

OCI Database Migration Service End-To-End Online Migration to Oracle Database@Google Cloud Autonomous Database

Aimed for scenarios where your application must remain online, your source database has a direct connection to OCI.

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Purpose statement

This document walks you through all the steps to get started using Oracle Cloud Infrastructure (OCI) Database Migration service (DMS). You will provision a Virtual Cloud Network (VCN), an Oracle Database instance, and an Oracle Database@Google Cloud Autonomous Database (ADB) instance to perform an online database migration using DMS.

With DMS we make it quick and easy for you to migrate databases from on-premises, Oracle, or third-party cloud into Oracle databases on OCI.

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Introduction to OCI Database Migration – DMS

OCI Database Migration (DMS) provides a high performant, self-service experience to achieve migrations, which include:

Homogeneous migration of data from Oracle or MySQL databases into OCI.

Enterprise-level logical offline and online migrations with minimal downtime into OCI targets.

Based on industry leading GoldenGate for data replication.

DMS Documentation:

Please review the documentation [here](#).

Prerequisites for this guide:

- Prerequisites for Oracle Database@Google Cloud. [More information](#)
- ODB network and subnet in the same Google Cloud project as the VPC network you'll be associating to connect to your Oracle databases.
- An Oracle database@Google Cloud Autonomous Database

Task 0 – Understand New DMS Concepts

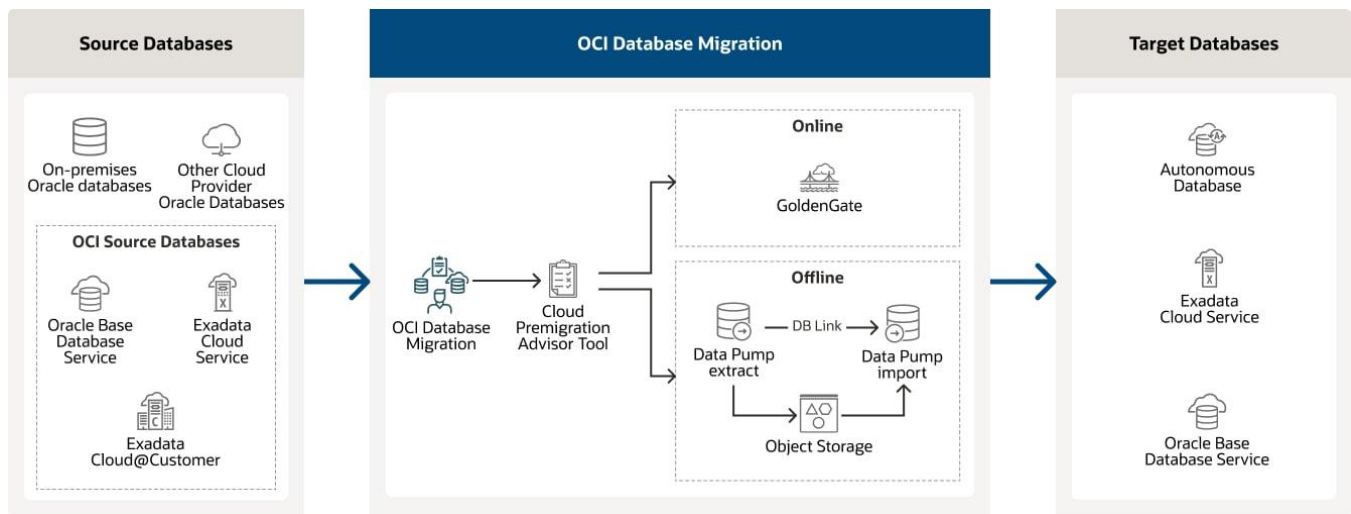
DMS provides a fully managed approach to migrating databases from various locations into OCI-hosted databases.

Migrations can be either one of the following modes:

- **Offline:** The Migration makes a point-in-time copy of the source to the target database. Any changes to the source database during migration are not copied, requiring any applications to stay **offline** for the duration of the migration.
- **Online:** The Migration makes a point-in-time copy and replicates all subsequent changes from the source to the target database. This allows applications to stay **online** during the migration and then be switched over from source to target database.

DMS supports both offline and online mode. For Oracle migrations the source databases can be located on-premises, in 3rd party clouds, or on Oracle OCI. The supported targets can be Oracle Autonomous Database shared or dedicated, Oracle Base Database and Exadata Database Service on dedicated infrastructure.

The DMS service runs as a managed cloud service separate from the user's tenancy and resources. The service operates as a multi-tenant service in a DMS Service Tenancy and communicates with the user's resources using Private Endpoints (PEs). PEs are managed by DMS and are transparent to the user.



DMS Simplified Topology

Compartment: A compartment is a collection of related resources (such as cloud networks, compute instances, or block volumes) that can be accessed only by those groups that have been given permission by an administrator in your organization. For example, one compartment could contain all the servers and storage volumes that make up the production version of your company's Human Resources system. Only users with permission to that compartment can manage those servers and volumes.

Data region: A geographical region that's associated with one or more data centers. When you sign up for an Oracle Cloud account, you select a default data region, where your services will be hosted.

DMS Control Plane: Used by DMS end user to manage Migration and Database Connection objects. The control plane is exposed through the DMS Console UI as well as the Rest API.

DMS Data Plane: Managed by DMS Control Plane and transparent to the user. The GGS Data Plane manages ongoing migration jobs and communicates with the user's databases and GoldenGate instance using PEs. The DMS data plane does not store any customer data, as data flows through GoldenGate and Data Pump directly within the user's tenancy.

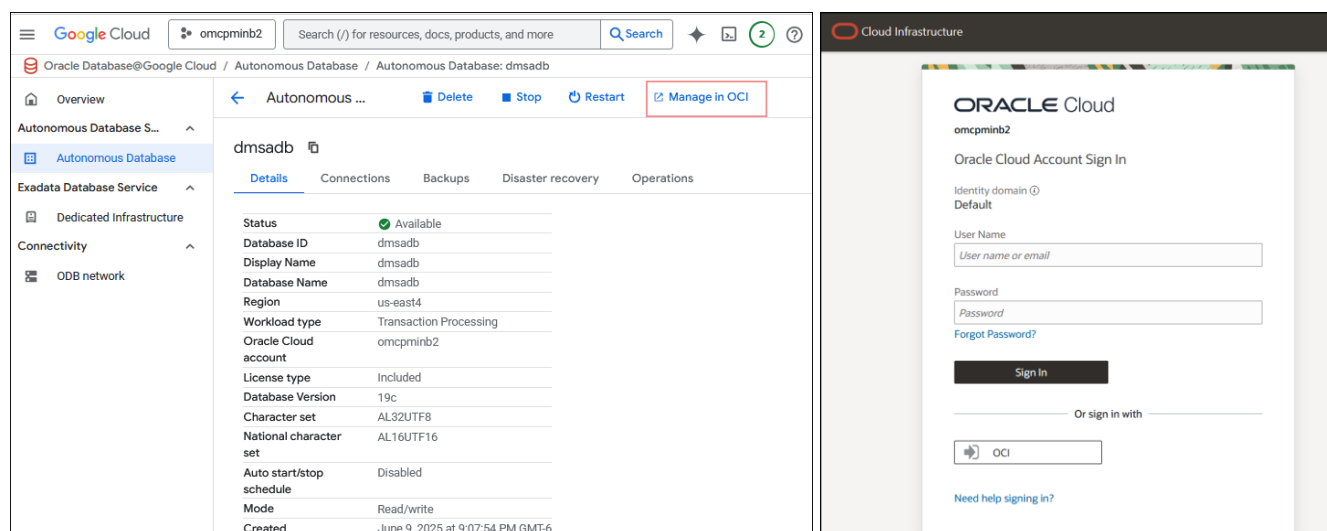
Migration: A Migration contains metadata for migrating one database. It contains information about source, target, and migration methods and is the central object for users to run migrations. After creating a migration, a user can validate the correctness of the environment and then run the migration to perform the copy of database data and schema metadata from source to target.

Migration Job: A Migration Job displays the state of a given Migration execution, either for validation or migration purposes. A job consists of several sequential phases, users can opt to wait after a given phase for user input to resume with the following phase.

Database Connection: A **Database Connection** represents information about a source or target database, such as connection and authentication credentials. DMS uses the OCI Vault to store credentials. A **Database Connection** is reusable across multiple Migrations.

Task 1 – Sign in to OCI and Open DMS Console

- In the Google Cloud portal navigate to Home >All products >Databases >Oracle Database@Google Cloud | Autonomous Database Service > Select your database > Click on the Manage in OCI link
- Log in using your OCI credentials.
- In the OCI console title bar change region if applicable.



Task 2 – Have the Administrator Set Required Permissions

The following permissions need to be set in OCI to have access to the necessary objects unless you have administrative privileges. The following permissions assume that the user is part of group DMS_LA and all resources are created in a compartment called DMS_LA. Have your tenancy administrator set these permissions. Review the following documentation on [Required Policies](#) if required

PERMISSIONS REQUIRED BY DMS TO USE DATABASES, VAULTS, AND NETWORKING

- Allow group DMS_LA to manage virtual-network-family in compartment DMS_LA
- Allow group DMS_LA to manage vaults in compartment DMS_LA
- Allow group DMS_LA to manage keys in compartment DMS_LA
- Allow group DMS_LA to manage database-family in compartment DMS_LA
- Allow group DMS_LA to manage autonomous-database-family in compartment DMS_LA
- Allow group DMS_LA to manage object-family in compartment DMS_LA
- Allow group DMS_LA to manage secret-family in compartment DMS_LA
- Allow group DMS_LA to manage goldengate-connections in compartment DMS_LA
- Allow group DMS_LA to manage odms-connection in compartment DMS_LA
- Allow group DMS_LA to manage odms-migration in compartment DMS_LA
- Allow group DMS_LA to manage odms-job in compartment DMS_LA
- Allow group DMS_LA to manage cloud-shell in compartment DMS_LA

Task 3 – Create Virtual Cloud Network

The following task is optional if a suitable VCN is already present.

In the OCI Console Menu, go to Networking > Virtual Cloud Networks

Pick a compartment on the left-hand side Compartment list. You need to have the necessary permissions for the compartment.

Click on Start VCN Wizard and pick VCN with Internet Connectivity.

Enter a VCN Name, such as VCN_DMS_LA. Leave CIDR block defaults, unless you need non-overlapping addresses for peering later. Press Next.

Review Summary and press Create.

Task 4 – Update Security List for Virtual Cloud Network Subnet

This task assumes default permissions in your public subnet. If you disabled or restricted your default permissions such as port 22 SSH access or restricted egress, please add default permissions as needed.

In the OCI Console Menu, go to **Networking > Virtual Cloud Networks** and pick your VCN.

In the Subnets list, pick Public Subnet- *VCN NAME*.

In the Security Lists list, pick Default Security List for *VCN NAME*.

In the Ingress Rules list press Add Ingress Rules.

Enter the following values, otherwise leave defaults:

- Source CIDR: **10.0.0.0/16**
- Destination Port Range: **1521**
- Description: Oracle DB access for PEs

Close dialog by pressing **Add Ingress Rules**.

In the Egress Rules list press Add Egress Rules.

Enter the following values, otherwise leave defaults :

- Source CIDR: 0.0.0.0/0
- Destination Port Range: 443
- Description: OSS traffic

Close dialog by pressing **Add Egress Rules**.

Ingress Rules								
Q Search and Filter								Search
Add Ingress Rules		Actions						
☐	Stateless	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Description
☐	No	0.0.0.0/0	TCP	All	22		TCP traffic for ports: 22 SSH Remote Login Protocol	...
☐	No	0.0.0.0/0	ICMP			3, 4	ICMP traffic for: 3, 4 Destination Unreachable: Fragmentation Needed and Don't Fragment was Set	...
☐	No	10.0.0.0/16	ICMP			3	ICMP traffic for: 3 Destination Unreachable	...
☐	No	10.0.0.0/16	TCP	All	1521		TCP traffic for ports: 1521	DB access PEs ...
Page 1 of 1 (1 - 4 of 4 total items)								Items per page 25

Egress Rules								
Q Search and Filter								Search
Add Egress Rules		Actions						
☐	Stateless	Destination	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Description
☐	No	0.0.0.0/0	TCP	All	443		TCP traffic for ports: 443 HTTPS	OSS traffic ...

Task 5 – Create Vault

The following task is optional if a Vault is already present.

In the OCI Console Menu, go to **Identity & Security > Vault**.

Pick a compartment on the left-hand side **Compartment** list.

Press Create Vault.

In the **Create Vault** dialog, enter a Name such as **DMS_Vault**.

Close the dialog by pressing **Create Vault**.

Wait until the state of the new vault is **Active**.

Click on the new vault and press **Create Key** in the **Master Encryption Keys** list.

In the **Create Key** dialog, enter a Name such as **DMS_Key**.

Close the dialog by pressing **Create Key**.

Task 6 – Create Source Database

The following task is optional if a source database is already present. In this example the source database is a Base Database with Oracle Database 19c.

In the OCI Console Menu, go to Oracle Database > Oracle Base Database Service.

Press Create DB System.

Enter the following values, otherwise leave defaults. You can adjust shapes and storage to your use case requirements and available quota.

- Name: SourceDB
- Leave VM.Standard.E5.Flex as default shape.
- Select generate SSH key pair, you need to save the private and public keys.
- Choose a license type: BYOL

- Virtual cloud network: VCN_DMS_LA *(Or your VCN name)*
- Client subnet: Public Subnet-VCN_DMS_LA *(Or your subnet name)*
- Hostname prefix: sourcedb

Press **Next**

Enter the following values, otherwise leave defaults.

- Database name: sourcedb
- PDB name: pdb
- Create administrator credentials – Password: *password of your choice*

Press Create DB System

The provisioning of the database can take 30 or more minutes. Wait for the Lifecycle State of the database to change to Active.

Open the database system SourceDB in the DB Systems table

Open the database sourcedb in the Databases table

Press DB Connection

Press Show next to the Easy Connect Connection String. A string like:

```
sourcedb.sub12062328210.vcndmsla.oraclevcn.com:1521/sourcedb_iad158.sub12062328210.vcndmsla.oraclevcn.com
```

should be shown. Copy the string after the /, in this case:

```
sourcedb_iad158.sub12062328210.vcndmsla.oraclevcn.com
```

This is the service name of your CDB, you will need this string later for accessing your database and creating migrations. Close the dialog.

Click on Pluggable Databases link on the left side under Resources section and click on pdb.

Press DB Connection. Like with CDB steps copy the string after the /, this is the service name of your PDB a string like:

```
pdb.sub12062328210.vcndmsla.oraclevcn.com
```

Go back to the DB Systems Details page of your database and select Nodes on the left-hand side Resources list.

The Nodes list shows the sourcedb node. Note the Public IP Address and Private IP Address of the node, in this case 129.213.162.34 and 10.0.0.3.

These values **can be used** later during database connection creation.

Nodes					
Name	State	Public IP Address	Floating IP Address	Private IP Address & DNS Name	Fault Domain
sourcedb	 Available	129.213.162.34	-	10.0.0.3 (sourcedb... Show Copy)	FAULT-DOMAIN-3
Displaying 1 Node < 1 of 1 >					

Task 7 – Create an Oracle Database@Azure Oracle Autonomous Database as Target

The following task is optional since an autonomous database should already be present.

1. On the Azure portal navigate to Home> Oracle Database@Google Cloud | Autonomous Database Services
2. Click on Create
3. Provide the Instance details:
 - o Instance ID
 - o Database name
4. Workload type: Data Warehouse
5. Leave default values in Database configuration:
 - o License included.
 - o Database version 19c
 - o Default values on ECPU and storage
6. Administrator credentials, provide a password for the ADMIN user
7. Networking:
 - o Select Private endpoint access only
 - o The associated network
 - o Provide a subnet range
8. Click on Create

Task 8 – Prepare Source

This task prepares the required user accounts and settings for Migration in the Source DB. It assumes default settings in the database. If you changed default settings, further settings might be necessary.

Open an SSH terminal to the source database instance. The instructions are for Unix-style ssh command:

```
ssh -i <private_key_file> opc@<dbnode_public_ip>
```

Create a new directory in the user volume, this directory will be used to temporary store the database export files:

```
sudo su - oracle
mkdir /u01/app/oracle/dumpdir
```

In this guide for your non-ADB source no SSH details will be provided during the creation of the **database connection**, to achieve HTTPS connectivity, the following steps need to be followed:

- a. Create a new directory: `mkdir /u01/app/oracle/dumpdir/wallet`
- b. Download a pre created SSL wallet: `curl -o walletSSL.zip https://objectstorage.us-phoenix-1.oraclecloud.com/p/YYkalHlLbbrfOAMlor-Mz1lqcFxaAZOvrYABKzRQYPERFQdzJrVjmalcUg4SIXEu/n/axsdric7bk0y/b/SSL-Wallet-For-No-SSH-Migrations-Setup/o/walletSSL.zip`
 - i. This [link](#) Is also available in the official documentation in the “Managing migrations section”
- c. Unzip the files: `unzip walletSSL.zip`
- d. **Make sure these files are present in your desired directory path:**
 - 2022 ewallet.p12.lck
 - cwallet.sso.lck
 - ewallet.p12
 - cwallet.sso
 - addedCertificates.txt
 - Save this path location, you will need it during the **migration creation** to populate the **SSL Wallet Path** with it, i.e: **/u01/app/oracle/dumpdir/wallet**

The user performing the export or import requires the necessary network ACL to be granted to access the network from the source and target database host. Create the script file `acl.sql` with the following content, for this guide, run the following script as SYS if the export or import user is SYSTEM. If your database is multitenant, then run the script in CDB\$ROOT. Replace `clouduser` and `sslwalletdir` accordingly:

```
define clouduser='system';/*user performing export at source or import at target*/
define sslwalletdir='/u01/app/oracle/dumpdir/wallet';/* OCI wallet path*/
begin
dbms_network_acl_admin.append_host_ace(
    host => '*',
    lower_port => 443,
    upper_port => 443,
    ace => xs$ace_type(
        privilege_list => xs$name_list('http', 'http_proxy'),
        principal_name => upper('&clouduser'),
        principal_type => xs_acl.ptype_db));
dbms_network_acl_admin.append_wallet_ace(
    wallet_path => 'file:&sslwalletdir',
    ace => xs$ace_type(privilege_list =>
        xs$name_list('use_client_certificates', 'use_passwords'),
        principal_name => upper('&clouduser'),
        principal_type => xs_acl.ptype_db));
end;
/
```

Enter the following commands:

```
. oraenv
ORACLE_SID enter your database details.
sqlplus sys/<db password>@<db private ip>/<db cdb service> as sysdba
```

In SQL Plus enter the following commands:

```
SQL> @acl.sql  
PL/SQL procedure successfully completed.
```

Once the connect privilege is granted, connect as the relevant user such as, SYSTEM, and verify if the privilege is granted using the following query:

```
SELECT host, lower_port, upper_port, privilege, status  
FROM user_network_acl_privileges;
```

	HOST	LOWER_PORT	UPPER_PORT	PRIVILEGE	STATUS
1 *		443	443	http	GRANTED
2 *		443	443	http-proxy	GRANTED

Follow the next [link](#) for a reference to the documentation.

The next step will prepare the source database. It will create the user C##GGADMIN on the CDB and the user GGADMIN on the PDB and will provide all the required grants, these users will be provided to perform the replication during **source connection creation**:

- 1) Download the preparation script from this [link](#).
- 2) Locate the file and run it `./dms-db-prep-v2.sh`
- 3) Follow the instructions:
 - a) Database type [(s)ource/(t)arget]? : s
 - b) Is your source database hosted in AWS RDS (Amazon Relational Database Service)? [y/n]: n
 - c) Is your database multi-tenant or single-tenant? [(m)ulti/(s)ingle]: m
 - d) Please provide your PDB service name (e.g. amer.subnet1.alimavcn.oraclevcn.com):
pdb.sub03132344240.vcndmssj.oraclevcn.com
 - e) Password for system user:
 - f) Migration type [(on)line/(off)line]: on
 - g) Password for ggadmin/c##ggadmin user:

```
-- Oracle Cloud Infrastructure Database Migration Service --  
This script will help you prepare your source and target databases for migration.  
Please answer the following questions to proceed:  
  
Database type [(s)ource/(t)arget]? : s  
Is your source database hosted in AWS RDS (Amazon Relational Database Service)? [y/n]: n  
Is your database multi-tenant or single-tenant? [(m)ulti/(s)ingle]: m  
Please provide your PDB service name (e.g. amer.subnet1.alimavcn.oraclevcn.com):   
Password for system user:   
Migration type [(on)line/(off)line]: on  
Password for ggadmin/c##ggadmin user:   
  
Sql script /home/ /dms_prep_db.sql generated.  
Please connect to your database's root container (CDB) as sysdba (role) and run the above generated sql script.  
This script will analyze your database and will generate a subsequent sql script that you must review, modify (if needed) and  
run in order to get your database set up for the migration.  
[ info] When setting up your migration through the OCI Console:  
[ info] Use system user as the Initial Load Database Username when Creating a Database Connection for Source Database throug  
h the Database Migration Service  
[ info] Create one Database Connection for the Container Database (CDB) and another one for the Pluggable Database (PDB)  
[ info] Use ggadmin as the Replication Database Username for the Source Pluggable Database when creating the Migration throug  
h the Database Migration Service  
[ info] Use c##ggadmin as the Replication Database Username for the Source Container Database when creating the Migration th  
rough the Database Migration Service
```

The next step is to locate the output file **dms_prep_db.sql** generated by the script, you should see the path on the screen. Connect to your database's root container (CDB) as sysdba (role) and run the above generated sql script.

This script will analyze your database and will generate a subsequent sql script (**DMS_Configuration.sql**), you must review, modify (if needed) and run it to get your database set up for the migration.

```
GRANT ALTER ANY SEQUENCE TO GGADMIN CONTAINER=CURRENT;
GRANT ALTER ANY TRIGGER TO GGADMIN CONTAINER=CURRENT;
GRANT ALTER ANY TYPE TO GGADMIN CONTAINER=CURRENT;
GRANT ALTER ANY SEQUENCE TO GGADMIN CONTAINER=CURRENT;
GRANT CREATE DATABASE LINK TO GGADMIN CONTAINER=CURRENT;
GRANT EXECUTE ON dbms_lock TO GGADMIN CONTAINER=CURRENT;
EXEC DBMS_GOLDENGATE_AUTH.GRANT_ADMIN_PRIVILEGE('GGADMIN',CONTAINER=>'CURRENT');
--
--
-- Script DMS_Configuration.sql generated. Please review this script, modify as appropriate and run it in your database.
-- Your source database will be ready for migration after execution of these operations.
--
```

The next steps add a user HR01 with a sample table and data. If your database already contains data for migration, you can skip these steps.

Create the script file `create_hr01.sql` with the following content:

```
DROP USER HR01 CASCADE;
CREATE USER HR01 IDENTIFIED BY HR##hr01123;
GRANT CONNECT,RESOURCE,CREATE TABLE,CREATE SEQUENCE to HR01;
GRANT CREATE ANY PROCEDURE to HR01;
ALTER USER HR01 quota unlimited on users;
CREATE TABLE HR01.EMPL (col1 number, col2 varchar2(9), col3
varchar2(100), col4 timestamp);
ALTER TABLE HR01.EMPL ADD CONSTRAINT EMPL_i1 PRIMARY KEY
(col1,col2);
```

Create the script file `data_hr01.sql` with the following content:

```
SET ECHO OFF;
SET HEADING OFF;
SET FEEDBACK OFF;
SET SERVEROUTPUT ON;
DECLARE
    SCN          HR01.EMPL.COL1%TYPE;
    RND1         HR01.EMPL.COL2%TYPE;
    RND2         HR01.EMPL.COL3%TYPE;
    RND3         HR01.EMPL.COL4%TYPE;
    ROWSNUM      NUMBER;
    DBNAME       VARCHAR2(60);
    i            INTEGER;
BEGIN
    i := 0;
    LOOP
        SELECT COUNT(*) INTO ROWSNUM FROM HR01.EMPL;
        SELECT DBMS_RANDOM.STRING('P', 9) INTO RND1 FROM DUAL;
```

```

SELECT DBMS_RANDOM.STRING('P', 10) INTO RND2 FROM DUAL;
SELECT TO_DATE(TRUNC (DBMS_RANDOM.VALUE (2451545, 5373484)),
'J') INTO RND3 FROM DUAL;
INSERT INTO HR01.EMPL(col1, col2, col3, col4) VALUES (ROWNUM,
RND1, RND2, RND3);
COMMIT;
DBMS_OUTPUT.PUT_LINE('Number of rows = ' || ROWNUM);
IF ( i >= 1000 ) THEN
    EXIT;
END IF;
i := i + 1;
END LOOP;
END;
/

```

Enter the following commands:

```
sqlplus sys/<db password>@<db private ip>/<db pdb service> as sysdba
```

In SQL Plus enter the following commands:

```

SQL> @create_hr01.sql
DROP USER HR01 CASCADE (You can ignore this error)
*
ERROR at line 1:
ORA-01918: user 'HR01' does not exist

SQL> @data_hr01.sql
Number of rows = 0
[...]
Number of rows = 1000
SQL> quit

```

Your source DB now has a user HR01 with a table EMPL that has 1000 rows.

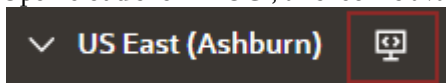
Task 9 – Prepare Target

The next steps will connect to the target ADB instance and enable the standard ggadmin user, you can skip these steps if the user is already enabled.

Make sure that your Autonomous Database mTLS authentication option is marked as 'Not required', you can check this in the following navigation path: Overview/Autonomous Database/Autonomous Database details

Go to Database connection/ Connection settings section and select TLS from the TLS authentication list of values, then copy the connection string for one of the TNS names.
Click Download wallet from the section "Download client credentials (Wallet)"

Open cloud shell in OCI, this icon is available in the top ribbon, next to the region:



In the Cloud Shell, click on the Upload button (it looks like a cloud with an up arrow).

Upload the wallet zip file you downloaded.

In the Cloud Shell, unzip the wallet file using the following command:

```
unzip Wallet_<your_db_name>.zip -d wallet
```

Set the TNS_ADMIN environment variable to point to the directory where you unzipped the wallet, i.e:

```
export TNS_ADMIN=$HOME/wallet
```

One of the extracted files from the wallet is sqlnet.ora, make sure that in the content the directory path is the same path where you decompressed the wallet file, i.e, :

```
WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA =  
(DIRECTORY="/home/cloudshell-user/wallet")))
```

Connect to sqlplus using the next command, get the connection string from your database “Connection strings” section:

```
sqlplus admin/ <ADB password>@ADB connection string
```

In SQL Plus enter the following commands:

```
SQL> alter user ggadmin identified by <new password> account unlock;
```

```
User altered.
```

```
SQL> quit
```

Now click on the Network security group:

- Select Add Rules, enter the following entries, otherwise leave defaults:
- Direction: Ingress
- Source Type: CIDR
- Source CIDR: 0.0.0.0/0
- IP Protocol: All Protocol
- Press Add.

Task 10 – Create Object Store Bucket for Data Pump Storage

Object Store is used as temporary storage between source and target databases with Data Pump. This task is creating an empty bucket for use in the migration.

In the OCI Console Menu, go to Storage > Object Storage & Archive...

Press Create Bucket.

On the page Create Bucket, fill in the following entries, otherwise leave defaults:

- Bucket Name: **DMSSStorage**

Press Create Bucket

Task 11 – Create a Database Connection for the Source CDB

In the OCI Console Menu, go to Migration & Disaster Recovery> Database Migration > Database Connections.

Press Create connection.

On the section Database Details, fill in the following entries, otherwise leave defaults:

- Name: **SourceCDB**
- Type: **Oracle Database**
- Vault: **DMS_Vault**
- Encryption Key: **DMS_Key**

Connection details: **Enter database connection details**

- Database connection string: Provide in format IP of host:port/database_service_name i.e:
 - 10.0.0.3:1521/ sourcedb_iad158.sub12062328210
- Initial load database username: **system**
- Initial load database password: <**Admin password**>
 - A user that has the DATAPUMP_EXP_FULL_DATABASE role is required for the source Database connection.
- Check “Use different credentials for replication” and provide **c##ggadmin** and **password**.
- Enable “Create private endpoint to access this database” and select the private subnet created.

Press **Create**

Create connection

Name: SourceCDB (Required)

Description

Compartment: 71465738804 (Required)

Type: Oracle Database (Required)

Vault details

Compartment: 71465738804 (Required)

Vault: DMS_Vault (Required)

Encryption key: DMS_Key (Required)

Connection details

Enter connection details for Oracle Database.

Database details

☐ Select an OCI database

☒ Enter database connection details

Database connection string: 10.0.0.82:1521/sourcedb_v7d_iad.sub07170059350.vcn.dms.oraclevcn.com

Initial load database username: system (Required)

Initial load database password: (Required)

Use different credentials for replication: ☒

Replication database username: c##ggadmin (Required)

Replication database password: (Required)

Database wallet

Drop a file or select a file

Choose a file with the proper extension.

Network connectivity

Create private endpoint to access this database: ☒

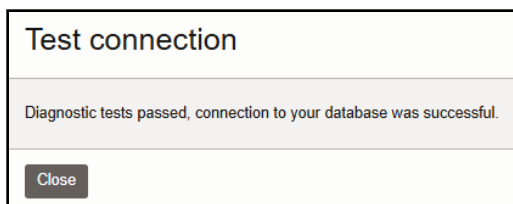
Private endpoints enable connection to databases with private IPs. Check this box if your database has a private IP address. [Learn more.](#)

Compartment: 71465738804 (Required)

Subnet: private subnet-VCN_DMS (in VCN_DMS VCH) (Required)

Cancel Create

Once your newly created connection is in Active state, test it by clicking “Test connection” :



Task 12 – Create Database Connection for Source PDB

In the OCI Console Menu, go to Migration & Disaster Recovery > Database Migration > Database Connections. Press Create connection.

On the section Database Details, fill in the following entries, otherwise leave defaults:

- Name: **SourcePDB**
- Type: **Oracle Database**
- Vault: **DMS_Vault**
- Encryption Key: **DMS_Key**

Select Database details: **Select an OCI database**

- Database System: **SourceDB**
- Database: **sourcedb**
- Pluggable database: **pdb**
- Initial load database username: **system**
- Initial load database password: **<Admin password>**
 - A user that has the DATAPUMP_EXP_FULL_DATABASE role is required for the source Database connection.
- Check “Use different credentials for replication” and provide **ggadmin** and **password**.
- Enable “Create private endpoint to access this database” and select the private subnet created.

Press **Create**

Create connection

Name
SourcePDB
Required

Description

Compartment
714657338804
Required

Type
Oracle Database
Required

Vault details

Compartment
714657338804

Vault
DMS_Vault

Compartment
714657338804

Encryption key
DMS_Key

Connection details

Enter connection details for Oracle Database.

Database details

☐ Select an OCI database
☒ Enter database connection details

Database connection string
10.0.0.82:1521/pdb.sub07170059350.vcndms.oraclevcn.com

Initial load database username
system
Required

Initial load database password
.....
Required

Use different credentials for replication
☐

Replication database username
gadmin
Required

Replication database password
.....
Required

Database wallet

Drop a file or select a file
Choose a file with the proper extension.

Network connectivity

Create private endpoint to access this database

☐ Private endpoints enable connection to databases with private IPs. Check this box if your database has a private IP address.
[Learn more.](#)

Compartment
714657338804

Subnet
private subnet-VCN_DMS (in VCN_DMS VCI)
Required

Cancel Create

Once your newly created connection is in Active state, test it by clicking “Test connection” :

Test connection

Diagnostic tests passed, connection to your database was successful.

Close

Task 13 – Create Database Connection for Target

In the OCI Console Menu, go to Migration & Disaster Recovery> Database Migration > Database Connections.

Press Create connection.

On the section Database Details, fill in the following entries, otherwise leave defaults:

- Name: **TargetATP**
 - Type: **Oracle Autonomous Database**
 - Vault: **DMS_Vault**
 - Encryption Key: **DMS_Key**
- Select the Autonomous database name in your compartment i.e: **dmsadb**
- Initial load database username: **admin**
 - Initial load database password: **<Admin password>**
 - A user with the DATAPUMP_IMP_FULL_DATABASE role is required for the target Database connection.

- Check “Use different credentials for replication” and provide **ggadmin** and **password**.
- Network connectivity: Create private endpoint to access this database, select the subnet attached to the Autonomous database instance.

Press **Create**

Create connection

Name
TargetATP
Required

Description

Compartment
714657338804
Required

Type
Oracle Autonomous Database
Required

Vault details

Compartment
714657338804

Vault
DMS_Vault

Compartment
714657338804

Encryption key
DMS_Key

Connection details

Enter connection details for Oracle Autonomous Database.

Compartment
714657338804

Database
dmsadb
Required

Connection details

Enter connection details for Oracle Autonomous Database.

Compartment
714657338804

Database
dmsadb
Required

Connection details

Enter connection details for Oracle Autonomous Database.

Compartment
714657338804

Database
dmsadb
Required

Connection details

Enter connection details for Oracle Autonomous Database.

Compartment
714657338804

Database
dmsadb
Required

Once the newly created connection is in Active state, press the Add network security rules button and select the one attached to your Autonomous database.

Test your connection.

Task 14 – Create Migration

In the OCI Console Menu, go to Migration & Disaster Recovery > Database Migration > Migrations.

Press **Create Migration**.

On the page **Add Details**, fill in the following entries, otherwise leave defaults:

- Name: **TestMigration**

On the **Source Database**, fill in the following entries:

- Database connection in the compartment: **SourcePDB**
- Target Database: **TargetATP**

On the page **Migration Options**, fill in the following entries, otherwise leave defaults:

- In Initial Load: Datapump via Object Storage
- Export Directory Object:
Name: **dumpdir**
Path: **/u01/app/oracle/dumpdir**
- Source database file system SSL wallet path: **/u01/app/oracle/dumpdir/wallet**

- Object Storage Bucket: **DMSStorage**
- **Check** Use Online Replication
- **Enable the “Source database is pluggable database”**
 - Select the container Database connection in the compartment: **SourceCDB**

Click **Create**

Create migration

Create a migration and specify how the migration should run, select the source and target databases, and then configure the data transport settings. [Learn more](#).

Name

TestMigration

Required

Description

Compartment

714657338804

Required

Source database

Compartment

714657338804

Database connection

SourcePDB

Required

Target database

Compartment

714657338804

Database connection

TargetATP

Required

Transfer medium for initial load

Data Pump via Object Storage

Use Data Pump to temporarily store the exported database in an Object Storage bucket.

Data Pump via database link

Use a direct SQL*Net connection between the source and the target databases.

Data Pump via file storage

Use a shared NFS mount between the source and the target databases using the File Storage Service.

Source Data Pump settings

Export directory object name

dumpdir

Required

Export directory object path

/u01/app/oracle/dumpdir

Required

Source Database file system SSL wallet path

/u01/app/oracle/dumpdir/wallet

Required

To upload dump files using HTTPS, you require an SSL wallet. Click the [link](#) to view the steps to download a pre-created wallet or to create a wallet.

Compartment

714657338804

Object Storage bucket

DMSStorage

Required

Online replication

Use online replication

☒ **Enable online replication**

Enables replication of all data and metadata transactions from the source to the target database committed after the initial load. [Learn more](#). For more replication configurations, see 'Replication' tab in the 'Show advanced options'.

Source container database

Source database is a pluggable database with version less than 21c

☒ **Enable source container database**

Compartment

714657338804

Container database connection

SourceCDB

Required

Cancel

Save as stack

Create

Task 15 – Validate Migration

In this step you will validate a migration prior to running it. It will check that all associated database and GoldenGate environments are correctly set up.

In the OCI Console Menu, go to Migration & Disaster Recovery > Database Migration > Migrations.

Select TestMigration.

If Migration is still being created, wait until Lifecycle State is Active.

Press **Validate** button

Click on **Jobs** tab

Click on most recent Evaluation Job

Click on **Phases** tab

Phases will be shown, and status will be updated as phases are completed. It can take 2 minutes before the first phase is shown.

If a phase has failed, it will show with status **Failed**. In this case you can click on it or navigate to the Actions menu and click **Download database migration log** to learn more about the reason of failure.

← Migration details

job-20250811225706

Failed

Job

Actions ▾

Error

Evaluation failed; job aborted.

Details

Phases

Excluded objects

Tags

Phases

Q Search and Filter

Search

Name	Status	Duration	
Validate target	Completed	22 s	...
Validate source	Completed	12 s	...
Run premigration advisor	Failed	17 s	...
Validate datapump source settings	Pending	—	...
Validate datapump target settings	Pending	—	...

◀ ▶

Page 1 of 1 (1 - 5 of 5 total items)

Items per page 25 ▾

Click **Run premigration advisor** phase name to open the Advisor report detail page (You should not find issues for this exercise but below lines would walk you through an event when the phase fails). From this page you can download the advisor report, view the report statistics, and drill down in the Checks list as shown:

Job details

Run premigration advisor

Failed

Download advisor report

Details
Checks

Checks

Search and Filter

Search

Applied filters

Result type Action required, Review require...
Reviewed state Reviewed, Unreviewed

Name	Result	Reviewed	Object count	
Has java objects	Action required	No	1	...
Has java source	Action required	No	1	...
Has columns with media data types adb	Action required	No	1	...
Has noexport object grants	Review required	No	4	...

◀

▶

Page 1 of 1 (1 - 4 of 4 total items)

Items per page

10

You can click a check name in the list to display details about a specific check from the CPAT report. You can mark a check as **Reviewed** or **Unreviewed**, this state is only for your convenience to track each check. For certain checks, CPAT generates a remedial script on the file system of the source database server. You can run the script on the source database to resolve the issue identified by the check. The checks page will also let you filter by state (top of screen).

The **View check details** panel is displayed when you click in one of the checks as follows:

← Job details

Run premium advisor report

DetailsChecks

Checks

Q Search and filter checks

Applied filters

Name

- Has java objects
- Has java source
- Has columns with multimedia object types
- Has noexport objects

<>

Page 1 of 1 (1 - 1 of 1 total items)

View check details

Name

Has columns with media data types adb

Result

Action required

Reviewed

No

Issue

Multimedia object types such as those from ORDSYS cannot be used in Autonomous databases.

Impact

Columns with Media data types are not allowed in Autonomous Database. Migration of tables with multimedia columns will fail.

Action

Follow the instructions in the Oracle Multimedia README.txt file in <ORACLE_HOME>/ord/im/admin/README.txt, or Oracle Support Document ID 2555923.1 to determine if Oracle Multimedia methods and packages are being used. If Oracle Multimedia is being used, refer to Oracle Support Document ID 2347372.1 for suggestions on replacing Oracle Multimedia. Refer to Oracle Support Document ID 2375644.1 "How To Migrate Data From Oracle Multimedia Data Types to BLOB columns" for information on how to move data stored in Oracle Multimedia object types to SecureFiles LOBs.

Objects

1

Exclude all

Actions ▾

☐	OWNER	TABLE_NAME	COLUMN_NAME	DATA_TYPE	Is excluded	Is excluded
☐	H_J_S_31	IMAGE_TABLE2	IMAGE	ORDIMAGE	No	No

<>

Page 1 of 1 (1 - 1 of 1 total items)

Items per page 10 ▾

Cancel

Mark as reviewed

Once you have cleared all “Action Required” checks then the validation Job can be run again. Repeat the process until **Run premigration advisor** phase completes with no error as shown:

← Migration details

job-20250811224533

Succeeded

Job

Actions ▾

Details

Phases

Excluded objects

Tags

Phases

Q Search and Filter

Search

Name	Status	Duration	
Validate target	Completed	19 s	...
Validate source	Completed	13 s	...
Run premigration advisor	Completed	17 s	...
Validate datapump source settings	Completed	1 m 7 s	...
Validate datapump target settings	Completed	10 s	...

◀ ▶

Page 1 of 1 (1 - 5 of 5 total items)

Items per page 25 ▾

Task 16 – Run Migration

After successful validation, a Migration can be run to perform the data transfer.

In the OCI Console Menu, go to Migration & Disaster Recovery > Database Migration > Migrations.

Select **TestMigration**.

Press **Start** to begin the migration

The Start Migration dialog is shown. Select the phase Monitor replication Lag in the Require User Input After list. This will cause the replication to run continuously until the migration is resumed.

Press Start to begin the Migration.

Start migration

Are you sure you want to start migration TestMigration?

Require user input after a phase before proceeding

☐

Phase to pause after

Monitor replication lag ▾

Cancel

Start

Click on **Jobs** tab

Click on most recent Job

Click on **Phases** tab

Job phases are updated as the migration progresses

When the migration has reached the state to wait for user input, the migration job changes to **Waiting** state. This is the point where a migration user would stop the source application so that no more transactions are applied to the source DB.

← Migration details

job-20250811234645

Waiting

Actions ▾

Details

Phases

Excluded objects

Monitoring

Tags

Phases

Q Search and Filter

Search

Name	Status	Duration	
Initialize replication infrastructure	Completed	44 m 39 s	...
Validate	Completed	47 s	...
Prepare	Completed	2 m 11 s	...
Export initial load	Completed	51 s	...
Upload data	Completed	1 s	...
Import initial load	Completed	1 m 31 s	...
Post initial load	Completed	3 s	...
Prepare replication target	Completed	2 m 6 s	...
Monitor replication lag	Completed	1 s	...
Switchover	Pending	—	...
Cleanup	Pending	—	...

◀ ▶

Page 1 of 1 (1 - 11 of 11 total items)

Items per page 25 ▾

You can now go to the Actions button and press **Resume** on the job to complete replication.

In the Resume Job dialog, chose the **Switchover** phase and press **Resume**. The Switchover phase will gracefully stop replication and signal the target application to initiate transactions to the target DB.

Resume job

Are you sure you want to resume job **job-20250811234645**

Require user input after a phase before proceeding

☒

Phase to pause after
Switchover

CancelResume

After Job resumes and waits after Switchover App phase, press Resume. Select the last phase **Cleanup** and press **Resume**.

Resume job

Are you sure you want to resume job **job-20250811234645**

Require user input after a phase before proceeding

☐

Phase to pause after

CancelResume

The migration runs the final cleanup phase and shows as Succeeded when finished.

← Migration details

job-20250811234645

Succeeded

Job

Actions ▾

Details

Phases

Excluded objects

Monitoring

Tags

Phases

Q Search and Filter

Search

Name	Status	Duration	
Initialize replication infrastructure	Completed	44 m 39 s	...
Validate	Completed	47 s	...
Prepare	Completed	2 m 11 s	...
Export initial load	Completed	51 s	...
Upload data	Completed	1 s	...
Import initial load	Completed	1 m 31 s	...
Post initial load	Completed	3 s	...
Prepare replication target	Completed	2 m 6 s	...
Monitor replication lag	Completed	1 s	...
Switchover	Completed	4 m 20 s	...
Cleanup	Completed	14 s	...

◀ ▶

Page 1 of 1 (1 - 11 of 11 total items)

Items per page 25 ▾

Your Migration is now completed.!

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OCI Database Migration Service End-To-End Online Migration with database@Google Cloud database as Target Tutorial / Version 1.0

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