ORACLE

Zero Downtime Migration Demo, Tips, and Tricks

UKOUG Breakthrough 2022

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Episode 1

Release and Patching Strategy

105 minutes – Feb 4, 2021

Episode 2

AutoUpgrade to Oracle Database 19c

115 minutes – Feb 20, 2021

Episode 3

Performance Stability, Tips and Tricks and Underscores

120 minutes – Mar 4, 2021

Episode 4

Migration to Oracle Multitenant

120 minutes – Mar 16, 2021

Episode 5

Migration Strategies – Insights, Tips and Secrets

120 minutes – Mar 25, 2021

Episode 6

Move to the Cloud – Not only for techies

115 minutes – Apr 8, 2021

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https://MikeDietrichDE.com/videos

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Introduction

Zero Downtime Migration

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Lets you quickly and smoothly move your Oracle databases to the Oracle Cloud or any Oracle Exadata Database Machine environment without incurring any significant downtime.

Zero Downtime Migration 21.3 - Documentation

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BUILD **SYNC** **SWITCH**

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Fleet Scale

You can migrate one or many databases.

Best Practices

Integrates with Maximum Availability Architecture (MAA) and uses our best practices.

Free

No additional license cost. Otherwise licensed features come at no extra cost when used by Zero Downtime Migration.

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Migration

OPTIONS

Physical

Online: Data Guard + switchover

Offline: Backup + restore

Logical

Online: Initial load + GoldenGate

Offline: Data Pump

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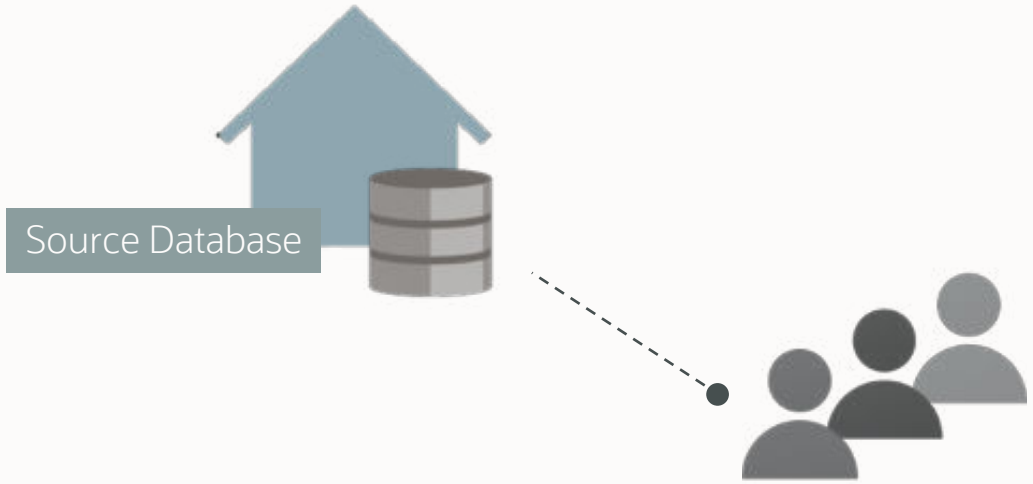
Physical Migration | Overview

Users are connected to source database

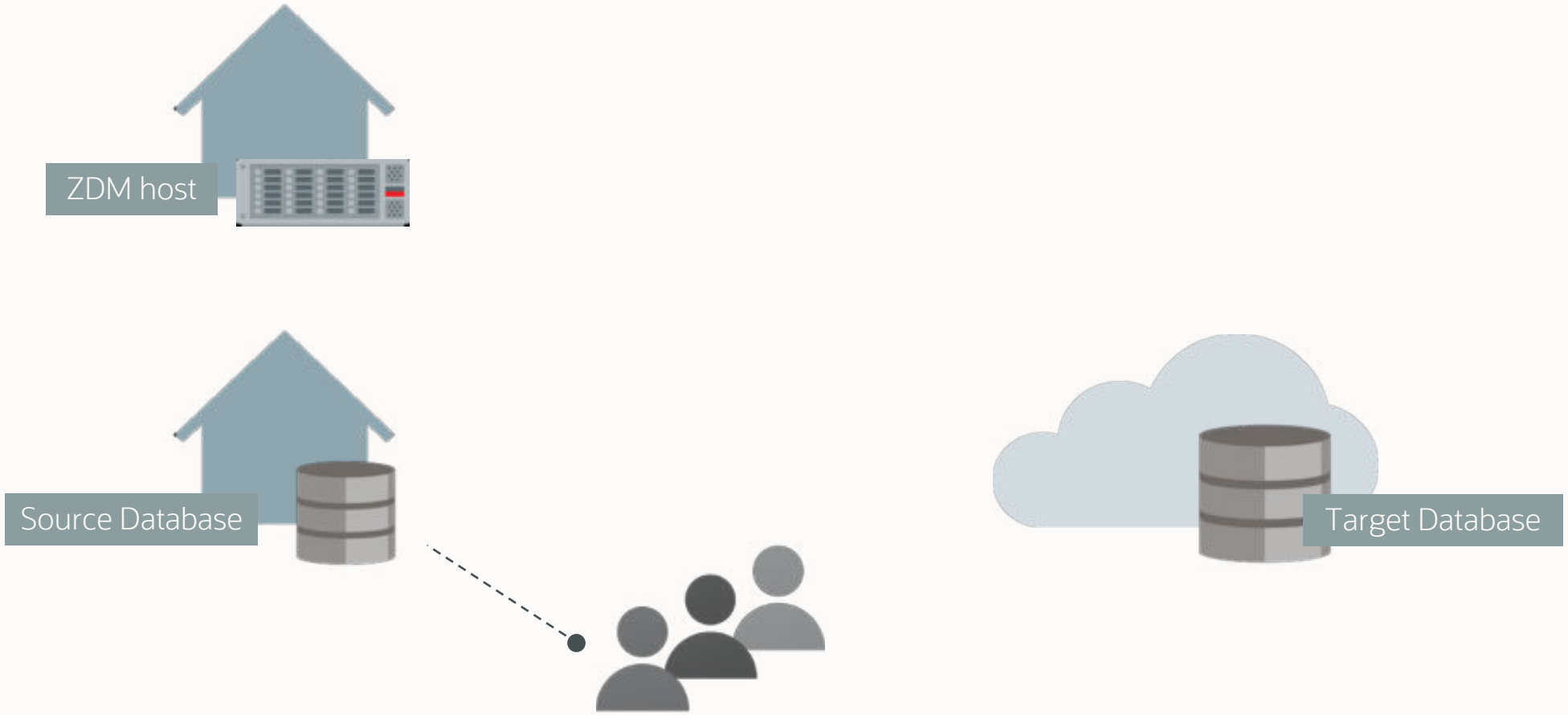


Physical Migration | Overview

Provision target database in OCI

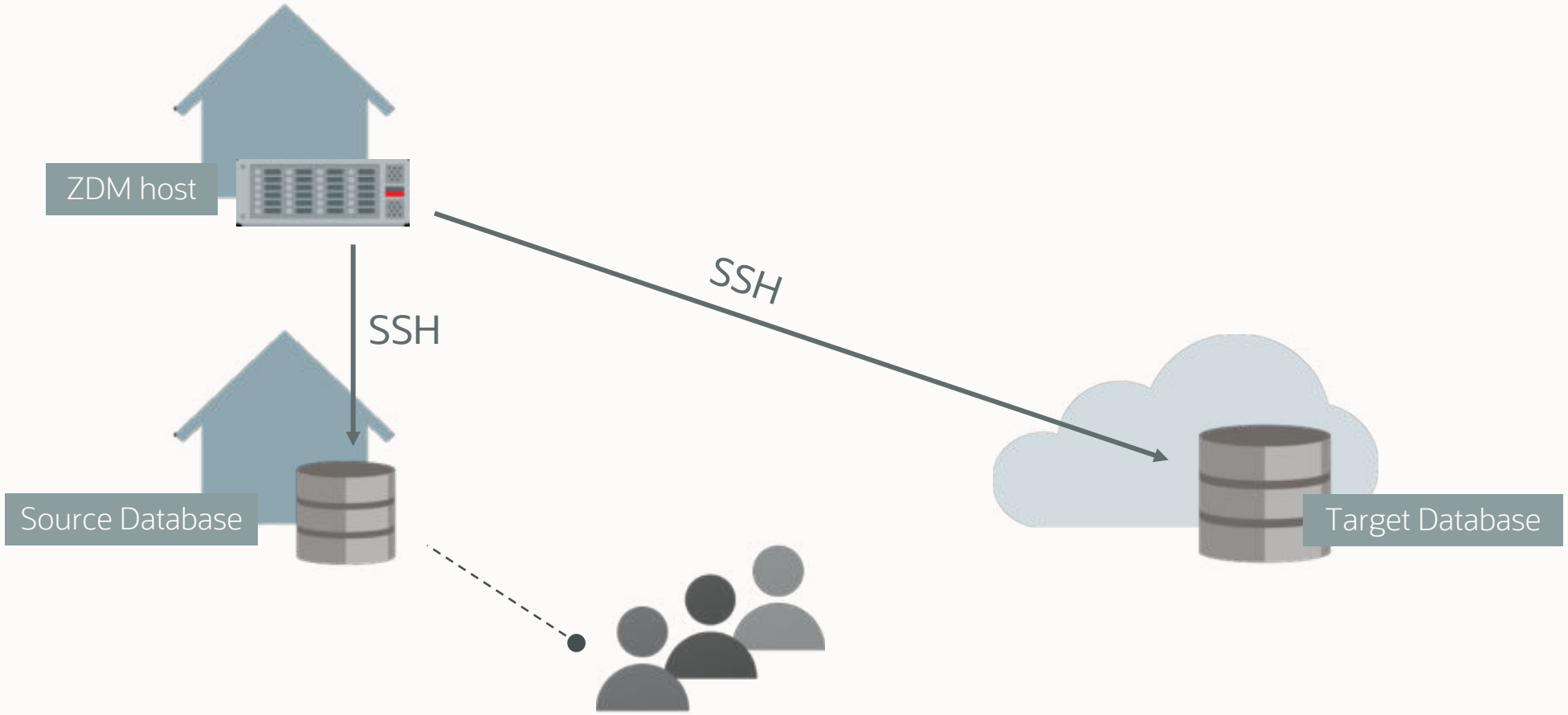
Physical Migration | Overview

Download and install ZDM



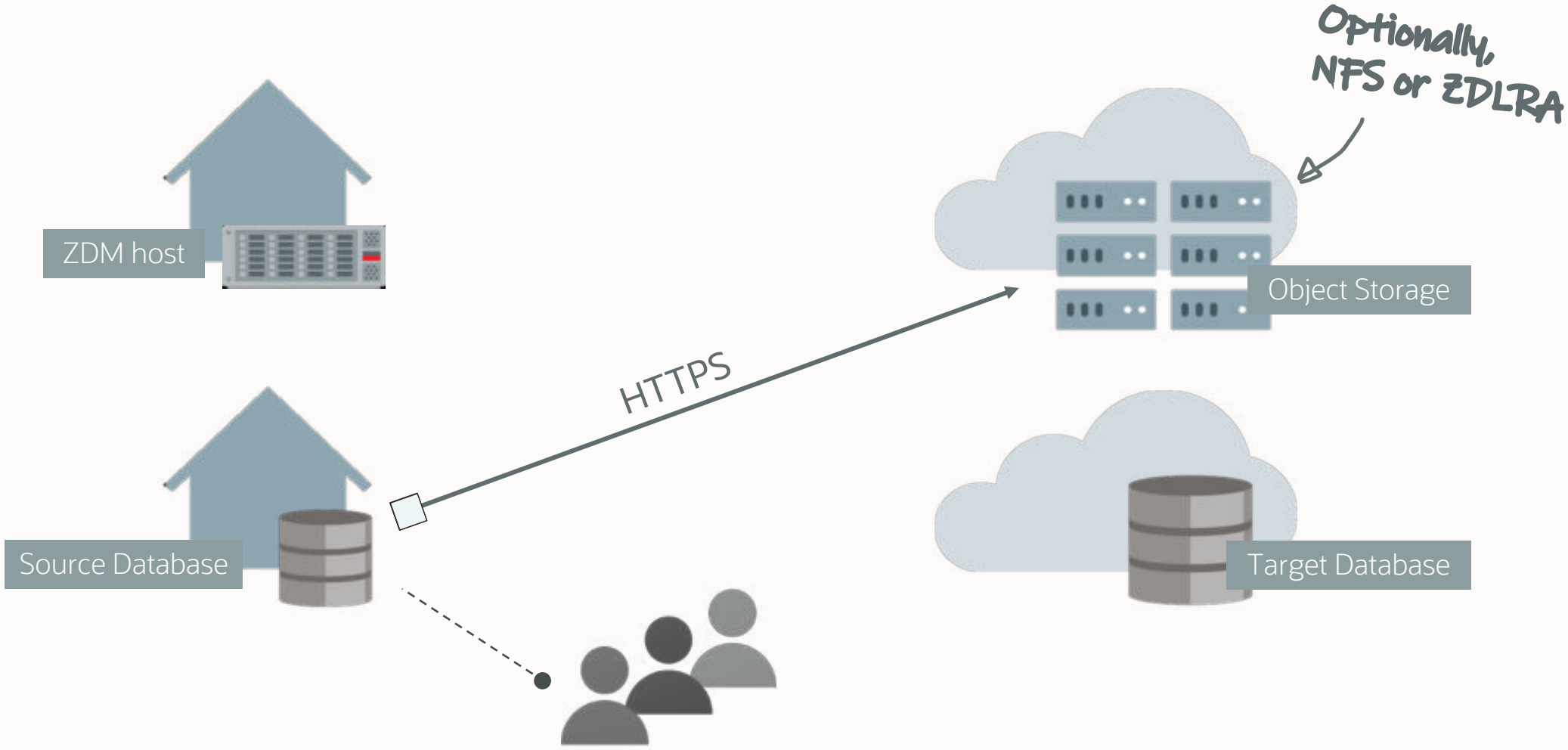
Physical Migration | Overview

ZDM connects to source and target database



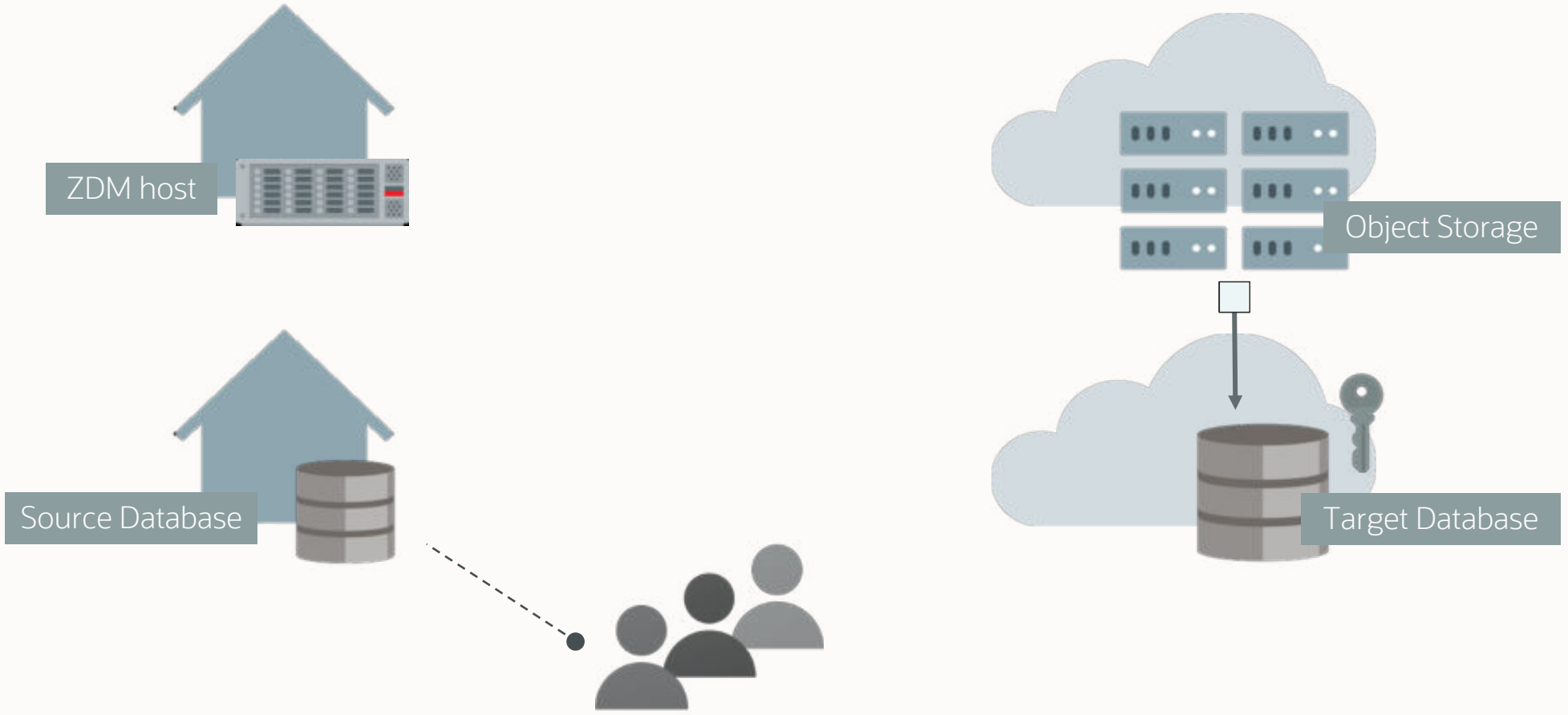
Physical Migration | Overview

Option 1, back up source database to object storage



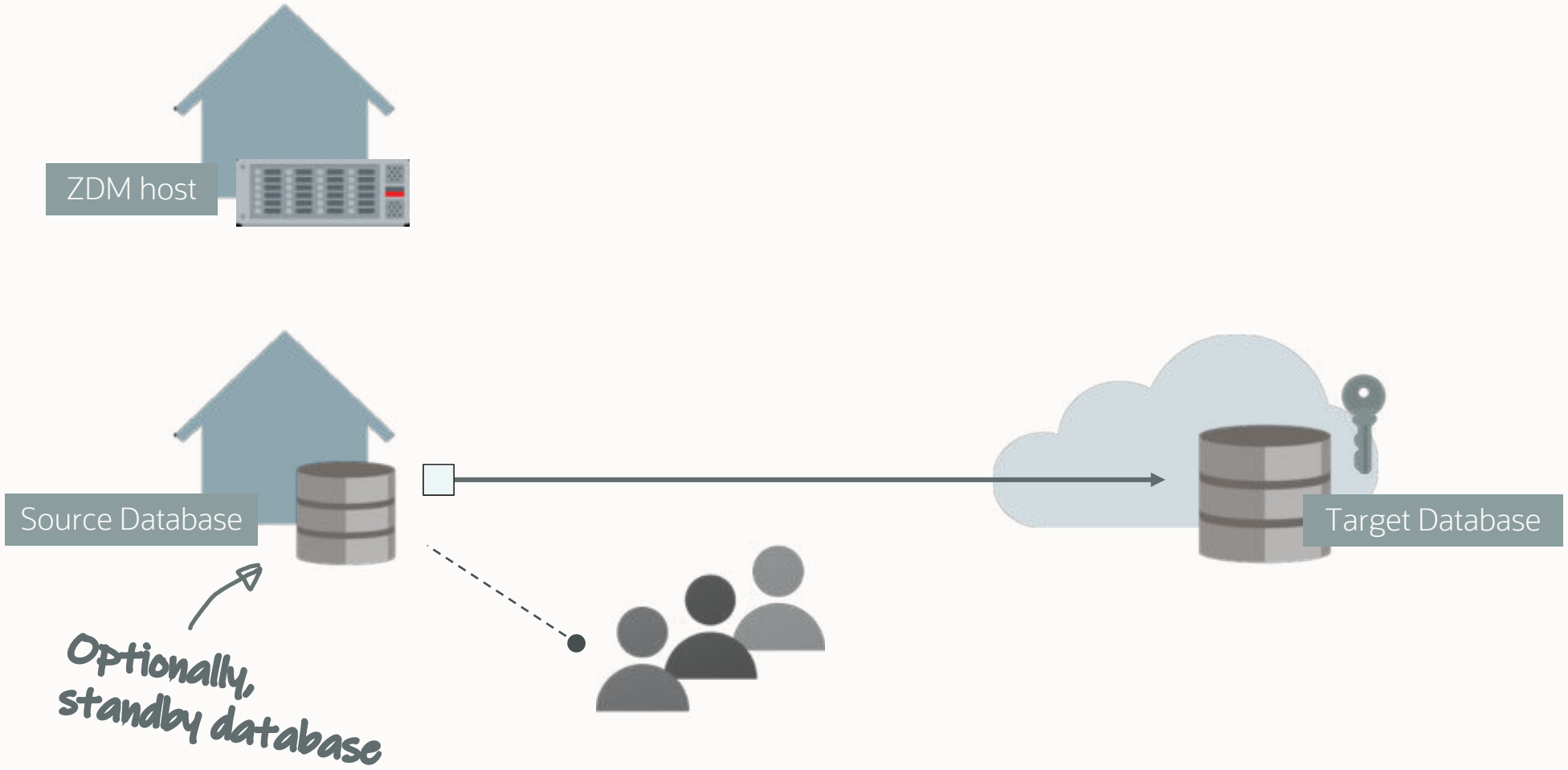
Physical Migration | Overview

Option 1, instantiate standby database from backup



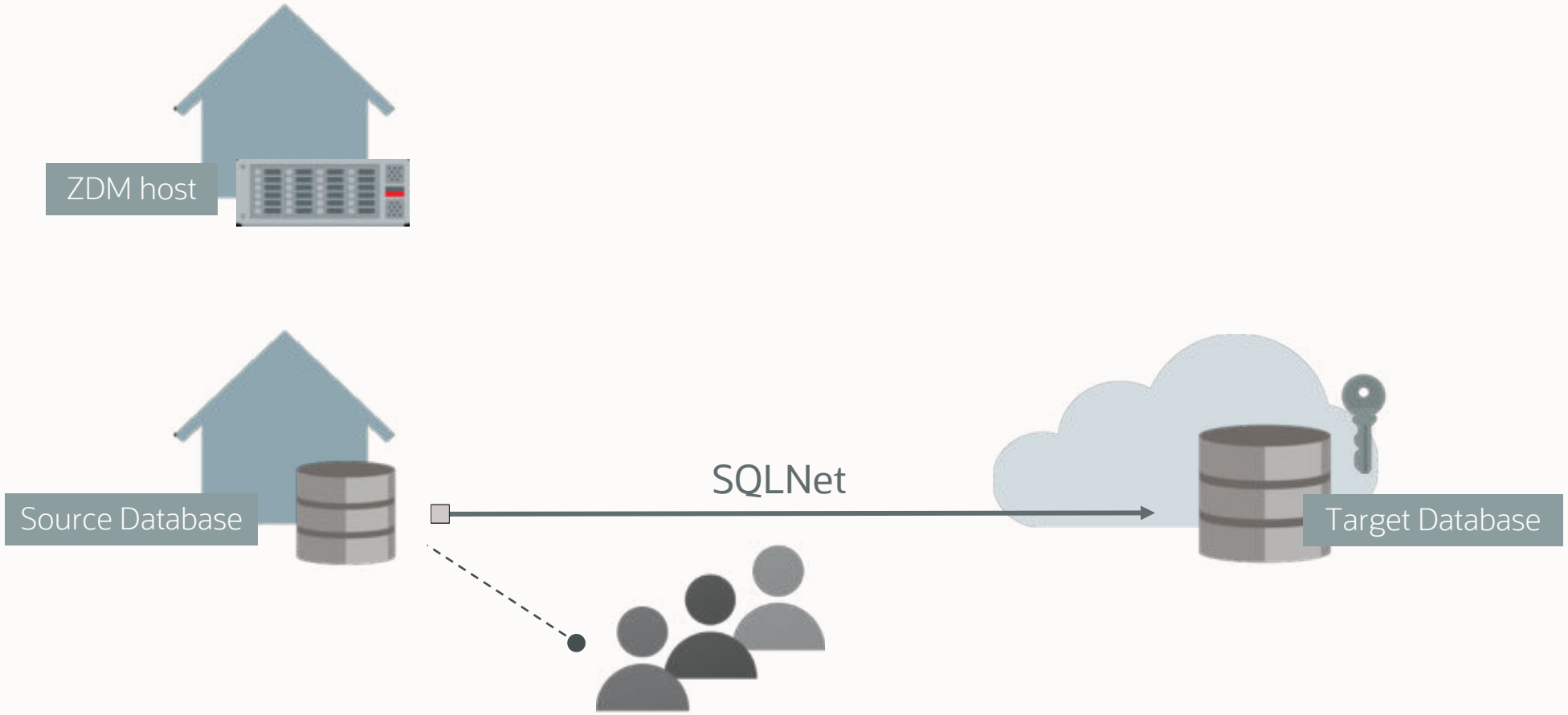
Physical Migration | Overview

Option 2, restore target database from source



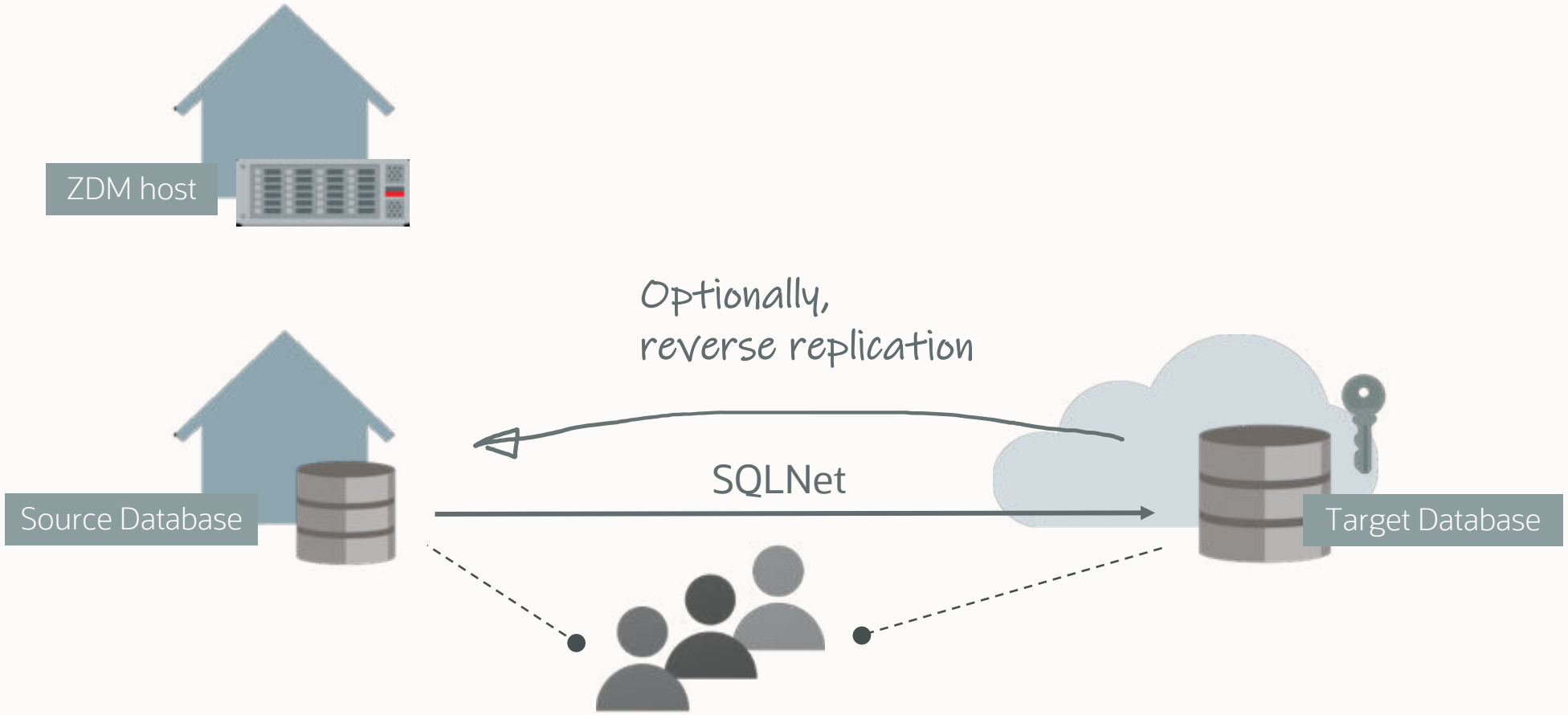
Physical Migration | Overview

Synchronize via redo apply



Physical Migration | Overview

At your will, switchover sessions



DEMO

- Physical online migration
- Migrate CDB using Data Guard
- Oracle Database 19c

Watch on YouTube

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Details

Good to know

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Security | Encryption

SOURCE

Can be encrypted or not.

Keystore and master key must be created - does not require ASO license.

TARGET

Must be encrypted.

Encrypted during restore (12.2+).

SIMPLE

Encryption is *always-on*.

No additional configuration.

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Platforms

On-premises
- Commodity hardware
- Exadata + ExaCC
- ODA

Cloud
- OCI / OCI-C
- Other clouds

Everything that runs Linux
More or less

Supported target platforms
- Base Database Service
- Exadata Database Service
- Exadata Cloud@Customer
- Exadata (on-prem)

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Target Database | Patches and Releases

DIFFERENT PATCH LEVEL

- ZDM invokes datapatch automatically
- Patch on-prem database after switchover
- Oracle Patch Assurance - Data Guard Standby-First Patch Apply (Doc ID 1265700.1)

DIFFERENT RELEASE

- Upgrade database after switchover
- Additional downtime needed

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Optionally, convert to a PDB

Additional downtime needed

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To fall back, perform another switchover back to the source database

Requires license for Advanced Security Option on source database.
Get 1-year limited license for ASO when you migrate to OCI.

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```
--To fallback
--MAA Practices for Cloud Migration Using ZDM (Doc ID 2562063.1)
$ $ZDM_HOME/bin/zdmcli abort job –jobid n


-- Target / OCI database
SQL> alter database commit to switchover to physical standby;


-- Source / On-prem database
$ srvctl modify database -d CDB1 -role primary -startoption open

SQL> alter database commit to switchover to primary;
SQL> alter database open;
```


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Physical Migration | Benefits

- Well-known method
- Seemless switchover with properly configured application
- Migrate entire database
  - AWR
  - SQL Plan Baseline
  - SQL Profiles
  - ...
- RMAN compression automatically applied
  - Advanced Compression Option not needed during migration

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Physical Migration | Considerations

- Migrate to same version only
- Convert to PDB requires additional downtime
- Entire database is migrated
  - *Old bagage*
- Standard Edition is offline only (backup/restore)

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Tips and Tricks

The little secrets

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Always use the latest version of Zero Downtime Migration

Also apply patch 33509650

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Ensure that cloud tooling is updated on all target servers

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Before switchover, convert target database to snapshot standby for testing

Physical Online Migration and Testing

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Pro Tips | Custom Scripts

Run your own script before or after any phase

The script is executed on either source or target

- Autonomous DB only .sql scripts are possible

Relevant information is available as environment variables

- Database
- Oracle Home
- ZDM Phase
- …

Pro Tip:
To list all phases: `zdmcli migrate database –rsp .... -listphases`

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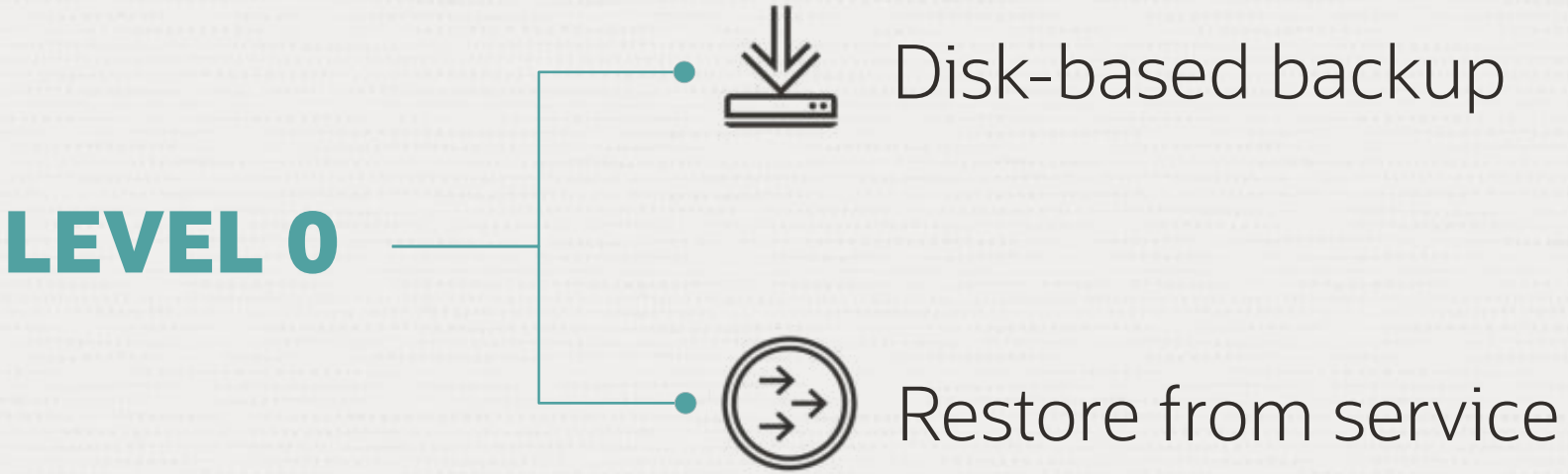
Initial Backup



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Initial Backup

Disk-based backup

- Backup is streamed directly to OCI
- The faster the connection to OCI, the faster the backup
- Must suspend other backup activities
- No disk space required for backup
- Potentially large amount of archive logs must be stored on disk
- Number of channels and compression algorithm configurable
- Exadata on-prem and ExaCC can use existing backup or ZDLRA

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Initial Backup

Restore from service

- Backup is streamed from source database directly to target database
- The faster the connection to OCI, the faster the restore
- No disk space required for backup
- Potentially large amount of archive logs must be stored on disk
- Optionally, reduce load on primary by using standby database

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ZDM can interact with existing Data Guard configuration

Optionally, configure via Data Guard broker

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On target, automatic backup and Data Guard must be configured **after** switchover

No support for cascading standby databases

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Physical Migration | Very Large Databases

Redo can be compressed

- Suitable for remote data centers only
- Requires Advanced Compression Option
- Not a good fit for encrypted databases
- How To Calculate The Required Network Bandwidth Transfer Of Redo In Data Guard Environments (Doc ID 736755.1)

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REDO APPLY

benchmark

Redo apply, TB/Day	11.2.0.4	12.1.0.2	12.2	MIRA 2x 12.2	MIRA 4x 12.2
Batch	57	57	57	115	226
OLTP	14	15	15	29	60

Source: Redo Apply Best Practices – Oracle Data Guard and Active Data Guard

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redo

TRANSPORT AND APPLY

benchmark

Connection, Gbps	**11.2.0.4**	**12.1.0.2**	**12.2**	**MIRA 2x 12.2**	**MIRA 4x 12.2**
Batch	57 / 6	57 / 6	57 / 6	115 / 11	226 / 22
OLTP	14 / 2	15 / 2	15 / 2	29 / 3	60 / 6

Source: Redo Apply Best Practices – Oracle Data Guard and Active Data Guard

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Wrapping up

Final Words

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- Oracle Zero Downtime Migration Product Page
- Oracle Zero Downtime Migration Documentation
- Technical Brief - Oracle Zero Downtime Migration 21.3
- Technical brief - ZDM Physical Migration Step by Step Guide
- YouTube Playlist
- Blog post series
- MAA Practices for Cloud Migration Using ZDM (Doc ID 2562063.1)
- Redo Apply Best Practices - Oracle Data Guard and Active Data Guard

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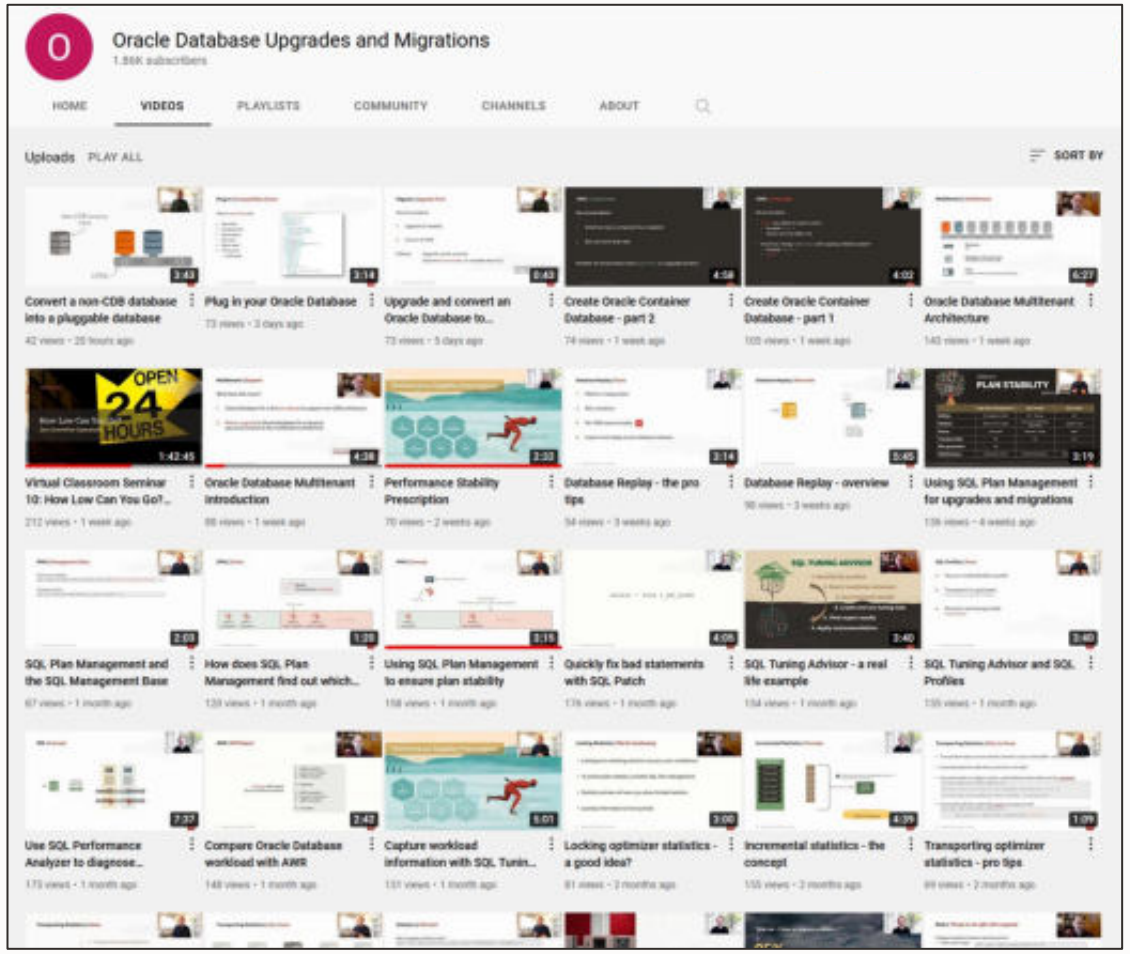
YouTube | Oracle Database Upgrades and Migrations



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- 200+ videos
- New videos every week
- No marketing
- No buzzwords
- All tech

SCAN ME

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