



ORACLE

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.

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Agenda

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

Part 1. Move to the Oracle Cloud-

Oracle Database Cloud Services & Considerations for Cloud Migration

Oracle Database Cloud Services



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**



ORACLE®
Autonomous
Transaction
Processing
Serverless



ORACLE®
Autonomous
Transaction
Processing
**Dedicated
Deployments**



ORACLE®
Autonomous
Data Warehouse

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.



ORACLE®
Database
Cloud Service

Bare
Metal

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
Storage	Up to 340 TB of Database Storage
Database	Enterprise Edition 11.2, 12.1, 12.2, 18c, 19c
Migration	ZDM, SQL Developer, RMAN, Data Pump, MAA, Plug/Unplug, Remote Cloning
Solutions	

Autonomous Database Cloud



ORACLE
Autonomous
Data Warehouse

PDB
Optimized for Analytics
Columnar
Large PGA
Statistics maintained during bulk loads



ORACLE
Autonomous
Transaction
Processing
Serverless



ORACLE
Autonomous
Transaction
Processing
Dedicated
Deployments

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

•

Migration

DBMS_CLOUD, SQL Developer, MAA, Data Pump, SQL*Loader, MV2ADB

Solutions

[Data Loading for Autonomous Data Ware House](#)

[Data Loading for Autonomous Transaction Processing Serverless Deployments](#)

[Data Loading for Autonomous Transaction Processing Dedicated Deployments](#)

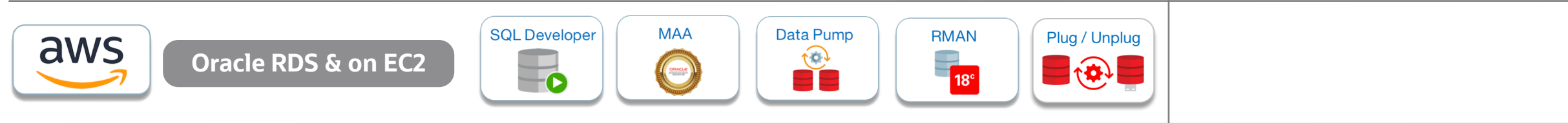
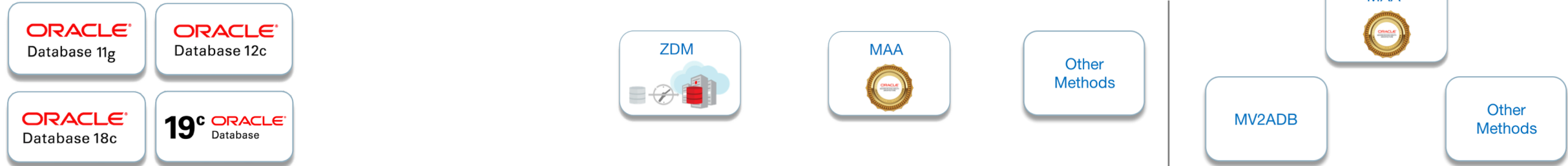
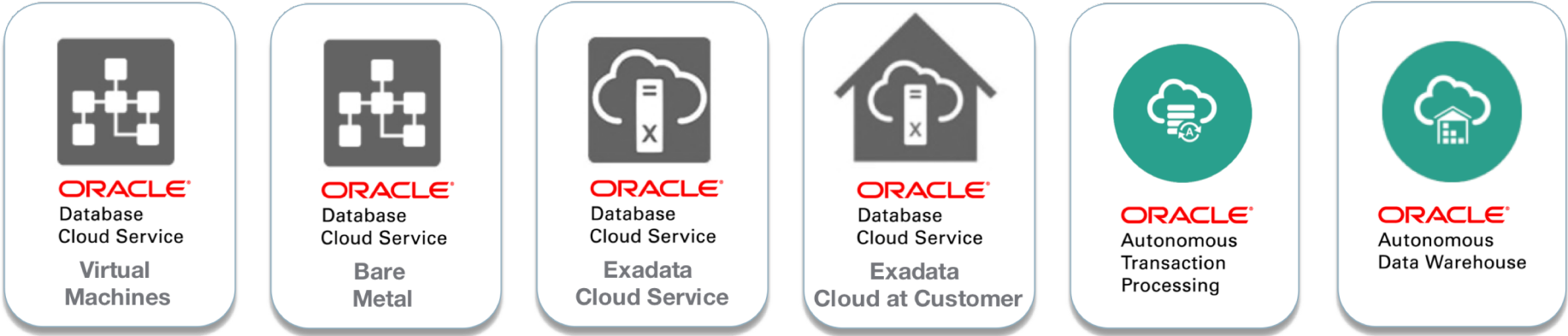


Cloud Migration Best Practice



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






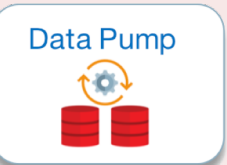
Plug / Unplug







Remote Cloning



Oracle Database Cloud Migration Solutions

Method	Logical / Physical	Online / Offline	Database Size
 ZDM	Physical	Online	Any
 MV2ADB	Logical	Online	Any
 MAA	Physical	Online	Any
 Data Pump	Logical & Physical	Online / Offline	Any

Oracle Database Cloud Migration Solutions

Method	Logical / Physical	Online / Offline	Database Size
<div>SQL Developer</div> <div></div>	Logical	Online	Small to Medium
<div>RMAN</div> <div></div>	Physical	Online / Offline	Any
<div>Plug / Unplug</div> <div></div>	Physical	Online / Offline	Any
<div>Remote Cloning</div> <div></div>	Physical	Online	Small to Medium

Cloud Migration Best Practice



For Autonomous Database use MV2ADB



For all other use cases use ZDM when applicable



ZDM will integrate MV2ADB in a single tool




If not applicable, use manual methods according on your requirements

Part 2. Move to the Oracle Cloud-

Migrating to Autonomous Databases using MV2ADB

Introducing MOVE to the Oracle Cloud

www.oracle.com/goto/move



Move to the Oracle Cloud

Move your Database to the Oracle Cloud

Simple & Efficient

Oracle automated tools make it seamless to move your on-premises database to the Oracle Cloud with virtually no downtime. Using the same technology and standards on-premises and in the Oracle Cloud, you can facilitate the same products and skills to manage your cloud-based Oracle Databases as you would on any other platform.

Flexible


You can directly migrate your Oracle Database to the Oracle Cloud from various source databases into different target cloud deployments depending on your requirements and business needs. A well-defined set of tools gives you the flexibility to choose the method that best applies to your needs.

Cost Effective

The same flexibility that lets you directly migrate your Oracle Database to the Oracle Cloud is applied to finding the most cost effective solution for the purpose and duration of the migration. Even if the automated tools determine that an Oracle licensable product should be used to optimize your migration, Oracle will provide a cost neutral solution.

Highly Available & Scalable

The tight integration of all migration tools with the Oracle Database lets you maintain control and gain better efficiency when moving your databases to the Oracle Cloud, while the Maximum Availability Architecture (MAA)-approved tools as well as Zero Downtime Migration (ZDM)-based migrations ensure that your migration is handled as smoothly as possible.



Cloud Migration Advisor

Autonomous Cloud | General Migration Path



**On
Premises**

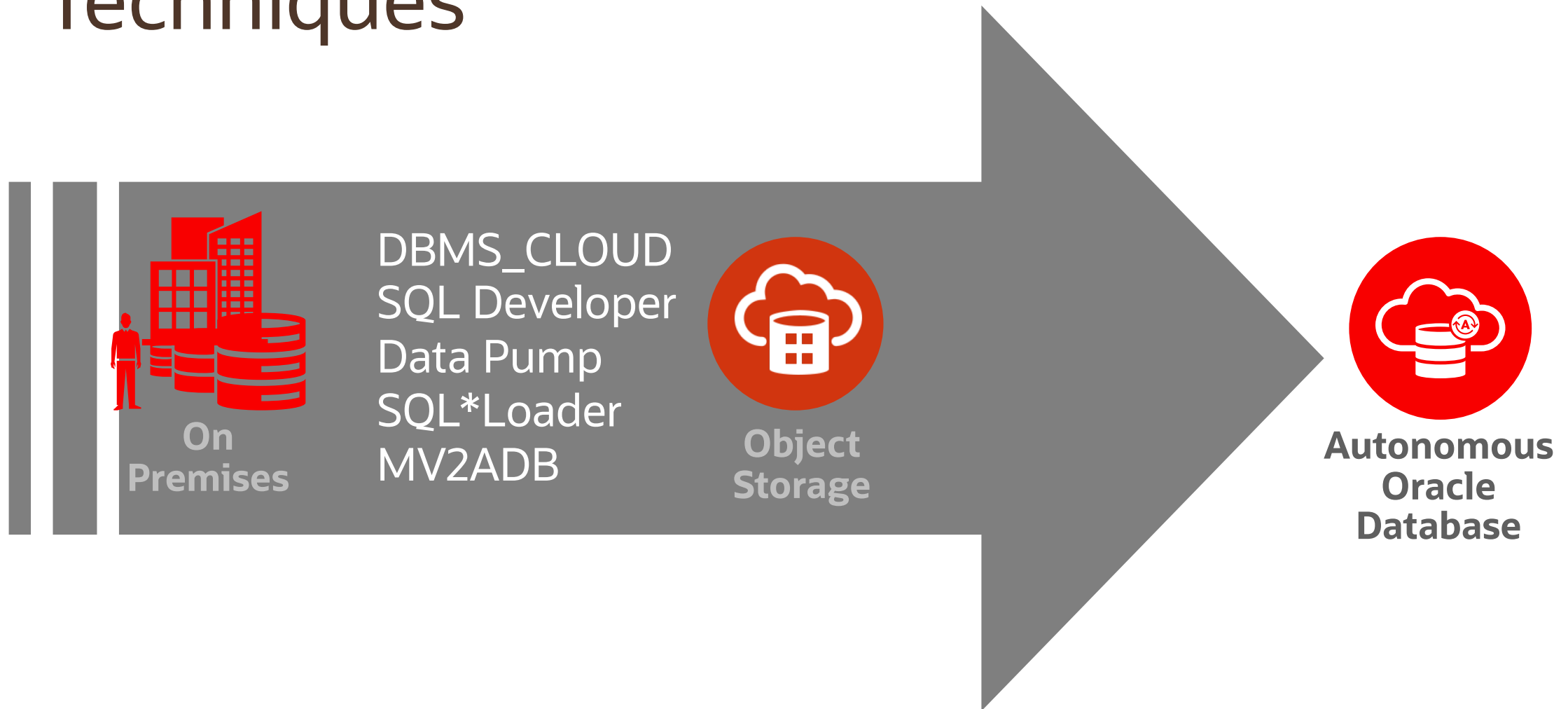


**Object
Storage**



**Autonomous
Oracle
Database**

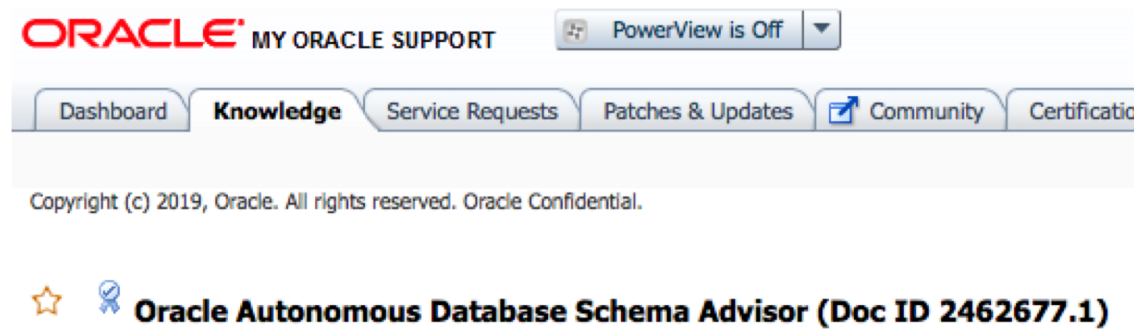
Autonomous Cloud | General Migration Techniques



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



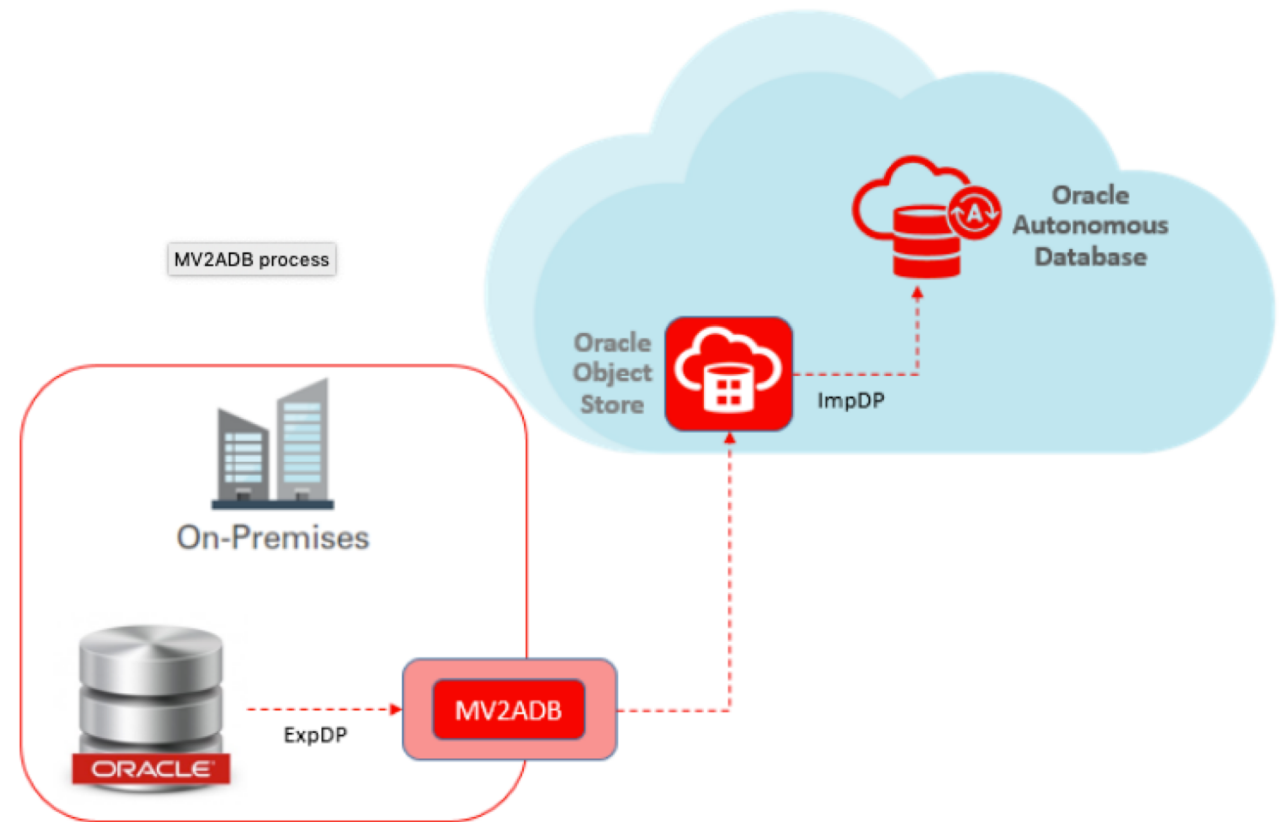
Cloud Migration Best Practice

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>

Command Line Interface for Oracle Cloud Infrastructure <https://cloud.oracle.com/cloud-infras...>

bare-metal

cloud

infrastructure

cli

108 commits

57 branches

49 releases

11 contributors

View license

Branch: master

New pull request

Find File

Clone or download

rajeshad Releasing version 2.5.10

scripts

Releasing version 2.5.10

services

Releasing version 2.5.10

src/oci_cli

Releasing version 2.5.10

tests

Releasing version 2.5.10

Clone with HTTPS

Use Git or checkout with SVN using the web URL.

<https://github.com/oracle/oci-cli.git>

Open in Desktop

Download ZIP

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](#)

▼ Attachments



mv2adb - 20190409 - \$Revision: 2.0.1.38 \$ (29.37 KB)

Migration Tools | MV2ADB

Operation Modes

Operation modes

auto

expdp

impdp

OCI object storage bucket operations:

createbucket

delbucket

listbucket

OCI object storage object operations:

deldump

getdump

listdump

putdump

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

```
mv2adb auto {-conf <conf file path>} |  
  {-bmchost <REST endpoint>  
  -bmctenant <tenant name>  
  -bmclid <user ID>  
  -bmcbucket <bucket name>  
  [-proxyHost <host> -proxyPort <port> [-proxyID <user ID> -proxyPass <password>]]} |  
  {-oci  
  -bmctenant <tenant 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 separated expdp dump file name>  
  [-encryption [-encype AES128 | AES192 | AES256]]}
```


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



Zero Downtime Migration



ORACLE®
Database
Cloud Service
Virtual
Machines



ORACLE®
Database
Cloud Service
Bare
Metal



ORACLE®
Database
Cloud Service
Exadata
Cloud Service

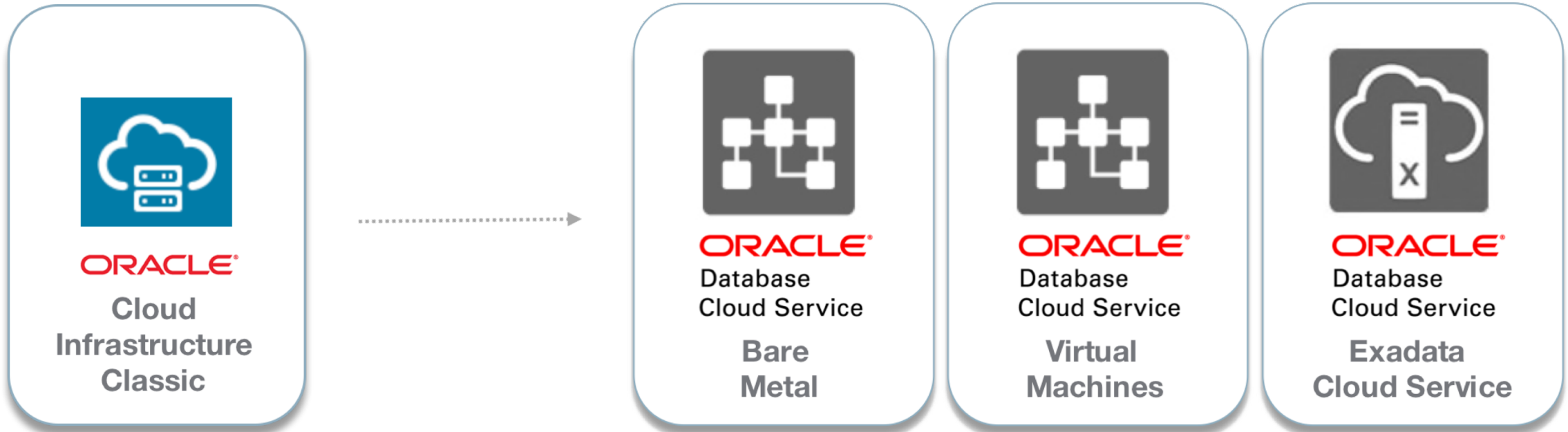
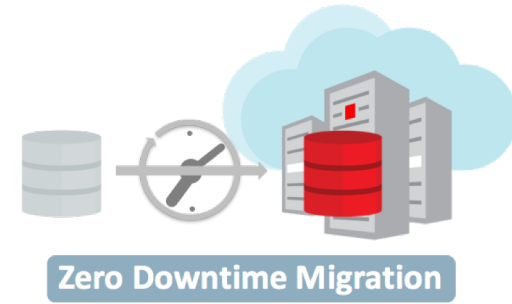


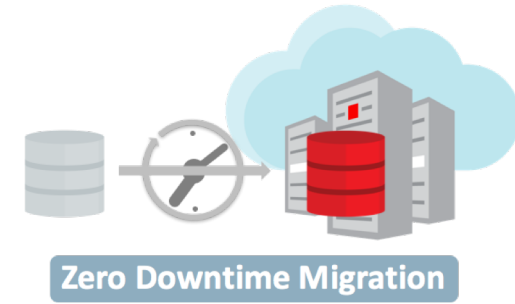
ORACLE®
Database
Cloud Service
Exadata
Cloud at Customer



ZDM

Migration from OCI-C to OCI



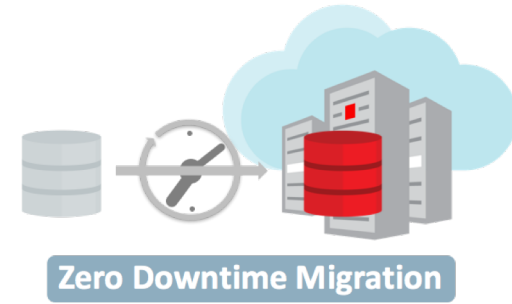


Oracle Zero Downtime Migration

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**

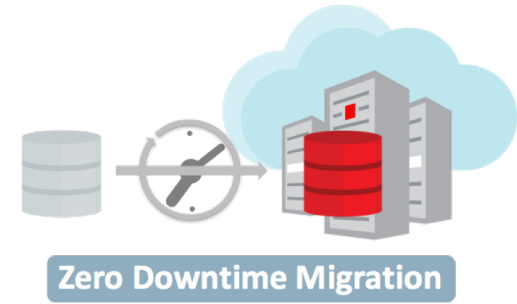
Migration

Switch

Finalize

Zero Downtime Migration

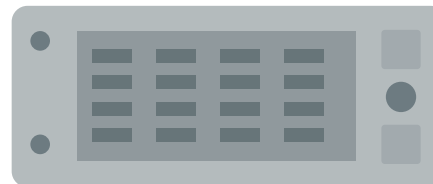
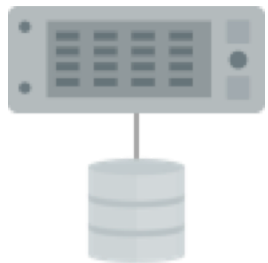
Workflow



Download &
Configure ZDM

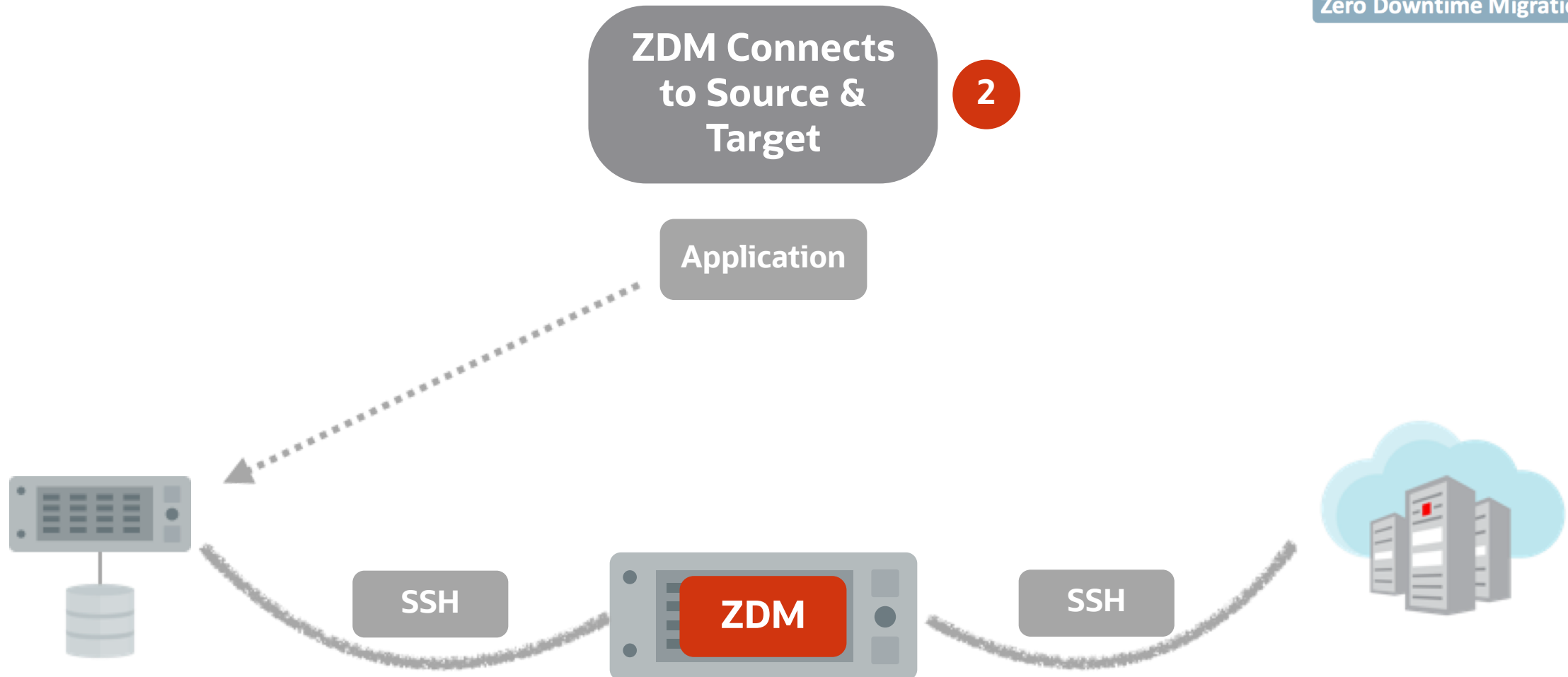
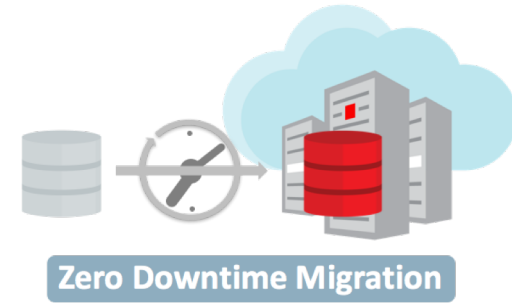
1

Application



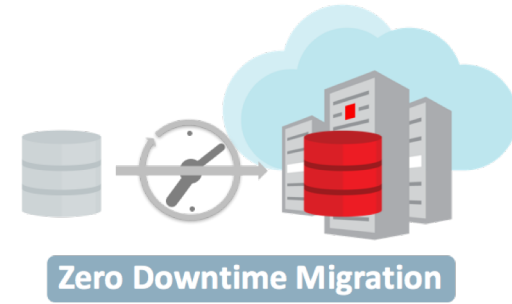
Zero Downtime Migration

Workflow



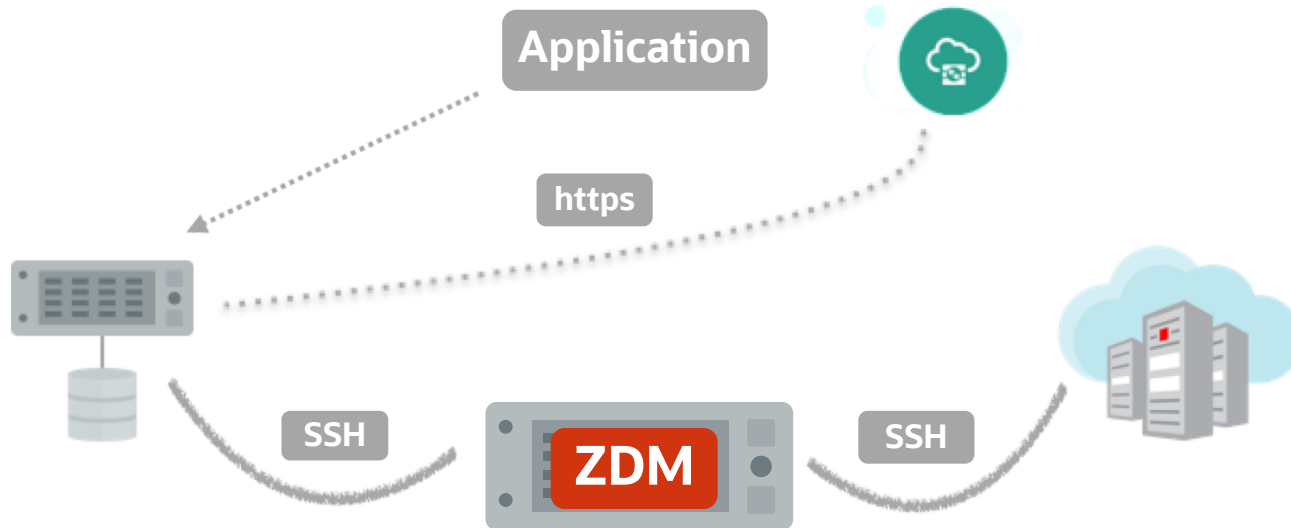
Zero Downtime Migration

Workflow



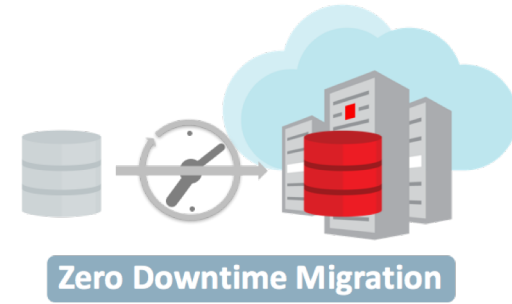
ZDM Connects
Source to Object
Store

3



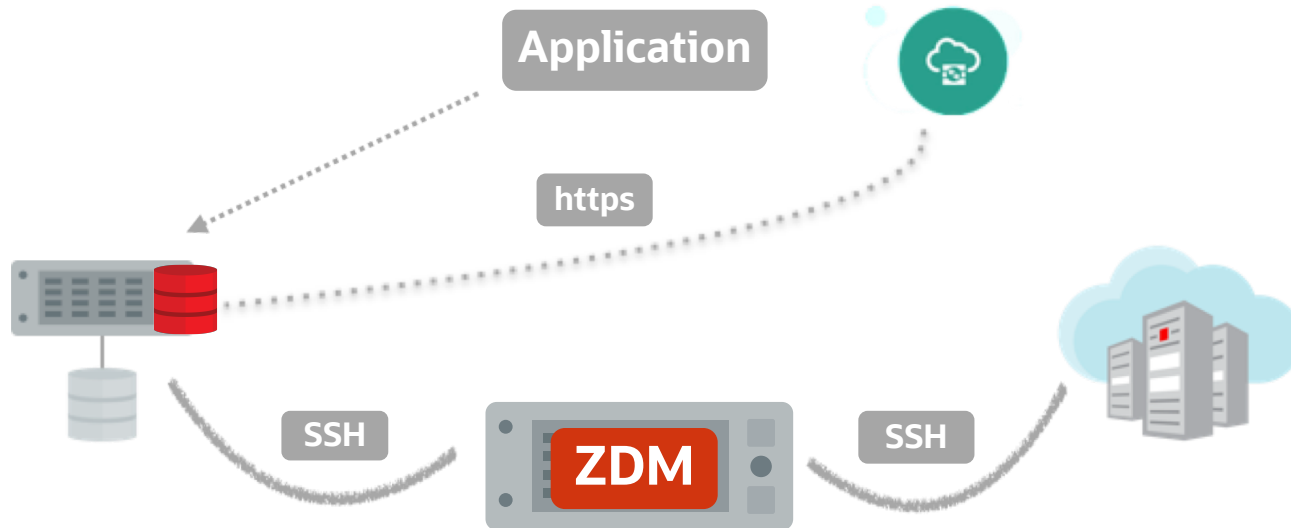
Zero Downtime Migration

Workflow



ZDM Transfers
DB Files

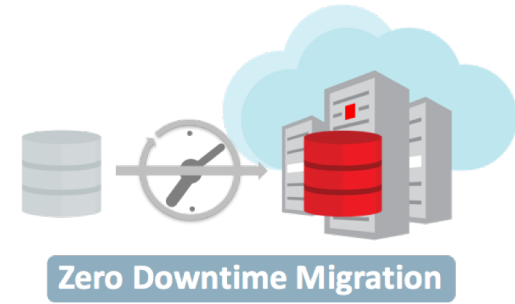
4



- Database Files
- Full Backup
- Including Incremental Archives

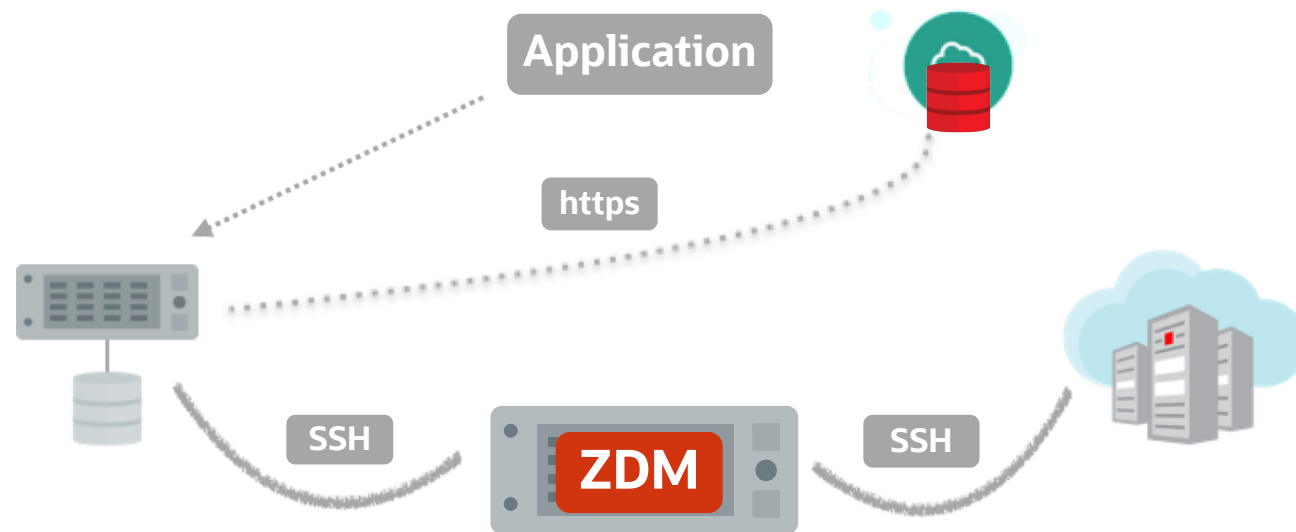
Zero Downtime Migration

Workflow



ZDM
Instantiates
Standby

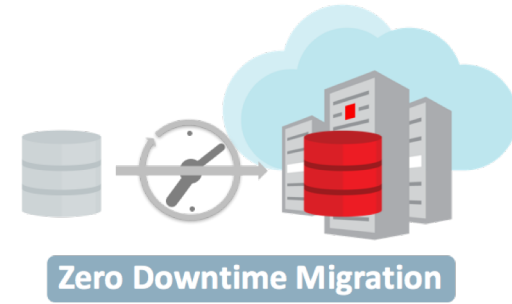
5



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

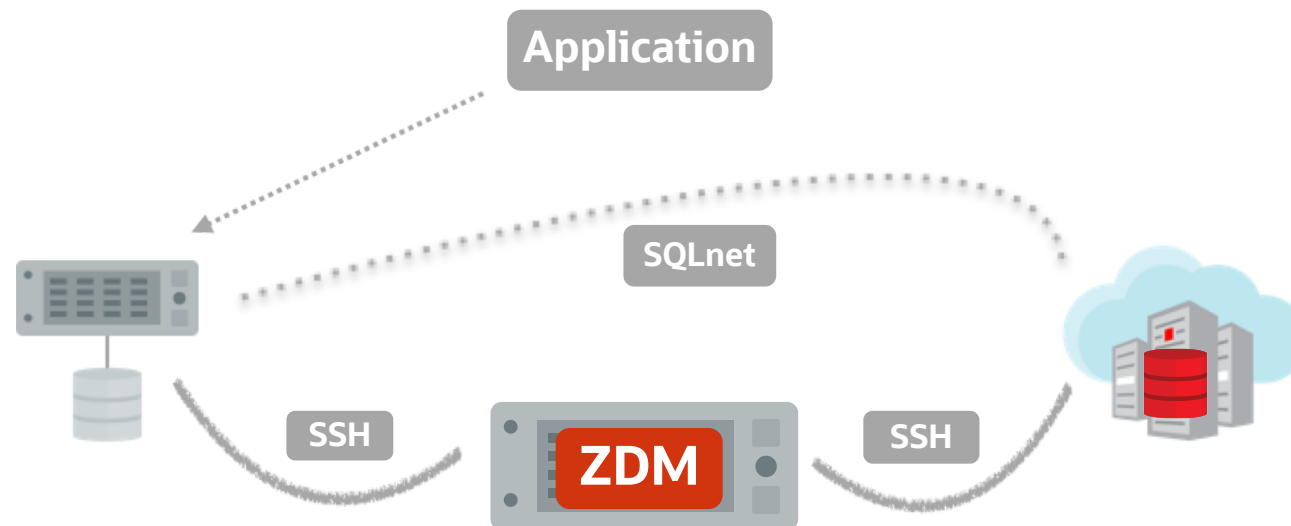
Zero Downtime Migration

Workflow



ZDM
Synchronizes
Primary &
Standby

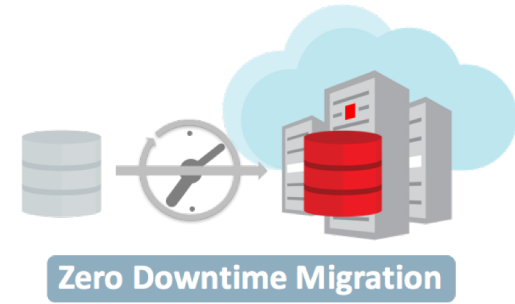
6



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

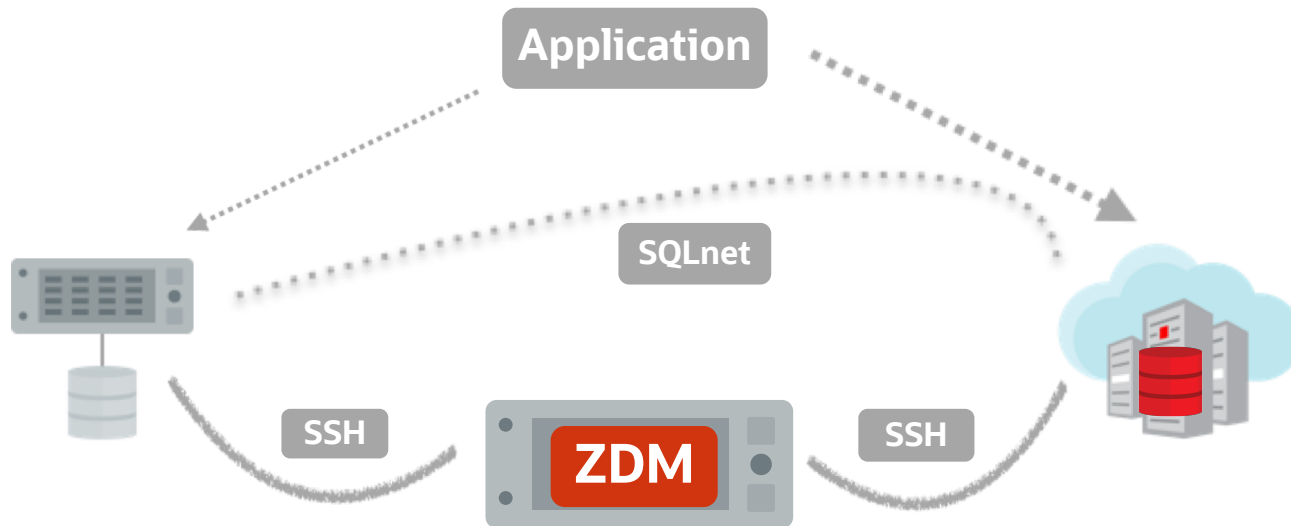
Zero Downtime Migration

Workflow



ZDM Switches
over and Role
Swaps

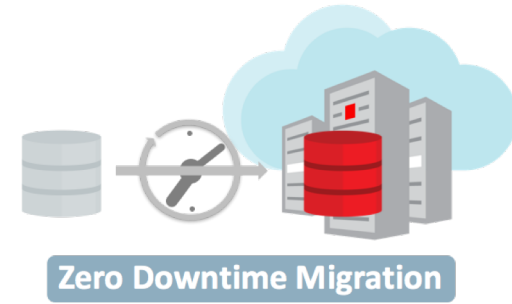
7



- Switchover
- Role swap between Primary and Standby

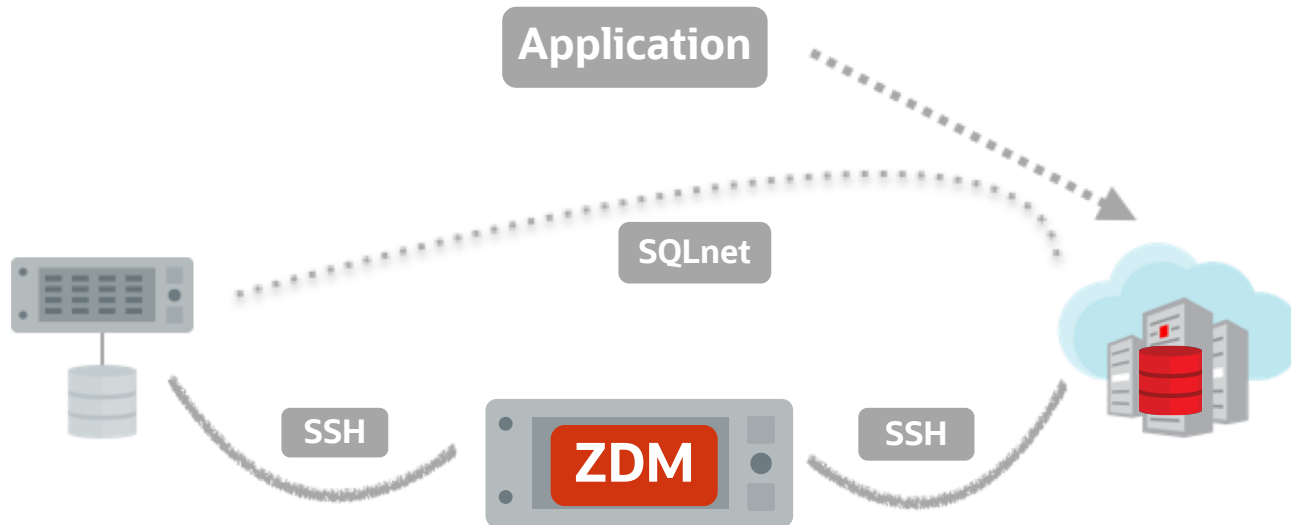
Zero Downtime Migration

Workflow



User Finalizes at Will

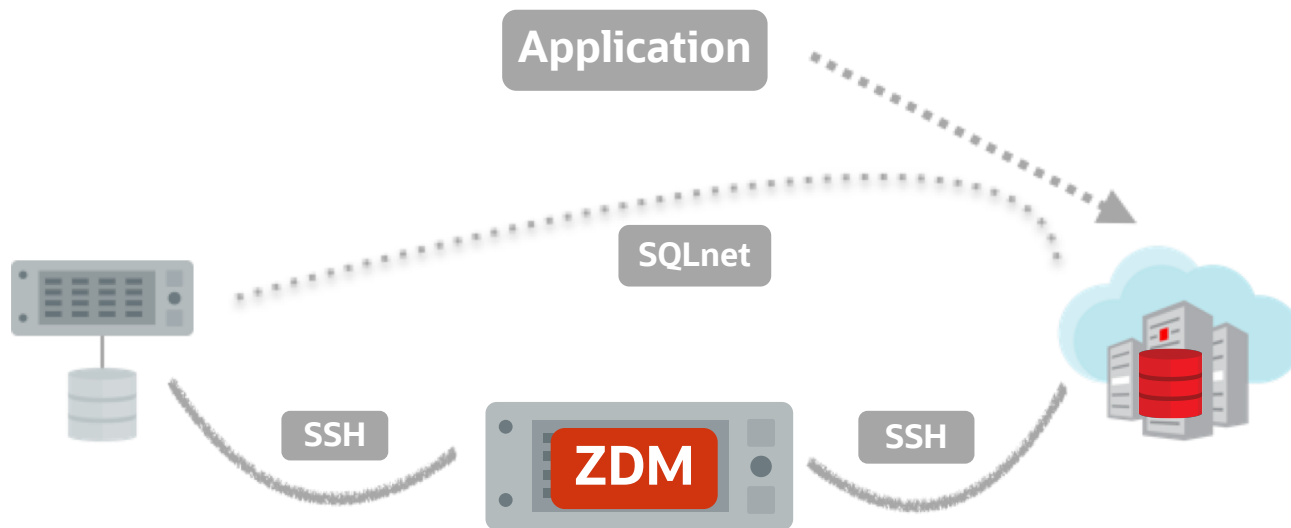
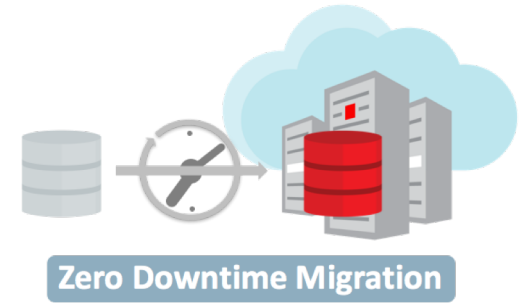
8



- 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

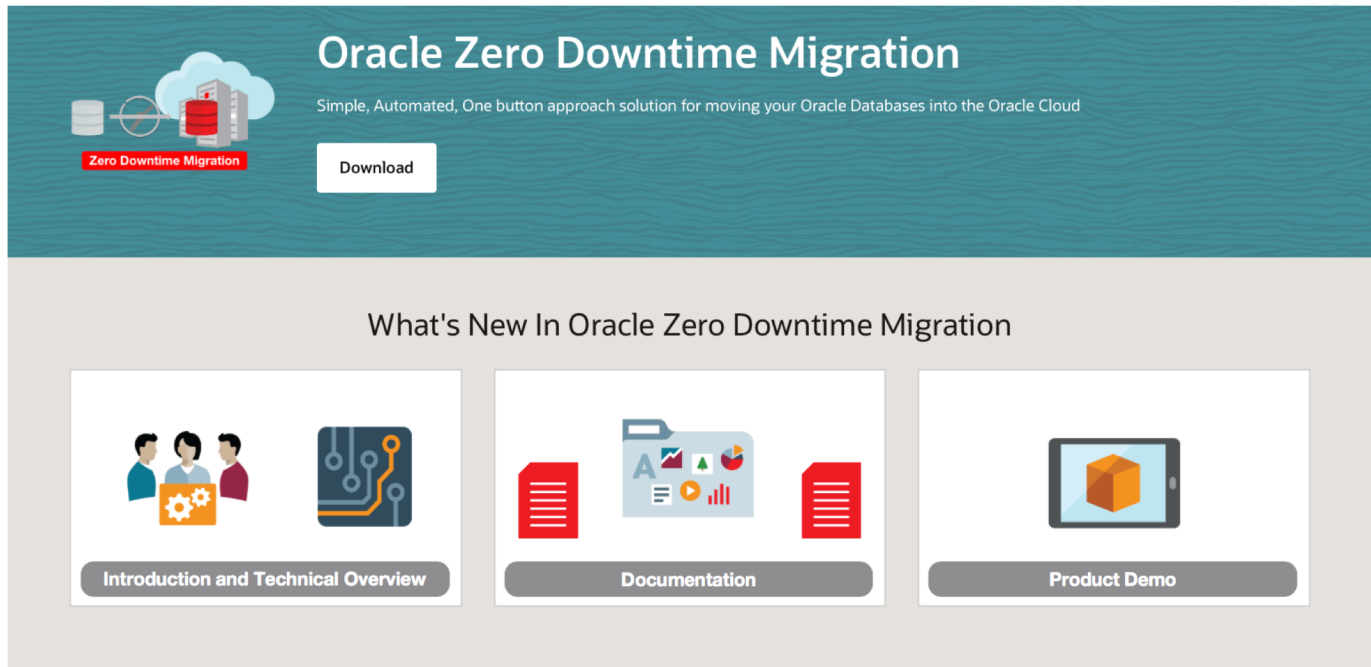
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Switches Over & Role Swaps

8


User Finalizes at Will

www.oracle.com/goto/zdm





Oracle Zero Downtime Migration


Simple, Automated, One button approach solution for moving your Oracle Databases into the Oracle Cloud

 **Zero Downtime Migration** [Download](#)

What's New In Oracle Zero Downtime Migration






Introduction and Technical Overview

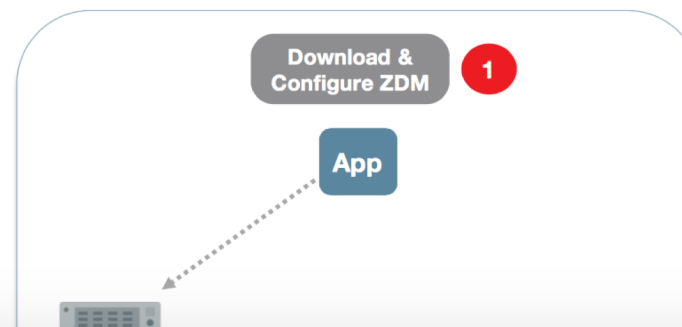

Documentation


Product Demo

Oracle Zero Downtime Migration

8 Simple Automated Steps

-  **User Downloads and Configures ZDM**
-  **ZDM Starts Database Migration**
-  **ZDM Connects to Object Store**
-  **ZDM Transfers Database Files**



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



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.qcloudable.com/provider/oracle

Oracle learning library videos on YouTube:

youtube.com/user/OracleLearning