

A wide-angle photograph of the Golden Gate Bridge in San Francisco, California, taken during the "golden hour" of sunset. The bridge's iconic orange-red steel structure is silhouetted against a sky with soft, warm clouds. The water of the bay is calm, reflecting the light from the sky. The bridge spans from the right side of the frame towards the left, where another tower is visible in the distance.

Oracle Cloud Infrastructure Database Migrations



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Cloud Architect, Oracle Corporation



Exam 1Z0-1094-23: Oracle Cloud Database 2023 Migration and Integration Professional

- Migrate a Database to Oracle Autonomous Database
- Migrate using Zero Downtime Migration
- Migrate using SQL Developer, Cloud Backup, and GoldenGate
- Migrate to OCI using RMAN, Data Pump and Cloning
- Understand Oracle Data Integration

<https://mylearn.oracle.com/ou/exam/oracle-cloud-database-2023-migration-and-integration-professional-1z0-1094-23/35644/122162/189236>

https://education.oracle.com/products/trackp_OCDBMI2023CP

Test: Practice Exam For - Oracle DB Cloud Migration and Integration

Answer the question(s) on this page, and click Next to go to the next test page. Click Summary to see which questions you need to answer before submitting the test. Click Finish Test if you are ready to submit your test.

Oracle DB Cloud Migration and Integration (Practice Exam)

(Answer all questions in this section)

1. Which technologies can you use for Zero Downtime physical migration? (Choose two)

☐ Mark for Review

(1) Points

- ☐ Oracle GoldenGate
- ☐ Data Pump
- ☐ RMAN
- ☐ Data Guard



Different Migration Types

Offline Migration

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

Physical Migration

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

Direct Connection

- Source database can be accessed directly from target network
- Requires VPN/FastConnect for On-Prem

Online Migration

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

Logical Migration

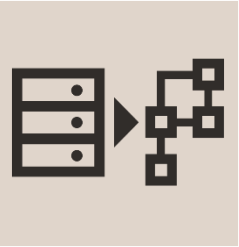
- Logically interpret database contents and copy to database in target format
- Source and target can be different
- Tools: Datapump, GoldenGate

Indirect Connection

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

Oracle Solutions to migrate databases to Oracle Cloud

OCI Database Migration (DMS)



- Fully managed
- Graphical guidance
- Online and offline migrations
- Autonomous Database target Based on Zero Downtime Migration

Zero Downtime Migration (ZDM)



- User Managed Expert Tool
- Fleet Migrations
- Logical and Physical Migrations
- Migrations to ExaCC

SQL Developer



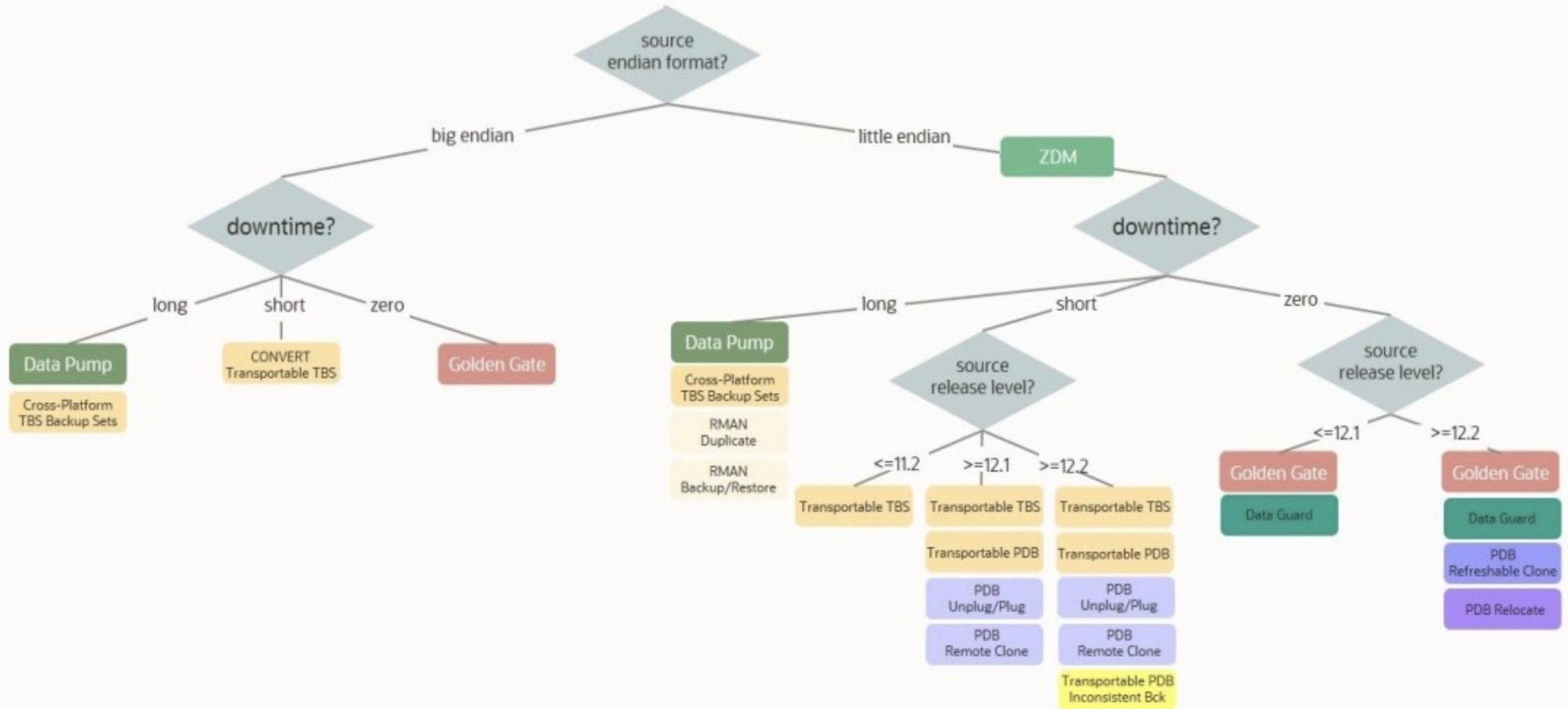
- Developer Experience
- Fine-grained transformations

Database Tools



- Manual use of DB Tools (RMAN, Data Guard, Datapump, GoldenGate)
- Full expert control
- Special use cases (bi-directional replication, etc.)

Database Migration Decision Tree



Migration requirements and constraints

What you should know before you design a migration strategy...

Source Database

- Database version
- Database size and number of database tables
- Workload Type
- Usage and performance requirements
- Single/Multi-tenant Architecture
- Endian format
- Character set

Target Database

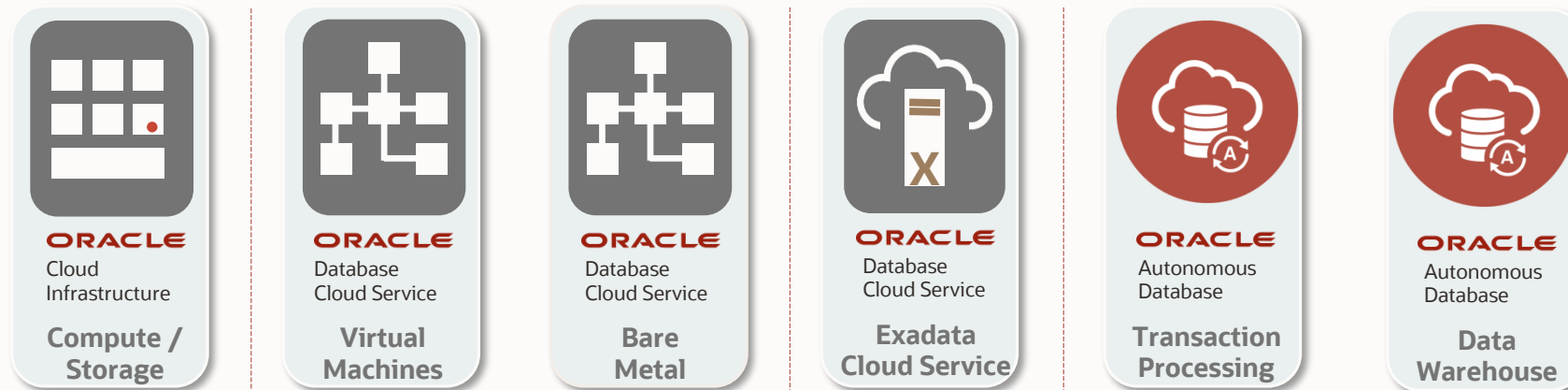
- Database Type
- Database version
- HA and DR requirements

Runtime Constraints

- Bandwidth and Connectivity
- Fallback Capability
- Down-time requirements for migration
- Project resources available for migration

Oracle Cloud Database

Range of options



The Right Cloud Database for Every Use Case

100%
Administrator
Operated

Economic,
Managed DB Service,
100% Configurable

Max Performance
& Consolidation,
Integrated
Database HW/SW

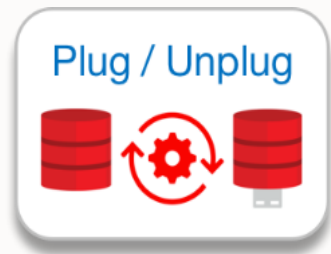
Fully Autonomous Operation,
Dynamic Scalability

Plug/Unplug

Migration Methodology

Source databases:

- CDB Databases 18c, 19c
- Non-CDB or CDB Databases 12c
- Non-CDB Databases 11g (via Upgrade)



Target databases:

- DBaaS VM, DBaaS BM, ExaCS, ExaCC
- Versions: 12c, 18c, 19c

When to use

- ✓ Source DB is Little-endian
- ✓ Supports small to large databases
- ✓ Migrate from non-CDB to CDB
- ⚠ Requires knowledge of migration tools like RMAN and Data Pump
- ⚠ Requires some down-time
- ⚠ Upgrade before migrate for 11g and lower versions



Simple



Flexible
Architecture



Enterprise fleet-
scale migrations



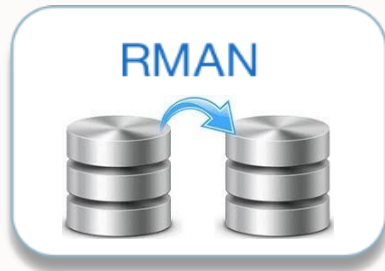
Free

Recovery Manager (RMAN)

Reliable and Versatile offline migration tool

Source databases:

- CDB/PDB Databases 12c, 18c, 19c
- Non-CDB Databases 11g, 12c, 18c, 19c



Target databases:

- DBaaS VM, DBaaS BM, ExaCS, ExaCC
- Versions: 12c, 18c, 19c

When to use

- ✓ Cross-platform migration possible
- ✓ Allows point-in time recovery
- ✓ Migrate from non-CDB to CDB
- ✓ Small to Large Database size
- ⚠ Requires knowledge of various RMAN methods
- ⚠ Requires some down-time



Point-in-Time
Recovery



Interoperability
with versions



Enterprise fleet-
scale migrations

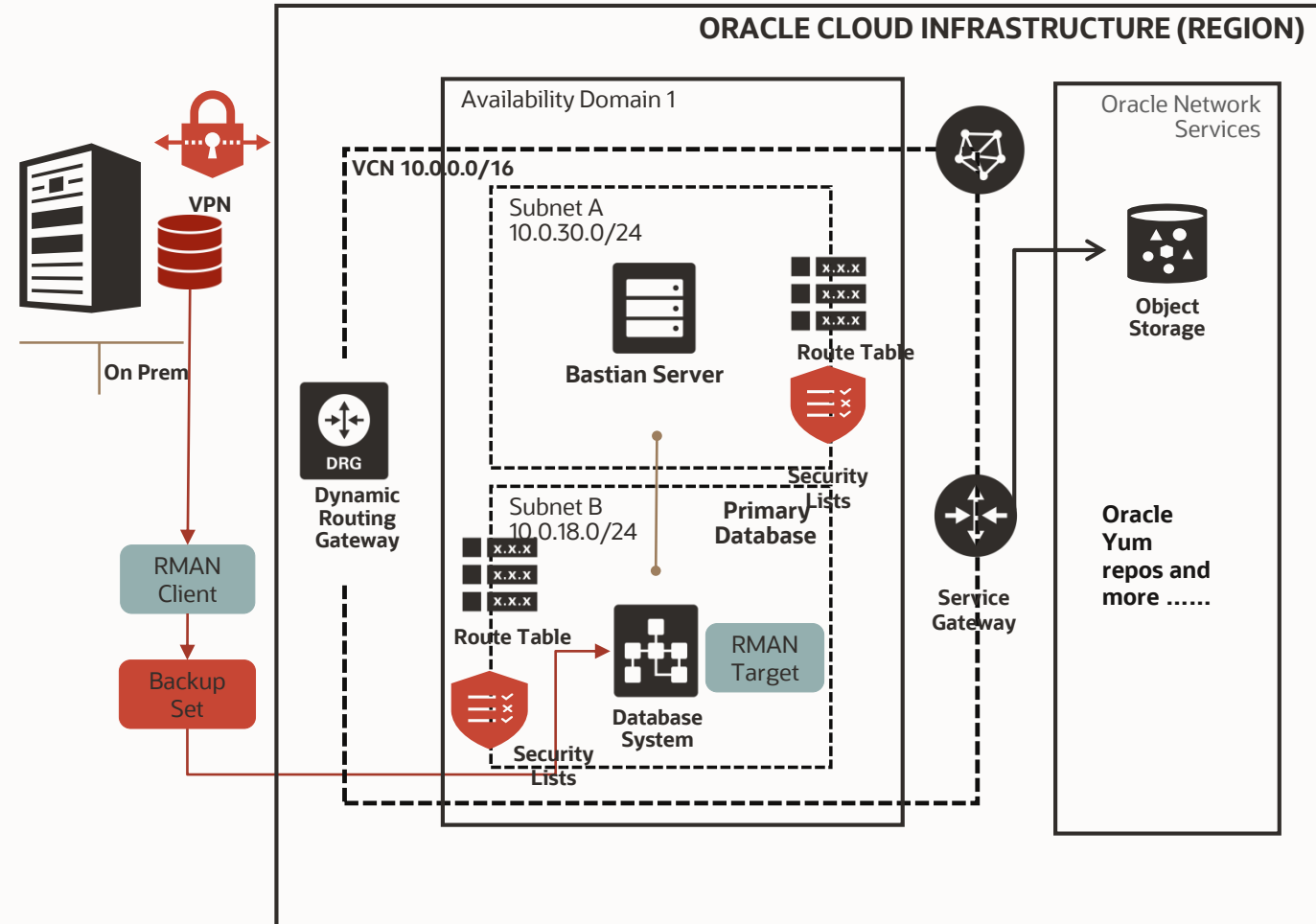


Free

RMAN Reference Architecture

Migration Steps

- On-premise Target Database – perform backup & recovery operations
- RMAN Client – command line interface to interpret and execute
- RMAN Methods
 - RMAN Cross-Platform Transportable PDB
 - RMAN Cross-Platform Transportable Tablespace Backup Sets
 - RMAN Transportable Tablespace with Data Pump
 - RMAN DUPLICATE from an Active Database
 - RMAN CONVERT Transportable Tablespace with Data Pump

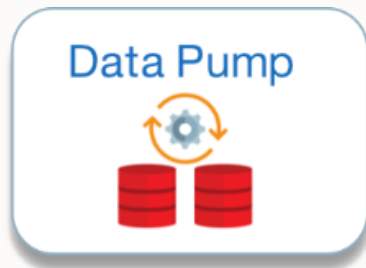


Data Pump

Fast, full offline database migration tool

Source databases:

- CDB/PDB Databases 12c, 18c, 19c
- Non-CDB Databases 11g, 12c, 18c, 19c



Target databases:

- DBaaS VM, DBaaS BM, ExaCS, ExaCC
- Versions: 12c, 18c, 19c

When to use

- ✓ Supports small to large databases
- ✓ Supports cross-endian and character-set
- ✓ In-flight Upgrade possible
- ✓ Changes to database structure possible
- ⚠ Requires knowledge of various methods
- ⚠ Requires some down-time



Simple



Interoperability
with versions



Enterprise fleet-
scale migrations

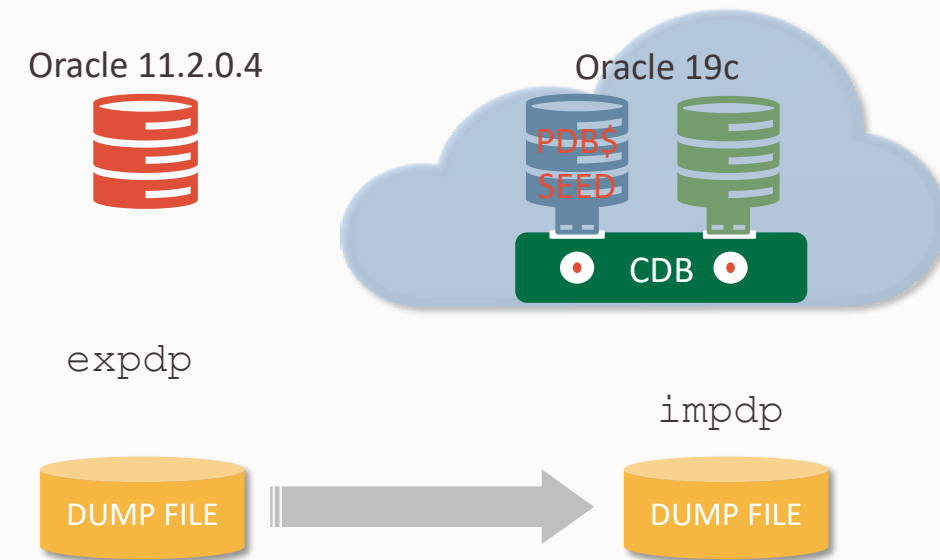


Free

Data Pump

Features and Capabilities

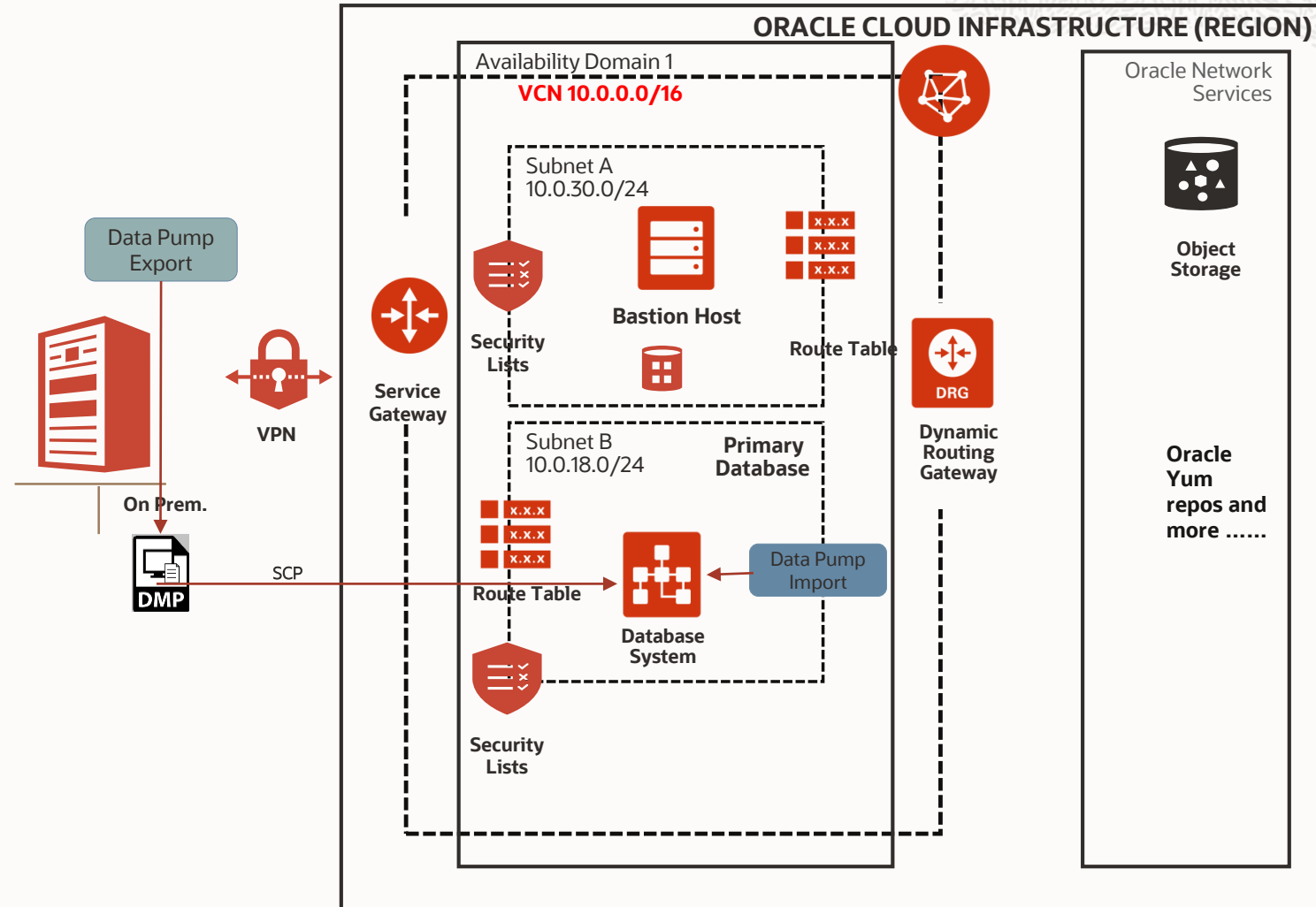
- Oracle Data Pump enables high-speed movement of data and metadata from one database to another
- Oracle Data Pump is available on Oracle Database 10g & later
- There are five different modes of data unloading
 - **Schema Mode** - default mode, specific schemas
 - **Table Mode** - specified set of tables dependent objects
 - **Tablespace Mode** - the tables in the specified tablespace
 - **Transportable Tablespace Mode** - only the metadata for the tables and dependent objects within a specified set of tablespaces
 - **Full Export Mode** - entire database



Use Case: Data Pump Migration Conventional Export/Import

Migration Steps

- Invoke Data Pump Export on-premises DB
- Secure copy the dump file to the OCI Database System
- On OCI DB System invoke Data Pump Import
- Validate the import



Data Guard

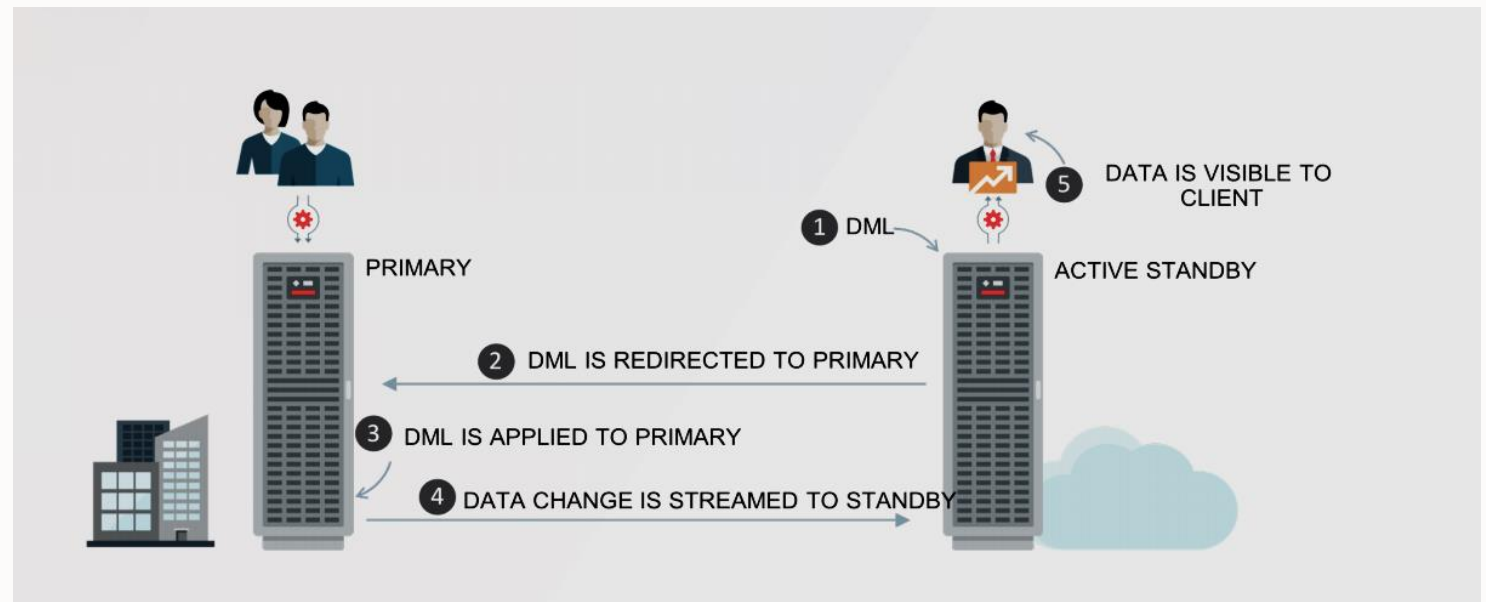
Real-time Data Protection & Availability

When to use

- ✓ Provides HA and DR solutions
- ✓ Minimal downtime migration
- ✓ Source version 11.2.0.4, 12.1.0.2, 12.2.0.1, 18, 19
- ✓ Only for Little Endian platforms
Only non-CDB to non-CDB or PDB to PDB
- ⚠ No structural changes
- ⚠ No upgrade to new version

Oracle Data Guard ensures high availability, data protection, and disaster recovery for enterprise data.

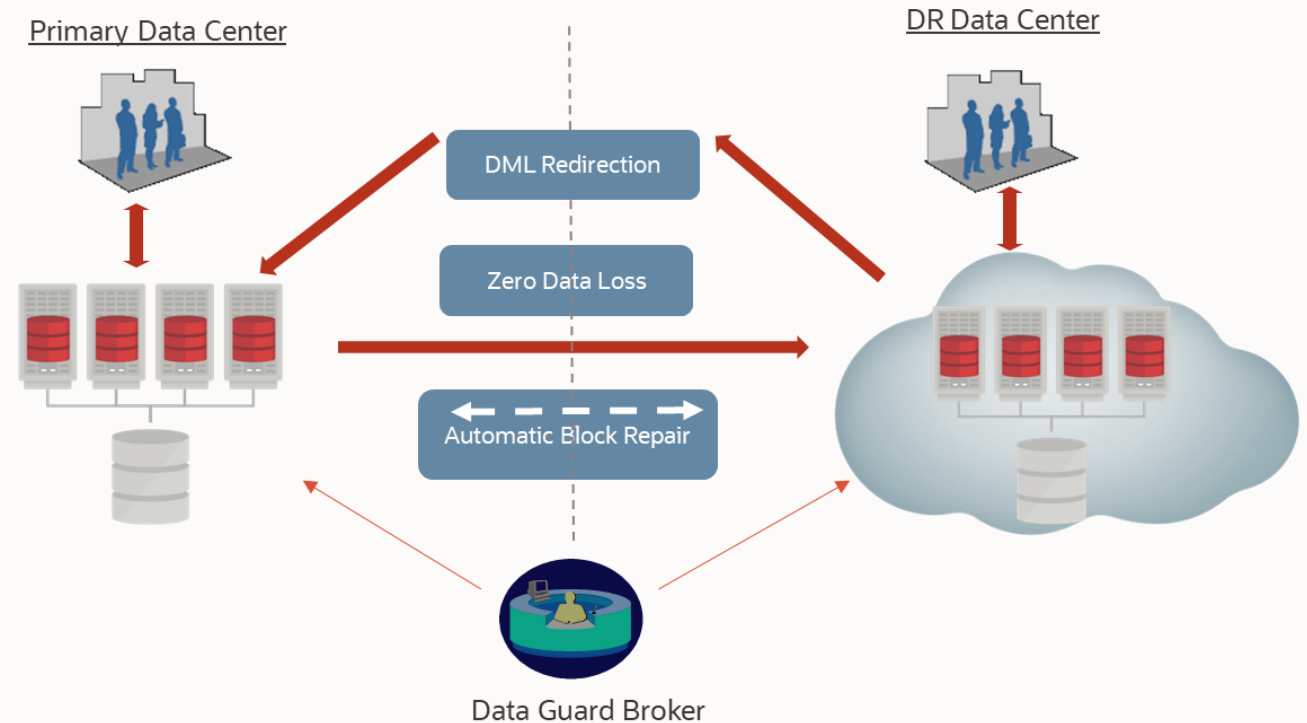
It provides a comprehensive set of services that create, maintain, manage, and monitor one or more standby databases.



Active Data Guard

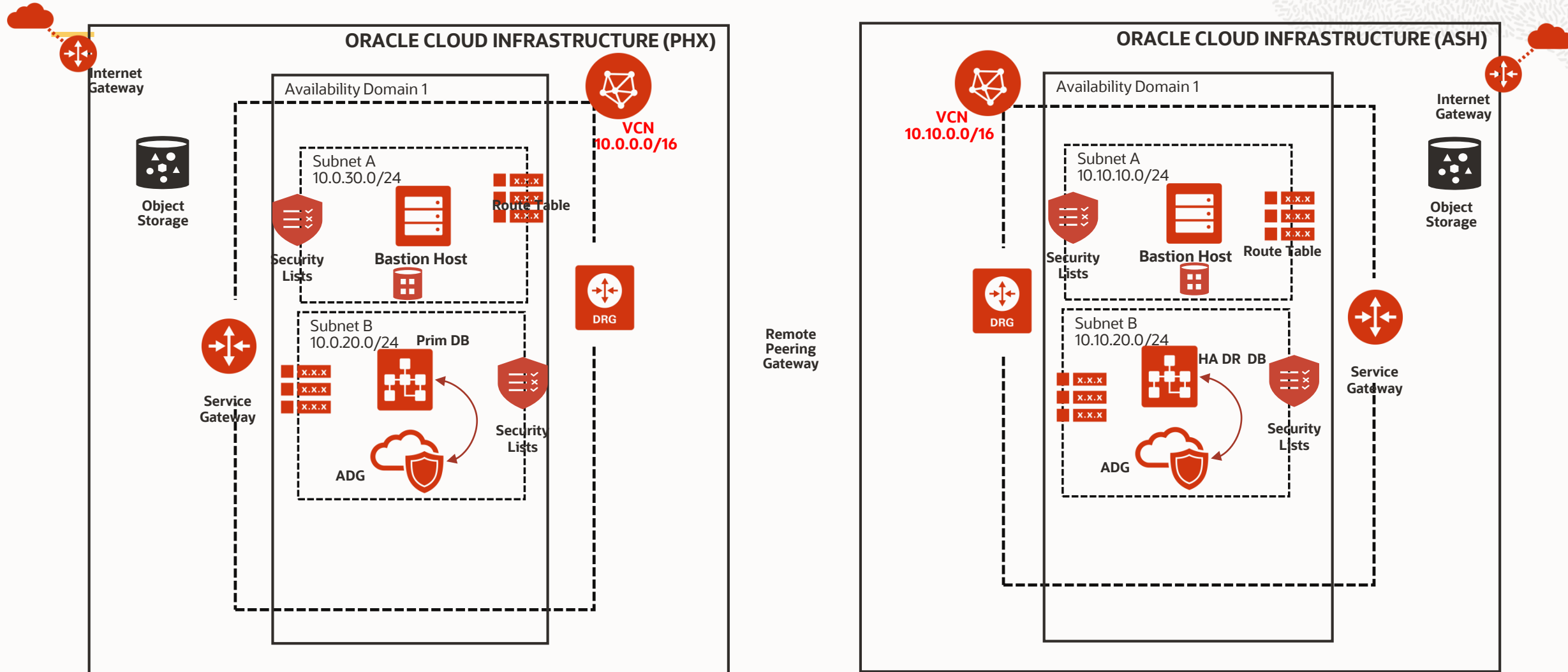
Oracle solution for Active Disaster Recovery

- Eliminates single point of failure
- Efficiently uses network bandwidth
- Provides unique levels of data protection
- Fast-Start failover to the standby
- Switchover to a standby
- Read Write mode on Standby.
- A True Sync between Primary and Secondary Instances.



Disaster Recovery Across Regions – Reference Architecture

Active Data Guard

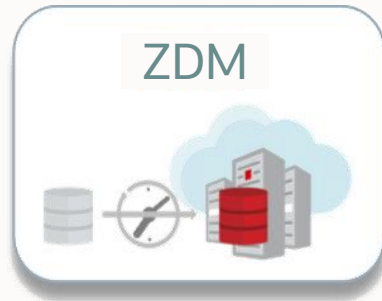


Zero Downtime Migration (ZDM)

Simple migration tool for lift and shift use cases

Source databases:

- CDB/PDB Databases 12c, 18c, 19c
- Non-CDB Databases 11g, 12c, 18c, 19c



OCI Target database:

- DBaaS VM, DBaaS BM, ExaCS, ExaCC
- Versions: 11g, 12c, 18c, 19c

When to use

- ✓ Free, easy to use tool
- ✓ Small to Large Database sizes
- ✓ Lift and Shift like to like versions
- ✓ Requires no downtime
- ⚠ In-Flight upgrade not possible
- ⚠ Cross-endian/ Cross-platform not possible



Simple



MAA Enabled



Enterprise fleet-scale migrations

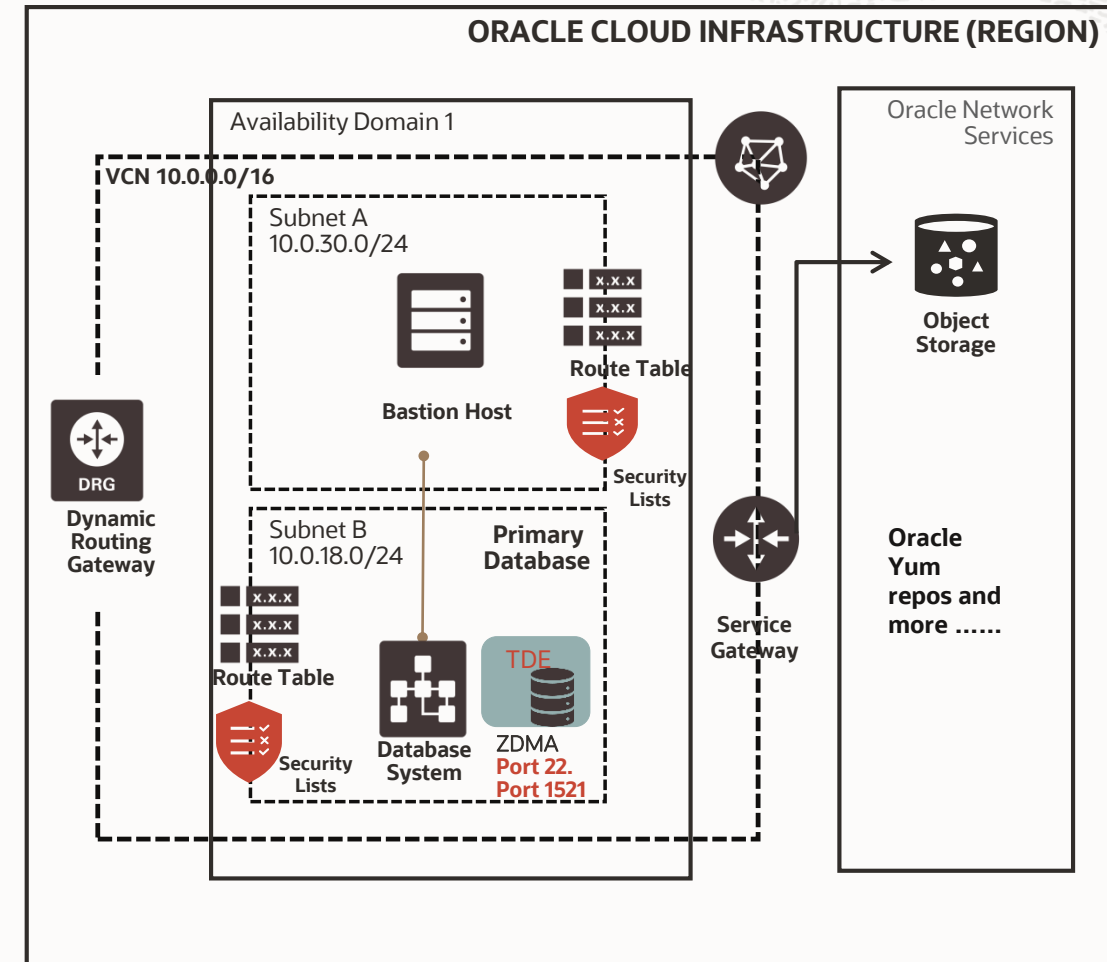
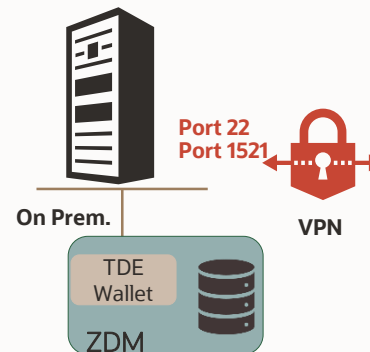


Free

Migration Process using Zero Downtime Migration Tool

Migration Steps

1. Network Configuration
2. Installing ZDM Tool
3. Setting up communication
4. Checking Encryption Wallet
5. Configuring ZDM Tool
6. Migration pre-check
7. Migrate the Database



Oracle Cloud Infrastructure – Database Migration

Fully managed, easy to use database migrations into Oracle Cloud

Database Migrations

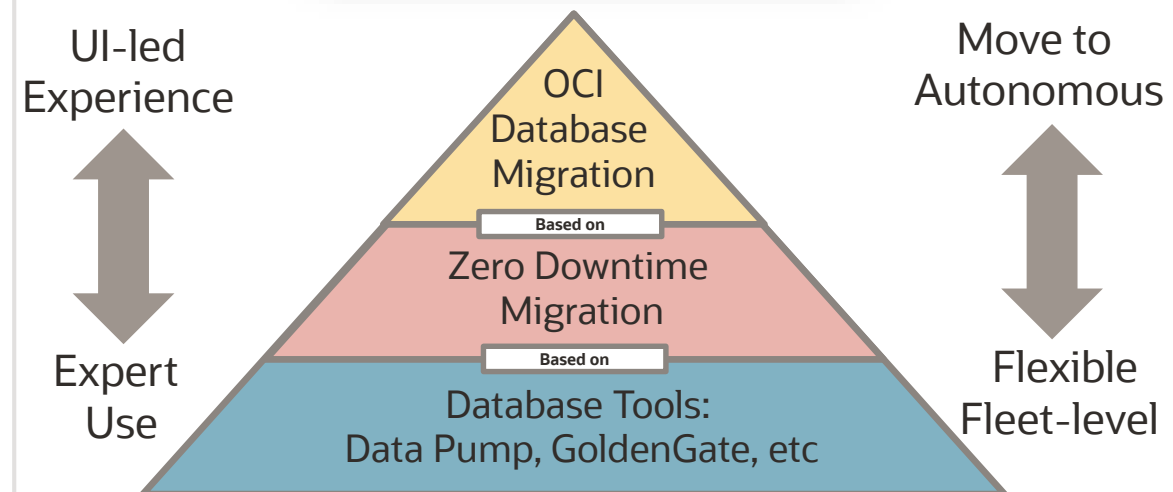
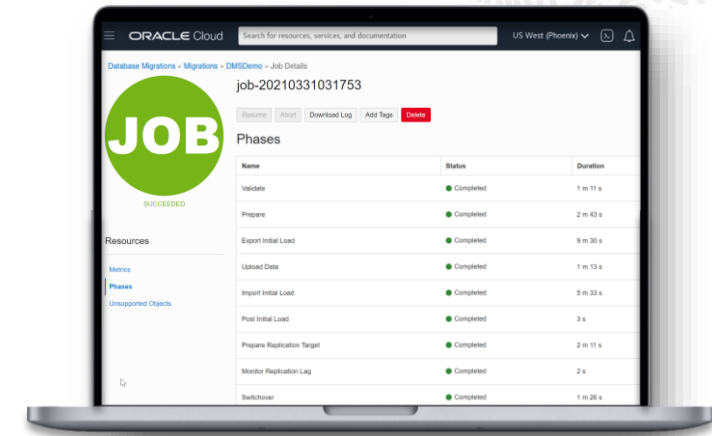
- Reduce cost and improve performance in Oracle Cloud
- Migrate databases, free for 6 months per migration

Core Use Cases

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

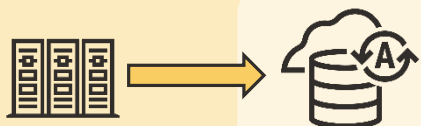
Differentiated Use Cases

- Simplifies underlying technologies and resources
- Logical Offline and Online Migrations
- Schema/Metadata Migration
- Based on enterprise-strength Oracle tools Zero Downtime Migration, GoldenGate, and Data Pump

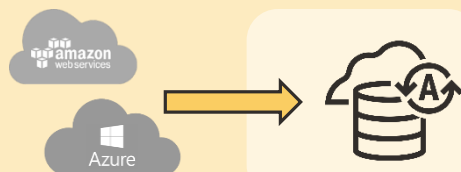


OCI Database Migration - Use Cases

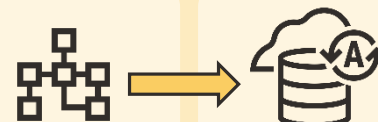
All Source Locations



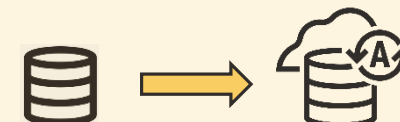
Migrate On-Premises
to OCI Cloud



Migrate Third-party
Cloud to OCI Cloud

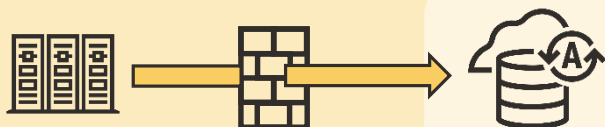


Migrate Oracle legacy
cloud to OCI Cloud



Migrate Within OCI
Cloud

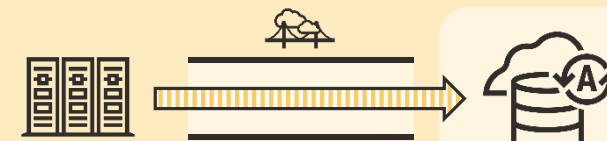
With or Without Direct Connection



Offline Migration from behind
firewall using Agent

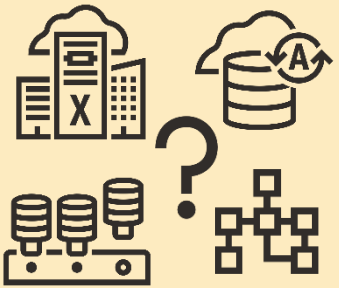


Offline Migration using
FastConnect/VPN connection



Online Migration using
FastConnect/VPN connection

Tools for all Steps of the Migration Process



Decision

Which Oracle Cloud Solution should I use?

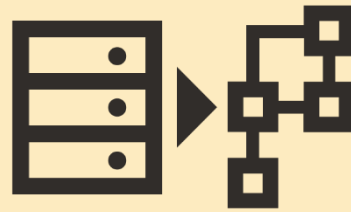
Oracle.com
Cloud Services Navigator
Migration Method Advisor



Planning

Is my data supported for migration?

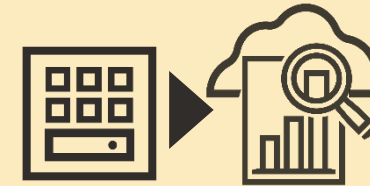
Cloud Premigration
Advisor Tool (CPAT)



Database Migration

How to move my Databases?

OCI Database
Migration



Application Migration

How to move applications and VMs to the cloud?

OCI Application
Migration

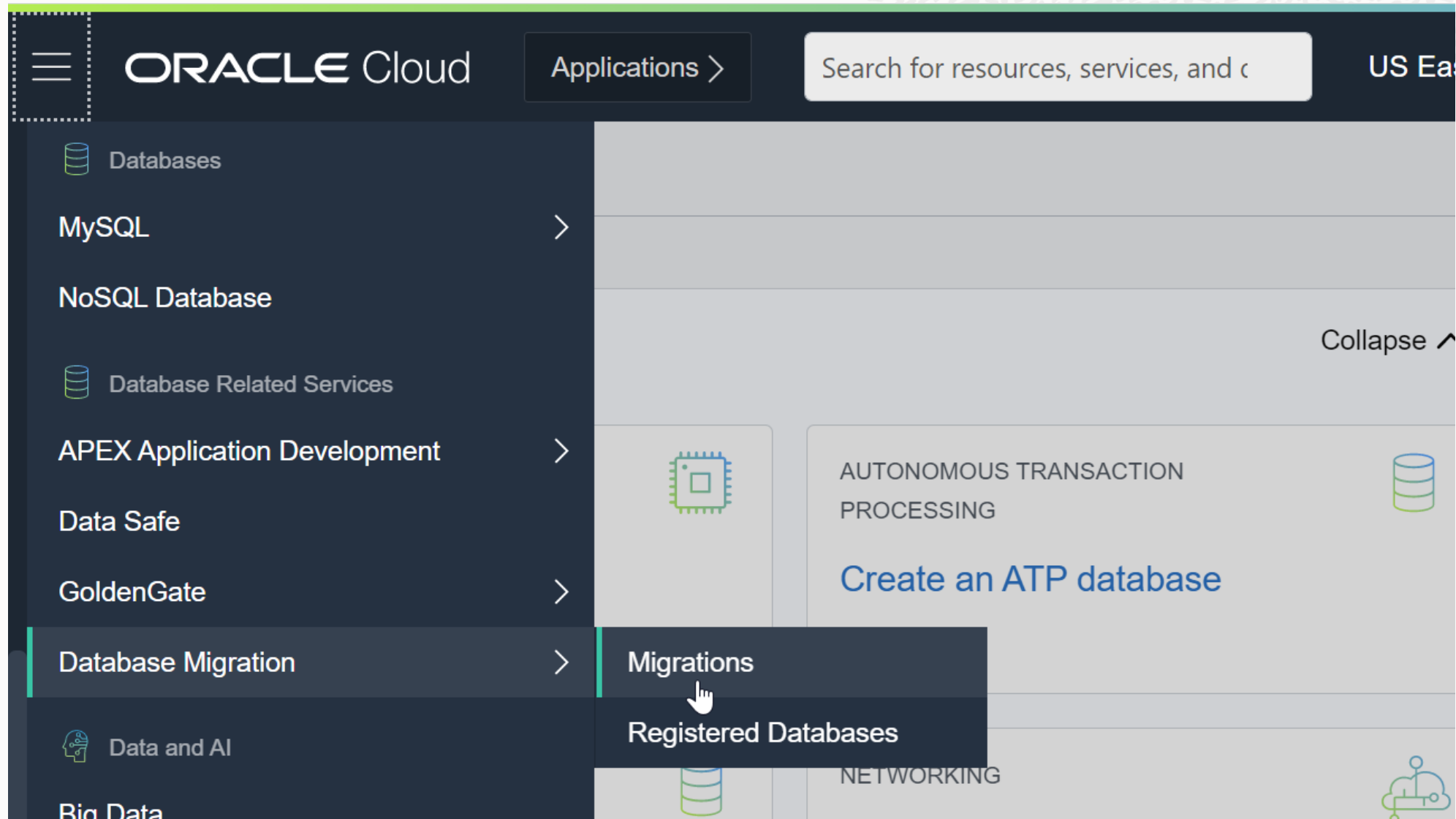


Validation

Was my data completely migrated?

GoldenGate
Veridata

Step 1: Open Database Migration on the OCI Console



Step 2: Register Source and Target Databases

Provide reusable connection information and credentials for databases

Register Database

[Help](#)

1 Database Details

2 [Connection Details](#)

Name

MySourcePDB

Compartment

DMS_LA

ggsstage (root)/DMS_LA

Vault in DMS_LA ⓘ [\(Change Compartment\)](#)

DMS_Vault

Encryption Key in DMS_LA [\(Change Compartment\)](#)

DMS_Key

☒ Select Database

☐ Manually Configure Database

Database Type

Database (Bare Metal, VM, Exadata)

Database System in DMS_LA [\(Change Compartment\)](#)

SourceDB

Register Database

[Help](#)

1 Database Details

2 [Connection Details](#)

Name

MyTargetATP

Compartment

DMS_LA

ggsstage (root)/DMS_LA

Vault in DMS_LA ⓘ [\(Change Compartment\)](#)

DMS_Vault

Encryption Key in DMS_LA [\(Change Compartment\)](#)

DMS_Key

☒ Select Database

☐ Manually Configure Database

Database Type

Autonomous Database

Database in DMS_LA [\(Change Compartment\)](#)

TargetATP

Step 3: Create Migration

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

Create Migration

[Help](#)

1 Add Details

2 Select Databases

3 Migration Options

Name

MyMigration

Compartment

DMS_LA

ggsstage (root)/DMS_LA

☒ Direct connection to source database

The source database is directly accessible from the Cloud

☐ No direct connection to source database

Requires you to download and install an agent to use as a bridge to the source database

Vault in DMS_LA ⓘ (Change Compartment)

DMS_Vault

Encryption Key in DMS_LA (Change Compartment)

DMS_Key

Next

Cancel

Create Migration

[Help](#)

✓ Add Details

2 Select Databases

3 Migration Options

Source Database

Registered Database in DMS_LA (Change Compartment)

MySourcePDB

☒ Database is pluggable database (PDB)

Registered Container Database in DMS_LA (Change Compartment)

MySourceCDB

Target Database

Registered Database in DMS_LA ⓘ (Change Compartment)

MyTargetATP

Previous

Next

Cancel

Create Migration

[Help](#)

✓ Add Details

✓ Select Databases

3 Migration Options

Initial Load

☐ Datapump via Database Link

☒ Datapump via Object Storage

Object Storage Bucket in DMS_LA ⓘ (Change Compartment)

DMSStorage

Export Directory Object

Name ⓘ

dumpdir

Path ⓘ

/u01/app/oracle

☒ Use Online Replication

GoldenGate Hub URL ⓘ

https://193.122.169.5

GoldenGate Administrator Username

oggadmin

GoldenGate Administrator Password

.....

Source Database

GoldenGate Deployment Name

Source


Previous

Create

Cancel

Step 4: Validate Migration

Confirm all prerequisites, permissions, and connectivity to source and target



ACTIVE

!

Migration requires validation before it can be started. Select the Validate action button to initiate validation process.

MyMigration

Validate

Start

Clone

Move Resource

More Actions

Migration Information

OCID: ...lgaxuq

Show

Copy


Compartment: ggsstage

(

Created: Wed, Mar 31, 2021

Encryption Vault: DMS_V

Encryption Key: DMS_Ke



IN PROGRESS

!

Validation in progress at phase "Validate Target" (Phase 1 of 5).

job-20210331030633

Resume

Abort

Download Log

Add Tags

Delete

Job Information

Tags

OCID: ...jdwsna

Show

Copy

Type: Evaluation

Created: Wed, Mar 31, 2021, 03:06:33 UTC

Resources

Metrics

Phases

Unsupported Objects

Phases

Name	Status	Duration
Validate Target	Started	3 s
Validate Source	Pending	1 s



Step 5: Start Migration

Initiate the migration job to move database into the cloud

DM

ACTIVE

MyMigration

Validate

Start

Clone

Move Resource

More Actions

Migration Information

OCID: ...lgaxuq

Show

Copy

Compartment: ggsstage (roc

Created: Wed, Mar 31, 2021

Encryption Vault: DMS Vau

Encryption Key: DMS Key

Resources

Metrics

Jobs

Excluded Objects

Jobs

Name	State
job-20210331031341	<div>Succeed</div>

Migration in progress at phase "Prepare" (Phase 2 of 10).

job-20210331031753

Resume

Abort

Download Log

Add Tags

Delete

Job Information

Tags

OCID: ...2jxcka

Show

Copy

Type: Migration

Created: Wed, Mar 31, 2021, 03:17:53 UTC

Resources

Metrics

Phases

Unsupported Objects

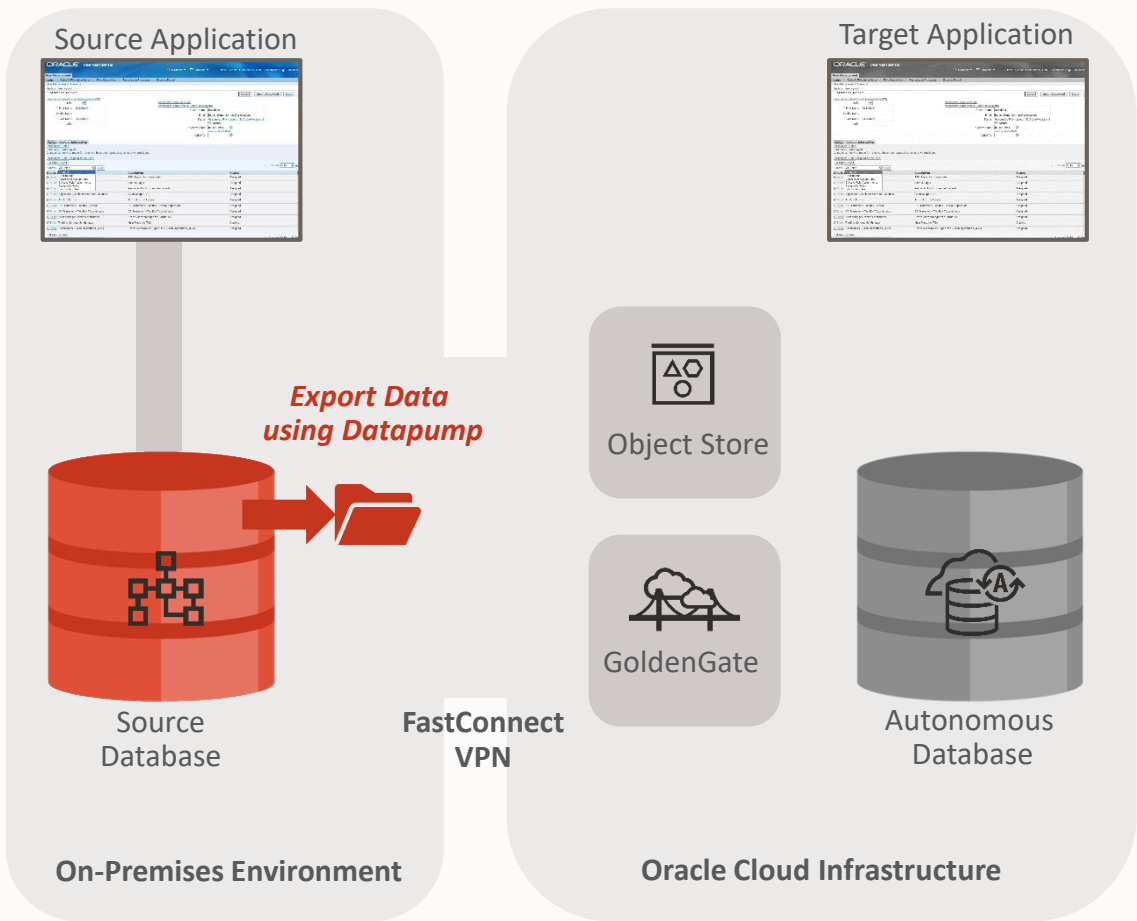
Phases

Name	Status	Duration
Validate	<div>Completed</div>	1 m 11 s
Prepare	<div>Started</div> <div>50%</div>	55 s



Start Migration – Export Initial Load

Current DB state is exported to files using datapump

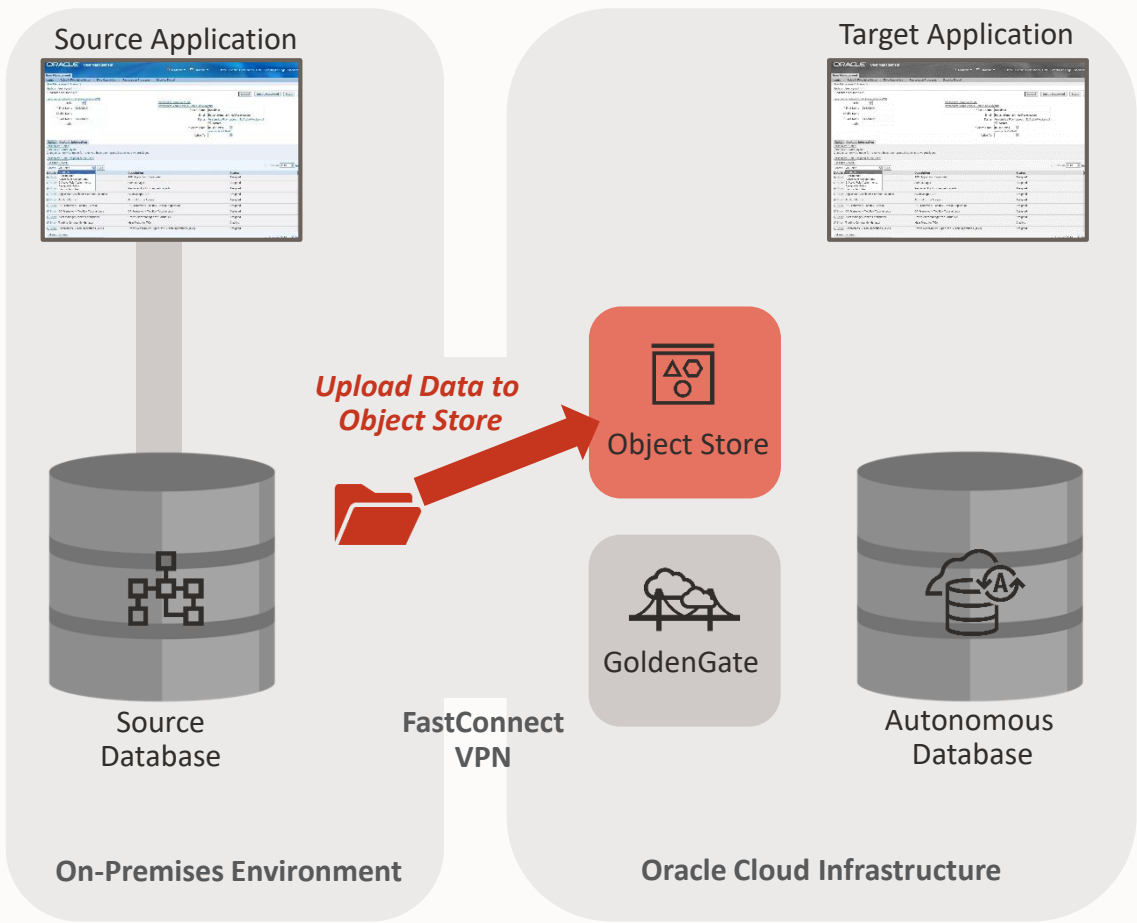


Phases		
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Started <div><div></div></div> 66%	3 m 38 s
Upload Data	● Pending	—
Import Initial Load	● Pending	—
Post Initial Load	● Pending	—
Prepare Replication Target	● Pending	—
Monitor Replication Lag	● Pending	—
Switchover	● Pending	—
Cleanup	● Pending	—
Showing 10 Items < 1 of 1 >		



Start Migration – Upload Data

Datapump export is uploaded to Object Store



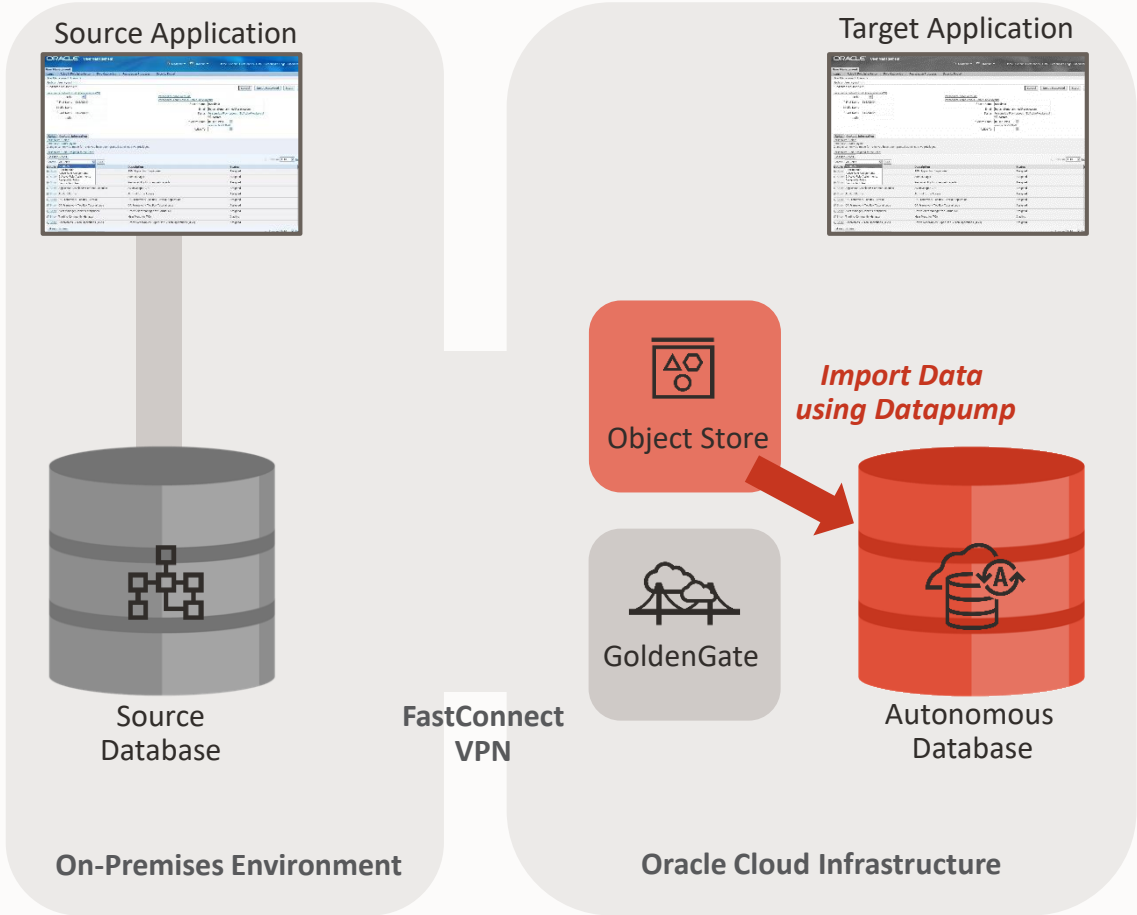
Phases

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

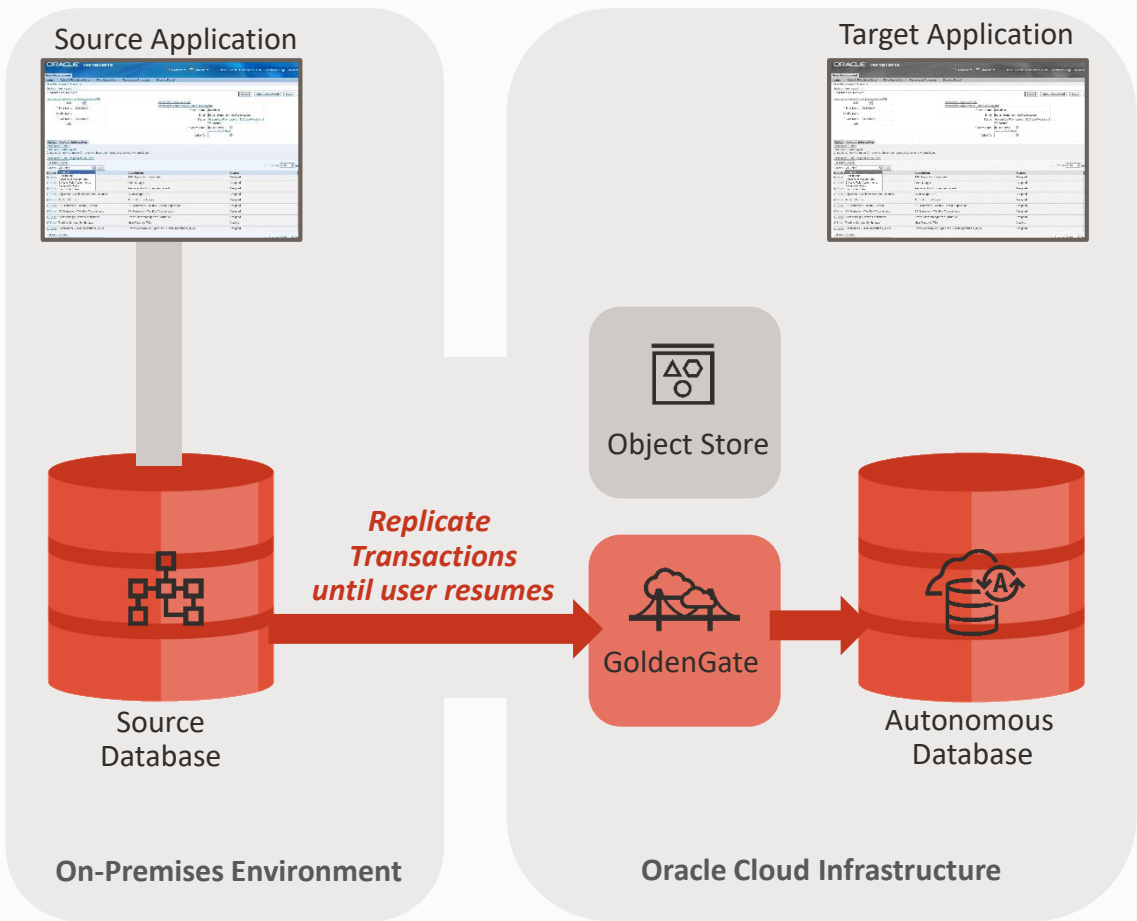
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Completed	1 m 13 s
Import Initial Load	● Started <input checked="" type="checkbox"/> 50%	3 m 30 s
Post Initial Load	● Pending	—
Prepare Replication Target	● Pending	—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

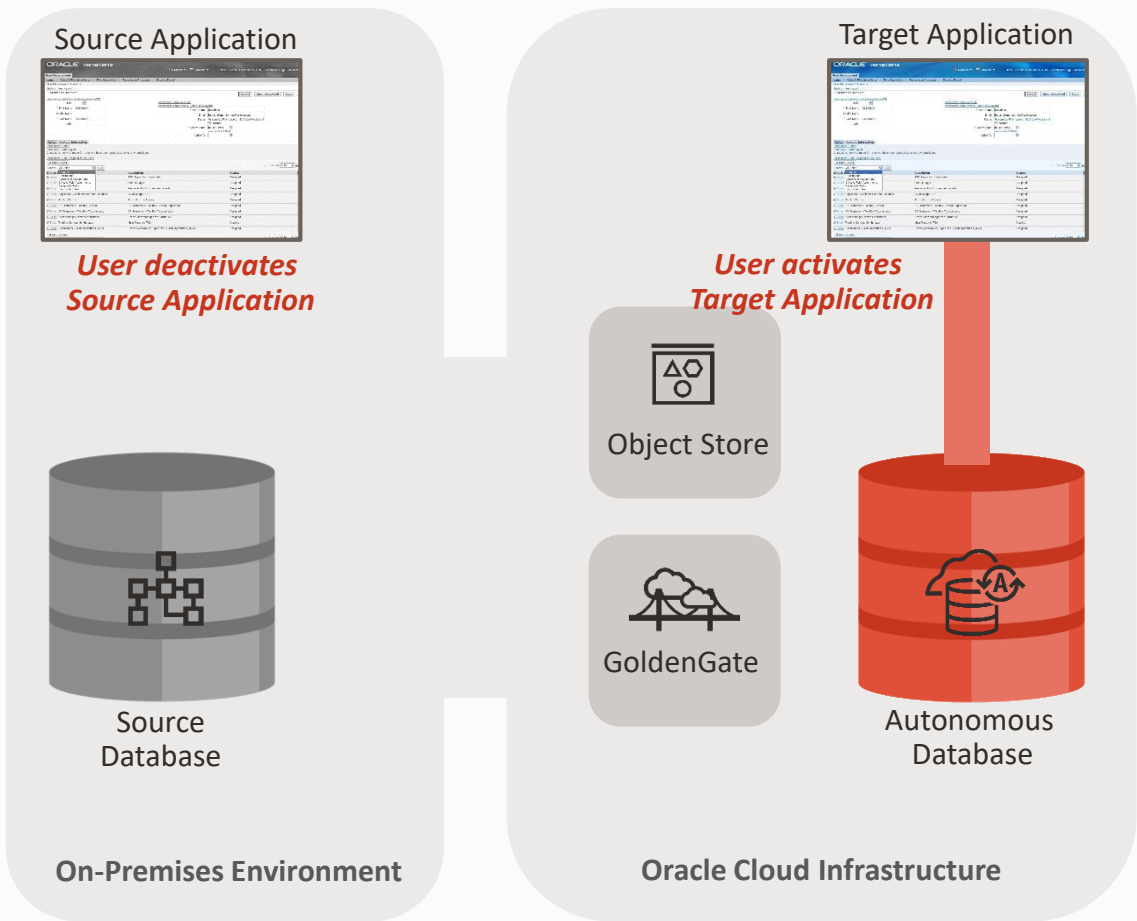


Phases		
Name	Status	Duration
Validate	● Completed	1 m 11 s
Prepare	● Completed	2 m 43 s
Export Initial Load	● Completed	9 m 30 s
Upload Data	● Completed	1 m 13 s
Import Initial Load	● Completed	5 m 33 s
Post Initial Load	● Completed	3 s
Prepare Replication Target	● Completed	2 m 11 s
Monitor Replication Lag	● Completed	2 s
Switchover	● Pending	—
Cleanup	● Pending	—
Showing 10 Items < 1 of 1 >		



Start Migration – Switchover

Wait until last transaction is replicated to let user 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

SUCCEEDED

job-20210331031753

Resume

Abort

Download Log

Add Tags

Delete

Job Information

Tags

OCID: ...2jxcka Show Copy

Type: Migration

Created: Wed, Mar 31, 2021, 03:17:53 UTC

Resources

Metrics

Phases

Unsupported Objects

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	Completed	39 s

Showing 10 Items < 1 of 1 >



ORACLE