

# Cloud Deployment Options for Java Applications

Application Modernization

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# Agenda

Drivers and obstacles of application modernization

Proposed approaches

Demonstration

Summary and a customer reference

Q&A and Next Steps

## Java is relevant

Java is widely used for systems that require high performance and security



Java continues to be the leading application development language with 98 percent of the Fortune 100 running Java

56B JVMs in 2020 growing to 82B in 2025

Fueling Long-term Success and Security with Java: [go.oracle.com/LP=122168](https://go.oracle.com/LP=122168)

# Business Objectives and Challenges

## Business:

- Agility
- Innovation at pace
- Business & Performance improvements

New digital channels

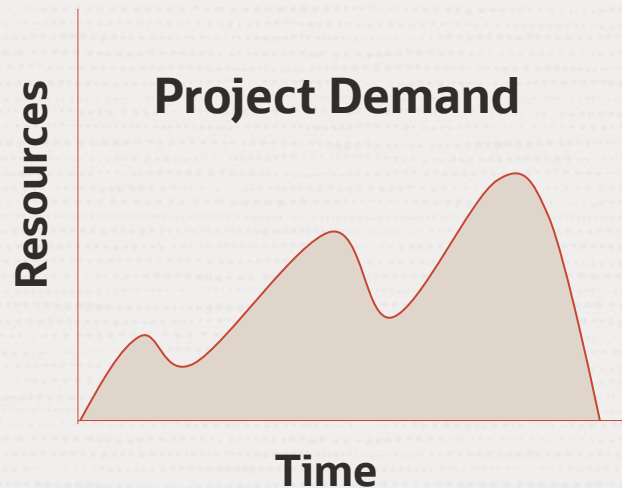
New business models

## Support & Security

- Upper stack & Critical patches

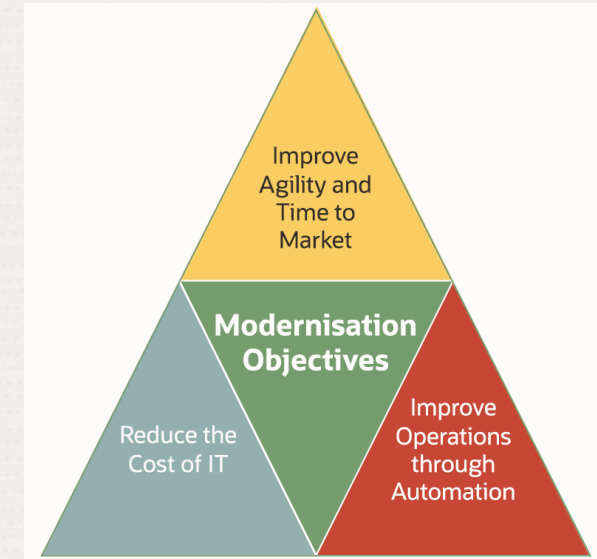
## Hardware

- Ageing
- Procuring new
- Capacity planning



## Modernisation

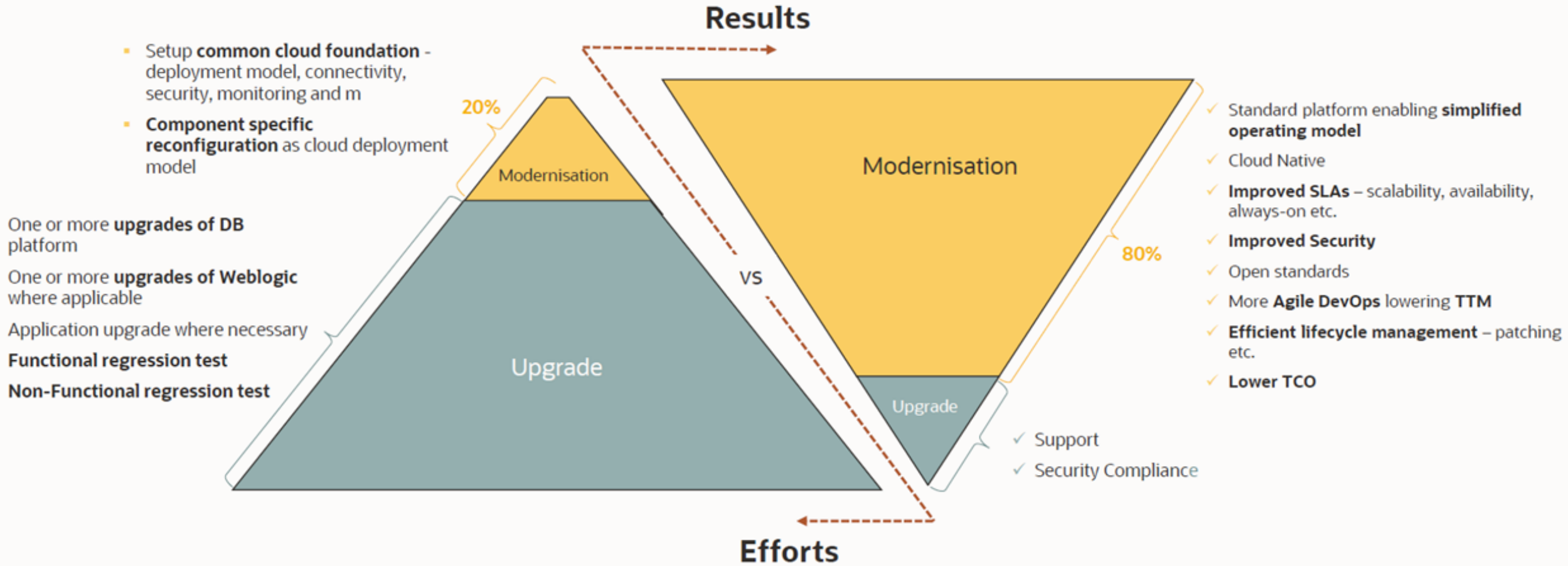
- Environment consistency & Portability
- Adoption of new trends & frameworks  
Cloud Native  
Microservices, etc
- Infrastructure & Platform automation
- Consolidation



## Finance

- Cost Optimisation
- CapEx to Opex
- Hardware & Software consolidation

# Additional effort in Modernization delivers many benefits



# Benefits of Cloud

Resilience by design



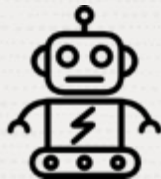
Security by design



Elastic infra and pricing



High automation



Faster  
*time-to-market*



Operational agility



Full observability

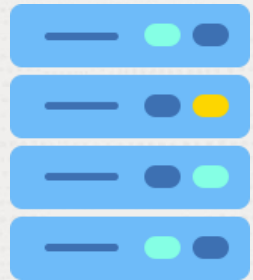


Extensible /  
Opensource friendly

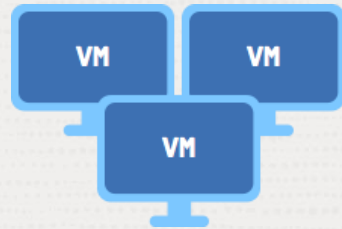


# Cloud Deployment Options for your on-premises Applications

Technical point of view



**Bare Metal**



**Virtual machines**



**Containers**



**Serverless**



**PaaS**

Bare Metal	Virtual machines	Containers	Serverless	PaaS
Code	Code	Code	Code	Declarative
Container Engine	Container Engine	Container Engine	Container Engine	Container Engine
Language Runtime	Language Runtime	Language Runtime	Language Runtime	Language Runtime
Operating System	Operating System	Operating System	Operating System	Operating System
Hardware	Hardware	Hardware	Hardware	Hardware

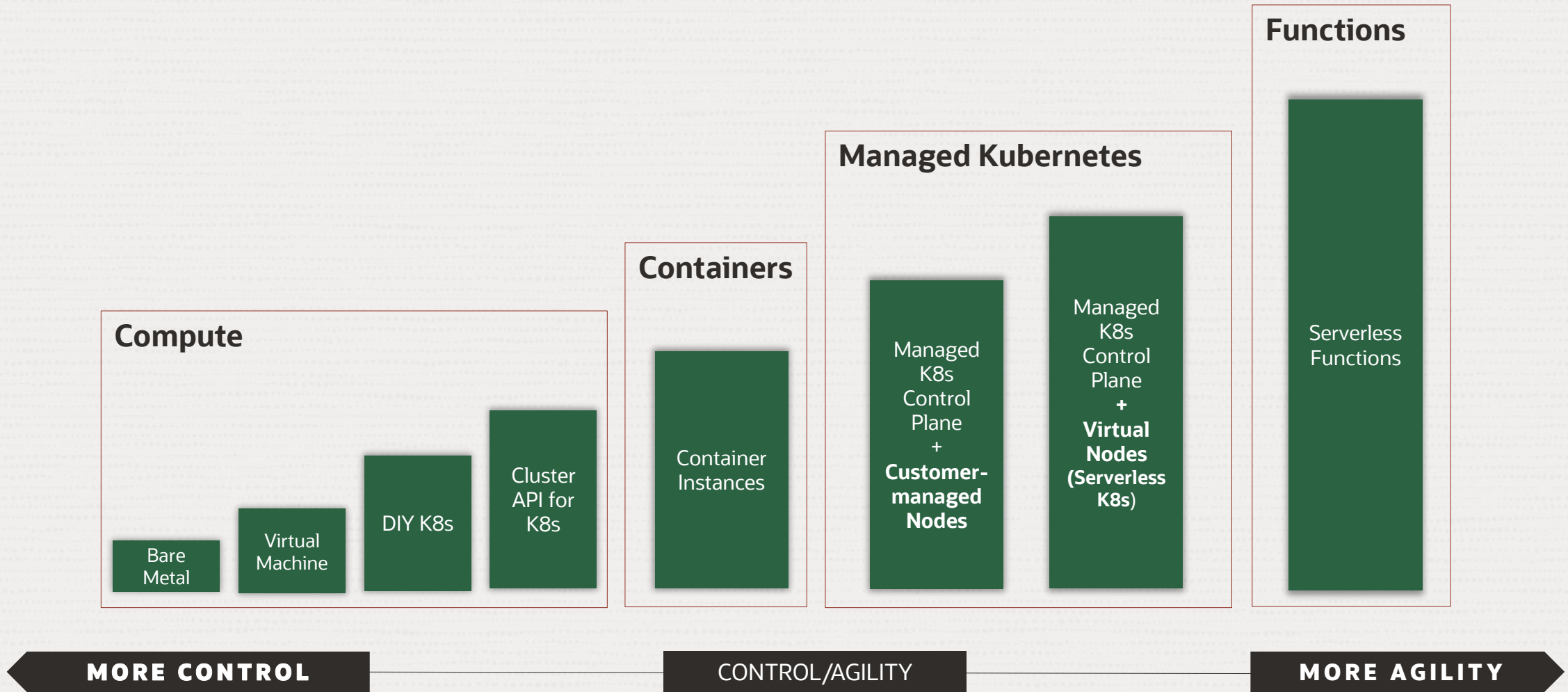
Managed by Cloud Provider

Managed by customers



# Cloud Deployment Options

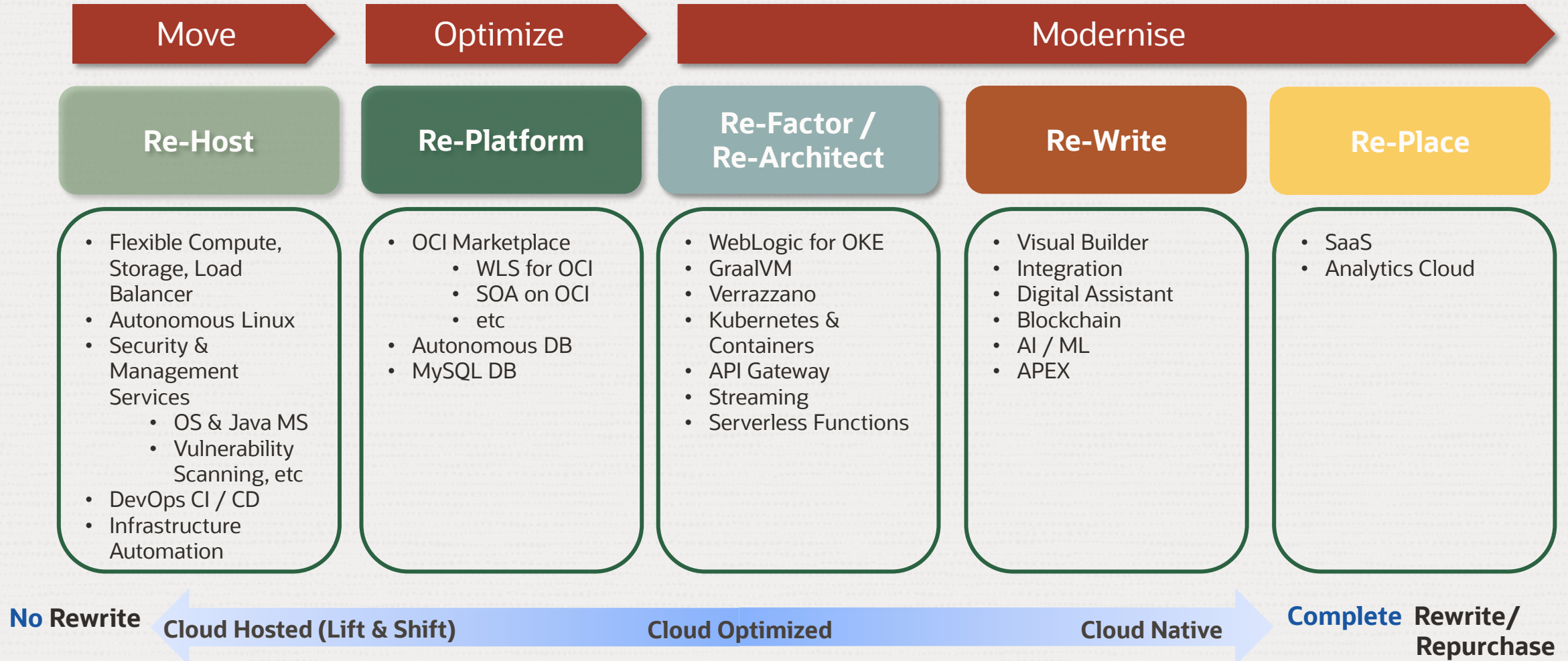
More detail technical view





# Migration Strategies for your on-premises Applications

6R's Oracle Cloud Perspective \*

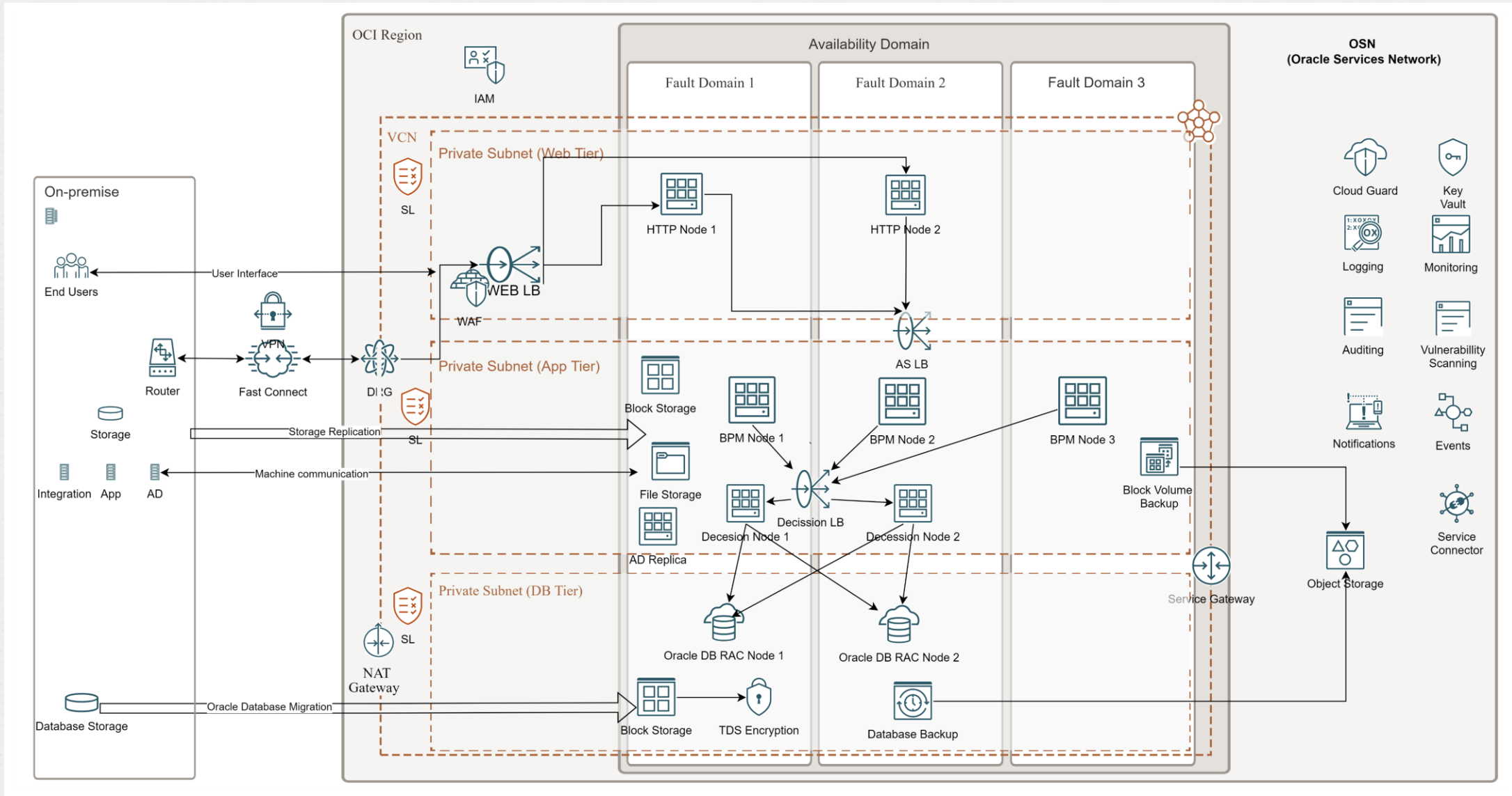


\* Except Retain an Retire



# Re-hosting example

## 3 tier Application



# Flexible Compute Instances

Number of CPU cores and amount of RAM of a Compute Shape based on the application's resource needs.

✓ VM.Standard3.Flex      1      16      1      2

You can customize the number of OCPUs and the amount of memory allocated to a flexible shape. The other resources scale proportionately. [Learn more about flexible shapes.](#)

Number of OCPUs

1

Burstable (i)

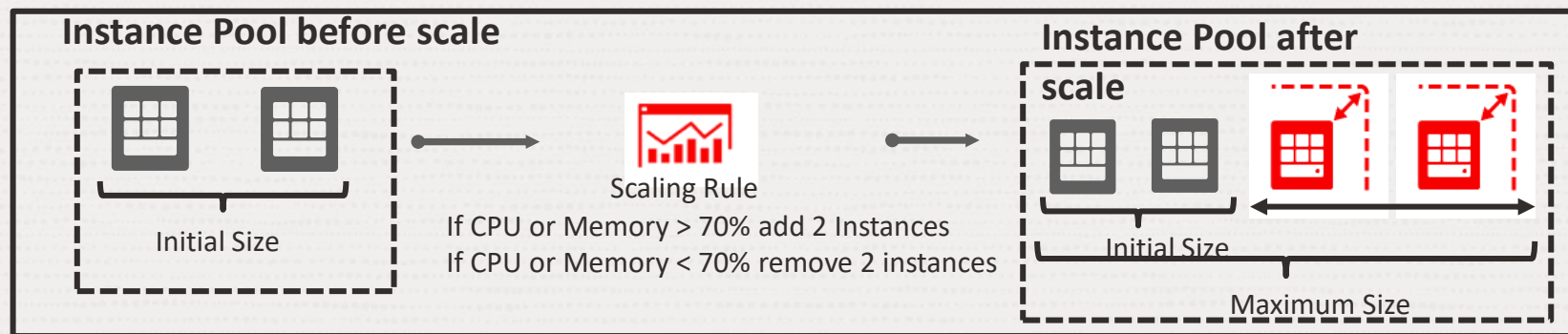
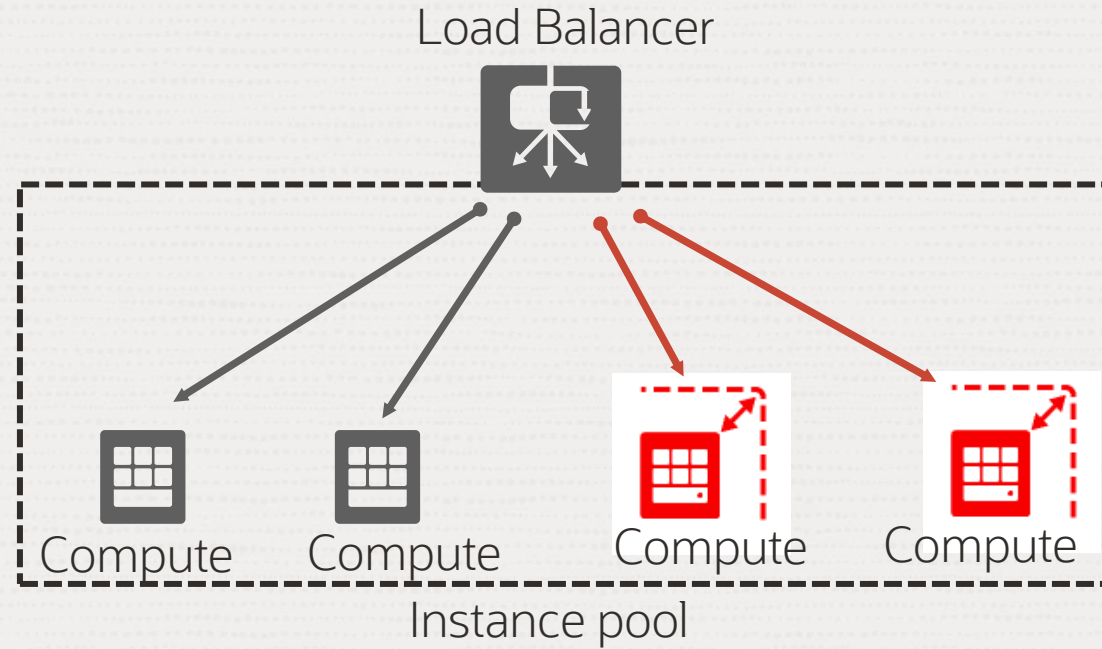
Amount of memory (GB) (i)

16



# Fault Tolerance and Scalability

## Compute Instances



# Cloud Deployment Protection

## Data Security



Deep integration with Identity and Access Management (IAM) service

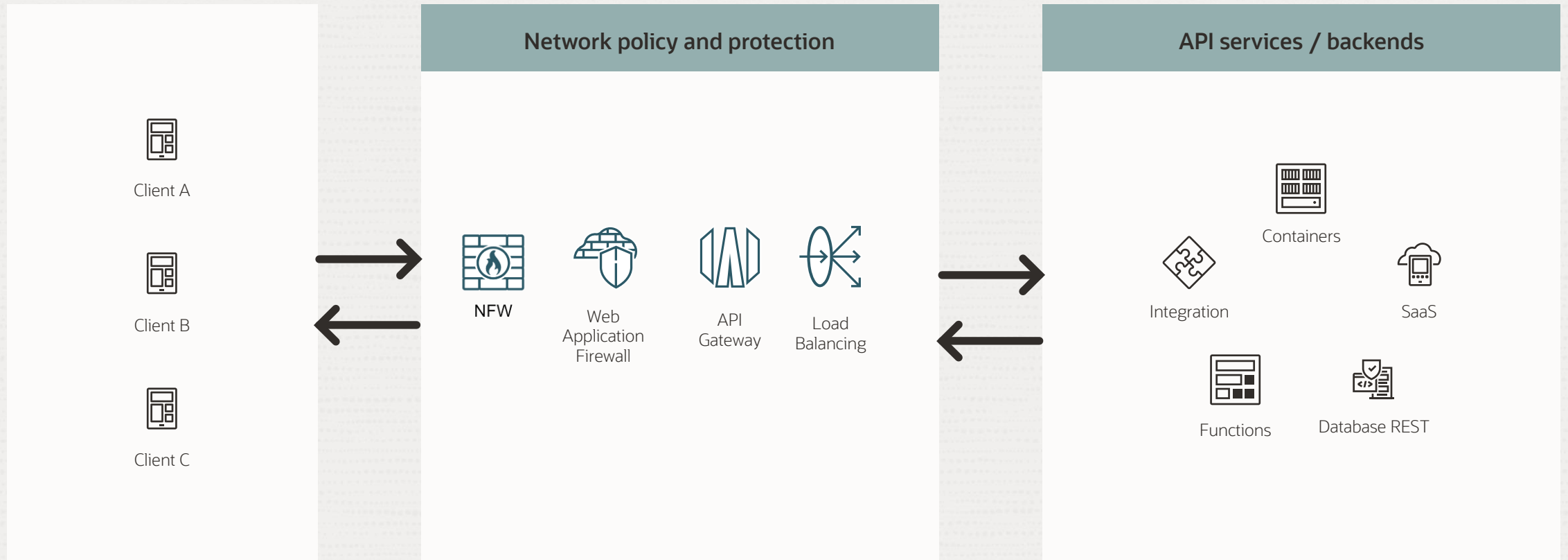
Server-Side Encryption (AES 256)

- All data is encrypted
- Integration with KMS/Vault
- Supports customer-provided keys (SSE-C)

Data transmitted over SSL connections

# Cloud Deployment Protection

## Network Security



# Observability and Management

ORACLE Cloud Cloud Classic >

Q Search

## Observability & Management

<ul style="list-style-type: none"> <li>Home</li> <li>Compute</li> <li>Storage</li> <li>Networking</li> <li>Oracle Database</li> <li>Databases</li> <li>Analytics &amp; AI</li> <li>Developer Services</li> <li>Identity &amp; Security</li> <li><b>Observability &amp; Management</b></li> <li>Hybrid</li> <li>Migration</li> <li>Billing &amp; Cost Management</li> <li>Governance &amp; Administration</li> <li>Marketplace</li> </ul>	<ul style="list-style-type: none"> <li><b>Application Performance Monitoring</b></li> <li>Home</li> <li>Dashboards</li> <li>Trace Explorer</li> <li>Synthetic Monitoring</li> <li>Stack Monitoring</li> <li>Administration</li> <li><b>Logging</b></li> <li>Search</li> <li>Saved Searches</li> <li>Logs</li> <li>Log Groups</li> <li>Agent Configurations</li> <li>Service Connectors</li> <li>Audit</li> </ul>	<ul style="list-style-type: none"> <li><b>Monitoring</b></li> <li>Service Metrics</li> <li>Metrics Explorer</li> <li>Alarm Status</li> <li>Alarm Definitions</li> <li>Health Checks</li> <li><b>Logging Analytics</b></li> <li>Home</li> <li>Log Explorer</li> <li>Dashboards</li> <li>Administration</li> <li><b>Events Service</b></li> <li>Rules</li> <li>Metrics</li> </ul>	<ul style="list-style-type: none"> <li><b>Database Management</b></li> <li>Overview</li> <li>Fleet Summary</li> <li>Database Groups</li> <li>Administration</li> <li><b>Operations Insights</b></li> <li>Overview</li> <li>Capacity Planning</li> <li>Exadata Insights</li> <li>Oracle SQL Warehouse</li> <li>EM Warehouse</li> <li>Exadata Warehouse</li> <li>AWR Hub</li> <li>Dashboards</li> <li>Administration</li> </ul>	<ul style="list-style-type: none"> <li><b>Management Agent</b></li> <li>Overview</li> <li>Agents</li> <li>Downloads and Keys</li> <li><b>Java Management</b></li> <li>Overview</li> <li>Fleets</li> <li>Java Download</li> </ul>
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# Observability and Security with Oracle Cloud Agent

ORACLE Cloud Cloud Classic > Search resources, services, documentation, and Marketplace Germany Central (Frankfurt) >

Compute > Instances > Instance details

## skolaapp

Start Stop Reboot Terminate More actions

Instance information Shielded instance **Oracle Cloud Agent** Notifications Tags

[Oracle Cloud Agent](#) is a lightweight process that manages plugins running on the instance. Plugins collect performance metrics, install OS updates, and perform other instance management tasks.

Stop plugins

Plugin name	Status	Message	Last updated	Enable plugin ⓘ
Vulnerability Scanning ⓘ	● Running	starting plugin started plugin, vss agent scan complete starting plugin started plugin, vss agent scan complete	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
Oracle Java Management Service ⓘ	● Running	generation id: d1dfc4b0-2351-4caa-86c6-988a7a2d8326 JMS Plugin uptime: PT16H29M59.064336S	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
OS Management Service Agent ⓘ	● Running	-	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
Management Agent ⓘ	● Running	started agent	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
Custom Logs Monitoring ⓘ	● Running	installation completed and running UM agent	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
Compute Instance Run Command ⓘ	● Running	-	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled
Compute Instance Monitoring ⓘ	● Running	-	Sat, Oct 1, 2022, 06:04:54 UTC	<input checked="" type="checkbox"/> Enabled






# Java Management Service

ORACLE Cloud
Cloud Classic >

Germany Central (Frankfurt) v
🔍 📄 🔔 ? 🌐 👤



ACTIVE

Edit properties
Move fleet
Set up management

Fleet properties Agent settings Tags

Advanced features ✔ Enabled  
[Learn more about advanced features](#)

Details

OCID: ...eqrmamoq5y2wfmjmn5psa [Show](#) [Copy](#)

Created on: Fri, Sep 30, 2022, 12:51:02 UTC

Compartment: oraseemeaocids (root)/northeast/mk

Resources

- [Metrics](#)
- [Managed instances](#)
- [Java runtimes](#)
- [Applications](#)
- [Work requests](#)

Java runtimes

Start date (UTC)  End date (UTC)

[Delete](#)

	Runtime version <span style="font-size: small;">(i)</span>	Distribution
<input type="checkbox"/>	11.0.16.1	Java(TM) SE Runtime Environment

0 Selected

## Install Java runtime

The selected Java runtime below will be installed in all managed instances observed in this fleet.

### Current releases

	Release version	Security state <span style="font-size: small;">(i)</span>	Release date	End of service life	Release notes
<input type="checkbox"/>	19	✔ Up to date	Sep 20, 2022 UTC	Mar 20, 2023 UTC	<a href="#">19 release notes</a>
<input type="checkbox"/>	17.0.4.1	✔ Up to date	Aug 18, 2022 UTC	Sep 18, 2029 UTC	<a href="#">17.0.4.1 release notes</a>
<input type="checkbox"/>	11.0.16.1	✔ Up to date	Aug 18, 2022 UTC	Sep 30, 2026 UTC	<a href="#">11.0.16.1 release notes</a>
<input type="checkbox"/>	1.8.0_341	✔ Up to date	Jul 19, 2022 UTC	Dec 31, 2030 UTC	<a href="#">1.8.0_341 release notes</a>

0 Selected Displaying 4 Java runtimes < 1 of 1 >

### Archive releases

! We've listed the non-current versions of JRE and JDK to help you debug issues in older systems. Non-current versions may include releases that aren't updated with the latest security patches, and we recommend that you don't use them in production.

	Release version	Security state <span style="font-size: small;">(i)</span>	Release date	End of service life	Release notes
<input type="checkbox"/>	18.0.2.1	✘ Upgrade required	Aug 18, 2022 UTC	Sep 22, 2022 UTC	<a href="#">18.0.2.1 release notes</a>
<input type="checkbox"/>	18.0.2	✘ Upgrade required	Jul 19, 2022 UTC	Sep 22, 2022 UTC	<a href="#">18.0.2 release notes</a>
<input type="checkbox"/>	17.0.4	✔ Up to date	Jul 19, 2022 UTC	Sep 18, 2029 UTC	<a href="#">17.0.4 release notes</a>

[Install Java runtime](#) [Cancel](#)



# Benefits of moving Java application to OCI



**Observability (Monitoring, Logging, APM)**



**OCI DevOps** (Git, Build Pipelines, Deploy Pipelines)



**Compute**

(Flex, OS Images, OS Management, Autoscaling Pools )



**Containers**

(Registry, Kubernetes, Service Mesh, ...)



**Access Control and Security**

(IAM, Vault, Certificates, Cloud Guard, Vulnerability Scanning)



**Oracle Java**

(Oracle JDK and GraalVM EE Support, Java Management Service)

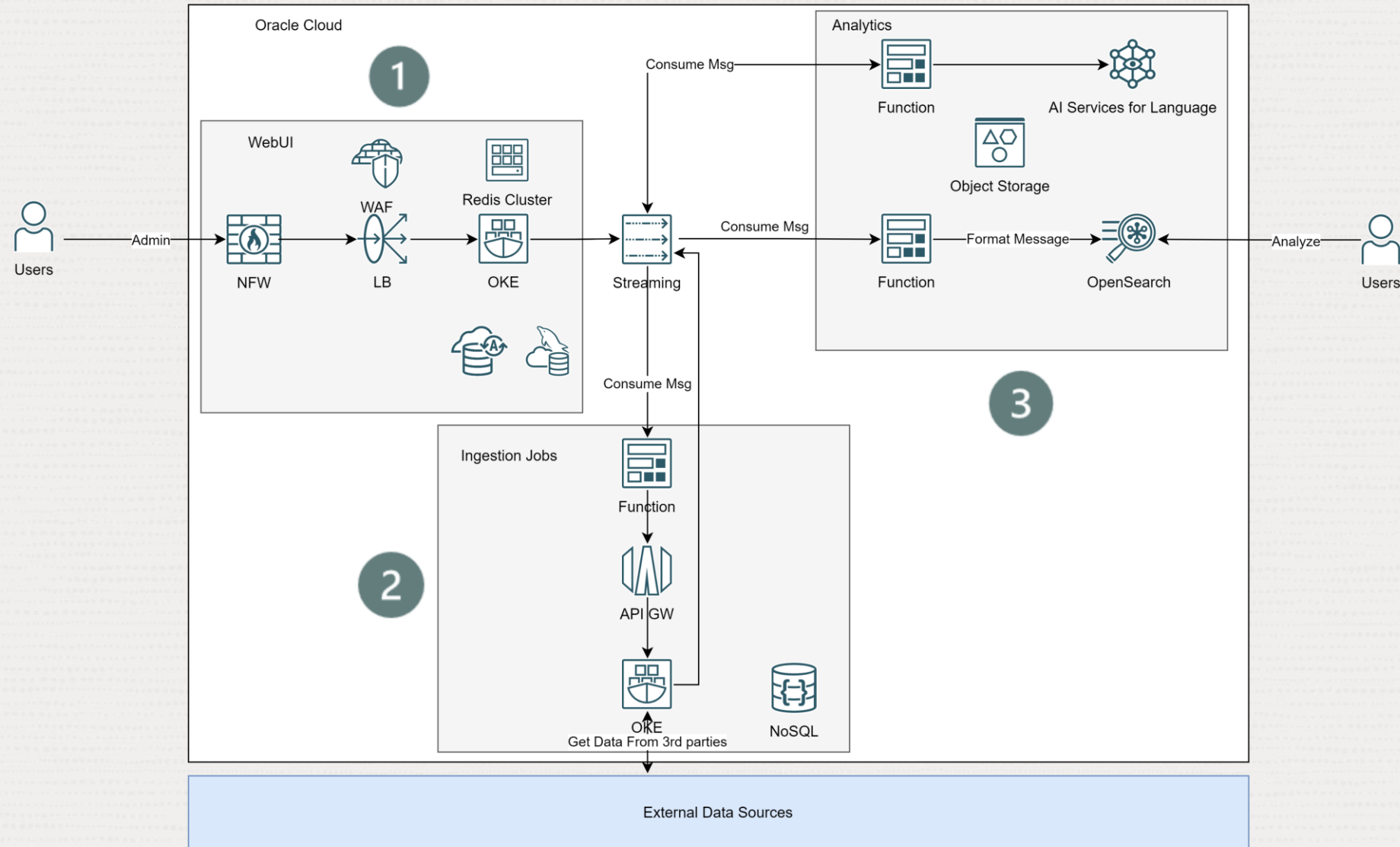


**OCI Infrastructure**

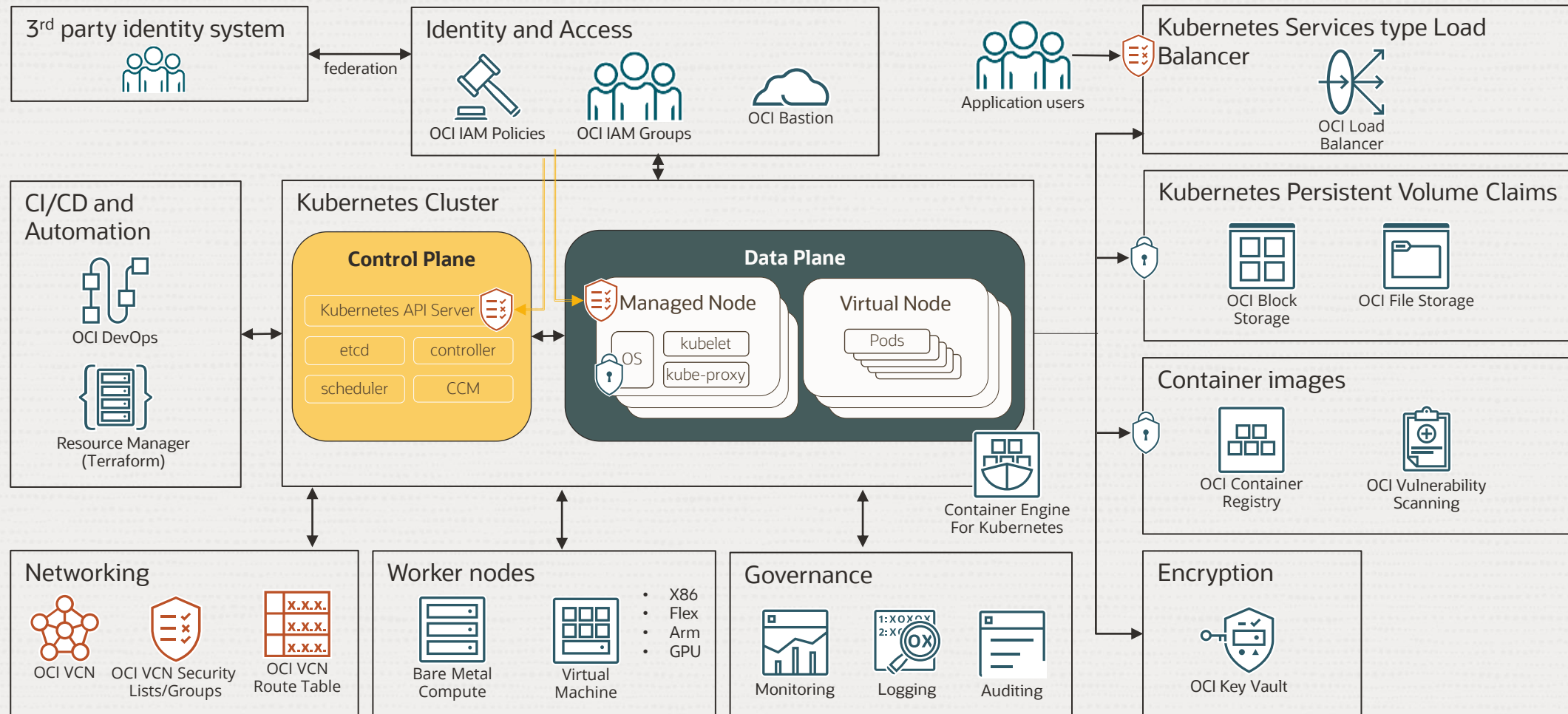
**CPU | GPU | Storage (Cloning , Replication) | Network (LB, WAF, NFW)**

# Re-platforming/factoring example

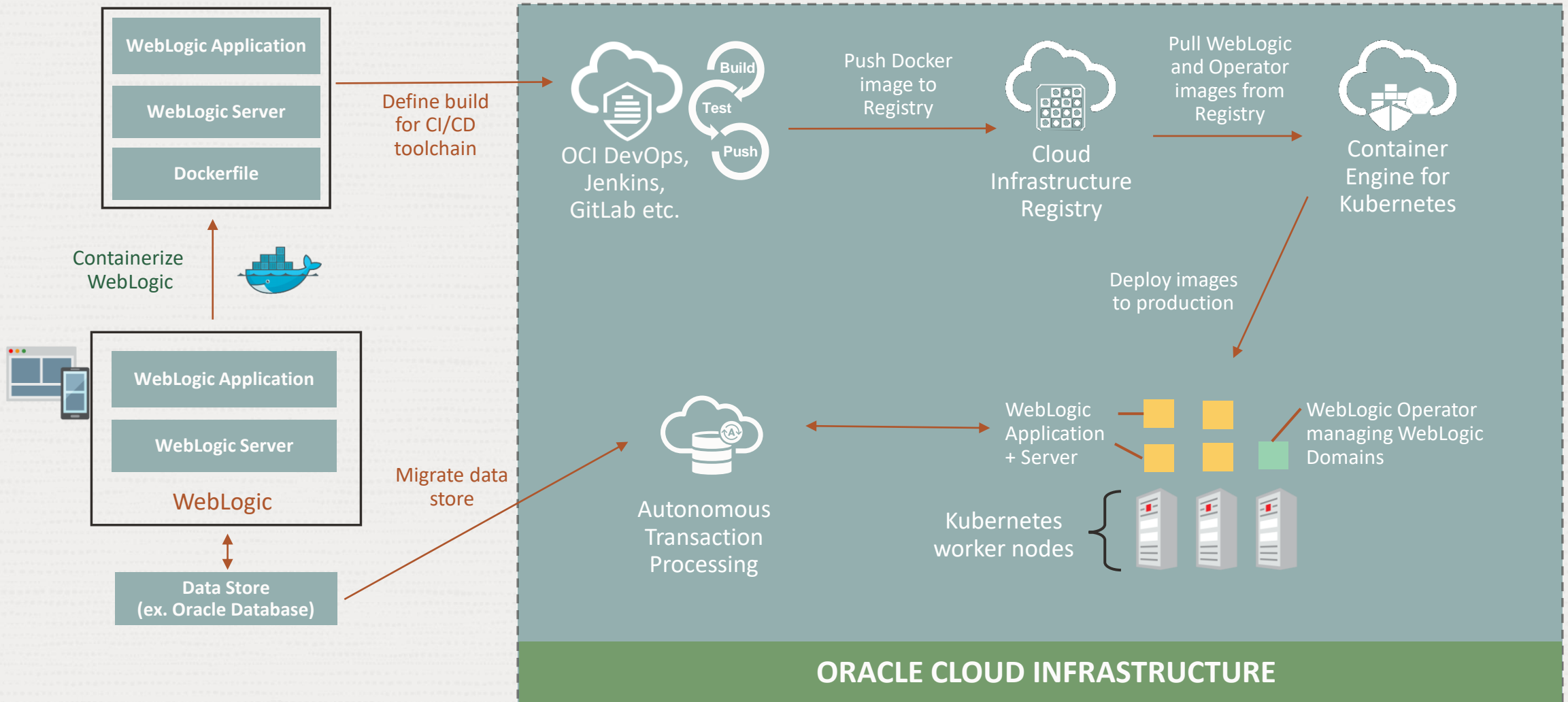
## Data Ingestion and Analytics Multi-tenant (SaaS) Platform



# Kubernetes Cluster integration with other OCI services



# Re-platforming Weblogic Applications



# Running WebLogic in Containers at CERN



**CERN is the world's premier research organization for nuclear physics.**

- ✓ Migrated their large WebLogic workloads comprising more than 250 clusters, 500 JVMs and 100 VMs, to Kubernetes (including production customers)
- ✓ Gained improvement in **deployment agility** with **shorter downtimes** and **better manageability**
- ✓ Achieved **faster time-to-market**
- ✓ Impressed by the results, CERN is currently **planning a hybrid environment** with some Kubernetes clusters running on OCI and some on premises

“

We were able to deploy the same WebLogic cluster in 2 minutes, what previously took us at least half a day.

”

*Antonio Nappi,  
DevOps Engineer*

Deploying Multicloud Apps on Verrazzano [youtu.be/iGMFQLrZGTc](https://youtu.be/iGMFQLrZGTc)

# Where do I run containers in OCI?

## OCI Container Instances

- Run containers in seconds without managing any servers
- Suitable for workloads that do not require Kubernetes orchestration
- Simple, does not require Kubernetes skills

## OKE with Managed Nodes

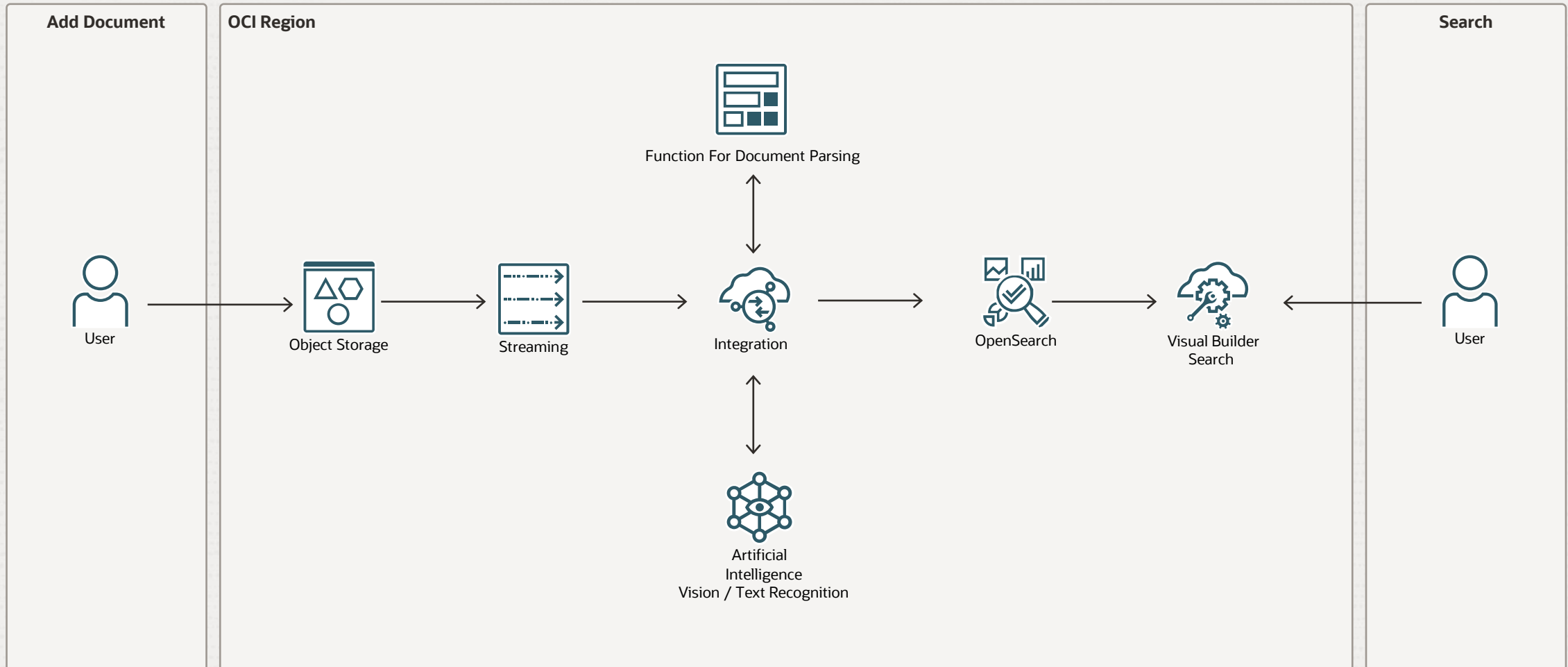
- Kubernetes orchestration
- Containers are executed by OCI Compute instances and lifecycle is managed through the OKE API
- You control the configuration of the nodes based on your requirements
- Requires Kubernetes skills

## OKE with Virtual Nodes

- Kubernetes orchestration
- Containers are executed by Virtual Nodes that provide an abstraction to Kubernetes nodes
- Eliminates the operational overhead of managing, scaling, upgrading, and troubleshooting the node infrastructure
- Requires less Kubernetes skills

# Re-writing example

Search Solution using OpenSearch for Documents (Word, Excel, PDF, ...), and images with Vision and Text Recognition, Pipeline Orchestration with Integration, Search with Visual Builder





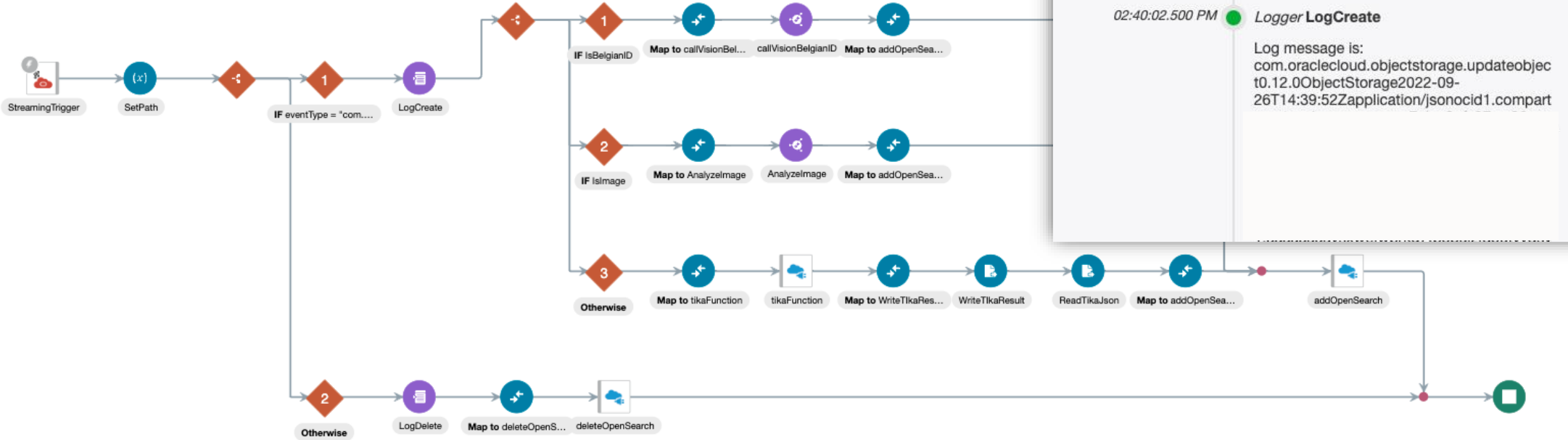
# Oracle Integration

## Pipeline Orchestration

ObjectStorage2OpenSearch (1.0.12) VIEW ONLY

App Driven Orchestration

Layout: Horizontal Reset



**Activity Stream**

Ascending

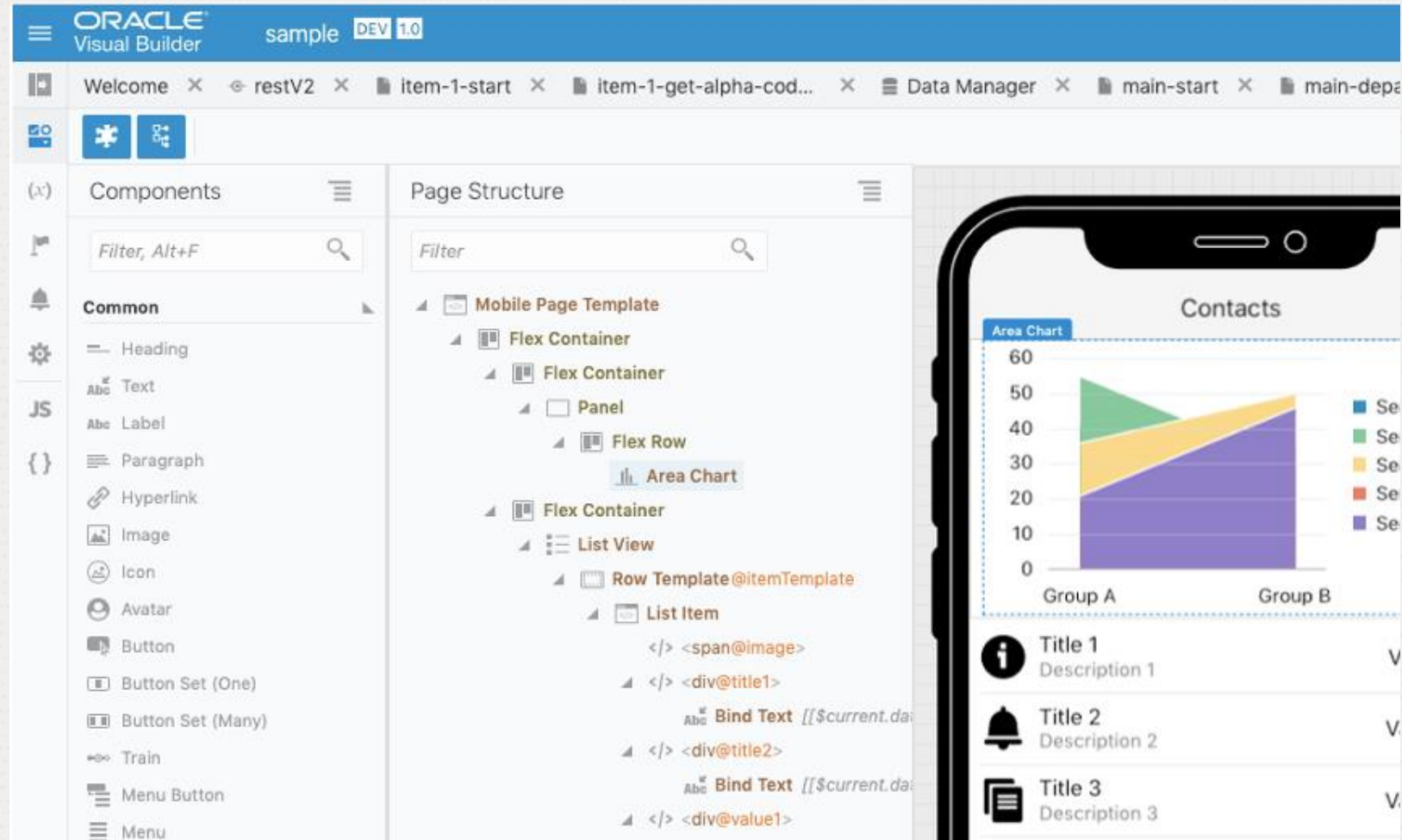
- Mon Sep 26 02:40:00.845 PM UTC 2022 Message received: Instance created and enqueued for processing
- 02:40:02.351 PM Message dequeued and processed by Trigger **StreamingTrigger**
- 02:40:02.466 PM Message received by Assignment **SetPath**
- 02:40:02.487 PM Message entered Switch
- 02:40:02.493 PM Message routed through Switch Route with condition **eventType = "com.oraclecloud.objectstorage.createobject" or eventType = "com.oraclecloud.objectstorage.updateobject"**
- 02:40:02.500 PM Logger **LogCreate**

Log message is:  
com.oraclecloud.objectstorage.updateobject0.12.0ObjectStorage2022-09-26T14:39:52Zapplication/jsonocid1.compart



# Visual Builder

## Search UI



- Build with intuitive drag & drop model
- Extend via JavaScript, REST, HTML, CSS
- Automated DevOps with source control, agile projects, and CI/CD pipelines.





# Object Storage

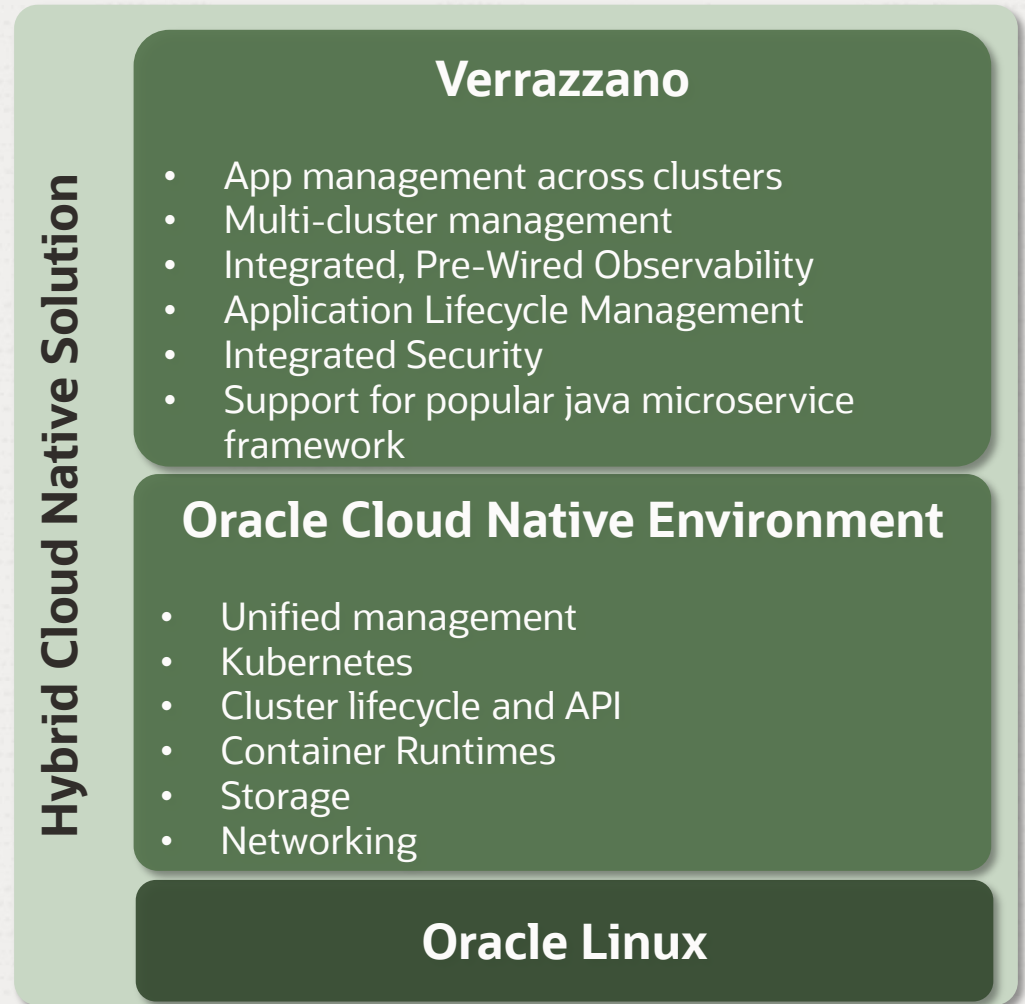
## Benefits of Object Storage on Oracle Cloud Infrastructure

- ❑ Supported by all OCI services
- ❑ Low Cost (around 26\$/month for 1TB of data in Standard Tier, around 10\$/month for 1TB of data in Infrequent Access Tier)
- ❑ Unlimited Storage Capacity and high Scalability
- ❑ Storage decoupled from Compute
- ❑ Automatic Data Durability (providing 99.999999999% (Eleven 9s) of annual durability)
- ❑ Optional Automatic Replication to different regions via Replication Policies
- ❑ Access Control provided by OCI IAM policies on the level of Compartments and Buckets
- ❑ Data is Encrypted by Oracle or customer managed keys
- ❑ Support for Versioning, Data Retention, and Data Lifecycle rules
- ❑ Support for customer-defined Metadata on the object level
- ❑ S3 Connectivity available with Amazon S3 Compatibility API
- ❑ HDFS Connectivity available with HDFS Connector for Object Storage

# Hybrid Cloud Native Solution from Oracle

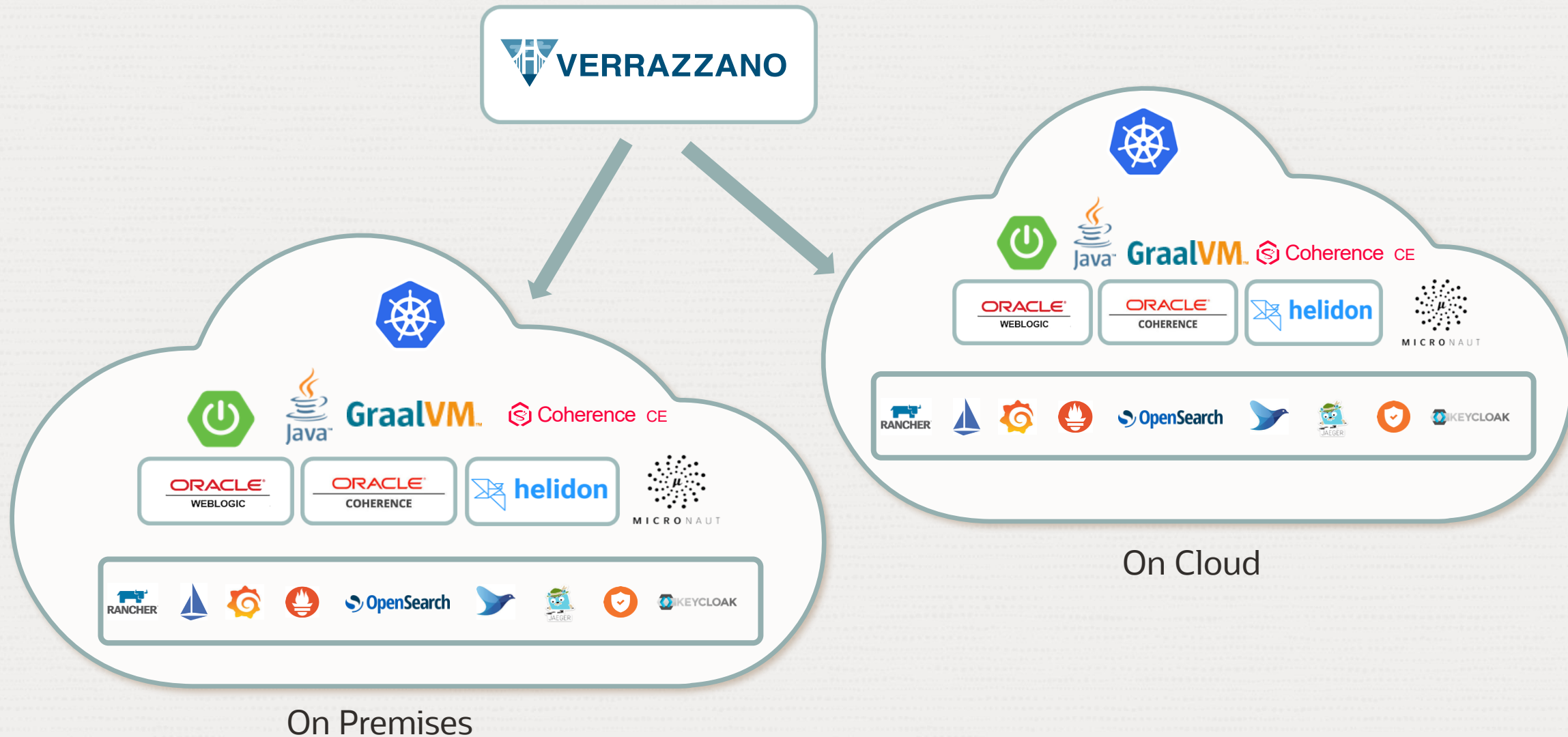
Oracle delivers a curated, standards-based suite of open-source software technologies that is tested, integrated, and supported on-premises or in the cloud of choice (OCI/AWS/Azure). Enabling simplified adoption & management of cloud native solutions.

- **Verrazzano:** Multi Cluster, Multi Cloud, hybrid application management platform. Supporting day 1 & day 2 automated management
- **Oracle Cloud Native Environment:** Simplified container infrastructure lifecycle management and runtime
- **Oracle Linux:** Secure & Scalable OS



# Oracle Verrazzano Enterprise Container Platform

What does it do?



# Demonstration

Build Weblogic container and deploy to Kubernetes managed by Verrazzano

- Project Home
- Workspaces
- Git
- Merge Requests
- Maven
- NPM
- Docker
- Builds**
- Releases
- Environments
- Issues
- Boards
- Wiki
- Snippets
- Project Administration

weblogic\_cicd\_verrazzano ▾ | Builds

Jobs Overview > build\_deploy

## build\_deploy

[Configure](#)
[Disable](#)
[Delete](#)
[Build Now](#)
 Auto Refresh

### Job Details

No description available

### Notifications

CC Me

- Changes
- Artifacts
- Javadoc
- Tests
- Build Log
- Git Log
- Audit
- SonarQube



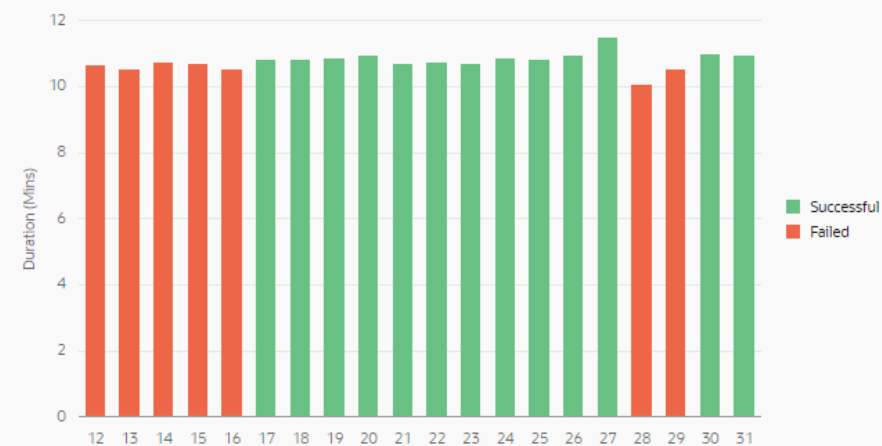
Vulnerabilities

### Build History

Last | [Successful](#) | [Unsuccessful](#) | [Failed](#) | [Test Failed](#)

By	Status	Build	Started	Duration	Actions
MK	✓	#31	Sat at 9:24 AM	10 m 57 s	
MK	✓	#30	Sat at 8:46 AM	10 m 59 s	
MK	✗	#29	Sat at 8:12 AM	10 m 32 s	
MK	✗	#28	Fri at 7:57 PM	10 m 3 s	
↻	✓	#27	Apr 8, 2022 9:54 AM	11 m 29 s	

### Build Trend



```
cd vtest
mvn package
```

```
export WDT_HOME=$MW_HOME/weblogic-deploy
export WIT_HOME=$MW_HOME/imagetool
```

```
cd $HOME
mkdir v8o
$WDT_HOME/bin/discoverDomain.sh \
-oracle_home $MW_HOME \
-domain_home $WLS_HOME/user_projects/domains/vtest \
-model_file ./v8o/wdt-model.yaml \
-archive_file ./v8o/wdt-archive.zip \
-target vz \
-output_dir v8o
```

```
cd v8o
$WIT_HOME/bin/imagetool.sh cache addInstaller --path $HOME/jdk-8u311-linux-x64.tar.gz --type jdk --version 8u311 --force
$WIT_HOME/bin/imagetool.sh cache addInstaller --path $HOME/fmw_12.2.1.4.0_wls_lite_generic.jar --type wls --version 12.2.1.4.0 --force
$WIT_HOME/bin/imagetool.sh cache addInstaller --path $HOME/weblogic-deploy.zip --type wdt --version latest --force
$WIT_HOME/bin/imagetool.sh create --tag fra.ocir.io/[REDACTED]/mkratky/weblogic/vtest:$tag --version 12.2.1.4.0 --jdkVersion 8u311 --wdtModel ./wdt-model.yaml --wdtArchive ./wdt-archive.zip --wdtVariables ./vz_variable.properties --resourceTemplates ./application.yaml --wdtModelOnly
```

```
docker login -u $DOCKER_USER -p $DOCKER_PASSWORD fra.ocir.io
docker push fra.ocir.io/[REDACTED]/mkratky/weblogic/vtest:$tag
```

```
kubectl apply -f ${PWD}/vtest-application.yaml -n vtest
kubectl apply -f ${PWD}/vtest-components.yaml -n vtest
```





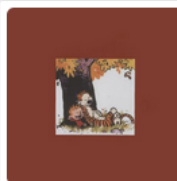
Enter author name

Cart

## Robert's Books

We take inspiration from the World's best writers.

### Books

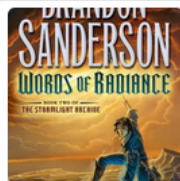


**The Complete Calvin and Hobbes**

Bill Watterson

Rating: 4.82 (based on 28900 reviews)

Add to Cart



**Words of Radiance**

Brandon Sanderson

Rating: 4.77 (based on 73572 reviews)

Add to Cart

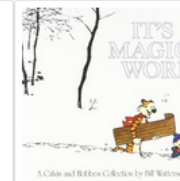


**Mark of the Lion Trilogy**

Francine Rivers

Rating: 4.76 (based on 9081 reviews)

Add to Cart



**It's a Magical World: A Calvin and Hobbes Collection**

Bill Watterson

Rating: 4.75 (based on 22351 reviews)

Add to Cart

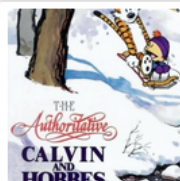


**Complete Harry Potter Boxed Set**

J.K. Rowling

Rating: 4.74 (based on 190050 reviews)

Add to Cart



**The Authoritative Calvin and Hobbes**

Bill Watterson

Rating: 4.73 (based on 16087 reviews)

Add to Cart



**Harry Potter Collection (Harry Potter #1-6)**

J.K. Rowling

Rating: 4.73 (based on 24618 reviews)

Add to Cart



**Attack of the Deranged Mutant Killer Monster Snow Goons: A Calvin and Hobbes Collection**

Bill Watterson

Rating: 4.72 (based on 9713 reviews)

Add to Cart



**A Court of Mist and Fury**

Sarah J. Maas

Rating: 4.72 (based on 108384 reviews)



**Homicidal Psycho Jungle Cat: A Calvin and Hobbes Collection**

Bill Watterson

Rating: 4.71 (based on 14113 reviews)



**The Revenge of the Baby-Sat: A Calvin and Hobbes Collection**

Bill Watterson

Rating: 4.71 (based on 11503 reviews)



**The Days Are Just Packed: A Calvin and Hobbes Collection**

Bill Watterson

Rating: 4.68 (based on 19143 reviews)





Home



VERRAZZANO

Resources

OAM Applications

OAM Components

Clusters

Projects

Filters

State

Running

Pending

Terminated

Cluster

### General Information

**Status:** Ready  
**Version:** 1.2.0  
**Install Profile:** Development  
**Admin Cluster:** local  
**Rancher:** <https://rancher.default.██████████.nip.io>  
**Keycloak:** <https://keycloak.default.██████████.nip.io>

### System Telemetry

**OpenSearch Dashboards:** <https://kibana.vmi.system.default.██████████.nip.io>  
**Grafana:** <https://grafana.vmi.system.default.██████████.nip.io>  
**Prometheus:** <https://prometheus.vmi.system.default.██████████.nip.io>  
**OpenSearch:** <https://elasticsearch.vmi.system.default.██████████.nip.io>  
**Kiali:** <https://kiali.vmi.system.default.██████████.nip.io>

## OAM Applications

Sort by:

(Showing 1-4 of 4 items) | < 1 >

**Name:** [bobs-books](#) **Cluster:** local  
**Namespace:** bobs-books  
**Status:** ● Running  
**Created:** 01-Oct-2022 10:38:31.31

**Name:** [hello-helidon-appconf](#) **Cluster:** local  
**Namespace:** hello-helidon  
**Status:** ● Running  
**Created:** 04-Apr-2022 17:10:32.32

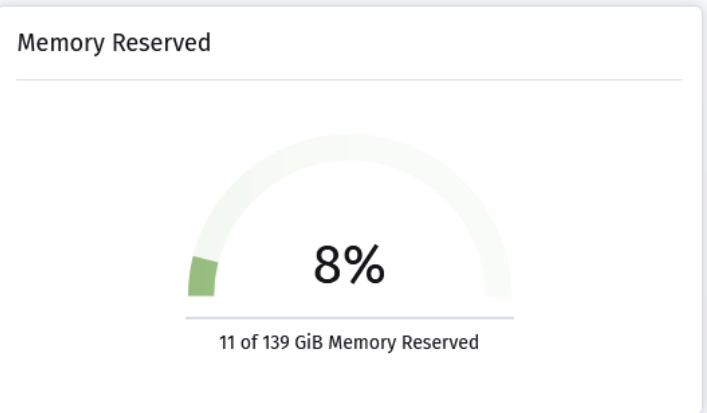
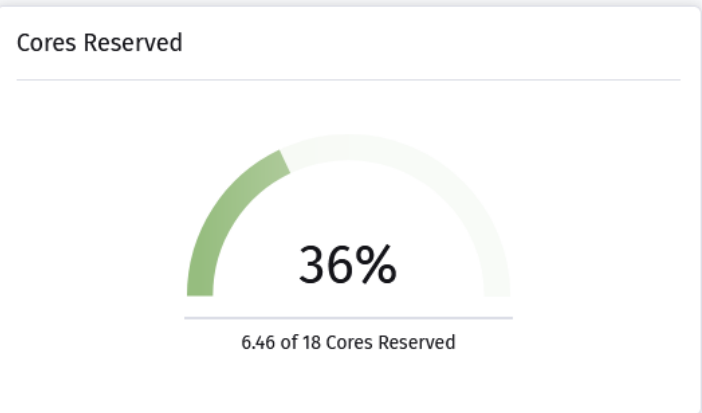
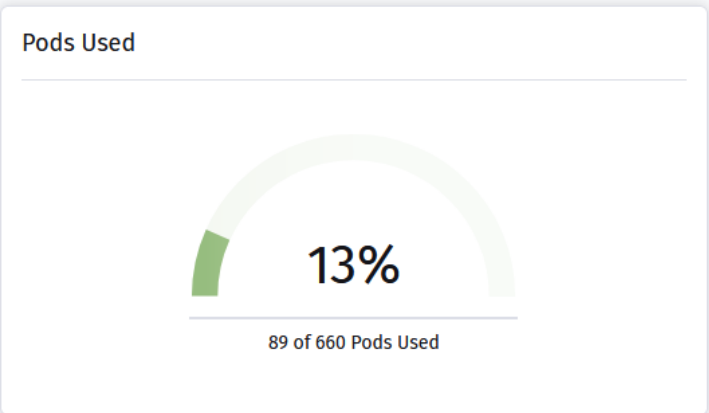
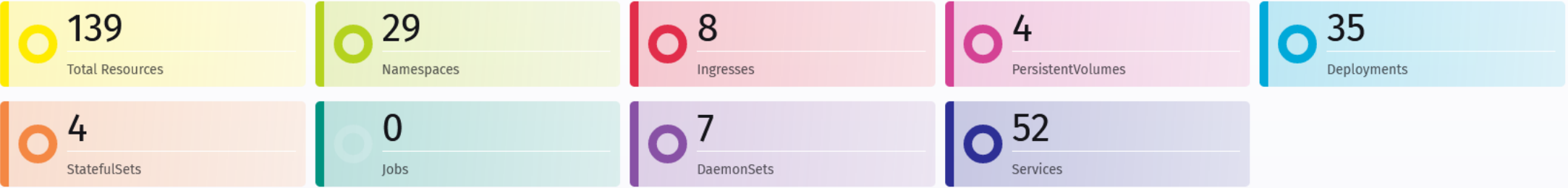
**Name:** [springboot-appconf](#) **Cluster:** local  
**Namespace:** springboot  
**Status:** ● Running



- Workload
  - Overview
  - CronJobs 0
  - DaemonSets 0
  - Deployments 3
  - Jobs 0
  - StatefulSets 2
  - Pods 11
- Service Discovery
  - HorizontalPodAutoscalers 0
  - Ingresses 0
  - NetworkPolicies 0
  - Services 15
- Storage
  - ConfigMaps 10
  - PersistentVolumeClaims 0
  - Secrets 11
- RBAC
  - RoleBindings 0
  - Roles 0
- Events

### Cluster Dashboard

Other  v1.21.5 6 181 days ago  
 Provider Kubernetes Version Total Nodes Created





Verrazano Cluster All Domain bobs-bookstore WebLogic Cluster cluster-1 Server All Top N 5

Servers

Running Servers

1

Deployed Applications

1

Server Name

managed-server1

Server Status

RUNNING

Heap Usage



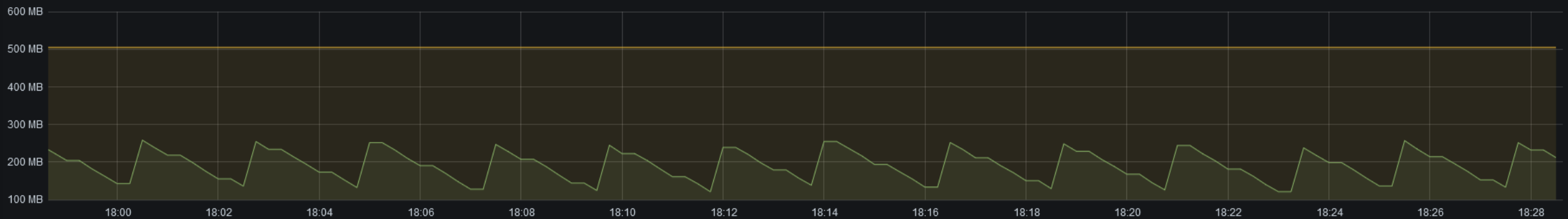
Running Time

2.2 day

Open Sockets

3

JVM Heap



Heap Free (managed-server1)

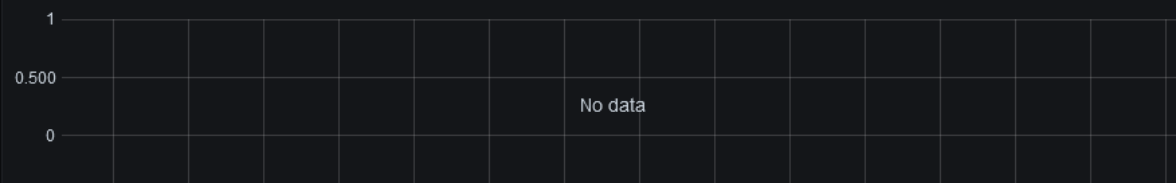
Heap Size (managed-server1)

	max	avg	current
Heap Free (managed-server1)	258 MB	191 MB	212 MB
Heap Size (managed-server1)	505 MB	505 MB	505 MB

CPU Load



Thread Pool

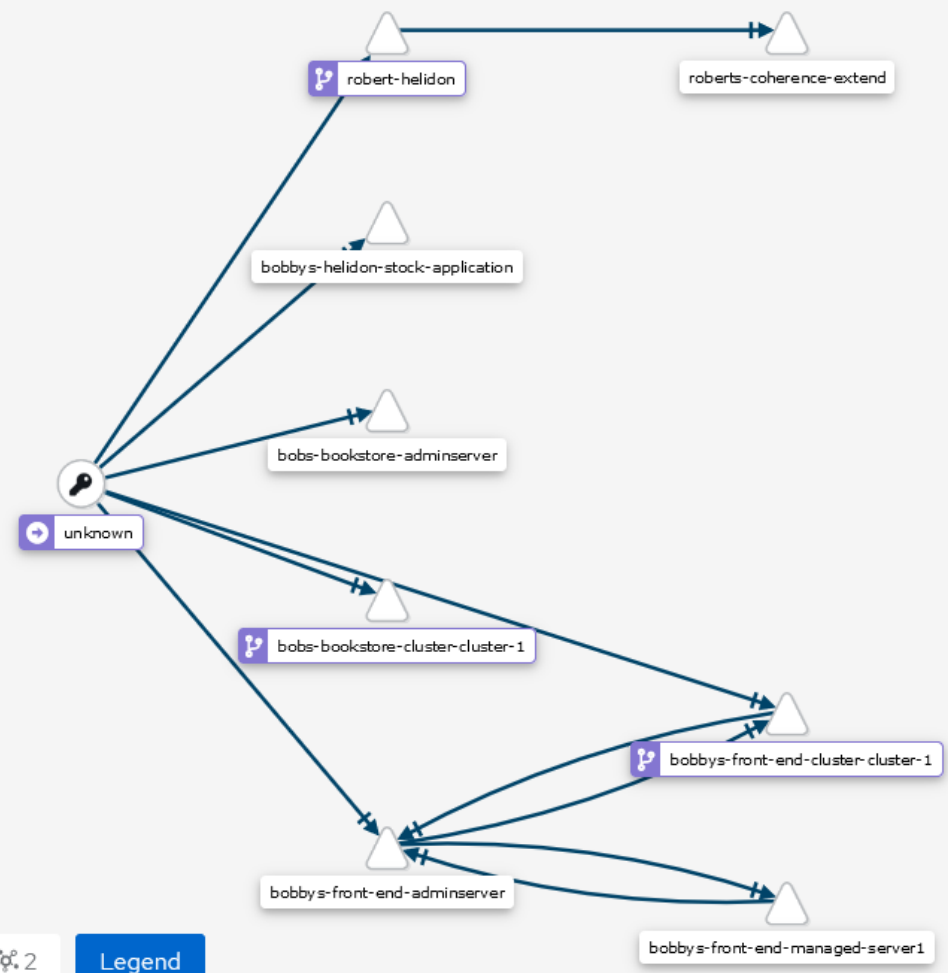


Namespace: bobs-books | Service graph

Last 1m

Display Find... Hide...

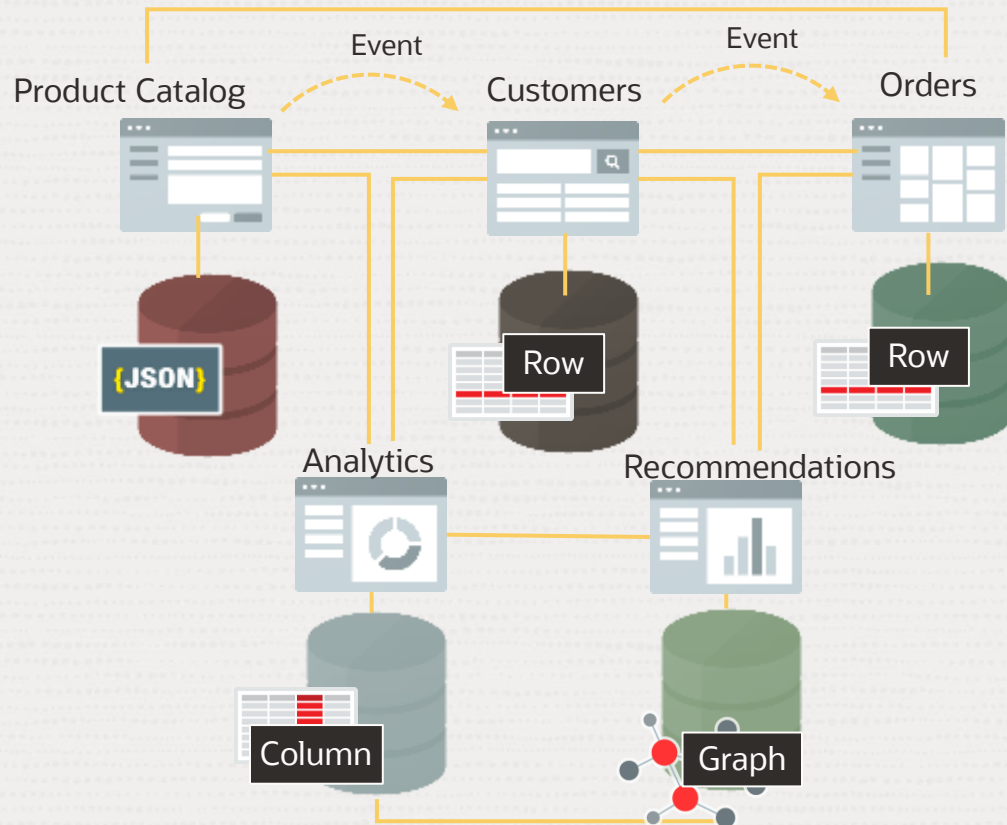
Oct 3, 06:29:45 PM ... 06:30:45 PM



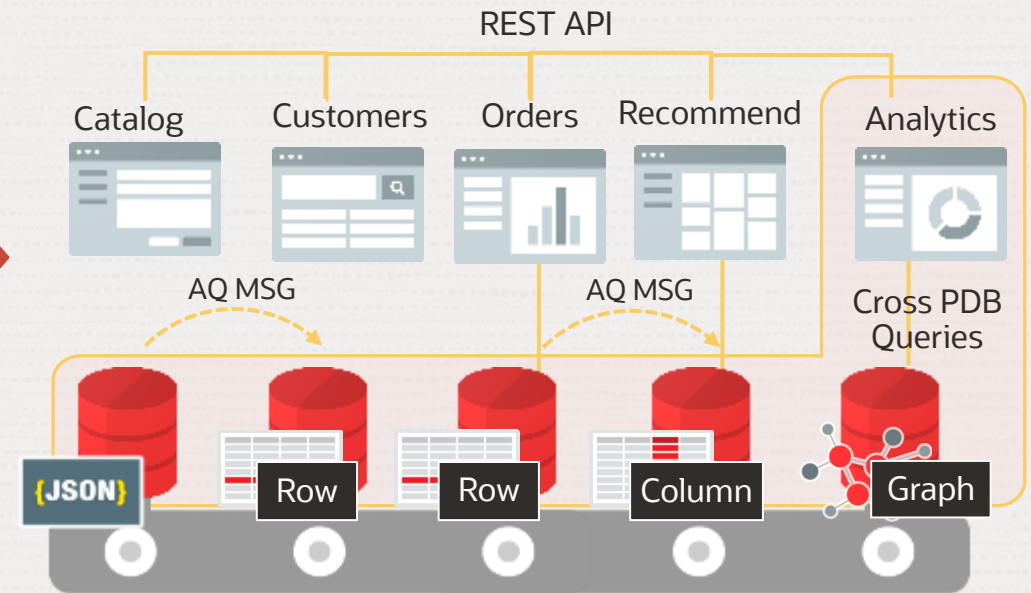
Current Graph:  
NS bobs-books  
8 services  
11 edges  
Inbound  
No inbound traffic.

# Simplifying Data Management for Cloud Native

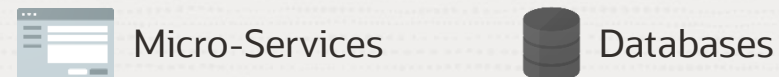
## Micro-Services with Multiple Self-Managed Databases



## Micro-Services with One Autonomous Database



## Autonomous Transaction Processing (ATP) Database



# Thank you!

## Additional Resources



### Next Steps:

- ✓ Try it:  
Free trial [signup.cloud.oracle.com](https://signup.cloud.oracle.com)  
Weblogic [cloudmarketplace.oracle.com/marketplace/listing/85491286](https://cloudmarketplace.oracle.com/marketplace/listing/85491286)  
[github.com/oracle/weblogic-image-tool](https://github.com/oracle/weblogic-image-tool)  
[graalvm.org](https://graalvm.org)  
[verrazzano.io/](https://verrazzano.io/)
- ✓ Hands on Labs:  
[bit.ly/golivelabs](https://bit.ly/golivelabs) :  
Oracle Verrazzano Fundamentals Workshop  
Search Documents and Images stored in Object Storage using OpenSearch, AI Vision, Text Recognition  
Luna Labs [luna.oracle.com](https://luna.oracle.com) for GraalVM
- ✓ Read more:  
[oracle.com/java/weblogic/weblogic-for-oracle-cloud-infrastructure](https://oracle.com/java/weblogic/weblogic-for-oracle-cloud-infrastructure)  
[oracle.com/verrazzano](https://oracle.com/verrazzano)
- ✓ Replay  
Modernizing your Application Development with Oracle  
[go.oracle.com/LP=101830](https://go.oracle.com/LP=101830)  
Helidon and Verrazzano: [youtu.be/iWCKGILhsxU](https://youtu.be/iWCKGILhsxU)
- ✓ Slack channel: [bit.ly/verrazzano-slack](https://bit.ly/verrazzano-slack)