

OCI Database Migration Service End-To-End Online Migration Tutorial for Oracle Databases

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

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Public

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 instance, and an Oracle 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 MySQL or Oracle databases into 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

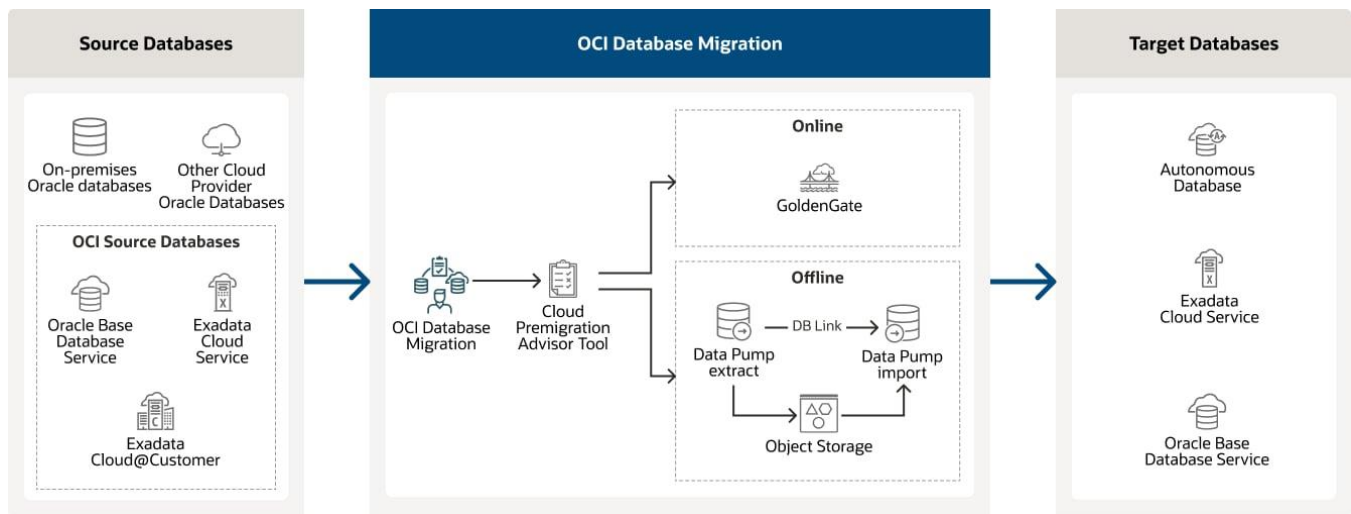
DMS provides a fully managed approach to migrating databases from various locations into OCI-hosted databases.

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. 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 or 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 – 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								
<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. 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.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.

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_NS**G 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_NGS (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_LRRpLxcSuSM6yRjO9u1TDuDy8wuiawEIl8Q_xPYFmvap_tPFdtm_c6TskV_/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.p_type_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.

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

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: <https://support.oracle.com/rs?type=doc&id=2953866.1>
- 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): [REDACTED],oraclevcn.com
Password for system user:
Migration type [(on)line/(off)line]: on
Password for ggadmin/c##ggadmin user:

Sql script /home/[REDACTED]/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**) that you must review, modify (if needed) and run in order 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 (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

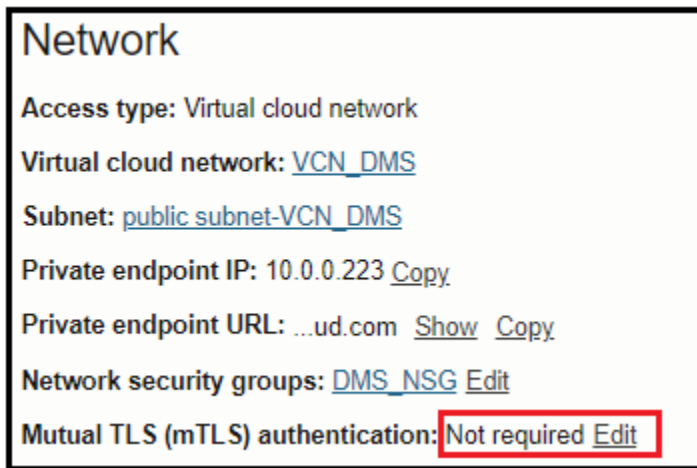
SQL> @data_hr01.sql
Number of rows = 0
[...]
Number of rows = 1000
SQL> quit

```

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

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

The screenshot shows the 'Create connection' wizard with the following details:

- Name:** SourceCDB
- Description:** Optional (empty field)
- Compartment:** ggstage (root)DMS/jorge
- Type:** Oracle Database
- Vault in jorge:** DMS_Vault
- Encryption key in jorge:** DMS_Key
- Link:** Show advanced options
- Buttons:** Next, Cancel

Press **Next**.

Select Database details: Select database

- Database System: **SourceDB**
- Database: **sourcedb**
- 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**.
- Don’t check create private endpoint option.

Create connection

1 General information Database system in **jorge** [\(Change compartment\)](#)

2 Connection details

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

Database home

Database

Pluggable database *Optional*
Select pluggable database

Initial load database username
system

Initial load database password

Use different credentials for replication

Replication database username
c##ggadmin

Replication database password

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

Network connectivity
 Create private endpoint to access this database ⓘ

Previous Create Cancel

Press **Create**

Task 11 – 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**

Press **Next**

Create connection

1 General information

2 Connection details

Name
SourcePDB

Description *Optional*

Compartment
ggstage (root)/DMS/jorge

Type
Oracle Database

Vault in **jorge** ⓘ (Change compartment)
DMS_Vault

Encryption key in **jorge** ⓘ (Change compartment)
DMS_Key

[Show advanced options](#)

Next Cancel

Select Database details: **Select 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**.
- Don’t check create private endpoint option.

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**
- Database Type: **Oracle Autonomous Database**
- Vault: **DMS_Vault**
- Encryption Key: **DMS_Key**

Press **Next**.

Create connection

1 General information

2 Connection details

Name
TargetATP

Description *Optional*

Compartment

Type
Oracle Autonomous Database

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

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

[Show advanced options](#)

Next Cancel

- Database: **TargetATP**
- 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

Press **Create**

Create connection

1 General information
2 Connection details

Enter connection details for Oracle Autonomous Database.
Database in [jorge](#) ([Change compartment](#))

Initial load database username
admin

Initial load database password
.....

Use different credentials for replication

Replication database username
gadmin

Replication database password
.....

Network connectivity

Create private endpoint to access this database ⓘ

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

Previous Create Cancel

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**

Create migration [Help](#)

1 General information
2 Select databases
3 Migration options

Name
TestMigration

Description *Optional*

Compartment

Next Cancel

Press **Next**

The screenshot shows the 'Create migration' wizard with the 'Select databases' step active. The 'Source database' section has 'SourcePDB' selected for 'Database connection in' and 'SourceCDB' for 'Container database connection in'. The 'Target database' section has 'TargetATP' selected for 'Database connection in'. A checkbox for 'Database is pluggable database (PDB)' is checked. The 'Previous', 'Next', and 'Cancel' buttons are visible at the bottom.

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**

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

Click **Create**

Create migration [Help](#)

General information
Select databases
Migration options

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 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 [\(Change compartment\)](#)

Use online replication

[Show advanced options](#)

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

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

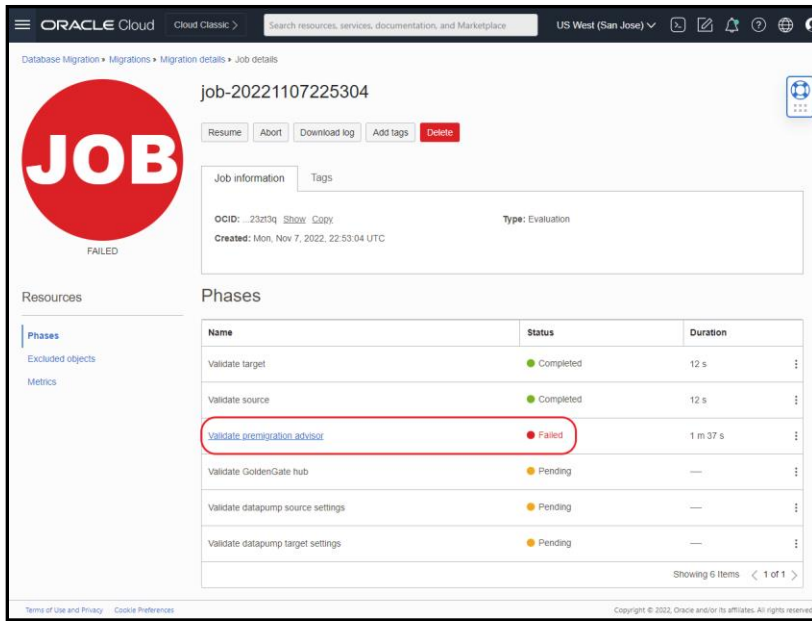
Click on most recent Evaluation Job

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

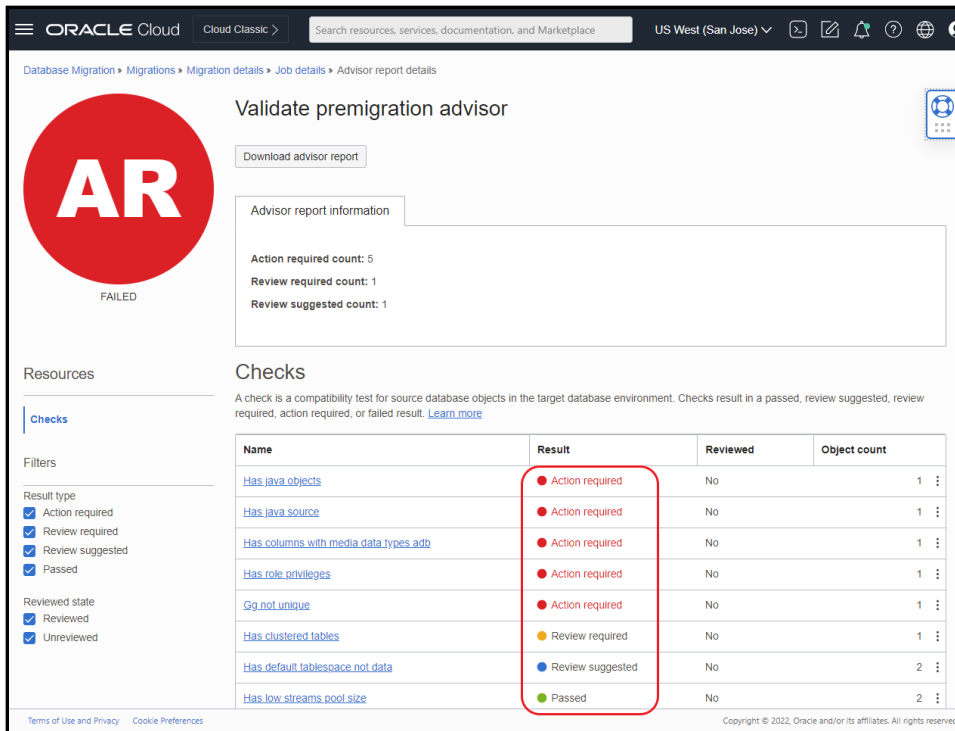
Phases will be shown, and status will be updated as phases are completed. It can take 2 minutes before the first phase is shown.

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:

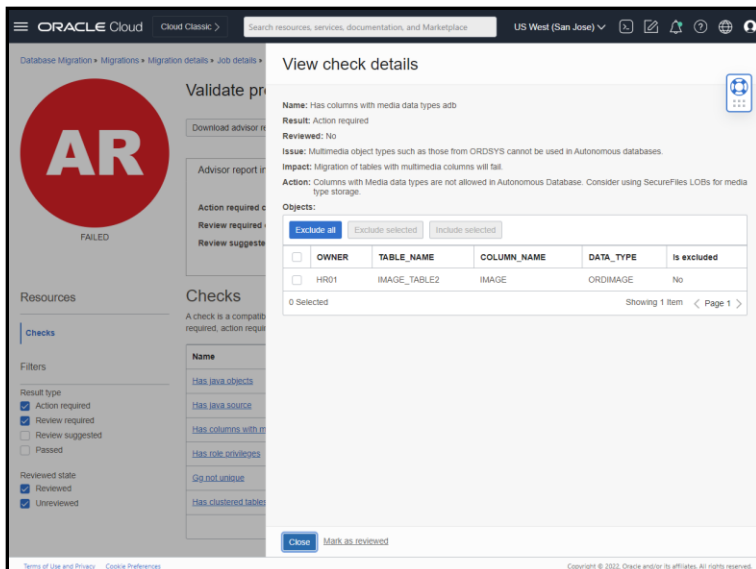


You can still download the report as a text file, but now you can also navigate through the different checks. The summary view is displayed as follows:

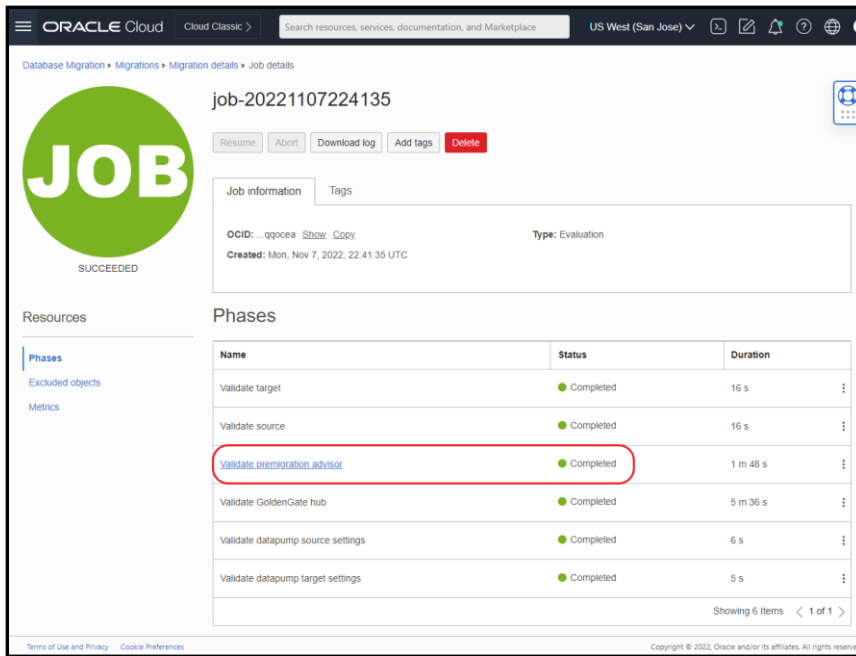


You can click a check name in the list to display details about a specific check from the CPAT report. You can mark a check as **Reviewed** or **Unreviewed**, this state is only for your convenience to track each check. For certain checks, CPAT generates a remedial script on the file system of the source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

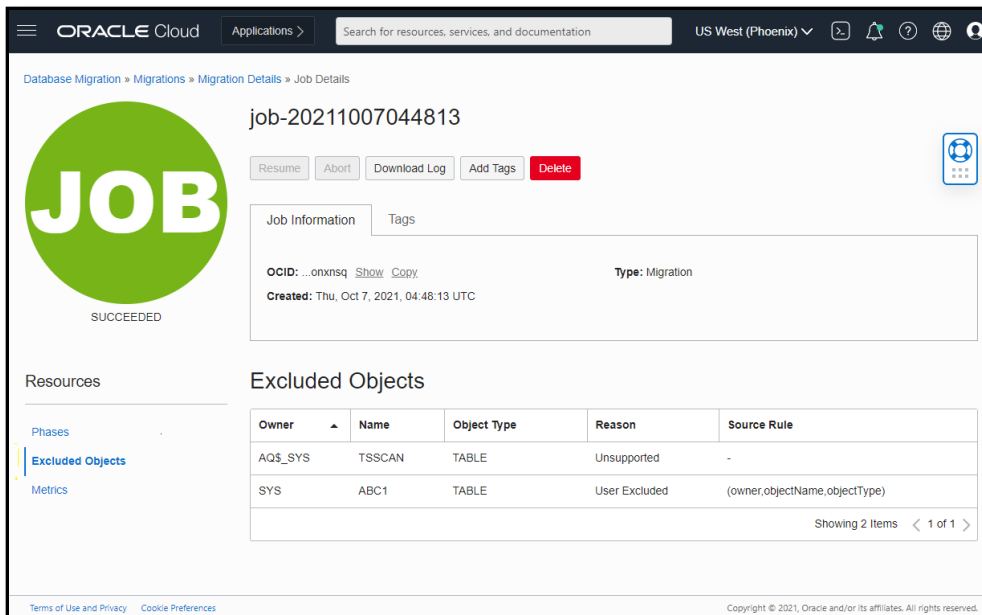
The **View check details** panel is displayed as follows:



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

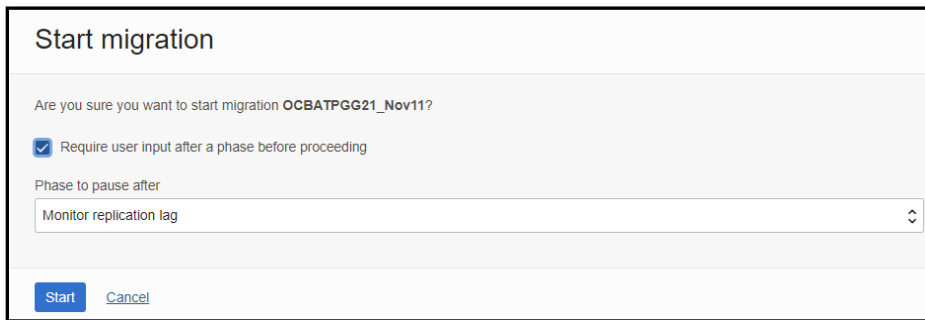
After successful validation, a Migration can be run to perform the data transfer.

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.



The 'Start migration' dialog box contains the following elements:

- Title: Start migration
- Confirmation text: Are you sure you want to start migration OCBATPGG21_Nov11?
- Checkbox: Require user input after a phase before proceeding
- Dropdown menu: Phase to pause after, with 'Monitor replication lag' selected.
- Buttons: Start (highlighted) and Cancel.

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

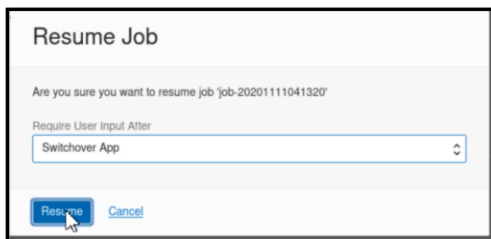
Click on most recent Evaluation Job

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.

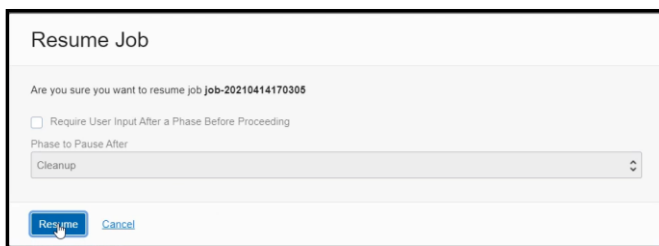
In the Resume Job dialog, chose the **Switchover App** phase and press **Resume**. The Switchover App phase will gracefully stop replication and signal the target application to initiate transactions to the target DB.



The 'Resume Job' dialog box contains the following elements:

- Title: Resume Job
- Confirmation text: Are you sure you want to resume job 'job-20201111041320'?
- Checkbox: Require User Input After a Phase Before Proceeding
- Dropdown menu: Require User Input After, with 'Switchover App' selected.
- Buttons: Resume (highlighted) and Cancel.

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



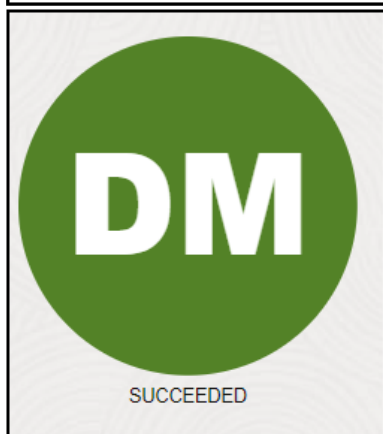
The 'Resume Job' dialog box contains the following elements:

- Title: Resume Job
- Confirmation text: Are you sure you want to resume job job-20210414170305
- Checkbox: Require User Input After a Phase Before Proceeding
- Dropdown menu: Phase to Pause After, with 'Cleanup' selected.
- Buttons: Resume (highlighted) and Cancel.

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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