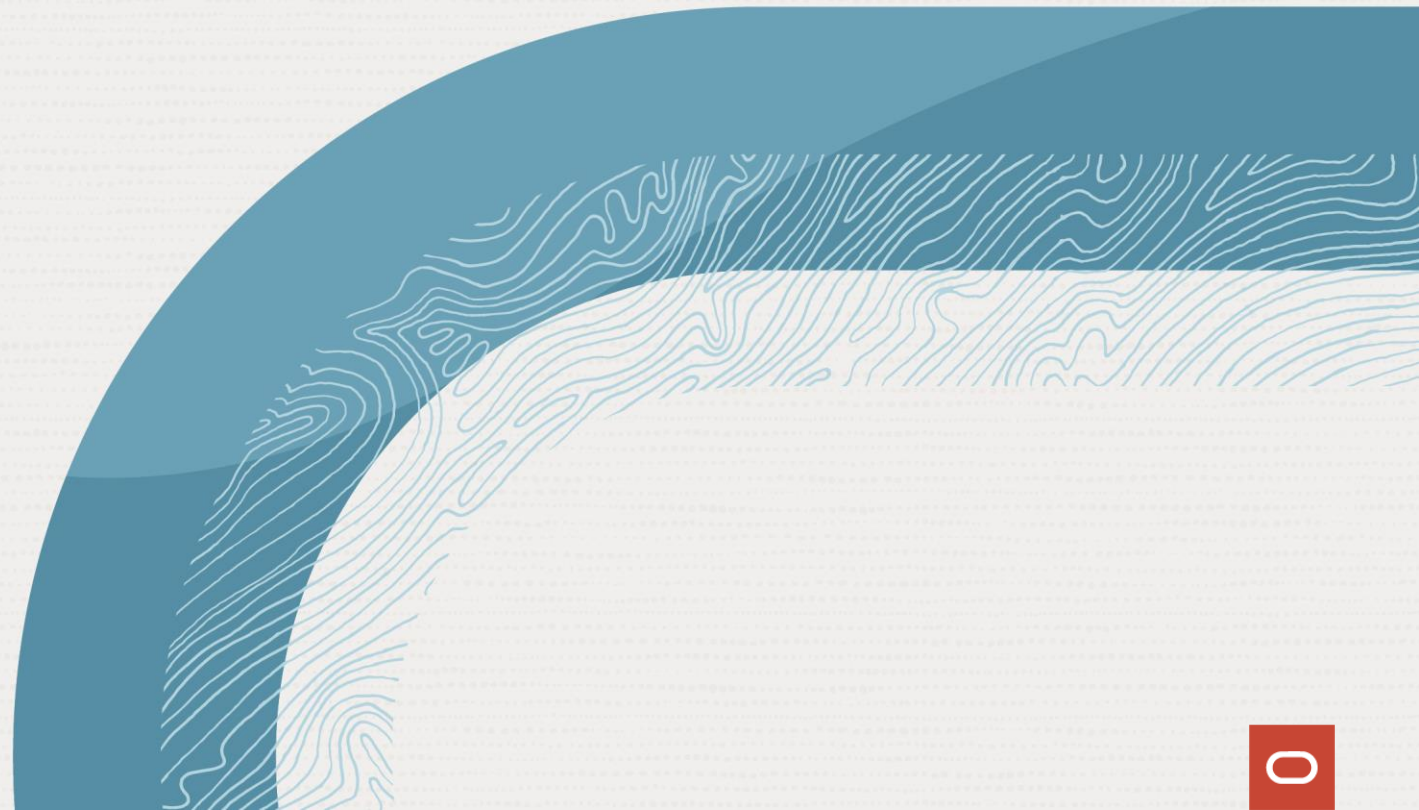


# Cloud Database Migrations the Easy Way

Introduction to OCI Database Migration for Oracle Databases

for Oracle Databases



# Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.



# Resources to learn more

Video demonstration

[Click here](#)

Do a LiveLab online migration

[Click here](#)

Step-by-step guide and tutorial

[Click here](#)

Oracle migration documentation

[Click here](#)

MySQL migration documentation

[Click here](#)

More information on Oracle.com

[Click here](#)



# OCI Database Migration migrates to the following OCI targets:

An easy to use fully managed service



# OCI Database Migration

Fully managed, easy-to-use homogeneous Oracle and MySQL database migrations

## Database migrations

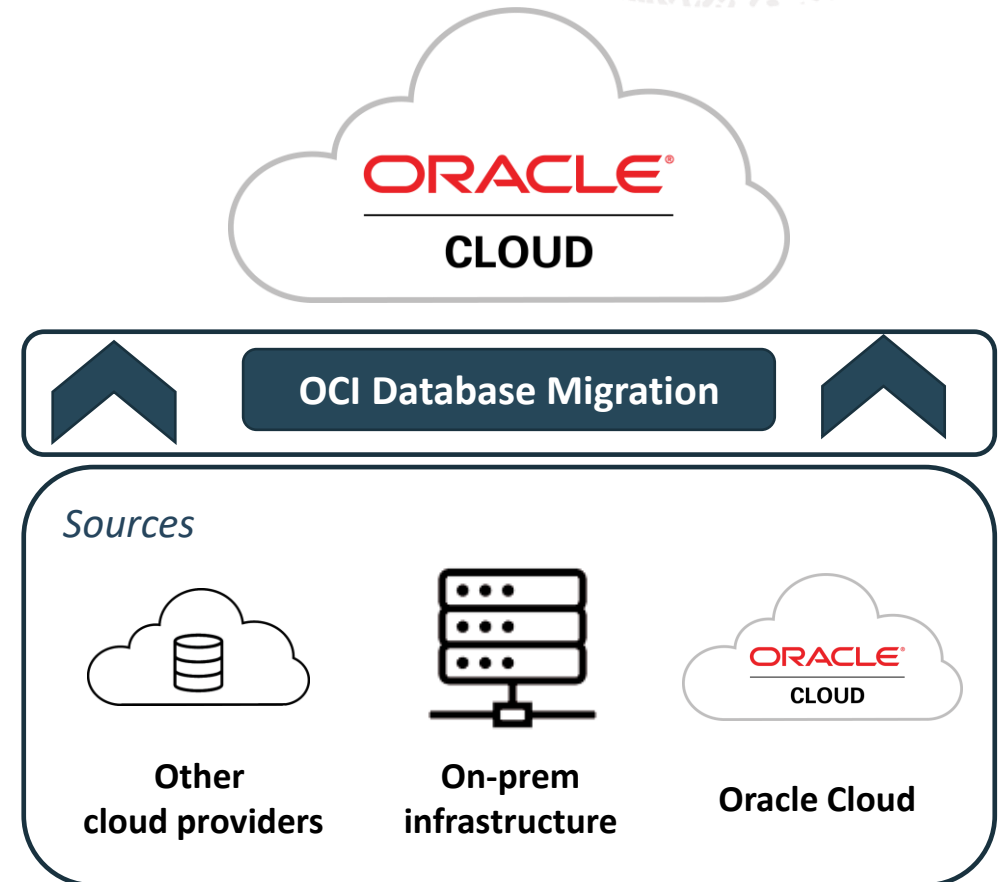
- Reduce cost and improve performance in Oracle Cloud
- Migrate databases, free for 6 months per migration

## Core use cases

- Machine-assisted migrations for Oracle and MySQL Databases, Data Marts and Data Warehouses into Oracle Cloud Infrastructure

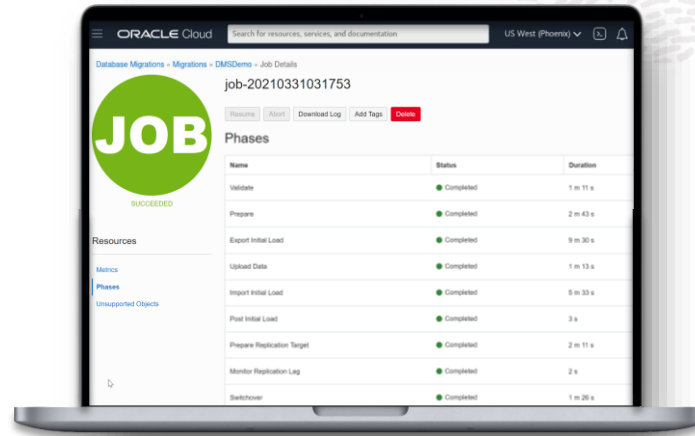
## Differentiated use cases

- Simplifies underlying technologies and resources
- Logical *offline* and *online* migrations
- Schema/metadata migration



# OCI Database Migration based on enterprise-strength tools

Single  
Workflow



Simple Online  
Experience

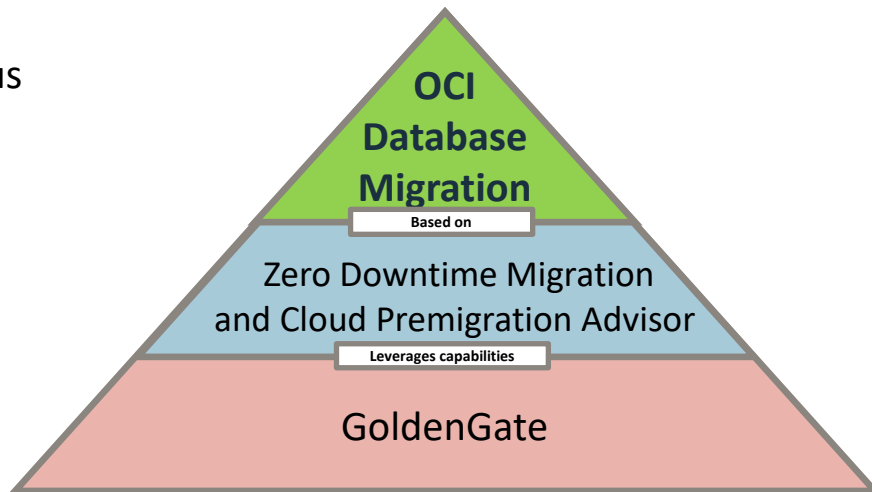
Oracle Databases

MySQL Databases

Move to  
Autonomous



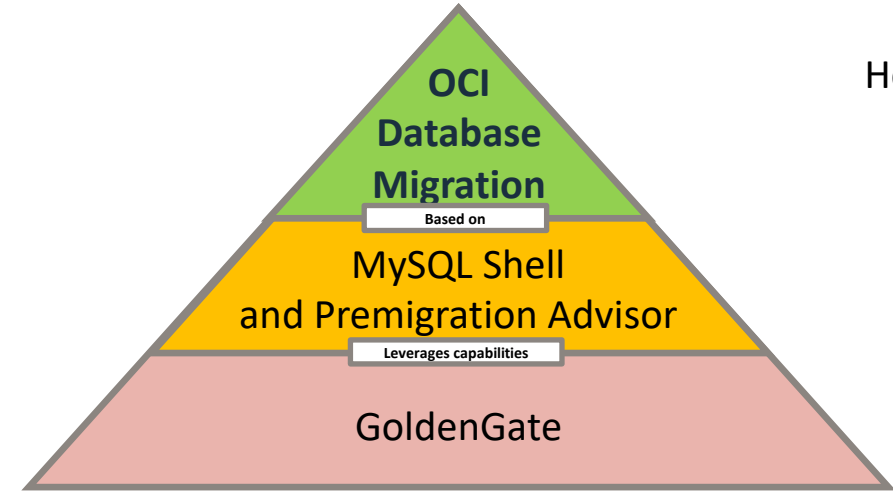
Flexible  
Fleet-level



UI-led  
experience



Expert  
use



Move to  
Heatwave MySQL



Flexible  
Fleet-level



# Different migration types



## **Offline Migration**

- One-time copy of the database
- Requires applications to be offline during migration

## **Physical Migration (Not available in OCI DM)**

- Blockwise copy of database files
- Requires database vendors and versions to be same on source and target
- No filtering or transformation
- Oracle DB Tools: RMAN, DataGuard, ZDM

## **Direct Connection**

- Source database can be accessed directly from target network
- Requires VPN/FastConnect for on-premises

## **Online Migration**

- Initial copy of database followed by change data capture during migration
- Applications can stay online during migration

## **Logical Migration**

- Logically interpret database contents and copy to database in target format
- Source and target can be different
- Oracle DB Tools: Datapump, GoldenGate, ZDM
- MySQL Tools: MySQL Shell, GoldenGate

## **Indirect Connection**

- Source database cannot be accessed directly, behind firewall
- Requires migration tool with agent



# Oracle Database migration process and tools



## Profile Estate

Review and prioritize by least effort and ongoing TCO

- [Oracle Estate Explorer\\*](#)
- [Cloud Services Advisor](#)



## Methods

Select the simplest migration method

- [Migration Method Advisor](#)
- [Cloud Migration Advisor\\*](#)



## Preparation

Ensure source compatibility with target

- Cloud Premigration Advisor Tool (CPAT)
- Embedded in OCI DM



## Execution

Choose zero downtime or offline migrations

- [OCI Database Migration](#)



## Validation

Ensure synchronization for ongoing online migrations

- GoldenGate Veridata

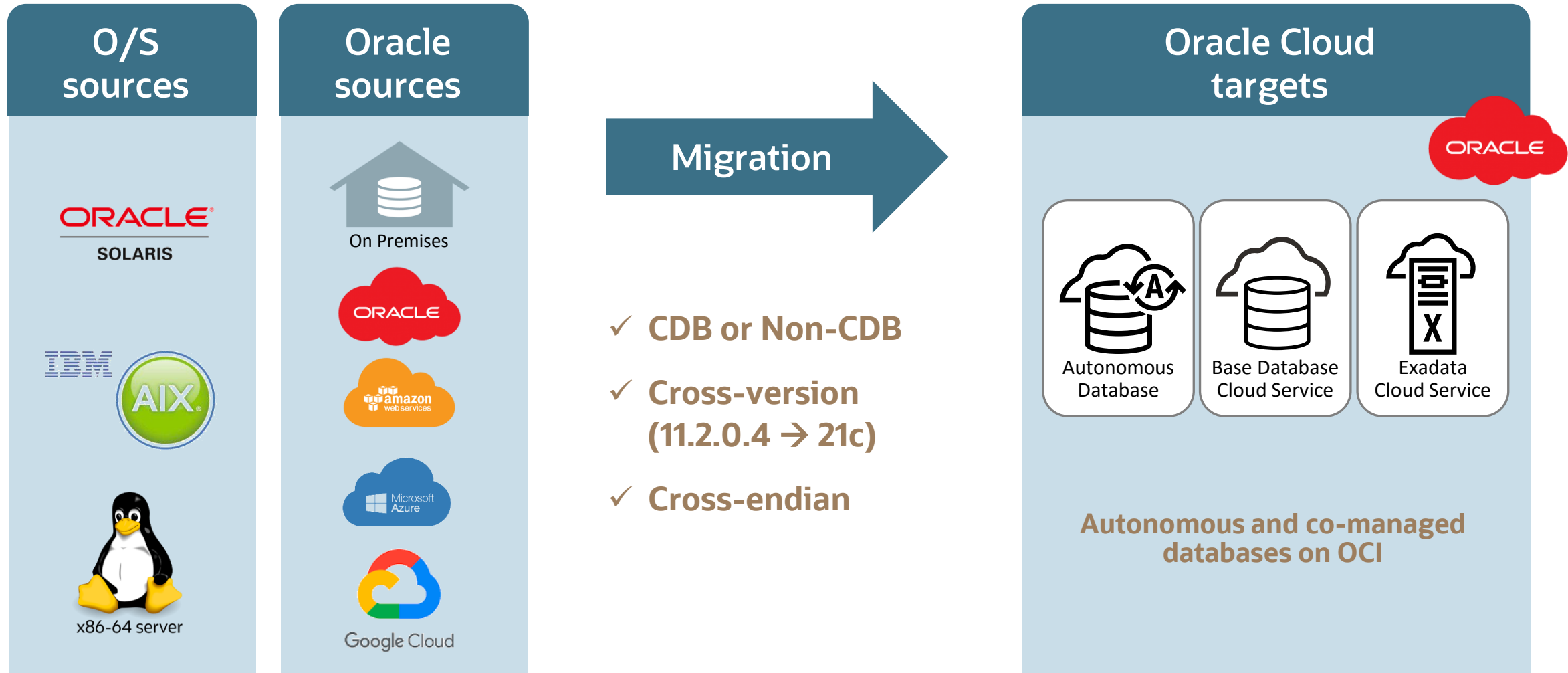
\*Requires Oracle for access





# OCI Database Migration – Native OCI Cloud Service

## Supported sources, database versions, and targets



# Migration steps



# 1

## Prerequisites:

- Setup VPN or FastConnect
- Provision Target DB, Object Store, and Vault
- Configure source and target

## Optional for online:

- OGG Marketplace

# 2

## Setup

# 3

## Validate

- Use CPAT interactively to discover and respond to issues

# 4

## Start

- Fully automated

## Optional controls

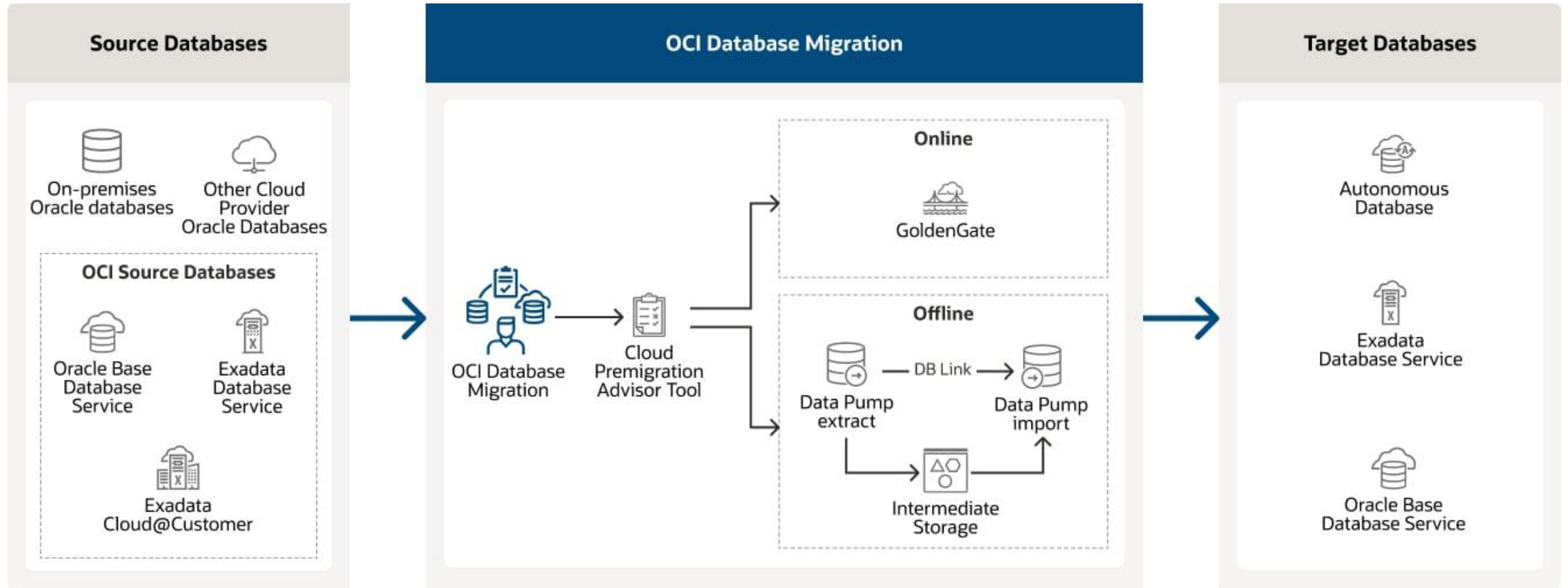
- Initial load
- Online replication
- Restarts

# 5

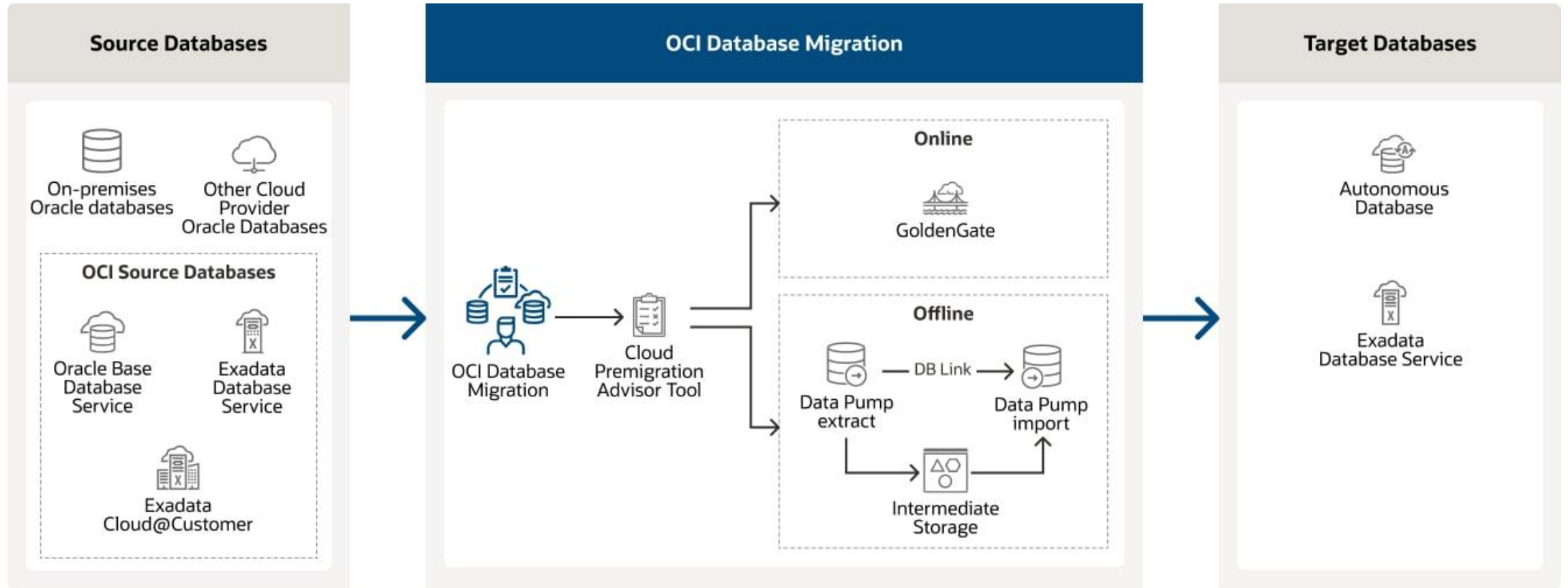
## Complete

- Switch operations to new database

# How it works for Oracle Cloud migrations



# How it works for Oracle Database@Azure migrations



# Pricing: **FREE** for all common Oracle use cases

## Included:

- OCI Database Migration service operations and supporting infrastructure
- On-premises software agent for specific use cases
- OCI GoldenGate usage for online migrations
- *Oracle GoldenGate Marketplace for Database Migrations* license

## Not included:

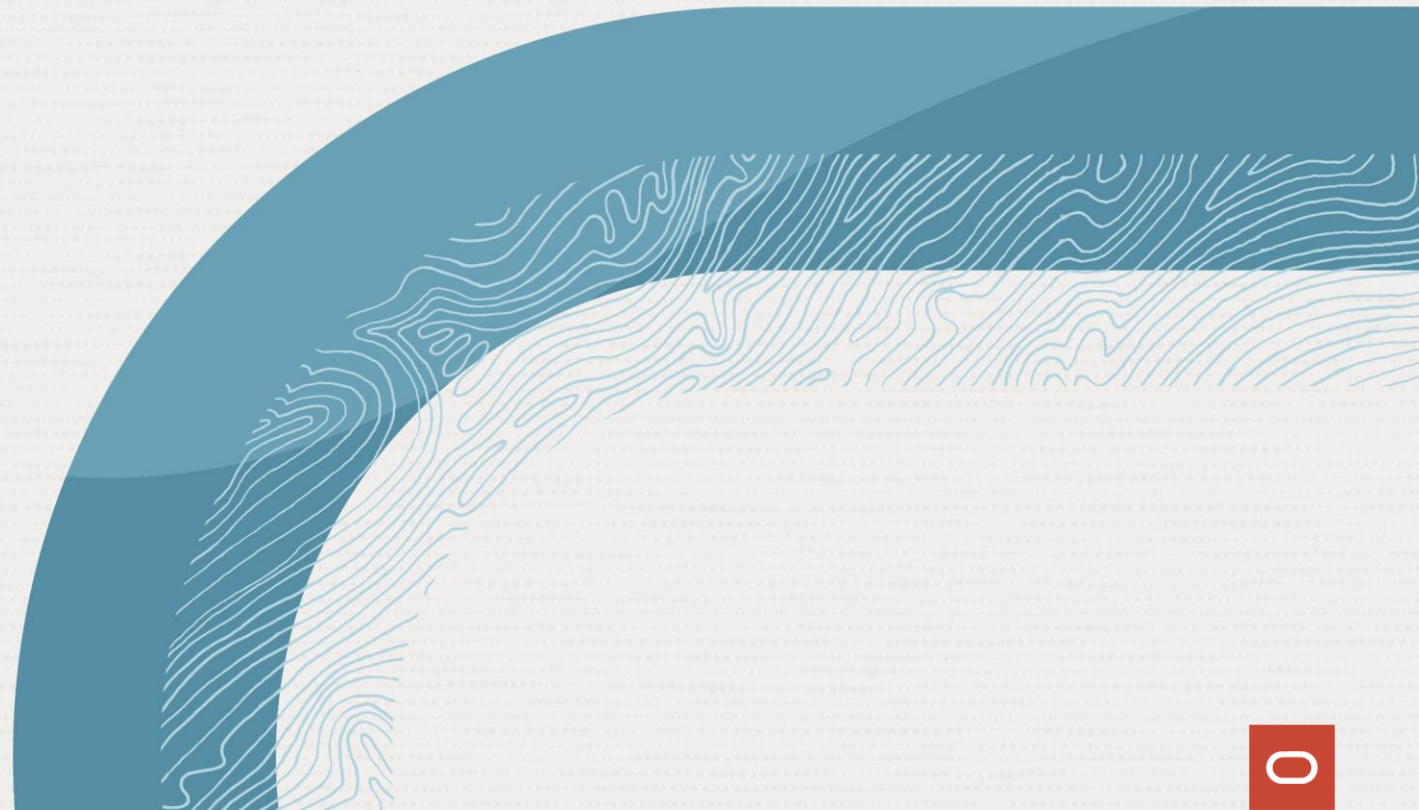
- Customer managed OCI resources used for database migration operations
  - Compute used for OCI GoldenGate, OCI Object Storage, File Storage Service, OCI Streaming, etc.
- FastConnect or other on-premise-to-cloud network connectivity
- Source or target database service costs

## Exceptions:

- Migrations that run more than 183 days (6 months) after they have been created
- Migrations running for more than 60 days idle (no data transferred)
- Billing starts after time limits have been exceeded with \$0.20 / hour per migration



# Initiate the service from Oracle@Azure



# Azure requirements

1. Azure permissions to accept private offers on the Marketplace
2. Azure Virtual Network with a delegated subnet to the Oracle Database@Azure service: (Oracle.Database/networkAttachments)
3. Azure groups and roles:
  - a) Odbaa-exa-infra-administrators to provision Exadata infrastructure
  - b) Odbaa-vm-cluster-administrators to provision VM cluster
4. A deployed Oracle@Azure database
5. Federated SSO user to sign in into OCI

# OCI requirements

1. Review the required policies in the following documentation [link](#).



# Step 1: Identify your Oracle@Azure database deployment



The screenshot shows the Microsoft Azure portal interface. At the top, there's a blue header with the Microsoft Azure logo and a search bar. Below the header, the breadcrumb navigation shows 'Home > Oracle Database@Azure'. The main content area is titled 'Oracle Database@Azure | Oracle Autonomous Database Service'. There's a search bar and a toolbar with actions like 'Create', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', and 'Delete'. A filter bar shows 'DMS' and several filter conditions: 'Subscription equals all', 'Resource group equals all', and 'Location equals all'. Below the filter bar, it says 'Showing 1 to 1 of 1 records.' and there are options for 'No grouping' and 'List view'. A table lists the resources with columns for Name, State, Compute, Storage, Workload type, and Disaster recovery. The table has one row with the resource name 'dmsatp1' circled in red. The state is 'Available' with a green checkmark, compute is '2', storage is '512 GB', workload type is 'Transaction Processing', and disaster recovery is 'Primary'.

<input type="checkbox"/>	Name ↑↓	State ↑↓	Compute ↑↓	Storage ↑↓	Workload type ↑↓	Disaster recovery ↑↓
<input type="checkbox"/>	dmsatp1	Available	2	512 GB	Transaction Processing	Primary

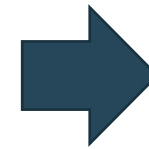




# Step 2: Identify the OCI Database URL and click it

The screenshot shows the Microsoft Azure portal interface. At the top, there is a search bar and a navigation menu. The main content area displays the details for an Autonomous Database resource named 'dmsatp1'. The resource name and icon are circled in red. Below the resource name, there is a search bar and a 'Refresh' button. The 'Essentials' section lists various attributes of the resource, including Resource group, Location, Subscription, Subscription ID, Tags, State, Workload type, and Database version. The 'OCI Database URL' link is circled in red.

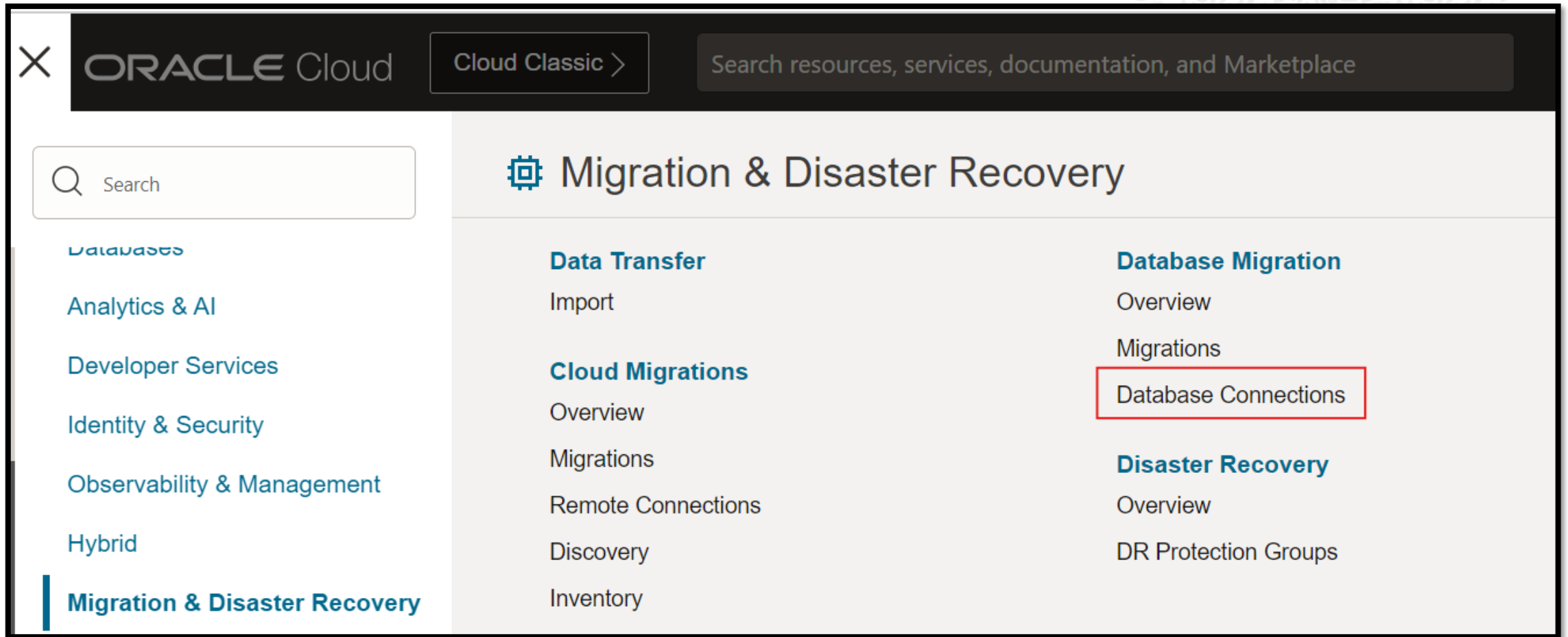
Attribute	Value
Resource group	DMS
Location	East US
Subscription	omcpmpoc1
Subscription ID	1e36c776-fc0a-4d93-b8e7-e2c1215a735f
Tags	
State	Available
Workload type	Transaction Processing
Database version	19c



The screenshot shows the Oracle Cloud Account Sign In page. The page title is 'ORACLE Cloud' and the account name is 'omcpmpoc1'. The page includes a search bar, a 'Refresh' button, and a 'Delete' button. The 'OCI Database URL' link is circled in red. Below the search bar, there is a 'Sign In' button and a 'Forgot Password?' link. The 'Or sign in with' section includes a button for 'Azure Entra ID', which is circled in red. At the bottom, there is a link for 'Need help signing in?'.

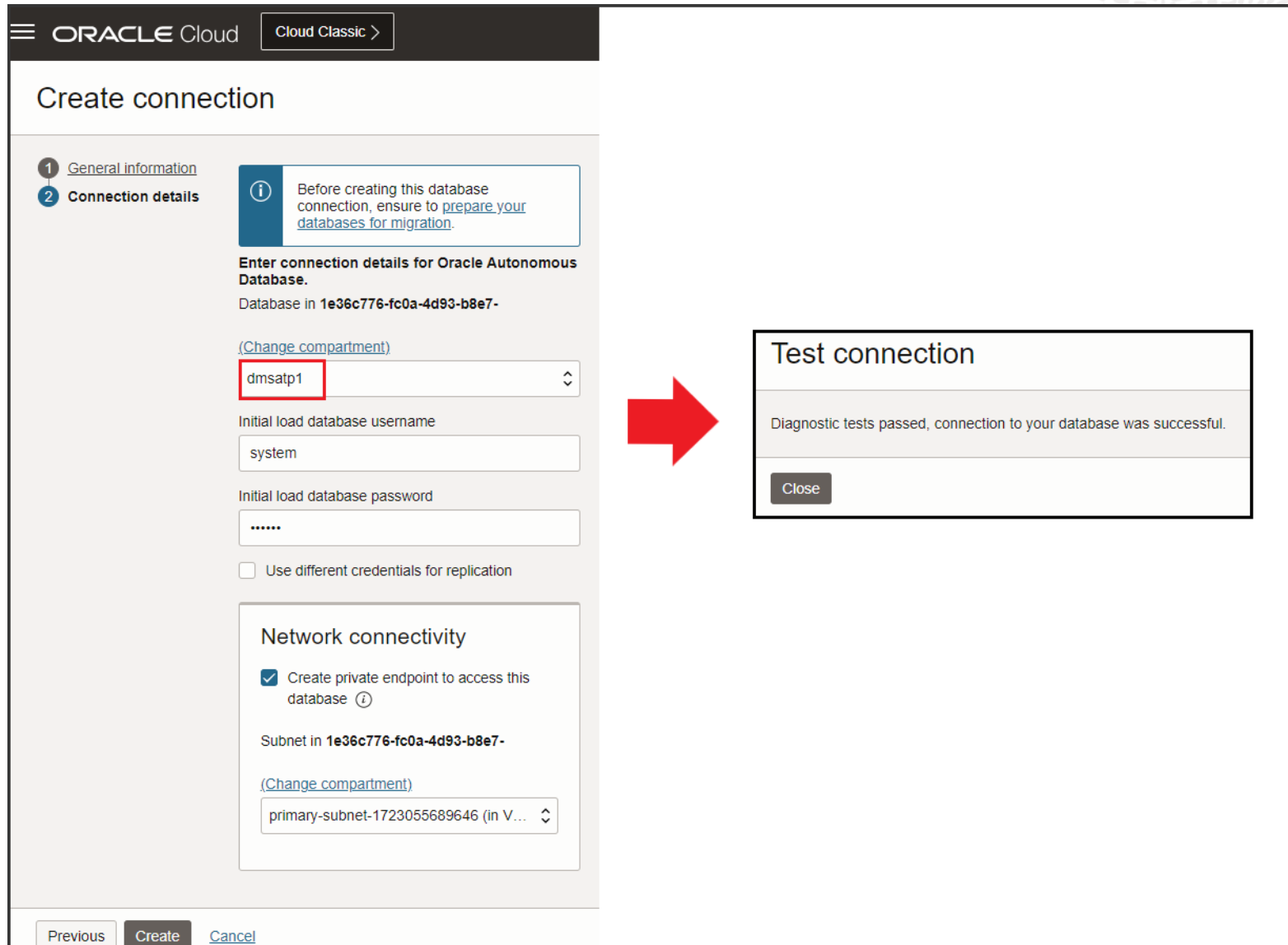


# Step 3: Navigate to the service using the OCI menu



The screenshot displays the Oracle Cloud console interface. At the top, the Oracle Cloud logo is on the left, followed by a 'Cloud Classic' button and a search bar containing the text 'Search resources, services, documentation, and Marketplace'. Below the search bar is a search input field with a magnifying glass icon and the word 'Search'. The main content area is titled 'Migration & Disaster Recovery' with a gear icon. The left sidebar lists various service categories: Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, Hybrid, and Migration & Disaster Recovery (which is currently selected). The main content area is organized into three columns. The first column, 'Data Transfer', includes 'Import'. The second column, 'Cloud Migrations', includes 'Overview', 'Migrations', 'Remote Connections', 'Discovery', and 'Inventory'. The third column, 'Database Migration', includes 'Overview', 'Migrations', 'Database Connections' (highlighted with a red border), and 'Disaster Recovery'. The 'Disaster Recovery' section includes 'Overview' and 'DR Protection Groups'.

# Step 4: The Database connection creation for your Oracle@Azure database should be transparent, use it as target.



ORACLE Cloud Cloud Classic >

## Create connection

1 General information  
2 Connection details

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

**Enter connection details for Oracle Autonomous Database.**

Database in **1e36c776-fc0a-4d93-b8e7-**

[\(Change compartment\)](#)

dmsatp1

Initial load database username  
system

Initial load database password  
.....

Use different credentials for replication

**Network connectivity**

Create private endpoint to access this database ⓘ

Subnet in **1e36c776-fc0a-4d93-b8e7-**

[\(Change compartment\)](#)

primary-subnet-1723055689646 (in V...)

Previous Create Cancel

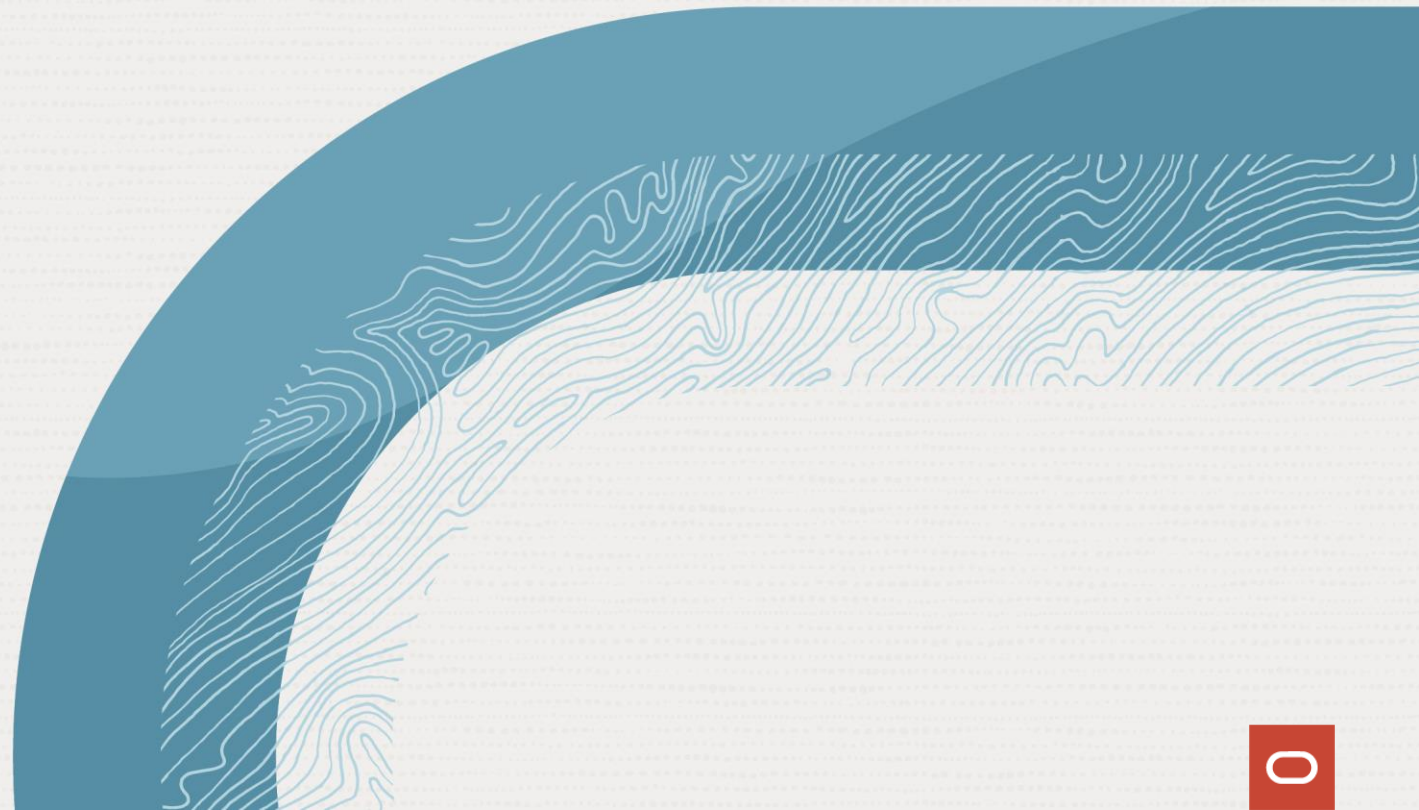
**Test connection**

Diagnostic tests passed, connection to your database was successful.

Close

You can now start your migration. Follow the next “Migration Walkthrough” section for the complete details.

# A walkthrough



# Step 1: *Select* Database Migration menu on the OCI Console



The screenshot displays the Oracle Cloud console interface. At the top, the Oracle Cloud logo is visible on the left, and a search bar on the right contains the text "Search resources, services, documentation, and Marketplace". Below the logo, a navigation menu lists various services: Home, Compute, Storage, Networking, Oracle Database, Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, Hybrid, and Migration & Disaster Recovery. The "Migration & Disaster Recovery" menu item is highlighted with a blue vertical bar. To the right of the navigation menu, the "Migration & Disaster Recovery" section is expanded, showing two columns of options. The left column is titled "Cloud Migrations" and includes Overview, Migrations, Remote Connections, Discovery, and Inventory. The right column is titled "Disaster Recovery" and includes Overview and DR Protection Groups. The "Database Migration" option is highlighted with a red rectangular border. Below "Database Migration" are the options Overview, Migrations, Database Connections, and Agents.

# Step 2: Create Connections for source and target

## Provide reusable connection information and credentials for databases

### Create connection

**1** General information

**2** Connection details

Name  
PDB


Description *Optional*

Compartment

Type  
Oracle Database

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

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

 [Show advanced options](#)

**Next** [Cancel](#)

### Create connection

**1** General information

**2** Connection details

Enter connection details for Oracle Database.

Database details

Select database  
 Enter database information

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

Database home  
dbhome20240213225644

Database  
DB0213

Pluggable database *Optional*  
pdb

Initial load database username  
System

Initial load database password  
.....

Use different credentials for replication

Database wallet *Optional*  
  
Database auto login wallet (.sso) files only

Network connectivity  
 Create private endpoint to access this database ⓘ

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



# Step 3: Create Migration

Select migration method and other settings to move a database to the cloud



### Create migration [Help](#)

**1 General information** Name

**2 Select databases**

**3 Migration options**

Description *Optional*

Compartment

[Show advanced options](#)

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

### Create migration [Help](#)

General information

**2 Select databases**

**3 Migration options**

#### Source database

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

Database is plugable database (PDB)

#### Target database

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

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

### Create migration [Help](#)

General information

Select databases

**3 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 [?](#)

#### Target database

Import directory object name [?](#)

Import directory object path [?](#)

Target Database file system SSL wallet path [?](#)

To download 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** [\(Change compartment\)](#)

Select an Object Storage bucket

Use online replication [?](#)

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



# Step 4a: Validate Migration

Confirm all prerequisites and permissions. CPAT identifies incompatible objects.

**TestMigration**

**DM**  
ACCEPTED

Validate Start Clone Move resou

Migration information Notification

OCID: ...khho4q [Show](#) [Copy](#)

Compartment: ggsstage (root)/DMS/jorge

Created: Wed, Feb 14, 2024, 21:16:26 UT

Encryption vault: [DMS\\_Vault](#)

Encryption key: [DMS\\_Key](#) [Edit](#)

**JOB**  
FAILED

An attempt to migrate a database with zero downtime failed because execution of CPAT found blockers. The accompanying messages provide detailed information.

job-20240226225210

Resume Abort Download log Add tags Delete

Job information Tags

OCID: ...uijja [Show](#) [Copy](#) Migration: CPATChecks2SSH

Created: Mon, Feb 26, 2024, 22:52:10 UTC Compartment: ggsstage (root)/DMS/jorge

Type: Evaluation

Resources

Phases

Excluded objects

Name	Status	Duration
Validate target	Completed	12 s
Validate source	Completed	13 s
<a href="#">Validate premigration advisor</a>	Failed	19 s

Embedded CPAT rules evaluate source database for issues. Validation fails when issues need user attention.



# Step 4b: Validate Migration

## Resolve CPAT findings

### Validate premigration advisor

**AR**  
FAILED

Download advisor report

Advisor report information

Action required count: 12  
Review required count: 2  
Review suggested count: 4

### Checks

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

Name	Result	Review
<a href="#">Has columns with media data types adb</a>	Action required	No
<a href="#">Has noexport object grants</a>	Review required	No
<a href="#">Gg_not_unique_bad_col_no</a>	Review required	No
<a href="#">Dp_has_low_streams_pool_size</a>	Passed	No

### 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:**

Exclude all | **Exclude selected** | Include selected

<input checked="" type="checkbox"/>	OWNER	TABLE_NAME	COLUMN_NAME	DATA_TYPE	Is excluded
<input checked="" type="checkbox"/>	HR01	IMAGE_TABLE	IMAGE	ORDIMAGE	No

1 selected | Showing 1 item | < Page 1 >

The advisor displays the *Issue*, *Impact*, and available *Actions*. In this case, the problematic object is excluded from the migration.



# Step 4c: Validate Migration

Validation success!

The screenshot displays the Oracle Cloud Migration console. On the left, a 'TestMigration' card shows a green 'DM' icon and the status 'ACCEPTED'. A red box highlights the 'Validate' button. Below it, migration information is listed: OCID: ...khho4q, Compartment: ggsstage (root)/DM, Created: Wed, Feb 14, 2024, 21:1, Encryption vault: DMS\_Vault, and Encryption key: DMS\_Key.

On the right, a 'job-20240214211656' card shows a green 'JOB' icon and the status 'SUCCEEDED'. It includes buttons for Resume, Abort, Download log, Add tags, and Delete. Job information includes OCID: ...l2mkza, Migration: CPATChecks2, Compartment: ggsstage (root)/DMS/jorge, and Type: Evaluation.

Below the job card is a 'Phases' table:

Name	Status	Duration
Validate target	Completed	7 s
Validate source	Completed	5 s
<a href="#">Validate premigration advisor</a>	Completed	15 s

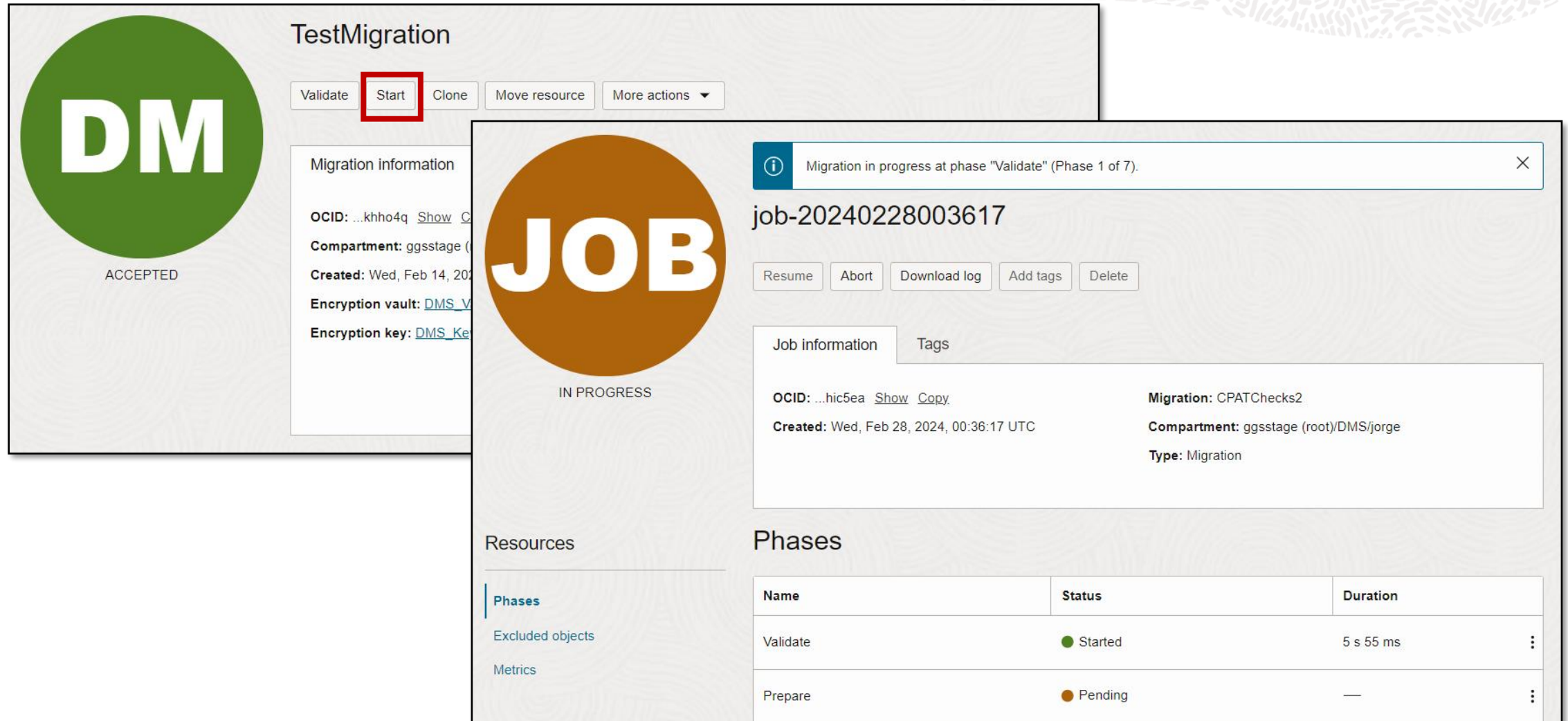
A green arrow points from the 'Validate premigration advisor' row to the right.

After repairs, the validation runs again. When validation succeeds, the migration continues to the next phase.



# Step 5: Start Migration

Initiate the migration job to migrate the database to the cloud



**TestMigration**

Validate **Start** Clone Move resource More actions ▾

**DM**  
ACCEPTED

Migration information

OCID: ...khho4q [Show](#) [Copy](#)

Compartment: ggsstage (root)/DMS/jorge

Created: Wed, Feb 14, 2024, 00:36:17 UTC

Encryption vault: [DMS\\_Vault](#)

Encryption key: [DMS\\_Key](#)

**JOB**  
IN PROGRESS

Migration in progress at phase "Validate" (Phase 1 of 7).

**job-20240228003617**

Resume Abort Download log Add tags Delete

Job information Tags

OCID: ...hic5ea [Show](#) [Copy](#)

Created: Wed, Feb 28, 2024, 00:36:17 UTC

Migration: CPATChecks2

Compartment: ggsstage (root)/DMS/jorge

Type: Migration

Resources

Phases

Name	Status	Duration	
Validate	● Started	5 s 55 ms	⋮
Prepare	● Pending	—	⋮

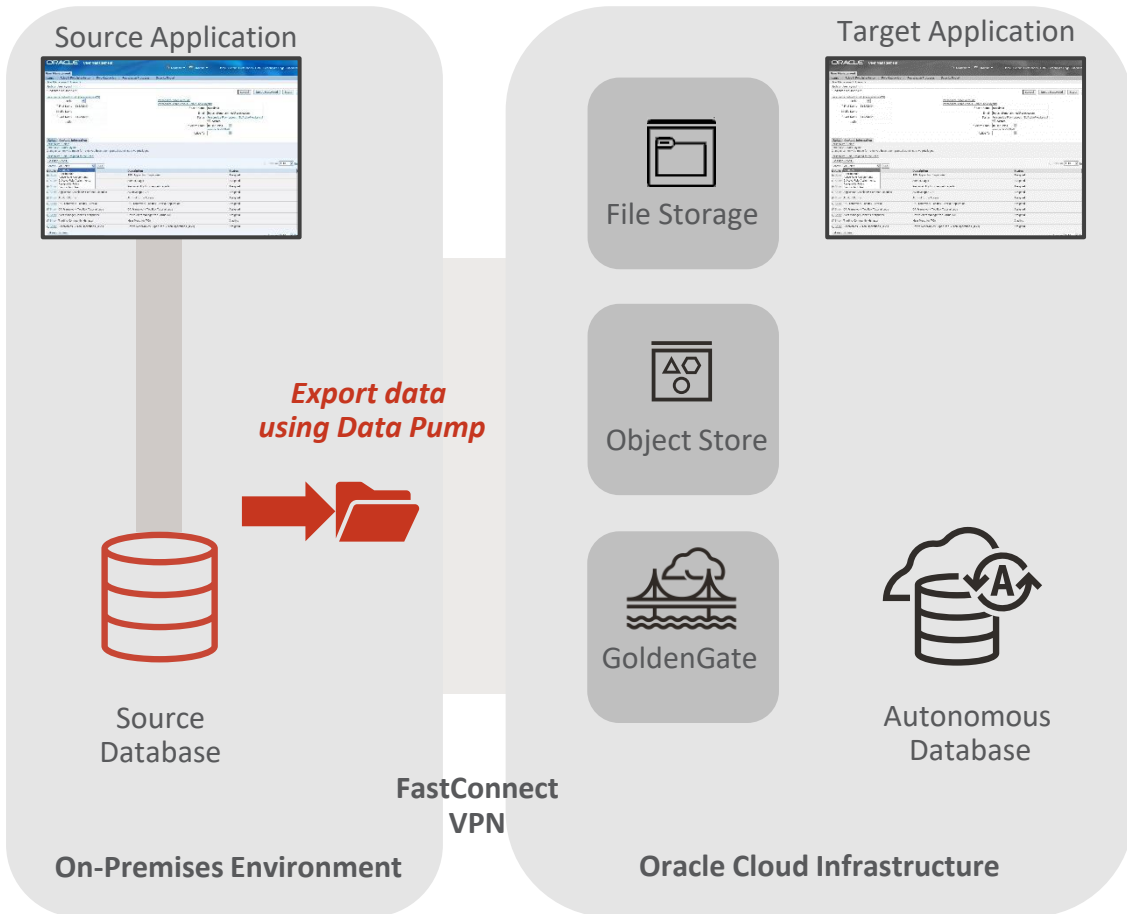
Excluded objects

Metrics



# Start Migration – Export Initial Load

Current DB state is exported to files using Oracle Data Pump



## Phases

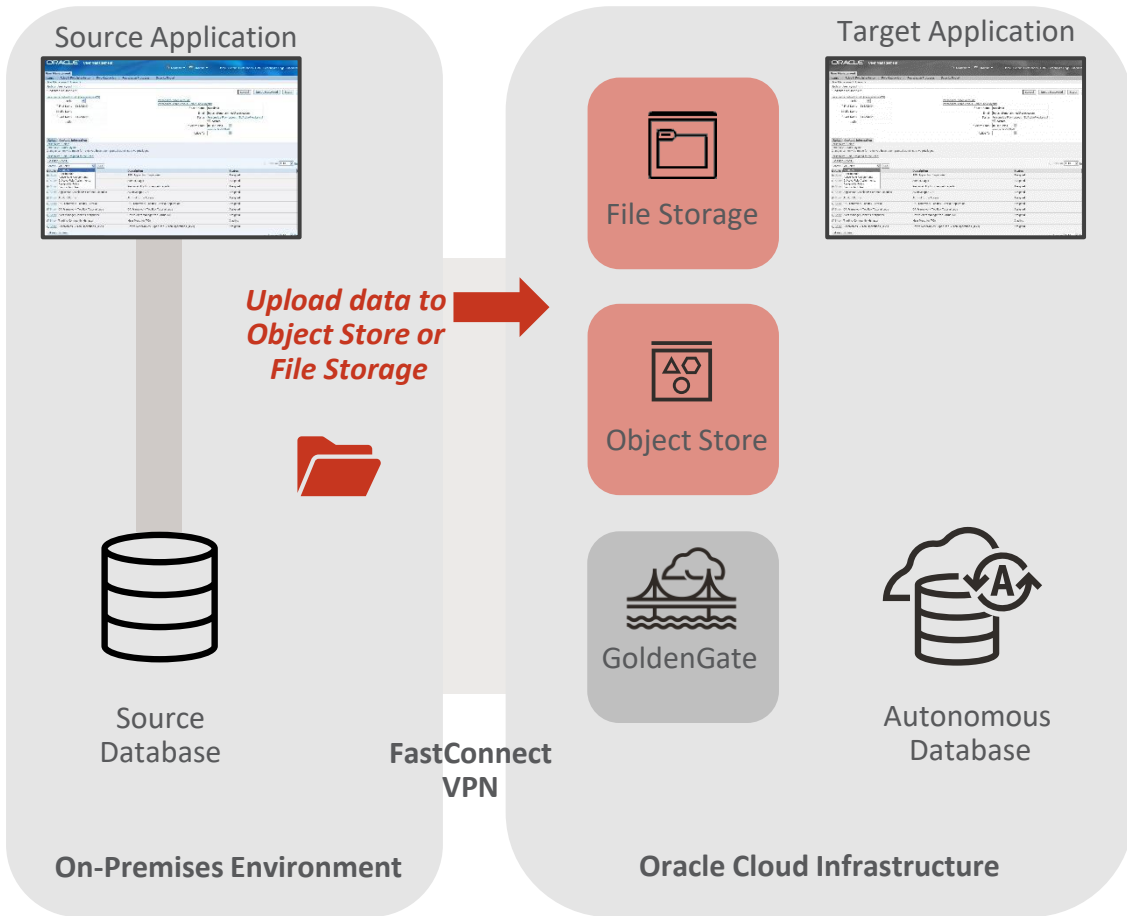
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Started <input type="checkbox"/> 66%	3 m 38 s
Upload Data	● Pending	—
Import Initial Load	● Pending	—
Post Initial Load	● Pending	—
Prepare Replication Target	● Pending	—
Monitor Replication Lag	● Pending	—
Switchover	● Pending	—
Cleanup	● Pending	—

Showing 10 Items < 1 of 1 >



# Start Migration – Upload Data

Data Pump export is uploaded to the intermediate storage



## Phases

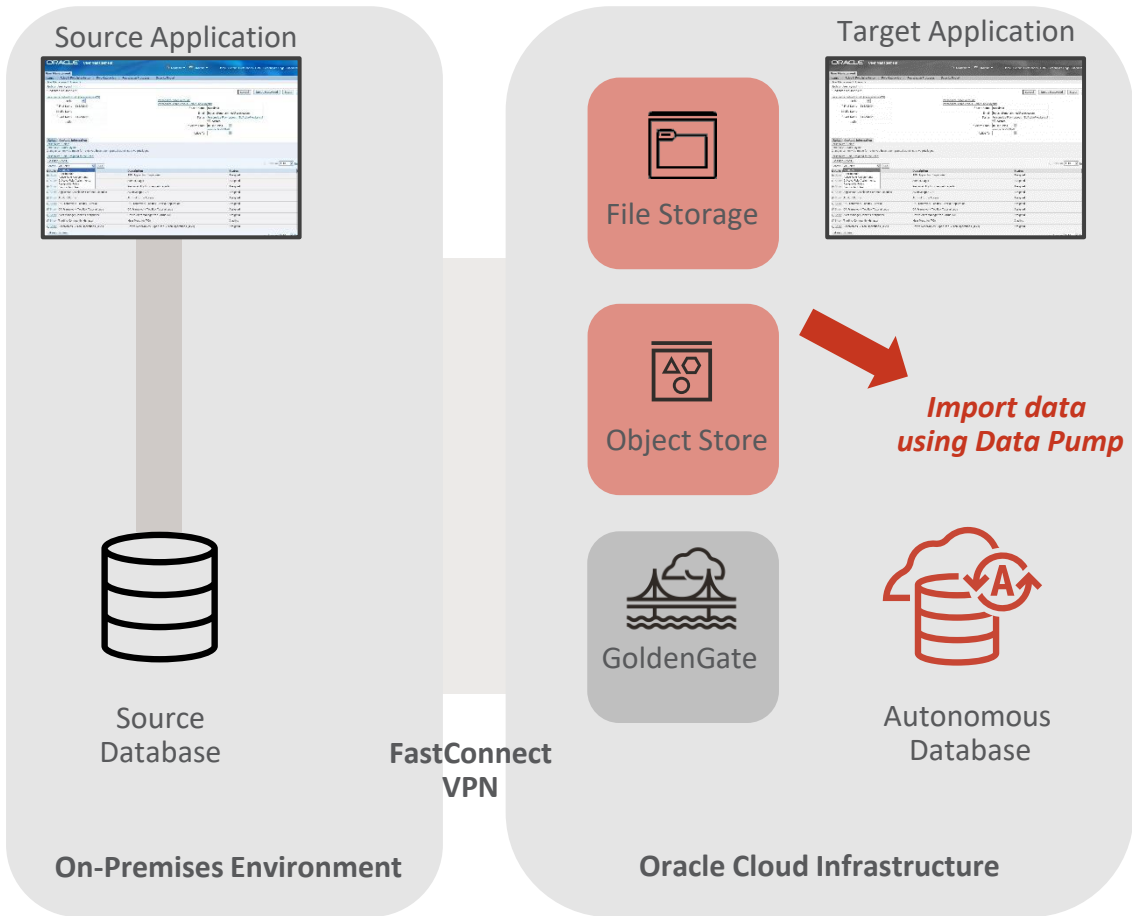
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Started	26 s
Import Initial Load	● Pending	—
Post Initial Load	● Pending	—
Prepare Replication Target	● Pending	—
Monitor Replication Lag	● Pending	—
Switchover	● Pending	—
Cleanup	● Pending	—

Showing 10 Items < 1 of 1 >



# Start Migration – Import Initial Load

Exported dump files are imported to ADB



## Phases

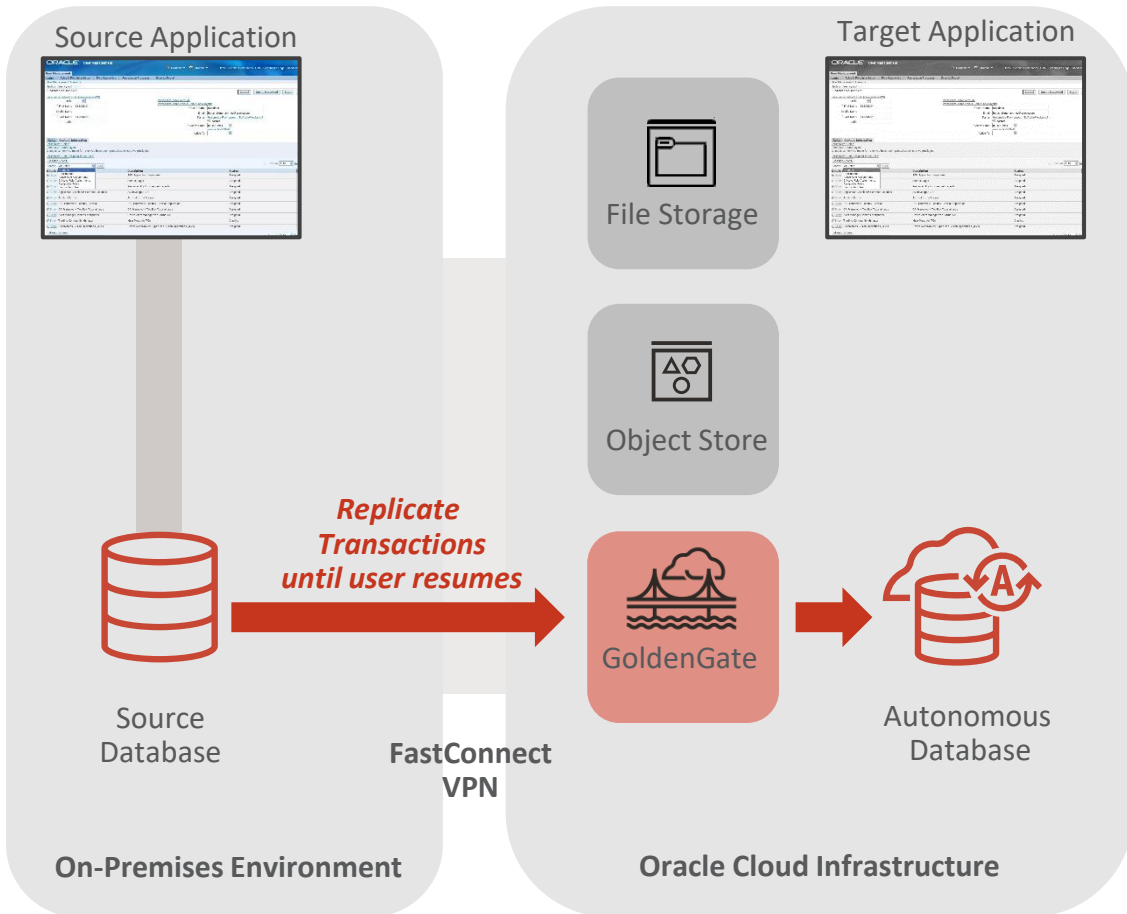
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Completed	1 m 13 s
Import Initial Load	● Started <input type="checkbox"/> 50%	3 m 30 s
Post Initial Load	● Pending	—
Prepare Replication Target	● Pending	—
Monitor Replication Lag	● Pending	—
Switchover	● Pending	—
Cleanup	● Pending	—

Showing 10 Items < 1 of 1 >



# Start Migration – Replication

DB transactions are replicated using GoldenGate until user resumes the next phase



## Phases

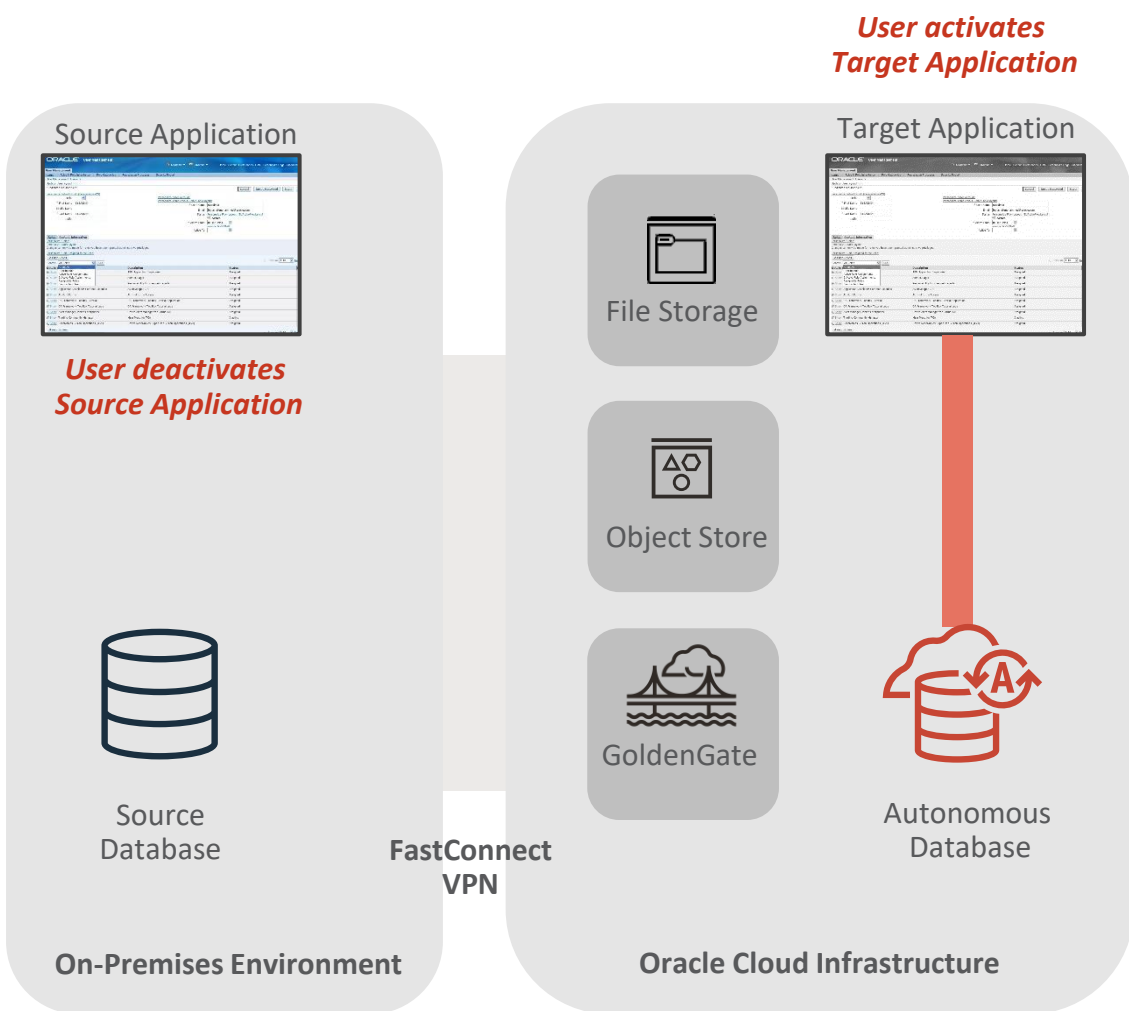
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Completed	1 m 13 s
Import Initial Load	● Completed	5 m 33 s
Post Initial Load	● Completed	3 s
Prepare Replication Target	● Completed	2 m 11 s
Monitor Replication Lag	● Completed	2 s
Switchover	● Pending	—
Cleanup	● Pending	—

Showing 10 Items < 1 of 1 >



# Start Migration – Switchover

Wait until last transaction is replicated to switch over applications



## Phases

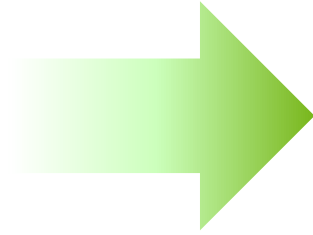
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Completed	1 m 13 s
Import Initial Load	● Completed	5 m 33 s
Post Initial Load	● Completed	3 s
Prepare Replication Target	● Completed	2 m 11 s
Monitor Replication Lag	● Completed	2 s
Switchover	● Completed	1 m 26 s
Cleanup	● Pending	—

Showing 10 Items < 1 of 1 >





# Migration Succeeded!



## job-20240103044437

**JOB**  
SUCCEEDED

Resume Abort Download log Add tags Delete

Job information Tags

OCID: ...5ujwba [Show](#) [Copy](#) Migration: GREENBUTTON  
Created: Wed, Jan 3, 2024, 04:44:37 UTC Compartment: ggsstage (root)/DMS/jorge  
Type: Migration

Resources

- Phases
- Excluded objects
- Metrics

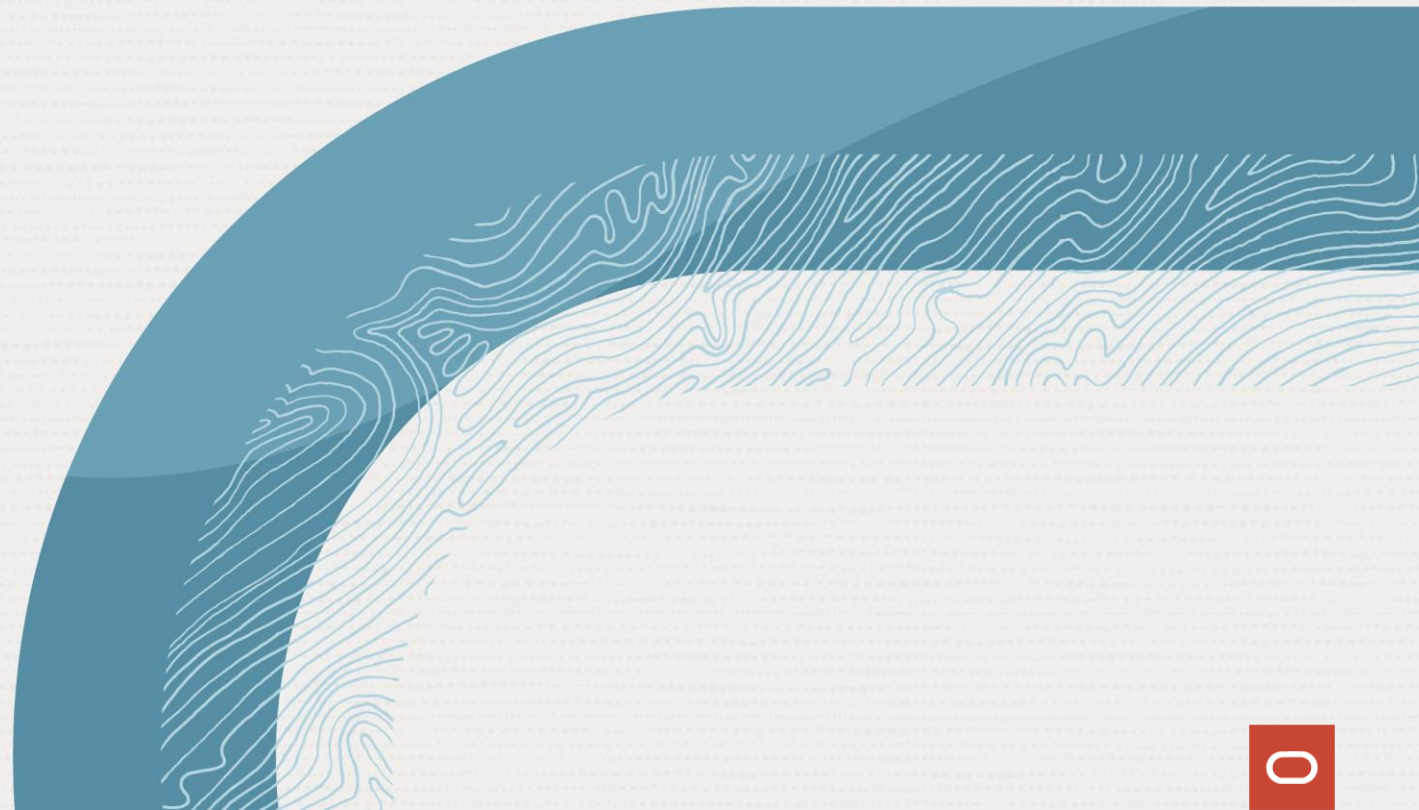
### Phases

Name	Status	Duration
Initialize replication infrastructure	Completed	14 m 12 s 527 ms
Validate	Completed	4 m
Prepare	Completed	6 m
Export initial load	Completed	6 m
Upload data	Completed	55 m
Import initial load	Completed	45 m
Post initial load	Completed	15 m
Prepare replication target	Completed	4 m
Monitor replication lag	Completed	48 m
Switchover	Completed	6 m
Cleanup	Completed	4 m

Showing 11 items < 1 of 1 >



# Thank You!



ORACLE