auto Restart Options	Section
Retries	The number of times to try an restart the task (path process).
Delay	The duration interval to wait between retries.

Rule Configuration	Description
Enable filtering	<p>If you enable filtering by selecting it from the toggle button and click the <code>Add Rule</code> button, you'll see the Rule Definition dialog box.</p> <ul style="list-style-type: none"> • <code>Rule Name</code> • <code>Rule Action</code>: Select either <code>Exclude</code> or <code>Include</code> • <code>Filter Type</code>: Select from the following list of options: <ul style="list-style-type: none"> – <code>Object Type</code>: Select from three object types: <code>DML</code>, <code>DDL</code>, and <code>Procedure</code> – <code>Object Names</code>: Select this option to provide an existing object name. A 3-part naming convention depends on whether you are using CDB. With CDB, you need to use a 3-part naming convention, otherwise a 2-part convention is mandatory. 3-part convention includes container, <i>schema</i>, <i>object</i>. 2-part convention includes <i>schema</i>, <i>object name</i>. – <code>Procedure Feature Name</code>: Select this option to filter, based on existing procedure feature name. – <code>Column Based</code>: If you select this option, you are presented with the option to enter the table and column name to which the rule applies. You can filter out using column value with <code>LT</code>, <code>GT</code>, <code>EQ</code>, <code>LE</code>, <code>GE</code>, <code>NE</code> conditions. You can also specify if you want to have before image or after image in filtered data. – <code>Tag</code>: Select this option to set the filter based on tags. – <code>Chunk ID</code>: Displays the configuration details of database shards, however, the details can't be edited. • <code>Negate</code>: Select this check box if you need to negate any existing rule. <p>You can also see the JSON script for the rule by clicking the <code>JSON</code> tab.</p>
Additional Options	Description
Eof Delay (cent sec)	<p>You can specify the Eof Delay in centiseconds. On Linux platforms, the default settings can be retained. However, on non-Linux platforms, you may need to adjust this setting for high bandwidth, high latency networks, or for networks that have Quality of Service (QoS) settings (<code>DSCP</code> and <code>Time of Service (ToS)</code>).</p>
Checkpoint Frequency	<p>Frequency of the path that is taking the checkpoint (in seconds).</p>
TCP Flush Bytes	<p>Enter the TCP flush size in bytes.</p>
TCP Flush Seconds	<p>Enter the TCP flush interval in seconds.</p>

Additional Options	Description
TCP Options	Section
DSCP	Select the Differentiated Services Code Point (DSCP) value from the drop-down list, or search for it from the list.
TOS	Select the Type of service (TOS) value from the drop-down list.
TCP_NODELAY	Enable this option to prevent delay when using the Nagle's option.
Quick ACK	Enable this option to send quick acknowledgment after receiving data.
TCP_CORK	Enable this option to allow using the Nagle's algorithm cork option.
System Send Buffer Size	You can set the value for the send buffer size for flow control.
System Receive Buffer Size	You can set the value for the receive buffer size for flow control.
Keep Alive	Timeout for keep-alive.

4. Click **Create Path** or **Create and Run**, as required. Select **Cancel** if you need to get out of the Add Path page without adding a path.

Once the path is created, you'll be able to see the new path in the Overview page of the Distribution Service.

How to Add a Target-Initiated Distribution Path


A target-initiated distribution path is created from the Receiver Server.

To know more about target-initiated distribution paths, see Using Target-Initiated Distribution Paths in MA.

To create a target-initiated distribution path, perform the following steps:

1. Log in to the Receiver Server.
2. Click the + sign on the home page to start adding a path.
3. The following table lists the options to set up the path:

Options	Description
Path Name	Select a name for the path.
Description	Provide a description. For example, the name of the Extract and Replicat names.
Reverse proxy enabled?	Select to use reverse proxy. To know more about configuring you reverser proxy servers, see Reverse Proxy Support in <i>Securing the Oracle GoldenGate Environment</i>
Use Basic Authentication	Select to add a credential to the target URI creating basic MA authentication.

Options	Description
Use Digest Authorization	<p>Select this option to set the Distribution Service to use digest authorization to communicate with the Receiver Service.</p>
	<div style="border-left: 2px solid #0070C0; border-right: 2px solid #0070C0; border-bottom: 2px solid #0070C0; padding: 10px;"> <p> Note:</p> <p>Both the Distribution Service and Receiver Service must have Digest Authorization for the path, otherwise the path is killed.</p> </div>
Source: <i>Trail Name</i>	<p>Select the Extract name from the drop-down list, which populates the trail name automatically. If it doesn't, enter the trail name that you provided while adding the Extract.</p>
Generated Source URI:	<p>A URI is automatically generated for the trail based on the Extract information you provided. You can edit this URI by clicking the pencil, then modifying the source. Typically, you will need to edit the URI if you want to use reverse proxy.</p>
Target Authentication Method	<p>Select the authentication method for the target URI. Authentication options are OAuth, Certificate, UserID Alias.</p> <p>Use the OAuth if the source and target deployments are IDCS-enabled. This option uses the client credentials for authentication from the Distribution Service to the Receiver Service.</p>

Options	Description
Target	<p>Enter the target endpoint of the path.</p> <p>From the drop-down list, select your data transfer protocol. The default option is wss (secure web socket). Specify the following details when you select this option:</p> <ul style="list-style-type: none"> • Target Host: Enter the URL of the target host, for example, localhost, if the target is on the same system. • Port Number: You may enter the port number of the Receiver Service and the trail name of the Replicat you created earlier. However, it's not mandatory. The port is the Manager port number for Classic Architecture. • Trail Name: Path takes the source trail and sends the data to a target trail given here, which can be consumed by any Replicats created later. • Domain: Name of the target domain. • Alias: User alias of the target domain. <p>You can also choose ogg or ws (web socket) protocol.</p> <p>For the ogg protocol, you need to specify only the target host, port number, and trail file name.</p> <p>For the ws protocol, the options are the same as the wss protocol.</p>
Generated Target URI	<p>A target URI is automatically generated for the trail based on the target authentication method and target you provided. You can edit this URI by clicking the pencil, then modifying the target.</p>
Target Encryption Algorithm	<p>Select the encryption algorithm for the target trail. Options include NONE, AES128, AES192, AES256.</p>
Target Encryption Keyname	<p>Specify a logical name for the encryption key based on the specified type of target encryption algorithm.</p>
Enable Network Compression	<p>Set the compression threshold value if you enable this option.</p>
Compression Threshold	<p>Option appears when you enable the network compression. Specify the compression threshold value.</p>
Sequence Length	<p>The length of the trail sequence number.</p>
Trail Size (MB)	<p>The maximum size of a file in a trail.</p>
Encryption Profile	<p>Name of the encryption profile associated with the path.</p>
Configure Trail Format	<p>Toggle this switch to enable and configure the trail file format.</p>
Type	<p>Select one of these types of trail file formats:</p> <ul style="list-style-type: none"> • Plain Text • XML • SQL

Options	Description
Compatible With	Select the utility that is compatible with the trail file. Options are: <ul style="list-style-type: none"> • BCP • SQLLOADER • COMCAST
Timestamp Precision	Specify the timestamp precision value for the trail file.
Extra Columns	Includes placeholders for additional columns at the end of each record. Use this option when a target table has more columns than the source table. Specify a value between 1 and 9.
Include SYSKEY	Select this option incase your Replicat configuration includes tables with <code>SYSKEY</code> .
Quote Style	Select the quote style depending on the database requirements.
Include Column Name?	Enable this option to include column names in the trail file.
Null Is Space?	Select this option to indicate that any null values in the trail file is a space.
Include Place Holder?	Outputs a placeholder for missing columns.
Include Header Fields?	Select to include header fields in the trail file.
Delimiter	An alternative delimiter character.
Use Qualified Name?	Select to use the fully qualified name of the parameter file.
Include Transaction Info?	Enable to to include transaction information.
Encryption Profile	Section
Begin	Select the point from where you need to log data. You can select the following options from the drop-down list: <ul style="list-style-type: none"> • Now • Custom Time • Position is Log (default)
Source Sequence Number	Select the sequence number of the trail from source deployment Extract.
Source RBA Offset	This setting provides the Relative Byte Address (RBA) offset value which is the point in the trail file (in bytes) from where you want the process to start.
Critical	The default value is false. If set to true, this indicates that the distribution path is critical to the deployment.
Auto Restart	The default value is false. If set to true, the distribution path restarts automatically if it's terminated.
Auto Restart Options	Section
Retries	The number of times to try an restart the task (path process).
Delay	The duration interval to wait between retries.

Rule Configuration	Description
Enable filtering	<p>If you enable filtering by selecting it from the toggle button and click the <code>Add Rule</code> button, you'll see the Rule Definition dialog box.</p> <ul style="list-style-type: none"> • <code>Rule Name</code> • <code>Rule Action</code>: Select either <code>Exclude</code> or <code>Include</code> • <code>Filter Type</code>: Select from the following list of options: <ul style="list-style-type: none"> – <code>Object Type</code>: Select from three object types: <code>DML</code>, <code>DDL</code>, and <code>Procedure</code> – <code>Object Names</code>: Select this option to provide an existing object name. A 3-part naming convention depends on whether you are using CDB. With CDB, you need to use a 3-part naming convention, otherwise a 2-part convention is mandatory. 3-part convention includes container, <i>schema</i>, <i>object</i>. 2-part convention includes <i>schema</i>, <i>object name</i>. – <code>Procedure Feature Name</code>: Select this option to filter, based on existing procedure feature name. – <code>Column Based</code>: If you select this option, you are presented with the option to enter the table and column name to which the rule applies. You can filter out using column value with <code>LT</code>, <code>GT</code>, <code>EQ</code>, <code>LE</code>, <code>GE</code>, <code>NE</code> conditions. You can also specify if you want to have before image or after image in filtered data. – <code>Tag</code>: Select this option to set the filter based on tags. – <code>Chunk ID</code>: Displays the configuration details of database shards, however, the details can't be edited. • <code>Negate</code>: Select this check box if you need to negate any existing rule. <p>You can also see the JSON script for the rule by clicking the <code>JSON</code> tab.</p>
Additional Options	Description
Eof Delay (cent sec)	<p>You can specify the Eof Delay in centiseconds. On Linux platforms, the default settings can be retained. However, on non-Linux platforms, you may need to adjust this setting for high bandwidth, high latency networks, or for networks that have Quality of Service (QoS) settings (DSCP and Time of Service (ToS)).</p>
Checkpoint Frequency	<p>Frequency of the path that is taking the checkpoint (in seconds).</p>
TCP Flush Bytes	<p>Enter the TCP flush size in bytes.</p>

Additional Options	Description
TCP Flush Seconds	Enter the TCP flush interval in seconds.
TCP Options	Section
DSCP	Select the Differentiated Services Code Point (DSCP) value from the drop-down list, or search for it from the list.
TOS	Select the Type of service (TOS) value from the drop-down list.
TCP_NODELAY	Enable this option to prevent delay when using the Nagle's option.
Quick ACK	Enable this option to send quick acknowledgment after receiving data.
TCP_CORK	Enable this option to allow using the Nagle's algorithm cork option.
System Send Buffer Size	You can set the value for the send buffer size for flow control.
System Receive Buffer Size	You can set the value for the receive buffer size for flow control.
Keep Alive	Timeout for keep-alive.



Note:

The the protocol options in Use Basic Authentication are `wss` and `ws` only for target-initiated distribution paths, unlike regular distribution paths, which provide `ogg` and `udt` options.

For target-initiated distribution paths, the use case for the `ws` and `wss` protocols is explained in the following table:

X	Target Deployment (Non-Secure)	Target Deployment (Secure)
Source Deployment (Non-secure)	<code>ws</code>	<code>ws</code>
Source Deployment (Secure)	<code>wss</code>	<code>wss</code>

The `wss` protocol must be specified whenever the source deployment (Distribution Server host) has been configured with security enabled. The secured communication channel can be created using an SSL certificate in a client Wallet, even if the target deployment (Receiver Server host) has disabled security.

Limitations

Here are the limitations when working with target-initiated paths:

- There is no support for interaction between legacy and secure deployments using this mode of operation.
- No support for `ogg` nor `udt` protocols. Only `ws` and `wss` protocols are supported.
- It is possible to only get information and stop a target-initiated distribution path on Distribution Server and after the path stops, it is not be visible on the Distribution Server.

You can also set up target-initiated distribution paths using the Admin Client. For command options, see the Admin Client commands `ADD RECVPATH`, `ALTER RECVPATH`, `INFO RECVPATH`, `DELETE RECVPATH`, `START RECVPATH` in Admin Client Command Line Interface Commands.

Using the Path Actions

Once a new path is added, you can perform actions such as stop or pause a path, view reports and statistics, reposition the path, change its filtering, and delete a path, if required.

On the Overview page of the Distribution Server, click the **Action** button adjacent to the path. From the drop-down list, use the following path actions:

- **Details:** Use this option to view details of the path. You can view the path information including the source and target. You can also edit the description of the path. Statistical data is also displayed including LCR Read from Trails, LCR Sent, LCR Filtered, DDL, Procedure, DML inserts, updates, and deletes, and so on. You can also update the App Options and TCP Options.
- **Stop:** Use this option to stop a path. If the path isn't started, the Start option is displayed rather than the Stop option. You can stop a target-initiated distribution path only from the Distribution Server. Once you stop the path, it'll not be available on the Distribution Server.
- **Stop (in the background):** This option stops the path in the background, without engaging the interface. For this option also, the Start (in background) option is displayed in case the path isn't started.
- **Delete:** Use this option to delete a path. Click Yes on the confirmation screen to complete path deletion.
- **Reposition:** Use this option to change the Source Sequence Number and Source RBA Offset
- **Change Filtering:** Use this option to enter sharding, DML filtering, DDL filtering, Procedure filtering, and Tag filtering options.

Depending on the action you select, you can see the change in status at the bottom of the Overview page.

Repositioning a Path

You can reposition a path whenever it's necessary.

On the Overview page of the Distribution Server, click `Action` adjacent to the path of interest. From the drop-down list, click `Reposition`.

Change one or both of the source database options to reposition the path, then apply the changes.

Changing Path Filtering

If you want to change the filter settings for an existing path, the steps are mostly the same as those for creating the filtering for a new path.

On the Overview page of the Distribution Server, click `Action` adjacent to the path of interest. From the drop-down list, click `Change Filtering`.

Rule Configuration	Description
Enable filtering	<p>If you enable filtering by selecting it from the toggle button and click the Add Rule button, you'll see the Rule Definition dialog box.</p> <ul style="list-style-type: none"> • Rule Name • Rule Action: Select either Exclude or Include • Filter Type: Select from the following list of options: <ul style="list-style-type: none"> – Object Type: Select from three object types: DML, DDL, and Procedure – Object Names: Select this option to provide an existing object name. A 3-part naming convention depends on whether you are using CDB. With CDB, you need to use a 3-part naming convention, otherwise a 2-part convention is mandatory. 3-part convention includes container, <i>schema</i>, <i>object</i>. 2-part convention includes <i>schema</i>, <i>object name</i>. – Procedure Feature Name: Select this option to filter, based on existing procedure feature name. – Column Based: If you select this option, you are presented with the option to enter the table and column name to which the rule applies. You can filter out using column value with LT, GT, EQ, LE, GE, NE conditions. You can also specify if you want to have before image or after image in filtered data. – Tag: Select this option to set the filter based on tags. – Chunk ID: Displays the configuration details of database shards, however, the details can't be edited. • Negate: Select this check box if you need to negate any existing rule. <p>You can also see the JSON script for the rule by clicking the JSON tab.</p>

After you add a rule, it is listed in Inclusion Rules. You can delete rules or edit them. When you edit a rule, you have the same options as adding a rule with the following added filters:

Option	Description
OR AND	Select one logical operator.
Chunk ID	Edit or delete the database shard settings if sharding is used.
Object Type:	Edit or delete the type of object for the rule.

Reviewing the Distribution Server Path Information

You can constantly monitor the activity of the path on the Distribution Server Process Information page.

- The path details that you configured. You can change the Description and change the trail format type. When changing the trail format, be sure to apply your changes.
- The advanced options are the delay, flush, and TCP that you configured. You can change any or all of these options, then apply to the path.

The Statistics tab shows you detailed information about the path, such as the different path types and tables. You can use the arrows to sort the tables and the search to quickly locate a specific table. The search is case insensitive and starts searching as you type to update the table.

6

Working with Trails

A trail is a series of files on disk where Oracle GoldenGate stores the captured changes temporarily to support the continuous extraction and replication of database changes. You can use trails to monitor path, tune networks, and data input and output.

This section describes the tasks to set up trails:

Topics:

Quick Tour of the Receiver Server Home Page

The Receiver Server is the central control service that handles all incoming trail files.

The Receiver Server works with the Distribution Server to provide compatibility with the classic remote architecture. The Receiver Server home page shows the condition of the distribution path with one end depicting the Extract and the other end, the Replicat.

You can use the Receiver Server home page to view the path details. Simply click **Action, Details** to see the path details. To know more, see [Monitoring Paths](#).

Tuning Network Parameters

The network settings in Receiver Server are for Receiver Server initiated paths and must mirror the ones in Distribution Server. Network parameters include TCP flush byte options, DSCP, ToS, buffer size settings and so on.

You can monitor and fine-tune these parameters depending on your requirements using the Performance Metrics and Distribution Server. However, this applies to Distribution Server if the path is initiated from the Distribution Server and to Receiver Server when the path is initiated from the Receiver Server.

You can view the network parameters from the Performance Monitor Server Overview page for paths that are initiated from the Distribution Server. If you need to tweak them, go to the Distribution Server and do the following:

1. Click the path **Action, Details**.

The Path Information page is displayed.

2. Expand the Advanced Options.

You'll see App Options, which contain the TCP Flush Bytes and TCP Flush Seconds values. By default, this value is set to OS Default.

The TCP Options, include the following parameters:

- DSCP
- TOS
- Nodelay
- Quick ack
- Cork

- System Send Buffer Size
 - System Receiver Buffer Size
3. Click the **Edit** icon next to **Advanced Options**, to change any of the these values,.
 4. Click **Apply** to save the changes to the network parameters.

Once you edit the network parameters, do monitor their status changes and messages from the server. You can do so using the Performance Monitor Server. See [Monitoring Performance](#) for details.

For paths initiated from the Receiver Server, the network statistics can be tweaked from the Receiver Server by performing the following steps:

1. Click the target-initiated path **Action** button and select **Details**.
2. From the Path Information tab, expand the Advanced Options, which has the setting for EoF Delay (centiseconds). You may typically need to edit this setting for non-Linux platforms.

Reviewing the Receiver Server Path Information

You can constantly monitor the activity of the path on the Receiver Server Statistics page.

The Statistics tab shows you detailed information about the logical change records (LCRs) and DDLs that were read from trails, LCRs and DDLs sent and received, LCRs and DDLs filtered. It also provides information about the DML types, inserts, updates, upserts, and deletes.

The table information includes the values of LCRs read and sent. You can use the arrows to sort the tables and the search to quickly locate a specific table. The search is case insensitive and starts searching as you type to update the table.

Monitoring Paths

You can monitor the path network statistics from the Receiver Server.

In the Receiver Server, you'll see the path depicted in a graphical representation and you can perform the following steps to monitor the selected path:

1. Log in to the **Receiver Server** home page.
2. Click **Action, Details** for a running path.
3. Click the Network tab.

You can review the path statistics from this tab. This page displays the following details:

- **Network Statistics:** The network statistics information includes details such as target trail file name, port number, total messages written out, and so on. You can use this information to go back to the Distribution Server and tune the network parameters, if required.
- **File IO Statistics:** The file IO statistics include total bytes read, total idle time and so on.

7

Monitoring Performance

The Performance Metrics Server provides a dashboard view as well as a detailed view of status changes, statistical data of the servers' performance. They are represented through statistical charts and real-time data.

Topics:

Quick Tour of the Performance Metrics Server Home Page

The Performance Metrics Server uses the metrics service to collect and store instance deployment performance results. The Performance Metrics Server home page allows you to perform these tasks.

When you arrive at the Performance Metrics Server home page, you see all the Oracle Golden Gate processes in their current state. You can click a process to view its performance metrics. You can also access server messages and status change details from this page.

Here's a general overview of the tasks that you can perform from this page.

Task	Description
Review Messages	Reviewing Messages from the Messages Overview tab.
Review Status Changes	Click the Review Status Changes tab to review changes in status of a server.

Monitoring Server Performance

All the servers and processes of the Microservices Architecture can be monitored at drill-down levels to allow trend monitoring and statistical analysis of data. The Performance Metrics Server offers these detailed views with graphical representations of statistical data in real-time.

The Performance Metrics Server home page presents a dashboard view of all the servers, along with their statuses. If you want to drill down to any of the servers performance, simply click the server to open the reports page for that particular server.

Each server provides an elaborate view of the processes, threads, trail files, database configuration, and so on, depending on the server that you are viewing. The page also provides the option to **Pause** or **Clear** the data displayed on the page. To get a snapshot of the trends captured for each of the servers, see the following table:

Metrics Report Tab	Available with Server
Process Performance	<ul style="list-style-type: none">Administration ServerDistribution ServerPerformance Metrics Server

	<ul style="list-style-type: none"> • Receiver Server • Extracts • Replicats
Thread Performance	<ul style="list-style-type: none"> • Administration Server • Distribution Server • Performance Metrics Server • Receiver Server • Extracts • Replicats
Status and Configuration	<ul style="list-style-type: none"> • Administration Server • Distribution Server • Performance Metrics Server • Receiver Server • Extracts • Replicats
Server Statistics	<ul style="list-style-type: none"> • Distribution Server • Performance Metrics Server
Trail Files	<ul style="list-style-type: none"> • Extracts • Replicats
Database Statistics	<ul style="list-style-type: none"> • Extracts • Replicats
Procedure Statistics	<ul style="list-style-type: none"> • Extracts • Replicats
Cache Statistics	Extracts
Queue Statistics	Extracts

Reviewing Messages

Messages from the servers are displayed in Performance Metrics server home page.

To review the messages sent or received, do the following:

1. From the Service Manager, click **Performance Metrics Server**.

The Performance Metrics Server Overview page is displayed.

2. Click the **Messages Overview** tab (if it's not already selected) to see a drill down into all the server messages.

Scroll through the list of messages or search for a specific message by entering the text in the message.
3. Click **Refresh** to get a synchronized real-time list of messages before you start searching. You can also change the page size to view more or fewer messages.

Review Status Changes

Real-time status changes to servers can be monitored from the Performance Metrics Server Status Changes Overview tab.

Status change messages show the date, process name, and its status, which could be running, starting, stopped, or killed.

To view status changes, click **Performance Metrics Server** from the Service Manager home page, and then click the **Status Changes Overview** tab. A list of status change messages from the server appears.

If you are searching for specific messages, you can use the search but make sure you click **Refresh** before you search to ensure that you get the updated status for servers.

Note that the search messages appear in different colors to differentiate critical and informational messages.

How to Purge the Datastore

You can change the datastore retention and purge it from the Performance Metrics Server Monitoring Commands tab.

To view status changes, click **Performance Metrics Server** from the Service Manager home page, and then click the **Monitoring Commands** tab.

The current process retention in days displays.

You can enter the number of retention days or use the sliding icon to set the new period from 1 to 365 days, then **Execute** to activate the purge. The details of the purge displays.

8

Working with Oracle GoldenGate Sharding

Oracle GoldenGate provides a cohesive platform for a sharded Oracle Database, allowing data replication across various sharded database topologies.

All the functionality of a sharded database, in addition to providing pre-configured Oracle GoldenGate replication as part of the `GDSCTL DEPLOY` command, is included.

Oracle GoldenGate With a Sharded Database

Sharding is only available with Oracle Database 12.2.0.1 or later, over a secure Microservices deployment.

You need to make sure that you setup your SSL certificate before you setup sharding. To configure a sharded Oracle Database with Oracle GoldenGate, see [Configuring Sharding for Oracle GoldenGate](#).

Advantages of Oracle GoldenGate Sharding

Oracle GoldenGate provides a complete data replication platform for sharded databases.

This is a powerful capability with the following advantages:

- Horizontally partitions data and workload across numerous discrete Oracle databases that do not share hardware or software
- Enables automatic partitioning and replication, elastic scaling, rebalancing, data-dependent routing for single-shard and cross-shard queries
- Provides an enterprise-class database platform for new generation developers who:
 - Explicitly design applications to scale linearly with fault tolerance
 - Assume schema flexibility with JSON
 - See benefits in the power of relational SQL and ACID
- Active replication within and across shardgroups
- Flexible Deployment, which could have single shardgroup for high availability, multiple shardgroups with varying replication factors
- Different shardgroups can have different replication factors, different number of shards, different hardware platforms and OS versions, or different database versions and patch sets.

How to Configure Sharding in Oracle GoldenGate

If you enable sharding, you must set up a secure deployment.

Prerequisites

Before you begin with the sharding setup, you must adhere to the following prerequisites:

- Complete Oracle Database install for the catalog and each shard database.

- Create `ggshd_wallet` directory for storing Oracle GoldenGate client certificate under `$ORACLE_BASE/admin` (if `$ORACLE_BASE` is defined) or `$ORACLE_HOME/admin` (when `$ORACLE_HOME` is defined).
- Add one microservices deployment per host where shard catalog or shards is set up.
- Generate Oracle GoldenGate Microservices server and client wallets and certificates.
- Authorize a sharding client user identified by SSL certificate.
(Recommended) Assign only one Oracle GoldenGate deployment for each shard for High Availability and simplified patching of shards.

For more information on generating security certificates, see [Setting Up a Secure Deployment](#).

Sharding Configuration in Oracle GoldenGate

As a best practice, a deployment should be dedicated to each shard. This ensures high availability. For more information on the advantages of using Oracle GoldenGate sharding, see [How Does Oracle GoldenGate Work for a Sharded Database](#).

The following steps are required to configure sharding in cases where you add a shard from a `shardcatalog` or create a shard:

1. Add a deployment using Oracle GoldenGate Configuration Assistant (OGGCA) in secure mode. See [How to Create Deployments](#).
2. Import the client certificate to `ggshd_wallet`. Ensure Oracle GoldenGate Microservices servers are up and running on Shards.
3. Prepare to set up a sharded database by connecting to the Oracle Sharding Coordinator (catalog database).
4. Load the Oracle GoldenGate sharding bootstrap scripts located in the `$OGG_HOME/lib/sql/sharding` directory. This is a one-time task.
5. Run the following command from the Oracle Sharding Coordinator:

```
shardcatalog load (as SYS):
$OGGHOME/lib/sql/sharding/ggsys_setup.sql
```

6. Before adding shards, load the following command (as SYS):

```
$OGGHOME/lib/sql/sharding/orashard_setup.sql
A <serviceManagerURI>/<OGGDeployName>
<ggadmin_password> <shardconnect_string>
```

Note:

This command is not required when you create a shard.

There are two ways to configure shards for Oracle GoldenGate:

- **Add shards:** It converts an existing single instance database into a shard. However, the instance must *not* contain any user data and should be an empty database.

- **Create shard:** It sets up a new database at runtime. These commands are issued from the GDSCTL shell interface. See Sharded Database Deployment in *Oracle Database Using Oracle Sharding Guide*.

```
create shardcatalog -database bpodb12s:1521/sdbcacat1 -user gsmcatuser/  
gsmcatuser -repl OGG -sharding SYSTEM -chunks 36  
  
add gsm -gsm gsm1 -listener 1540 -catalog bpodb12s:1521/sdbcacat1 -pwd  
gsmcatuser  
  
add shardgroup -shardgroup shgrp1 -repfactor 3  
add shardgroup -shardgroup shgrp2 -repfactor 2  
...  
create shard -shardgroup shgrp1 -destination host01 -CREDENTIAL gds_oracle -  
netparam none  
-gg_service host01:9000/deploy1  
-gg_password ggadmin pw  
create shard -shardgroup shgrp1 -destination host02 -CREDENTIAL gds_oracle -  
netparam none  
-gg_service host02:9000/deploy2 -gg_password ggadmin status  
configure  
add service ...  
start service ..
```

A

How to Use the Admin Client

Admin Client is a command line utility (similar to the classic GGSCI utility). It uses the REST API published by the Microservices Servers to accomplish control and configuration tasks in an Oracle GoldenGate deployment.

Admin Client is used to create, modify, and remove processes, instead of using the Microservices web user interface.

If you need to automate the Admin Client connection with the deployment, you can use an Oracle Wallet to store the user credentials. The credentials stored must have the following characteristics:

- Single user name (account) and password
- Local to the environment where the Admin Client runs
- Available only to the currently logged user
- Managed by the Admin Client
- Referenced using a credential name
- Available for Oracle GoldenGate deployments and proxy connections.



Note:

To use the Admin Client for administration tasks, you need the user credentials that work with both the Service Manager and Administration Server.

To use the Admin Client, perform the following steps:

1. Set the environment variables: OGG_HOME, OGG_VAR_HOME.

Move to \$OGG_HOME/bin and run the command:

```
[oracle@bigdatalite bin]$ ./adminclient
Oracle GoldenGate Administration Client for Oracle
Version 19.1.0.0.0 OGGCORE_19.1.0.0.0_PLATFORMS_yymmdd.HHMM_FBO

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reserved.

Linux, x64, 64bit (optimized) on Dec 31 2016 23:58:36
Operating system character set identified as UTF-8.

OGG (not connected) 1>
```

2. Log into the deployment using the security user credentials. This is the user you created while adding the deployment for your Oracle GoldenGate instance.

```
connect http(s)://localhost:port deployment deployment_name as security
role user
```

3. To add users, other than the security role user, for the deployment, use the `ADD CREDENTIALS` command. To know how this command works, see `ADD CREDENTIALS` in *Command Line Interface Reference for Oracle GoldenGate*. Other commands for user credentials are `INFO CREDENTIALS` and `DELETE CREDENTIALS`.
4. You can connect to a deployment or to a proxy server from the Admin Client.

Note:

If your password to connect to a secure or non-secure deployment from the Admin Client has an exclamation mark (!) at the end, then you must enter the password in double quotes when using the `CONNECT` command in a single line. Otherwise, the password is not accepted and the connection fails. This is required for all deployments with a strong password policy.

Syntax:

```
CONNECT - Connect to an Oracle GoldenGate Service Manager
|CONNECT server-url [ DEPLOYMENT deployment-name]
|[ ( AS deployment-credentials-name|
| USER deployment-user-name )
|[PASSWORD deployment-password] ]
|[PROXY proxy-uri|
|[ (AS proxy-credentials-name
| USER proxy-user-name)
|[ PASSWORD proxy-password] ] ] [ ! ]
```

Note:

The deployment credentials cannot be stored as a `USERIDALIAS` in the credential store because the Oracle wallet used for storing database credentials is managed by the Administration Server. Instead, a separate Oracle wallet is created for the Admin Client. The Oracle wallet is stored in the users home directory.

The following example shows the connection to a deployment and to a proxy server:

```
OGG (not connected) 1> ADD CREDENTIALS admin USER oggadmin PASSWORD
oggadmin-A1
2019-02-14T00:35:38Z INFO OGG-15114 Credential store altered.
OGG (not connected) 2> ADD CREDENTIALS proxy USER oggadmin PASSWORD
oggadmin-A2
2019-02-14T00:35:48Z INFO OGG-15114 Credential store altered.
OGG (not connected) 3> CONNECT http://abc.oracle.com:12000 AS admin PROXY
http:111.1.1.1:3128 as proxy
```

```
Using default deployment 'Local'  
OGG (http://abc.oracle.com:12000 Local) 4>
```

If the credentials are invalid for a proxy connection, then an error similar to the following error occurs:

```
OGG (not connected) 2> ADD CREDENTIALS proxy USER proxyadmin PASSWORD  
invalid  
2019-02-14T00:48:12Z INFO OGG-15114 Credential store altered.  
OGG (not connected) 3> CONNECT http://abc.oracle.com:12000 AS admin PROXY  
http://111.1.1.1:3128 as proxy  
ERROR: Proxy server user name 'proxyadmin' or password is incorrect.
```

5. You can view the full list of Admin Client commands using the `HELP` command. Use the `HELP SHOWSYNTAX` command to view the syntax for specific commands.

B

Connecting Oracle GoldenGate Classic Architecture to Microservices Architecture

Oracle GoldenGate Classic Architecture uses the data pump Extract in Admin Client and GGSCI to connect to Microservices Architecture

Note:

Oracle GoldenGate Classic Architecture's pump Extract can only connect to an unsecured Microservice Architecture deployment, of which the receiver server's port is open for ingress traffic.

If the above requirement is a security concern, it is recommended to install Microservices Architecture on the same target, along with Classic Architecture, and use a reverse proxy server to allow wss distribution path between these two Microservices Architecture deployments. After this distribution path is established, the Classic Architecture deployment can pick up the trail from the same location on the target.

To connect Oracle GoldenGate Classic Architecture and Microservices follow these steps:

Note:

To establish a connection between Oracle GoldenGate Classic Architecture and Microservices, only non-secured MA deployments are supported. Secure Microservices Architecture deployments are not supported.

Create a data pump Extract

Note:

To perform this task, an existing data pump Extract must be running in Classic Architecture.

1. Log in to GGSCI.
2. Add a data pump Extract using the command:

```
ADD EXTRACT dp_name, EXTTRAILSOURCE ./dirdat/aa
```

This example uses, `dp_name` as the name of the data pump Extract.

3. Add the remote trail to the data pump Extract using the command:

```
ADD RMTTRAIL ab, EXTRACT dp_name, MEGABYTES 500
```

4. Edit the parameter file for the data pump Extract using the command:

```
EDIT PARAMS dp_name
```

Here is an example of the data pump Extract parameter file:

```
EXTRACT dp_name  
RMTHOST hostname-or-IP-address, PORT receiver-service-port  
RMTTRAIL ab  
PASSTHRU  
TABLE pdb.schema.table;
```

Start the data pump Extract

Use the following command to start the data pump Extract `dp_name`:

```
START EXTRACT dp_name
```

Once the data pump Extract has started, the Receiver Service establishes a path and begins reading the remote trail file. The remote trail file appears in the `$OGG_VAR_HOME/lib/data` of the associated deployment running the Receiver Service.

C

Connecting Microservices Architecture to Classic Architecture

To establish a connection to Classic Architecture from Microservices Architecture, the Distribution Service in Oracle GoldenGate Microservices Architecture must know where to place the remote trail file for reading.

To connect Oracle GoldenGate Microservices Architecture and Classic Architecture follow these steps:



Note:

For this procedure to work only the `ogg` protocol is supported and an existing Extract must be running in Microservices Architecture.

Task 1: Start Manager in Classic Architecture

1. Log in to GGSCI.
2. Use the command:

```
START MANAGER
```

For more information, see `START MANAGER` in *Reference for Oracle GoldenGate*.

Task 2: Add a Distribution Path

1. Launch the Distribution Service web interface.
2. Click the plus (+) sign next to **Path**. The **Add Path** page is displayed.
3. Enter the following details on the **Add Path** page:

Options	Description
Path Name	Enter the name of the Distribution Path.
Description	Enter the description of the Distribution Path.
Source	Select Extract from the drop-down list. Enter the Extract name in the text box below it.
Generated Source URI	Enter the location of the source trail file.

Options	Description
Target	<p>Select ogg as the target protocol from the drop-down list.</p> <p>Enter the following in the given order:</p> <ol style="list-style-type: none"> a. Target Hostname: Name of the target host service to which the connection will be established. b. Target Manager Port: Port number of the Oracle GoldenGate Classic Architecture Manager port. c. Target sub-directory for the trail file: Name of the subdirectory where the trail file is to be stored. For example, <code>.dirdat</code>. d. Target trail file name: Name of the target trail file, such as <code>ea</code>.
Generated Target URI	The location of the target trail file is displayed.
Target Encryption Algorithm	<p>Select NONE from the drop-down list.</p> <p>To encrypt the target trail file, select the appropriate encryption algorithm from the drop-down list.</p>
Enable Network Compression	Select this option if you want to enable network compression.
Sequence Length	Select the required value from the drop-down list for target trail sequence length. The default value is 9 .
Trail Size (MB)	Specify the value of the trail file size, as per your requirements.
Configure Trail Format	<p>Select this option if you want the trail file in any of the following formats:</p> <ul style="list-style-type: none"> • TEXT • SQL • XML
Encryption Profile	<p>This is the encryption profile that was used to encrypt the trail file when it was generated.</p> <p>However, certain encryption methods are only available in Microservices Architecture and are not supported by Classic Architecture, so use this feature with caution.</p>

Options	Description
Target Type	Select Manager as the target type. Alternatively, you can select Collector or Receiver Service . When connecting Microservices architecture with other Microservices architecture, select the Receiver Service option. When connecting Microservices architecture with Classic architecture, select either the Manager or Collector option. If you select the Collector option, you need to start a static collector beforehand on the Classic architecture and use that static collector port as the value of the Target Manager Port field.
Begin	Select the Position in Log option from the drop-down list.
Source Sequence Number	Enter the sequence value of the source trail.
Source RBA Offset	Enter the value of the RBA offset of the source trail if you want the path to start reading from a specific RBA.

4. Click `Create Path` or `Create and Run`, as required. Select `Cancel` if you need to get out of the **Add Path** page without adding a path.

After the path is created, you'll be able to see the new path in the Distribution Service home page.