

ORACLE

# Oracle Database Appliance X10

Get Started – Technical Overview

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Oracle, Alliances and Channels LAD

April, 2024



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




## MARCEL LAMARCA

Exadata Cloud Specialist

Upgrade, Utilities, Patching, Performance & Migrations

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 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



Oracle  
Database  
Appliance



Exadata



Private Cloud  
Appliance



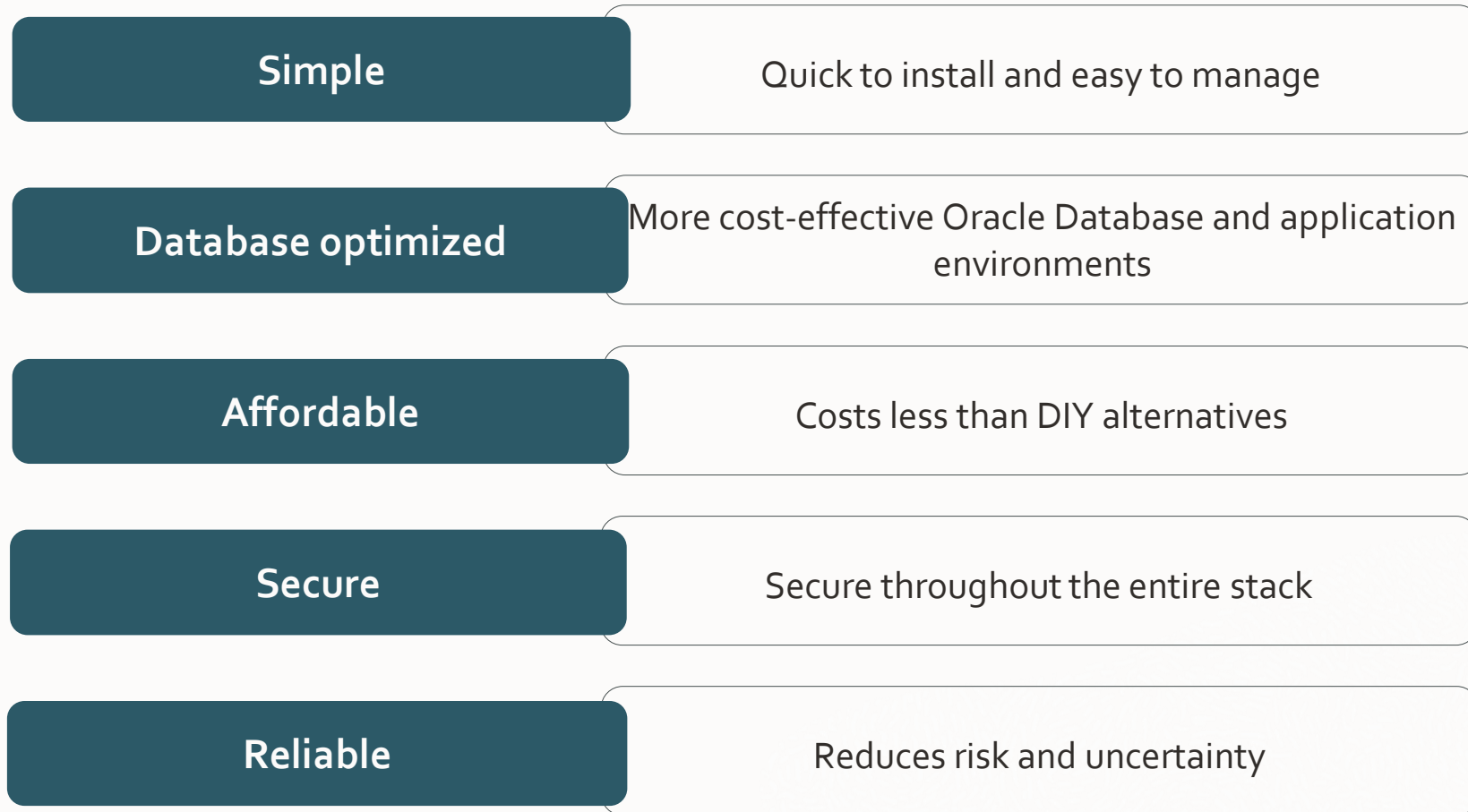
Data Protection

Databases

Middleware / Apps

# Oracle Database Appliance

The Simplest, Most Affordable Solution for Oracle Database and Applications





# Simplicity through integration

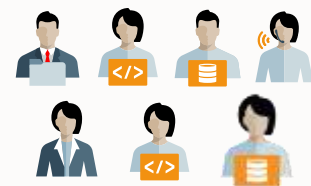
## Build your own

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



1 component  
Easy installation



1 DBA



4 patches  
per year

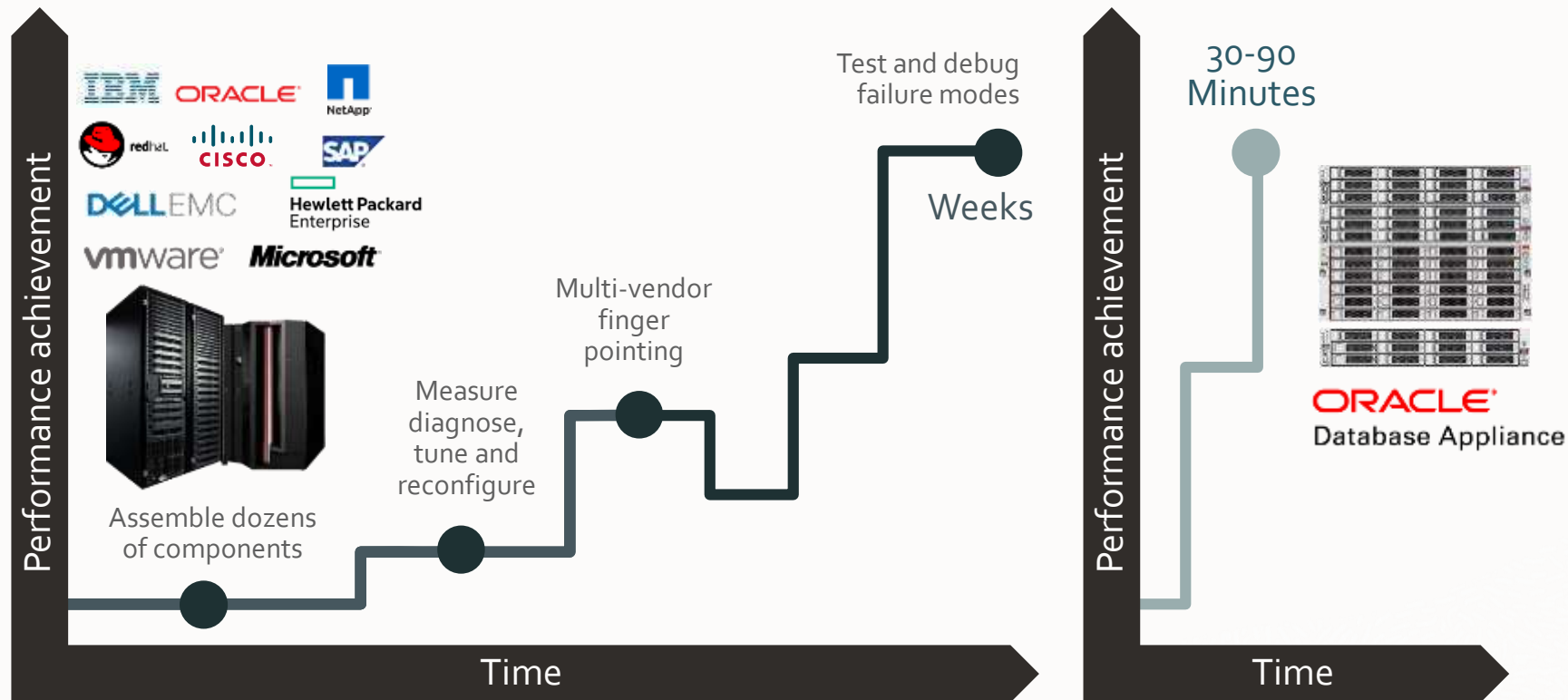


~ 36 hours  
3 years deploy, maintenance,  
support



# Reduced OPEX through simplicity and automation

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

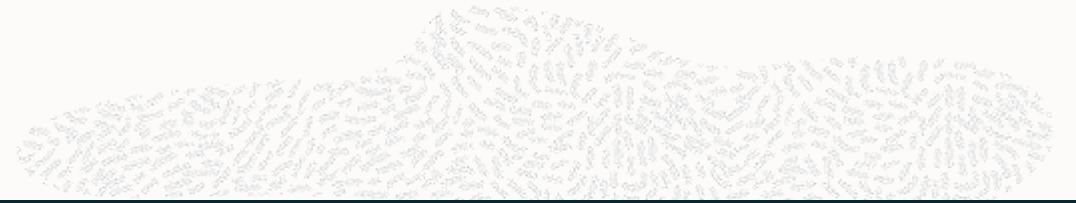


## Key benefits

- 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



High cost and risk to run and maintain

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





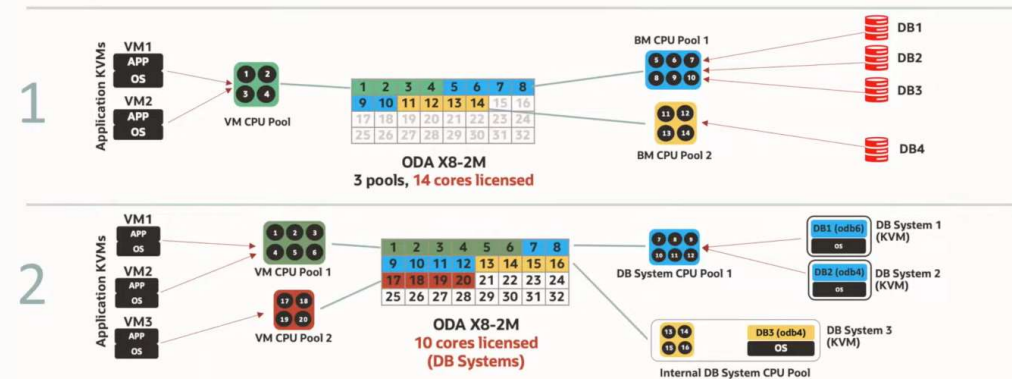
# ODA Architecture

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

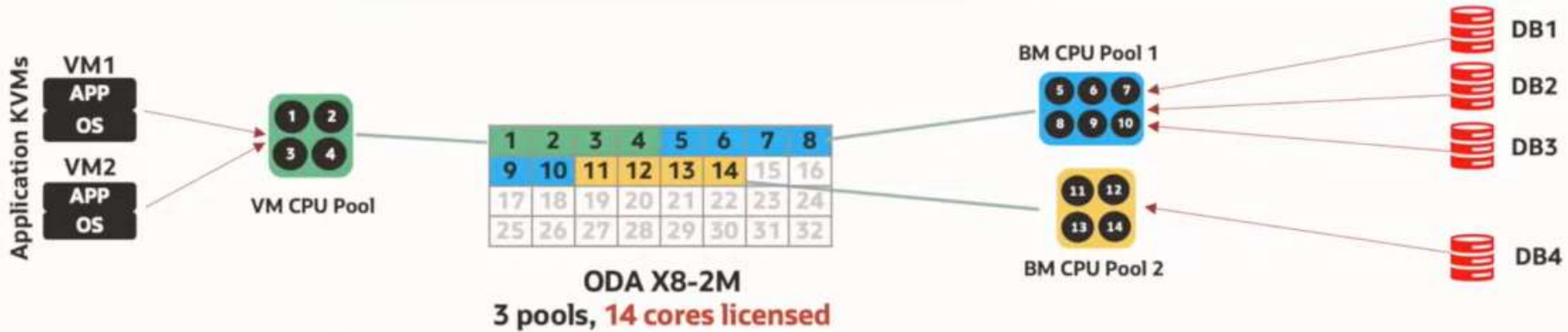
## How ODA pool works

- 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

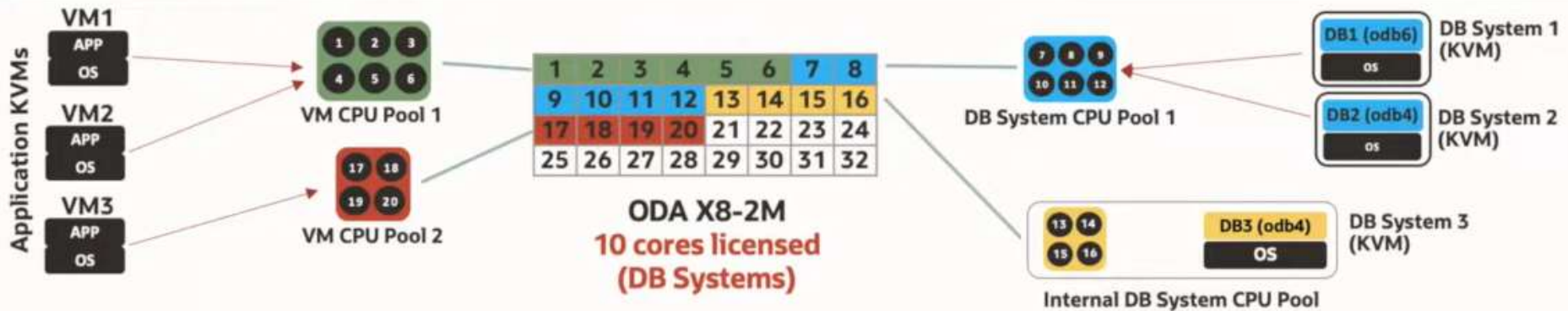


# Oracle Database Appliance CPU Pools

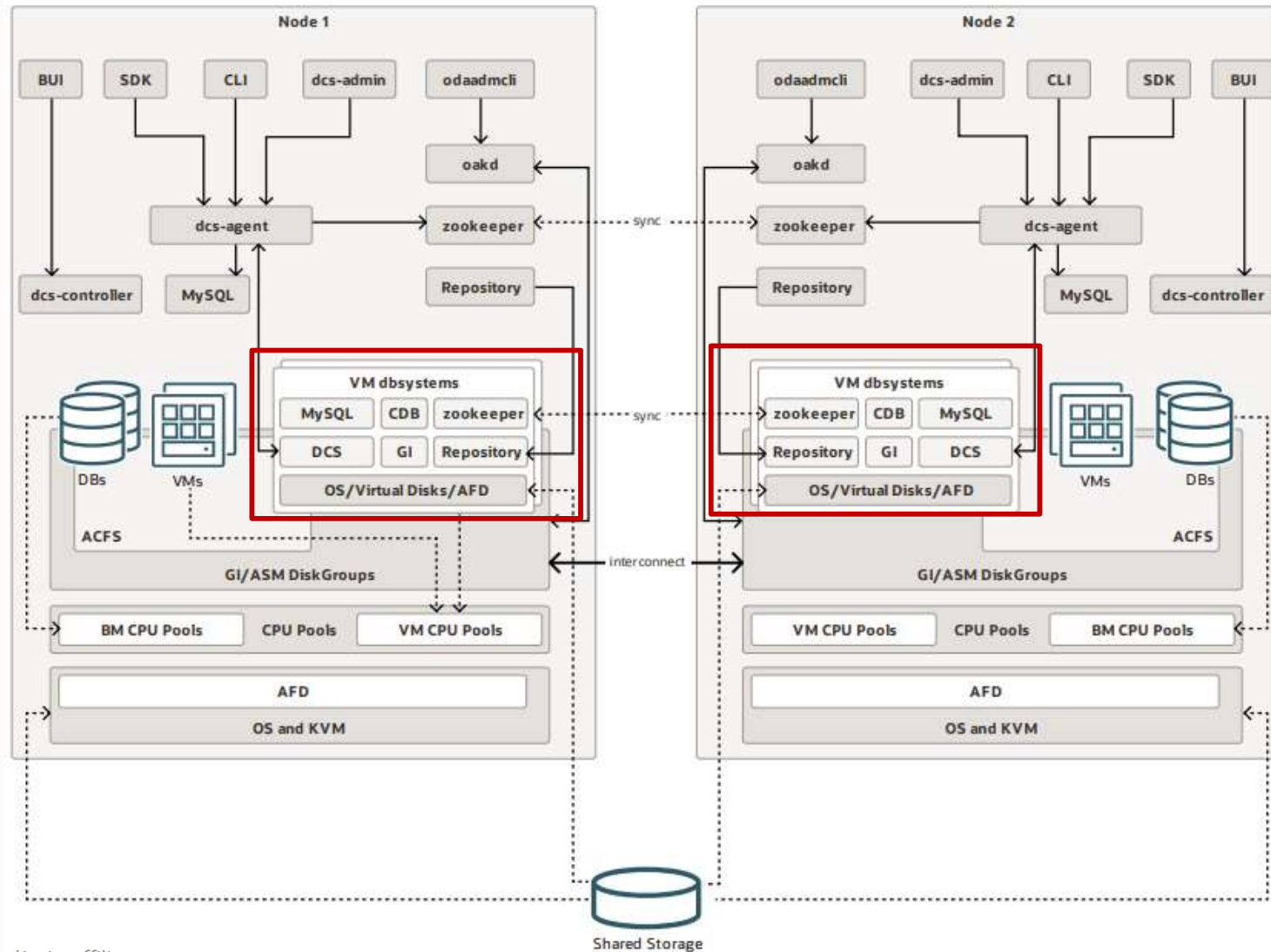
1



2



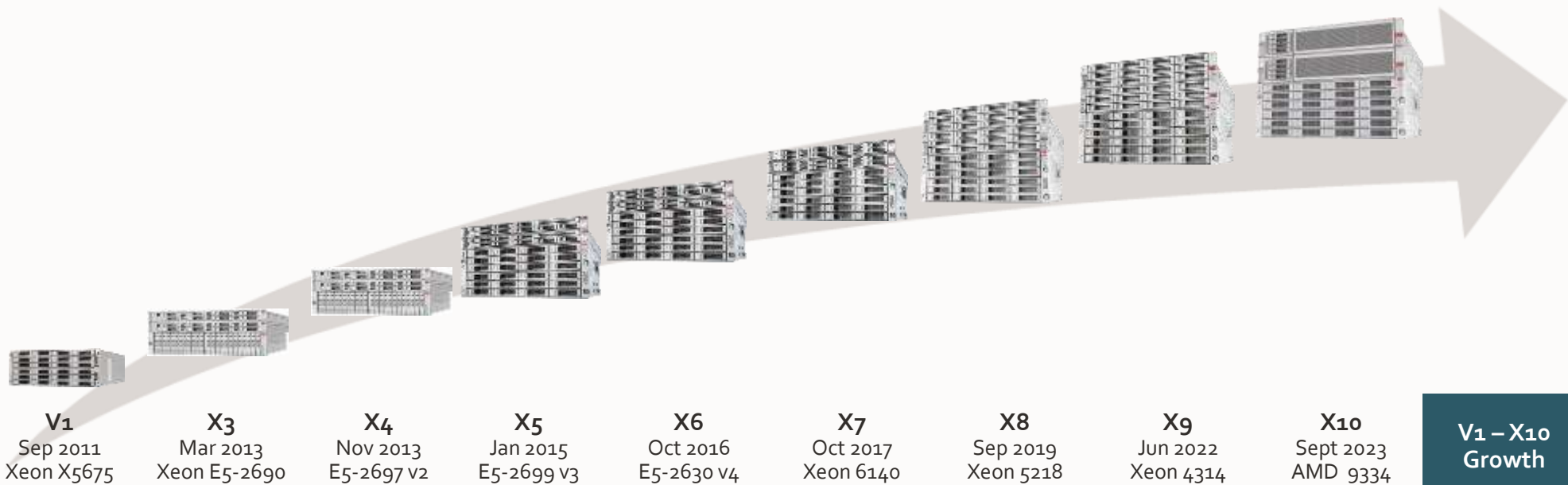
# Oracle Database Appliance KVM Architecture



# Oracle Database Appliance Shapes



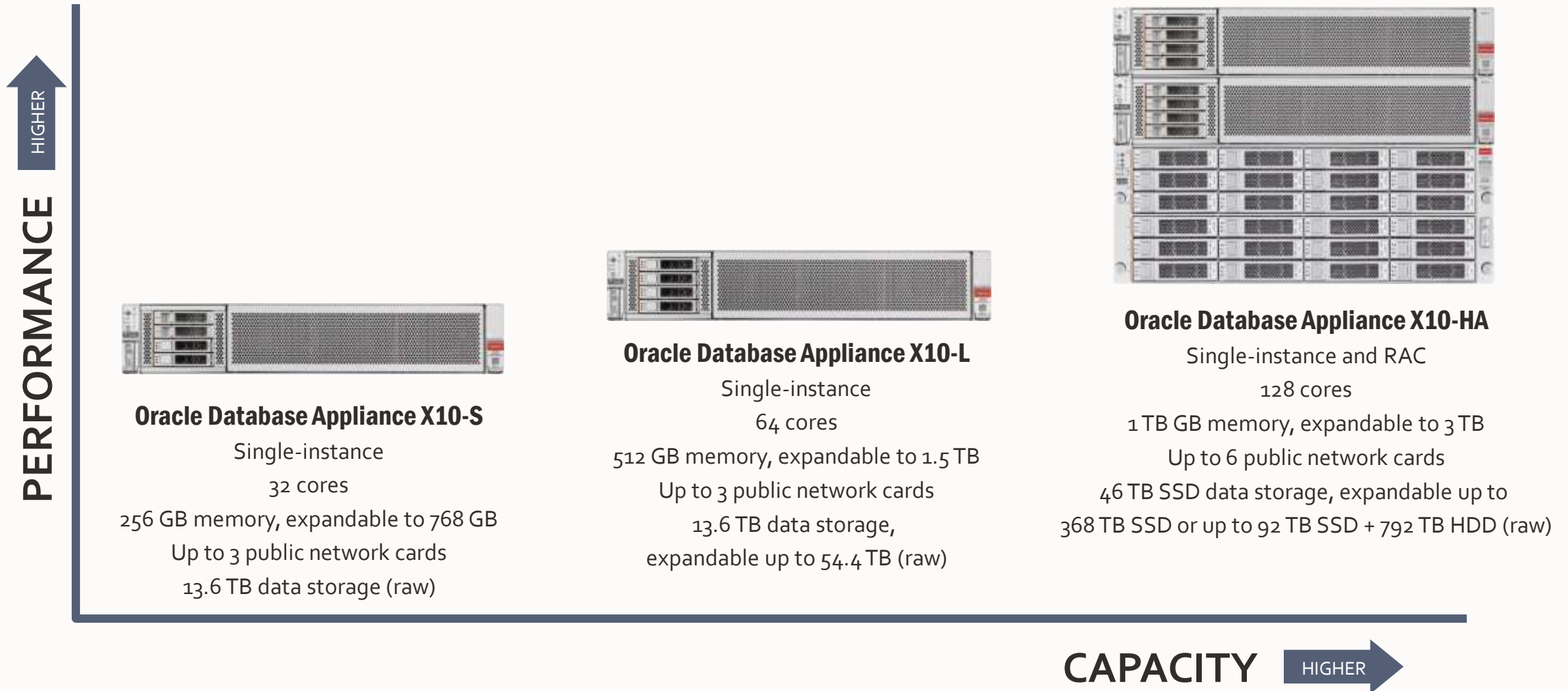
# Oracle Database Appliance | High-Availability Configuration



	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

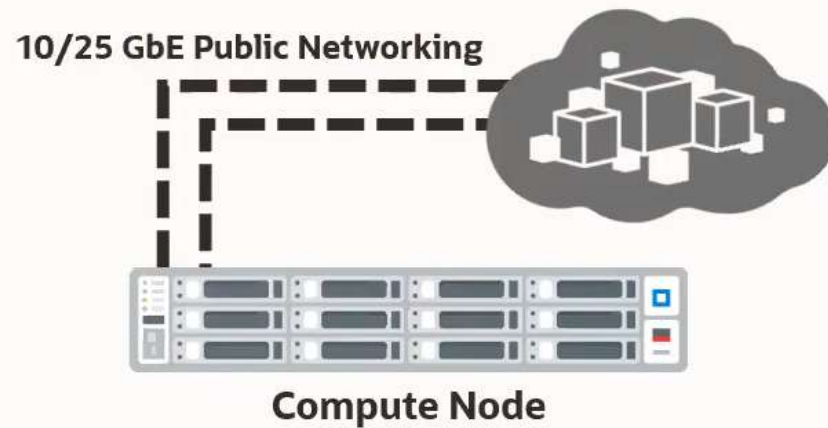


# Introducing the Oracle Database Appliance X10 model family

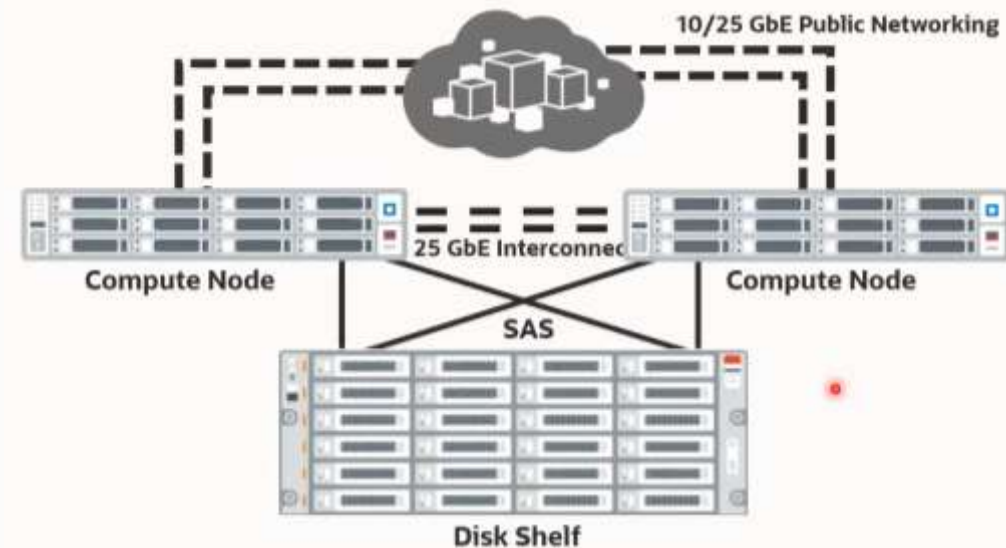


# Oracle Database Appliance Storage

## Single Node System



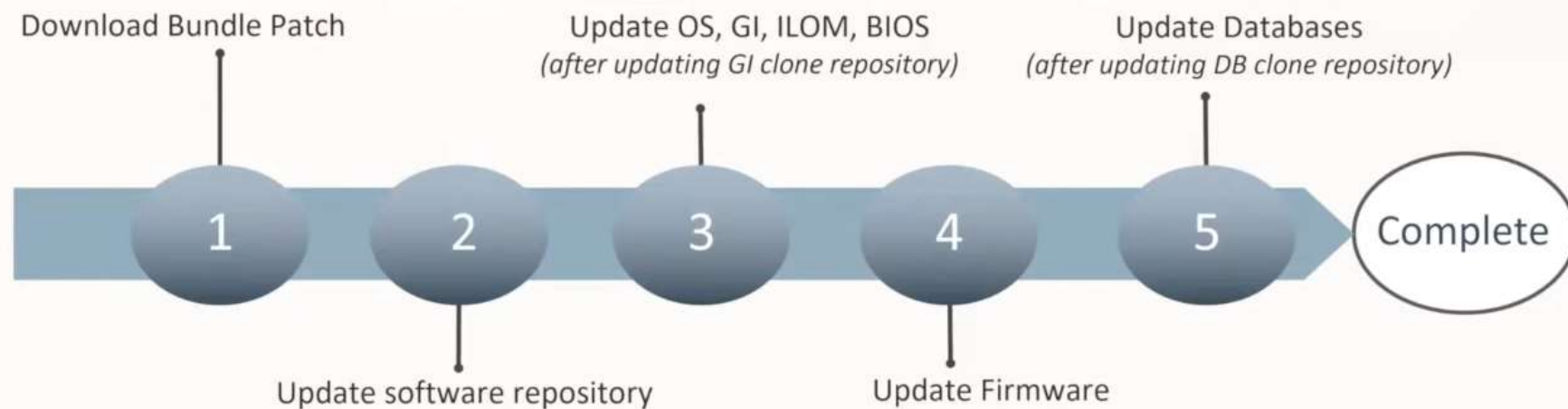
## Fully Redundant High Availability System



# Oracle Database Appliance Patching

# Automated End-to-End Patching

- Patching for Entire includes latest 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 monitoring
- Manage, Patch, Backup, and Monitor the system

## Background Process

- Continual monitoring and management to ensure best practices 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

The screenshot shows the 'Create Database' form in the Oracle Database Appliance Manager. The form is organized into three main columns. The left column contains fields for 'DB Name', 'DB Unique Name', 'Use Existing DB Name' (with radio buttons for Yes/No), 'DB Version' (set to 19.0.0.0.0/214), 'CDB' (set to Yes), 'PDB Name', and 'PDB Admin User'. The middle column contains dropdown menus for 'Database Edition' (Enterprise Edition), 'Shape' (ed01(1 Core, 8GB Memory)), 'Database Class' (OLTP), 'Storage' (ASM), 'Database Redundancy' (Minor), and 'Networks' (Public network). The right column contains password fields for 'Password' and 'Confirm Password', and dropdown menus for 'Character Set' (AL32UTF8), 'National Character Set' (AL16UTF16), 'Language' (AMERICAN), and 'Territory' (AMERICA). At the bottom right, there are buttons for '< Back', 'Cancel', and 'Create >'. The top of the interface shows the 'ORACLE' logo, 'Database Appliance' title, and navigation tabs for 'Appliance', 'Database', 'Object Store', 'Monitoring', and 'Activity'.

# 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



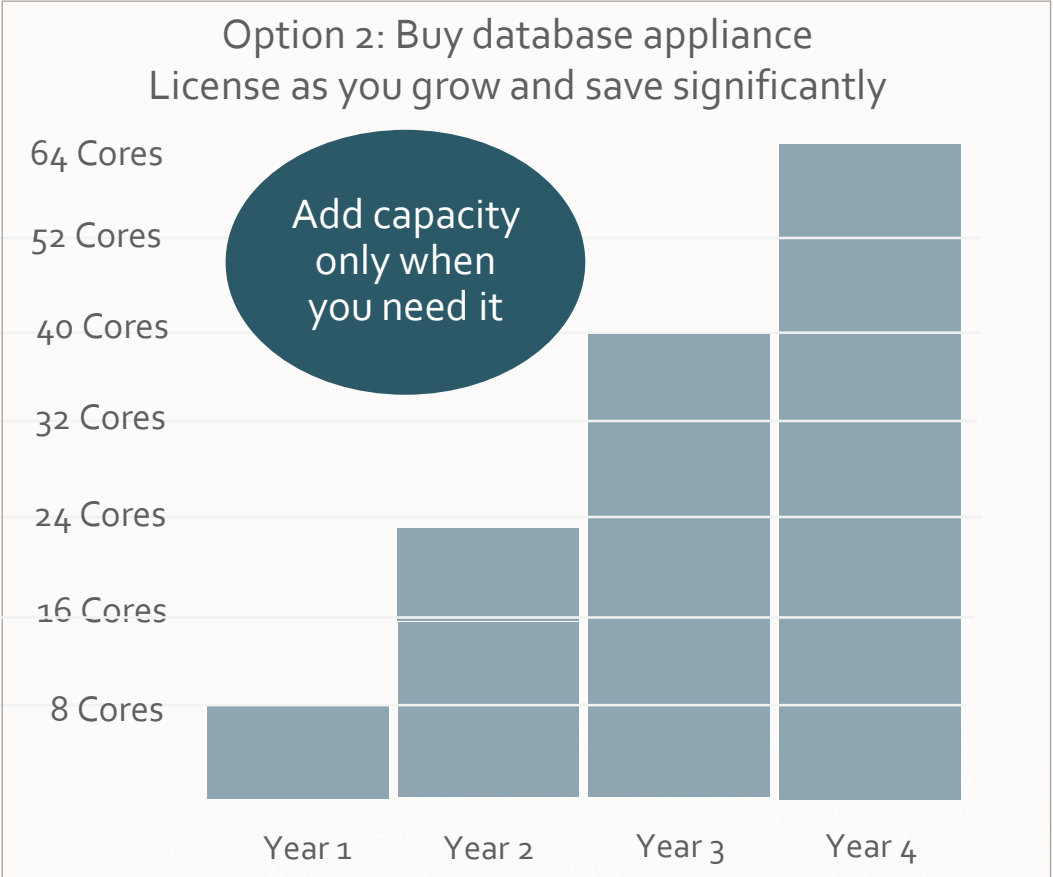
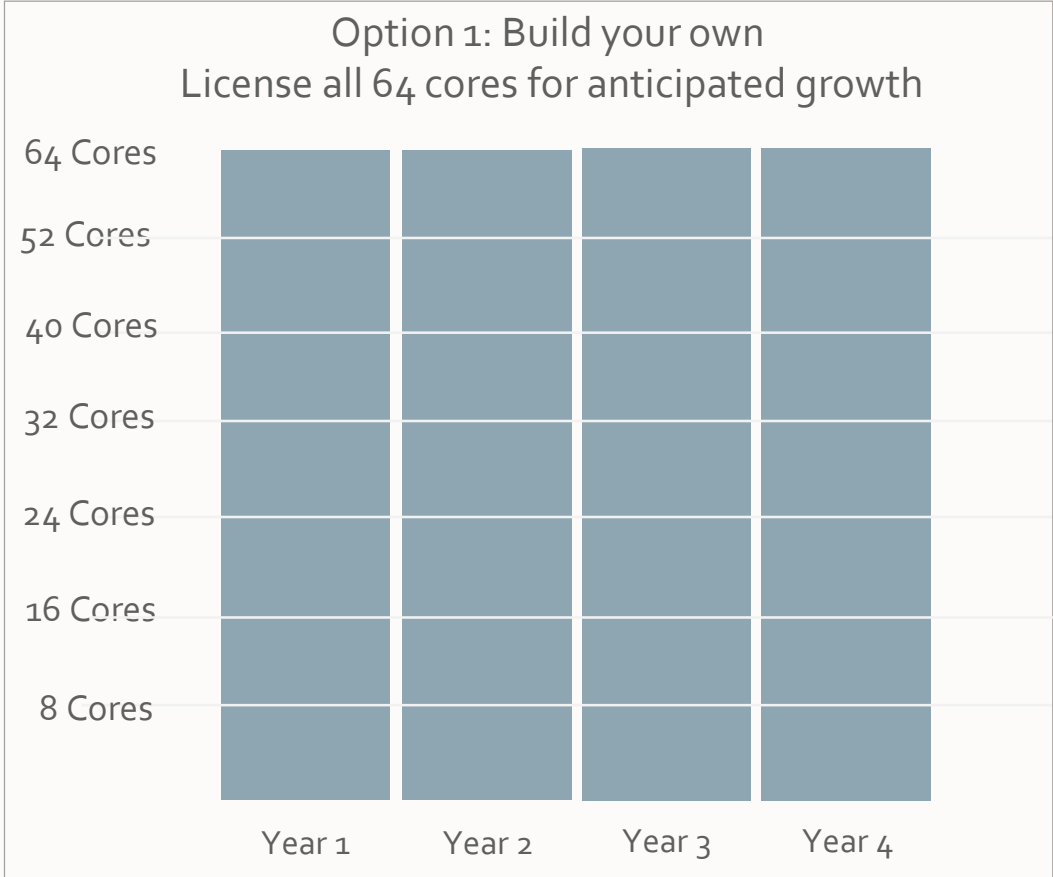
# Oracle Database Supported on Oracle Database Appliance



- 
- 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



# Manage license costs using capacity on-demand



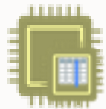
# ODA Database features for Oracle Database Appliance



Multitenant  
up to 3



Standard Edition High  
Availability

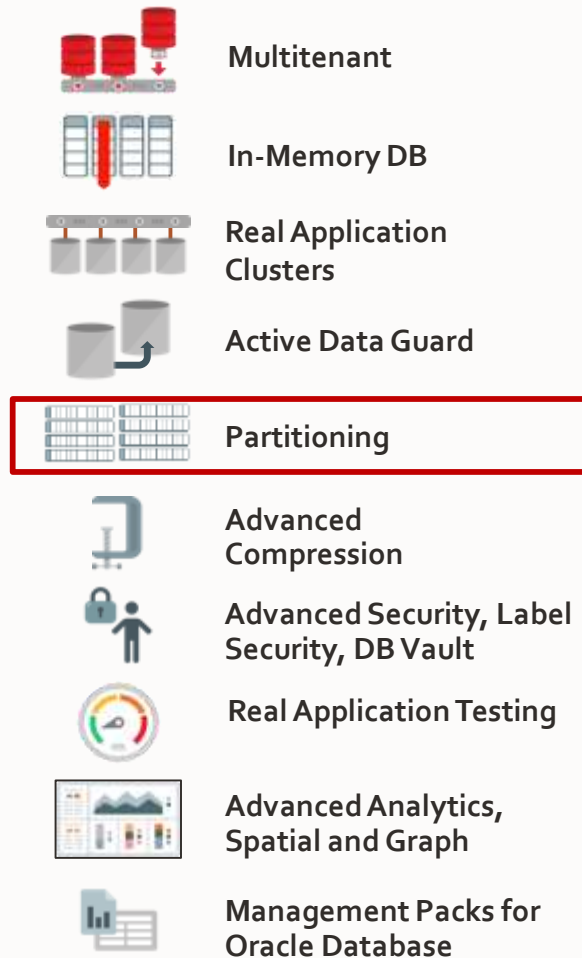


Multi-chip

Database  
**Standard**  
Features



# Database features for Oracle Database Appliance



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

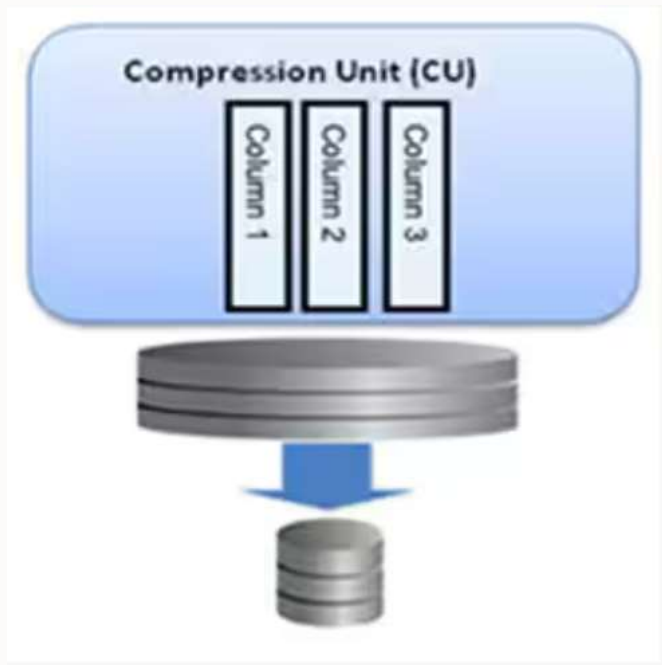
There are two types of Exadata Hybrid Columnar Compression:

## 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_uncomp pls_integer;
row_cmp pls_integer;
row_uncomp pls_integer;
cmp_ratio pls_integer;
comptype_str varchar2(1000);
```

# ODA Maximum Availability

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# Integrated Oracle Data Guard

## Configure Oracle Data Guard with One command

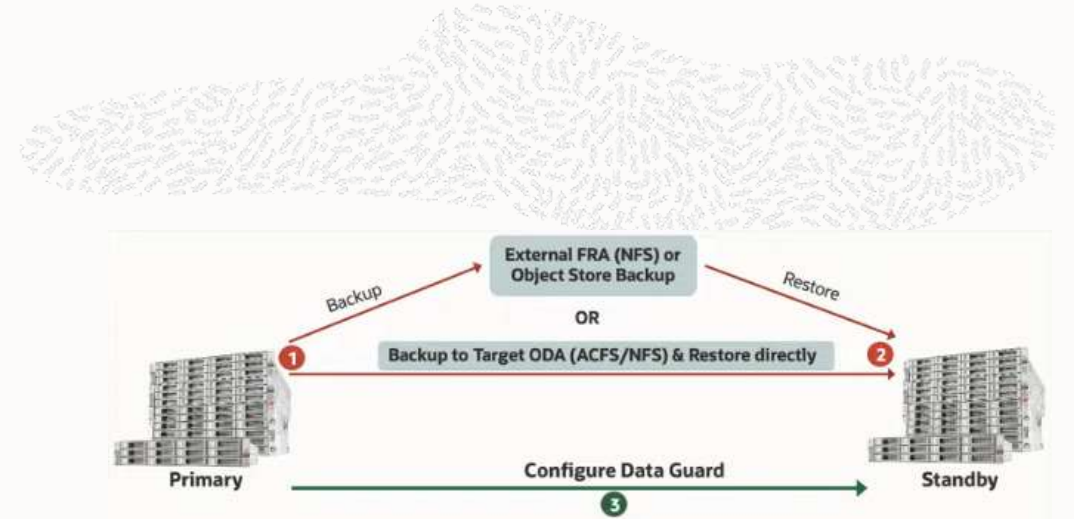
- Provisioning standby databases for enhanced availability, disaster recovery, rolling patching, or system migration

## 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

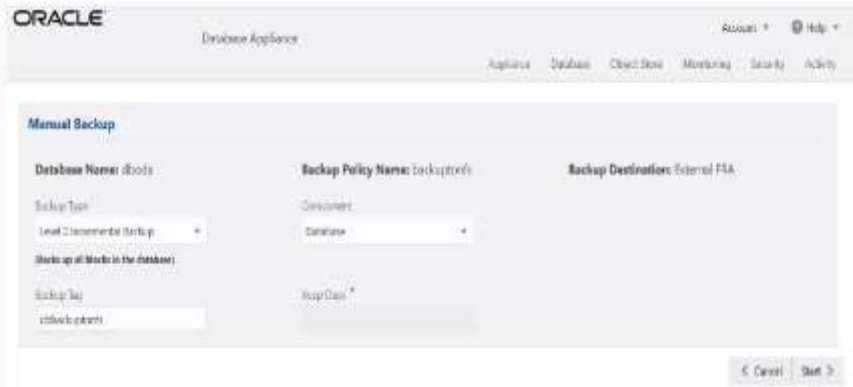
Apply a backup to an existing database to trigger automatic backups

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 of 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](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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