Oracle ACE

Oracle Database 23ai & Exadata Exascale

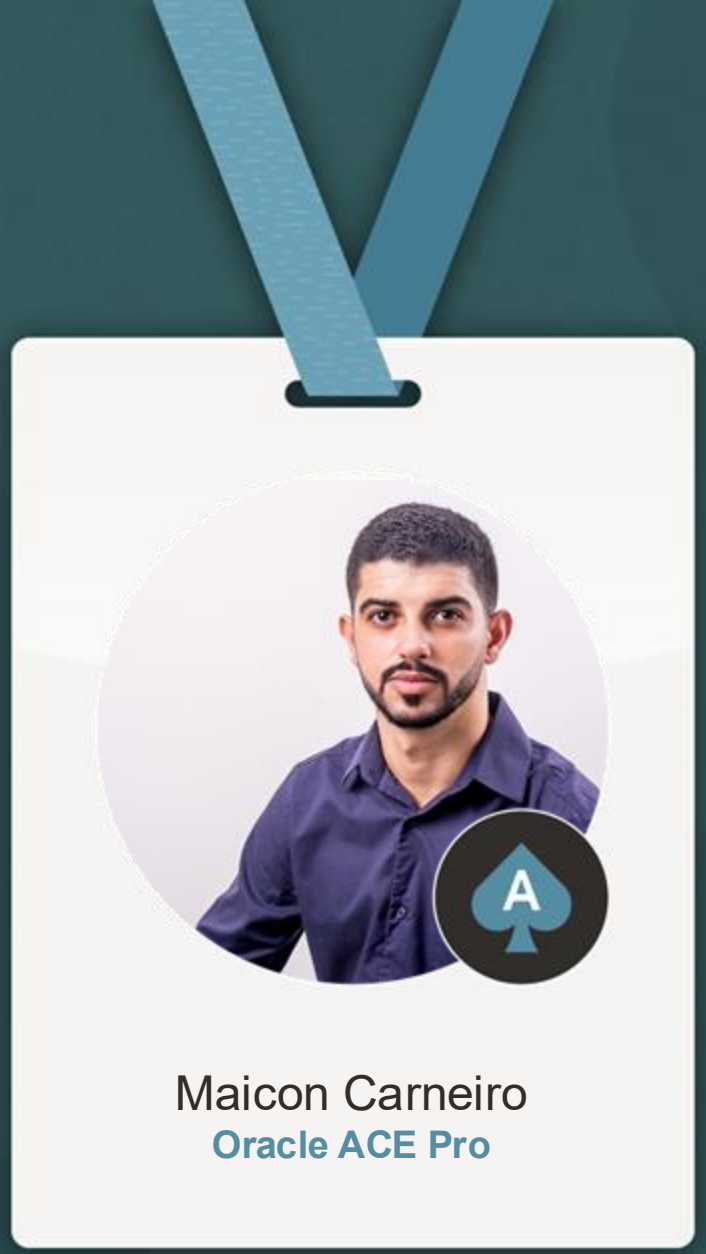
O Futuro do Banco de Dados na Nuvem

GUOB Tech Day

Maicon Carneiro

São Paulo, 23 de agosto de 2025

GUOB GRUPO DE USUÁRIOS ORACLE DO BRASIL



Trajetória com tecnologia Oracle

- *Bacharel em Sistemas de Informação – UniFTC (2015 ~2019)*
- *Trabalha com Oracle Database, SQL & PL/SQL desde 2015*
- *Atua como DBA em consultorias desde 2019*
- *Escreve posts técnicos no Blog do Dibiei desde 2019 (dibiei.blog)*
- *Membro do conselho do Grupo de Usuários Oracle do Brasil (GUOB) desde 2022*
- *Reconhecido como Oracle ACE PRO (Advocate Community Expert) desde 2022*

https://dibiei.blog

https://www.linkedin.com/in/maiconcarneiro

https://ace.oracle.com/ords/ace/profile/maiconcarneiro

GUOB GRUPO DE USUÁRIOS ORACLE DO BRASIL Oracle ACE

Certificações

Oracle Database

ORACLE Certified Associate
Oracle Database 12c Administrator

ORACLE Certified Professional

ORACLE Certified Expert
Oracle Database 12c Data Guard Administrator

ORACLE Certified Expert
Oracle Database 12c: Oracle RAC and Oracle Grid Infrastructure Administrator

ORACLE Certified Expert
Oracle Database 12c Maximum Availability Architecture

Oracle Cloud

GUOB GRUPO DE USUÁRIOS ORACLE DO BRASIL Oracle ACE

Edições Anteriores: GUOB 2023 e 2024

2023 - Como Usar Oracle RAT no Autonomous Database

2024 - Fleet Patching and Provisioning (FPP)

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Cloud Account

$5k USD Cloud account*

Travel Support

ACE Directors are eligible for travel support to give presentations or lead workshops at conferences globally

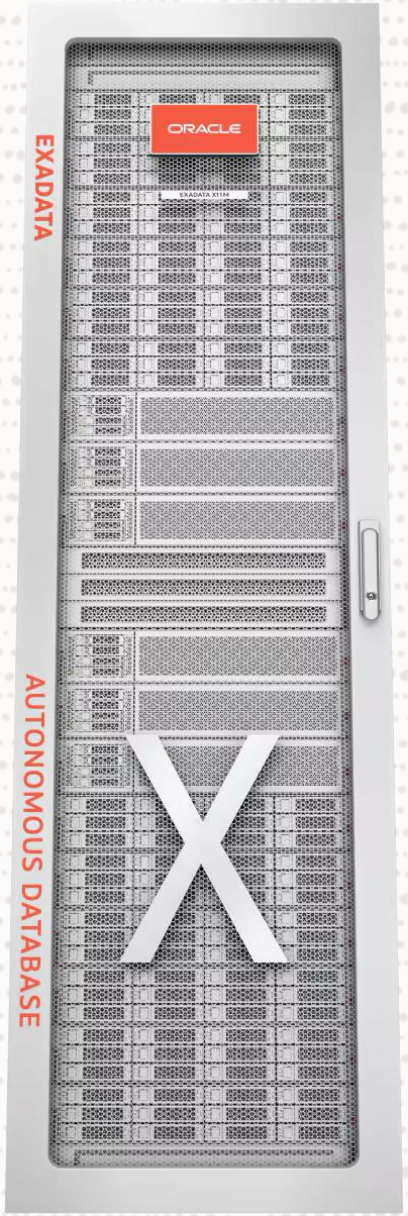
* for Pro and Director levels

Agenda

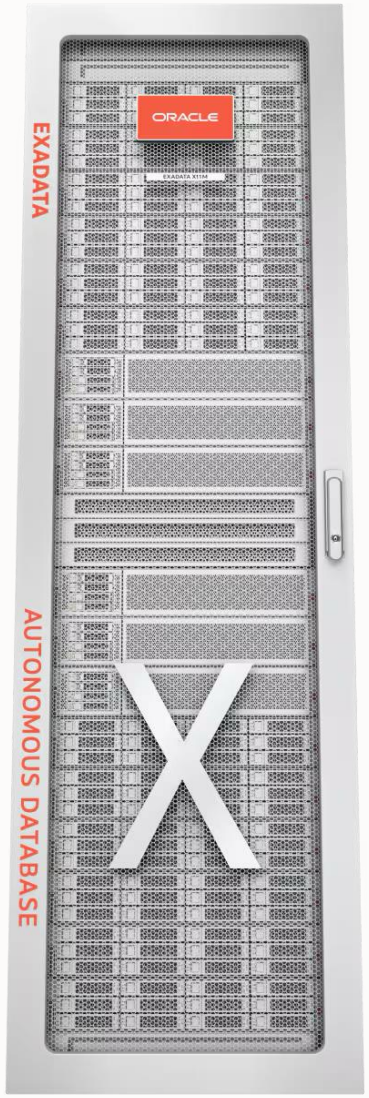
- Exadata Architecture Overview
- Exascale Architecture Overview
- VM Clusters on Exascale
- Databases Files on Exascale
- Exascale Intelligent Snapshot Clones
- Exascale Database Aware PDB Thin Clone
- Exascale CDB Thin Clone with gDBClone
- Monitoring Exascale Storage Vault
- Exascale Deployment Options

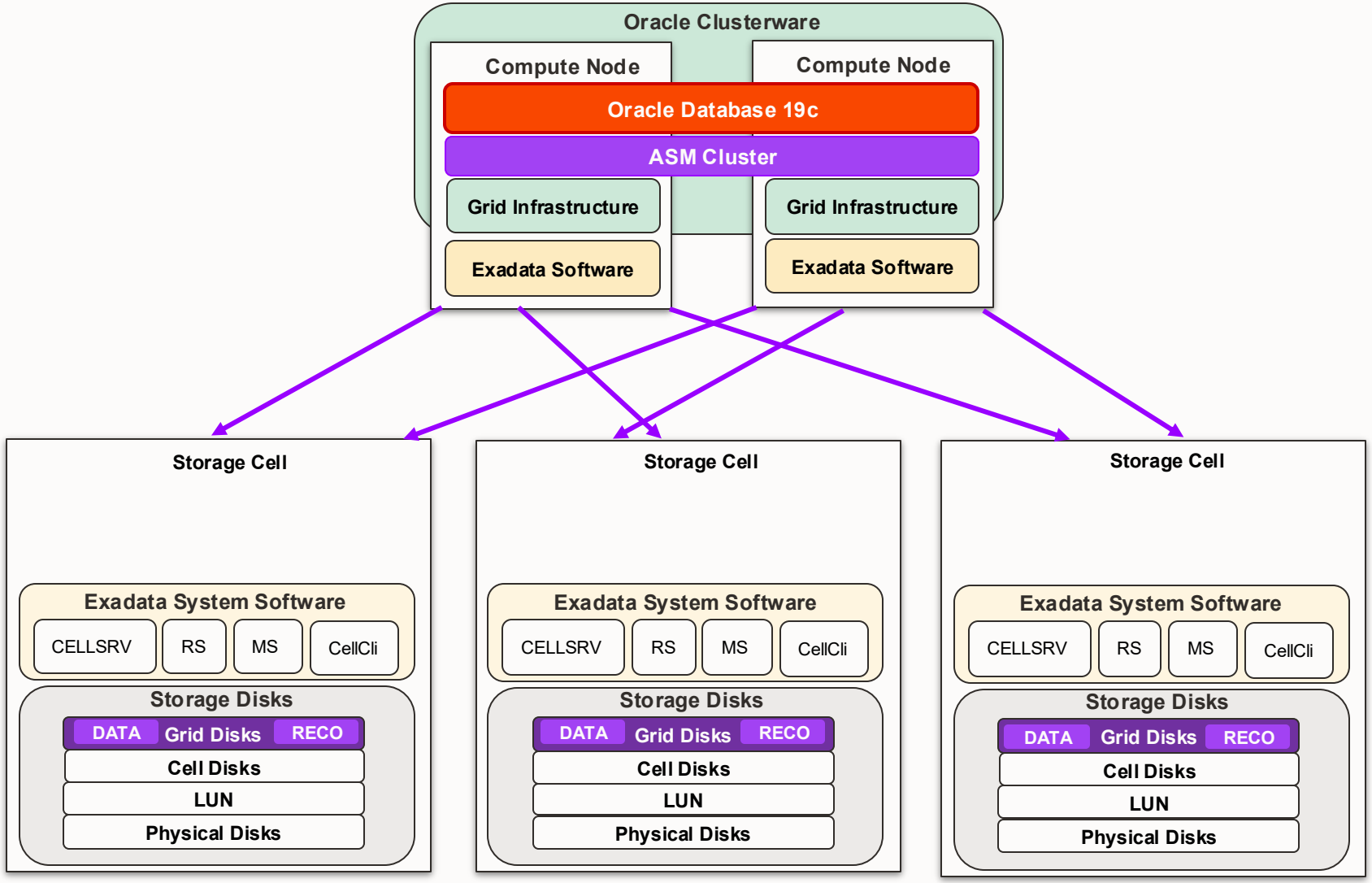
Exadata – ASM Architecture

How this worked for 15 Years ...

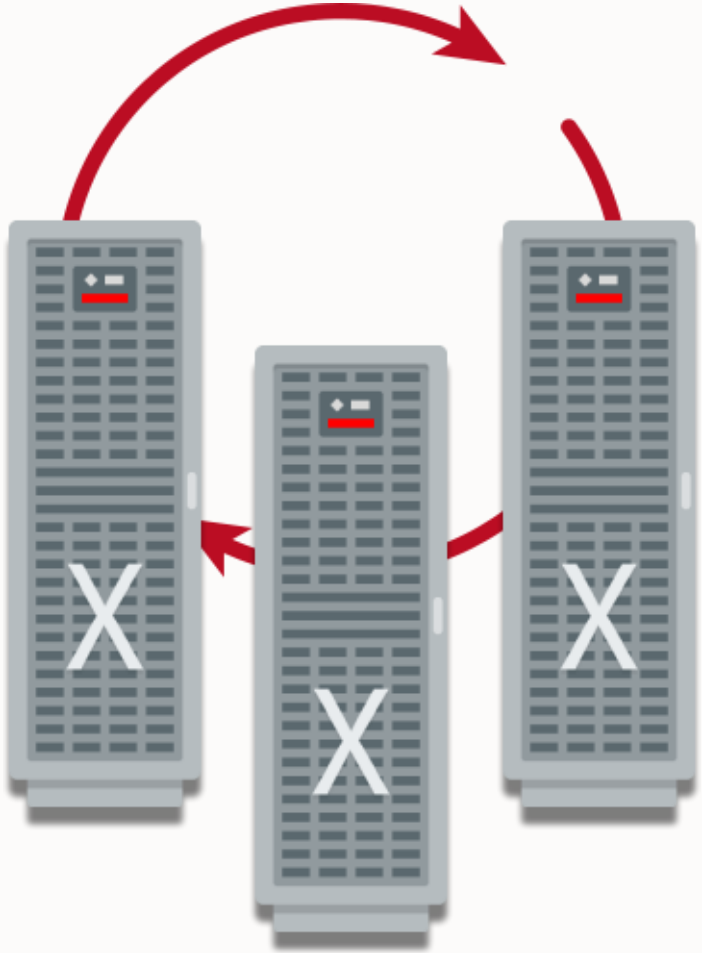


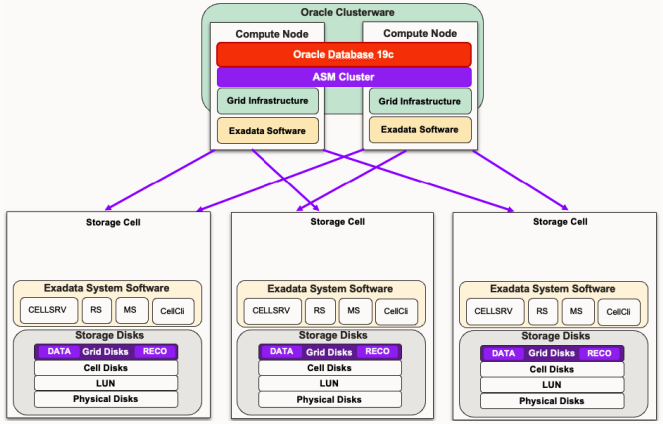
Exadata Architecture

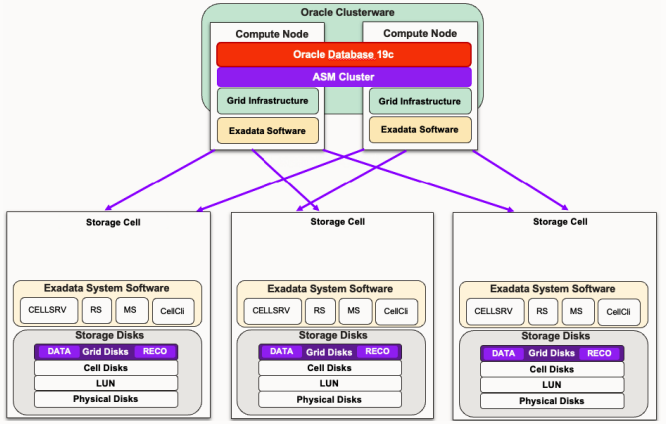


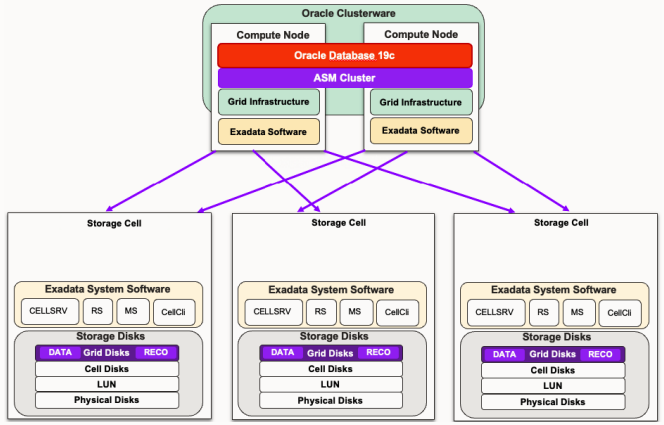


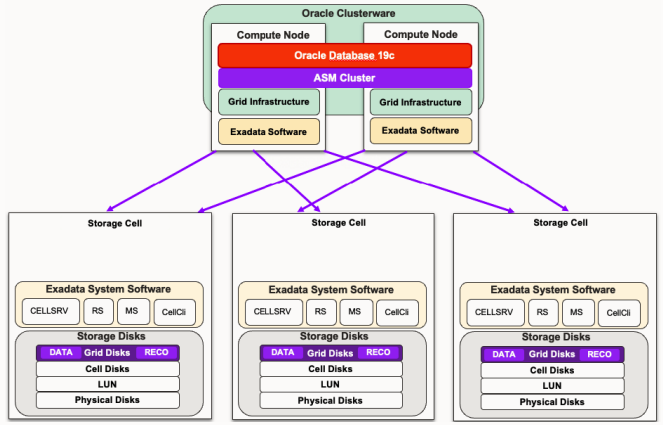
Exadata Architecture – Multiple Clusters







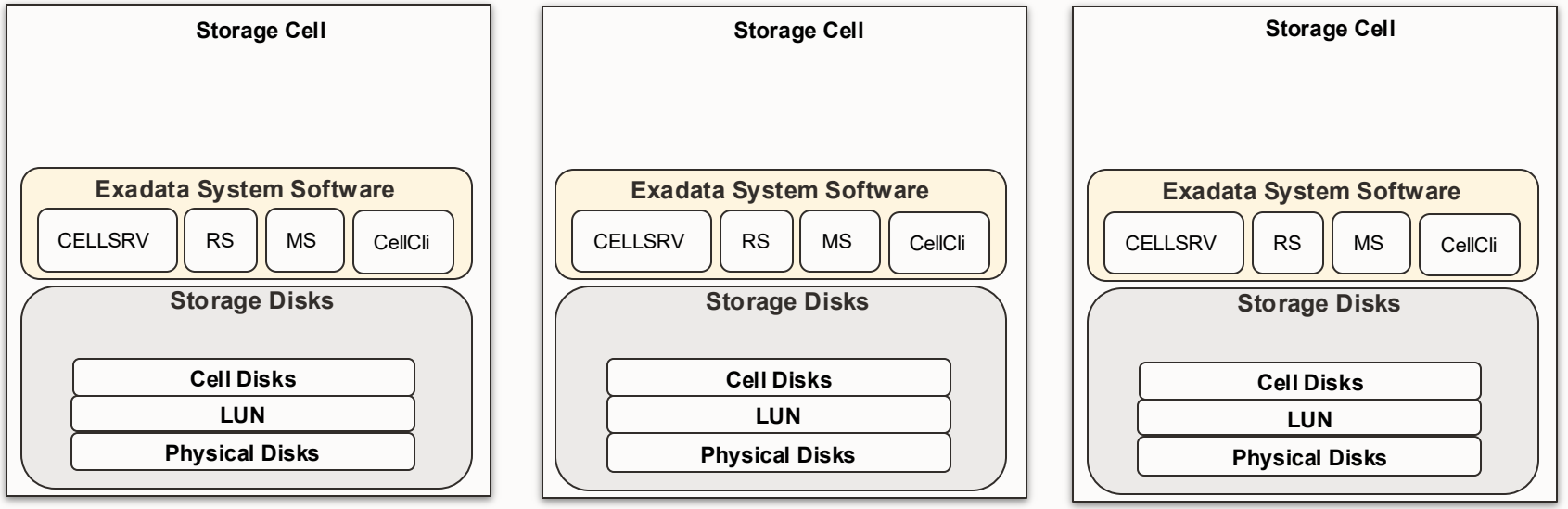




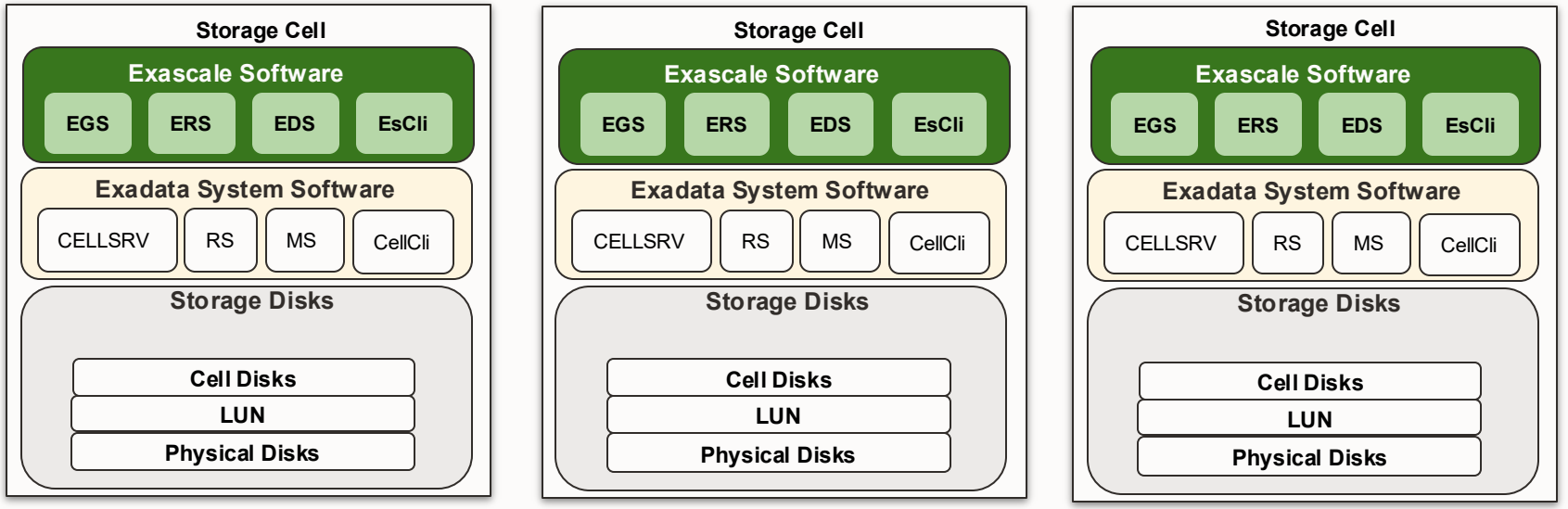
Exascale Architecture

The future of Oracle Database on the Cloud !

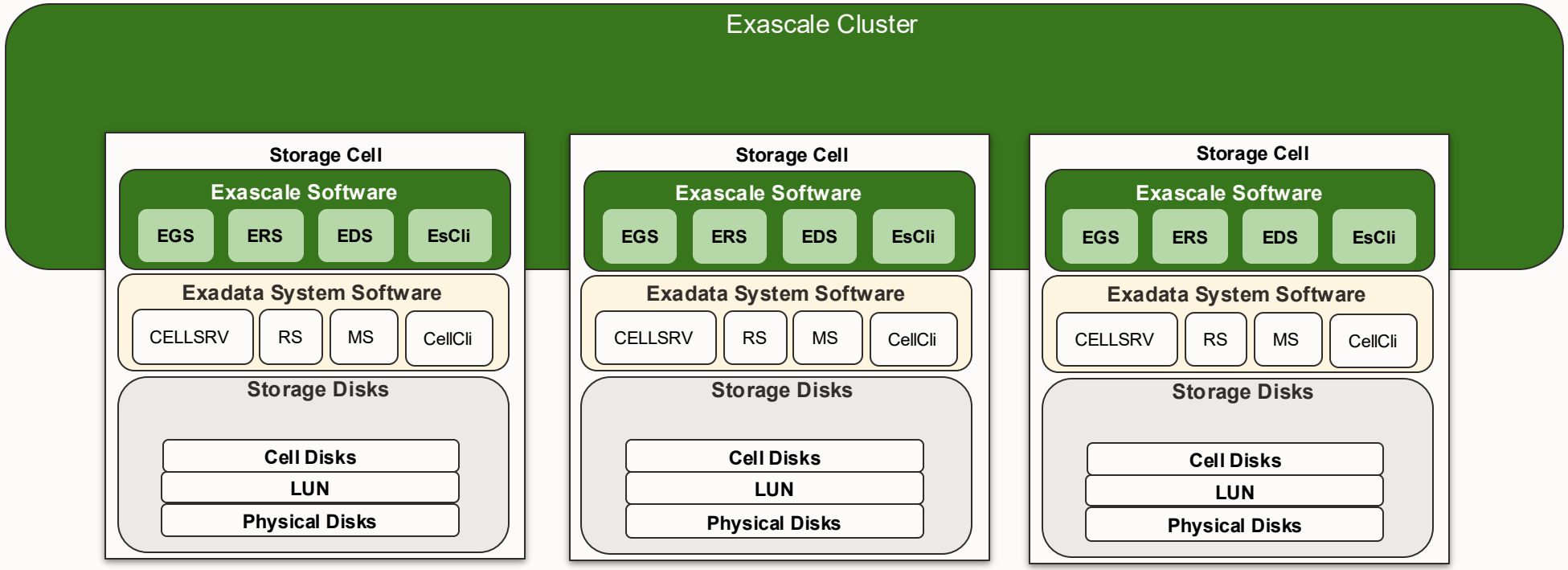
Exascale Architecture



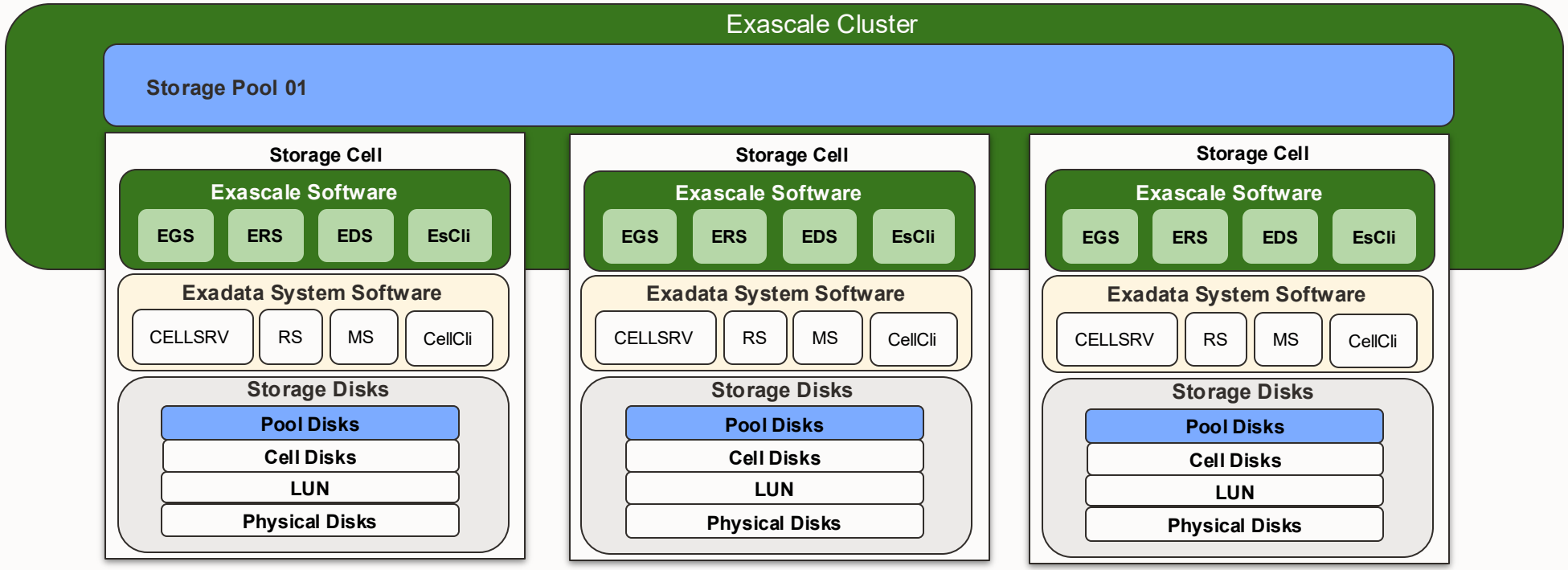
Exascale Architecture



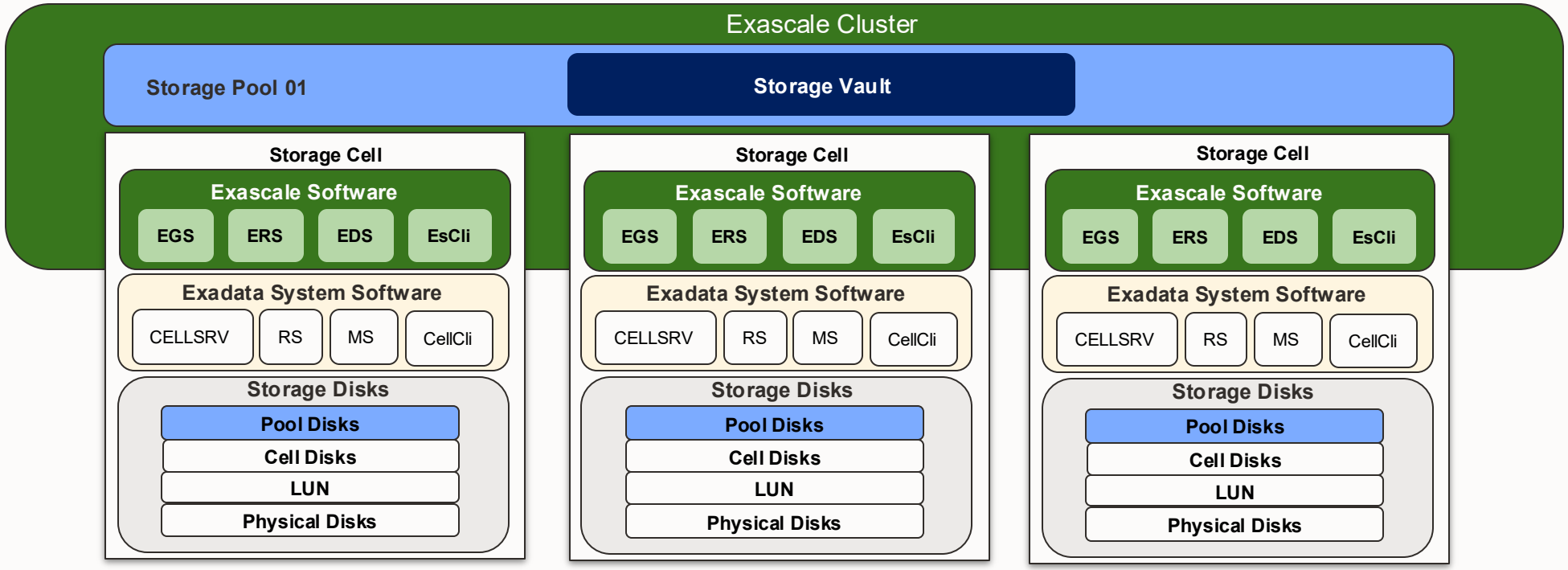
Exascale Architecture



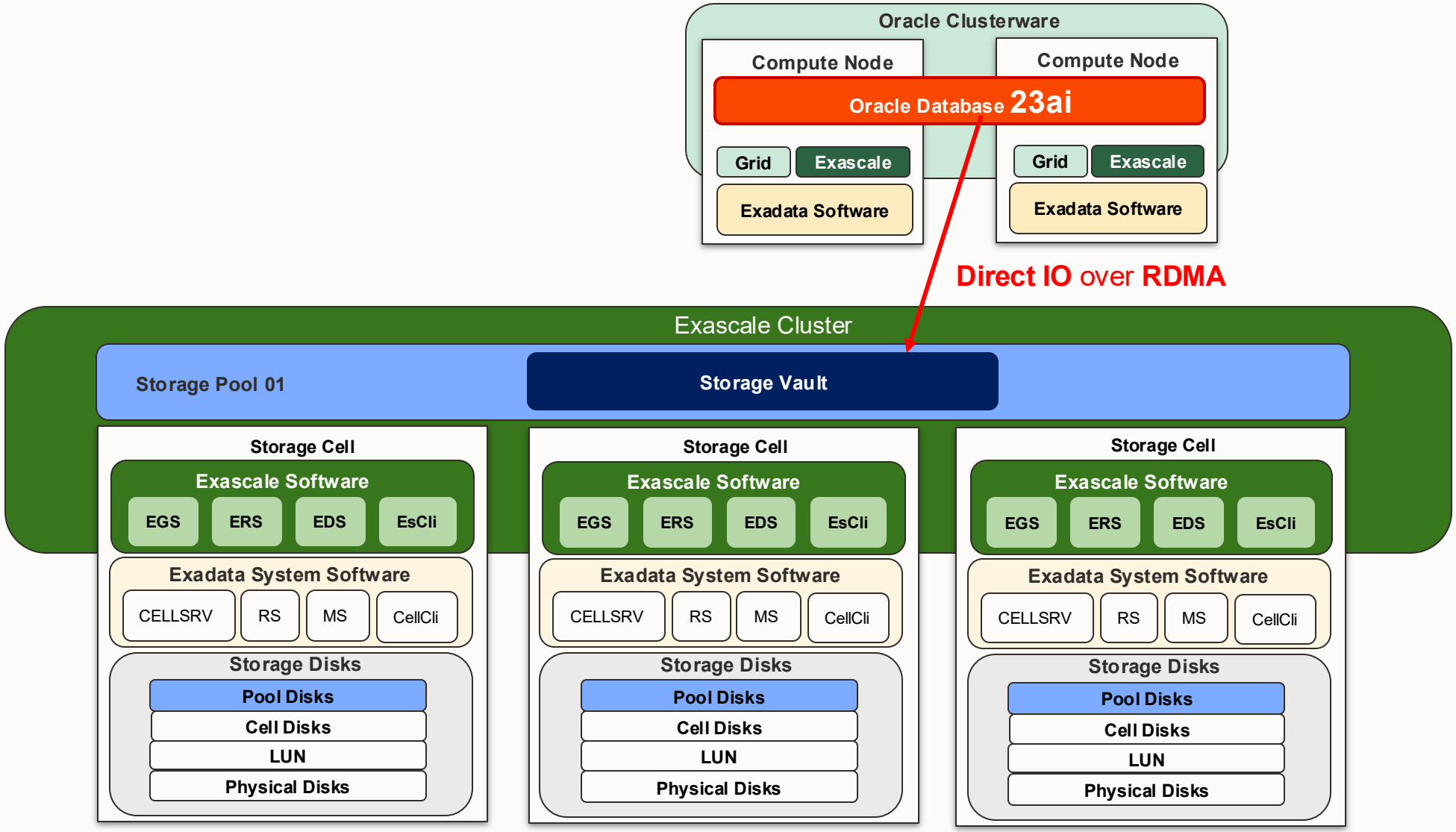
Exascale Architecture



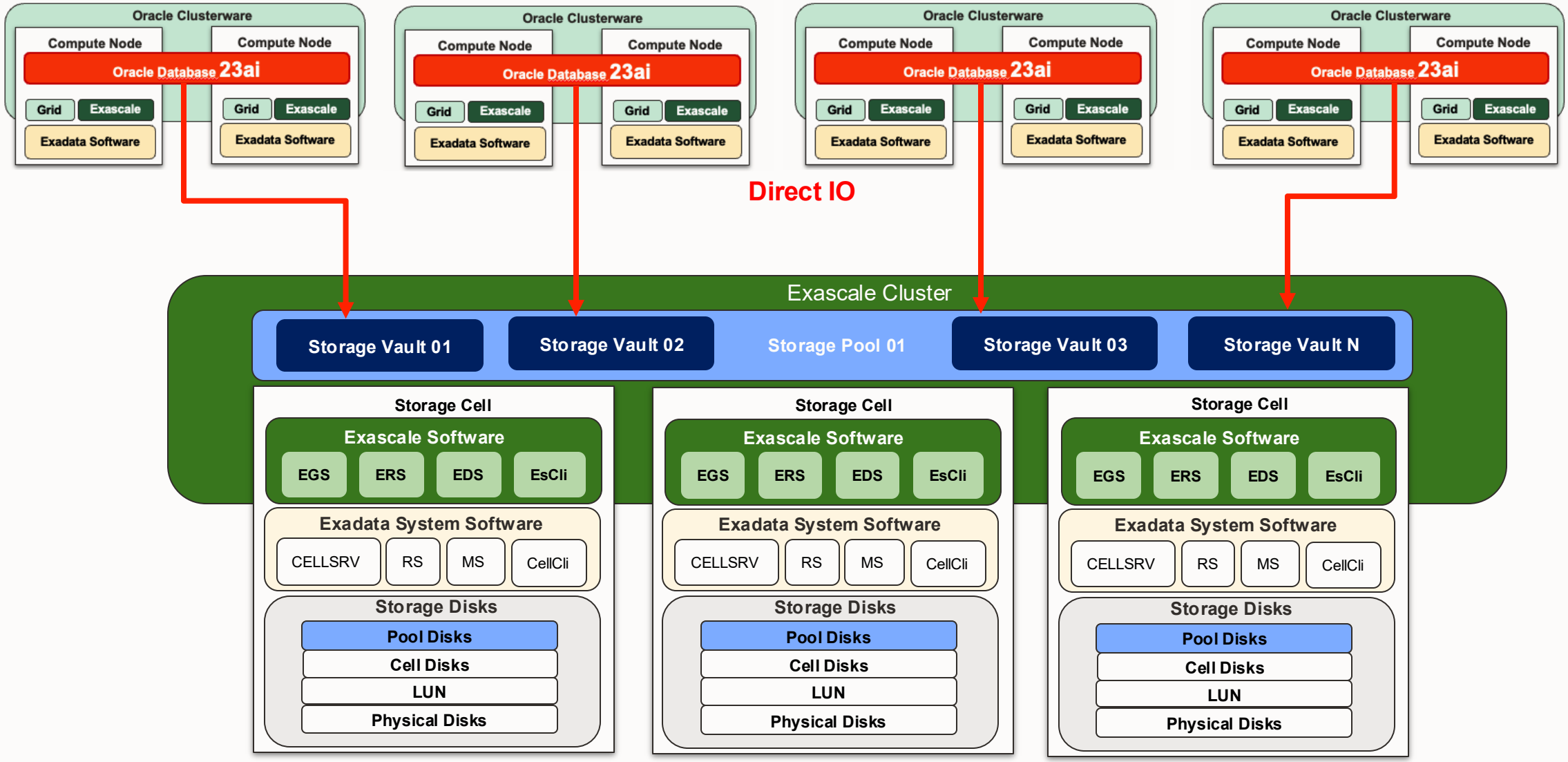
Exascale Architecture



Exascale Architecture



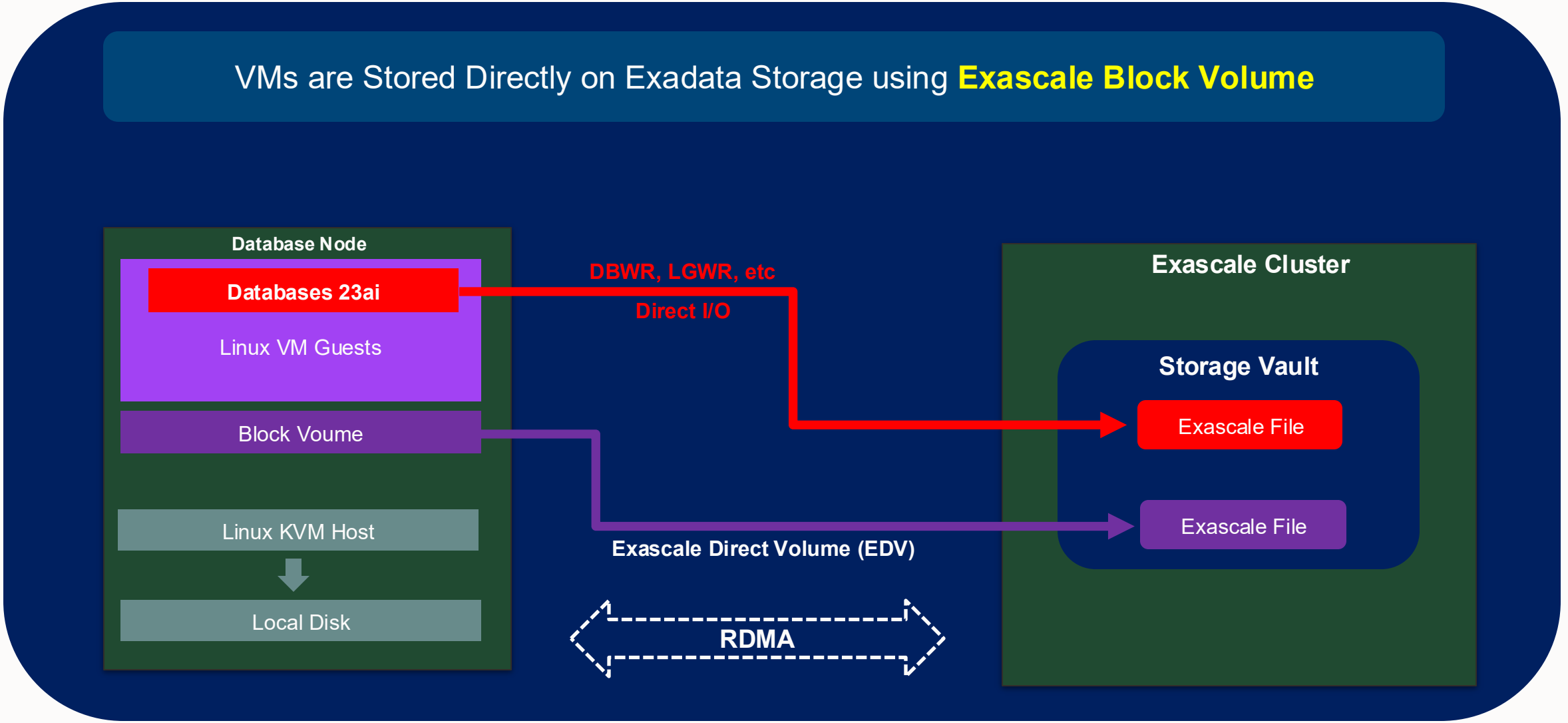
Exascale Architecture – Multiple Clusters



Exascale – VM Cluster

New Limits for VMs per Database Servers

VM Images Architecture – Exascale



Database Files on Exascale

How database files look like in Exascale storage

Exascale Database Files - Parameters

Using ASM Diskgroup (+)

+ASM_DISKGROUP_NAME

```
NAME                                     VALUE
---------------------------------------- ----------------------------------------
db_create_file_dest                      +DATA
db_create_online_log_dest_1              +DATA
db_recovery_file_dest                    +RECO
```

Exascale Database Files - Parameters

Using ASM Diskgroup (+)

+ASM_DISKGROUP_NAME

```
NAME                                 VALUE
------------------------------------ ------------------------------
db_create_file_dest                  +DATA
db_create_online_log_dest_1          +DATA
db_recovery_file_dest                +RECO
```

Using Exascale Storage Vault (@)

@EXASCALE_VAULT_NAME

```
NAME                                 VALUE
------------------------------------ ------------------------------
db_create_file_dest                  @eGEDOpGD
db_create_online_log_dest_1          @eGEDOpGD
db_recovery_file_dest                @eGEDOpGD
```

Database files on Exascale

```
SQL> select name from v$controlfile where rownum = 1;

NAME
--------------------------------------------------------------------------------
+DATA/CDBDG/CONTROLFILE/current.346.1180641287

SQL>
SQL>
SQL> select name from v$datafile where rownum = 1;

NAME
--------------------------------------------------------------------------------
+DATA/CDBDG/DATAFILE/system.298.1180641183

SQL>
SQL>
SQL> select member from v$logfile where rownum = 1;

MEMBER
--------------------------------------------------------------------------------
+DATA/CDBDG_A/ONLINELOG/group_201.338.1193068263
```

Database files on Exascale

```
SQL> select name from v$controlfile where rownum = 1;

NAME
--------------------------------------------------------------------------------
+DATA/CDBDG/CONTROLFILE/current.346.1180641287

SQL>
SQL>
SQL> select name from v$datafile where rownum = 1;

NAME
--------------------------------------------------------------------------------
+DATA/CDBDG/DATAFILE/system.298

SQL>
SQL>
SQL> select member from v$logfi

MEMBER
--------------------------------------------------------------------------------
+DATA/CDBDG_A/ONLINELOG/group_2
```

Using ASM Diskgroup

Using Exascale Storage Vault

```
SQL> select name from v$controlfile where rownum = 1;

NAME
--------------------------------------------------------------------------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/CONTROLFILE/Current.OMF.34A2D8C6

SQL>
SQL> select name from v$datafile where rownum = 1;

NAME
--------------------------------------------------------------------------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/DATAFILE/SYSTEM.OMF.75B52763

SQL>
SQL>
SQL> select member from v$logfile where rownum = 1;

MEMBER
--------------------------------------------------------------------------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ONLINELOG/group_101.OMF.4025DA2F
```

Database files on Exascale

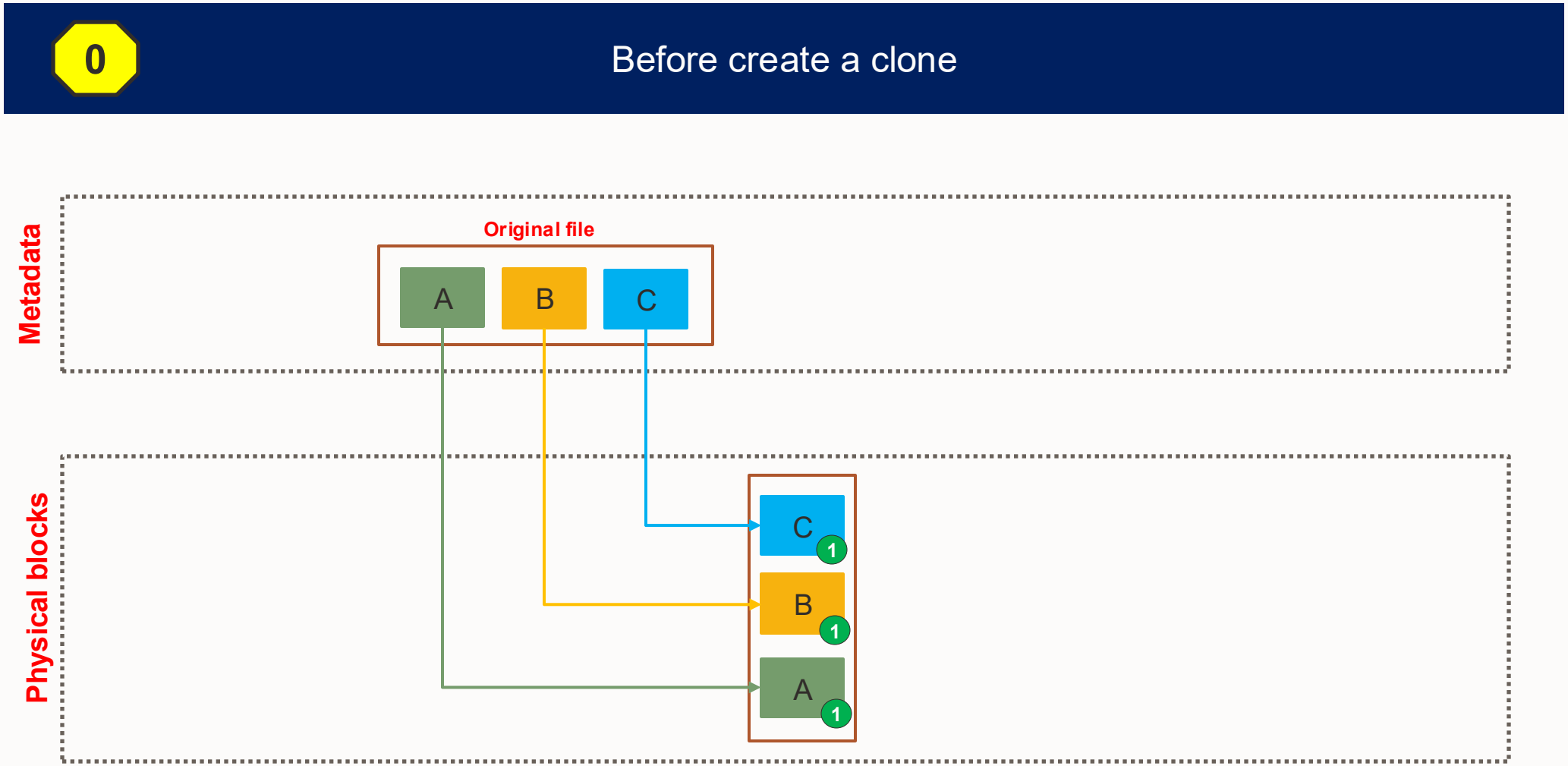
```
[oracle@guob011-rpdrb ~]$ srvctl config database -d CDB1_wg8_iad
Database unique name: CDB1_wg8_iad
Database name: CDB1
Oracle home: /u02/app/oracle/product/23.0.0.0/dbhome_1
Oracle user: oracle
Spfile: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/PARAMETERFILE/spfile.OMF.216B3DD2
Password file: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/PASSWORD/pwdCDB1_WG8_IAD.344ED854
Domain: b.vcnus01.oraclevcn.com
Start options: open
Stop options: immediate
Database role: PRIMARY
```

```
RMAN> list archivelog all;
list archivelog all;
using target database control file instead of recovery catalog
List of Archived Log Copies for database with db_unique_name CDB1_WG8_IAD
=====================================================================

Key     Thrd Seq     S Low Time
------- ---- ------- - -------------------
1055    1    1053    A 13/07/2025 11:26:06
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1053.OMF.1E016F70

1056    1    1054    A 13/07/2025 11:36:06
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1054.OMF.7E11A777

1057    1    1055    A 13/07/2025 11:37:05
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1055.OMF.07241CEA

1058    1    1056    A 13/07/2025 11:52:52
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1056.OMF.7009A1E7

1059    1    1057    A 13/07/2025 11:53:07
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1057.OMF.2E77E79E

1060    1    1058    A 13/07/2025 12:35:09
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1058.OMF.50237C5C

1061    1    1059    A 13/07/2025 13:01:04
        Name: @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_07_13/thread_1_seq_1059.OMF.3EF78B0E
```

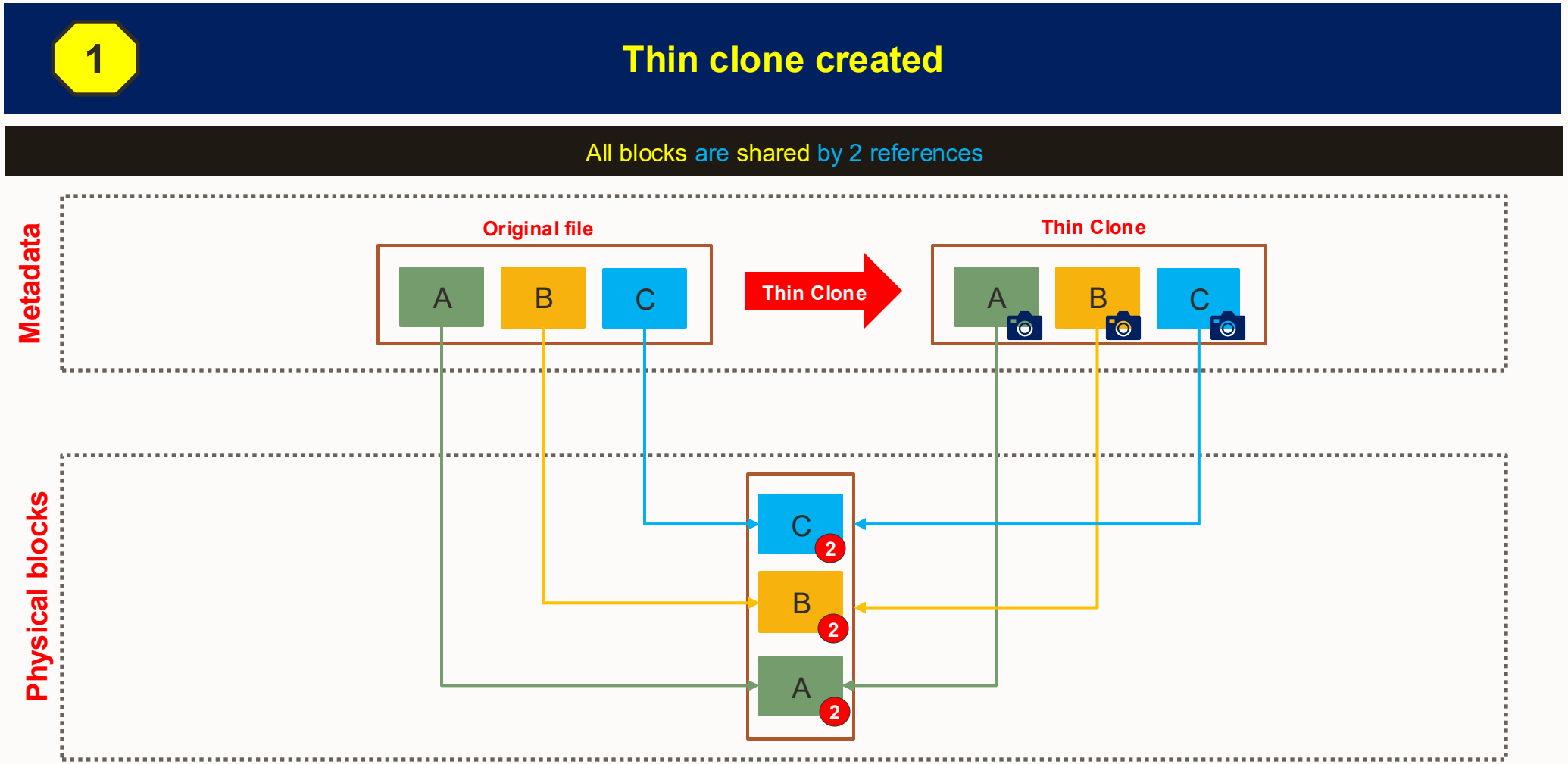
Exascale Intelligent Snapshot Clone

How Exascale uses Redirect-On-Write (ROW) – by Maicon Carneiro

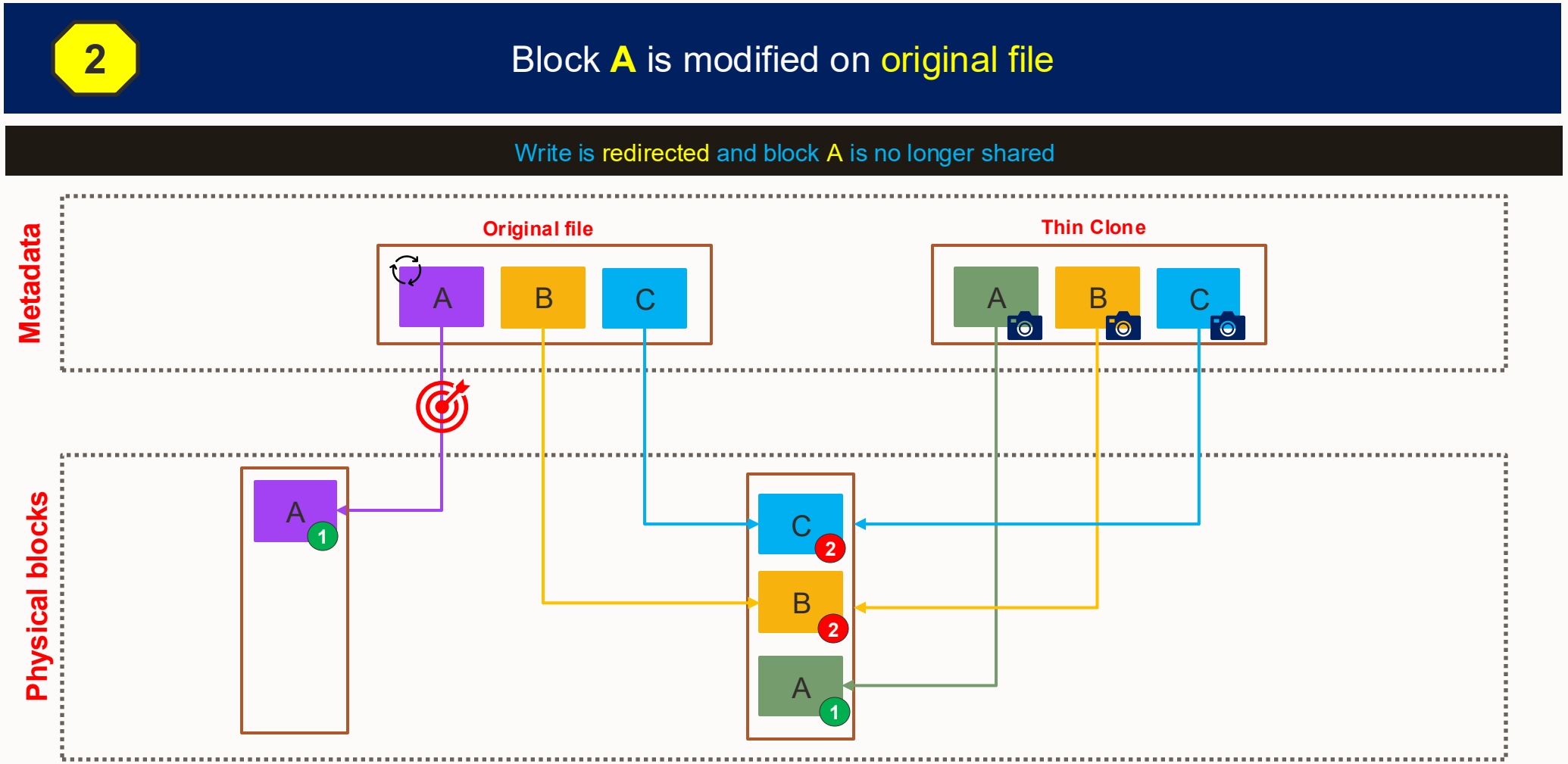
Snapshot Clone Redirect-On-Write Overview



Snapshot Clone Redirect-On-Write Overview



Snapshot Clone Redirect-On-Write Overview



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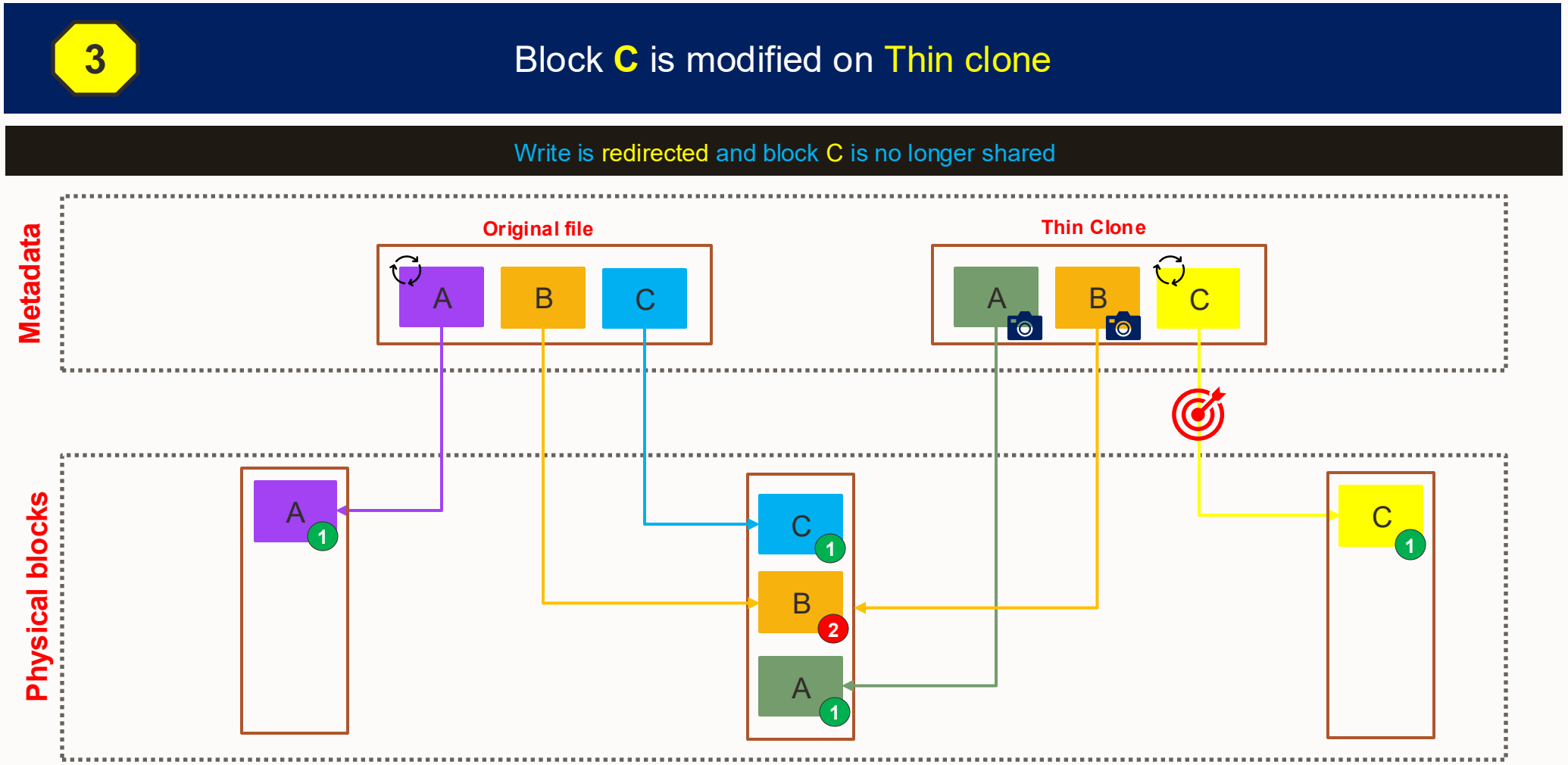

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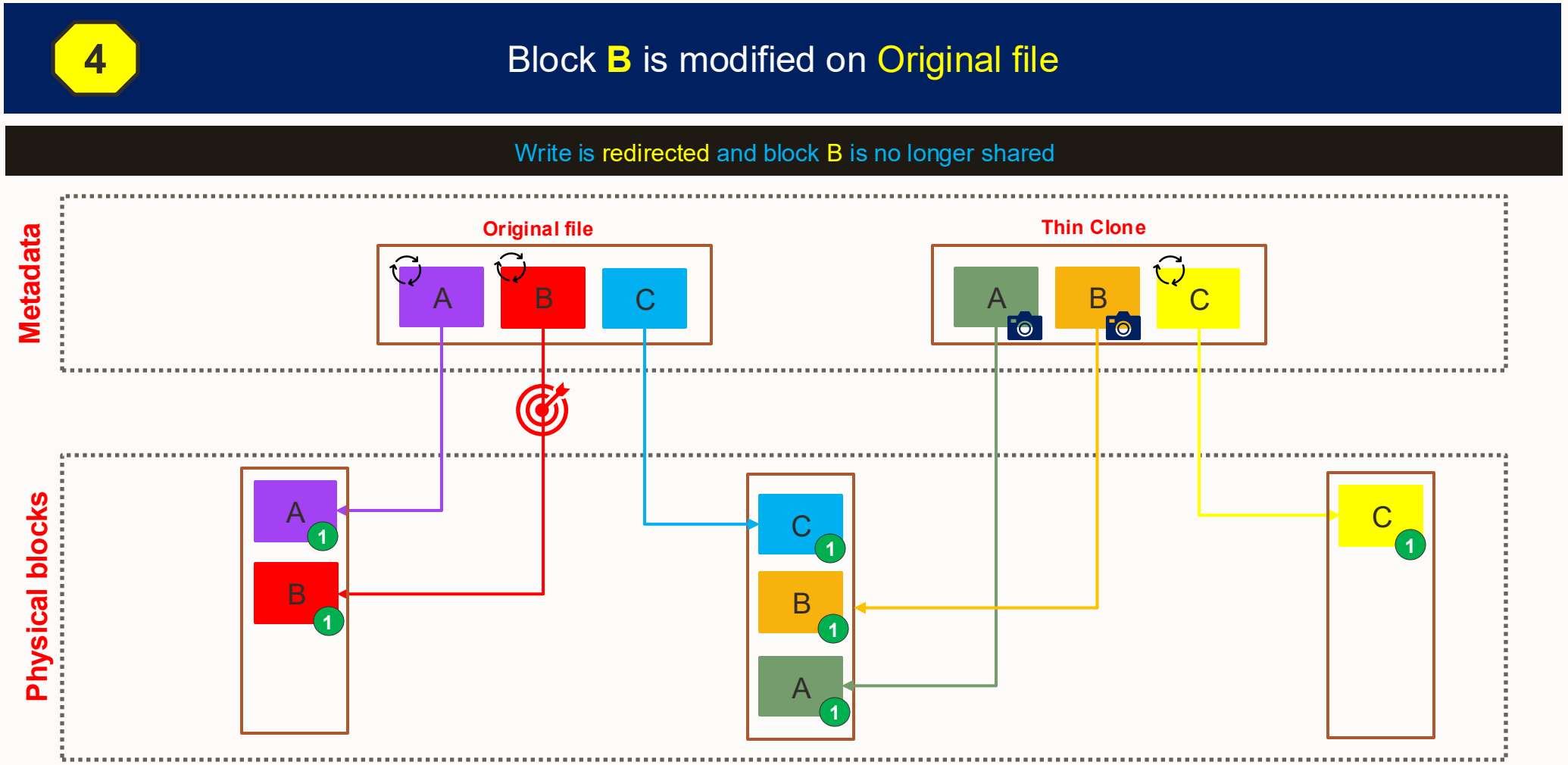
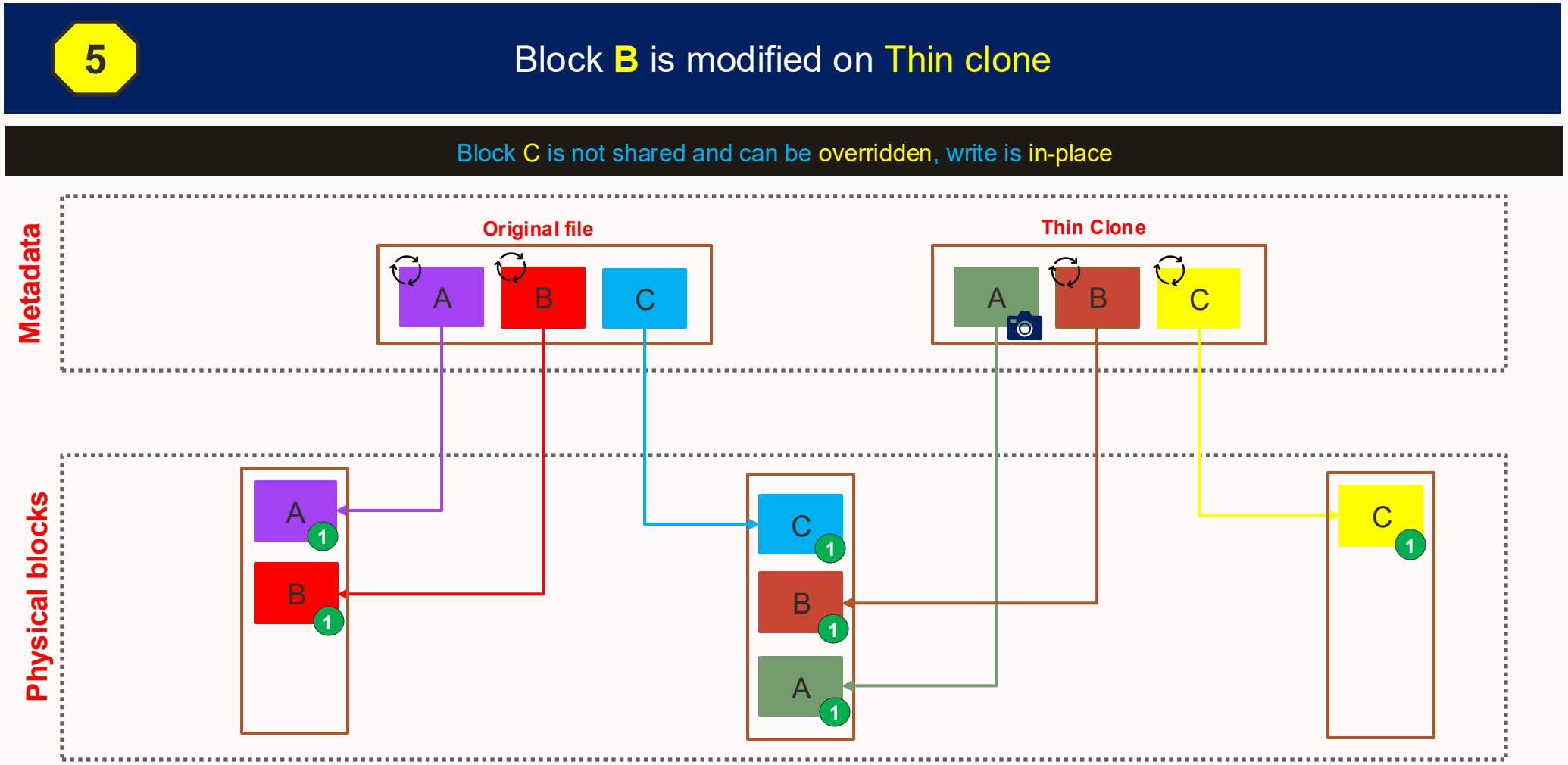


Snapshot Clone Redirect-On-Write Overview



Snapshot Clone Databases on Exascale

Create Thin Clones with one command !

Snapshot clone of Databases on Exascale

PDB Snapshot Clone

- Database Aware Thin Clone
- Just add “**SNAPSHOT COPY**” clause in CREATE PLUGGABLE DATABASE command.
- Oracle Database 23ai uses Exascale snapshot capability transpalently.

Snapshot clone of Databases on Exascale

PDB Snapshot Clone

- Database Aware Thin Clone
- Just add "**SNAPSHOT COPY**" clause in CREATE PLUGGABLE DATABASE command.
- Oracle Database 23ai uses Exascale snapshot capability transpalently.

CDB Snaphot Clone

- Automated with **gDBClone** tool
- gDBClone creates a snapshot clone of source datafiles.
- gDBClone automation creates a new database instance in the Cluster and mount the new database using the cloned datafiles.

Exascale - Database Aware Thin Clone

Create Thin Clones with one command !

Exascale - Database Aware Thin Clone

```
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 PDB1                           READ WRITE NO
SQL>
```

```
SQL> @pdbsize

PDB_NAME             GUID                                     GBYTES
-------------------- ---------------------------------------- ----------
PDB1                 329A723565C06874E0630E02020A3A53          222.20
```

Exascale - Database Aware Thin Clone

```
SQL> CREATE PLUGGABLE DATABASE PDB1_CLONE FROM PDB1;
```

Exascale - Database Aware Thin Clone

SQL> CREATE PLUGGABLE DATABASE **PDB1_CLONE** FROM ***PDB1;***

```
SQL> create pluggable database PDB1_CLONE from PDB1
keystore identified by EXTERNAL STORE;  2

Pluggable database created.

Elapsed: 00:12:52.46
```

Exascale - Database Aware Thin Clone

```
SQL> CREATE PLUGGABLE DATABASE PDB1_CLONE FROM PDB1;
```

```
SQL> create pluggable database PDB1_CLONE from PDB1
keystore identified by EXTERNAL STORE;  2

Pluggable database created.

Elapsed: 00:12:52.46
```

SNAPSHOT COPY

```
SQL> CREATE PLUGGABLE DATABASE PDB1_SNAP FROM PDB1 SNAPSHOT COPY;
```

Exascale - Database Aware Thin Clone

SQL> CREATE PLUGGABLE DATABASE **PDB1_CLONE** FROM ***PDB1;***

```
SQL> create pluggable database PDB1_CLONE from PDB1
keystore identified by EXTERNAL STORE;  2

Pluggable database created.

Elapsed: 00:12:52.46
```

+ 12 minutes

SNAPSHOT COPY

SQL> CREATE PLUGGABLE DATABASE **PDB1_SNAP** FROM ***PDB1 SNAPSHOT COPY;***

```
SQL> create pluggable database PDB1_SNAP from PDB1 snapshot copy
keystore identified by EXTERNAL STORE;  2

Pluggable database created.

Elapsed: 00:00:09.08
```

- 10 seconds

CDB Thin Clone with **gDBClone** on Exascale

Create Thin Clones with one command !

gDBClone on Exascale – Example

Basic syntax

```
./gDBClone.bin snap  -sdbname CDB1 -tdbname CDB1CLONE
```

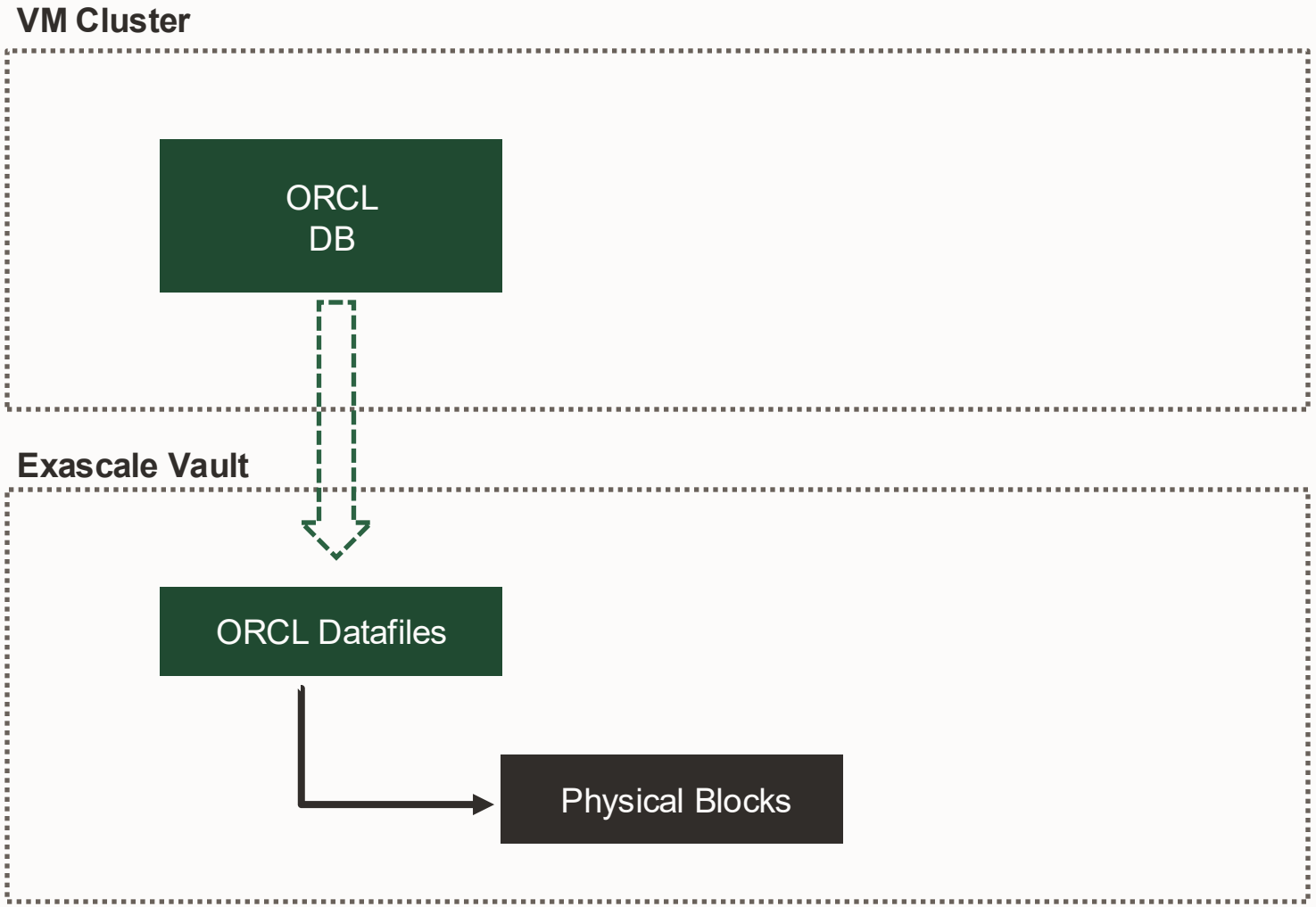
Full syntax

```
./gDBClone.bin snap \
  -sdbname CDB1 \
  -tdbname CDB1CLONE \
  -tdomain b.vcnus01.oraclevcn.com \
  -tdbhome OraHome1 \
  -syspwf /opt/gDBClone/cdb1_sys \
  -walletpwf /opt/gDBClone/cdb1_sys \
  -racmod 2 \
  -sga_max_size 2048 -sga_target 2048
```

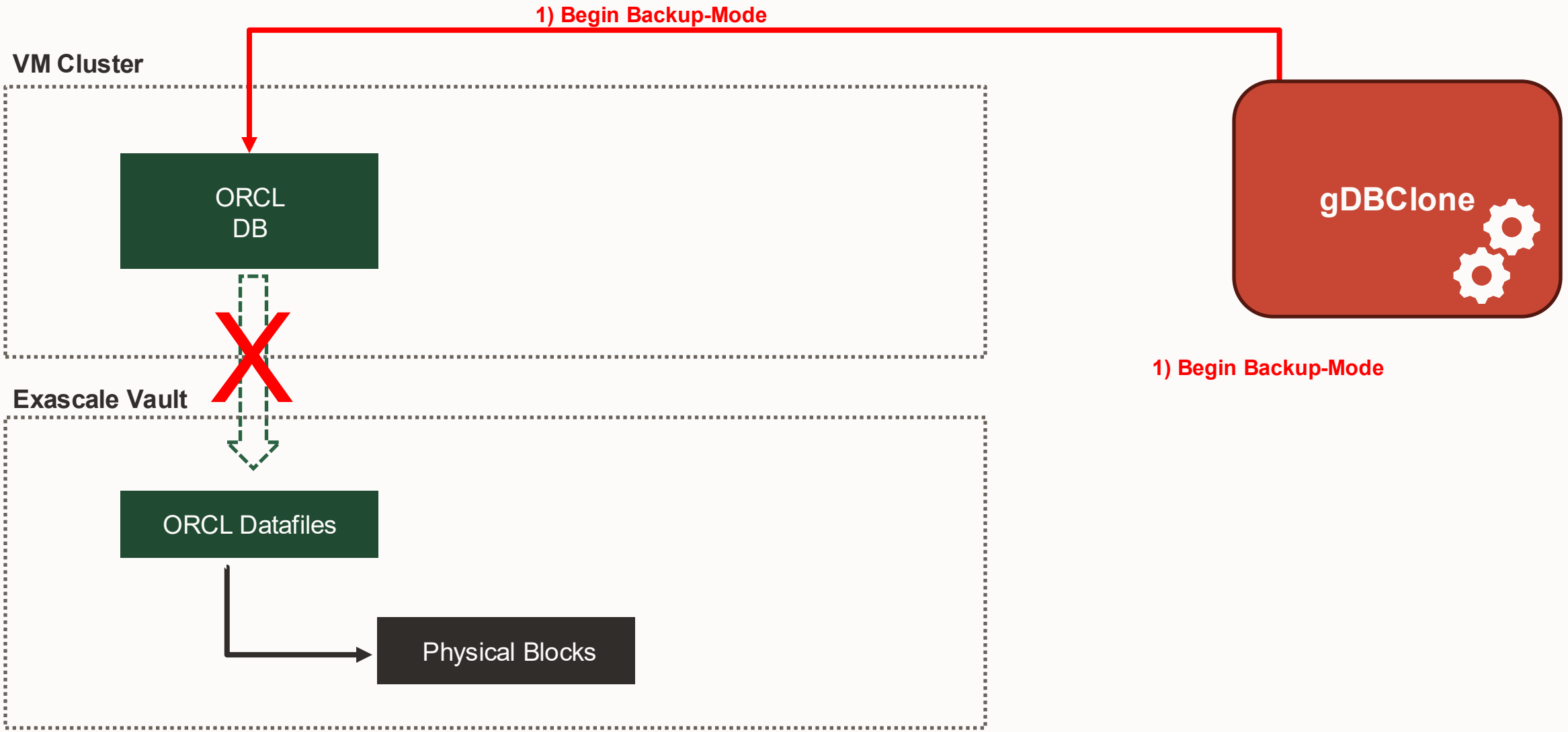
gDBClone Powerful Database Clone/Snapshot Management Tool (Doc ID 2099214.1)

https://docs.oracle.com/en/engineered-systems/exadata-database-machine/exscl/cloning-pdb-cdb.html

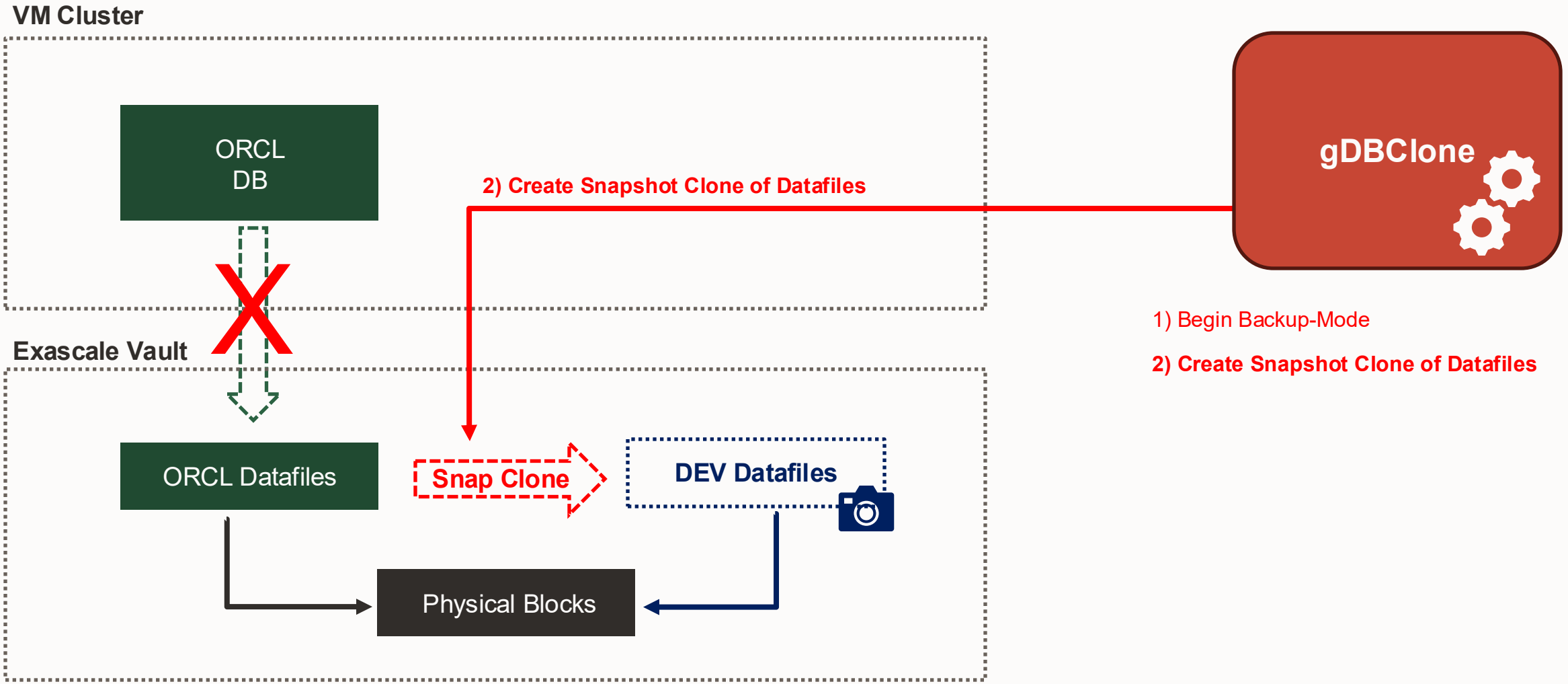
CDB Thin Clone with gDBClone on Exascale



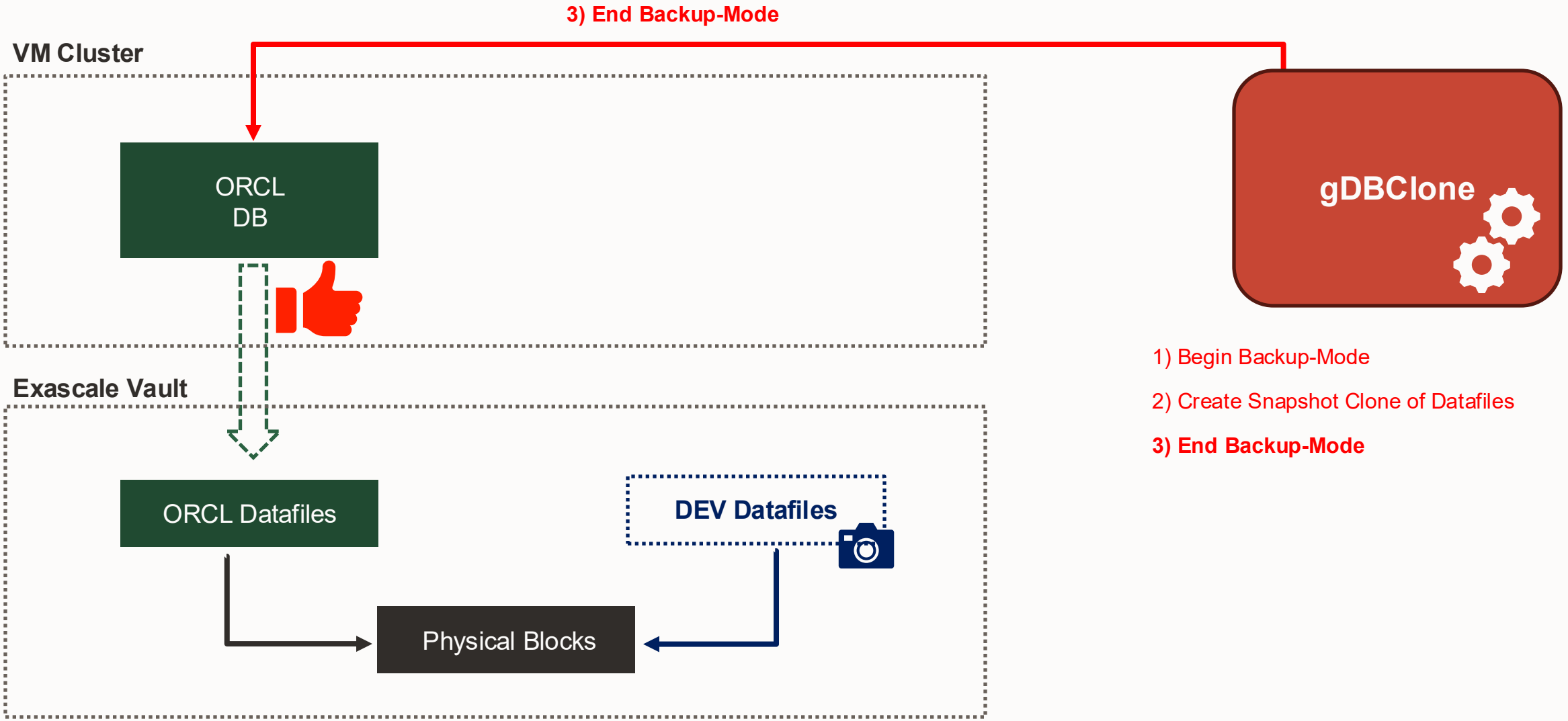
CDB Thin Clone with gDBClone on Exascale



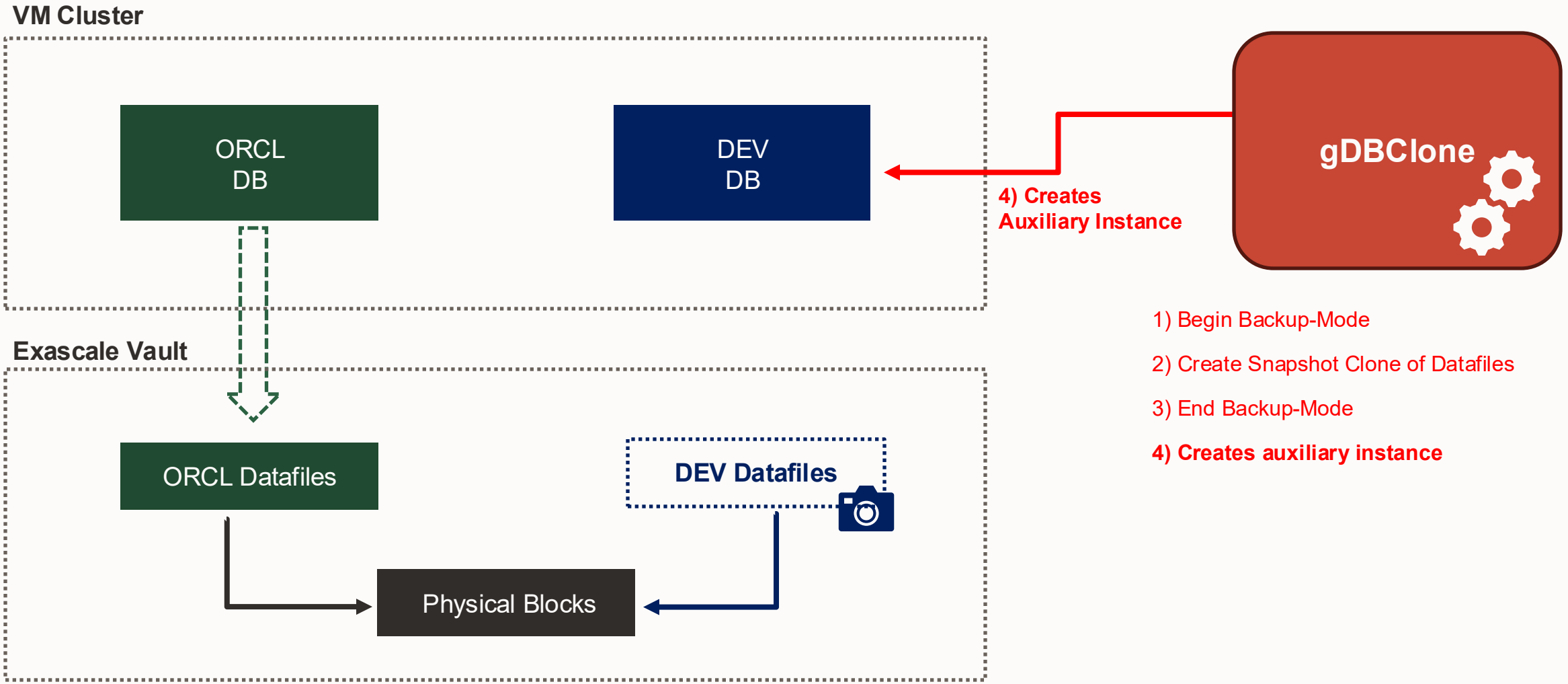
CDB Thin Clone with gDBClone on Exascale



CDB Thin Clone with gDBClone on Exascale



CDB Thin Clone with gDBClone on Exascale



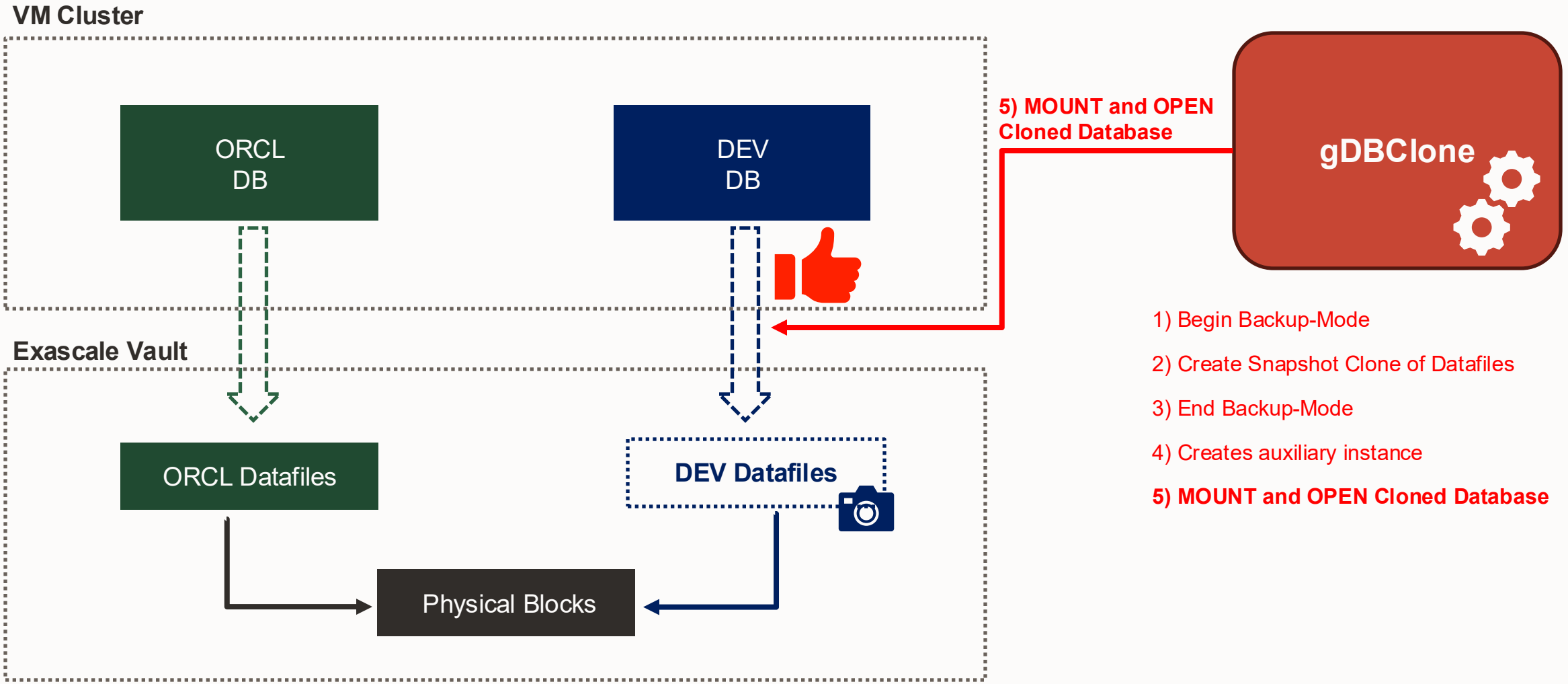
1) Begin Backup-Mode

2) Create Snapshot Clone of Datafiles

3) End Backup-Mode

4) Creates auxiliary instance

CDB Thin Clone with gDBClone on Exascale



gDBClone on Exascale – Demo

```
[root@guob011-rpdrb ~]#
[root@guob011-rpdrb ~]# /opt/gDBClone/gDBClone.bin snap \
>  -sdbname CDB1_wg8_iad \
>  -tdbname CDB1THIN \
>  -tdomain b.vcnus01.oraclevcn.com \
>  -tdbhome OraHome1 \
>  -syspwf /opt/gDBClone/cdb1_sys \
>  -walletpwf  /opt/gDBClone/cdb1_sys \
>  -racmod 2 \
>  -sga_max_size 2048 -sga_target 2048
INFO: 2025-07-13 12:33:26: Please check the logfile '/opt/gDBClone/out/log/gDBClone_184810.log' for more details

 gDBClone - Version: 3.0.6-21
 Copyright (c) 2012-2025 Oracle and/or its affiliates.
 --------------------------------------------------------
 Author: Ruggero Citton <ruggero.citton@oracle.com>
 RAC Pack, Cloud Innovation and Solution Engineering Team
```

gDBClone on Exascale – Demo: MacroStep1

Validation

```
MacroStep1 - Getting information and validating setup...
INFO: 2025-08-10 19:13:14: Checking whether the database 'CDB1_wg8_iad' is on Exascale
INFO: 2025-08-10 19:13:14: Processing CDB1_wg8_iad;' on Exascale
INFO: 2025-08-10 19:13:14: Source database 'CDB1_WG8_IAD' Exascale vault is '@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A435937
INFO: 2025-08-10 19:13:14: Validating environment...
INFO: 2025-08-10 19:13:14: ...checking superuser usage
INFO: 2025-08-10 19:13:14: ...checking clusterware
INFO: 2025-08-10 19:13:14: ...checking oracle Restart
INFO: 2025-08-10 19:13:14: ...checking minimum crs active version
INFO: 2025-08-10 19:13:14: ...checking source database 'CDB1_wg8_iad' existence
INFO: 2025-08-10 19:13:14: ...checking if source database 'CDB1_wg8_iad' is running
INFO: 2025-08-10 19:13:15: ...checking if source database 'CDB1_wg8_iad' is having all DBFs on same exascale vault '@eGEDOpGD,
INFO: 2025-08-10 19:13:15: ...checking if source database 'CDB1_wg8_iad' is having all DBFs on same exascale root path
INFO: 2025-08-10 19:13:15: ...checking if source database 'CDB1_wg8_iad' is having invalid PDBs
INFO: 2025-08-10 19:13:16: ...checking if target database name 'CDBSNAP1' is a valid name
INFO: 2025-08-10 19:13:16: ...checking source database 'CDB1_wg8_iad' connectivity
INFO: 2025-08-10 19:13:16: ...checking source database 'CDB1_wg8_iad' and target dbhome version
INFO: 2025-08-10 19:13:21: ...checking minimun source database 'CDB1_wg8_iad' dbhome version
INFO: 2025-08-10 19:13:21: ...checking if target database 'CDBSNAP1' exists
INFO: 2025-08-10 19:13:21: ...checking target database 'CDBSNAP1' registered instance
INFO: 2025-08-10 19:13:24: ...checking if target database 'CDBSNAP1' is having files on exascale
INFO: 2025-08-10 19:13:24: ...checking if source database 'CDB1_wg8_iad' is snapable
NOTE: 2025-08-10 19:13:26: Transparent Data Encryption is enabled on 'CDB1_wg8_iad'
INFO: 2025-08-10 19:13:27: ...checking whether the database 'CDB1_wg8_iad' is a primary/physical standby database.
INFO: 2025-08-10 19:13:28: ...checking whether the database 'CDB1_wg8_iad' is in rw/ro mode
INFO: 2025-08-10 19:13:29: ...checking whether the database 'CDB1_wg8_iad' is running as backup mode
INFO: 2025-08-10 19:13:29: ...checking whether the database 'CDB1_wg8_iad' is running in archivelog mode
INFO: 2025-08-10 19:13:29: ...checking if there are offline datafiles
SUCCESS: 2025-08-10 19:13:29: Environment validation complete
```

19:13:14

gDBClone on Exascale – Demo: MacroStep2

Clone

```
MacroStep2 - Getting database Exascale clone...
INFO: 2025-08-10 19:13:29: Collecting source database 'CDB1_wg8_iad' required information
INFO: 2025-08-10 19:13:29: ...checking 'CDB1_wg8_iad' supplementary logging status
INFO: 2025-08-10 19:13:30: ...checking 'CDB1_wg8_iad' block change tracking
INFO: 2025-08-10 19:13:30: ...checking 'CDB1_wg8_iad' flashback mode
INFO: 2025-08-10 19:13:30: ...getting  'CDB1_wg8_iad' storage information
INFO: 2025-08-10 19:13:31: ...checking 'CDB1_wg8_iad' open mode
INFO: 2025-08-10 19:13:31: ...checking 'CDB1_wg8_iad' role
INFO: 2025-08-10 19:13:31: ...checking 'CDB1_wg8_iad' readonly tablespaces
INFO: 2025-08-10 19:13:32: Entering into Exascale database clone creation phase 1
INFO: 2025-08-10 19:13:32: ...making required action to get consistent database exascale clone
NOTE: 2025-08-10 19:13:34: Setting database 'CDB1_wg8_iad' in backup mode
INFO: 2025-08-10 19:13:35: ...getting control file backup
INFO: 2025-08-10 19:13:38: ...getting source database 'CDB1_wg8_iad' exascale clone
NOTE: 2025-08-10 19:13:39: Ending database 'CDB1_wg8_iad' backup mode
INFO: 2025-08-10 19:13:41: ...getting the exascale archive files clone for database 'CDB1_wg8_iad'
```

Begin Backup

5 seconds

End Backup

gDBClone on Exascale – Demo: MacroStep2

Clone

```
INFO: 2025-08-10 19:13:44: Entering into Exascale database clone creation phase 2
INFO: 2025-08-10 19:13:44: ...startup auxiliary instance
INFO: 2025-08-10 19:13:51: ...duplicating database 'CDB1_wg8_iad' as 'CDBSNAP1', please wait...
INFO: 2025-08-10 19:13:51: ....(rman log file at '/opt/gDBClone/out/log/rman_duplicate4exascale_224780.log')
INFO: 2025-08-10 19:15:41: ...creating spfile for 'CDBSNAP1'
INFO: 2025-08-10 19:15:44: ...creating pfile for 'CDBSNAP1'
INFO: 2025-08-10 19:15:44: ...creating passwordfile
INFO: 2025-08-10 19:15:44: ...copying passwordfile to exascale storage
INFO: 2025-08-10 19:15:45: ...removing temporary control.bkp
INFO: 2025-08-10 19:15:46: Entering into Exascale database clone creation phase 3
INFO: 2025-08-10 19:15:46: ...registering database 'CDBSNAP1' as cluster resource
INFO: 2025-08-10 19:15:55: ...successfully started the database
INFO: 2025-08-10 19:15:55: ...setting database 'CDBSNAP1' express port
INFO: 2025-08-10 19:16:05: ...getting external references information for the database 'CDB1_wg8_iad'
INFO: 2025-08-10 19:16:05: ...disabling the external references in the database 'CDBSNAP1' inherited from 'CDB1_wg8_iad'
      ------------------------------------------------------------------------
      Enable these external references running on the database 'CDBSNAP1' the SQL script:
       '/u02/app/oracle/product/23.0.0.0/dbhome_1/enable_external_refs_CDBSNAP1_rl38.sql'
      Restart the database after running the SQL script is required
      ------------------------------------------------------------------------
INFO: 2025-08-10 19:16:07: ...restarting database 'CDBSNAP1'
INFO: 2025-08-10 19:16:49: ...creating pfile for 'CDBSNAP1'
INFO: 2025-08-10 19:16:49: ...cleanup Archivelog files
SUCCESS: 2025-08-10 19:17:09: Exascale clone database 'CDBSNAP1' created successfully
```

gDBClone on Exascale – Demo: MacroStep3

RAC Configuration

```
MacroStep3 - Converting clone database 'CDBSNAP1' to cluster mode...
INFO: 2025-08-10 19:17:10: Checking for 'Real Application Clusters' option
INFO: 2025-08-10 19:17:12: Database conversion started...
INFO: 2025-08-10 19:17:12: Making required redolog thread on database 'CDBSNAP1'
INFO: 2025-08-10 19:17:13: ...number of the nodes is less or equal the thread#, no more redolog thread are required
INFO: 2025-08-10 19:17:13: Making required undo tablespaces on database 'CDBSNAP1'
INFO: 2025-08-10 19:17:13: Getting UNDOTBS for 'CDBSNAP1'
INFO: 2025-08-10 19:17:14: Making required instances spfile changes
INFO: 2025-08-10 19:17:16: Stopping database 'CDBSNAP1'
INFO: 2025-08-10 19:17:32: Register 'CDBSNAP1' database as RAC database
INFO: 2025-08-10 19:17:34: Registering additional instance
INFO: 2025-08-10 19:17:37: Register Exascale passwordfile '@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDBSNAP1/PASSWORD/pwdCDBSNAP1'
INFO: 2025-08-10 19:17:38: Copying password file to the cluster nodes...
INFO: 2025-08-10 19:17:38: ...copying '/u02/app/oracle/product/23.0.0.0/dbhome_1/dbs/orapwCDBSNAP11' to 'guob011-rpdrb'
INFO: 2025-08-10 19:17:38: Copying pfile to the cluster nodes...
INFO: 2025-08-10 19:17:38: ...copying '/u02/app/oracle/product/23.0.0.0/dbhome_1/dbs/initCDBSNAP11.ora' to 'guob011-rpdrb'
SUCCESS: 2025-08-10 19:17:39: Database 'CDBSNAP1' converted to RAC successfully

INFO: 2025-08-10 19:17:39: Starting database 'CDBSNAP1'
SUCCESS: 2025-08-10 19:18:08: Successfully started clone database 'CDBSNAP1'
```

19:18:08 (**5 minutes**)

```
SQL>
SQL> @datafiles_used_per_cdb.sql

CDB_PATH                                                          SIZE_GBYTES     USED_GBYTES USED_GBYTES_RAW
----------------------------------------------------------------- --------------- --------------- ---------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/          236.49          236.49          709.46
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDBSNAP1/              231.96           23.25           69.75

SQL>
SQL>
```

Monitoring Storage Vault usage

How to see the total capacity and space used in my Exascale Vault ?

Oracle Database - Specific views for Exascale

V$EXA_VAULT

- Capacity and space usage in Storage Vault
- Replacement for V$ASM_DISKGROUP

Oracle Database - Specific views for Exascale

V$EXA_VAULT

- Capacity and space usage in Storage Vault
- Replacement for V$ASM_DISKGROUP

V$EXA_FILE

- Space used per file in Storage Vault
- Replacement for V$ASM_FILE

Oracle Database - Specific views for Exascale

V$EXA_VAULT

- Capacity and space usage in Storage Vault
- Replacement for V$ASM_DISKGROUP

V$EXA_FILE

- Space used per file in Storage Vault
- Replacement for V$ASM_FILE

V$EXA_TEMPLATE

- Templates that governs where and how each file type is stored in the Vault
- Replacement for V$ASM_TEMPLATE

Exascale Monitoring Vault

SQL> SELECT * FROM V$EXA_VAULT;

```
sys@CDB1>@exavault2

Vault                 High Capacity   High Capacity   High Capacity  High Capacity
Name                Provisioned (GB) Space Used (GB) Space Free (GB) Space Used (%)
------------------- ---------------- --------------- --------------- --------------
eGEDOpGD                     600.00          300.58          299.42          50.10

1 row selected.
```

Exascale Monitoring Vault

SQL> SELECT * FROM V$EXA_VAULT;

```
sys@CDB1>@exavault2

Vault                 High Capacity   High Capacity   High Capacity  High Capacity
Name                Provisioned (GB) Space Used (GB) Space Free (GB) Space Used (%)
------------------- ---------------- --------------- -------------- --------------
eGEDOpGD                     600.00          300.58         299.42          50.10

1 row selected.
```

SQL> SELECT * FROM V$EXA_FILE;

```
sys@CDB1>@exavault_used_per_cdb.sql

CDB_PATH                                                                  SIZE_GBYTES
------------------------------------------------------------------------ ------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/              246.95
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1THIN/                    6.02
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDBCLONE/                    .33

3 rows selected.
```

Exascale Monitoring Vault

SQL> SELECT * FROM V$EXA_VAULT;

```
sys@CDB1>@exavault2

Vault                 High Capacity   High Capacity   High Capacity  High Capacity
Name                Provisioned (GB) Space Used (GB) Space Free (GB) Space Used (%)
------------------- ---------------- --------------- -------------- --------------
eGEDOpGD                     600.00          300.58         299.42          50.10

1 row selected.
```

SQL> SELECT * FROM V$EXA_FILE;

```
sys@CDB1>@exavault_used_per_cdb.sql

CDB_PATH                                                                SIZE_GBYTES
----------------------------------------------------------------------- -----------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/             246.95
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1THIN/                 6.02
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDBCLONE/                  .33

3 rows selected.
```

$ df -t acfs

```
sys@CDB1>
sys@CDB1>! df -h -t acfs
Filesystem        Size  Used Avail Use% Mounted on
/dev/exc/vExdb82   50G  7.6G   43G  16% /var/opt/oracle/dbaas_acfs
```

Exascale Monitoring Vault

ACFS space comes from Storage Vault
(Exascale Direct Volume)

SQL> SELECT * FROM V$EXA_VAULT;

```
sys@CDB1>@exavault2

Vault                High Capacity   High Capacity   High Capacity  High Capacity
Name                 Provisioned (GB) Space Used (GB) Space Free (GB) Space Used (%)
-------------------- ---------------- --------------- -------------- --------------
eGEDOpGD                       600.00          300.58         299.42          50.10

1 row selected.
```

SQL> SELECT * FROM V$EXA_FILE;

```
sys@CDB1>@exavault_used_per_cdb.sql

CDB_PATH                                                                  SIZE_GBYTES
------------------------------------------------------------------------ ------------
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/              246.95
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1THIN/                    6.02
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDBCLONE/                     .33

3 rows selected.
```

$ df -t acfs

```
sys@CDB1>
sys@CDB1>! df -h -t acfs
Filesystem      Size  Used Avail Use% Mounted on
/dev/exc/vExdb82  50G  7.6G   43G  16% /var/opt/oracle/dbaas_acfs
```

Exascale Tools

Command line tools to manage Exascale

New specific tools for Exascale

Exadata admins

ESCLI

Addition to **CELLCLI**

- 6 Using ESCLI
  - 6.1 Start and Use ESCLI
  - 6.2 ESCLI Command Reference
    - 6.2.1 ESCLI Command Help
    - 6.2.2 Describing Resources and Attributes
    - 6.2.3 Service and Cluster Management
    - 6.2.4 Security and User Management
    - 6.2.5 Storage Pool and Pool Disk Management

Cluster & DB admins

XSH

Replacement for **asmcmd**

- 7 Using XSH
  - 7.1 Start and Use XSH
  - 7.2 XSH Command Reference
    - 7.2.1 cat
    - 7.2.2 chacl
    - 7.2.3 chresourceprofile
    - 7.2.4 chtemplate
    - 7.2.5 clone
    - 7.2.6 cp

Exascale Tools - XSH

```
[oracle@guob011-rpdrb ~]$ xsh ls
@eGEDOpGD
[oracle@guob011-rpdrb ~]$
[oracle@guob011-rpdrb ~]$
```

```
[oracle@guob011-rpdrb ~]$ xsh ls @eGEDOpGD
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/24C26E584BA61F76E0633307F40A7940/DATAFILE/SYSAUX.OMF.622E632C
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/24C26E584BA61F76E0633307F40A7940/DATAFILE/SYSTEM.OMF.20DC0CA5
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/24C26E584BA61F76E0633307F40A7940/DATAFILE/UNDOTBS1.OMF.01A6FEC3
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/24C26E584BA61F76E0633307F40A7940/DATAFILE/temp012025-04-12_15-52-32-684-PM.dbf
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/IOPS.OMF.18F795FA
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/SYSAUX.OMF.369CB05A
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/SYSTEM.OMF.208D2075
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/UNDOTBS1.OMF.0C3F1EA0
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/UNDO_7.OMF.52707605
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/DATAFILE/USERS.OMF.6B26596A
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/329A723565C06874E0630E02020A3A53/TEMPFILE/TEMP.OMF.6501DCDD
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/36384A6A84C0CBF3E0630E02020AEA70/DATAFILE/SH.OMF.770FB600
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/36384A6A84C0CBF3E0630E02020AEA70/DATAFILE/SYSAUX.OMF.5B5F8397
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/36384A6A84C0CBF3E0630E02020AEA70/DATAFILE/SYSTEM.OMF.52F72F0E
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/36384A6A84C0CBF3E0630E02020AEA70/DATAFILE/UNDOTBS1.OMF.6EFC3993
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/36384A6A84C0CBF3E0630E02020AEA70/DATAFILE/UNDO_5.OMF.749C18DB
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4779.OMF.1B0E6069
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4779.OMF.2919DDD1
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4780.OMF.0985295A
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4780.OMF.37D9FB9D
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4781.OMF.0A283B8F
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4781.OMF.24E55B1B
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4782.OMF.37EF0910
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4782.OMF.649F1347
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/CDB1_WG8_IAD/ARCHIVELOG/2025_08_10/thread_1_seq_4783.OMF.4094C2D4
```

Exascale Tools - XSH

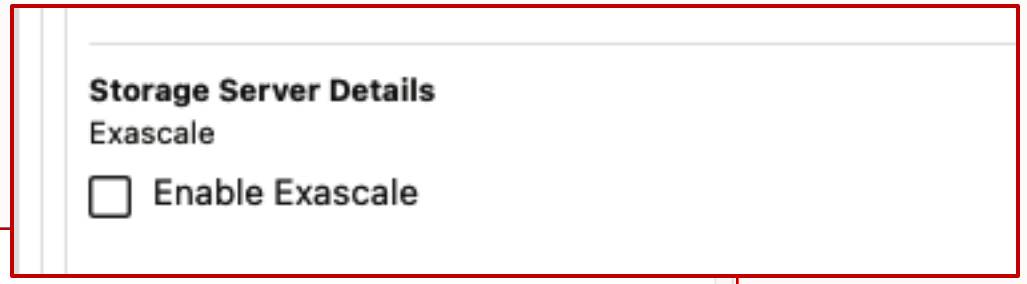
```
[grid@guob011-rpdrb ~]$
[grid@guob011-rpdrb ~]$ xsh ls @eGEDOpGD
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/backup00.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/backup01.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/backup02.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/backup_20250412_174515.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/data.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/day.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/vfile1
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/week.ocr
@eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/week_.ocr
@eGEDOpGD/vol.55b73f6ef22544a2abd0183b48b8da0c
```

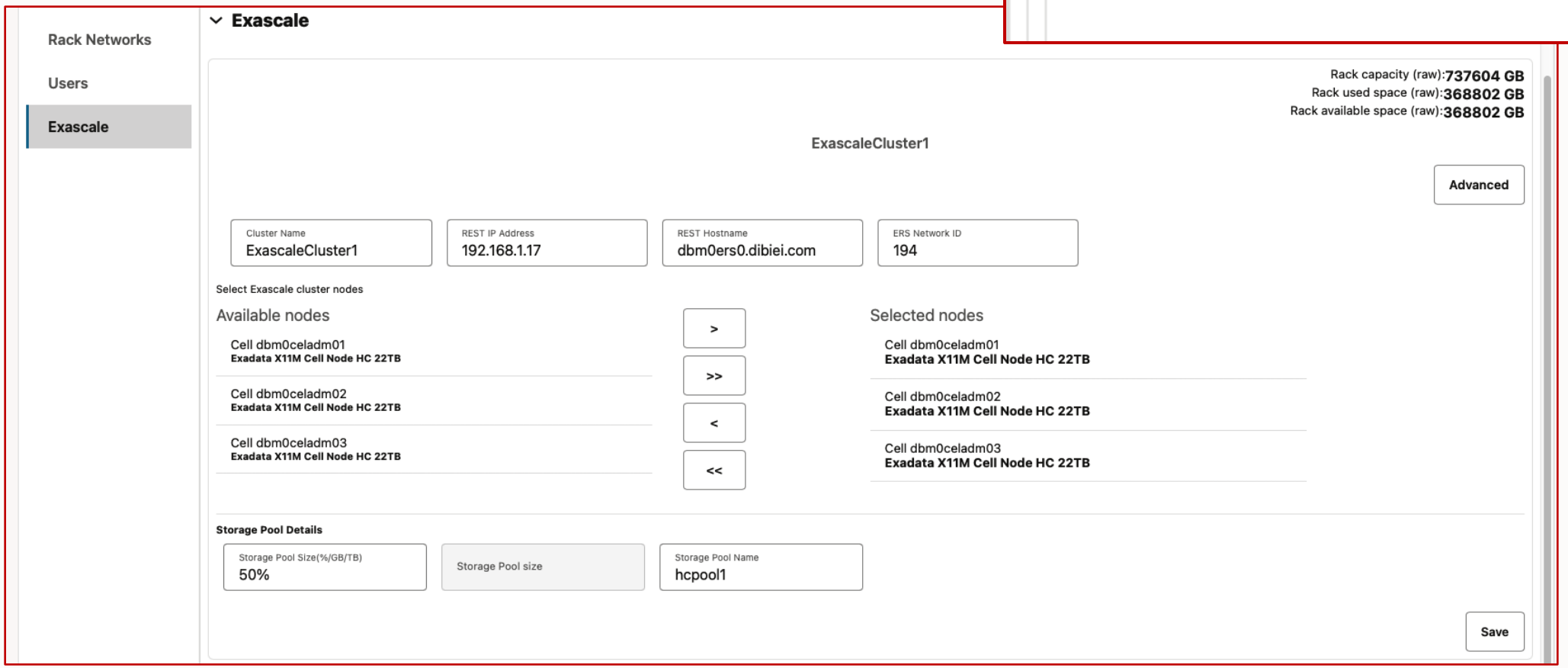
```
[grid@guob011-rpdrb ~]$
[grid@guob011-rpdrb ~]$ xsh cp @eGEDOpGD/GUOB-C1-E680D9DCFBC24FBDBF0F628A4359374D/week.ocr /tmp/week.ocr
[grid@guob011-rpdrb ~]$
[grid@guob011-rpdrb ~]$ ls -lrt /tmp/week.ocr
-rw-rw---- 1 grid oinstall 3059712 Aug 10 18:02 /tmp/week.ocr
[grid@guob011-rpdrb ~]$
[grid@guob011-rpdrb ~]$
```

Exascale – Deployment Options

Where we can use Exascale

Exascale on Exadata OnPremise





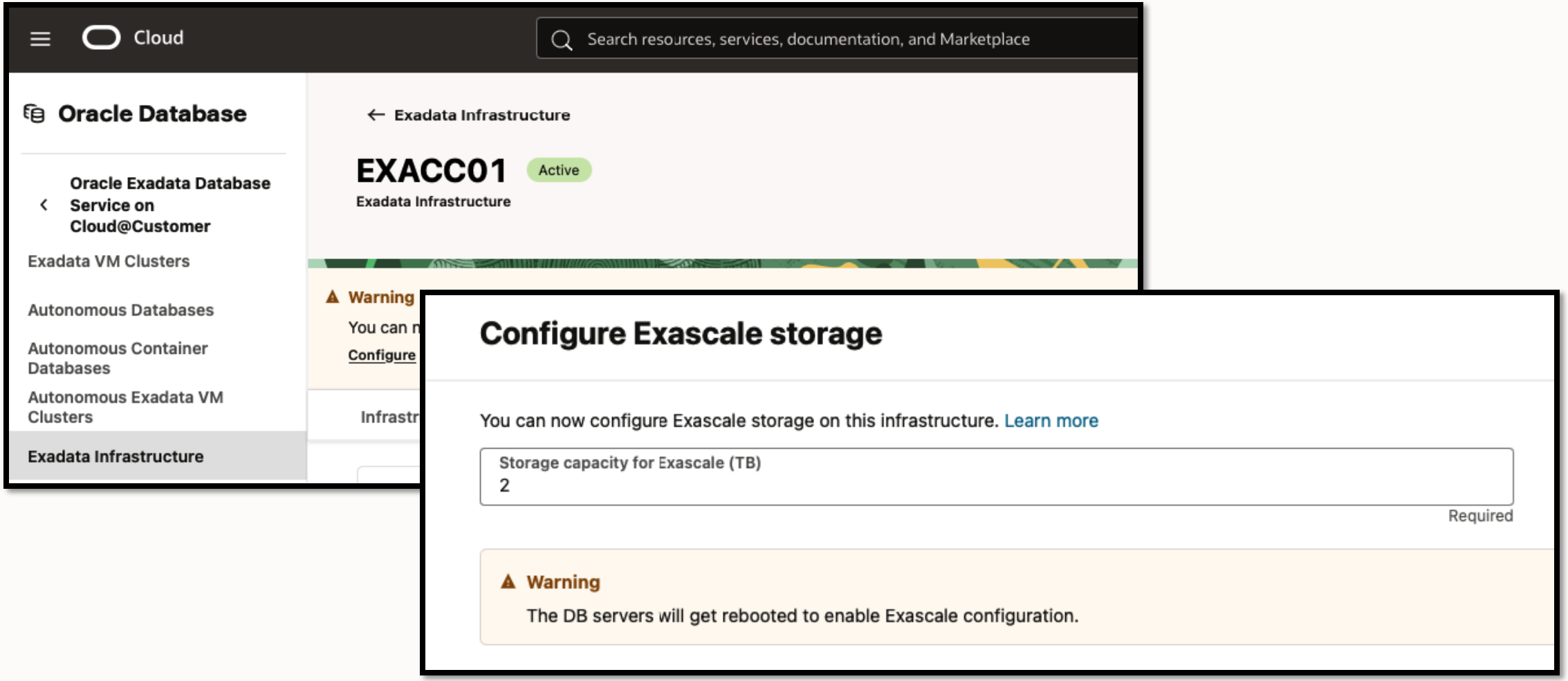
Exascale on OCI & Multicloud

Exadata Cloud at Customer
(ExaCC)

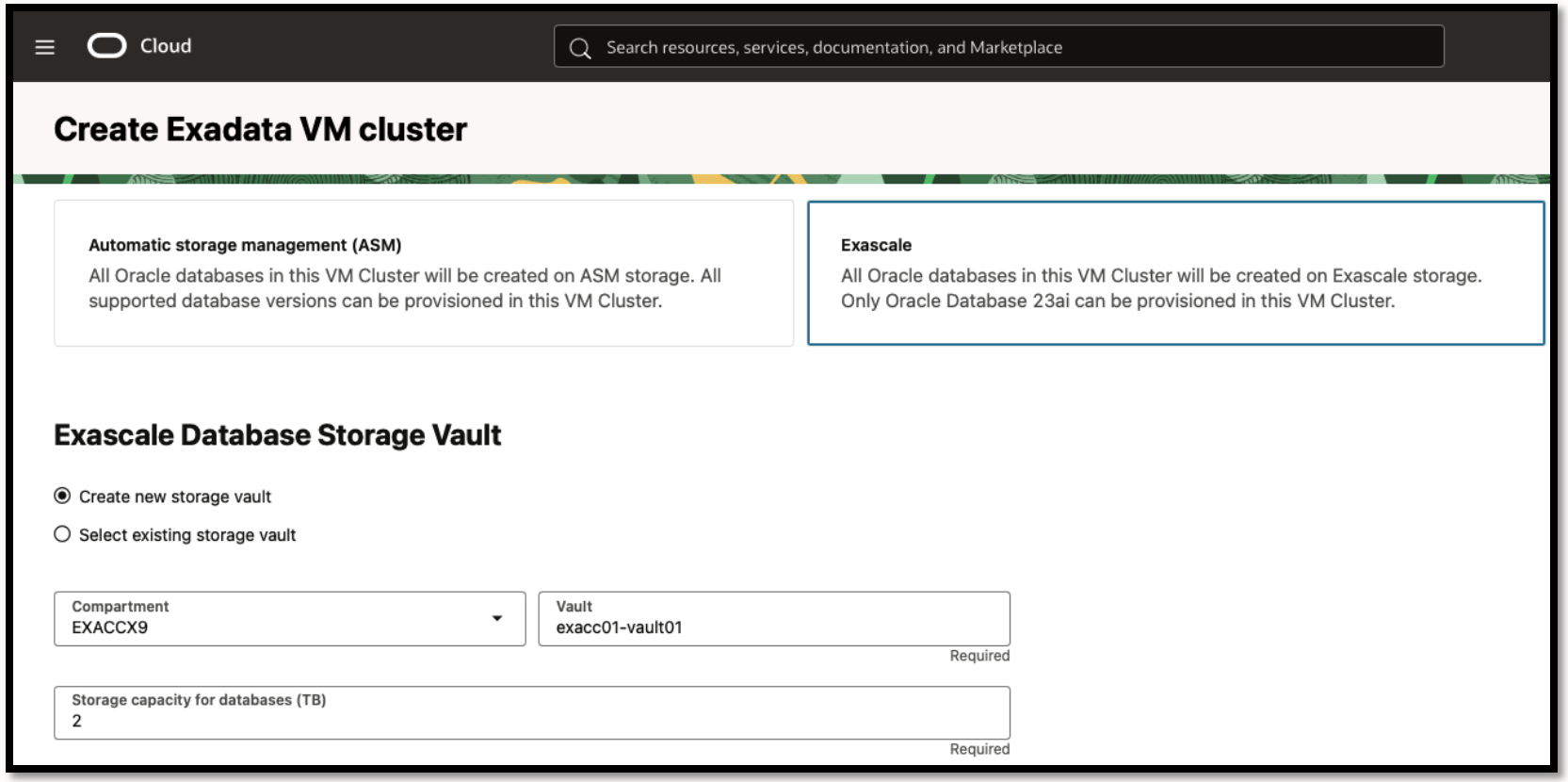
Exadata Cloud Service
(ExaCS)

Exadata on Exascale Infrastructure
(ExaXS)

Enable Exascale on ExaCC or ExaCS



Create VM Cluster with Exascale on ExaCC or ExaCS

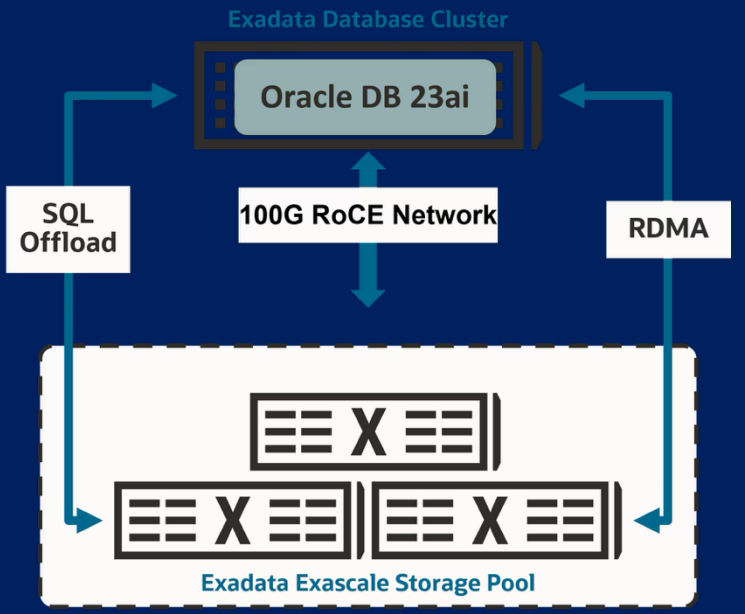


Exadata Database Service on Exascale Infrastructure

Shared Exadata Infrastructure

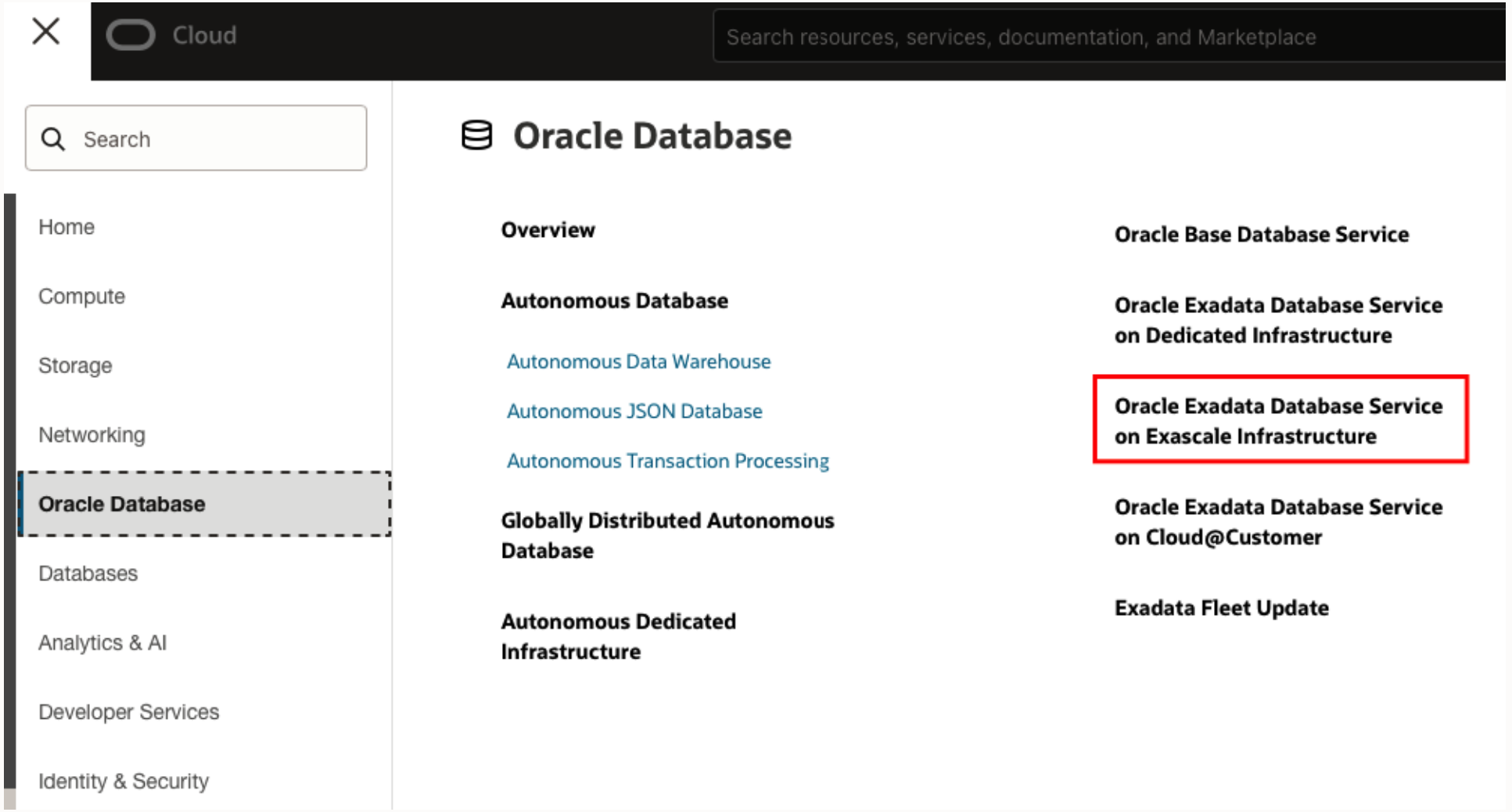
Exadata Database Service on Exascale Infrastructure (ExaXS)

1. Start with a Single VM with **8 ECPU** and **22 GB** of Memory
2. Start with **300 GB** of Storage Vault
3. **Pay per use** (CPU billing per second – Minimum 48h)



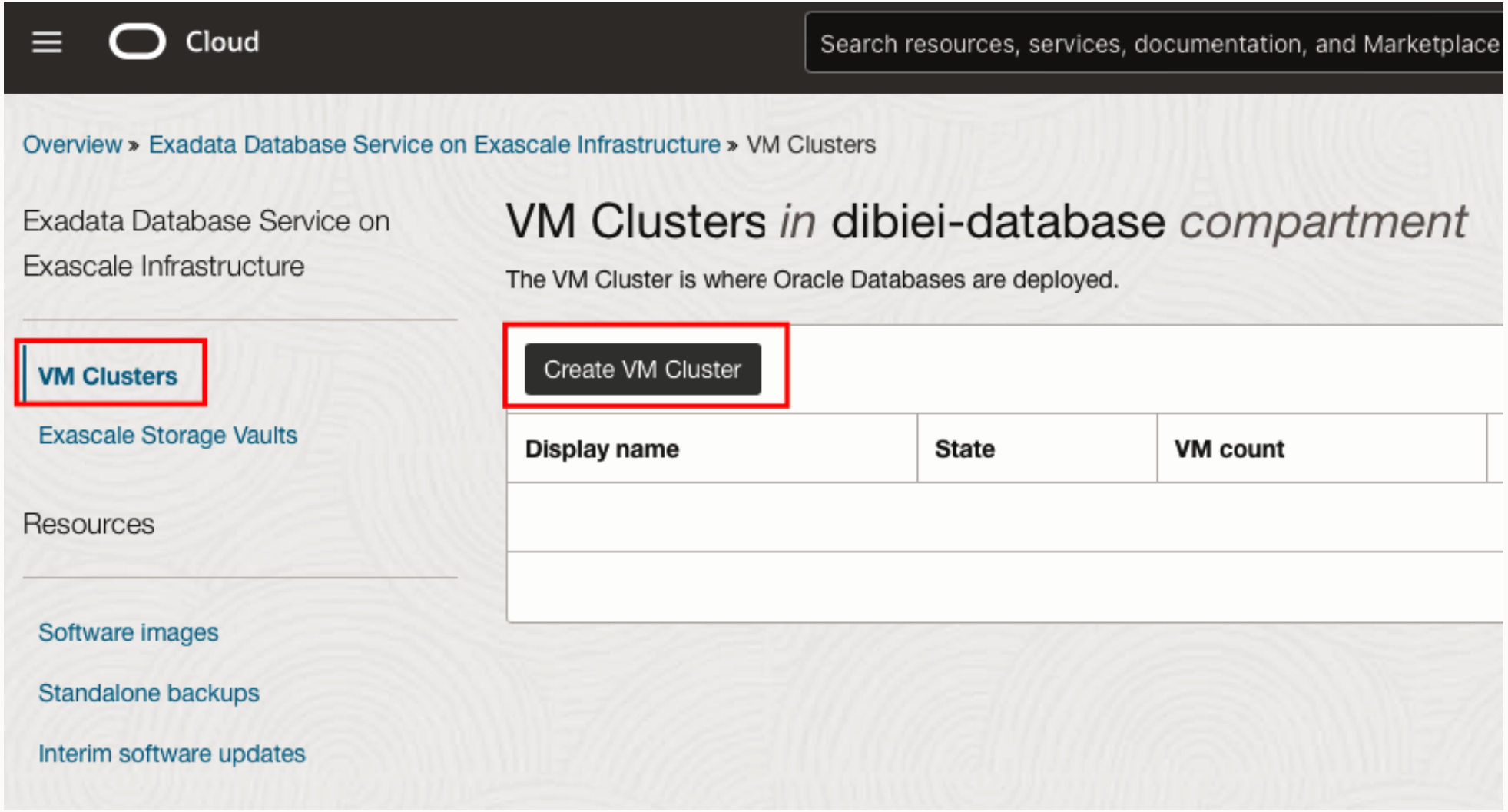
ExaXS - Example

EXTRA



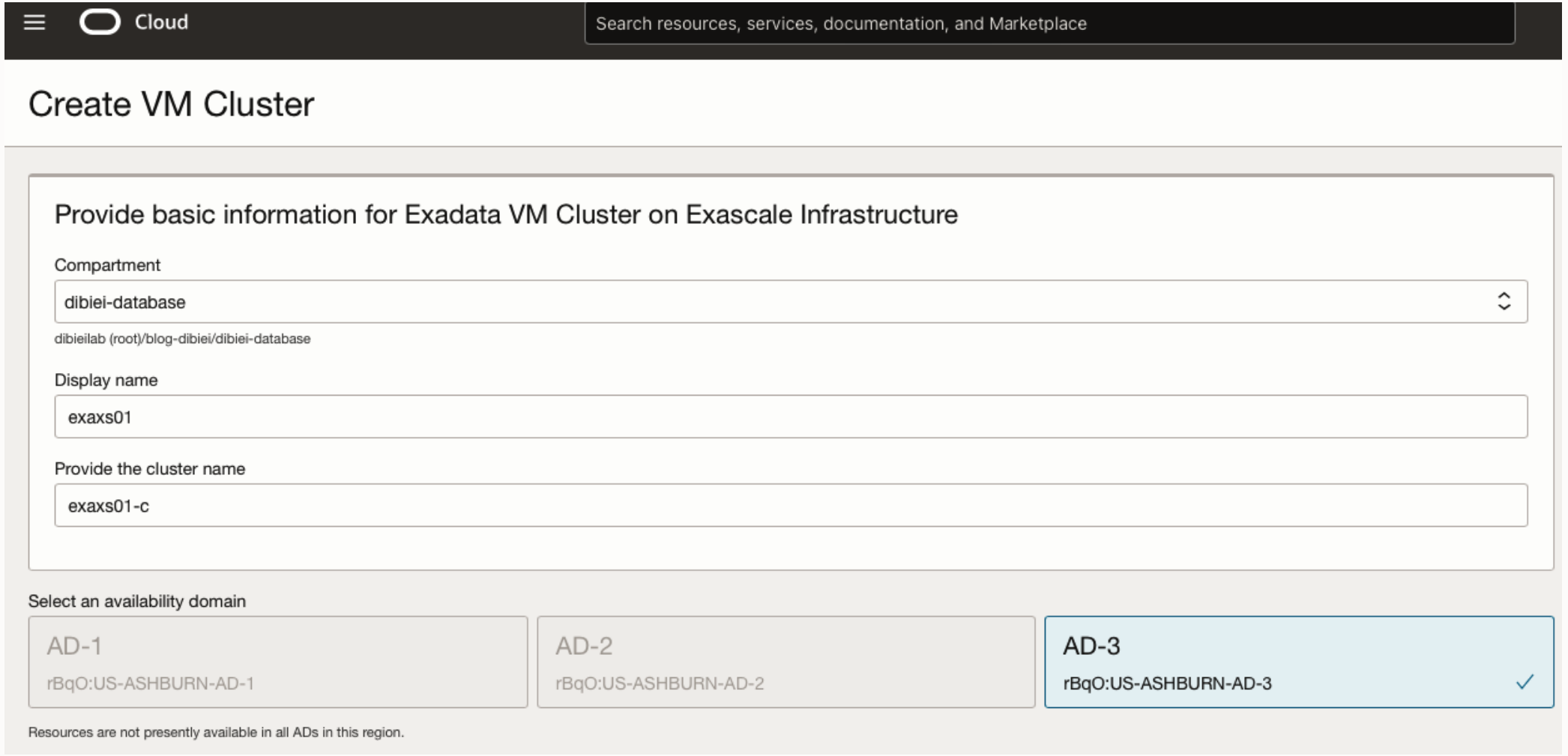
EXTRA

ExaXS - Example



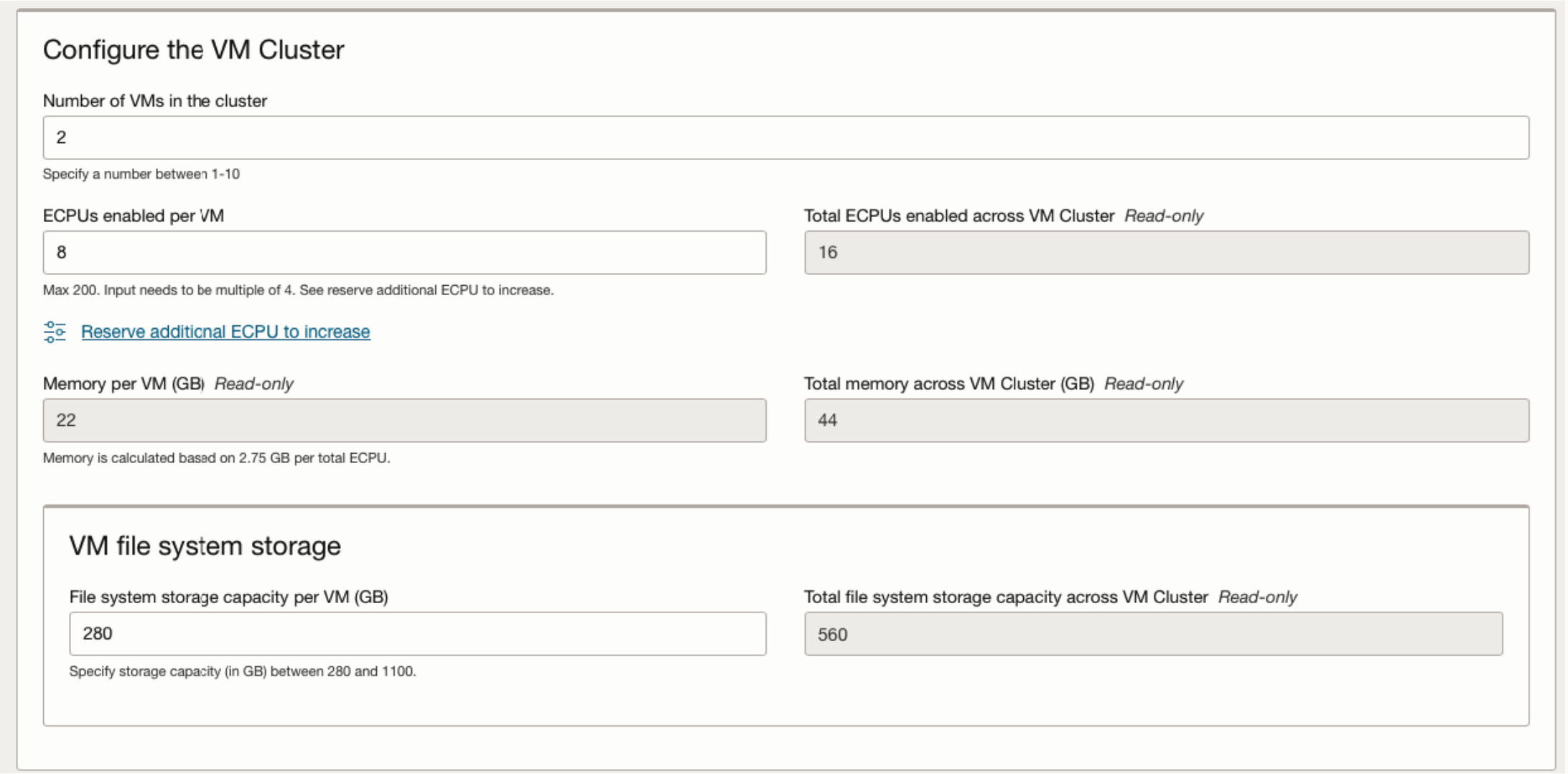
ExaXS - Example

EXTRA



EXTRA

ExaXS - Example



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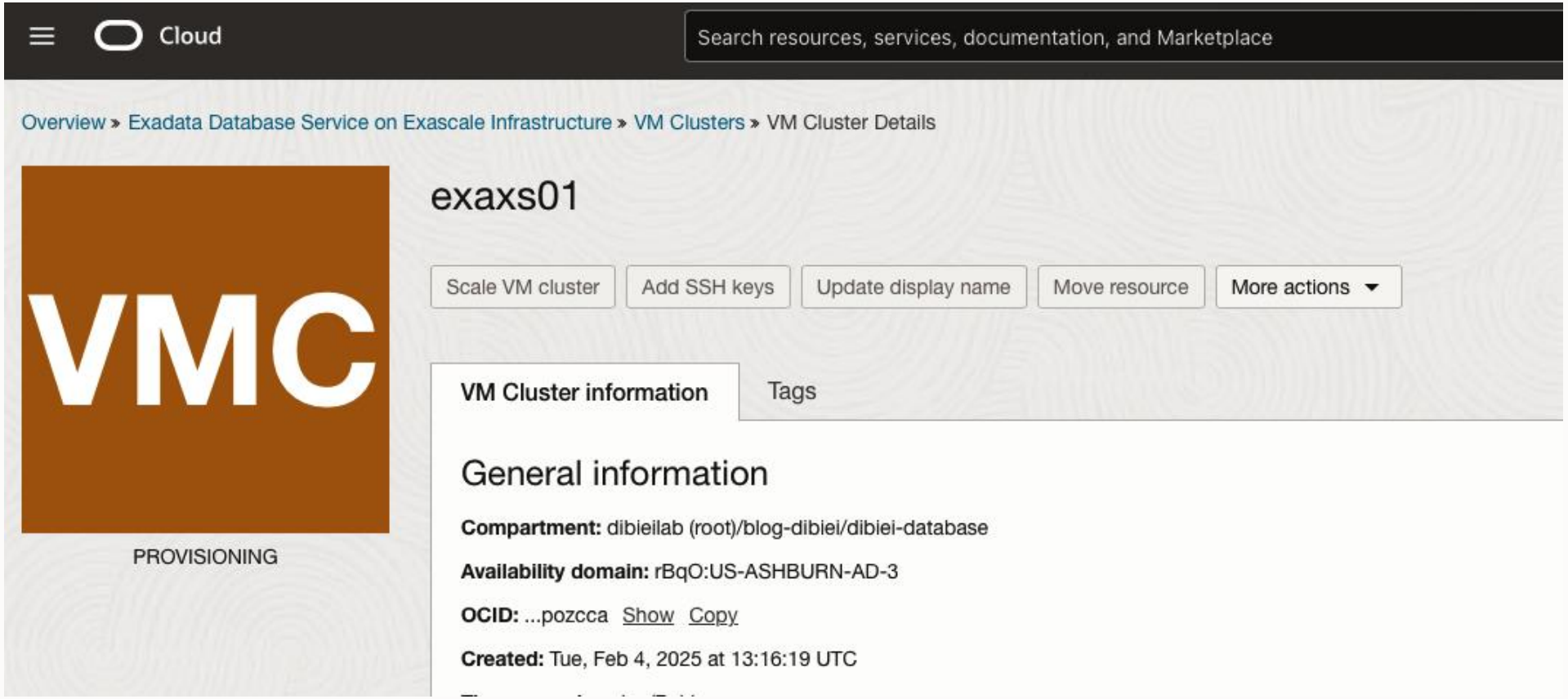
ExaXS - Example

EXTRA

ExaXS - Example

EXTRA



ExaXS - Service Limits

Limits Name	Description	Limits	Value
`exadbxs-vm-instance-base-count`	Exadata Database Service on Exascale Infrastructure - Instance Count	Number of VM Instances	4
`exadbxs-total-cpu-base-count`	Exadata Database Service on Exascale Infrastructure - Total ECPU Count	`TotalCpuCores`	64
`exadbxs-local-storage-base-gb`	Exadata Database Service on Exascale Infrastructure - Local Storage (GB)	Local Storage (in GB)	1500
`exadbxs-hc-storage-base-gb`	Exadata Database Service on Exascale Infrastructure - High Capacity Storage (GB)	High capacity storage (in GB)	2000

https://docs.oracle.com/en/engineered-systems/exadata-database-exascale/exdxs/overview-exadb-xs-service.html#GUID-E332834C-B356-443D-BF66-F8D8E68229D8

Thank you

Maicon Carneiro

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