

# Cloud Database Migrations the Easy Way

Introduction to OCI Database Migration for MySQL Databases

for MySQL Databases



# Safe harbor statement

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# Resources to learn more

MySQL migration documentation

[Click here](#)

Oracle 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

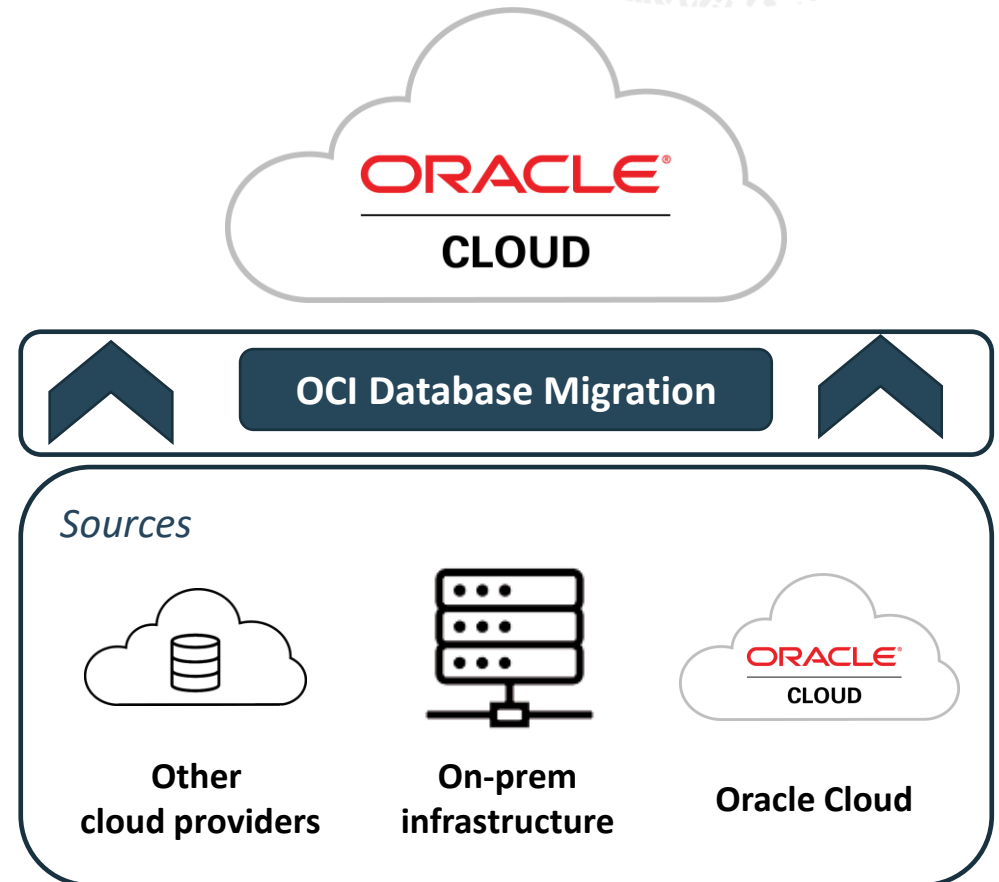
- Reduce cost and improve performance in Oracle Cloud
- Migrate databases, free for 6 months per migration

## Core use cases

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

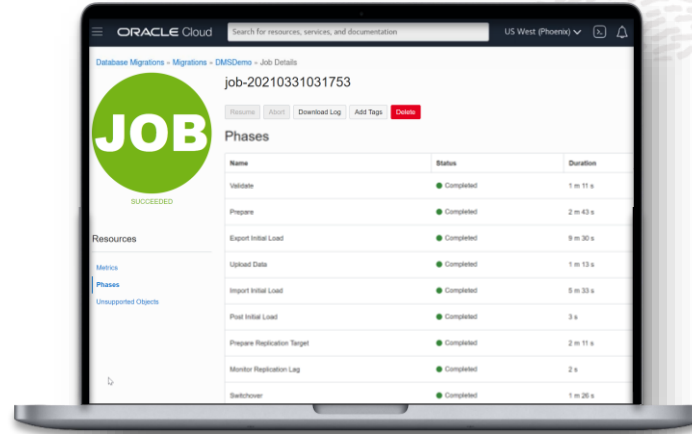
## Differentiated use cases

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



# OCI Database Migration based on enterprise-strength tools

Single  
Workflow



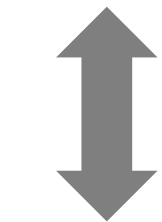
Simple Online  
Experience

## Oracle Databases

## MySQL Databases

Move to OCI  
Autonomous AI/  
Co-managed

Move to  
MySQL HeatWave

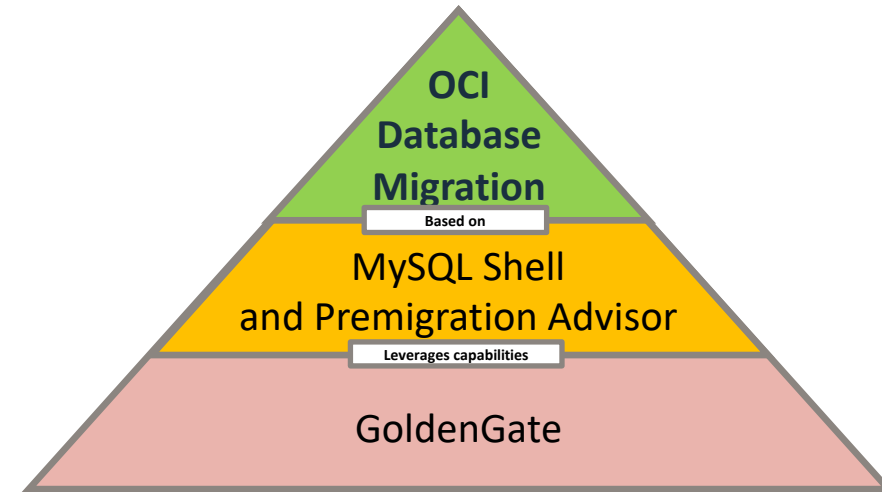
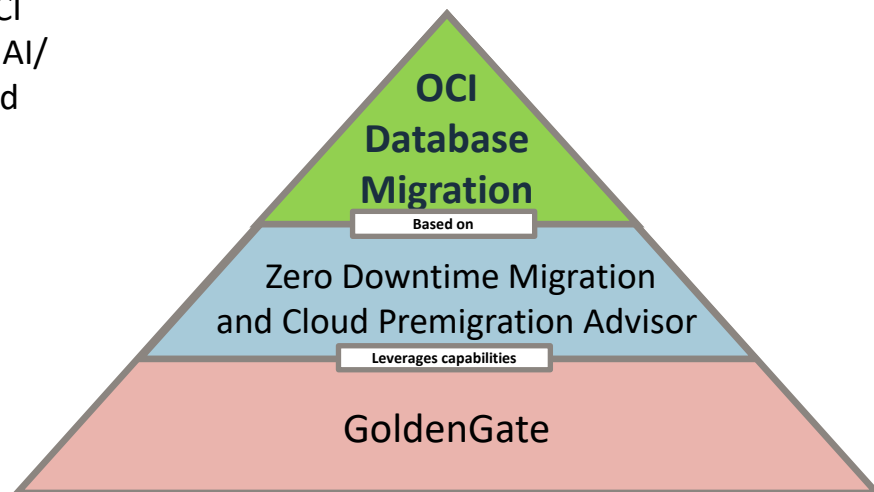


UI-led  
experience



Flexible  
Fleet-level

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)**

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

## **Online Migration**

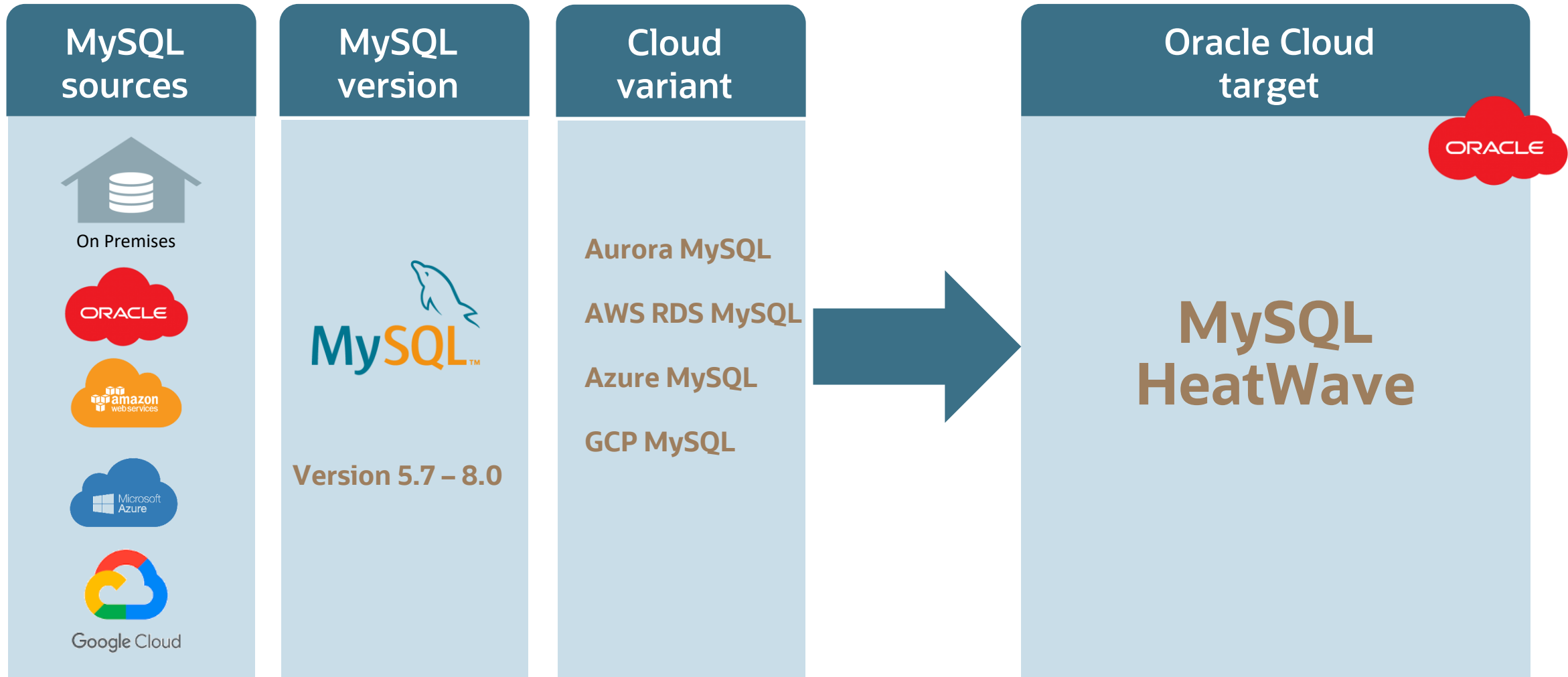
- Initial copy of database followed by change data capture during migration
- Applications can stay online during migration

## **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

# OCI Database Migration – Native OCI Cloud Service

MySQL supported scenarios:



# Migration steps



# 1

## Prerequisites:

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

# 2

## Setup

- Database connection creation for source and target.

# 3

## Validate and prepare

- Assessment to identify incompatible objects between source and target
- Database readiness for migration

# 4

## Start

- Fully automated

## Optional controls

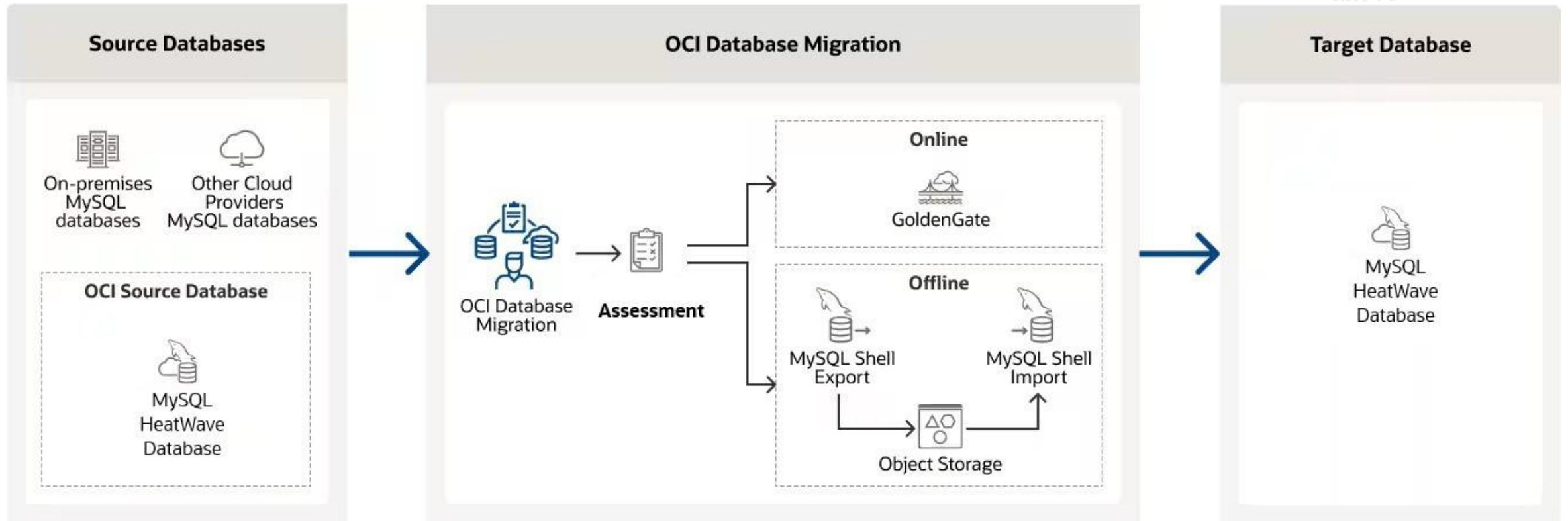
- Initial load
- Online replication
- Restarts

# 5

## Complete

- Switch operations to new database

# How it works for MySQL migrations



# Pricing: **FREE** for all common MySQL 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

## Not included:

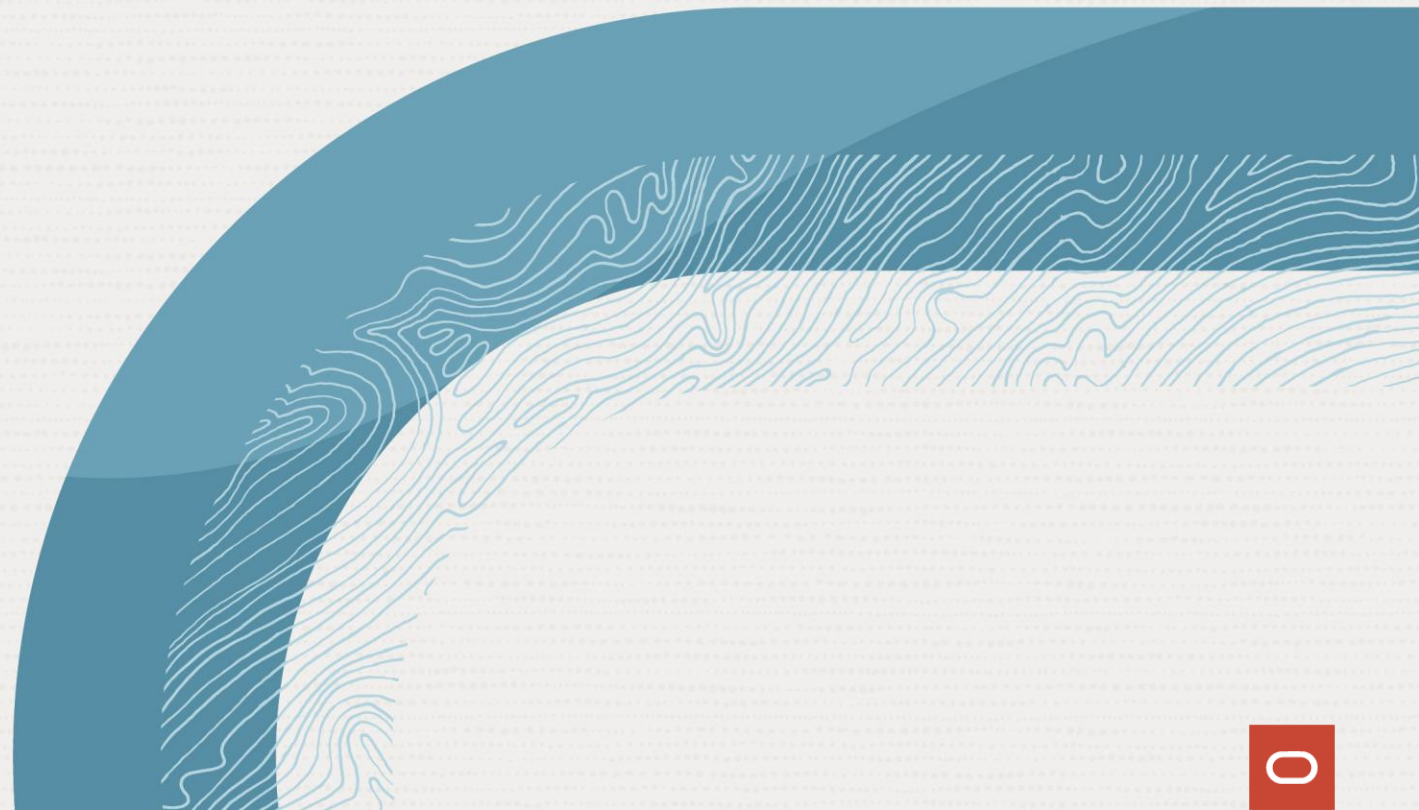
- Customer managed OCI resources used for database migration operations
  - OCI Object Storage
- FastConnect or other on-premise-to-cloud network connectivity
- Source or target database service costs

## 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



# A walkthrough



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

The screenshot shows the OCI Console interface. At the top, there is a navigation bar with a search icon, a dropdown menu set to 'US West (San Jose)', and several utility icons. On the left side, there is a sidebar menu with a search box and several categories: Oracle AI Database, Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, and Hybrid & Multicloud. The 'Migration & Disaster Recovery' category is highlighted with a red border. The main content area is titled 'Migration & Disaster Recovery' and contains two columns of links. The first column, 'Cloud Migrations', includes links for Overview, Migrations, Remote Connections, Discovery, and Inventory. The second column, 'Database Migration', includes links for Overview, Assessments, Migrations, and Database Connections. Below these is a 'Disaster Recovery' section with links for Overview and DR Protection Groups. The 'Database Migration' header and its first link, 'Overview', are highlighted with a red border.

Cloud

Search

Oracle AI Database

Databases

Analytics & AI

Developer Services

Identity & Security

Observability & Management

Hybrid & Multicloud

**Migration & Disaster Recovery**

**Migration & Disaster Recovery**

**Cloud Migrations**

Overview

Migrations

Remote Connections

Discovery

Inventory

**Database Migration**

Overview

Assessments

Migrations

Database Connections

**Disaster Recovery**

Overview

DR Protection Groups

# Step 2: Create Connections for source and target

## Provide reusable connection information and credentials for databases

### Create connection

**Warning**  
Before creating a database connection, ensure that your databases are [prepared for migration](#).

[Download preparation script](#)

Name Required

Description

Compartment  
Demo

Type  
Amazon RDS for MySQL

#### Vault details

Vault in compartment  
Demo

Vault  
Required

Encryption key in compartment  
Demo

Encryption key  
Required

### Connection details

Enter connection details for Amazon RDS for MySQL.

Database name Required

Host or IP address Required Port Required

Initial load database username Required

Initial load database password Required

Use different credentials for replication

#### SSL details

Security protocol  
Plain

#### Network connectivity

Create private endpoint to access this database

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

> **Advanced options**

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



# Step 3: Assessment creation

Select source and target connection details, provide migration parameters.



### Create assessment

Name

Required

Description

Compartment

Database type

### Source database

Compartment  Database connection

Required

Database objects

### Target database

Target type

**Connect to the database**  
Select this option if you have already created a connection.

**Select the target database type**  
Select this option if you do not have a target database or if Oracle Cloud Infrastructure (OCI) Console cannot connect to the database.

Compartment  Database connection

### Migration options

Network speed

Acceptable downtime

Data size for migration

Required

DDL changes expected

Required

Create and run assessment

Turning this off will only create the assessment and you will need to manually run the first assessment step.

> **Advanced options**



## Step 4: Migration method selection

Based on the provided inputs, a migration method is recommended, confirm your selection.

### Review recommended migration method

The recommended migration method is Online migration, (recommended based on settings selected)  
Would you like to proceed with this recommendation, or choose a different migration method? [Learn more](#)

Migration method

Select offline migration ⓘ

Proceed with online migration (recommended) ⓘ

Cancel **Confirm**



# Step 5: Analyze compatibility

Incompatibilities between source and target are identified as well as validation of database configuration readiness.

### 2. Analyze compatibility

Service will evaluate that source and target databases are suitable for the OCI Database Migration Service.

Review required (1)

- MySQL GTID Mode Check Acknowledged Review

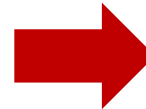
Review is suggested (2)

- MySQL Shell Initial Load Checks Not acknowledged Review
- GG capture binary log files and index reside in same directory Not acknowledged Review

Passed checks (20)

- MySQL version should be >= 5.7 Passed Review
- Binlog Row Metadata should be FULL (applies for MySQL 8+) Passed Review
- GG apply has MyISAM engine Passed Review
- GG apply has InnoDB engine Passed Review
- GG capture has proper user privileges Passed Review
- GG apply has user privileges Passed Review
- GG database has supported schema level character set Passed Review

Close



### Review issues

Name	MySQL Shell Initial Load Checks
Status	<span>Not acknowledged</span>
Issue	The current user lacks privileges to acquire a global read lock using 'FLUSH ... Upgrading MySQL Server from version 8.0.42 to 9.6.0 is not supported. Please ...
Impact	MySQL initial load utility found an unsupported feature/configuration, MySQL initial load utility found an unsupported feature/configuration
Action	The current user lacks privileges to acquire a global read lock using 'FLUSH TABLES WITH READ LOCK'. Falling back to LOCK TABLES... Upgrading MySQL Server from version 8.0.42 to 9.6.0 is not supported. Please consider running the check using the following option: targetVersion=8.4

Cancel Previous issue Next issue Acknowledge

You can review each check and take appropriate actions, a clear issue, impact and action is displayed. Once blockers are resolved the step will complete.



# Step 6: Complete migration configuration

Provide additional details to complete your migration configuration

### Configure Migration

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

Name  
My Migration

Description

Compartment  
assessment-demo

#### Connection details

Source database connection    mysqldb-us-west-1a

Target database connection    OCI HeatWave

#### Storage settings

Object Storage bucket is used for temporary storage of database export files or logs.

Object Storage bucket in compartment  
assessment-demo

Object Storage bucket  
assessment-demo

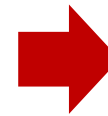
#### Online replication

Use online replication

**> Advanced options**

Cancel    **Configure**

Database connections details and online replication options will be displayed; they are not updatable in this screen as they come from the provided inputs. You can select a transfer medium for your initial load, and you can access the advanced options for initial load and replication.



Advanced options

- > Initial load
- > Replication
- > Tags

Cancel    **Configure**

# Step 7: Prepare source and target steps

Approved checks during Analyze compatibility will be executed in these steps

## 5. Prepare target database

Java Objects	Approved	Review
Java Sources	Approved	Review

### Preparation script

**▲ Review script**  
The following script prepares and will make changes to your database. Ensure that you review it completely before running it. After running the script the database needs to be restarted.

SQL script Copy

```
5 --
6 -- Fixup Script Execution Context Notes:
7 --   Execute this Fixup on the Target Instance
8 --   The instance must be restarted after applying this Fixup
9 --
10 -- Action:
11 --   Enable the JAVAVM feature on the target system by executing this SQL
12 --   and then restart your instance
13 --
14 -- BEGIN
```

I have reviewed the SQL script and am aware of the changes it will apply to my database

**Run SQL** Download SQL

Close

SQL script can be reviewed, when ready the service can run it or the user can select to download it and run it locally. Any pending database configuration will be displayed with clear user actions.



# Step 8: Advanced assessment steps (optional)

Currently a table migration can be completed to validate the migration configuration

### 6. Advanced assessment steps (optional)

Select and run any of the following optional steps as needed. Each step operates independently and enables a specific feature. Refer to the description of each step to learn more about its functionality.

<b>Migrate table</b>	Not started	Run
This step will test the assessment. It will create a table named DMS_MIGRATION_TEST_2XINCQ in the GGADMIN schema and transfer it to the target database.		

Close

This step will create a table in the GGADMIN schema and transfer it to the target database.

In case failures, a clear description of the issue, impact and resolution is provided, the log file can be downloaded.



# Step 9: Start Migration

Initiate the migration job to migrate the database to the cloud

← Migrations

## My Migration

In progress (Assessed)

Start More actions

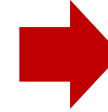
Details Progress Migration history Selected objects Monitoring Work requests Tags

### Progress

Search and Filter Search

Start

Name	Status	Duration
Initialize replication infrastructure	Pending	—
Validate	Pending	—
Export initial load and upload data	Pending	—
Import initial load	Pending	—
Prepare	Pending	—
Monitor replication lag	Pending	—
Switchover	Pending	—
Cleanup	Pending	—



### Start migration

Are you sure you want to start migration Migration?

Require user input after a phase before proceeding

Phase to pause after  
Monitor replication lag

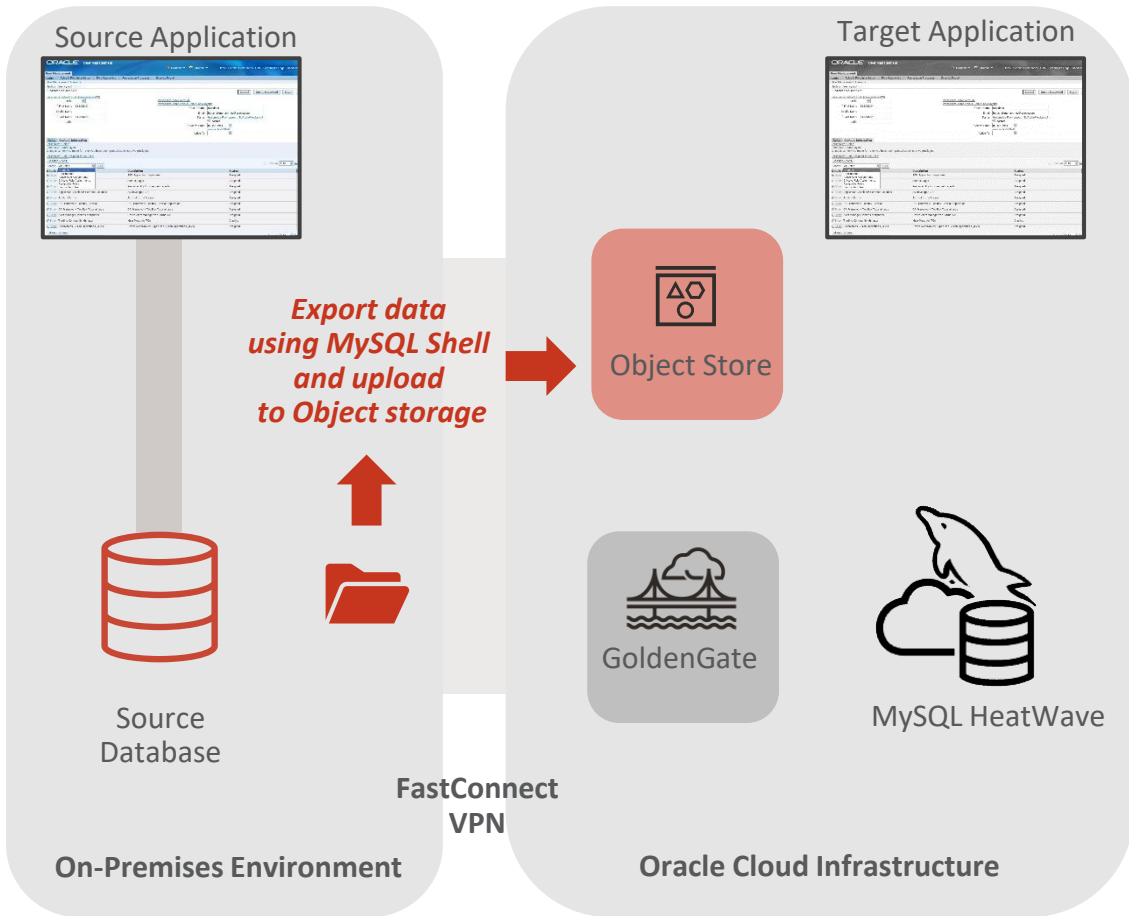
Cancel Start

User can select a phase to pause after.



# Start Migration – Export Initial Load and Upload Data

Current DB state is exported to files and uploaded to OSS using MySQL Shell



## Phases

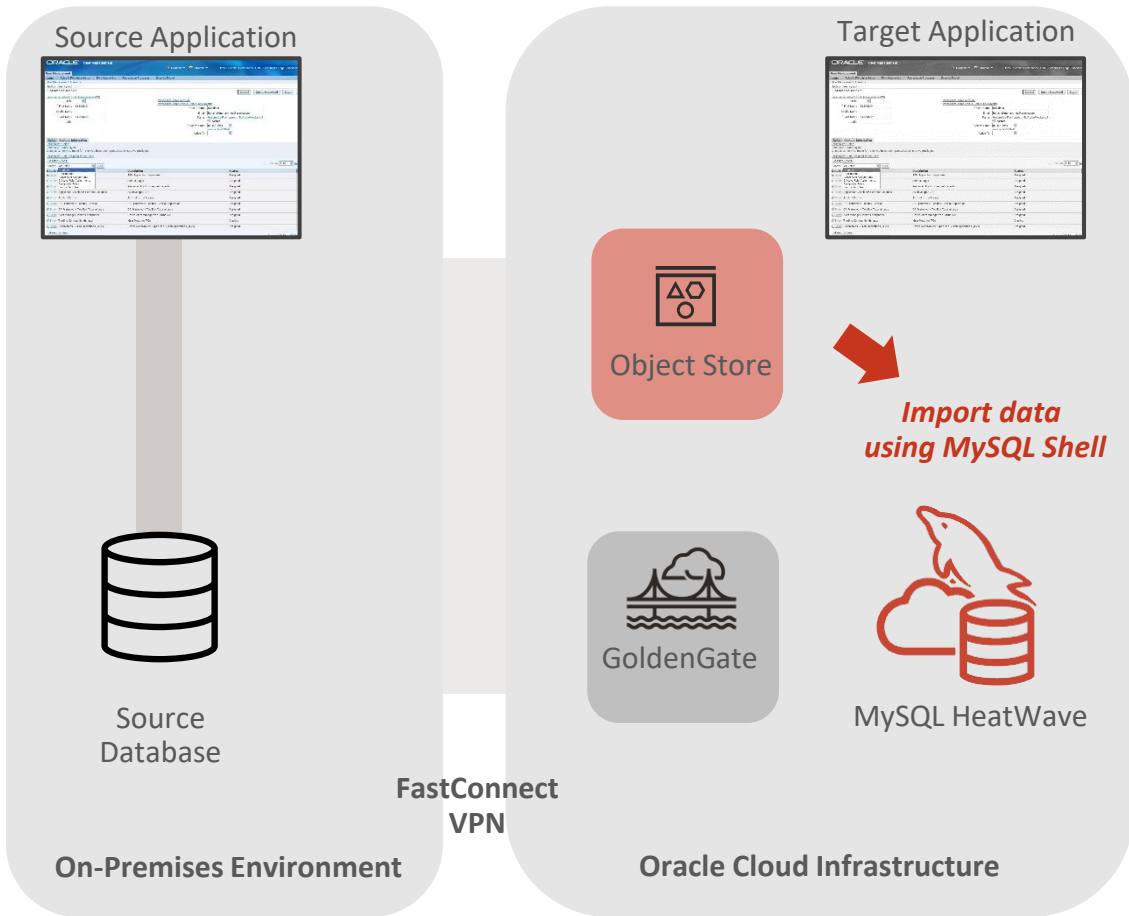
Name	Status	Duration
Initialize replication infrastructure	Completed	12 m 58 s 550 ms
Validate	Completed	3 s 76 ms
Export initial load and upload data	Started <input type="checkbox"/> 33%	5 s 332 ms
Import initial load	Pending	—
<a href="#">Prepare</a>	Pending	—
Monitor replication lag	Pending	—
Switchover	Pending	—
Cleanup	Pending	—

Showing 8 items < 1 of 1 >



# Start Migration – Import Initial Load

## Exported dump files are imported to HeatWave MySQL



### Phases

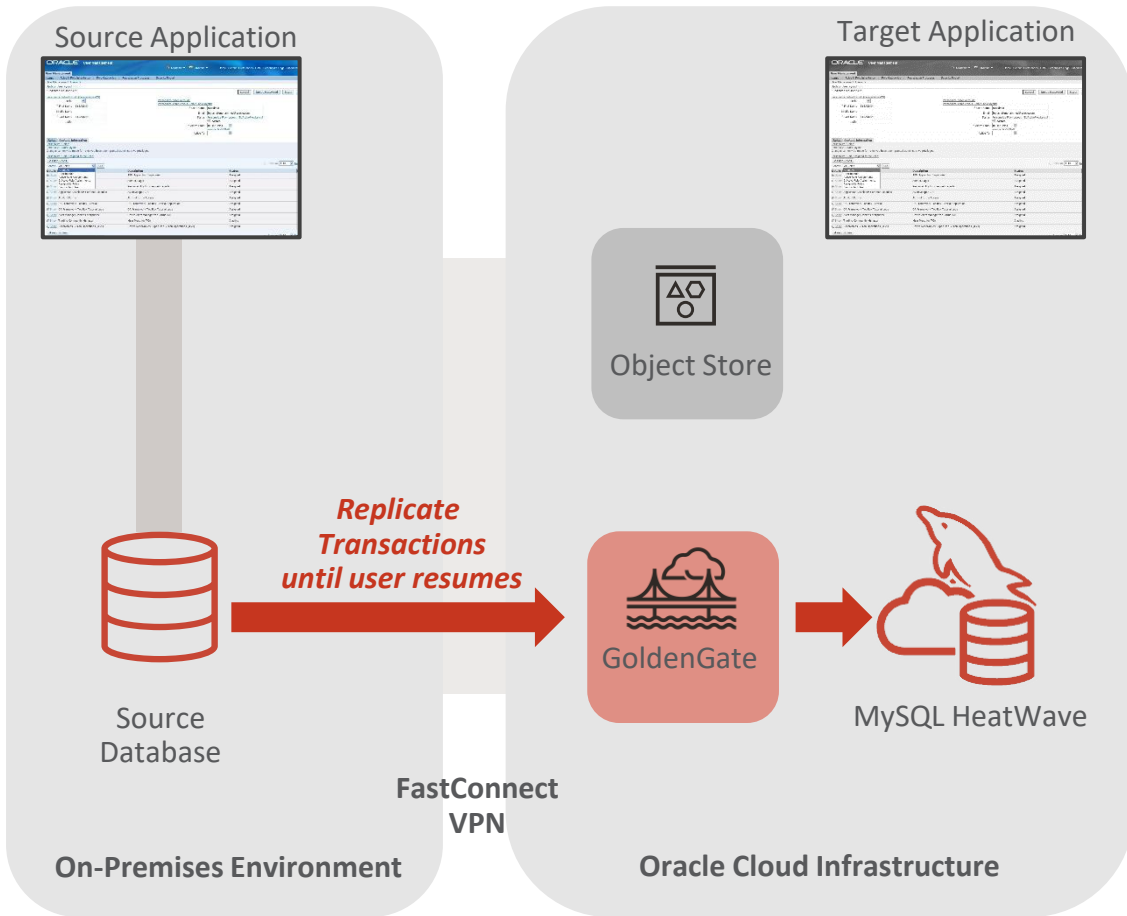
Name	Status	Duration
Initialize replication infrastructure	● Completed	12 m 58 s 550 ms
Validate	● Completed	3 s 76 ms
Export initial load and upload data	● Completed	5 s 332 ms
Import initial load	● Started <input checked="" type="checkbox"/> 42%	—
<a href="#">Prepare</a>	● Pending	—
Monitor replication lag	● Pending	—
Switchover	● Pending	—
Cleanup	● Pending	—

Showing 8 items < 1 of 1 >



# Start Migration – Replication

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



## Phases

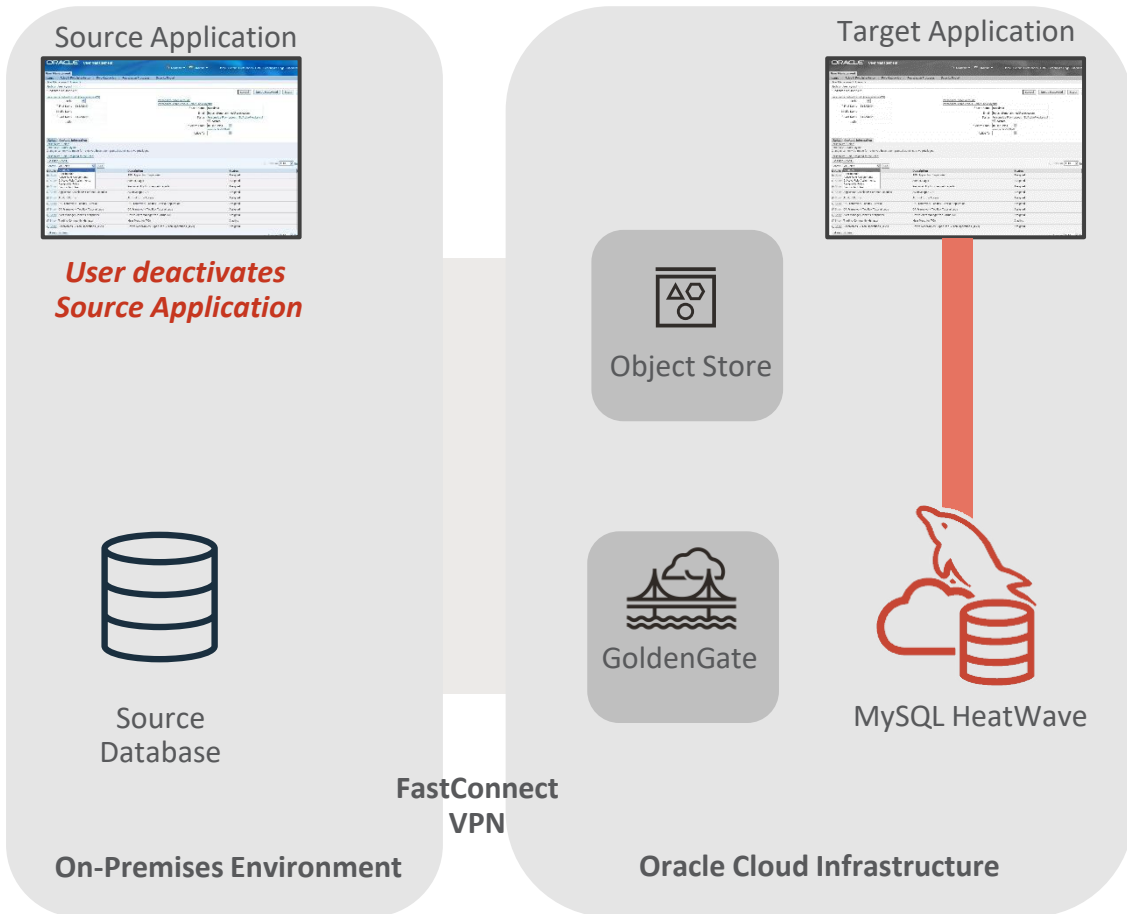
Name	Status	Duration	
Initialize replication infrastructure	● Completed	12 m 58 s 550 ms	⋮
Validate	● Completed	3 s 76 ms	⋮
Export initial load and upload data	● Completed	5 s 332 ms	⋮
Import initial load	● Completed	10 s 606 ms	⋮
<a href="#">Prepare</a>	● Completed	594 ms	⋮
Monitor replication lag	● Completed	860 ms	⋮
Switchover	● Pending	—	⋮
Cleanup	● Pending	—	⋮

Showing 8 items < 1 of 1 >



# Start Migration – Switchover

Wait until last transaction is replicated to switch over applications



## Phases

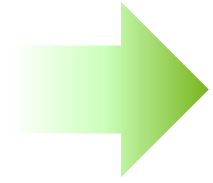
Name	Status	Duration
Initialize replication infrastructure	Completed	12 m 58 s 550 ms
Validate	Completed	3 s 76 ms
Export initial load and upload data	Completed	5 s 332 ms
Import initial load	Completed	10 s 606 ms
<a href="#">Prepare</a>	Completed	594 ms
Monitor replication lag	Completed	860 ms
Switchover	Completed	2 s 528 ms
Cleanup	Pending	—

Showing 8 items < 1 of 1 >



# Migration Succeeded!

Once all phases including switchover, and cleanup, the migration is marked as succeed.



## My Migration Succeeded

Migration

Start More actions

Details Progress Migration history Selected objects Monitoring Work requests Tags

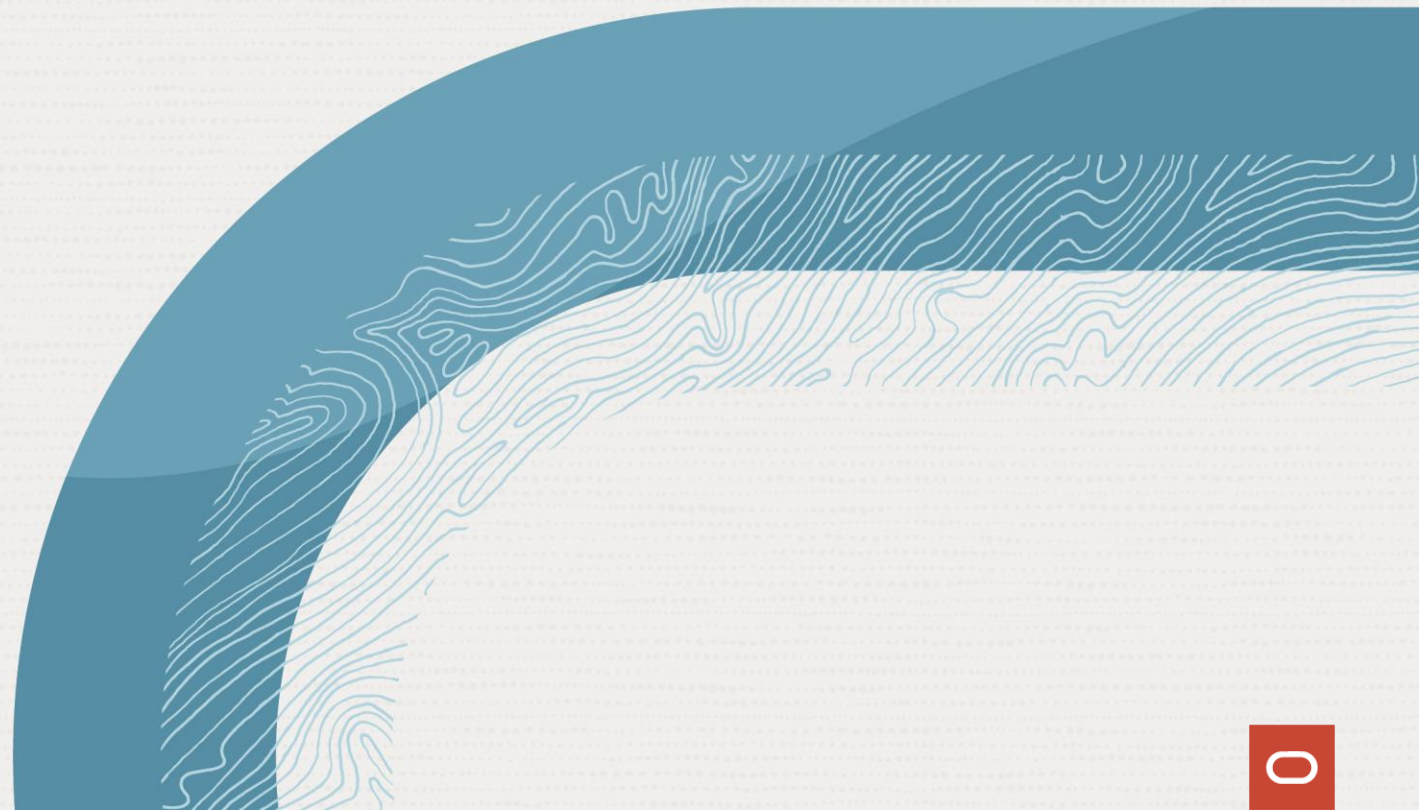
### Progress

Search and Filter Search

Resume

Name	Status	Duration	
Initialize replication infrastructure	Completed	16 m 27 s	...
Validate	Completed	3 s	...
Export initial load and upload data	Completed	5 s	...
Import initial load	Completed	5 s	...
Prepare	Completed	1 s	...
Monitor replication lag	Completed	2 m	...
Switchover	Completed	5 m 16 s	...
Cleanup	Completed	7 s	...

Thank You!



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