

ORACLE

Exadata Cloud At Customer X10M

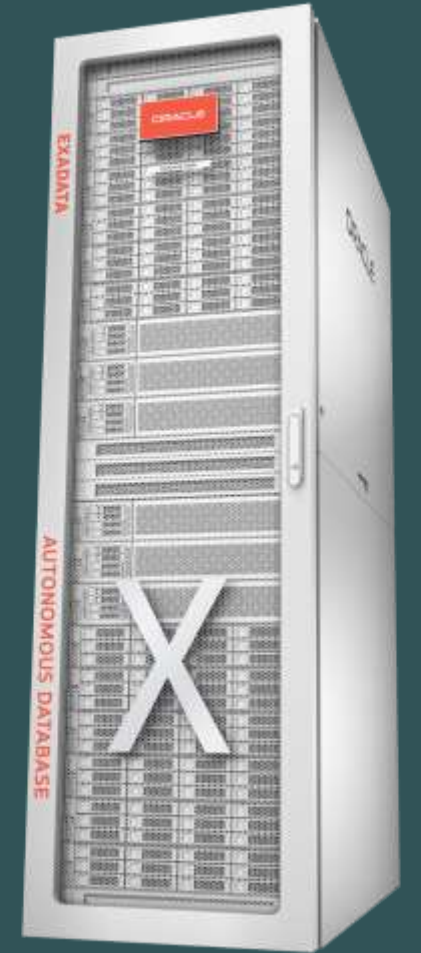
Get Started – Overview

Marcel Lamarca

Exadata Cloud Specialist

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

 [marcel-lamarca](https://www.linkedin.com/in/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

Exadata Cloud at Customer X10M - Overview

2

Exadata Cloud at Customer Licensing

3

Autonomous Database - Overview

4

Resources

5

Demo - Exadata Smart Scan



Oracle Cloud Systems Portfolio

ZFS Storage
Appliance



Zero Data Loss
Recovery
Appliance



Data Protection

Oracle
Database
Appliance



Databases

Exadata



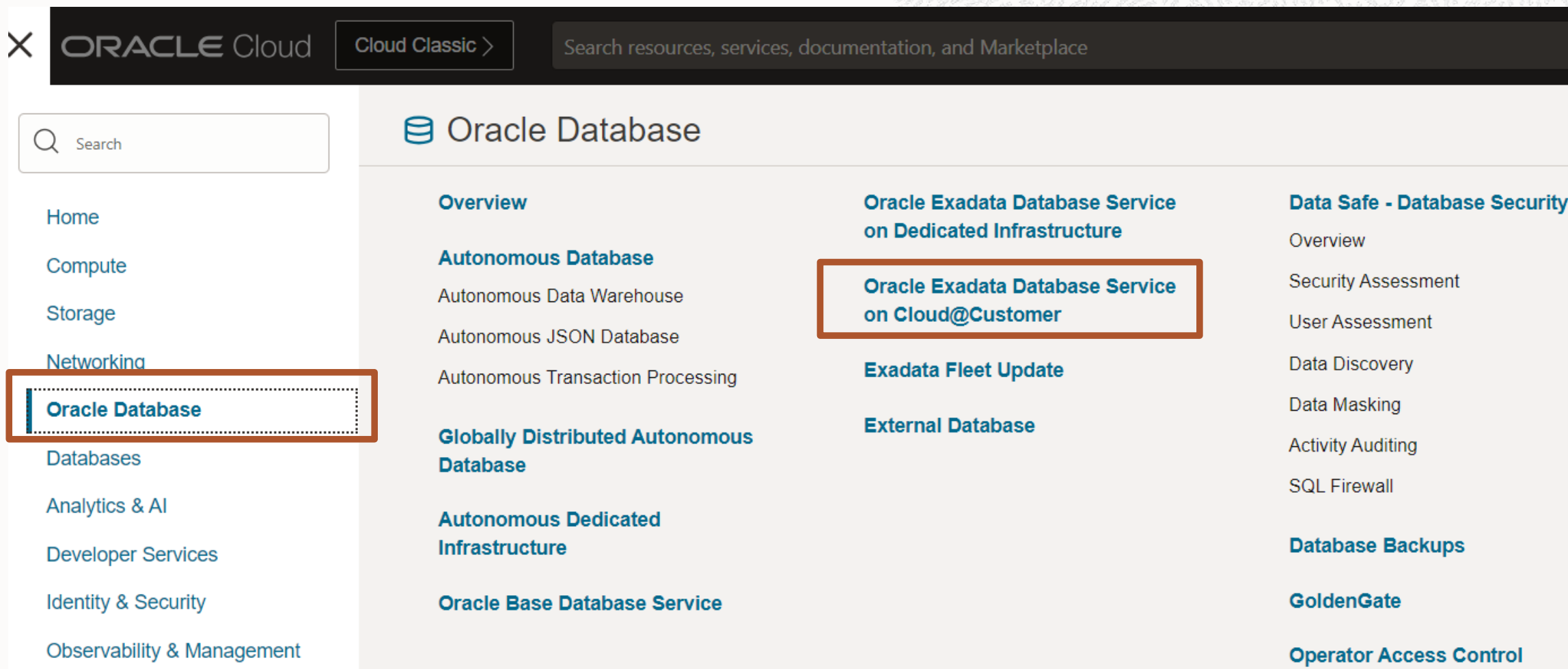
Private Cloud
Appliance



Middleware / Apps

EXaC@C Architecture Overview

Exadata Cloud At Customer Ob OCI Menu



The screenshot displays the Oracle Cloud console interface. At the top, the header includes the Oracle Cloud logo, a 'Cloud Classic' link, and a search bar. The left sidebar contains a navigation menu with items like Home, Compute, Storage, Networking, and Oracle Database. The 'Oracle Database' item is highlighted with a red dashed border. The main content area is titled 'Oracle Database' and lists various database services. The 'Oracle Exadata Database Service on Cloud@Customer' option is highlighted with a red solid border. Other visible options include 'Oracle Exadata Database Service on Dedicated Infrastructure', 'Exadata Fleet Update', 'External Database', 'Data Safe - Database Security', 'Database Backups', 'GoldenGate', and 'Operator Access Control'.

Oracle Cloud Cloud Classic > Search resources, services, documentation, and Marketplace

Search

Home

Compute

Storage

Networking

Oracle Database

Databases

Analytics & AI

Developer Services

Identity & Security

Observability & Management

Oracle Database

Overview

Autonomous Database

Autonomous Data Warehouse

Autonomous JSON Database

Autonomous Transaction Processing

Globally Distributed Autonomous Database

Autonomous Dedicated Infrastructure

Oracle Base Database Service

Oracle Exadata Database Service on Dedicated Infrastructure

Oracle Exadata Database Service on Cloud@Customer

Exadata Fleet Update

External Database

Data Safe - Database Security

Overview

Security Assessment

User Assessment

Data Discovery

Data Masking

Activity Auditing

SQL Firewall

Database Backups

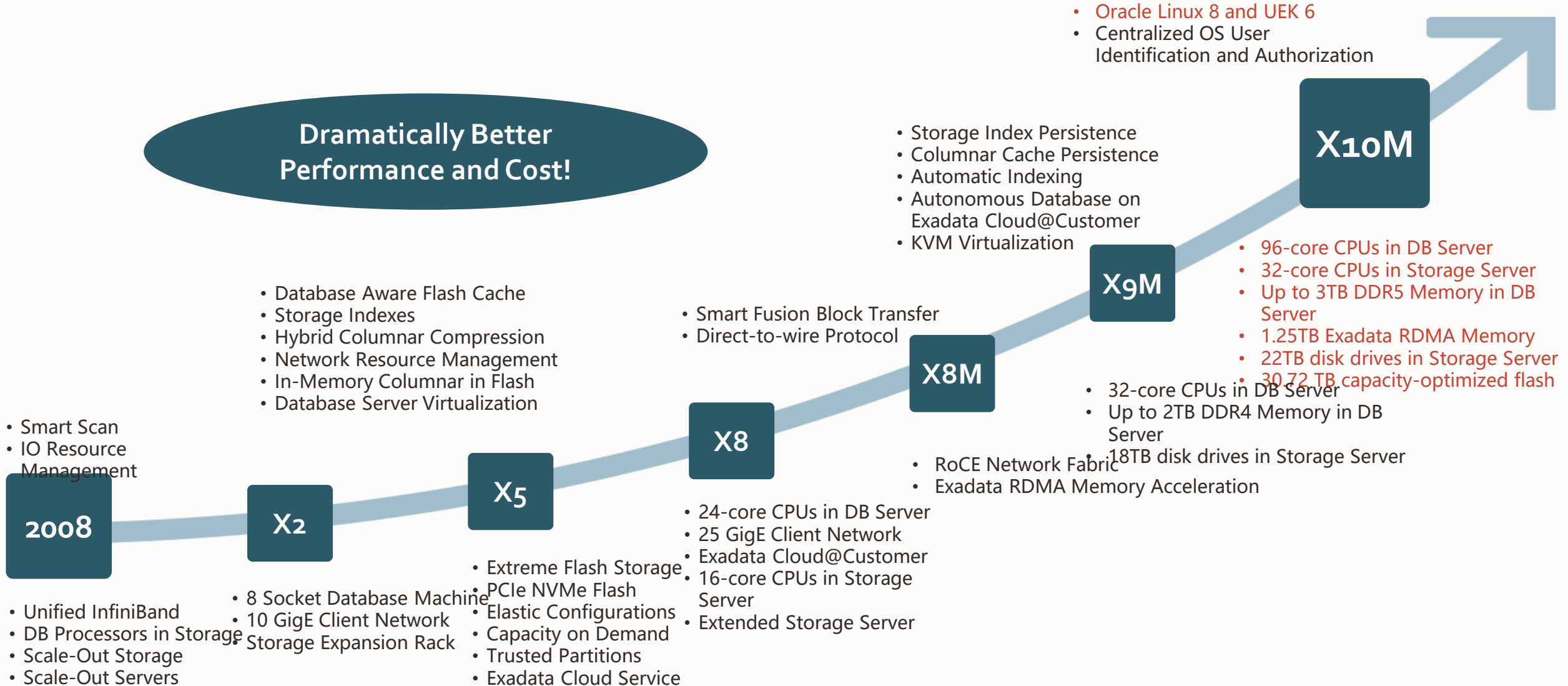
GoldenGate

Operator Access Control



Exadata Advantages Increase Every Year

**Dramatically Better
Performance and Cost!**



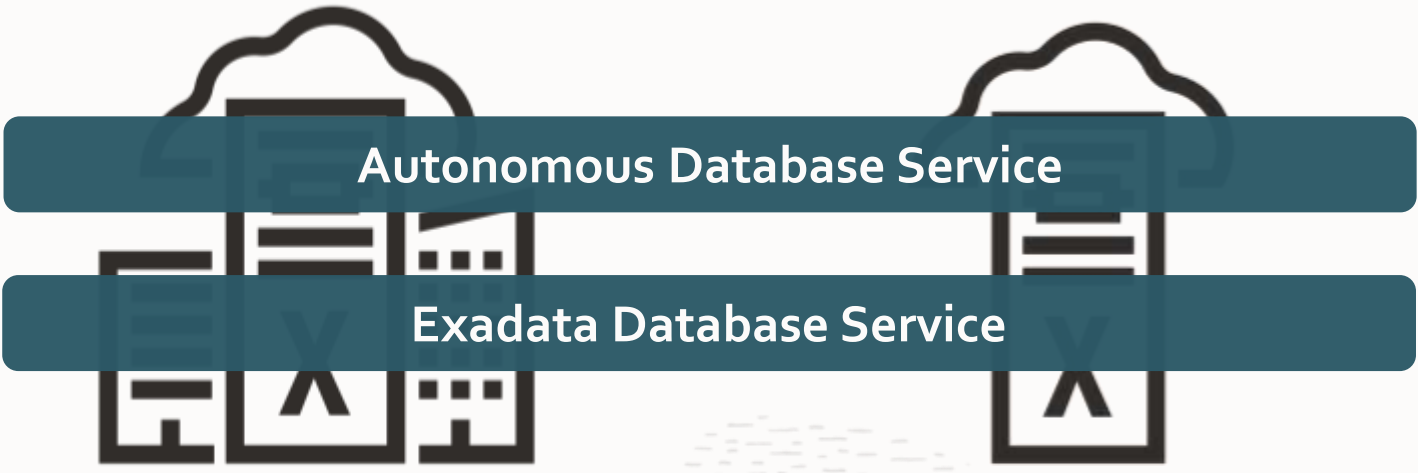
We meet you where you are in your database consolidation journey

On-Premises Traditional
Exadata Database Machine



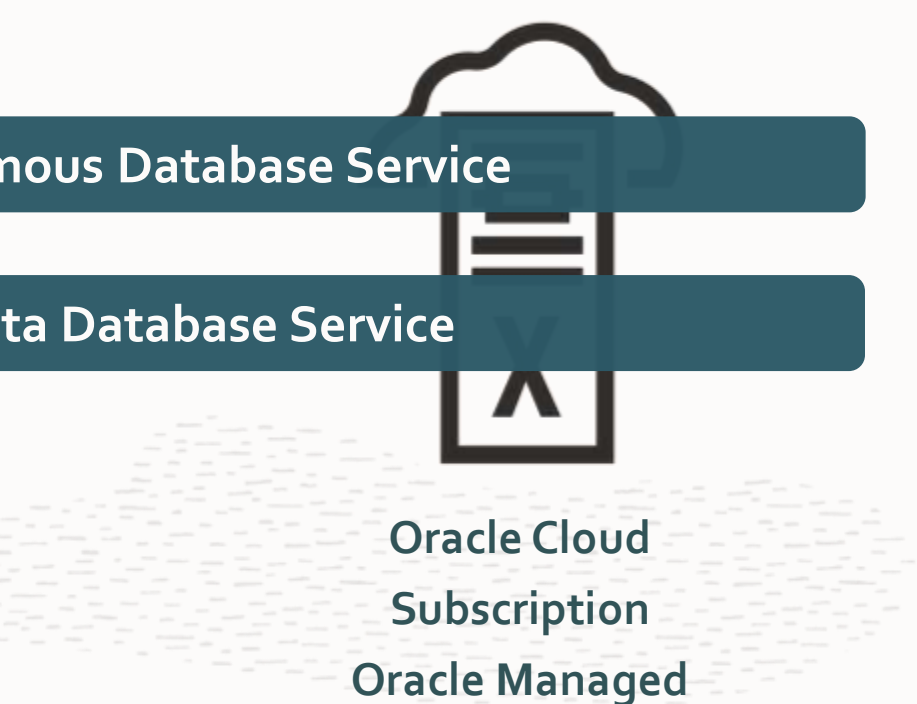
Customer Data Center
Purchased
Customer Managed

Cloud@Customer
Exadata Cloud@Customer

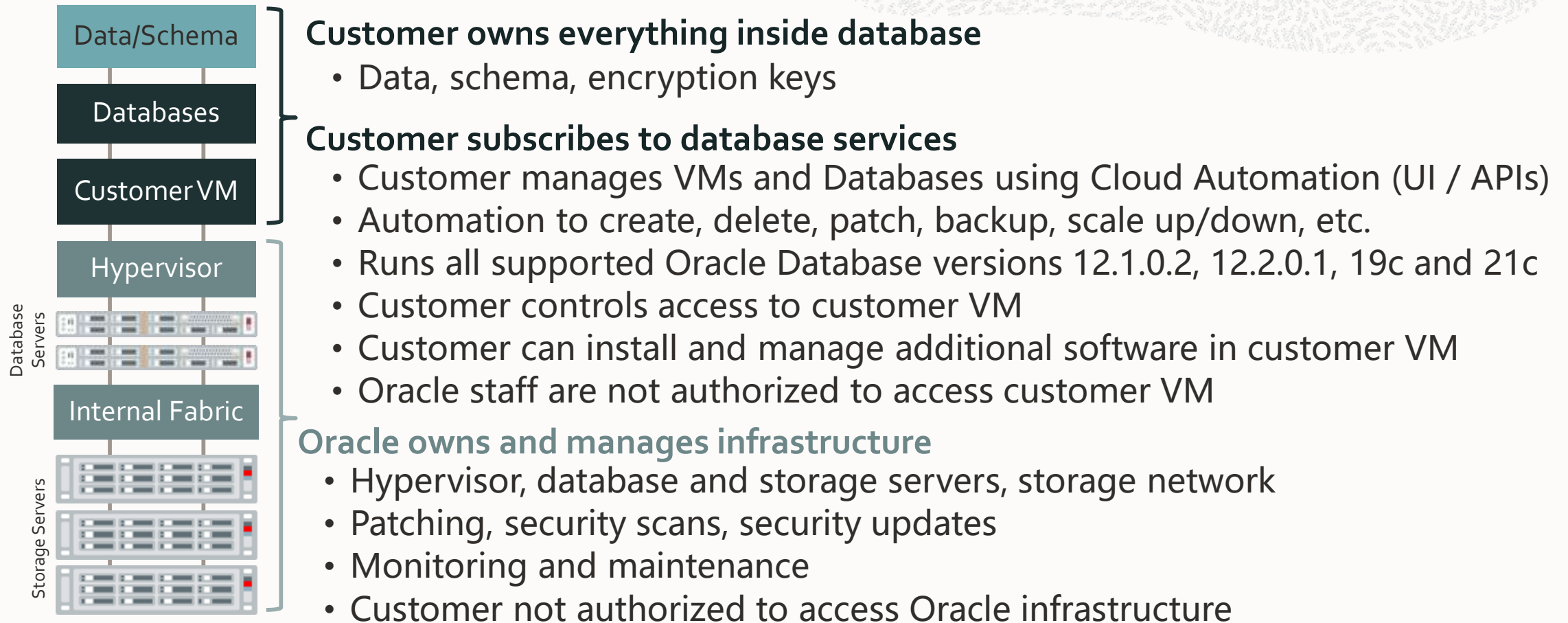


Customer Data Center
Subscription
Oracle Managed

Public Cloud, Dedicated Region, and
Oracle Database@Azure
Exadata Cloud Infrastructure



Simple Cloud Management Model in at Customer Cloud



Exadata Unique Cloud-Scale Database-Optimized Architecture

Unique Next Generation RAC Scale-Out for Any Workload

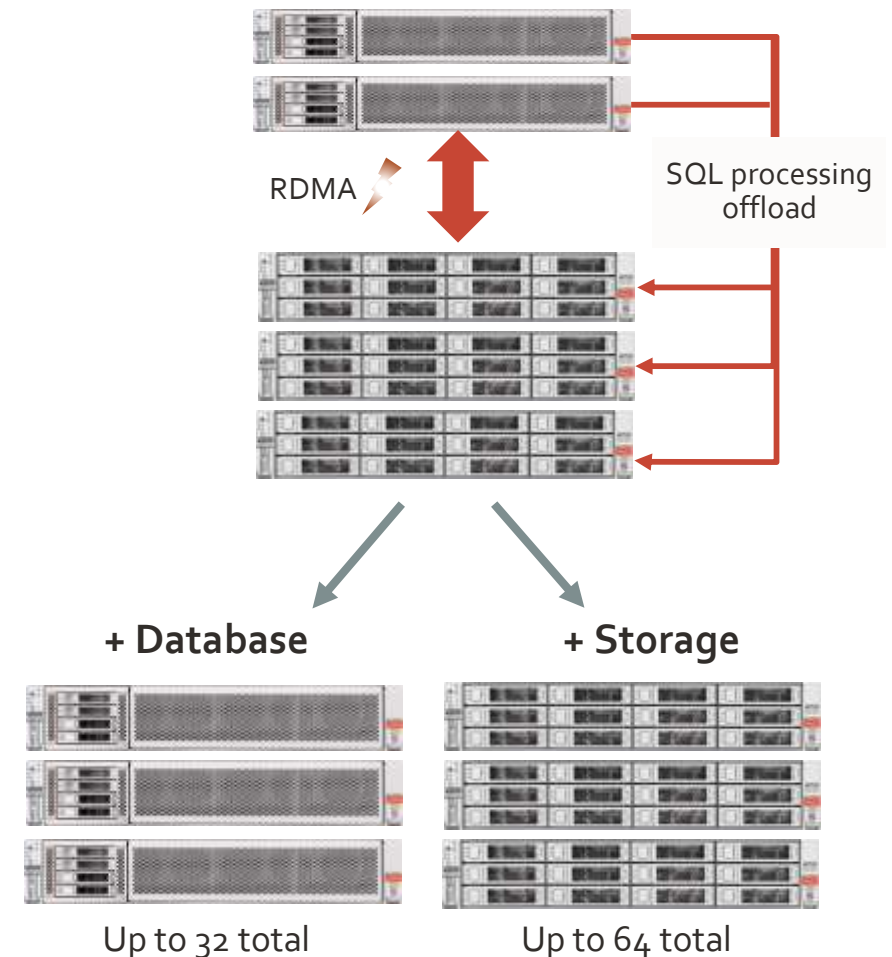
- Application-transparent database scalability & availability

Start small with minimum size High Availability configuration

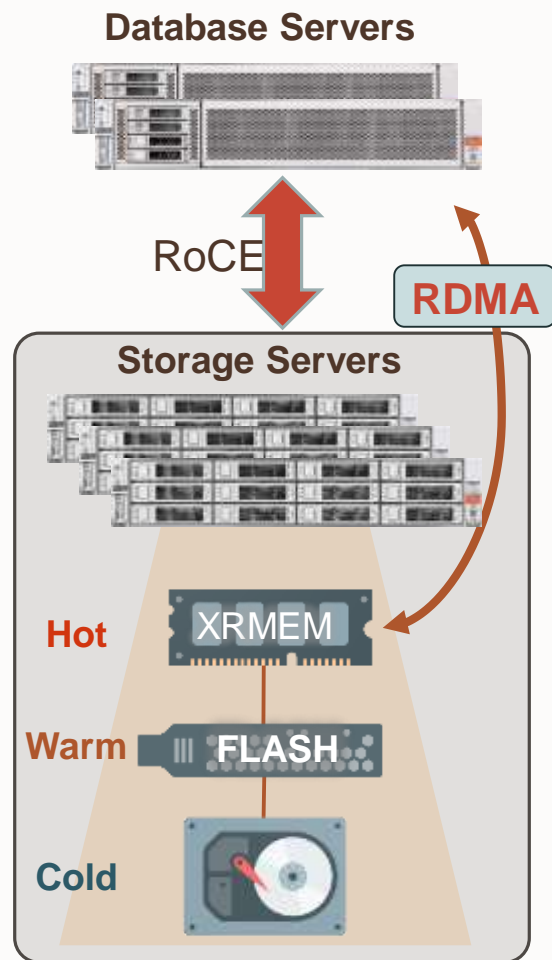
- 2 Compute Servers, 3 Storage Servers
- Dedicated to you – no noisy or malicious neighbors

Add individual Database or Storage servers as needed

Expansion happens **fully online**



Exadata architecture – scale out with intelligent storage



Scale-out system architecture and software

- Independent, online scaling of database and storage servers
- Scales from 2 to 210 Exadata X10M database servers
- Scales from 3 to 264 Exadata X10M storage servers
- Redundancy with fast failover provides high availability

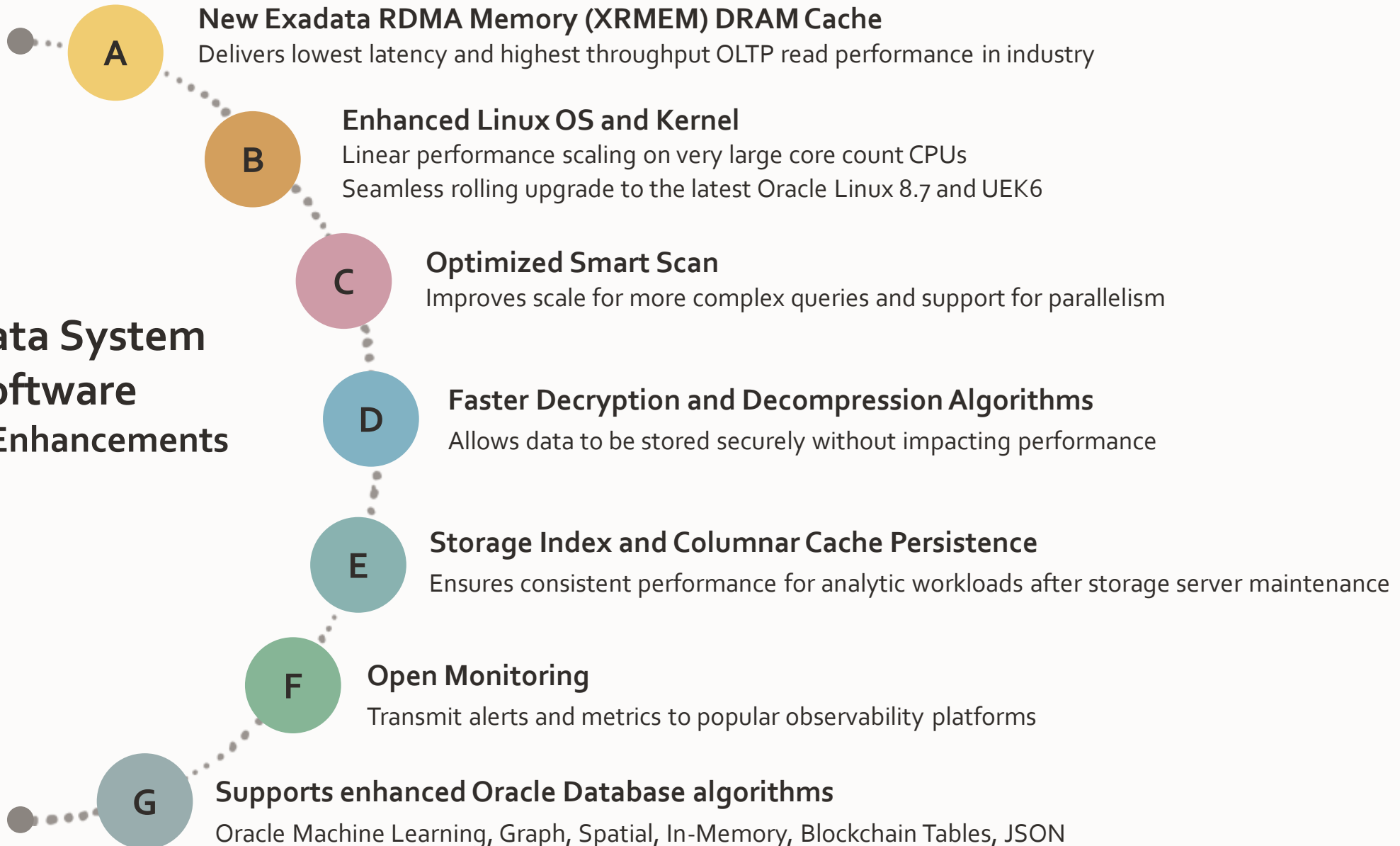
Database uses RDMA instead of I/O to read XRMEM in Smart Storage

- Bypasses network and I/O software, interrupts, context switches
- Data is transparently managed in multiple storage tiers to minimize latency
- High-performance active-active 100 Gbit/s internal network maximize throughput
- Speeds up both database reads and commits

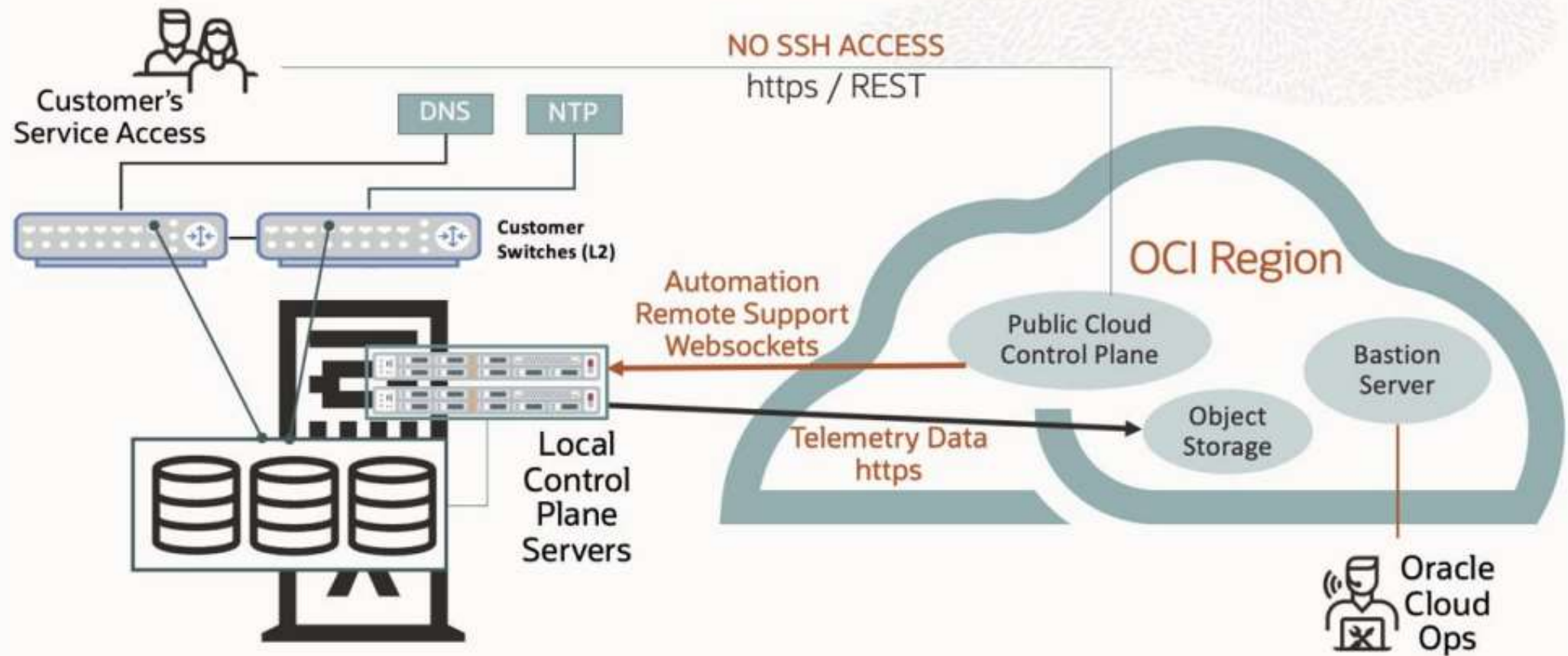
Database cluster virtualization

- Deploy environments with different needs on the same system
 - Dev-Test, Staging Production, DR
 - OLTP, Analytics, Mixed Workloads
- Share and manage pools of resources to increase efficiency and lower costs
- Isolate resources to meet differing security and predictability requirements

Exadata System Software Recent Enhancements



Simple Cloud Management Model in at Customer Cloud



Oracle Database Supported on Exadata

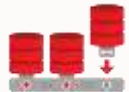
19^c **ORACLE[®]**
Database

- Enterprise Edition – 19c Last Long Term Release
- Enterprise Edition – 21c Innovation Release

EXaC@C Features



Oracle Exadata Database and Platform Innovations



Multitenant



In-Memory DB



Real Application Clusters



Active Data Guard



Partitioning



Advanced Compression



Advanced Security, Label Security, DB Vault



Real Application Testing

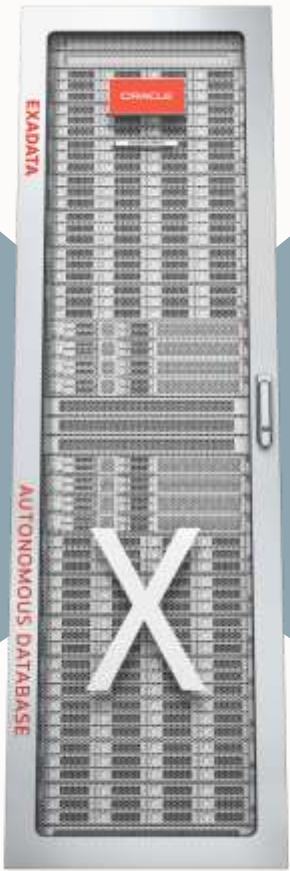


Advanced Analytics, Spatial and Graph



Management Packs for Oracle Database

All Oracle Database Innovations



All Exadata Innovations

Offload SQL to Storage



RoCE Fabric



100 GB

PMEM Commit and Data Accelerators



Smart Flash Cache



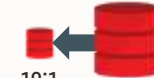
Storage Indexes



Columnar Flash Cache



Hybrid Columnar Compression



10:1

I/O Resource Management



Network Resource Management



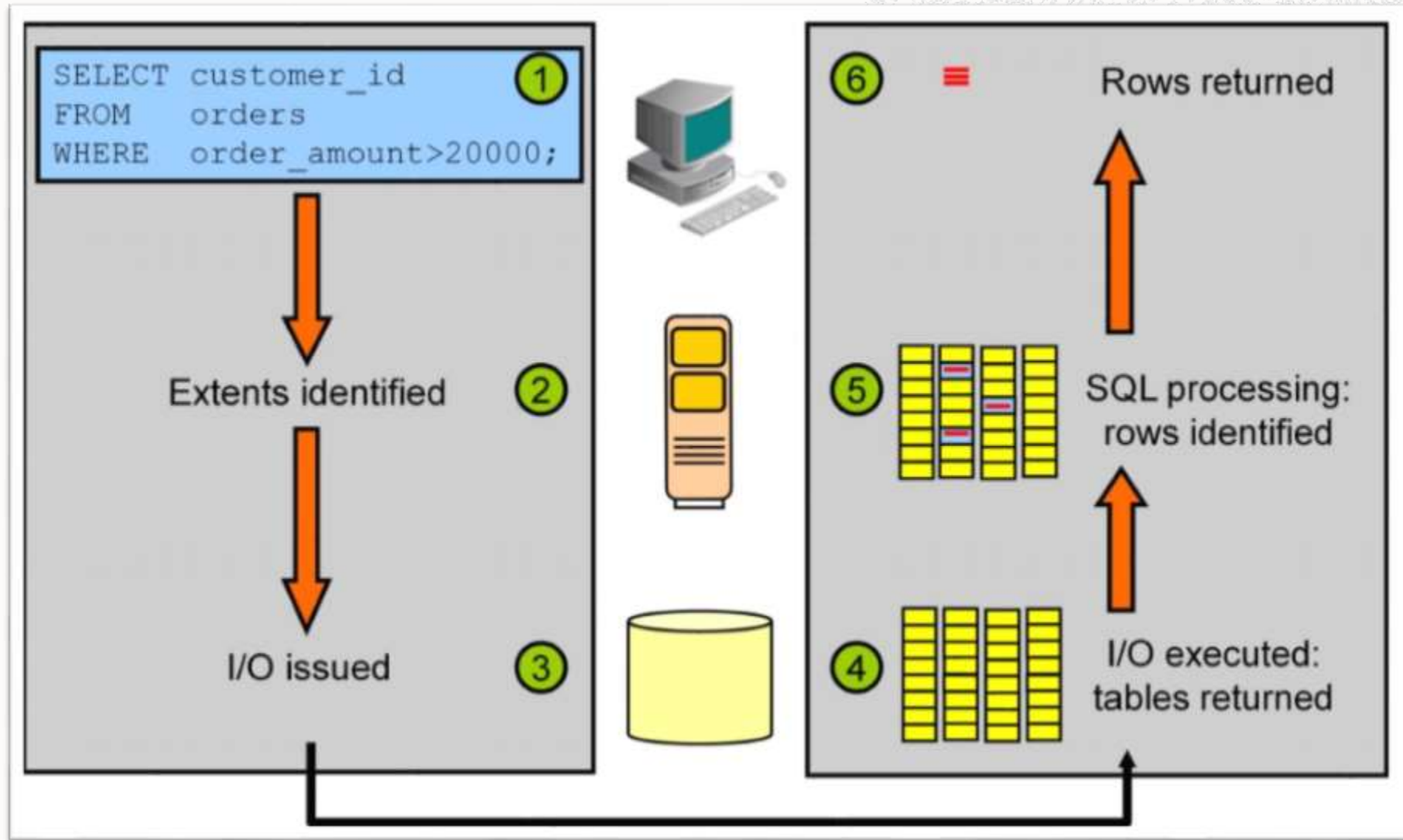
In-Memory Fault Tolerance



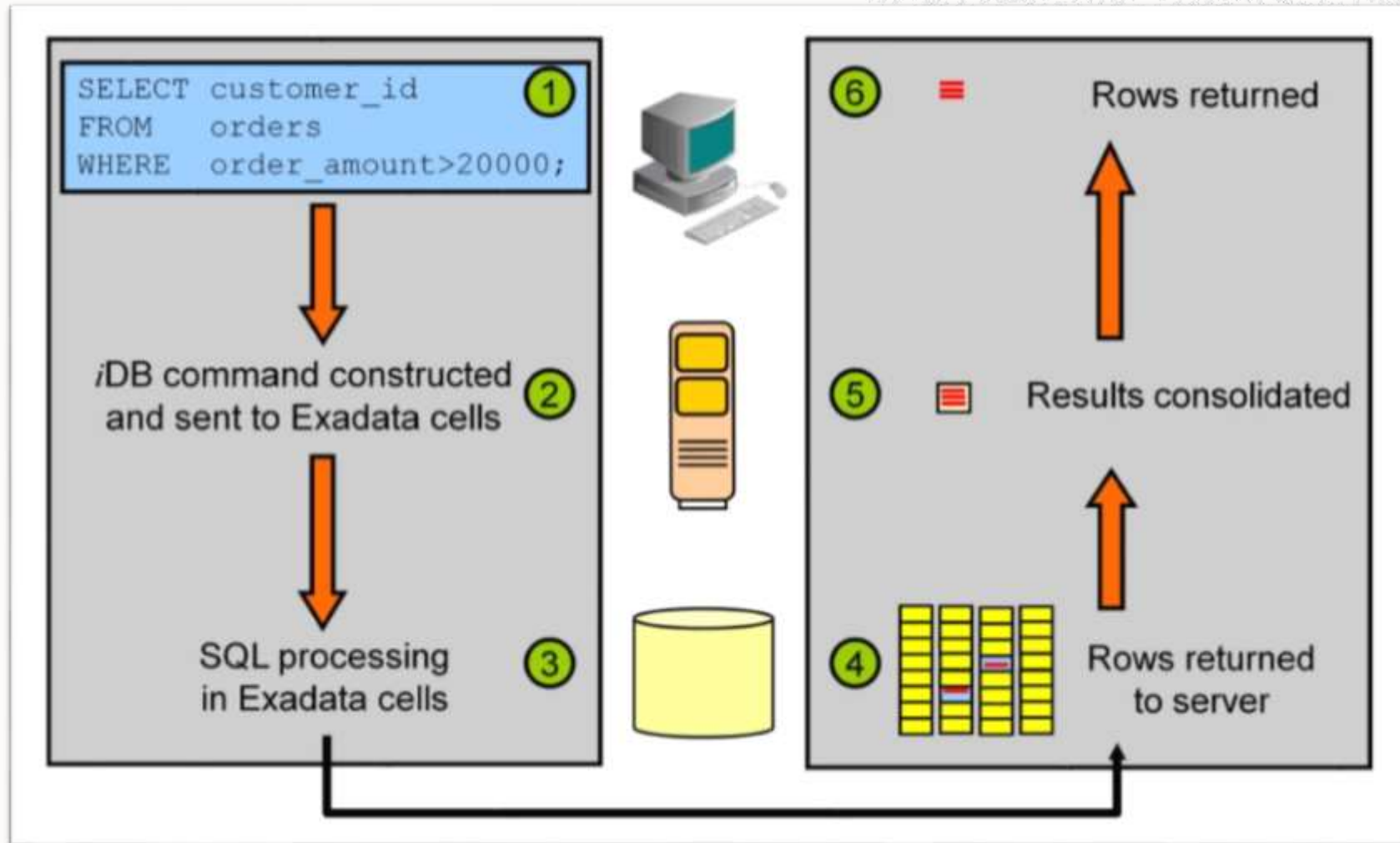
Exafusion Direct-to-Wire Protocol



Oracle Database | No Exadata System



Exadata Cloud a Smart Scan | Off Load Querying

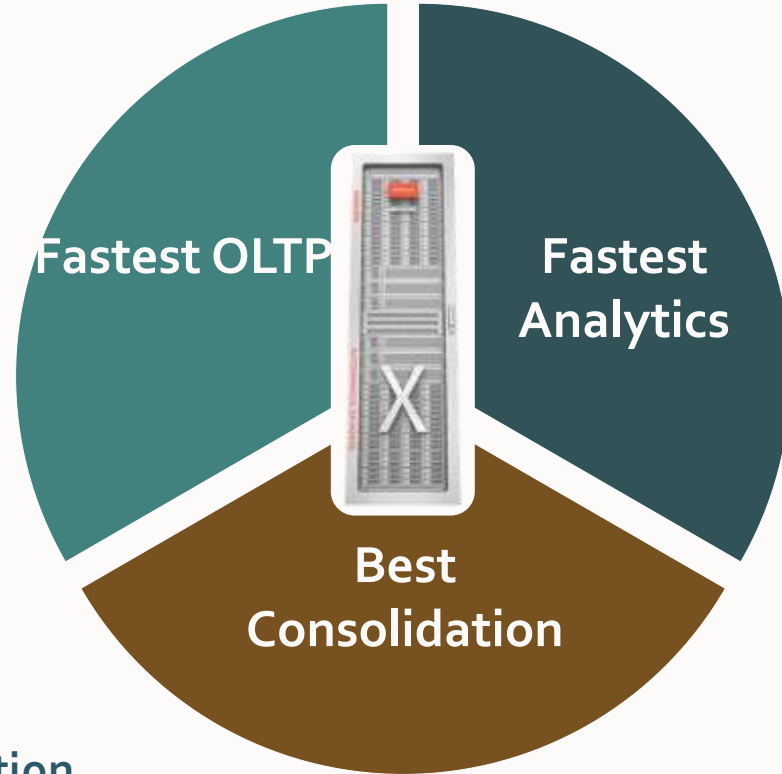


Exadata's Superior Software Architecture Highlights

Smart system software enables highest performance for OLTP | Analytics | Consolidation workloads

Fastest OLTP

- **Fastest OLTP I/O** with scale-out storage, RDMA to storage, and NVMe flash
- **Fastest scale-out** with unique RDMA algorithms for inter-node cluster coordination
- **Fastest recovery** from unplanned downtime and component failure



Fastest Analytics

- **Unique Smart Scan** automatically offloads data intensive SQL operations to storage
- **Unique Smart Flash Cache and Storage Index** automatically accelerate database I/O
- **Unique Columnarization** automatically converts data to fast In-Memory Columnar format in flash

Best Consolidation

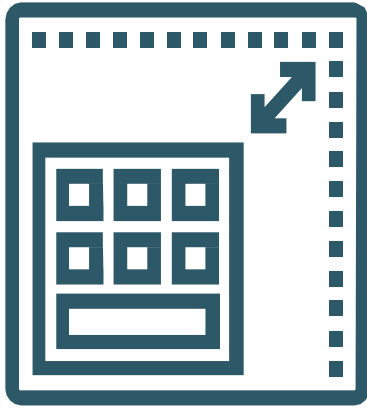
- **Unique Prioritization** of latency sensitive or important workloads
- **Unique Workload Isolation** of multiple tenants or workloads



ExaC@C Scaling Concepts

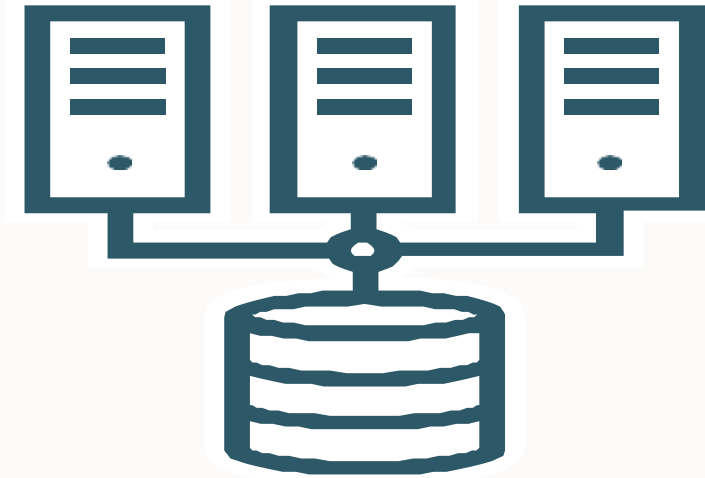


Vertical vs Horizontal Scaling



Vertical scaling (or "scaling up")

- Adding more hardware to an existing machine
- Run the same workload on better specs;
- For example, if a server requires more processing power, vertically scaling the device would mean upgrading its CPU.



Horizontal scaling (or "scaling out")

- Add more nodes;
- Do not improve the specifications of the existing machine;
- Add more same-size servers to the cluster and share the workload across more devices.



ExaC@C X10M Shapes



Exadata Cloud@Customer X10M

Extreme scale and performance with more capabilities throughout the stack



Scale-out Database Servers

- **190** AMD EPYC usable processor cores per database server
- Up to **2,800 GB** of usable DDR5 Memory per database server

Scale-out intelligent Storage Servers

- **64** AMD EPYC processor cores per storage server
- Three tiers of storage in each high capacity storage server with automatic tiering of data to minimize access latency and maximize throughput
 - **1.25 TB DDR5** Exadata RDMA Memory (XRMEM) plus
 - **27.2 TB** NVMe Flash plus
 - **80 TB** of usable disk space

Dedicated active-active 100 Gbit/s RDMA over Converged Ethernet network

- Low-latency, high-bandwidth connectivity
- Links multiple racks of database and storage servers together

Exadata Cloud@Customer X10M Shapes



Quarter Rack – X10M

Total Capacity

DB Servers

380 Cores – 2,780 GB Memory

Storage Servers

192 TB Usable DB Storage

NEW
SHAPE



Quarter Rack – X10M - L

380 Cores – **4,180 GB Memory**

192 TB Usable DB Storage

NEW
SHAPE



Quarter Rack X10M-XL

380 Cores – **5,600 GB Memory**

192 TB Usable DB Storage

There are no Half and Full rack shapes.
Expand Quarter Racks using Expansion Servers.

Exadata Cloud@Customer X10M - Quarter Rack Expansions

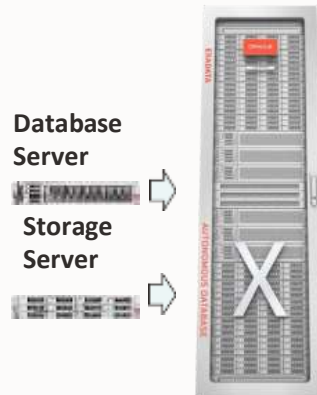
All Configurations greater than a Quarter Rack are elastic

Standard Configuration



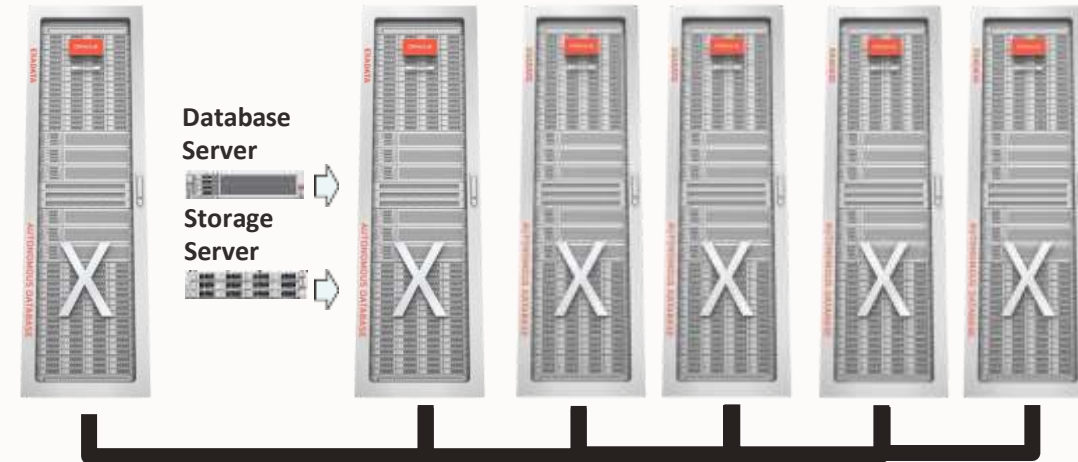
Incrementally add
Database and
Storage Servers

Elastic Configuration



Add Racks to
Continue Scaling

Multi-Rack Configuration



Start with a Standard Configuration

- Quarter Rack
- Quarter Rack-L
- Quarter Rack – XL

Elastically Expand Rack with Servers

- Database Server
- Storage Server
- Can NOT mix Database Servers with different memory configurations
 - e.g. X10M cannot be mixed with X10M-XL

Continue to Expand Servers using Expansion Rack(s)

- Up to 6 Racks including primary rack
- Max 32 Database Servers
- Max 64 Storage Servers
- Max 5 Expansion Racks

ExaC@C Management Tools



Exadata Cloud Automation on OCI Console

Oracle Cloud Web base UI, REST APIs, SDK, CLI, Terraform

- Scale OCPUs
- Create Database Homes and Databases
- Schedule Infrastructure Maintenance
- Update Operating System, Grid Infrastructure, and Databases
- Backup and recovery
- Enable Data Guard

Create Database

Database name:

Database version:

PDB name:

Database Home:

Create administrator credentials:

Scale VM Cluster

Configure the VM cluster

Specify OCPU count per virtual machine:

Requested OCPU count for the Exadata VM cluster:

Current Exadata storage:

Create Backup

Name:

If you previously used RMAN or dbcli to configure backups and then you switch to using the Console or the API for backups, a new backup configuration is created and associated with your database. This means that you can no longer rely on your previously configured unmanaged backups to work.

Enable Data Guard

Data Guard association details

Protection mode:

Transport type:

Async

Select Peer VM Cluster

Peer region:

US East (Ashburn)

Exadata Cloud Command Line Interface (*dbaascli*)

How to upgrade DBAAS Cloud Tooling using *dbaascli* (Doc ID 2350471.1)

Database Commands

- *dbaascli* database create
- *dbaascli* pdb create
- *dbaascli* pdb relocate



Backup Commands

- *dbaascli* database backup
- *dbaascli* database recover
- *dbaascli* create-dbstorage



Database Home Patch


- *dbaascli* database upgrade
- *dbaascli* db home patch
- *dbaascli* grid patch
- *dbaascli* update-dbhome



Autonomous Database



Autonomous Database on OCI Menu



The screenshot displays the Oracle Cloud console interface. At the top, the Oracle Cloud logo is on the left, followed by a 'Cloud Classic' button and a search bar. Below the header, a left-hand navigation menu lists various services: Home, Compute, Storage, Networking, **Oracle Database** (highlighted with a red dashed border), Databases, Analytics & AI, Developer Services, Identity & Security, and Observability & Management. The main content area is titled 'Oracle Database' and features a grid of service tiles. The 'Overview' tile is highlighted with a red solid border and contains links to 'Autonomous Database' (with sub-links for Autonomous Data Warehouse, Autonomous JSON Database, and Autonomous Transaction Processing), 'Globally Distributed Autonomous Database', and 'Autonomous Dedicated Infrastructure'. Other tiles include 'Oracle Exadata Database Service on Dedicated Infrastructure', 'Oracle Exadata Database Service on Cloud@Customer', 'Exadata Fleet Update', 'External Database', 'Data Safe - Database Security' (with sub-links for Overview, Security Assessment, User Assessment, Data Discovery, Data Masking, Activity Auditing, and SQL Firewall), 'Database Backups', 'GoldenGate', and 'Operator Access Control'.

Oracle Cloud Cloud Classic > Search resources, services, documentation, and Marketplace

Search

Home
Compute
Storage
Networking
Oracle Database
Databases
Analytics & AI
Developer Services
Identity & Security
Observability & Management

Oracle Database

Overview

- Autonomous Database**
 - Autonomous Data Warehouse
 - Autonomous JSON Database
 - Autonomous Transaction Processing
- Globally Distributed Autonomous Database**
- Autonomous Dedicated Infrastructure**

Oracle Exadata Database Service on Dedicated Infrastructure

Oracle Exadata Database Service on Cloud@Customer

Exadata Fleet Update

External Database

Data Safe - Database Security

- Overview
- Security Assessment
- User Assessment
- Data Discovery
- Data Masking
- Activity Auditing
- SQL Firewall

Database Backups

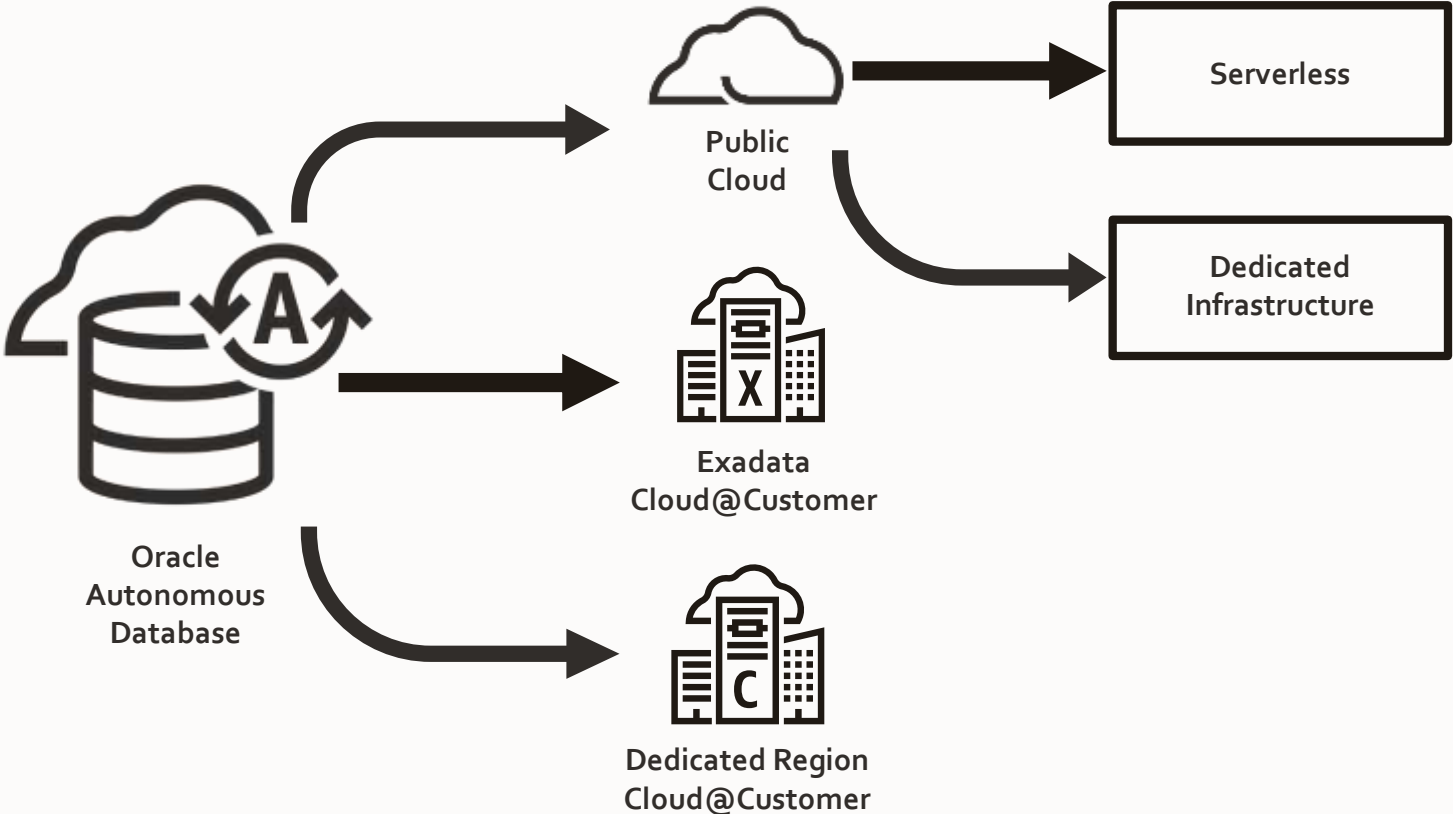
GoldenGate

Operator Access Control

Oracle Base Database Service

Multiple deployment choices

The most complete support for hybrid cloud strategies



Oracle Public Regions

Hyperscale cloud regions in more than 40 worldwide locations



Dedicated Regions

All OCI services, running in customer data centers



Exadata Cloud@Customer

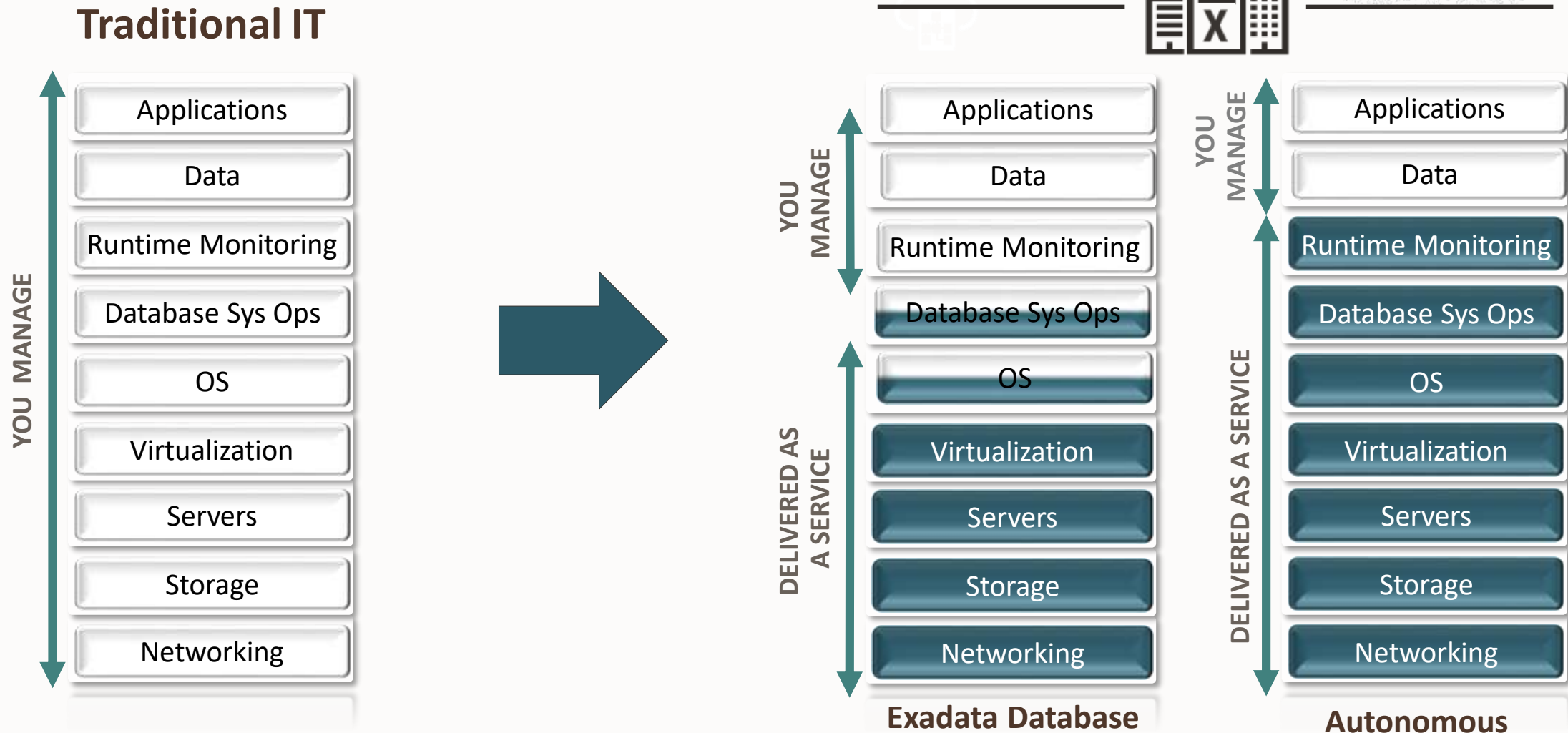
Cloud Autonomous Databases, running in your data center



Worldwide or exactly where you need it, with scale and control



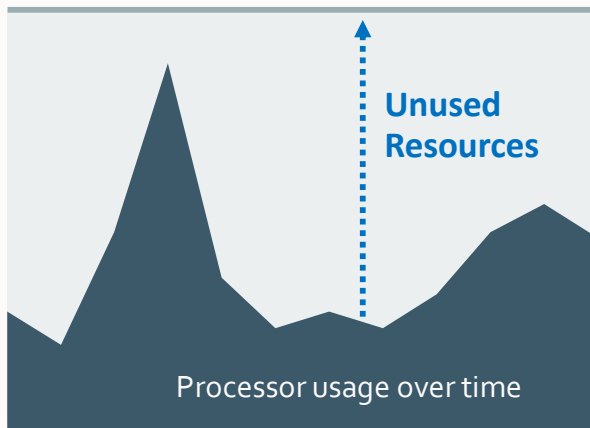
Transfer more responsibility to the service while lowering costs



Online, Elastic Scaling with Exadata and Autonomous Database Services

Pay only for what you use, in OCI or your data center

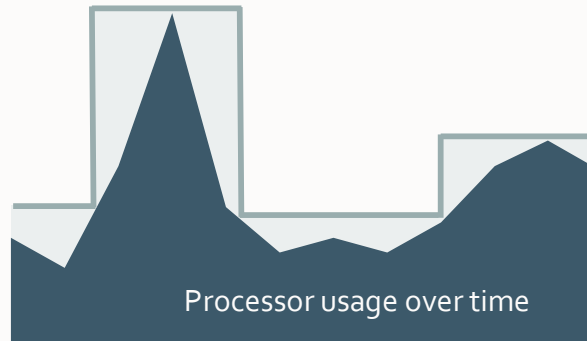
Total Processor Resources



On-Premises & Other Clouds – Static

Purchase server processors and software licenses for **highest projected peak load**

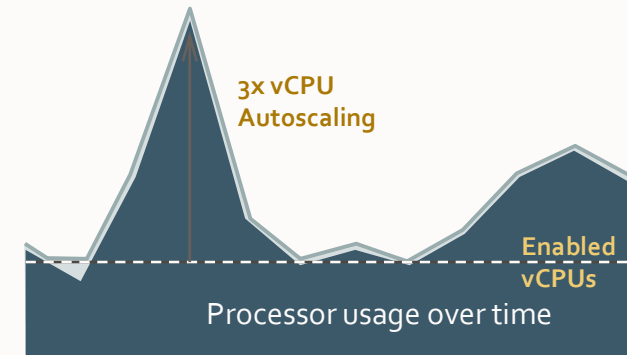
Manually Scaled CPU cores



Exadata Database Service – Elastic

Adjust enabled CPUs to match **actual workload** via APIs and web UI - CPUs are charged per second

Autonomously Scaled CPU cores



Autonomous Database – Self-scaling

Automatically scales CPU core consumption based on **dynamic workload demands**, in real-time



Retirement Of The OCPU Billing Metric In Autonomous Database Serverless (Doc ID 2998742.1)

ACTIONS

What action do I need to take now?

We encourage customers to provision all new Autonomous Data Warehouse and Autonomous Transaction Processing databases or clones with the ECPU billing metric. We also encourage customers to update all existing databases to the ECPU billing metric, which is a simple and seamless button click or API call, as described in the documentation here. While you may choose not to update your existing databases' billing metric at this time, Oracle may convert your databases from the OCPU billing metric to the ECPU billing metric in the future.

Note: Autonomous Data Warehouse databases provisioned as part of Oracle Data Intelligence Platform (formerly Fusion Analytics Warehouse) service instance will be updated to the ECPU billing metric by Oracle. No user action is required on those databases.

How will updating my databases to the ECPU billing metric affect my service?

Updating your Autonomous Database Serverless to the ECPU billing metric will have **no impact to your service** and incur **no downtime**.

Which SKUs are affected by this retirement notice?

Oracle Autonomous Database will be retiring the OCPU-based SKUs and replacing them with the ECPU-based SKUs listed below:

Retired OCPU Billing Metric - SKU Name	Part Number	Metric
Oracle Autonomous Data Warehouse	B89040	OCPU Per Hour
Oracle Autonomous Data Warehouse - BYOL	B89039	OCPU Per Hour



Retirement Of The OCPU Billing Metric In Autonomous Database On Dedicated Infra (Doc ID 2998755.1)

ACTIONS

What action do I need to take now?

We encourage users to provision new Autonomous VM Clusters (AVM) with the ECPU billing metric. Oracle will offer an online conversion capability to update existing OCPU AVMs and their respective Autonomous Container Databases and Autonomous Databases to the ECPU billing metric via the OCI console and API in Q3 CY2024. In the meantime, users can also use database cloning to migrate existing OCPU ADBs to ECPU if they have AVMs configured with the ECPU billing metric. While you may choose not to update your existing databases' billing metric at this time, Oracle may convert your databases from the OCPU billing metric to the ECPU billing metric in the future.

Which SKUs are affected by this retirement notice?

Oracle Autonomous Database on Dedicated Infrastructure will be retiring the OCPU-based SKUs and replacing them with the ECPU-based SKUs listed below:

Retired OCPU Billing Metric - SKU Name	Part Number	Metric
Oracle Autonomous Data Warehouse - Dedicated	B92182	OCPU Per Hour
Oracle Autonomous Data Warehouse – Dedicated - BYOL	B92184	OCPU Per Hour
Oracle Autonomous Transaction Processing - Dedicated	B92181	OCPU Per Hour
Oracle Autonomous Transaction Processing – Dedicated - BYOL	B92183	OCPU Per Hour



EXaC@C Licensing Model

Cost-Effective Software Licensing Models

Subscribe to infrastructure and choose License Included or Bring Your Own License (BYOL)

License Included Pricing

Ideal for organizations with new workloads and dynamic utilization

- Includes Oracle Database Enterprise Edition with all options and management packs at one low price
- Consumption-based pricing for software and vCPUs, includes software support and paid for with Universal Credits



Bring Your Own License Pricing

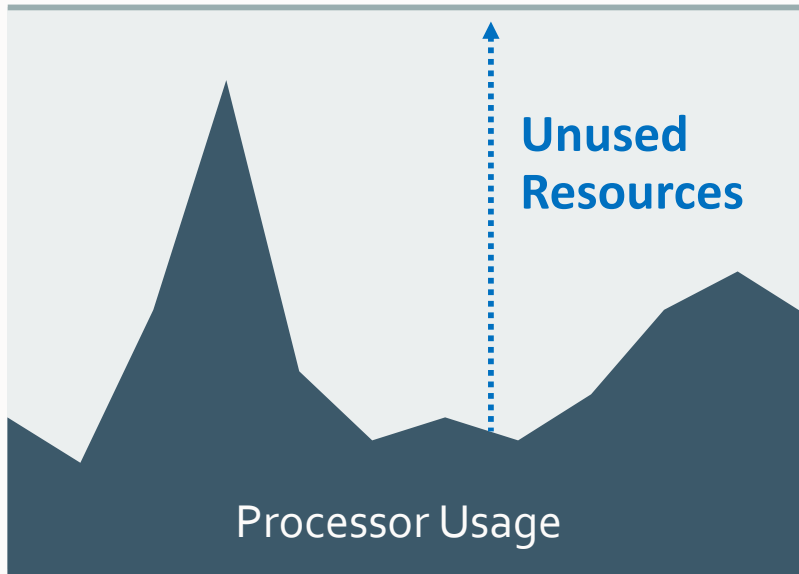
Ideal for organizations moving existing workloads with consistent usage to the cloud

- Utilize existing on-premises licenses and pay software support for them
- Very-low, compute-only consumption pricing, paid for with Universal Credits
- Includes Transparent Data Encryption, Data Safe, Oracle Machine Learning, and select management packs at no additional cost

Online, Elastic Scaling with Exadata Cloud@Customer

Pay Only for What You Use

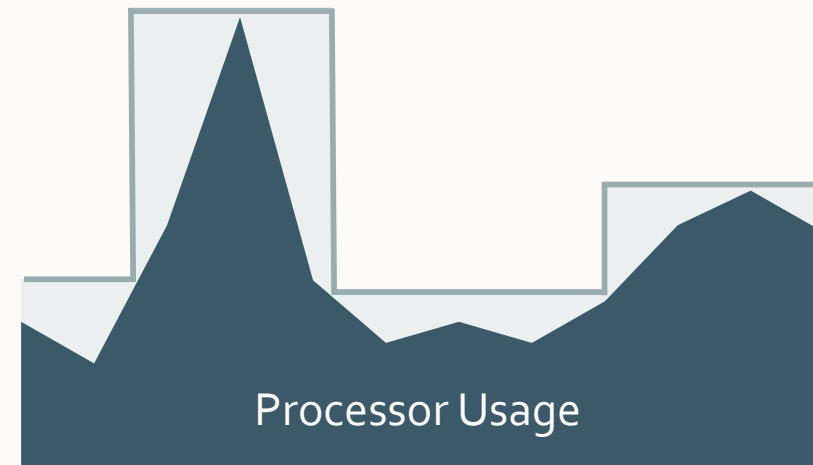
Total Processor Resources



On-Premises – Static

Purchase server processors and software licenses for **highest projected peak load**

Manually Scaled vCPUs



Exadata Database Service – Elastic

Adjust enabled vCPUs to match **actual workload** via APIs and web UI - vCPUs are charged per second

OCI License Manager

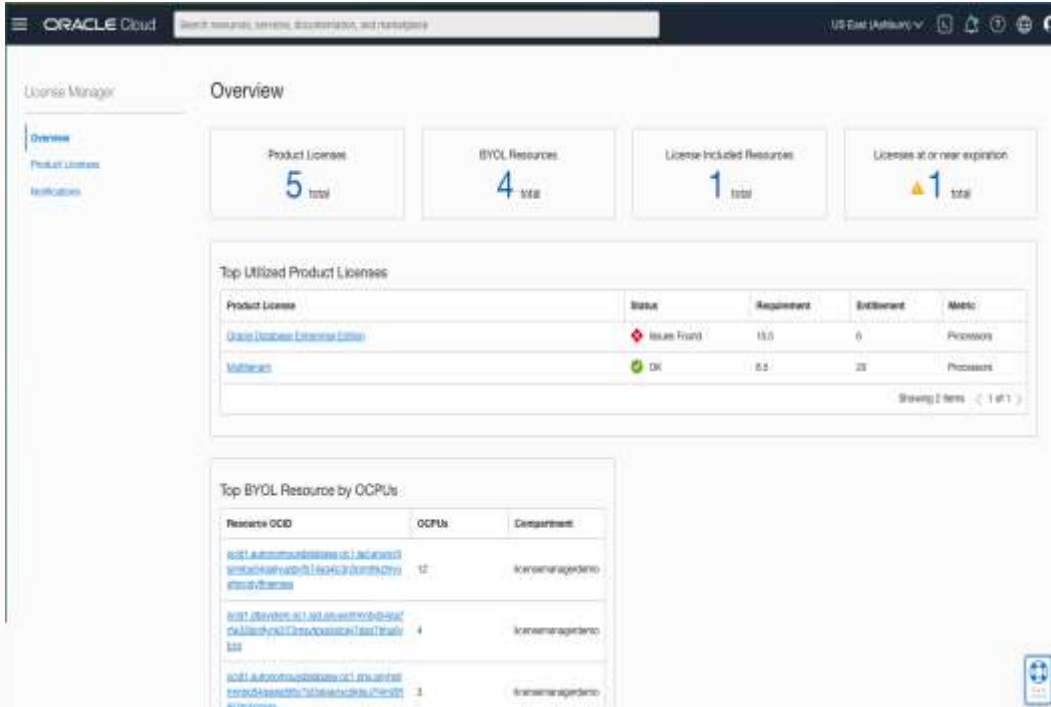
Oracle License Manager on OCI Console

The screenshot displays the Oracle Cloud console interface. At the top, the header includes the Oracle Cloud logo, a 'Cloud Classic' button, a search bar with the text 'Search resources, services, documentation, and Marketplace', and a 'US' region indicator. On the left sidebar, a search bar is present above a list of navigation items: 'Developer Services', 'Identity & Security', 'Observability & Management', 'Hybrid', 'Migration & Disaster Recovery', 'Billing & Cost Management', 'Governance & Administration' (highlighted with a red dashed box), 'Marketplace', and 'OCI Classic Services'. The main content area is divided into three columns. The first column contains 'Cloud Advisor' with sub-items: Overview, Recommendations, Work Requests, History, and Settings. The second column contains 'Tenancy Management' with sub-items: Tenancy Explorer, Quota Policies, Limits, Quotas and Usage, Tag Namespaces, and Domain Management. The third column contains 'License Manager' (highlighted with a red dashed box) with sub-items: Overview, Product Licenses, and Notifications. The 'Overview' link under 'License Manager' is the active selection.

License Manager

License Manager is a free, opt-in service that makes it easier for you to Bring Your Own License (BYOL) on OCI with the following capabilities:

- Automating the license portability rules for Oracle Database products to OCI Database service
- Single pane of glass to track licensing needs on both IaaS and PaaS resources. Use the same tool to track Oracle and Third-party license utilization
- Pro-active email notification on over-subscription and license expiration scenarios.



License Manager e-mail notification



Dear Customer,

Re: License Manager Summary.

The following is a summary of License Manager items that require your attention for licensemanagerdemo as of date 05/09/2022.

Sincerely,
License Manager

Product Licenses Over Subscribed

Product Name	Metric	Requirement	Entitlement	License Records
Oracle Database Enterprise Edition	Processors	9	6	2

License Records near or past expiration date for License or Support Contract

Product Name	Metric	License Record Name	License Record Product Id	License Expiration Date	Support Contract End Date
Oracle Database Enterprise Edition	Processors	323213	231231231	05/03/2122	05/04/2022 - Expired

Copyright © 2021, Oracle and/or its affiliates.

[Contact Us](#) | [Legal Notices and Terms of Use](#) | [Privacy Statement](#)



Resources

- **Exadata Cloud At Customer Product Page**

<https://www.oracle.com/engineered-systems/exadata/cloud-at-customer/>

- **Exadata Cloud At Customer X10M Datasheet**

<https://www.oracle.com/a/ocom/docs/engineered-systems/exadata/exadb-cc-x10m-ds.pdf>

- **OCI Cost Estimator**

<https://www.oracle.com/cloud/price-list/>

- **Learning - Oracle Cloud at Customer sales Specialist 2023**

<https://learn.oracle.com/ols/learning-path/oracle-exadata-x10m-introduction/89350/128363>

- **Learning - Oracle Compute Cloud@Customer 2024 Sales Specialist**

<https://learn.oracle.com/ols/learning-path/oracle-compute-cloudcustomer-2024-sales-specialist/89350/128629>

- **OCI Licensing Manager Documentation**

<https://docs.oracle.com/en-us/iaas/Content/LicenseManager/Concepts/licensemanageroverview.htm>

- **Autonomous Database Get Started**

<https://www.oracle.com/autonomous-database/get-started>

- **Autonomous Data Warehouse**

<https://www.oracle.com/autonomous-database/autonomous-data-warehouse/>

- **Autonomous Transaction Processing**

<https://www.oracle.com/autonomous-database/autonomous-transaction-processing/>

- **Autonomous JSON Database**

<https://www.oracle.com/autonomous-database/autonomous-json-database>

- **Autonomous Database Free services**

<https://www.oracle.com/autonomous-database/free-trial/>

- **Architecture Center Autonomous Database**

<https://docs.oracle.com/en/cloud/paas/autonomous-database/index.html>

- **Machine Learning on Oracle Databases**

<https://www.oracle.com/br/artificial-intelligence/database-machine-learning/>

- **Autonomous Database ECPU Billing**

<https://www.oracle.com/a/ocom/docs/autonomous-database-ecpu-faq.pdf>

Thank you

Marcel Lamarca

marcel.lamarca@oracle.com



ORACLE