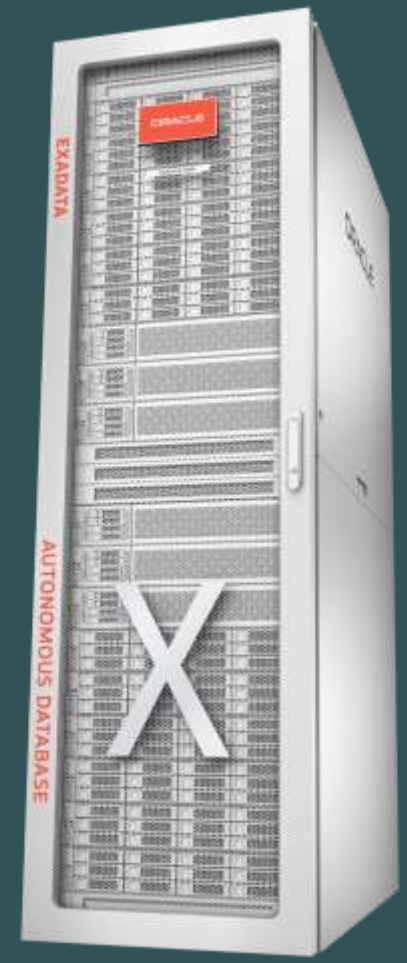
ORACLE

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'

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. 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

Exadata

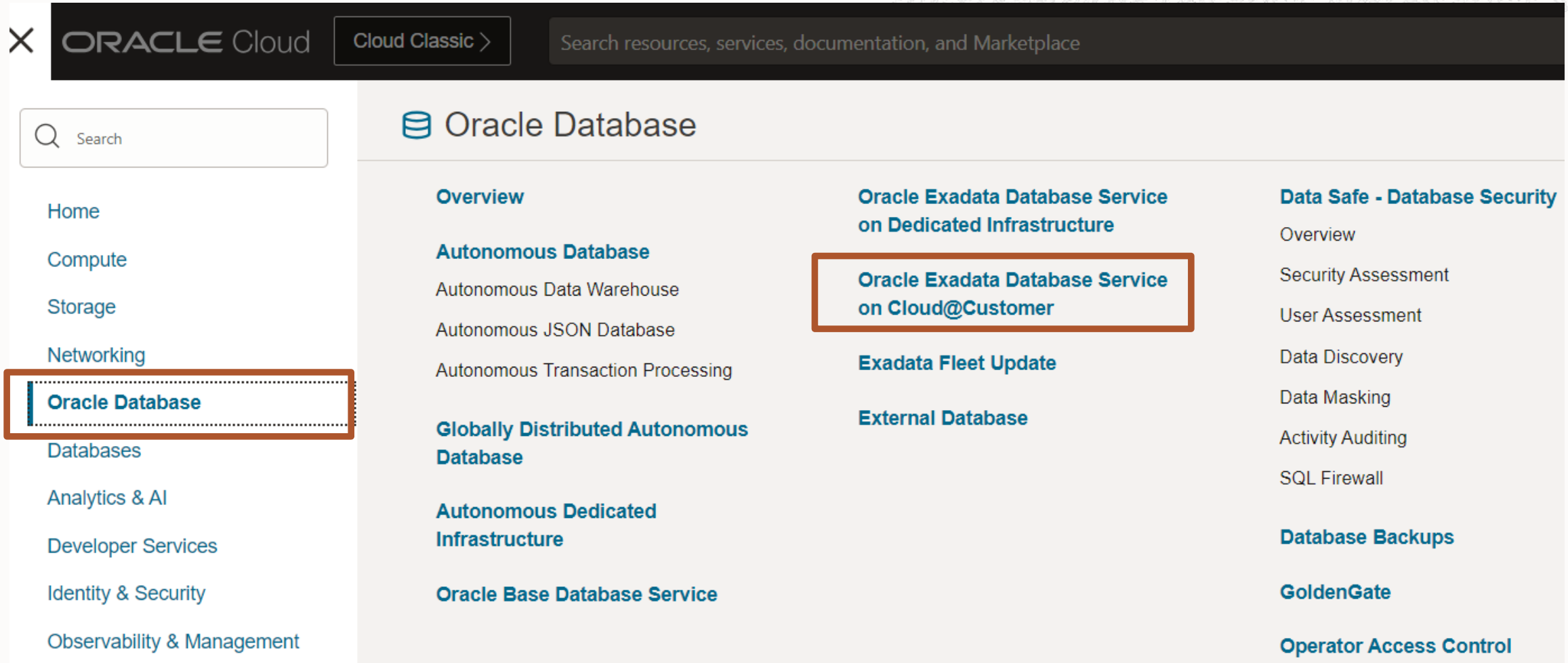
Databases

Private Cloud Appliance

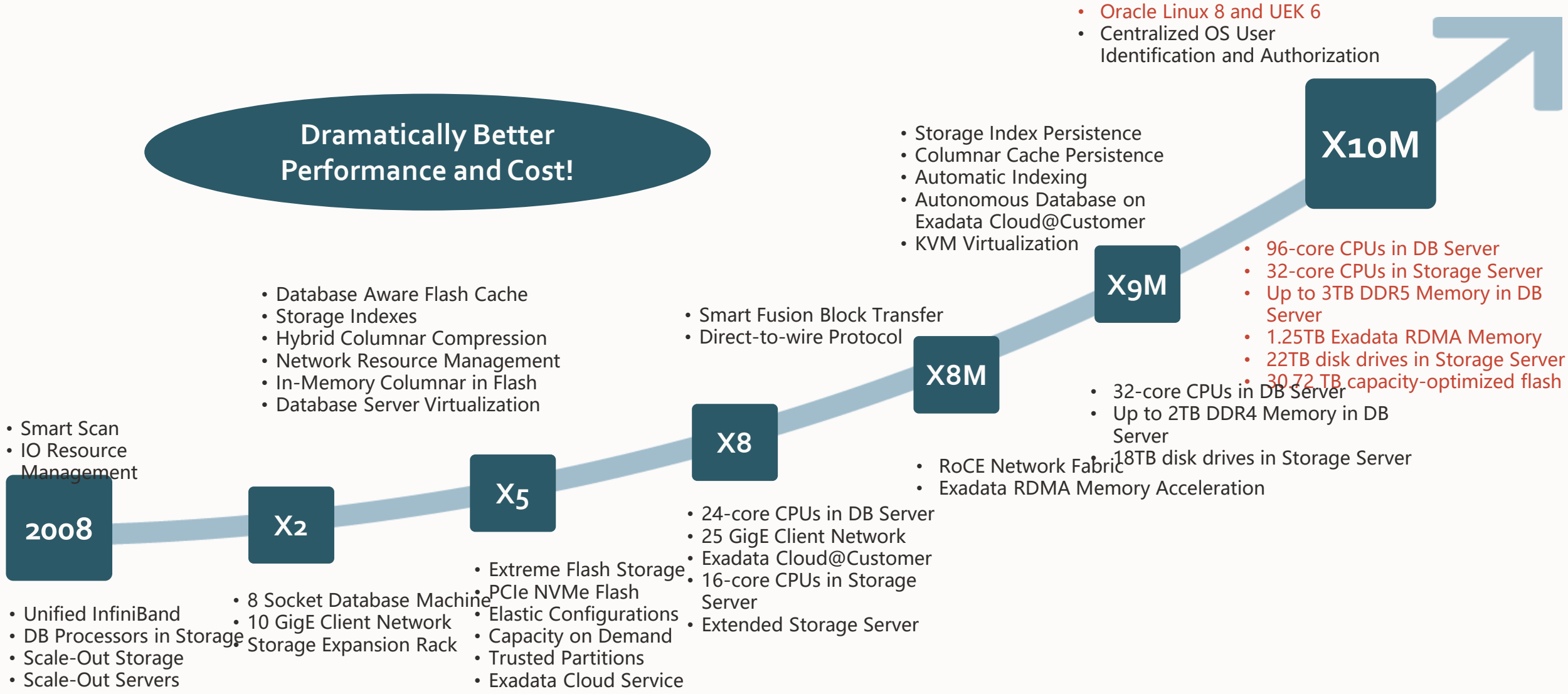
Middleware / Apps

EXaC@C Architecture Overview

Exadata Cloud At Customer Ob OCI Menu

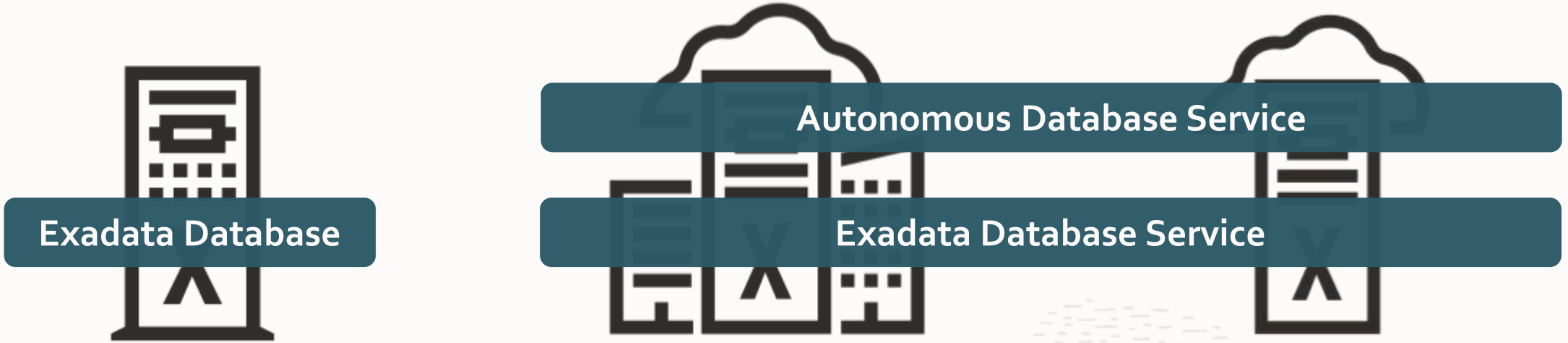


Exadata Advantages Increase Every Year



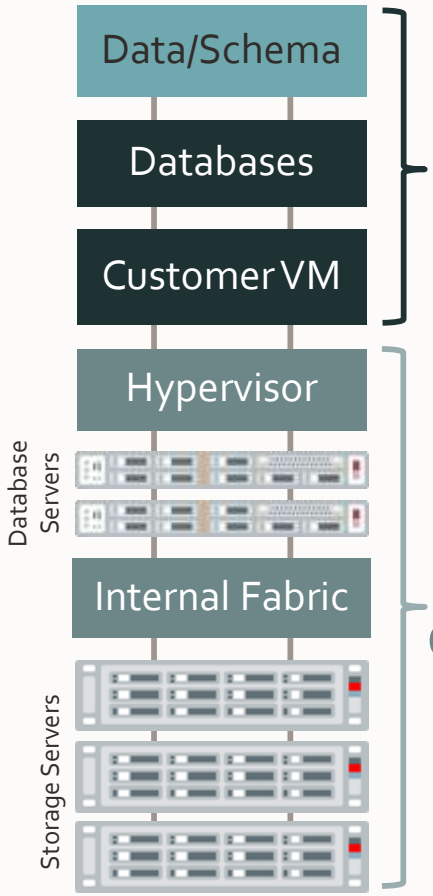
We meet you where you are in your database consolidation journey

On-Premises Traditional	Cloud@Customer	Public Cloud, Dedicated Region, and Oracle Database@Azure
Exadata Database Machine	Exadata Cloud@Customer	Exadata Cloud Infrastructure



Customer Data Center	Customer Data Center	Oracle Cloud
Purchased	Subscription	Subscription
Customer Managed	Oracle Managed	Oracle Managed

Simple Cloud Management Model in at Customer Cloud



Customer owns everything inside database

- Data, schema, encryption keys

Customer subscribes to database services

- Customer manages VMs and Databases using Cloud Automation (UI / APIs)
- Automation to create, delete, patch, backup, scale up/down, etc.
- Runs all supported Oracle Database versions 12.1.0.2, 12.2.0.1, 19c and 21c
- Customer controls access to customer VM
- Customer can install and manage additional software in customer VM
- Oracle staff are not authorized to access customer VM

Oracle owns and manages infrastructure

- Hypervisor, database and storage servers, storage network
- Patching, security scans, security updates
- Monitoring and maintenance
- Customer not authorized to access Oracle infrastructure

Exadata Unique Cloud-Scale Database-Optimized Architecture

Unique Next Generation RAC Scale-Out for Any Workload

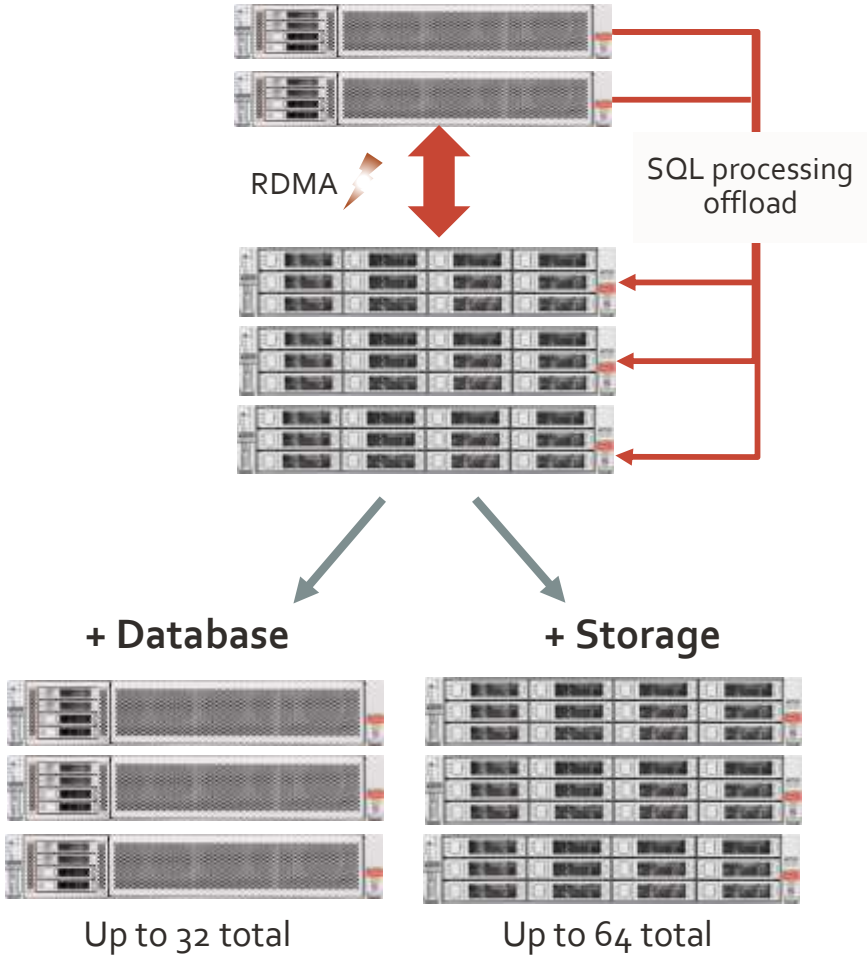
- Application-transparent database scalability & availability

Start small with minimum size High Availability configuration

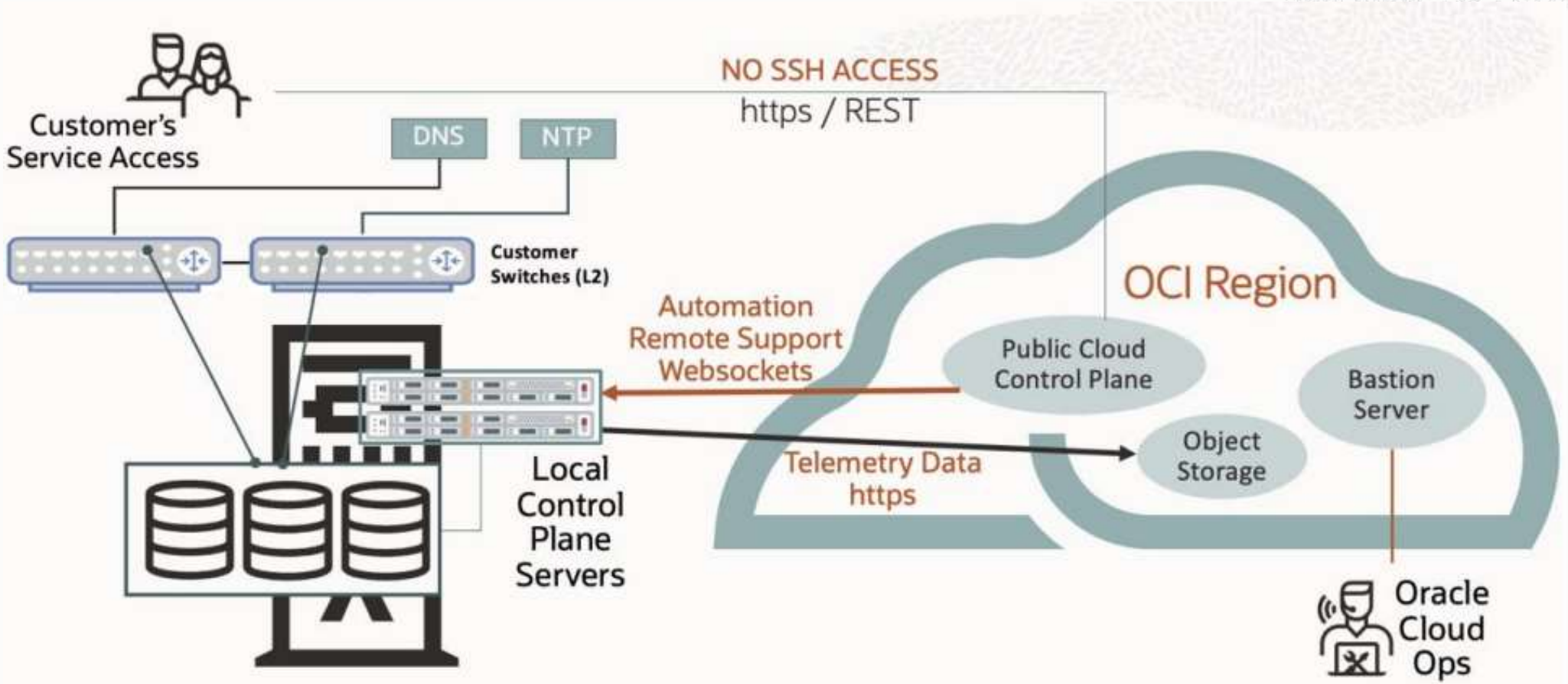
- 2 Compute Servers, 3 Storage Servers
- Dedicated to you – no noisy or malicious neighbors

Add individual Database or Storage servers as needed

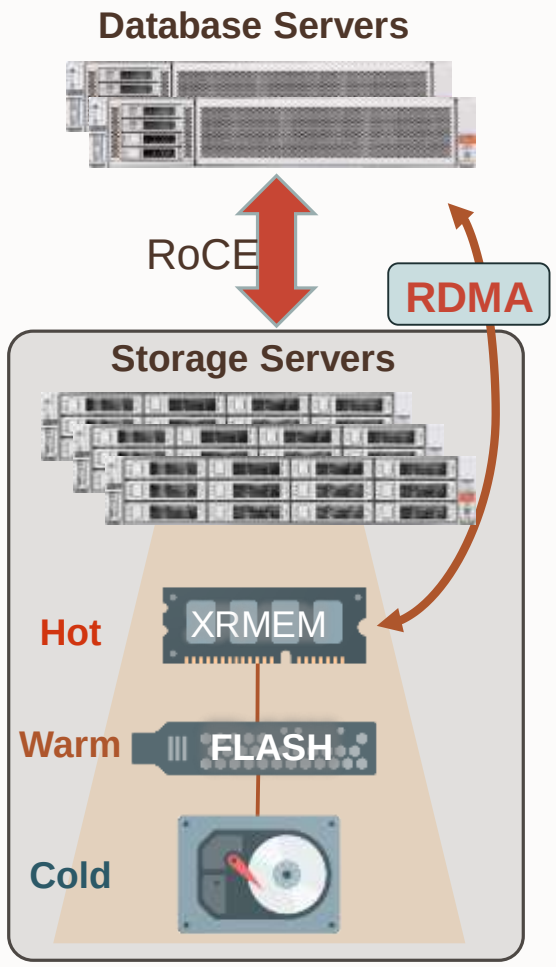
Expansion happens **fully online**



Simple Cloud Management Model in at Customer Cloud



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

New Exadata RDMA Memory (XRMEM) DRAM Cache
Delivers lowest latency and highest throughput OLTP read performance in industry

Enhanced Linux OS and Kernel
Linear performance scaling on very large core count CPUs
Seamless rolling upgrade to the latest Oracle Linux 8.7 and UEK6

Optimized Smart Scan
Improves scale for more complex queries and support for parallelism

Faster Decryption and Decompression Algorithms
Allows data to be stored securely without impacting performance

Storage Index and Columnar Cache Persistence
Ensures consistent performance for analytic workloads after storage server maintenance

Open Monitoring
Transmit alerts and metrics to popular observability platforms

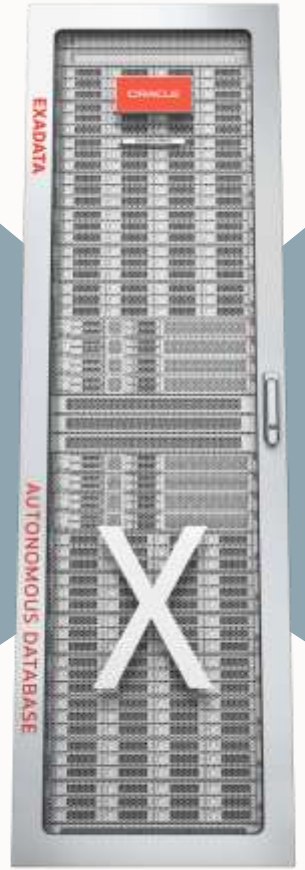
Supports enhanced Oracle Database algorithms
Oracle Machine Learning, Graph, Spatial, In-Memory, Blockchain Tables, JSON

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

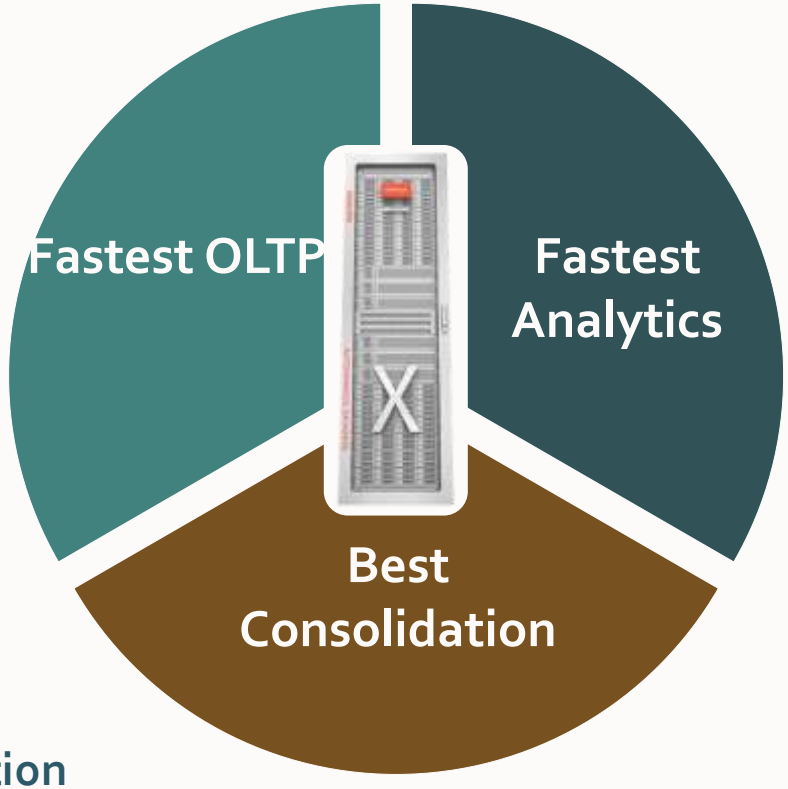
- Offload SQL to Storage
- RoCE Fabric
- 100 GB
- PMEM Commit and Data Accelerators
- Smart Flash Cache
- PCI Flash
- Storage Indexes
- Columnar Flash Cache
- Hybrid Columnar Compression
- 10:1
- I/O Resource Management
- Network Resource Management
- In-Memory Fault Tolerance
- Exafusion Direct-to-Wire Protocol

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

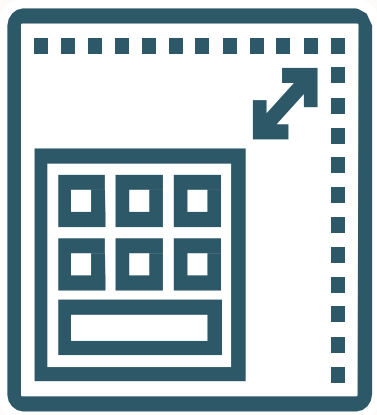
- **Unique Smart Scan** automatically offloads data intensive SQL operations to storage
- **Unique Smart Flash Cache** and **Storage Index** automatically accelerate database I/O
- **Unique Columnarization** automatically converts data to fast In-Memory Columnar format in flash

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



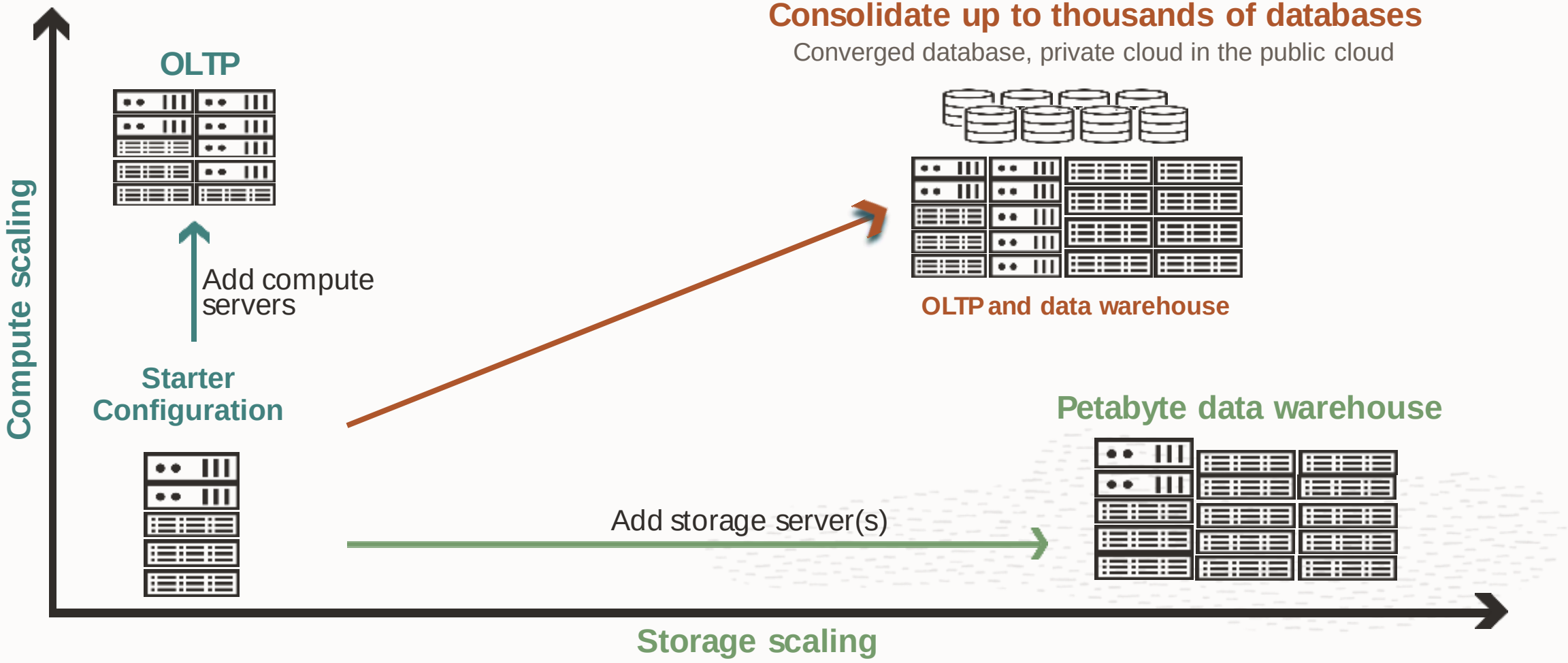
Vertical scaling (or "scaling up")

- 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.

Easily right-size your service by adding compute and storage as needed

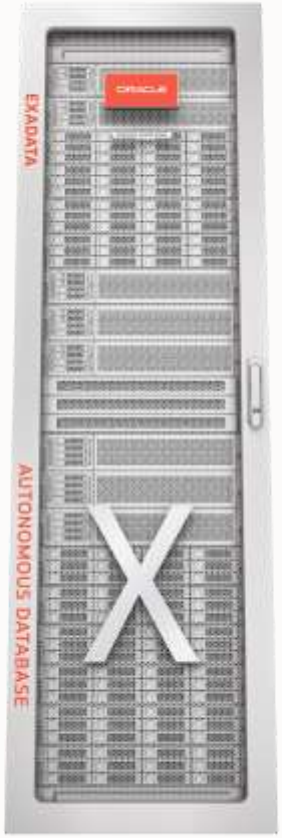


Online – No downtime scaling

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

<u>Total Capacity</u>
DB Servers
Storage Servers

380 Cores – 2,780 GB Memory
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.

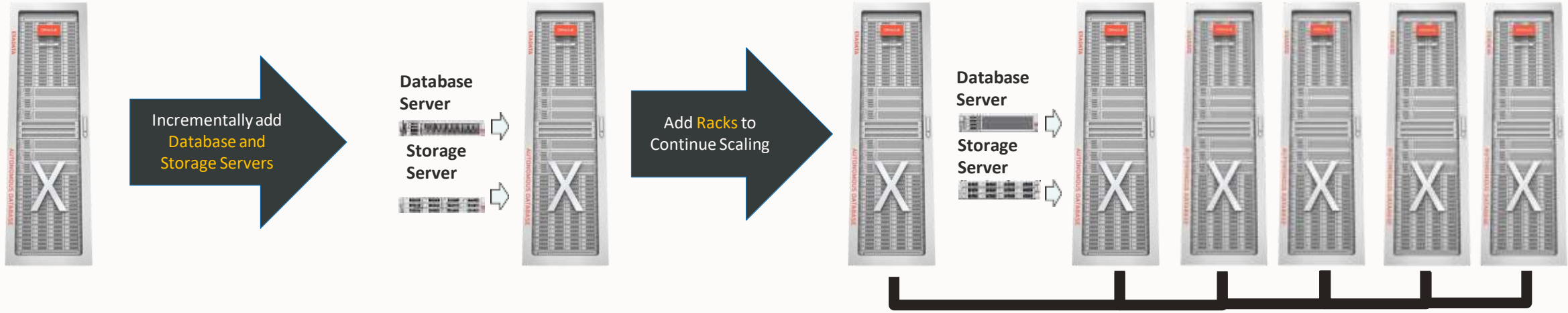
Exadata Cloud@Customer X10M - Quarter Rack Expansions

All Configurations greater than a Quarter Rack are elastic

Standard Configuration

Elastic Configuration

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

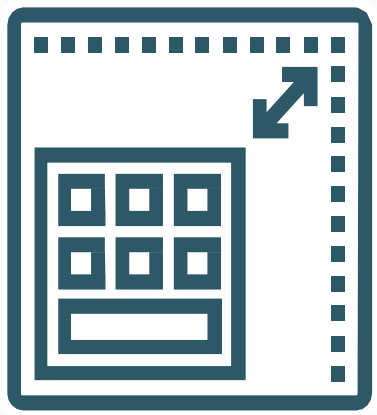
- Can NOT mix Database Servers with different memory configurations
  - e.g. X10M cannot be mixed with X10M-XL

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 Scaling Concepts

Vertical vs Horizontal Scaling



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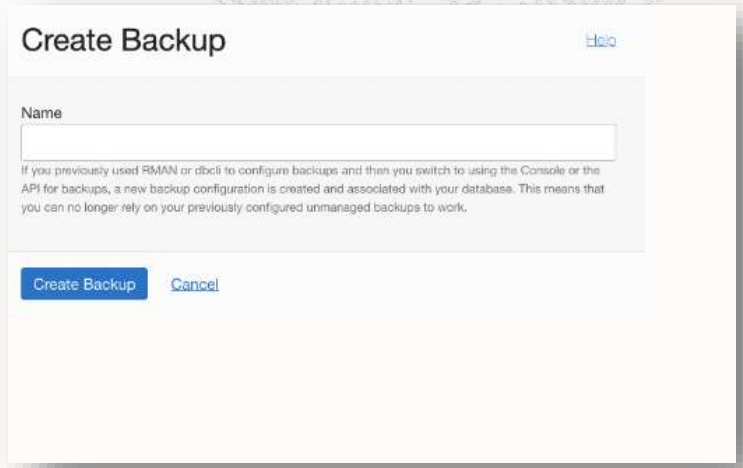
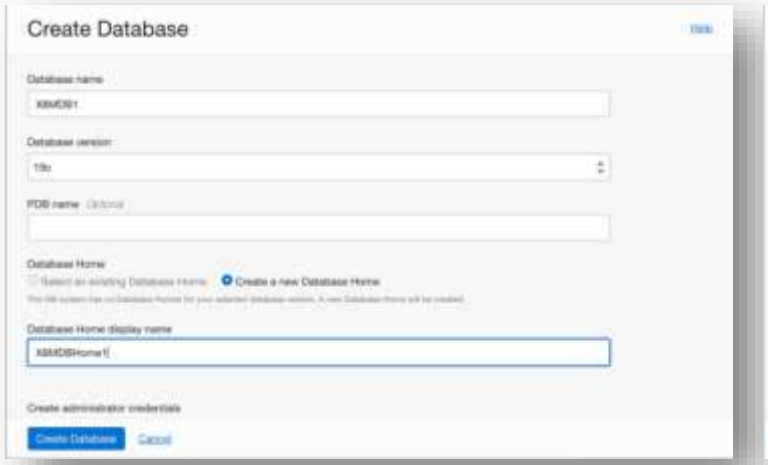
ExaC@C Management Tools

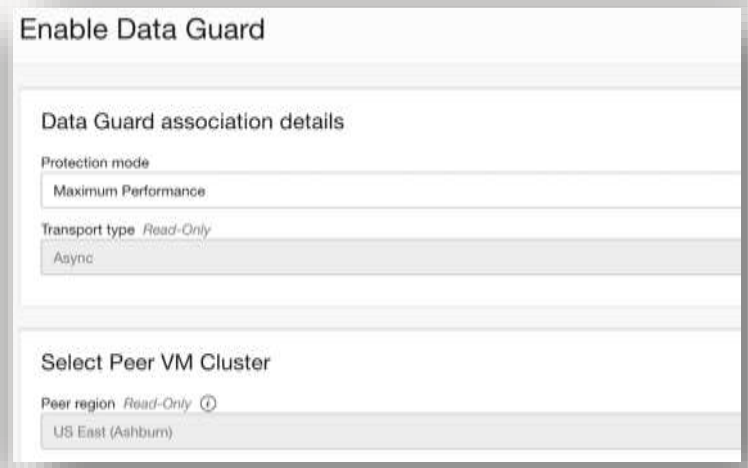
Exadata Cloud Automation on OCI Console

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







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

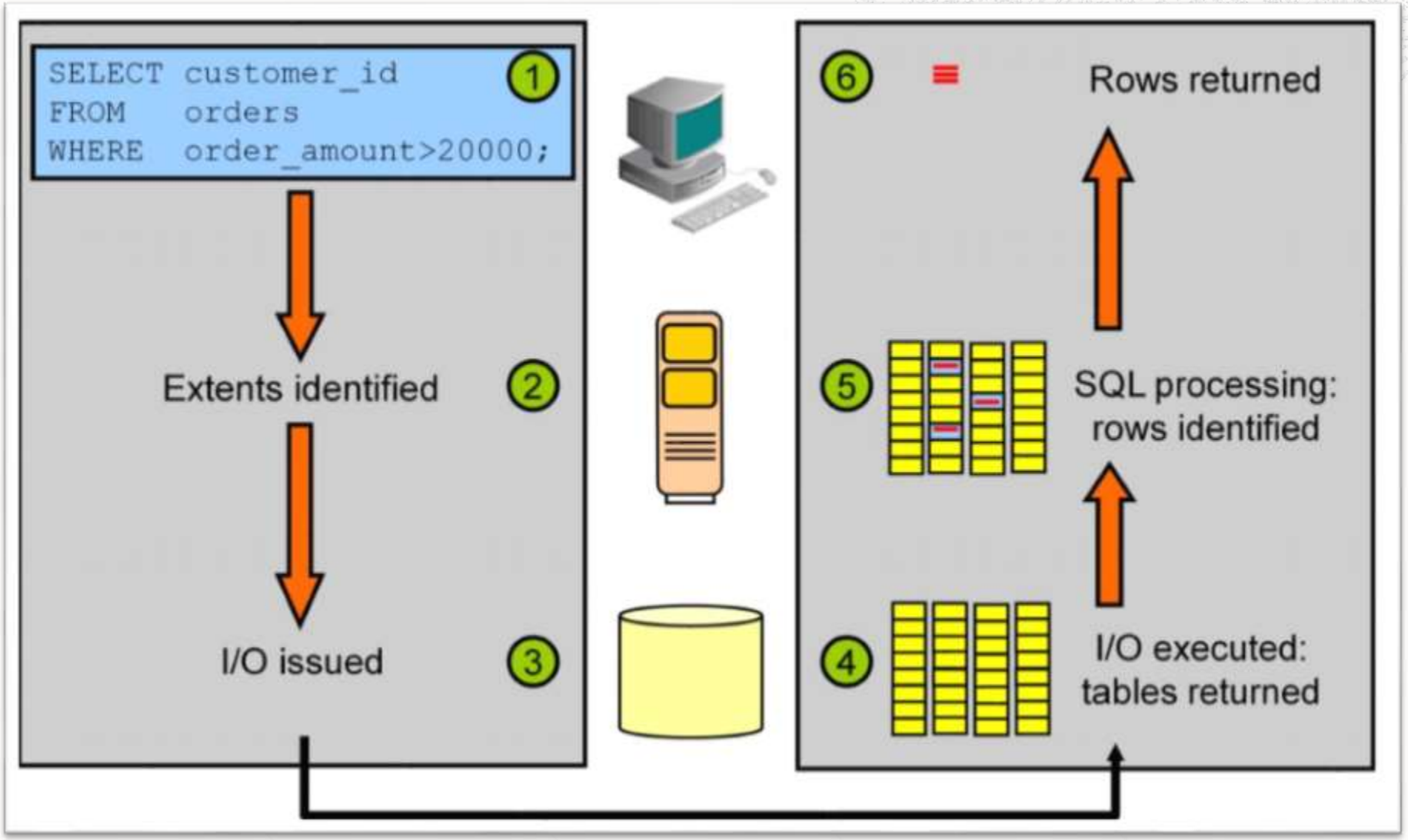
Backup Commands

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

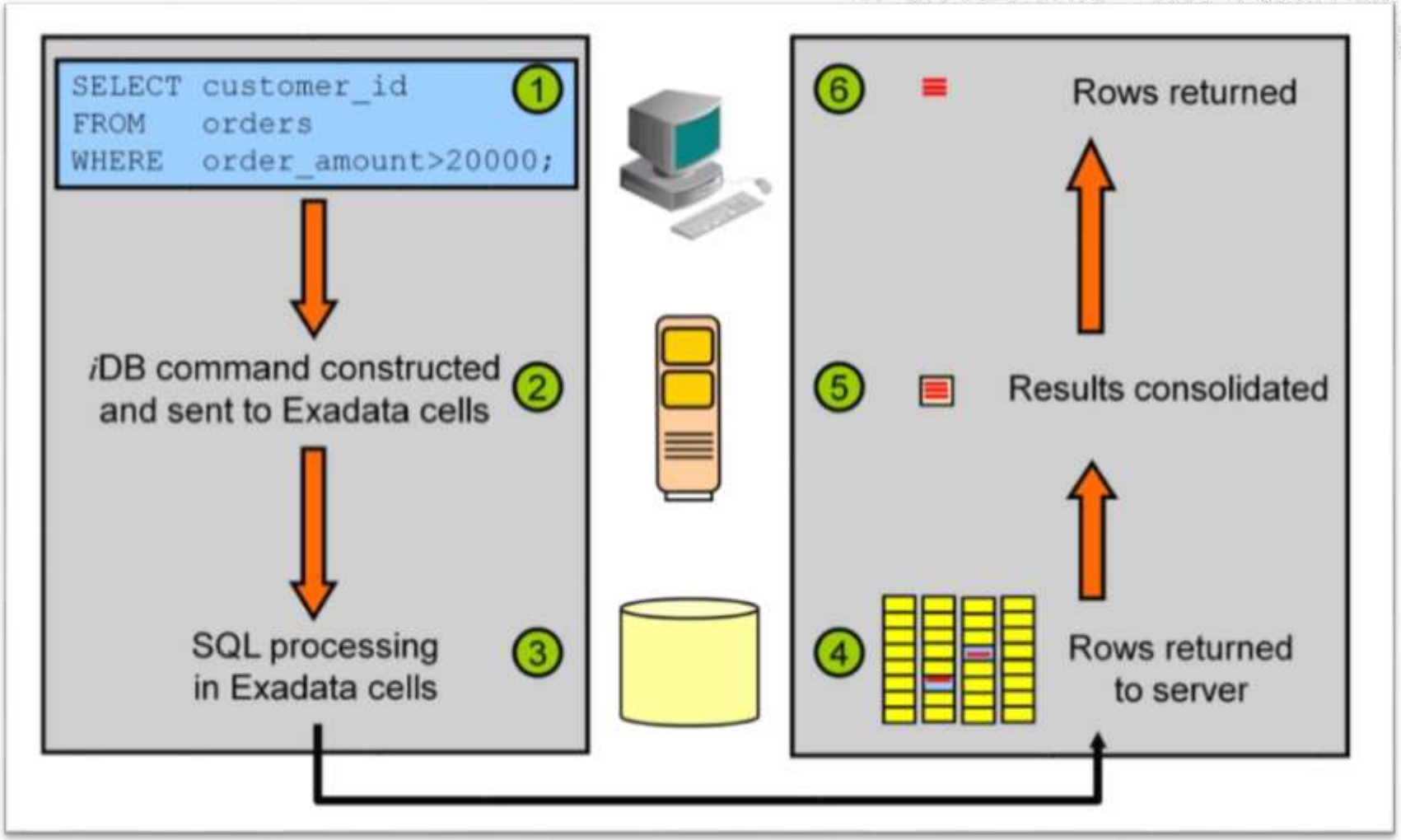
Database Home Patch

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

Oracle Database | No Exadata System



Exadata Cloud a Smart Scan | Off Load Querying



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

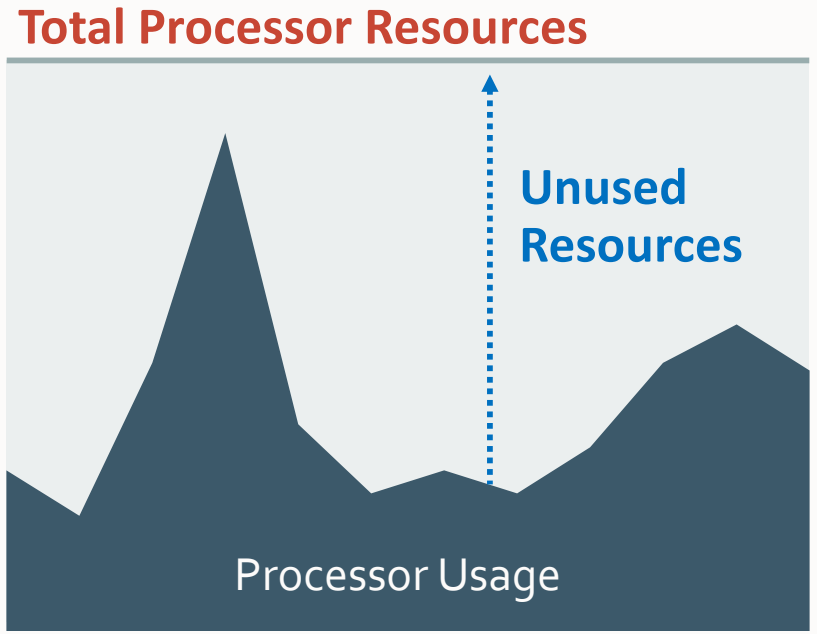
Bring Your Own License Pricing

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

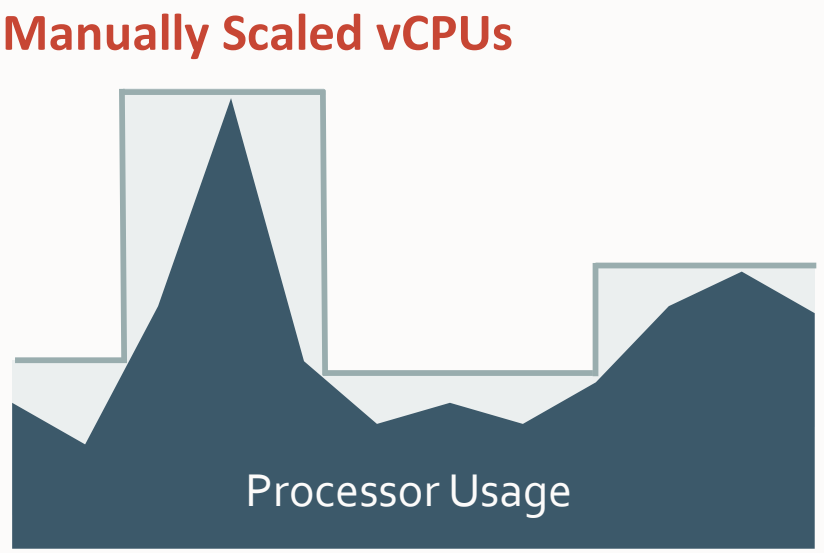
Online, Elastic Scaling with Exadata Cloud@Customer

Pay Only for What You Use



On-Premises – Static

Purchase server processors and software licenses for highest projected peak load



Exadata Database Service – Elastic

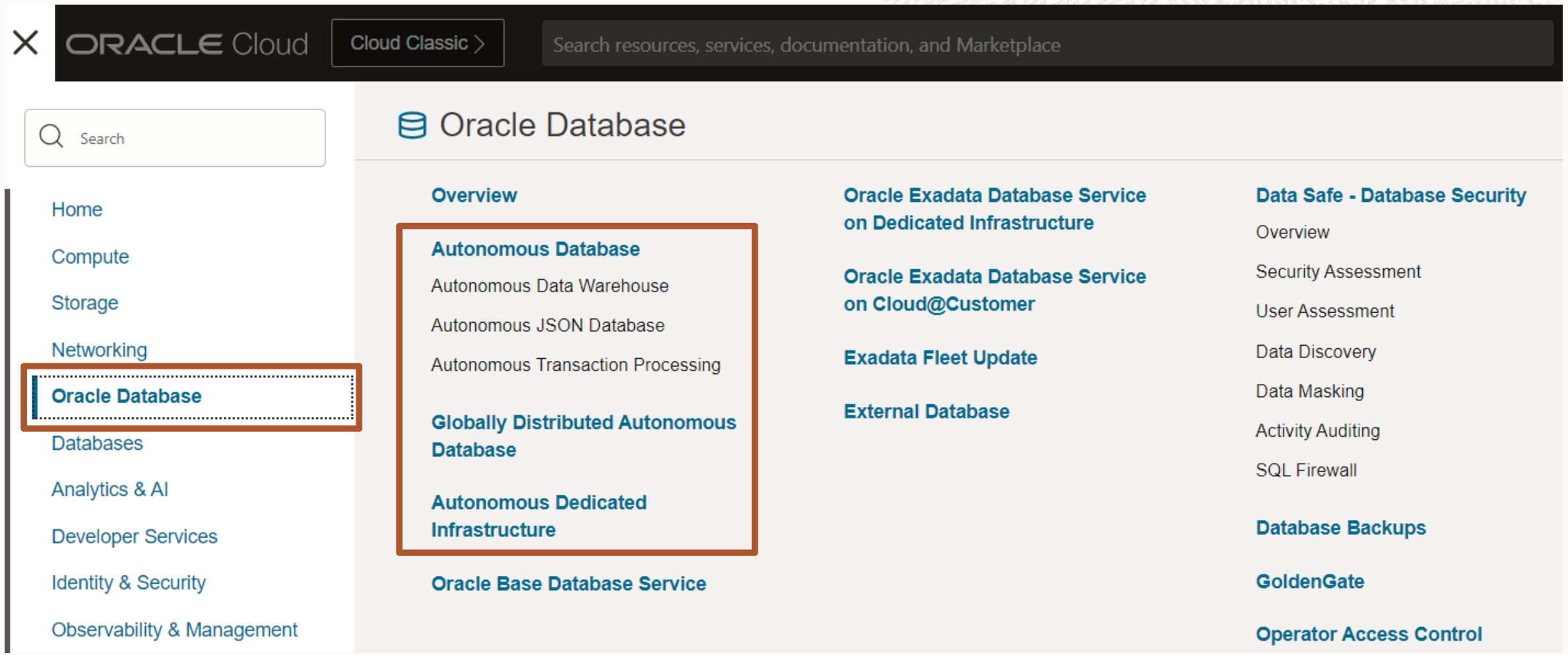
Adjust enabled vCPUs to match actual workload via APIs and web UI - vCPUs are charged per second

Oracle Database Supported on Oracle Database Appliance

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

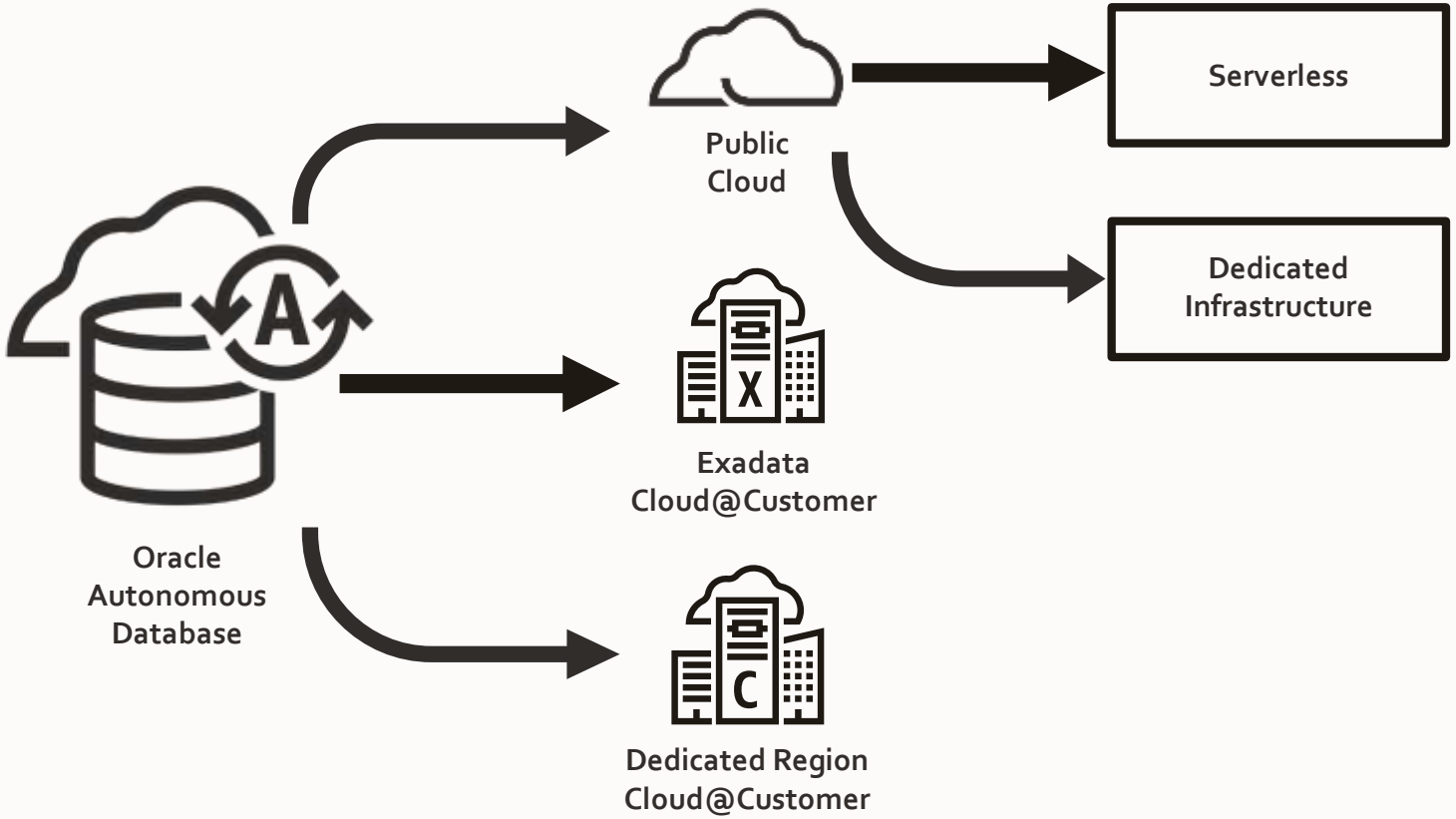
Autonomous Database

Autonomous Database on OCI Menu



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

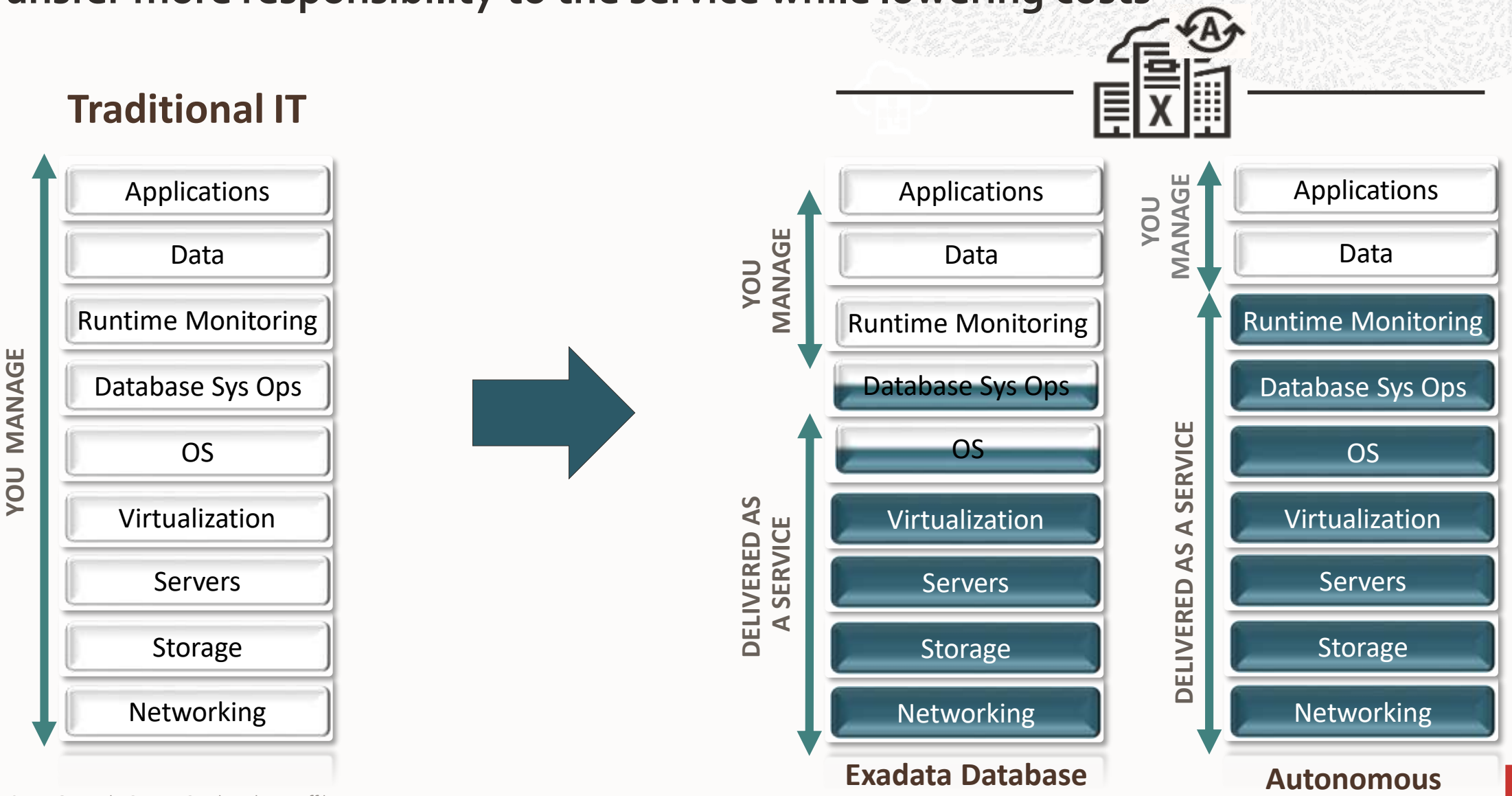
All OCI services, running in customer data centers

Exadata Cloud@Customer

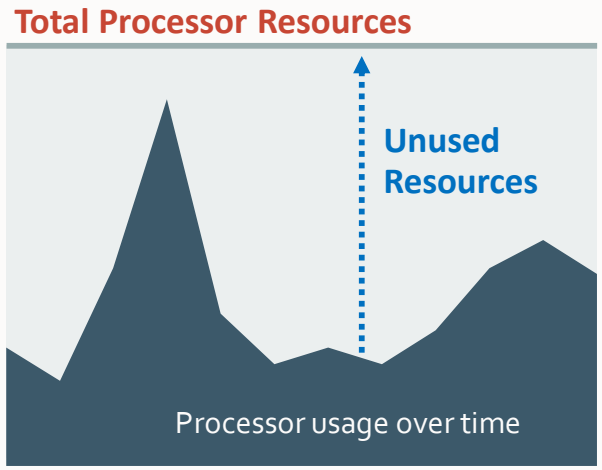
Cloud Autonomous Databases, running in your data center

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

Transfer more responsibility to the service while lowering costs

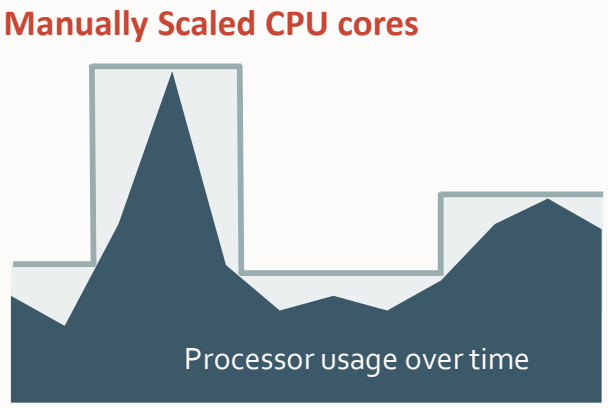


Online, Elastic Scaling with Exadata and Autonomous Database Services Pay only for what you use, in OCI or your data center



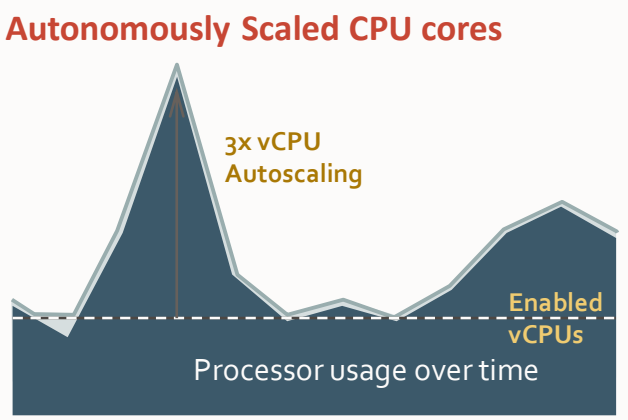
On-Premises & Other Clouds – Static

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



Exadata Database Service – Elastic

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



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.

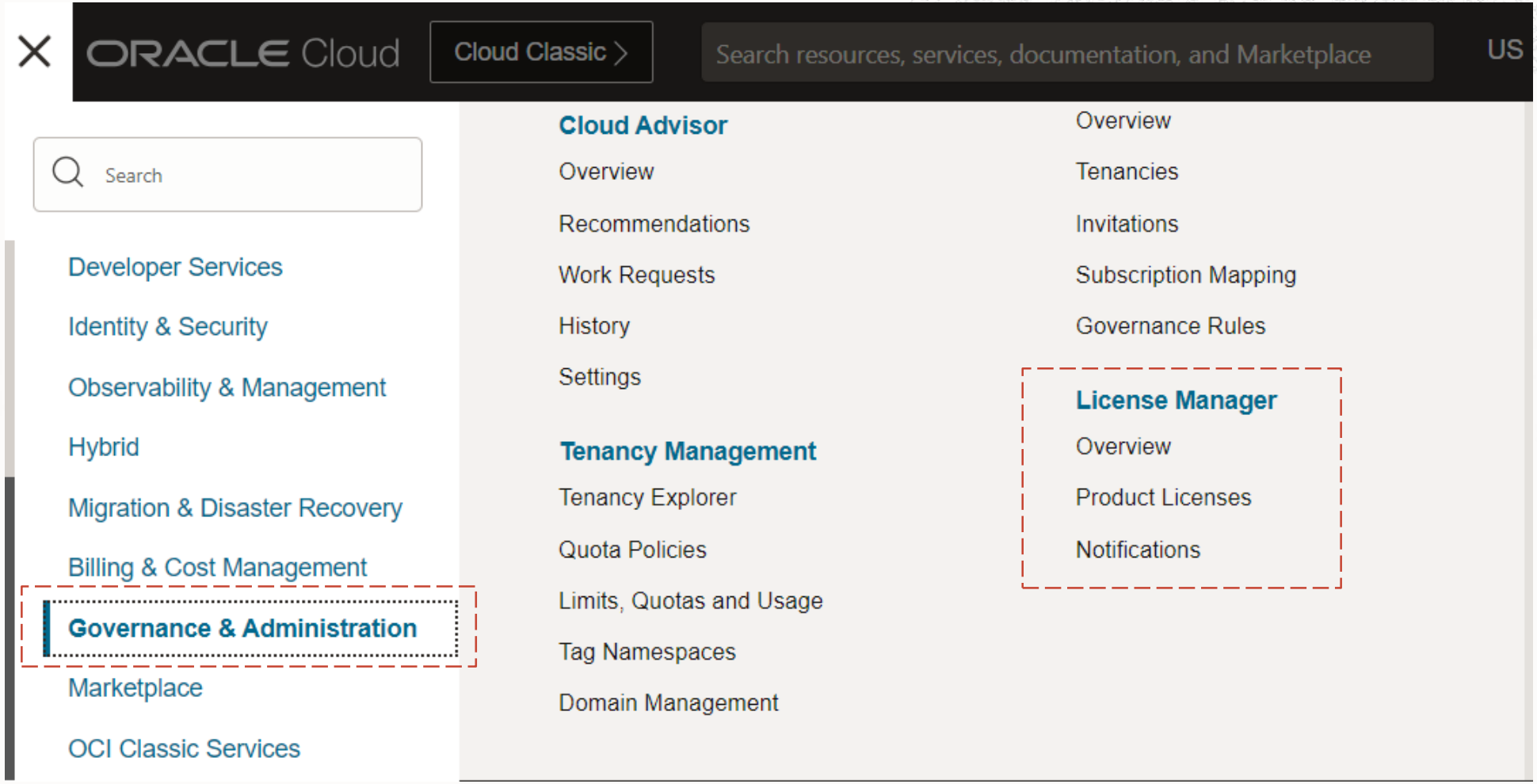
Which SKUs are affected by this retirement notice?

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

OCI License Manager

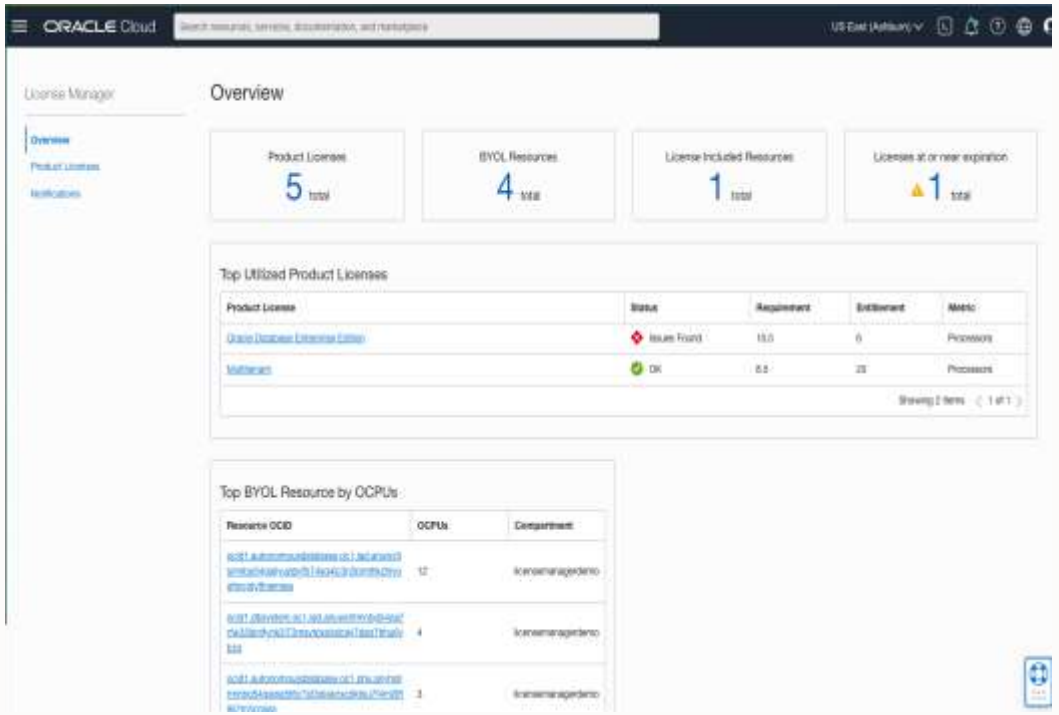
Oracle License Manager on OCI Console



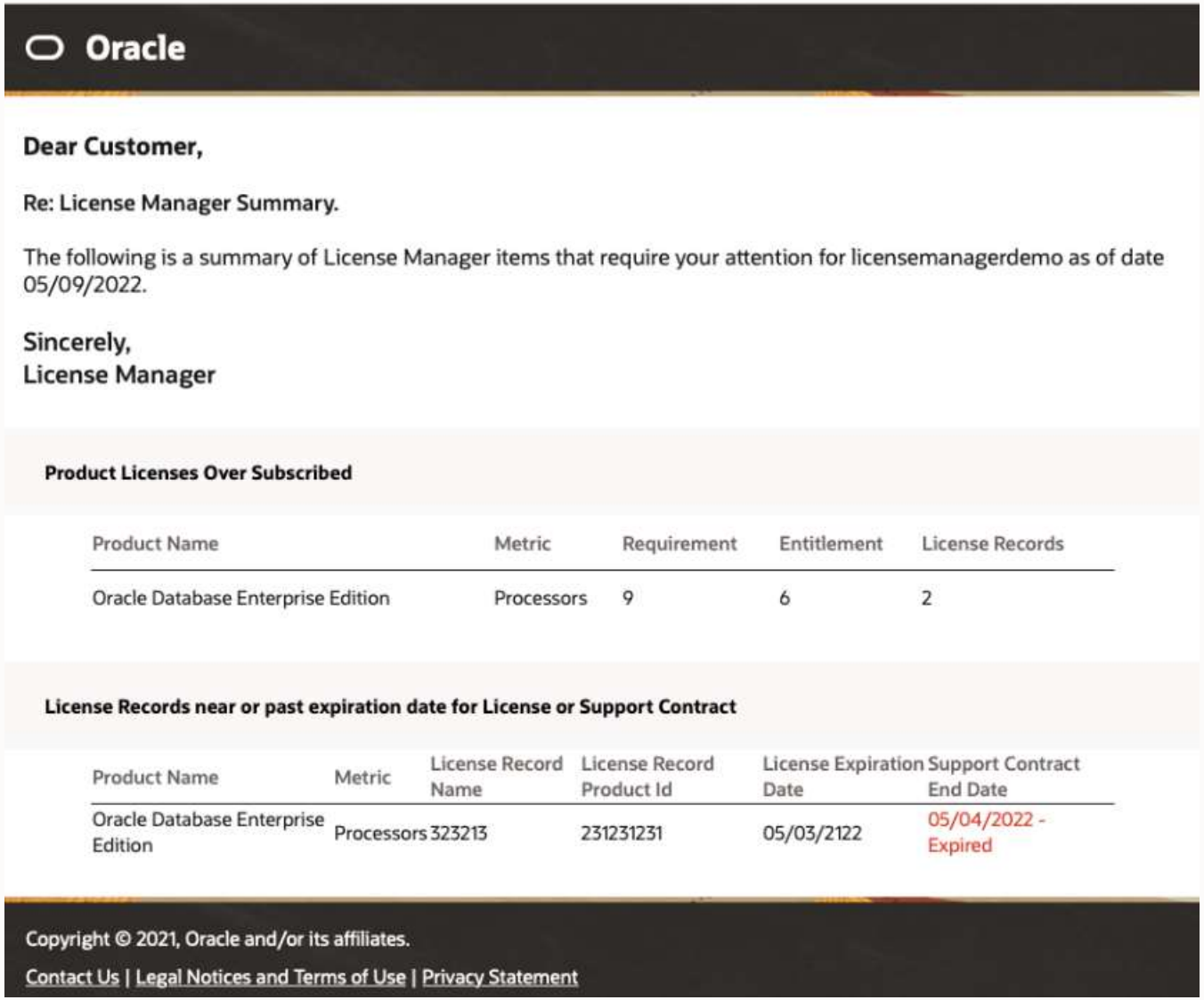
License Manager

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



Oracle

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

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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

- **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

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