Oracle® Database
Using Oracle GoldenGate on Oracle Cloud Marketplace

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Preface

This guide describes how to use Oracle GoldenGate on Oracle Cloud Marketplace.

Audience

This guide is intended for developers, database users, and administrators who are responsible for installing, deploying, and configuring Oracle GoldenGate. It is assumed that readers are familiar with web technologies, low code development, and scripting. A general understanding of Windows and UNIX platforms is required.

Documentation Accessibility

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Related Information

Oracle GoldenGate Documentation

Oracle GoldenGate for Distributed Applications and Analytics

Oracle GoldenGate Studio Documentation

OCI GoldenGate

Oracle Database High Availability

Oracle GoldenGate Veridata

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.
italic `italic`	Italic type indicates placeholder variables for which you supply particular values, such as in the parameter statement: `TABLE table_name`. Italic type also is used for book titles and emphasis.

Convention	Meaning
`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 process or utility unless the name is intended to be a specific case. Keywords in upper case (`ADD EXTRACT`, `ADD EXTTRAIL`, `FORMAT RELEASE`).
LOWERCASE	Names of processes to be written in lower case. Examples: `ADD EXTRACT exte`, `ADD EXTRAIL ea`.
{}	Braces within syntax enclose a set of options that are separated by pipe symbols, one of which must be selected, for example: `{option1	option2	option3}`.
[]	Brackets within syntax indicate an optional element. For example in this syntax, the `SAVE` clause is optional: `CLEANUP REPLICAT group_name [, SAVE count]`. Multiple options within an optional element are separated by a pipe symbol, for example: `[option1	option2]`.
Sample Locations	Compass directions such as east, west, north, south to be used for demonstrating Extract and Replicat locations. Datacenters names to use the standard similar to `dc1`, `dc2`.
Group names	Prefixes for each process, as follows: • Extract: ext. Usage with location: `extn`, where **n** indicates 'north' compass direction. • Replicat: rep. Usage with location: `repn`, where **n** indicates 'north' compass direction. • Distribution Path: dp. Usage with location: `dpn`, where **n** indicates 'north' compass direction. • Checkpoint table: `ggs_checkpointtable` • Trail file names: e or d depending on whether the trail file is for the Extract or distribution path. Suffix derived in alphabetical order. Usage for an Extract trail file: `ea`, `eb`, `ec`. • Trail file subdirectory: The name will use compass directions to refer to the trail subdirectories. Example for trail subdirectory name would be `/east`, `/west`, `/north`, `/south`.

Part I

Oracle GoldenGate Microservices on Oracle Cloud Marketplace

You need to use the *Oracle GoldenGate Microservices Documentation* along with the *Using Oracle GoldenGate on Oracle Cloud Marketplace* guide to use Microservices on Marketplace.

1

Prerequisites

Following are the prerequisites for using Oracle GoldenGate on Oracle Cloud Marketplace.

Supported Browsers

Oracle Cloud Infrastructure supports the latest desktop versions of Google Chrome, Microsoft Edge, Safari, Firefox, and Firefox ESR.

Note that Mobile browsers as well as private browsing mode is not supported for Firefox or Edge.

Prerequisites to Deploy Oracle GoldenGate Microservices

Here are the prerequisites required to deploy Oracle GoldenGate Microservices:

- Oracle Cloud Account
- Access to assigned Oracle Cloud Tenant
- Compute node resources within Oracle Cloud Tenant
- Local SSH/RSA Key

Create an SSH/RSA Key

To work with the Oracle Cloud Infrastructure once the Oracle GoldenGate Compute Node is built, you have to provide a SSH Public Key during the interview process that will allow you to log in to the node once built.

Perform the following steps to build your SSH keys:

1. Open a Terminal window and start the key generation program by typing the following command:

   ```
   $ ssh-keygen Generating public/private rsa key pair.
   ```

2. Enter the path to store this file. By default, this gets saved in your home directory under a hidden folder called `.ssh`. Change this default location, if required.

   ```
   Enter file in which to save the key (/Users/johndoe/.ssh/id_rsa): <Return>
   ```

3. Enter a passphrase for using your key.

   ```
   Enter passphrase (empty for no passphrase): <passphrase>
   ```

4. Re-enter the passphrase to confirm it.

   ```
   Enter same passphrase again: <passphrase>
   ```

5. Check the results.

The key fingerprint (a colon separated series of 2 digit hexadecimal values) is displayed. Check if the path to the key is correct. In the above example, the path is `/Users/johndoe/.ssh/id_rsa.pub`. You have now created a public or private key pair.

> ⓘ **Note**
>
> For generating key pair on Windows platform, refer to [Creating a Key Pair](#) section in *Oracle Cloud Infrastructure Documentation*.

OCI Policies Needed for Creating Oracle GoldenGate Marketplace Instances

The following OCI policies are required for creating Oracle GoldenGate Market Place instances:

- Allow group *<ggowner>* to manage *instance-family* in compartment *<Compartment Name>*
- Allow group *<ggowner>* to manage *orm-family* in compartment *<Compartment Name>*
- Allow group *<ggowner>* to manage *volume-family* in compartment *<Compartment Name>*
- Allow group *<ggowner>* to use *virtual-network-family* in compartment *<Compartment Name>*
- Allow group *<ggowner>* to manage *public-ips* in compartment *<Compartment Name>*
- Allow group *<ggowner>* to use *tag-namespaces* in tenancy
- Allow group *<ggowner>* to inspect *compartments* in tenancy

Where *<ggowner>* is an example for a group and *<Compartment Name>* is an example of a compartment. The following are permission names: *instance-family*, *orm-family*, *volume-family*, *virtual-network-family*, and *public-ips*.

> ⓘ **Note**
>
> - The manage public-ips permission is required only if you give the instance a public IP address. Oracle GoldenGate uses reserved IP addresses so that the public address is preserved across stack upgrades.
>
> - The Networks compartment is an assumption that the customers follow the practice of having a separate network group manage the network resources for all users in the tenancy. If the tenancy instead allows you to create network resources of your own, then the policy would be: `Allow group <marketplace-permissions> to manage virtual-network-family in compartment <Marketplace-Test>`.

Configuring Source or Target Database for Replication

Before you can begin replicating data, you should prepare the source or target database to support Oracle GoldenGate. For more information about steps to prepare your Oracle AI Database, see Configure Databases and view details for the relevant database in *Oracle GoldenGate Microservices Documentation*.

Cross Cloud Functionality

Oracle GoldenGate is designed for large scale, cloud based architectures and Oracle GoldenGate on Oracle Cloud Marketplace is a key to many cloud-based solutions. By using Oracle GoldenGate from the Oracle Cloud Marketplace, you can replicate data from on premise to the Oracle Cloud, between data points within the Oracle Cloud, or even between third party clouds.

Network Recommendations

The network recommendations listed here primarily apply for Oracle to Oracle replication, but the general rules apply to all platforms supported by Oracle GoldenGate. This applies to Oracle GoldenGate on-premise, in 3rd party clouds, in the Oracle cloud, and OCI GoldenGate.

- **For Capture**: Network latency is critical for performance throughput of an Extract and it is recommended to ensure that the Marketplace deployment is in the same region, or as close as possible, to the database server.

- **For Replicat**: If you run Oracle GoldenGate remotely (on a separate server from the database that Oracle GoldenGate is applying changes to) then the round trip ping time must be less than 5ms.

- **For Oracle GoldenGate to Oracle GoldenGate communication**: The Oracle GoldenGate trail files grows at about 30-40% of the generated redo log volume (if you are capturing 100% of the data). That means that Oracle GoldenGate sends about 30-40% of the generated redo log volume across the network. If the network is not able to scale to this volume, then you can enable compression on the trail file data being sent across the network. This compression can typically achieve 8:1 compression ratios or better. You can also modify the TCP window socket size and buffers as well.

The following table provides a matrix on cross cloud support for replication by using Oracle GoldenGate on the Oracle Cloud Marketplace:

Table 1-1   Oracle GoldenGate Cross-Cloud Support

Technology	Remote Capture	Remote Apply
Oracle Cloud Infrastructure	Yes	Yes
Amazon Web Services (AWS)	Yes	Yes
Microsoft Azure	Yes	Yes
Google Cloud Service	Yes	Yes

2

Getting Started with Oracle Cloud Marketplace

This chapter provides an introduction to Oracle GoldenGate on the Oracle Cloud Marketplace.

Overview

Oracle GoldenGate on Oracle Cloud Marketplace provides pre-installed versions of Oracle GoldenGate and offers the same benefits, scalability, security, and robustness that you can rely on for your enterprise replication needs.

Resources

The Oracle GoldenGate image on Oracle Cloud Marketplace contains the latest Oracle GoldenGate release that is available at the time of provisioning an instance.

The Oracle GoldenGate software is installed on the compute node under the `/u01/app` directory.

Supported Compute Shapes

Oracle GoldenGate runs on different OCI Compute Sizes. The following table provides details on the supported OCI Compute Sizes:

Compute Shape	OCPU	Memory (GB)	Max Network Bandwidth
VM.Standard2.1	1	15	1 Gbps
VM.Standard2.4	4	60	4.1 Gbps
VM.Standard2.8	8	160	8.2 Gbps
VM.Standard2.16	16	240	16.4 Gbps
VM.Standard2.24	24	320	24.6 Gbps
VM Standard 3 Flex	1 to 32	16 to 512	?
VM Standard E3 Flex	1 to 32	16 to 512	?
VM Standard E4 Flex	1 to 32	16 to 512	?

For pricing details on compute nodes, please refer to OCI Pricing.

Block Storage

The following table provides details on the default block storage configuration used by Oracle GoldenGate on Oracle Cloud Marketplace.

Volume	Default Size	Configurable
Boot	50GB	Yes
Swap	256GB	Yes

Volume	Default Size	Configurable
Trail	512GB	Yes
Deployments	128GB	Yes
Cache Manager	128GB	Yes

For pricing details on block storage, please refer to Oracle Storage Cloud Pricing.

3

Provisioning Oracle GoldenGate Microservices on Marketplace

This chapter describes the steps to provision Oracle GoldenGate Microservices for Oracle Cloud Marketplace.

Finding Oracle GoldenGate within the Oracle Cloud Marketplace

To launch Oracle GoldenGate Microservices from Oracle Cloud Marketplace:

1. Log in to [Oracle Cloud Marketplace](#).

2. From the Oracle Cloud Marketplace home page, use the search box under Applications and search for the keywords **GoldenGate**.

3. From the search results, select one of the following: Oracle GoldenGate for Oracle, Oracle GoldenGate for Non-Oracle, or Oracle GoldenGate for Big Data, based on your required database or Big Data implementation.

Deploying Oracle GoldenGate Microservices on Oracle Cloud Marketplace

After finding Oracle GoldenGate Microservices listing in Oracle Cloud Marketplace, you can deploy Oracle GoldenGate using the provided Stack Listing. This Terraform Stack prompts you for specific information and then builds the Oracle Cloud Infrastructure Compute Node with the desired hardware settings, Oracle Database Client (if applicable), Oracle GoldenGate Microservices and the default deployment.

1. From the Application page, select **Get App**.

2. Select **OCI Region** or **Log in using your Single Sign-On** credentials.

   • OCI Region – Select the desired region and click **Create Stack**.

3. Provide the OCI tenant details.

4. Sign in to the Identity provider and then provide the following details:

5. On the Oracle GoldenGate application page, provide the following information:

   • **Select Version** - It provides a list of versions that are available in the listing.

   • **Select Compartment** - Specifies the compartment where the compute node will be built. It is generally the location that you have access to build the compute node.

   • **Terms of Use** - This check box is selected by default. Oracle recommends to review the licenses before proceeding with the instance creation.

   • **Launch Stack** - It launches the stack in the OCI environment.

6. Fill in the required **Stack** information:

   • **Name** - Name of the Stack. It has a default name and provides a date time stamp. You can edit this detail, if required.

- **Description** - Description of the Stack that you are creating.

- **Create In Compartment** – It defaults to the compartment you have selected on the Oracle GoldenGate application page.

- **Tags** (optional) – Tags are a convenient way to assign a tracking mechanism but are not mandatory. You can assign a tag of your choice for easy tracking. You have to assign a tag for some environments for cost analysis purposes.

- Click **Next**.

7. Fill in the required details to configure variables. This information is required to build the compute node with Oracle GoldenGate Microservices.

- Name for New Resources -

  a. **Display Name** – Display name used to identify all new OCI resources.

  b. **Host DNS Name** – Name of the Domain Name Service for the new compute node.

- Network Settings -

  a. **Create New Network** – Select this check box if you wish to create a new network resource.

    – If you select this check box, the **Create New Network** wizard appears allowing you to add and edit the new network information.

    – If you do not select this check box, the Create New Network wizard does not appear and the compute node is created with the existing network options in the VCN.

  b. **Network Compartment** (optional) – Compartment for new or existing network resources.

  c. **VCN** (optional) – Existing VCN to use for the newly created instance if you are not creating a new network.

  d. **Subnet Network Compartment** (optional) - It specifies the compartment in which the VCN submit resides.

  e. **Subnet** (optional) – Existing subnet to use for the newly created instance if you are not creating a new network. The subnet that you have selected must match the same Availability Domain set in the Instance Settings.

- Instance Settings -

  a. **Availability Domain** – It specifies the availability domain for the newly created Oracle GoldenGate Instance. It must match the Subnet that you have selected in the Use Existing Network settings.

  b. **Compute Shape** – Shape of new compute instance. Supported shapes are VM.Standard2.1, VM.Standard2.4, VM.Standard2.8, VM.Standard2.16, and VM.Standard2.24, VM.Standard3.Flex, VM.Standard.E3.Flex, and VM.Standard.E4.Flex

  c. **Assign Public IP** – This option indicates if the newly created VM should have a public IP address. This option is selected by default. If you clear this check box, no public IP address will be assigned preventing public access to the compute node.

> ⓘ **Note**
>
> If you are using a private IP address to access the compute node, you have to set up an IPSec VPN or FastConnect connection. Refer to OCI documentation for more details.

    d. **Custom Volume Sizes**- Select this check box to customize the size of the new block storage volumes that are built for the compute node.
Block Storage (Custom Volume Sizes):

      i. Boot Volume Size – Default value is 50GB

      ii. Swap Volume Size – Default value is 256GB

      iii. Trails Volume Size – Default value is 512GB

      iv. Deployments Volume Size – Default value is 50GB

      v. Cache Manager Volume Size with a default of 256GB

- **Create Oracle GoldenGate Deployment** -

    a. **Deployment**: An option for the Oracle Database Marketplace image is to select **Deployment - Autonomous Database** which then prompts you for more information about the Autonomous DB to connect to the GoldenGate Deployment with the following details:

      – **Deployment Name**: Name of the Oracle GoldenGate Deployment.

      – **Deployment - Autonomous Database**. Select if deployment connects to an Autonomous Database

      – **Deployment - Autonomous Database Compartment**. Compartment that existing Autonomous Database resides in **Deployment - Autonomous Database** instance.

      – **Choose an Autonomous Database instance**: This variable is required.

- Shell Access -

    – **SSH Public Key** - Public Key for allowing SSH access as the `opc` user. Enter the key and click **Next**.

8. On the **Review** page, review the information you provided and then click **Create**.

9. After clicking **Create**, you are navigated to the **Stacks Job Details** page. You can monitor the creation of the compute node using this page.

10. Upon completion, you can now view the Oracle GoldenGate Microservices compute node under **Instances**.

Migrating to Exadata Cloud@Customer Using Oracle Zero Downtime Migration

The Marketplace image **Oracle GoldenGate for Oracle – Database Migrations** contains a downloadable Docker image that you can install on premises in order to migrate data to Exadata Cloud@Customer using Oracle Zero Downtime Migration (ZDM). All migration targets other than Exadata Cloud@Customer should use the Oracle GoldenGate installation on the Marketplace compute instance instead of the docker image.

For more information on Oracle Zero Downtime Migration, see Move to Oracle Cloud Using Zero Downtime Migration.

It is required to have a Docker engine set up on the system that will host the Docker image. For more information about setting up a Docker engine, see [Docker Documentation](#).

1. Provision and start an Oracle GoldenGate for Oracle – Database Migrations Marketplace compute instance. This is necessary to download the docker image from the Marketplace instance. You can stop the instance and delete it once the docker image is downloaded.

2. Use SFTP or SCP to download the docker image file from the following location: /`home/opc/ora23ai-23602410.tar`.

3. Load the docker image to your Docker Engine installation using docker load command as shown in the following example:

```
[opc@zdmol8 ~]$ sudo docker image list
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet
msg.
REPOSITORY  TAG        IMAGE ID    CREATED     SIZE
[opc@zdmol8 ~]$
[opc@zdmol8 ~]$ sudo docker load < ./ora23ai-23602410.tar
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet
msg.
Getting image source signatures
Copying blob 24bb09b2817c done
Copying blob ae9fa111a1ac done
Copying blob 67d008ba80bc done
Copying blob 0d2d7cc2c739 done
Copying blob 8e10c3fcde59 done
Copying blob 006248eeb32f done
Copying config 3b6feb874a done
Writing manifest to image destination
Storing signatures
```

After loading, the docker image will look similar the following output:

```
REPOSITORY              TAG          IMAGE ID      CREATED
SIZE
oracle/goldengate    23.6.0.24.10    b0f5ef6c8953   2 months ago
2.91GB
```

For more information about usage of docker, see [Docker Documentation](#).

4. Run the image as a container using the docker run command. The image needs to expose port 443 for HTTPS access to the Oracle GoldenGate web UI and API, use appropriate parameters to expose and map ports. As part of the docker run output, the password for the `ggadmin` user is generated and displayed as follows:

```
[opc@zdmol8 ~]$ sudo docker run --name ogg218 -p 443:443 oracle/
goldengate:23.5.0.0.0
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet msg.
------------------------------------------------------------------------------
--  Password for OGG administrative user 'oggadmin' is 'BmRqDusMoOp0-IGri'
```

Ensure to change the password later in the Oracle GoldenGate web UI.

> ⓘ **Note**
>
> For more information about the parameters for the docker run command, see *Running Oracle GoldenGate in a Container* in the GITHUB page. All the parameters here are optional. The docker image was created using the docker file from that project described in this page.

5. Once the docker container has started, you can access it through the Oracle GoldenGate web interface using `http://hostname`, where hostname is the hostname or IP address of the server where the docker container was started. If port 443 was remapped to a different port, then adjust the URL accordingly.

4

Getting Started with Oracle GoldenGate Microservices

After deploying Oracle GoldenGate Microservices on the Oracle Cloud Marketplace, you can access the latest release of Oracle GoldenGate.

Connecting to the Oracle GoldenGate Compute Node

To access the new Oracle GoldenGate deployment, log in to the compute node using the following steps. For this, you need to identify the IP address of the compute node where Oracle GoldenGate is running.

> ⓘ **Note**
>
> If the instance has a public IP address, you can use it to connect using SSH. If the instance only has a private IP address, then use the bastion service to start a bastion session to SSH to the instance.

To identify the IP address:

1. Log in to your Oracle Cloud Console.
2. Select **Compute** -> **Instances**.
3. Select the hyperlink name of the compute node. The IP Address is listed under **Instance Access**.
4. To access the compute node where Oracle GoldenGate is running, connect as the `opc` account using SSH. For more information on how to access a node using the `opc` account, see [Connecting to an Instance](#).

A public SSH key is specified as a part of the deployment process and you can use the private key when you are connecting to the Oracle GoldenGate instance. The following example illustrates how you connect to the Oracle GoldenGate compute node:

```
ssh -i private-key-filename opc@public-id-address
```

Next you need the Administrator Password before you connect to the Service Manager.

Setting up Oracle GoldenGate Microservices for Your Database

Before you can start using Oracle GoldenGate Microservices, there are a few tasks that you must perform, depending on your database platform, to ensure that your environment is complete and ready to replicate your data.

Setting up for DB2 z/OS

The required DB2 connection drivers are not pre-installed in Oracle GoldenGate on Microservices for Non-Oracle (DB2 z/OS) compute node. You have to install one of the following DB2 connection drivers before using Oracle GoldenGate (listed from lightest to heaviest):

- IBM Data Server Driver for ODBC and CLI v10.5 or later

- IBM Data Server Runtime Client v10.5 or later

- IBM Data Server Client v10.5 or later

- DB2 Connect v10.5 or later

For more information on these drivers, see DB2 z/OS - Choosing an Installation Operating System in *Oracle GoldenGate Microservices Documentation*.

Setting up Environment Variables

After provisioning the Oracle GoldenGate Microservices instance and installing the connection drivers, follow these instructions to edit the deployment's environment variables restart the services.

To set the environment variables:

1. Open a browser and connect to the Oracle GoldenGate Service Manager. The URL is similar to `http://host:port`, where host is the name of the server or IP of the server that is running the Service Manager and port is the port number of the Service Manager. For a secure deployment, the URL is similar to `https://public_ip_address`.

2. Enter the Oracle GoldenGate Administration user name and password and sign in to display the **Service Manager** home page.

3. In the **Deployments** page of the **Service Manager** home page, locate the deployment.

4. Click the **Deployment** name and then click **Configuration**.

5. Ensure that you see both `PATH` and `LD_LIBRARY_PATH` variables in the list on the **Deployment** page. If the variables are not set, then set them as shown in the following example, and the values of these variables should typically, reflect the path where the ODBC driver is installed.

    ```
    PATH: /home/opc/odbc_cli/clidriver/bin:/home/opc/odbc_cli/clidriver/adm:$PATH

    LD_LIBRARY_PATH: /home/opc/odbc_cli/clidriver/lib:$LD_LIBRARY_PATH
    ```

6. In the **Action** column of the **Deployment** page, click **Start** to restart the deployment.

7. In the **Service Manager** home page, identify the Administration service you want to start and click **Start** to start the Administration service.

For more information about using the Service Manager, see Manage Deployments from the Service Manager in *Oracle GoldenGate Microservices Documentation*.
Topic:

Setting up for Oracle

The Oracle GoldenGate image on Oracle Cloud Marketplace contains the latest Oracle GoldenGate release along with Oracle Database Client software for all supported versions of the Oracle database.

For supported Oracle Database platforms for Oracle GoldenGate, see the latest certification matrix.

For more information about setting up the environment variables, such as `LD_LIBRARY_PATH` and`TNS_ADMIN` to the instant client directories, see OGGCA User Deployment in *Oracle GoldenGate Microservices Documentation*.

Setting up for MySQL

Before you can begin replicating data, for a MySQL database, review the instance, database and user requirements available in Prepare MySQL for Oracle GoldenGate and MySQL: Understanding What's Supported in *Oracle GoldenGate Microservices Documentation*.

Setting up for PostgreSQL

The required PostgreSQL client libraries are not pre-installed in the Oracle GoldenGate Microservices for Non-Oracle (PostgreSQL) compute node and will need to be manually installed and configured before using the Microservices installation of Oracle GoldenGate for PostgreSQL on OCI Marketplace.

Required packages are available at https://www.postgresql.org/download/. Select the **Linux** operating system family and **Red Hat/Rocky/CentOS** distribution, then follow the instructions to integrate with the PostgreSQL Yum Repository. When selecting a PostgreSQL **version**, choose the version based on the version of the source or target PostgreSQL database. For **platform**, choose `Red Hat Enterprise`, `CentOS`, `Scientific or Oracle version 7`, and select `x86_64` for the architecture.

Install the `postgresqlversion#-libs` module of the Linux installation package.

For example:

```
# Install the repository RPM:
sudo yum install -y https://download.postgresql.org/pub/repos/yum/reporpms/EL-7-x86_64/
pgdg-redhat-repo-latest.noarch.rpm
# Install PostgreSQL:
sudo yum install -y postgresql13-libs
```

Setting up Environment Variables

After provisioning the instance for PostgreSQL and installing the connection drivers, follow these instructions to edit the deployment's environment variables restart the services.

To set the environment variables:

1. Open a browser and connect to the Oracle GoldenGate Service Manager. The URL for OCI Marketplace is in the following format: `https://public_ip_address`

2. Enter the Oracle GoldenGate Administration **User Name** and **Password** and sign in to display the **Service Manager** home page.

3. In the **Deployments** page of the **Service Manager** home page, locate the deployment.

4. Click the **Deployment** name and then click **Configuration**.

5. Click the **+ sign** next to Environment Variables and create a new **Name** entry called `LD_LIBRARY_PATH` with a **Value** of the PostgreSQL client libraries installation `lib` folder and of the Oracle GoldenGate's installation `lib` folder.

   For example:

   ```
   /usr/pgsql-13/lib:/u01/app/ogg/lib
   ```

6. Click **Add** and **Save Changes**.

7. Repeat the previous step and add another Name entry called `ODBCINI` with the value of `/etc/odbc.ini`.

8. Click **Add** and **Save Changes**.

9. Return to the **Overview** page of the **Service Manager** and in the **Action** drop-down of the Deployment, click **Start** or **Restart**, depending on its status, in order for the new variables to take effect.

Upgrading from Oracle GoldenGate for PostgreSQL version 21.14

When upgrading from Oracle GoldenGate for PostgreSQL release 21.14 to a higher version for a cloud database as source and target databases, the environment variables, such as `ODBCINI` and `LD_LIBRARY_PATH` need to be set again.

Perform the following steps to set the environment variables after an upgrade:

1. Create a JSON file to list the environment variables and their values.

   For example:

   ```
   {
           "environment": [
             {
               "name": "ODBCINI",
               "value": "/home/opc/odbc.ini"
             },
             {
               "name": "LD_LIBRARY_PATH",
               "value": "/u01/app/ogg/lib/:/usr/pgsql-11/
   lib:$LD_LIBRARY_PATH"
             }
             ]}
   ```

2. Run the following `curl` command to set the environment variables:

   ```
   curl -o output.json
           --request
           PATCH 'https://ogg instance name/services/v2/deployments/
   MarketPlace?root=deployments&deployment=deploymentInfo&name=MarketPlace' -
   u 'ogg username':'ogg password'
           --header
           'Content-Type: application/json' -d@JSON file
           --insecure
   ```

Starting the Administration Service

For some installations of Oracle GoldenGate Microservices, such as for DB2 and SQL Server, you were instructed in previous steps to install the client drivers for the database on the compute node. After they are installed, you must then manually start the Administration service for your instance.

To start the Administration Service:

1. Navigate to the Service Manager login page. You can reach the Service Manager page by using the public IP address that you obtained when you performed a look up of the compute node information for the environment: `https://public_ip_address`

2. Under **Services**, use the **Action** drop-down for the Administration Service, and select **Start**.

Creating User Accounts

To secure your Oracle GoldenGate Microservices deployment, you should consider creating new user accounts for your Oracle GoldenGate users and assign each account to the functional role that they are expected to perform. These roles are as follows:

- Security

- Administrator

- Operator

- User

Oracle GoldenGate users only have access permissions according to their defined access levels. For more information on how Oracle GoldenGate Security Framework is used, refer to Authentication and Authorization in Oracle GoldenGate in *Oracle GoldenGate Microservices Documentation*.

Topics:

- [Creating Users in the Service Manager](#)

- [Creating Users in the Administration Service](#)

Creating Users in the Service Manager

After you log in to the Service Manager as Administrator, you can create users with the different roles such as Administrator, Operator, or User. Users with the Security role can administer all Microservices.

To create users in the Service Manager:

1. Navigate to the **Service Manager** log in page. You can reach the Service Manager page by using the public IP address that you obtained when you looked up the compute node information for the environment: `https://public_ip_address`.

2. Log in using the *oggadmin* user and the password credentials located in the `/home/opc/ogg_credentials.json` file.

3. Click the menu icon present on the top left corner to open the menu section.

4. Select the **User Administration** option from the menu.

5. On the **Users** screen, select the plus (+) icon to add a new user.

6. Fill in all the required fields.

7. Click **Submit** to create the new user.

Creating Users in the Administration Service

After logging in to the Oracle GoldenGate Microservices Administration Service as the Administrator, for the specified deployment, you can create a new user with the role of Administrator, Operator, or User to administer the deployment.

To create Users in the Administration Service:

1. Log in to the Administration Service using the Security Role User (*oggadmin*) credentials.

2. Click the menu icon present in the top left corner to open the menu.

3. From the menu, select the **User Administration** option.

4. From the **Users** screen, select the plus (+) icon, to create a new user.

5. Fill in the details for all the required fields and click **Submit**.

> ⓘ **Note**
>
> Passwords must be 8 to 30 characters long and contain at least 1 uppercase, 1 lowercase, 1 numeric, and 1 special character. Special characters such as '$', '^', or '?'are not allowed.

Changing Default Administrator Password

Changing passwords for critical accounts, such as *oggadmin*, is the first priority in securing your Oracle GoldenGate Microservices deployment. To change the password for *oggadmin*, you must first change it in the Service Manager and then in Administration Service.

This topic describes the following:

Changing the Administrator Password for the Service Manager

To change the Administrator password for the Service Manager:

1. Navigate to the **Service Manager** login page. You can reach the Service Manager page by using the public IP address that you obtained when you performed a look up of the compute node information for the environment.

   ```
   https://public_ip_address
   ```

2. Log in using the *oggadmin* user and password credentials located in the `/home/opc/ogg-credentials.json` file.

3. Select the menu icon present on the top left corner to open the menu.

4. Select **User Administration** option from the menu.

5. From the **Users** screen, select the **Pencil** icon under **Actions** column.

6. Update the password for the *oggadmin* user and click **Submit**.
When the password is successfully reset, the current user is logged out.

7. Log in again to the Service Manager by using the new password.

> ⓘ **Note**
>
> Passwords must be 8 to 30 characters long and must contain at least 1 uppercase, 1 lowercase, 1 numeric, and 1 special character. Special characters such as '$', '^', or '?' are not allowed.

Changing the Administrator Password for the Administration Service

After changing the Oracle GoldenGate Microservices Service Manager security role user password, you should change the password of the security role user in the underlying deployments.

To change the Administrator password for the Administration Service:

1. From the **Service Manager** left-navigation pane, click Deployments and then select the deployment name.

2. Click Administration Service from the Deployments page to open the Administration Service web interface for the deployment.

3. Log in using the *oggadmin* user credentials available in the following location:

   ```
   /home/opc/ogg_credentials.json
   ```

4. Select the menu icon present on the top left corner to open the menu.

5. Select **User Administration** option from the menu.

6. From the **Users** screen, select the **Pencil** icon under **Actions** column.

7. Update the essential details for password and info sections for the *oggadmin* user and click **Submit**.
When the password is successfully reset, the current user is logged out.

8. Log in again to the Administration Service by using the new password.

See Edit Users in *Oracle GoldenGate Microservices Documentation*.

> ⓘ **Note**
>
> Passwords must be 8 to 30 characters long and contain at least 1 uppercase, 1 lowercase, 1 numeric, and 1 special character. Special characters such as '$', '^', or '?' are not allowed.

Changing the Default GGSCHEMA Value

By default, Oracle GoldenGate Microservices deployments on OCI Marketplace creates a default `GGSCHEMA` of `ggadmin`.

> **ⓘ Note**
>
> Oracle GoldenGate display error if the schema value for the SQLServer database is not `ggadmin`.

When connecting deployments to source and target databases, for some databases, such as SQL Server, Oracle GoldenGate needs to create objects in the database. These are created objects using the `ggadmin` schema, unless otherwise specified.

This means that in the source or target databases, that a schema called `ggadmin` needs to be created in advance of adding supplemental logging (`TRANDATA`), creating heartbeat tables, and creating checkpoint tables.

If you prefer to use a different schema instead of the default `ggadmin` schema, then you can manually modify the value, following the steps listed in the Creating a Parameter File in *Oracle GoldenGate Microservices Documentation* guide.

After you have modified the `GGSCHEMA` value, for these processes to recognize the new schema, you need to restart the Administration service and any existing Extracts and Replicats.

5

Connecting to Data Sources

Learn about different methods of connecting Oracle GoldenGate data sources and targets and how to add Extract and Replicats.

Configuring Data Sources for SQL Server and DB2

After you have installed the SQL Server and DB2 client drivers, the next steps are to create connection data sources to your source and target databases.

For SQL Server, follow the instructions in Prepare Database Connection for SQL Server and for DB2, see Prepare DB2 z/OS in *Oracle GoldenGate Microservices Documentation*.

Creating Data Source Connections in Oracle GoldenGate Microservices

To create and run Extract and Replicat processes, enable supplemental logging and add heartbeat and checkpoint tables, you need to set up database connections.

1. Launch the Administration Service interface and log in.

2. Click **DB Connections** from the **Application Navigation** pane.

3. Click the **+** sign next to **DB Connections**, and set up your new credential alias, then click **Submit**.

4. Click the **Connect** icon to verify that the new alias can correctly log in to the database.
   If an error occurs, then 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.

Enabling Logging, Checkpoint Tables, and Implementing Heartbeat Monitoring

After you have created Credentials for your source and target databases, you can enable transaction log for source databases, create checkpoint tables for target databases, and create heartbeat monitoring, all through the Credentials.

For more information about how to create the processes, see Before Adding Extract and Replicat in *Oracle GoldenGate Microservices Documentation*.

Creating the Oracle GoldenGate CDC Cleanup Job for SQL Server

After you have enabled `TRANDATA` for SQL Server, the next step is to disable the default SQL Server CDC Cleanup job and install the Oracle GoldenGate CDC Cleanup job.

For more information about these steps, see the Purging the CDC Staging Data and Details of the Oracle GoldenGate CDC Cleanup Process in *Oracle GoldenGate Microservices Documentation*.

For the OCI Marketplace compute node, the *ogg_cdc_cleanup_setup.sh* file is located in the `/u02/deployments/`*deployment*`/etc/conf/ogg` directory.

Connecting to Oracle Database (on-premises)

You can use Oracle GoldenGate Microservices on Marketplace to remotely capture from and apply data to on-premises Oracle database resources. This allows you to enable replication and centrally manage the replication processes.

Use Cases for Replication
You can use Oracle GoldenGate Microservices to replicate data between data resources in the following use cases:

- Migrations

- Data Distribution

- Real-Time Data Warehousing

- Operational Reporting

Replicating Data from On-premises
Prerequisites

Ensure that the following are set up before you begin replication:

- Oracle GoldenGate Microservices

- Source Database

- Target Database

To move data from on-premises to the cloud or from on-premises to on-premises, perform the following tasks :

Configure Oracle Database for Replication

To prepare your Database as a Service (DBaaS) instance for replication, perform the following tasks:

1. Configure Logging Properties

   - Enable Supplemental Logging

2. Enable Oracle GoldenGate within the Oracle Database

   - Update parameter for `enable_goldengate_replication`

For more details, see Prepare Oracle Database for Oracle in *Oracle GoldenGate Microservices Documentation*.

Configure Oracle GoldenGate Microservices Compute Node

To connect the Microservices Compute Node to any database, edit the `tnsnames.ora` file and point the entry to your database resources.

By default, the environment variable `TNS_ADMIN` is pre-configured for each deployment. But the files `tnsnames.ora` or `sqlnet.ora` are not readily available on the compute node. You need to create the files or copy them from an existing file.

> ⓘ **Note**
>
> • If you are using Oracle Autonomous AI Database products, see Oracle Autonomous AI Database in *Oracle GoldenGate Microservices Documentation*.
>
> • If you want your networking directory structure to be consistent with other Oracle products, you must append `/network/admin` to the directory structure. For this you have to change the environment variable `TNS_ADMIN`. For more information on Local Naming Parameters, refer to [Database Net Services Reference](#).

Connecting Oracle GoldenGate on Marketplace with Different Oracle GoldenGate Instances

Oracle GoldenGate on Oracle Cloud Marketplace enables you to connect and work with many existing and new Oracle GoldenGate instances.

This topic helps you with a few examples and steps required to set up and configure the architectures. The supported architectures are:

• On-premise to Oracle Cloud (Marketplace)

• Oracle Cloud to Oracle Cloud (Marketplace to Marketplace)

Securely Connecting Oracle GoldenGate Microservices On Premise to Oracle GoldenGate Microservices on Marketplace

You can connect your on-premises Oracle GoldenGate Microservices architecture to the Oracle GoldenGate Microservices architecture on Oracle Cloud Marketplace using the following methods:

• Connecting through Public IP Address

• Connecting through IPSec VPN

• Connecting through FastConnect

The following section helps you to connect through public IP address. To use the IPSec VPN or the FastConnect approach, refer to the respective [VPN Connect](#) and [FastConnect](#) documentation.

Connecting Through Public IP Address

By default, we configure Oracle GoldenGate Microservices on Oracle Cloud Marketplace behind the Nginx Reverse Proxy. This simplifies the architecture on Oracle Cloud and also makes the deployment secure. When you connect over a public IP address, on-premises Oracle GoldenGate Microservices architecture has to be secure.

When the deployment is secure and in order to connect to it securely, perform the following steps on the on premise machine and the Oracle Cloud compute node:

In the On Premise Machine

1. Test the connection to Oracle Cloud Compute Node using OpenSSL.

   ```
   $ openssl s_client -connect <public IP address>:443
   ```

2. Copy the `ogg.pem` file from the Oracle GoldenGate Microservices compute node to the on premise environment.

   a. Copy the `ogg.pem` to the local machine.

   ```
   $ scp opc@<public ip address>:/etc/nginx/ogg.pem
   ```

   b. Check if the `ogg.pem` file is present on the local machine through the following command:

   ```
   $ ls -a
   ```

3. Update the local wallet for Oracle GoldenGate Microservices Distribution Service with the `ogg.pem` file. You have to assign it as a trusted certificate.

   > ⓘ **Note**
   >
   > In Oracle GoldenGate Microservices 21c and later, certificates should be added using APIs.

   a. Find the required wallet.

   ```
   $ ps -ef | grep -i distsrvr
   ```

   i. Use the listed dat file.

   ```
   $ cat <dat file> | python -m json.tool
   ```

   ii. Get the wallet location for the Distribution Service.
       For example: `$DEPLOYMENT_HOME/etc/ssl/<distribution service wallet>`

   b. Update the wallet.

   ```
   $ $OGG_HOME/bin/orapki wallet add -wallet <wallet directory> -
   trusted_cert -cert <certificate file path> -pwd <wallet password>
   ```

For example:

```
$OGG_HOME/bin/orapki wallet add -wallet /opt/app/oracle/
gg_deployments/on-premises/etc/ssl/DistroClient -trusted_cert -cert /
home/oracle/oci_cert.pem -pwd ********
```

c. Check the wallet.

```
$ $OGG_HOME/bin/orapki wallet display -wallet <wallet directory> -pwd
<wallet password>
```

For example:

```
$OGG_HOME/bin/orapki wallet display -wallet /opt/app/oracle/
gg_deployments/on-premises/etc/ssl/DistroClient -pwd ********
```

d. As root user, update the on premise `/etc/hosts` file. You can find the information that needs to go in to the `/etc/hosts` file on the Oracle GoldenGate Oracle Cloud Compute Node Instance in the Details page. The required information includes:

   • Public IP Address

   • Internal FQDN

   From the Internal FQDN, you have to use the short hostname as well.

e. Stop the Microservices components. Any running Extracts and/or Replicats are not affected.

   i. Stop the deployment

      • Login to ServiceManager.

      • Under Deployments, click Action, to stop the deployment.

   ii. Start and Stop Deployments and Servers. See [Setting Up Secure or Non-Secure Deployments](#) in *Using Oracle GoldenGate Microservices Architecture* guide.

f. Start the Microservices Components.

   i. Start the Deployment

      • Login to ServiceManager.

      • Under Deployments, click **Action**, to start the deployment.

On Oracle Cloud Compute Node

Follow the below steps from the Administration Service tab on the Oracle GoldenGate Microservices configuration page on Oracle Cloud:

1. Create a user, who can login to the environment and connect to the Receiver Service.

   • Login to the Administration Service. For this, you will need the oggadmin password available in the `ogg-credentials.json` file, unless you changed it after the initial setup.

   ```
   https://<public id address>/<deployment name>/adminsrvr
   ```

For example-

```
https://<public ip address>/OCI-BASE/adminsrvr
```

2. Open the context menu and select the Administrator option.

3. Click the plus (+) icon, to add a new user with Operator role. This account is used by the on premise Distribution Service to login through the Reverse Proxy.

   Provide the following information:

```
Username: streamnetwork
Role: Operator
Type: Basic
Info: Network User
Password: **********
Verify Password: **********
```

On Premise Machine

In the on premise machine:

1. From the Administration Service tab on the on premise environment, create an alias that can connect to the network user created in the previous step. This alias is used by the Distribution Service to connect to the Receiver Service on Oracle Cloud.

   - Login to the Administration Service.

   - Open the context menu and select Configuration.

   - Click the plus (+) icon, to add a new credential.

   - Add a new **Credential** by providing the following information:

```
Credential Domain: Network
Credential Alias: streamnetwork
User ID: streamnetwork
Password: **********
Verify Password: *********
```

> ⓘ **Note**
>
> You cannot validate the new credential, as it is not logged in to the database.

2. In the Distribution Service on the on-premise environment,

   - Provide information needed for the Distribution Path. The basic information required are:

```
Path Name: OP2OCI
Reverse Proxy Enabled: Toggle to on
Use Basic Authentication: Toggle to on
Source: Select Extract and provide source trail file info
Target:
    Keep the WSS protocol
    Provide the Hostname of the OCI Compute node – IP will not work
    Provide remote trail file name
```

```
        Provide Deployment name
        Domain: Network
        Alias: securitynetwork
Trail Size (MB): set to desired size
```

- Click **Create** or **Create and Run**.

Connecting to Oracle Autonomous AI Database

You can replicate data to an Oracle Autonomous AI Database instance and capture data from an Oracle Autonomous Database instance by using Oracle GoldenGate Microservices on Oracle Cloud Marketplace. The steps described in this section, streamline the approach for making a remote connection to Oracle Autonomous AI Database.

To learn about replicating data with an Oracle Autonomous AI Database, see Configure Autonomous Database Capture for Replication in the *Oracle GoldenGate Microservices Documentation* guide.

Configure the Oracle Autonomous AI Databasefor Replication

Unlock the Precreated Oracle GoldenGate User (ggadmin)

Perform the following steps to configure the Oracle Autonomous AI Database for Replication:

1. Unlock and change the password for the precreated Oracle GoldenGate user (ggadmin) within the Autonomous AI Lakehouse. Use any SQL client tool to unlock the account.

   For more details, see About Replication to Oracle Autonomous Data Warehouse Cloud in *Oracle GoldenGate Microservices Documentation*.

   ```
   SQL> select * from dba_users order by username;
   SQL> alter user ggadmin identified by password account unlock;
   ```

2. Check whether the parameter `enable_goldengate_replicaton` is set to true. If not, then modify the parameter.

   ```
   SQL> select * from v$parameter where name =
   'enable_goldengate_replication';
   SQL> alter system set enable_goldengate_replication = true scope=both;
   ```

Create Target Schema

Complete the following steps to create schema and target objects that can be used in replication. This schema and associated objects does not support DDL replication.

1. Create a new application user/schema. This user/schema stores the target objects for replication.

> ⓘ **Note**
>
> `appadmin` is an example user.

```
SQL> create user appadmin identified by ********
SQL> grant create session, resource, create view, create table to appadmin;
SQL> alter user appadmin quota unlimited on data;
```

2. Connect to Oracle Autonomous AI Database as a user/schema and create your application tables.

Oracle Autonomous AI Database Client Credentials

Obtain the Oracle Autonomous AI Database Client Credentials

To establish connection to your Oracle Autonomous AI Database, you must download the client credential files from the Oracle Autonomous AI Database Service Console. For more information, see [Downloading Client Credentials](link) section of Autonomous AI Database Serverless guide .

> ⓘ **Note**
>
> If you do not have administrator access to the Oracle Autonomous AI Database, ask your service administrator to download and provide the credential files to you. After you have the credential files for your Oracle Autonomous AI Database, you should upload the zip file to the Oracle GoldenGate Compute Node.

Perform the following steps to obtain the Oracle Autonomous AI Lakehouse Cloud account details:

1. Log in to your Oracle Autonomous AI Lakehouse Cloud account.

2. From the `Instance` page, click the menu option for the Autonomous Database instance and select `Service Console`.

3. Log in to the Service Console using the admin username, and its associated password.

4. In the `Service Console`, click the `Administration` tab.

5. Click `Download Client Credentials`.

6. Enter a password to secure your credentials zip file and click `Download`.

7. Save the credentials zip file to your local system.

Move Client Credentials to Oracle GoldenGate Compute Node

In order to establish a connection from Oracle GoldenGate to the Autonomous AI Lakehouse, you need to move the client credentials to Oracle GoldenGate Compute Node. The following steps will illustrate how to move the credential zip file from your machine to Oracle GoldenGate Compute Node.

1. Connect to the Oracle GoldenGate Compute Node using SSH and `opc` user credentials.

   ```
   ssh -i private_key opc@public_ip_address
   ```

2. Create a staging directory and grant the essential permissions and then exit the session.

```
$ mkdir stage
$ exit
```

3. Copy the credentials zip file to the Oracle GoldenGate Compute Node.

```
$ scp ./credential_file.zip opc@public_id_address:~/stage
```

4. Connect to the Oracle GoldenGate Compute Node.

```
ssh -i private_key opc@public_ip_address
```

5. Verify whether the credentials zip file is available in the stage location.

```
$ cd ~/stage
$ ls -ltr
```

Configure Oracle Goldengate Compute Node with Autonomous Client Credentials

After moving the ADWC Client Credentials to the Oracle GoldenGate Compute Node, you have to install the necessary files and ensure you have a connection to the Oracle Autonomous AI Lakehouse. The following steps will help you configure the required SQL*Net components:

1. Log in to the Oracle GoldenGate Compute Node using SSH and the `opc` user credentials.

```
ssh -i private_key opc@public_ip_address
```

2. Unzip the client credentials file into a temporary directory.

```
unzip ./credential_file.zip -d ./client_credentials
```

3. Copy the `sqlnet.ora` and `tnsnames.ora` files to the location of your TNS_ADMIN.

```
$ cd ~/stage/client_credentials
$ cp ./sqlnet.ora /u02/deployments/deployment/etc
$ cp ./tnsnames.ora /u02/deployments/deployment/etc
```

> ⓘ **Note**
>
> If you want your networking directory structure to be consistent with other Oracle products, you must append `/network/admin` to the directory structure. For this you have to change the environment variable `TNS_ADMIN`. For more information on Local Naming Parameters, refer to [Database Net Services Reference](#).

4. Edit the `sqlnet.ora` file and replace the directory parameter with the location of the information pointing to the location where the client credentials were unzipped.

```
$ cd /u02/deployments/deployment/etc
$ vi ./sqlnet.ora
```

Change `?/network/admin` to `/home/opc/stage/client_credentials`.

5. For testing purposes, set the `TNS_ADMIN` and `ORACLE_HOME` environment variables at the operating system level.

> **ⓘ Note**
>
> The Oracle GoldenGate Deployment(s) use the `ORACLE_HOME` and `TNS_ADMIN` environment variables that are set per deployment.

```
$ export ORACLE_HOME=/u01/app/client/oracle version
$ export TNS_ADMIN=/u02/deployments/deployment/etc
```

6. Test the connection to Autonomous AI Lakehouse by connecting to one of the entries in the `tnsnames.ora` file.

```
$ cd $ORACLE_HOME/bin
$ ./sqlplus appadmin/**********@orcladw_low
```

Configure Oracle GoldenGate Microservices for Replication

Perform the following steps for establishing a successful connection to the Autonomous Database with Oracle GoldenGate Microservices.

Add Oracle GoldenGate Credential to Connect to Autonomous Database

To add Oracle GoldenGate Credential details, to connect to Autonomous Database:

1. Log in to the **Service Manager** using the password for `oggadmin`.

2. From the **Service Manager** main page, select the hyperlink for the port number associated with the **Administration Service**.

3. Open the context menu in the top left corner of the **Overview** page.

4. From the context menu, select **Configuration**.

5. From the **Database** tab, click the plus (+) icon, to add a new credential.

6. Provide the following information and click **Submit**.

```
Credential Domain: [Defaults to OracleGoldenGate]
Credential Alias: [Name of the Alias]
User ID: ggadmin@adw_tnsnames_reference
Pasword: [Password for ggadmin]
Verify Password: [Password for ggadmin]
```

7. Test the connection to the Autonomous Database by clicking the **Log in Database** icon after the credential has been added.

Connecting to Db2 z/OS (On-Premises)

You can use Oracle GoldenGate Microservices for Non-Oracle (Db2 z/OS) on Oracle Cloud Marketplace to remotely capture and apply data to Db2 z/OS database on-premises or across Oracle Cloud platforms. This allows you to enable replication between cloud services in a scalable fashion and centrally manage the replication processes.

Use Cases for Replication

Use Oracle GoldenGate Microservices for Non-Oracle (Db2 for z/OS) to replicate data between data resources in the following use cases:

- Migrations
- Data Distribution
- Real-Time Data Warehousing
- Operational Reporting

Prerequisites

Ensure that the following are set up before you begin replication:

- Oracle GoldenGate Microservices for Non-Oracle (Db2 for z/OS)
- Oracle DB2 Source or Target Database

To configure DB2 for replication, see: Prepare Db2 z/OS for Replication in *Oracle GoldenGate Microservices Documentation*.

Configuring Oracle Db2 z/OS for Replication

There is no default ODBC driver installed in Marketplace, you need to install your ODBC driver. Oracle GoldenGate Administration Service does not run upon the virtual machine creation. You need to start it up once ODBC driver is properly installed and configured. For more information, see [Setting up for DB2 z/OS](#).

To prepare your Oracle Db2 z/OS database for replication, perform the tasks that are outlined in Prepare Db2 z/OS in *Oracle GoldenGate Microservices Documentation*.

Part II

Additional Configurations

This part contains the following chapters:

Refer to Connecting Microservices Architecture and Classic Architecture in the *Oracle GoldenGate Microservices Documentation* .

6

Upscaling and Downscaling Oracle GoldenGate Marketplace Compute Shape Sizes

This chapter helps you in dynamically changing the compute shape sizes of your Oracle GoldenGate on Oracle Cloud Marketplace compute node.

To upscale or downscale your Oracle GoldenGate Compute Shape:

1. Log in to your OCI Tenancy.
2. From the **Context** menu present on the top left corner of your screen, select **Compute** -> **Instances** .
3. Select the Oracle GoldenGate Compute Node that you wish to upscale to display the **Instance Details** page.
4. Click **Edit** to display the **Edit Instance** page and enter the name of the instance.
5. Click **Edit Shape** to display the **Share Summary**.

> ⓘ **Note**
>
> You may see more shapes listed, depending on your access to OCI compute resources. But, you can only upscale to shapes that are supported for Oracle GoldenGate on Oracle Cloud Marketplace. For more information see Compute Shapes.

6. Select the required compute shape and click **Save Changes**.

This restarts your compute node. Once the compute node is restarted, check your access to Service Manager by using the Public IP address.

7

Upgrading Oracle GoldenGate Marketplace Image

This chapter helps you to upgrade an existing (or older version of) Oracle GoldenGate Marketplace stack to the latest release, using the OCI Stacks approach.

> ⓘ **Note**
>
> Upgrade from a 19c or 21c stack to the 23ai release is not permitted.

> ⓘ **Note**
>
> OCI GoldenGate Marketplace will only keep the latest five patch versions of the GoldenGate image for each release baseline. We recommend that users update to the latest OCI GoldenGate Marketplace patch version whenever possible. OCI GoldenGate Marketplace typically implements quarterly patches/updates for the image, however there may be additional interim patch version releases for urgent updates. Overall, availability of patch versions of an image older than latest 5 releases is not guaranteed.

Before any upgrade, ensure to do the following:

1. Shut down all the Oracle GoldenGate processes in the VM instance.
2. Backup all the block storage just in case you need revert it back in the future for a failed upgrade/update.

Stacks

Stacks are zip files that contain the latest Terraform code base. These stacks enable you to provision a new compute node and attach your existing block storage. This approach ensures that Oracle GoldenGate does not lose any associated data present in the environment.

Retrieving a Stack

Before you upgrade Oracle GoldenGate Marketplace, you have to retrieve the latest stack. To retrieve a stack:

1. Log in to the Oracle Cloud Interface (OCI).
2. In the home page, navigate to the top left corner to select the Context menu.
3. Select **Marketplace -> All Applications**.
4. Search for **Oracle GoldenGate for Oracle**.

5. Downloaded zip file to perform the upgrade.

Identifying the Terraform Version for the Stack to be Upgraded

To identify the Terraform version for the stack to be upgraded:

1. Log in to the Oracle Cloud Interface (OCI) Console.

2. On the Home page, under **Developer Services**, click **Resource Manager**, and then click **Stacks**.

3. Select an existing stack for which, you want to identify the Terraform version.
Under **Stack Information**, the **Terrafom version** field lists the Terraform version used by the stack.

Upgrading an Oracle Cloud Marketplace Image

The upgrade process is only valid for the upgrade or patching within the same major version, for example, from v19c to v19c. Current Marketplace doesn't support major version upgrade through image update.

To upgrade an existing Oracle GoldenGate Marketplace image when the pre-upgrade stack Terraform version is the same as the new stack version, perform the following tasks:

> ⓘ **Note**
>
> These steps are applicable in Oracle GoldenGate Marketplace that are updated from Terraform v .14 to 1.0.x only.

1. Download the correct version of the Stack.

2. Log in to the Oracle Cloud Interface (OCI) Console.

3. Login to your Oracle GoldenGate Instance and stop all the running Oracle GoldenGate processes. Ensure that you stop all the Microservices (Administration Service, Distribution Service, Receiver Service and Performance Metrics Service) including Service Manager.

4. On the Home page, click the navigation menu in the top left corner and under **Developer Services**, click **Resource Manager**, and then click **Stacks**.

5. Select an existing stack that you want to upgrade.

6. Click **Edit** from the top menu.

7. Click **Browse** to select the downloaded stack.

8. Upload the new .zip file.

9.

10. Update the terraform version in the stack to 1.5.x and click **Next**.

11. Verify that the pre-filled details are accurate and click **Save Changes**.

12. Go to **Compute** and select **Instances**.

13. Terminate the existing compute instance that needs to be upgraded.

14. Ensure that the **Permanently delete the attached boot volume** option is selected.

15. After the instance is terminated, from the left navigation pane, select **Developer Services** and click **Resource Manager** and then click **Stacks**.

16. Select the **Stack** that you edited in step 6, for upgrade.

17. Click **Apply Job**.

Wait until the job completes and verify whether the compute node is up and running.

18. After upgrade, remove the compute instance's IP address from the `~/.ssh/known_hosts` file, so that you can log in to the compute node to start all the Oracle GoldenGate processes.

8
Migrating to Exadata Cloud@Customer Using Oracle Zero Downtime Migration

The Marketplace image **Oracle GoldenGate for Oracle – Database Migrations** contains a downloadable Docker image that you can install on premises in order to migrate data to Exadata Cloud@Customer using Oracle Zero Downtime Migration (ZDM). All migration targets other than Exadata Cloud@Customer should use the Oracle GoldenGate installation on the Marketplace compute instance instead of the docker image.

For more information on Oracle Zero Downtime Migration, see [Move to Oracle Cloud Using Zero Downtime Migration](#).

It is required to have a Docker engine set up on the system that will host the Docker image. For more information about setting up a Docker engine, see [Docker Documentation](#).

1. Provision and start an Oracle GoldenGate for Oracle – Database Migrations Marketplace compute instance. This is necessary to download the docker image from the Marketplace instance. You can stop the instance and delete it once the docker image is downloaded.

2. Use SFTP or SCP to download the docker image file from the following location: `/home/opc/ora23ai-23602410.tar`.

3. Load the docker image to your Docker Engine installation using docker load command as shown in the following example:

```
[opc@zdmol8 ~]$ sudo docker image list
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet
msg.
REPOSITORY  TAG          IMAGE ID    CREATED     SIZE
[opc@zdmol8 ~]$
[opc@zdmol8 ~]$ sudo docker load < ./ora23ai-23602410.tar
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet
msg.
Getting image source signatures
Copying blob 24bb09b2817c done
Copying blob ae9fa111a1ac done
Copying blob 67d008ba80bc done
Copying blob 0d2d7cc2c739 done
Copying blob 8e10c3fcde59 done
Copying blob 006248eeb32f done
Copying config 3b6feb874a done
Writing manifest to image destination
Storing signatures
```

After loading, the docker image will look similar the following output:

```
REPOSITORY            TAG            IMAGE ID       CREATED
SIZE
oracle/goldengate     23.6.0.24.10   b0f5ef6c8953   2 months ago
2.91GB
```

For more information about usage of docker, see [Docker Documentation](#).

4. Run the image as a container using the docker run command. The image needs to expose port 443 for HTTPS access to the Oracle GoldenGate web UI and API, use appropriate parameters to expose and map ports. As part of the docker run output, the password for the `ggadmin` user is generated and displayed as follows:

```
[opc@zdmol8 ~]$ sudo docker run --name ogg218 -p 443:443 oracle/
goldengate:23.5.0.0.0
Emulate Docker CLI using podman. Create /etc/containers/nodocker to quiet msg.
--------------------------------------------------------------------------
--  Password for OGG administrative user 'oggadmin' is 'BmRqDusMoOp0-IGri'
```

Ensure to change the password later in the Oracle GoldenGate web UI.

> ⓘ **Note**
>
> For more information about the parameters for the docker run command, see *Running Oracle GoldenGate in a Container* in the [GITHUB page](#). All the parameters here are optional. The docker image was created using the docker file from that project described in this page.

5. Once the docker container has started, you can access it through the Oracle GoldenGate web interface using `http://hostname`, where hostname is the hostname or IP address of the server where the docker container was started. If port 443 was remapped to a different port, then adjust the URL accordingly.

9
Removing Oracle GoldenGate Instance

To remove the Oracle GoldenGate Instance from your Oracle Cloud environment, follow these steps:

1. Log in to your Oracle Cloud Account.

2. Select `Resource Manager` → `Stacks` from the menu.

   You can get a list of stacks that are built in your compartment.

3. Click the link of the stack that you want to remove.

4. In the `Stack`, select `Destroy` from the `TerraForm Action` drop-down list.

   This permanently removes your Oracle GoldenGate Instance.

5. Delete the stack (optional).

10

Manually Patching Oracle GoldenGate for Big Data Instance on Oracle Cloud Marketplace

This chapter describes how to manually patch Oracle GoldenGate for Big Data instance 19*c* (19.1.0.0) image by downloading the product as described in [Downloading Oracle GoldenGate for Big Data](#), and then choosing the upgrade paths that suits your environment.

> ⓘ **Note**
>
> The below procedure helps you to manually apply additional bug fixes on your existing marketplace place image. In the future if, you decide to upgrade your new marketplace image (as described in [Upgrading an Oracle Cloud Marketplace Image](#)chapter) then make sure to manually verify all the fixes that you had previously applied on your existing marketplace image. Otherwise, you may miss those fixes by switching to image upgrade procedure.

Upgrading by Overwriting the Existing Installation

To upgrade your existing Oracle GoldenGate for Big Data marketplace image, copy the Oracle GoldenGate for Big Data 19*c* (19.1.0.0.*x*) files into the existing 19*c* (19.1.0.0.*x*) installation directory. Overwriting the product files is possible because there is neither structural nor package name changes in 19*c* (19.1.0.0.*x*).

1. (Source systems) Back up the current Oracle GoldenGate for Big Data installation directory on the source system, and any working directories that you have installed on a shared drive in a cluster (if applicable).

2. (Source system) Stop user activity on objects in the Oracle GoldenGate configuration.

3. Stop any running Extract and Replicat processes.

4. Stop the Manager process.

5. Verify whether all the above processes are stopped by using the command -

   ```
   ggsci> info all
   ```

   > ⓘ **Note**
   >
   > Make sure all the process are stopped before proceeding with the upgradation process.

6. Copy the new Oracle GoldenGate for Big Data 19c (19.1.0.0.x) zip to the location `/u01/app/ogg/bigdata`.

7. Navigate to the path `/u01/app/ogg/bigdata` using the command -

   ```
   cd /u01/app/ogg/bigdata
   ```

8. Extract the new Oracle GoldenGate for Big Data 19c (19.1.0.0.x) zip file, which divides the files into several subdirectories.

> ⓘ **Note**
>
> Please note to replace `x` with appropriate patch version number in the below commands.

```
/u01/app/ogg/bigdata  > unzip OGG_BigData_Linux_x64_19.1.0.0.x.zip
/u01/app/ogg/bigdata  > tar -vf OGG_BigData_Linux_x64_19.1.0.0.x.tar
```

9. Verify whether all the binary files got overridden by the command

```
/u01/app/ogg/bigdata  > ls -ltr
```

.

10. Execute the command `ggsci -v` to verify the version upgrade.

11. Start the manager and Replicat processes and verify that they are running.

```
GGSCI> START MANAGER
GGSCI> START REPLICAT group_name
GGSCI> INFO REPLICAT group_name
GGSCI> VIEW REPORT group_name
```

11

Troubleshooting

This chapter helps you in troubleshooting the problems that occur when you deploy Oracle GoldenGate Microservices on Oracle Cloud Marketplace.

Logdump

The logdump utility is used to open, control the display, navigate through a file, search, filter, view and save data that is stored in the trail or extract file. This is a key utility in troubleshooting issues related to data within an Oracle GoldenGate environment.

For more information on how to use Logdump to its potential, please refer to the Logdump Reference for Oracle GoldenGate documentation.

Enable Debug Logging for Oracle GoldenGate Microservices

You can enable debug logging in the Oracle GoldenGate Microservices framework, which enables you to diagnose all the processes happening in a particular service. It can be enabled for any of the HTML5 development services. The following steps help you to enable debugging for the services:

1. Log in to `Distribution Service` or any service HTML5 pages.

2. Open the context menu to display options for that page.

3. Select `Debug Log`.

4. Click the `Enable Debug Log` toggle switch, to enable it.