ORACLE

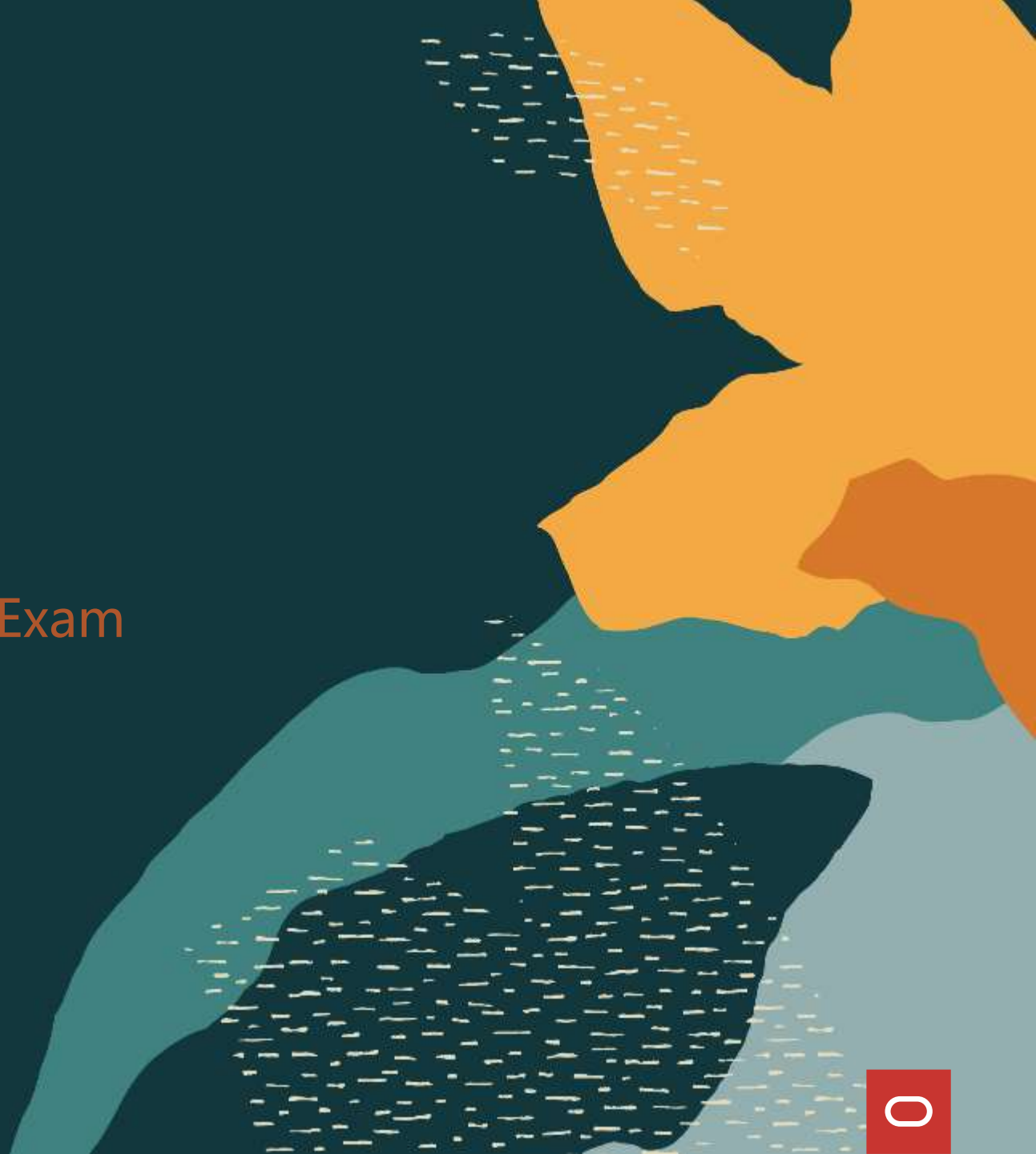
OCI Foundations Day 2

Pass OCI Foundations Certification Exam

Sub-heading

Bruno Kaarna
Marcel Lamarca

April, 2024



Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

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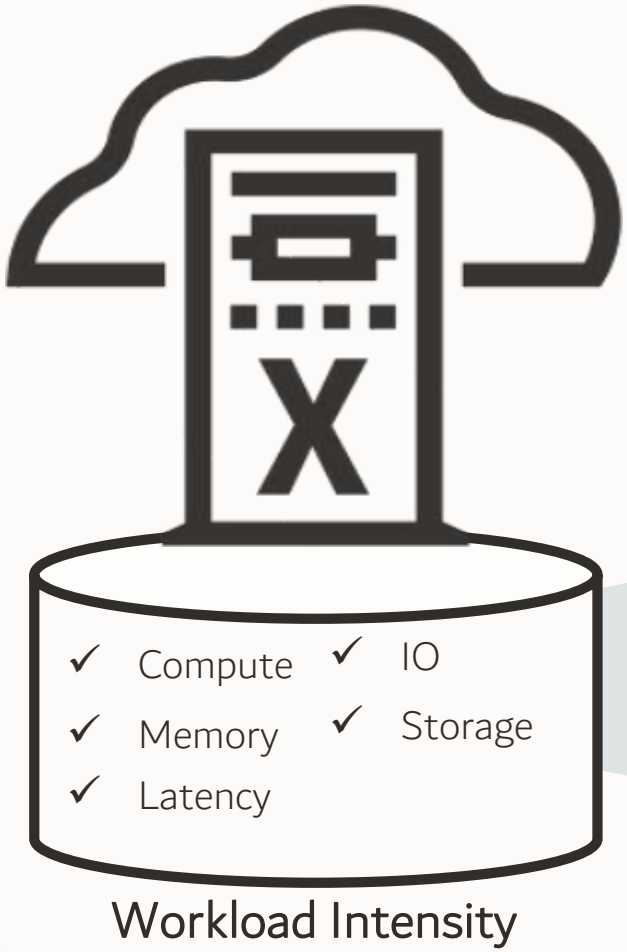
Agenda

- Free Training OU / OCI Foundations 2023
- Getting Started With OCI
- OCI Core Services: Compute Services
- OCI Core Services: Networking Services
- OCI Core Services: Database Services
- OCI Core Services: Storage Services
- Security and Compliance
- Governance and Administration

OCI Oracle Database

Exadata Cloud Service

- Full Oracle Database with all advanced options
- On fastest and most available database cloud platform
  - Scale-Out Compute, Scale-Out Storage, Infiniband, PCIe flash
  - Complete Isolation of tenants with no overprovisioning
- All Benefits of Public Cloud
  - Fast, Elastic, Web Driven Provisioning
  - Oracle Experts Deploy and Manage Infrastructure



As low as 19µs. latency

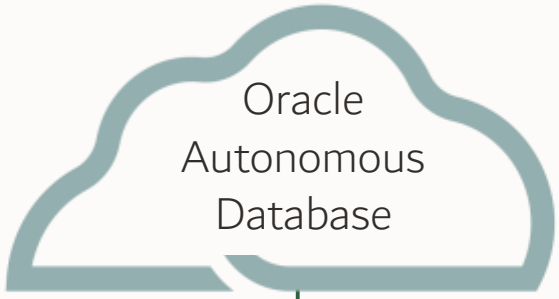
Scale up to:

- 48 TB memory, 8,064 vCPUs
- 96 TB PMem, 1,638 TB NVMe flash
- 4 PB usable storage

Databases up to 31 PB in size*

* Assumes 10:1 HCC compression

Oracle Autonomous Database



Autonomous Data Warehouse (ATP)	Autonomous Transaction Processing (ATP)	Autonomous JSON Database
Analytics Workloads	OLTP and Mixed Workloads	Application Development
• Data warehouse, data mart • Data lake, machine learning	• Transactions, batch, reporting, IoT • Application development, machine learning	• Mobile applications • User profile management • Customer 360 • Catalog and content management

Choose the one that best meets your workload needs

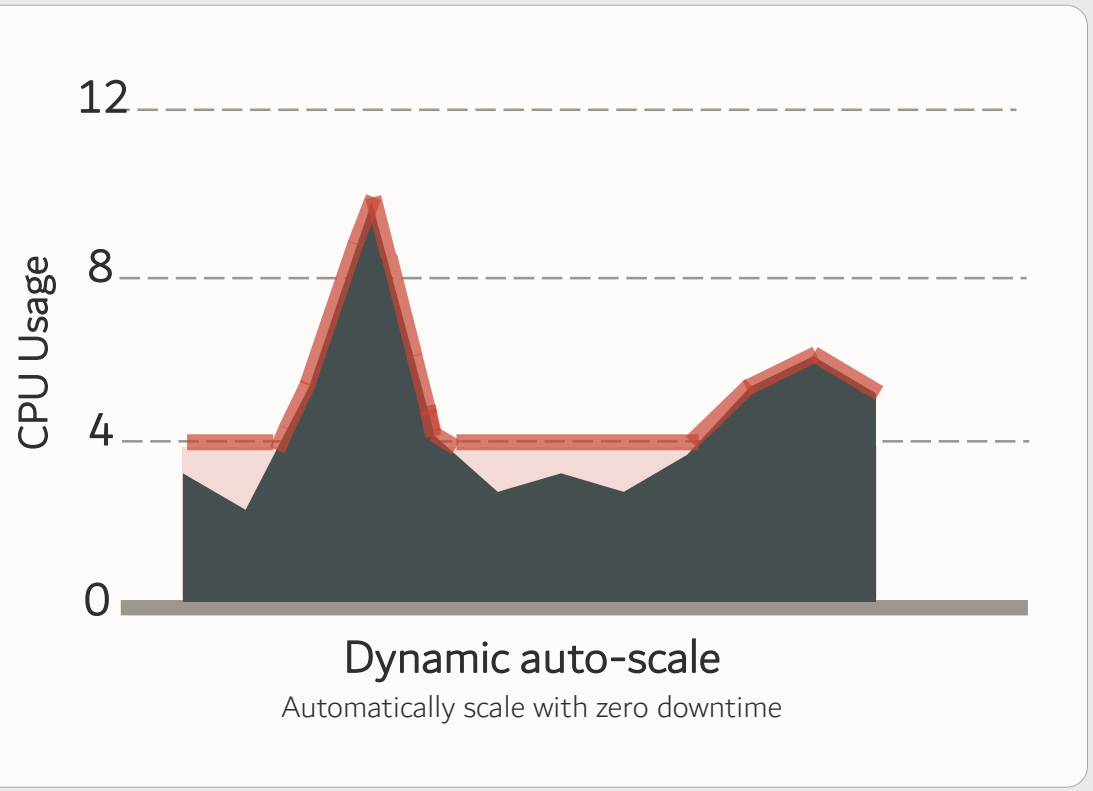
Consistent High Performance and Scaling

Size to number of OCPUs and TBs required

- Not constrained by fixed shape ‘t-shirt’ sizes
- Simple incremental growth
- Lower operating costs

Auto-scaling for changing workloads

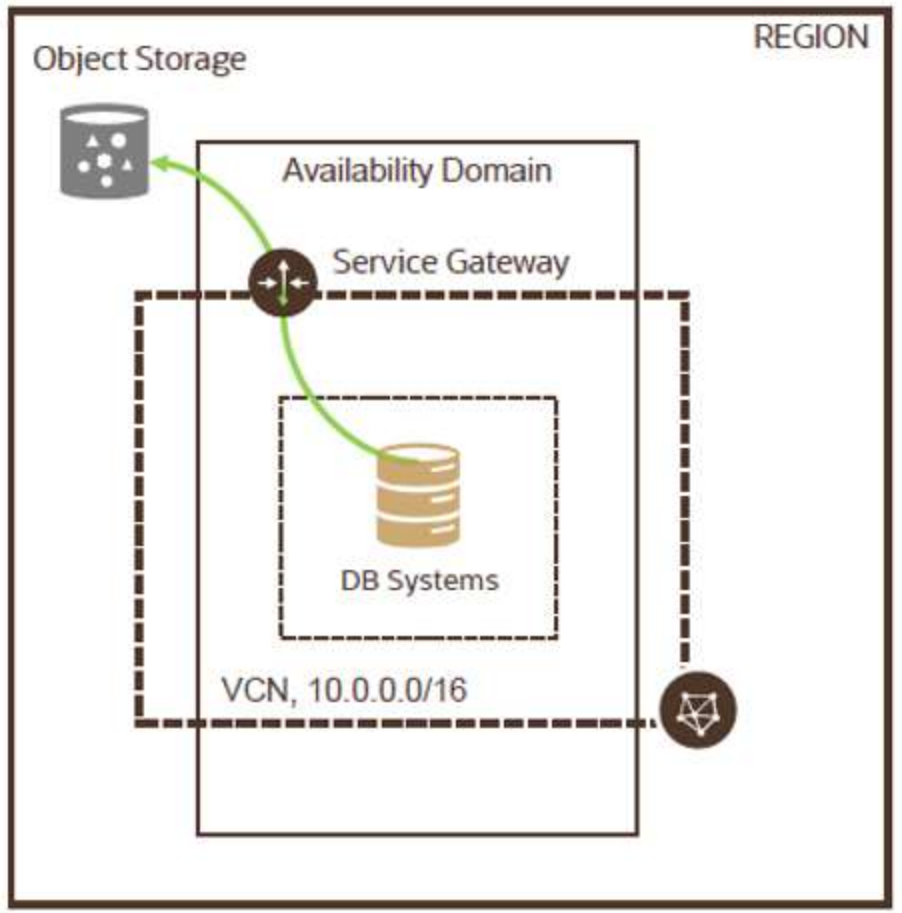
- Dynamically adjusts CPU and IO resources based on workload requirements
- Zero delay while scaling up or down
- No ‘cache warm-up’ after scaling



DB System Backup / Restore

- Manual or Automatic Backups
- Automatic Backups Written in Object Storage
- Preset Retention Period:
  7, 15, 30, 45 and 60 days

- Recover Database from a Backup in Object Storage
  - Last to know good state
  - Using specific timestamp value
  - Using the SCN specified



DB Systems DR

Oracle Data Guard provides a set of services that create, maintain, manage and monitor one or more standby data bases, to enable Oracle databases to survive disasters and data corruption.

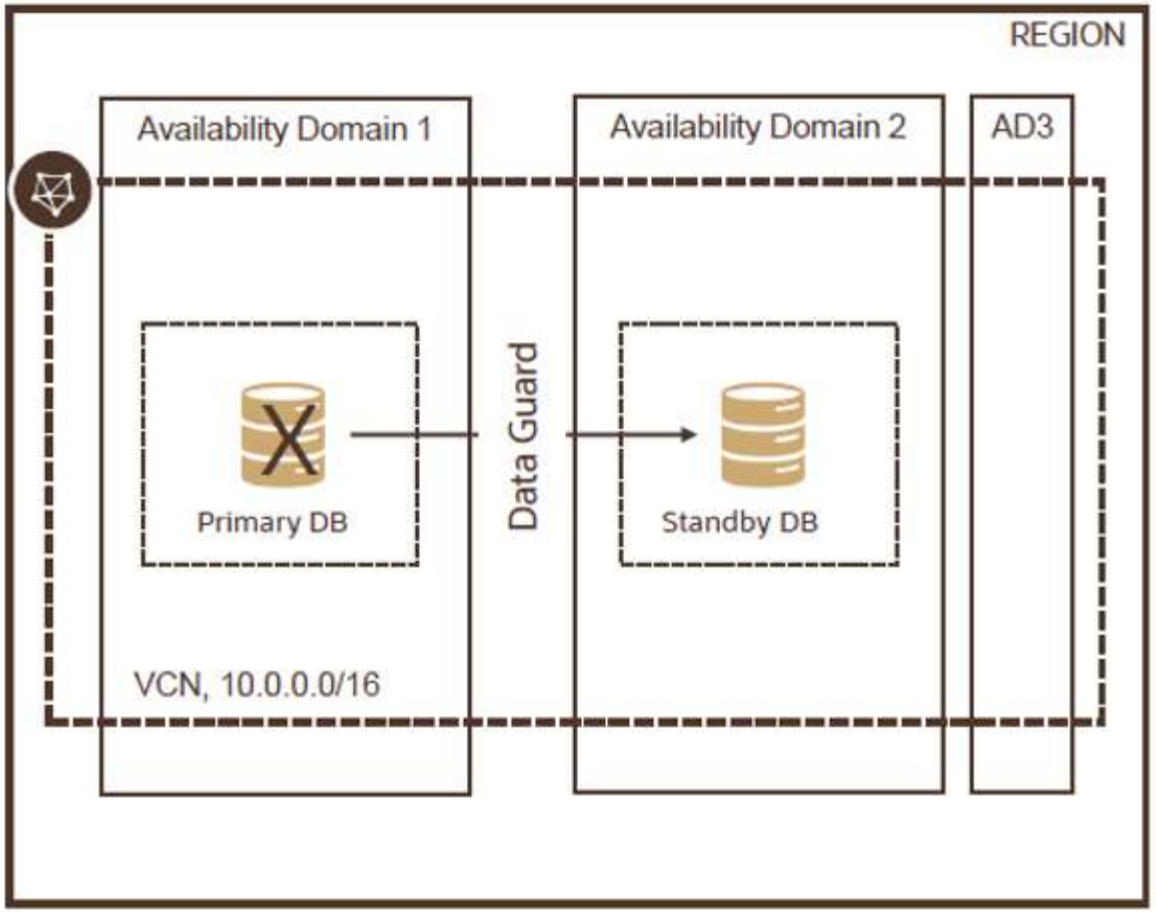
It maintains synchronization between the primary and the standby databases.

Active Data Guard extends the Data Guard by providing advanced features for data protection and availability. It's included in the Extreme Performance Edition and Exadata Service.

Two modes:

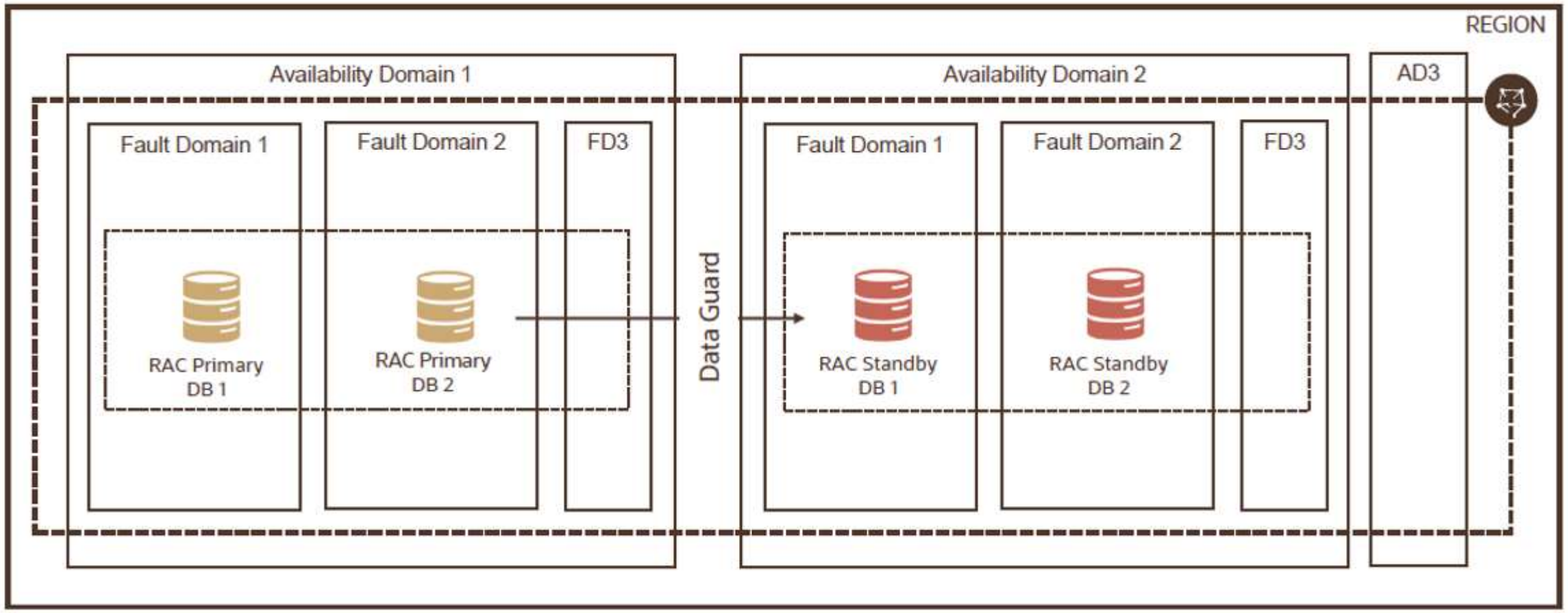
Switch Over, planned migration no data loss

Fail Over, unplanned migration minimal data loss



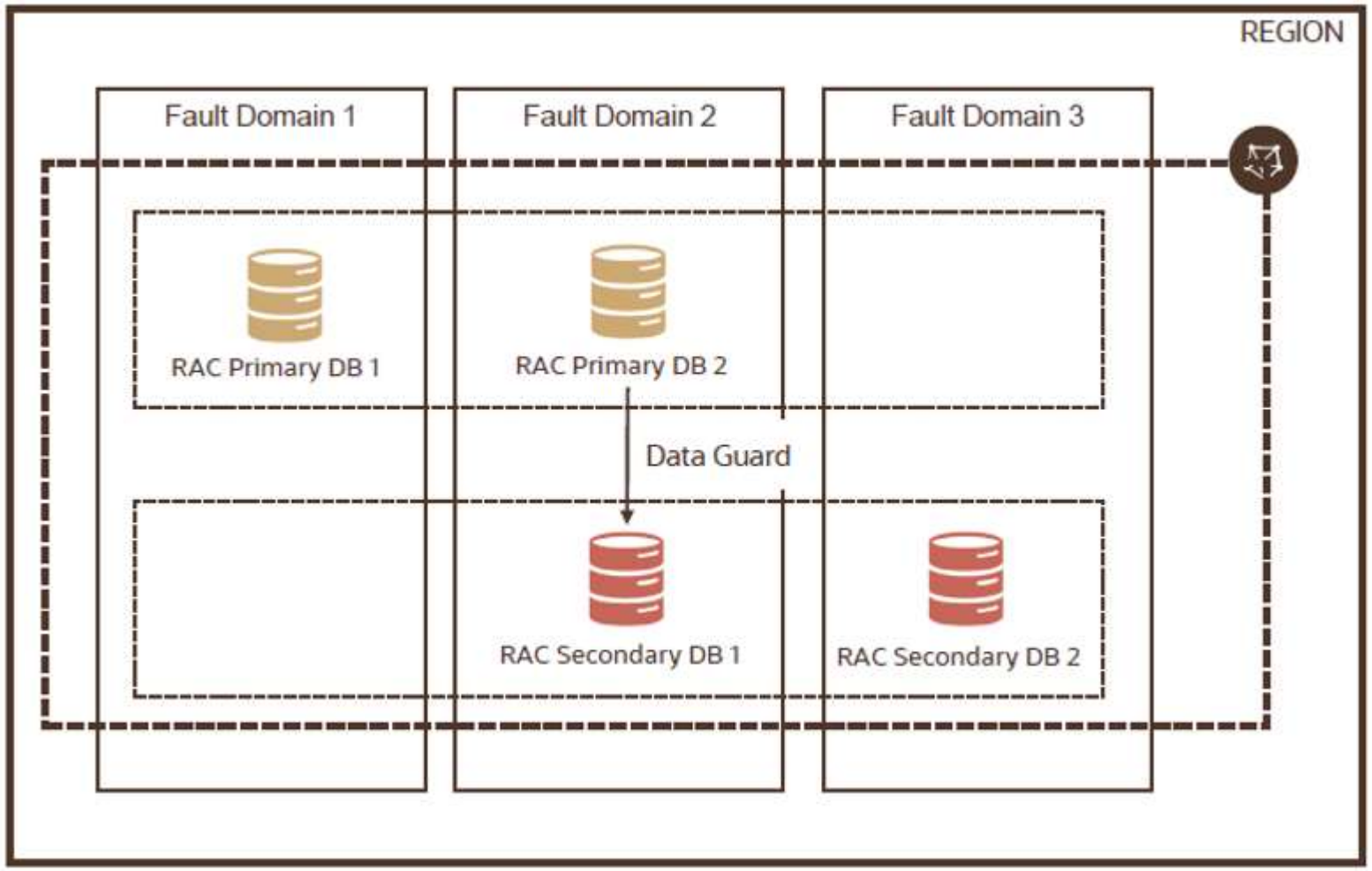
DB System HA and DR (multi AD region)

Primary and Standby Databases can be either single instance or RAC



DB System HA and DR (single AD region)

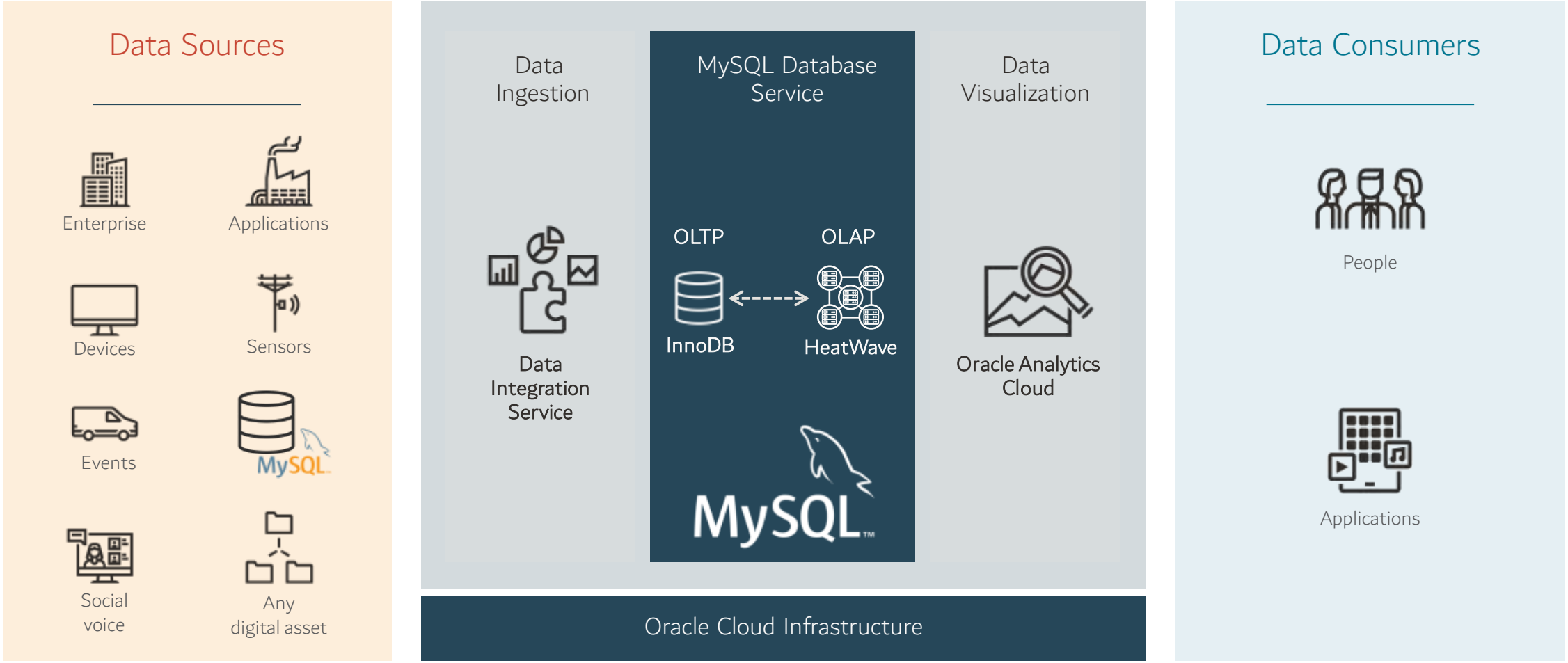
Primary and Standby Databases can be either single instance or RAC



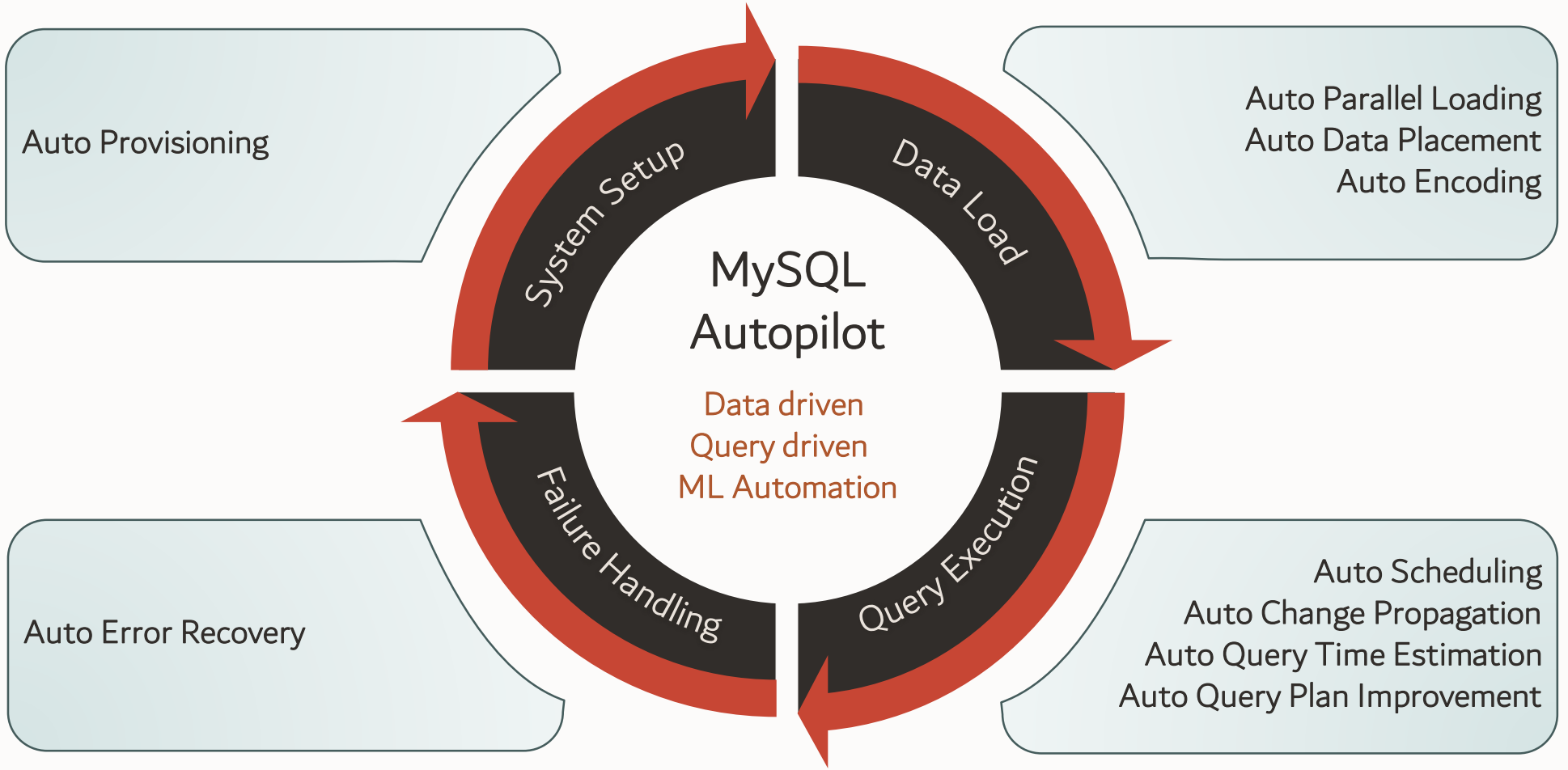
MySQL Database Service

- Fully managed MySQL Enterprise database running on OCI
- MySQL automatizes a series of manual opertaions, such as scaling, applying patches and upgrades, OS management, etc...
- Cheaper than running MySQL on VMs in other clouds.
- Includes Security features like Masking, TDE, Audit and Backup.
- User may deploy Heatwave to leverage faster analytics via this OLAP Engine
- Possible to dpeloy HA archtecture, replicated in 3 different sites.

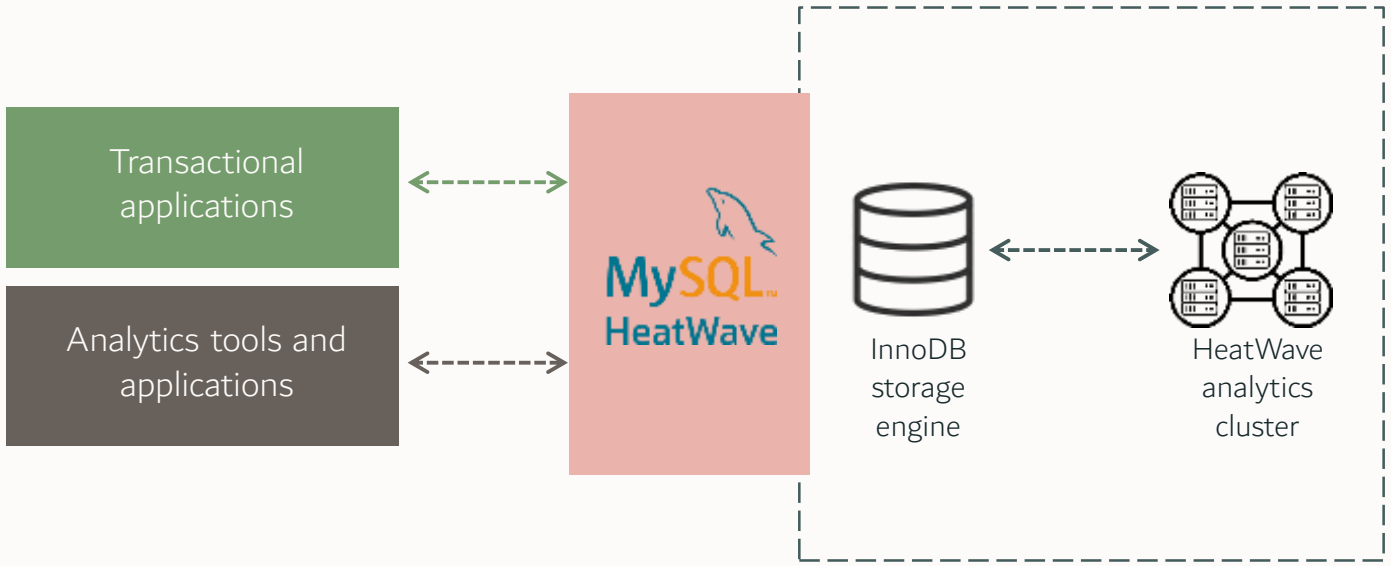
MySQL Database Services is integrated with other Oracle Services



Machine learning-powered automation for MySQL HeatWave



One Database is Better than Two



1>2 with MySQL HeatWave

One service for OTLP & OLAP

No ETL duplication

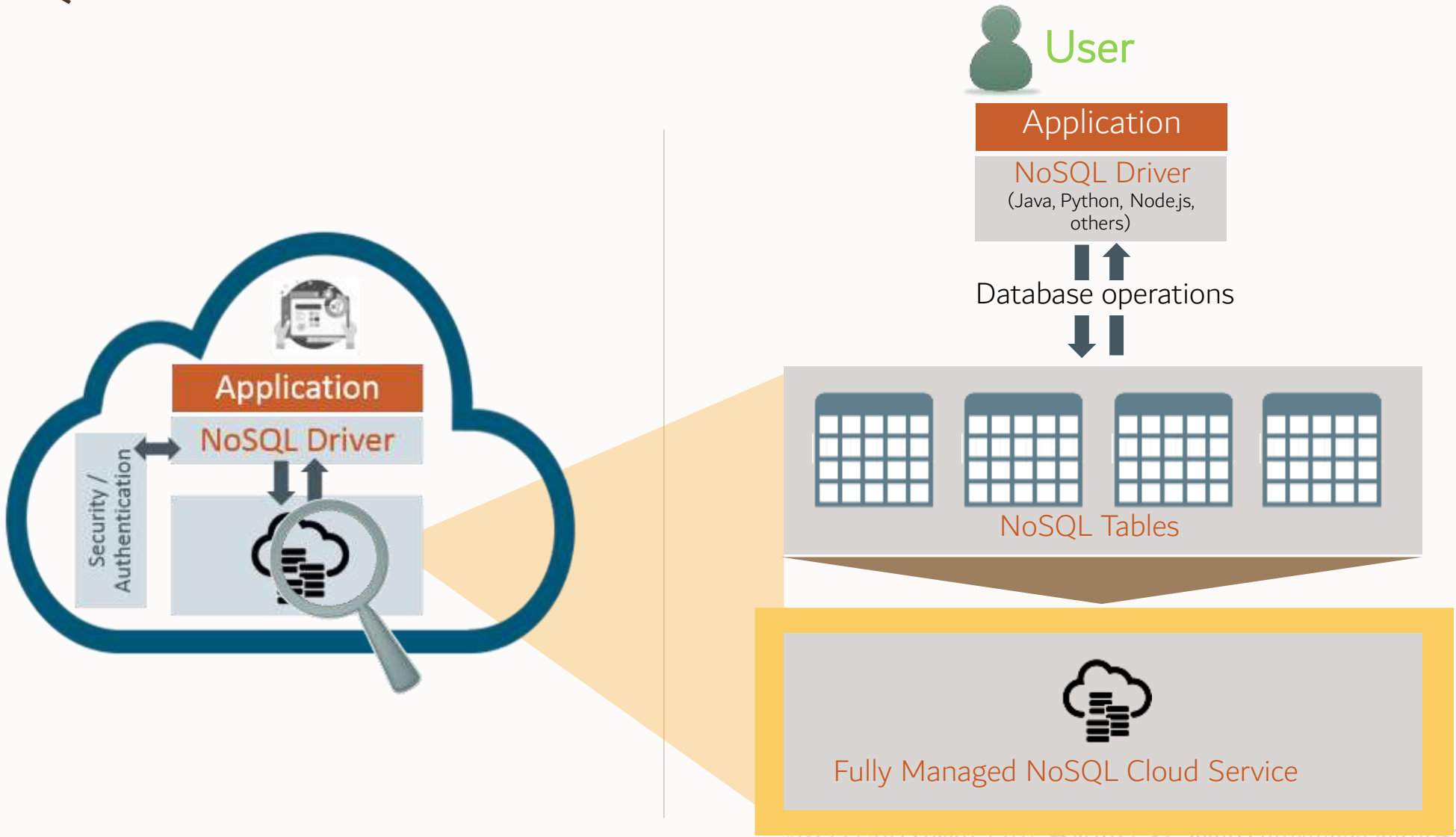
Unmatched performance, at a fraction of the cost

Real-time analytics

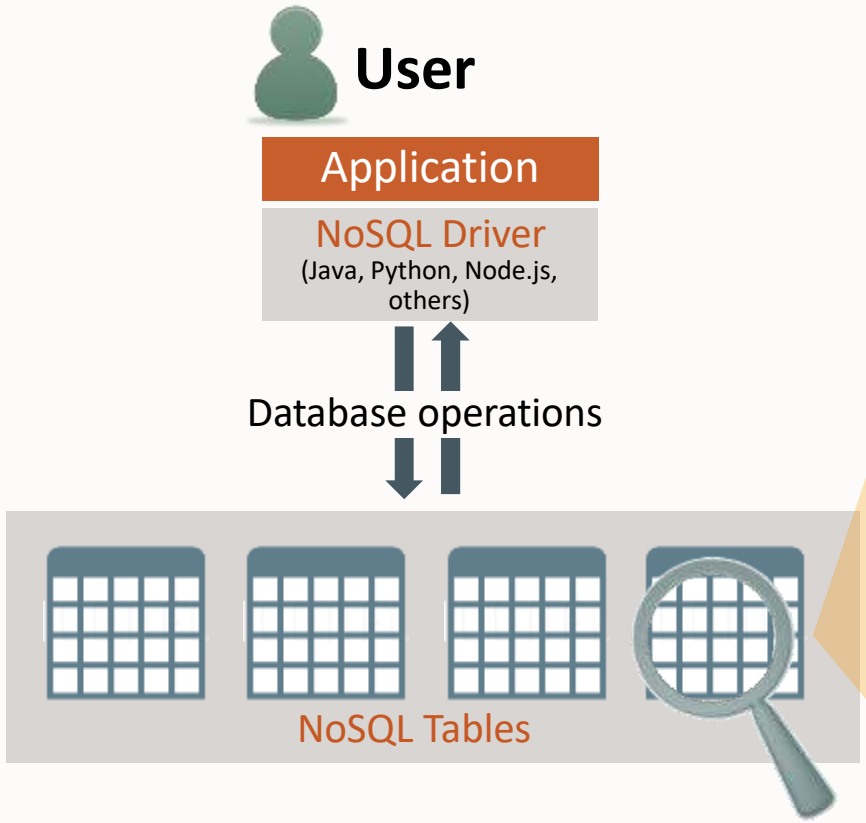
Improved security

Applications work without changes

NoSQL Service



NoSQL Table

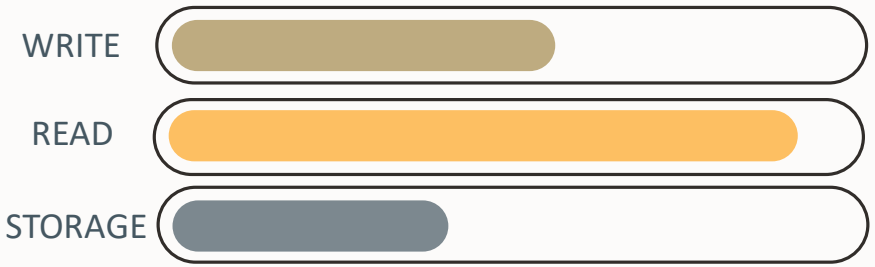


NoSQL Table

DATA

Integer (key)	String (data)	String (data)	Json (data)
num1	string1	string1	json1
num2	string2	string2	json2
num3	string3	string3	json3
num4	string4	string4	json4

CAPACITY PROVISIONED



Oracle NoSQL Database Cloud Service

Fully Managed

Database operation, maintenance, tuning are managed by Oracle

Elastic

Dynamically change throughput and storage capacities based on workloads

High Performance

Predictable low latency for all types of workloads

Data Model Flexibility

Document, columnar, key/value models supported with a single application interface

Security

Enterprise grade security with roles, privileges, encryption

Low Operating Cost

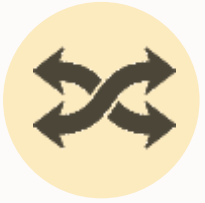
Pay only for the throughput and storage capacities provisioned

Developer Friendly

Easy-to-use APIs and integrated with different developer tools

Always Available

Built-in high availability to ensure business continuity



Hybrid Cloud

Interoperate with Oracle NoSQL on-premise solution using a single application interface

Summary

- Oracle Database Cloud Services
- DBCS, Autonomous DB, Exadata CS
- MySQL Database Service and HeatWave
- NoSQL Cloud Service

OCI Storage Options

Storage Requirements

Persistent v/s non-persistent?

What type of data?

Database, videos, audio, photos, text

Performance?

Max capacity, IOPS, throughput

Durability?

# of copies of data

Connectivity?

Local v/s network, how does app access the data

Protocol

Block v/s File v/s HTTPs

OCI Storage Services

Local NVMe

- Highest performance flash-based storage
- NVMe SSD-based temporary storage
- DenseIO Virtual Machines and Bare Metal Instances
- Sizes include **51.2 TB** for BM, **6.3 – 25.6 TB** for VM
- **3 million** IOPS
- HPC, Big Data, and other demanding IO workloads

Block Volumes

- Auto-tuned, high performance remote storage
- **300k IOPS** with UHP volumes, up to **700k** per compute instance
- **<32 volumes** per instance
- **50 GB** to **32 TB** in 1 GB increments, up to **1 PB**/instance
- **Performance auto-tuning** to dynamically scale as demand changes
- Up to **98% cheaper** than AWS
- OS, application data, and large OLTP workloads

File Storage

- Managed and elastic shared file system
- Scales automatically up to **8 Exabyte**
- No need to provision, pay and scale as you go
- Easy snapshotting (up to **10,000** per file system)
- Filesystem **cloning** (up to **10** active clones)
- **NFSv3** support

Object Storage

- internet-scale, high-performance storage
- Elastic unstructured data
- **Infinitely scalable**
- **Compatible APIs** such as AWS S3
- Connectivity to **Hadoop and Spark** via HDFS connector
- **Auto-tier** objects between Standard and Infrequent Access tiers
- **Long-term data storage** through Archive
- Big data, rich media, backups workloads

Archive Storage

- Long-term archival and backup
- **Compatible APIs** such as AWS S3
- **~ 1 hour** to restore, instant after restore
- Cost-effective, cold data storage
- **No retrieval fees**

Summary

- Block Volume
- Local NVMe
- File Storage
- Object Storage
- Archive Storage

Agenda

- Getting Started With OCI
- OCI Core Services: Compute Services
- OCI Core Services: Networking Services
- OCI Core Services: Database Services
- OCI Core Services: Storage Services
- Security and Compliance
- Governance and Administration

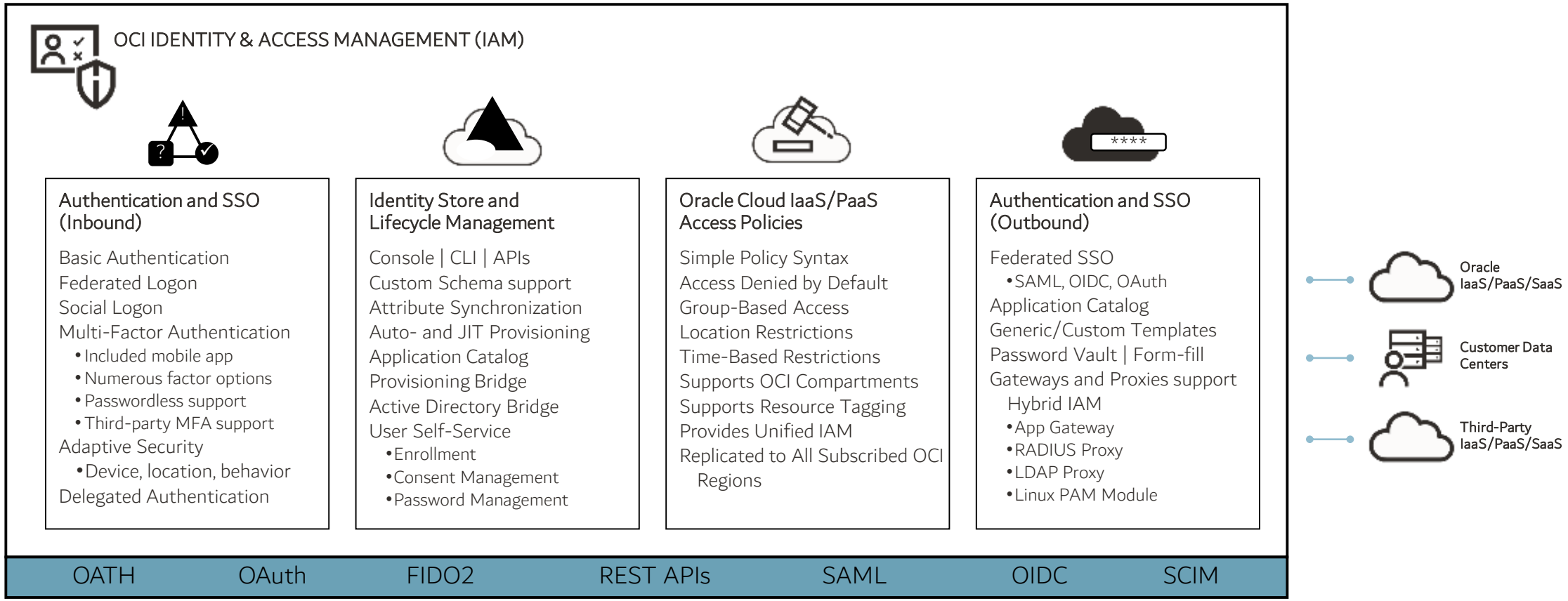
OCI Identity & Access Management (OCI IAM): Key Functional Pillars

Enterprise Identity & Access Management for complex, hybrid IT environments

Access Control Plane for Oracle Cloud and SaaS applications

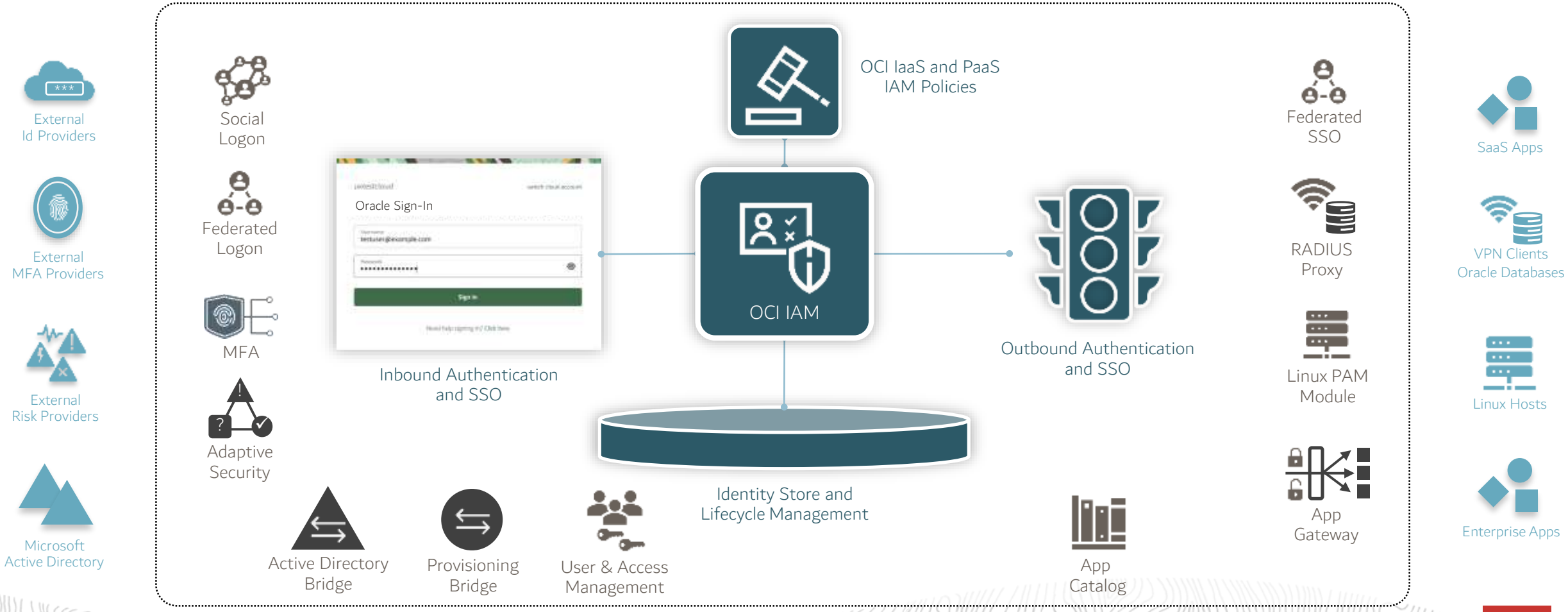
Developer-friendly IAM engine for custom and consumer applications

OCI Identity & Access Management (OCI IAM): Core Functionality



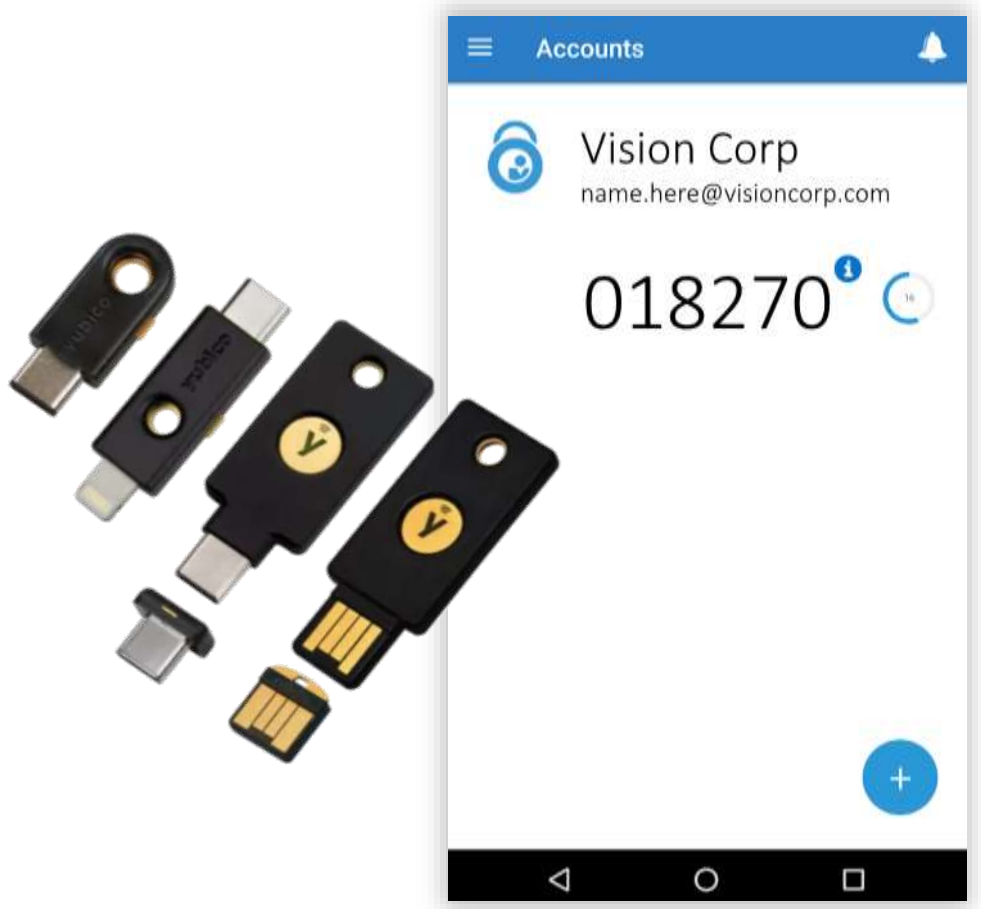
OCI Identity & Access Management (OCI IAM)

Enterprise Identity & Access Management



Inbound Authentication and SSO: Multi-Factor Authentication (MFA)

- FIDO2 Authenticators
- Voice Phone Call
- Mobile App Passcode or Notification
- SMS Text
- Security Questions
- Email
- Bypass Code
- Third-Party Authenticators
  Duo, Yubico, TOTP, etc.
- Trusted Devices

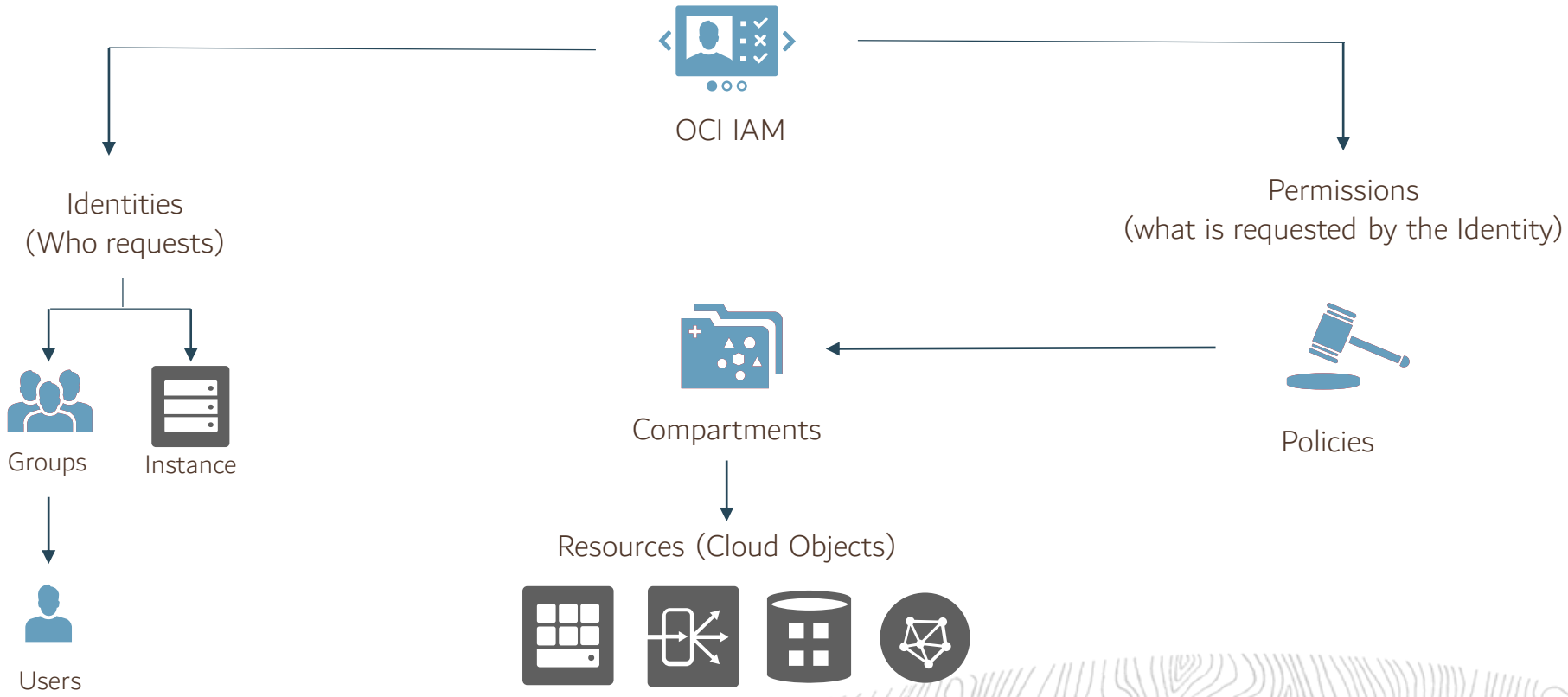


Inbound Authentication and SSO: Passwordless Authentication

1. User creates profile at first logon
2. User enrolls device and MFA app
3. When user attempts to authenticate, they can logon via a push notification in the MFA app – no password required!

IAM Overview

IAM uses traditional identity concepts such as Principals, Users, Groups, Dynamic Groups, AuthN, AuthZ and introduces a new capability called Compartment



Resource, Just one Cloud Object

Documentation Link

Resource is a cloud object that you create and use in OCI
(e.g. compute instances, block storage volumes, Virtual Cloud Networks)

Each OCI resource has a unique, Oracle-assigned identifier called an Oracle Cloud ID **(OCID)**

Oracle Cloud ID (OCID)

ocid1.<RESOURCE TYPE>.<REALM>.[REGION][.FUTURE USE].<UNIQUE ID>

Ex: Tenancy OCID: ocid1.tenancy.oc1..aaaaaaaaba3pv6wkcr4jqae5f44n2b2m2yt2j6rx32uzr4h25vqstifsfdsq

Compartment

Each resource belongs to a single compartment

Resources can interact with other resources in different compartments

Resources and compartments can be added and deleted anytime

Resources can be moved from one compartment to another

Resources from multiple regions can be in the same compartment

Compartments can be nested (six levels deep)

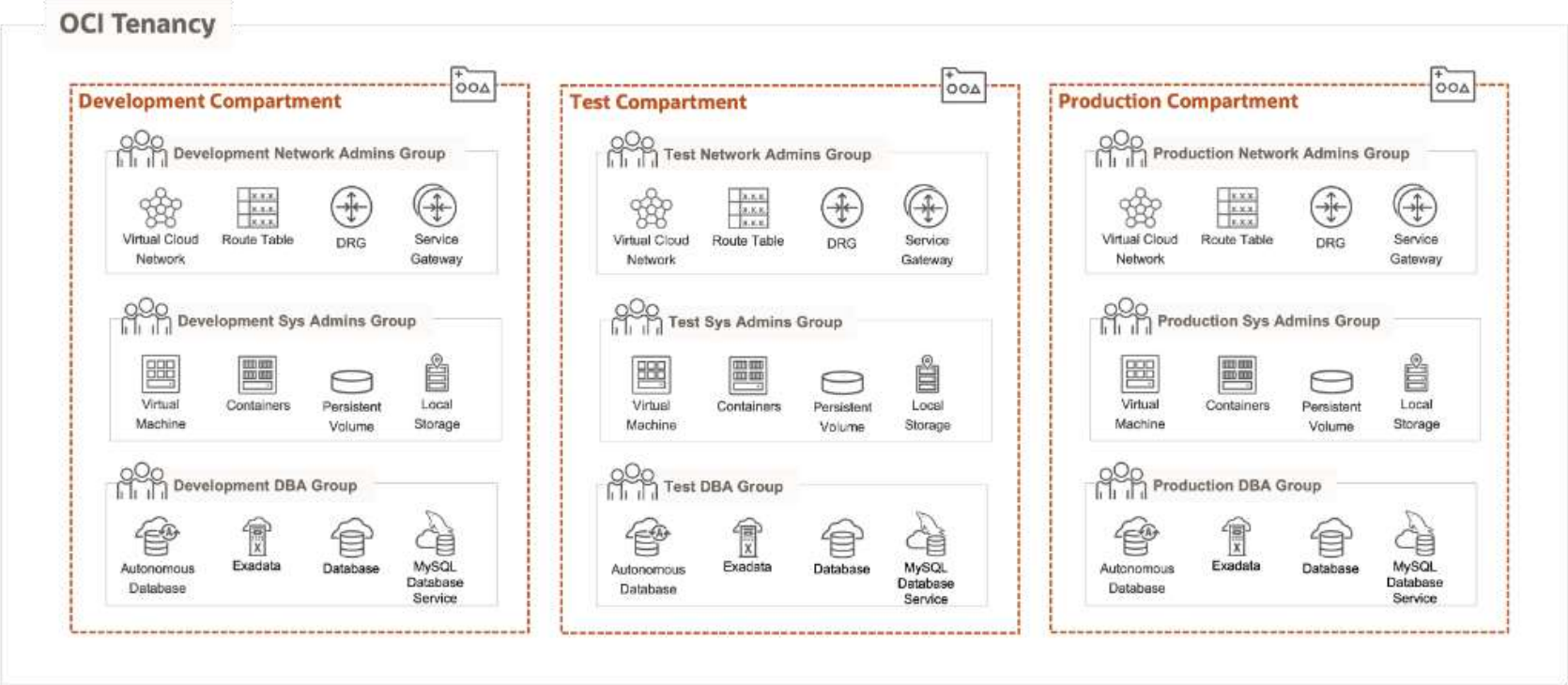
You can give group of users access to compartments by writing Policies

Analyze cost and assign budget for resources in compartments

Compartment Example

Reference DOC Link

A compartment is a collection of related resources. It helps you isolate and control access to your resources



Root Compartment (OCI Tenancy) can hold all the cloud resources. Best practice is to create dedicated compartments when you need to isolate resources

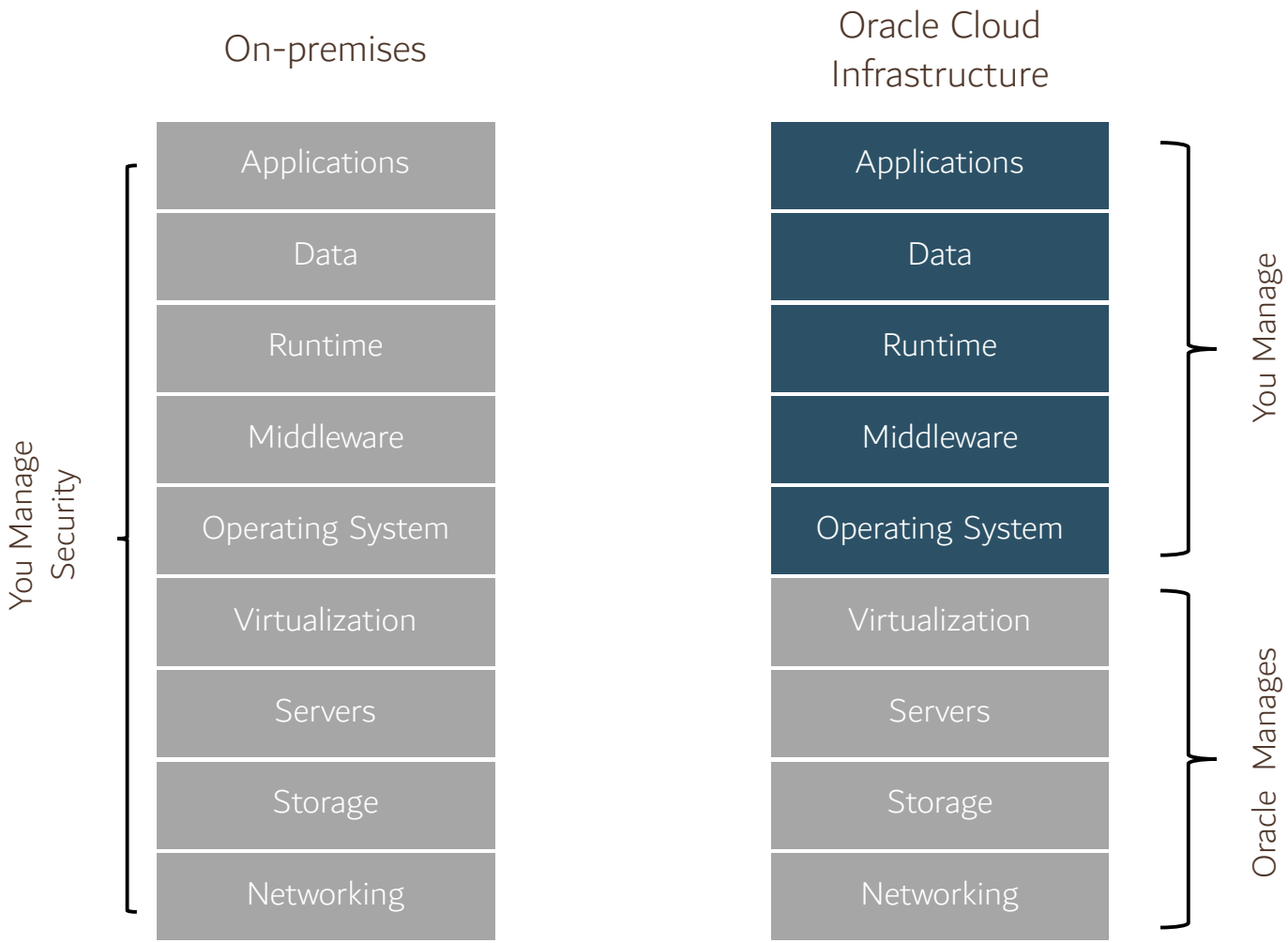
Setup your tenancy: Best Practices

Summary IAM Service

- IAM Concepts
- Authentication
- Authorization
- Policies

OCI Security

Shared Security Model



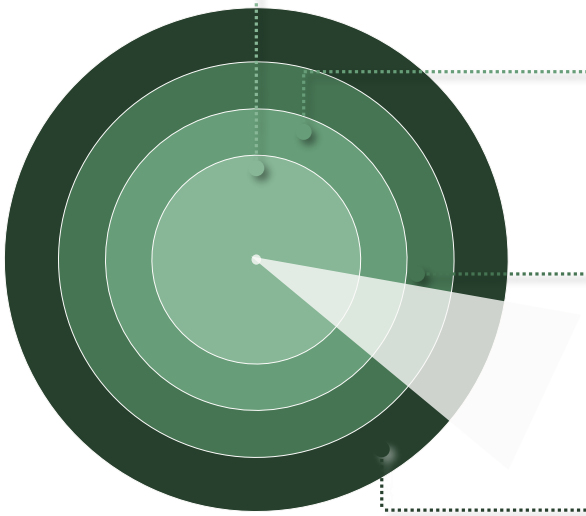
Customer responsible for security in the cloud

- Patching applications and OS, OS configuration
- Identity and access management
- Network security
- Endpoint protection
- Data classification and compliance

Oracle responsible for security of the cloud

- Physical security for the data centers
- Hardware, software, networking

Defense-in-depth, from data to the edge



Storage and Database Safeguards
- Data Safe
- MySQL Heatwave security
- Vault
- Secrets Management
- Vault Cross Regional Replication
- HSMs
- Certificates

Compute
- Hardware Root-Of-Trust
- Signed Firmware
- Off-box Networking
- Harden Disk Images
- Autonomous Linux

Network Security
- Virtual Cloud Network
- Interface Segmentation
- Private Networks
- FastConnect
- Secure VPN
- P2P, NAT, DRG Gateways
- Bastion
- Network Firewall

Identity and Operator Access
- Oracle Cloud infrastructure Identity and Access Management
  - Identity Federation
  - Role-Based Policy

Monitoring and Prevention
- Cloud Guard
- Custom Security Zones
- Cloud Guard Threat Detector
- Threat Intelligence
- Logging/Flows
- Cloud Guard Fusion Apps Detector
- Vulnerability Scanning Service

Internet and Edge
- DDoS protection
- SD-WAN
- Enhanced WAF protection
- WAF for Fusion Applications

Oracle Data Safe

Unified database security control center

- Risk dashboard: configuration, data, users
- Monitor user activity
- Discover sensitive data and mask it for test/dev
- Extensible: more features to come…

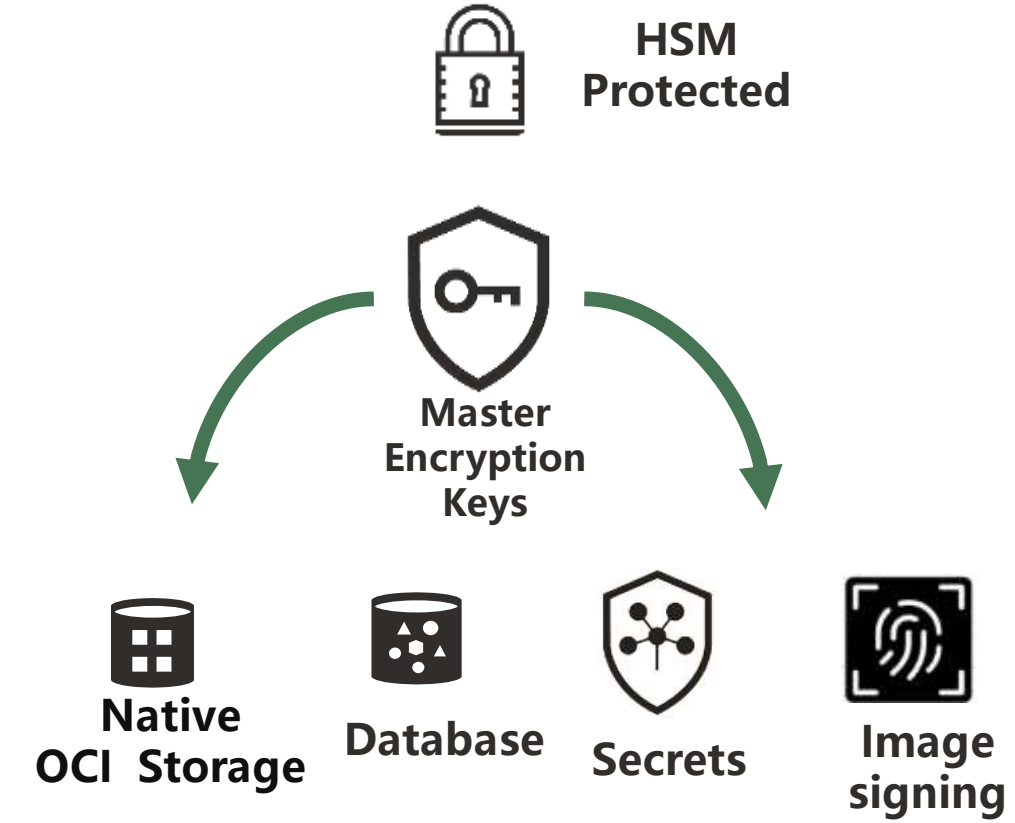
Benefits

- No special expertise needed: click-and-secure
- Saves time and mitigates security risks
- Defense-in-depth security for all customers

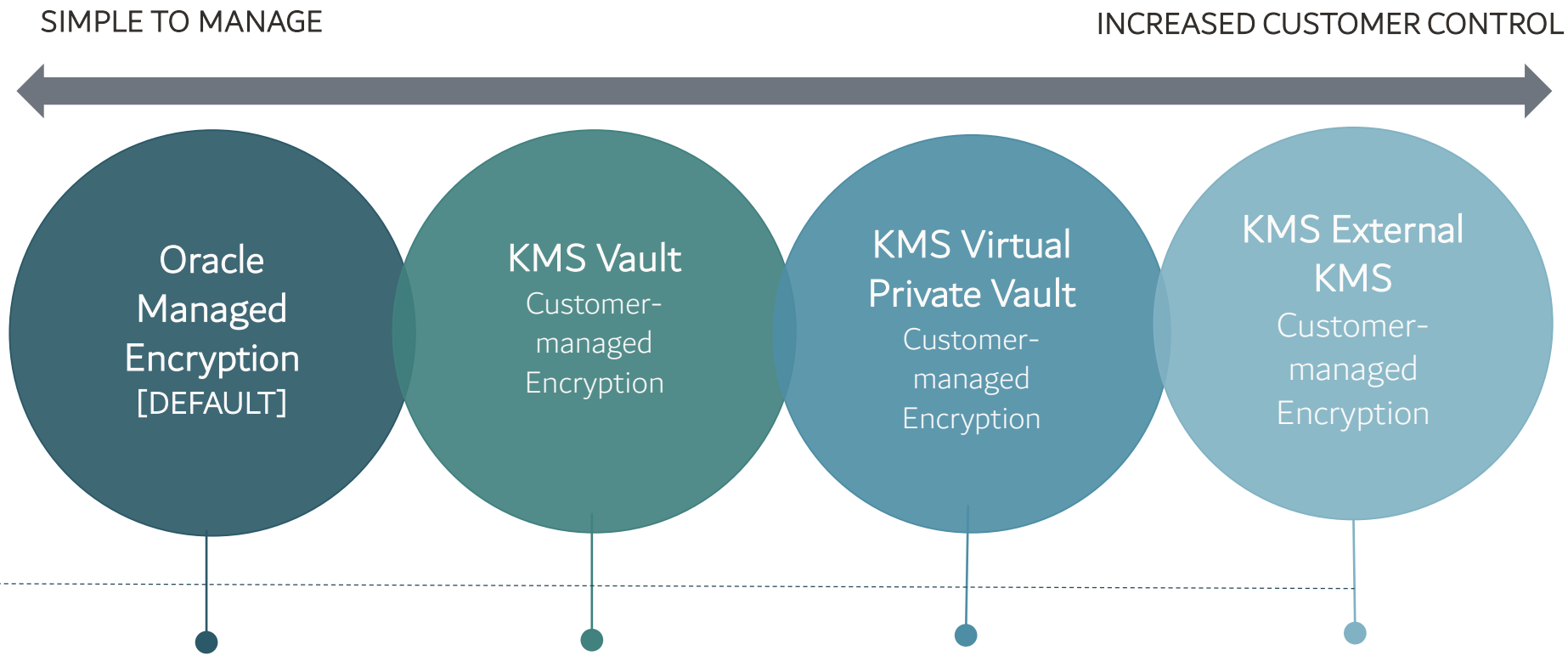
Now available for securing on-premises databases

OCI Vault: Protect data and the secret credentials to securely access resources

- Managed service that allows central management of encryption keys
- Stores master encryption keys and secrets that might otherwise be stored in configuration files or in code
- Create and manage Vaults, Keys, and Secrets
- Centralized and customer controlled key management
  - Natively integrated to many OCI services: OCI-Native Storage, DBaaS (ADB-D, ExaCS), OKE, Streams
- Fully managed and highly available service
  - Availability - 99.9% SLAs and 99.99% SLOs
- Support regulatory compliance
  - Meets PCI DSS and FIPS 140-2 Level 3 standard for cryptographic processing



Oracle Cloud Encryption Options



Oracle Security Zones

SIMPLE

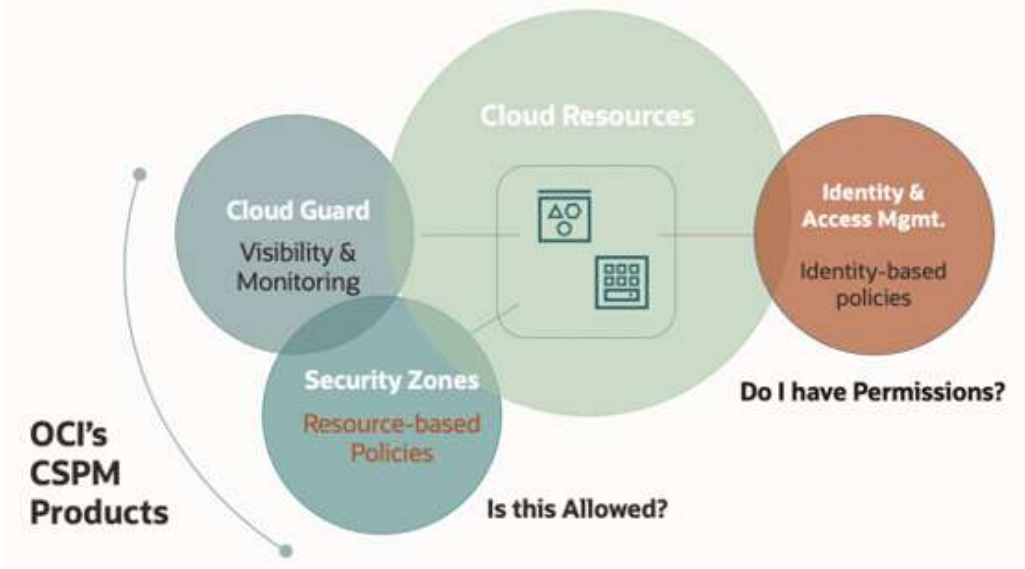
Select which Security Zone policies should apply to resources in one or more compartments.

PRESCRIPTIVE

Prevent weak configurations from being deployed with active policy enforcement

INTEGRATED

Integrated posture monitoring with Cloud Guard supporting a true 'trust and verify' model



"As we venture into the public cloud, Ferguson Enterprises is focused on cloud security. Oracle Security Zones integrated with Oracle Cloud Guard, helps Ferguson build safe environments and maintain security with true 'trust and verify' security posture management."

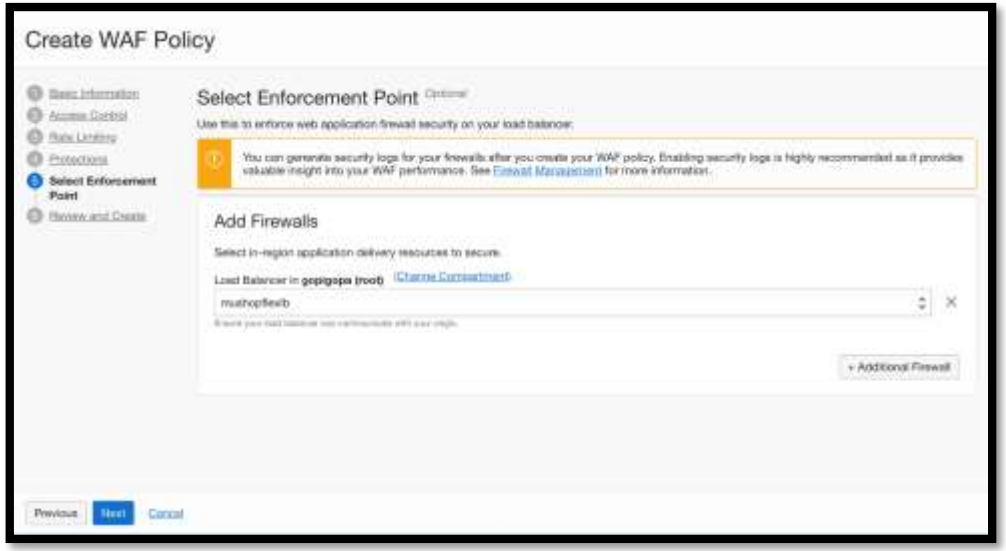
Ferguson, Karen Cake, Cloud Architect

OCI Web Application Firewall (WAF)

Protects against threats such as OWASP defined top-10 vulnerabilities.

Can be used to limit access to the application based on geography or the signature of incoming requests, block unwanted bots.

Protects your application infrastructure and workloads no matter where they reside: in OCI, on-premises, multi-cloud and anywhere in between.



CUSTOMER BENEFITS

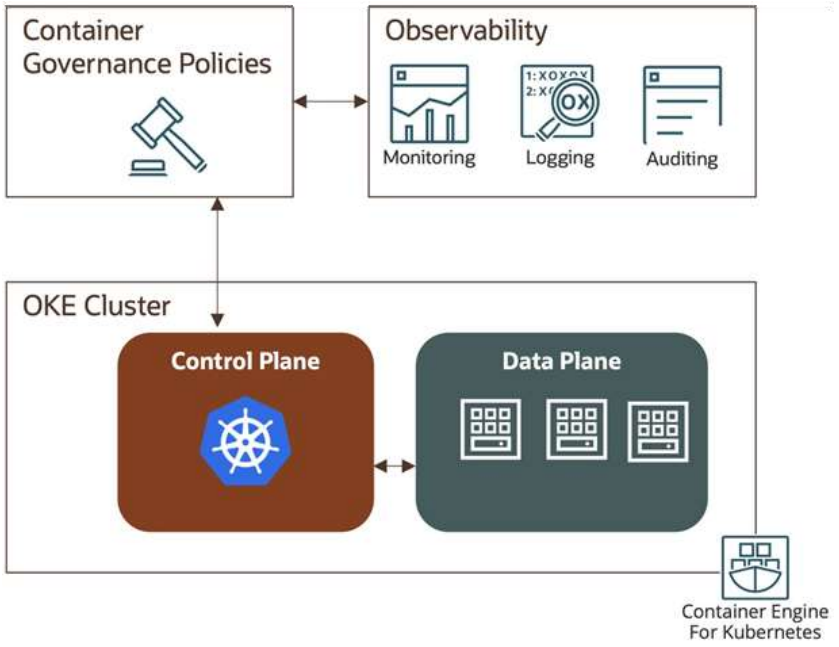
- Layered defense and flexibility to enforce security at the edge closest to users as well as in-region closest to the application on flexible load balancers
- WAF policies can be enforced on internet facing web applications, and/or (public/private) flexible load balancer instances
- Protects internet facing and internal applications against both external and insider threats
- Supports access rules, protection rules, rate limiting and bot management

Cloud Guard: Monitor, Identify, Achieve and Maintain Strong Security Posture

- Find and fix security issues with containers, virtual machines, databases, networks, policies and much more
- Use automated enforcement of critical policies
- Reduce complexity with policy management for regulatory compliance and industry best practices
- Streamline audits and security reviews by ensuring container environments are within compliance
- Enable easy reporting with integration into OCI Logging and Monitoring
- Governance applied remotely so it does not consume data plane capacity

Workloads

- Works with managed and virtual nodes, ideal for production workloads



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- **OCI Core Services: Compute Services**
- **OCI Core Services: Networking Services**
- **OCI Core Services: Database Services**
- **OCI Core Services: Storage Services**
- **Security and Compliance**
- **Governance and Administration**

Flexible consumption models with Universal Credits

Choice of Consumption Models

- Available with all Cloud Services BYOL, IaaS and/or PaaS subscriptions

Pay As You Go (PAYG)

Best when usage is uncertain

- No upfront fees or commitment
- Usage billed monthly in arrears
- Pay only for what you use

Annual Flex

Lowest cost without sacrificing flexibility

- Universal access to all IaaS and PaaS Oracle Cloud Services
- Annual consumption commitment of $2k or more
- Minimum term of 1 year
- Billed in advanced and debited monthly based on actual usage
- Discounts available based on consumption levels and term
- Pricing remains fixed for term of agreement with any consumption overages billed at fixed price

Simplified business experience with one simple agreement describing financial relationship.

UC Price list, BYOL FAQs

Factors that impact pricing

Resource Size

Bigger resources cost more!

Data Transfer

No Ingress cost
Careful with Egress cost

Resource Type

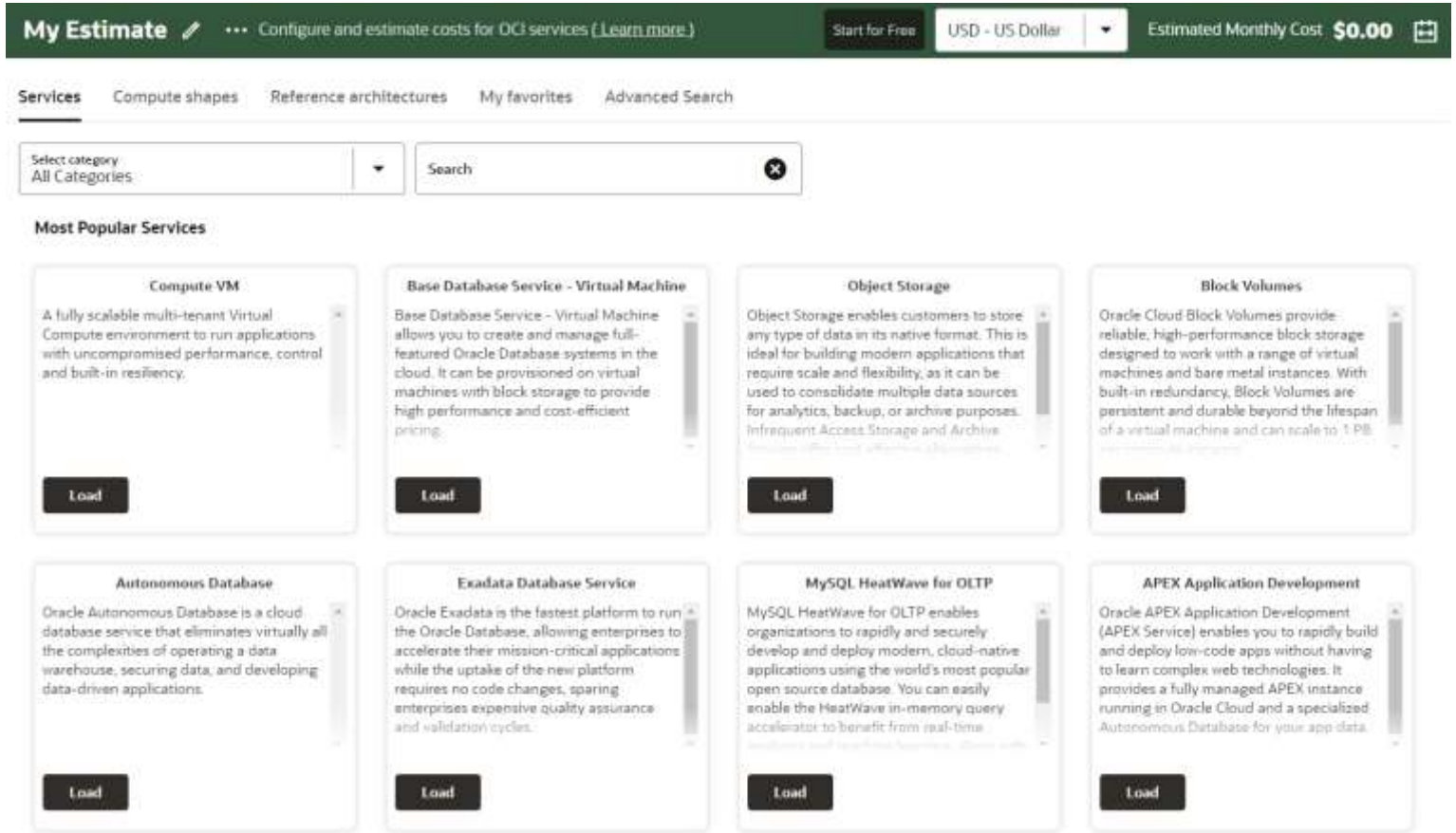
VMs v/s BMs
VMs v/s Functions
BYOL v/s managed DBs..

All OCI regions have the same pricing!

Cost Estimator

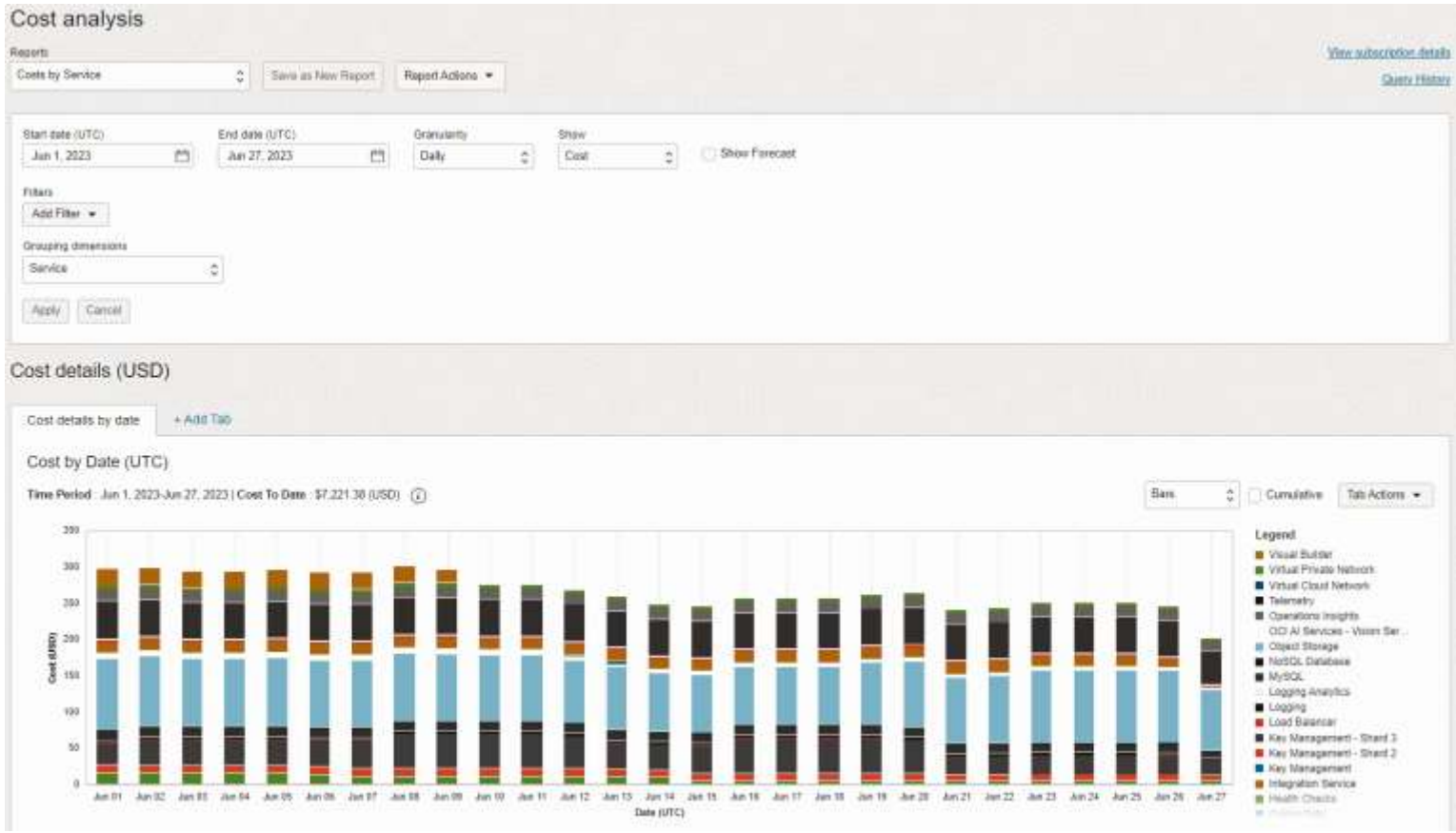
Page Link

- Generate Costs Estimates based cloud services usage.
- You can choose from single services, to Reference Architectures, and can customize the services based on the customer need
- You can see price details for your customer Architecture or OCI services
- Save the estimate or export as spreadsheet to compare the TCO, ROI or just monthly costs with others cloud provides costs



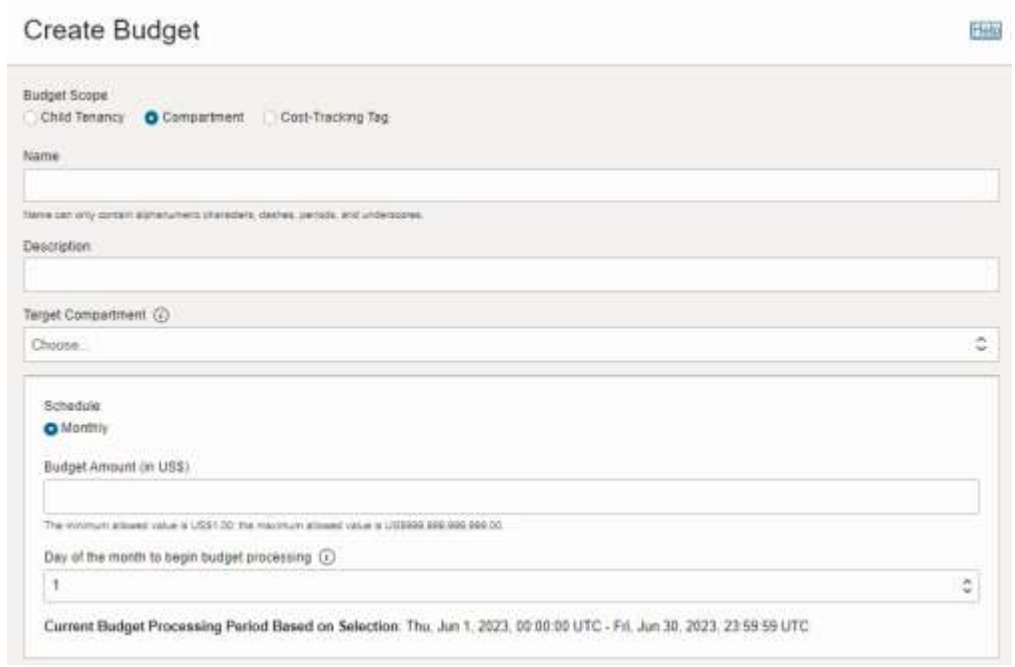
Cost Analysis

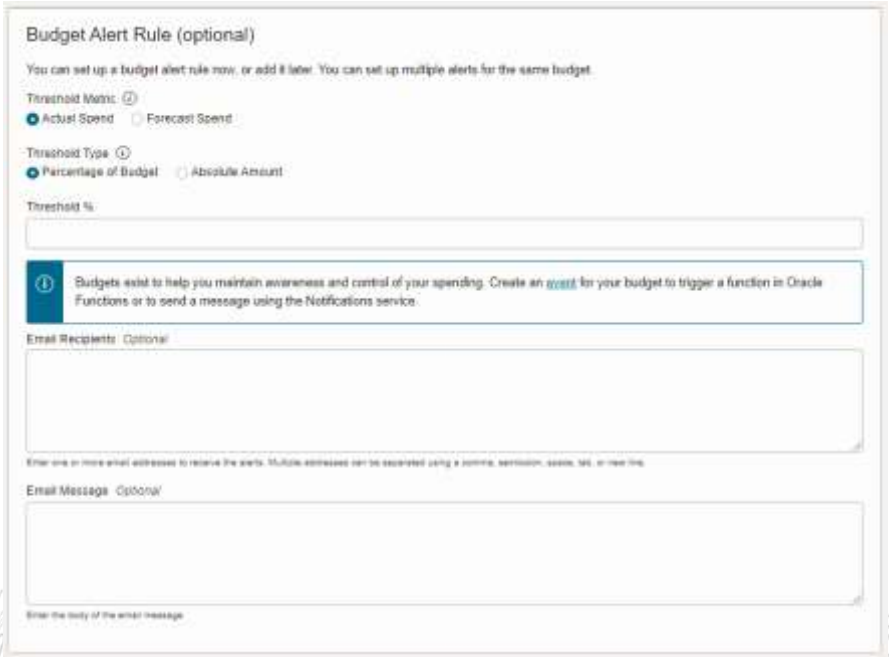
- Visualization tools Help understand spending patterns at a glance
- Filter costs by Date, Tags and Compartments
- To use Cost Analysis you must be a member of the Administrators group



Budgets

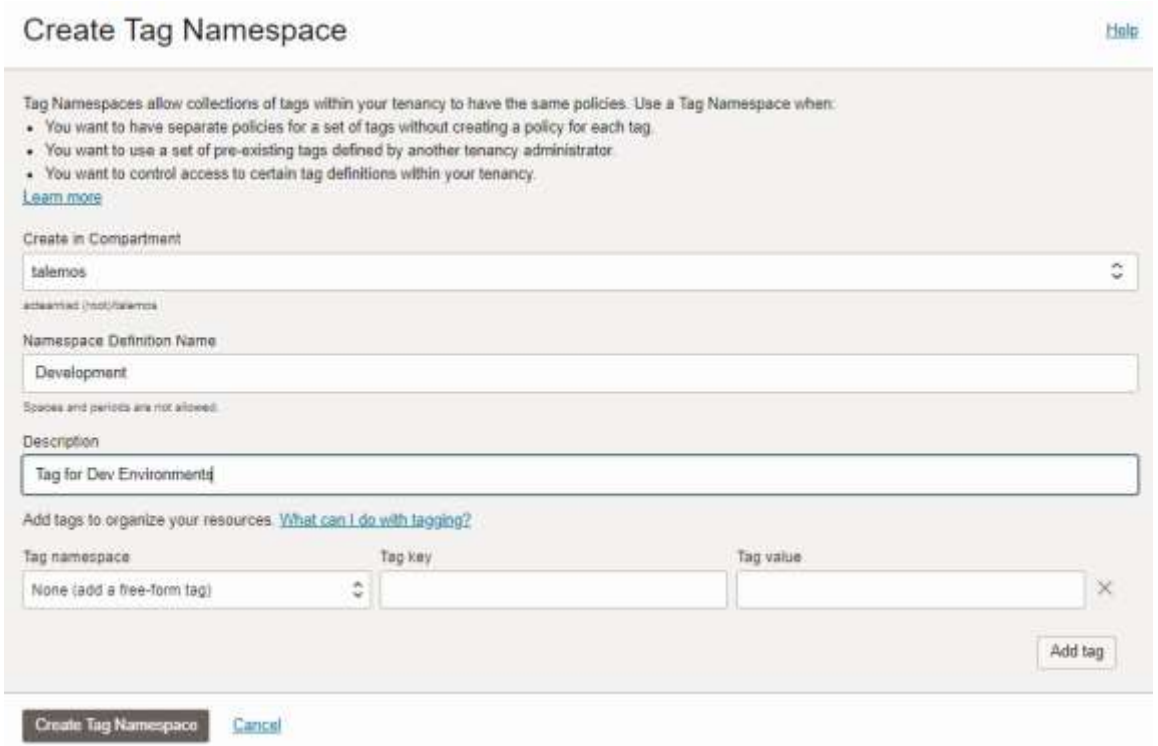
- A monthly threshold you define for your OCI spend
- Can be set on cost-tracking tags or compartments and track all spending in the cost-tracking tag or compartment and any child compartments
- Can define email alerts that get sent out for your budget
- Alerts are evaluated every 15 minutes, and can be triggered when your actual or forecasted spending hits either a budget % or a specified amount

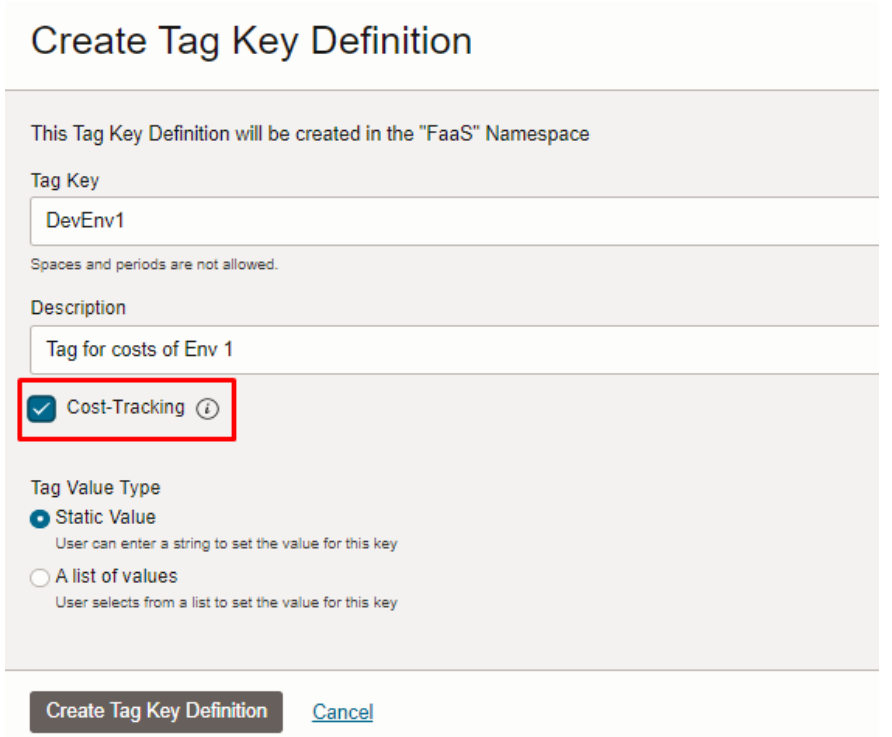




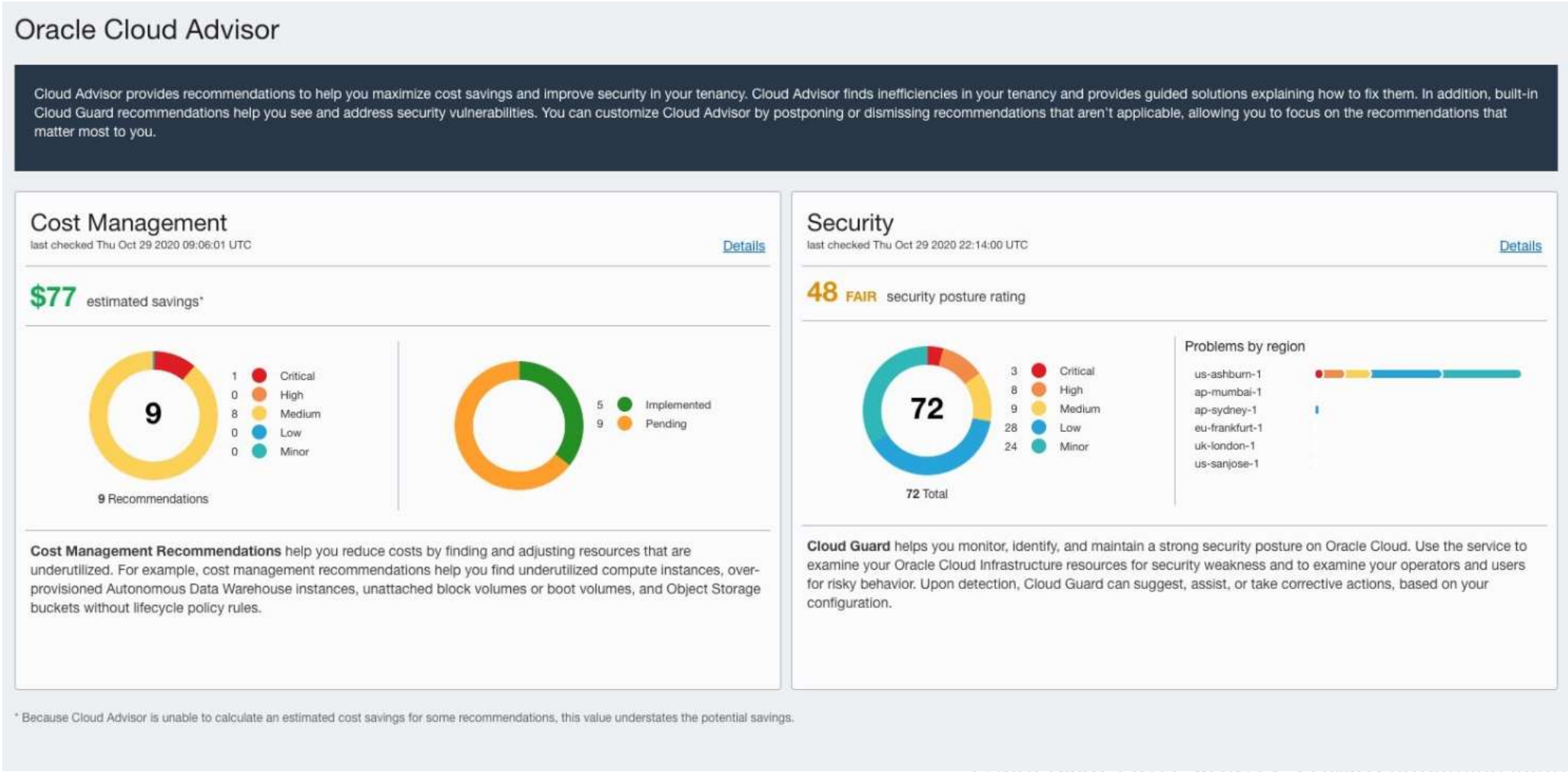
Cost Tracking Tags

- Create a Tag Namespace
- Create a Tag Key Definition and enable “Cost-Tacking”
- Use this tag on your services





Oracle Cloud Advisor



Thank you