TECHX

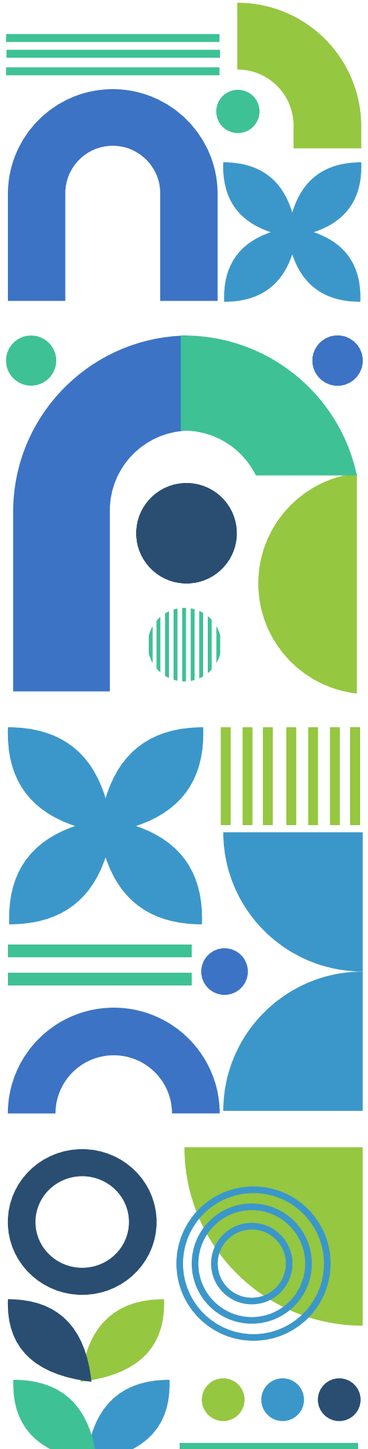
Asia's Largest

AI & Cloud

Conference 2024

15 - 16, November 2024

Chennai Trade Center, Chennai



Automate Kubernetes Disaster Recovery on Oracle Cloud Infrastructure (OCI)

Using OCI Full Stack Disaster Recovery Service

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- Product Manager for OCI Full Stack Disaster Recovery Service
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Outside of work

Safe harbor statement

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Agenda

Introduction to Oracle Cloud Infrastructure (OCI)

Introduction to OCI Kubernetes Engine (OKE)

Introduction to OCI Full Stack Disaster Recovery (DR)

Disaster Recovery for OKE Workloads

Disaster Recovery Deployment Architecture

Demo

Q&A

Why Oracle Cloud Infrastructure (OCI)

We power your day...

- Back office on OCI
- Oracle Analytics Cloud
- Oracle Cloud ERP & SCM

- Kubernetes modernization & data warehouse on OCI

- Real-time analytics on OCI, increased simulations by 25%
- Oracle Cloud Advertising & CX

- OCI AI infrastructure powers Microsoft Bing

- Core app on OCI
- Co-innovation with Oracle Cloud retail

Spotify

Microsoft

zoom

Marriott INTERNATIONAL

Walmart

CHIPOTLE MEXICAN GRILL

GOLDEN STATE WARRIORS

AT&T

Deutsche Bank

- Real-time analytics on OCI, increased simulations by 25%
- Oracle Cloud Advertising & CX

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

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

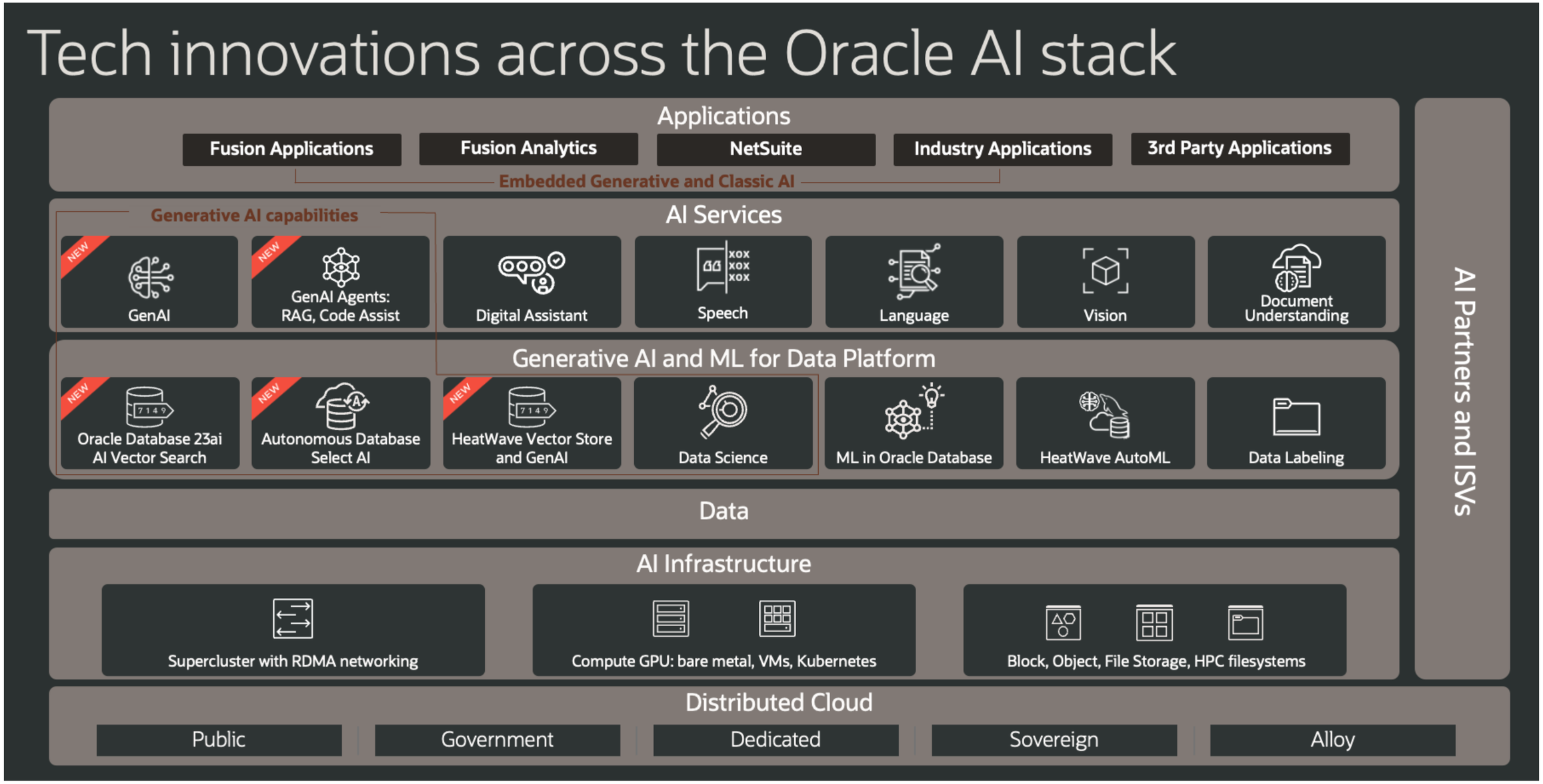
Generative AI innovation at Oracle

Address enterprise generative AI requirements

Embed generative AI across every layer of the tech stack

Prioritize data management, security and governance

Tech innovations across the Oracle AI stack



Oracle's open source leadership and contributions

Open source enables innovation, security, and flexibility for our customers

Leading

- $3M for 3years in ARM credits to CNCF
- 900+ projects
- Linux Kernel #1 contributor with 91K+ lines of code
- Leads development of globally strategic technologies
- Contributions from bug fixes to entire solutions

Contributing to

- Packaged and deployable anywhere
- Certified & secure
- Open-source solutions as OCI services
- Any Open-source run on OCI

Participating in

- Board member
- Sponsor
- Community Advocacy

https://developer.oracle.com/open-source.html
https://opensource.oracle.com/

Oracle’s distributed cloud offers exceptional flexibility and choice

Multicloud

We work with other providers:

Oracle Database@Azure

Oracle Database@Google Cloud

Oracle Database@AWS*

Oracle Interconnect for Azure
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

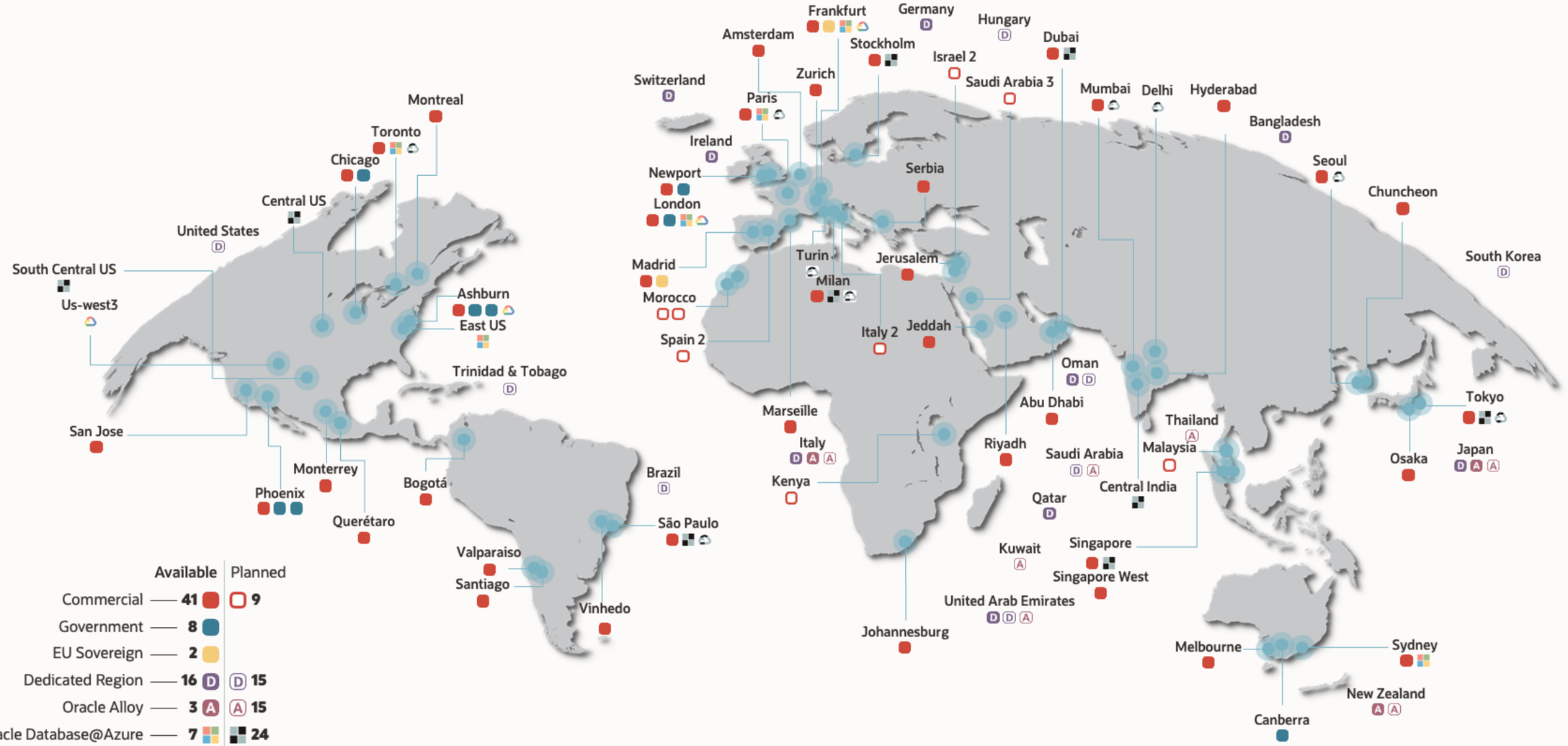
All 100+ OCI services running in customer data centers:

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

Oracle Cloud Infrastructure global footprint

October 2024 – 165 live or planned regions[1]

100% renewable energy by 2025



	Available	Planned
Commercial	41	9
Government	8	
EU Sovereign	2	
Dedicated Region	16	15
Oracle Alloy	3	15
Oracle Database@Azure	7	24
Oracle Database@Google Cloud	4	14

[1] Not all regions listed on map

Oracle is a Leader in 15 Gartner® Magic Quadrant™ reports

October 2024
Gartner Magic Quadrant for Strategic Cloud Platform Services

October 2024
Gartner Magic Quadrant for Distributed Hybrid Infrastructure

November 2023
Gartner Magic Quadrant for CRM Customer Engagement Center

February 2024
Gartner Magic Quadrant for Integration Platform as a Service

November 2023
Gartner Magic Quadrant for Financial Close and Consolidation Solutions

December 2023
Gartner Magic Quadrant for Cloud Database Management Systems

October 2023
Gartner Magic Quadrant for Cloud ERP for Product-Centric Enterprises

December 2023
Gartner Magic Quadrant for Data Integration Tools

October 2023
Gartner Magic Quadrant for Cloud HCM Suites for 1,000+ Employee Enterprises

March 2024
Gartner Magic Quadrant for Transportation Management Systems

September 2023
Gartner Magic Quadrant for Sales Force Automation Platforms

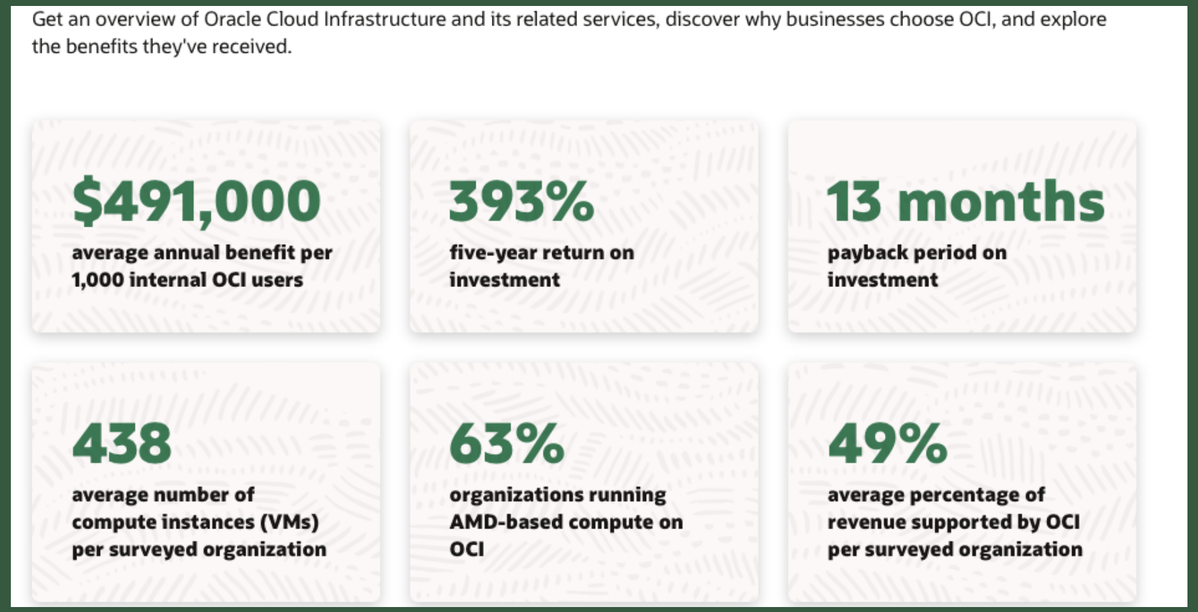
December 2023
Gartner Magic Quadrant for Financial Planning Software

September 2023
Gartner Magic Quadrant for B2B Marketing Automation Platforms

December 2023
Gartner Magic Quadrant for Configure, Price and Quote Applications

August 2023
Gartner Magic Quadrant for Cloud ERP for Service-Centric Enterprises

Oracle Cloud
The Business Value of Oracle Cloud Infrastructure (OCI) by IDC (International Data Corporation)



https://www.oracle.com/cloud/idc-business-value-of-oci/

Oracle Cloud Free Tier

Sign up for a free tier account now!!!

Oracle Cloud Free Tier allows you to sign up for an Oracle Cloud account which provides a number of Always Free services and a Free Trial with US$300 of free credit to use on all eligible Oracle Cloud Infrastructure services for up to 30 days. The Always Free services are available for an unlimited period of time. The Free Trial services may be used until your US$300 of free credits are consumed or the 30 days has expired, whichever comes first.

What are Always Free Services?

Always Free services are part of Oracle Cloud Free Tier. Always Free services are available for an unlimited time. Some limitations apply. As new Always Free services become available, you will automatically be able to use those as well.

The following services are available as Always Free:

- HeatWave
- AMD-based Compute
- Arm-based Ampere A1 Compute
- Block Volume
- Object Storage
- Archive Storage
- Flexible Load Balancer
- Flexible Network Load Balancer
- Site-to-Site VPN
- Autonomous Data Warehouse
- Resource Manager (Terraform)
- Monitoring
- Notifications
- Logging
- Application Performance Monitoring
- Service Connector Hub
- Vault
- Bastions
- Security Advisor
- Virtual Cloud Networks

Oracle LiveLabs

Oracle LiveLabs (livelabs.oracle.com)

Showcasing how Oracle's solutions solve your business problems — available 24/7 for free!

1000+

events run using LiveLabs workshops

700+

free workshops, available or in development

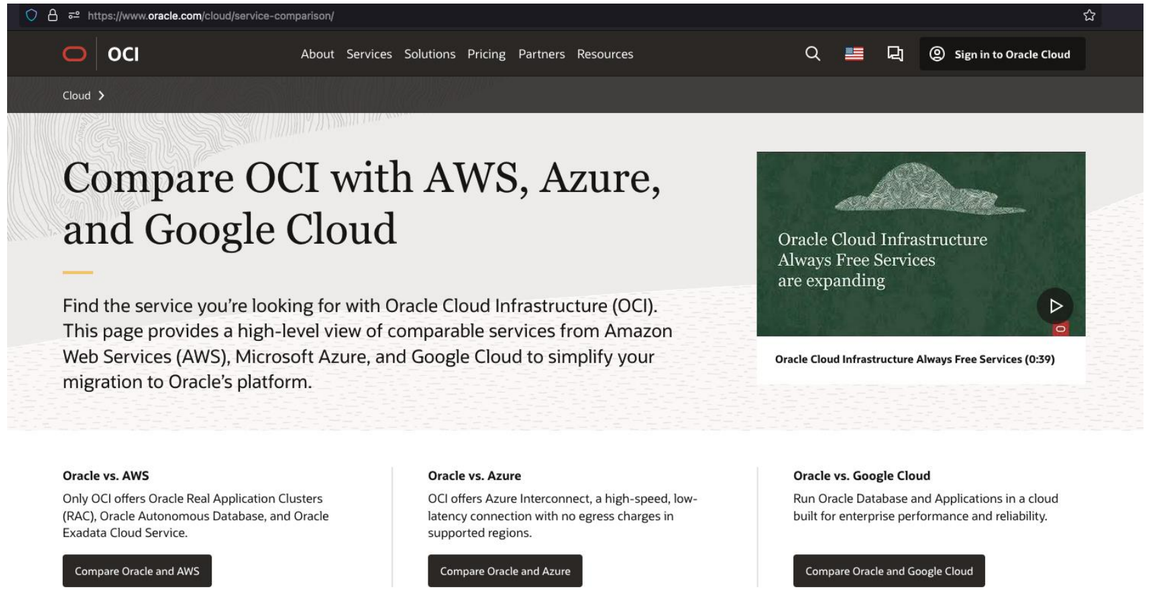
10 million

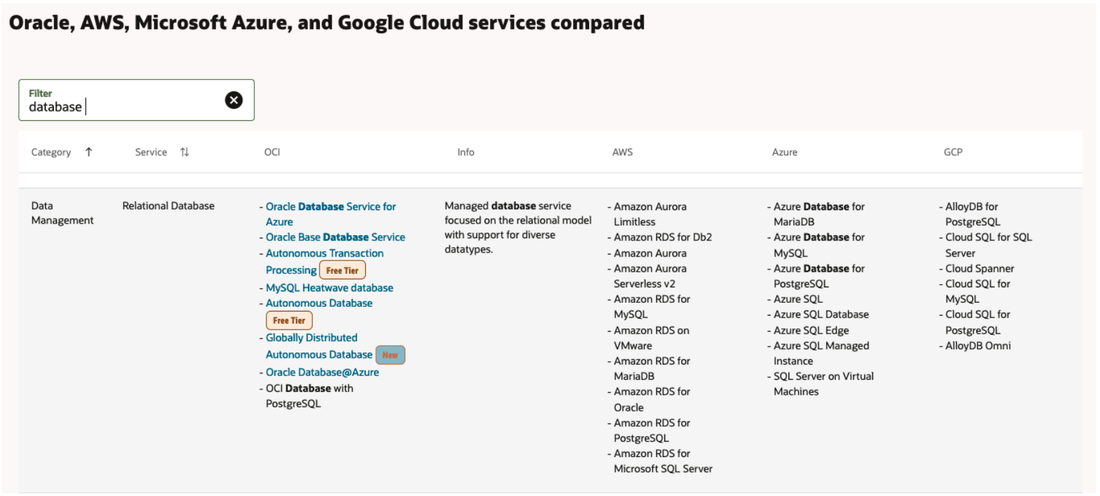
people have already visited LiveLabs

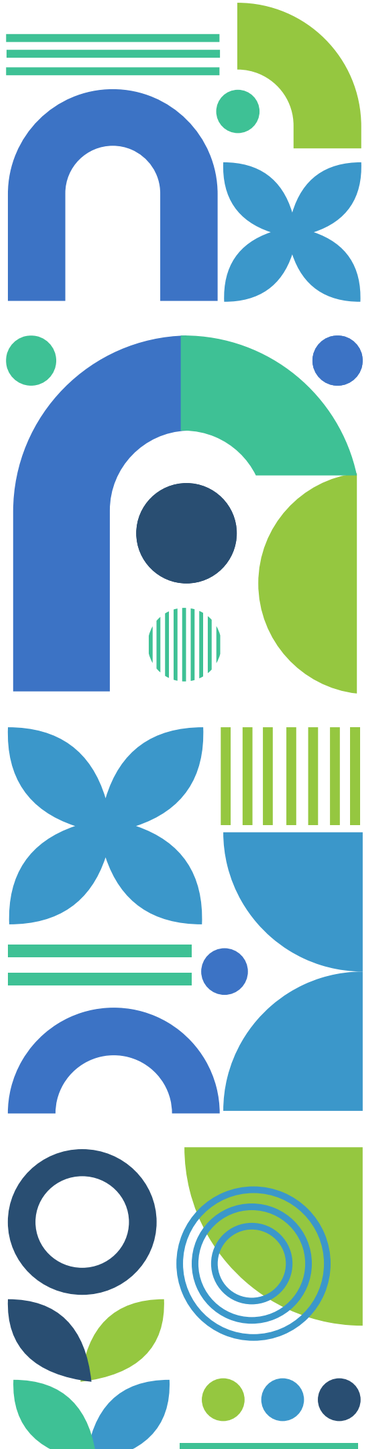
OCI Training and Certifications

Cloud Comparison

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







Kubernetes on OCI:

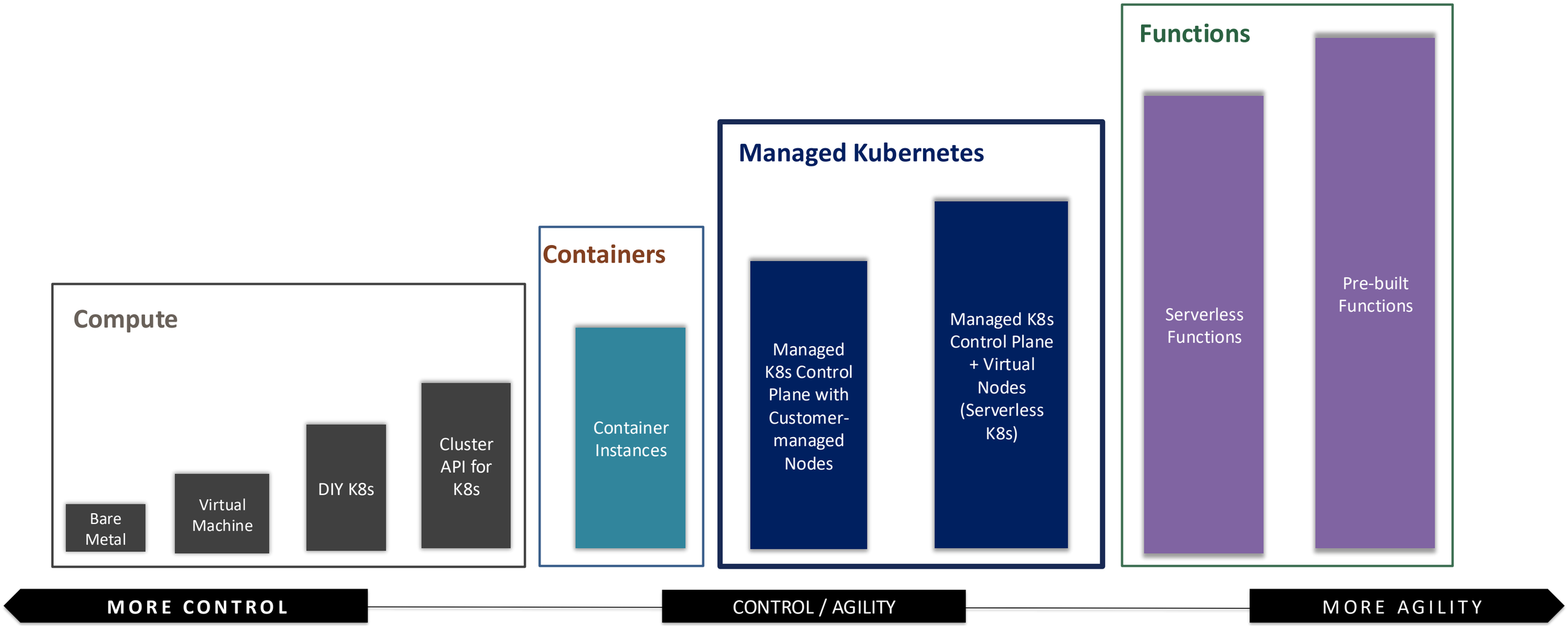
OCI Kubernetes Engine (OKE)

How popular are containerized applications?

"**By 2029, more than 95%** of global organizations will be running containerized applications in production, which is a **significant increase** from less than 50% in 2023."

Gartner®, A CTO's Guide to Containers and Kubernetes: Top 10 FAQs, Arun Chandrasekaran, Wataru Katsurashima, 22 January 2024

Container Strategy: Flex Runtimes



Managed Kubernetes on OCI: OCI Kubernetes Engine (OKE)

OKE simplifies enterprise-grade Kubernetes at scale:

- Eliminate operational burden by offloading management complexities to the service
- Ensure optimal operations with less risk
- Improve agility and flexibility
- Enhance security
- Lower cloud costs for Kubernetes at scale

- ✓ **Lower TCO:** Reduce the time, cost & effort needed
- ✓ **Accelerate adoption** of Kubernetes in the org
- ✓ **Improve developer productivity** and TTM

OKE Key Features

Built-in Management

- Fully managed control plane
- Highly-managed data plane components
- Automatic scaling

Reliability

- Highly available by default
- Node Doctor for easy troubleshooting

Price Performance

- Rightsized compute through Flex shapes and Flexible Load Balancers
- Predictable and consistent performance
- Enterprise support included

Open Standards

- Certified Kubernetes conformant
- Open Container Initiative compliant
- No vendor lock-in

Advanced Security

- Private clusters and registry
- Encryption by default
- Container Image Scanning & Signing
- Conformance with Kubernetes STIG, NSA, DoD, CISA
- Regulatory Compliance (FedRAMP, HIPAA, SOC, etc.)

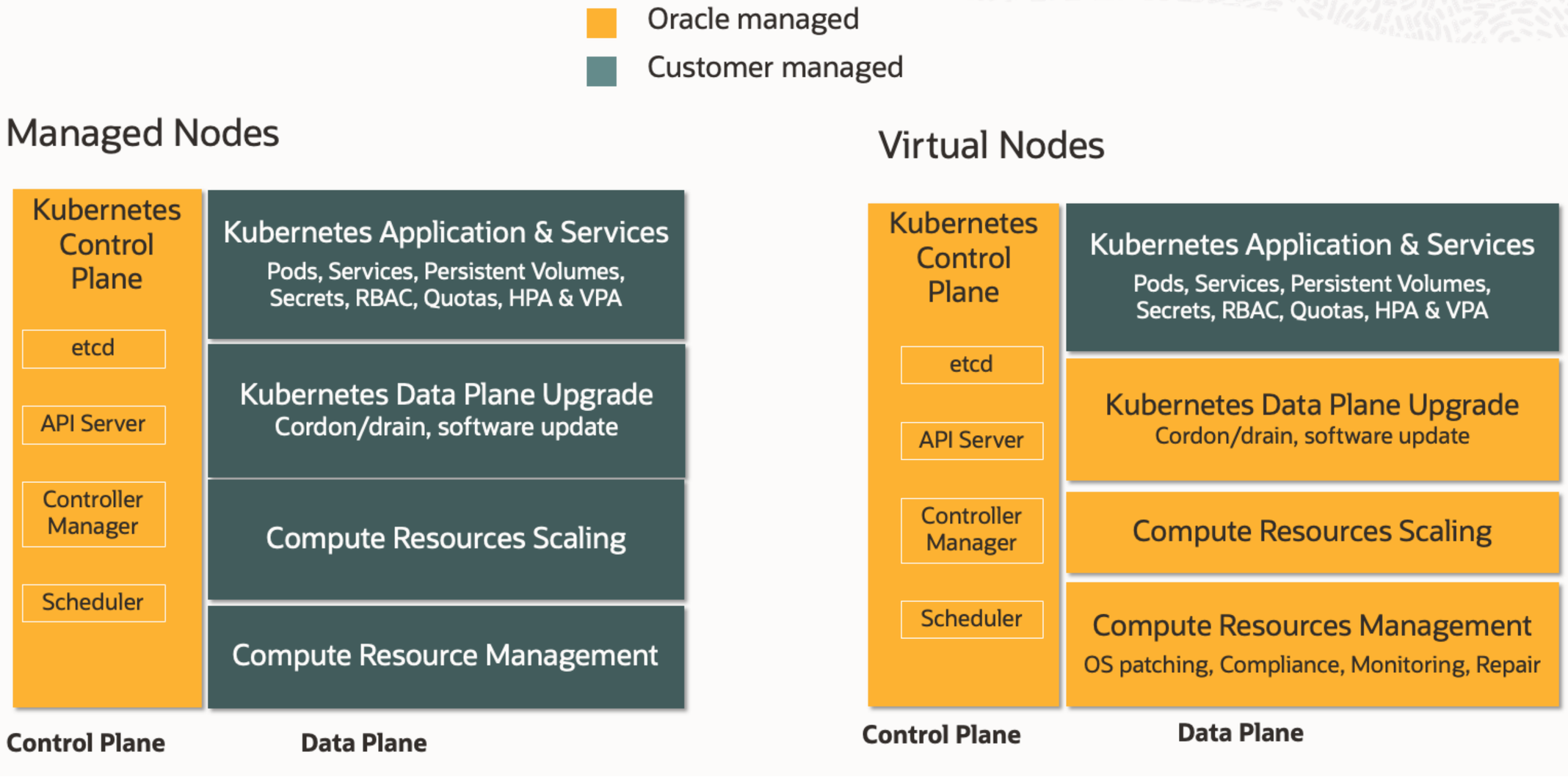
Deployment Flexibility

- Choose from Managed or Virtual Nodes (for a complete serverless experience)
- DevOps integration for deployment
- Rich compute shape support: HPC, GPU, ARM, Flex, Bare Metal, and VM
- Available in all commercial regions and OCI Dedicated Region

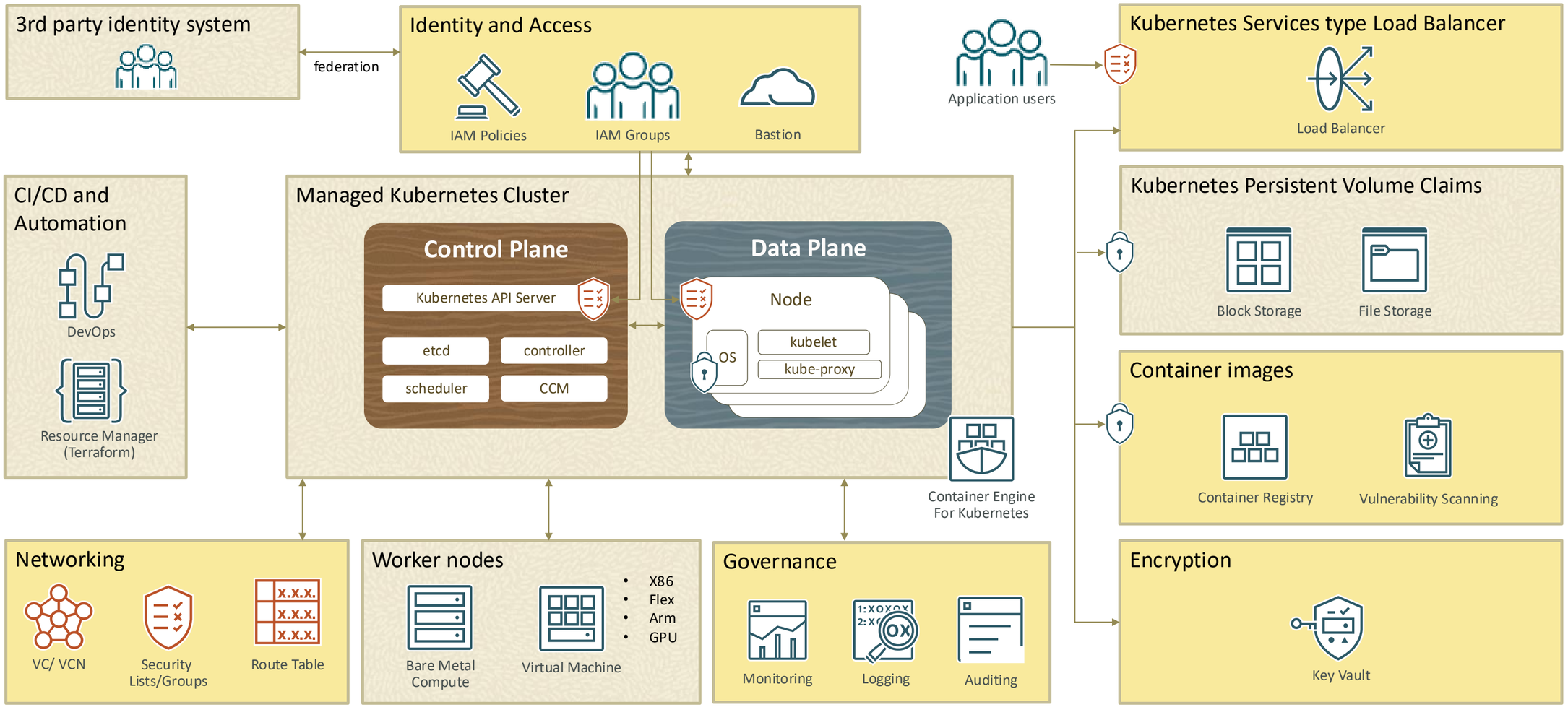
Extensibility

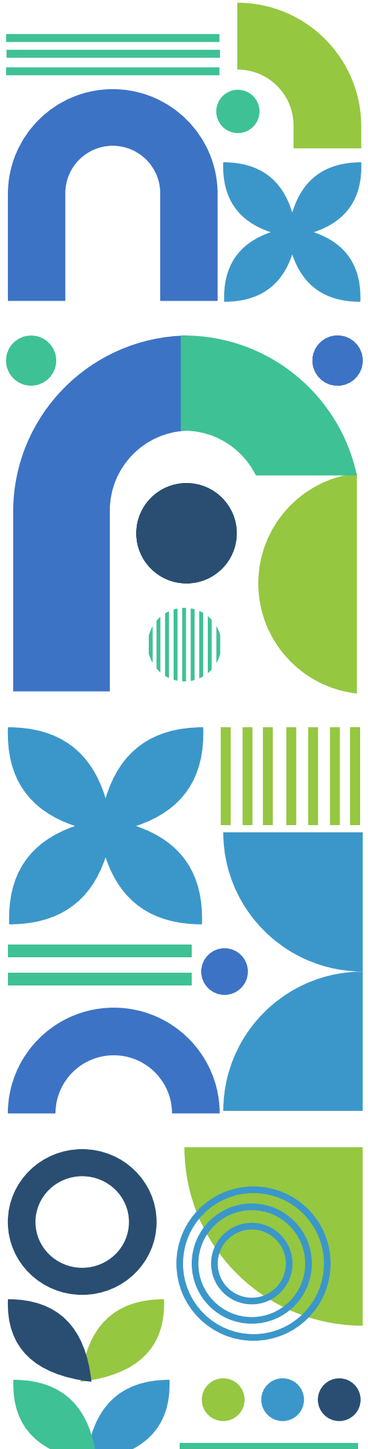
- Operators for OCI services and Oracle DB
- Leverage any Kubernetes software
- Seamless integration with OCI services

OKE Managed Nodes and Virtual Nodes



OKE integration with other OCI services





OCI Full Stack Disaster Recovery

Why Disaster Recovery?

Disaster recovery can no longer remain an afterthought, or something considered only when there's enough budget because today's organizations are expected to respond promptly to disruptive events and stay operational.

Cost of planned or unplanned downtime.
Revenue, productivity and lost loyalty

53%
Lost Revenue

47%
Lost Productivity

41%
Lost Brand Equity/Trust

Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, August 2019. "Which of the following costs does your organization face due to planned and unplanned downtime?"

Business Requirements

Tolerance for **Data Loss**

Recovery Point Objective
Maximum acceptable amount of data lost after a planned or unplanned data-loss event

Tolerance for **Downtime**.

Recovery Time Objective
The overall length of time to recover workloads before negatively impacting the organization's critical business processes.

Weeks	Days	Hours	Minutes	Seconds	Zero/Near Zero	Seconds	Minutes	Hours	Days	Weeks

DR Event

1.1x	1.25x	1.5x	1.5x-2x	2x-3x	3x-4x	2x-3x	1.5x-2x	1.5x	1.25x	1.1x

Relative Cost of DR Solutions
Costs exponentially increase as RPO and RTO reach zero data loss and zero downtime

$

Affordability

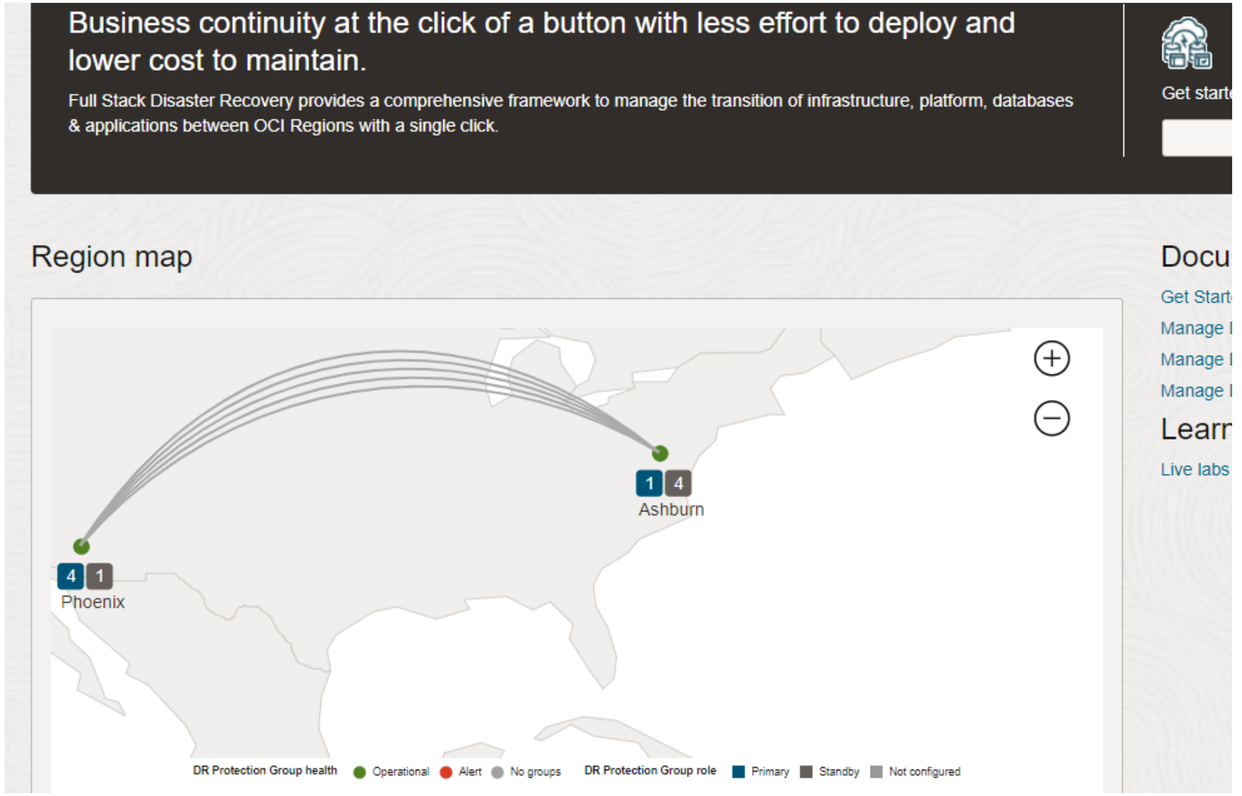
OCI Full Stack DR Service

Full Stack DR supports recovery between two availability domains or OCI regions

Organize application stacks for many different lines of business into protection groups – each line of business can manage recovery independently or together with other lines of business

Fully automated recovery for existing business systems that are already deployed for disaster recovery without having to redesign or redeploy anything

Validate recovery for an entire application stack with a single button push without impacting production workloads



Full Stack DR orchestrates recovery with a single click

Tie DR capabilities from disparate services & apps into a single workflow

Single Pane of glass

Full Stack DR normalizes the way DR operations are executed and monitored for vastly different business systems using a single pane of glass

DR at Scale

Operators can recover many critical business systems at the same time without knowing anything about the steps needed to recover

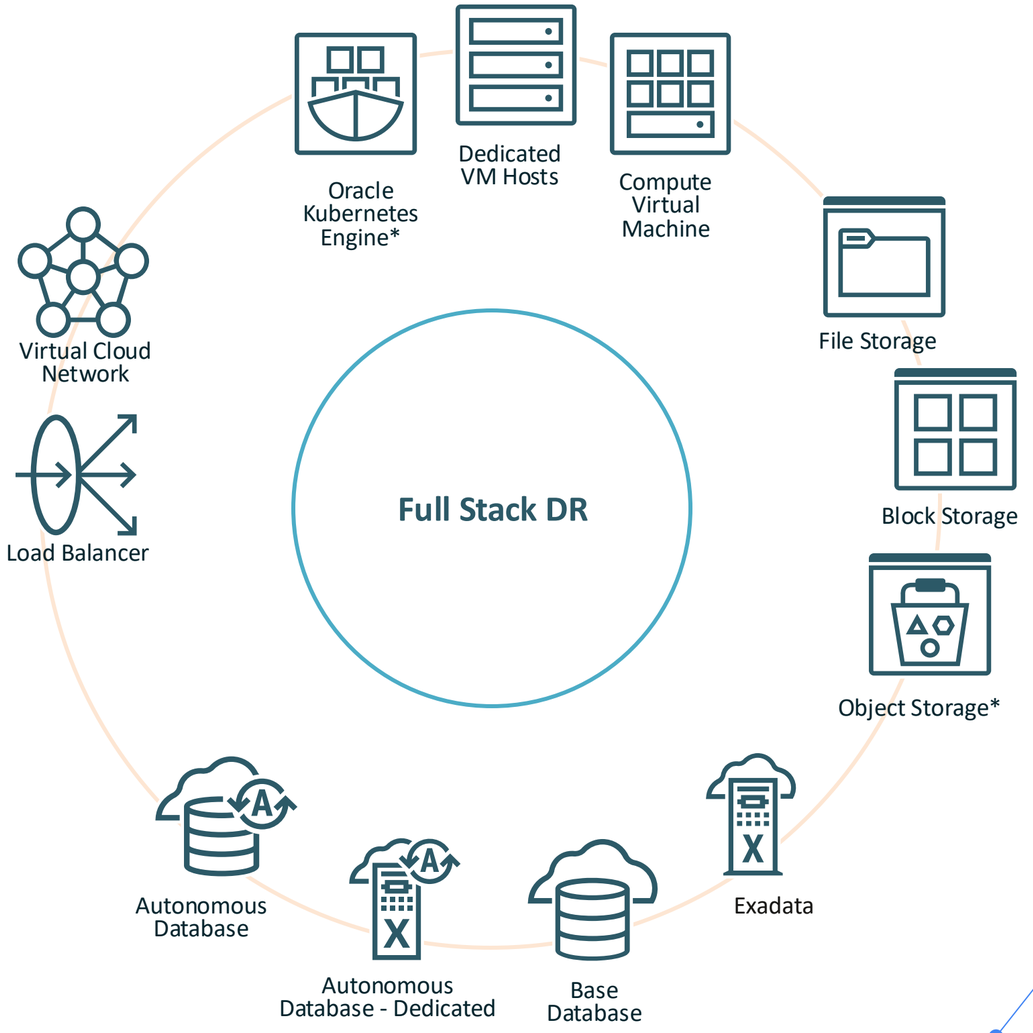
Validate DR before it's needed

Fully automated non-intrusive, non-disruptive DR drills using a single button are built into the service

Use any DR topology

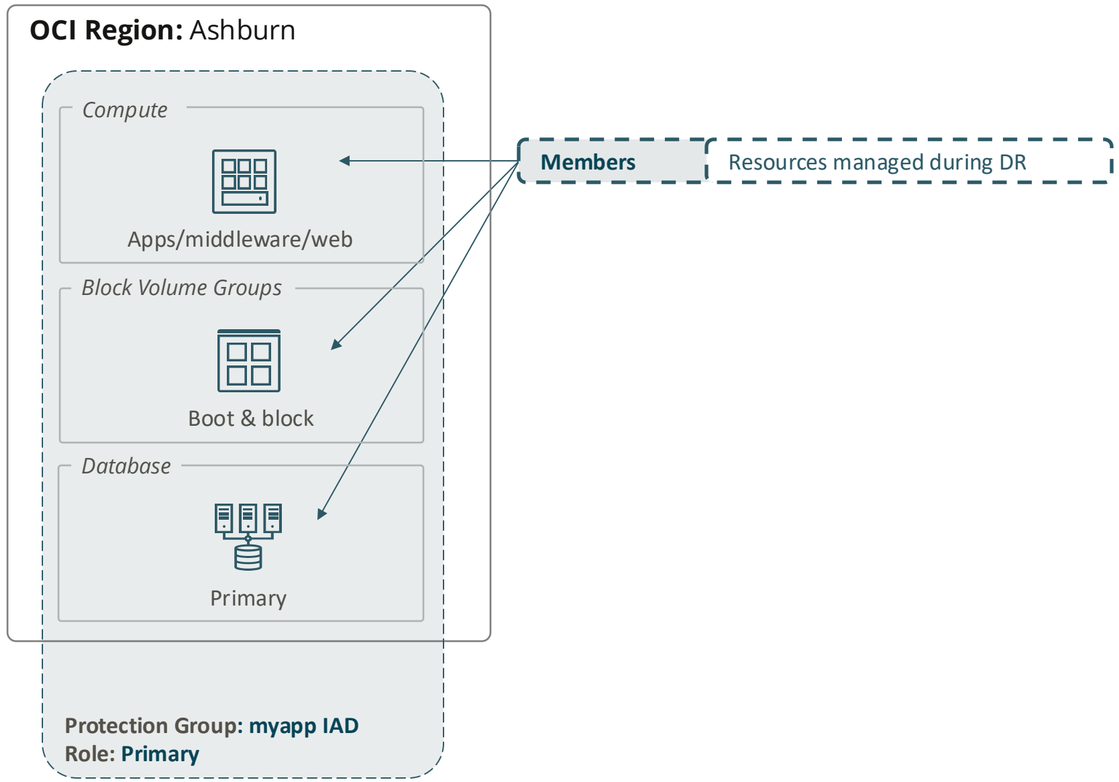
Full Stack DR does not limit or make you conform to a certain way of deploying or recovering your business system

***Coming soon**



Full Stack DR – Core Concepts

DR Protection Groups: OCI resources that define an application are organized into a group to ensure they are recovered together.



Members: OCI resources that can be added to the DR protection groups. Supported OCI resources are

1. Oracle Database – Base Database Service,Exadata Database Service on Dedicated Infrastructure, Autonomous Database Serverless
2. Compute – Virtual Machine, Dedicated Virtual Machine Host
3. Storage – Volume Group (Boot and Block), File Storage Service (FSS), Object Storage Service (OSS)
4. Load Balancer
5. OKE Cluster (Coming up soon)

Full Stack DR – Core Concepts

DR Plan Types: DR runbooks or workflows are managed using four different plan types.

Plan Type	Action
Failover	Recover at standby
Switchover	Shutdown at primary, then transition to standby
Start DR drill	Perform a complete dry run of a failover for validation
Stop DR drill	Tear down workload at standby

Full Stack DR – Core Concepts

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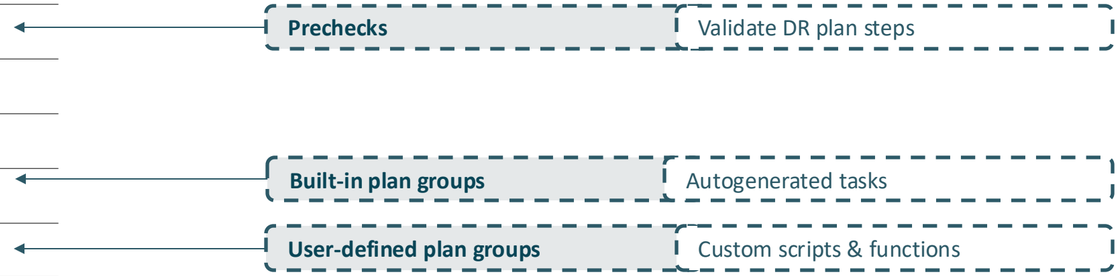
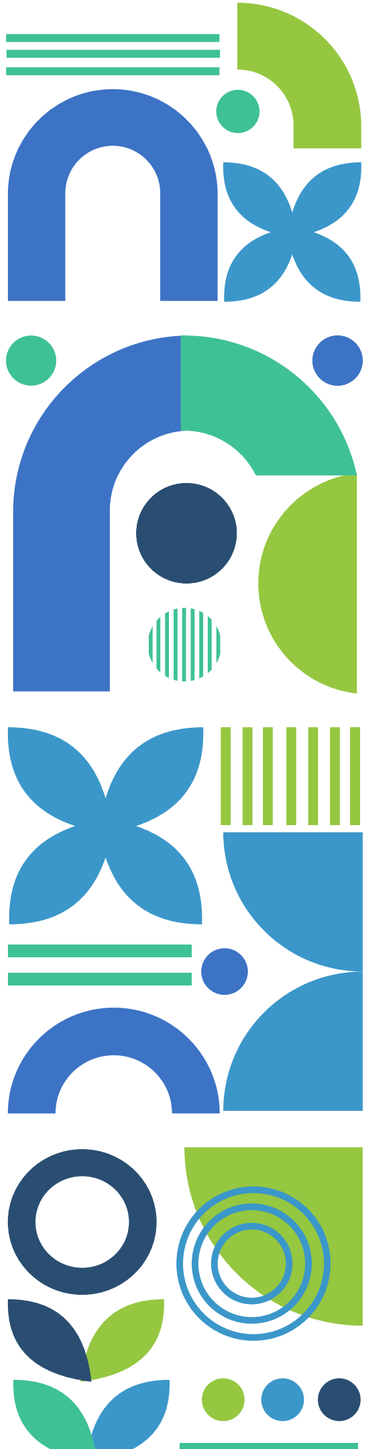
DR Plans: Recovery steps to be executed by Full Stack DR on a protection group.

Name	Type	Enabled/Disabled
prechecks	Built-in precheck	Enabled
stop compute	Built-in	Enabled
launch compute	Built-in	Enabled
switchover database	Built-in	Enabled
launch application	User-Defined	Enabled





Disaster Recovery for OKE Workloads

OKE Disaster Recovery - Challenges

- Today, customers rely on third-party like Velero, Kasten or home-grown solutions to secure their OKE workloads
  - They must handle the lifecycle of these products, including provisioning, patching, and upgrading
  - Licensing is handled separately and cannot use OCI universal credits
- There is currently no OCI native solution available to manage DR for OKE workloads
- These solutions are not holistic and do not offer seamless integration with other OCI services
  - OCI Storage, Oracle Database Services
  - These solutions do not utilize OCI’s native storage replication features
  - It increases egress costs

Full Stack DR – OKE DR: Features

- Periodic backup of all Kubernetes resources including custom resources
- Periodic Replication of OCIR Images
- Scale up and scale down Nodepools

  Lowers the customer's DR costs

  Scales up before deploying the workload
- Support for DR of persistent volumes

  Utilizes replication provided by OCI native storage services, including Block and File System

  No network egress and CPU overhead due to the use of OCI's native replication
- Integration with other OCI services

  Load balancer (Native Ingress Controller)

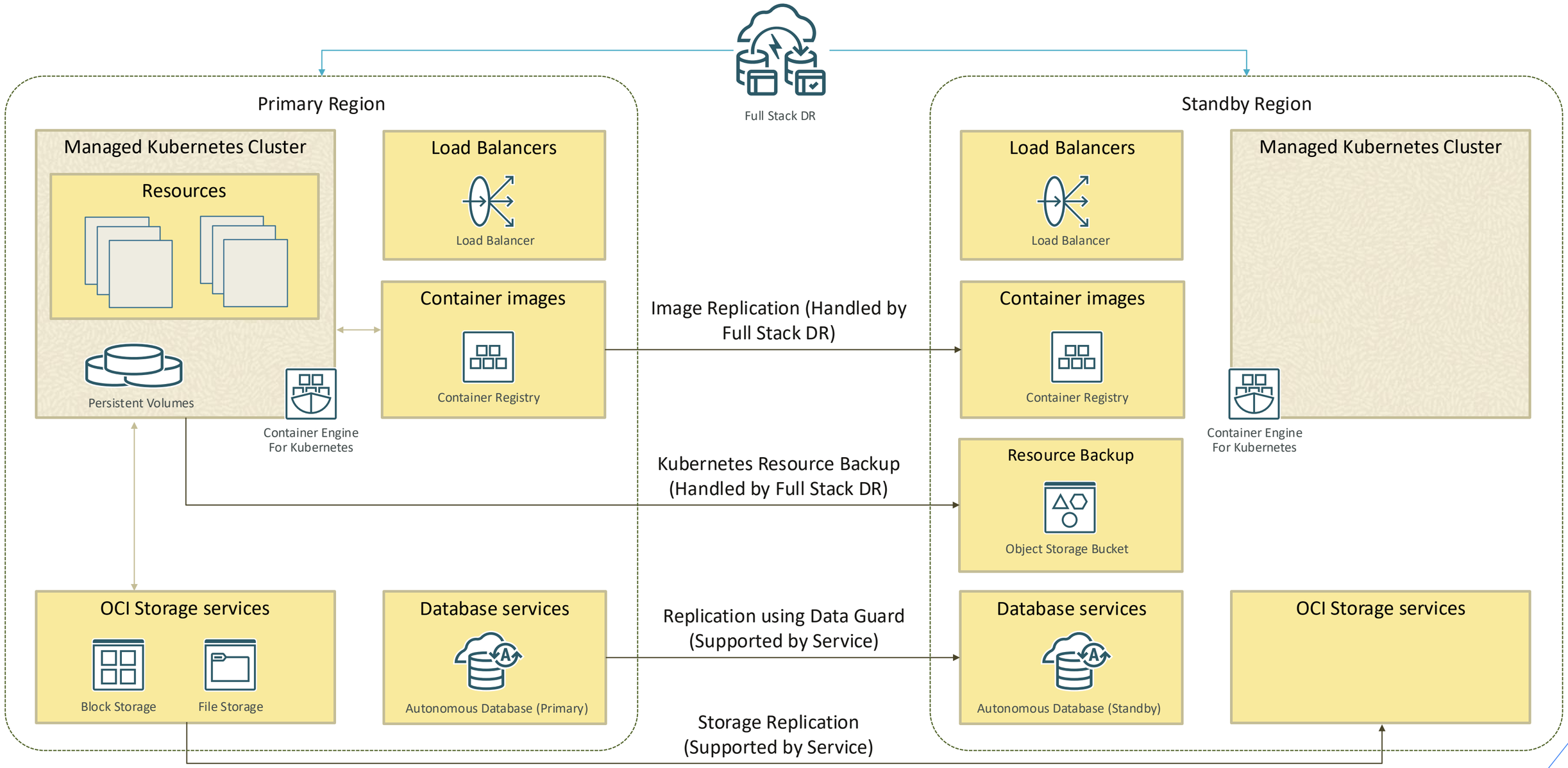
  OCI Vault

Full Stack DR – OKE DR: Features (Continued)

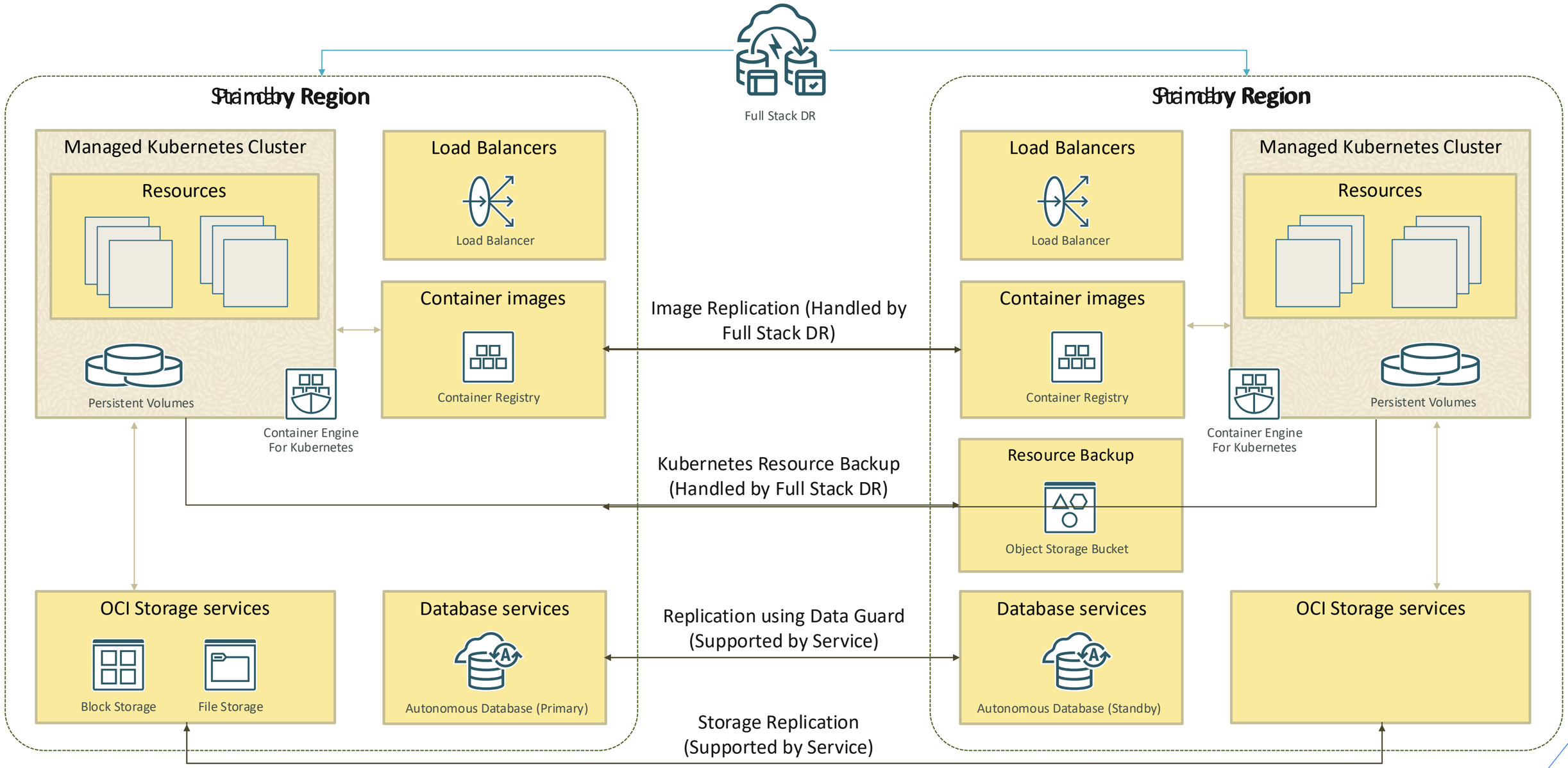
- Supports all types of OKE clusters
  - Cluster types - Basic and Enhanced cluster
  - Nodepools - Managed and Virtual
  - API endpoints – Private, Public, or Kubernetes
- Fine-grained backup support
  - Entire cluster
  - Subset of namespaces
- Supported DR operations
  - DR Drills
  - Switchover
  - Failover

Disaster Recovery Deployment Architecture

OKE DR Deployment Architecture



OKE DR – Switchover Operation



Demo time!

Useful Resources

Full Stack DR product page

https://www.oracle.com/cloud/full-stack-disaster-recovery/

Full Stack DR- Documentation

https://docs.oracle.com/en-us/iaas/disaster-recovery/index.html

Oracle Kubernetes Engine

https://www.oracle.com/cloud/cloud-native/kubernetes-engine

Full Stack DR - Live Labs (Hands on lab, free to use)

https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3357

Full Stack DR- YouTube Playlists

Full Stack DR getting started
Full Stack DR Implementing and Configuring
Full Stack DR in action
Full Stack DR:Solutions from OCI specialists

Full Stack DR- Public Slack Channel

https://bit.ly/odevrel_slack and join #full-stack-dr

Full Stack DR- User defined group scripts

https://github.com/oracle-samples/full-stack-disaster-recovery

THANK YOU!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