ORACLE

Oracle Zero Downtime Migration (ZDM)

Step-by-Step Guide – Logical Online Migration
from On-Premises to Oracle Autonomous
Database (ADB)

Table of contents

List of Figures
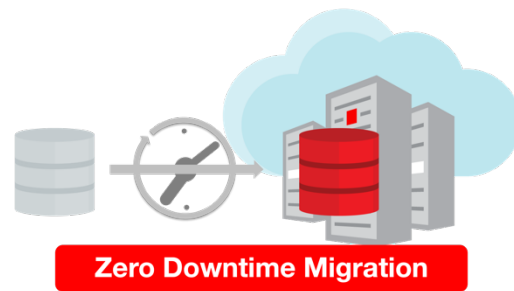
ORACLE

List of figures and tables

ORACLE

Figure 1. Oracle Zero Downtime Migration Logo comprising of a Database, a Clock with an arrow pointing to a Database deployed in the Cloud

Purpose

Oracle customers are moving Oracle workloads into the Oracle Cloud or onto Engineered Systems at a growingly rapid pace. However, migrating workloads has been a source of challenges for many years. Migrating database workloads from one system to another or into the Cloud is easier said than done.

Based on years of experience migrating Oracle workloads, Oracle has developed Zero Downtime Migration (ZDM). ZDM is Oracle's premier solution for a simplified and automated migration experience, providing zero to negligible downtime for the production system depending on the migration scenario. ZDM allows you to directly and seamlessly migrate your on-premises Oracle Databases to and between any Oracle-owned infrastructure, including Exadata Database Machine On-Premises, Exadata Cloud at Customer (ExaC@C), and Oracle Cloud Infrastructure. Oracle ZDM supports a wide range of Oracle Database versions and, as the name implies, ensures minimal to no production database impact during the migration.

ZDM follows Oracle Maximum Availability Architecture (MAA) principles[1] and incorporates products such as GoldenGate and Data Guard to ensure High Availability and an online migration workflow that leverages technologies such as the Recovery Manager, Data Pump, and Database Links.

This technical brief is a step-by-step guide for migrating your on-premises Oracle Databases to the Oracle Cloud with Zero Downtime Migration's Logical Online workflow. The scenario for this migration comprises a Source Database running on OCI Database Cloud Service to emulate an On-Premises environment and a Target Database running on Oracle Autonomous Database.

Oracle ZDM will run on a separate node and connect to Source and Target to perform the migration. This guide will cover all requirements for installing the Oracle ZDM Service Host, the Source Database, the Target Database recipient of the migration process, and the backup and networking used. The migration process will be dissected and done in a step-by-step fashion. This guide will answer the most frequently asked questions regarding the product and the overall migration process.

For more information on Oracle Zero Downtime Migration, please visit ZDM's product website.[2]

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[1] Http://oracle.com/goto/maa

[2] Http://www.oracle.com/goto/zdm

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Zero Downtime Migration

Architecture

Oracle Zero Downtime Migration (ZDM) is the Oracle Maximum Availability Architecture (MAA)-recommended solution to migrate Oracle Databases to the Oracle Cloud. ZDM's inherent design keeps in mind the migration process as straightforward as possible to ensure the most negligible impact on production workloads. The Source Database to be migrated can be on-premises, deployed on Oracle Public Cloud Gen 1 or Oracle Cloud Infrastructure. The Target Database deployment can be in a Database Cloud Service on Oracle Cloud Infrastructure (OCI) Virtual Machine, Exadata Cloud Service, Exadata Cloud at Customer, or Autonomous Database. ZDM automates the entire migration process, reducing the chance of human errors. ZDM leverages Oracle Database-integrated high availability (HA) technologies such as Oracle Data Guard and GoldenGate and follows all MAA best practices that ensure no significant downtime of production environments. Oracle ZDM supports both Physical and Logical Migration workflows. This technical brief covers a step-by-step guide for the Logical Migration Workflow leveraging the Object Storage as a backup location.

The Logical Migration Workflow in ZDM has two flavors, Offline and Online. Offline migration leverages Data Pump for data transfer and target instantiation. Online Migration also leverages Data Pump for the same purposes described above but also leverages Oracle GoldenGate for synchronization purposes and to preserve the online portion of the migration process. For offline and online workflows, ZDM takes care of each one of the steps and automates everything.

A standard logical offline migration will take the following steps:

1. Download and Configure ZDM.
2. ZDM Performs Validations.
3. ZDM Connects to Backup Location
4. ZDM Exports Via Data Pump from Source to Backup Location.
5. ZDM Imports Data Dump Files from Backup Location to Target.
6. ZDM Instantiates Target Database.
7. ZDM Switches Over Finalizes the Migration Process.

A standard logical online migration will take the following steps:

1. Download & Configure ZDM.
2. ZDM Starts Database Migration.
3. ZDM Connects to the Source, Target, and Backup Location.
4. ZDM Configures GoldenGate and Captures Source Transactions.
5. ZDM Exports via Data Pump from Source to Backup Location.
6. ZDM Imports Data Dump Files from Backup Location to Target.
7. ZDM Configures GoldenGate and Starts Applying changes.
8. ZDM Switches Over and Finalizes the Migration Process.

Supported Configurations

Oracle ZDM supports Oracle Database versions 11.2.0.4, 12.1.0.2, 12.2.0.1, 18c, 19c & 21c. ZDM's physical migration workflow requires the Source and Target Databases to be in the same database release. Starting with ZDM 21c and introducing the Logical Migration workflow, ZDM now supports database cross-version migration, thus providing an in-flight upgrade while migrating to the Oracle Cloud.

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Oracle ZDM supports Source Oracle Databases hosted on Linux, Solaris, and AIX operating systems. Oracle ZDM supports single-instance databases, Oracle RAC One Node databases, or Oracle RAC databases as sources. Oracle ZDM supports Oracle Database Enterprise & Standard Edition as Source and Target Databases.

Zero Downtime Migration Service Host

Zero Downtime Migration Service Host Requirements

Oracle Zero Downtime Migration installation must take place on a separate host, which must fulfill the following requirements:

- Linux host running on Oracle 7 (must be this OS version).
- 100 GB of free storage space. This space is required for all the logs that ZDM will generate.
- A `zdm` group and a `zdmuser` as part of this group.
- The following packages must be installed:
  - `glibc-devel`
  - `expect`
  - `unzip`
  - `libaio`
  - `oraclelinux-developer-release-el7`
- All hostnames and IP addresses to be used must be present as entries in the `/etc/hosts file`.

For more information on the ZDM Service Host requirements, please refer to Oracle ZDM's product documentation, specifically the "Setting Up Zero Downtime Migration Software" section.

- https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

The ZDM software can be:

- Installed manually on-premises.

- Installed manually on OCI.

This Step-by-Step Guide will cover the manual installation of the ZDM Service Host, including a thorough description of all necessary instructions about the deployment and configuration.

ZDM Service Host Installation

Log in to the ZDM Service Host as root user and follow the steps described here.

First, create a new group, user, and the needed directories as described in the code excerpt below:

```
[root@zdmhost]# groupadd zdm

[root@zdmhost]# useradd zdmuser -g zdm

[root@zdmhost]# mkdir -p /home/zdmuser/zdminstall

[root@zdmhost]# mkdir /home/zdmuser/zdmhome

[root@zdmhost]# mkdir /home/zdmuser/zdmbase

[root@zdmhost]# chown -R zdmuser:zdm /home/zdmuser/
```

ORACLE

Then, proceed to install the required software packages; as root user, follow the code excerpt below:

```
[root@zdmhost]# yum -y install \

glibc-devel \

expect \

unzip \

libaio \

oraclelinux-developer-release-el7
[root@zdmhost]# yum list installed glibc-devel expect unzip libaio oraclelinux-
developer-release-el7
```

Download ZDM binaries to /home/zdmuser/zdminstall from www.oracle.com/database/technologies/rac/zdm-downloads.html. Change the owner of the zip file to zdmuser. As root user, follow the code excerpt below:

```
[root@zdmhost]# cd /home/zdmuser/zdminstall

[root@zdmhost zdminstall]# chown zdmuser:zdm /home/zdmuser/zdminstall/zdm.zip
```

Install the ZDM software. As zdmuser, follow the code excerpt quoted below:

```
[root@zdmhost zdminstall]# su - zdmuser

 [zdmuser@zdmhost ~]$ echo "ORACLE_HOME=/home/zdmuser/zdmhome; export ORACLE_HOME" >>
~/.bashrc

[zdmuser@zdmhost ~]$ echo "ORACLE_BASE=/home/zdmuser/zdmbase; export ORACLE_BASE" >>
~/.bashrc

[zdmuser@zdmhost ~]$ echo "ZDM_BASE=\$ORACLE_BASE; export ZDM_BASE" >> ~/.bashrc

[zdmuser@zdmhost ~]$ echo "ZDM_HOME=/home/zdmuser/zdmhome; export ZDM_HOME" >>
~/.bashrc

[zdmuser@zdmhost ~]$ echo "ZDM_INSTALL_LOC=/home/zdmuser/zdminstall; export
ZDM_INSTALL_LOC" >> ~/.bashrc

[zdmuser@zdmhost ~]$ cat  ~/.bashrc

ORACLE_HOME=/home/zdmuser/zdmhome; export ORACLE_HOME

ORACLE_BASE=/home/zdmuser/zdmbase; export ORACLE_BASE

ZDM_BASE=$ORACLE_BASE; export ZDM_BASE

ZDM_HOME=/home/zdmuser/zdmhome; export ZDM_HOME

ZDM_INSTALL_LOC=/home/zdmuser/zdminstall; export ZDM_INSTALL_LOC

[zdmuser@zdmhost ~]$ source ~/.bashrc

[zdmuser@zdmhost ~]$ cd /home/zdmuser/zdminstall/

[zdmuser@zdmhost zdminstall]$ unzip zdm.zip

[zdmuser@zdmhost zdminstall]$ cd zdm

-- Proceed to runZDM's installation script zdmuser:

[zdmuser@zdmhost zdm]$ ./zdminstall.sh setup \

oraclehome=$ZDM_HOME \

oraclebase=$ZDM_BASE \
```

ORACLE

```
ziploc=./zdm_home.zip -zdm
```

Start ZDM and check the status. As zdmuser, follow the code excerpt below:

```
[zdmuser@zdmhost zdm]$ $ZDM_HOME/bin/zdmservice start

Return code is 0

Server started successfully.

[zdmuser@zdmhost zdm]$ $ZDM_HOME/bin/zdmservice status

-------------------------------------

      Service Status

-------------------------------------


 Running:        true

 Tranferport:

 Conn String:    jdbc:mysql://localhost:8897/

 RMI port:       8895

 HTTP port:      8896

 Wallet path:    /home/zdmuser/zdmbase/crsdata/zdmhost/security
```

ZDM Service Host Port Requirements

Please find a simplified table with the ports required for communication between the Zero Downtime Migration service host and the Source and Target Database servers.

Port Requirements for ZDM Service Host

- **Purpose:** SSH
    o **Port:** 1, 22
    o **Protocol:** TCP

- **Purpose:** SQL*NET
    o **Port:** 1521, 2484 or a DB Scan listener
    o **Protocol:** TCP

- **Purpose:** OCI & GoldenGate REST Endpoint
    o **Port:** 443
    o **Protocol:** HTTP

You can find more information on the Oracle Zero Downtime Migration documentation section "*Configuring Required Connections."*

    o https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

ORACLE

Source Database

Source Database Requirements

ZDM supports Oracle Database 11g release 2 (11.2.0.4) or later versions. Follow these recommendations before starting the migration.

- Apply all recommended/required OGG and RDBMS patches; an updated list of this information can be found at:

    - Oracle ZDM Product Documentation section: "Source Database Prerequisites for Logical Migration"

        - https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

    - Oracle GoldenGate – Oracle RDBMS Server Recommended Patches (Doc ID 1557031.1)

        - https://support.oracle.com/rs?type=doc&id=1557031.1

    - Latest GoldenGate/Database (OGG / RDBMS) Patch recommendations (Doc ID 2193391.1)

        - https://support.oracle.com/rs?type=doc&id=2193391.1

- Enable and set the following:

    - ARCHIVELOG mode
    - FORCE LOGGING
    - Enable database minimal supplemental logging
    - Set STREAMS_POOL_SIZE to at least 2GB

    - Follow all the above and other requirements as per:

        - "Source Database Prerequisites for Logical Migration": https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

        - "Integrated Extract / Replicat and STREAMS_POOL_SIZZE"
            - https://support.oracle.com/epmos/faces/DocumentDisplay?id=2078459.1

- Ensure Row Uniqueness by following:

    - "Ensuring Row Uniqueness in Source and Target Tables":
        - https://docs.oracle.com/en/middleware/goldengate/core/21.3/index.html

- If the source database is configured with MAX_STRING_SIZE=STANDARD, set the same for the target database.

- Follow all Oracle GoldenGate Performance Guidelines as per:

    - "Oracle Zero Downtime Migration – Logical Migration Performance Guidelines"
        - https://www.oracle.com/a/tech/docs/zdm-gg-performance.pdf

- Create all relevant users for GGADMIN in the source database by following:

    - "Additional Logical Migration Prerequisites"
        - https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

ORACLE

Source Database Port Requirements

- **Purpose:** SSH
    - o **Port:** 22
    - o **Protocol:** TCP

- **Purpose:** SQL*NET
    - o **Port:** 1521, 2484 or a DB Scan listener
    - o **Protocol:** TCP

- **Purpose:** Database Backup Store. OCI OSS
    - o **Port:** 443
    - o **Protocol:** HTTP

You can find more information on the Oracle Zero Downtime Migration documentation section "*Configuring Required Connections.*"

- o https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

Target Database

Target Database Requirements

Zero Downtime Migration will migrate the Source Database to an Oracle Cloud Infrastructure database. This step-by-step guide covers the basics of migrating to an Oracle Autonomous Database.

Create a placeholder database on the Target Cloud service before migration. This placeholder Target Database must comply with the following requirements:

- **Sizing**: please ensure that the shape chosen will suffice for the Source Database sizing and any future increment in size.
- **Version**: Target Database must be of the same or higher version than the Source Database. Migration to a lower version database is not supported.
- **Character set**: the character set on the Source and Target Database must be the same.
- **SSL/TLS**: for Target Databases configured to use SSL/TLS, store the wallet containing the TLS authentication certificates in the correct location on the GoldenGate hub:
    - o `/u02/deployments/deployment_name/etc/adb`

Please log in to your Oracle Cloud Account and access the Database systems tab by clicking on the Autonomous Database option. Then click on the "**Create Autonomous Database**" button.

Provide basic information for the Oracle Autonomous Database:

- **Choose a compartment**: Use the same compartment as your compute instance.
- **Display Name**: Enter a memorable name for the database for display purposes. For this step-by-step guide, use TargetATP1.
- **Database Name**: Use letters and numbers only, starting with a letter. The Maximum length is 14 characters. (Underscores not initially supported.) For this step-by-step guide, we will use TargetATP1. Please remember that there must not be another database with the same name; otherwise, creating and provisioning will be an issue.

Choose a workload type. Select the workload type for your database from the following choices:

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- **Transaction Processing**: We will migrate to a Transaction Processing database as the workload type for this step-by-step guide.
- **Data Warehouse**: Alternatively, you could choose Data Warehouse as the workload type.

Choose a deployment type. Select the deployment type for your database from the following choices:

- **Shared Infrastructure**: Autonomous Database on shared Exadata infrastructure
- **Dedicated Infrastructure**: Autonomous Database on dedicated Exadata infrastructure

Configure the database according to your specific use case:

- **Always Free**: If your Cloud Account is always free, you can select this option to create an always-free autonomous database. An always-free database comes with 1 CPU and 20 GB of storage.
- **Choose database version**: Select a database version from the available versions. For this step-by-step guide, we will be migrating to a 19c database.
- **OCPU count**: Number of CPUs for your service. For this step-by-step guide, specify 1 CPU. If you choose an Always Free database, it comes with 1 CPU.
- **Storage (TB)**: Select your storage capacity; if you choose an Always Free database, it comes with 20 GB of storage.
- **Auto Scaling**: – Auto-scaling allows the system to automatically use up to three times more CPU and IO resources to meet workload demand.

  Create administrator credentials:

- **Password and Confirm Password**: Specify the password for the ADMIN user of the service instance.

Choose network access:

- Accept the default, "Allow secure access from everywhere."
- If you want to use Private Endpoint to allow traffic only from the VCN, you specify select "Virtual cloud network" in the "**Choose network access**" area.
- You can control and restrict access to your Autonomous Database by setting network Access Control Lists (ACLs). You can select from four IP notation types: IP Address, CIDR Block, Virtual Cloud Network, and Virtual Cloud Network OCID.

Choose a license type:

- **Bring Your License (BYOL)**: Select this type when your organization has existing database licenses.
- **License Included**: Select this type when you want to subscribe to new database software licenses and the database cloud service.

Finally, upon reviewing your choices, click "**Create Autonomous Database."**

Your instance will begin provisioning. In a few minutes, the state will turn from Provisioning to Available. At this point, your Autonomous Database is ready to use. Please look at your instance's details, including its name, database version, OCPU count, and storage size.

Target Database Port Requirements

- **Purpose:** SSH
  - o **Port:** 22
  - o **Protocol:** TCP
- **Purpose:** SQL*NET
  - o **Port:** 1521, 2484 or a DB Scan listener
  - o **Protocol:** TCP
- **Purpose:** Database Backup Store. OCI OSS
  - o **Port:** 443
  - o **Protocol:** HTTP

ORACLE

You can find more information on the Oracle Zero Downtime Migration documentation section "*Configuring Required Connections.*"

Connectivity

SSH Key Pair

ZDM connects via SSH to the Source Database servers; hence an SSH key pair for the zdmuser is required. As zdmuser, run the following:

```
[zdmuser@zdmhost ~]$ mkdir ~/.ssh
[zdmuser@zdmhost ~]$ chmod 700 ~/.ssh
[zdmuser@zdmhost ~]$ /usr/bin/ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/zdmuser/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/zdmuser/.ssh/id_rsa.
Your public key has been saved in /home/zdmuser/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:keyfingerprintsample zdmuser@zdmhost
[zdmuser@zdmhost ~]$ cd ~/.ssh
[zdmuser@zdmhost .ssh]$ cat id_rsa.pub >> authorized_keys
[zdmuser@zdmhost .ssh]$ chmod 600 authorized_keys
```

You can find more information on ZDM Product's documentation section, **"*Generating a Private SSH Key Without a Passphrase.*"**

Before continuing with the migration environment setup, rename the id_rsa.pub file to <zdm_service_host_name>.ppk on the ZDM Service Host.

```
[zdmuser@zdmhost .ssh]$ cd /home/zdmuser/.ssh
[zdmuser@zdmhost .ssh]$ mv id_rsa  zdm.ppk
```

Authentication Token

The OCI user requires an Authentication Token, which can be created from the user's detail page. Click on the "***Auth Tokens***" option and the "**Generate Token**" button. ZDM uses the Auth Token during the migration; hence, it is of the utmost importance that it is securely copied and stored.

OCI CLI Command Line Tool

The Oracle Cloud Infrastructure command-line tool (OCI CLI) accesses OCI resources during the migration, among other tasks. To install the OCI CLI on the ZDM Service Host, the zdmuser run as follows:

```
[zdmuser@zdmhost ~]$ sudo yum install python36-oci-cli
```

API Signing Public Key and Configuration File

ZDM uses an API Signing Public Key to call REST APIs. First, you need to create the API Keys, do so by accessing the terminal on the ZDM Service Host, and as the zdmuser run the following:

ORACLE

```
[zdmuser@zdmhost ~]$ mkdir .oci

[zdmuser@zdmhost ~]$ cd .oci

[zdmuser@zdmhost ~]$ openssl genrsa -out /u01/app/zdmhome/.oci/oci_api_key.pem 2048

[zdmuser@zdmhost ~]$ openssl rsa -pubout -in /u01/app/zdmhome/.oci/oci_api_key.pem -
out /u01/app/zdmhome/.oci/oci_api_key_public.pem

                            cat oci_api_key_public.pem
```

Copy the catted 'oci_api_key_public.pem' file and save it; you will need it in the next step. Include the "Begin Public Key" and "End Public Key" lines during the copy.

Go to your Oracle Cloud OCI Dashboard, navigate to the top right, click on your user profile icon, and select the top option representing your user. Select **API Keys** and **Add API Key**. Paste your public OCI API key file you copied above and click **Add Key**.

You will see a configuration file preview. Copy its contents; you will be using it to populate your configuration file in the following step.

As the zdmuser in the ZDM Service Host, in the command prompt, create a configuration file; you can use vi/vim or any editor of your preference. In the empty file, paste the configuration file contents copied from above. Replace < path to your private key file > # TODO with the line above; once done, save the file and quit the editor:

```
/u01/app/zdmhome/.oci/oci_api_key.pem
```

GoldenGate Hub

ZDM's Logical Online Migration workflow requires a GoldenGate Hub with two GoldenGate Microservices, one Extract, and one Replicat. These two microservices' tasks keep both source and Target Databases in sync during the migration and the graceful switchover.

Verify Virtual Cloud Network (VCN) Configuration

In your Oracle Cloud account, click on the top left *hamburger* menu and select the displayed "***Networking***" option. A new pane will pop up; click on "***Virtual Cloud Networks.***"

Follow these steps to access the Security List of your subnet:

- Click on the name of the Virtual Cloud Network (VCN) you will use for the migration. Your browser will refresh the view to show information relevant to the chosen VCN.
- Scroll down to Subnets and click on the subnet in your compartment used for the migration. Your browser will refresh the view to show information relevant to the chosen subnet.
- Scroll down to Security Lists and click on the default security list in your compartment. Your browser will refresh the view to show information relevant to the chosen security list.
- Scroll down to the Ingress Rules sections.

If there are no rules for **Port 443** and **Port 1521**, they must be added. Click the "Add Ingress Rules" button to add the rules.

An **Add Ingress Rules** pane will pop up. Enter the following parameters:

- **Stateless**: Left Unchecked
- **Source Type**: CIDR
- **Source CIDR**: 0.0.0.0/0
- **IP Protocol**: TCP
- **Source Port Range**: Left as is
- **Destination Port Range**: 443
- **Description**: OGG HTTPS

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Click on **+ Another Ingress Rule**:

Enter the following parameters:

- **Stateless**: Left Unchecked
- **Source Type**: CIDR
- **Source CIDR**: 0.0.0.0/0
- **IP Protocol**: TCP
- **Source Port Range**: Left as is
- **Destination Port Range**: 1521
- **Description**: Oracle DB

Click on **Add Ingress Rules** to add the ingress rules for Ports **443** & **1521**.

Setup of the GoldenGate Image from the Oracle Cloud Infrastructure Market Place

In your Oracle Cloud account, click on the top left *hamburger* menu, and on the Search bar, type "***Marketplace***" and click on the "***All Applications***" result on the right-hand side. On the Market Place search bar, enters **GoldenGate Migration** and select the **Oracle GoldenGate - Database Migrations** Image.

Review and then accept the Terms & Conditions and click on **Launch Stack**. The stack is divided into stages: Stack Information, Configurable Variables, and Final Review. For the first stage, Stack Information, scroll down to the bottom and click Next.

Configure the following variables for the sub-section **Stack Information**:

- **Name**: (As is)

Configure the following variables for the sub-section **Configure Variables**:

- **Name**: (As is)
- **Host DNS Name**: For this step-by-step guide, we will use **oggzdm**; please enter the name of your choice.

Configure the following variables for the sub-section **Network Settings**:

- **VCN Network Compartment**: select the compartment where your resources are deployed.
- **VCN**: select the VCN that will be used for the migration.
- **Subnet Network Compartment**: select the compartment where your resources are deployed.
- **Subnet**: select the subnet that will be used for the migration.

Configure the following variables for the sub-section **Instance Settings**:

- **Availability Domain**: select the availability domain for the Oracle GoldenGate Instance
- **Compute Shape**: select your compute shape of choice; for this step-by-step guide, the size used is VM.Standard2.4
- **Assign Public IP**: Check this option
- **Custom Volume Sizes**: Left this option unchecked

Configure the following variables for the sub-section **Create OGG Deployment**:

- **Deployment Name**: for this step-by-step guide, the value used is **MarketplaceOGGDeployment**
- **Deployment - Autonomous Database**: Check this option
- **Deployment - Autonomous Database Compartment**: select the compartment where your resources are deployed.
- **Deployment - Autonomous Database Instance**: select the Target Database created earlier

Configure the following variables for the sub-section **Shell Access**:

- **SSH Public Key**: enter the key saved for the opc user.

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Review your entries and click **Next**. Proceed to do a final review & Click **Create** when ready. Upon creation, scroll down to the bottom of the logs and copy the following values and save them for later use; you will require them during the migration:

- ogg_image_id
- ogg_instance__id
- ogg_public_ip

Upon creating the Oracle GoldenGate Hub, open **CloudShell** from within your Oracle Cloud account and connect. To do so, replace **ogg_public_ip** with the GoldenGate Hub public IP copied above and replace **sshkeyname** with the SSH Key name used previously. Enter **yes** at the prompt. Please remember that the instance creation might still be wrapping up, so the connection might be refused. Please wait a few minutes and try again if this is the case.

```
ssh -i ~/.ssh/<sshkeyname> opc@<ogg_public_ip>
```

Once logged in, run the following command, and copy its output. It will be required during the migration:

```
cat ./ogg-credentials.json
```

The output consists of the username and credential/password for the OGG Service Manager. These values will be required further on during the migration process. Additionally, for an extra layer of security, you can update the credential/password for the overall OGG Service Manager and each one of the microservices (Extract for the Source Database and Replicat for the Target Database; to do so, open a browser tab and enter the Oracle GoldenGate Hub Public IP copied above. You need to enter the username and credential/password provided by the ogg-credentials.json file; once logged in, you can update the authentication parameters as desired.

Unlocking the GoldenGate User in the Target Autonomous Database

The Target Autonomous Database has a pre-created GoldenGate user named **ggadmin; it** is required that this user is unlocked. To do so, in your OCI Dashboard, select the hamburger menu in the top left, click on **Oracle Database** and click on **Autonomous Database**. Select the Target Database by clicking on its name; on this step-by-step guide, the Target Database is named **TargetATP1; this** could be different from your environment; please select accordingly.

New content will be shown in your browser tab, displaying general Target Database information. Click on the **Tools** menu, then click on **Database Actions**. A new browser tab will open, and it will request credentials. Fill in ADMIN for the username (as created in this step-by-step and the password you created for the admin user).

Under the Development area, click on the **SQL** option. Your browser tab will refresh and show you a **Database Action | SQL** window; here, you can run SQL statements on the Target Database. Copy the statement below and complete it by clicking on the **Run Script** icon:

```
alter user ggadmin identified by WELcome##1234 account unlock;
```

Connectivity to the GoldenGate Hub

In your Oracle Cloud Account, open Cloud Shell. Connect to the GoldenGate Hub, replace **ogg_public_ip** with the GoldenGate Hub public IP copied above, and replace **sshkeyname** with the SSH Key name used previously. Enter yes at the prompt. Please bear in mind that the instance creation might still be wrapping up, so the connection might be refused. If this is the case, please wait for a couple of minutes and try again

```
ssh -i ~/.ssh/<sshkeyname> opc@<ogg_public_ip>
```

Copy the output of the following command; it will be required in the following steps

```
cat ./ogg-credentials.json
```

ORACLE

In a separate browser tab, open the OGG Service Manager home page using the **GoldenGate Hub Public IP**: **https://ogg_public_ip** (replace the ogg_public_ip value with the value saved above). The browser will warn that the page is insecure because it uses a self-signed certificate. Ignore those warnings and proceed.

- Enter the username and password (labeled credential) from the out copied from the ogg-credentials.json file from above.
- Click Sign In.
- Click on the top left "Navigation" menu.
- Click on **Administrator**.
- Click on the Edit Pen on the right to edit the oggadmin user.
- Enter the following information:
  - **Type**: Basic
  - **Info**: admin
  - **Password**: *your password of choice*
  - **Verify Password**: *your password of choice*
- Upon review, click **Submit**

You will be logged out of the Oracle GoldenGate Service Manager and sign in again with oggadmin and the recently updated password from the step above.

- In the Services table, click on the port of the Marketplace Administration Server (typically 9011); this will open a new Sign-In page for the Oracle GoldenGate Administrator Server.
- Enter the username and password (labeled credential) from the out copied from the ogg-credentials.json file from above. Do not enter the newly updated password.
- Click on the top left navigation menu
- Click on **Administrator**
- Click on the Edit Pen on the right to edit the oggadmin user
- Enter the following information:
  - **Type**: Basic
  - **Info**: admin
  - **Password**: *your password of choice*
  - **Verify Password**: *your password of choice*
- Upon review, click **Submit**

You may now close any Oracle GoldenGate Service Manager leftover tab.

Connectivity between ZDM Service Host, Source, Target, and GoldenGate Hub

Configure the /etc/hosts file as a first step to ensure connectivity between the ZDM Service Host and the Source and Target Database servers. As the root user on the ZDM Service Host, adding the Source Database server, Target Database server, and OGG Hub information:

```
[root@zdmhost zdminstall]# vi /etc/hosts

[root@zdmhost]# vi /etc/hosts

Source_ip   source.publicsubnet.xyz.xyz.com   source    ##Source Database

Target_ip   target.publicsubnet.xyz.xyz.com   target    ##Target Database

GGHub_ip    ogg_fqdn ogg_hostname ##OGG Hub
```

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Backup Location

Object Storage Requirements

When migrating to OCI Native Databases, ZDM requires a backup location to export Data Pump dump files. The Target Database service can leverage them for instantiating the Target Database; this backup location will be an Object Storage bucket within the customer's tenancy. To create an Object Storage bucket in your OCI Dashboard, select the hamburger menu in the top left, click on **Storage,** and then on **Buckets**. Click on **Create Bucket**.

The following details are required:

- **Bucket Name**: For this step-by-step guide, the name used will be ZDMBucket; please enter this or the name of your choice.
- **Default Storage Tier**: For this step-by-step guide, **Standard** will be used; please select this or the tier appropriate to your use case.
- **Encryption**: For this step-by-step guide, **Encrypt using Oracle-managed keys** will be used; please select this or the tier appropriate to your use case.

    There are also options for **Tags; this** step-by-step guide does not use them, but please evaluate and select according to your use case and needs.

Next, on the Details page, the two most important pieces of information you need to save are the bucket name and the namespace; keep them; they will be required for the migration later.

Preparing the Response File

Oracle Zero Downtime Migration leverages a response file that is fully customizable by the customer. A wide array of parameters for the logical migration methodology allows the customer to configure the migration according to the appropriate use case. This step-by-step guide uses a specific set of response file parameters; a detailed description is present only for the parameters used here. For more information on the complete response file parameters for logical migration, refer to ZDM's Product Documentation section **Zero Downtime Migration Logical Migration Response File Parameters Reference**.

    o   https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

Response File Parameters used in this guide

- **Parameter:** MIGRATION_TYPE

    o   **Description:** ZDM will leverage Data Pump and Oracle GoldenGate for the migration process. (LOGICAL_ONLINE)

- **Parameter**: DATA_TRANSFER_MEDIUM

    o   **Description:** Object Storage Service. (OSS)

- **Parameter:** TARGETDATABASE_OCID

    o   **Description:** Specifies the connection details for the Oracle Cloud resource identifier for the Target Database.

- **Parameter:** TARGETDATABASE_ADMINUSERNAME

    o   **Description:** Specifies the Target Database administrator's username.

- **Parameter:** SOURCEDATABASE_ADMINUSERNAME

    o   **Description:** Specifies the Source Database administrator's username.

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- **Parameter:** SOURCEDATABASE_CONNECTIONDETAILS_HOST
  - **Description:** Specifies the listener hostname or IP address.
- **Parameter:** SOURCEDATABASE_CONNECTIONDETAILS_PORT
  - **Description:** Specifies the listener port number.
- **Parameter:** SOURCEDATABASE_CONNECTIONDETAILS_SERVICENAME
  - **Description:** Specifies the fully qualified service name.
- **Parameter:** OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_TENANTID
  - **Description:** Specifies the OCID of the OCI tenancy.
- **Parameter:** OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_USERID
  - **Description:** Specifies the OCID of the IAM user.
- **Parameter:** OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_FINGERPRINT
  - **Description:** Specifies the fingerprint of the public API key.
- **Parameter:** OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_PRIVATEKEYFILE
  - **Description:** Specifies the absolute path of the API private key file.
- **Parameter:** OCIAUTHENTICATIONDETAILS_REGIONID
  - **Description:** Specifies the OCI region identifier.
- **Parameter:** SOURCEDATABASE_GGADMINUSERNAME
  - **Description:** Specifies the GoldenGate administrator's username.
- **Parameter:** TARGETDATABASE_GGADMINUSERNAME
  - **Description:** Specifies the GoldenGate administrator's username for the Target Database.
- **Parameter:** SOURCECONTAINERDATABASE_ADMINUSERNAME
  - **Description:** In the case of a multitenant-based Source Database, specifies the Database Administrator username.
- **Parameter:** SOURCECONTAINERDATABASE_GGADMINUSERNAME
  - **Description:** In the case of a multitenant-based Source Database, specifies the GoldenGate administrator username.
- **Parameter:** SOURCECONTAINERDATABASE_CONNECTIONDETAILS_HOST
  - **Description:** In the case of a multitenant-based Source Database, specify the source's connection details (IP or Hostname).
- **Parameter:** SOURCECONTAINERDATABASE_CONNECTIONDETAILS_SERVICENAME
  - **Description:** In the case of a multitenant-based Source Database, specifies the fully qualified service name for the CDB.
- **Parameter:** SOURCECONTAINERDATABASE_CONNECTIONDETAILS_PORT
  - **Description:** In the case of a multitenant-based Source Database, specifies the Source Database connection port.
- **Parameter:** GOLDENGATEHUB_ADMINUSERNAME
  - **Description:** Specifies the GoldenGate Hub administrator's username.
- **Parameter:** GOLDENGATEHUB_URL
  - **Description:** Specifies the GoldenGate Hub's REST endpoint.
- **Parameter:** GOLDENGATEHUB_SOURCEDEPLOYMENTNAME

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- o **Description:** Specifies the name of the GoldenGate Microservices deployment to operate on the Source Database. Since OGG 21c, there is only one deployment, and hence the name of the deployment will be the same in this parameter, and the next one (target deployment name)
- **Parameter:** GOLDENGATEHUB_TARGETDEPLOYMENTNAME
  - o **Description:** Specifies the name of the GoldenGate Microservices deployment to operate on the Target Database. Since OGG 21c, there is only one deployment, and hence the name of the deployment will be the same in this parameter and the previous one (source deployment name)
- **Parameter:** GOLDENGATEHUB_COMPUTEID
  - o **Description:** Specifies the Oracle Cloud identifier of the VM.
- **Parameter:** GOLDENGATEHUB_ALLOWSELFSIGNEDCERTIFICATE
  - o **Description:** specify this parameter to TRUE in the response file, this tells ZDM to trust the self-signed HTTPS certificate.
- **Parameter:** DATAPUMPSETTINGS_JOBMODE
  - o **Description:** Specifies the Data Pump export mode: FULL, SCHEMA, TABLE.
- **Parameter:** DATAPUMPSETTINGS_DATAPUMPPARAMETERS_IMPORTPARALLELISMDEGREE
  - o **Description:** Specifies the maximum number of worker processes a Data Pump import job can use.
- **Parameter:** DATAPUMPSETTINGS_DATAPUMPPARAMETERS_EXPORTPARALLELISMDEGREE
  - o **Description:** Specifies the maximum number of worker processes a Data Pump export job can use.
- **Parameter:** DATAPUMPSETTINGS_METADATAREMAPS-LIST_ELEMENT_NUMBER
  - o **Description:** Defines remapping to be applied to objects as they are processed. This parameter can be added to the response file multiple times, one per object. To do so, replace the list_element_number for the object number and then the value to be added
- **Parameter:** DATAPUMPSETTINGS_DATABUCKET_NAMESPACENAME
  - o **Description:** Specifies the object storage bucket namespace.
- **Parameter:** DATAPUMPSETTINGS_DATABUCKET_BUCKETNAME
  - o **Description:** Specifies the object storage bucket name.
- **Parameter:** DATAPUMPSETTINGS_EXPORTDIRECTORYOBJECT_NAME
  - o **Description:** Specifies a directory name on the source server to store the Data Pump Export dump files. ZDM will create this object if it does not exist already.
- **Parameter:** DATAPUMPSETTINGS_EXPORTDIRECTORYOBJECT_PATH
  - o **Description:** Specifies a directory path on the source server to store the Data Pump Export dump files. ZDM will create this object if it does not exist already.
- **Parameter:** DATAPUMPSETTINGS_IMPORTDIRECTORYOBJECT_NAME
  - o **Description:** Specifies a directory path on the target server to store the Data Pump Export dump files. ZDM will create this object if it does not exist already.
- **Parameter:** DATAPUMPSETTINGS_CREATEAUTHTOKEN
  - o **Description:** Specifies if an OCI Authentication Token is needed to be created for the specified OCI user to import the Data Dump Files from the Object Storage into an Autonomous Database. For DBCS/ExaCS migration, this parameter is FALSE.
- **Parameter:** DATAPUMPSETTINGS_OMITENCRYPTIONCLAUSE

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- o **Description:** When enabled, this parameter sets TRANSFORM=OMIT_ENCRYPTION_CLAUSE, which directs the Data Pump to suppress any encryption clauses associated with objects using encrypted columns.
- **Parameter:** DATAPUMPSETTINGS_FIXINVALIDOBJECTS
    - o **Description:** Indicates whether invalid objects are recompiled in the database as part of the Data Pump workflow during the migration.
- **Parameter:** DATAPUMPSETTINGS_SECUREFILELOB
    - o **Description:** Sets TRANSFORM=LOB_STORAGE:SECUREFILE, which directs Data Pump to transform basic LOBs into secure file LOBs during the Data Pump Import.
- **Parameter:** DATAPUMPSETTINGS_SKIPDEFAULTTRANSFORM
    - o **Description:** Skips default transform parameters.
- **Parameter:** DUMPTRANSFERDETAILS_PARALLELCOUNT
    - o **Description:** Specifies the # of Export Dump files to transfer to the backup location in parallel.
- **Parameter:** DUMPTRANSFERDETAILS_RETRYCOUNT
    - o **Description:** Specifies the number of times to retry the upload of Data Pump Dump files to the backup location.

To run the migration described in this step-by-step guide, the sample response file will be as follows.

As the **zdmuser,** run the following commands:

```
[zdmuser@zdmhost ]$ cd ~

[zdmuser@zdmhost ]$ mkdir template

[zdmuser@zdmhost ]$ cp /u01/app/zdmhome/rhp/zdm/template/zdm_logical_template.rsp
~/template

[zdmuser@zdmhost ]$ cd template

[zdmuser@zdmhost ]$ cp zdm_logical_template.rsp zdm_logical_online.rsp

[zdmuser@zdmhost ]$ vi zdm_logical_online.rsp

:%d
```

The **:%**d command in vi deletes all of the existing lines. After deleting the content of the file, paste the below contents into the empty file:

```
MIGRATION_METHOD=ONLINE_LOGICAL
DATA_TRANSFER_MEDIUM=OSS
TARGETDATABASE_OCID=<UPDATE>
TARGETDATABASE_ADMINUSERNAME=ADMIN
SOURCEDATABASE_ADMINUSERNAME=SYSTEM
SOURCEDATABASE_CONNECTIONDETAILS_HOST=<UPDATE>
SOURCEDATABASE_CONNECTIONDETAILS_PORT=1521
SOURCEDATABASE_CONNECTIONDETAILS_SERVICENAME=ORCLPDB
OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_TENANTID=<UPDATE>
OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_USERID=<UPDATE>
OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_FINGERPRINT=<UPDATE>
OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_PRIVATEKEYFILE=/u01/app/zdmhome/.oci/oci_api_k
ey.pem
OCIAUTHENTICATIONDETAILS_REGIONID=<UPDATE>
TARGETDATABASE_GGADMINUSERNAME=GGADMIN
```

ORACLE

```
SOURCEDATABASE_GGADMINUSERNAME=GGADMIN
SOURCECONTAINERDATABASE_ADMINUSERNAME=SYSTEM
SOURCECONTAINERDATABASE_GGADMINUSERNAME=C##GGADMIN
SOURCECONTAINERDATABASE_CONNECTIONDETAILS_HOST=<UPDATE>
SOURCECONTAINERDATABASE_CONNECTIONDETAILS_PORT=1521
SOURCECONTAINERDATABASE_CONNECTIONDETAILS_SERVICENAME=ORCL
GOLDENGATEHUB_ADMINUSERNAME=oggadmin
GOLDENGATEHUB_URL=<UPDATE>
GOLDENGATEHUB_SOURCEDEPLOYMENTNAME= MarketplaceOGGDeployment
GOLDENGATEHUB_TARGETDEPLOYMENTNAME= MarketplaceOGGDeployment
GOLDENGATEHUB_COMPUTEID=<UPDATE>
GOLDENGATEHUB_ALLOWSELFSIGNEDCERTIFICATE=TRUE


DATAPUMPSETTINGS_DATAPUMPPARAMETERS_IMPORTPARALLELISMDEGREE=1
DATAPUMPSETTINGS_DATAPUMPPARAMETERS_EXPORTPARALLELISMDEGREE=1
DATAPUMPSETTINGS_METADATAREMAPS-1=type:REMAP_TABLESPACE,oldValue:USERS,newValue:DATA
DATAPUMPSETTINGS_DATABUCKET_NAMESPACENAME=<UPDATE>
DATAPUMPSETTINGS_DATABUCKET_BUCKETNAME=<UPDATE>
DATAPUMPSETTINGS_EXPORTDIRECTORYOBJECT_NAME=DATA_PUMP_DIR
DATAPUMPSETTINGS_IMPORTDIRECTORYOBJECT_NAME=DATA_PUMP_DIR
DATAPUMPSETTINGS_EXPORTDIRECTORYOBJECT_PATH=/u01/app/oracle/product/19c/dbhome_1/rdbm
s/log/
DATAPUMPSETTINGS_JOBMODE=SCHEMA
DATAPUMPSETTINGS_DELETEDUMPSINOSS=TRUE
DATAPUMPSETTINGS_FIXINVALIDOBJECTS=TRUE
DATAPUMPSETTINGS_OMITENCRYPTIONCLAUSE=TRUE
DATAPUMPSETTINGS_SECUREFILELOB=TRUE
DATAPUMPSETTINGS_SKIPDEFAULTTRANSFORM=FALSE
DATAPUMPSETTINGS_CREATEAUTHTOKEN=false
DUMPTRANSFERDETAILS_PARALLELCOUNT=3
DUMPTRANSFERDETAILS_RETRYCOUNT=3
```

As you can see, there are several parameters whose value is <UPDATE>, this is for illustration purposes of this step-by-step guide; please update with the values provided below per your environment.

- **TARGETDATABASE_OCID**: On your Autonomous Database home page. The value labeled as **OCID**
- **SOURCEDATABASE_CONNECTIONDETAILS_HOST**: On your Compute Instance home page
- **OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_TENANTID**: On your API key configuration file preview.
- **OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_USERID**: On your API key configuration file preview.
- **OCIAUTHENTICATIONDETAILS_USERPRINCIPAL_FINGERPRINT**: On your API key configuration file preview.
- **OCIAUTHENTICATIONDETAILS_REGIONID**: On your API key configuration file preview.
- **GOLDENGATEHUB_URL**: On your GG Hub Compute Instance home page, copy the Internal FQDN; as an example, it should look something like this: https://oggzdm.subnet1.labvcn.oraclevcn.com
- **GOLDENGATEHUB_COMPUTEID**: On your GG Hub Compute Instance home page. Copy the OCID value.
- **DATAPUMPSETTINGS_DATABUCKET_NAMESPACENAME**: On your object storage bucket homepage.
- **DATAPUMPSETTINGS_DATABUCKET_BUCKETNAME**: On your object storage bucket homepage.

ORACLE

Logical Online Migration to ADB with ZDM

Performing a Test Database Migration in Evaluation Mode

Oracle Zero Downtime Migration includes an evaluation mode that performs a dry run of the migration process; this is an optional step. It allows customers to ensure that the migration runs swiftly and encounters no issues. When migrating with the evaluation flag on, ZDM evaluates all the different stages and will alert the user if there are any inconsistencies or potential issues; this way, customers can fix any problems beforehand. As a best practice, run a Test Database Migration before executing the migration. To do this, please perform as follows:

```
[zdmuser@zdmhost logs]$ $ZDM_HOME/bin/zdmcli migrate database -sourcedb SOURCE_DB \
-sourcenode source \
-srcauth zdmauth \
-srcarg1 user:opc \
-srcarg2 identity_file:/home/zdmuser/.ssh/zdm.ppk \
-srcarg3 sudo_location:/usr/bin/sudo \
-rsp /home/zdmuser/logical_online.rsp \
-eval
```

Bear in mind that `-sourcedb` is used for databases where the source is part of an Oracle Grid Infrastructure deployment; for Source Databases that are single instance with no Oracle Grid Infrastructure (using Logical Volume Manager instead), please use `-sourcesid` with the source `ORACLE_SID`.

ZDM will then request the different required passwords and generate a job id.

```
zdmhost.publicsubnet.xyz.xyz.com: Audit ID: 264
Enter Source Database administrative user "SYSTEM" password: WElcome##1234
Enter Source Database administrative user "ggadmin" password: WElcome##1234
Enter Target Database administrative user "ADMIN" password: WElcome##1234
Enter Target Database administrative user "ggadmin" password: WElcome##1234
Enter Oracle GoldenGate hub administrative user "oggadmin" password: your password
Enter Authentication Token for OCI user "ocid1.user.oc1..xyz": your token
Enter Data Pump encryption password: WElcome##1234
Operation "zdmcli migrate database" scheduled with the job ID "90".
```

The generated job id can be queried for progress using the `zdmcli query job -jobid job_id` command.

```
[zdmuser@zdmhost logs]$ $ZDM_HOME/bin/zdmcli query job -jobid 90

zdmhost.publicsubnet.xyz.xyz.com: Audit ID: 280

Job ID: 90

User: zdmuser

Client: zdmhost

Job Type: "EVAL"

Scheduled job command: "zdmcli migrate database -sourcedb SOURCE_DB -sourcenode source -srcauth
zdmauth -srcarg1 user:opc -srcarg2 identity_file:/home/zdmuser/.ssh/zdm.ppk -srcarg3
sudo_location:/usr/bin/sudo -targetnode target -rsp /home/zdmuser/logical_online.rsp -tgtauth
zdmauth -tgtarg1 user:opc -tgtarg2 identity_file:/home/zdmuser/.ssh/zdm.ppk -tgtarg3
sudo_location:/usr/bin/sudo -eval"

Current status: SUCCEEDED

ZDM_VALIDATE_TGT   ........................ COMPLETED

ZDM_VALIDATE_SRC   ...................... COMPLETED

ZDM_SETUP_SRC   ........................ COMPLETED

ZDM_PRE_MIGRATION_ADVISOR   ........... COMPLETED

ZDM_VALIDATE_GG_HUB              ...... COMPLETED

ZDM_VALIDATE_DATAPUMP_SETTINGS_SRC   .... COMPLETED

ZDM_VALIDATE_DATAPUMP_SETTINGS_TGT   .... COMPLETED

ZDM_CLEANUP_SRC   .................. COMPLETED
```

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Performing a Database Migration

To perform the database migration once the migration command with the evaluation flag is completed successfully and without errors and warnings, run the same command without the -eval option:

```
[zdmuser@zdmhost logs]$ $ZDM_HOME/bin/zdmcli migrate database -sourcedb SOURCE_DB \
-sourcenode source \
-srcauth zdmauth \
-srcarg1 user:opc \
-srcarg2 identity_file:/home/zdmuser/.ssh/zdm.ppk \
-srcarg3 sudo_location:/usr/bin/sudo \
-rsp /home/zdmuser/logical_online.rsp \

zdmhost.publicsubnet.xyz.xyz.com: Audit ID: 271
Enter Source Database administrative user "SYSTEM" password: WElcome##1234
Enter Source Database administrative user "ggadmin" password: WElcome##123
Enter Target Database administrative user "ADMIN" password: WElcome##1234
Enter Target Database administrative user "ggadmin" password: WElcome##1234
Enter Oracle GoldenGate hub administrative user "oggadmin" password: your password
Enter Authentication Token for OCI user "ocid1.user.oc1..xyz": your token
Enter Data Pump encryption password: WElcome##1234
Operation "zdmcli migrate database" scheduled with the job ID "91".
```

Proceed to periodically query the migration job with the provided migration job id until completed:

```
[zdmuser@zdmhost ~]$ $ZDM_HOME/bin/zdmcli query job -jobid 91
zdmhost.publicsubnet.xyz.xyz.com: Audit ID: 307
Job ID: 34
User: zdmuser
Client: zdmhost
Job Type: "MIGRATE"
Scheduled job command: "zdmcli migrate database -sourcedb SOURCE_DB -sourcenode source -
srcauth zdmauth -srcarg1 user:opc -srcarg2 identity_file:/home/zdmuser/.ssh/zdm.ppk -
srcarg3 sudo_location:/usr/bin/sudo -rsp /home/zdmuser/logical_online.rsp"
Current status: SUCCEEDED
ZDM_VALIDATE_TGT ...................... COMPLETED
ZDM_VALIDATE_SR  ...................... COMPLETED
ZDM_SETUP_SRC ......................... COMPLETED
ZDM_PRE_MIGRATION_ADVISOR  ............ COMPLETED
ZDM_VALIDATE_GG_HUB ................... COMPLETED
ZDM_VALIDATE_DATAPUMP_SETTINGS_SRC .... COMPLETED
ZDM_VALIDATE_DATAPUMP_SETTINGS_TGT .... COMPLETED
ZDM_PREPARE_GG_HUB .................... COMPLETED
ZDM_ADD_HEARTBEAT_SRC ................. COMPLETED
ZDM_ADD_SCHEMA_TRANDATA_SRC ........... COMPLETED
ZDM_CREATE_GG_EXTRACT_SRC ............. COMPLETED
ZDM_PREPARE_DATAPUMP_SRC .............. COMPLETED
ZDM_PREPARE_DATAPUMP_TGT .............. COMPLETED
ZDM_DATAPUMP_EXPORT_SRC ............... COMPLETED
ZDM_UPLOAD_DUMPS_SRC .................. COMPLETED
ZDM_DATAPUMP_IMPORT_TGT ............... COMPLETED
ZDM_POST_DATAPUMP_SRC ................. COMPLETED
ZDM_POST_DATAPUMP_TGT ................. COMPLETED
ZDM_ADD_HEARTBEAT_TGT ................. COMPLETED
ZDM_ADD_CHECKPOINT_TGT ............... COMPLETED
ZDM_CREATE_GG_REPLICAT_TGT ........... COMPLETED
ZDM_MONITOR_GG_LAG ................... COMPLETED
ZDM_SWITCHOVER_APP ................... COMPLETED
ZDM_RM_GG_EXTRACT_SRC ................. COMPLETED
ZDM_RM_GG_REPLICAT_TGT ............... COMPLETED
ZDM_DELETE_SCHEMA_TRANDATA_SRC ....... COMPLETED
ZDM_RM_HEARTBEAT_SRC ................. COMPLETED
ZDM_RM_CHECKPOINT_TGT ................ COMPLETED
ZDM_RM_HEARTBEAT_TGT ................. COMPLETED
ZDM_CLEAN_GG_HUB ..................... COMPLETED
ZDM_POST_ACTIONS ..................... COMPLETED
ZDM_CLEANUP_SRC ...................... COMPLETED
```

Known Issues

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Troubleshooting & Other Resources

For Oracle ZDM log review:

- ZDM Server host logs:
    - Check - $ZDM_BASE/crsdata/zdmserver.log.0
- ZDM source node Data Pump logs:
    - DATAPUMPSETTINGS_EXPORTDIRECTORYOBJECT_PATH
- ZDM target node logs:
    - DATAPUMPSETTINGS_IMPORTDIRECTORYOBJECT_NAME
- Import Log
    - OSS Bucket
- OGG hub logs:
    - /u02/deployments/<ogg_deployment_name>/var/log

All common issues are documented and updated periodically in Oracle Zero Downtime Migration's product documentation, specifically in the Product Release Notes, Known Issues section:

- https://docs.oracle.com/en/database/oracle/zero-downtime-migration/index.html

For all Oracle Support Service Requests related to Zero Downtime Migration, please be sure to follow the instructions in My Oracle Support Document:

- SRDC – Data Collection for Database Migration Using Zero Downtime Migration (ZDM) (DOC ID 2595205.1)
- https://support.oracle.com/epmos/faces/DocContentDisplay?id=2595205.1

Please review our Maximum Availability Architecture document for best practices related to Zero Downtime Migration.

- MAA Practices for Cloud Migration Using ZDM (Doc ID 2562063.1)
- https://support.oracle.com/epmos/faces/DocContentDisplay?id=2562063.1

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