ORACLE

Oracle Database Appliance X10

Get Started – Technical Overview

Marcel Lamarca
Exadata Cloud Specialist
Oracle, Alliances and Channels LAD

May, 2024

SQL> select * from person where name = 'Marcel Lamarca'

SCAN ME

MARCEL LAMARCA

Exadata Cloud Specialist

Upgrade, Utilities, Patching, Performance & Migrations

marcel-lamarca

marcel.lamarca@oracle.com

About My Career

- 22 Years dedicated to study and support Oracle Databases.
- 12 Years working with Exadata (On-prem, C@C and Cloud Services) .
- 5 Year working for Oracle do Brasil
- 2 Year on Alliances LAD knowledge Team

Certifications

Oracle Cloud Specialist (OCS)

- Exadata Database Machine X9M Certified Specialist
- OCI Foundation 2020 / 2023
- Oracle Autonomous Database Administrator Professional 2019 / 2023
- Oracle Cloud Database Migration and Integration 2021
- OCI Cloud Certified Architect Associate 2022
- OCI Cloud Certified Architect Professional 2022
- OCI Multi-Cloud Architect Professional 2023
- Oracle Database Services Certified Professional 2023

Oracle Certified Professional (OCP)

- Oracle Database certified professional 10g, 11g, 12c and 19c.
- Mysql 8.0 Database Administrator Certified Professional

Oracle Certified Specialist (OCE)

- Grid/RAC Database Administrator 11g
- Oracle Golden Gate 12c Certified Implementation Specialist

Agenda

1. ODA Architecture Overview
2. ODA Management Tools
3. ODA Backup and Security
4. Resources
5. Demo

Oracle Cloud Systems Portfolio

ZFS Storage Appliance

Zero Data Loss Recovery Appliance

Data Protection

Oracle Database Appliance

Exadata

Databases

Private Cloud Appliance

Middleware / Apps

Oracle Database Appliance

The Simplest, Most Affordable Solution for Oracle Database and Applications

Simple	Quick to install and easy to manage
Database optimized	More cost-effective Oracle Database and application environments
Affordable	Costs less than DIY alternatives
Secure	Secure throughout the entire stack
Reliable	Reduces risk and uncertainty

Simplicity through integration

Build your own

5 Puzzle pieces
Server, storage, networking, database, consultants

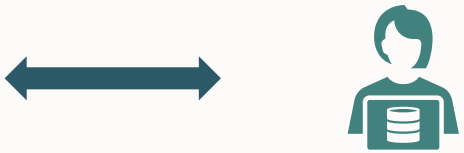
7 staff / skills for HA
DBA, network admin, storage admin, system admin, installation expertise, HA expertise, optimization skills

16 + patches
per year

~ 863 hours
3 years deploy, maintenance, support

Oracle Database Appliance

1 component
Easy installation



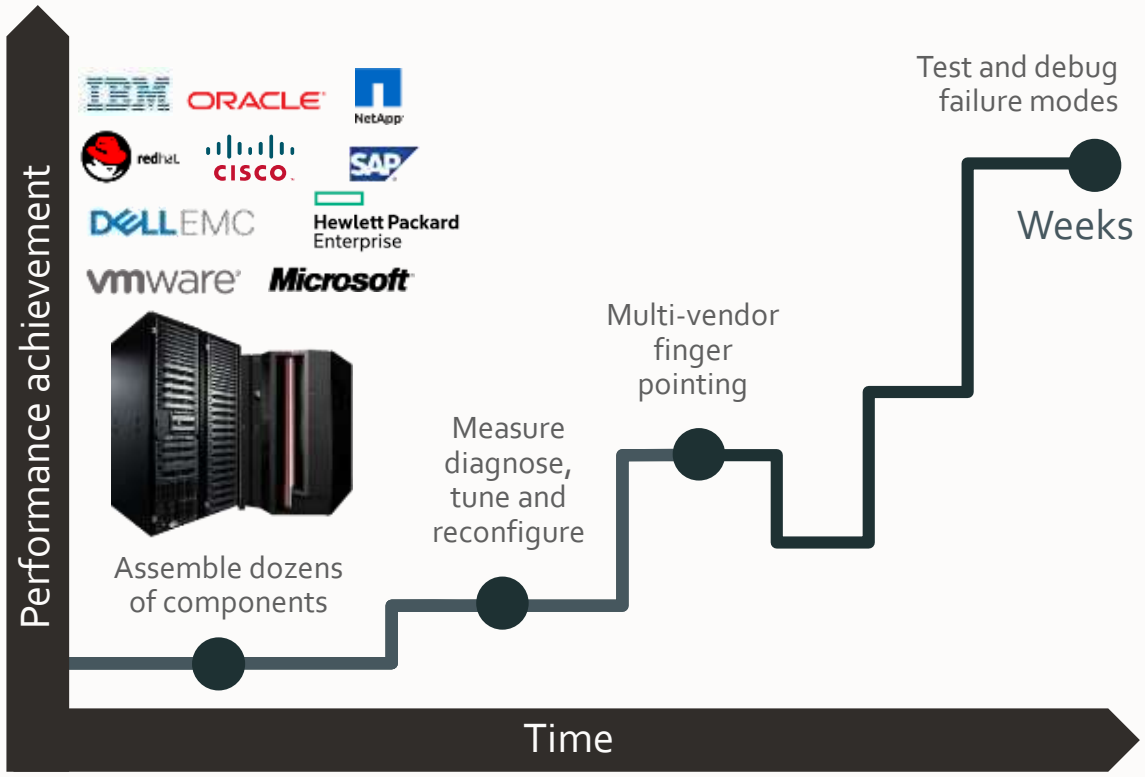
1 DBA

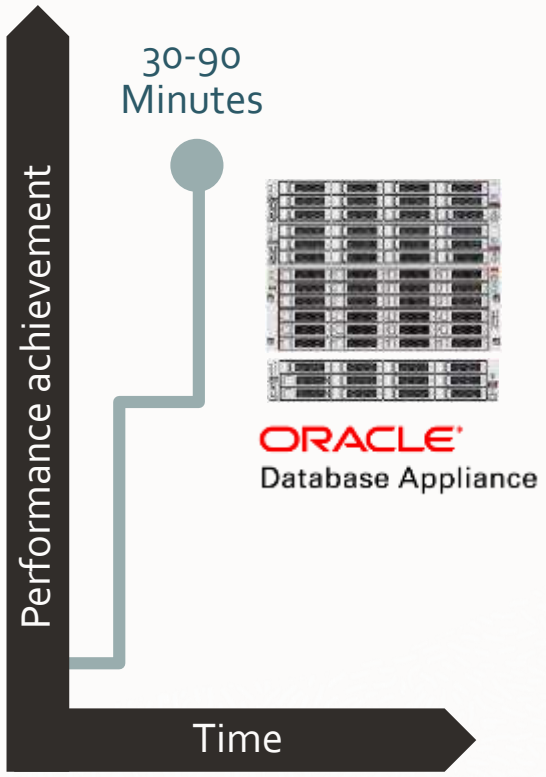
4 patches
per year

~ 36 hours
3 years deploy, maintenance, support

Reduced OPEX through simplicity and automation

Build your own (Dell, HP, CISCO, etc.)





Key benefits

- Simplify IT environment
- 40% reduced TCO
- License only the cores you use
- 10X faster deployment time
- 20X less maintenance

Oracle Database Appliance Software Stack

Fully-managed, cloud native, Database as a Service

Multiple Shapes and License Options

- Enterprise and Standard Edition
- Capacity on-demand or Full license
- Trusted Partition

Spend less, improve performance, mitigate risk

- Oracle Real Application Cluster (RAC) and RAC One Node
- Oracle VM (Optional)
- Oracle Linux

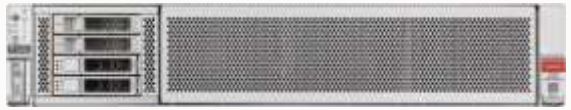
ODA X10 Shapes

Oracle Database Appliance | High-Availability Configuration

	V1 Sep 2011 Xeon X5675	X3 Mar 2013 Xeon E5-2690	X4 Nov 2013 E5-2697 v2	X5 Jan 2015 E5-2699 v3	X6 Oct 2016 E5-2630 v4	X7 Oct 2017 Xeon 6140	X8 Sep 2019 Xeon 5218	X9 Jun 2022 Xeon 4314	X10 Sept 2023 AMD 9334	V1 – X10 Growth
SSD Storage (TB, raw)	---	---	---	3.2	48	128	368	368	368	115 X
HDD Storage (TB, raw)	12	36	36	128	---	300	504	648	792	66 X
CPU (cores)	24	32	48	72	40	72	64	64	128	5.3 X
Max Memory (TB)	0.2	0.5	0.5	1.5	1.5	1.5	1.5	2.0	3.0	15 X
Ethernet (Gb/s)	48	80	80	80	80	100	300	300	300	6 X
Max Read IOPS	4,466	6,500	6,500	300,000	2,250,000	2,250,000	2,250,000	2,880,000	3,251,000	727 X
Bandwidth (GB/sec)	3.0	5.3	5.3	6.0	22.2	22.2	22.2	23.0	29.6	9.9 X

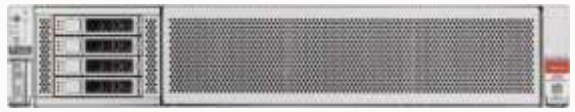
Introducing the Oracle Database Appliance X10 model family

PERFORMANCE HIGHER



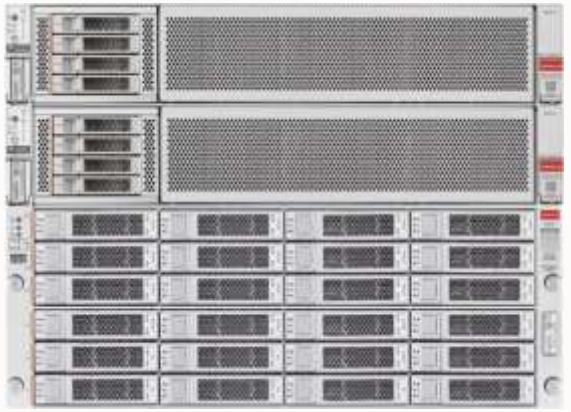
Oracle Database Appliance X10-S

Single-instance
32 cores
256 GB memory, expandable to 768 GB
Up to 3 public network cards
13.6 TB data storage (raw)



Oracle Database Appliance X10-L

Single-instance
64 cores
512 GB memory, expandable to 1.5 TB
Up to 3 public network cards
13.6 TB data storage,
expandable up to 54.4 TB (raw)



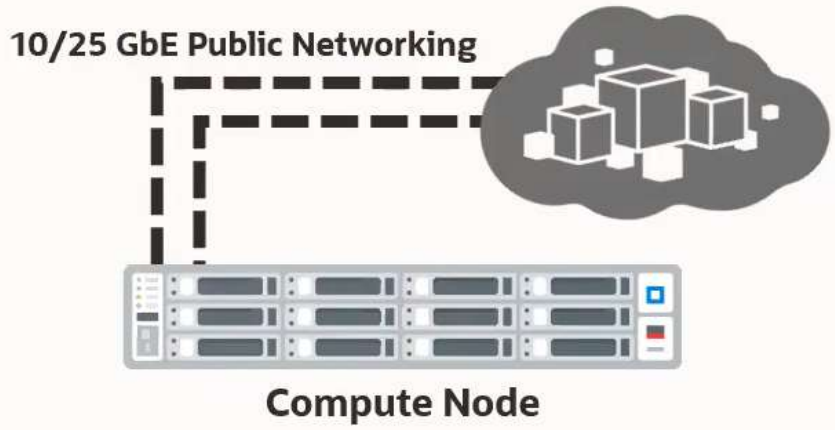
Oracle Database Appliance X10-HA

Single-instance and RAC
128 cores
1 TB GB memory, expandable to 3 TB
Up to 6 public network cards
46 TB SSD data storage, expandable up to
368 TB SSD or up to 92 TB SSD + 792 TB HDD (raw)

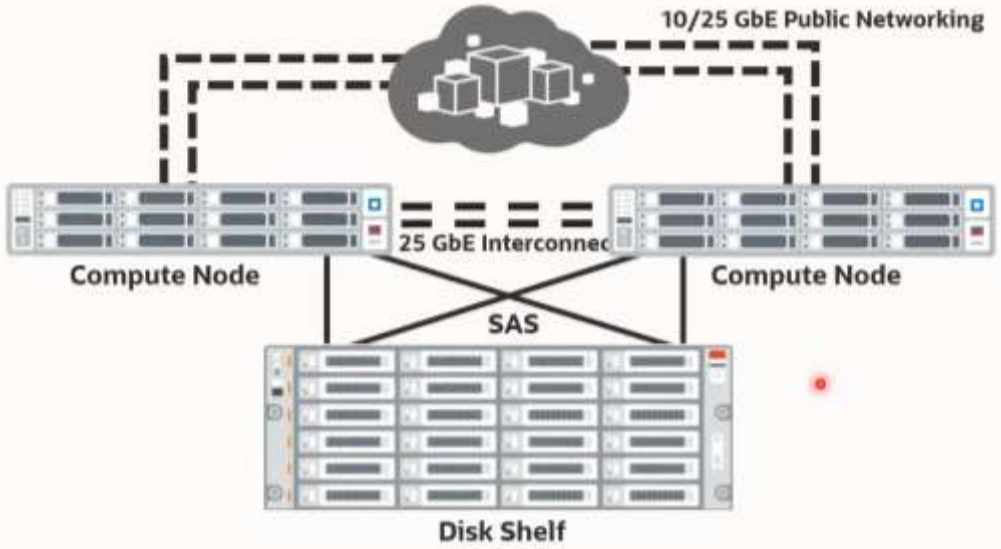
CAPACITY HIGHER

Oracle Database Appliance Storage

Single Node System



Fully Redundant Higt Availability System

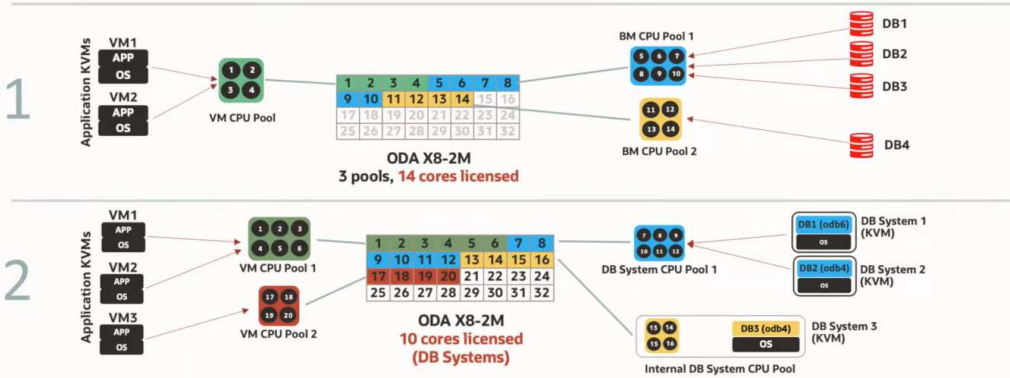


ODA CPU Pools

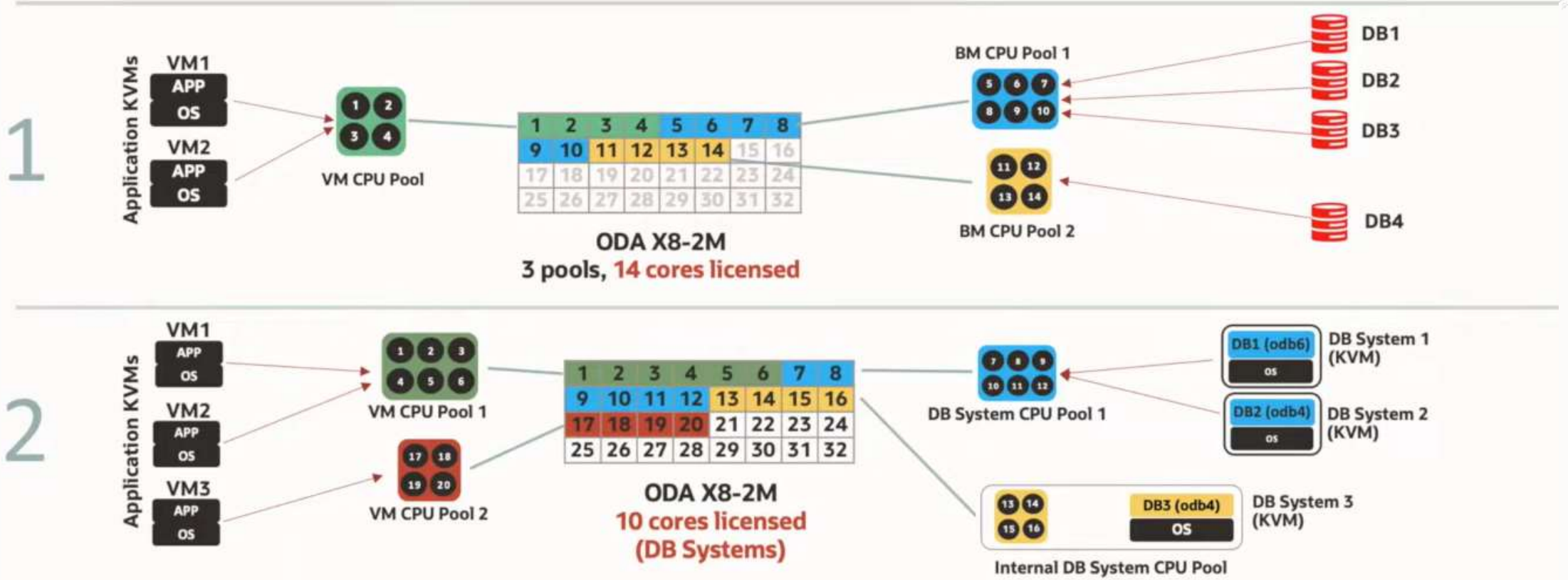
KVM (Application, Database) Bare Metal DBs and CPU Pool

How ODA pool works

- Three types of CPU pools: BM, VM (Application VM), and DB System shared DB on KVM
- CPU Resource Management (Guarantee CPU For Database and VMs)
- Integrated Oracle Database KVM management for support hard-partitioning licensing
- Supported with Oracle Database 19.x or higher only
- Ideal for database consolidation and eliminate the noisy-neighbor problem

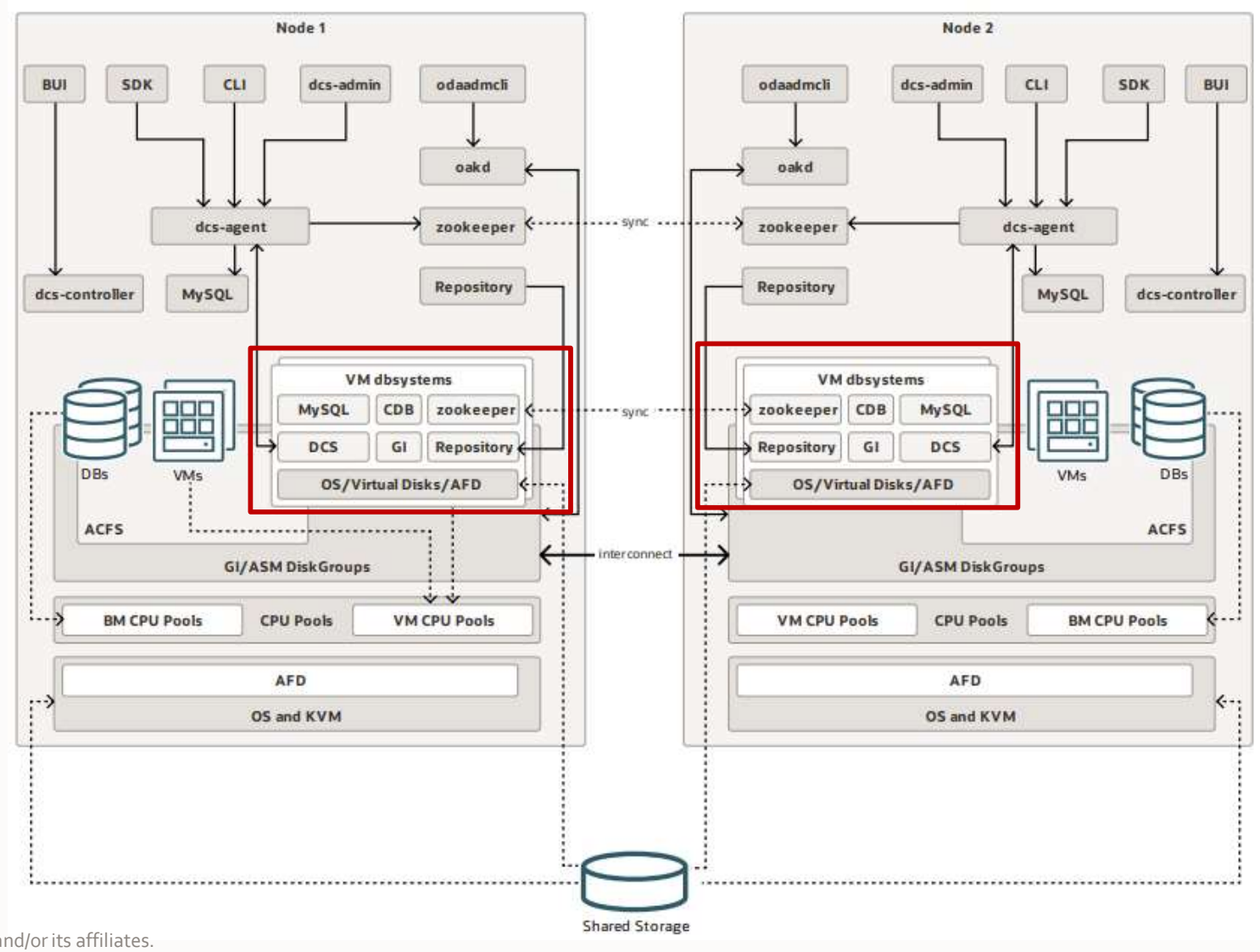


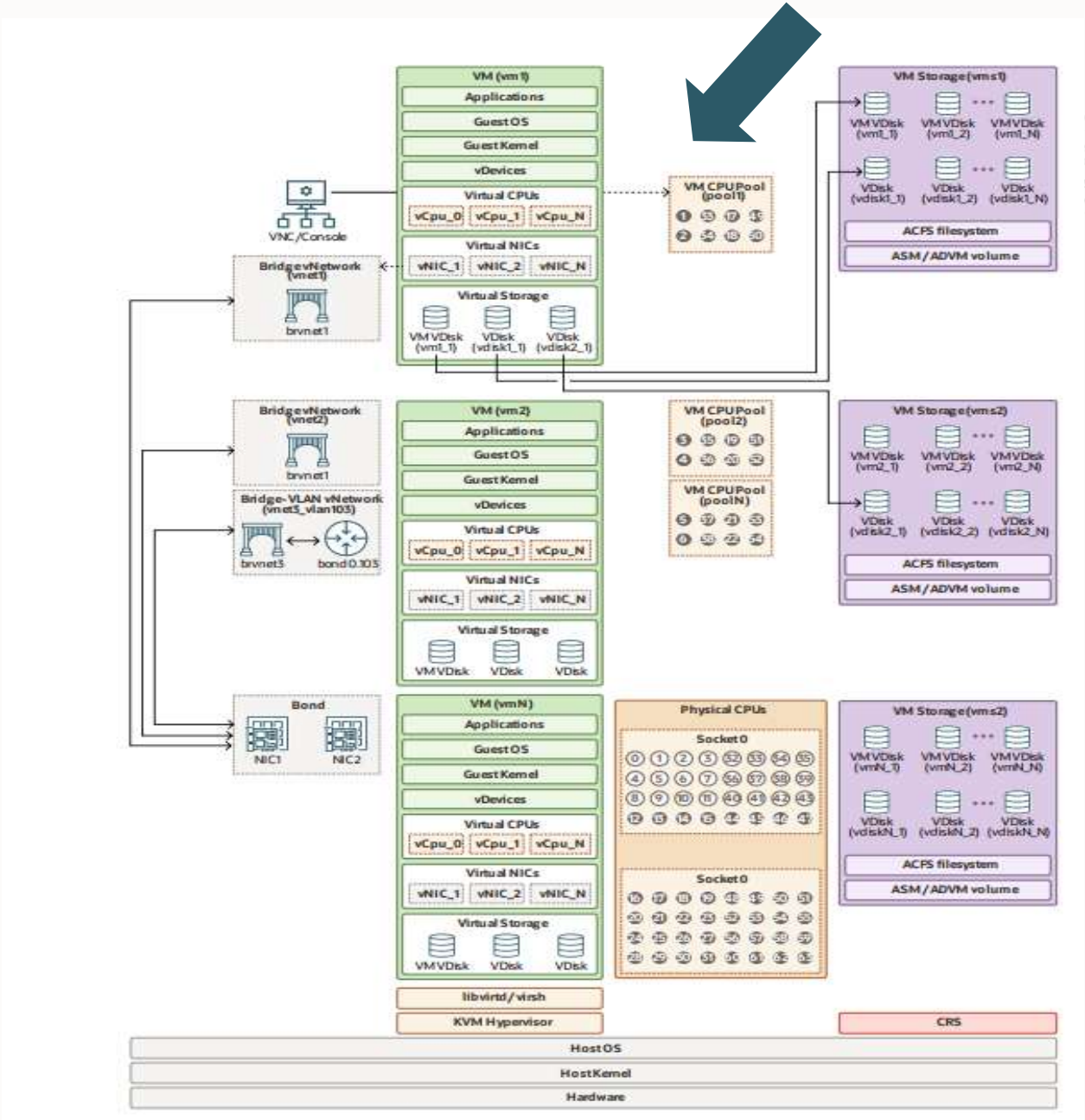
Oracle Database Appliance CPU Pools

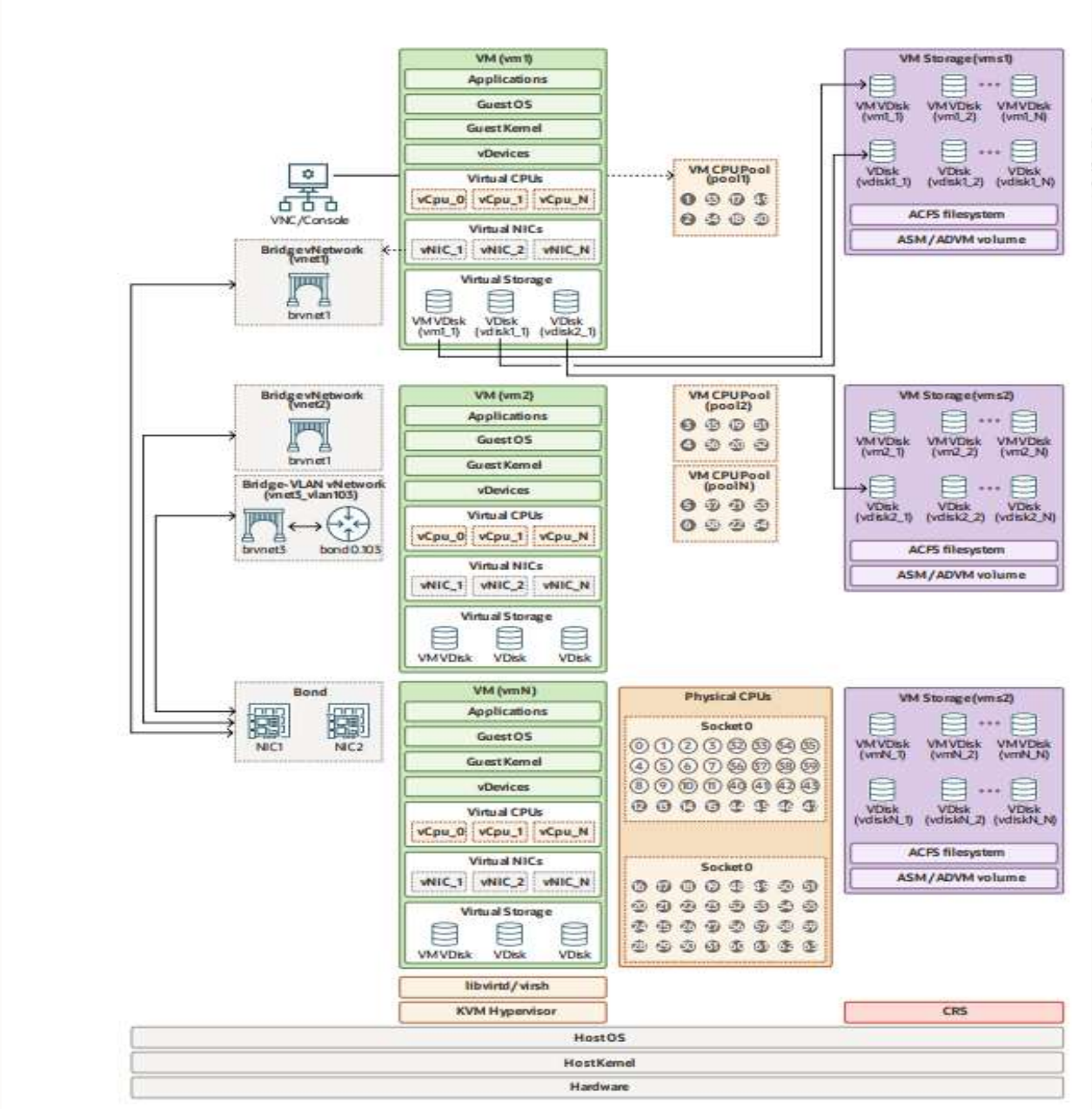


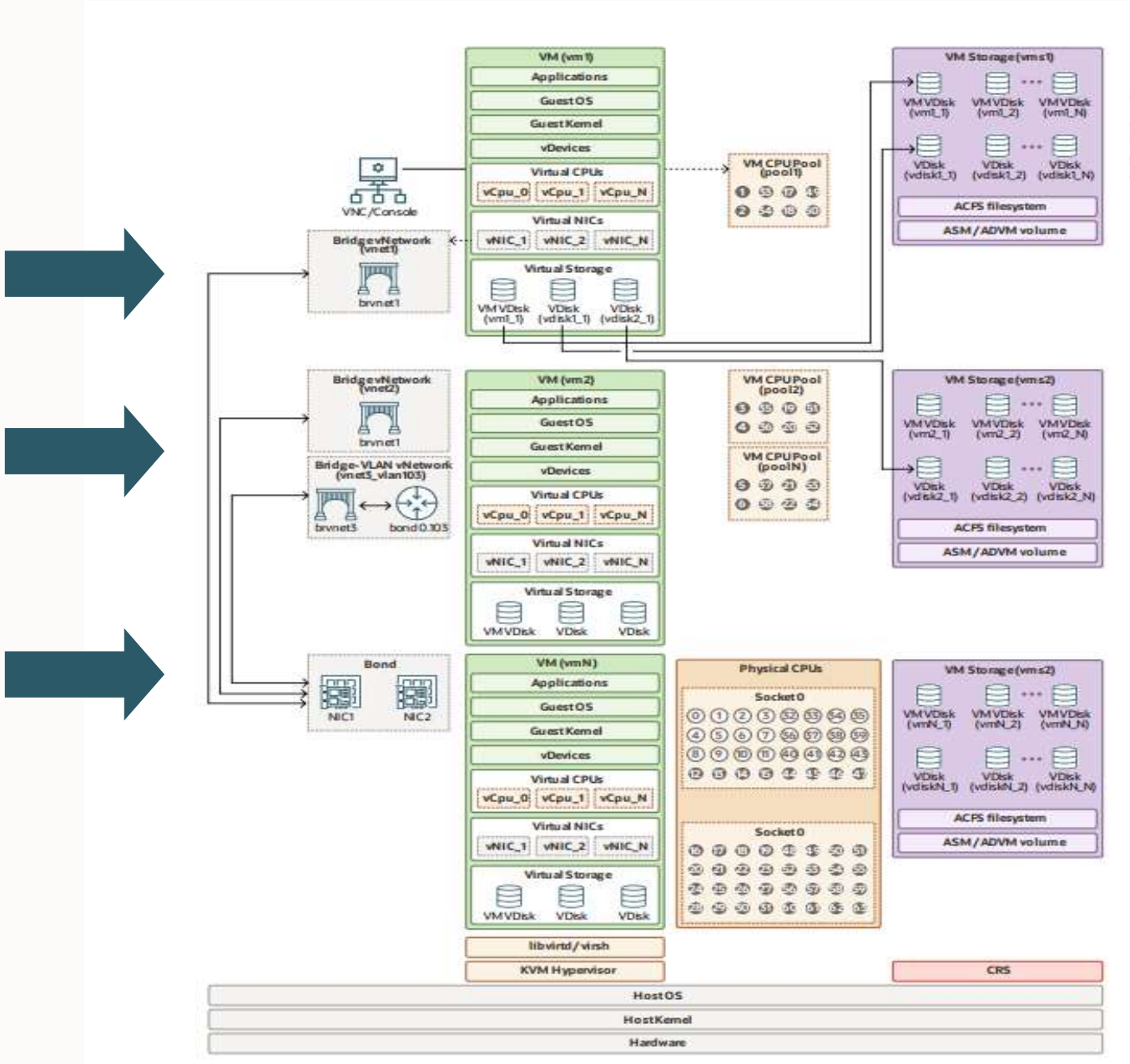
ODA kVM Architecture

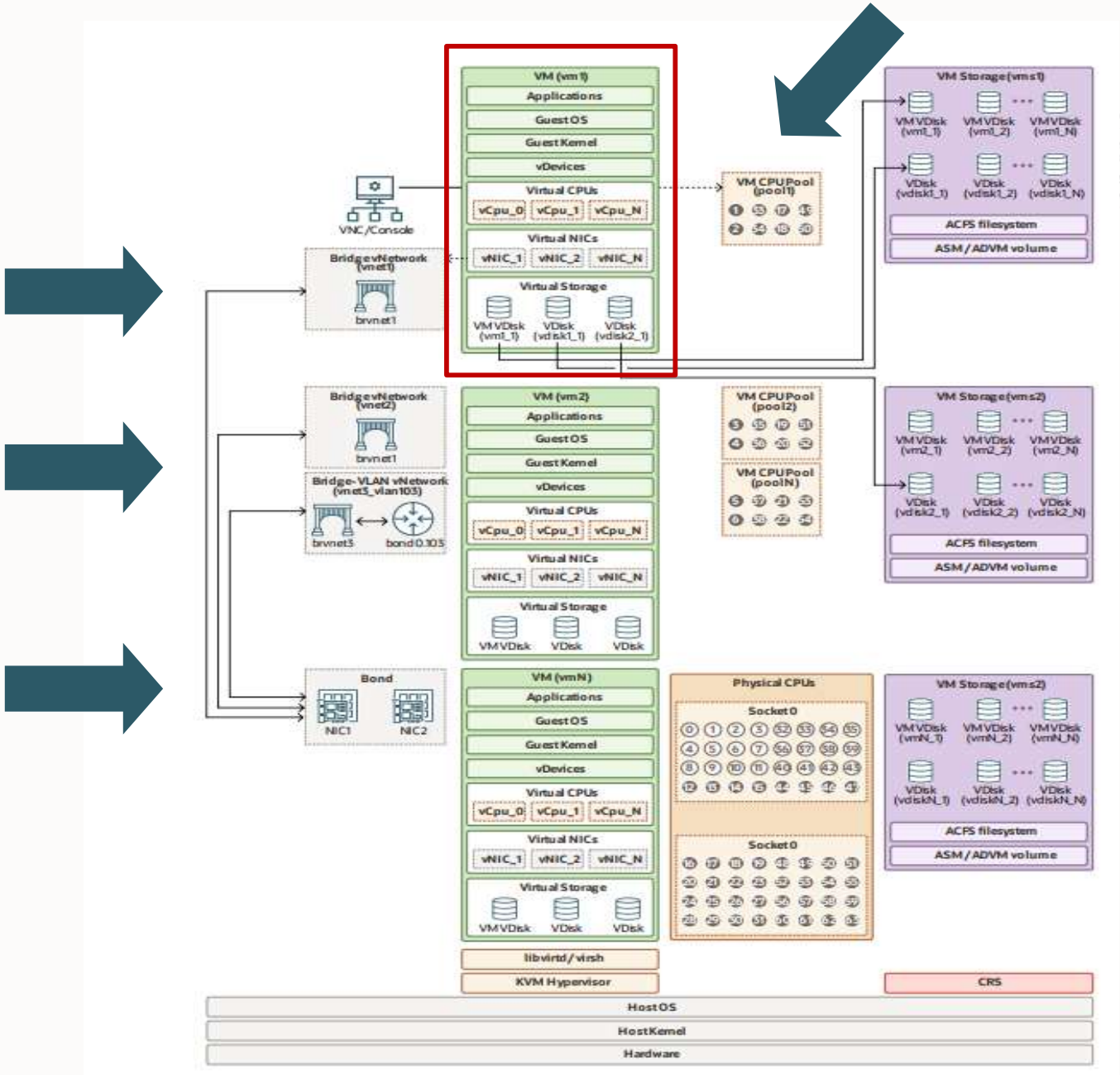
Oracle Database Appliance KVM Architecture









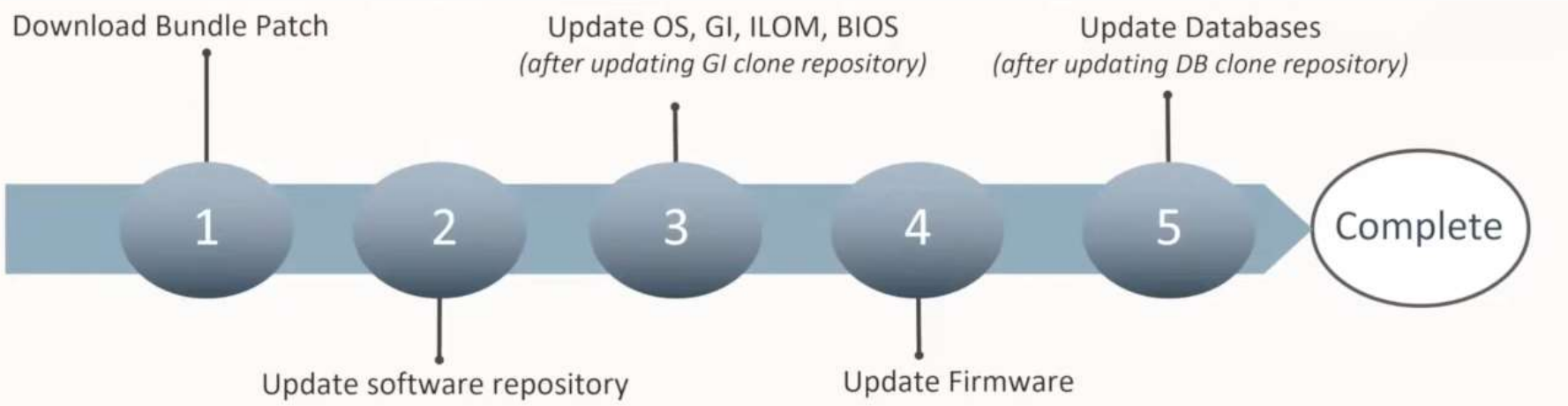


Oracle Database Appliance Patching

Automated End-to-End Patching

- Patching for Entire includes lasted database release updates, SO and firmware updates
- Oracle thoroughly tested the entire stack
- Automated patching process
- Rolling upgrades for shared storage

- Eliminate the time required to determine patches
- Reduce the need to test end-to-end inter-operability
- Use command line or browser use interface (web Console to patch



ODA Managements Tools

Oracle Database Appliance – Appliance Manager

Browser User Interface (Web Console)

- Gather configuration and Deploy Systems
  - ✓ System information
  - ✓ Network information
  - ✓ Database Information
- Manage, Patch, Backup,and Monitor the system

Command Line

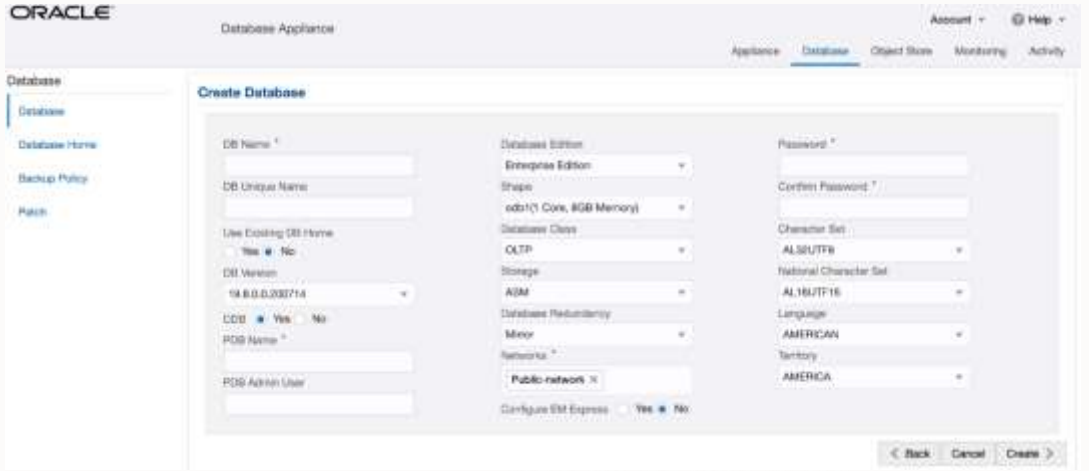
- ODACLI/ODAADMCLI provides simple commands to streamline administration and hardware monitoriong
- Manage, Patch, Backup, and Monitor the system

Background Process

- Continual monotoriong and management to ensure best preactices compliance and optimal performance
  - ✓ Servers
  - ✓ Storage
  - ✓ Databases

Oracle Database Appliance Manager

- Browser user interface gathers vital information and manages deployment
- Command line interface provides simple commands to streamline administration and hardware monitoring
- Continually monitors and manages background processes to ensure optimal performance
- Manages, patches, backs-up, and monitors the system



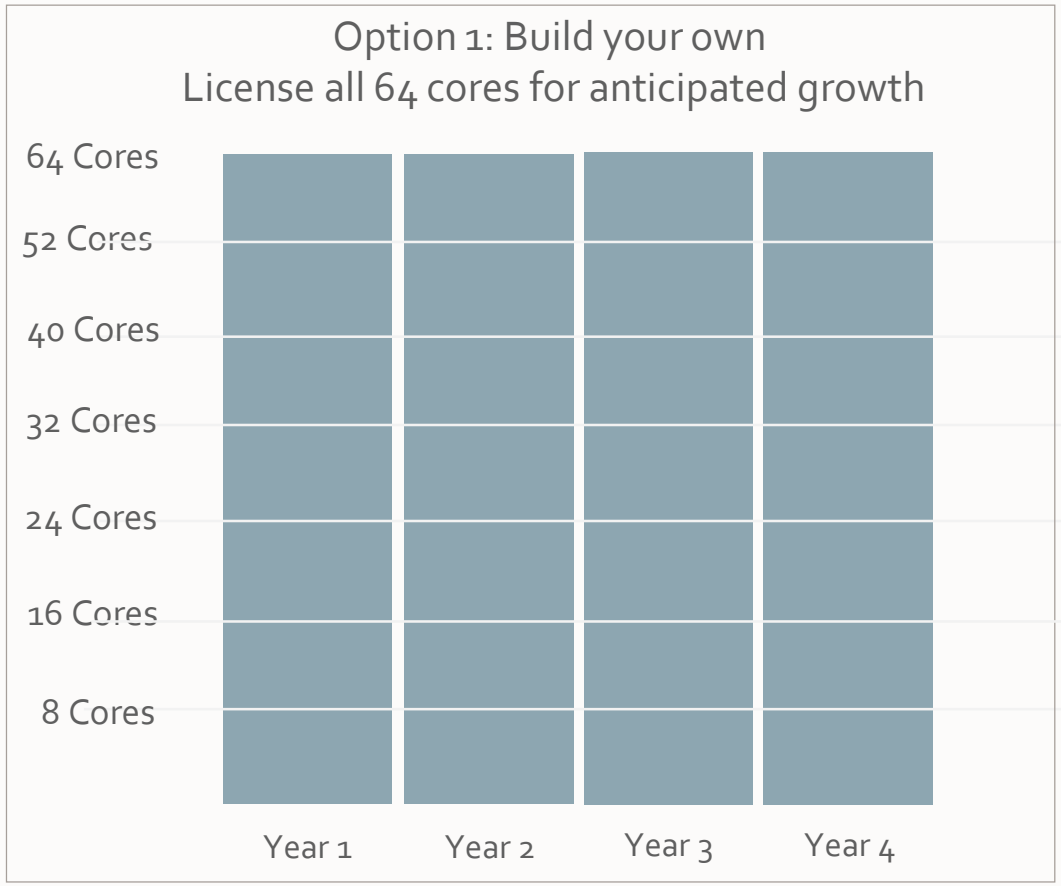
Oracle Database Appliance - ODACLI syntaxe sample

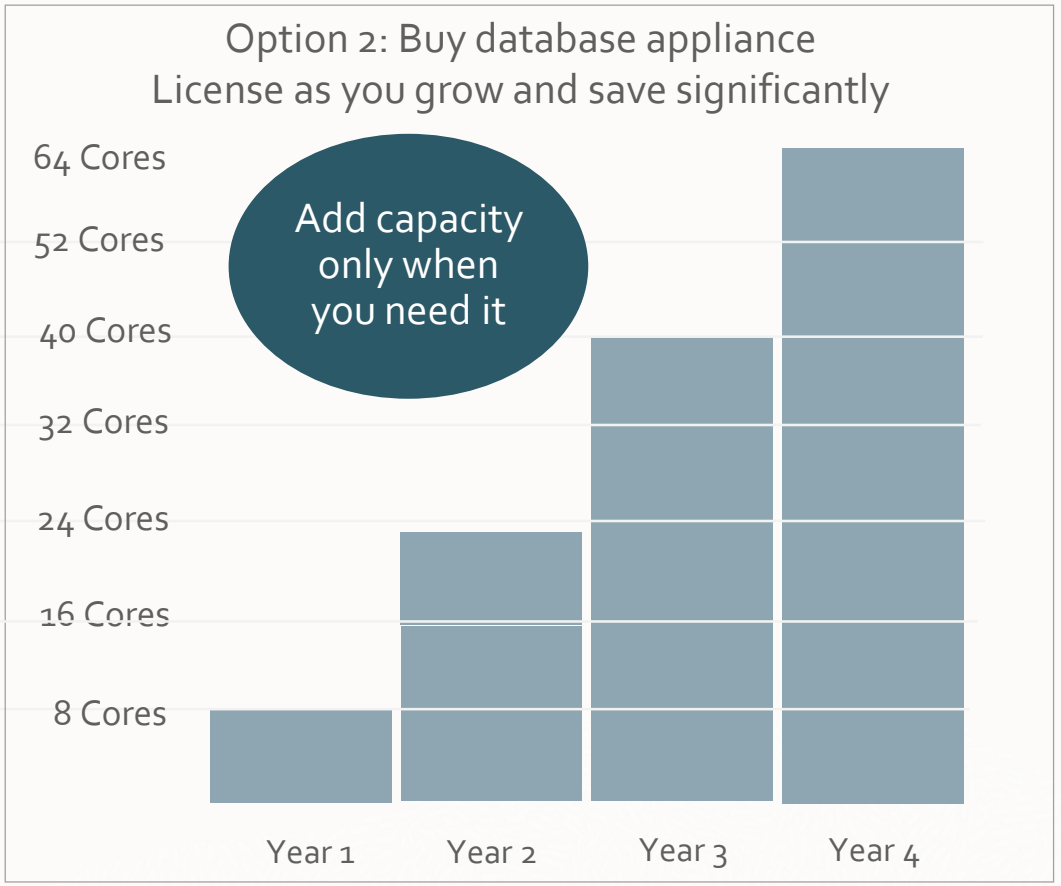
```
[root@odasim-2-node0 patchfiles]# odacli list-jobs
Enter your ODA account username:odaadmin
Enter your ODA account password:


ID           Description                                                 Created                                  Status
--------     ----------------------------------------------------------- ---------------------------------------- ---------
fd4d93e7     Update agent configuration parameter values [FEATURE:RHP]   2024-04-17 00:51:31 UTC                  Success
26de4c16     Enable 'Multi-User Access' Feature                          2024-04-17 00:57:34 UTC                  Success
09e29026     Set 'Multi-User Access' Config Properties                   2024-04-17 00:57:36 UTC                  Success
88a34e2a     Initialize 'Multi-User Access' Domains data                 2024-04-17 00:57:38 UTC                  Success
8e285098     Initialize 'Multi-User Access' Tenants data                 2024-04-17 00:57:40 UTC                  Success
fc2811bf     Initialize 'Multi-User Access' Operations data              2024-04-17 00:57:43 UTC                  Success
c2da5df5     Initialize 'Multi-User Access' Operations data              2024-04-17 00:57:47 UTC                  Success
6a3397af     Initialize 'Multi-User Access' Entitlements data            2024-04-17 00:57:49 UTC                  Success
80e7e497     Initialize 'Multi-User Access' Roles data                   2024-04-17 00:57:52 UTC                  Success
2d7a81c9     Set 'Multi-User Access' system property                     2024-04-17 00:57:54 UTC                  Success
9939fabf     Set 'Multi-User Access' system property                     2024-04-17 00:57:56 UTC                  Success
0cc41a55     User creation(odaadmin)                                     2024-04-17 00:57:57 UTC                  Success
9027a037     Repository Update                                           2024-04-18 13:54:53 UTC                  Success
d63e0418     Repository Update                                           2024-04-18 13:55:39 UTC                  Success
43e11e0d     Repository Update                                           2024-04-18 13:58:02 UTC                  Success
ea8f3bf4     Repository Update                                           2024-04-18 13:58:50 UTC                  Success
3dc80e1d     Repository Update                                           2024-04-18 13:59:24 UTC                  Success
```

ODA X10 Licensing and Features

Manage license costs using capacity on-demand

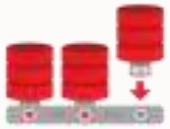




Oracle Database Supported on Oracle Database Appliance

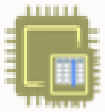
- Standard Edition – 19c, 21c (only in DB System)
- Enterprise Edition – 19c, 21c (only in DB System)
  - For Capacity-on-Demand Licensing set ODA core count in multiples of 2 via Appliance Manager
    - Can only increase core count after initial provisioning (it is a High Water Mark system)
    - To decrease core count on exception basis, contact Oracle ODA Support

ODA Database features for Oracle Database Appliance



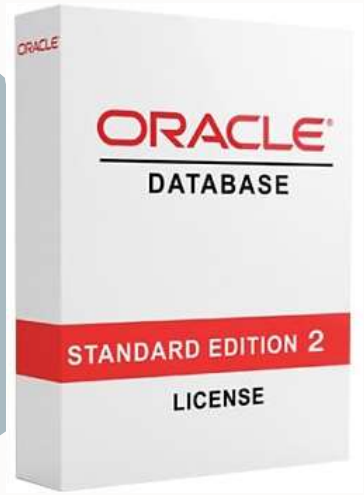
Multitenant
up to
3 PDB's

Standard Edition High Availability



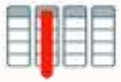
Multi-chip

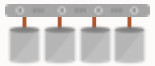
Database Standard Features



Database features for Oracle Database Appliance


Multitenant


In-Memory DB


Real Application Clusters


Active Data Guard


Partitioning


Advanced Compression


Advanced Security, Label Security, DB Vault


Real Application Testing


Advanced Analytics, Spatial and Graph

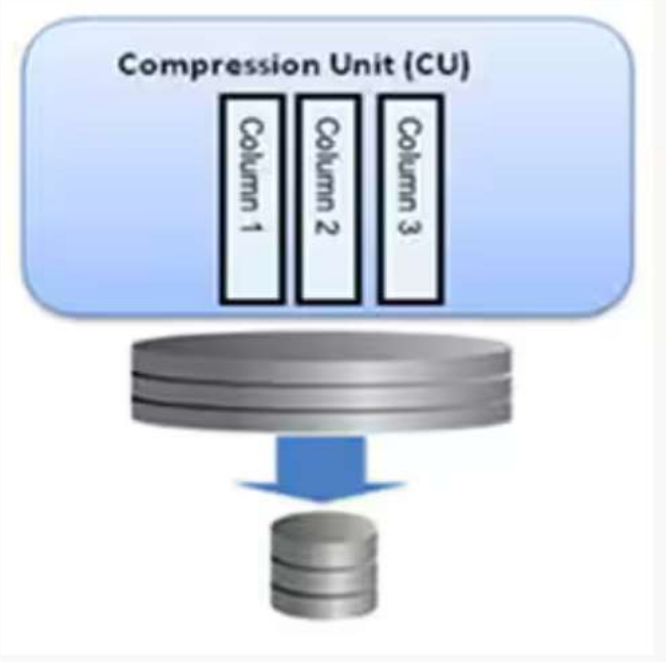

Management Packs for Oracle Database

Database **Enterprise** features

What features your environments needs ?

Oracle High columnar compression HCC

ODA Hybrid Columnar Compression can be used at different levels:



- Partition Level
- Table Level
- Tablespace Level

There are two types of Exadata/ODA Hybrid Columnar Compression:

Warehouse Compression

- Query High
- Query Low

Online archival compression

- Archive High
- Archive Low

- **Exadata Hybrid Columnar Compression (EHCC) FAQ** (Doc ID 1910687.1)

APPLIES TO:

Exadata Database Machine V2 - Version All Versions to All Versions [Release All Releases]
Information in this document applies to any platform.

PURPOSE

This document addresses the frequently asked questions related to Exadata Hybrid Columnar Compression.

QUESTIONS AND ANSWERS

What is Exadata Hybrid Columnar Compression (EHCC)

Exadata Hybrid Columnar Compression (EHCC), also known as Hybrid Columnar Compression (HCC), is data that is organized by a hybrid of columns/rows and compression rather than organized by basic row format.

This approach achieves the compression benefits of columnar storage.
For Further Information Please Review https://www.oracle.com/technetwork/database/exadata/ehcc-twp-131254.pdf

What are the types of compression available with EHCC ?

EHCC is available with following types:

1. Warehouse Compression
Within warehouse compression there are two subtypes:

- **How To Estimate ADVANCED COMPRESSION RATIO For Tables** (Doc ID 2426970.1)

APPLIES TO:

Oracle Database Cloud Schema Service - Version N/A and later
Oracle Database Exadata Express Cloud Service - Version N/A and later
Oracle Database Exadata Cloud Machine - Version N/A and later
Oracle Cloud Infrastructure - Database Service - Version N/A and later
Oracle Database Backup Service - Version N/A and later
Information in this document applies to any platform.

PURPOSE

How to use DBMS_COMPRESSION.GET_COMPRESSION_RATIO for Tables in 12c

SCOPE

DETAILS

Below script can be used to estimate the Advanced Compression Ratio for Tables in 12c & higher

```
DECLARE
blkcnt_cmp pls_integer;
blkcnt_uncmp pls_integer;
row_cmp pls_integer;
row_uncmp pls_integer;
cmp_ratio pls_integer;
comptype_str varchar2(1000);
```

ODA Maximum Availability

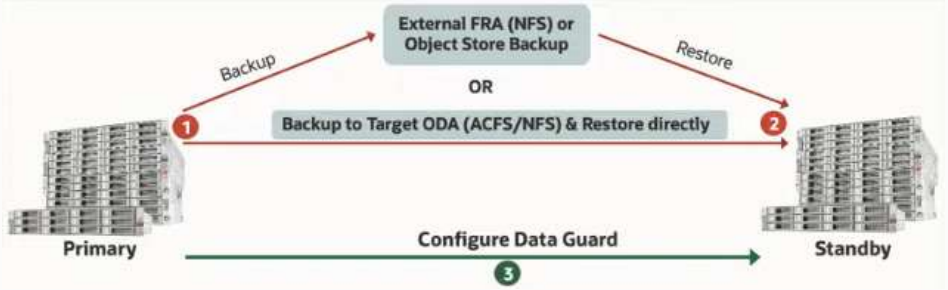
Integrated Oracle Data Guard

Configure Oracle Data Guard with One command

- Provisioning standby databases for enhanced availability, disaster recovery, rolling patching, or system migration

Configuration Process

- Backup Oracle Database to NFS or Object Storage
- Restore Database backup to Standby system
- Run configure-dataguard command to configure Data Guard
- Run list-dataguardstatus command to verify activity



Integrated Data Guard Operation

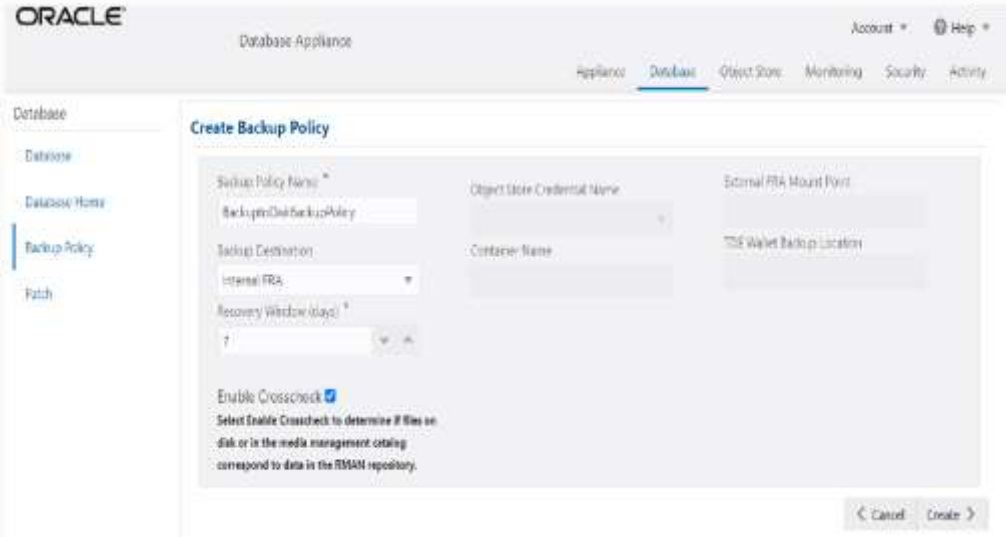
- Switching roles between primary and standby
- Failover a standby database to the primary
- Migrate to a newer ODA system and retire the old one

ODA Backup and Recovery

Automated Database Backup

RMAN Integration

- Create backup policy with backup destination set to
- Internal FRA (+RECO disk group)
- External FRA (Filesystem)
- Object Storage in Oracle Cloud

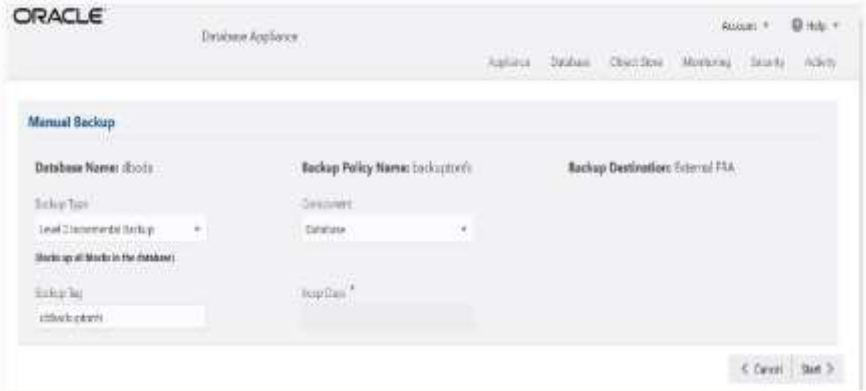


Apply a backup to an existing database to trigger automatic backups

A backup report is created for every backup that is taken

- RMAN level 0
- RMAN level 1
- RMAN level 2

ODA Backup And Recovery options



- Restore and recovery in ODA Bare Metal configuration
- Backup and recovery in ODA Virtualized Platform configuration
- Backup and Recovery in Oracle Cloud
- Backup and recovery with Oracle ZFS Storage Appliance (ZFSSA)
- Backup and recovery with Zero Data Loss Recovery Appliance (ZDLRA)
- Backup and recovery using Tape devices
- Backup and recovery with Network File System (NFS) storage

- **How to Manage and Evaluate the Block Change Tracking Benefits (Doc ID 2821967.1)**

APPLIES TO:

Oracle Database - Enterprise Edition - Version 12.1.0.2 and later
Information in this document applies to any platform.

PURPOSE

Help DBAs determine the benefits and impacts of Block Change Tracking (BCT).

1. Benefits of enabling BCT
2. When should customers enable BCT
3. Software recommendations and prerequisites for large busy systems
4. Configuration practices
5. Operational practices
6. Troubleshooting RMAN backups with BCT
7. Critical BCT fixed bugs

SCOPE

Intended for DBAs tuning or trying to determine the benefits of using BCT.
Intended for DBAs to determine whether they should enable BCT and what information to gather if they encounter any BCT related issues.

DETAILS

Benefits of enabling BCT

- **Block Change Tracking Inside Out** (Doc ID 1528510.1)

APPLIES TO:

Oracle Database - Enterprise Edition - Version 10.1.0.3 and later
Oracle Database Cloud Schema Service - Version N/A and later
Oracle Database Exadata Express Cloud Service - Version N/A and later
Gen 1 Exadata Cloud at Customer (Oracle Exadata Database Cloud Machine) - Version N/A and later
Oracle Database Cloud Exadata Service - Version N/A and later
Information in this document applies to any platform.

PURPOSE

Oracle RMAN was able to take incremental backups already in 9i. However, prior to introduction of Oracle 10g block change tracking (BCT), RMAN had to scan the whole datafile to and filter out the blocks that were not changed since base incremental backup and overhead or incremental backup was as high as full backup. Oracle 10g new feature, block change tracking,
minimizes number of blocks RMAN needs to read to a strict minimum. With block change tracking enabled RMAN accesses on disk only blocks that were changed since the latest base incremental backup.

This feature is widely known in the world of Oracle database administrators. However, hardly anything is available on internal implementation of block change tracking. This makes it difficult to evaluate the impact of enabling BCT in Oracle databases and quantify performance overhead.

This paper and presentation try to uncover internals of block change tracking and show which areas of Oracle database are involved, how processes work together, what are hidden limitations and impact of enabling block change tracking.

DISCLAIMER

Resources

- **Oracle Database Appliance (Product Page)**

https://www.oracle.com/engineered-systems/database-appliance/

- **Oracle Database Appliance User Guide**

https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/19.8/index.html

- **Oracle Database Appliance Group (Linkedin)**

https://www.linkedin.com/groups/4348075/

- **Oracle Database Appliance Group Blog**

https://blogs.oracle.com/oda

- **Oracle Database Appliance on Youtube**

https://www.youtube.com/playlist?list=PLdtXkK5KBY57pMto1ujb7i7io4e_7n4qU

- **Oracle Database Appliance Simulator Sep Guide**

https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/19.14/dalab/about-the-simulator-362112628.html

- **Oracle Database Appliance Backup and Recovery Best Practices**

https://www.oracle.com/docs/tech/oda-backup-recovery-technical-brief.pdf

- **Automated Virtual Machine Provisioning**

https://www.oracle.com/docs/tech/database/oda-automatedvmprovisioning.pdf

- **Protecting ODA – Tape Backup with Oracle Secure Backup**

https://www.oracle.com/docs/tech/database/protecting-oda-with-osb.pdf

- **Protecting ODA – Tape Backup with Oracle Secure Backup**

https://www.oracle.com/docs/tech/database/protecting-oda-with-osb.pdf

- **ODA Configuring Active Dataguard MAA**

https://www.oracle.com/docs/tech/oda-dg-maa.pdf

- **ODA Migration Strategies**

https://www.oracle.com/docs/tech/database/oda-migration-strategies.pdf

- **Benefits Of ACFS File System**

https://www.oracle.com/docs/tech/database/benefits-of-oracle-acfs.pdf

- **Oracle Database Appliance X10 Datasheet**

https://www.oracle.com/a/ocom/docs/oda-x10-s-x10-l-datasheet.pdf

- **Oracle Database Appliance X9 Datasheet**

https://www.oracle.com/a/ocom/docs/engineered-systems/database-appliance/oda-x9-2sl-datasheet.pdf

- **Simulator Labs for Oracle Database Appliance**

https://docs.oracle.com/en/engineered-systems/oracle-database-appliance/19.14/dalab/simulator-labs-for-oracle-database-appliance-252881465.html

Thank you

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