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Moving Databases to OCI-
Methods & Best Practices
L200

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Oracle Cloud Infrastructure
October 2019

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.

Agenda

- Oracle Databases in the Oracle Cloud
- Move to the Oracle Cloud – Migration Scenarios
- Oracle Database Cloud Migration Solutions

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Part 1. Move to the Oracle Cloud-

Oracle Database Cloud Services & Considerations for Cloud Migration

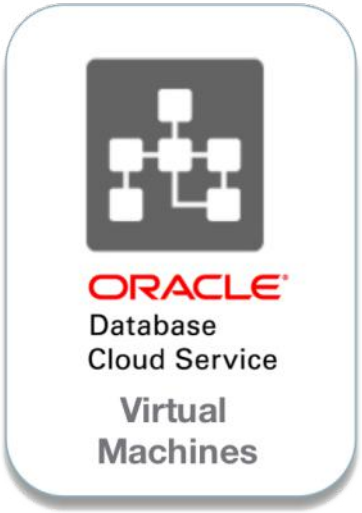
Oracle Database Cloud Services

Cloud Migration Best Practice

Understand which Oracle Database Cloud Service is best for your use case

ORACLE Cloud

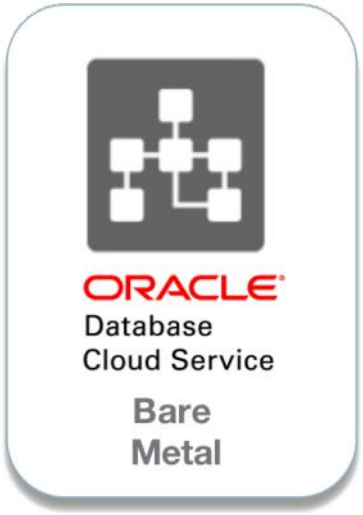
Single instance or RAC-enabled choices, Oracle Cloud Infrastructure offers elastic database virtual machine services for application development, test, and production deployment.



Memory	Up to 640 Gb of RAM
Cores	Scale up to 48 Cores
Storage	Up to 40 TB of remote NVMe SSD Block Volumes
Database	Standard or Enterprise Edition | 11.2, 12.1, 12.2, 18c, 19c
Migration Solutions	ZDM, SQL Developer, RMAN, Data Pump, MAA, Plug/Unplug, Remote Cloning

ORACLE
Cloud

Oracle Cloud is the only Cloud providing dedicated bare metal servers for the Oracle Database, offering the best in class performance.



Memory	Up to 768 Gb of RAM
Cores	Scale up to 52 Cores
Storage	Up to 51.2 TB of local NVMe SSD Database Storage
Database	Standard or Enterprise Edition | 11.2, 12.1, 12.2, 18c, 19c
Migration Solutions	ZDM, SQL Developer, RMAN, Data Pump, MAA, Plug/Unplug, Remote Cloning

ORACLE®
Cloud

Oracle highest-performance engineered system, catering for all your enterprise needs, supporting OLTP, Data Warehouse and real-time analytic and mixed database workloads.

Memory	Up to 5.7 TB of RAM & over 300 TB of NVMe Flash Cache
Cores	Scale up to 368 Cores
Storage	Up to 340 TB of Database Storage
Database	Enterprise Edition | 11.2, 12.1, 12.2, 18c, 19c
Migration Solutions	ZDM, SQL Developer, RMAN, Data Pump, MAA, Plug/Unplug, Remote Cloning

ORACLE®
Cloud

Oracle highest-performance engineered system, catering for all your enterprise needs, supporting OLTP, Data Warehouse and real-time analytic and mixed database workloads, in your data center and managed by Oracle.

Memory	Up to 5.7 TB of RAM & over 300 TB of NVMe Flash Cache
Cores	Scale up to 368 Cores
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Migration Solutions	ZDM, SQL Developer, RMAN, Data Pump, MAA, Plug/Unplug, Remote Cloning

Autonomous Database Cloud

PDB

Optimized for Analytics

Columnar

Large PGA

Statistics maintained during bulk loads

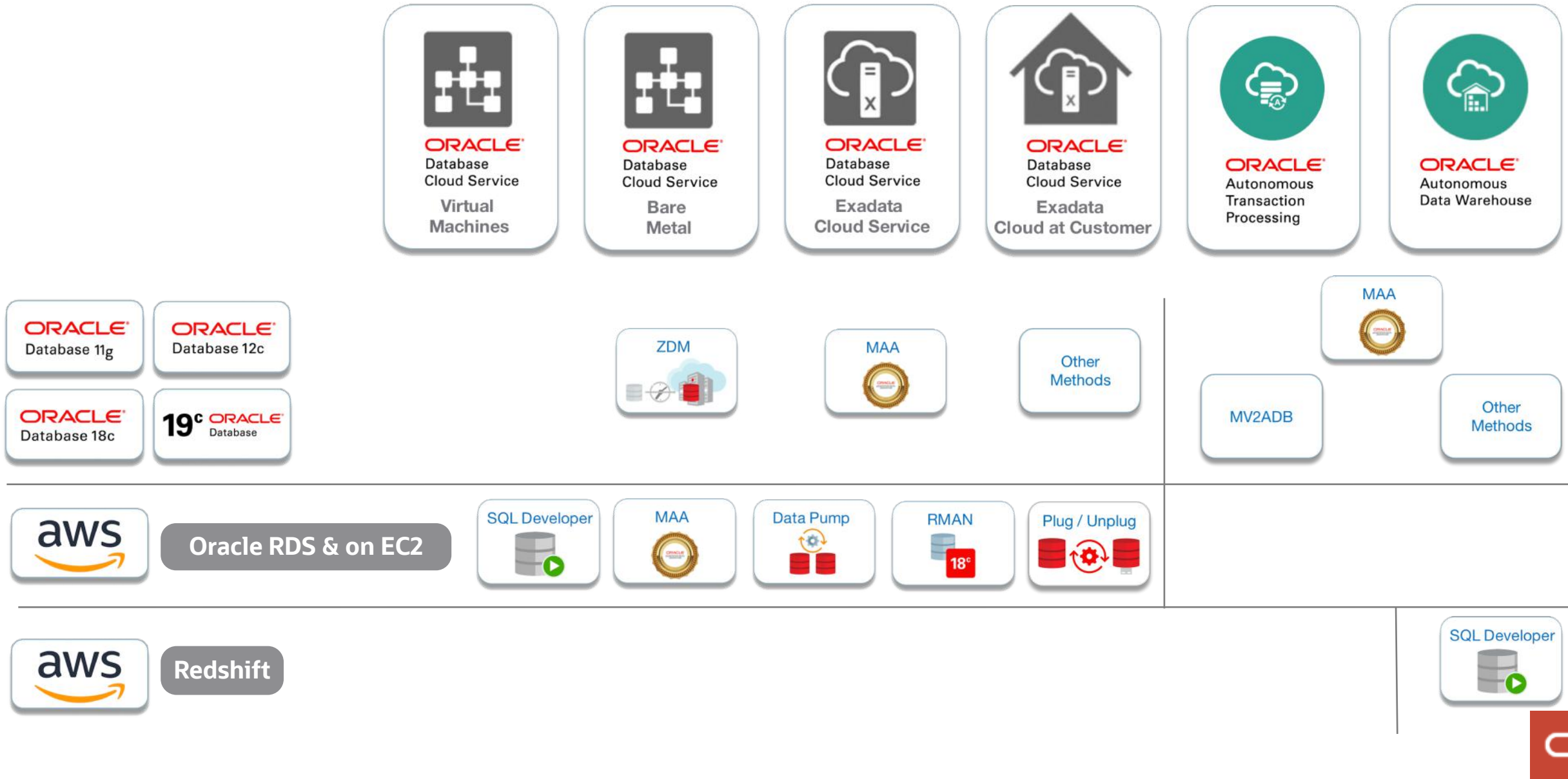
- PDB
- Optimized for OLTP
- Row based
- Large SGA
- Stats gathering triggered by DML

Migration Solutions	DBMS_CLOUD, SQL Developer, MAA, Data Pump, SQL*Loader, MV2ADB **Data Loading for Autonomous Data Ware House** **Data Loading for Autonomous Transaction Processing Serverless Deployments** **Data Loading for Autonomous Transaction Processing Dedicated Deployments**

Cloud Migration Best Practice

Understand your Cloud Migration Landscape

Cloud Migration Scenarios



Cloud Migration Best Practice

Understand the available Cloud Migration Solutions and determine which best suits your needs

Oracle Database Cloud Migration Solutions

ZDM

MV2ADB

MAA

SQL Developer

Data Pump

RMAN

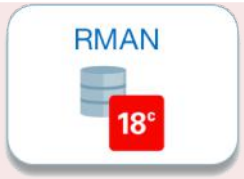
Plug / Unplug

Remote Cloning

Oracle Database Cloud Migration Solutions

Method	Logical / Physical	Online / Offline	Database Size
	Physical	Online	Any
	Logical	Online	Any
	Physical	Online	Any
	Logical & Physical	Online / Offline	Any

Oracle Database Cloud Migration Solutions

Method	Logical / Physical	Online / Offline	Database Size
	Logical	Online	Small to Medium
	Physical	Online / Offline	Any
	Physical	Online / Offline	Any
	Physical	Online	Small to Medium

Cloud Migration Best Practice

- For Autonomous Database use MV2ADB
- For all other use cases use ZDM when applicable
  - NEW IN 20c ZDM will integrate MV2ADB in a single tool
- If not applicable, use manual methods according on your requirements

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Part 2. Move to the Oracle Cloud-

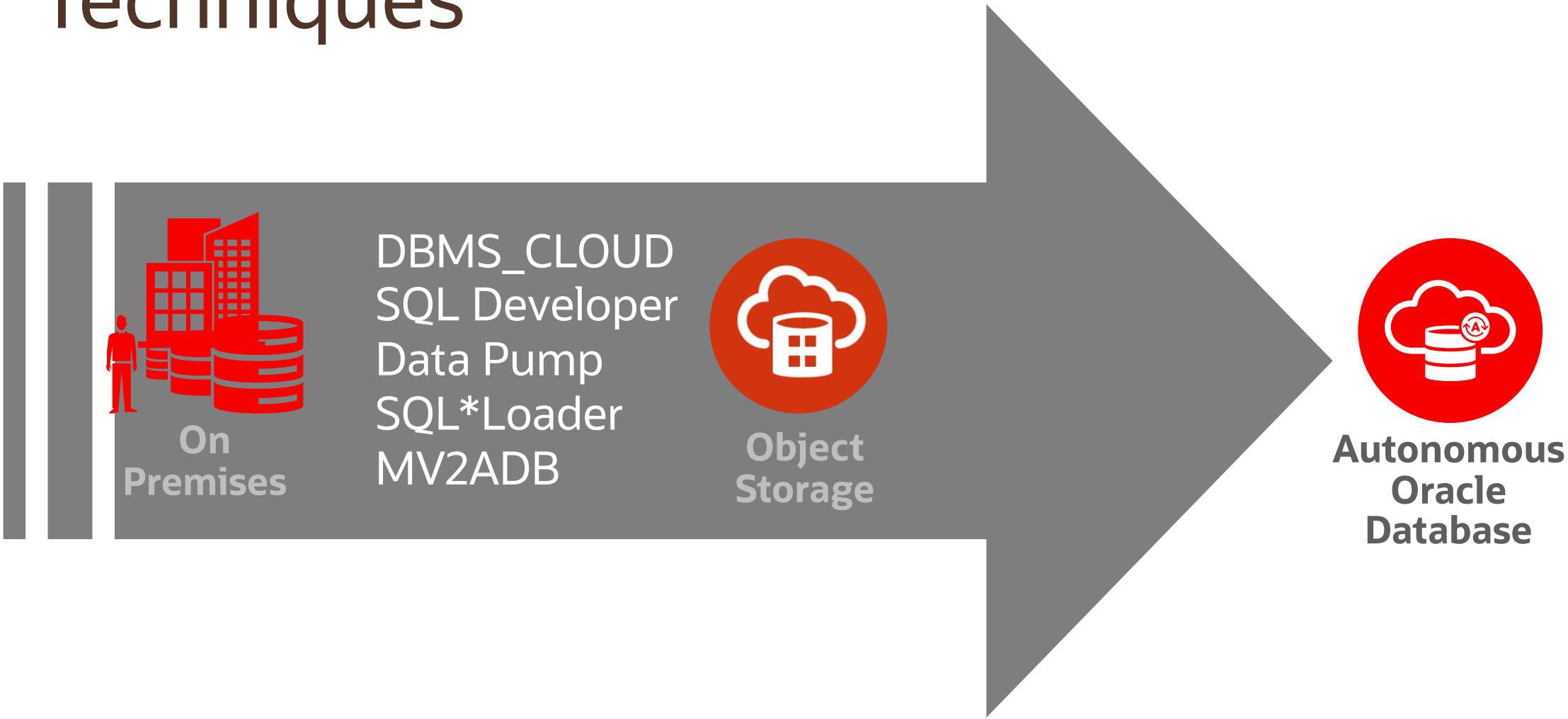
Migrating to Autonomous Databases using MV2ADB

Introducing MOVE to the Oracle Cloud

www.oracle.com/goto/move

Autonomous Cloud | General Migration Path

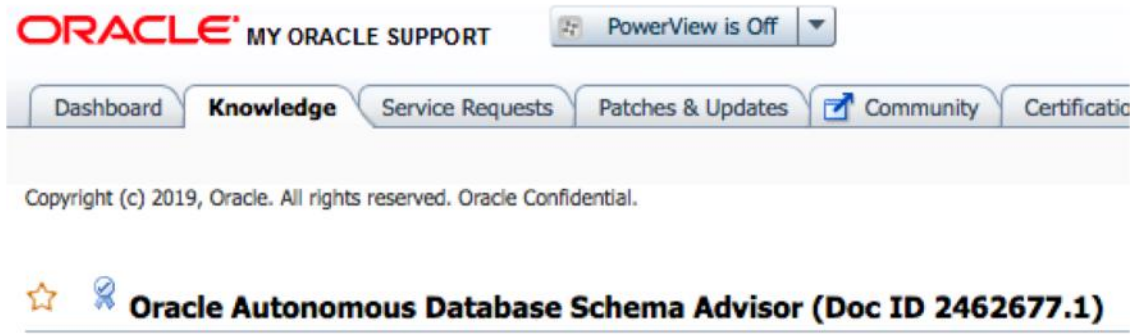
Autonomous Cloud | General Migration Techniques



How To Load Data To ADW/ATP Using DBMS_CLOUD.COPY_DATA Method And Find/Validate The Inputs Required (Doc ID 2493502.1)

Cloud Migration Best Practice

Use the Schema Advisor when migrating to Oracle Autonomous Database

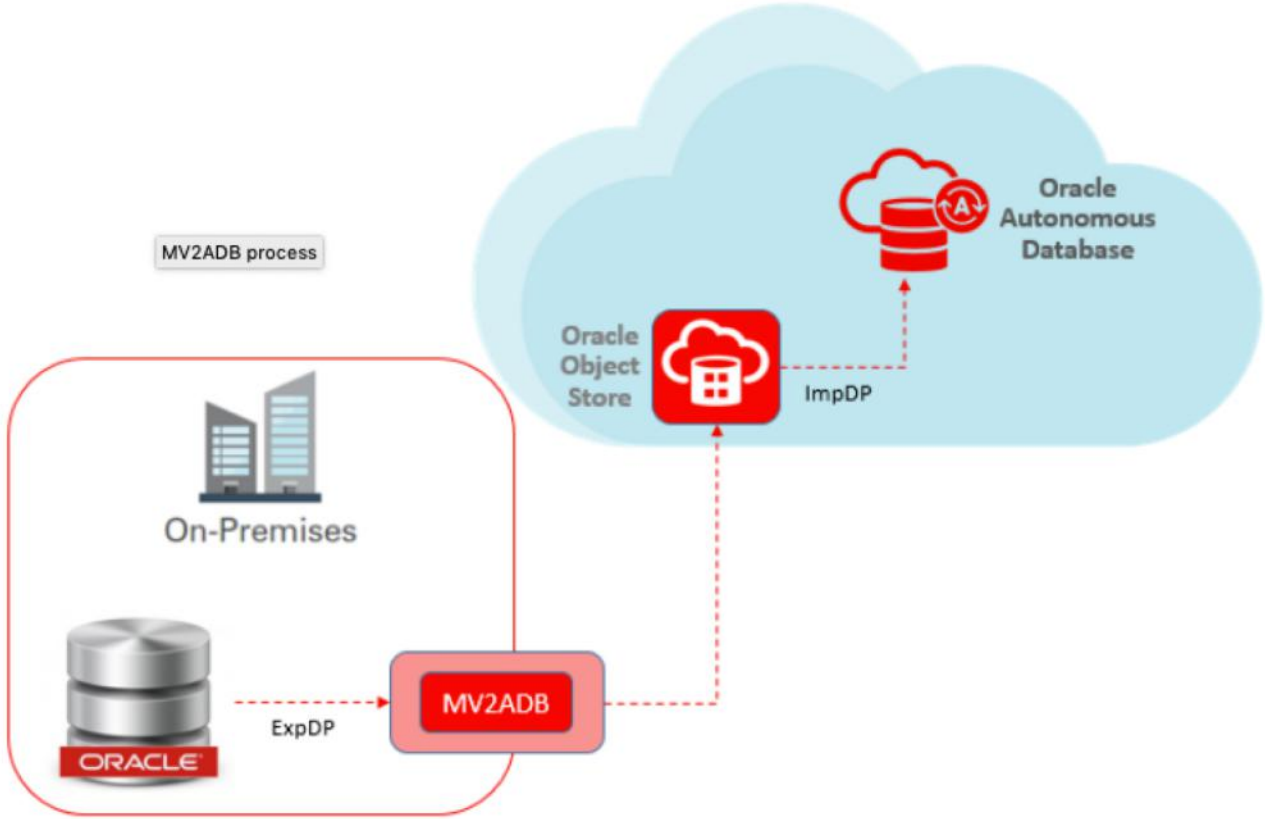


Cloud Migration Best Practice

Use MV2ADB when migrating to Oracle Autonomous Database

Migration Tools | MV2ADB
MOS Note: 2463574.1

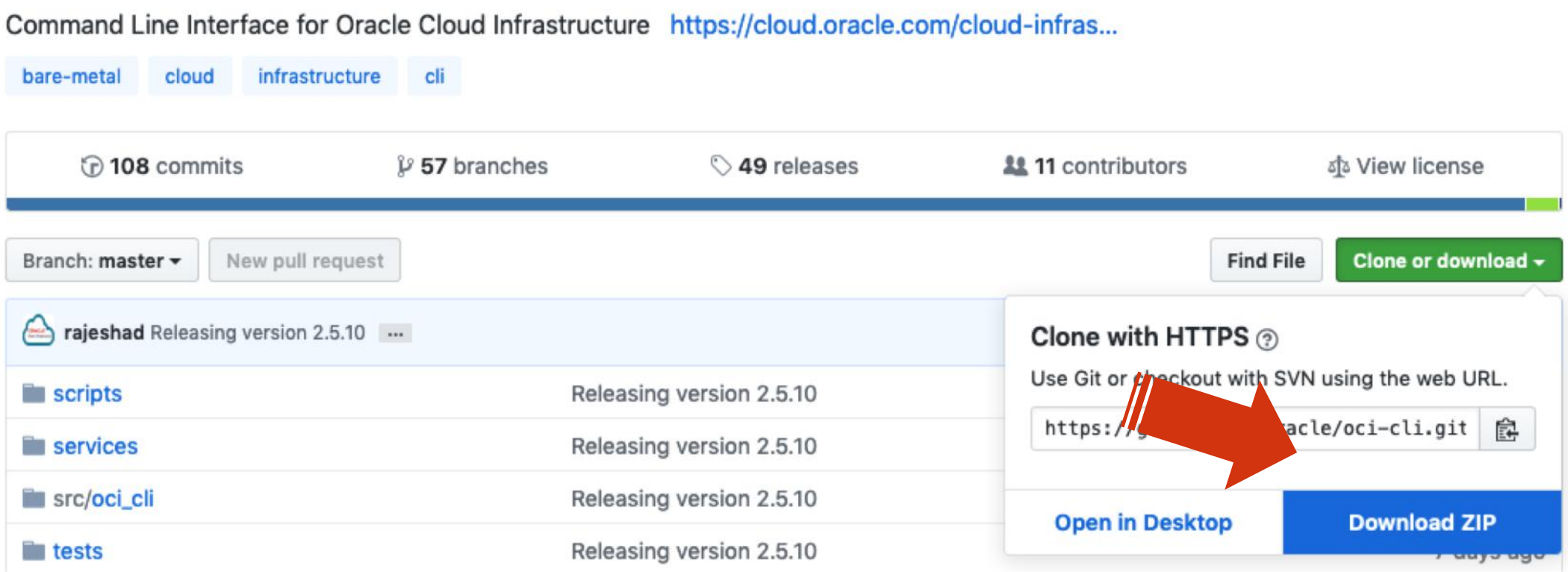
MV2ADB:
Move to Autonomous Database



Migration Tools | MV2ADB - Prerequisites

OCI Command Line Interface must be installed

https://github.com/oracle/oci-cli



Migration Tools | MV2ADB - Download

MOS Note:2463574.1
MV2ADB: move data to Autonomous Database in "one-click"

- MV2ADB: Migrate to Autonomous Database Cloud within "1-Click"
  - Loading data with autonomous database cloud
  - MV2ADB features & operations
    - MV2ADB - Auto Operation
    - MV2ADB - Expdp Operation
    - MV2ADB - Impdp Operation
    - MV2ADB – createbucket Operation
    - MV2ADB – deletebucket Operation
    - MV2ADB – listbuckets Operation
    - MV2ADB – putdump Operation
    - MV2ADB – getdump Operation
    - MV2ADB – deldump Operation
    - MV2ADB – listdump Operation
    - MV2ADB – report Operation
    - MV2ADB – encpass Operation
  - MV2ADB Command Option
  - MV2ADB Configuration File
  - MV2ADB Installation
  - MV2ADB De-installation

Migration Tools | MV2ADB Operation Modes

Operation modes

- auto
- expdp
- impdp

1. `expdp` from source (schemas based)
2. upload dump to Oracle Object Store
3. `impdp` into Autonomous Database Cloud

OCI object storage bucket operations:

- createbucket
- delbucket
- listbucket

OCI object storage object operations:

- deldump
- getdump
- listdump
- putdump

```
mv2adb auto {-conf <conf file path>} |
            {-bmchost <REST endpoint>
             -bmctennant <tennant name>
             -bmcId <user ID>
             -bmcbucket <bucket name>
            [-proxyHost <host> -proxyPort <port> [-proxyID <user ID> -proxyPass <password>]]} |
            {-oci
             -bmctennant <tennant name>
             -bmcbucket <bucket name>
             -dumpfiles <comma separated dump name> [-size <size Mb> -parallel <count>]}
            {-adbname <ADB database name>
             -cfile <ADB credential zip file>
             -ohome <Oracle Home>
             -ichome <Instant Client Home>
             -dbcs <Source DB connect string>
             -schemas <Database schemas to export>
             -dumpfile <comma separted expdp dump file name>
            [-encryption [-enctype AES128 | AES192 | AES256]]}
```

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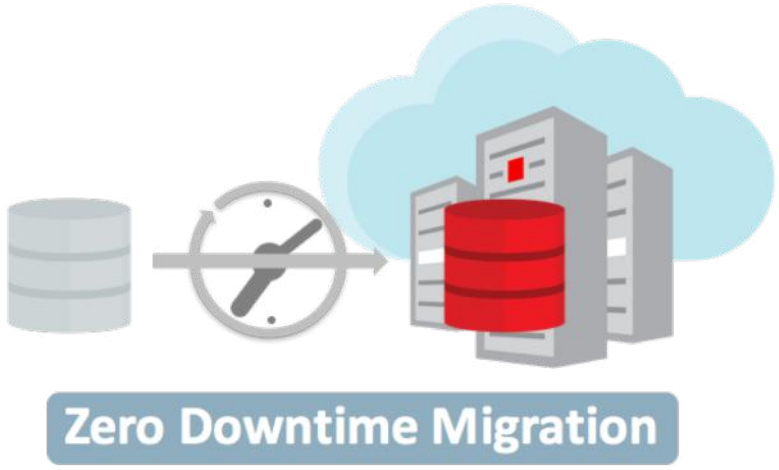
Part 3. Move to the Oracle Cloud-

Oracle Zero Downtime Migration

Zero Downtime Migration

Simple

- Single Button Approach



Comprehensive

- MAA Compliant
- Extensive Pre/Post-checks
- Resumable
- Rollback enabled
- Dry-run option
- Customizable Workflow

Fleet Scale

- Centralized
- Scheduled Operations
- Command Deck
- Audit Trail
- Migrations in Parallel
- Jobs Framework

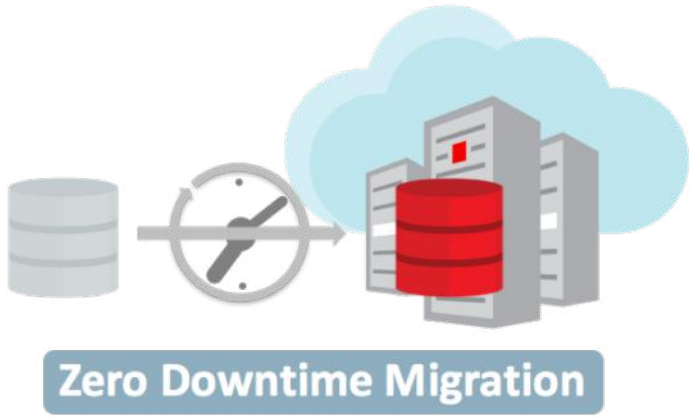
Zero Downtime Migration

Sources

ORACLE Database 11g

ORACLE Database 12c

ORACLE Database 18c



Targets

ORACLE Database 11g

ORACLE Database 12c

ORACLE Database 18c

Same Version / Platform

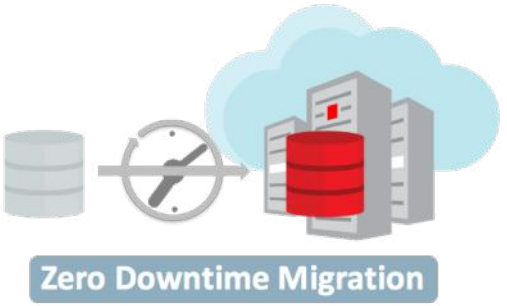
ORACLE Database Cloud Service
Virtual Machines

ORACLE Database Cloud Service
Bare Metal

ORACLE Database Cloud Service
Exadata Cloud Service

ORACLE Database Cloud Service
Exadata Cloud at Customer

ZDM
Migration from OCI-C to OCI

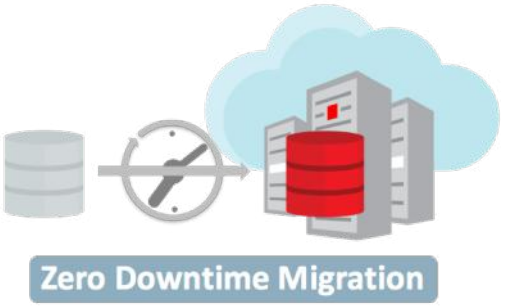


ORACLE
Cloud
Infrastructure
Classic

ORACLE
Database
Cloud Service
Bare
Metal

ORACLE
Database
Cloud Service
Virtual
Machines

ORACLE
Database
Cloud Service
Exadata
Cloud Service

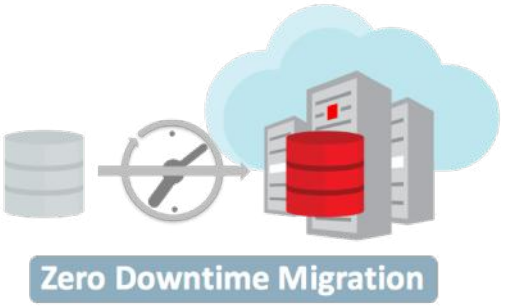


Oracle Zero Downtime Migration

Step by Step Migration workflow

Zero Downtime Migration

Operational Phases

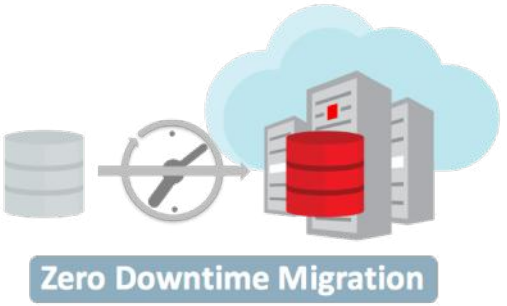


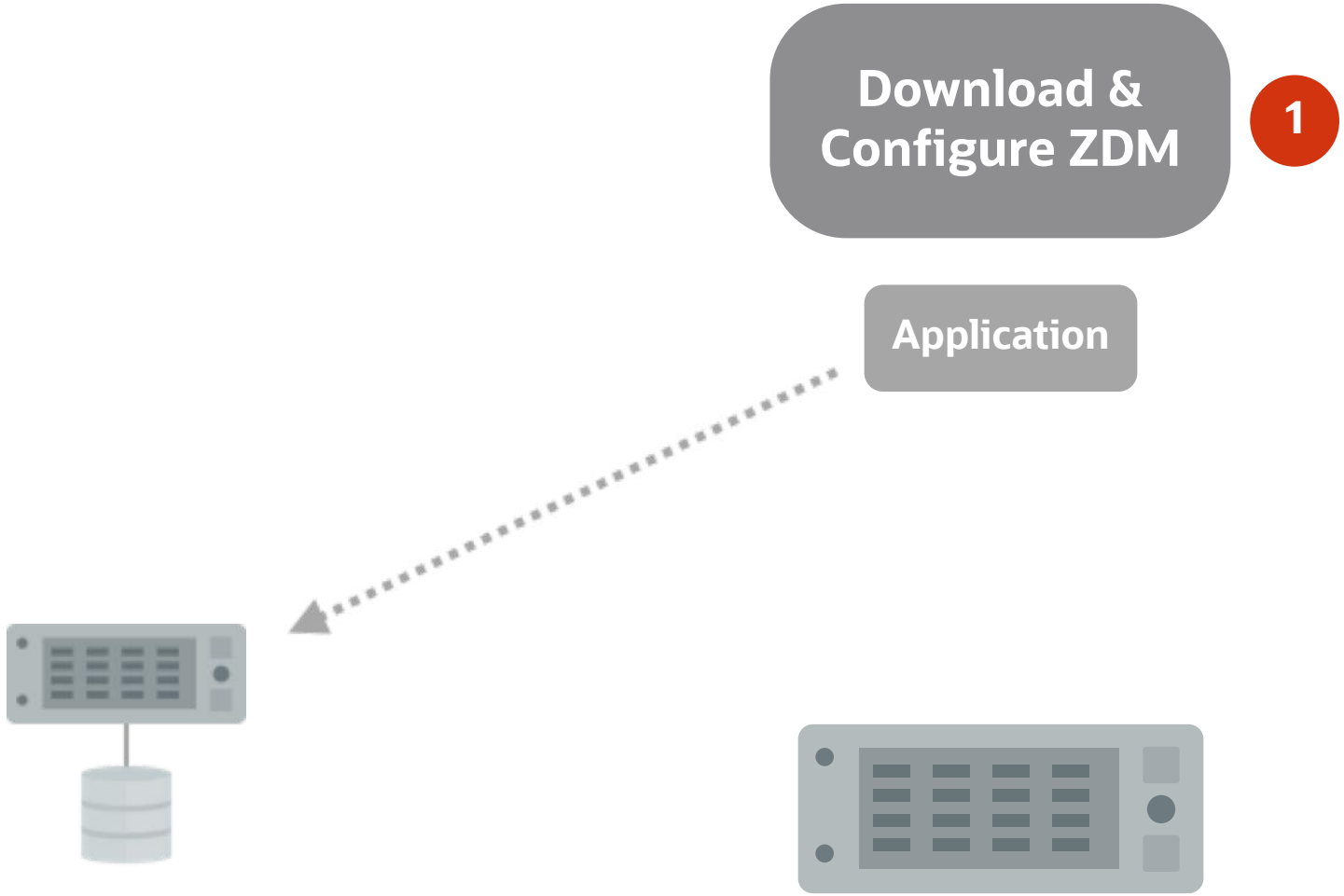
- Workflow is defined in 4 categories divided in operational phases
- Workflow can be customized by inserting plug-ins on each phase
- Migration can be paused and resumed at most operational phases

Analysis & Preparation | **Migration** | **Switch** | **Finalize**

Zero Downtime Migration

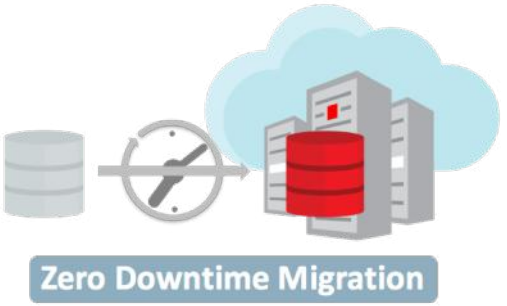
Workflow

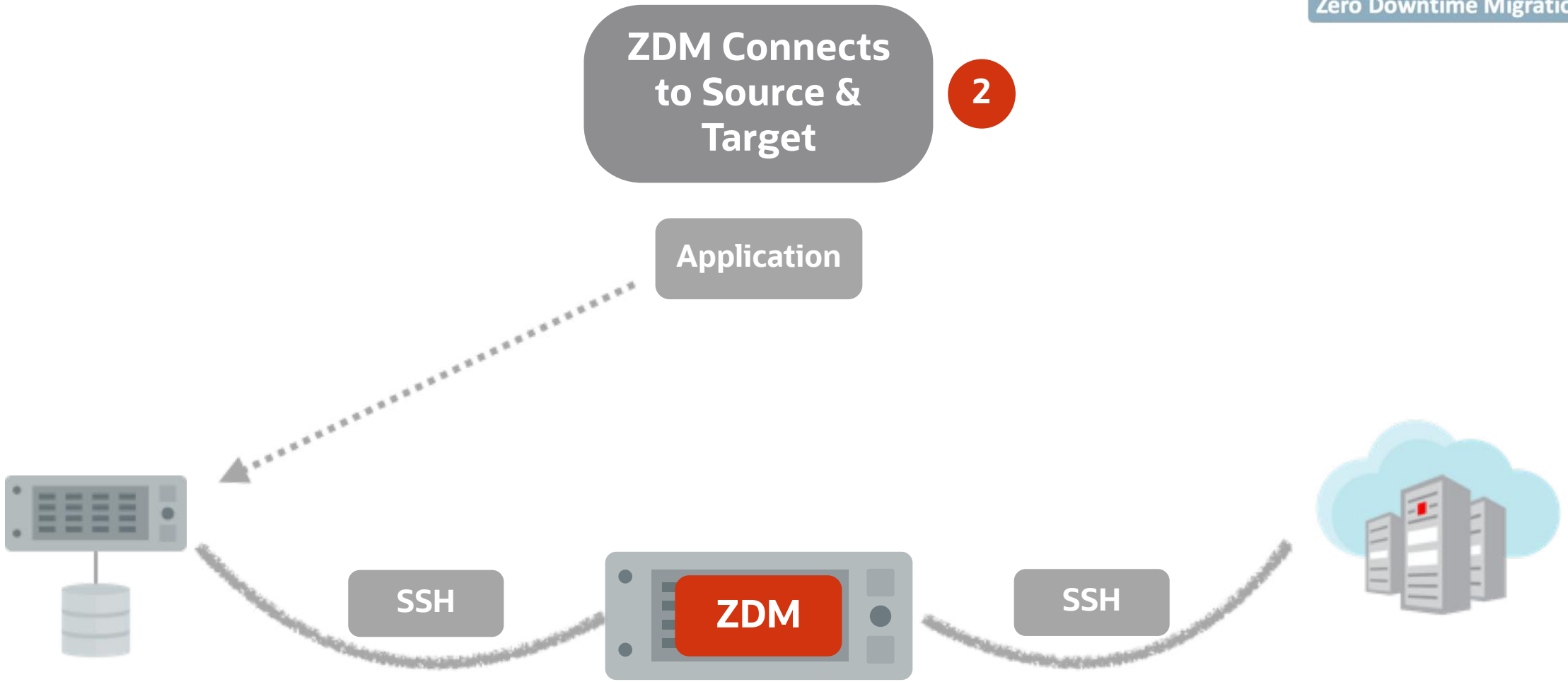




Zero Downtime Migration

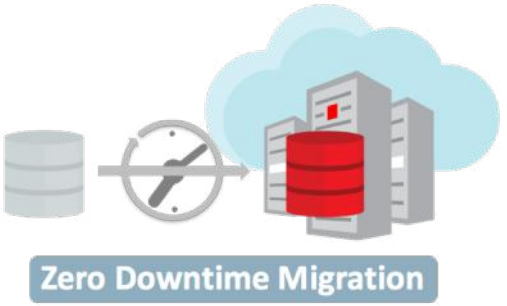
Workflow



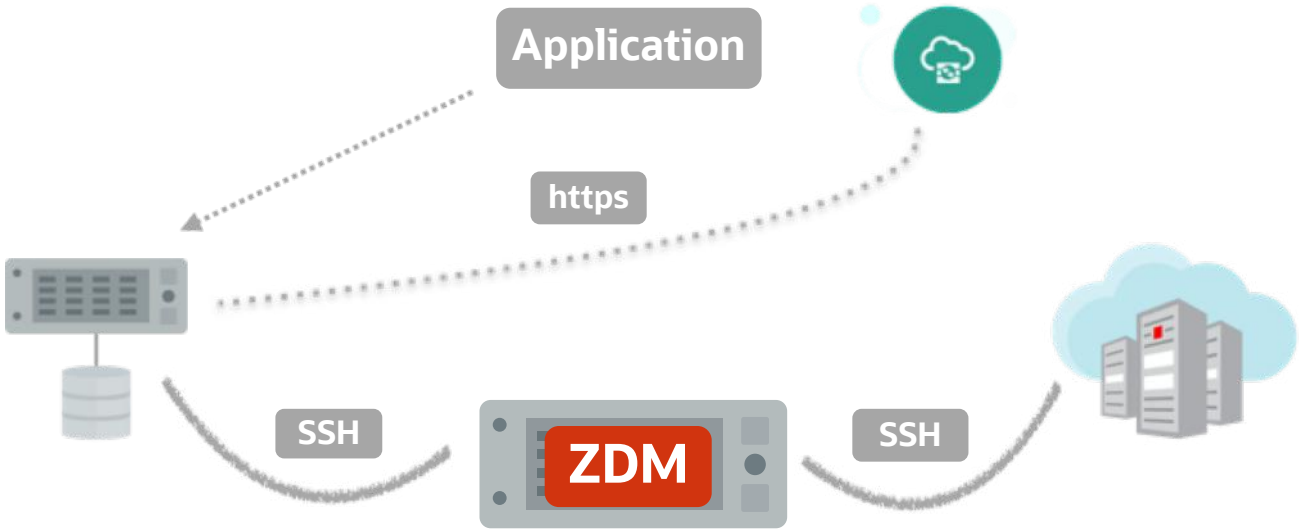


Zero Downtime Migration

Workflow

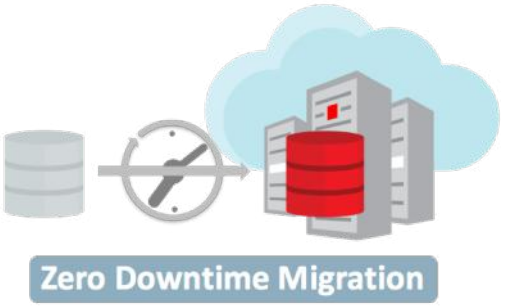


ZDM Connects Source to Object Store 3

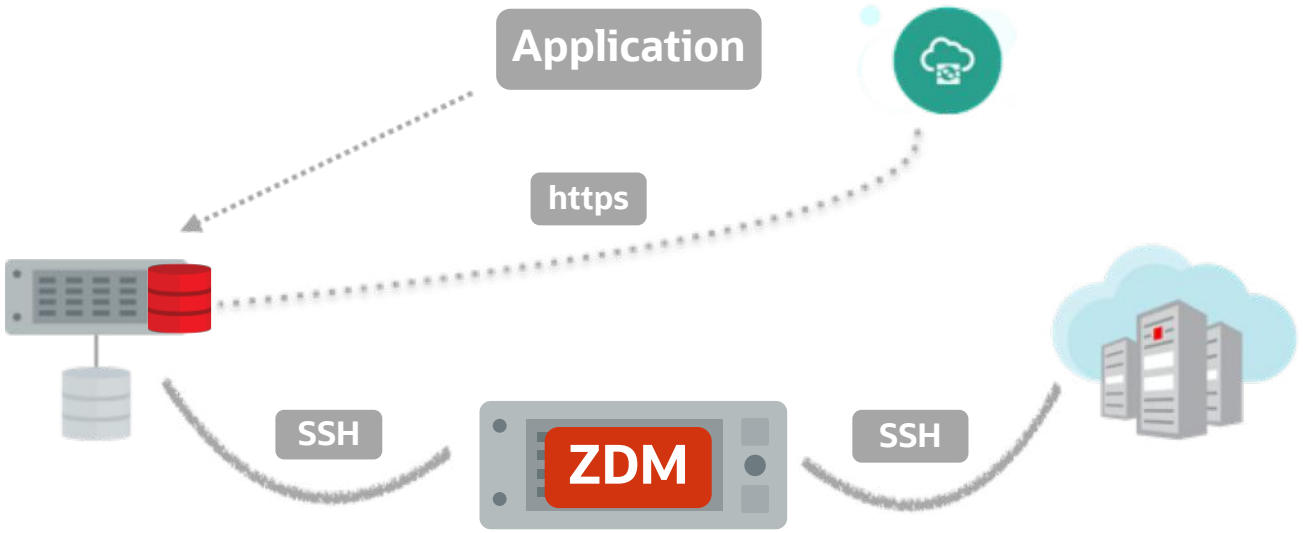


Zero Downtime Migration

Workflow



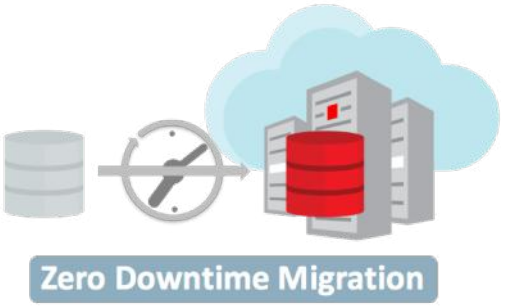
ZDM Transfers DB Files 4



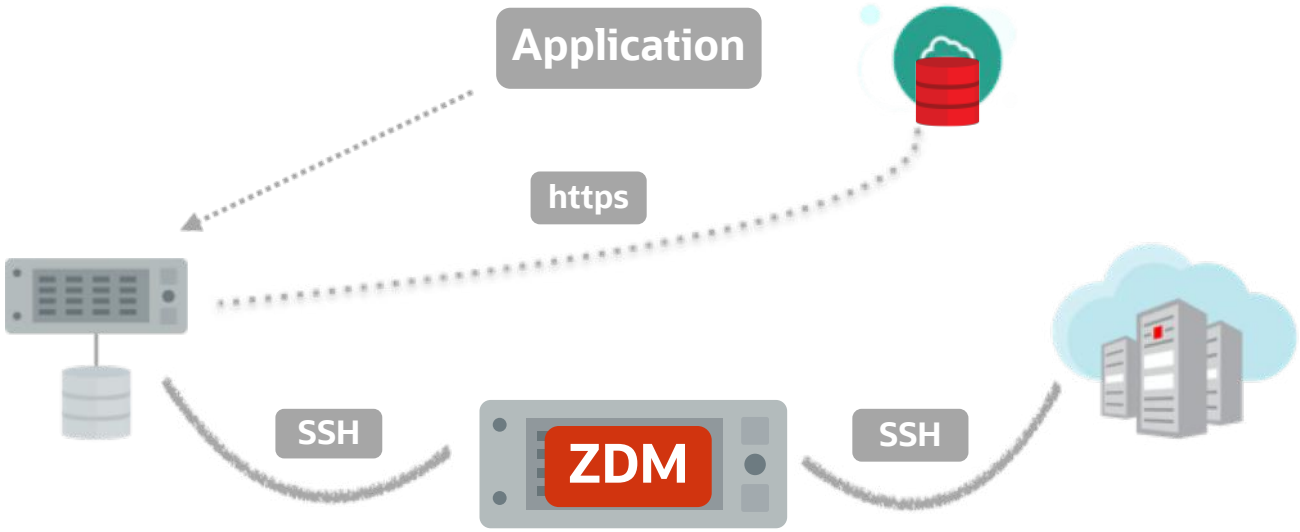
- Database Files
- Full Backup
- Including Incremental Archives

Zero Downtime Migration

Workflow



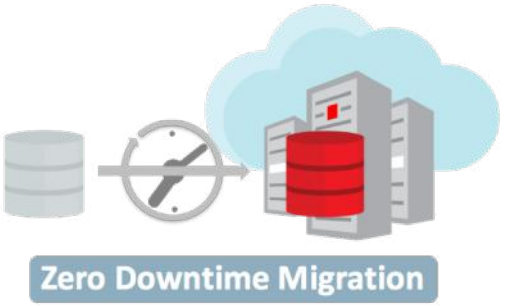
ZDM Instantiates Standby 5



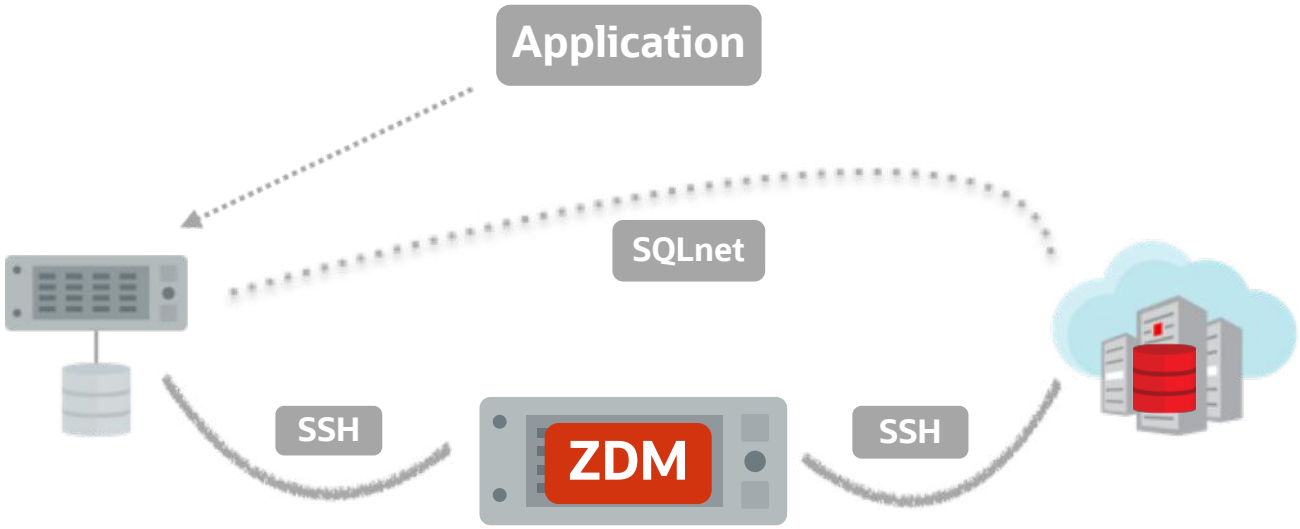
- Standby on target initiates with the backup files transferred to the Object Store

Zero Downtime Migration

Workflow



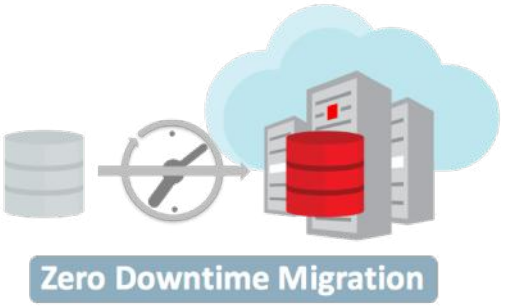
ZDM Synchronizes Primary & Standby 6



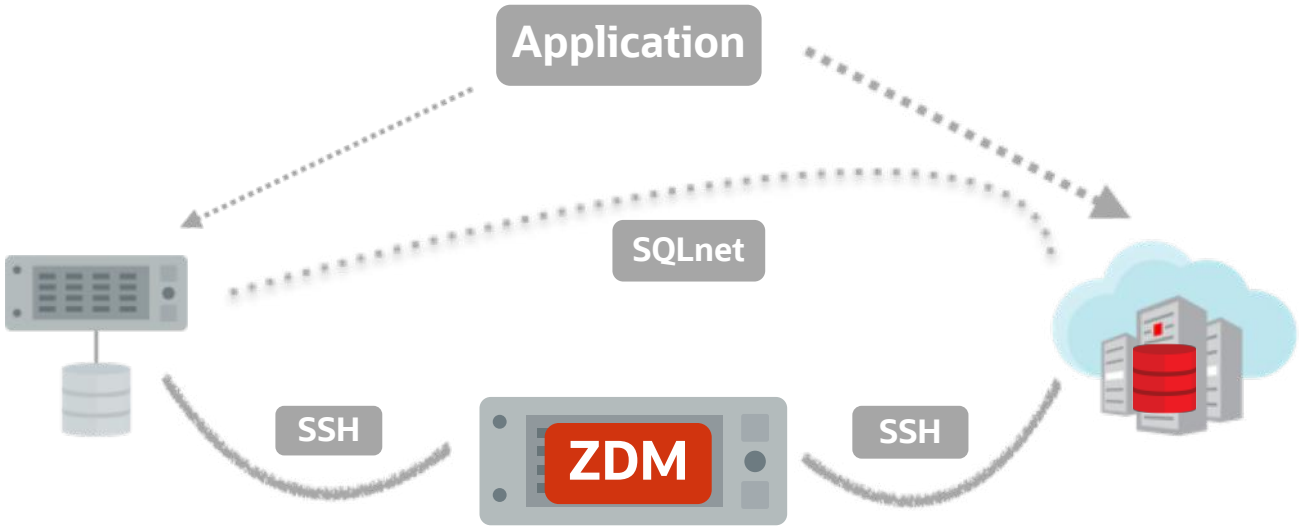
- SQLnet connectivity is established between source & target
- Synchronization between Primary and Standby starts

Zero Downtime Migration

Workflow



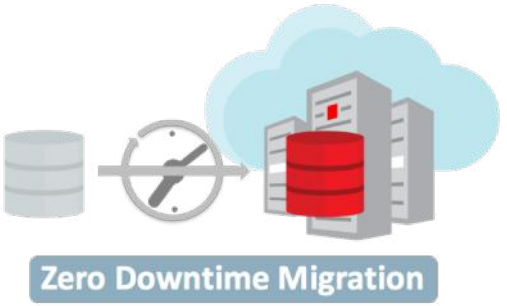
ZDM Switches over and Role Swaps 7



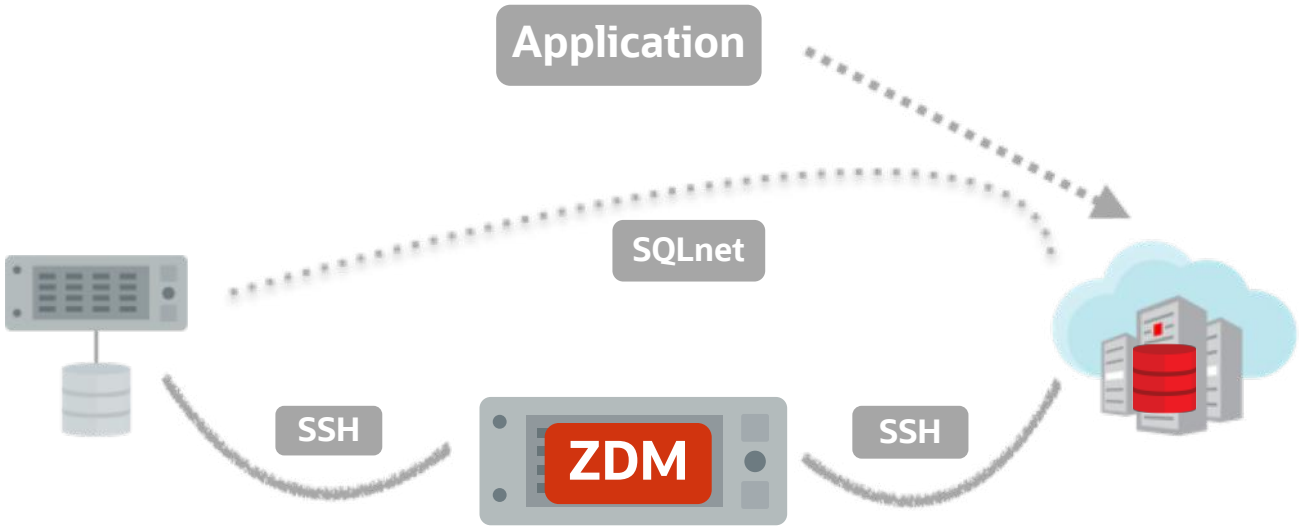
- Switchover
- Role swap between Primary and Standby

Zero Downtime Migration

Workflow



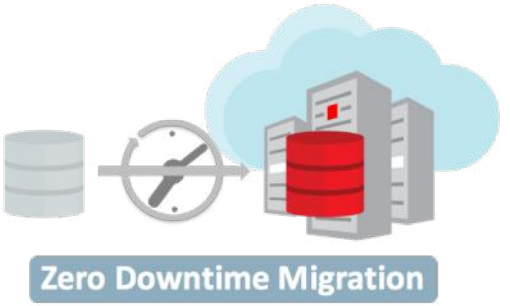
User Finalizes at Will 8

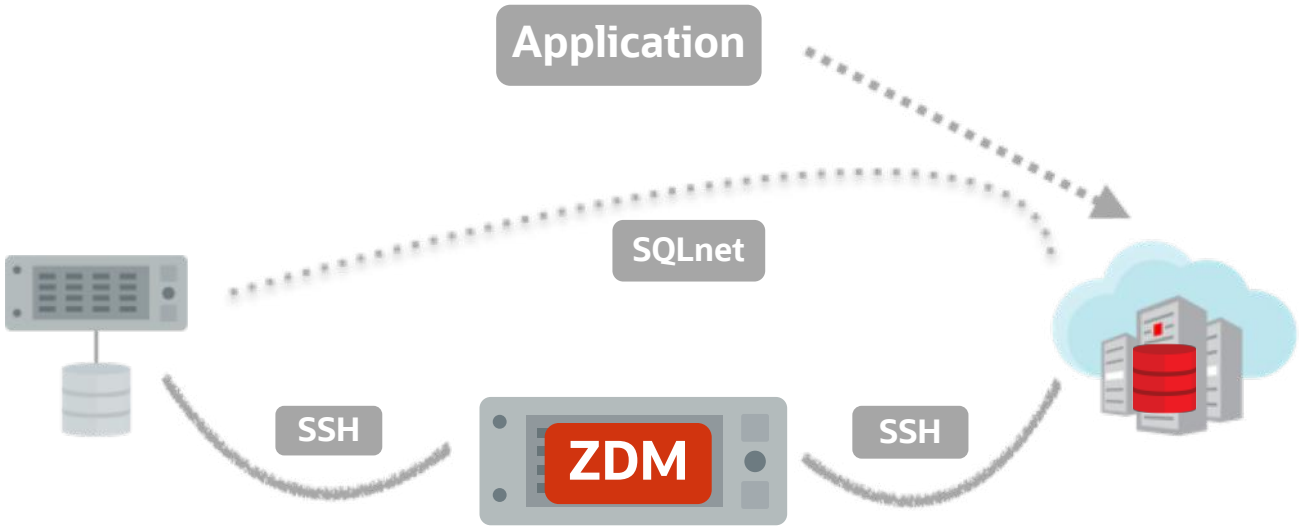


- ZDM keeps the standby on-premises synchronized.
- User decides when to stop this process in case fall back is required.

Zero Downtime Migration

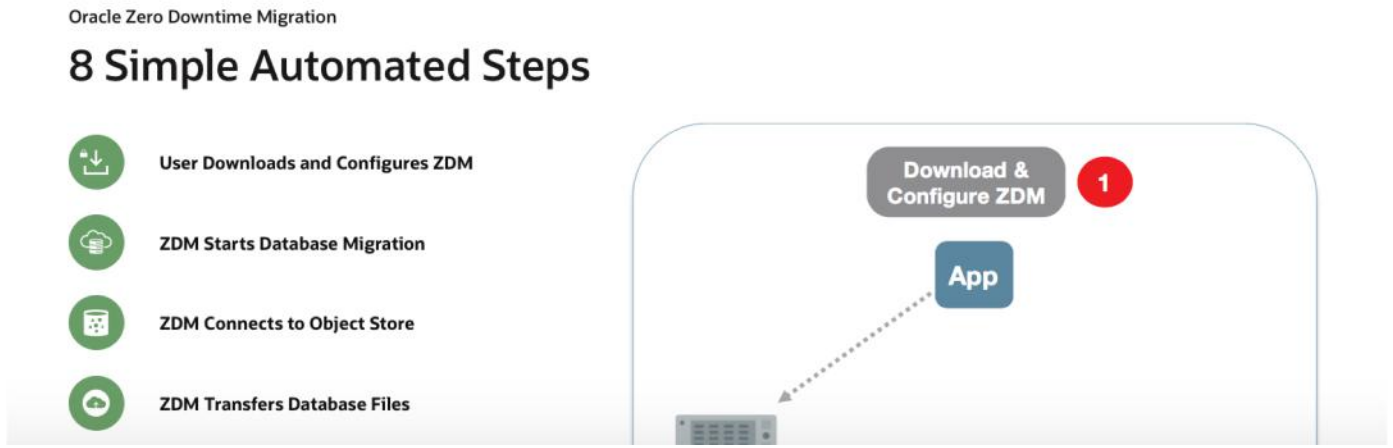
Workflow





1. Download ZDM
2. Connects to Source & Target
3. Connects to Object Store
4. Transfers DB Files
5. Instantiates Standby
6. Syncs Primary & Standby
7. Switches Over & Role Swaps
8. User Finalizes at Will

www.oracle.com/goto/zdm



Cloud Migration Best Practice

"Switch Over" at will.
Always test your new environment and applications after migrating and before performing the final switch over

Summary

After completing this module you should have learnt :

- Oracle Databases in the Oracle Cloud
- Methods to move to the Oracle Cloud – Migration Scenarios
- Oracle Database Cloud Migration Solutions

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Oracle Cloud always free tier:
oracle.com/cloud/free/

OCI training and certification:
oracle.com/cloud/iaas/training
oracle.com/cloud/iaas/training/certification
education.oracle.com/oracle-certification-path

OCI hands-on labs:
ocitraining.qloudable.com/provider/oracle

Oracle learning library videos on YouTube:
youtube.com/user/OracleLearning