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

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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

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Business Objectives and Challenges

Business:

- Agility
- Innovation at pace
- Business & Performance improvements

New digital channels

New business models

Support & Security

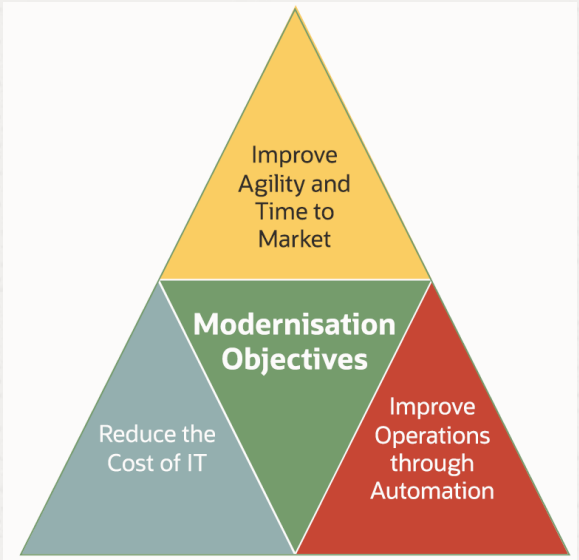
- Upper stack & Critical patches

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

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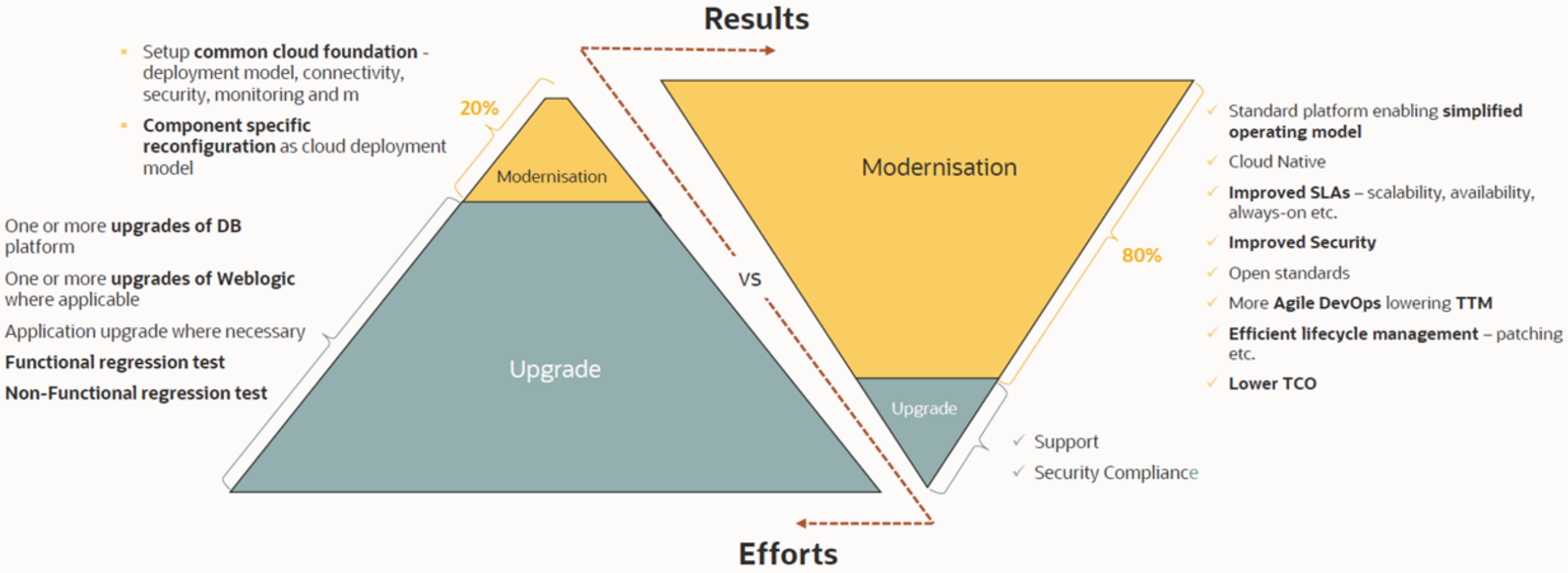
Additional effort in Modernization delivers many benefits



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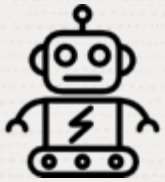
Benefits of Cloud

Resilience by design

Security by design

Elastic infra and pricing

High automation



Faster
time-to-market

Operational agility

Full observability

Extensible /
Opensource friendly

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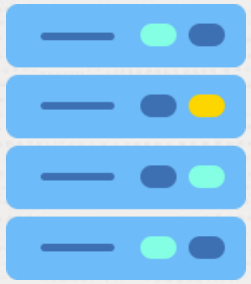
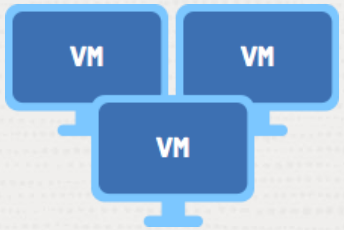
Cloud Deployment Options for your on-premises Applications

Technical point of view



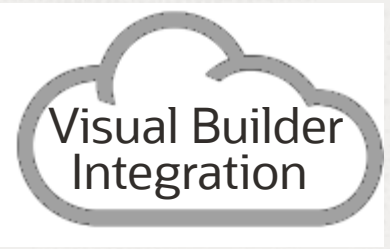
Bare Metal



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

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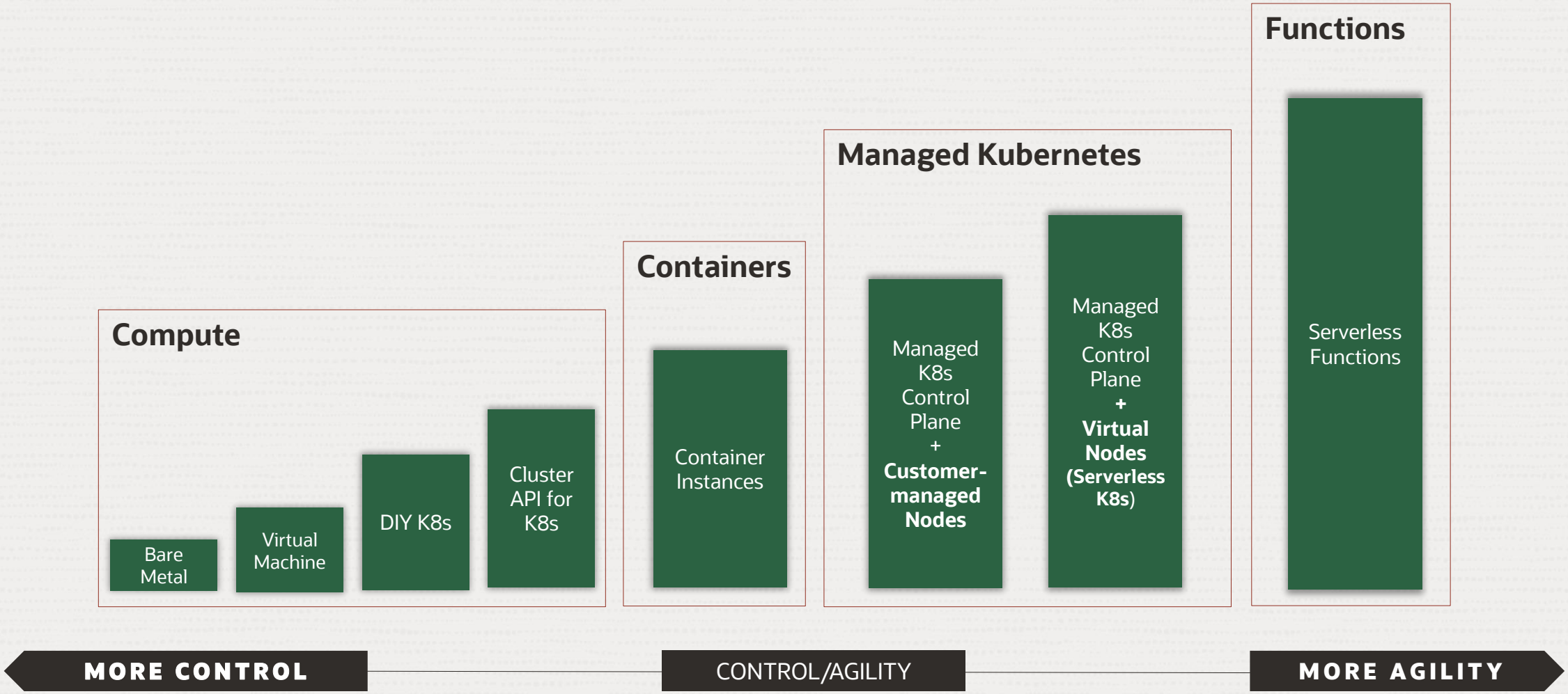
Cloud Deployment Options

More detail technical view



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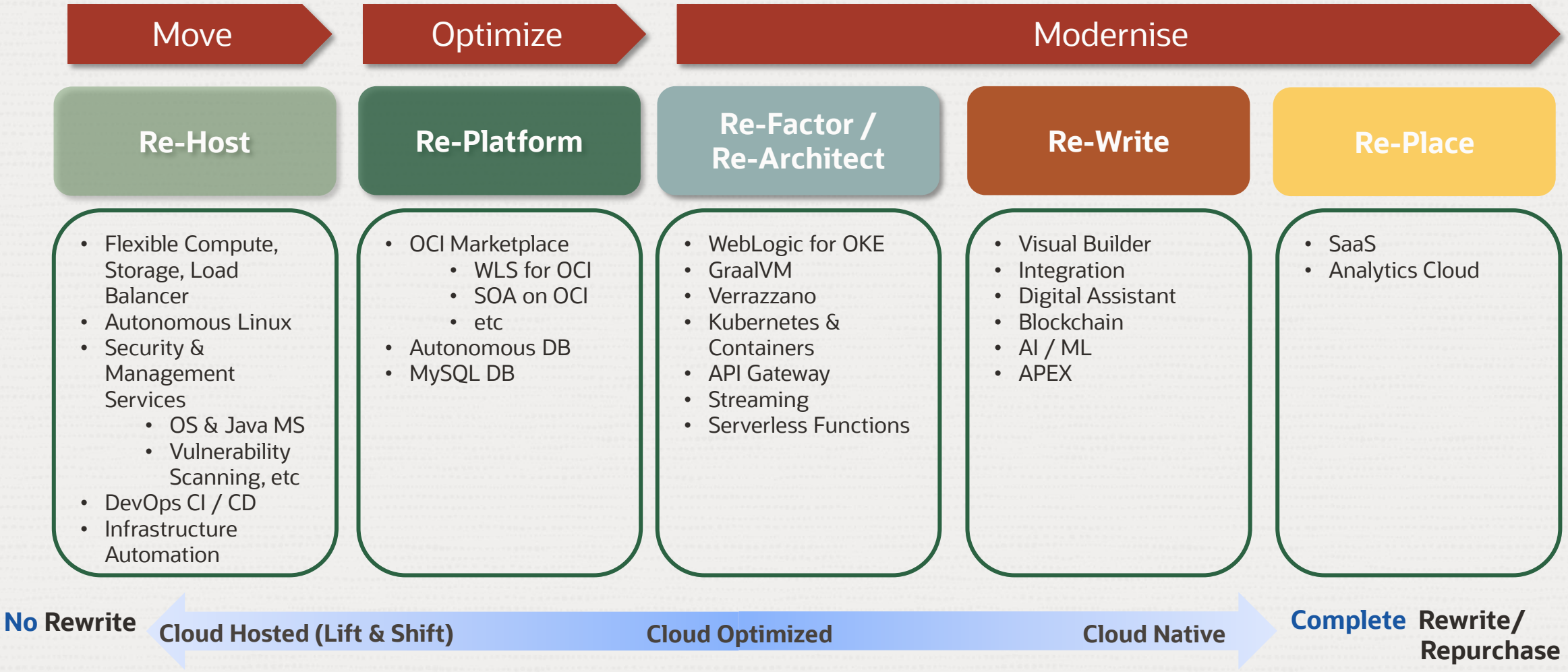
Migration Strategies for your on-premises Applications

6R's Oracle Cloud Perspective *



* Except Retain an Retire

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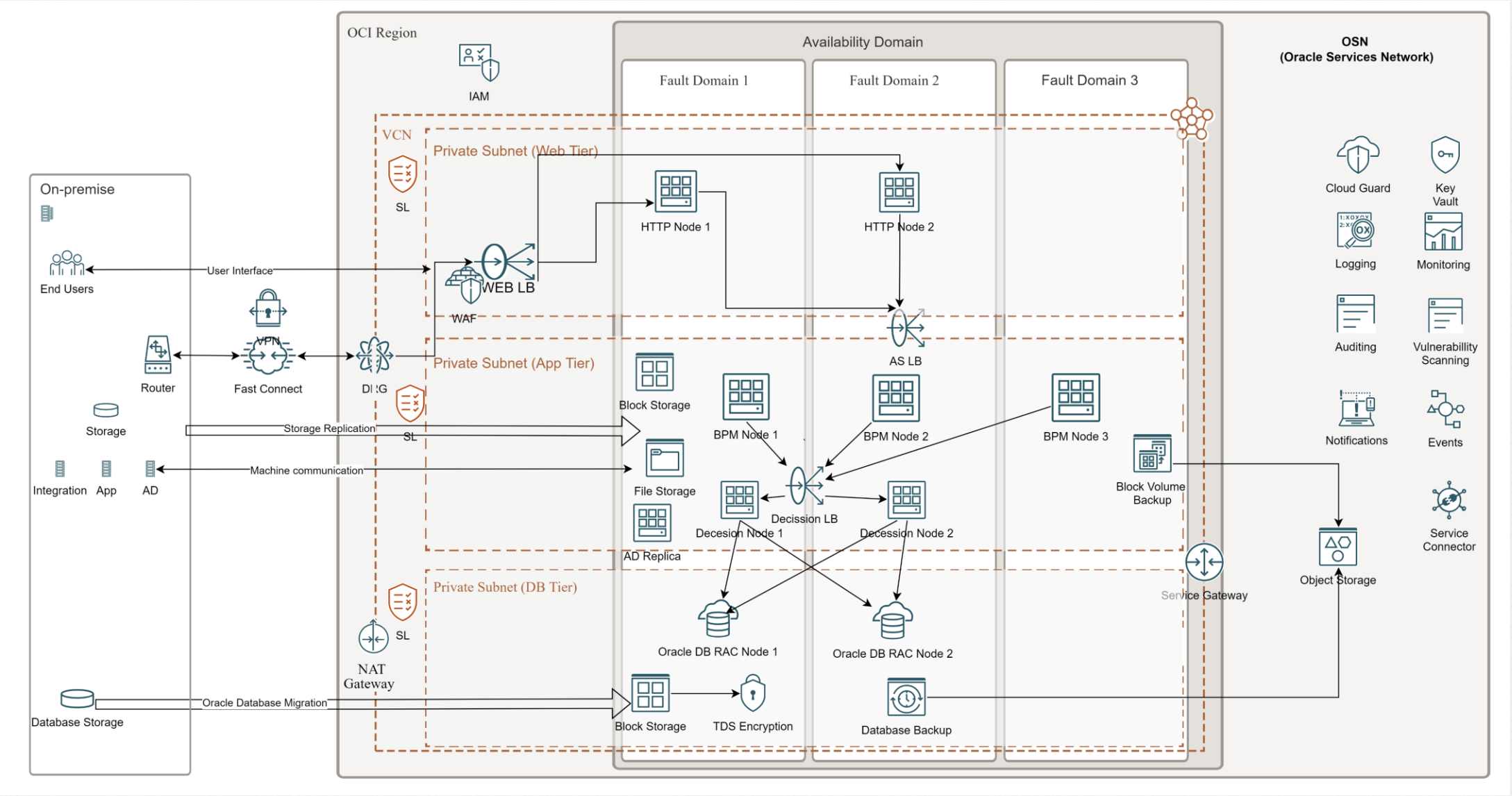
Re-hosting example

3 tier Application



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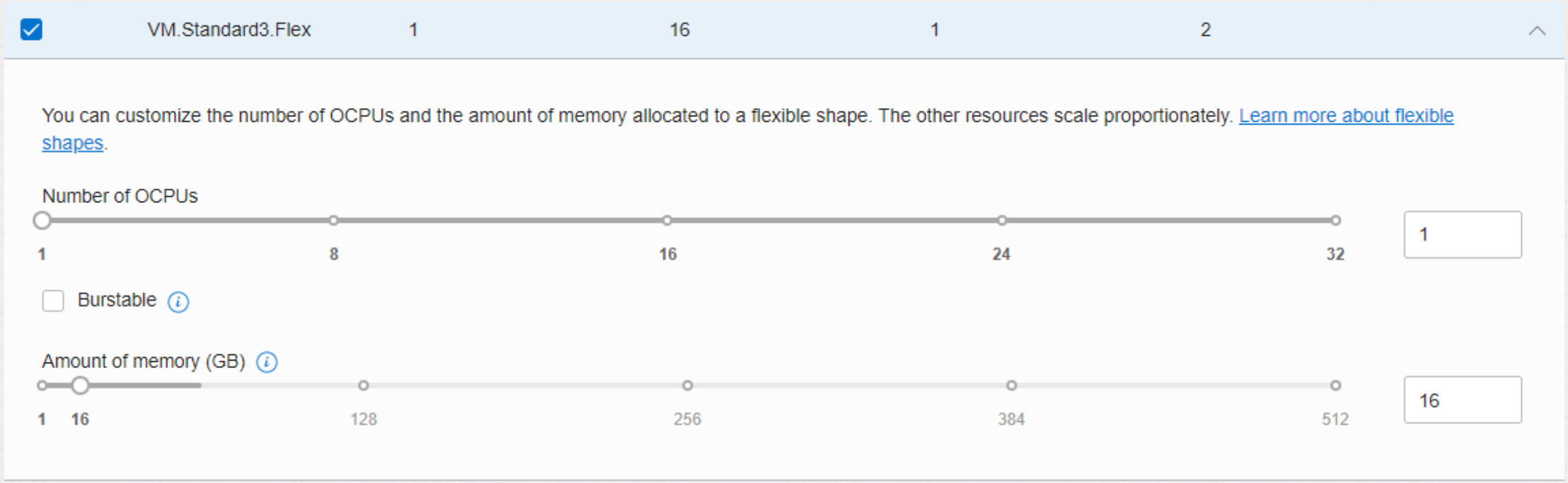
Flexible Compute Instances

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



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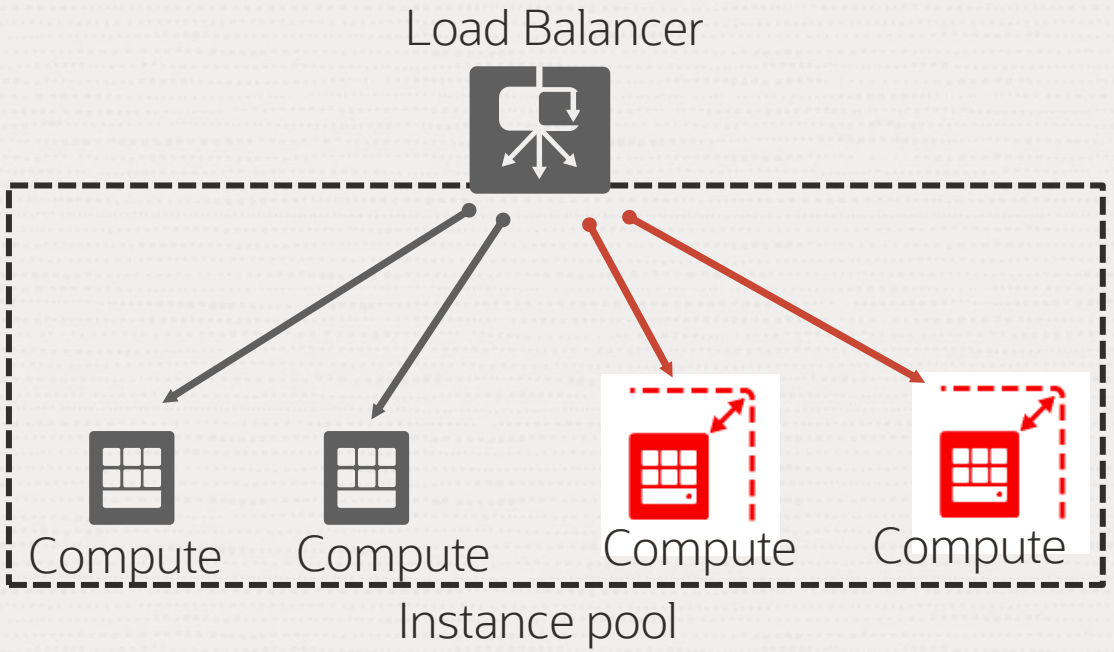
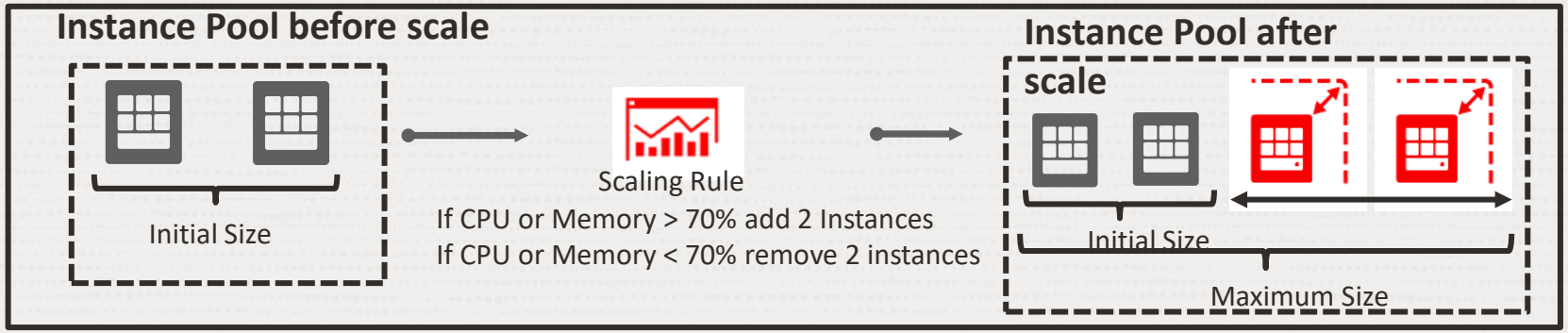
Fault Tolerance and Scalability

Compute Instances





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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

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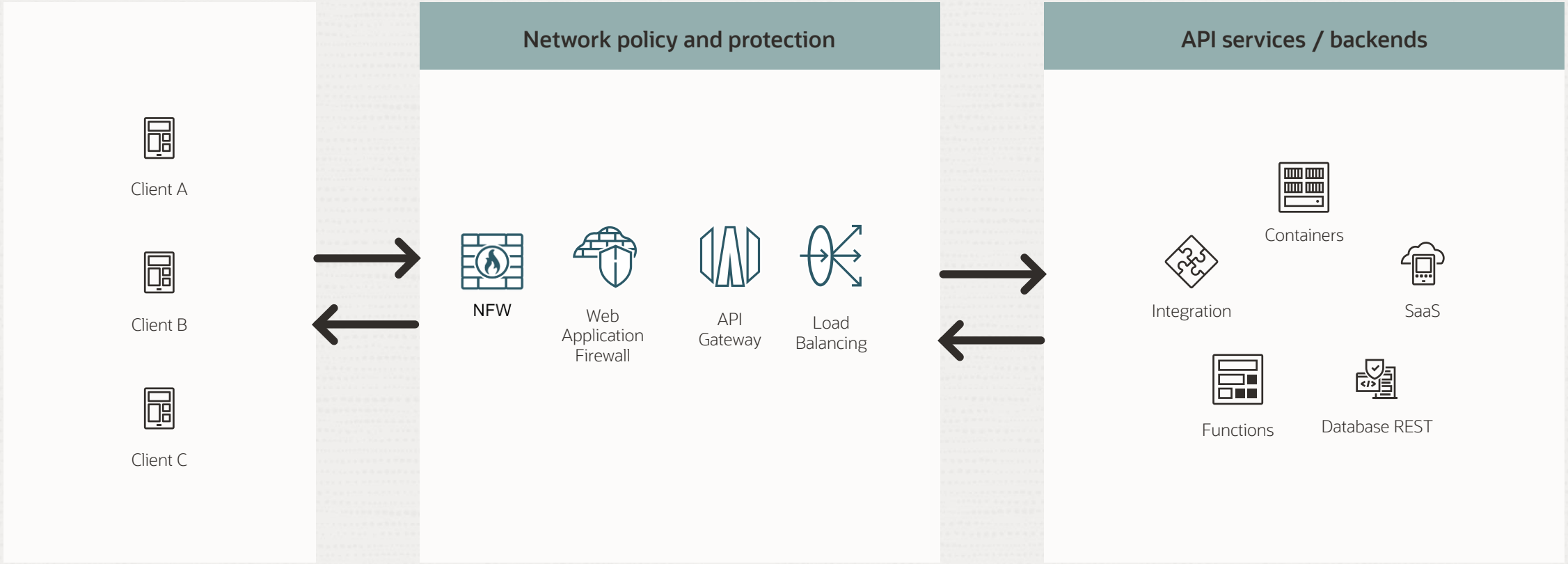
Cloud Deployment Protection

Network Security



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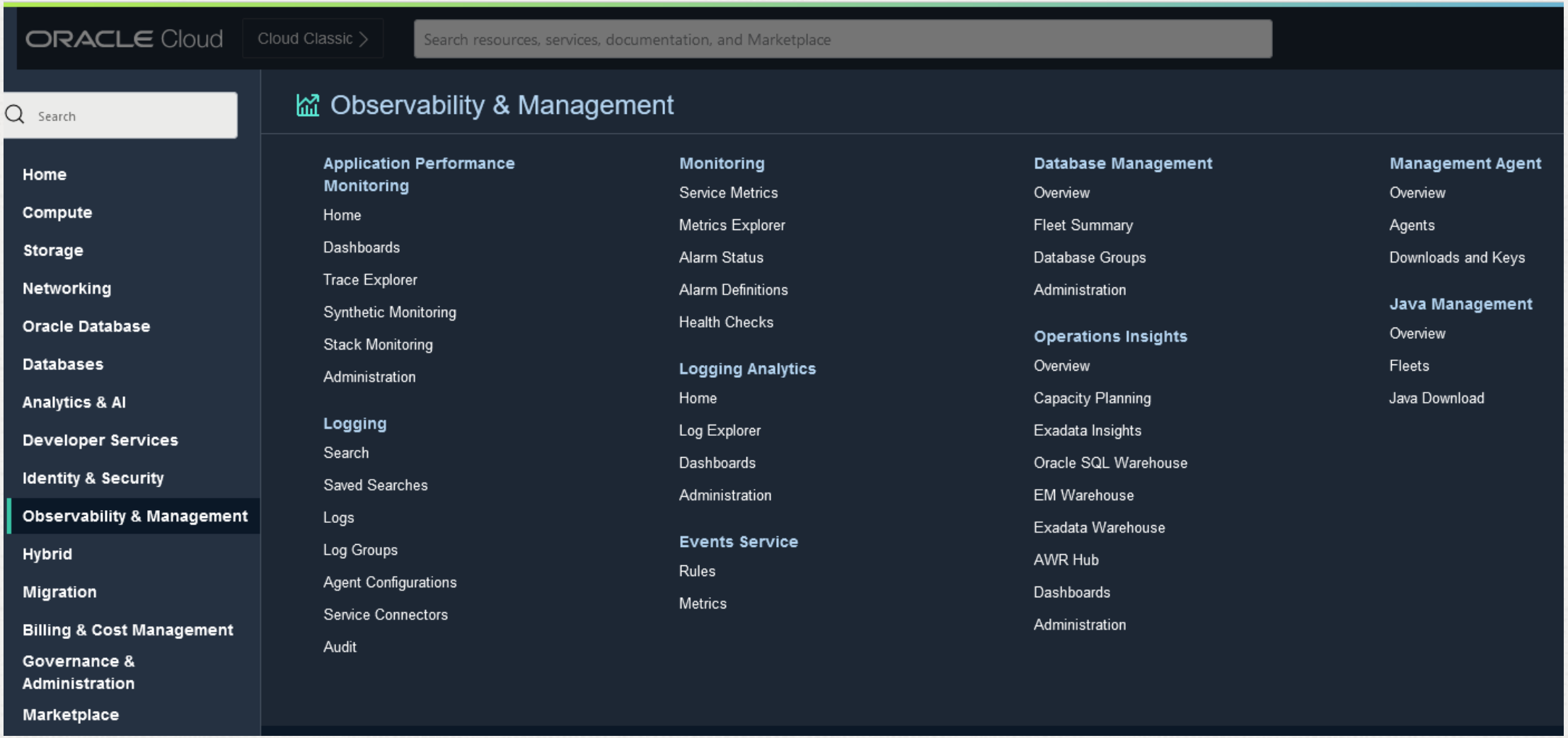
Observability and Management



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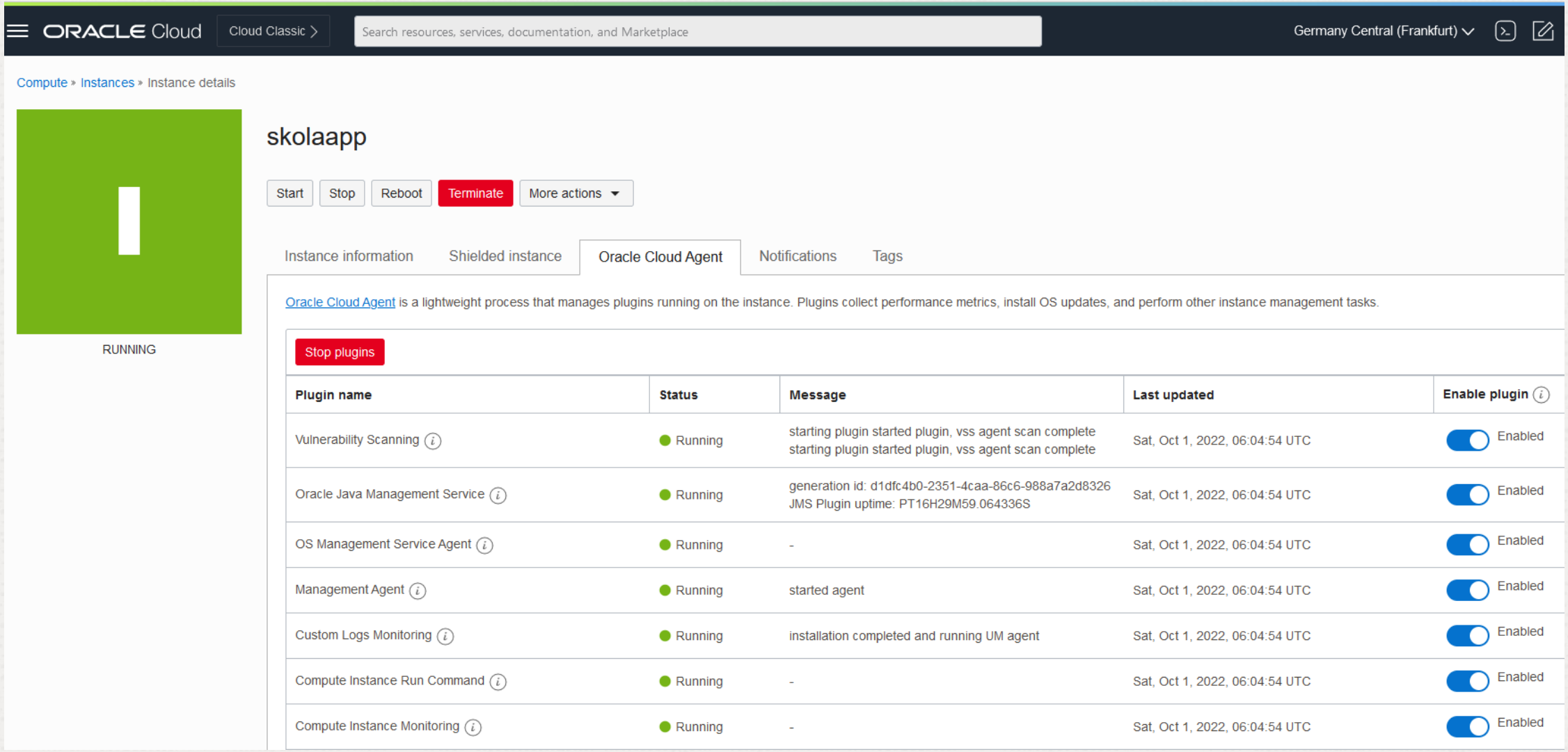
Observability and Security with Oracle Cloud Agent



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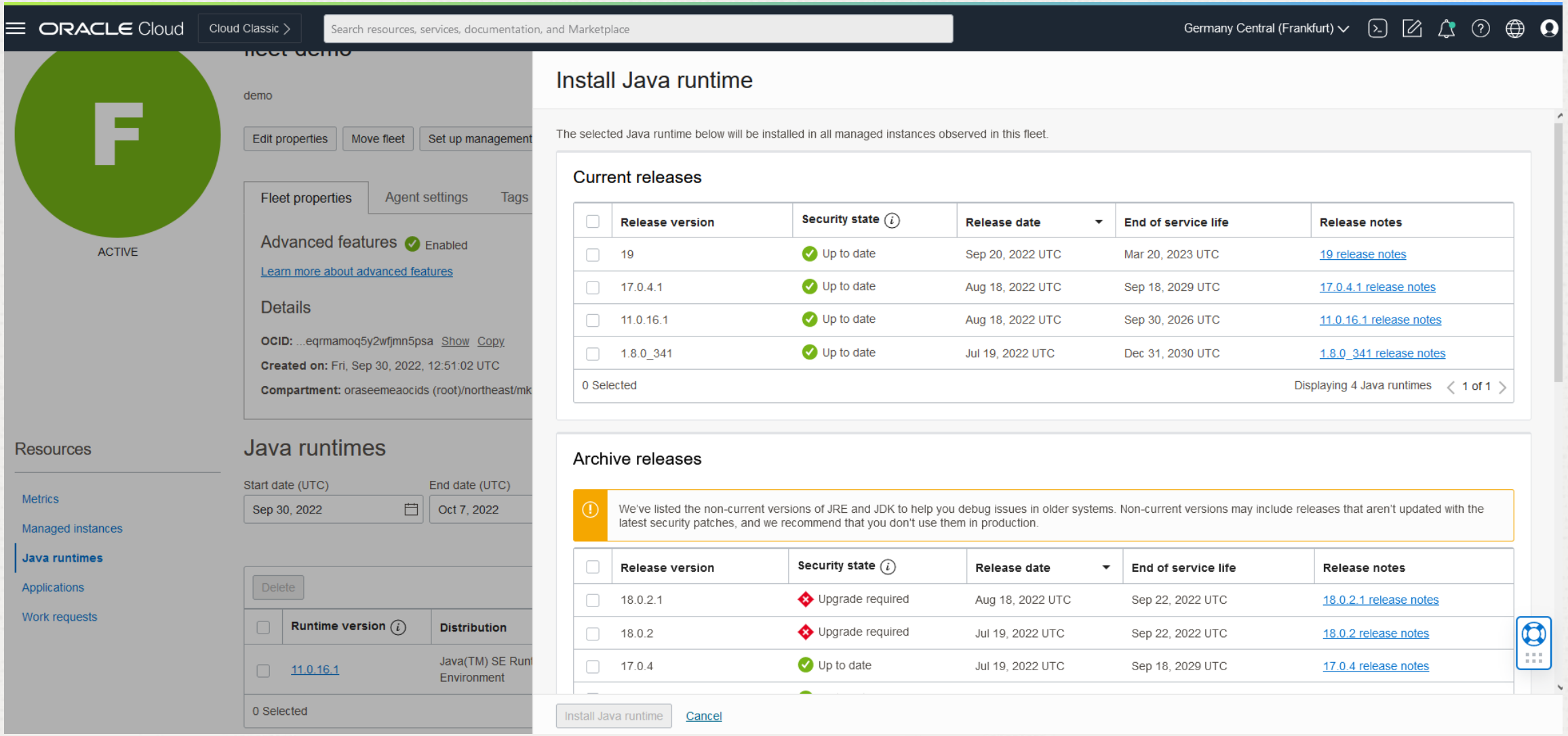
Java Management Service



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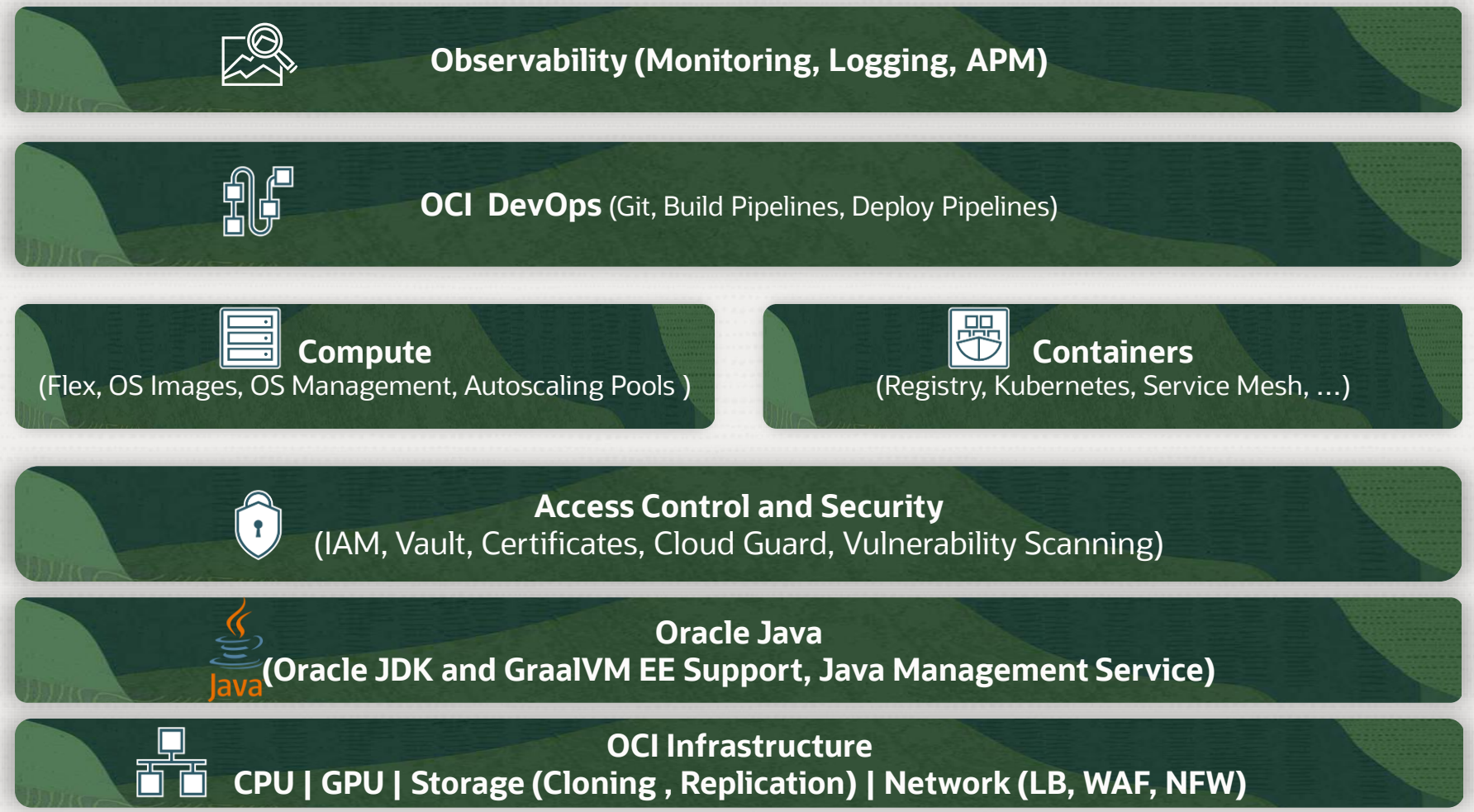
Benefits of moving Java application to OCI



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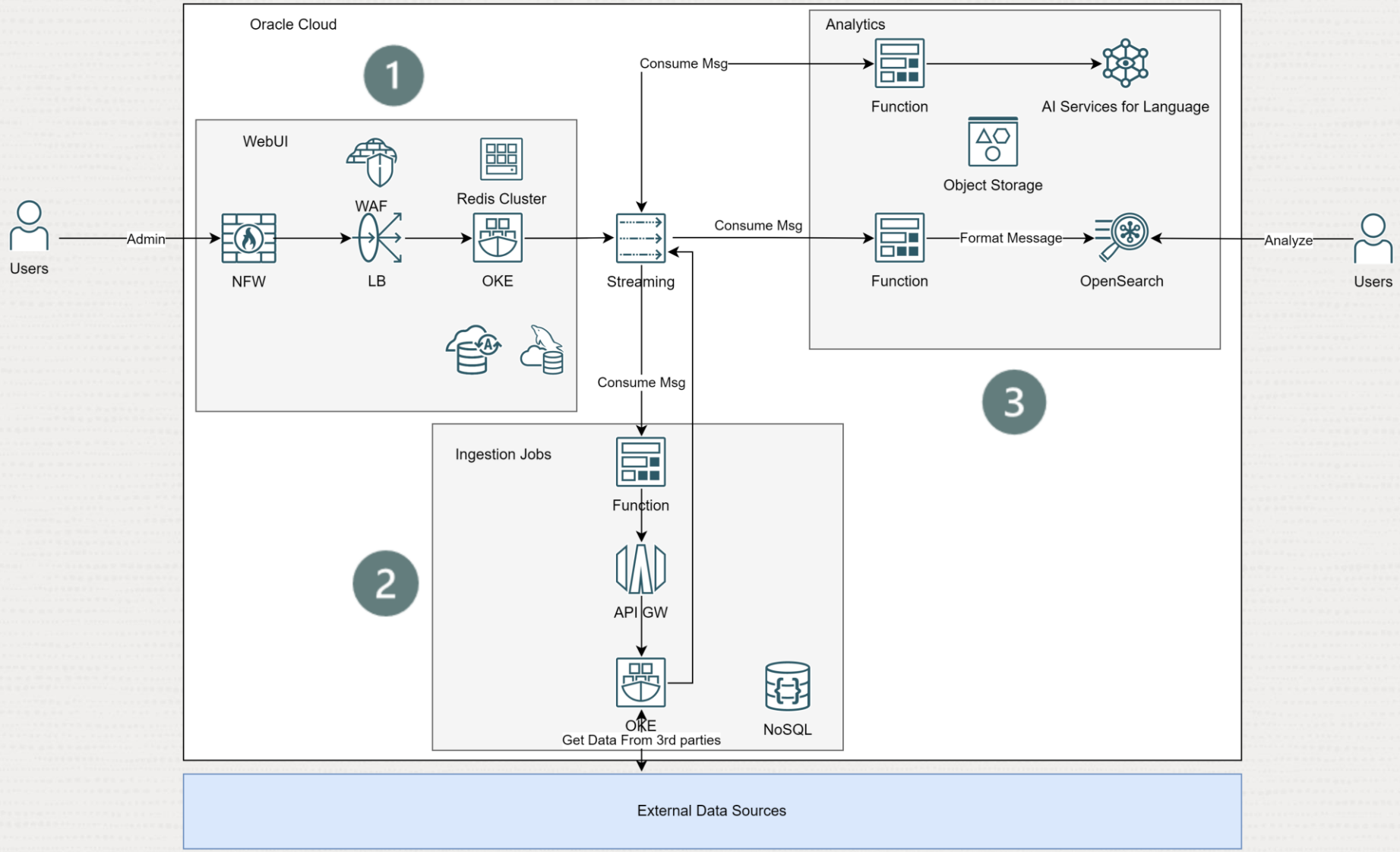
Re-platforming/factoring example

Data Ingestion and Analytics Multi-tenant (SaaS) Platform



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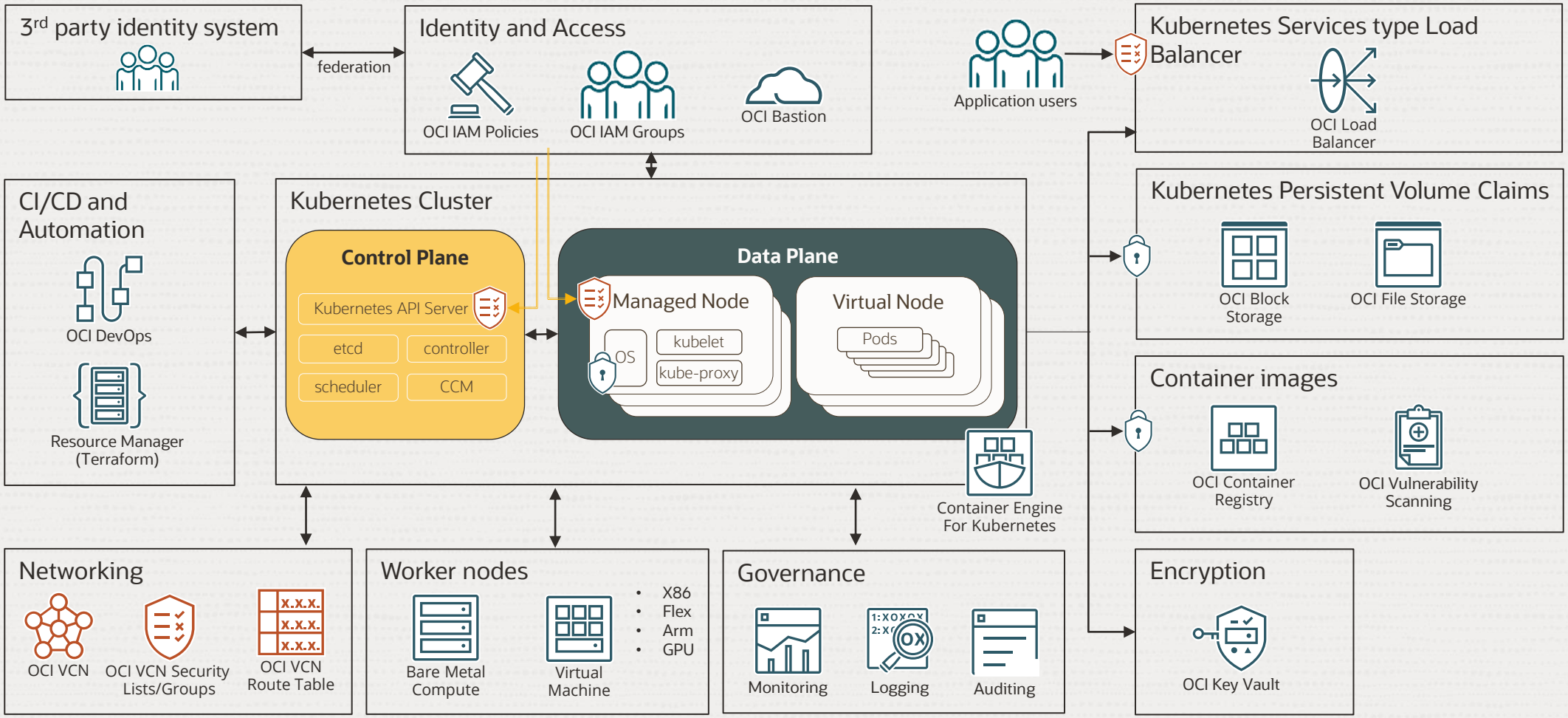
Kubernetes Cluster integration with other OCI services



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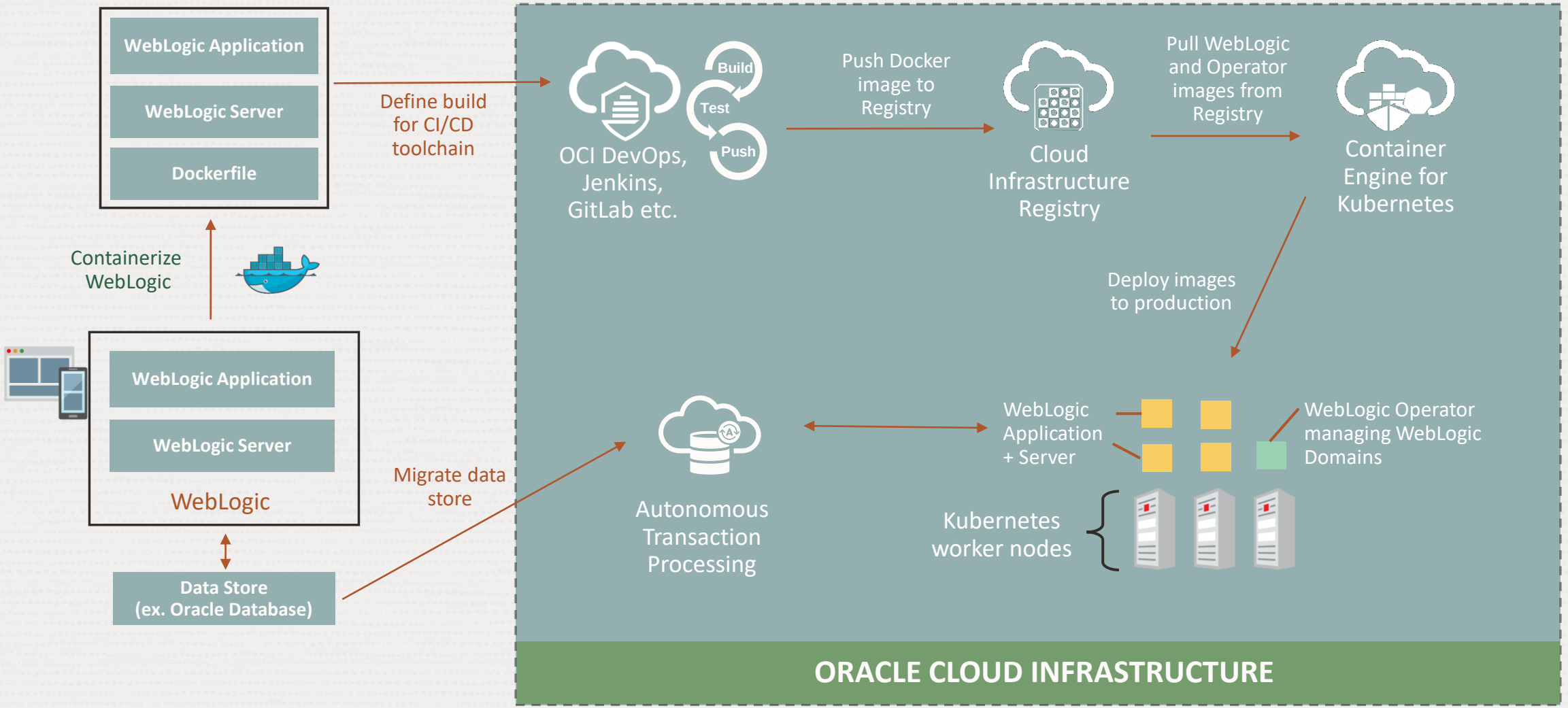
Re-platforming Weblogic Applications



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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

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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

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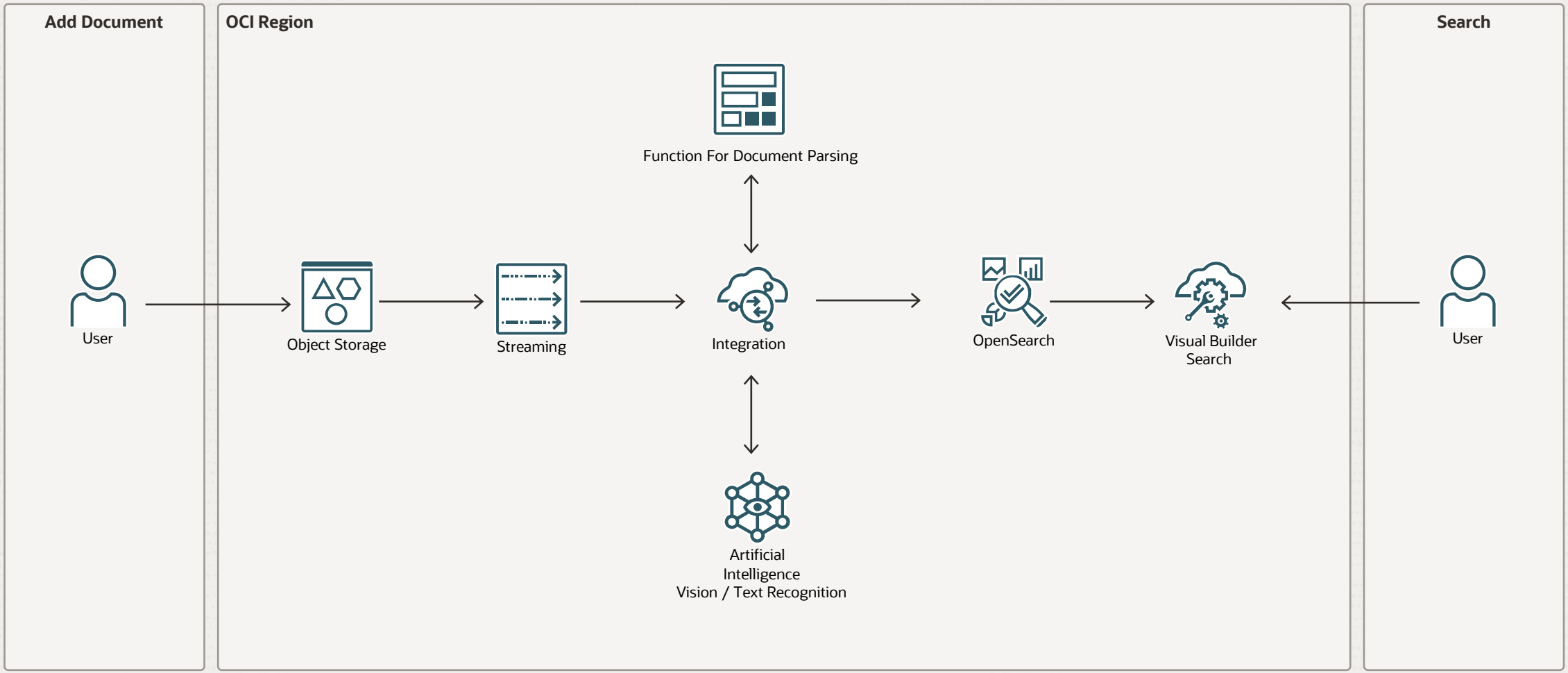
Re-writing example

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



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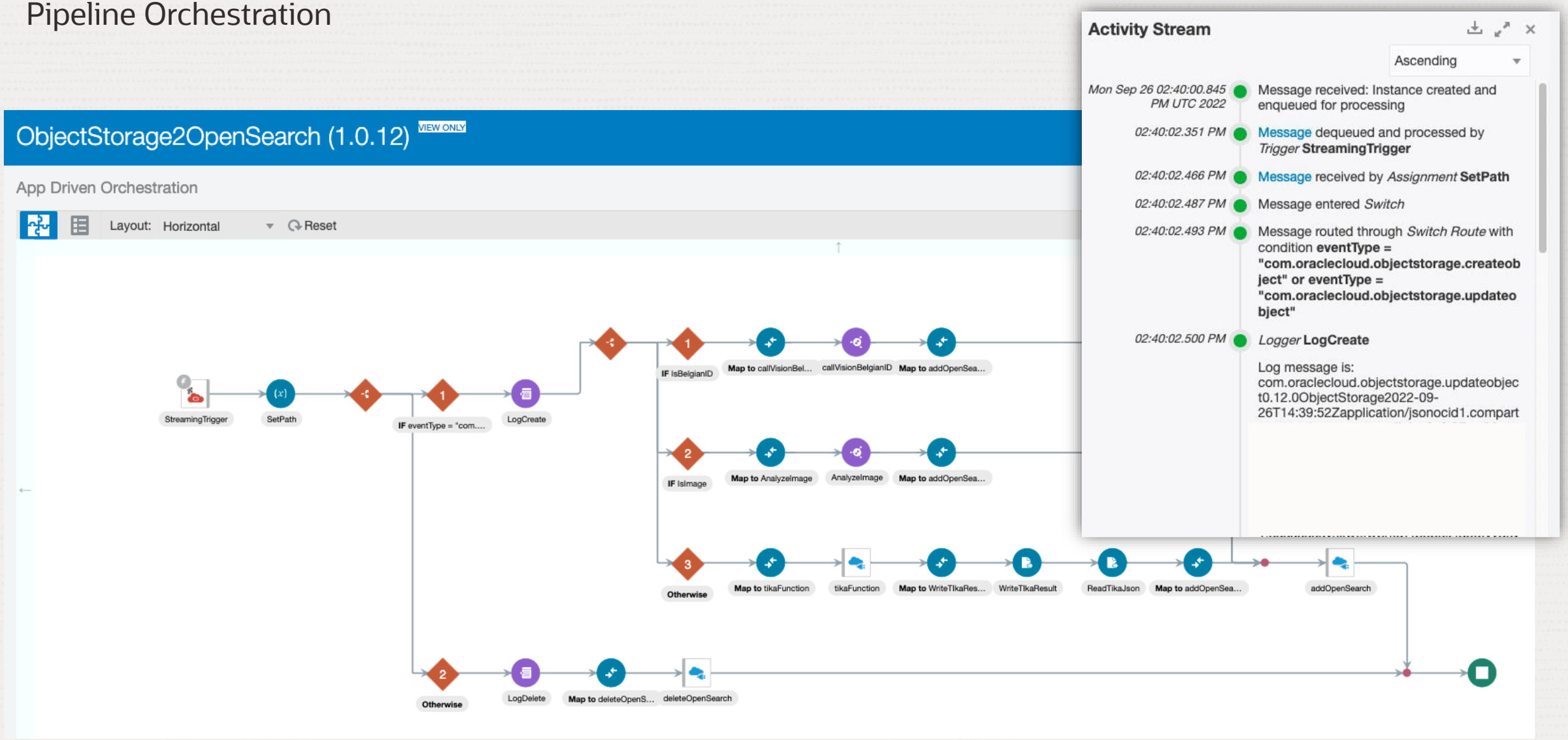
Oracle Integration

Pipeline Orchestration



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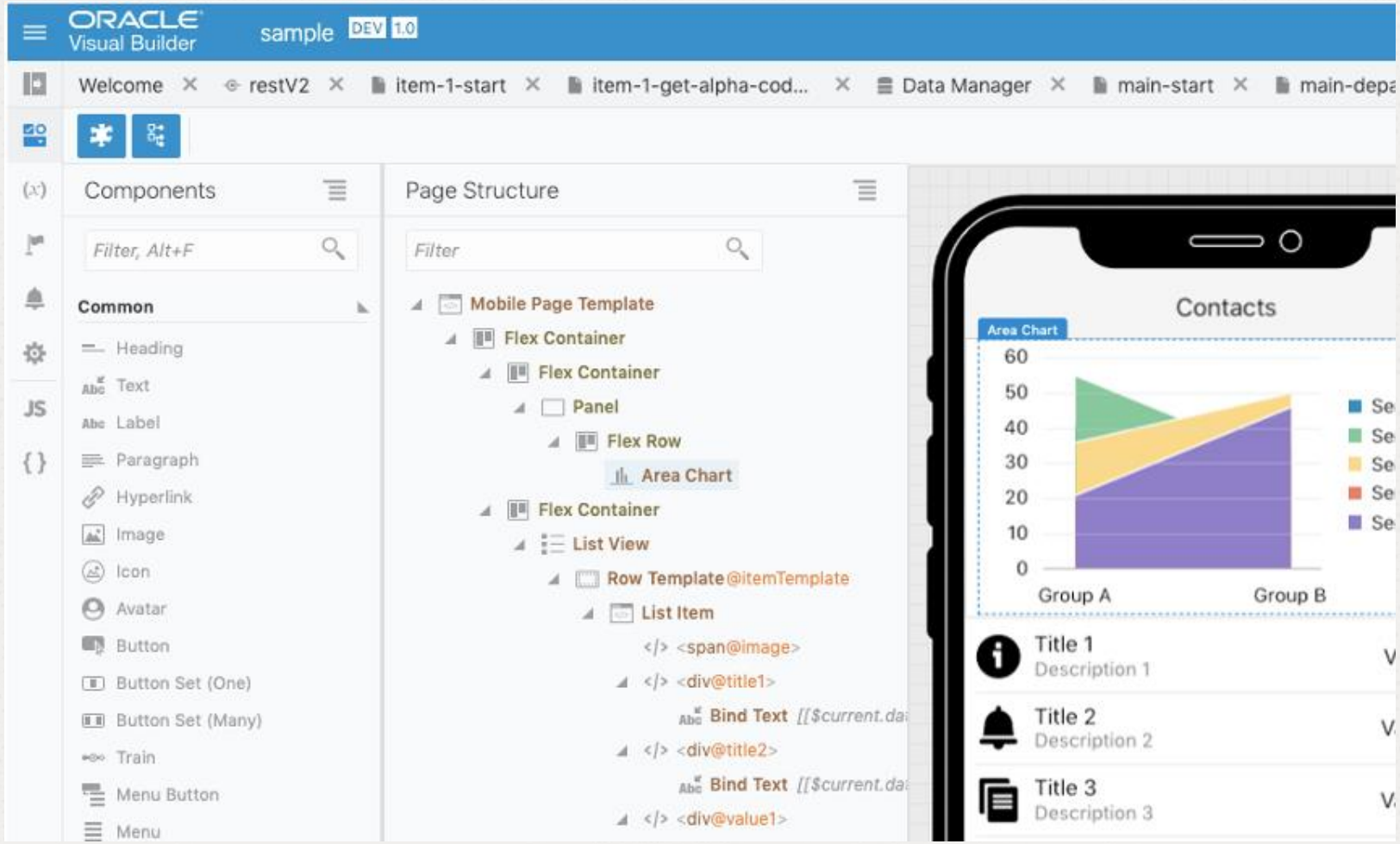
Visual Builder

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.

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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

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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

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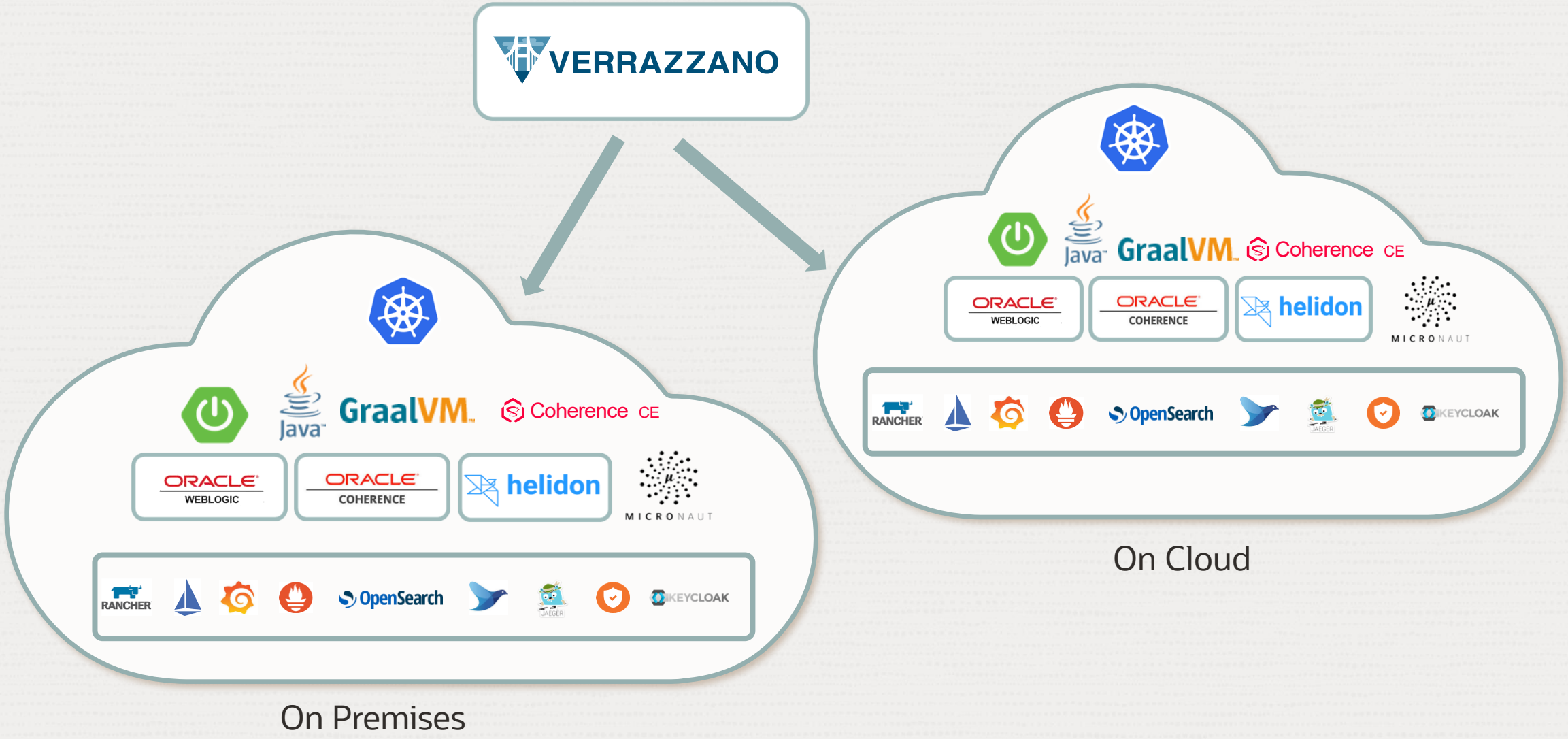
Oracle Verrazzano Enterprise Container Platform

What does it do?



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Demonstration

Build Weblogic container and deploy to Kubernetes managed by Verrazzano

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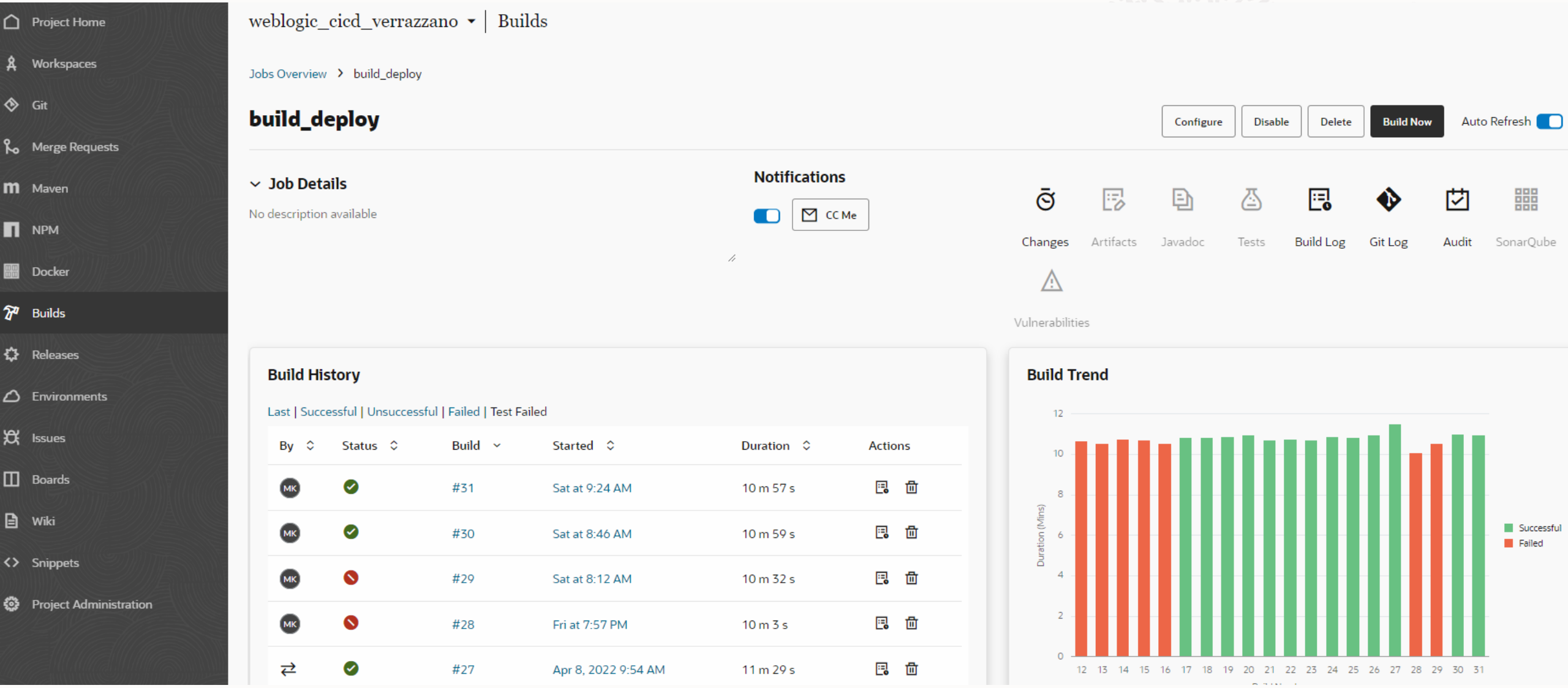

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```
cd vtest
mvn package
```

```
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
```

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Enter author name

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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)

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

Bill Watterson

Rating: 4.75 (based on 22351 reviews)

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Complete Harry Potter Boxed Set

J.K. Rowling

Rating: 4.74 (based on 190050 reviews)

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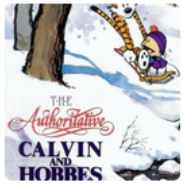

The Authoritative Calvin and Hobbes

Bill Watterson

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Harry Potter Collection (Harry Potter #1-6)

J.K. Rowling

Rating: 4.73 (based on 24618 reviews)

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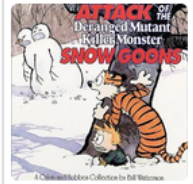

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The Days Are Just Packed: A Calvin and Hobbes Collection

Bill Watterson

Rating: 4.68 (based on 19143 reviews)

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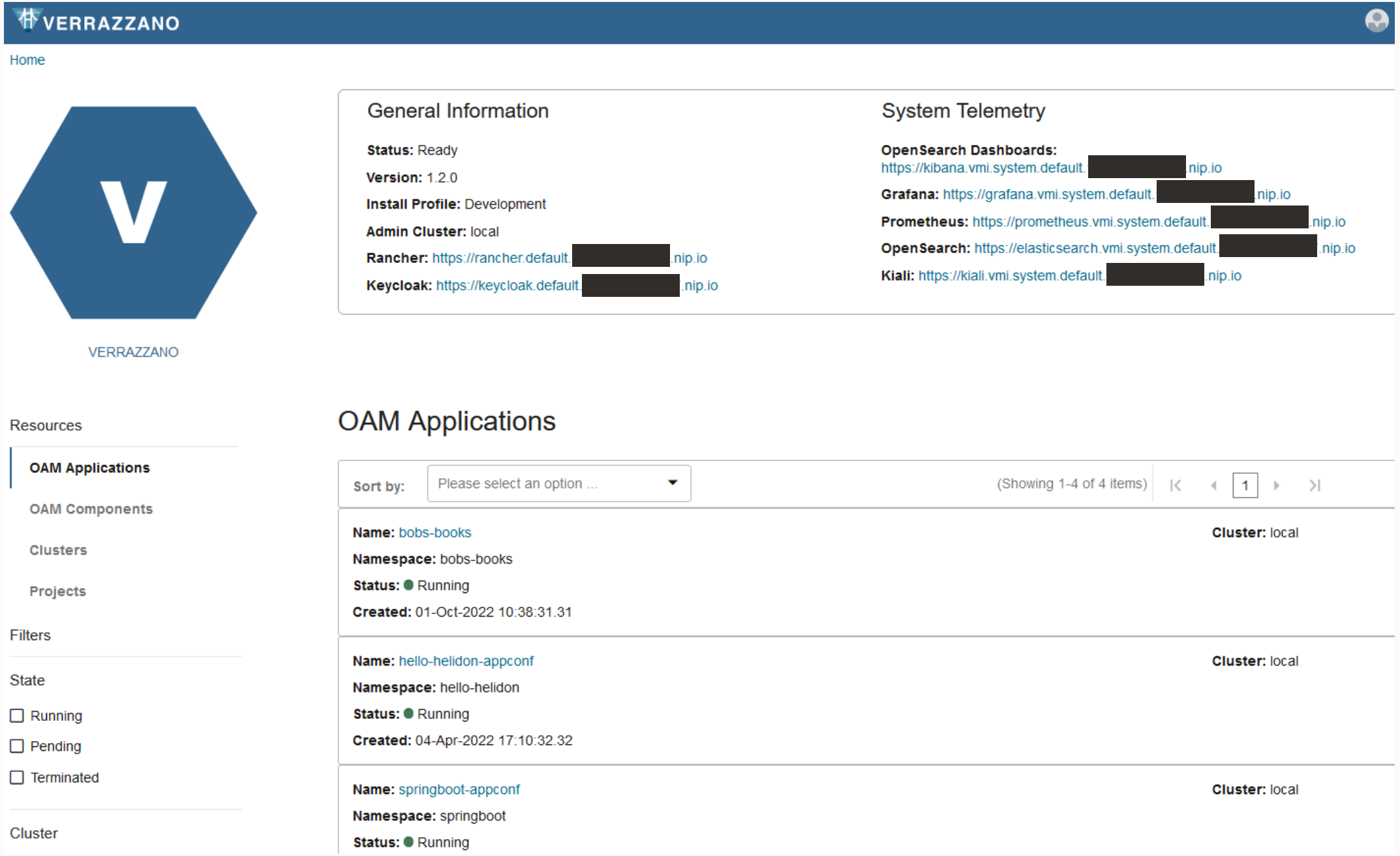

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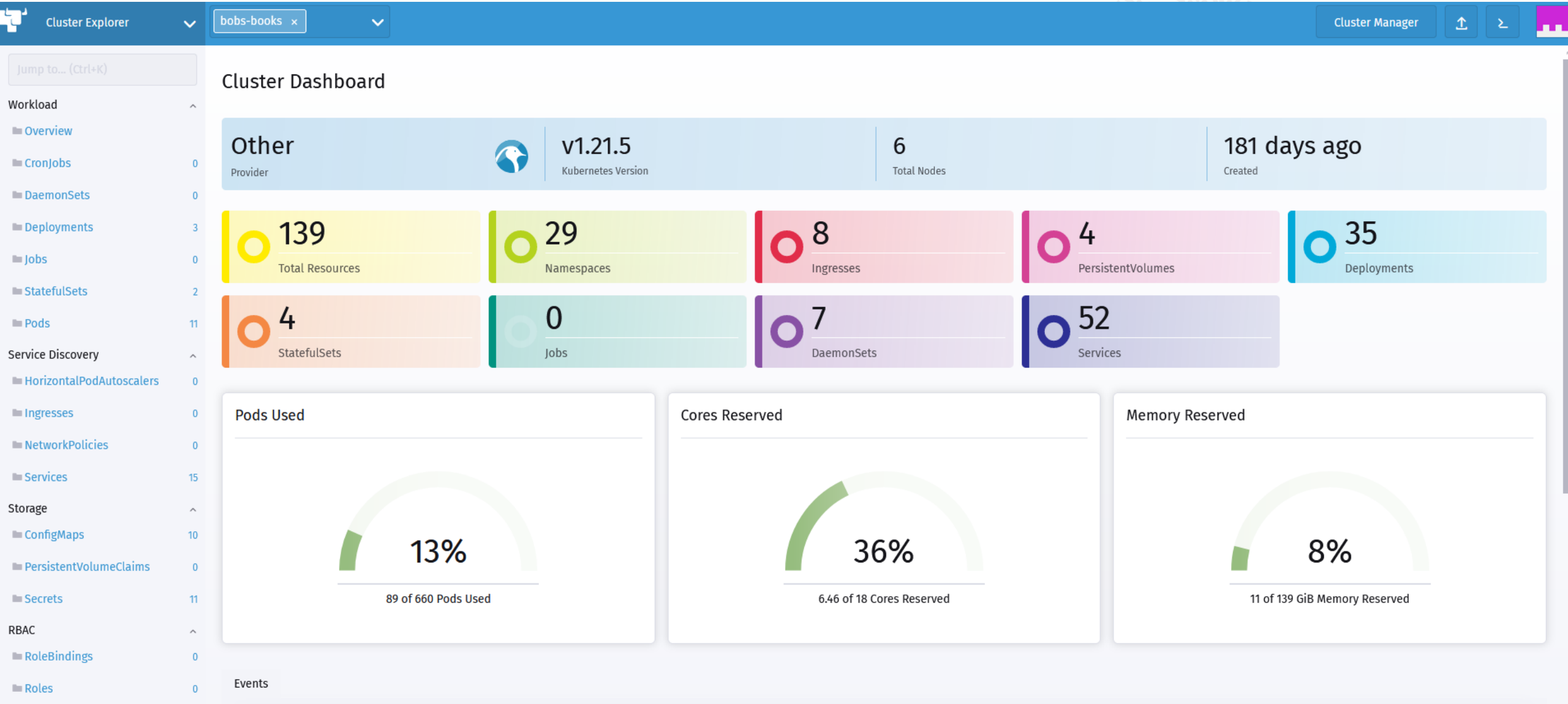

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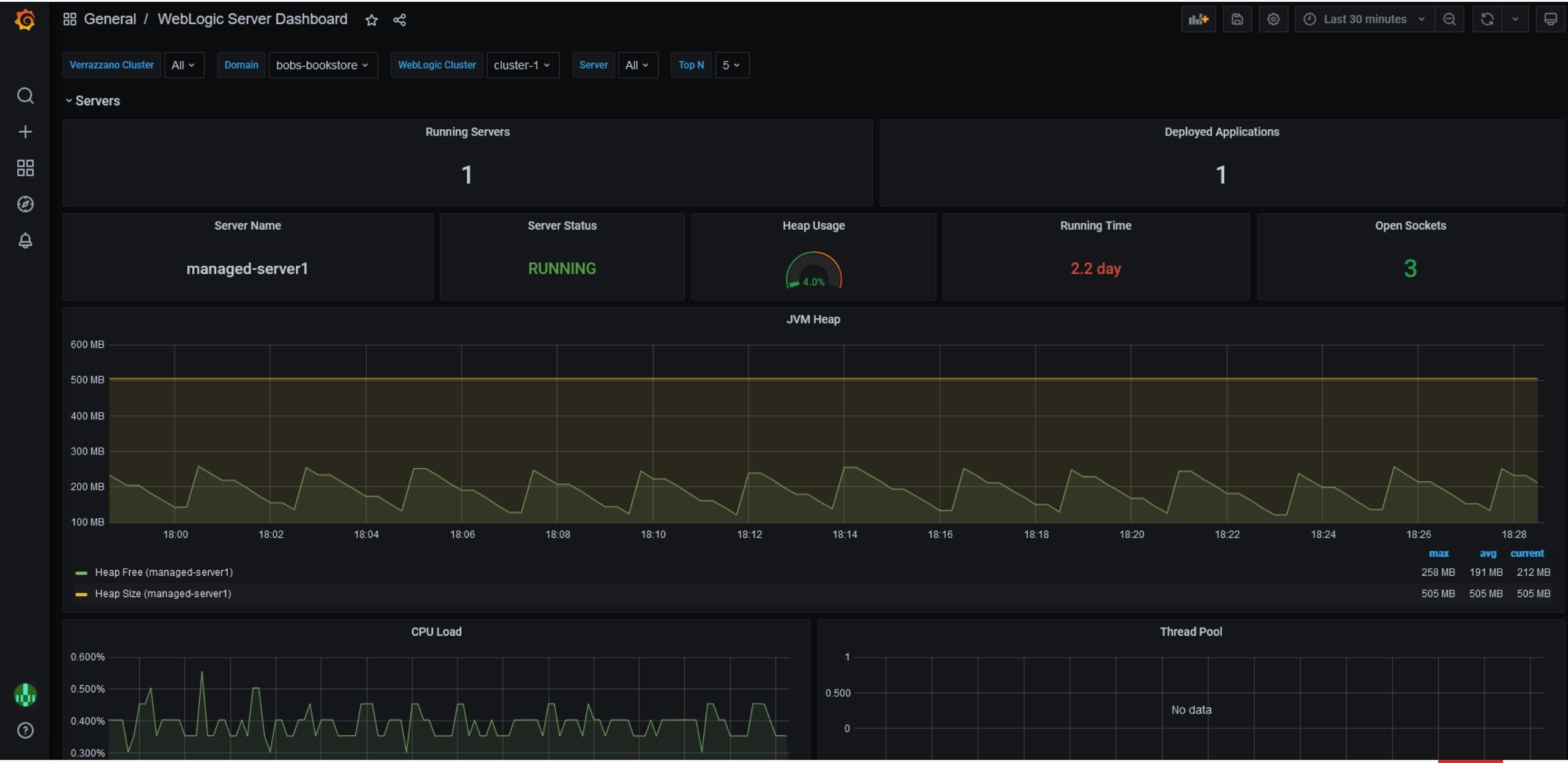

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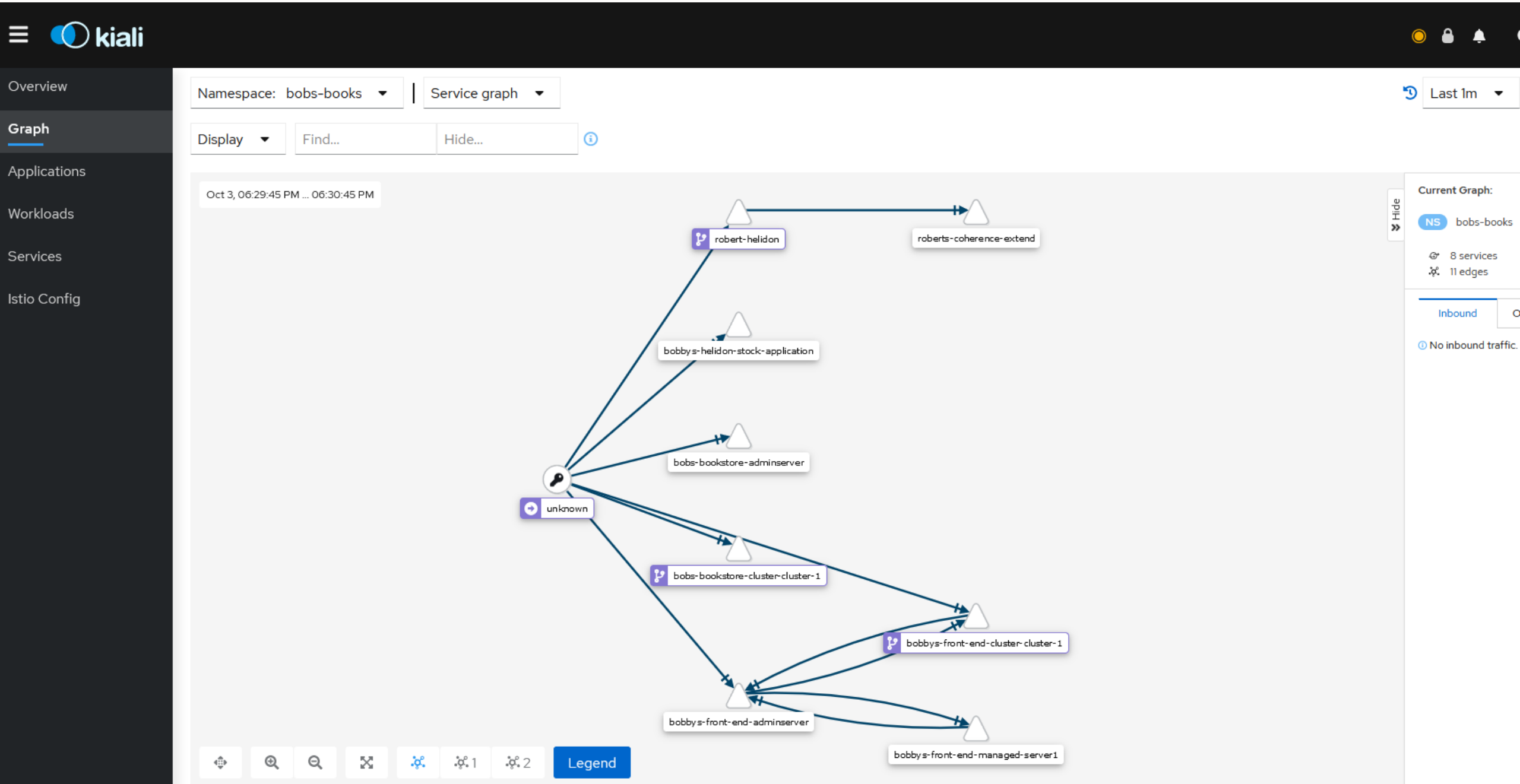

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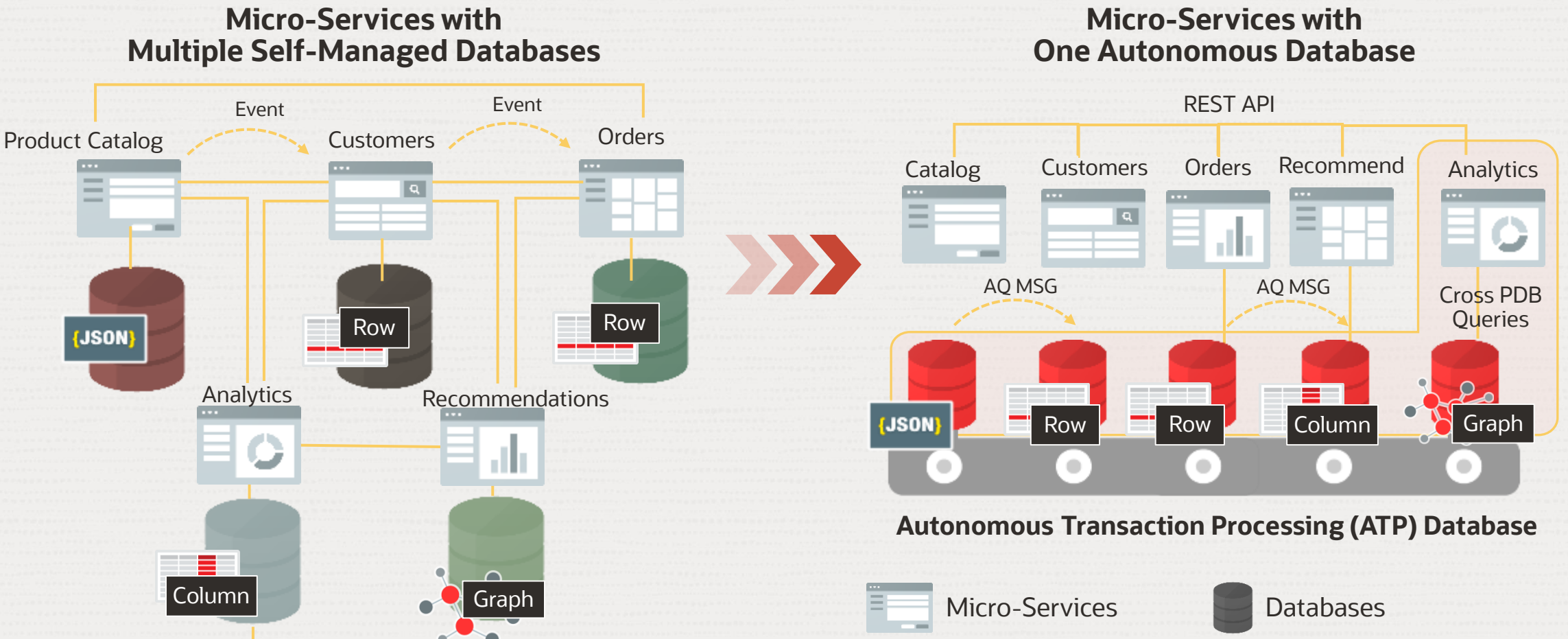
Simplifying Data Management for Cloud Native



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Thank you!
Additional Resources

Next Steps:

- ✓ Try it:
  Free trial signup.cloud.oracle.com
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  github.com/oracle/weblogic-image-tool
  graalvm.org
  verrazzano.io/

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- ✓ Slack channel: bit.ly/verrazzano-slack

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