

OCI Database Migration Service End-To-End Online Migration Tutorial

Aimed for scenarios where your application must remain online, and 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 (DMS). You will provision a Virtual Cloud Network (VCN), an Oracle Database 19c instance, and an Oracle Autonomous Database (ADB) instance to perform a 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:

Migration of data from on-premises, Oracle, or 3rd party cloud databases into Oracle databases on OCI.

Logical Online and Offline Migrations providing enterprise-level migration with minimal downtime and on-premises to cloud migration.

Based on industry leading GoldenGate for data replication.

DMS Documentation:

Please review the documentation here:

<https://docs.oracle.com/en/cloud/paas/database-migration>

Task 0 – Understand New DMS Concepts

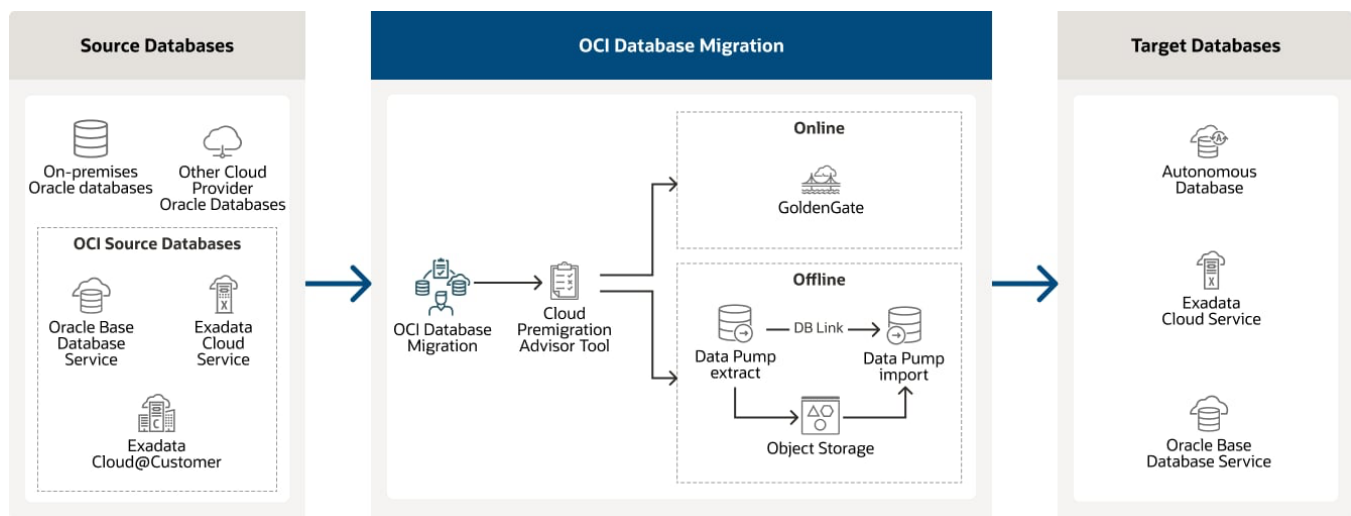
DMS provides a fully managed approach to migrating databases from various locations into OCI-hosted databases.

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. In the first release, we will support Oracle databases located on-premises, in 3rd party clouds, or on Oracle OCI as source and Oracle Autonomous Database shared or dedicated as target.

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 Registered Database 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.

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

Task 1 – Have the Administrator Set Required Permissions

The following permissions need to be set 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.

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

Task 2 – Sign In and Open DMS Console

To perform this learning path you need to have access to an OCI tenancy with access to a region where DMS is released, such as the US-Ashburn-1 region. Please review <https://www.oracle.com/cloud/data-regions/> for available regions.

Open browser with URL <https://console.us-ashburn-1.oraclecloud.com/> (Adjust for home region)

Log in using your tenancy name and username/password.

In the OCI console title bar change region if applicable.

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.

Press 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: 0.0.0.0/0
- Destination Port Range: 443
- Description: OGG HTTPS

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

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**.

Ingress Rules								
<div>Add Ingress Rules Edit Remove</div>								
<input type="checkbox"/>	Stateless ▾	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Description
<input type="checkbox"/>	No	0.0.0.0/0	TCP	All	22		TCP traffic for ports: 22 SSH Remote Login Protocol	⋮
<input type="checkbox"/>	No	0.0.0.0/0	ICMP			3, 4	ICMP traffic for: 3, 4 Destination Unreachable, Fragmentation Needed and Don't Fragment was Set	⋮
<input type="checkbox"/>	No	10.0.0.0/16	ICMP			3	ICMP traffic for: 3 Destination Unreachable	⋮
<input type="checkbox"/>	No	0.0.0.0/0	TCP	All	443		TCP traffic for ports: 443 HTTPS	OGG HTTPS ⋮
<input type="checkbox"/>	No	10.0.0.0/16	TCP	All	1521		TCP traffic for ports: 1521	Oracle DB access for PEs ⋮
0 Selected							Showing 5 items < 1 of 1 >	

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 DBCS VM with Oracle Database 19c.

You will need an SSH key pair for logging into your database and GoldenGate environments. If you don't already have one, please create one. **Important:** The key needs to be in RSA key in PEM format, other formats like OpenSSL are currently not supported. You can use a command like:

```
ssh-keygen -t rsa -N "" -b 2048 -C "<key_name>" -f <path/root_name>
```

Review the following link for a reference.

<https://docs.oracle.com/en-us/iaas/Content/API/Concepts/apisigningkey.htm#RequiredKeysandOCIDs>

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.E4.Flex as default shape.
- Add public SSH keys: Upload the public key file you use.
- 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.oraclecn.com:1521/sourcedb_iad158.sub12062328210.vcndmsla.oraclecn.com
```

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

```
sourcedb_iad158.sub12062328210.vcndmsla.oraclecn.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.

Repeat steps 11 and 12. This is the service name of your PDB a string similar to
pdb.sub12062328210.vcndmsla.oraclecn.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.

You will need these IP addresses later.

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 Target Autonomous Database

The following task is optional if a target autonomous database is already present. In the first phase of DMS LA an autonomous database with private IP address is required. In this example the target database is an ATP-shared instance.

1. You first need to create a Network Security Group for use in a Private IP ADB instance. In the OCI Console Menu, go to **Networking > Virtual Cloud Networks** and pick your VCN.
2. In the left-hand **Resources** list, pick **Network Security Groups**.
3. Press **Create Network Security Group**.
4. Enter Name such as **DMS_NSG** and press **Next**.
5. In the **Rule** box please enter the following entries, otherwise leave defaults:
 - Source Type: CIDR
 - Source CIDR: 0.0.0.0/0
6. Press **Create**.
7. Now you can create the ADB instance. In the OCI Console Menu, go to **Oracle Database > Autonomous Transaction Processing**.
8. Pick a compartment on the left-hand side **Compartment** list.
9. Press **Create Autonomous Database**.
10. Enter the following values, otherwise leave defaults. You can adjust shapes and storage to your use case.
 - Display Name: TargetATP
 - Database name: TargetATP
 - Create administrator credentials – Password: password of your choice
 - Access Type: Private endpoint access only
 - Virtual cloud network: VCN_DMS_LA (Or your VCN name)
 - Client subnet: Public Subnet-VCN_DMS_LA (Or your subnet name)
 - Network security group: DMS_NSG (Or your NSG name)
 - Choose a license type: Bring Your Own License (BYOL)
11. Close the dialog by pressing **Create Autonomous Database**.

Task 8 – Prepare Source and Target Databases

This task prepares 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 storage of database export files:

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

For your non-ADB source if you won't provide SSH details during the creation of the database connection, to achieve HTTPS connectivity, you must perform the following steps:

- 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/FSBC_LRRpLxcSuSM6yRjO9u1TDuDy8wuiawEI18Q_xPYFmvap_t`

PFdtm_c6TskV_/n/axsdric7bk0y/b/SSL-Wallet-For-No-SSH-Migrations-Setup/o/walletSSL.zip

- 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/dmpdir/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/dmpdir/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;
/
```

Create the script file `create_ggadmin_cdbroot.sql` with the following content (Replace `<password>` with actual password, use double quotes to delimit it i.e `"*****"`):

```
create user c##ggadmin identified by <password> default
tablespace users temporary tablespace temp;
grant connect, resource to c##ggadmin container=all;
grant select on sys.ccol$ to c##ggadmin container=all;
grant select on sys.cdef$ to c##ggadmin container=all;
grant select on sys.col$ to c##ggadmin container=all;
grant select on sys.con$ to c##ggadmin container=all;
grant select on sys.deferred_stg$ to c##ggadmin container=all;
grant select on sys.icol$ to c##ggadmin container=all;
grant select on sys.ind$ to c##ggadmin container=all;
```

```

grant select on sys.lob$ to c##ggadmin container=all;
grant select on sys.lobfrag$ to c##ggadmin container=all;
grant select on sys.obj$ to c##ggadmin container=all;
grant select on sys.seg$ to c##ggadmin container=all;
grant select on sys.tab$ to c##ggadmin container=all;
grant select on sys.tabcompart$ to c##ggadmin container=all;
grant select on sys.tabpart$ to c##ggadmin container=all;
grant select on sys.tabsubpart$ to c##ggadmin container=all;
grant create view to c##ggadmin container=all;
grant execute on dbms_lock to c##ggadmin container=all;
alter user c##ggadmin quota 100M on USERS container=all;
grant unlimited tablespace to c##ggadmin container=all;
exec dbms_goldengate_auth.GRANT_ADMIN_PRIVILEGE
('c##ggadmin',container=>'all');
alter system set streams_pool_size=2G scope=both
SID='sourcedb';
ALTER DATABASE ADD SUPPLEMENTAL LOG DATA;
alter system switch logfile;
ALTER SYSTEM SET ENABLE_GOLDENGATE_REPLICATION=TRUE
SCOPE=BOTH;

```

Create the script file `create_ggadmin_pdbroot.sql` with the following content (Replace `<password>` with actual password, use double quotes to delimit it i.e "*****")

```

create user ggadmin identified by <password> default tablespace
users temporary tablespace temp;
grant connect, resource to ggadmin;
grant select on sys.ccol$ to ggadmin;
grant select on sys.cdef$ to ggadmin;
grant select on sys.col$ to ggadmin;
grant select on sys.con$ to ggadmin;
grant select on sys.deferred_stg$ to ggadmin;
grant select on sys.icol$ to ggadmin;
grant select on sys.ind$ to ggadmin;
grant select on sys.lob$ to ggadmin;
grant select on sys.lobfrag$ to ggadmin;
grant select on sys.obj$ to ggadmin;
grant select on sys.seg$ to ggadmin;
grant select on sys.tab$ to ggadmin;
grant select on sys.tabcompart$ to ggadmin;
grant select on sys.tabpart$ to ggadmin;
grant select on sys.tabsubpart$ to ggadmin;
grant create view to ggadmin;
grant execute on dbms_lock to ggadmin;
alter user ggadmin quota 100M on USERS;
grant unlimited tablespace to ggadmin;
exec dbms_goldengate_auth.GRANT_ADMIN_PRIVILEGE('ggadmin');

```

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.

<https://docs.oracle.com/en/cloud/paas/database-migration/dmsus/managing-migrations.html#GUID-A288C5E1-AF44-4436-8493-08C7E343BEBE>

```
SQL> @create_ggadmin_cdbroot.sql
```

```
User created.  
[...]  
System altered.
```

```
SQL> show pdbs
```

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
2	PDB\$SEED	READ ONLY	NO
3	PDB	READ WRITE	NO

```
SQL> alter session set container=PDB;
```

```
Session altered.
```

```
SQL> @create_ggadmin_pdbroot.sql
```

```
User created.  
[...]  
Grant succeeded.
```

PL/SQL procedure successfully completed.

SQL> quit;

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 (ROWSNUM,
        RND1, RND2, RND3);
        COMMIT;
        DBMS_OUTPUT.PUT_LINE('Number of rows = ' || ROWSNUM);
        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

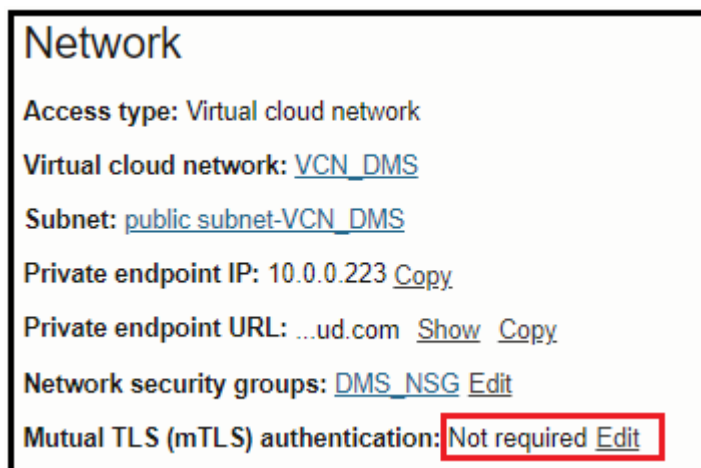
SQL> @data_hr01.sql
Number of rows = 0
[...]
Number of rows = 1000
SQL> quit
```

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

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.

Connect to sqlplus:

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

In SQL Plus enter the following commands:

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

User altered.

SQL> quit

Task 9 – Create Object Store Bucket for Datapump Storage

Object Store is used as temporary storage between source and target databases with Datapump. 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: **DMSStorage**

Press Create Bucket

Task 10 – Create a Database Connection for the Source CDB

For this task you need the following info from previous steps:

- Source DB Private IP
- Source DB CDB Service Name

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
- Vault: DMS_Vault
- Encryption Key: **DMS_Key**
- Database Type: Oracle Base Database
- Database System: **SourceDB**
- Database: **sourcedb**
- Connect String: Change existing string by replacing the qualified hostname with the private IP of the database node. This is important as DMS does not accept FQDNs or hostnames in the connect string.
- Subnet: Pick the Subnet that the DB is located in.

Press **Next**.

Create connection [Help](#)

1 Database details
2 **Connection details**

SourceCDB

Compartment
jorge

ggstage (root)/DMS/jorge

Vault in jorge [\(Change compartment\)](#)
DMS_Vault

Encryption key in jorge [\(Change compartment\)](#)
DMS_Key

☒ Select database
☐ Manually configure database

Database type
Oracle Base Database

Database system in jorge [\(Change compartment\)](#)
SurceSJ1

Database home
dbhome20220314222727

Database
SurceSJ1

Connect string
10.0.0.43:1521/SurceSJ1_sjc1jb.sub03132344240.vcndmssj.oracle
The host in the connect string must be an IP address; if needed change the FQDN default to an IP address.

☒ Create private endpoint to access this database [\(i\)](#)

Subnet in jorge [\(Change compartment\)](#)
Public Subnet-VCN_DMS_SJ (in VCN_DMS_SJ VCN)

[Next](#) [Cancel](#)

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

- 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.

Optionally if you prefer you can enter SSH credentials under “Show optional SSH settings”:

- SSH Database Server Hostname: < DB Node Private IP Address>
- SSH Private Key: Select private key file
- SSH Username: **opc**
- SSH Sudo Location: **/usr/bin/sudo**

Press Create

Task 11 – Create Database Connection for Source PDB

For this task you need the following info from previous steps:

- Source DB Private IP
- Source DB PDB Service Name

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
- Vault: DMS_Vault

- Encryption Key: **DMS_Key**
- Database Type: Oracle Base Database
- Database System: **SourceDB**
- Database: **sourcedb**
- Connect String: Change existing string by replacing the qualified hostname with the private IP of the database node. This is important as DMS does not accept FQDNs or hostnames in the connect string. Then replace service name with PDB service name, for example
10.0.0.3:1521/pdb.subXXXXXXXXX.vcndmsla.oraclevcn.com
- Subnet: Pick the Subnet that the DB is located in.

Press Next.

The screenshot shows the 'Create connection' window with the 'Connection details' tab selected. The 'Database details' section shows 'SourcePDB'. The 'Connection details' section includes a 'Compartment' dropdown set to 'jorge', a 'Vault in jorge' dropdown set to 'DMS_Vault', and an 'Encryption key in jorge' dropdown set to 'DMS_Key'. There are two radio buttons for 'Select database' (selected) and 'Manually configure database'. The 'Database type' is 'Oracle Base Database', 'Database system in jorge' is 'SourceSJ1', 'Database home' is 'dbhome20220314222727', and 'Database' is 'SourceSJ1'. The 'Connect string' is '10.0.0.43:1521/PDBSJ.sub03132344240.vcndmssj.oraclevcn.com'. A checkbox for 'Create private endpoint to access this database' is checked. The 'Subnet in jorge' dropdown is set to 'Public Subnet-VCN_DMS_SJ (in VCN_DMS_SJ VCN)'. 'Next' and 'Cancel' buttons are at the bottom.

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

- 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.

Create connection [Help](#)

1 Database details

2 **Connection details**

Before creating this database connection, ensure to [prepare your databases for migration](#).

Initial load database username
system

Initial load database password

☒ Use different credentials for replication

Replication database username
ggadmin

Replication database password

TLS certificate distinguished name *Optional* ⓘ

TLS wallet *Optional*
Drop a file or [select files](#)
Database auto login wallet file only

TLS keystore *Optional*
Drop a file or [select files](#)
Java key store file only

⚙️ [Show optional SSH settings](#)

[Previous](#) **Create** [Cancel](#)

Optionally if you provided SSH credentials for the Container database connection then provide the same under “Show optional SSH settings”:

- SSH Database Server Hostname: < DB Node Private IP Address>
- SSH Private Key: Select private key file
- SSH Username: **opc**
- SSH Sudo Location: **/usr/bin/sudo**

Press Create

Task 12 – 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
- Vault: DMS_Vault
- Encryption Key: **DMS_Key**
- Database Type: Autonomous Database

- Database: **TargetATP**
- Select Network Connectivity via Private Endpoint

Press **Next**.

The image shows two screenshots of the 'Create connection' wizard in the OCI console.

Left Screenshot (Database details):

- Name:** TargetATP
- Compartment:** jorge
- Vault in jorge:** DMS_Vault
- Encryption key in jorge:** DMS_Key
- Select database:** ☒ Select database (Manually configure database is unselected)
- Database type:** Autonomous Database
- Database in jorge:** TargetATP
- Create private endpoint to access this database:** ☒
- Subnet in jorge:** Public Subnet-VCN_DMS_SJ (in VCN_DMS_SJ VCN)

Right Screenshot (Connection details):

- Initial load database username:** admin
- Initial load database password:** *****
- Use different credentials for replication:** ☒
- Replication database username:** ggadmin
- Replication database password:** *****

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

- 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.

Press **Create**

Task 13 – 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
- Vault: DMS_Vault

- Encryption Key: **DMS_Key**

Press **Next**

Create migration [Help](#)

1 **Add details**
 2 [Select databases](#)
 3 [Migration options](#)

Name
 TestMigration

Compartment
 jorge
 ggsstage (root)/DMS/jorge

☒ Direct connection to source database
 The source database is directly accessible from the Cloud

☐ No direct connection to source database
 Requires you to download and install an agent to use as a bridge to the source database

Vault in **jorge** ⓘ [\(Change compartment\)](#)
 DMS_Vault

Encryption key in **jorge** ⓘ [\(Change compartment\)](#)
 DMS_Key

[Next](#) [Cancel](#)

On the page **Select Databases**, fill in the following entries, otherwise leave defaults:

- Source Database: **SourcePDB**
- Check Database is pluggable database (PDB)
- Registered Container Database: **SourceCDB**
- Target Database: **TargetATP**

Press **Next**

Create migration [Help](#)

☒ Add details
2 Select databases
☐ Migration options

Source database

Database connection in **jorge** [\(Change compartment\)](#)

SourcePDB

☒ Database is pluggable database (PDB)

Container database connection in **jorge** [\(Change compartment\)](#)

SourceCDB

Target database

Database connection in **jorge** [\(Change compartment\)](#)

TargetATP

Previous Next Cancel

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

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

Create migration [Help](#)

☒ Add details
☒ Select databases
☒ **Migration options**

Transfer medium for initial load
☐ Data Pump via database link
Use a direct SQL*Net connection between the source and the target databases.
☒ **Data Pump via object storage**
Use Data Pump to temporarily store the exported database in an Object Storage bucket.

Source database

Export directory object name ⓘ

Export directory object path ⓘ

Source Database file system SSL wallet path ⓘ

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.

Object storage bucket in jorge ⓘ ([Change compartment](#))

☒ Use online replication ⓘ

[Show advanced options](#)

- Check Use Online Replication

Click **Create**

Task 14 – 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** in left-hand **Resources** list

Click on most recent Evaluation Job

Click on **Phases** in left-hand **Resources** list

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 press **Download Log** to learn more about the reason of failure. Press **Abort** on a failed job to allow further jobs or deleting of the migration.

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

Oracle Cloud Cloud Classic > Search resources, services, documentation, and Marketplace US West (San Jose) >

Database Migration > Migrations > Migration details > Job details

job-20221107225304

Resume Abort Download log Add tags Delete

Job information Tags

OCID: ...23xt3q Show Copy Type: Evaluation Created: Mon, Nov 7, 2022, 22:53:04 UTC

Resources

Phases

Name	Status	Duration
Validate target	Completed	12 s
Validate source	Completed	12 s
Validate premigration advisor	Failed	1 m 37 s
Validate GoldenGate hub	Pending	—
Validate datapump source settings	Pending	—
Validate datapump target settings	Pending	—

Showing 6 items < 1 of 1 >

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You can still download the report as a text file, but now you can also navigate through the different checks. The summary view is displayed as follows:

Oracle Cloud Cloud Classic > Search resources, services, documentation, and Marketplace US West (San Jose) >

Database Migration > Migrations > Migration details > Job details > Advisor report details

Validate premigration advisor

Download advisor report

Advisor report information

Action required count: 5
Review required count: 1
Review suggested count: 1

Resources

Checks

A check is a compatibility test for source database objects in the target database environment. Checks result in a passed, review suggested, review required, action required, or failed result. [Learn more](#)

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 adp	Action required	No	1
Has role privileges	Action required	No	1
Gg not unique	Action required	No	1
Has clustered tables	Review required	No	1
Has default tablespace not data	Review suggested	No	2
Has low streams pool size	Passed	No	2

Filters

Result type

- ☒ Action required
- ☒ Review required
- ☒ Review suggested
- ☒ Passed

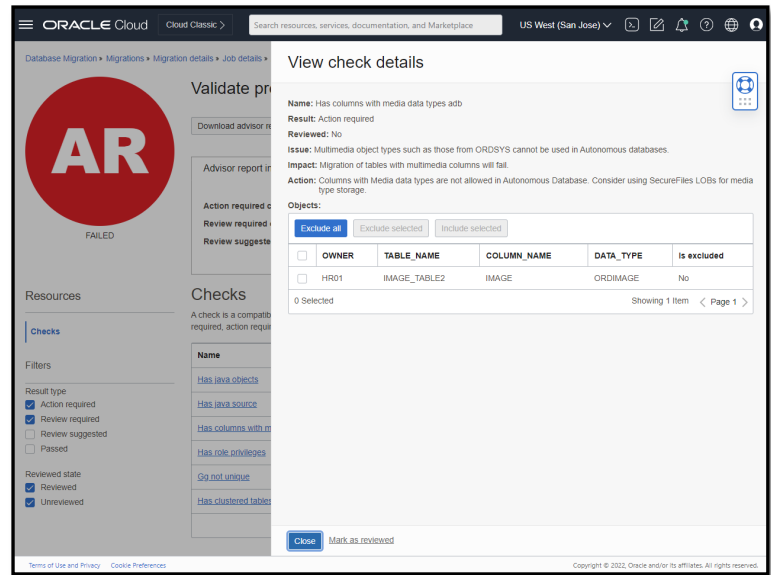
Reviewed state

- ☒ Reviewed
- ☒ Unreviewed

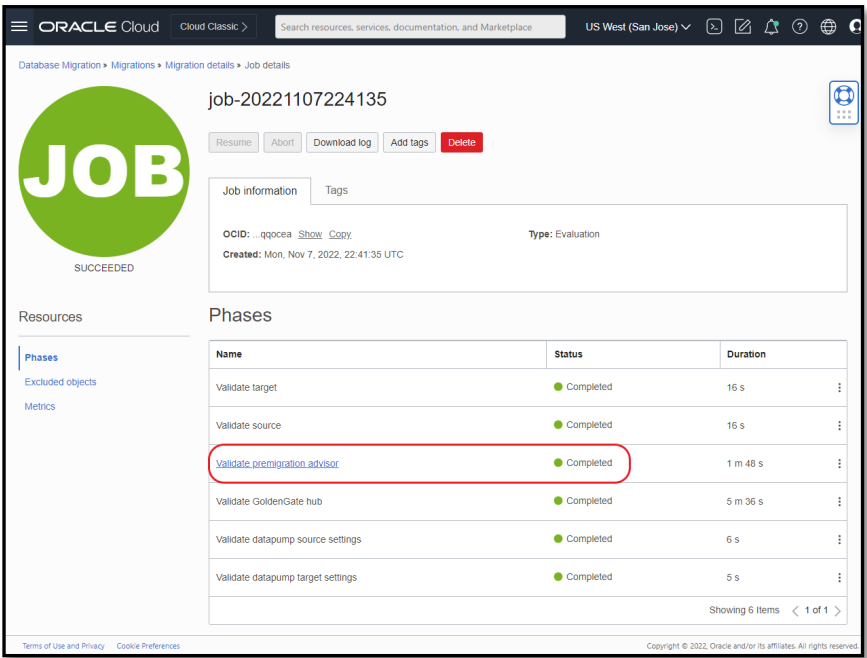
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You can click a check name in the list to display details about a specific check from the CPAT report. You can mark a check as **Reviewed** or **Unreviewed**, this state is only for your convenience to track each check. For certain checks, CPAT generates 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 this state (left side of screen):

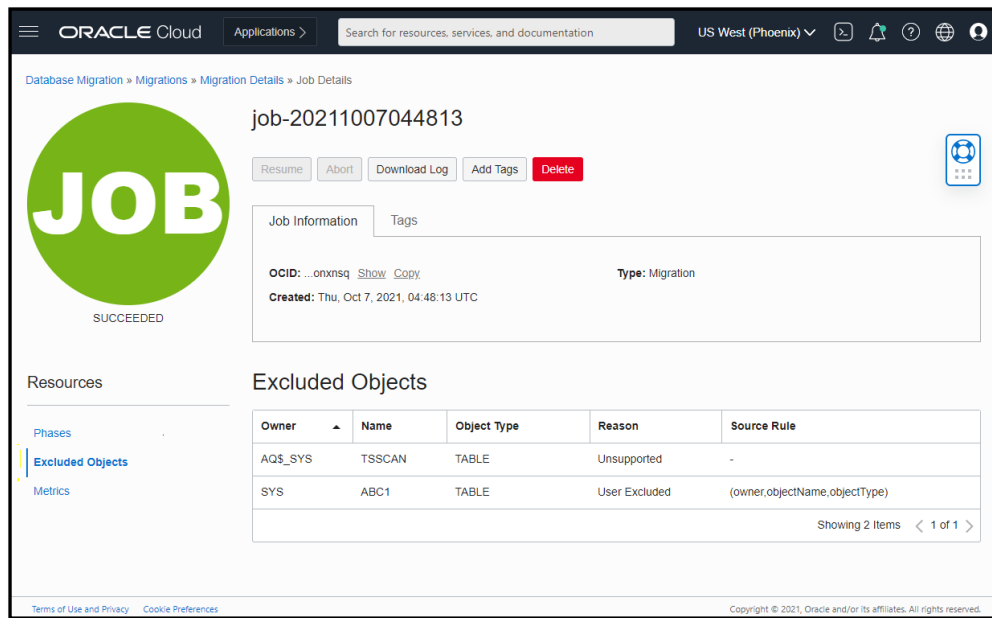
The **View check details** panel is displayed as follows:



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



Excluded Objects: View the report of all excluded objects based on static exclusion rules as well as dynamic exclusion settings made by the user. The excluded objects list displays objects that are excluded from migration as shown:



Task 15 – 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 GoldenGate 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 **OCBATPGG21_Nov11?**

☒ Require user input after a phase before proceeding

Phase to pause after

Monitor replication lag

Start [Cancel](#)

Click on **Jobs** in left-hand **Resources** list

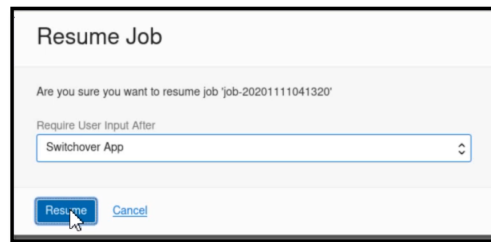
Click on most recent Evaluation Job

Click on **Phases** in left-hand **Resources** list

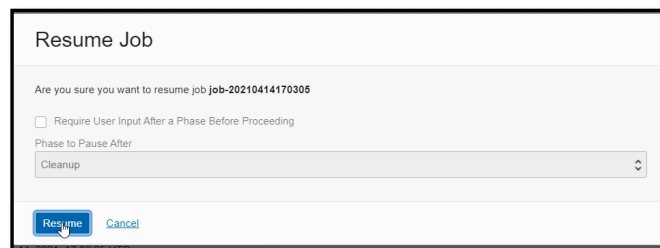
Job phases are updated as the migration progresses

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. You can now press **Resume** on the job to complete replication.

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

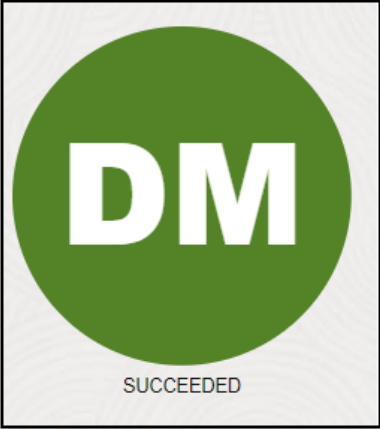


After Job resumes and waits after Switchover App phase, press Resume. Select the last phase **Cleanup** and press **Resume**.



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

Phases			
Name	Status	Duration	
Initialize replication infrastructure	● Completed	18 m 1 s 18 ms	⋮
Validate	● Completed	48 s	⋮
Prepare	● Completed	2 m 14 s	⋮
Export initial load	● Completed	49 s	⋮
Upload data	● Completed	35 s	⋮
Import initial load	● Completed	1 m 41 s	⋮
Post initial load	● Completed	3 s	⋮
Prepare replication target	● Completed	2 m 19 s	⋮
Monitor replication lag	● Completed	2 s	⋮
Switchover	● Completed	6 m 45 s	⋮
Cleanup	● Completed	15 s	⋮
Showing 11 items < 1 of 1 >			



Your Migration is now completed.!

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