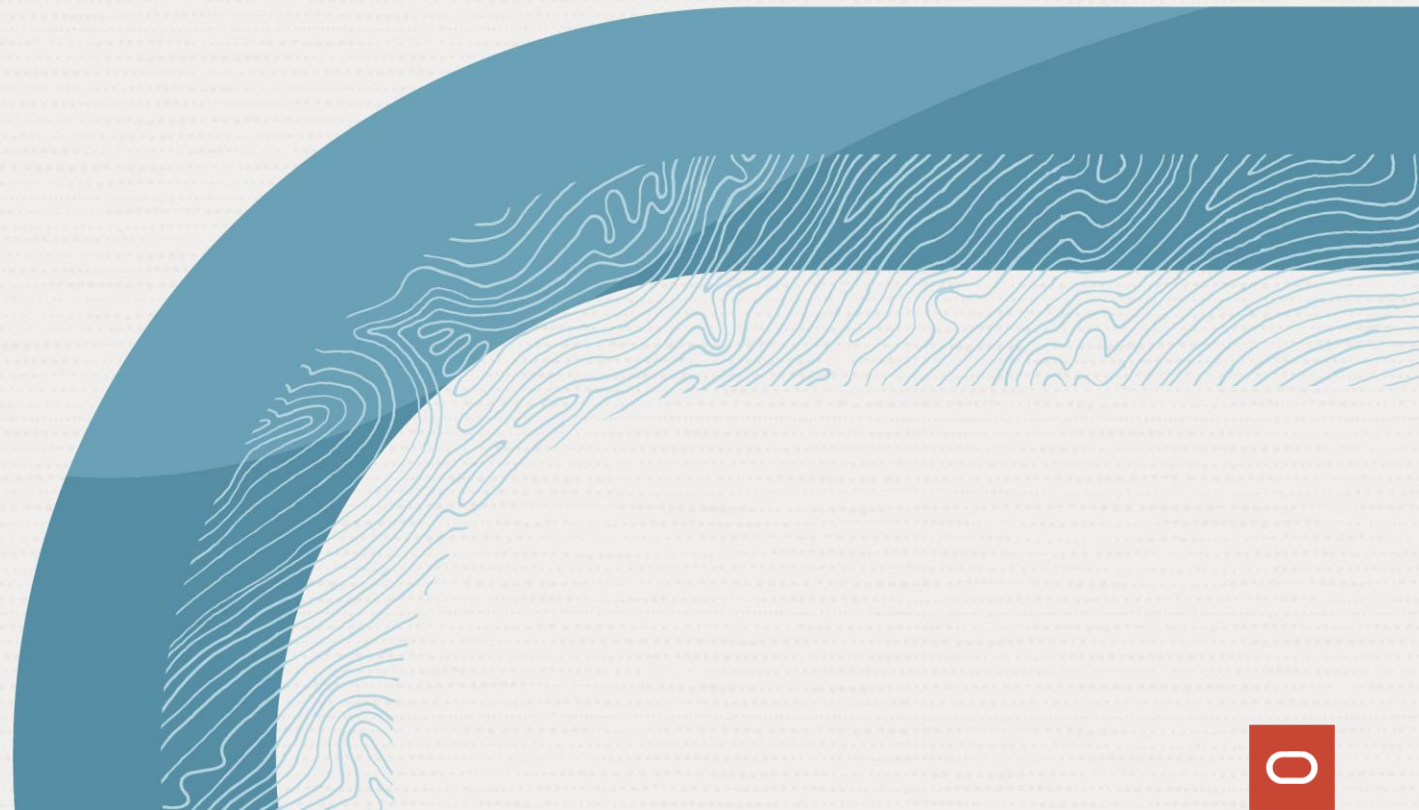


Cloud Database Migrations the Easy Way

Introduction to OCI Database Migration for MySQL Databases

for MySQL 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](#)

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

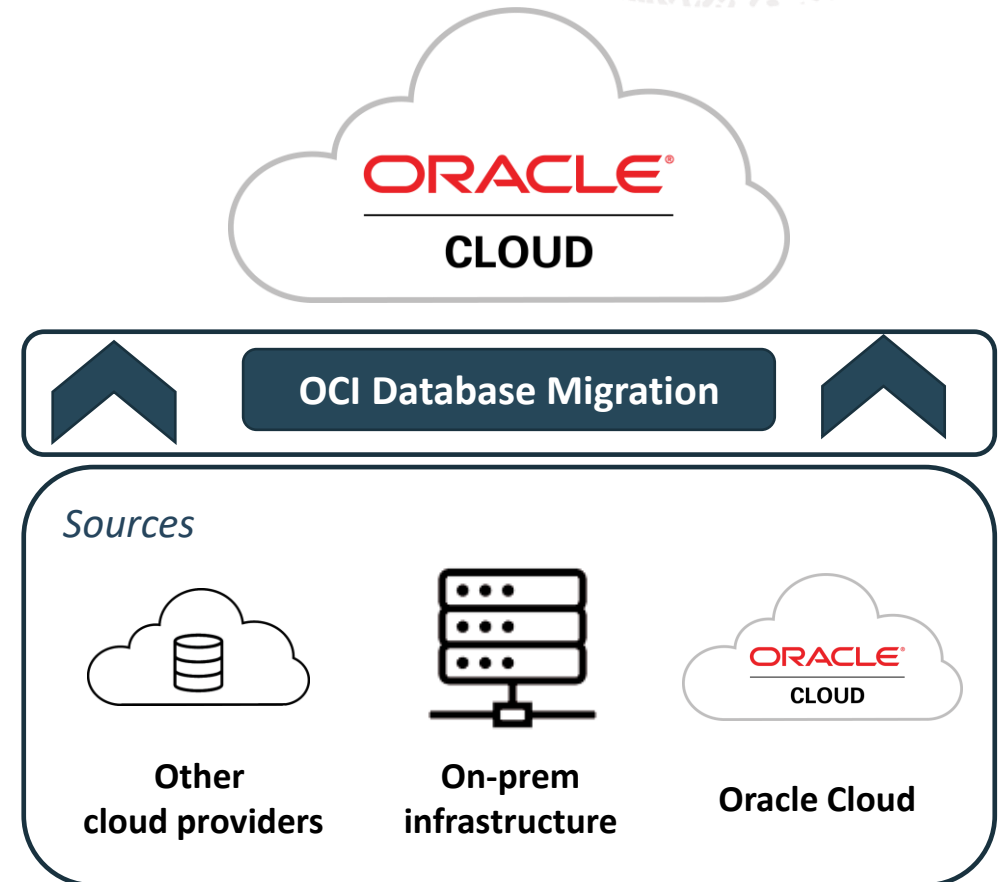
- Reduce cost and improve performance in Oracle Cloud
- Migrate databases, free for 6 months per migration

Core use cases

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

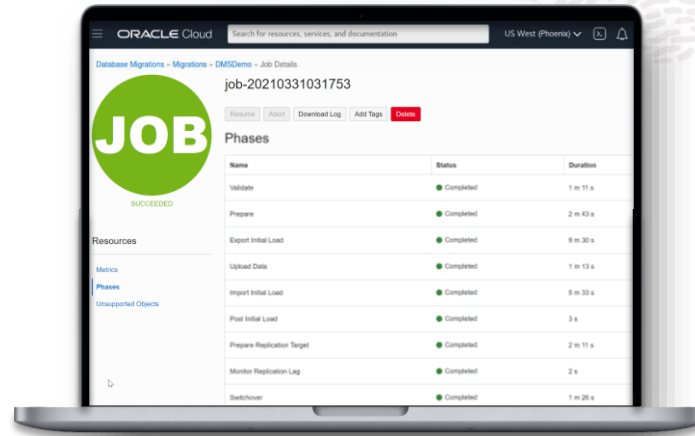
Differentiated use cases

- 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

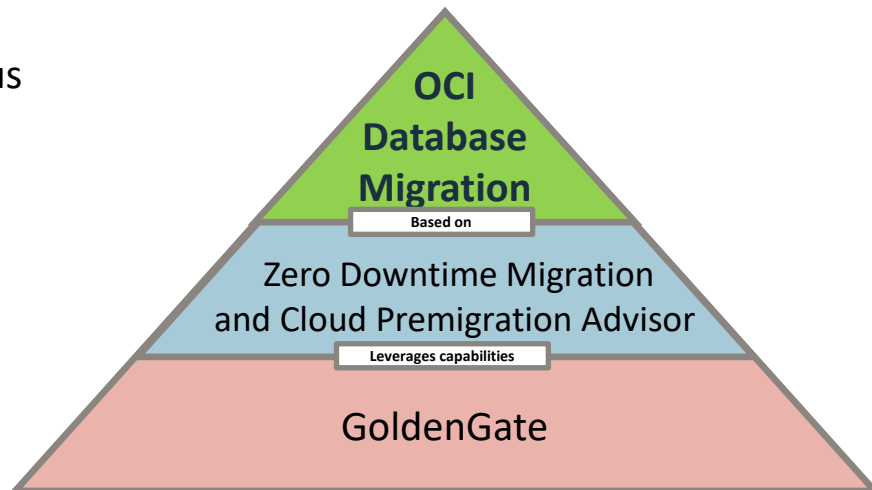
Oracle Databases

MySQL Databases

Move to
Autonomous



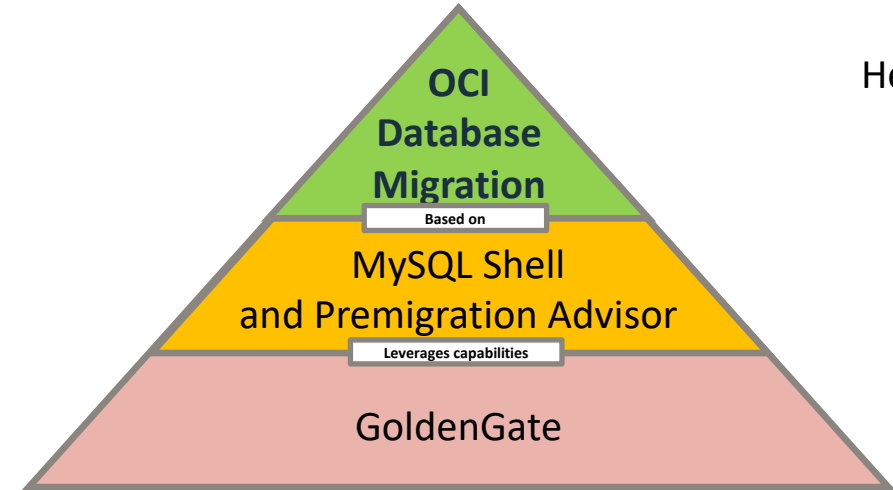
Flexible
Fleet-level



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

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
- MySQL Tools: MySQL Shell, GoldenGate

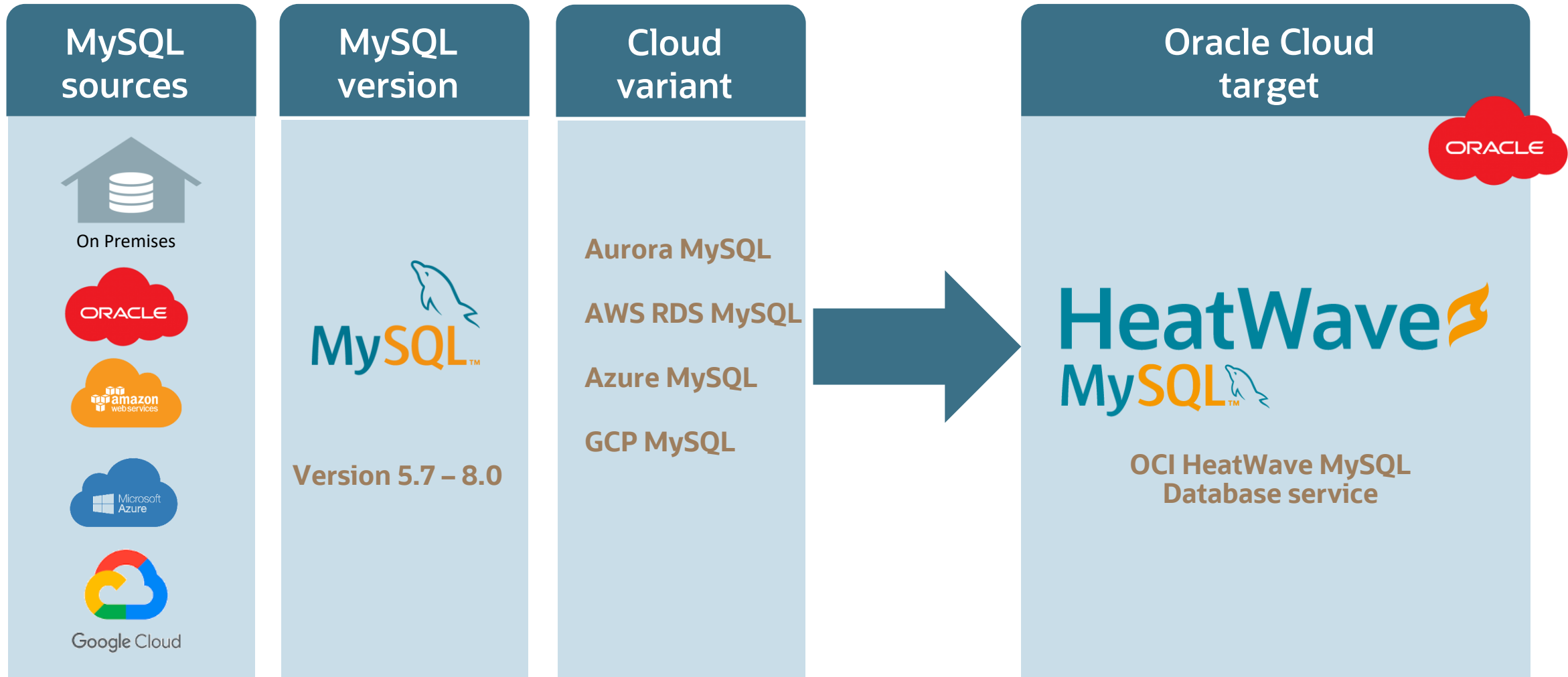
Indirect Connection

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



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
- Configure source and target

Optional for online:

- OGG Marketplace

2

Setup

3

Validate

- Use pre migration advisor interactively to discover and respond to issues

4

Start

- Fully automated

Optional controls

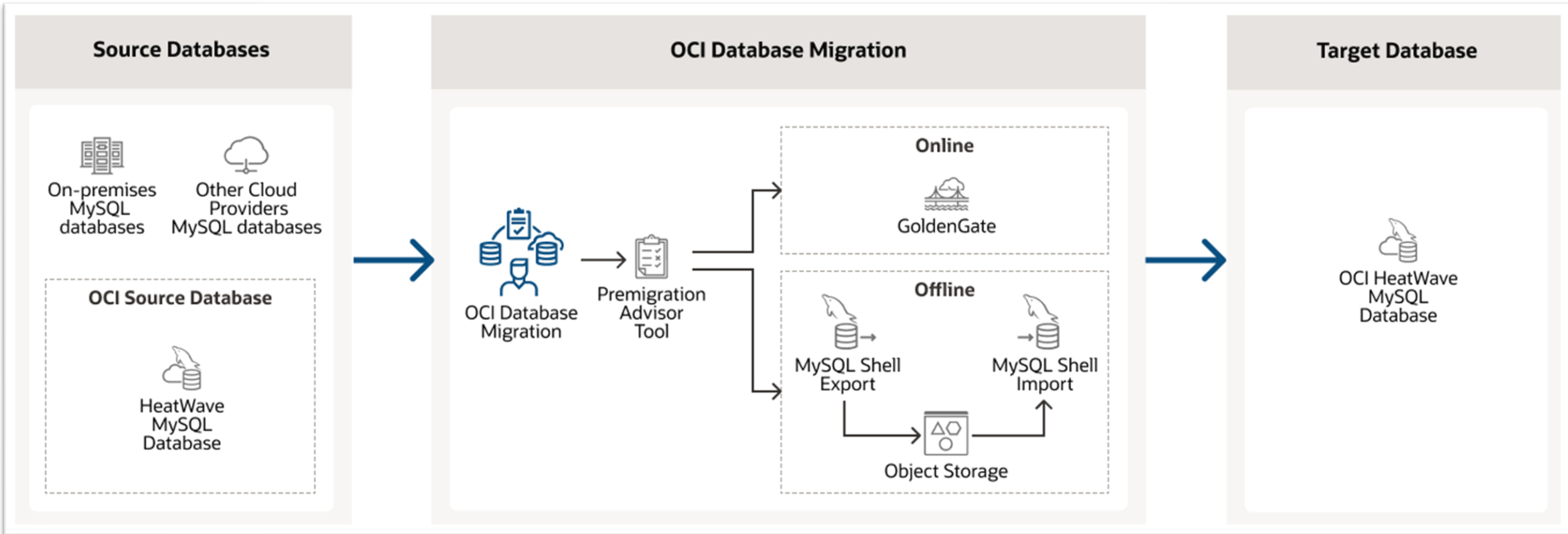
- Initial load
- Online replication
- Restarts

5

Complete

- Switch operations to new database

How it works for 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
- *Oracle GoldenGate Marketplace for Database Migrations* license

Not included:

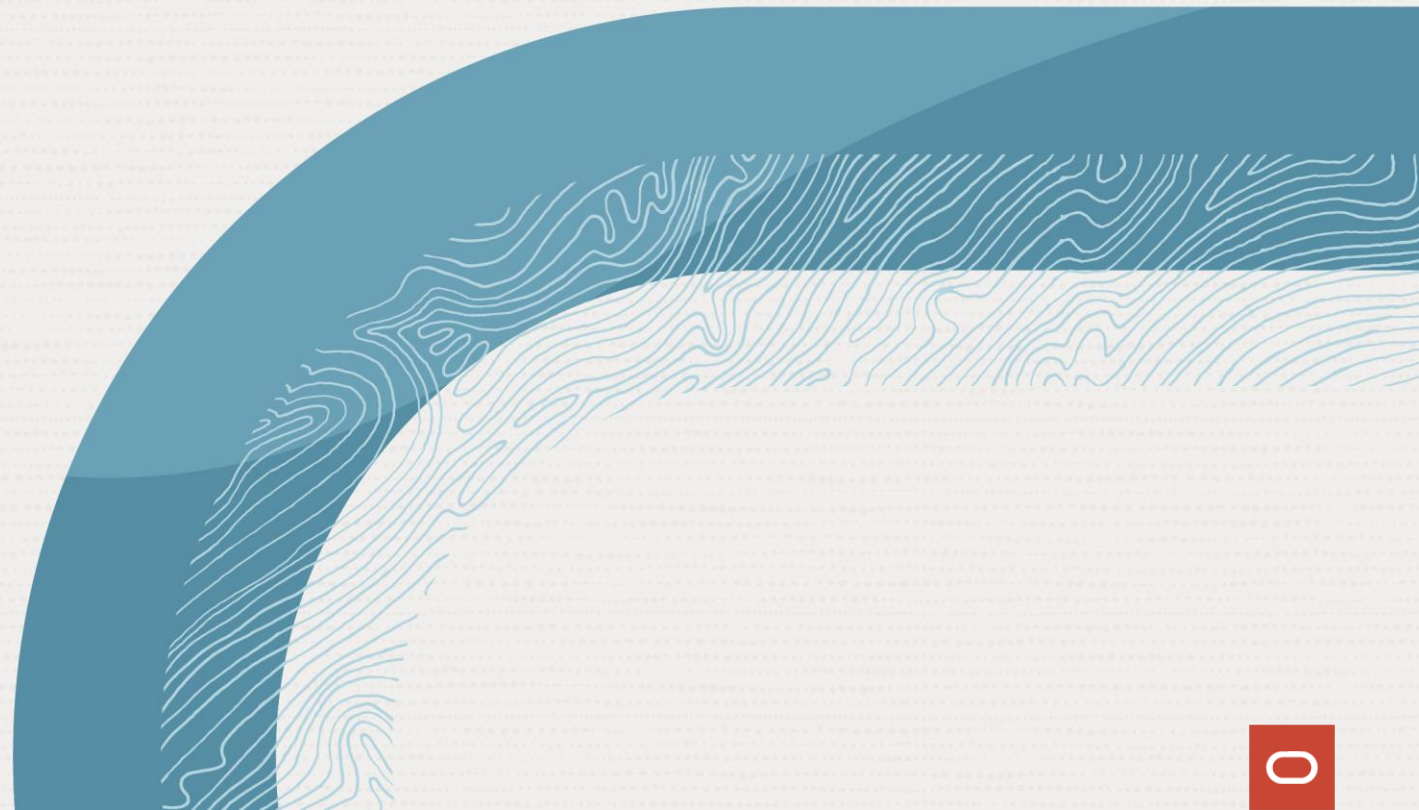
- Customer managed OCI resources used for database migration operations
 - Compute used for OCI GoldenGate Marketplace, OCI Object Storage
- FastConnect or other on-premise-to-cloud network connectivity
- Source or target database service costs

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 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 is expanded, showing two columns of options. The left column includes Cloud Migrations, Overview, Migrations, Remote Connections, Discovery, and Inventory. The right column includes Disaster Recovery, Overview, and DR Protection Groups. The Database Migration option is highlighted with a red rectangular border. Below Database Migration, the following options are listed: 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: Source

Description *Optional*

Compartment: jorge
ggsstage (root)/DMS/jorge

Type: Amazon RDS for MySQL

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

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

Show advanced options

Next Cancel

Create a connection to your MySQL source database



Create a connection to your HeatWave MySQL target database

Create connection

1 General information

2 Connection details

Name: Target

Description *Optional*

Compartment: jorge
ggsstage (root)/DMS/jorge

Type: OCI MySQL Heatwave

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

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

Show advanced options

Next Cancel



Step 3: Create Migration

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

Create migration [Help](#)

- 1 **General information**
- 2 Select databases
- 3 Migration options

Name: MySQL migration

Description *Optional*

Compartment: gtaneja
ggsstage (root)/DMS/gtaneja

[Show advanced options](#)

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

Create migration [Help](#)

- 1 General information
- 2 **Select databases**
- 3 Migration options

Source database

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

RDS

Target database

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

MySQLHeatwave

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

Create migration [Help](#)

- 1 General information
- 2 Select databases
- 3 **Migration options**

Object Storage bucket in **jorge** [\(Change compartment\)](#)

DMSStorage

Use online replication [\(i\)](#)

[Show advanced options](#)

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



Step 4a: Validate Migration

Confirm all prerequisites and permissions. Premigration Advisor identifies incompatible objects.

The screenshot displays two main components in the Oracle Cloud Infrastructure console:

- TestMigration Card:** Labeled 'DM' in a green circle, status 'ACCEPTED'. It has buttons for 'Validate' (highlighted with a red box), 'Start', 'Clone', 'Move resource', and 'More actions'. Below are tabs for 'Migration information' and 'Notifications'. Migration details include:
 - OCID: ...khho4q
 - Compartment: ggsstage (root)/DMS/jorge
 - Created: Wed, Feb 14, 2024, 21:16:26 UTC
 - Encryption vault: [DMS_Vault](#)
 - Encryption key: [DMS_Key](#)
- job-20240703013341 Card:** Labeled 'JOB' in a red circle, status 'FAILED'. It has buttons for 'Resume', 'Abort', 'Download log', 'Add tags', and 'Delete'. Below are tabs for 'Job information' and 'Tags'. Job details include:
 - OCID: ...tpwjpq
 - Created: Wed, Jul 3, 2024, 01:33:41 UTC
 - Migration: MySQLDMSOnline
 - Compartment: ggsstage (root)/DMS/gtaneja
 - Type: Evaluation

The 'Phases' table for the job is as follows:

Name	Status	Duration
Validate source	Completed	233 ms
Validate target	Completed	230 ms
Validate source metadata	Completed	10 s 614 ms
Validate target metadata	Completed	341 ms
Run premigration advisor	Failed	1 s 95 ms

A red arrow points to the 'Run premigration advisor' row, which is highlighted with a red box. The bottom right of the table shows 'Showing 5 items < 1 of 1 >'.

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



Step 4b: Validate Migration

Resolve premigration advisor findings

AR
FAILED

Run premigration advisor

Download advisor report

Advisor report information

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

Checks

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

Name	Result	Review
GG capture has replication FULL DDL	Action required	No

Filters

Result type

- Action required
- Review required
- Review suggested
- Passed

View check details

Name: GG capture has replication FULL DDL
Result: Action required
Reviewed: No
Issue: Validate DDL replication must be FULL with version 8.0 and higher
Action: If the value of binlog_row_metadata is not FULL, then set the binlog_row_metadata variable's value to FULL in my.cnf file and restart the MySQL server.

Close Mark as reviewed

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 'ACCEPTED' status. A red box highlights the 'Validate' button. Below it, migration information is listed: OCID, Compartment, Created date, Encryption vault, and Encryption key. On the right, a 'JOB' card for 'job-20240704000032' shows 'SUCCEEDED' status. It includes buttons for Resume, Abort, Download log, Add tags, and Delete. Job information includes OCID, Created date, Migration type (MySQLDMSOnline), Compartment, and Type (Evaluation). Below the job details is a 'Phases' table with columns for Name, Status, and Duration. A green arrow points to the 'Run premigration advisor' row, which is highlighted with a green border.

Name	Status	Duration
Validate source	Completed	26 ms
Validate target	Completed	367 ms
Validate source metadata	Completed	10 s 427 ms
Validate target metadata	Completed	316 ms
Run premigration advisor	Completed	767 ms

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

The screenshot displays the Oracle Cloud console interface for a migration job. On the left, a green circle with 'DM' and 'ACCEPTED' indicates the migration is ready. The main area shows a 'TestMigration' card with a 'Start' button highlighted in red. Below this, a 'JOB' card shows 'IN PROGRESS' status. A notification banner at the top right states 'Migration in progress at phase "Validate" (Phase 1 of 7)'. The job details include OCID, compartment, and creation time. A table at the bottom right lists the migration phases: 'Validate' (Started) and 'Prepare' (Pending).

DM
ACCEPTED

TestMigration

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

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

job-20240228003617

Resume Abort Download log Add tags Delete

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

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

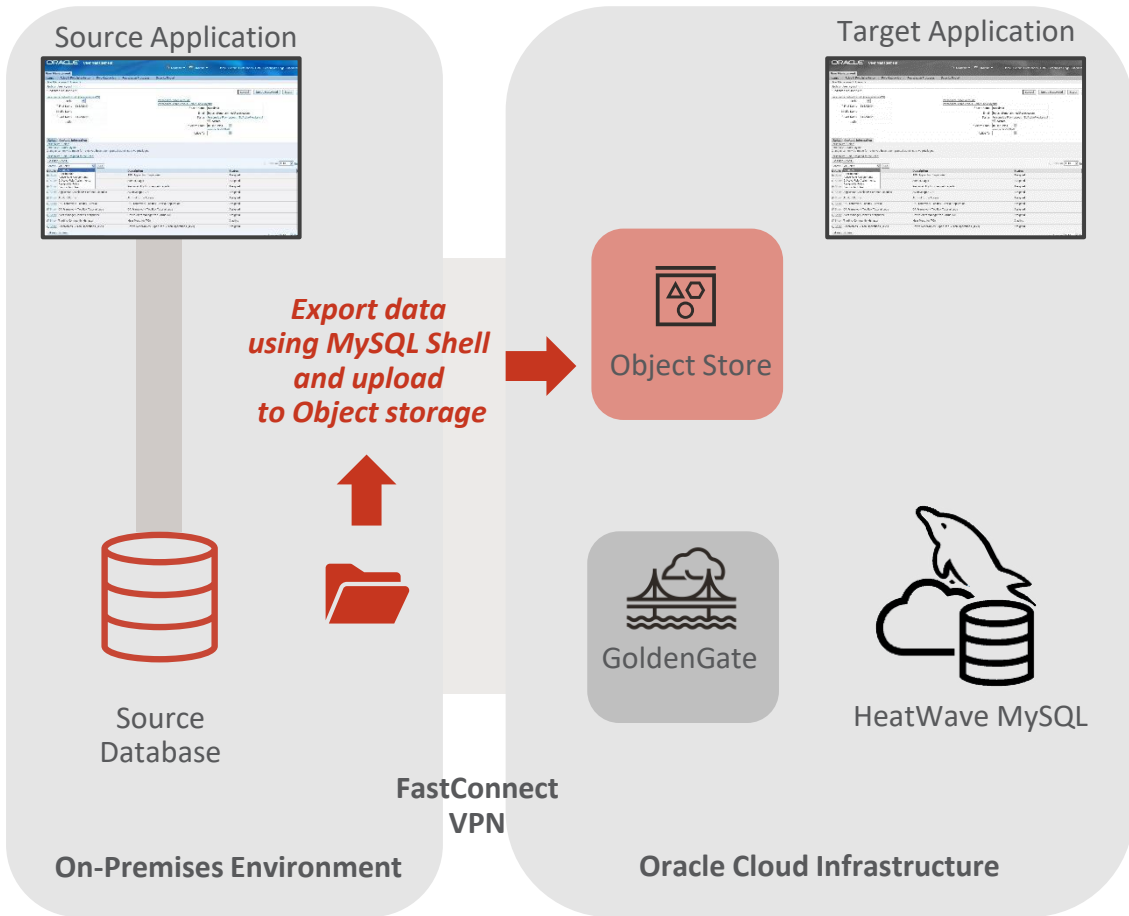
Phases

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



Start Migration – Export Initial Load and Upload Data

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



Phases

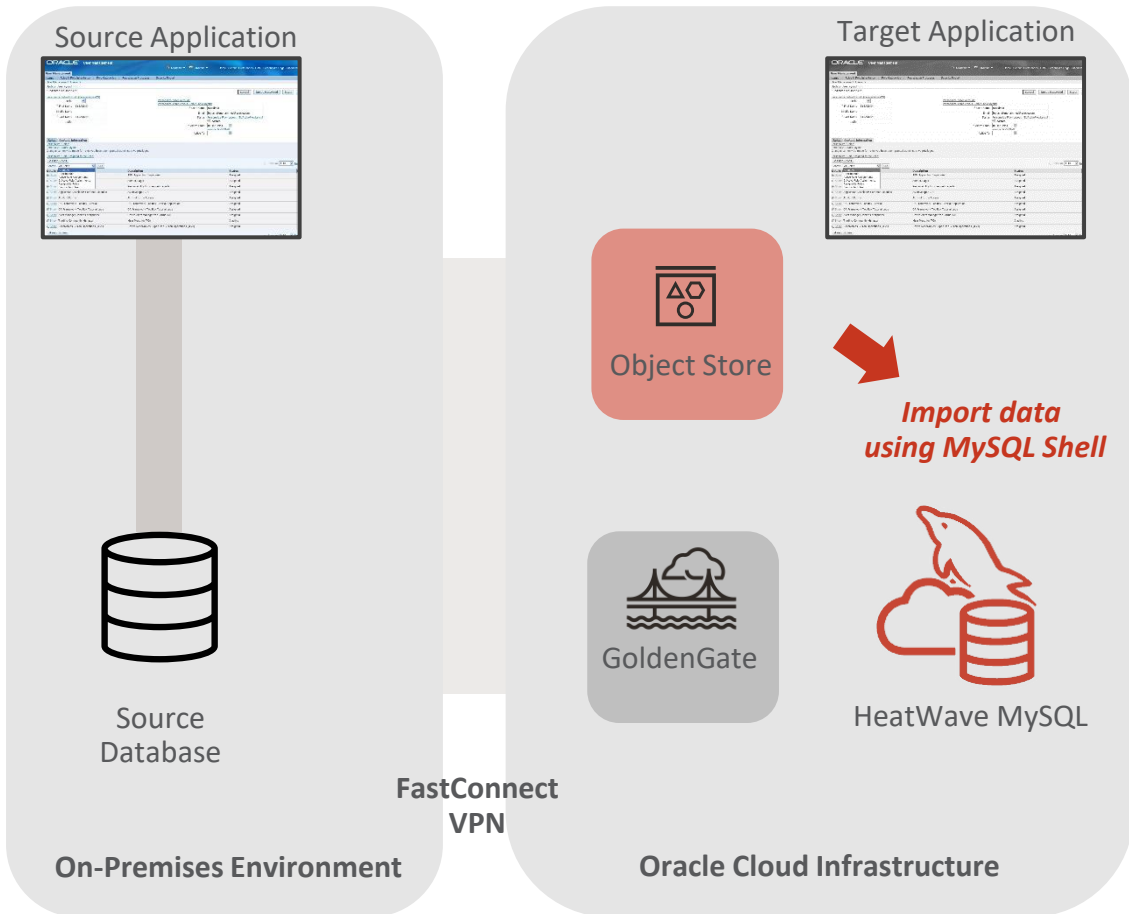
Name	Status	Duration
Initialize replication infrastructure	Completed	12 m 58 s 550 ms
Validate	Completed	3 s 76 ms
Export initial load and upload data	Started <input type="checkbox"/> 33%	5 s 332 ms
Import initial load	Pending	—
Prepare	Pending	—
Monitor replication lag	Pending	—
Switchover	Pending	—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

Showing 8 items < 1 of 1 >



Start Migration – Import Initial Load

Exported dump files are imported to HeatWave MySQL



Phases

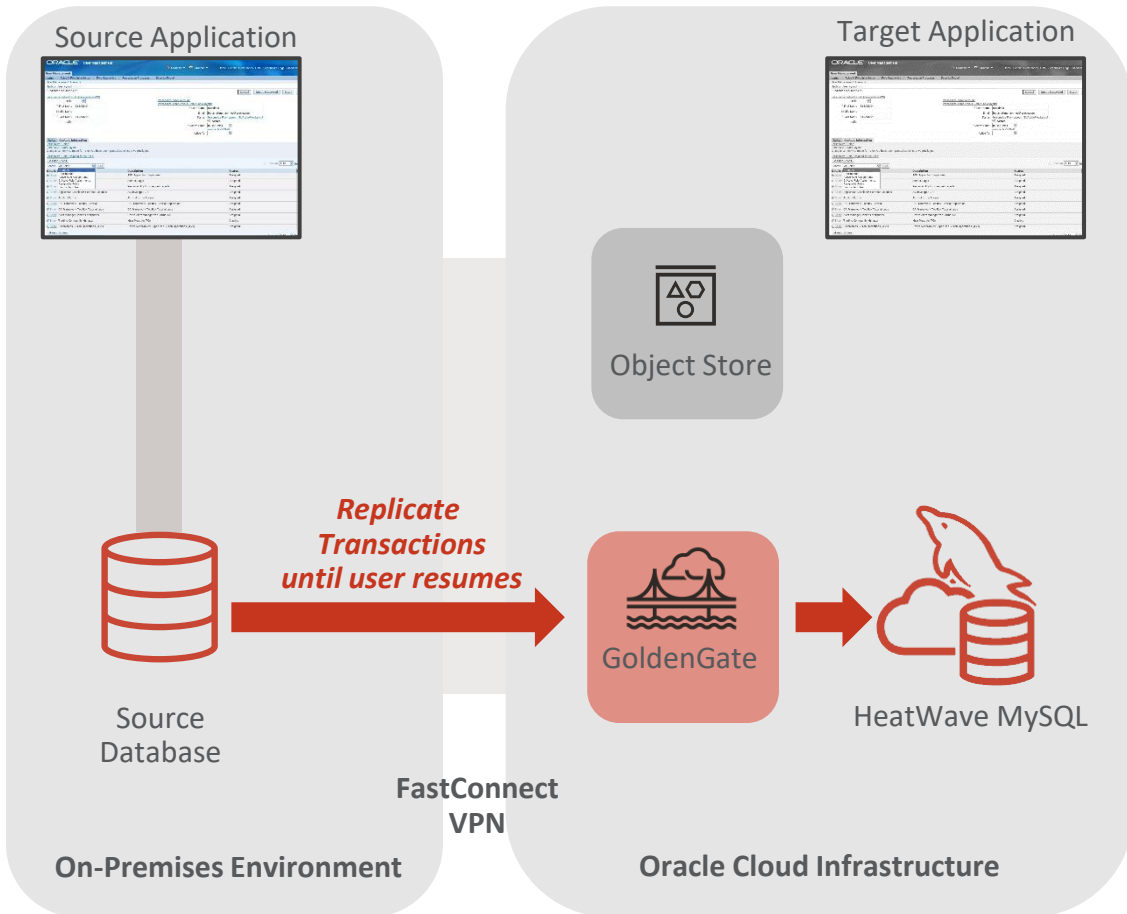
Name	Status	Duration
Initialize replication infrastructure	Completed	12 m 58 s 550 ms
Validate	Completed	3 s 76 ms
Export initial load and upload data	Completed	5 s 332 ms
Import initial load	Started <input checked="" type="checkbox"/> 42%	—
Prepare	Pending	—
Monitor replication lag	Pending	—
Switchover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

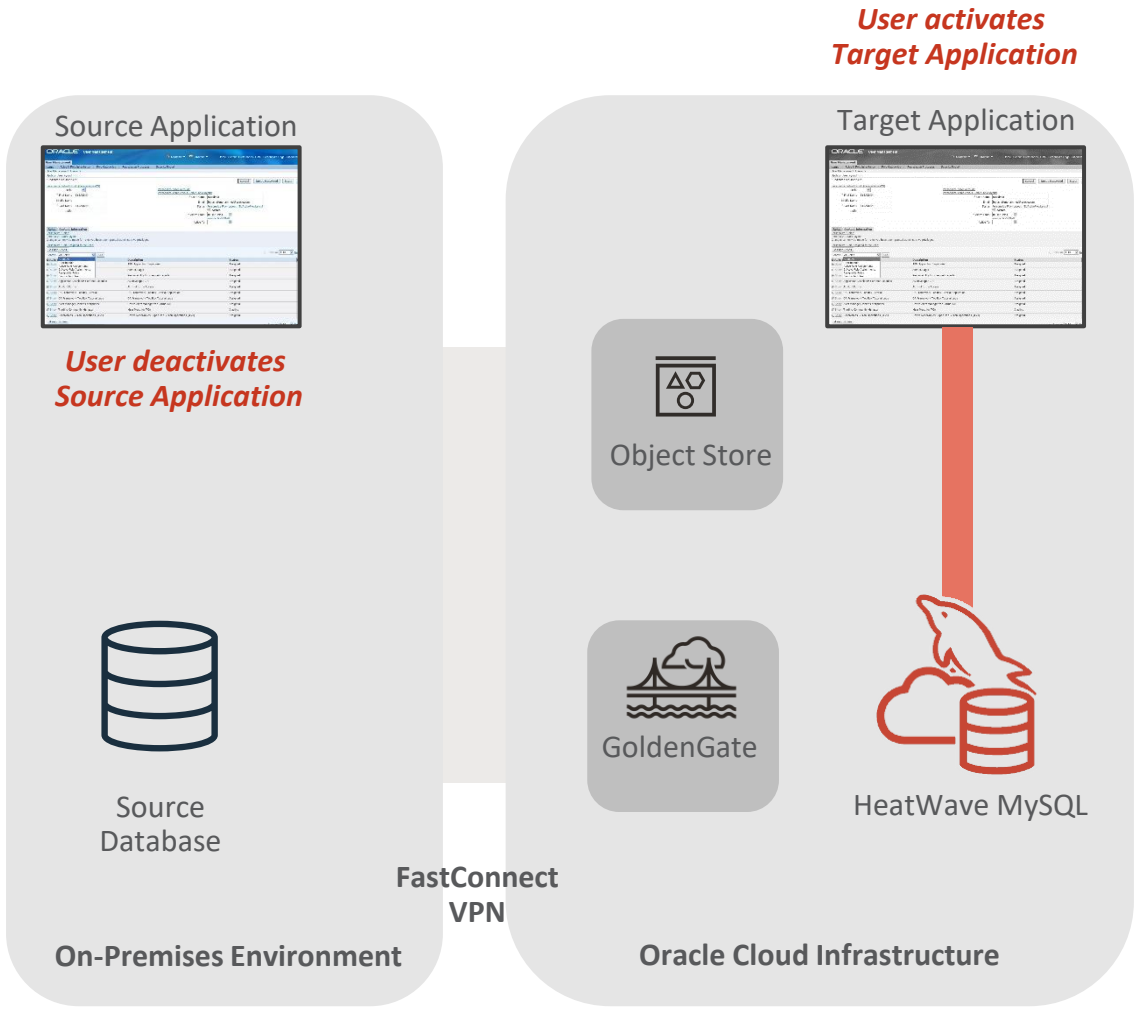
Name	Status	Duration	
Initialize replication infrastructure	● Completed	12 m 58 s 550 ms	⋮
Validate	● Completed	3 s 76 ms	⋮
Export initial load and upload data	● Completed	5 s 332 ms	⋮
Import initial load	● Completed	10 s 606 ms	⋮
Prepare	● Completed	594 ms	⋮
Monitor replication lag	● Completed	860 ms	⋮
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	⋮
Prepare	● 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!



job-20240704161522

Resume Abort Download log Add tags Delete

Job information Tags

OCID: ...amvxf [Show](#) [Copy](#) **Migration:** DMS1Online
Created: Thu, Jul 4, 2024, 16:15:22 UTC **Compartment:** ggsstage (root)/DMS/gtaneja
Type: Migration

Resources

Phases

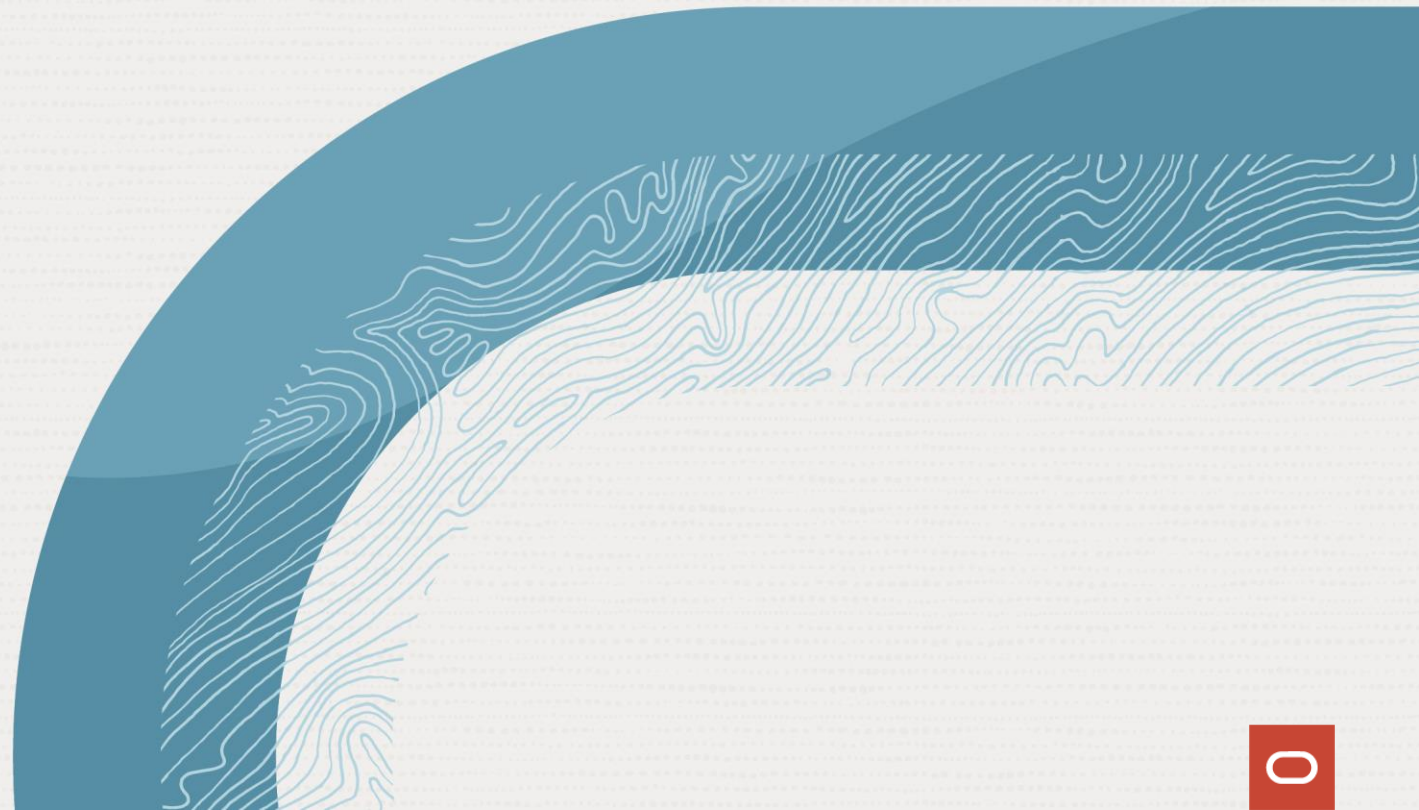
Excluded objects

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	5 s 44 ms
Prepare	● Completed	1 s 51 ms
Monitor replication lag	● Completed	2 s 528 ms
Switchover	● Completed	10 s 606 ms
Cleanup	● Completed	594 ms

Showing 8 items < 1 of 1 >



Thank You!



ORACLE