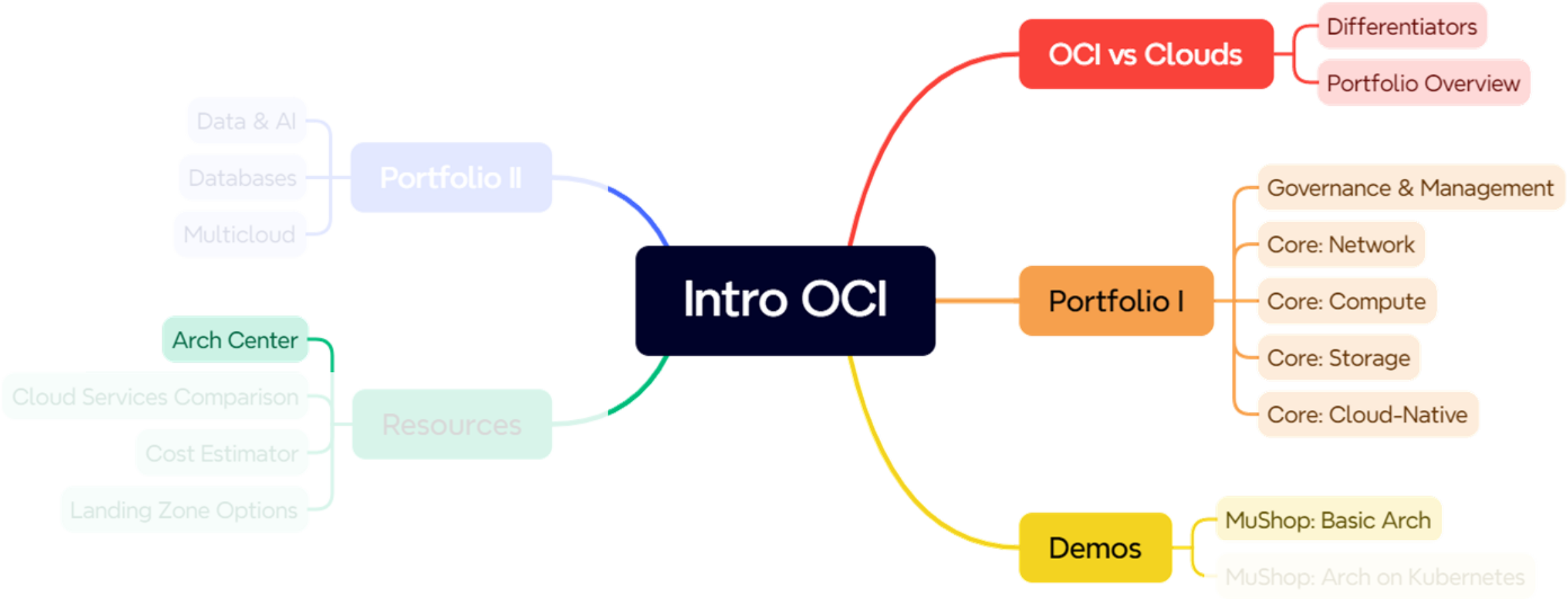
Oracle Cloud Infrastructure (OCI) Course

Internal Course for Intermediate Solutions Architect (SAA)

MARCH 2025

Agenda


Intro OCI
OCI vs Clouds
Differentiators
Portfolio Overview
Portfolio I
Governance & Management
Core: Network
Core: Compute
Core: Storage
Core: Cloud-Native
Demos
MuShop: Basic Arch
MuShop: Arch on Kubernetes
Portfolio II
Data & AI
Databases
Multicloud
Resources
Arch Center
Cloud Services Comparison
Cost Estimator
Landing Zone Options

Who am I ?

{Ent/SW/Cloud/Devops} Architect.

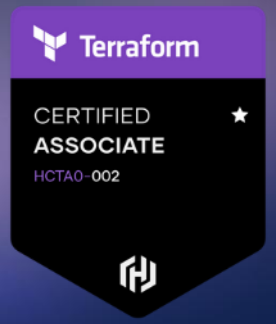
16 y of sw dev for trx platforms.

Cloud (20+ Active certfs.)

Main approaches:

- DevOps
- Multicloud
- Solutions Architecture
- Landing Zone

Note: All links are embedded on the slides: on images or on text.



Interesting Regions on Europe

Oracle Cloud Infrastructure

Secure, high-performance platform
for all your workloads

Adapted from Oracle Sales Accelerator as Public Info

V2.12, 30-MAY-2024

Why customers are choosing OCI

All the services you need, including SaaS

Oracle can help you modernize your entire app and infrastructure portfolio, without an army of consultants

Designed for the best performance

Performance for enterprise applications as well as cloud native and AI

Distributed cloud

OCI's distributed cloud provides the flexibility to consume cloud services across a choice of clouds and locations

Radically better pricing

Run all your applications – new or existing – up to 50% cheaper with more efficiency and agility

We built our cloud from the ground up to break the rules

11 years after the first generation of cloud, we started with a clean sheet

Off-box virtualization

The way we manage OCI is entirely separate from your resources, maximizing isolation, performance, and security

Nonblocking network design

We designed and optimized our networks to help ensure consistent bandwidth between your resources.

Maximum computing density per MW

We pack over 230,000 cores into each megawatt and can deliver an entire cloud region in only 12 racks

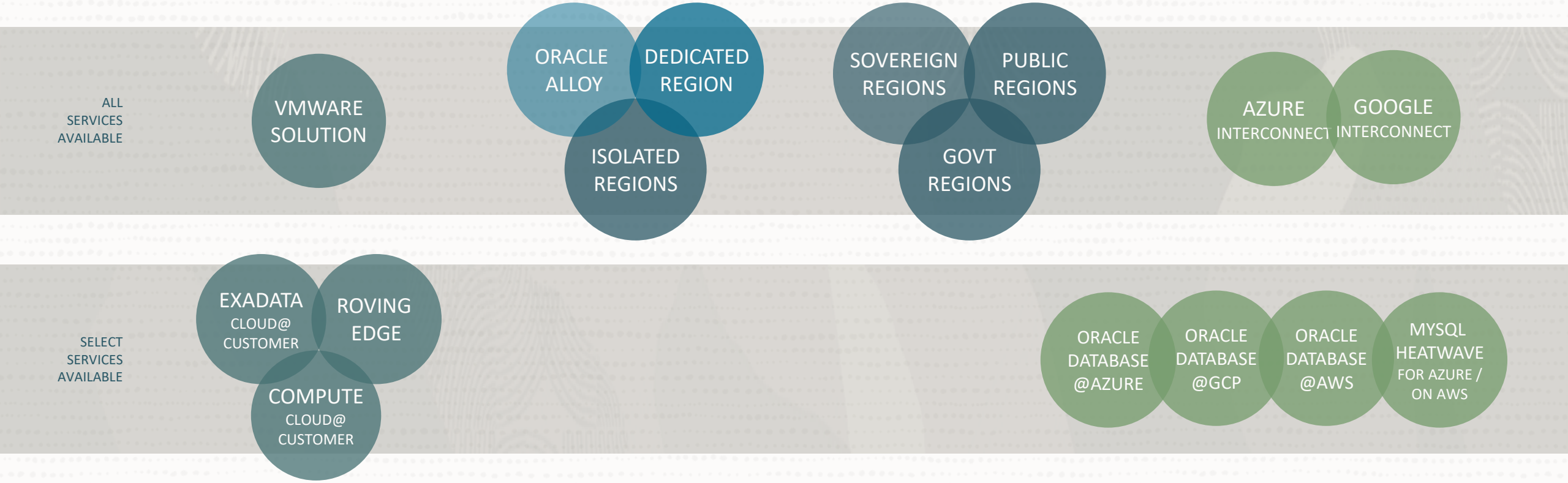
Flex infrastructure

You can choose exactly the amount of cores, memory, and storage performance you need, and pay for exactly that, minimizing waste

Simple, predictable pricing

Our pricing is simple to understand. Services in each region are priced consistently worldwide, so you get predictable savings with no surprises. Networking between regions are up to 90% lower than other hyperscalers.

Or deploy OCI cloud services exactly where you need them



Oracle’s distributed cloud offers exceptional flexibility and choice

Multicloud

We work with other providers:

Oracle Database@Azure/GCP/AWS
Oracle Interconnect for Azure/GCP
Oracle MySQL Heatwave on AWS

Public cloud

48 global locations:

Commercial
US Gov, UK Gov, Australian Gov
EU Sovereign

Hybrid cloud

We bring cloud services to you:

Oracle Exadata Cloud@Customer
Oracle Compute Cloud@Customer
Oracle Roving Edge Infrastructure

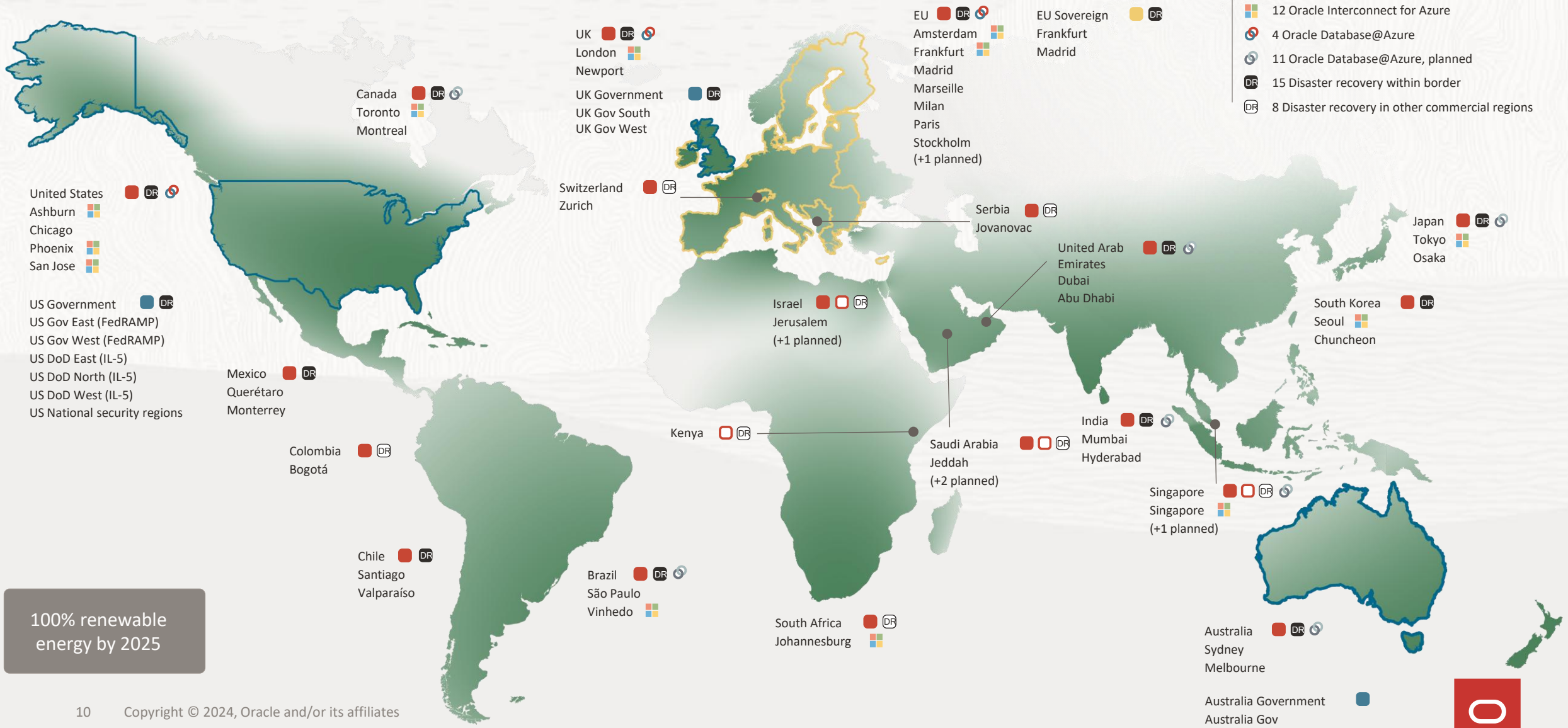
Dedicated cloud

All 100+ OCI services running in customer data centers:

OCI Dedicated Region
Oracle Alloy
Oracle Isolated Region
US National Security Regions

Oracle Cloud Infrastructure global footprint – 72 regions

May 2024 – 48 public regions, 24 Dedicated, Alloy, Multicloud and secret regions



100% renewable energy by 2025

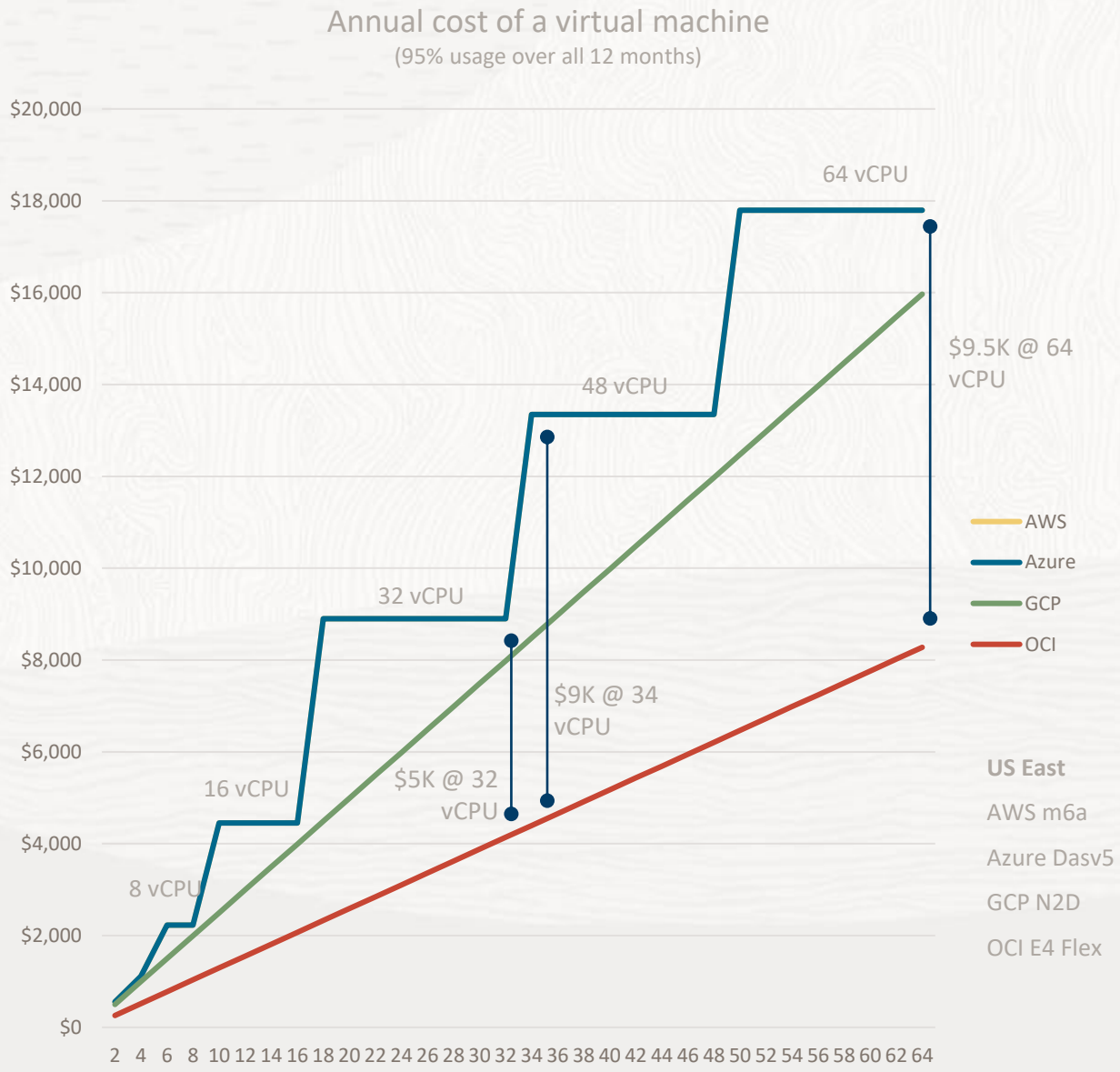
Flexible sizing vs savings plans

We're (still) noticeably cheaper

OCI and Google Cloud offer flexible CPU virtual machines

AWS and Azure offer fixed sizes, forcing you to "upsize" even if you just need "a little bit more"

Needed vCPUs	OCI	AWS	Azure	Google Cloud
2	2 (1 OCPU)	**2** .large	**2**	2
4	4 (2 OCPU)	**4** .xlarge	**4**	4
6	6 (3 OCPU)	**8** .2xlarge	**8**	6
8	8 (4 OCPU)	**8** .2xlarge	**8**	8
10	10 (5 OCPU)	**16** .4xlarge	**16**	10
12	12 (6 OCPU)	**16** .4xlarge	**16**	12
14	14 (7 OCPU)	**16** .4xlarge	**16**	14
16	16 (8 OCPU)	**16** .4xlarge	**16**	16
18	18 (9 OCPU)	**32** .8xlarge	**32**	18
20	20 (10 OCPU)	**32** .8xlarge	**32**	20
22	22 (11 OCPU)	**32** .8xlarge	**32**	22
24	24 (12 OCPU)	**32** .8xlarge	**32**	24
26	26 (13 OCPU)	**32** .8xlarge	**32**	26
28	28 (14 OCPU)	**32** .8xlarge	**32**	28
30	30 (15 OCPU)	**32** .8xlarge	**32**	30
32	32 (16 OCPU)	**32** .8xlarge	**32**	32



AWS, Azure, and GCP costing *include* savings plan discount

AWS and Azure lines **overlap** (with only Azure showing).

Modernize at your pace with unique infrastructure options

Bare Metal, VMware Solution

On-premises performance and control for demanding workloads

Quickest migration path for existing applications

Exadata Cloud@Customer, Database Service

Optimized instances for the Oracle Database, including Autonomous DB

Upgrade and consolidate multiple Oracle Databases

Flex Virtual Machine

Flexible and scalable compute resources at enterprise scale

Adapt to dynamic usage patterns with familiar environments

Containers, Kubernetes

Managed container instances or Kubernetes orchestration

Focus on the essentials of a scalable application

Functions

Focus on the code, not the infrastructure

No hardware or compute resources to manage

Lift-and-shift → Upgrade → Cloud powered → Cloud native → Serverless

Oracle Cloud: all the services you need to build, run, and scale

Infrastructure, platform, and SaaS in one cloud

Oracle Applications
Industry | ERP | EPM | SCM | HCM | ACX

Custom Applications
Polyglot | Traditional | Cloud Native

ISV Applications
Hundreds to choose from

Oracle Cloud Infrastructure


Developer Services


Oracle Databases


Open Source Databases


Analytics and BI


AI and Machine Learning


Data Lake


Compute


Operating Systems, Native VMware


Containers and Functions


Storage


Networking


Integration

Security | Observability | Compliance | Messaging | Governance

Distributed Cloud

Public Cloud | Cloud@Customer | Dedicated Cloud | Multicloud

100+
platform services to support your workloads

10,000
OCI developers

3,000
field cloud engineers

Use familiar technologies

- Retain your investment in skills and technologies
- Work in a familiar environment
- Get up to speed on OCI fast
- Save time and effort
- Reduce risk

Red Hat
Ubuntu
CentOS
Oracle
Debian
SUSE

Linux
OPERATING SYSTEM

Microsoft

Windows
OPERATING SYSTEM

vmware

VMware
VIRTUAL ENVIRONMENT

MySQL

MySQL
DATABASE

redis

Redis
CACHING DATABASE

mongoDB.

MongoDB
DATABASE

Spring Boot
APPLICATION FRAMEWORK

PostgreSQL
DATABASE

OpenJDK
GraalVM

OpenJDK & GraalVM
JAVA + HIGH PERFORMANCE JVM

helidon.io

Helidon.io
APPLICATION FRAMEWORK

PyTorch

PyTorch
MACHINE LEARNING FRAMEWORK

HYPERLEDGER

Hyperledger
BLOCKCHAIN

Use your existing tools

Retain your investment in skills and technologies

Continue using your existing tools and processes

Integrate OCI into your environment quickly

Save time and effort

Reduce risk

GitHub
VERSION CONTROL & DEVOPS

Jenkins
AUTOMATION

GitLab
DEV-SEC-OPS PLATFORM

Java
PROGRAMMING ENVIRONMENT

Kubernetes
CONTAINER MANAGEMENT

Terraform
INFRASTRUCTURE AS CODE

Atlassian / JIRA
TEAM COLLABORATION

Coherence
RELIABLE APP PLATFORM

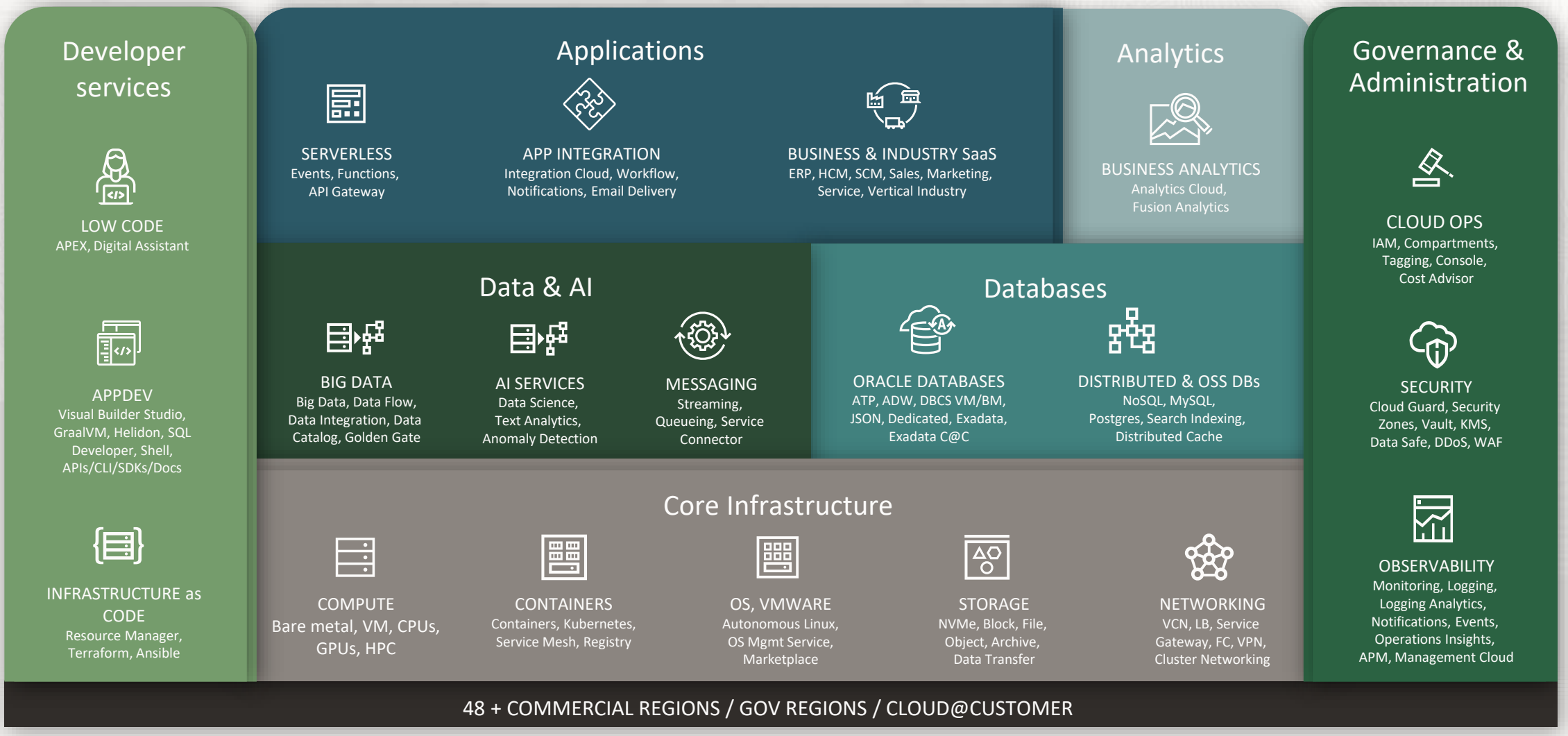
Ansible
AUTOMATION

ProcessBolt
RISK MANAGEMENT

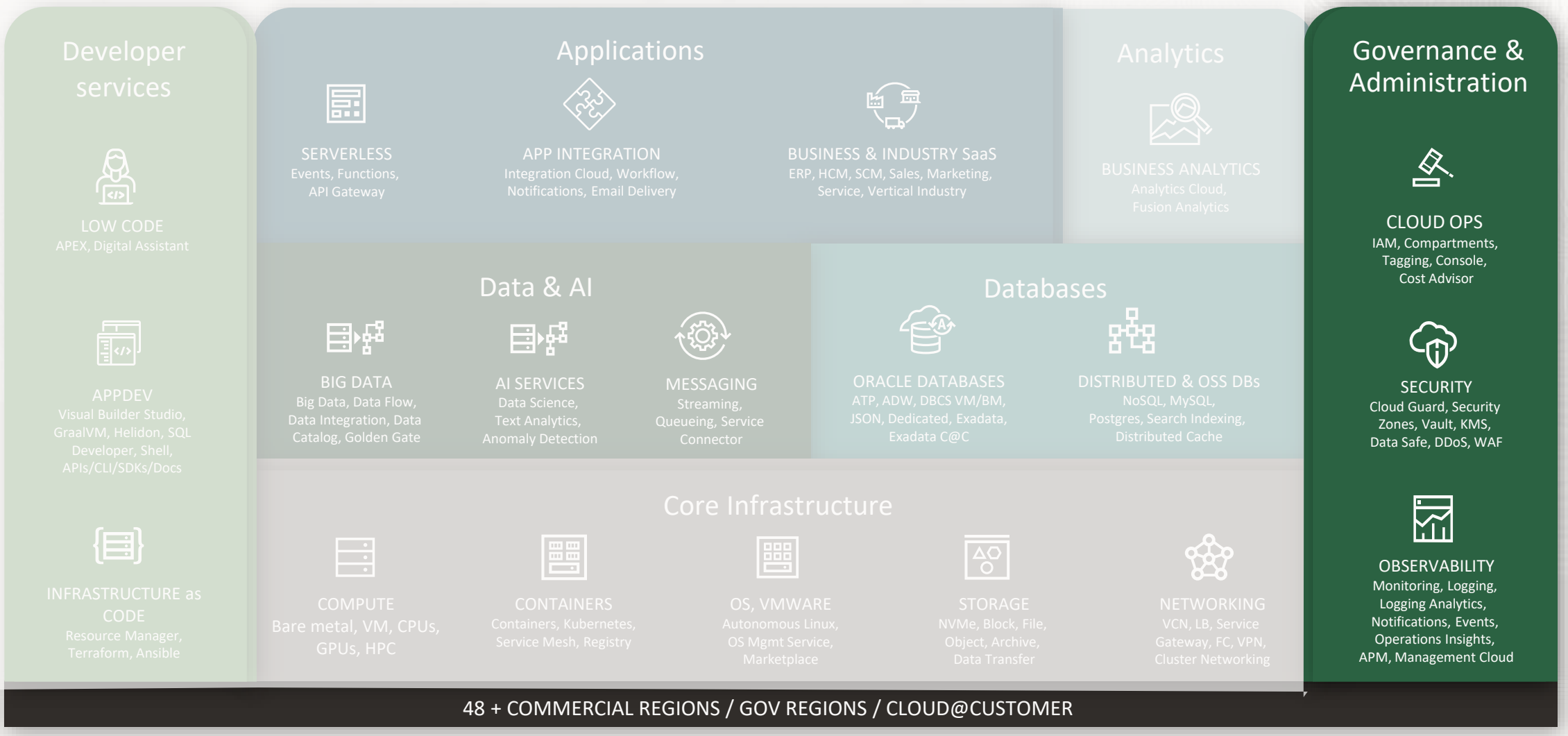
Helm
PACKAGE MANAGEMENT

Open source
MANY PACKAGES AND TOOLS

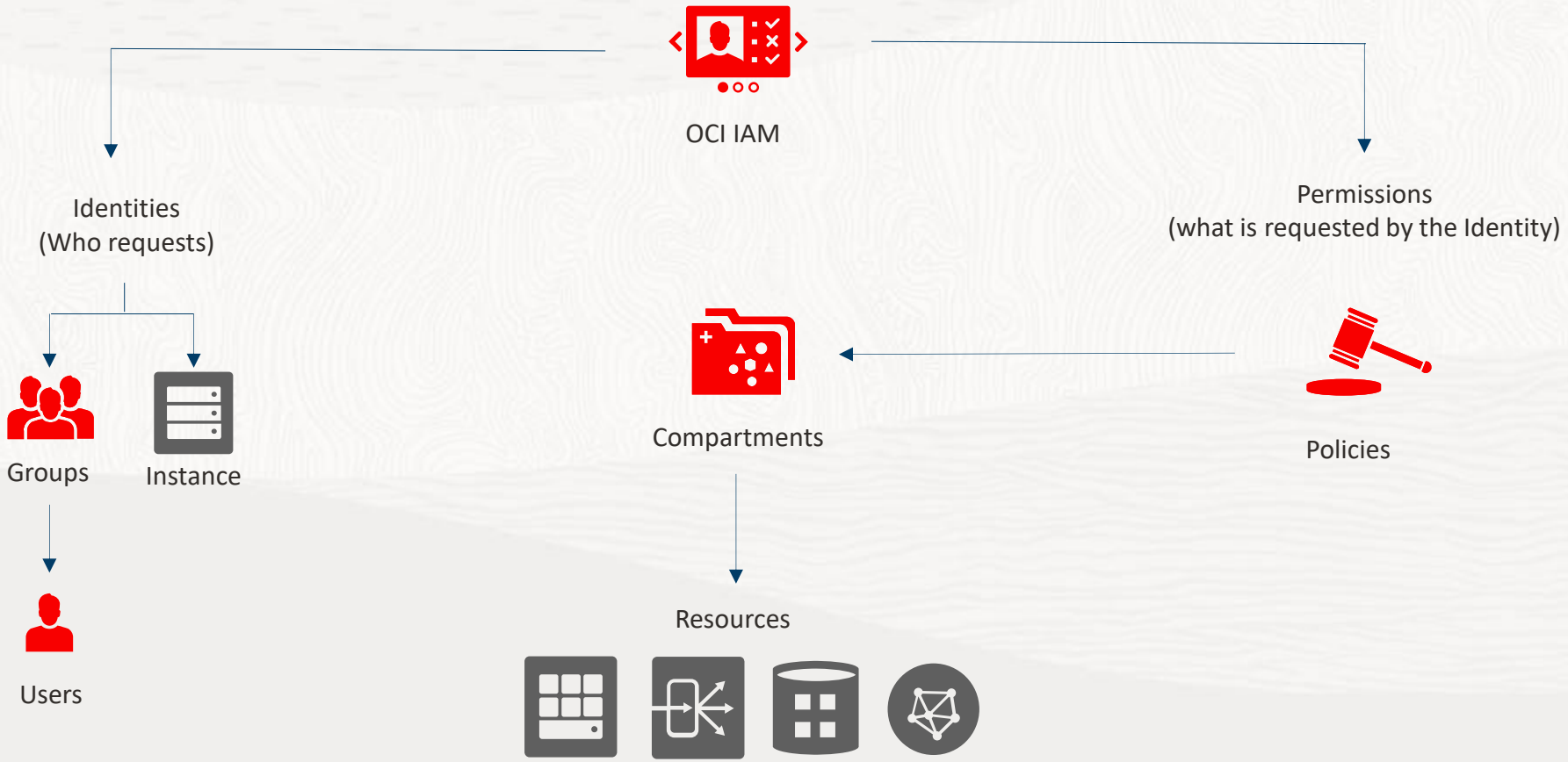
Complete cloud capabilities



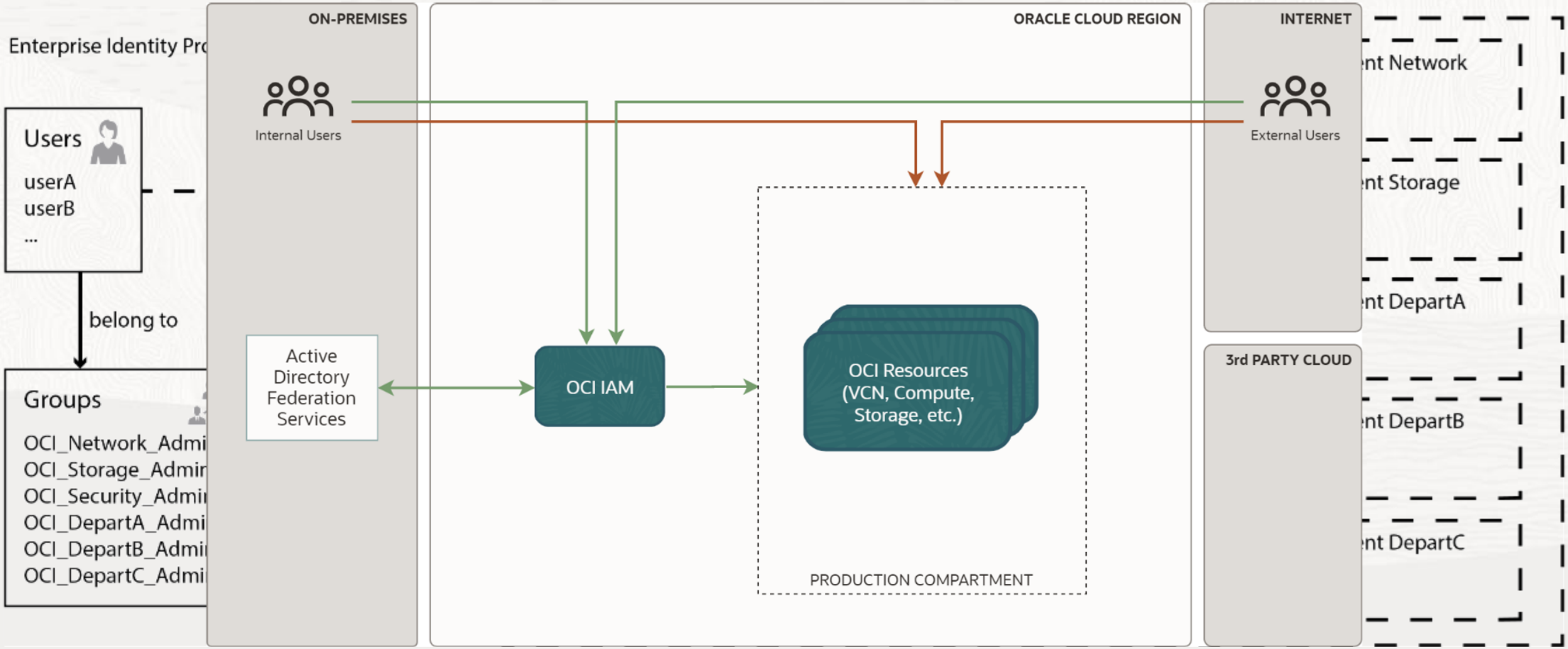
Complete cloud capabilities



Basics of Identity and Access Management

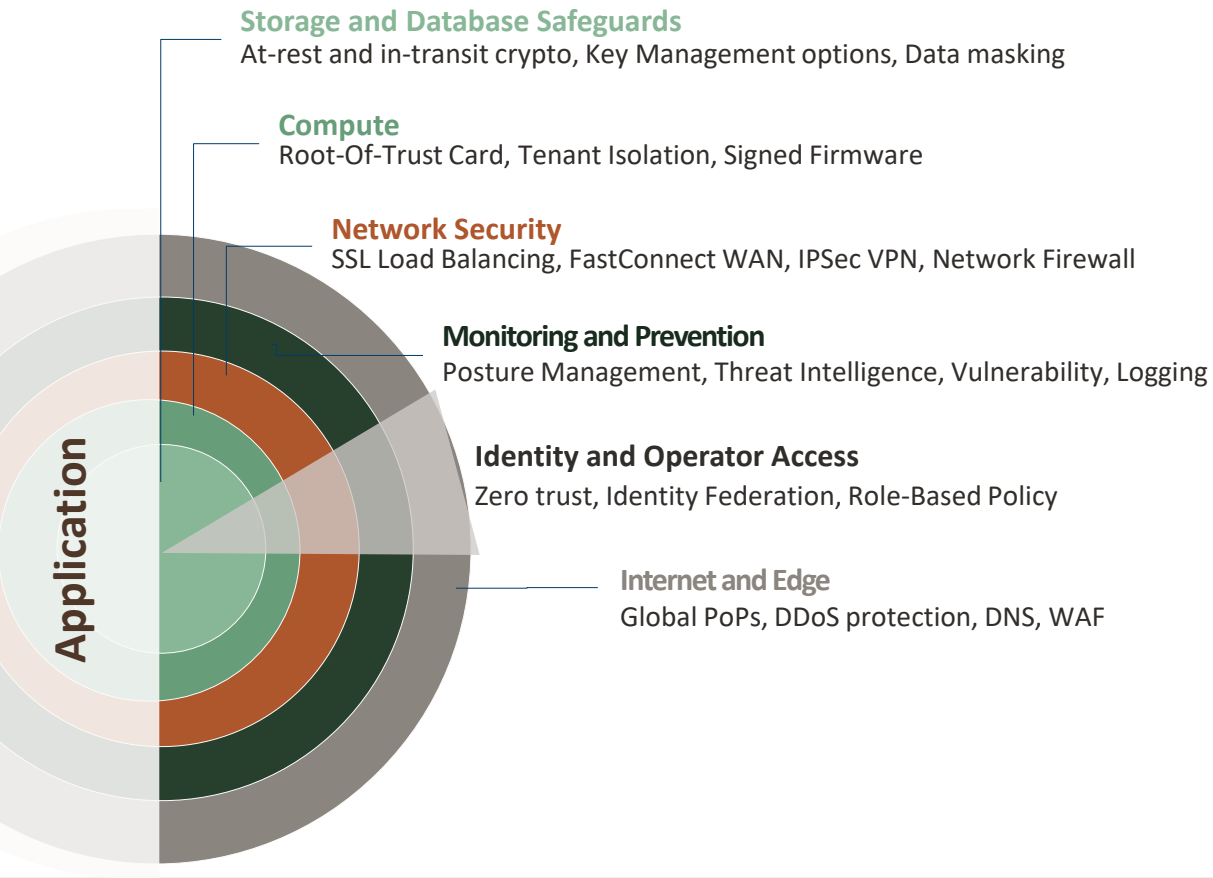


Identity Federation and Active Directory



More info for federating with Azure Active Directory here

OCI’s security-first architecture



Storage and Database Safeguards
At-rest and in-transit crypto, Key Management options, Data masking

Compute
Root-Of-Trust Card, Tenant Isolation, Signed Firmware

Network Security
SSL Load Balancing, FastConnect WAN, IPSec VPN, Network Firewall

Monitoring and Prevention
Posture Management, Threat Intelligence, Vulnerability, Logging

Identity and Operator Access
Zero trust, Identity Federation, Role-Based Policy

Internet and Edge
Global PoPs, DDoS protection, DNS, WAF

Means customers do not have to choose between security and cost

Simple
‘Always on’ security posture. Easy defaults for developing and running apps

Prescriptive
Policies to enforce security posture, automated baseline management

Integrated
Unified Security and Identity across IaaS and SaaS

No Compromise
Included security eliminates the cost/security tradeoff

Oracle offers a full stack of cybersecurity capabilities

Prevent

Block attacks and malicious traffic

Distributed Denial of Service protection
Automatic DDoS protection

Web Application Firewall
Internet-facing endpoint protection

INTERNET & EDGE

Monitor

Log, analyze, and audit activity

Cloud Guard
Security posture management

Security Zones
Security policy compliance

Threat Intelligence
Multi-source, actionable guidance

Threat Detector
Monitor for known threats

Logging
Single pane for service logs

Fusion Apps Detector
Monitor ERP and HCM apps

Vulnerability Scanning
Patch and port monitoring

Auditing
OCI API logging

MONITORING & PREVENTION

Mitigate

Isolate communications with secure and reliable networks

Virtual Cloud Network
Secure, isolated network

Security Lists
Virtual network firewall rules

Network Firewall
Advanced firewall service

Bastion
Time-limited SSH access

Dynamic Routing Gateway
Virtual router

Fast Connect
Dedicated, high-speed connection

Virtual Private Network
Secure connectivity over any network

NAT Gateway
Protected access to the internet

NETWORK

Protect

Hardware-enabled security built into the architecture

Bare Metal Servers
Servers with full customer control

Hardware Root of Trust
Protect from firmware attacks

Signed Firmware
Prevent rootkit installation

Hardened Disk Images
OS with expert security settings

Off-box Control Plane
Isolated admin of compute hardware

Off-box Network Virtualization
Encapsulated, separated traffic

Oracle Linux & Oracle Enterprise Linux
Performant, secure, enterprise Linux

COMPUTE

Encrypt

Encrypt and protect all data

Confidential computing
Encrypt VMs in motion

Data Safe
Monitor data usage in database

Vault
Hardware security module protection

Key Management
Encryption key administration

Secrets Management
Credential and similar administration

Certificates
Validation certificate administration

STORAGE & DATABASE

Access

Ensure authentication, authorization, and accounting

Access Governance
Proactive guidance for user actions

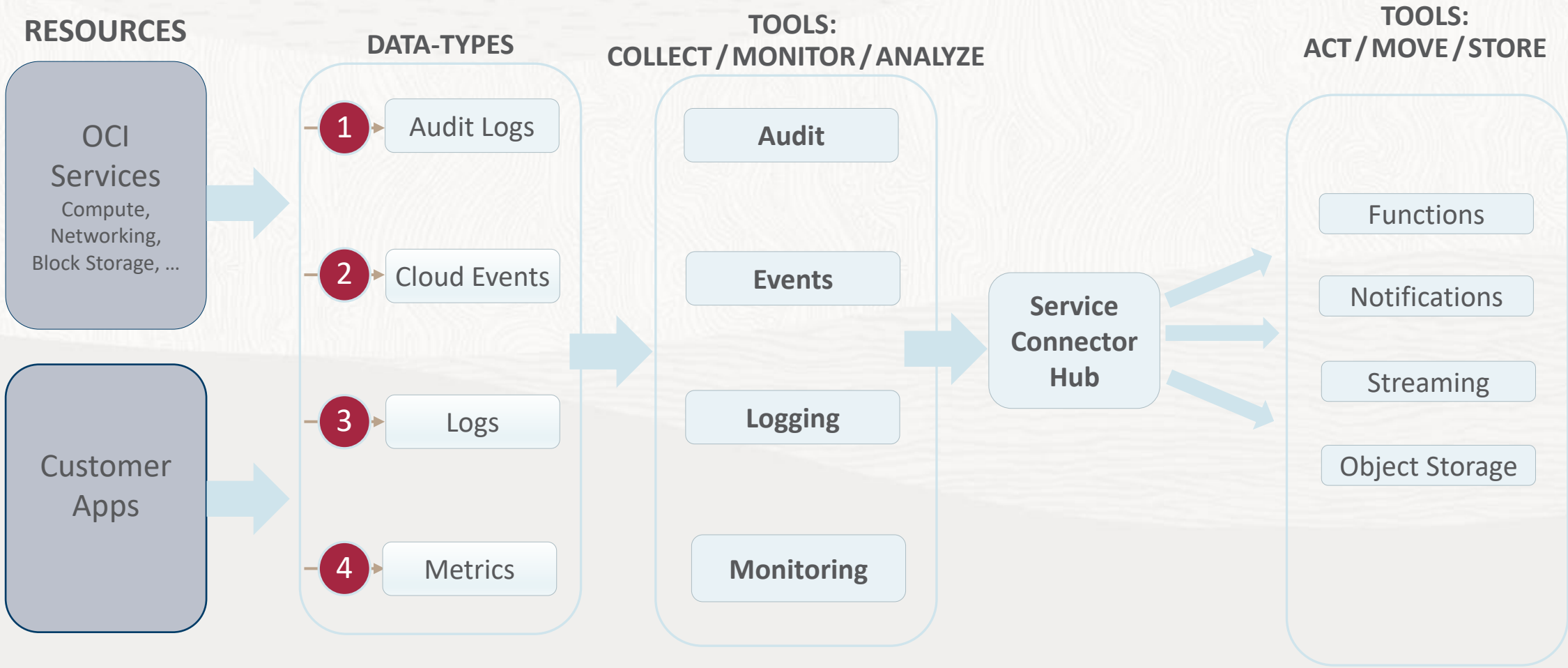
OCI Identity and Access Management
Control access to cloud resources

Policies
User access rules

Federation
Identity provider inter-operation

IDENTITY & OPERATOR ACCESS

Observability Overview



Discover Oracle Cloud Observability and Management capabilities

Application and stack monitoring

Complete visibility through stack monitoring, real user experience, synthetic monitoring, and distributed tracing.

Explore OCI APM

Explore OCI Monitoring

Database monitoring and management

Unified monitoring, capacity planning, and database administration capabilities for on-premises and cloud databases.

Explore OCI Database Management

Explore OCI Ops Insights

Logging and troubleshooting

Monitor and troubleshoot issues faster by analysing data from any source using interactive, intuitive dashboards.

Explore OCI Logging

Explore OCI Logging Analytics

Infrastructure resource management

Deploy and manage Oracle Cloud resources using Terraform-based automation and manage data exchanges.

Explore OCI Resource Manager

Explore OCI Connector Hub

Oracle Management Cloud

Full-Stack Monitoring and Operational Analytics for Applications Deployed Anywhere

END USER EXPERIENCE

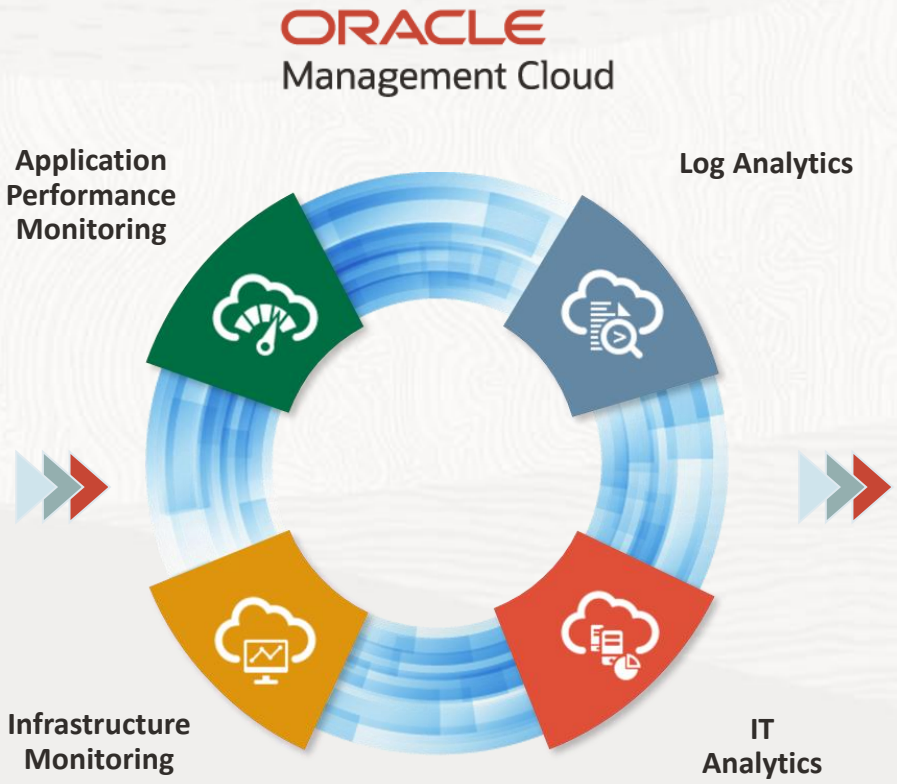
APPLICATION TIER

MIDDLE AND INTEGRATION TIER

DATA / DATABASE TIER

VIRTUALIZATION TIER

INFRASTRUCTURE TIER

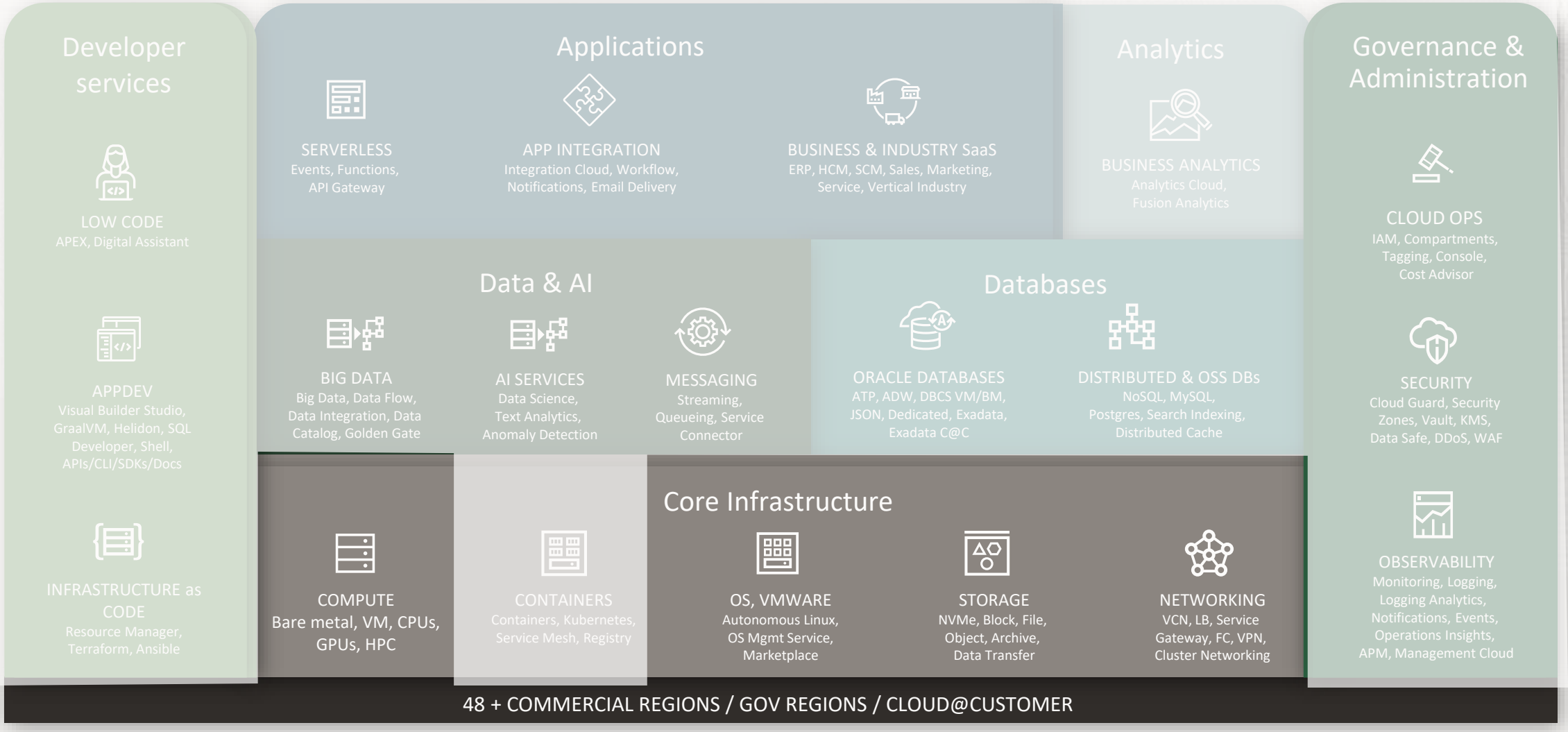


Unified SaaS Platform

Using ML to increase…

- ANOMALY DETECTION
- CLUSTERING
- CORRELATION
- PREDICTION

Complete cloud capabilities



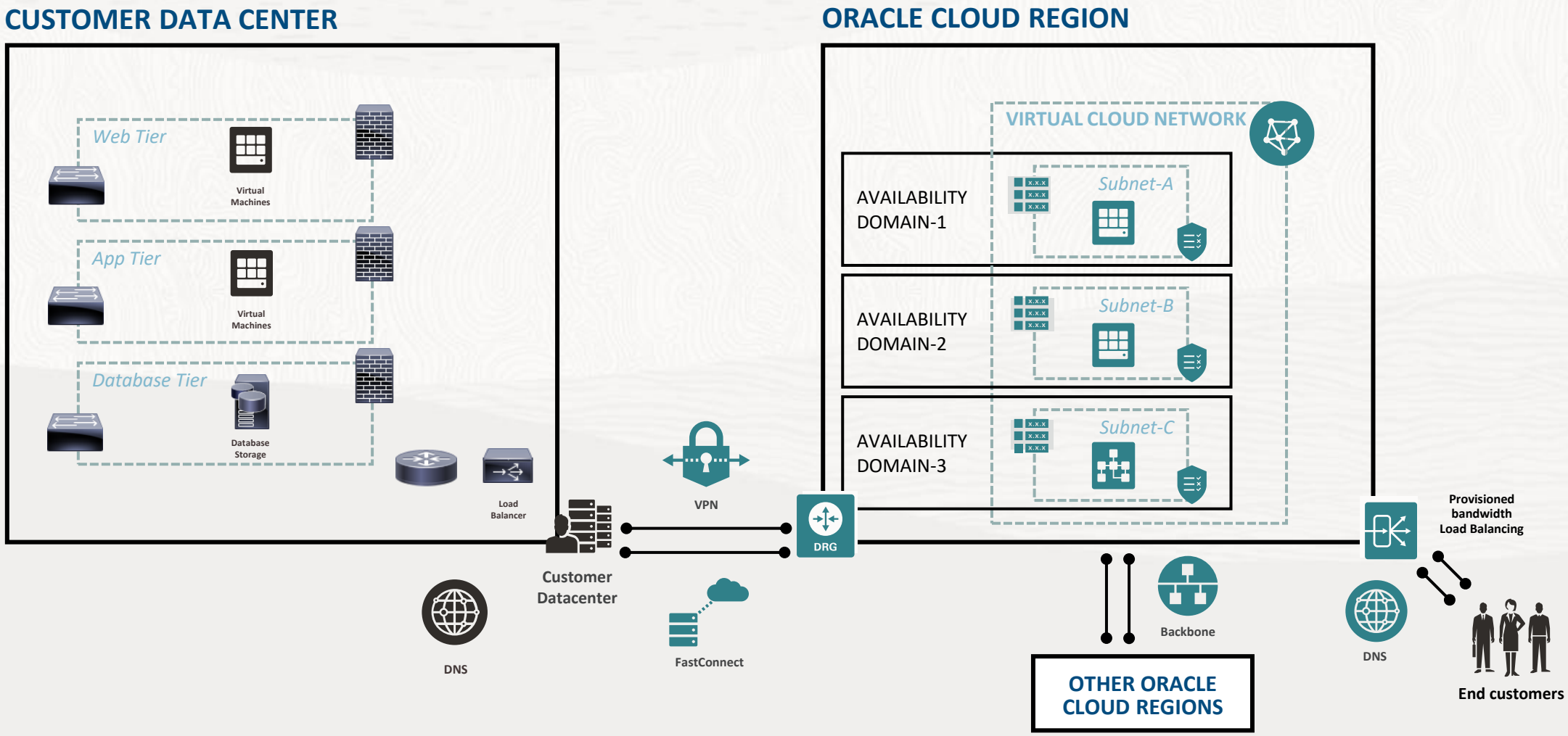
Networking

High fidelity virtual networks and connectivity

VCN	FastConnect	Load Balancing
Fully configurable subnets, routing, firewalls Default IPSec VPN 25Gb network infrastructure	Dedicated, SLA backed connectivity No data transfer charges 42 carriers worldwide	Choice of TCP, HTTP, HTTP/2 Flexible, autoscaling End-to-end SSL TLS encryption

Service Gateway	DNS
Private access without traversing internet Full range of IaaS/PaaS services covered	~ms response time Global load balancing Traffic management Network health checks

Networking flexibility and control



High performance, flexible, scalable, and low-cost storage

Local NVMe
- Highest performance flash-based storage
- HPC and other demanding IO workloads

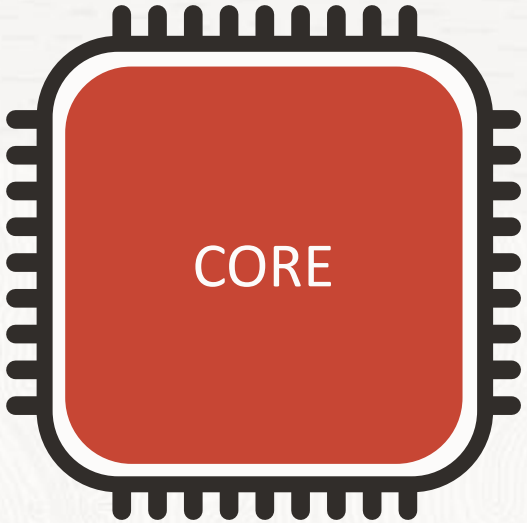
Block Storage
- Auto-tuned, high performance remote storage
- OS, application data, and large OLTP workloads

File Storage
- Managed and elastic shared file system

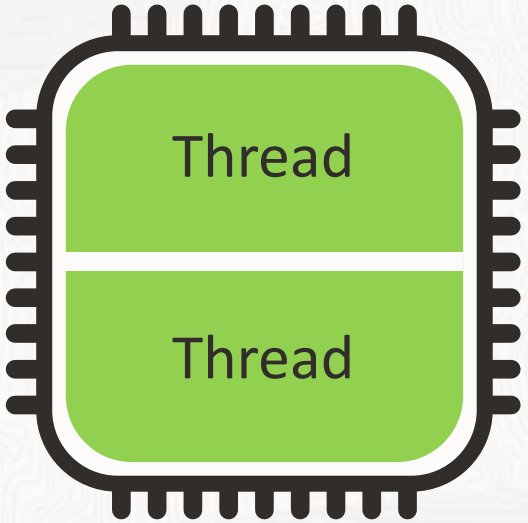
Object Storage
- Elastic unstructured data
- Big data, rich media, backups

Archive Storage
- Long-term archival and backup
- Cost-effective, cold data storage

Oracle Cloud: OCPU vs vCPUS



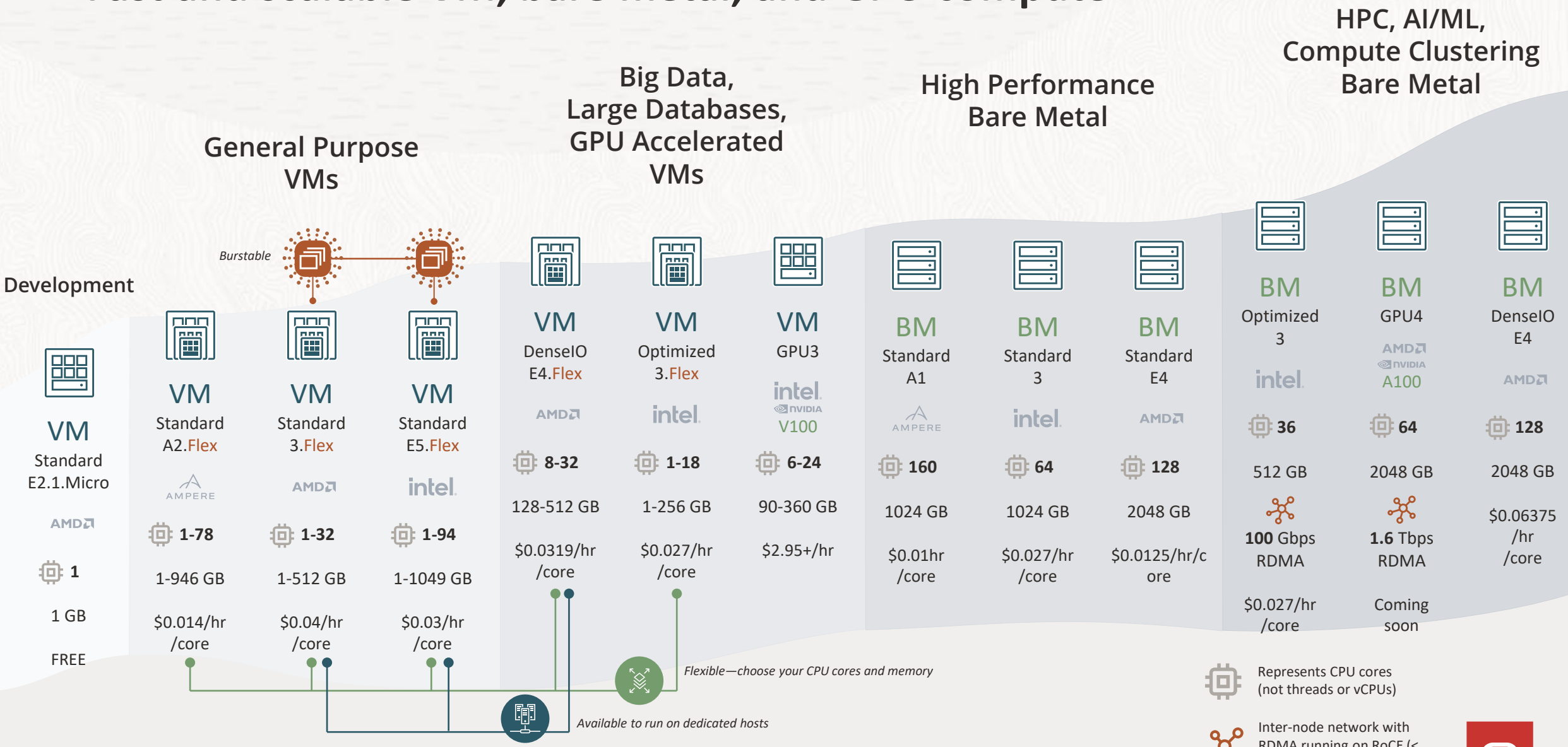
1 Core = 1 OCPU
1 OCPU (x86) = 2 vCPU
1 OCPU (ARM A1) = 1 vCPU
1 OCPU (ARM A2) = 2 vCPU



1 Thread = 1 vCPU

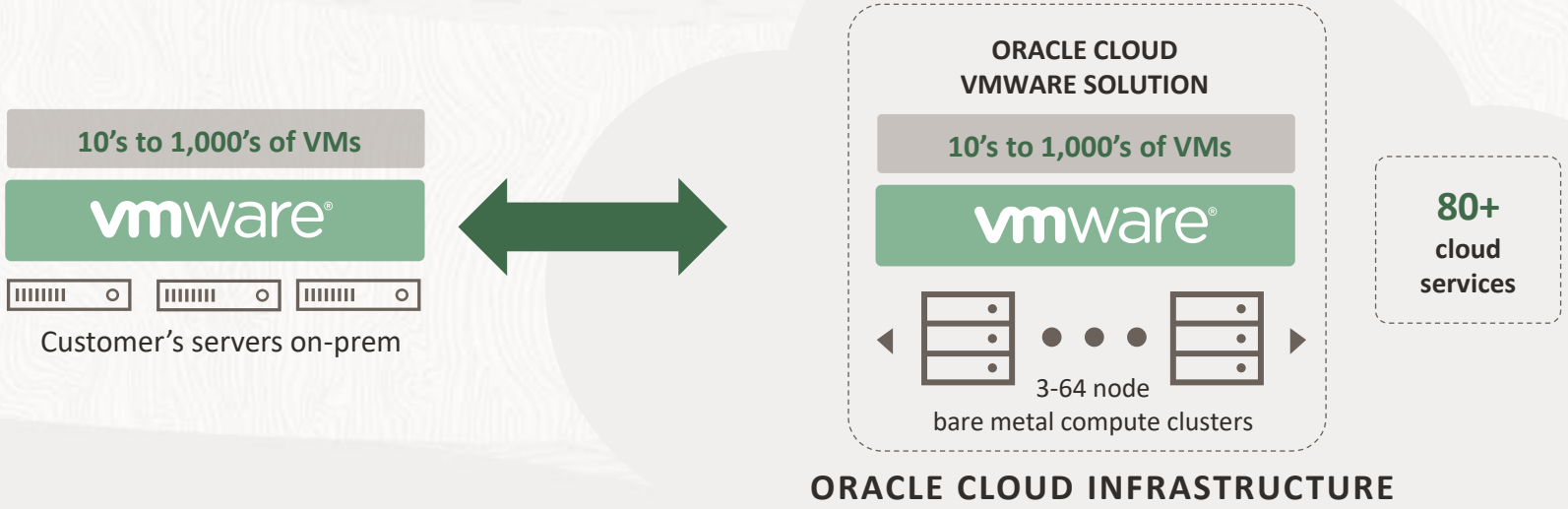
Original Blog on 2021
Updated page for Compute Shapes on 2025

Fast and scalable VM, bare metal, and GPU compute



All prices and limits are subject to change (Taken on 08/2022). Memory is extra for flex instances, but typically insignificant. For standard instances, the price for the smallest configuration is shown.

Oracle Cloud VMware Solution



Key use cases:

- Data Center Migration
- Hybrid Cloud Expansion
- Disaster Recovery Site

More info here

Protect VMW Investment

Most like on-premises VMW
Control versions, policies
Full access, all features

Modernize Infrastructure

Elastic capacity
OCI + NSX + hybrid flexibility
Security-first architecture

Modernize Applications

Increase performance & scale
Integrate 80+ OCI services
Integrate Oracle SaaS

Global Availability

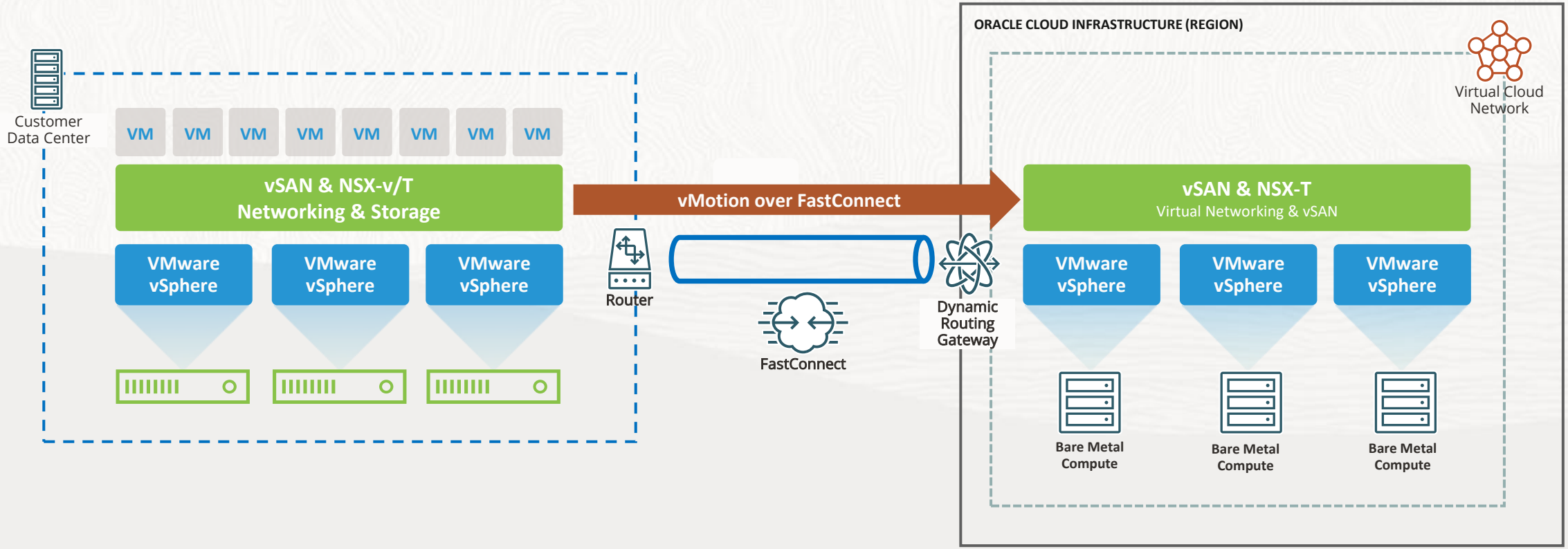
48+ comm. regions
8 US Gov regions
OCI Dedicated Region

(50 Comm. Region on March 2025)

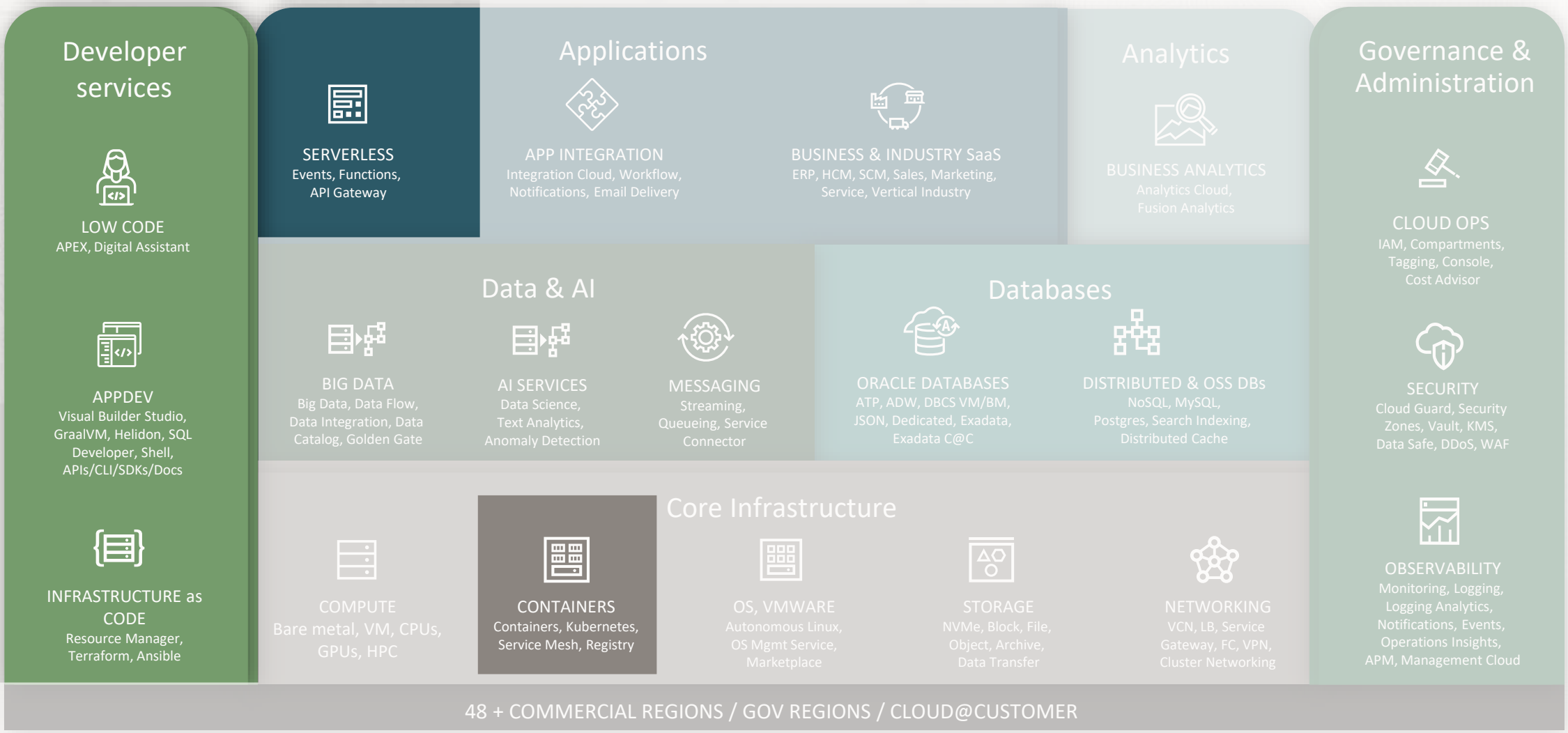
Data Center Migration

Move workloads from on-premises to consolidate or decommission data centers

Exit Data Center | Hardware Refresh | Business Expansion



Complete cloud capabilities



Cloud Native Development on OCI

Dev Productivity

Microservices, Containers, and Kubernetes

Container
Kubernetes
Container Registry
Events
Functions
Notifications

API Management and Streaming

API Gateway
API Catalog
Streaming

Artificial Intelligence (AI) and Data Services

Digital Assistant
AI Services
Machine Learning
MySQL
Autonomous DB
Data Science

Monitoring and Observability

Logging
Monitoring
APM
Operations Insights
Alarm
Search

OCI DevOps + Freedom of Choice with Integrated Ecosystem

Open Frameworks, 100% Upstream Compatible

Autonomous Operations

Shared Data Services

Flexible Infrastructure, Storage & Networking: any size, any workload, anywhere

IAM, Security & Governance across the SDLC

From always-free developer tier to hyperscale – on a single platform

Operations Reliability

Containers, Serverless, and Functions-based Development

Container Engine for Kubernetes (OKE)

Managed Kubernetes service to simply and securely deploy and operate applications at scale

Serverless Kubernetes with Virtual Nodes capability for OKE

Eliminate the operational burden and learning curve around managing K8s clusters' infra. to accelerate cloud-native adoption.

Container Instances

Instantly run containers without managing any servers

Functions

Create, run and scale serverless event-driven apps

Container Registry

Container images and Helm repository with OOTB security scanning

Service Mesh

Secure, observe, and connect your microservices with no app code changes

Observability & Management

OOTB APM, logging, monitoring, ML-driven insights enable end-to-end visibility and management

Verrazano

Hybrid application orchestration platform

API Management, Streaming, and Messaging Services

API Gateway

Managed, HA API frontend for securely exposing, managing and connecting to API services

API Developer Portal

COMING SOON

Coming soon! Discover, monitor, and share APIs with internal teams or the broad developer ecosystem

API Design

Design and develop APIs with fast prototyping and validation, based on OpenAPI

Serverless APIs

Functions triggered on-demand, eliminating infrastructure operations

API Security and Governance

Ensure authorization, routing, mTLS, rate limit, monitoring, and quota policies

Streaming & Queueing

Real-time, serverless, Kafka-compatible event streaming and REST/STOMP-based queueing for asynchronous, autoscaling, secure messaging

Workflow

COMING SOON

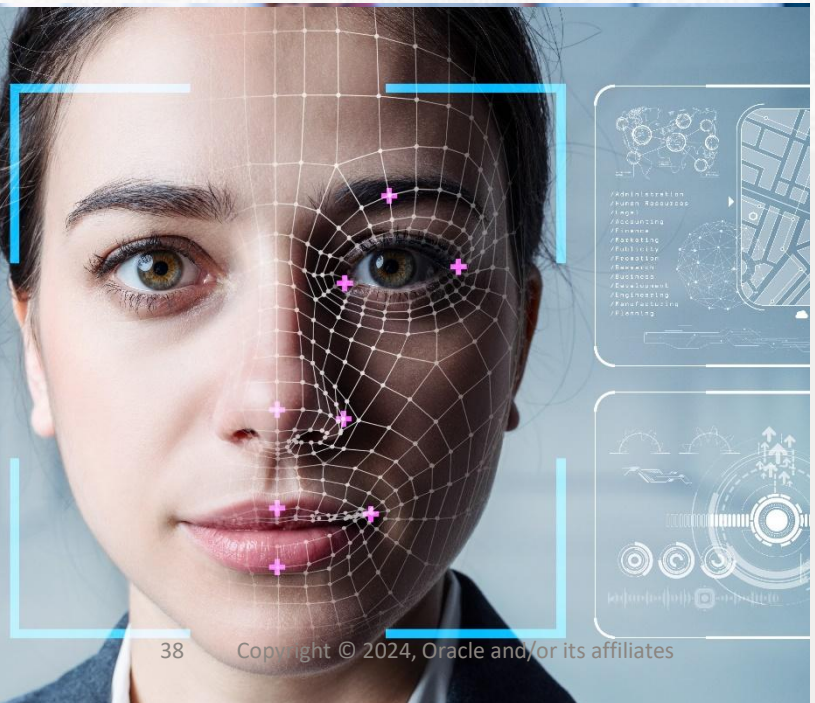
Simplify the design and execution of new apps, automation flows, and orchestration of microservices or OCI services - with a serverless, low-code visual workflow engine

Events & Notifications

Respond to CloudEvents-compatible resource changes. Trigger Email, SMS, functions, other webhooks notifications

Artificial Intelligence and Data Services

Managed AI services with pre-built models enable infusing your existing apps with AI – no experience necessary



Broad set of OCI services

Oracle Digital Assistant

Add chatbots to your website, mobile apps, and business applications

OCI Language

Sophisticated text analysis at scale—including sentiment analysis, key-phrase extraction, and classification

OCI Speech

Automatic speech recognition (ASR) and highly accurate transcription of audio/video files across languages

OCI Vision

Use computer vision to detect visual anomalies, automatically classify images, extract text from docs, and more

OCI Anomaly Detection

Anomaly detection models that flag critical incidents for sensor data processing, fraud detection, and more

OCI Forecasting

Time-series forecasts using ML and statistical algorithms—predict demand, budget, revenue, and resources

Machine Learning

Full lifecycle ML service (data prep, labeling, training, inference, visualization) and in-DB ML

Data Services & Blockchain

Autonomous Databases, OSS MySQL, OpenSearch, Data Lakes, Lakehouse services, Blockchain, and more

Native DevOps Experience

Along with Freedom of Choice and an Integrated Ecosystem

Broad set of OCI services

CI/CD

Run declarative serverless CI/CD pipelines to easily automate your end-to-end delivery

Resource Manager

Automate infrastructure-as-code with Terraform-as-a-service

Secured Deployments

Easily deploy to private K8s clusters or VMs

Native Dev Environment

Git repos, CI/CD pipelines, Artifact Repo, Container Registry, Cloud IDE, Cloud Shell, and more

Integrated Ecosystem

Connect the tools you're already using: GitHub, GitLab, Jenkins, Ansible, Rancher, EFK, Spinnaker, more

Low Code Development

Visual Builder Studio, APEX, Blockchain Builder enable non-developers to extend & create new interfaces for your business apps

Reference Architectures

Cloud-Native opinionated templates and workflows get you started quickly with DevOps services

Modern App Frameworks

Micronaut, Helidon, Springboot, GraalVM, more enable you to modernize Java apps and build new services

Flexibility & Integrated Ecosystem

Terraform, Ansible, GitHub, GitLab, paloalto NETWORKS, TREND MICRO, FORTINET, PagerDuty, cybereason, TANIUM, JFrog, servicenow, RANCHER, DATADOG, Grafana, HELM, Spinnaker

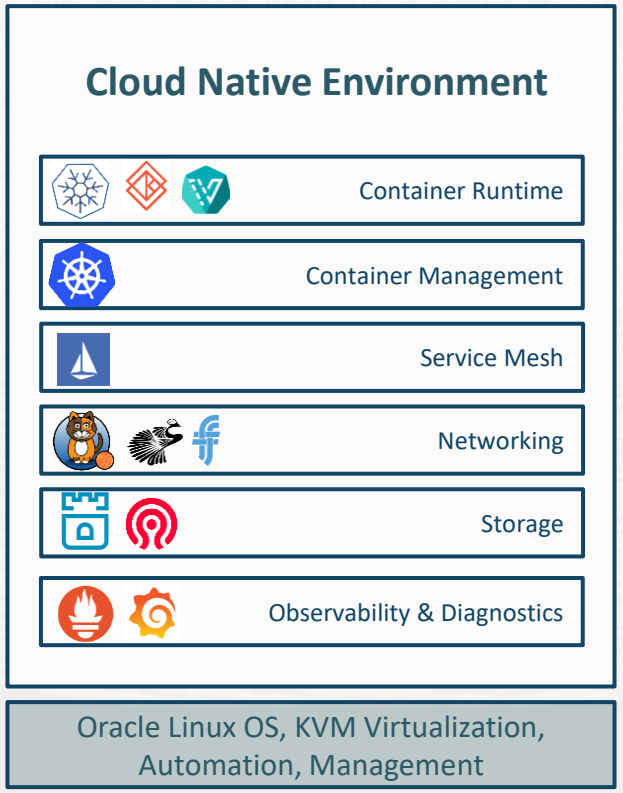
Work how you like:

GUI, CLI, API, SDKs

Oracle Cloud Native Environment

Infrastructure software for cloud native application deployment

- Centralized Kubernetes management
- 100% open-source CNCF Certified Kubernetes distribution
- Container runtimes
- Support for x86_64 and aarch64 platforms
- Simplified installation
- Container orchestration with multi cluster support
- Container Network Interface (CNI) and Container Storage Interface (CSI) plugins support
- High availability and load balancing for micro-services
- Infrastructure Monitoring and observability



Oracle's complete app development platform

APPLICATION DEVELOPMENT SERVICES + TOOLING

Any Language or Tool

Python, Ruby, JavaScript, .NET, C++, PHP, Swift

Code Editor

APEX Low-code

Visual Builder

Java Frameworks

Java

GraalVM

MICRONAUT

helidon.io

Continuous Integration & Delivery

GitHub, docker, Terraform, GitLab

Code Repository

Build/Deployment Pipelines

Artifact Repository

Registry

API Management, Streaming, and Messaging

Notifications

Streaming

API Gateway

Events

Workflow

Service Connector Hub

API Service

Integration

Queue

OCI DATA + AI SERVICES

AI Services

OCI Digital Assistant

OCI Language

OCI Speech

OCI Vision

OCI Anomaly Detection

OCI Forecasting

Machine Learning Services

OCI Data Science

Oracle Database ML, MySQL Heatwave ML

OCI Data Labeling

Data Services

Data Movement
Data Integration, GoldenGate

Managed Open Source
Big Data, Data Flow, OpenSearch, Blockchain

Data Stores
Object Storage, Relational Data

Data Management
Autonomous Database, NoSQL, Exadata, MySQL Heatwave

Data Definition & Discovery
Data Catalog

CORE INFRASTRUCTURE

Compute GPU

Compute CPU

Compute Arm

Operating Systems, Native VMware

Container Engine for Kubernetes

Container Instances

Functions

Storage

Networking

Service Mesh

WAF/Load Balancer

DNS

OBSERVABILITY & MANAGEMENT

Logging Analytics

Monitoring

APM

Cloud Advisor

Operations Insights

OS Management

Logging

Resource Manager

Java Management

SECURITY & GOVERNANCE

Identity & Access Mgmt

Cloud Guard

Security Zones

DataSafe

OCI Vault

Auditing

Bastions

Threat Intelligence

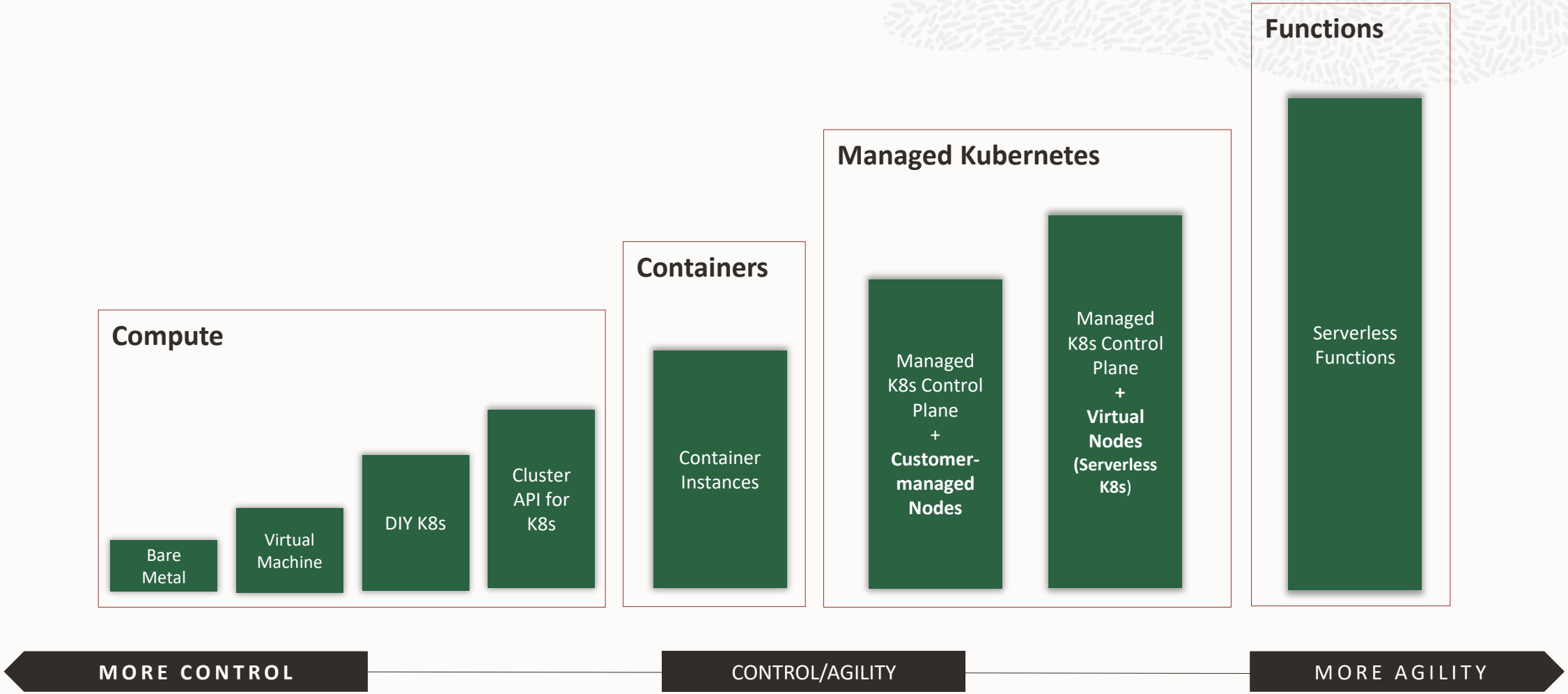
Threat Detector

Container Image Scanning

Vulnerability Scanning

Certificates

Container Strategy: Flex Runtimes



Oracle Portfolio of Low-Code Platforms

Visual Builder

Extending Oracle SaaS apps

Responsive Web and native mobile apps to extend Oracle SaaS functionality

Digital Assistant

Conversational User Interfaces

Digital assistants and chatbots using visual development, AI/ML and Natural Language Processing

APEX

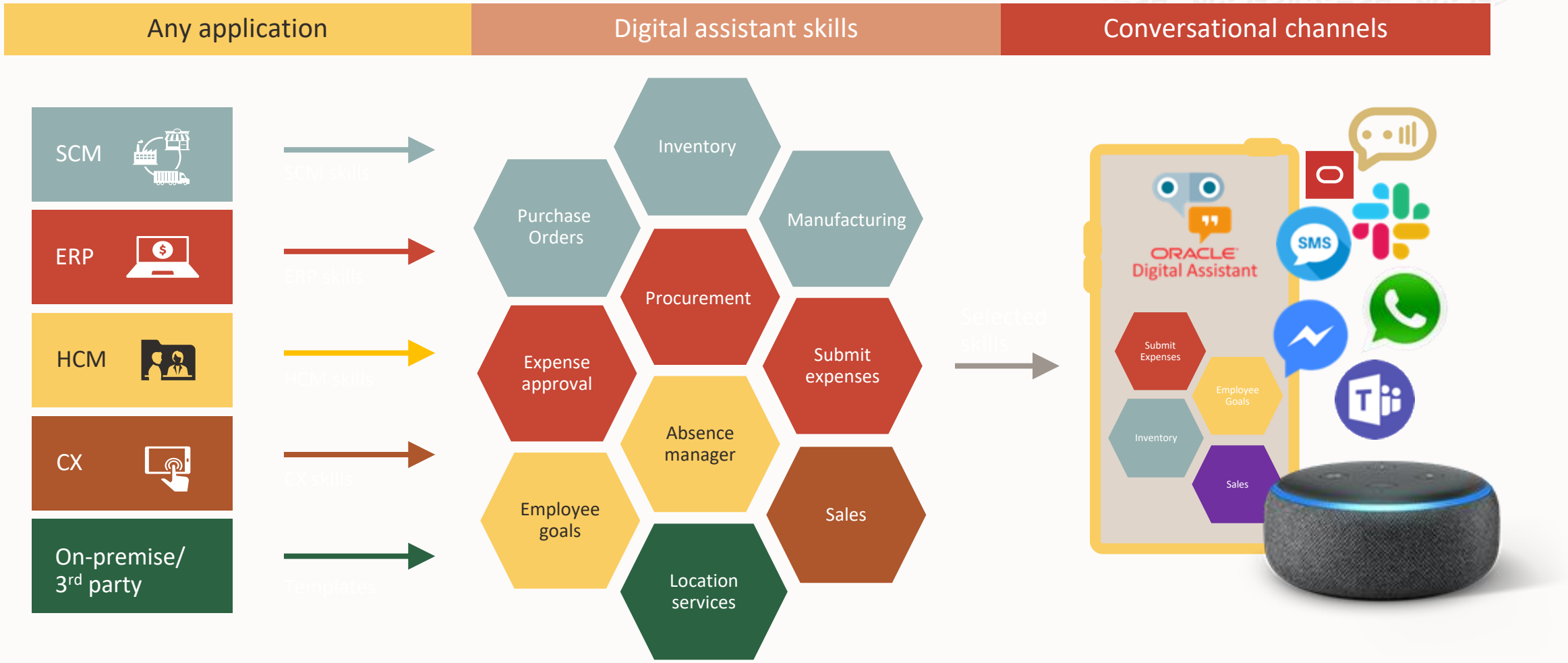
Data-riven applications

Responsive Web and mobile apps using data from databases, spreadsheets or RESTful web services

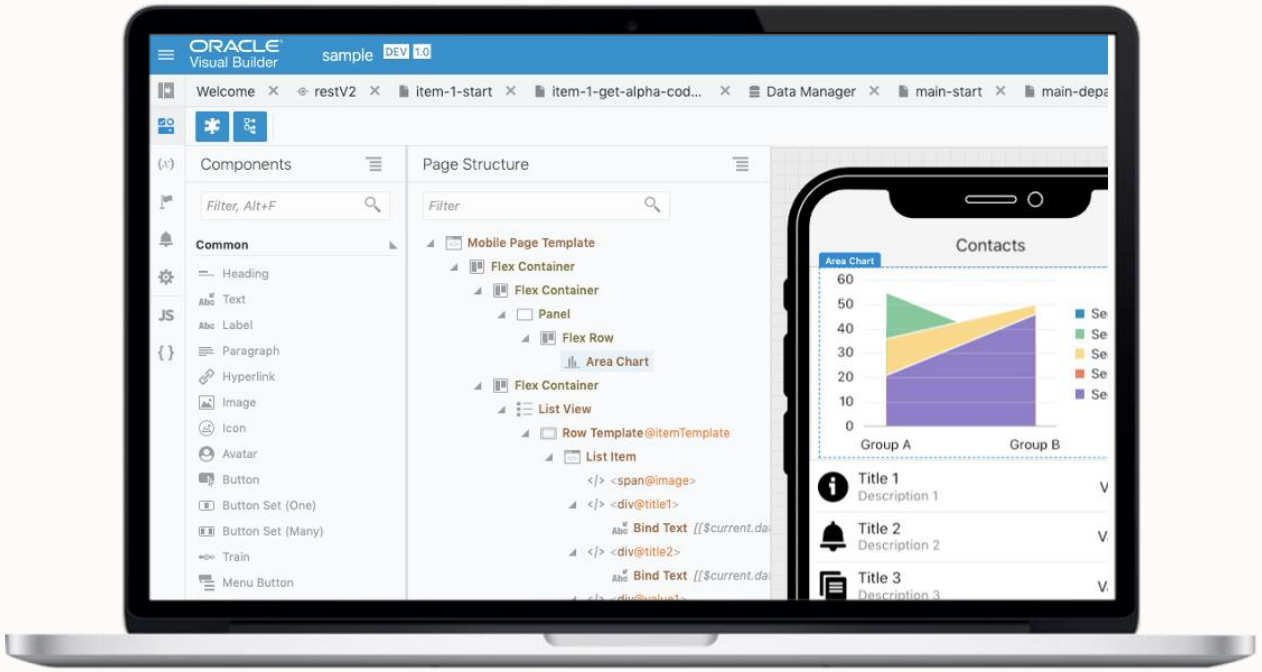
Dev based on Apps

Dev based on Data

One Digital Assistant for your Business

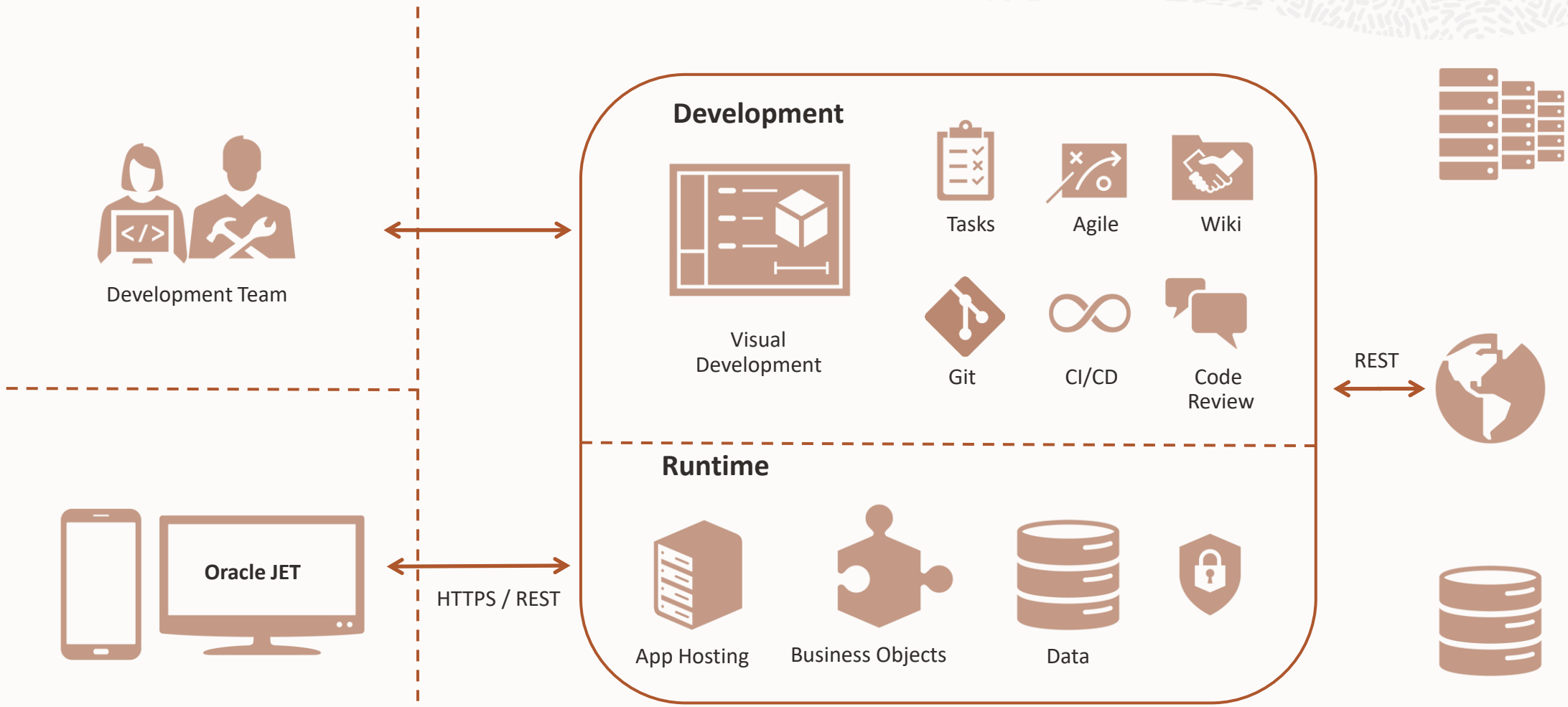


Visual Builder

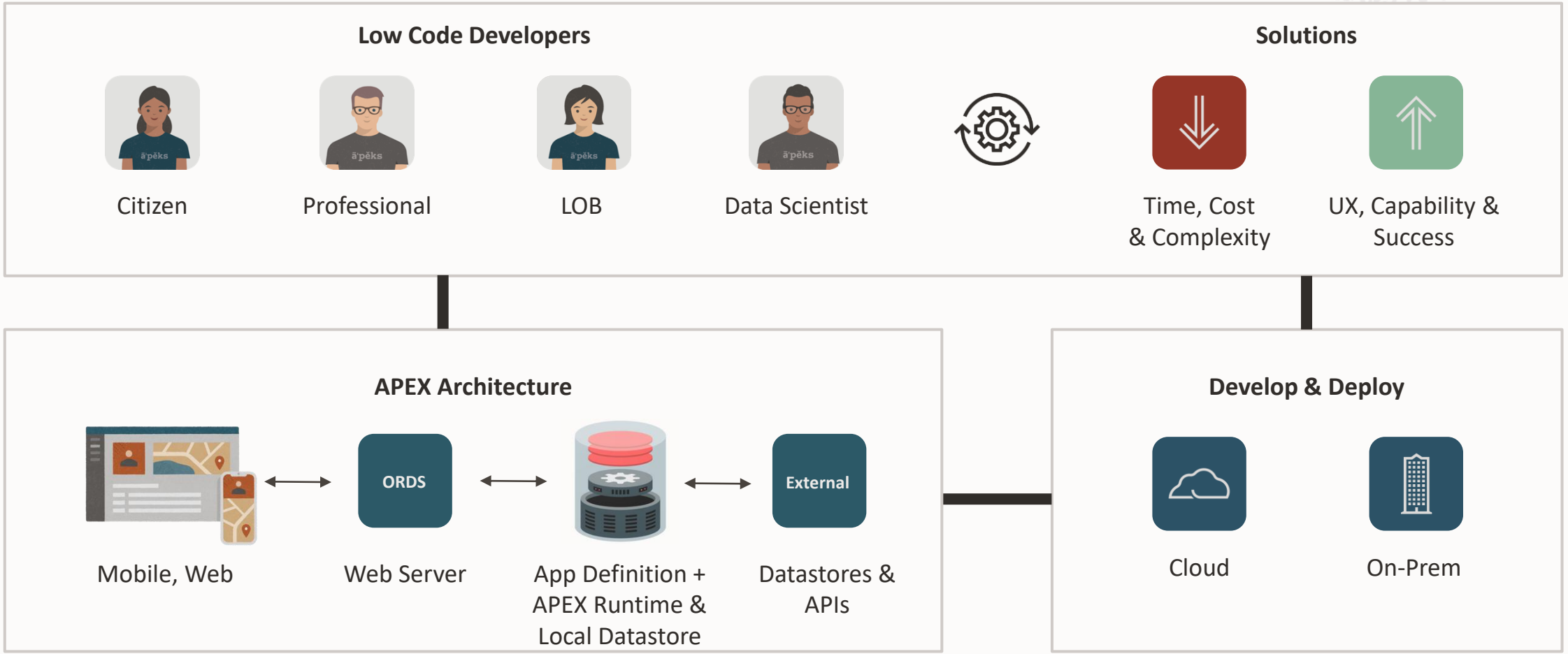


- Connect Mobile & Web Apps in Minutes
- Discover Oracle SaaS business objects
- Surface and reuse business processes
- Build with intuitive drag & drop model
- Securely enrich SaaS to fit your business needs
- Extend via JavaScript, REST, HTML, CSS
- Automated DevOps with source control, agile projects, and CI/CD pipelines.

Visual Builder – High Level Architecture



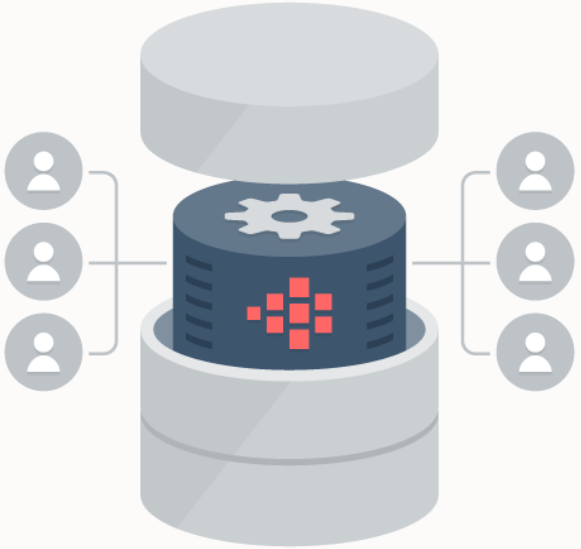
Oracle APEX Low-Code Application Platform



Oracle APEX - Features

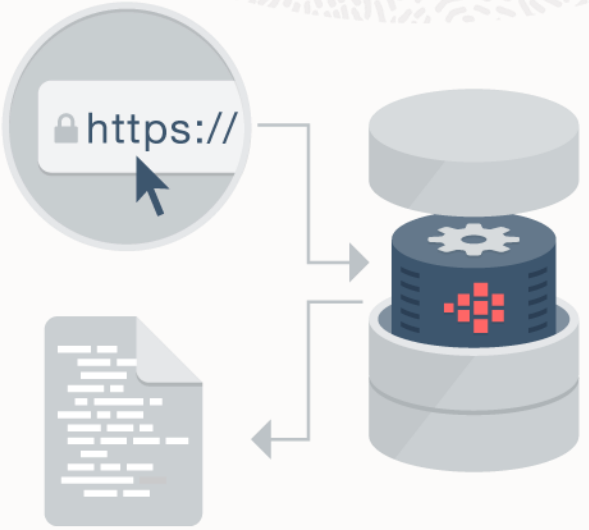
App Development IDE is a web browser

No software to install



App definitions are stored as meta data

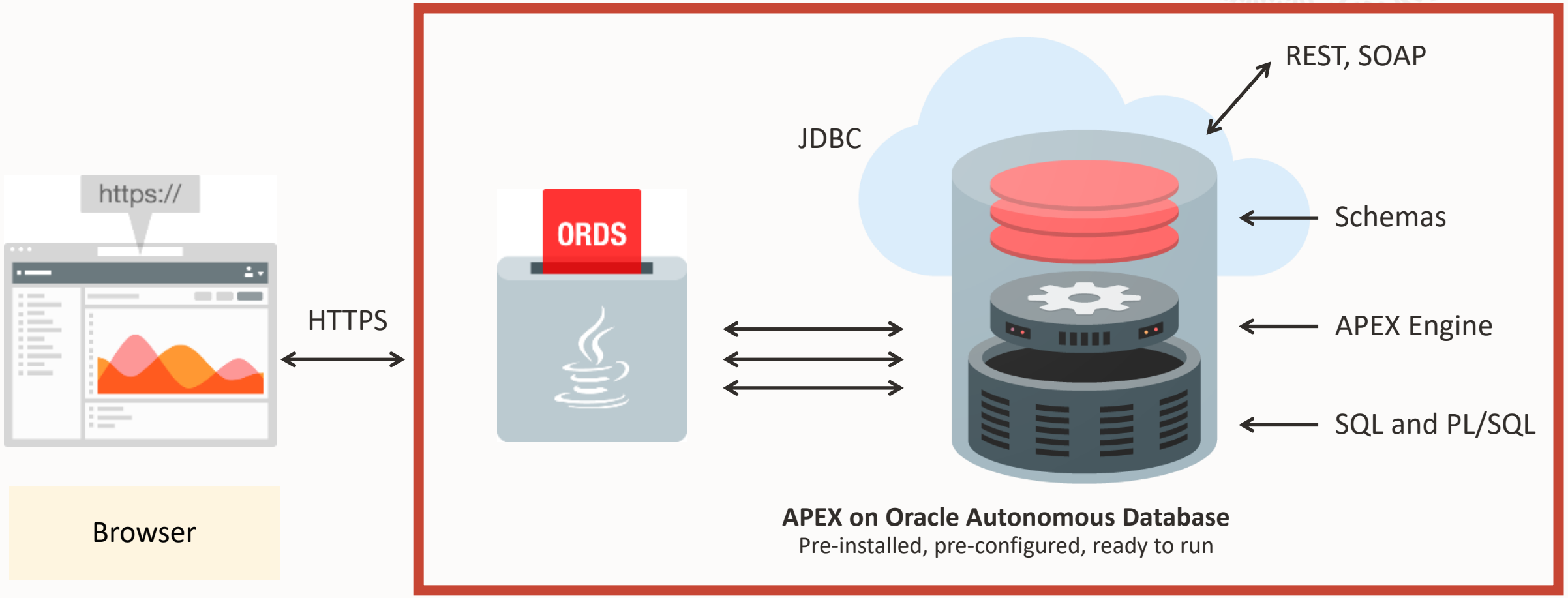
Declarative - **No code generation**



Efficient execution with only one request and one response

Zero latency data access

APEX – High Level Architecture



Oracle Cloud Infrastructure Reference Architectures

Access to OCI best practices framework

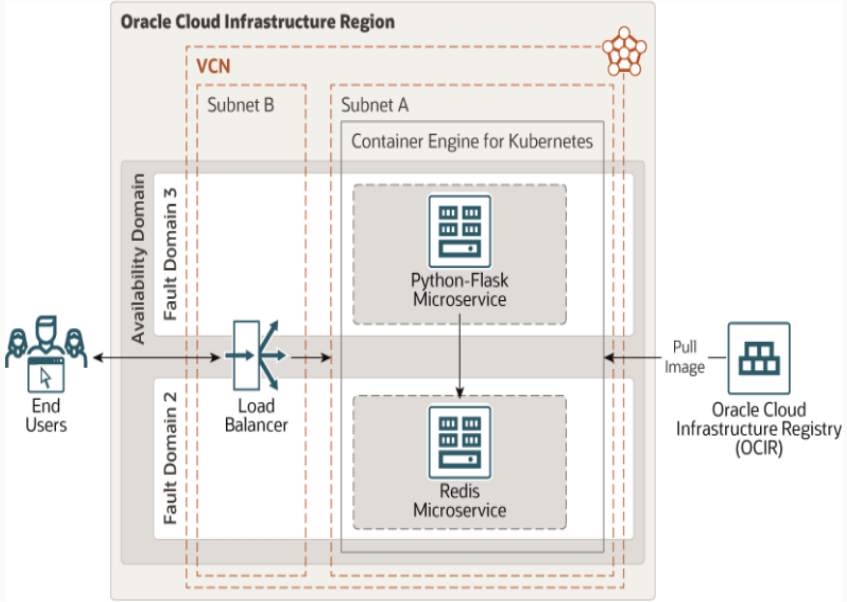


Image: Deploy microservices to a Kubernetes cluster

Access OCI reference architecture (https://www.oracle.com/cloud/architecture-center/) for:

- Cloud best practices including availability, performance, security, and costs
- Access to OCI best practices framework
- Migration automation to OCI
- Latest deployments updates from customers and partners who are using OCI to drive innovation

Automation Available

You can deploy this pattern using downloadable code or automated provisioning, as described in the Download or Deploy section.

Learn more

Deploy to Oracle Cloud

Go to GitHub

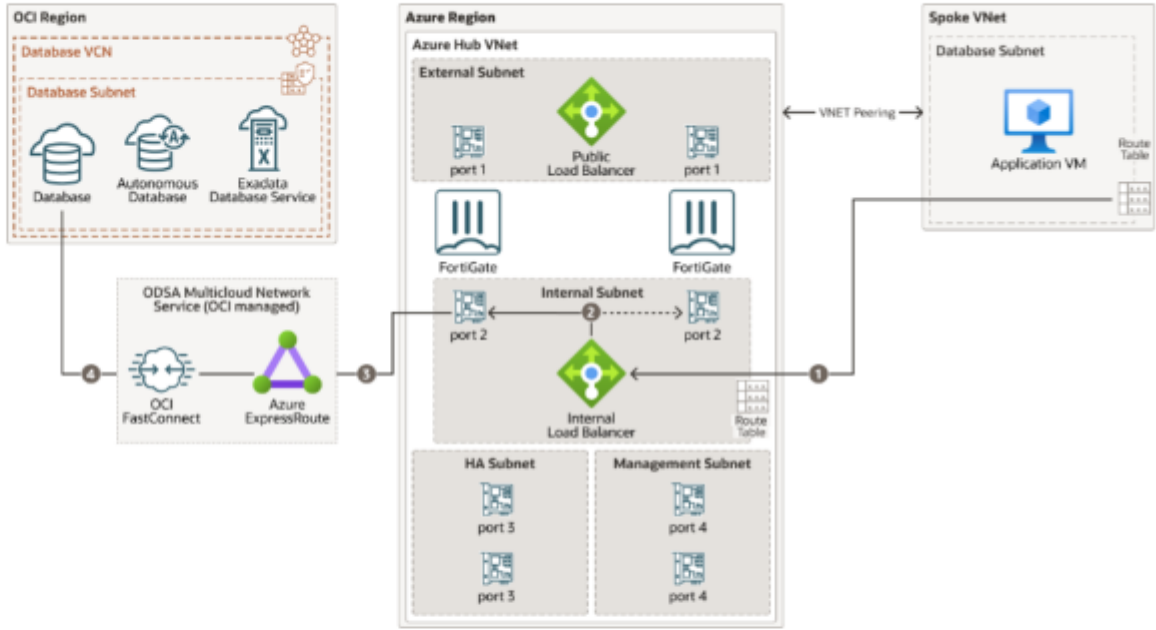
Architecture Center

Examples from https://www.oracle.com/cloud/architecture-center/

Application split sta

- Deploy a mult GCP
- Deploy IBM St Cloud and Mic
- Extend your h multicloud usi
- ODSA disaste and Base Data
- Split Applicati for Azure
- Network laten practices
- ODSA versus

- Best practices for hybrid and multicloud OCI networking design
- Deploy multicloud Oracle Database Service for Microsoft Azure in a hub and spoke topology
- Share an Autonomous Database running in OCI within AWS using Endpoint Service
- DNS in multicloud disaster recovery architectures
- Learn about interconnecting Oracle Cloud with other cloud providers
- Enable a split-stack architecture spanning Oracle Cloud and other providers using Equinix
- Enable multicloud high availability and data protection across OCI and AWS with Megaport

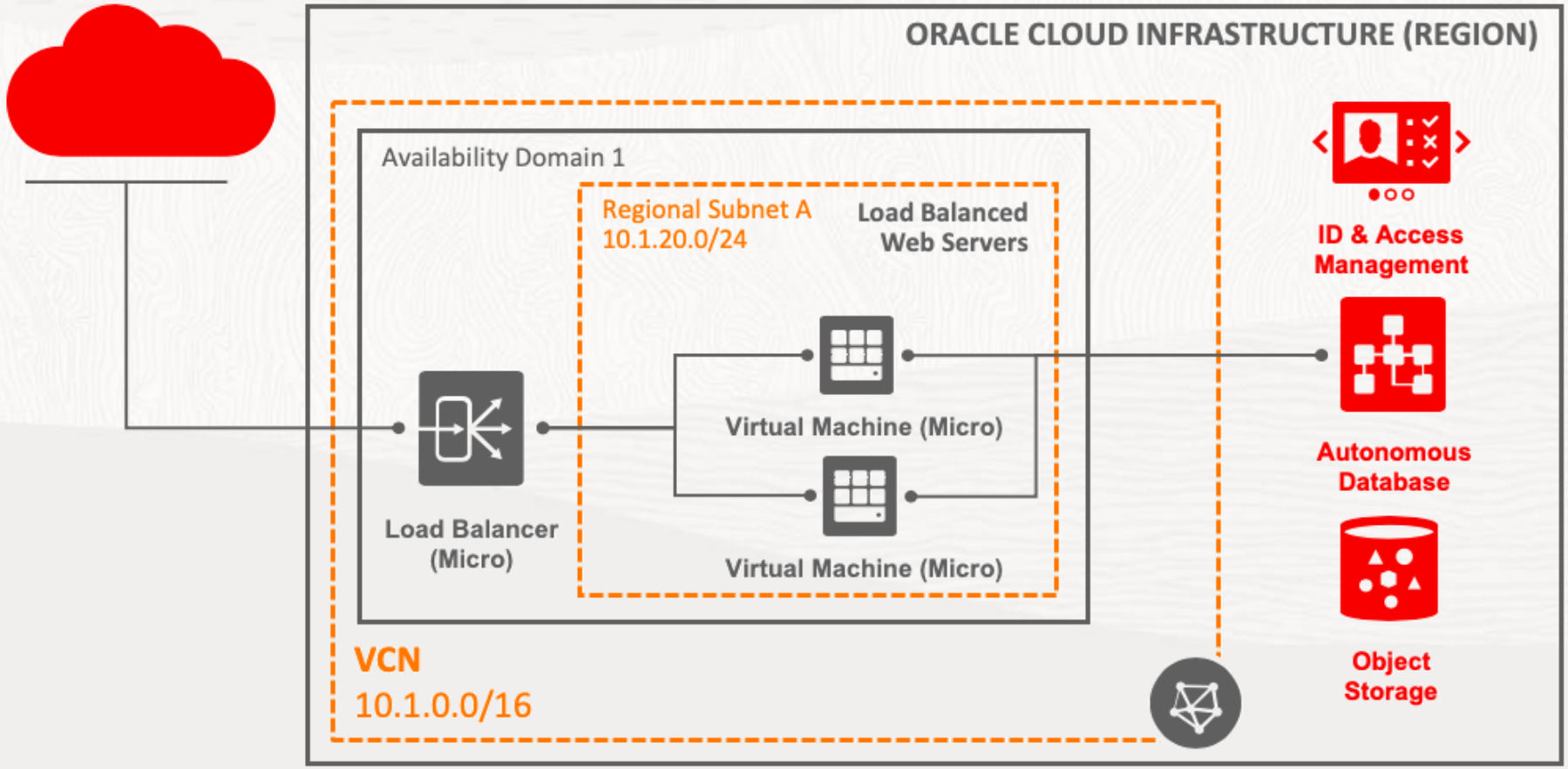


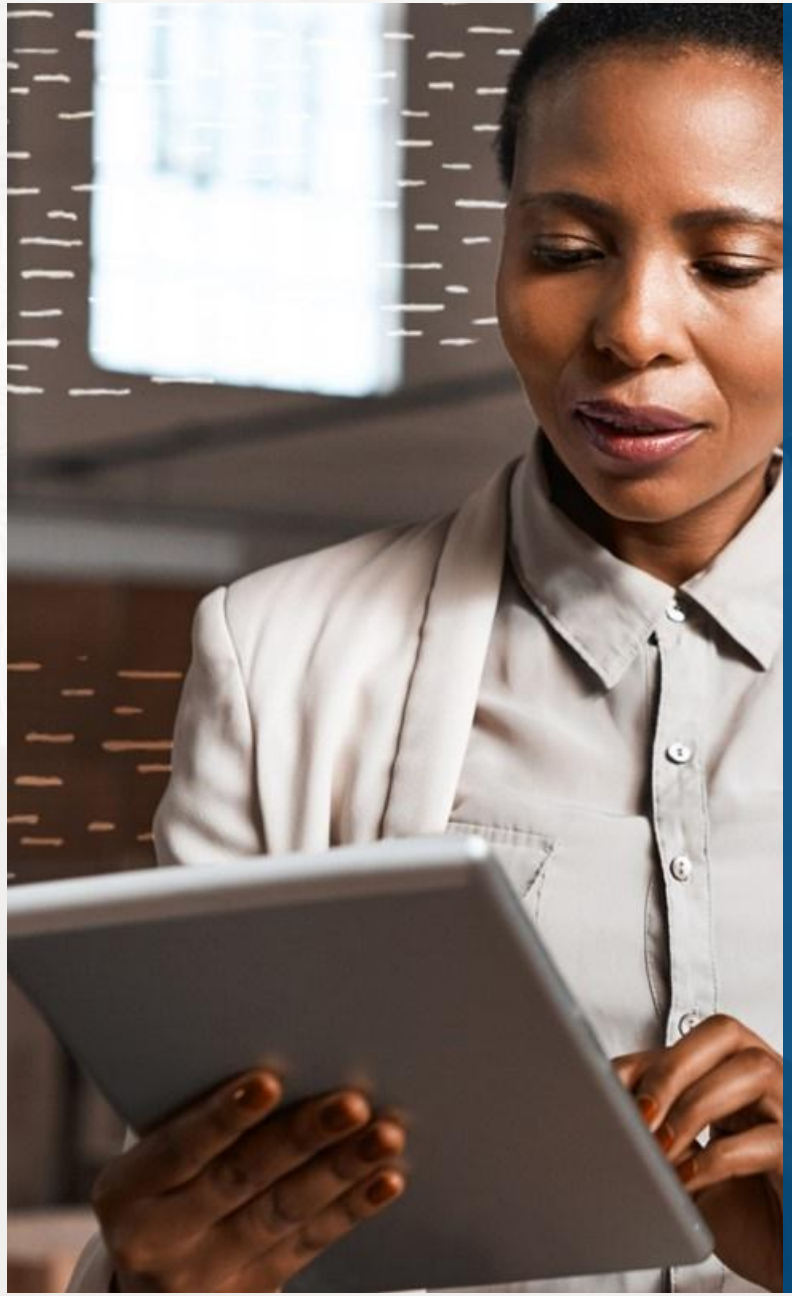
- Enable a split-stack architecture spanning Oracle Cloud and other providers using Megaport
- Enable multicloud high availability and data protection across OCI and AWS with Colt
- Explore the Oracle Interconnect for Azure networking use cases to support multicloud connectivity

Simple Demo using Resource Manager

MuShop

https://github.com/oracle-quickstart/oci-cloudnative/





Thank you.


ORACLE

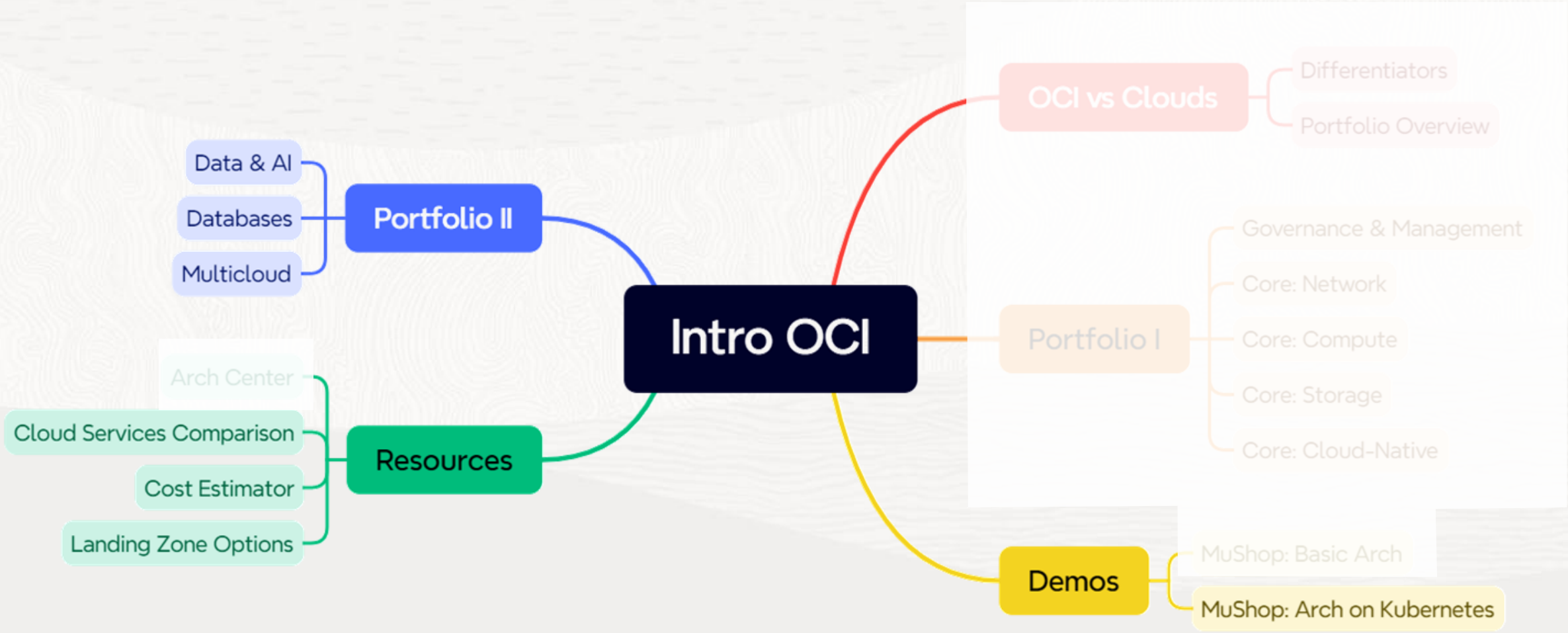
Oracle Cloud Infrastructure

Secure, high-performance platform
for all your workloads

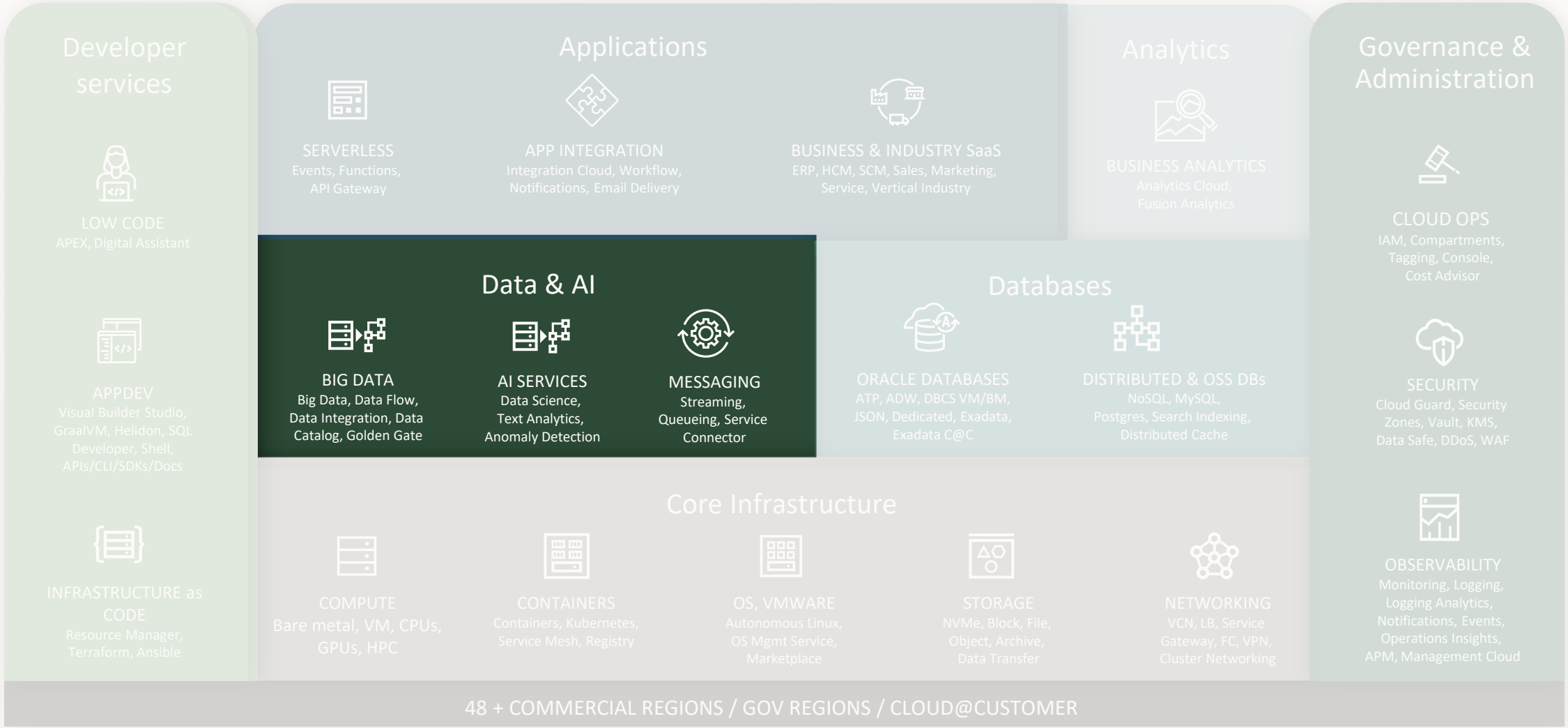
Adapted from Oracle Sales Accelerator as Public Info

V2.12, 30-MAY-2024

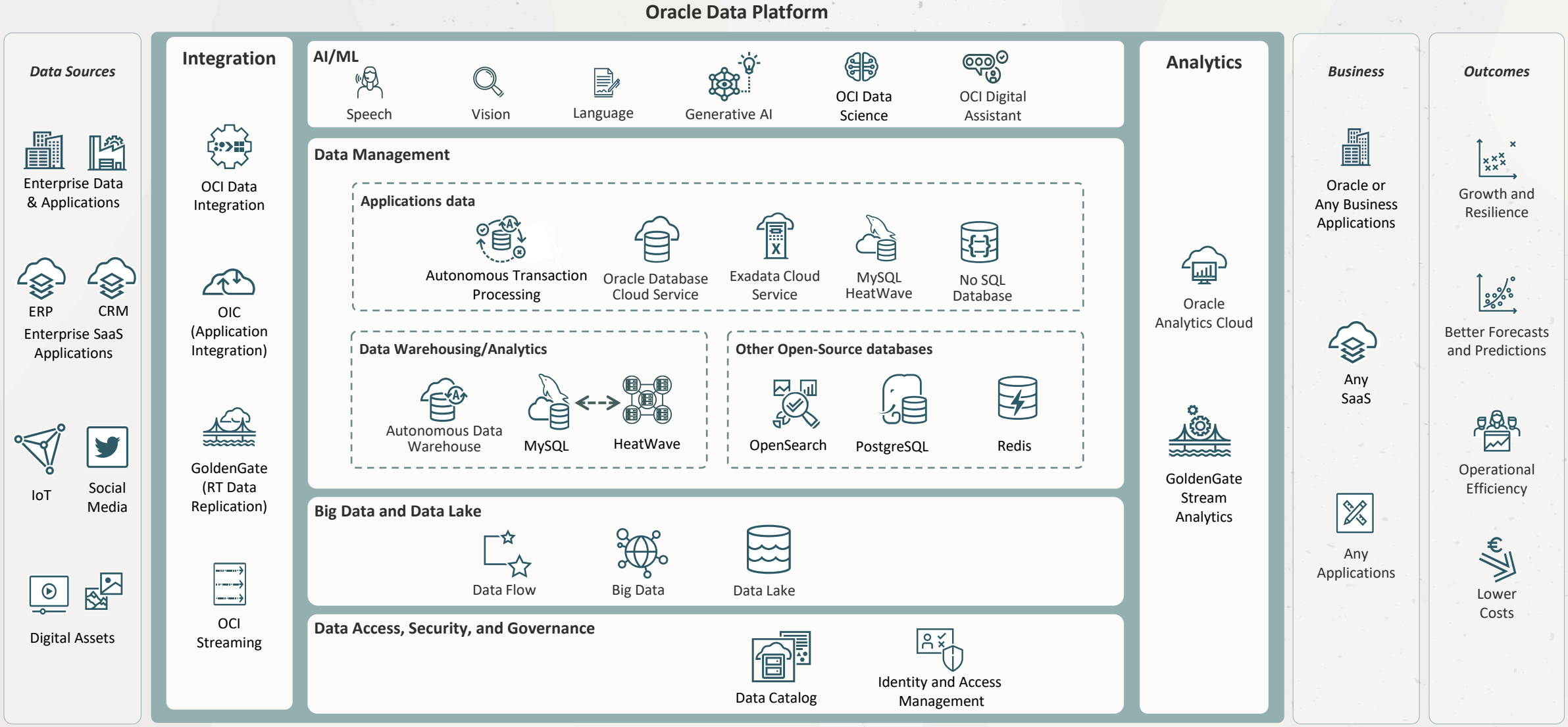
Agenda


Intro OCI
OCI vs Clouds
Differentiators
Portfolio Overview
Portfolio I
Governance & Management
Core: Network
Core: Compute
Core: Storage
Core: Cloud-Native
Portfolio II
Data & AI
Databases
Multicloud
Resources
Arch Center
Cloud Services Comparison
Cost Estimator
Landing Zone Options
Demos
MuShop: Basic Arch
MuShop: Arch on Kubernetes

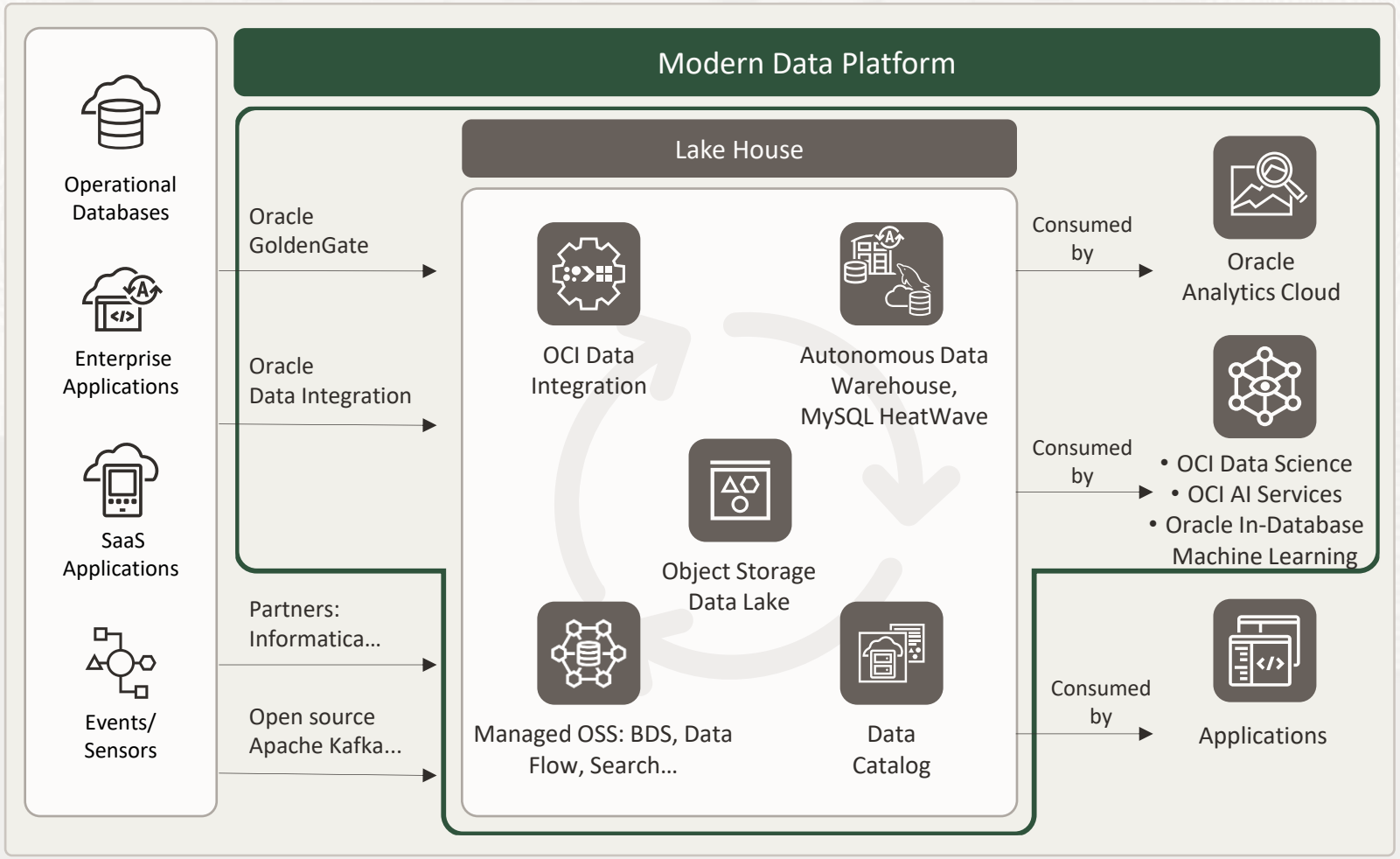
Complete cloud capabilities



Oracle Data Platform: A complete suite of services



The Oracle Lakehouse



Autonomous Data Warehouse: automated management with high-performance storage and analytics

MySQL Heatwave: high performance analytics for MySQL

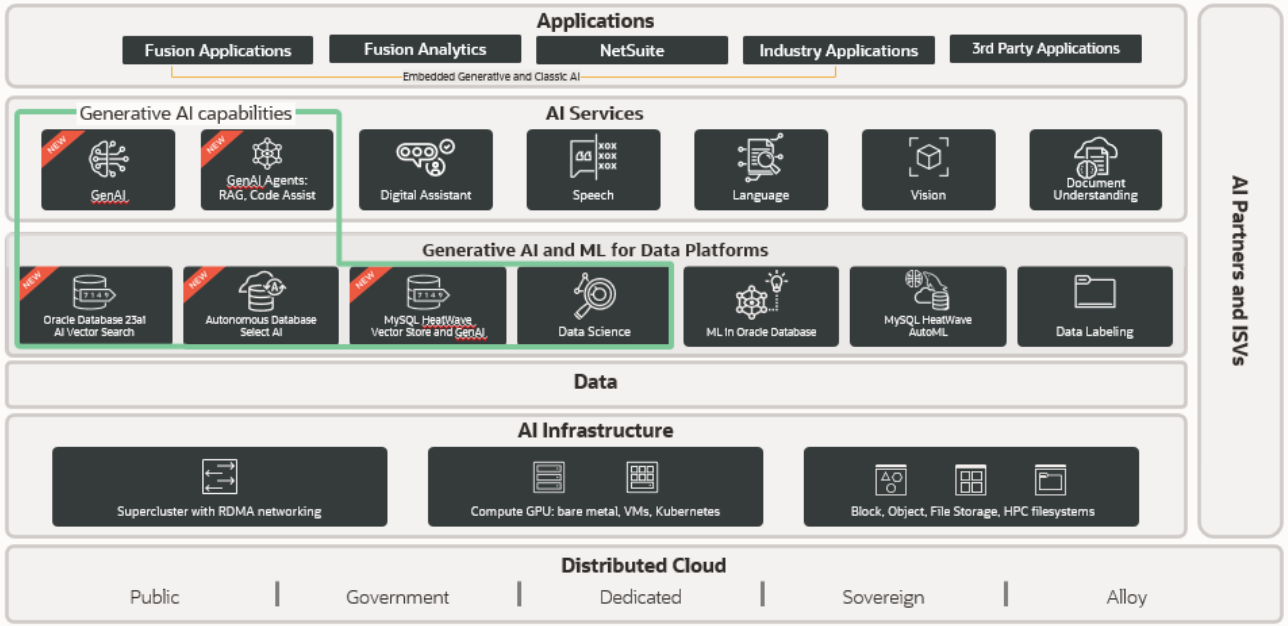
Object Storage Data Lake: low-cost storage

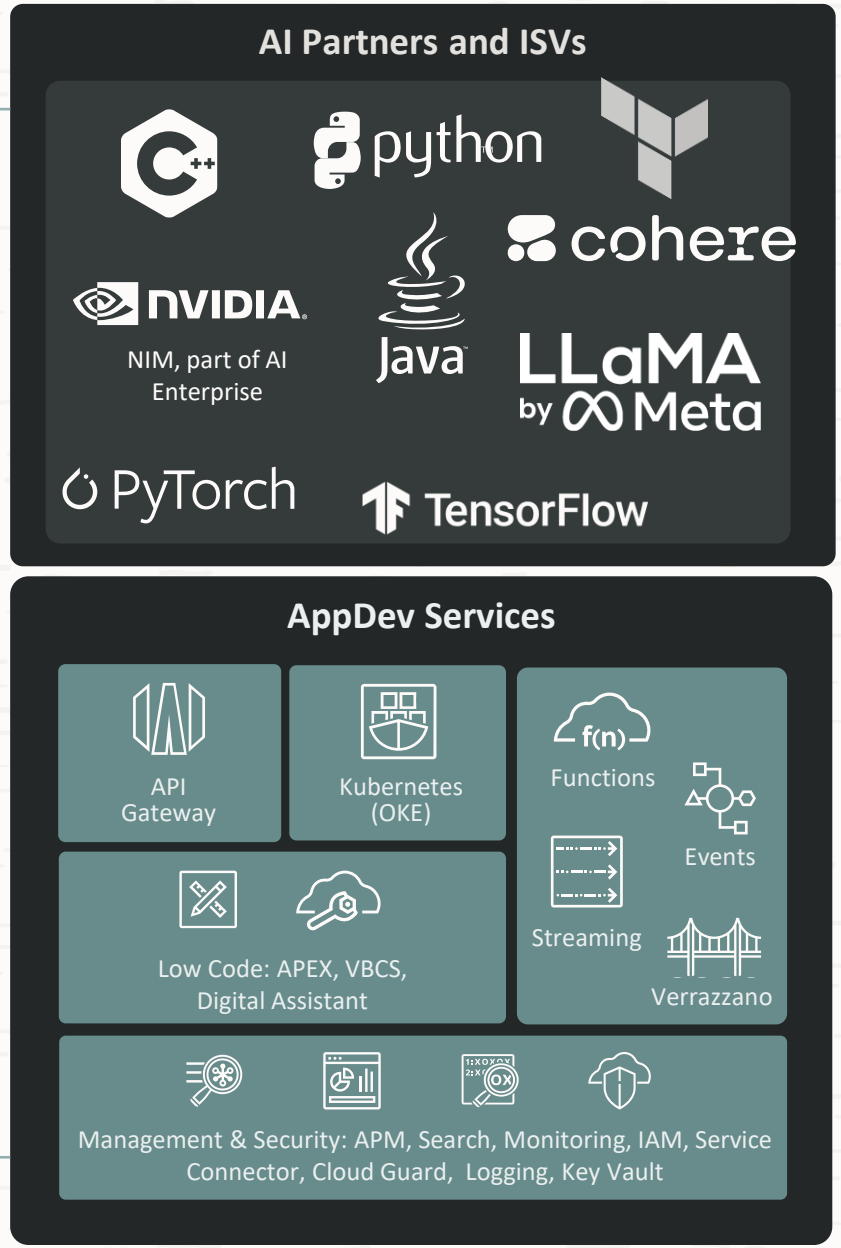
Managed Open-source Services: customer needs what works best—or what they are already using (Spark, Hadoop, Elasticsearch, Redis)

OCI Data Integration: Easily extract, transform, and load (ETL) data for data science and analytics. Design code-free data flows between data lakes and data warehouse

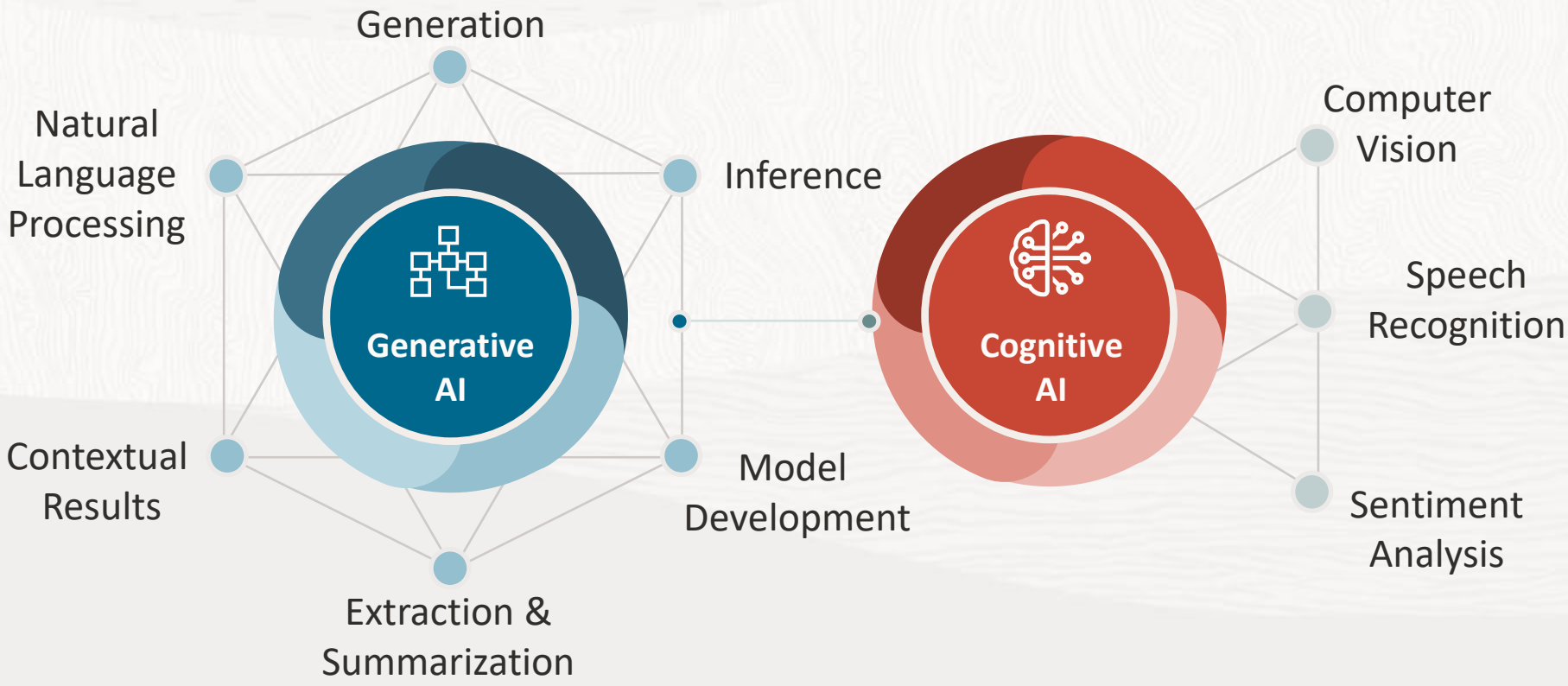
OCI Data Catalog: Maintains an inventory of assets used by both data lake and data warehouse for data discovery

The Oracle AI tack



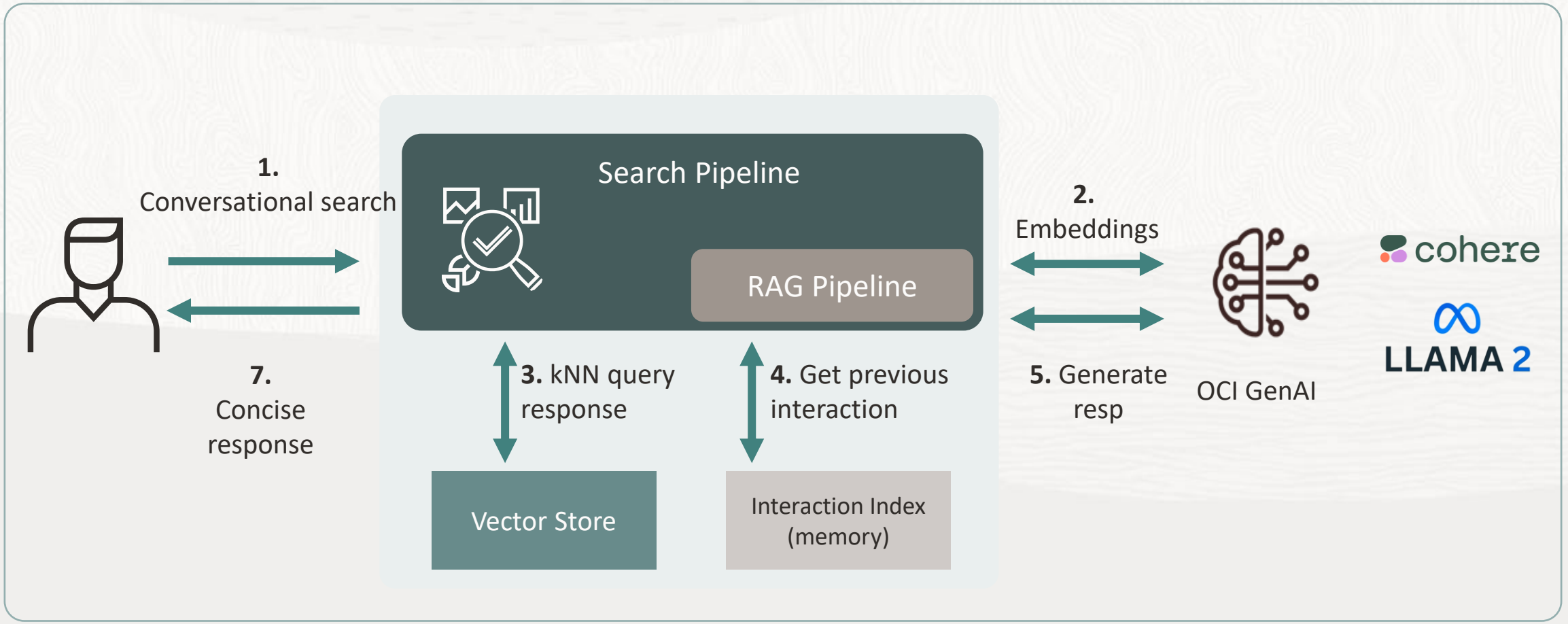


Broad and deep portfolio of ready-to-use AI solutions



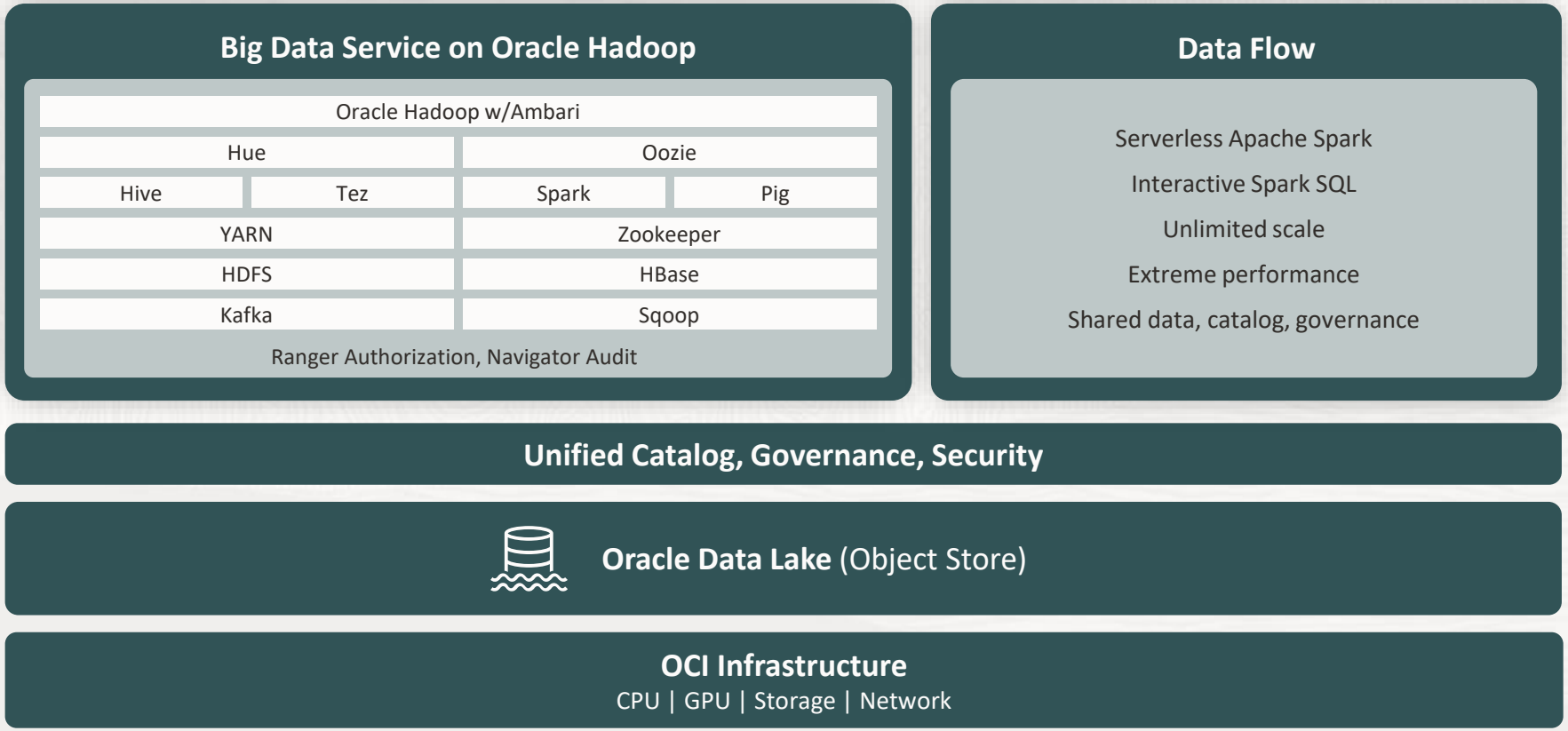
More info here

Debug your application in a fraction of the time – Issue identification and resolution guidance using natural language



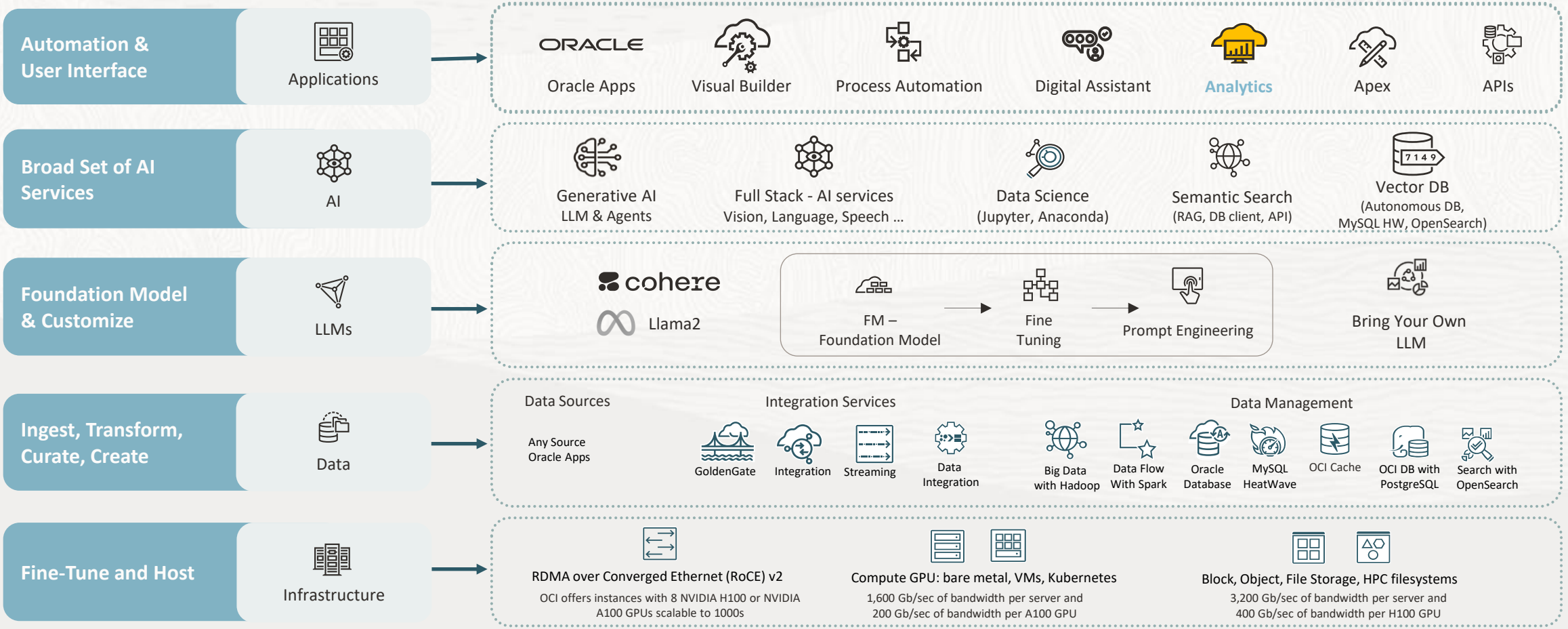
Big Data Service and Data Flow managed

Open-source services on shared storage and catalog



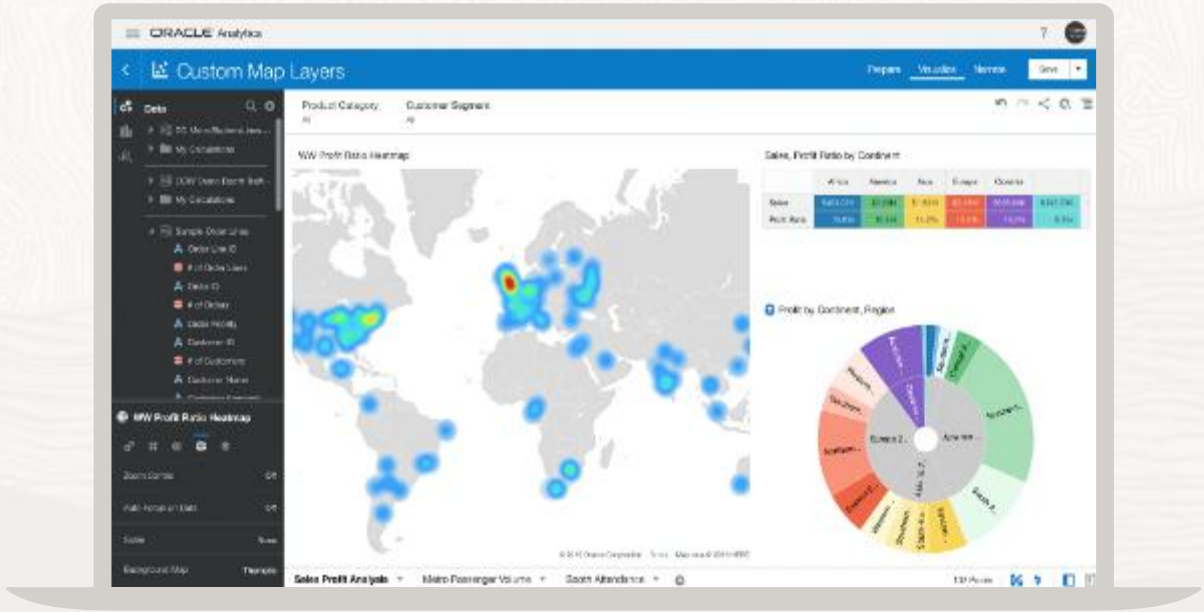
Extending Oracle Analytics with OCI

Part of a fully integrated data and AI stack

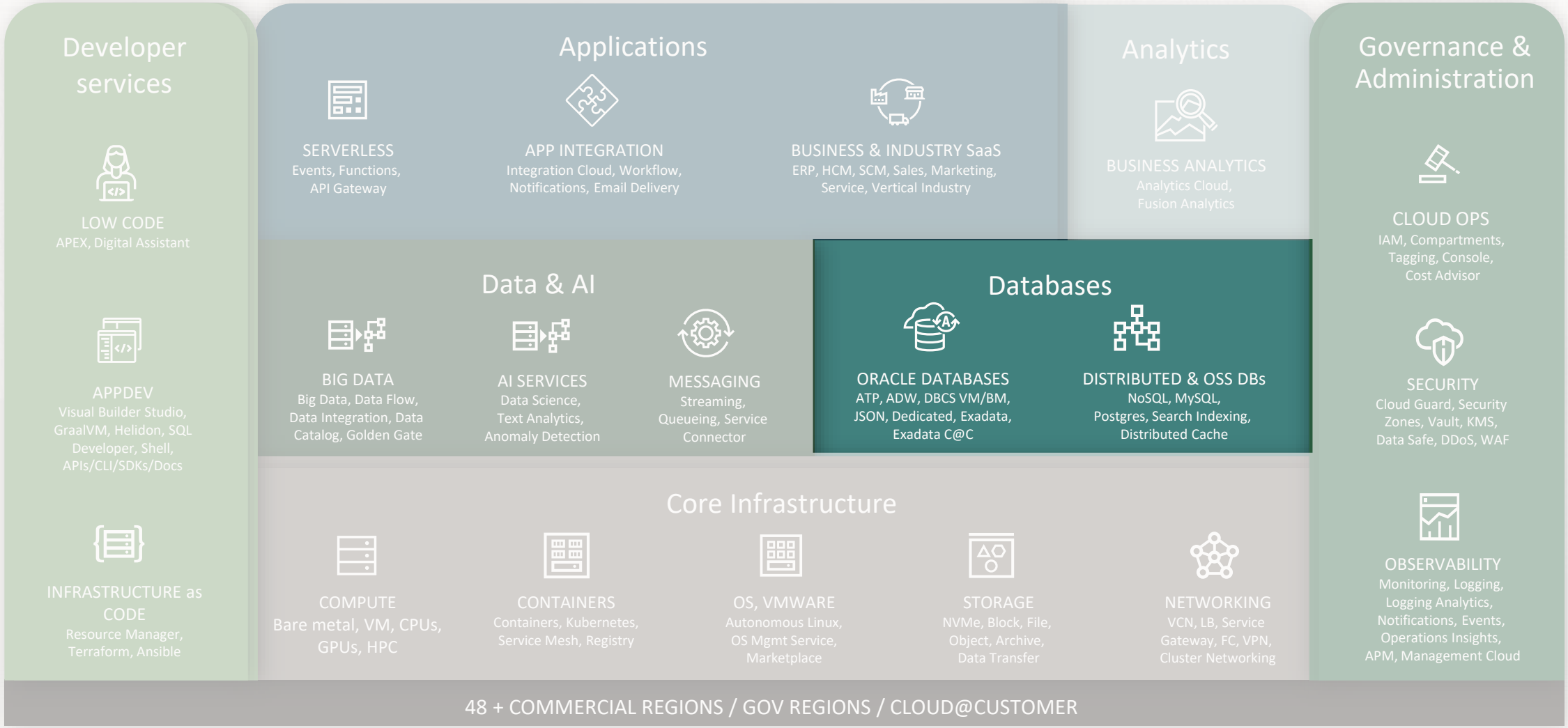


Oracle Analytics Cloud

- Comprehensive analytics cloud platform
- Data visualization, data preparation, data quality and data flows
- ML and AI embedded throughout
- Natural language processing and generation
- Self-upgrading, self-patching, self-securing

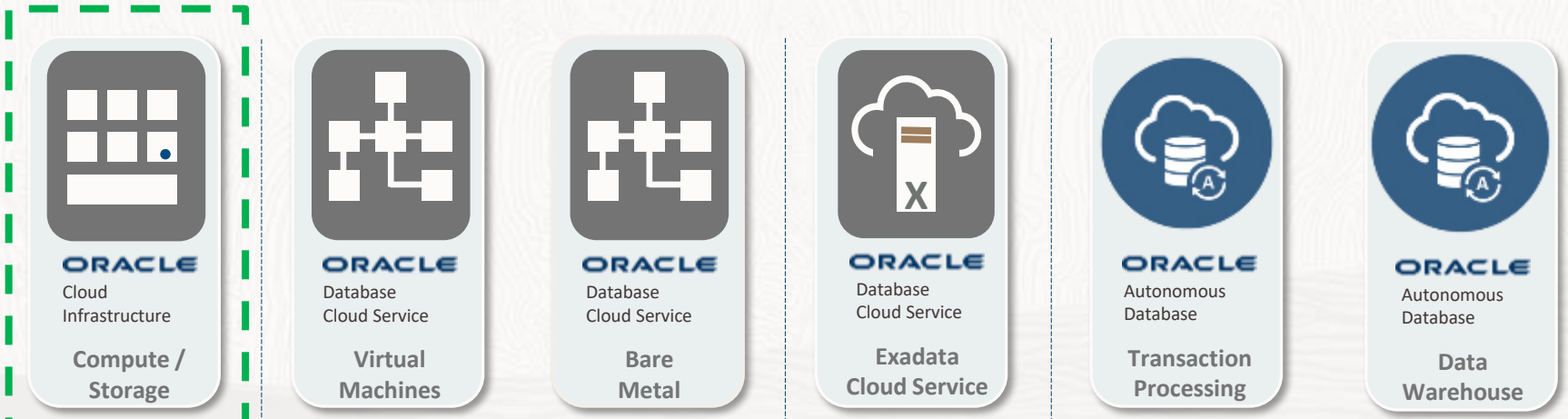


Complete cloud capabilities



Oracle Cloud Database

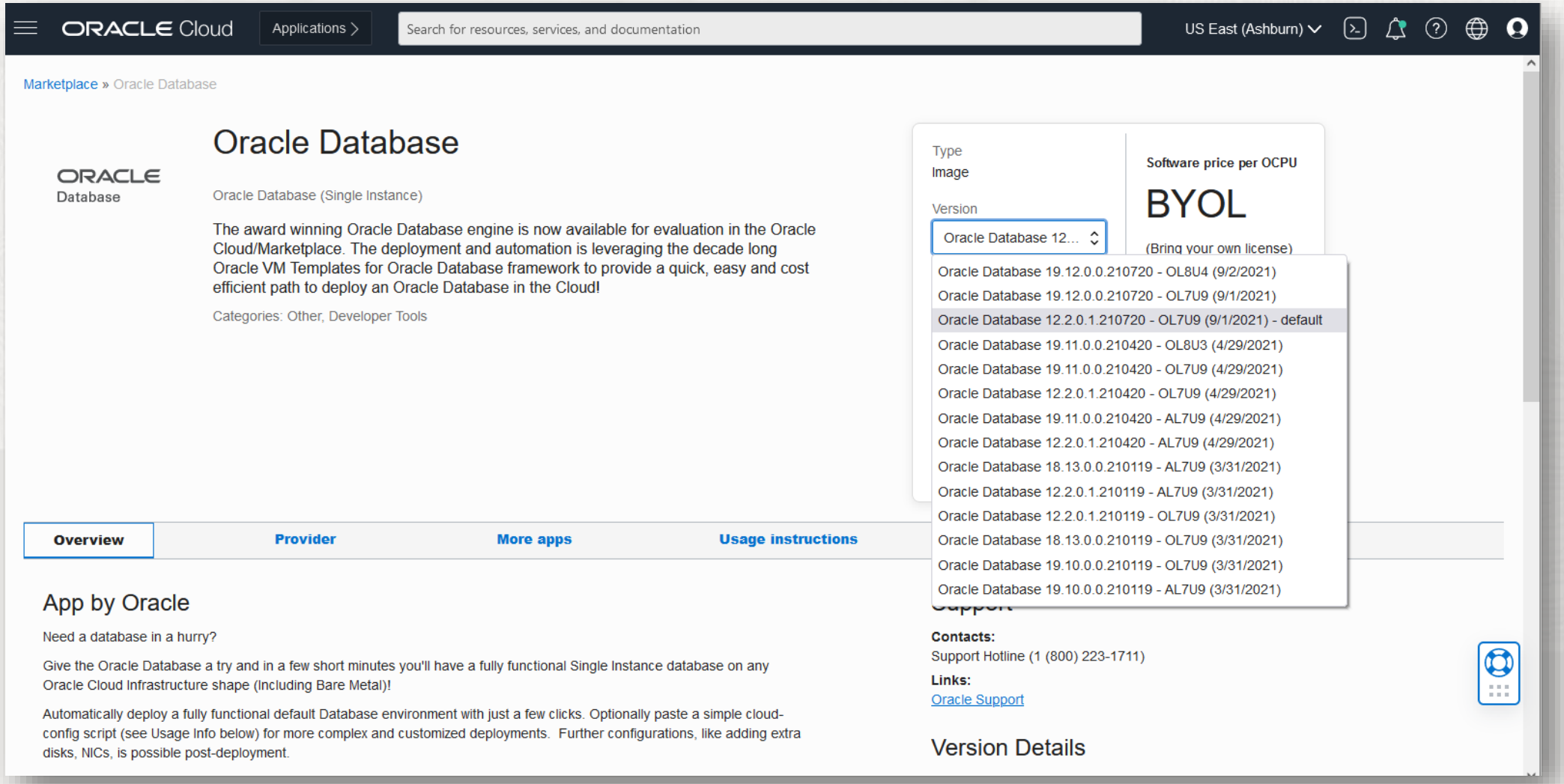
Range of options



The Right Cloud Database for Every Use Case

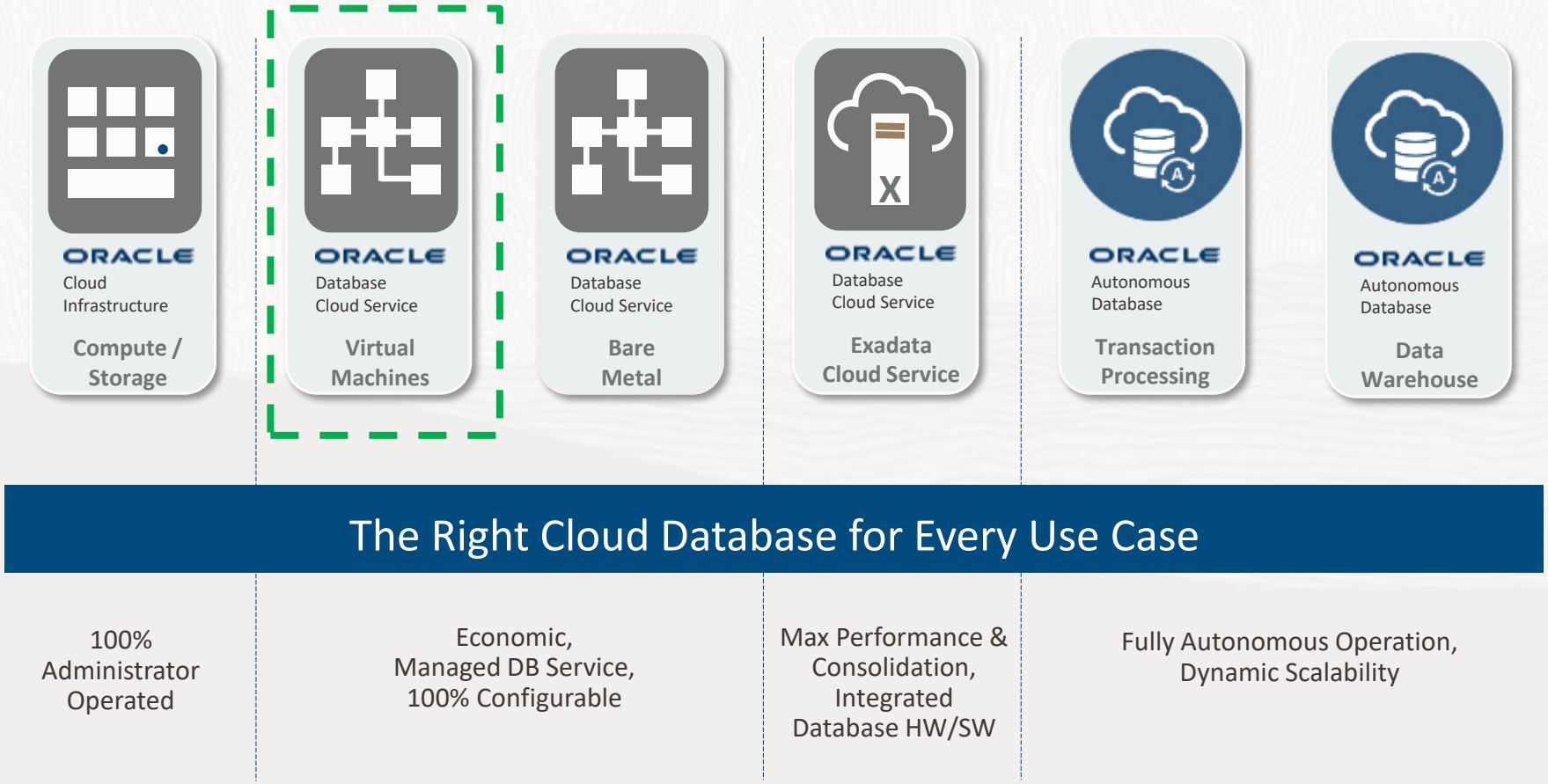
100% Administrator Operated by Customer	Economic, Managed DB Service, 100% Configurable	Max Performance & Consolidation, Integrated Database HW/SW	Fully Autonomous Operation, Dynamic Scalability

Marketplace



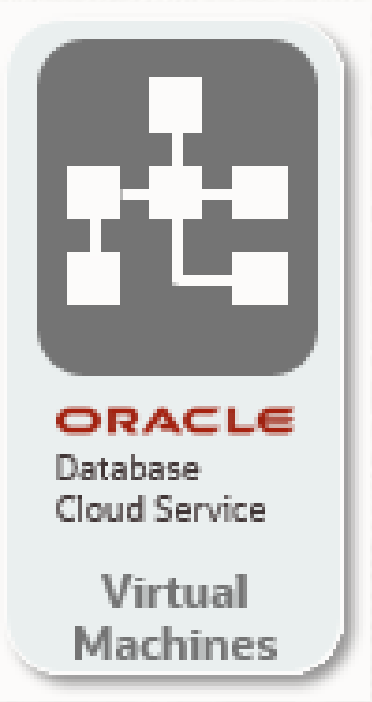
Oracle Cloud Database

Range of options



Database Cloud Services VM: basic information

- DBCS uses standard Intel Compute with block storage
  - **Block storage is triple-mirrored automatically**
  - Either on LVM or ASM (Grid Infrastructure)
    - ASM uses external redundancy
- VMs are automatically restarted on failure
- VMs are automatically relocated to a different hypervisor on HW failure
- RAC nodes use different fault domains per node
- Support for «VM reboot» migrations



ARM A1.Flex support Oracle DB 19c; AMD Standard.E4.Flex 23c, 21c and 19c; and IntelX9,Standard3.Flex 23c, 21c and 19c.
Data source of this table is here.
News about the latest DB 23c (19-Sept/24): No Standard Edition, No ARM A1 Processor, No Multinode RAC System, no OCI Vault Integration, etc

Oracle Cloud - Full Support for the OnPrem Oracle Database Feature Set

Standard Edition

- Full database instance
- Includes Transparent Data Encryption

Enterprise Edition

Adds…

- All standard EE features
- Data Masking and Subsetting
- Diagnostics and Tuning
- Real Application Testing
- Advanced Analytics
- Spatial
- Graph
- Multitenant up to 3 PDBs

EE High Performance

Adds…


Multitenant


Partitioning


Advanced Compression

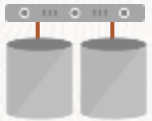

Advanced Security, Label Security, Database Vault


OLAP


Management Packs

EE Extreme Performance

Adds…


Real Application Clusters (RAC)

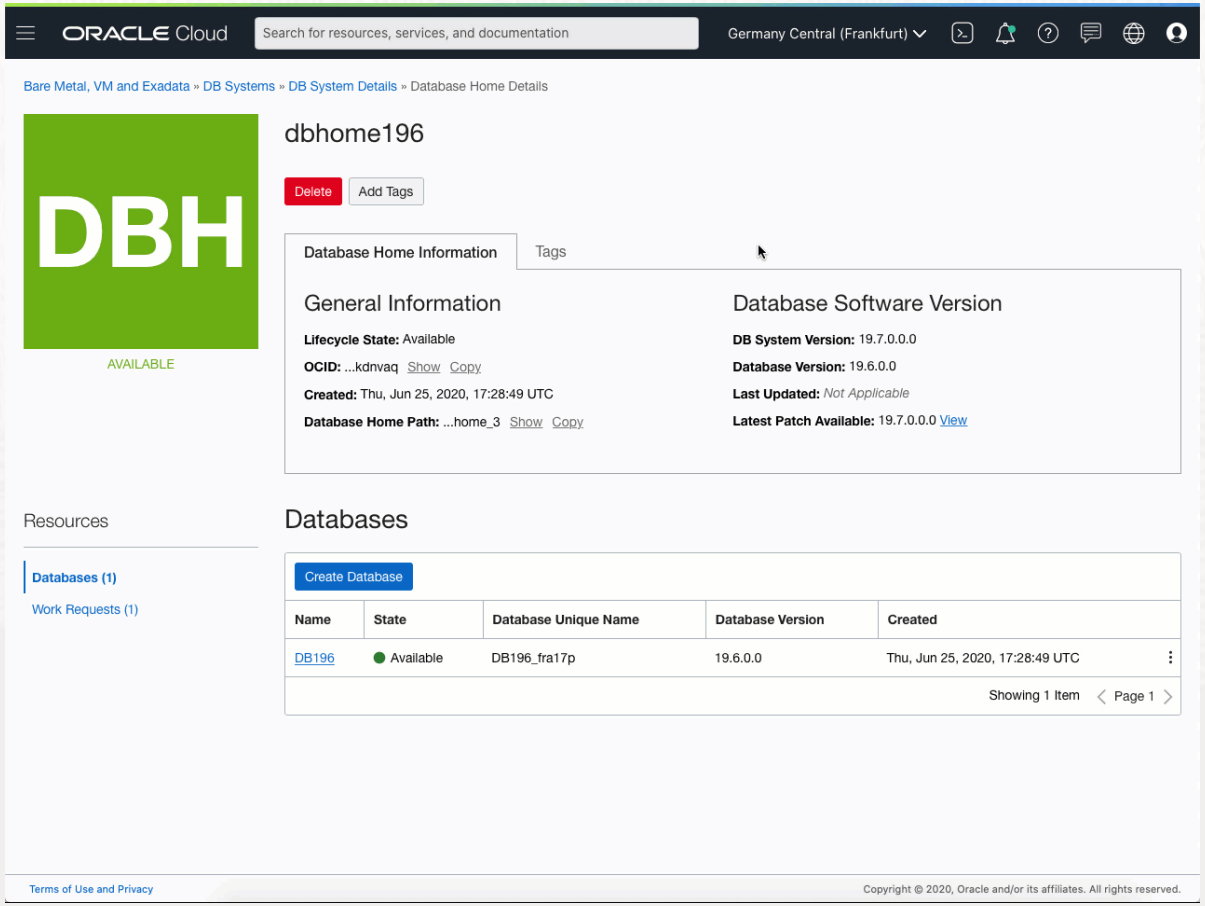

In-Memory


Active Data Guard

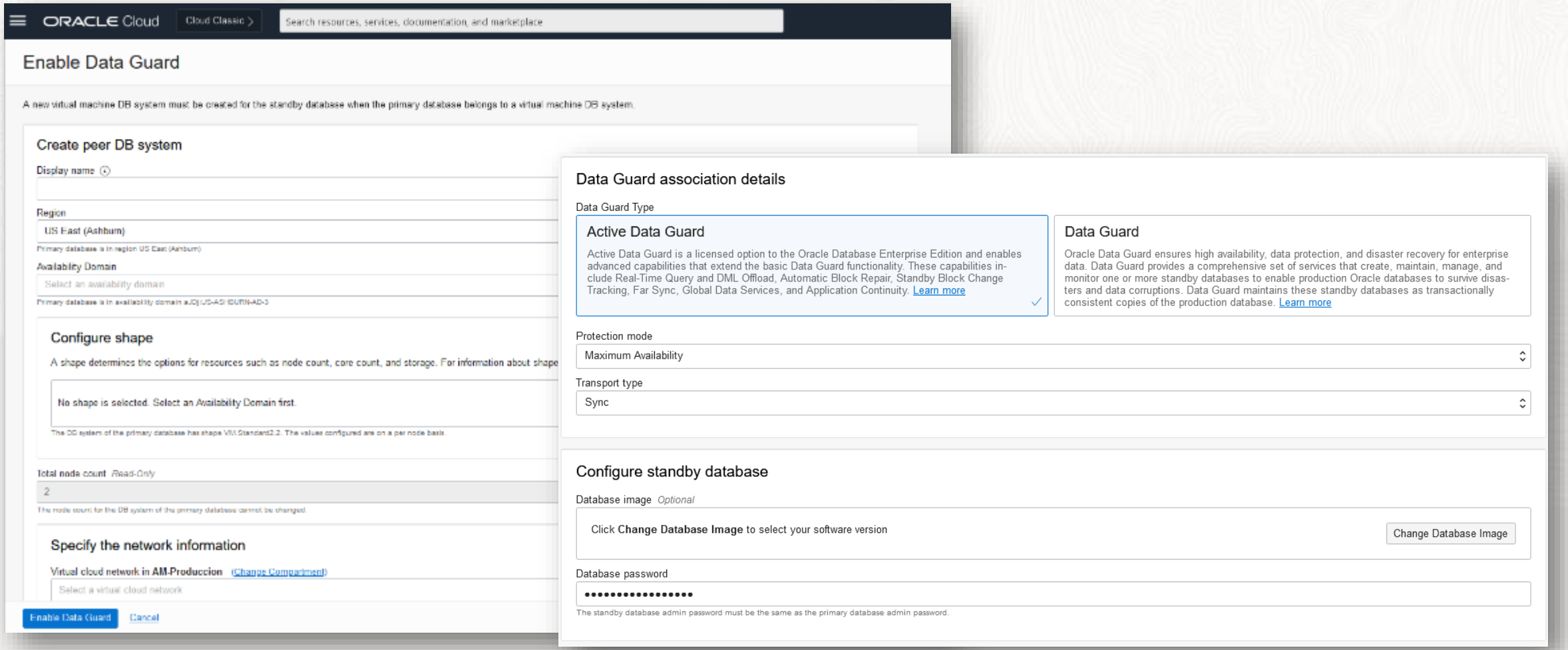
Note that all editions include Oracle Database Transparent Data Encryption (TDE)

Database and Grid Infrastructure Patching

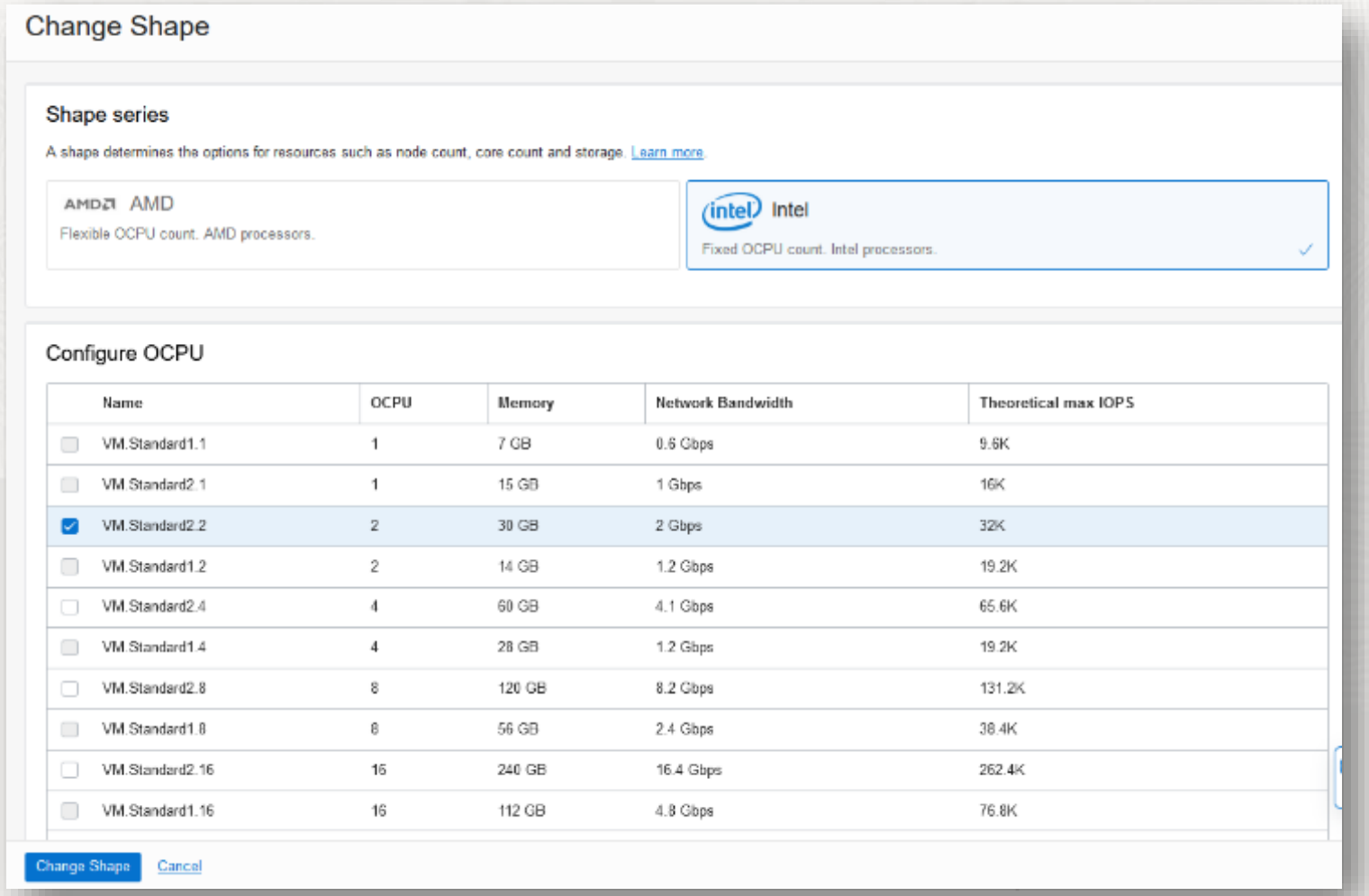
- One Click Patch Automation for Databases and Grid Infrastructure
- Pre-Check and Apply
- Patches are staged automatically when available (Quarterly)
- Patch History available for each database/GI
- Patches are rolling with RAC
- Out of place patching used; you patch the home and all databases in that home and not 1 database at a time



Enable Data Guard



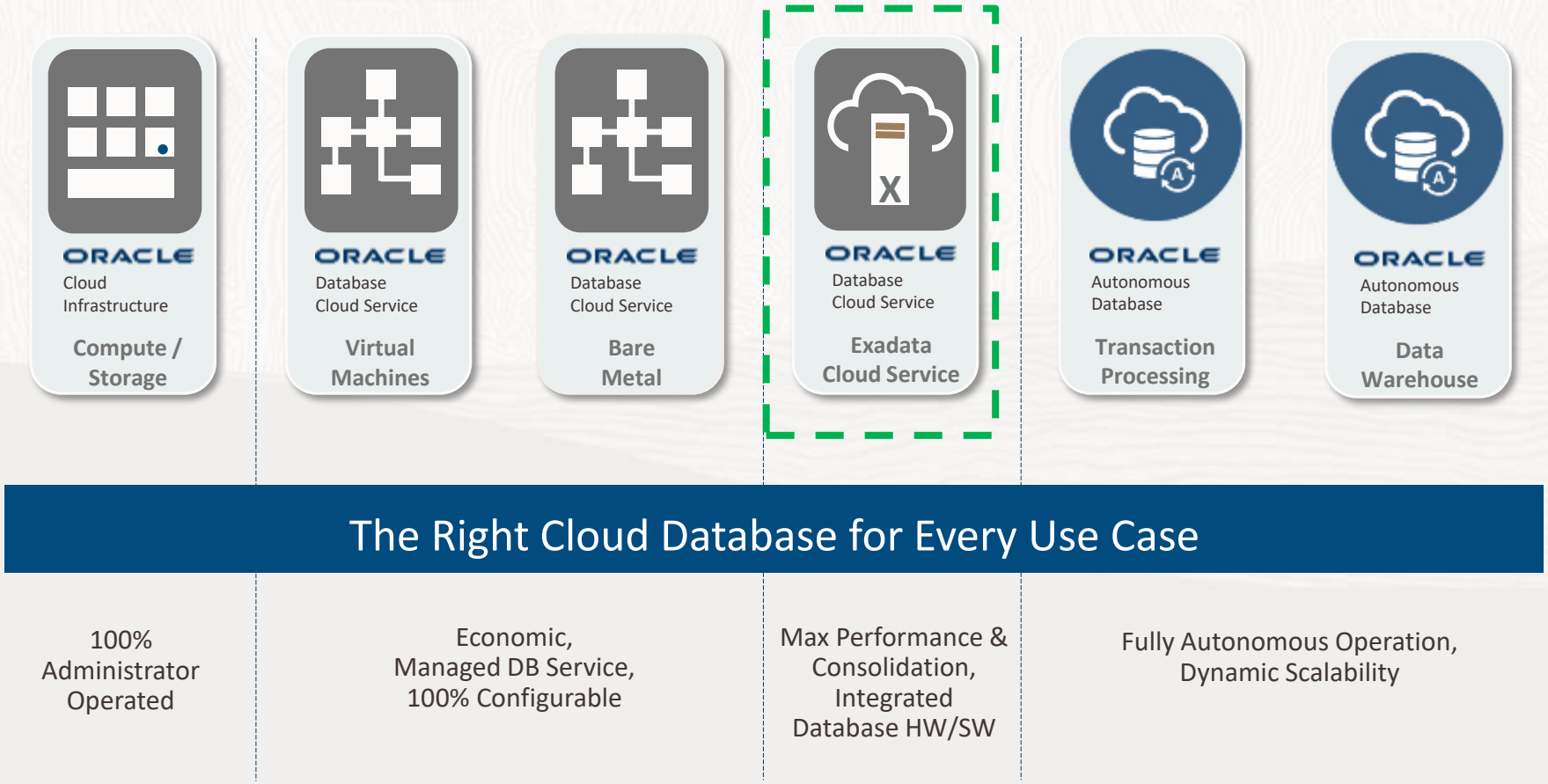
Database Cloud Service Scaling



Pay for only what you need when you need it

Oracle Cloud Database

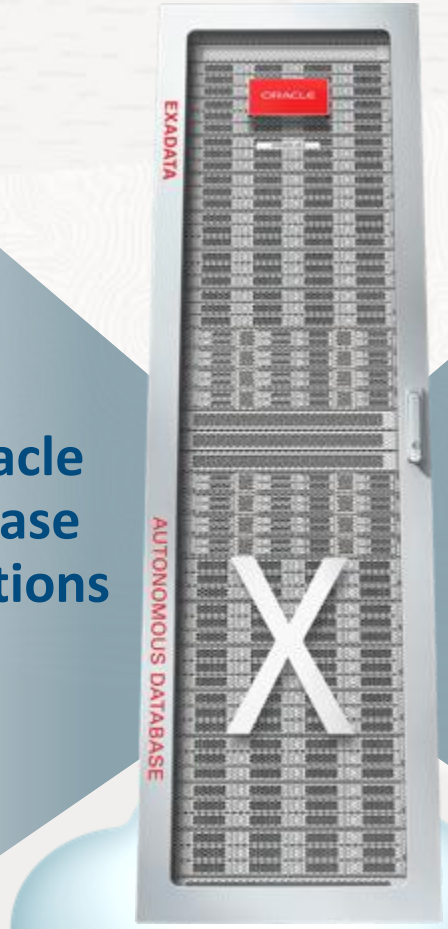
Range of options



Exadata Cloud

- 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 DB Machine Innovations

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

Most Powerful Database + Platform

Elastic Server Expansion

- [illegible]

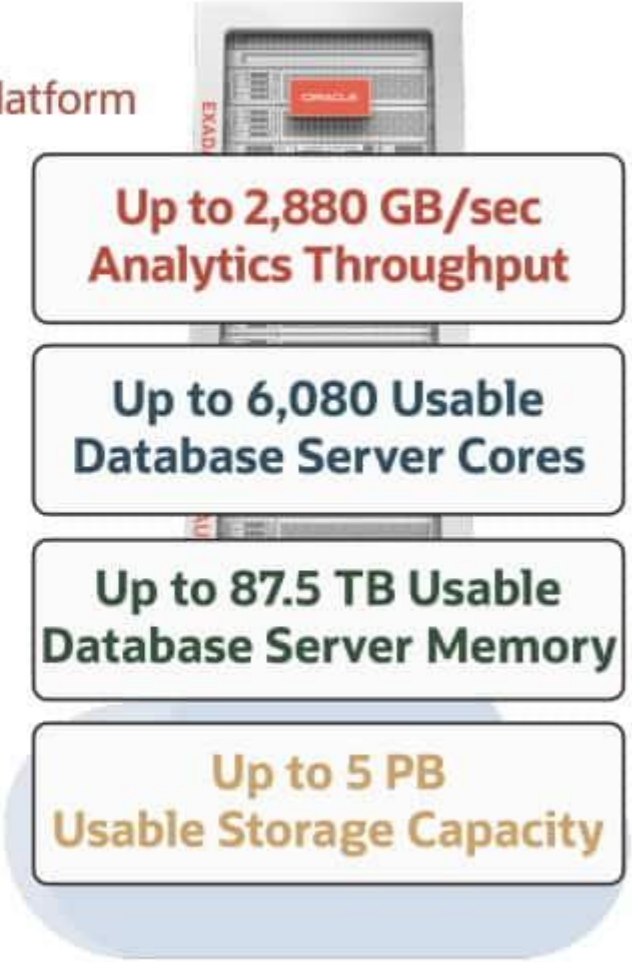
Exadata Cloud@Customer X10M

World's Fastest and Most Scalable On-premises Cloud Database Platform

Run OLTP, analytics and mixed workloads with best price-performance

- Powerful 4th Generation AMD EPYC™ processors
  - 190 usable cores per database server
  - 64 cores per storage server
- Extra large memory size
  - Up to 3 TB of DDR5 DRAM per database server
- High capacity disk storage
  - 22 TB drives
- Ultra-fast <17 µs latency with XRMEM and RoCE

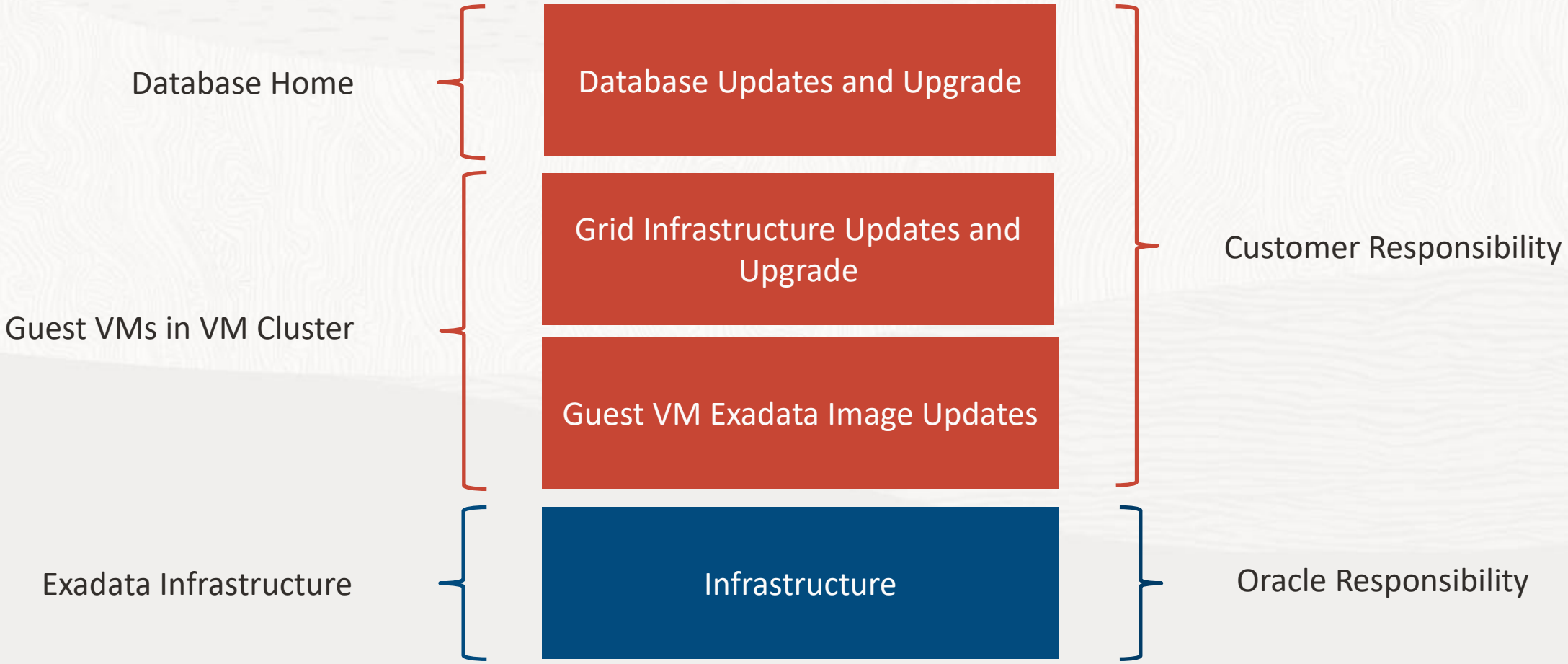
More work with less resources lowers TCO



Compute Scaling

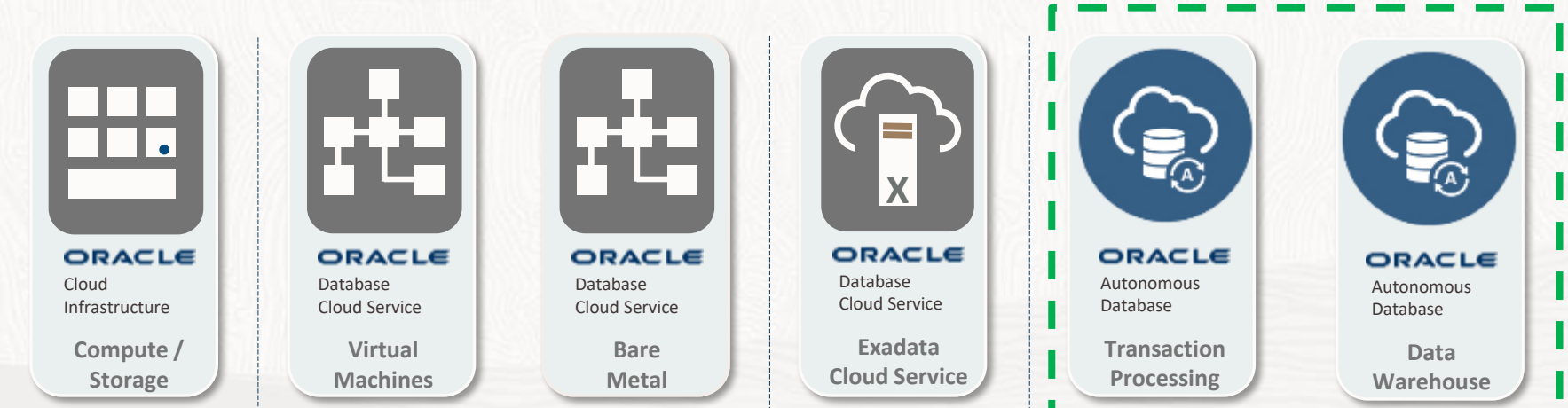
Storage Scaling

Update (patching) / Upgrade Automation Across the Exadata Cloud Service Stack



Oracle Cloud Database

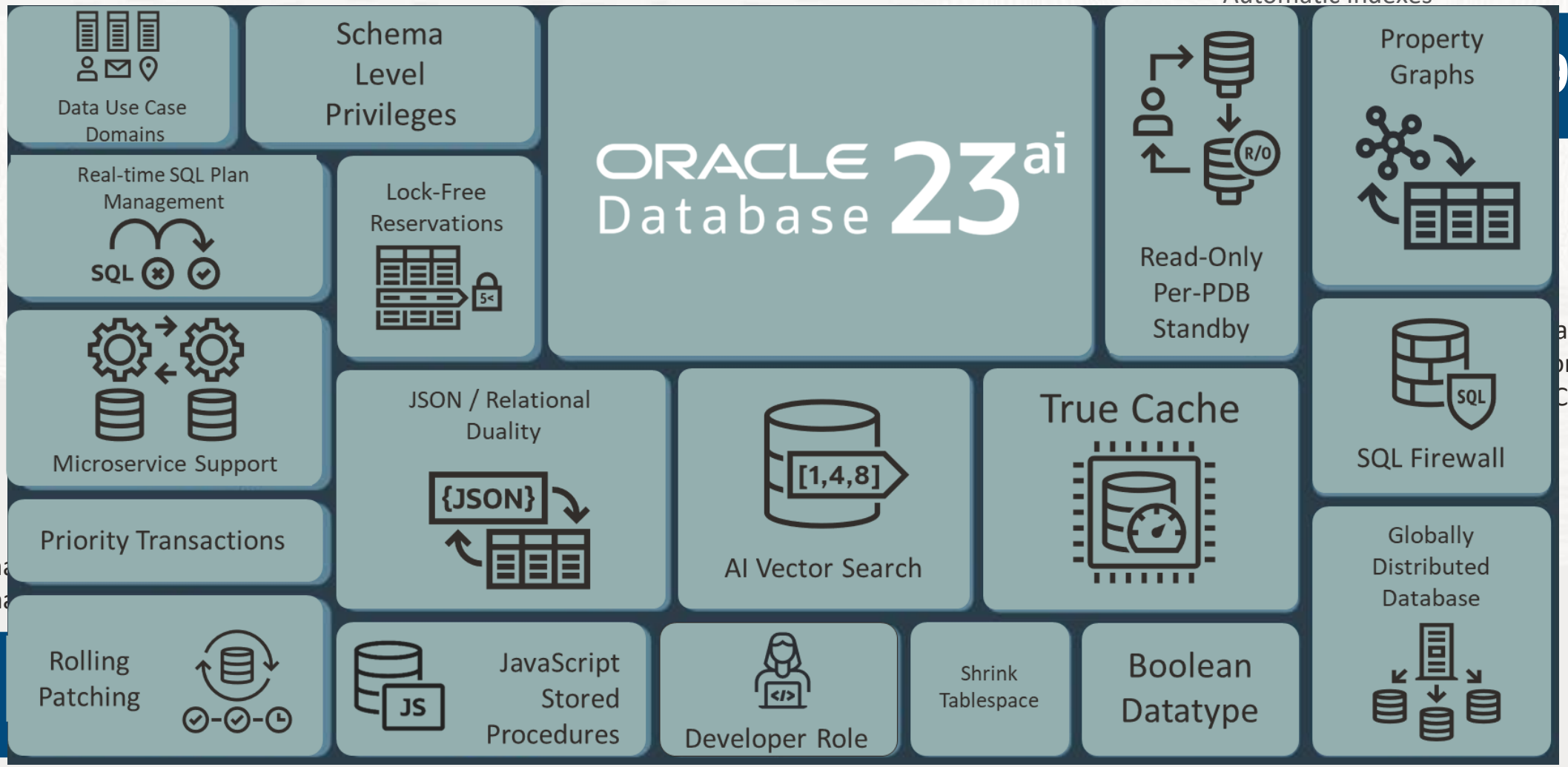
Range of options



The Right Cloud Database for Every Use Case

100% Administrator Operated	Economic, Managed DB Service, 100% Configurable	Max Performance & Consolidation, Integrated Database HW/SW	Fully Autonomous Operation, Dynamic Scalability

Oracle Spent Last 20 Years Automating Database Technology



- Automatic Indexes

ash
on
Continuity

- Automa
- Automa

9i

Autonomous Database Completes the Job

- *Eliminates All the Complexity of Mission Critical Databases*

Complete Infrastructure Automation

Complete Database Automation

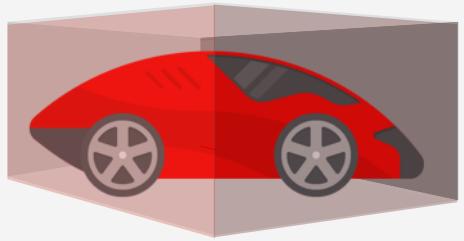
Automated Data Center Operations

Autonomous Database Delivers Full Database Lifecycle Automation

Provision

Rapidly and easily creates mission critical databases

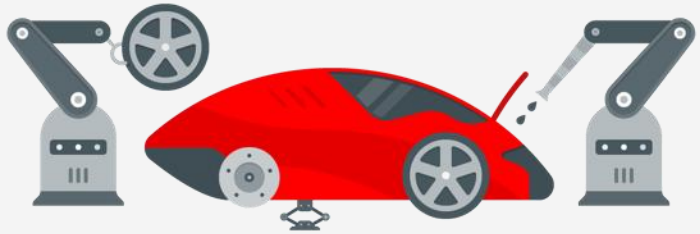
Creates **Exadata**[+] Cloud Infrastructure, **Real Application Clusters**[+] scale-out database



Secure

Protects data from all external and internal threats

Continuous threat detection, Applies security **updates online**[+], prevents admin snooping, **encrypts** all data



Manage

Automates all infrastructure and database maintenance

Patches all software **online**[+], tunes settings, performs **all OS and SYSDBA** operations

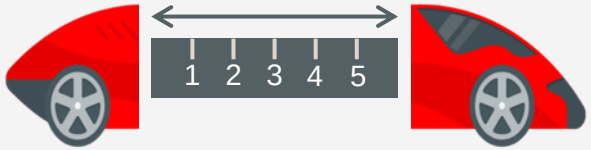
[+] Unique to Oracle

Autonomous Database Delivers Full Database Lifecycle Automation

Protect

Recovers from any failure without downtime

Automates backup, restore, **application transparent**[+] cluster failover, diagnoses and repairs **errors**[+]



Scale

Scales online for highest performance and lowest cost

Instant online elasticity[+] of **serverless** compute and storage enables **true pay-per-use**[+]

Optimize

Optimally runs workloads without human direction

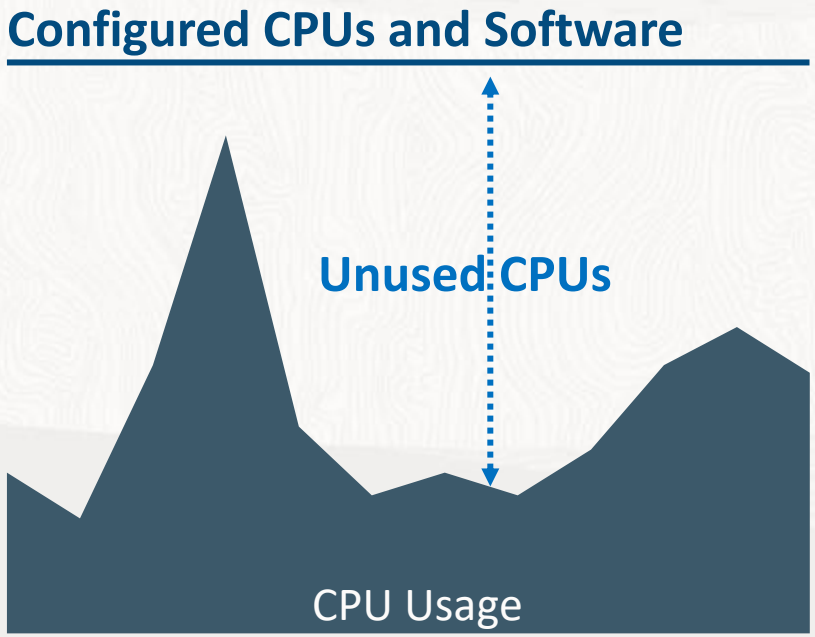
Automatically optimizes **data formats**, **parallelism**[+], memory, and plans for each workload

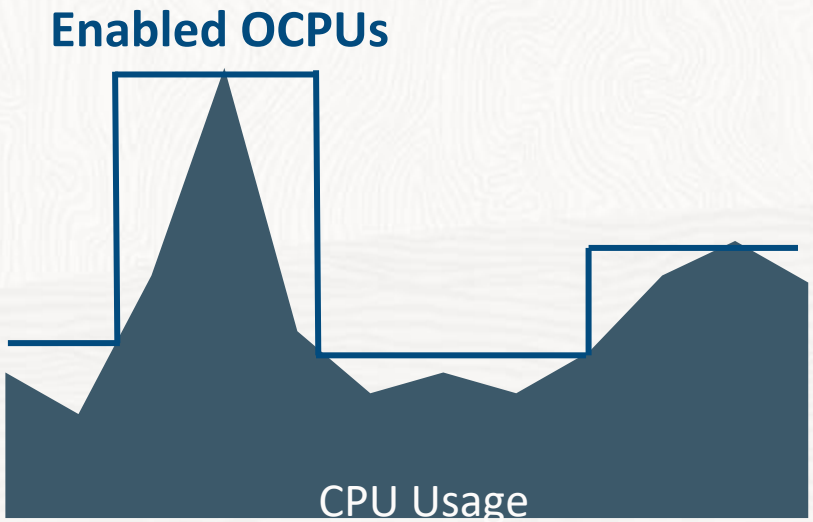
[+] Unique to Oracle

OCPU Scaling to Reduce Costs

DBCS / ExaCS / Autonomous Database

Pay for only what you need when you need it





On-Premises - Static

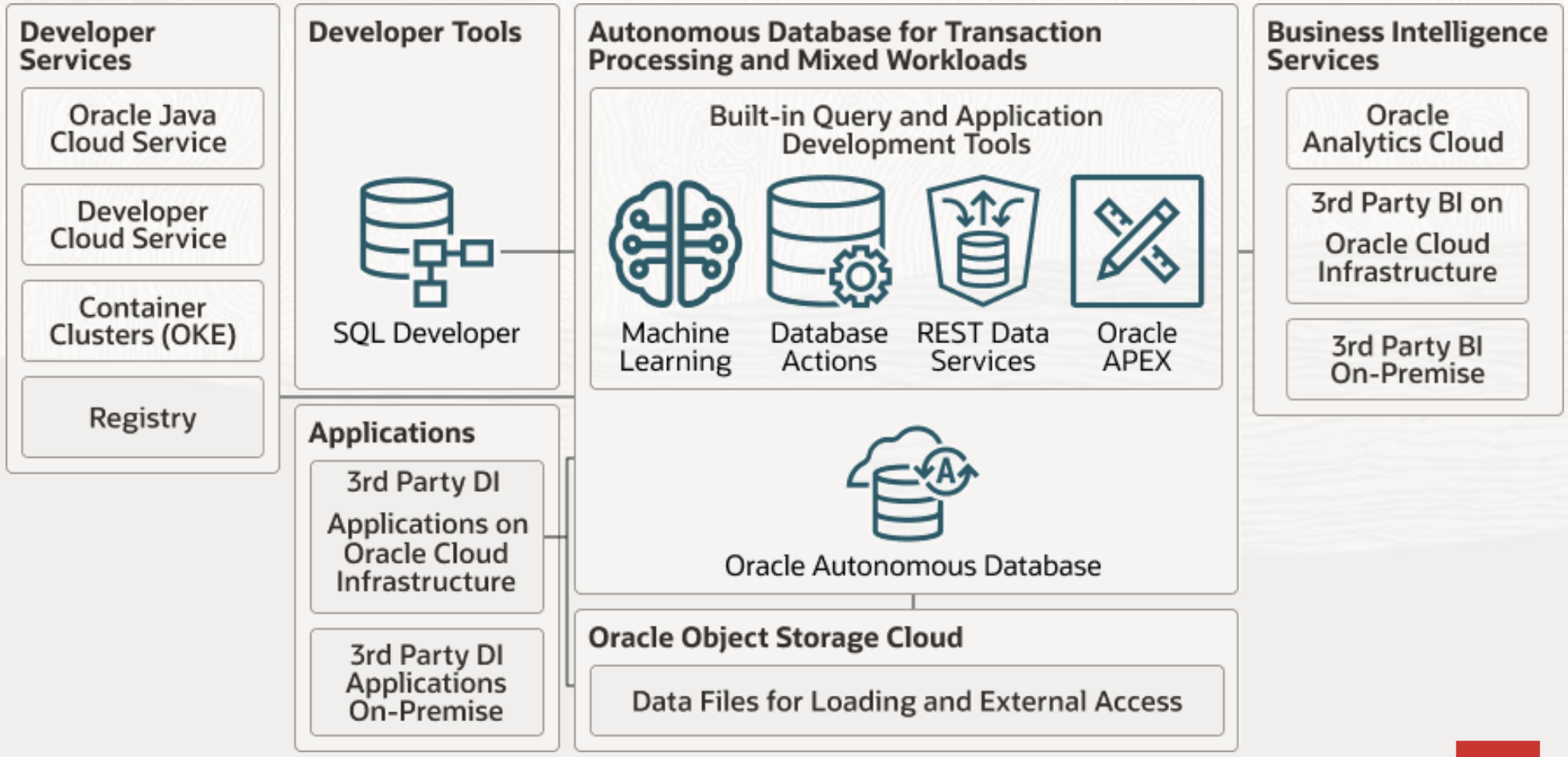
Purchase CPUs and software licenses for highest projected peak load

Cloud - Elastic

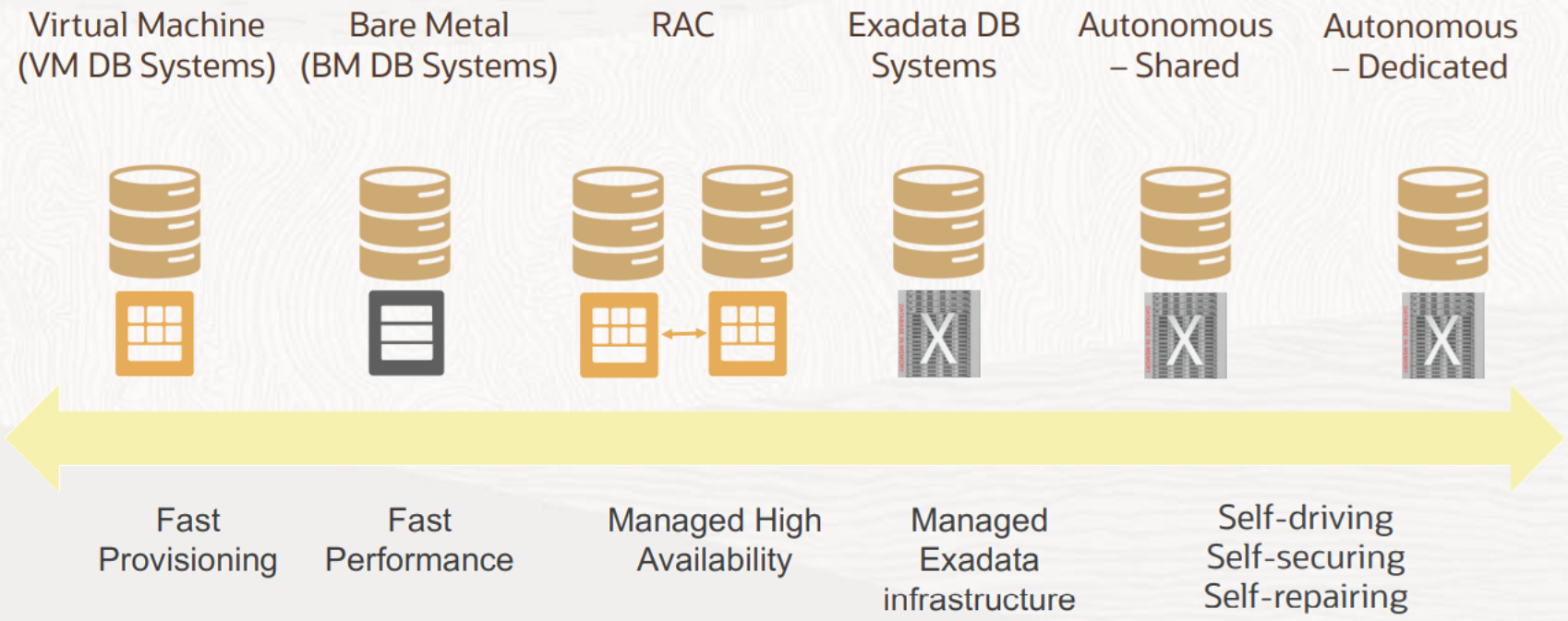
Adjust enabled OCPUs to match actual load
OCPU scaling with per second billing

ADB Workload Types

1. ADB for Analytics and Data Warehouse
2. ADB Transactional Processing
3. JSON ADB
4. APEX Service



DB Deployment Options



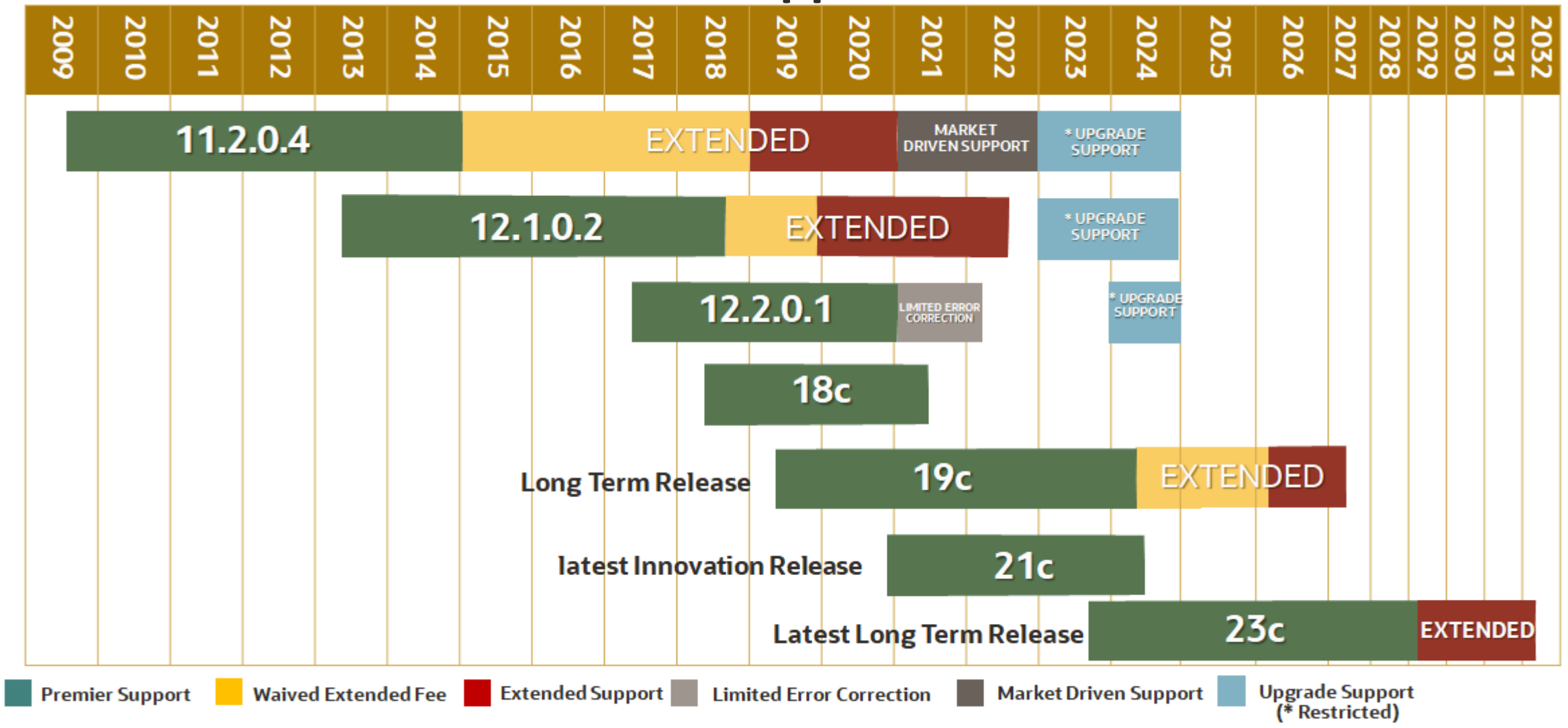
DB Comparison Table

	VM DB Systems	BM DB Systems	Exadata DB Systems	Autonomous – Shared	Autonomous - Dedicated
Management	Customer	Customer	Customer	Oracle	Oracle
Updates	Customer initiated	Customer initiated	Customer initiated	Automatic	Customer policy control
Scaling	Storage (CPU cores cannot be changed)	CPU (storage cannot be changed)	Within Exa CPU, across Exa racks	Both CPU and Storage	Both CPU and Storage
Backups	Customer initiated	Customer initiated	Customer initiated	Automated	Automated
Storage	Block Storage	Local NVMe disks	Local disks and NVMe flash cards	Local disks and NVMe flash cards	Local disks and NVMe flash cards
RAC	Available (2-node)	Not Available	Available	Not Available	Not Available
Data Guard	Available	Available	Available*	Not Available	Not Available

*You can manually configure Data Guard on Exadata DB systems using native Oracle Database utilities and commands. dbcli is not available on Exadata DB systems

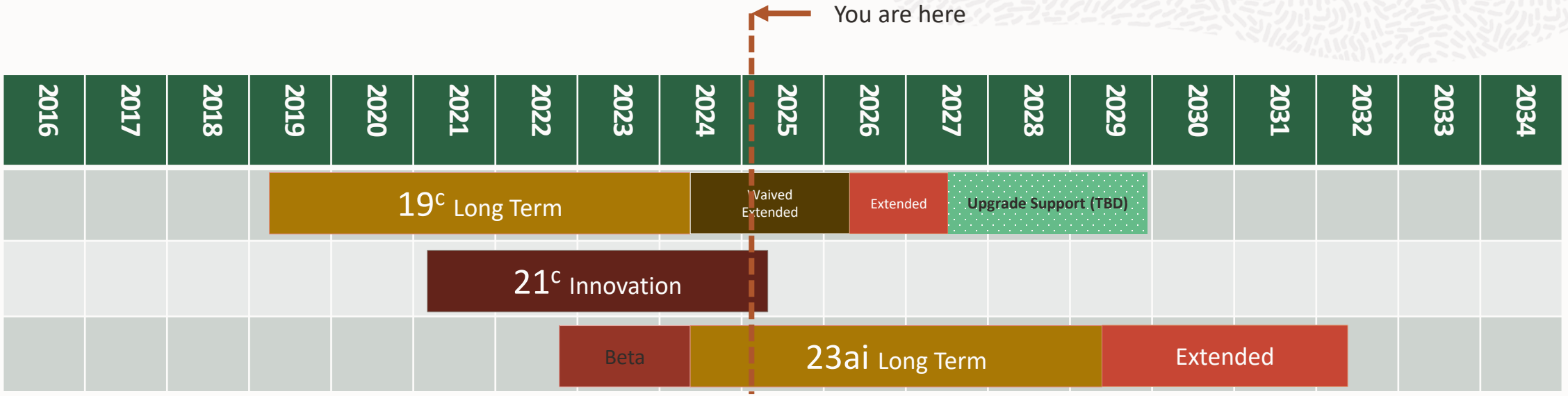
**The database can be a container database with multiple pluggable databases, if the edition is High Performance or Extreme Performance.

Database Cloud Release and Support Timelines I



[Release Schedule of Current Database Releases [742060.1]]

Database Cloud Release and Support Timelines II



Oracle Database 23ai long-term release provides you with:

- **Access to 300 + new features and thousands of enhancements, including AI Vector Search, JSON Relational Duality, True Cache and more**
- **Latest administrative and security patches**
- **Updates for legal and/or regulatory requirements**

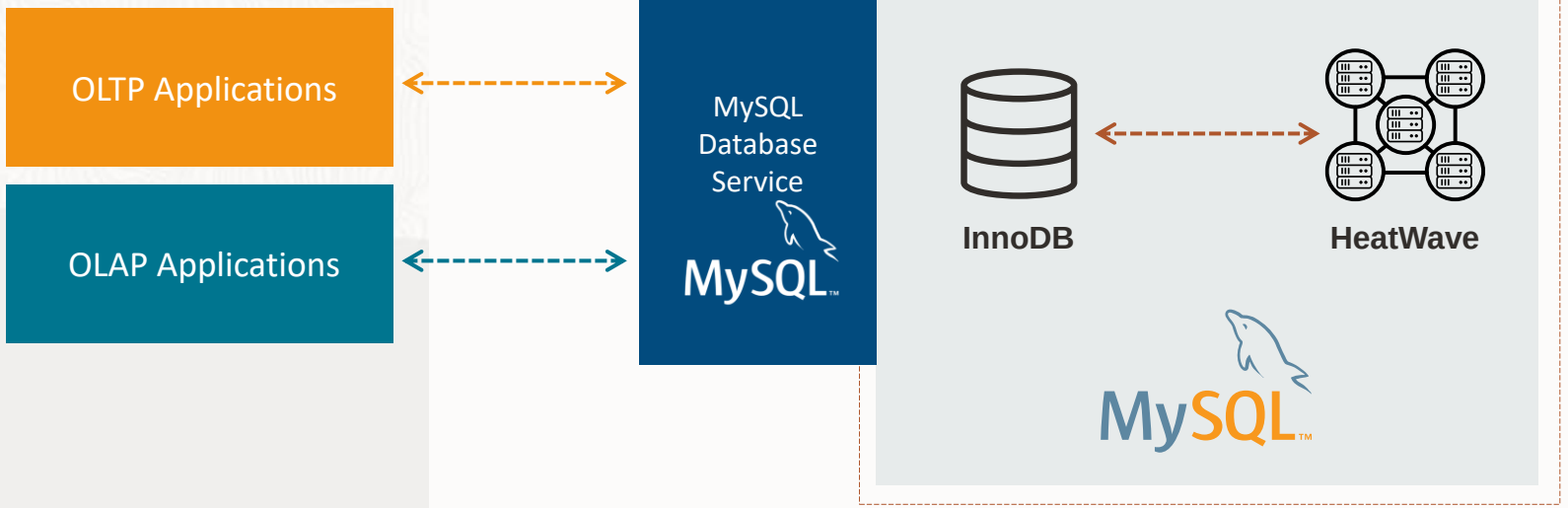
Oracle Database Cloud Migration Solutions

	Physical	Logical
Online	 Zero Downtime Migration	 GoldenGate
Offline	 RMAN	 Data Pump

More info here

MySQL HeatWave

Easily run complex queries against your MySQL database, no ETL required

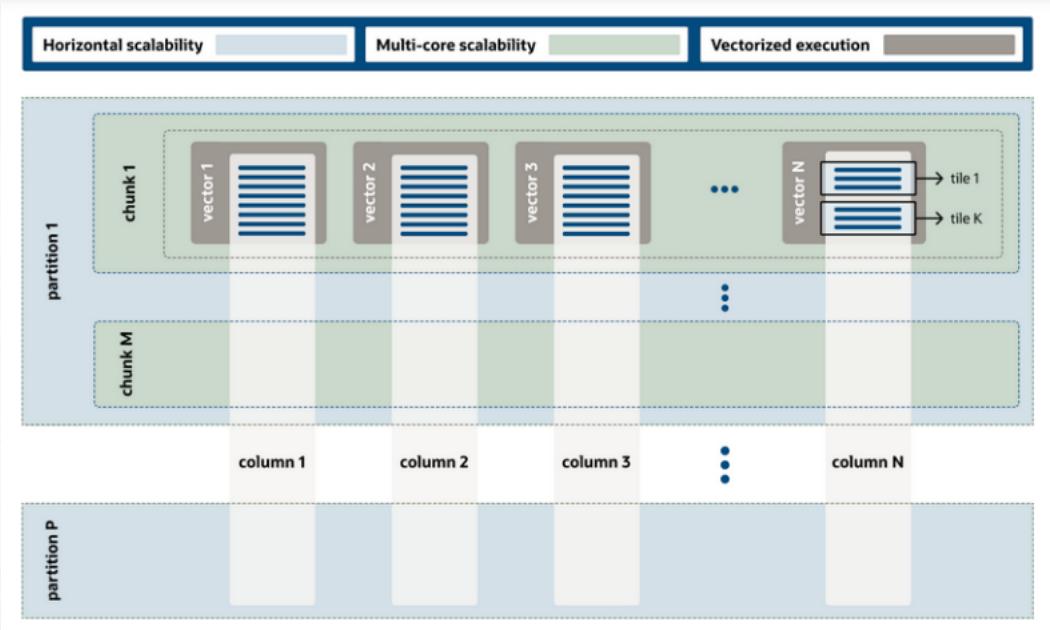


- Single MySQL database for all applications
- No need to ETL
- Query real-time data
- Applications work without any changes
- Scales to thousands of cores

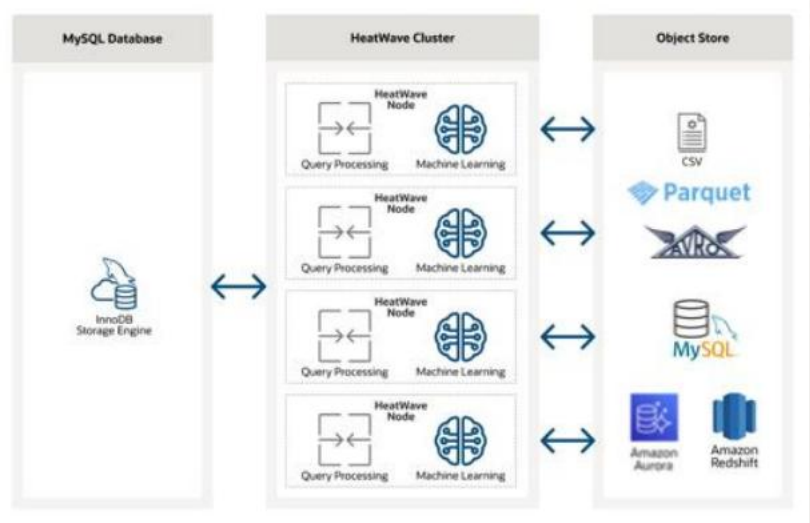
MySQL HeatWave Architecture Features

1. Innovative in-memory hybrid columnar analytics engine
2. Optimized for the cloud
3. HeatWave scale out data management layer
4. MySQL Autopilot
5. HeatWave AutoML
6. HeatWave Lakehouse
7. MySQL-Javascript

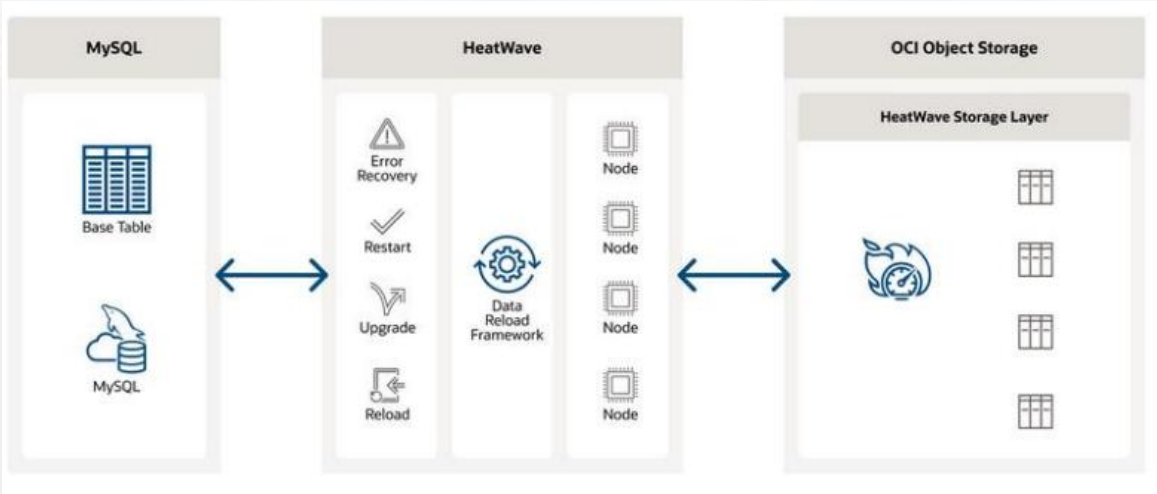
Vectorized in-memory columnar representation for analytic processing



HeatWave Lakehouse

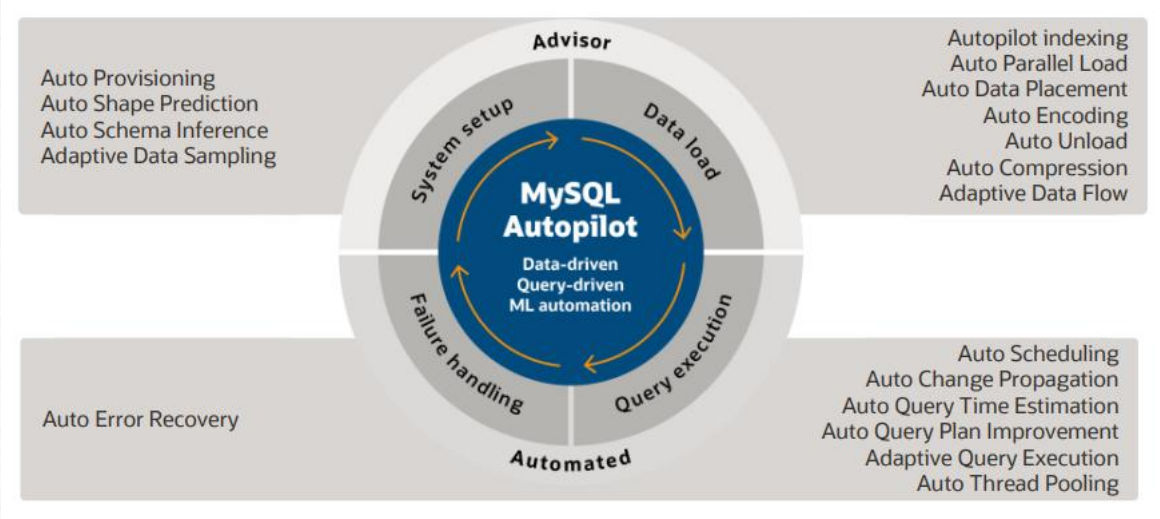


Scale-out storage layer

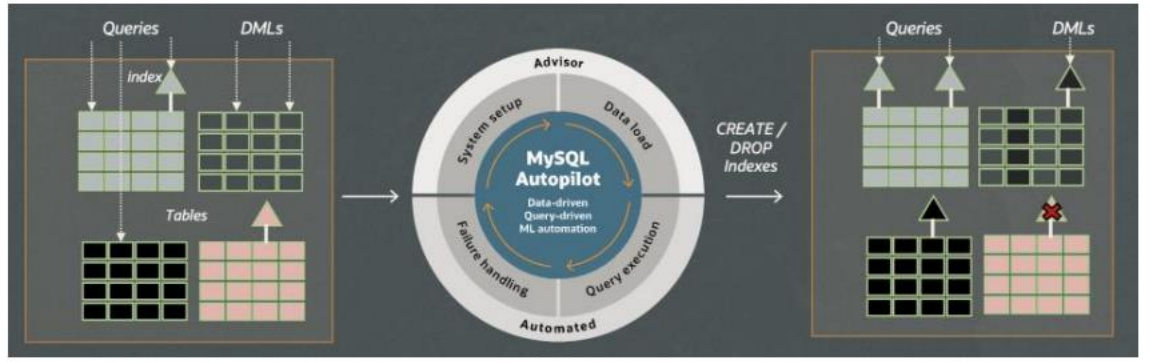


AutoPilot and AutoML

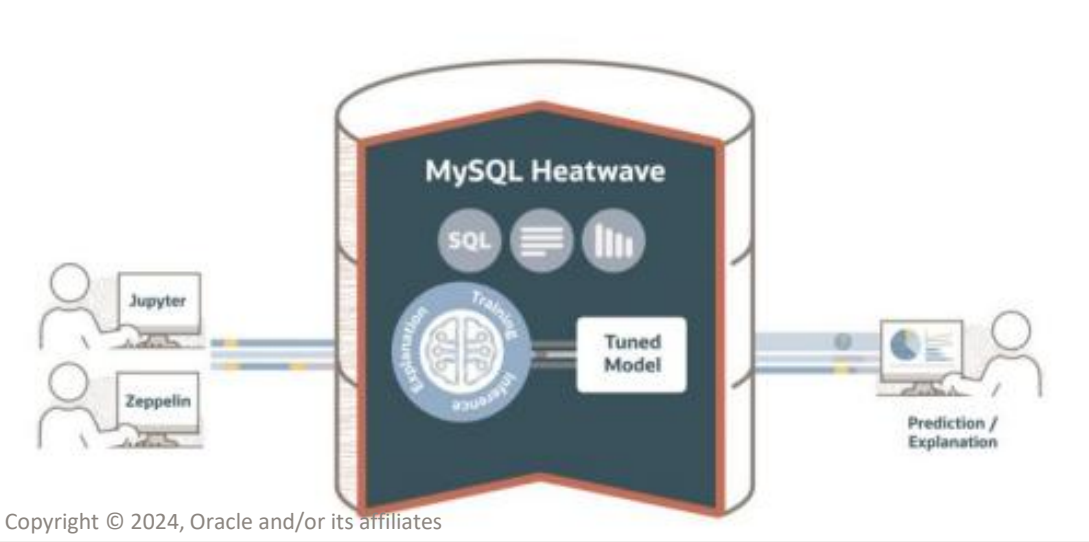
AutoPilot



Autopilot Auto-Indexing



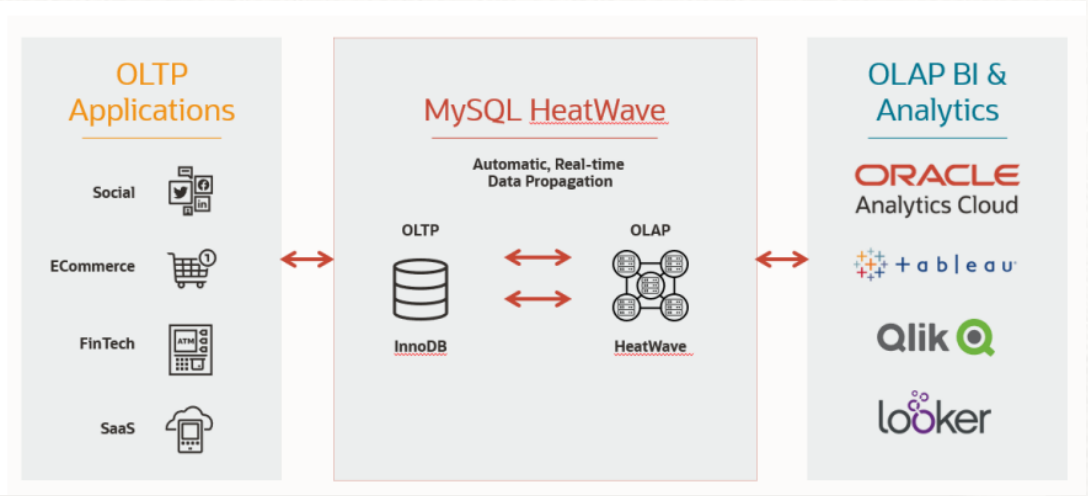
AutoML



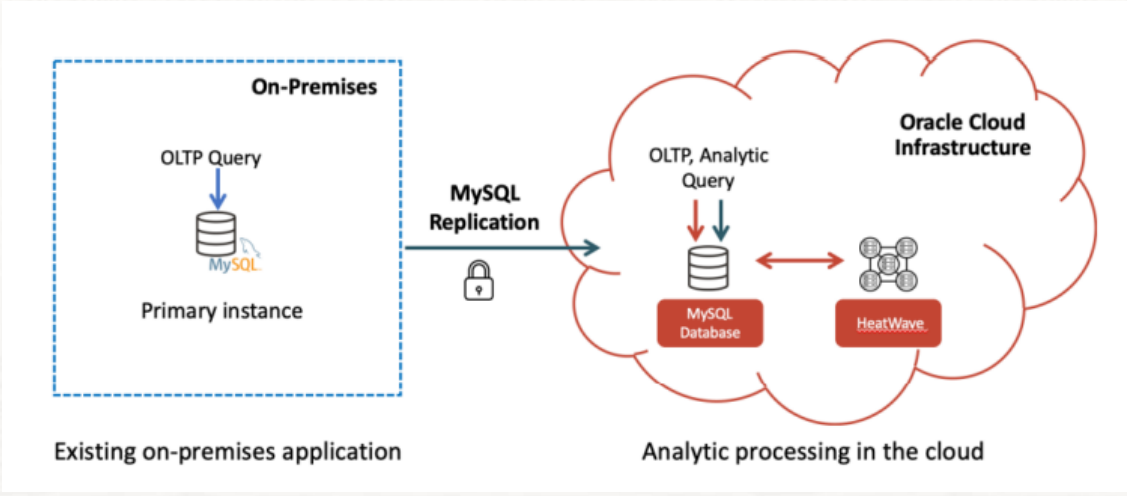
HeatWave ML delivers predictions with an explanation of the results.

Use of Cases

Integration with BI/Data Analytics Tools



DR Scenarios or Cloud processing



NoSQL vs SQL

NoSQL

- Scheme-less (Dev without a clever structure)
- No-Structured Data: Doc, KV, Column, Graph.
- Write Time (No check though a schema)
- Indexes better for storage but inefficient for time due to schemeless. Partition/Shard Keys.
- **Horizontal Scalable**, Fault Tolerant
- No ACID
- High Performance.

SQL

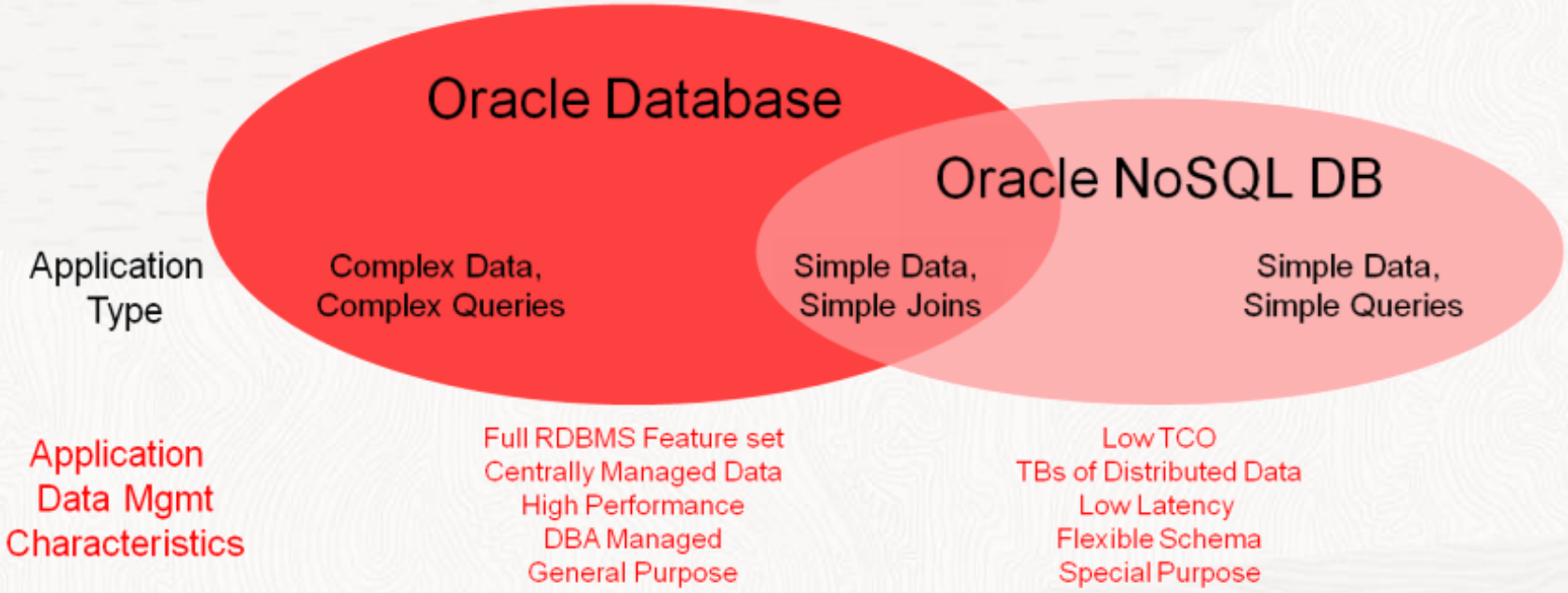
- Full Scheme (Consistency e Integrity)
- Structured Data
- Reading Time (Better for Indexes).
- Indexes improve performance
- Vertical Scalable – SPOF except Oracle
- ACID-Compliant
- Better for troubleshooting.

"…if you want to read a lot of structured data, then SQL databases will be better…"

"…you don't want to accidentally sacrifice consistency isolation when your application actually requires it…"

"The choice between SQL and NoSQL depends entirely on individual circumstances…"

Oracle Vision for NoSQL



OCI Services:

NoSQL store as table, JSON (doc-oriented) and key-value pair (Memcached, Redis).

ATP can store JSON.

This presentation cover NoSQL Database Cloud Service only.
The another service is NoSQL Database Analytics Integrator, you can find more information here.

Amazon.com conducted an extensive study that demonstrated a direct relationship between increased latency and loss of revenue. For every 100ms (that's 1/10th of a second) of increased latency on their web site, they observed a decrease of 1% in revenue. In other words, an almost imperceptible increase in latency translated directly into lost business because customers stopped browsing or using the site.

Azure Partnership

Microsoft Azure + ORACLE

1. Technology integration

- Private interconnect with FastConnect and ExpressRoute
- Unified identity and access management

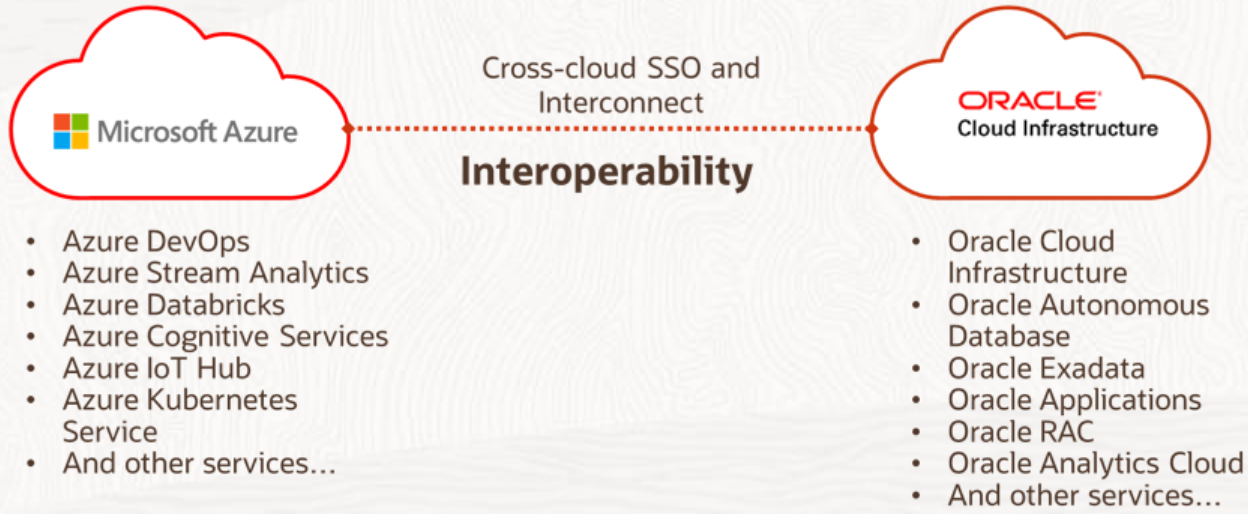
2. Application interoperability

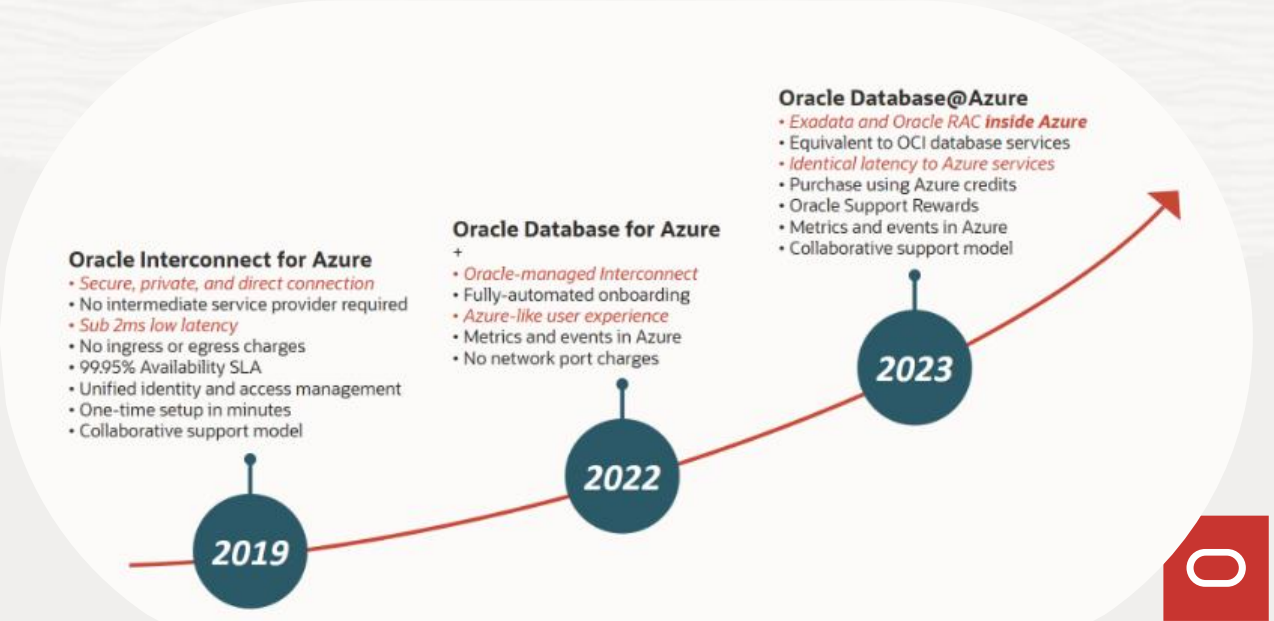
- Tested, validated, and supported application deployments
- Innovate across clouds
- Large choice of services
- Leverage existing investments: Maximize ROI for Licenses. No charge by traffic.

3. Collaborative support model

Joint, collaborative, standard support model

- Seamless issue resolution





Azure Interconnect

FastConnect and ExpressRoute

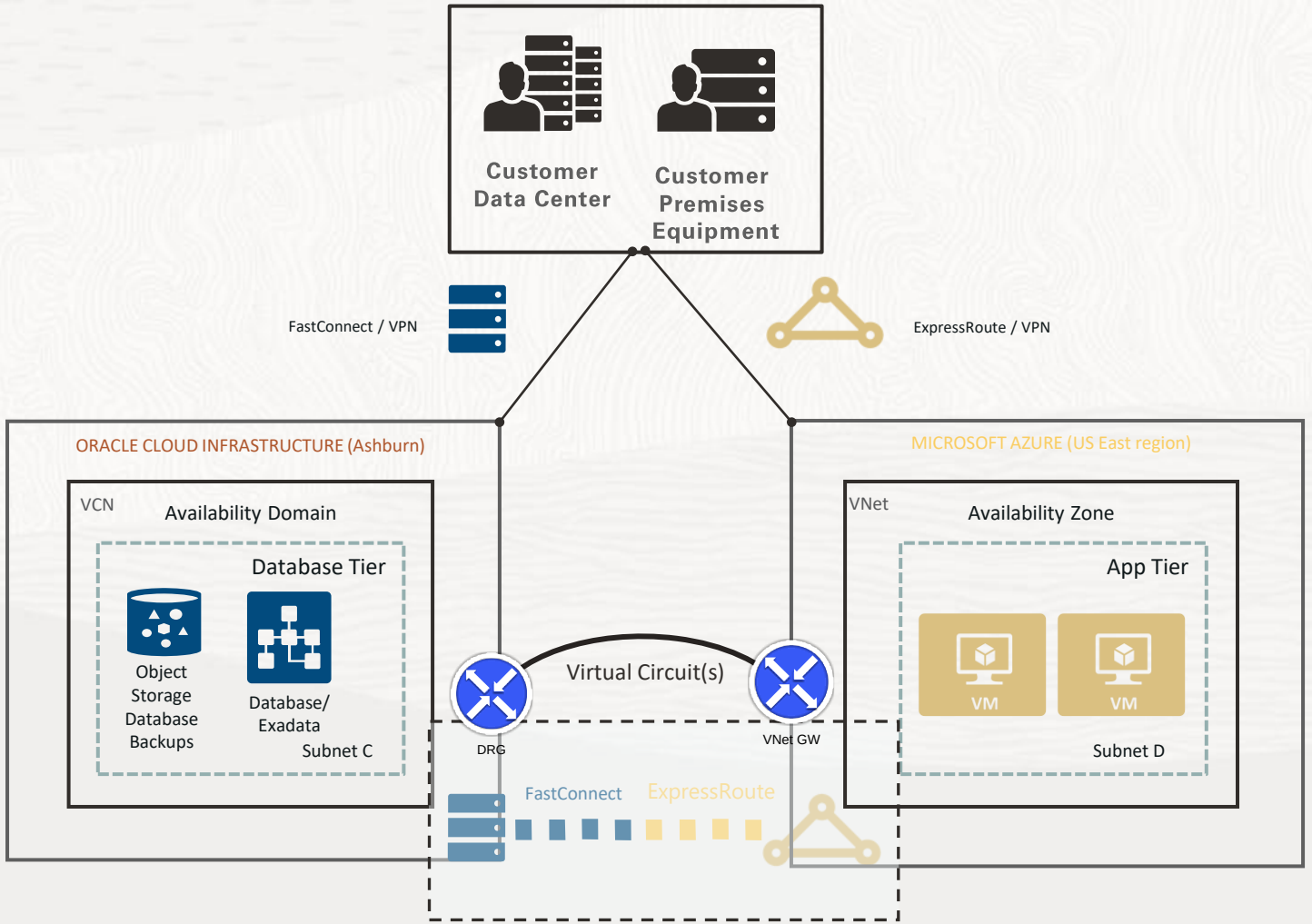
- No intermediate service provider required for setup
- No bandwidth charges in either direction

Performance and Security

- Lowest multi cloud latency
  - Average latency across interconnect: ~1.2ms to ~2.1ms*
- High bandwidth with a private connection

Simplified implementation

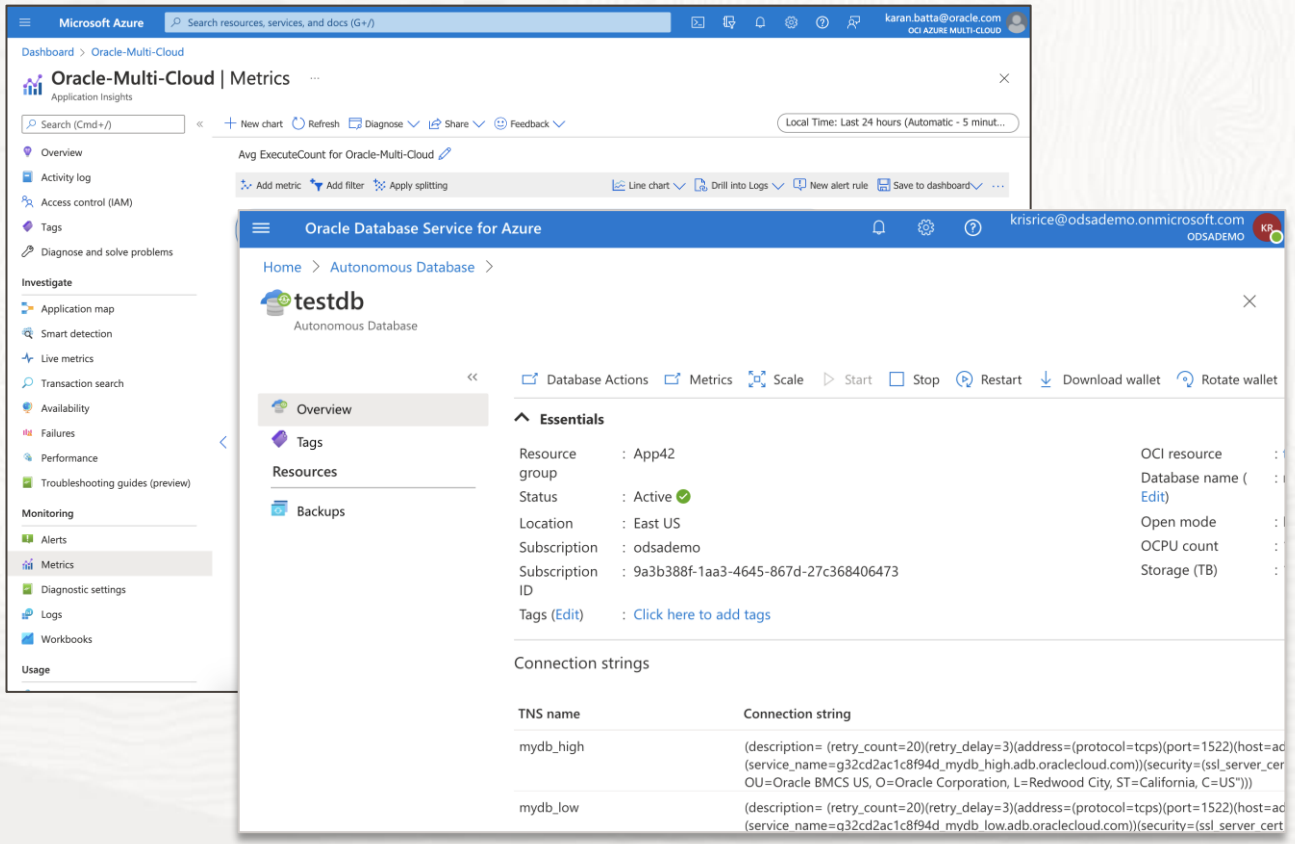
- Terraform scripts to automate provisioning and deployment



Note: Latency is a function of the service not a function of the interconnect

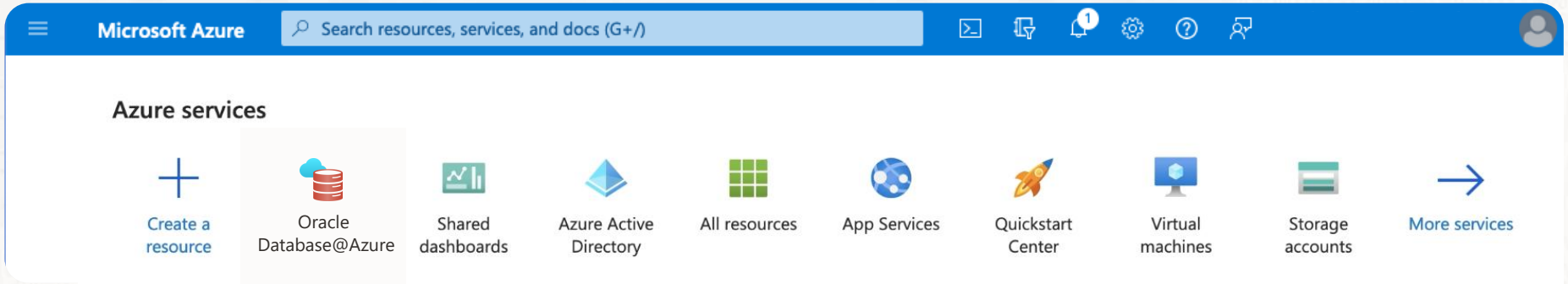
Oracle Database Service for Azure (ODSA)

An Oracle managed service that enables customers to easily provision and manage Oracle databases running on OCI using an Azure-native API and console experience.

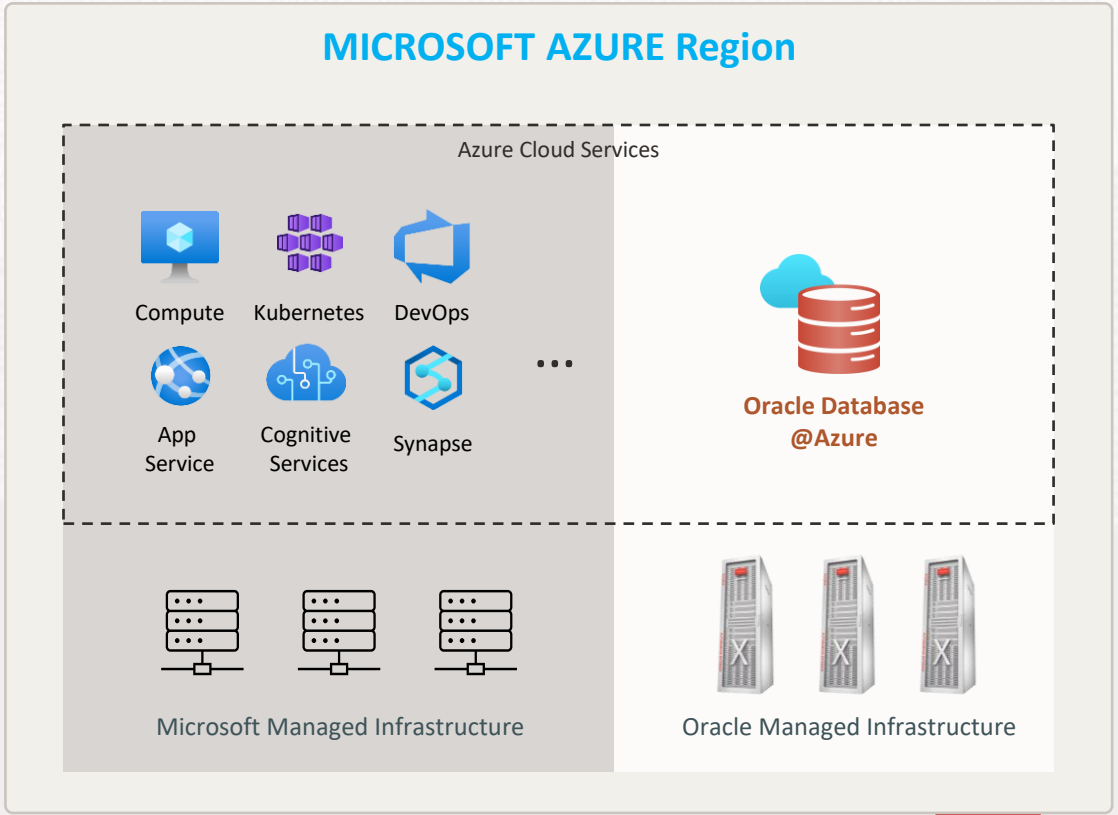


1. Connect Azure and OCI
2. Provision OCI databases
3. Use your OCI database like an Azure resource
4. OCI manages Azure-to-OCI networking

Oracle database services on OCI in Azure

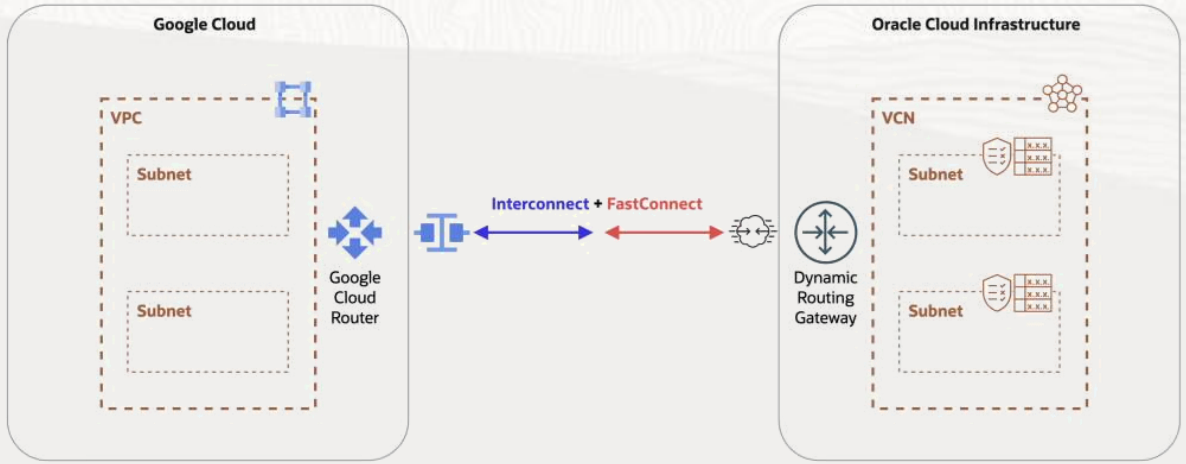


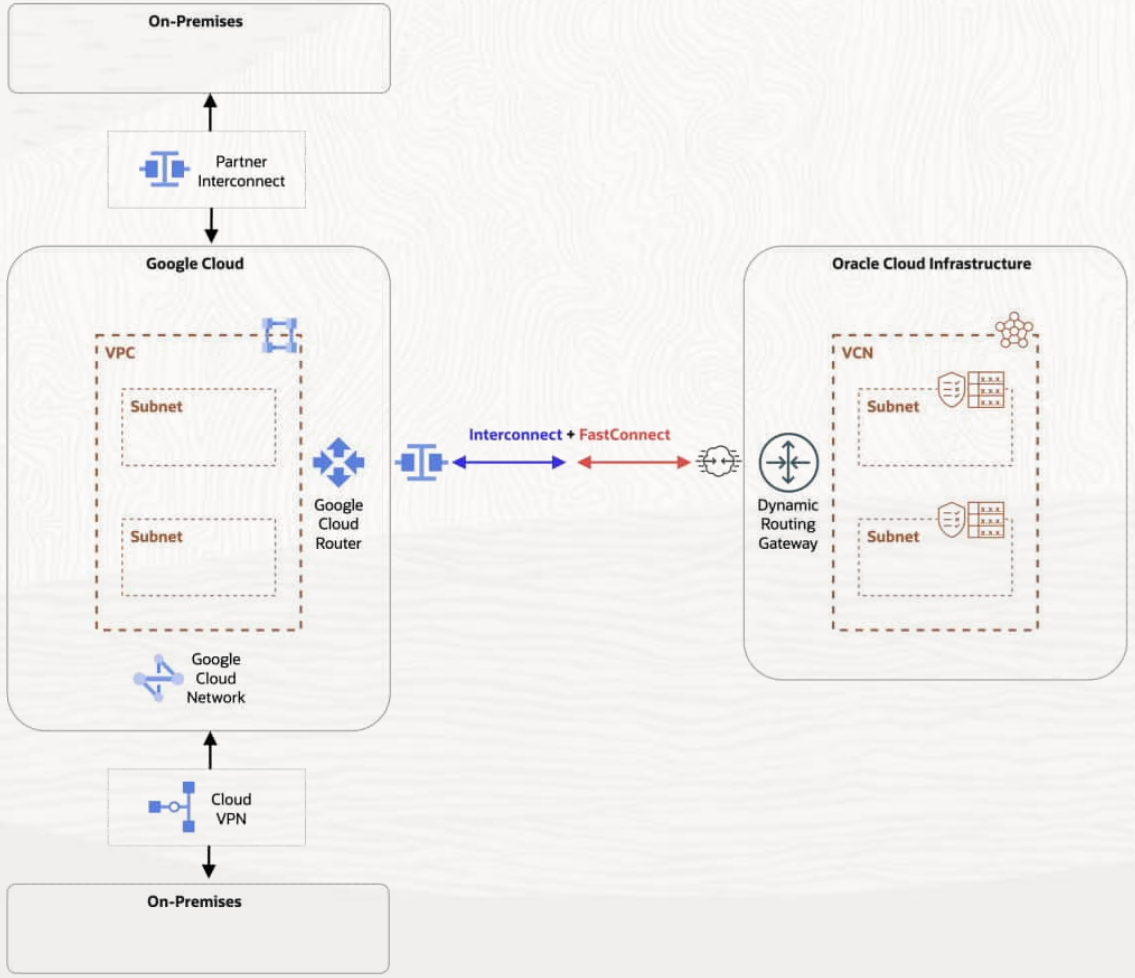
- **Run your workloads where you choose:**
  Combine Azure services with Oracle Exadata Database Service and Autonomous Database running on OCI, colocated in Microsoft Azure datacenters; Experience the highest levels of Oracle Database performance, scale, security, and availability
- **Migrate, Modernize and Innovate:** Migrate with proven tools and services like Oracle Zero Downtime Migration, Benefit from managed databases, Use familiar application development tools and frameworks, Build and run cloud native apps with access to data in Oracle Database.
- **Simplify operations and purchasing:** Use new or existing Azure commitments, Leverage existing Azure and Oracle Database skills, Receive collaborative support, Get Oracle Support Awards



Oracle Interconnect for Google Cloud

- Similar to the other Interconnect.
- Same use cases: cloud-native applications,, full stack apps, DR and Cloud scenarios, distribute AI workloads and SaaS Apps.



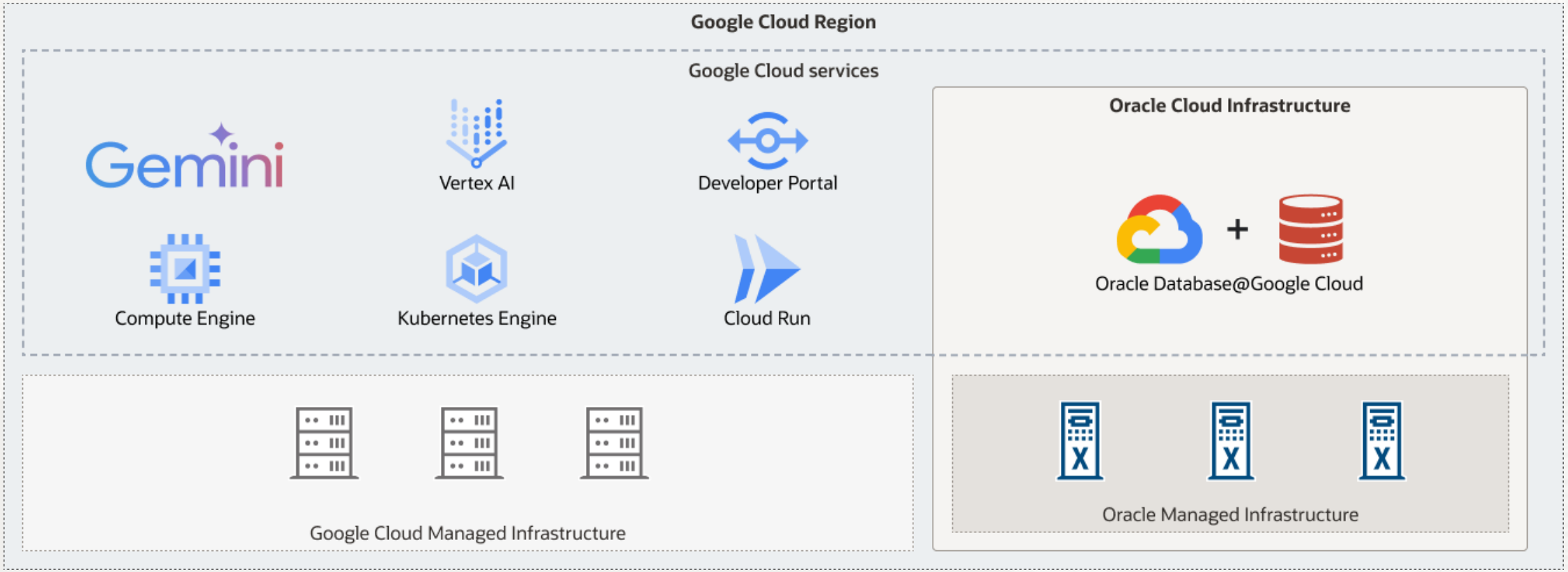


https://www.oracle.com/cloud/google/interconnect/
https://blogs.oracle.com/cloud-infrastructure/post/announcing-oracle-interconnect-google-cloud

Oracle Interconnect for Google Cloud Global Footprint

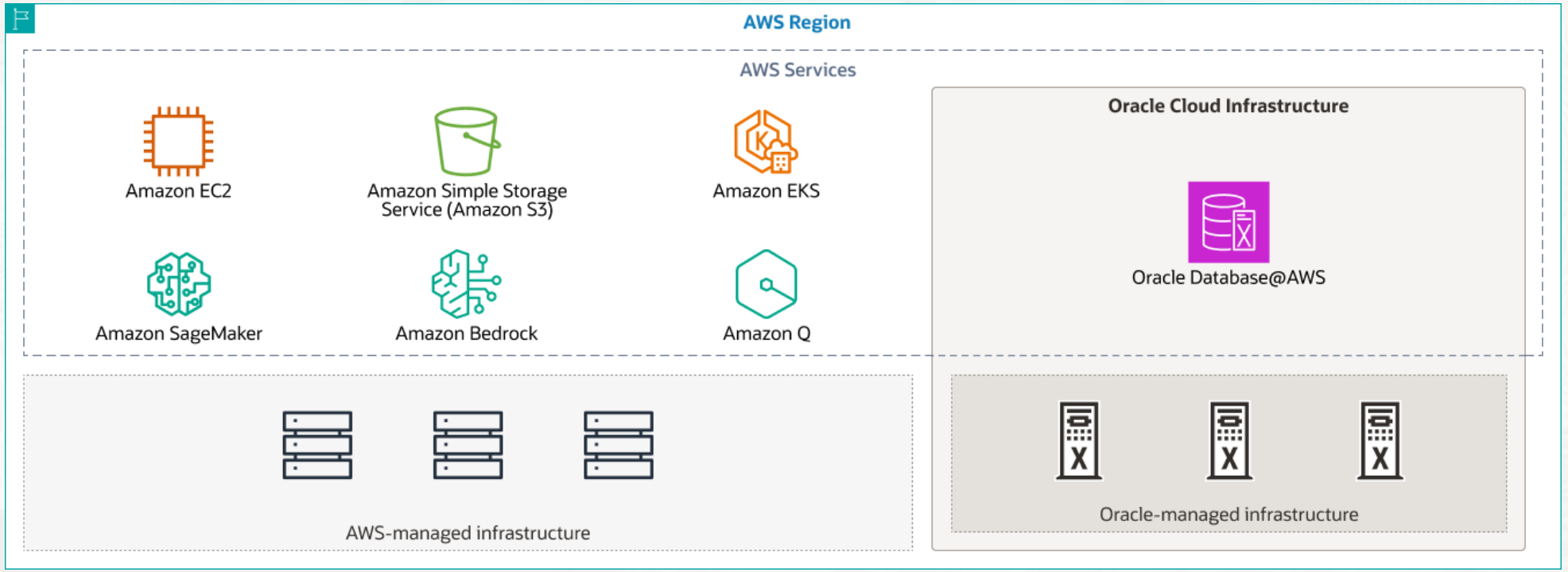
More info here

Oracle Database@Google Cloud



Service launched as GA on 9-Sept-2024, and 2 services: ExaCS and ADB.
More info about available regions (7 at late 2024), GCP and Oracle.
Video deploying Exadata Cloud Services using GCP Console

Oracle Database@AWS



Service launched as GA on 1-Dec-2024 in 1 region (us-east-1) and 1 service: ExaCS

More info in AWS and Oracle

Documentation in AWS and Oracle

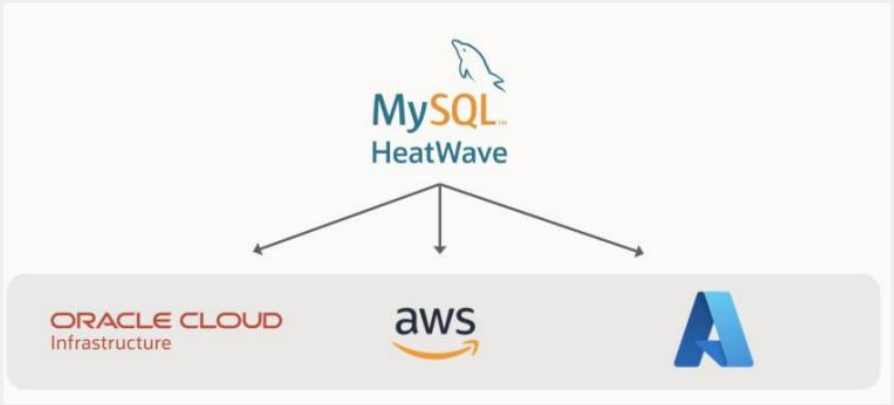
Learn

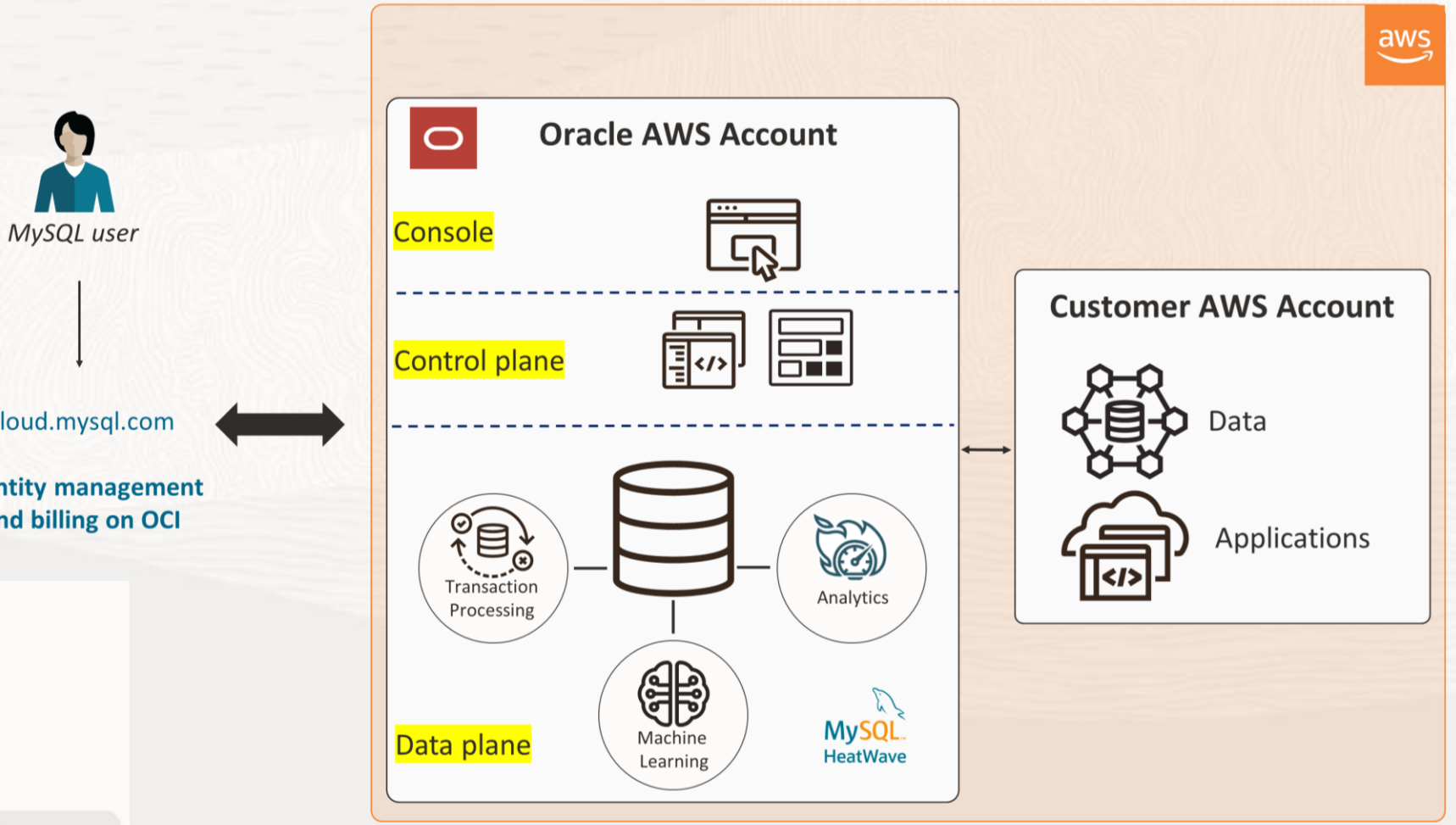
Provision Oracle Exadata Database Service in Oracle Database@AWS

Duration	Level	Audience	Products and Services	Technologies	Released
6 hours	Beginner	DevOps Engineer, Developer, Systems DBA, Technology Manager	Exadata Database Service	Database	Feb 10, 2025

MySQL HeatWave runs natively on AWS

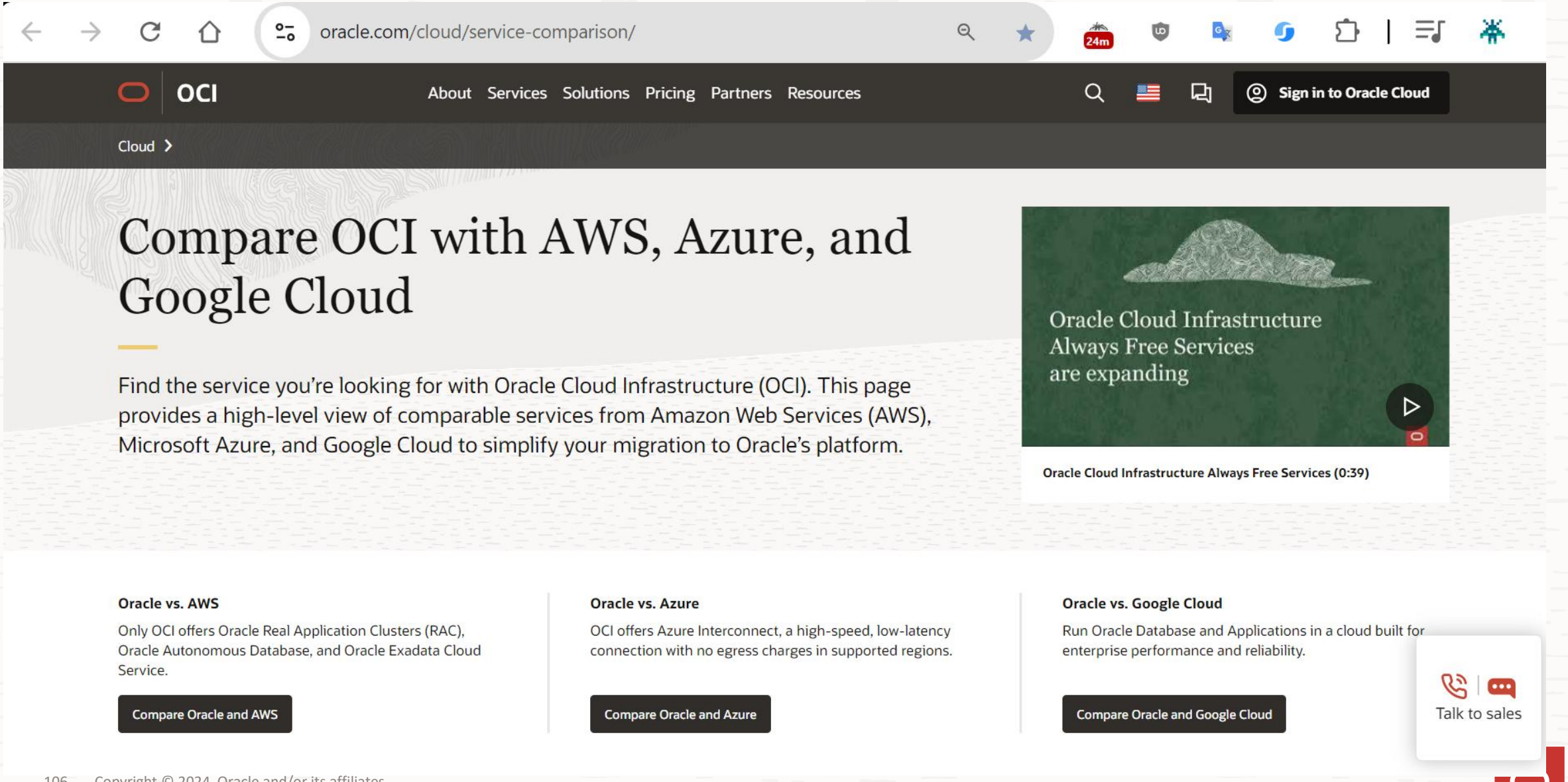
- Data plane, control plane, and console run in AWS





Service Comparison

https://www.oracle.com/cloud/service-comparison/



Example: Comparison with AWS

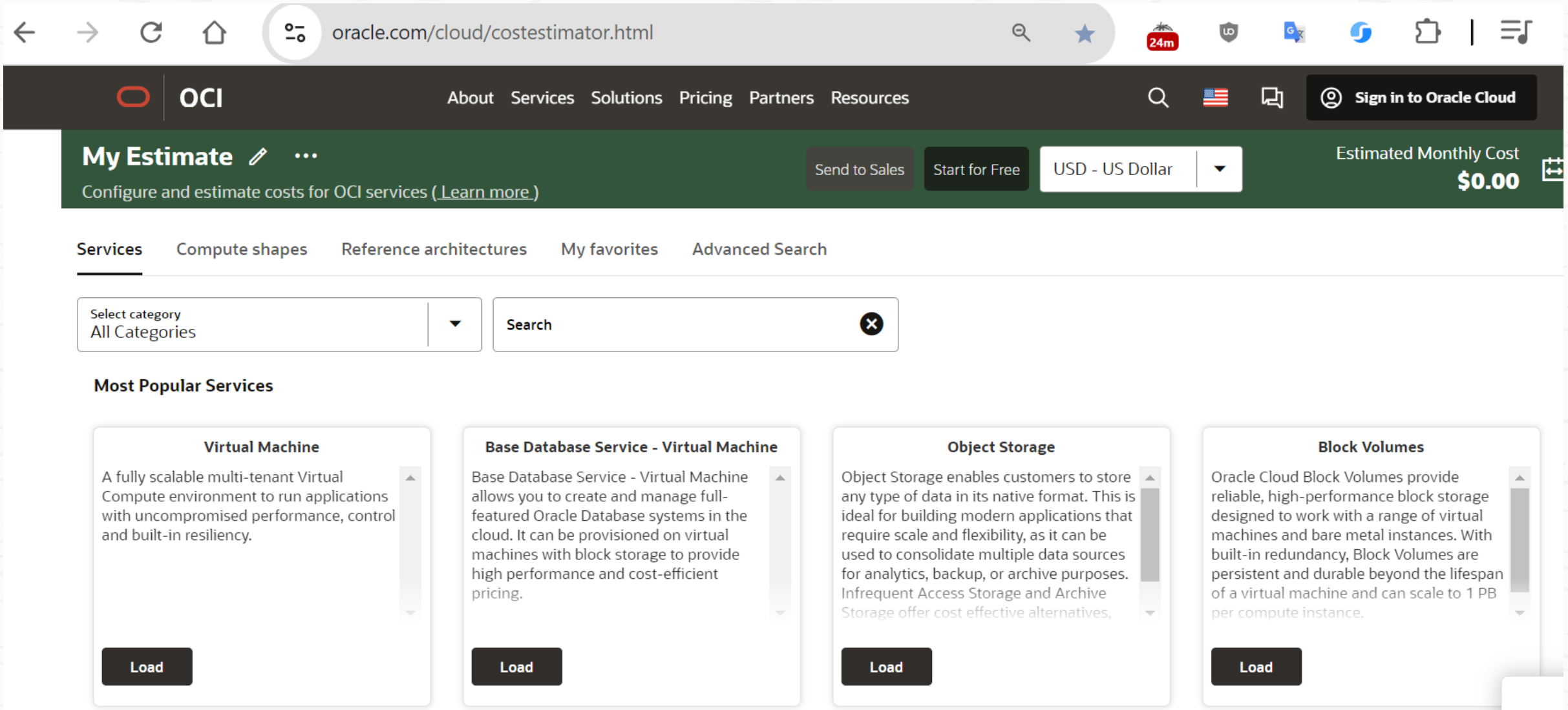
https://www.oracle.com/cloud/service-comparison/

Category	Service	OCI	Info	AWS
Data Management	Graph **Database**	- Autonomous **Database** Free Tier	**Database** that is primarily built to handle graph relations, typically using nodes and edges.	- Amazon Neptune serverless - Amazon Neptune
Data Management	Relational **Database**	- Oracle **Database** Ser Azure - Oracle Base **Databas** Service - Autonomous Transac Processing Free Tier - MySQL Heatwave **da** - Autonomous **Databa** Free Tier - Globally Distributed Autonomous **Databa** New - Oracle **Database**@A New Preview - OCI **Database** with PostgreSQL LA		
Data Management	Document **Database**	- Autonomous JSON **Database** Free Tier		

Category	Service	OCI	Info	AWS
Data Management	Data Warehouse	- Autonomous Data Warehouse - MySQL Heatwave **database** - Autonomous **Database** Free Tier	Managed **database** service optimized for analytic workloads, including data marts, data warehouses, and data lakes.	- Amazon Redshift
Data Management	Document **Database**	- Autonomous JSON **Database** Free Tier	**Database** primary built to handle the JSON datatype.	- Amazon DocumentDB Elastic Clusters - Amazon
Data Management	Time Series **Database**	- Autonomous **Database** Free Tier	Managed **database** primarily built for time series data and related analytics.	- Amazon Timestream
Data Management	Hardware-Accelerated **Database**	- Exadata Cloud Service - Exadata Cloud@Customer	Managed **database** service that leverages dedicated, purpose-built hardware to accelerate **database** operations.	
				- Amazon DocumentDB

Cost Estimator

https://www.oracle.com/cloud/costestimator.html



What does a Landing Zone deploy?

Compartment structure

Security Posture

Cloud Guard, Bastions, Scanning

Logging

Audit and Networking

Network design

VCN, Subnet

Identity

Policies, Users, and Groups

Billing

Budgets

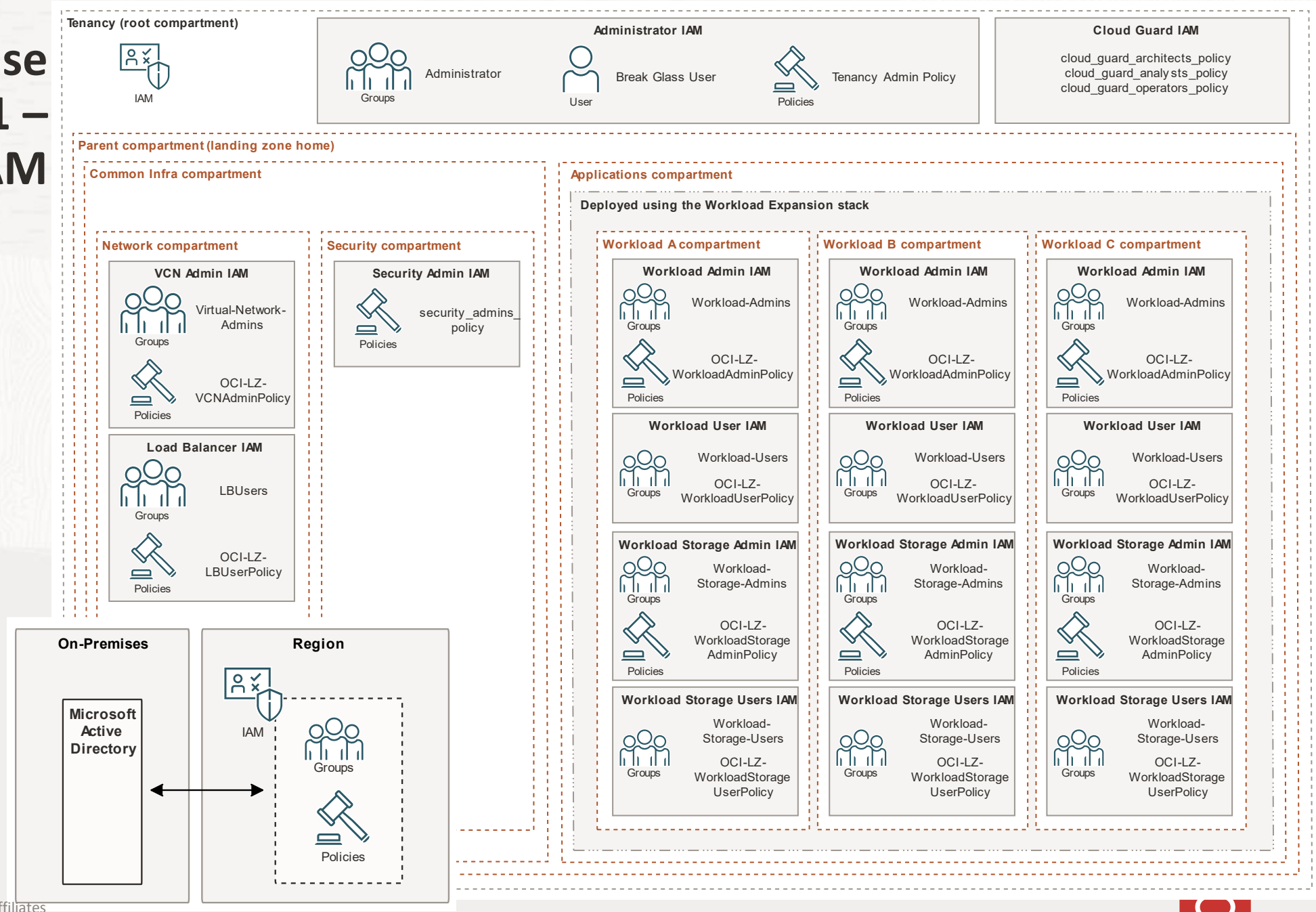
Oracle Enterprise Landing Zone v1 – IAM

2 Terraform Templates:

- Baseline LZ (Core Infrastructure Components)
- Workload Expansion

For Authentication:

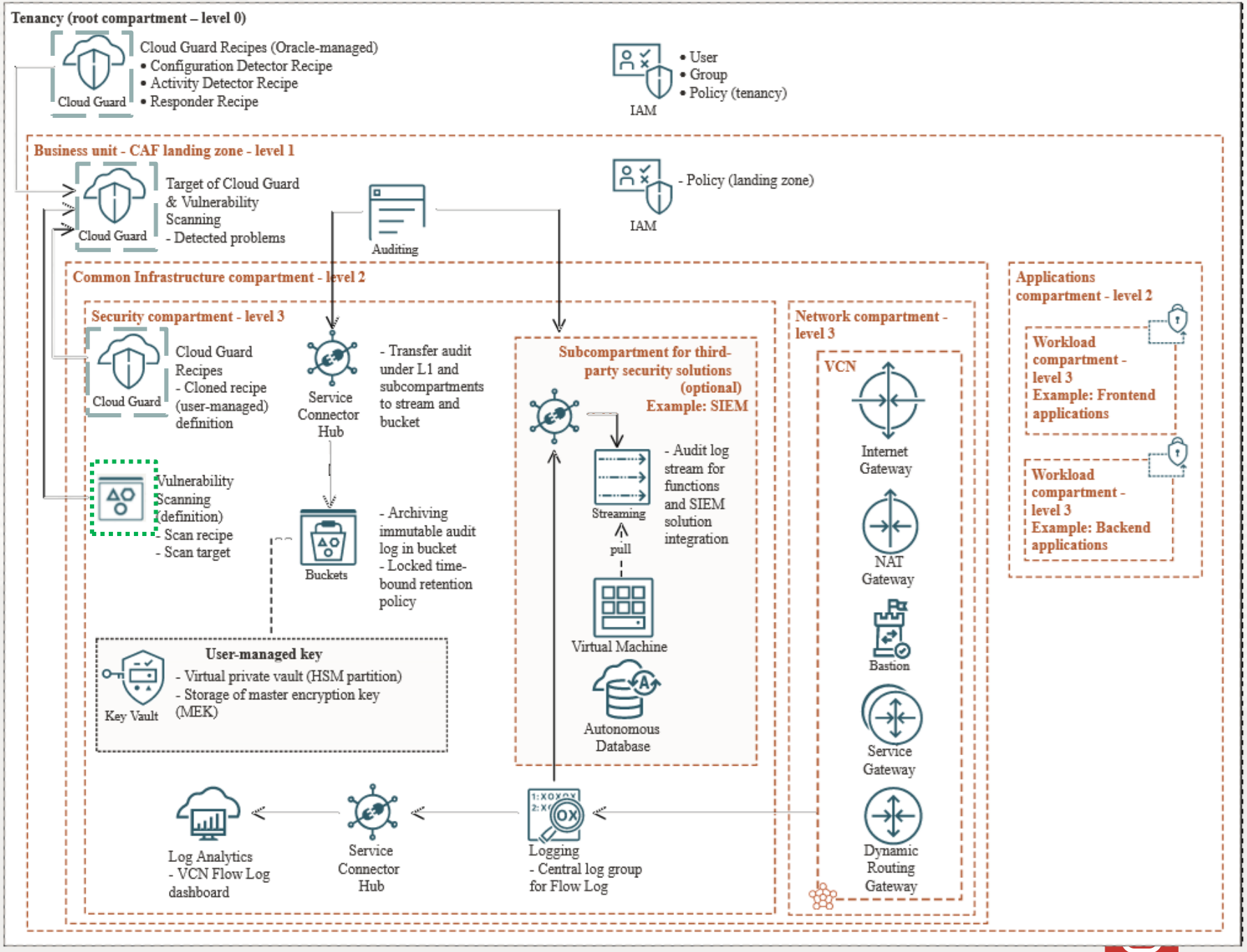
- IAM Groups and Policies
- Federated with MS Active Directory (Optional)
- Break-Glass Users (Recommended)



OELZ v1 – Security Posture

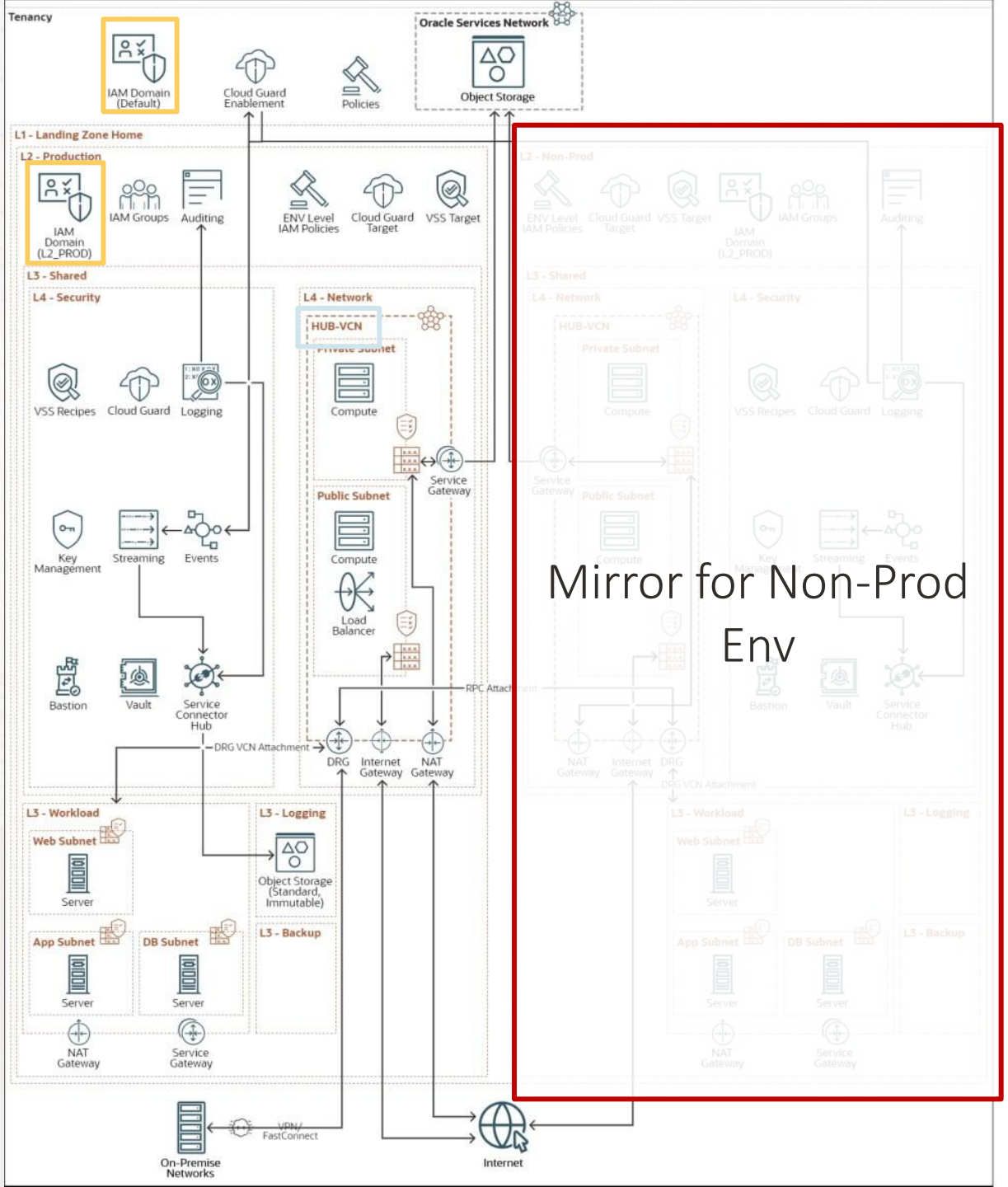
Take account of:

- Security Lists/Network Security Groups
- Routing Table for IGW, NAT GW and Service GW
- 2 subnets for Workloads: App & DB
- DRG: FastConnect or VPN
- Bastion Services to access to servers temporary.
- Centralized actions on Sec compartment: Cloud Guard, Audit, VCN Flow Logs, Archive with User-managed Key. Connector with Native and 3rd Party Services: Logs & SIEM.
- Cloud Guard.
- Vulnerability Scanning: Scan potentional vulnerabilities on agent & agent-less schemas: OVAL, NVD & CIS.

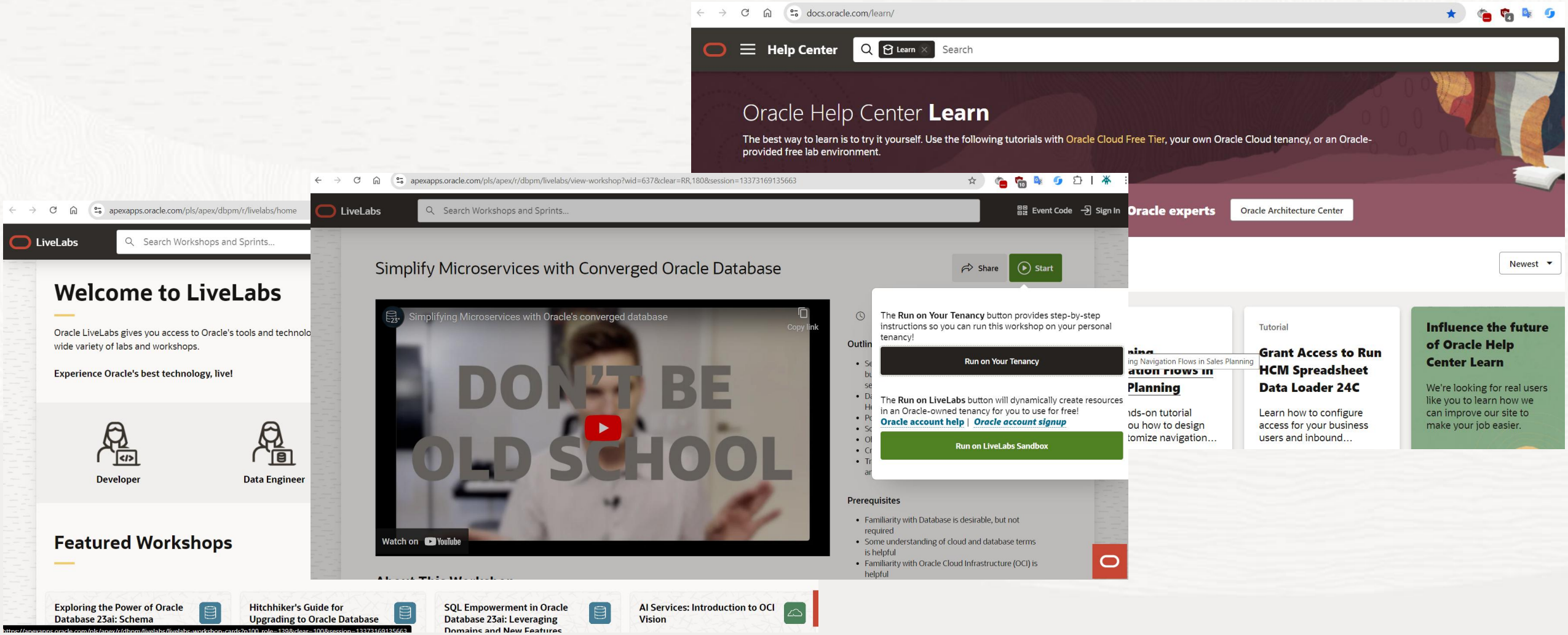


Oracle Enterprise Landing Zone v2

OELZ v2 Features and Services	Associated Service	Description
Multi-Environment	Compartments	Provides a new stack that offers compartment designs for Prod, Dev/Test/UAT. This allows customers to have isolated environments.
Hub & Spoke Networking	Networking	Allows users to segment their environment on a network layer by having one-to-many relationships between the hub and spoke networks.
Identity Domains	Identity, Compartments	Separates production and non-production environments on an Identity layer allowing customers to isolate different user personas.
CIS Benchmarks 1.2	Security	Is compliant with CIS Benchmark 1.2 Level 1.
Modular Design	All	Makes it easier to customize, deploy in modular chunks.



Self-Learning with Hands-On Labs

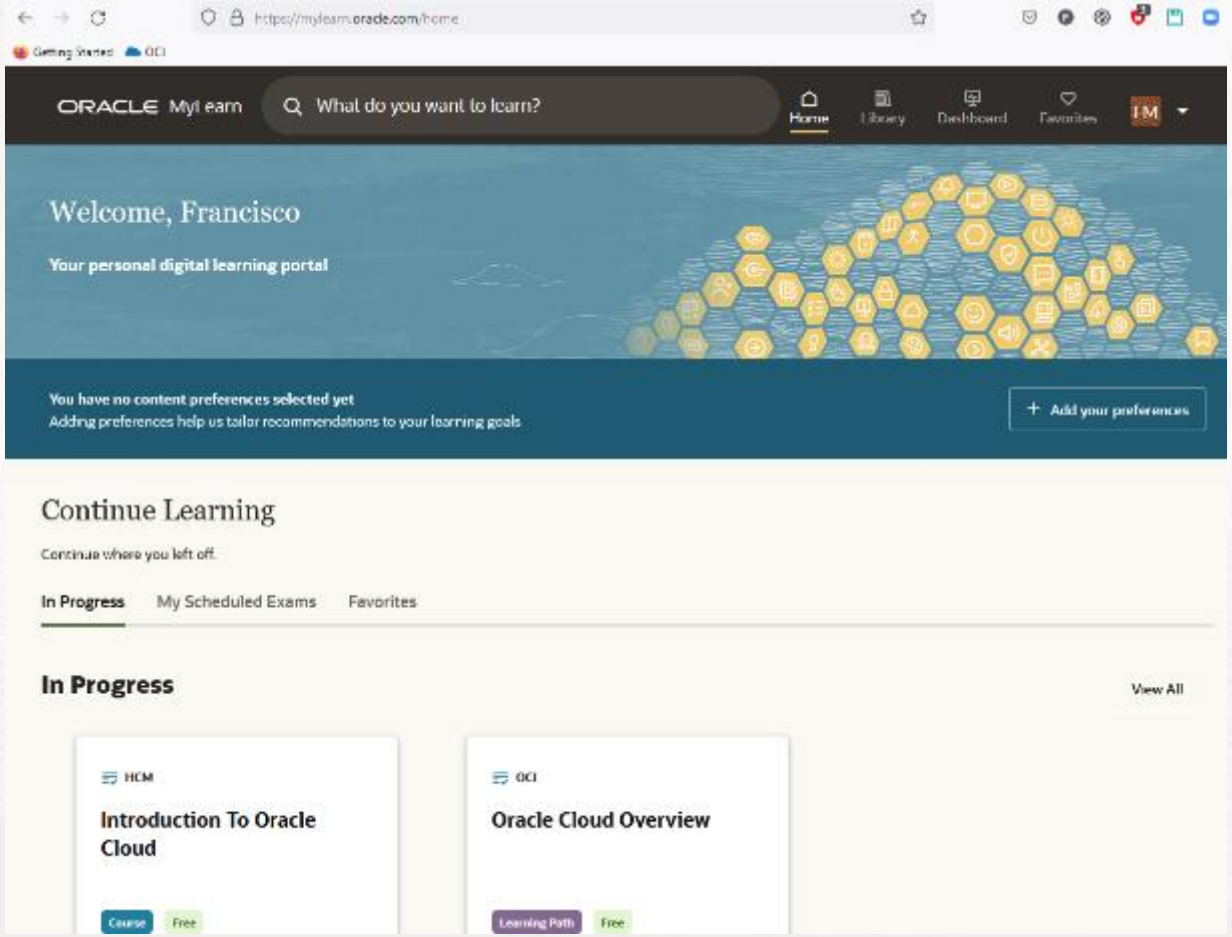


https://docs.oracle.com/learn/
https://apexapps.oracle.com/pls/apex/dbpm/r/livelabs/home

Self-paced courses

All courses are free*.
Pricing for Labs and Certifications are on the page*.

Those conditions depends on Oracle.



Resources

Learn more

Oracle Cloud Infrastructure
- OCI Overview
- OCI Compute
- OCI Compute Customer Showcase
- Oracle Cloud Economics
- OCI vs. AWS

E-Books and analyst reports
- OCI Powers Cloud-Connected Enterprises
- IDC: OCI delivers high business value
- IDC: Oracle Cloud Infrastructure for Heterogenous Workloads
- Omdia: Why all clouds are not the same
- 451 Research: Oracle is building a compelling proposition around enterprise cloud

OCI solutions and services
- GPU Compute
- High performance computing
- Ampere (Arm) Compute
- VMware on OCI
- Migrate Oracle Applications to OCI
- Migrate Custom Applications to OCI
- Migrate ISV Applications to OCI
- Oracle Cloud Native services

Technical resources
- Architecture Center
- Developer Tools
- Technical Whitepapers
- Technical Case Studies
- Oracle PartnerNetwork

Training resources
- Oracle University
- Certification Paths
- Oracle Learning Explorer
- Oracle Cloud Free Tier

OCI video series + virtual summits
- Oracle Live
- Built and Deployed on OCI video series
- Oracle Cloud Infrastructure Events
- Oracle Live Labs

Ready to get started?

Explore OCI Compute

Learn more about OCI's compute offerings, customers, and analyst reviews

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Get resources for technical support, get connected with a sales representative, and more

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Quick Start on Oracle Cloud

Oracle Cloud Infrastructure Blog

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Product News

Introducing Quickstarts for the Oracle Cloud Console

July 9, 2021 | 4 minute read

Sam Fisher
Senior Product Manager

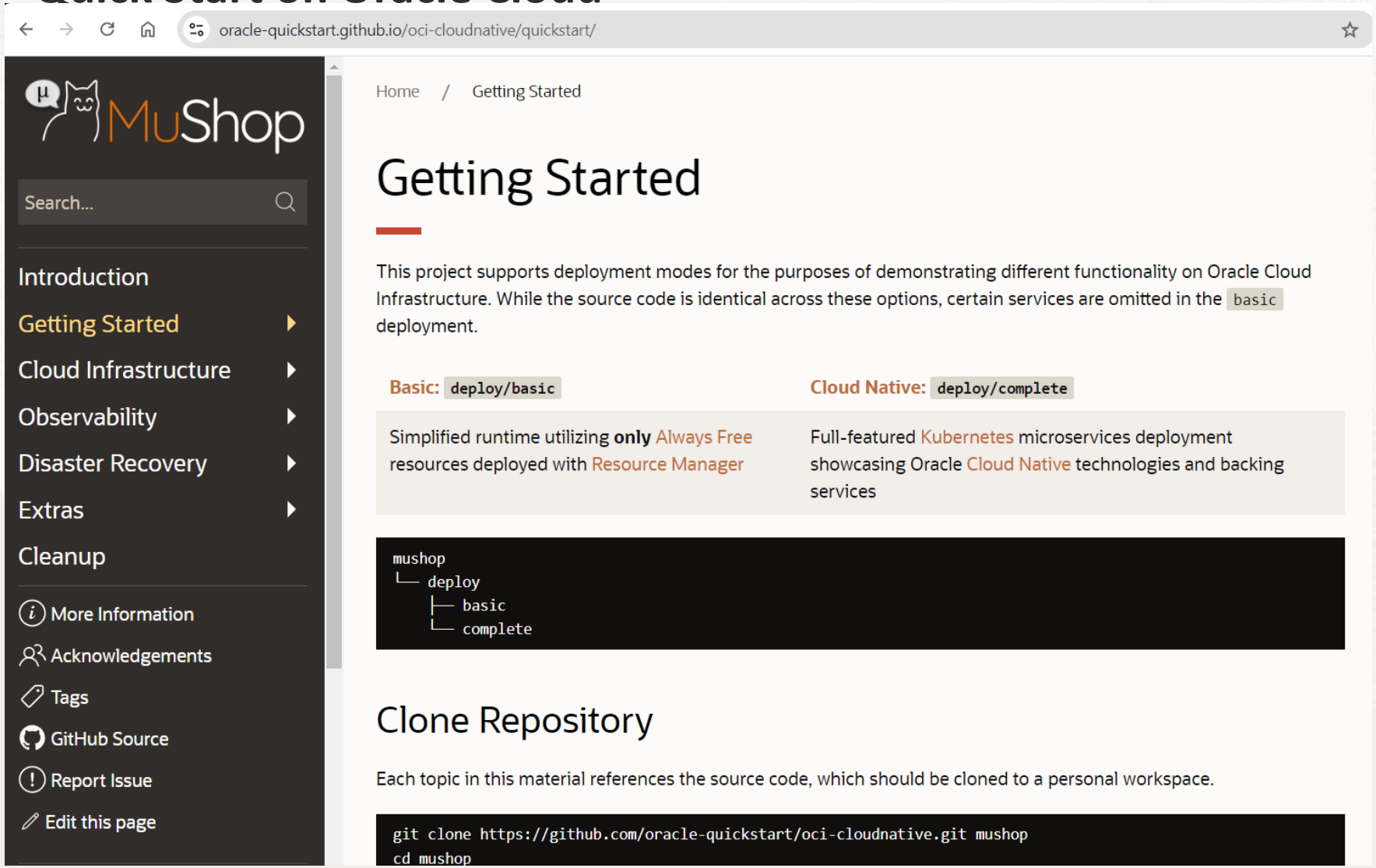
We're excited to announce the launch of Oracle Cloud Infrastructure (OCI) Quickstarts. Quickstarts are complete solutions that you can launch quickly on your OCI account, including a free tier or trial account. They let you try different use cases and products without having to go through all the steps for deploying and configuring individual resources yourself.

Today, we've launched with five Quickstarts, and soon we're adding more across different use cases to let you try out various features of OCI. The following Quickstarts are available today:

- Deploy a WordPress website
- Deploy a low-code app on Autonomous Database using APEX
- Deploy a cloud native app
- Deploy a Jenkins CI/CD pipeline
- Deploy a .NET application on Windows

Quick Start on Oracle Cloud

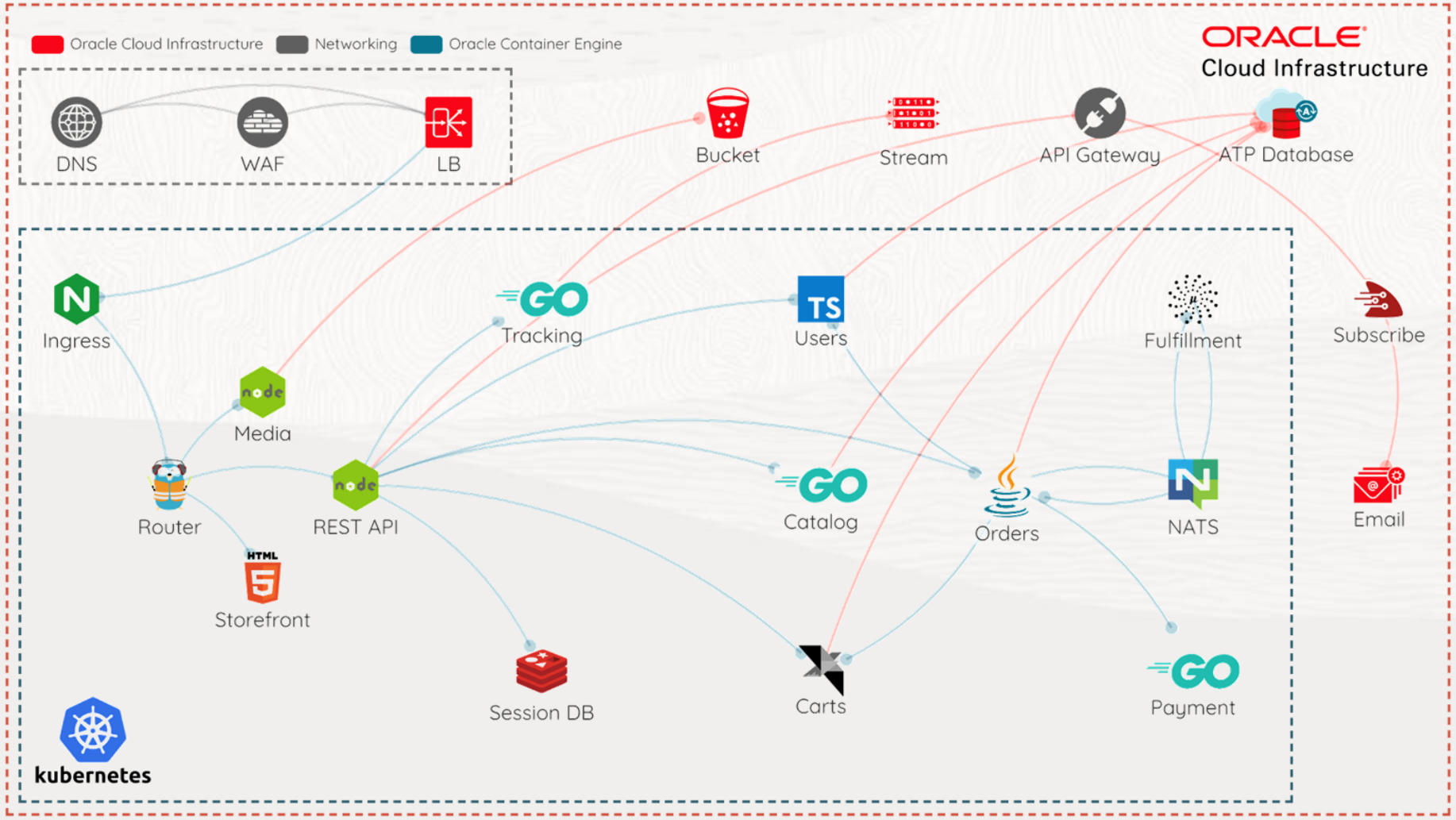
https://oracle-quickstart.github.io/oci-cloudnative/quickstart/basic/



Simple Demo with Kubernetes using RM

MuShop

https://github.com/oracle-quickstart/oci-cloudnative/



Why customers are choosing OCI

“One cloud is rarely the answer”

OCI’s distributed cloud provides the flexibility to consume cloud services across a choice of clouds and locations

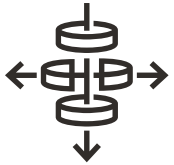
“It’s too hard to migrate most of our apps”

OCI’s architecture gives enterprise apps the security, performance, and scale without costly re-architectures

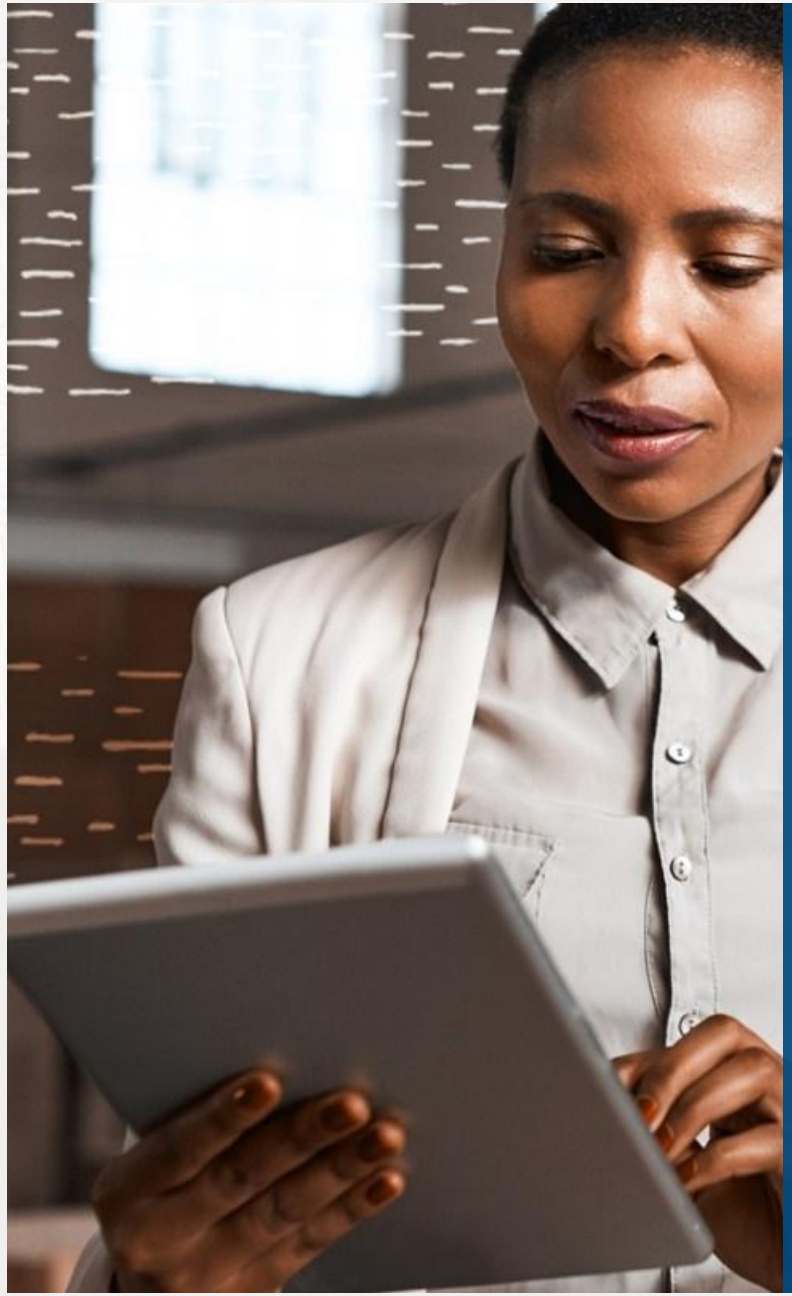
“We’ve made significant investments in specific technologies, and don’t want to change.”

Services to easily run third-party, open-source, or cloud native applications

“We want to use our data more effectively”



Build or improve any data management strategy, with unique capabilities to converge data



Thank you.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