



# Oracle Enterprise Cloud Native Java

Modernizing Enterprise Java Applications using Weblogic Server  
Applications and Helidon Microservices

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September 30, 2020

## Safe Harbor

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# Oracle WebLogic Server and Coherence Have Powered The Most Demanding Enterprise Applications



Scale and Performance



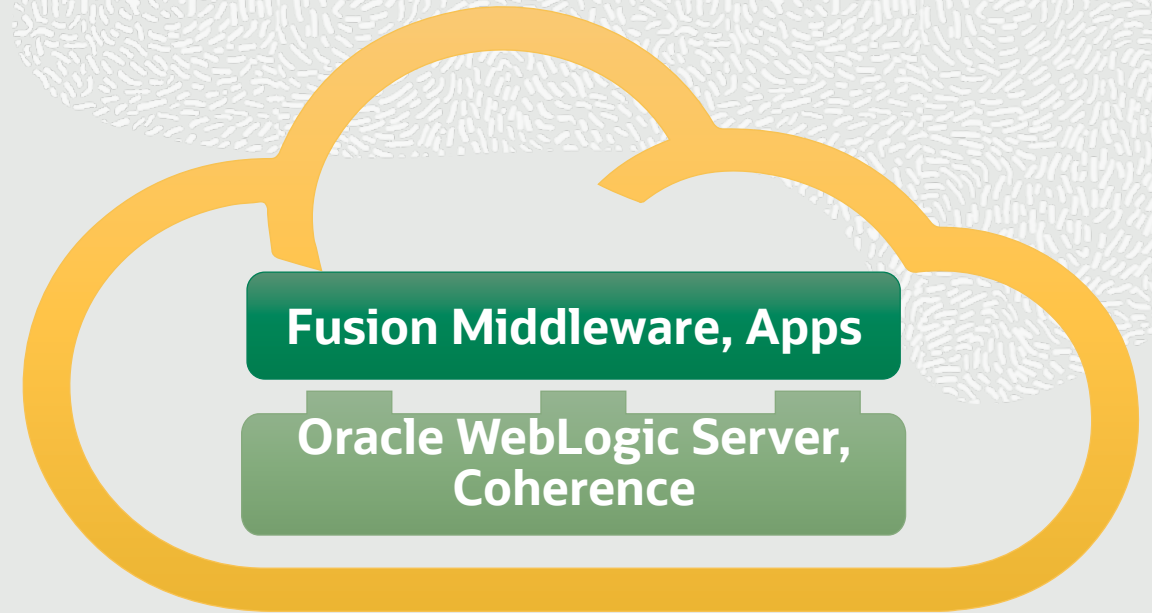
Robustness and Availability



Operational Simplicity and Efficiency

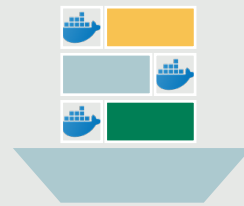


Proven, Secure, Integrated

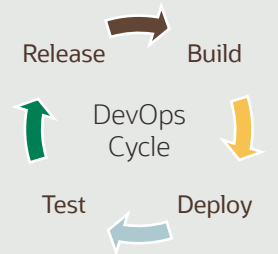


# The Enterprise Application World Is Changing

Cloud Native **Container** Deployments That Run Anywhere



Open Source **DevOps** Tool Chains

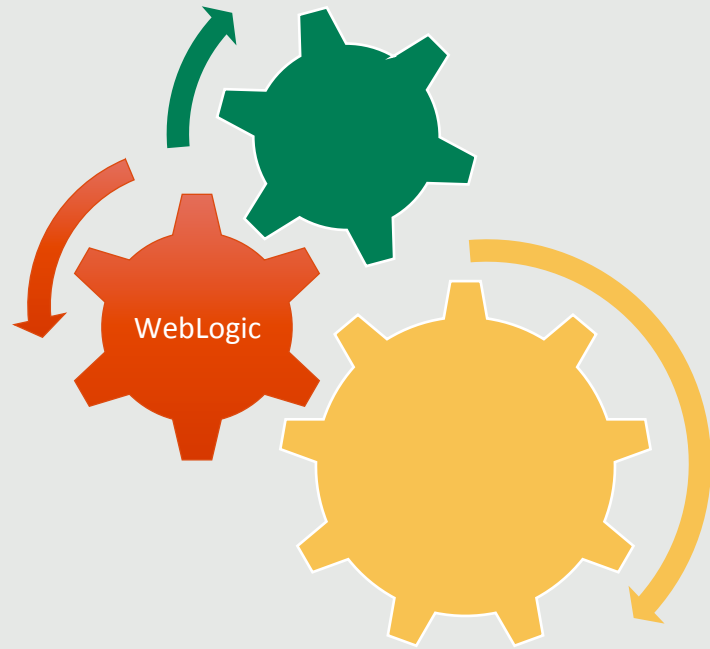


**Microservices** and “Serverless” Applications



“**Polyglot**” Applications That Use Multiple Languages



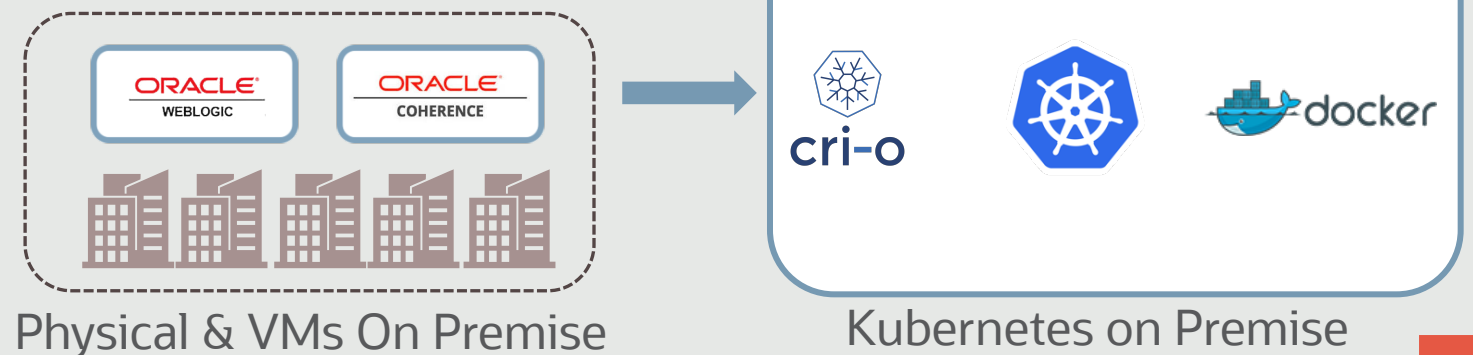


- ✓ Modernize enterprise Java applications
- ✓ Adopt new operational models
- ✓ Run your applications anywhere
- ✓ Move forward at your own pace

## How Do You Combine The Best Of Both Worlds?

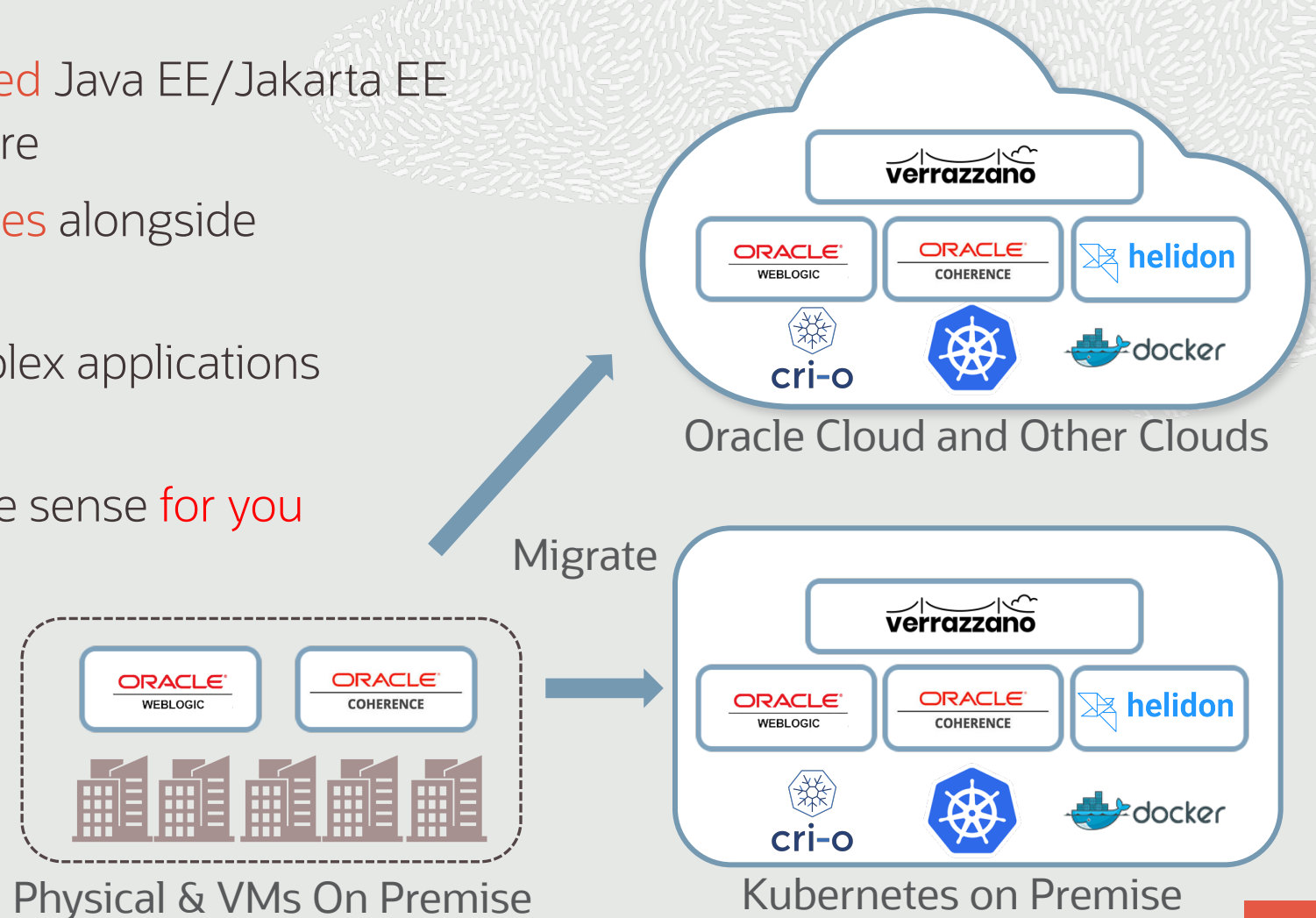
# Customer Question: How Can Oracle Help Us....

- Migrate traditional applications to containers, Kubernetes
- Evolve applications and adopt microservices
- Manage this changing environment



# Oracle Enterprise Cloud Native Java

- Build and deploy **containerized** Java EE/Jakarta EE applications that run anywhere
- Build and deploy **microservices** alongside traditional applications
- Easily run and manage complex applications **combining existing and new**
- Select an approach that make sense **for you**



# Oracle Enterprise Cloud Native Java



Supported on Kubernetes and the Cloud  
Integration with Oracle Cloud, Database, FMW...

New Releases and Innovation  
Current and Future Application Needs



# Oracle Enterprise Cloud Native Java Topics

- Docker and Kubernetes certification
- WebLogic Kubernetes Toolkit
- WebLogic Server on OCI/OKE
- Coherence Operator
- Coherence Community Edition
- Helidon
- GraalVM
- Verrazzano



Supported on Kubernetes and the Cloud  
Integration with Oracle Cloud, Database, FMW...

New Releases and Innovation  
Current and Future Application Needs

Available  
Today

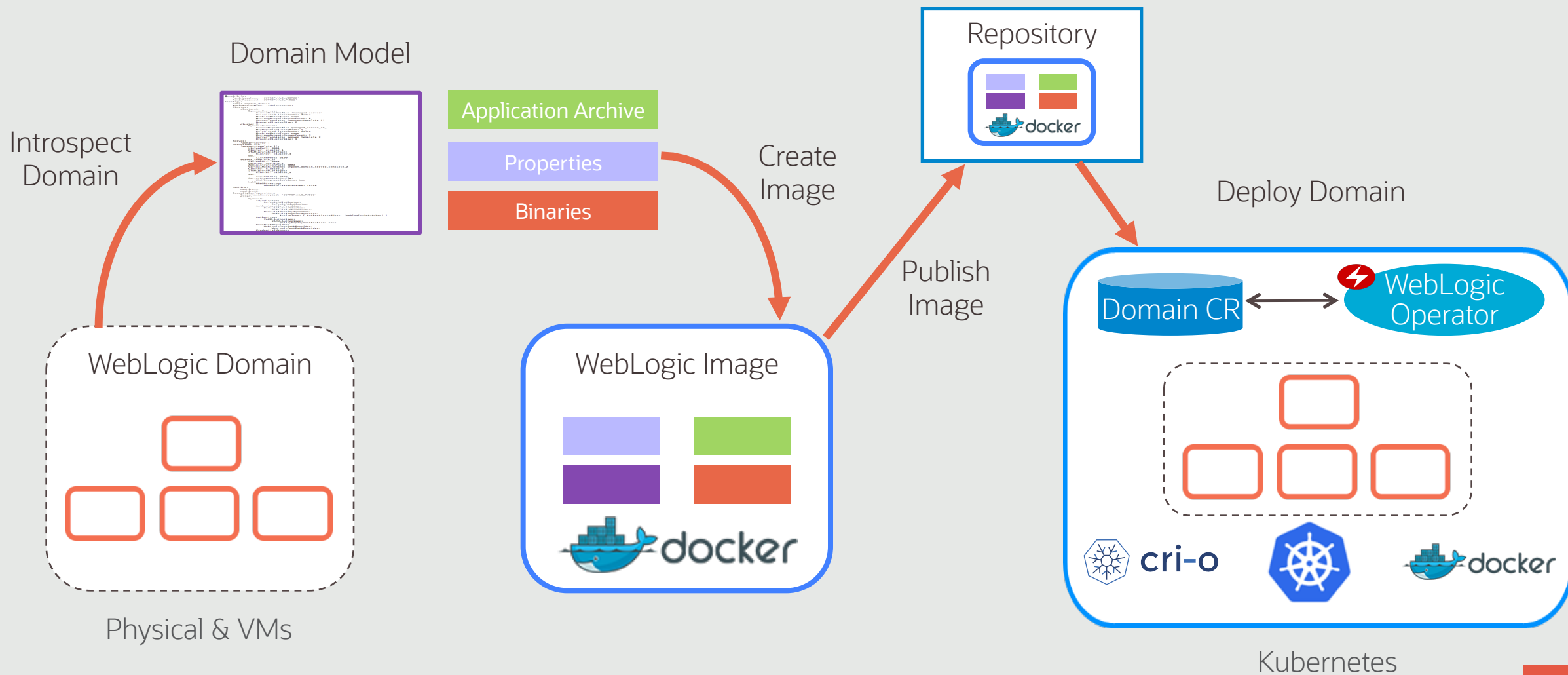
# WebLogic Server on Kubernetes

- Kubernetes certification
  - OKE on Oracle Cloud
  - Oracle Linux Cloud Native Environment
  - Oracle Private Cloud Appliance
  - Other Kubernetes (e.g. OpenShift)
- WebLogic Kubernetes ToolKit
  - Integrated tools available in open source...
  - Migration: WebLogic Deploy Tooling
  - Image Creation: WebLogic Image Tool
  - Management: Operator
  - Monitoring: Exporter for Prometheus
  - Logging: Exporter for Elastic Stack



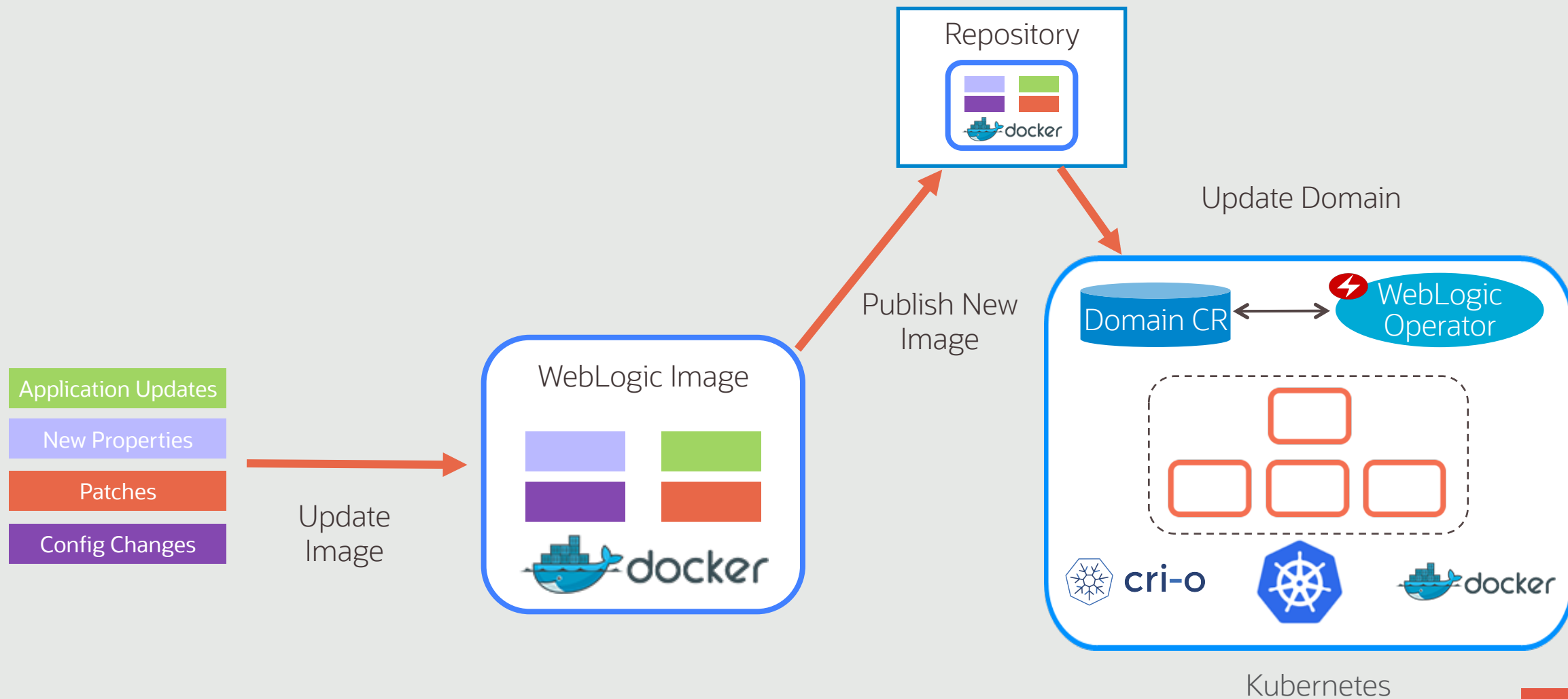
Available Today

# WebLogic Kubernetes ToolKit Example - Migrate to Kubernetes



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# WebLogic Kubernetes ToolKit Example – Automate Updates



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# WebLogic Server for Oracle Cloud Infrastructure

- Select listing to provision WebLogic domain on Oracle Cloud Infrastructure compute instances
- Metered usage – pay for what you use
  - Priced per OCPU/Hour
  - Consume Universal Credits
  - Create, destroy, start, stop, scale
- Bring Your Own License (BYOL)
- Develop and deploy in the cloud
- Migrate existing applications to cloud
- Integrate with other cloud services

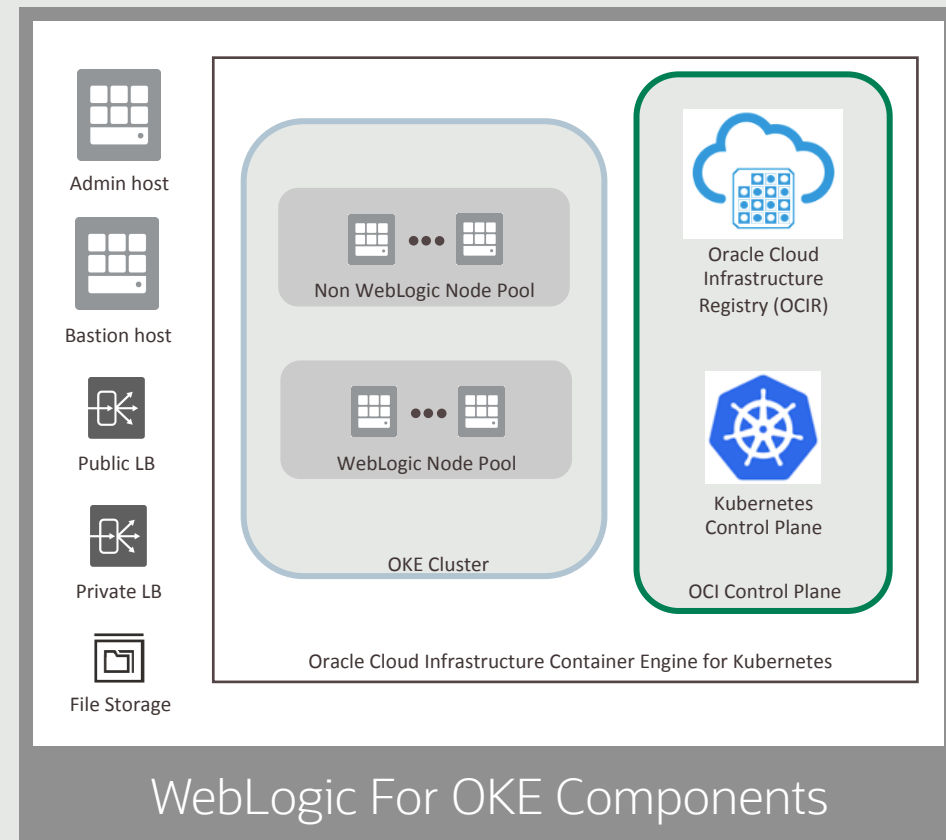
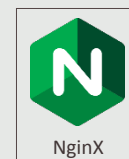
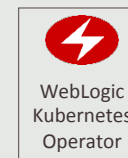
The screenshot displays the Oracle Cloud Marketplace interface. At the top, the Oracle Cloud logo and 'Applications >' are visible. The main content is divided into two sections: 'Marketplace' on the left and 'All Applications' on the right. The 'Marketplace' section includes a navigation menu with 'All Applications' (selected) and 'Deployed Applications'. Below this is a 'Filters' section with a 'clear' link and several dropdown menus: 'TYPE' set to 'Stack', 'PUBLISHER' set to 'Oracle', 'CATEGORY' set to 'Application Development', and 'PRICE' set to 'Paid'. The 'All Applications' section shows two product cards for Oracle WebLogic. The first card is for 'Oracle WebLogic Suite UCM', described as 'Accelerate WebLogic deployment in Oracle Cloud Infrastructure' with 'Type: Stack | Price: Paid'. The second card is for 'Oracle WebLogic Server Enterprise Edition UCM', also described as 'Accelerate WebLogic deployment in Oracle Cloud Infrastructure' with 'Type: Stack | Price: Paid'.



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# Oracle WebLogic Server for OKE

- Provision WebLogic on OCI/OKE
- Built in CI/CD solution using Jenkins
- Configured to run WebLogic on specific nodes
- Public Load Balancer for WLS Cluster
- Private Load Balancer for Admin Consoles
- Scale K8s cluster through OCI Node Pool
- Scale WebLogic domain through WLS Operator
- Backups for every domain configuration change
- Domain image scan for vulnerabilities
- Leverages WebLogic Kubernetes ToolKit



# 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.

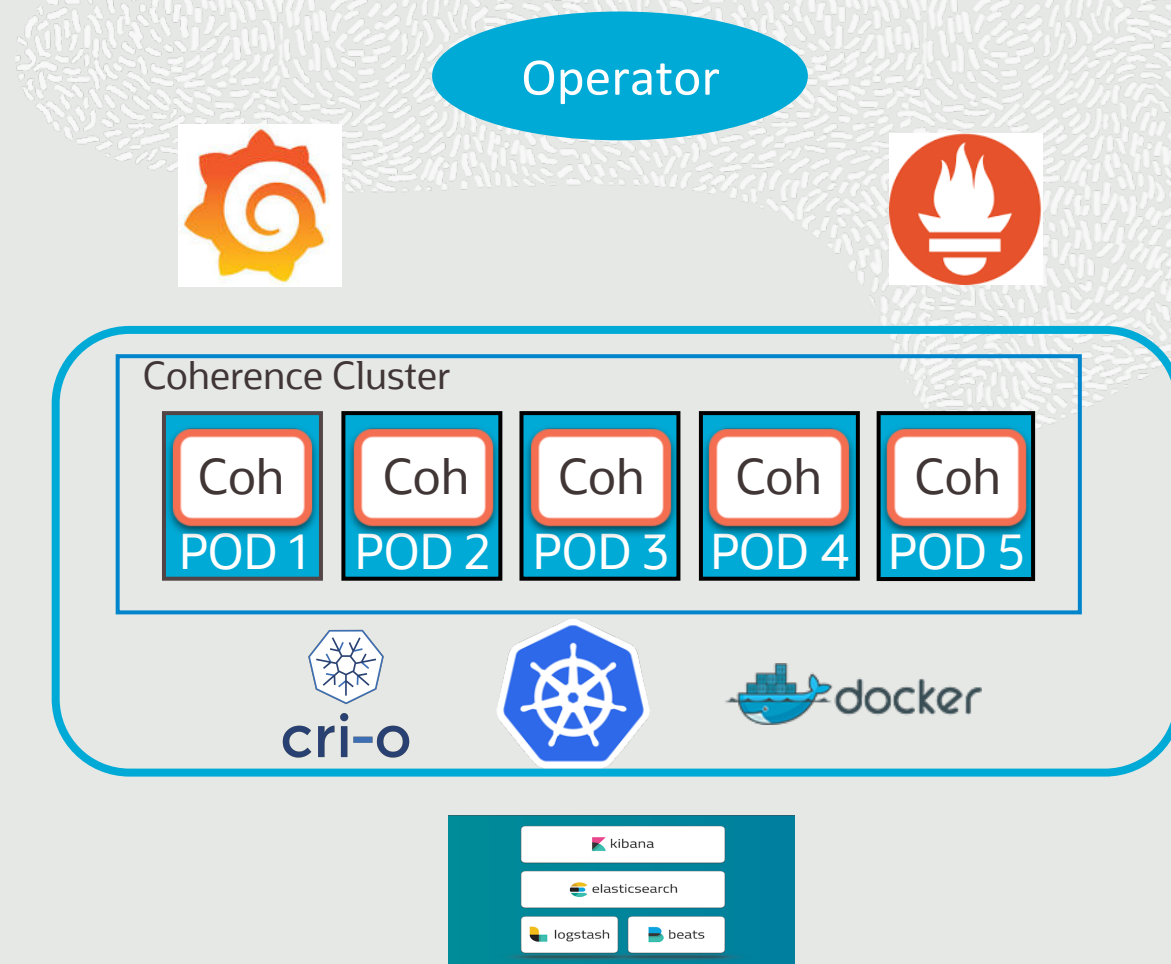
”

*Antonio Nappi,  
DevOps Engineer*

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# Coherence on Kubernetes

- “Coherence-only” configurations
- Leverages REST Management, metrics  
Included in Coherence 12.2.1.4  
Simplified Coherence management
- Consistent approach with WLS Operator  
Helm chart for installing Operator  
Prometheus, Grafana, ELK  
Manage scaling, patching, versioning

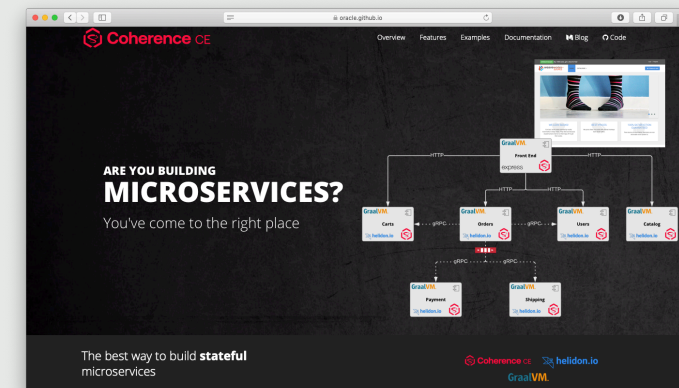
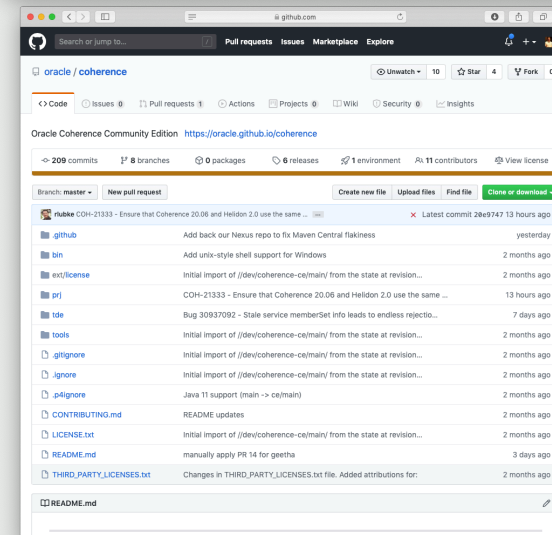
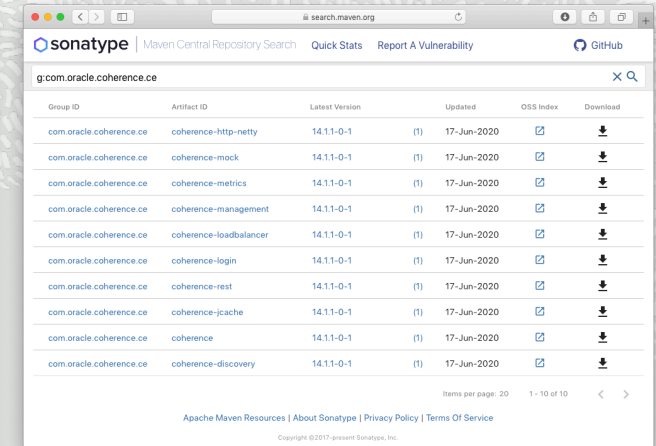
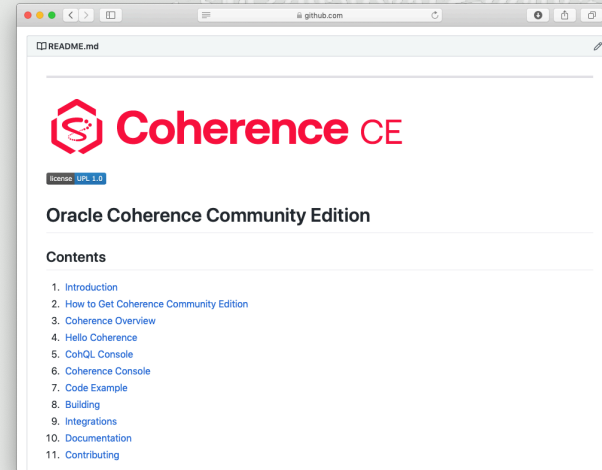




# Coherence Community Edition

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- Open-source edition of Coherence
- Hosted on GitHub
- Artifacts in Maven Central
- Docker images to Docker Hub
- Subset of Coherence EE features
- Everything necessary to write microservices applications
- New option for new projects
- Part of a platform for cloud-native microservices applications



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# WebLogic and Coherence Supported on GraalVM

- GraalVM – universal virtual machine for running polyglot applications
  - JavaScript, Python, Ruby, R, Java, Scala...
- At runtime, translates Java bytecodes into machine code
- You can use GraalVM as your JDK – Java compliant
- Includes the same commands, flags, and options
- High performance – 5%-10% performance benefit



**GraalVM**<sup>™</sup>  
a Java Virtual Machine



# Coherence Support for GraalVM

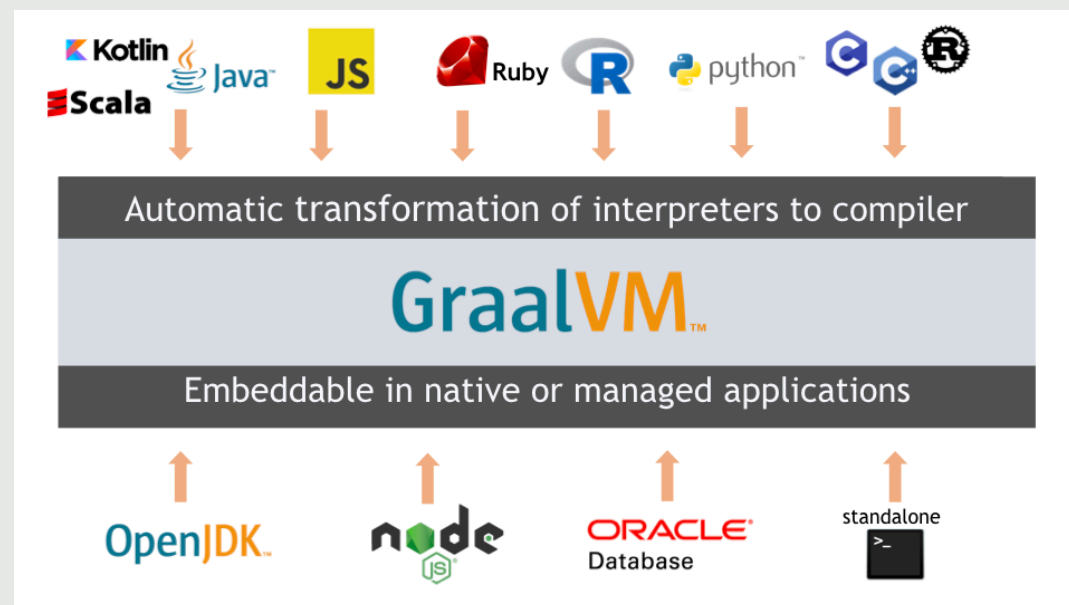
Server-side polyglot language support

Certify running Coherence on Graal JVM OOTB, including docker image

Grid-side code in your favorite language – JavaScript, Python, R, Ruby ...

Embedding Coherence into non-Java applications

Connect to or host Coherence in non-Java processes e.g. Node.js/Express



# Coherence-Based Microservices at Union Pacific Railroad



Union Pacific Railroad is North America's premier railroad franchise, covering 23 states across the western two-thirds of the United States

- ✓ Replacing mainframe-based logistics system with **microservices**
- ✓ Coherence-based data management at **massive scale**:
  - ✓ 5,600 microservices in production; 20,000 JVMs
  - ✓ 1.3B API calls per day; producing 300M events per day
  - ✓ 9TB data managed
  - ✓ 10,000 TPS against Coherence API
- ✓ **Multi-site** architecture with data replication

“

Stateless systems are extremely data-hungry, and state management is one of the biggest challenges we faced. This is where the Oracle Coherence product played a huge role. Coherence is our state management platform for this logistics system today; that's where all our data is stored.

”

*Arun Giri  
Associate Vice President and Distinguished Technologist*

# Java Microservices with Helidon

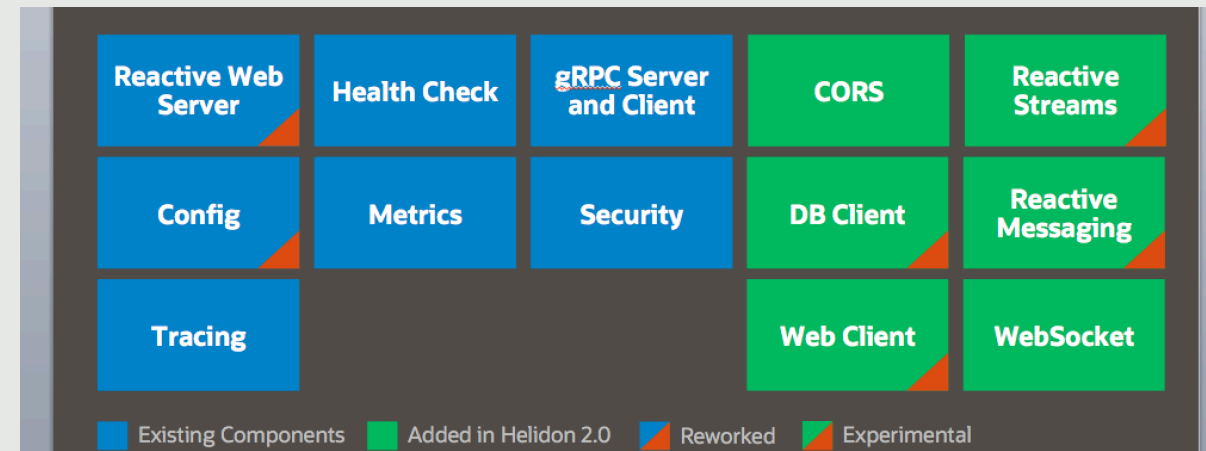


- Java libraries for developing microservices
- Standards-based, open source, cloud native
- Helidon SE
  - Functional style, Reactive, Transparent
- Helidon MP (MicroProfile 3.2)
  - MicroProfile, Declarative, Dependency Injection
- GraalVM Native Image
- Integrates with other frameworks
- WebLogic, Coherence integration
- Support included with WebLogic

## Helidon SE



## Helidon MP



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# GraalVM Native Image

- Compiles your programs ahead-of-time into a native executable
  - Improves startup time
  - Reduces memory footprint
- Closed world assumption

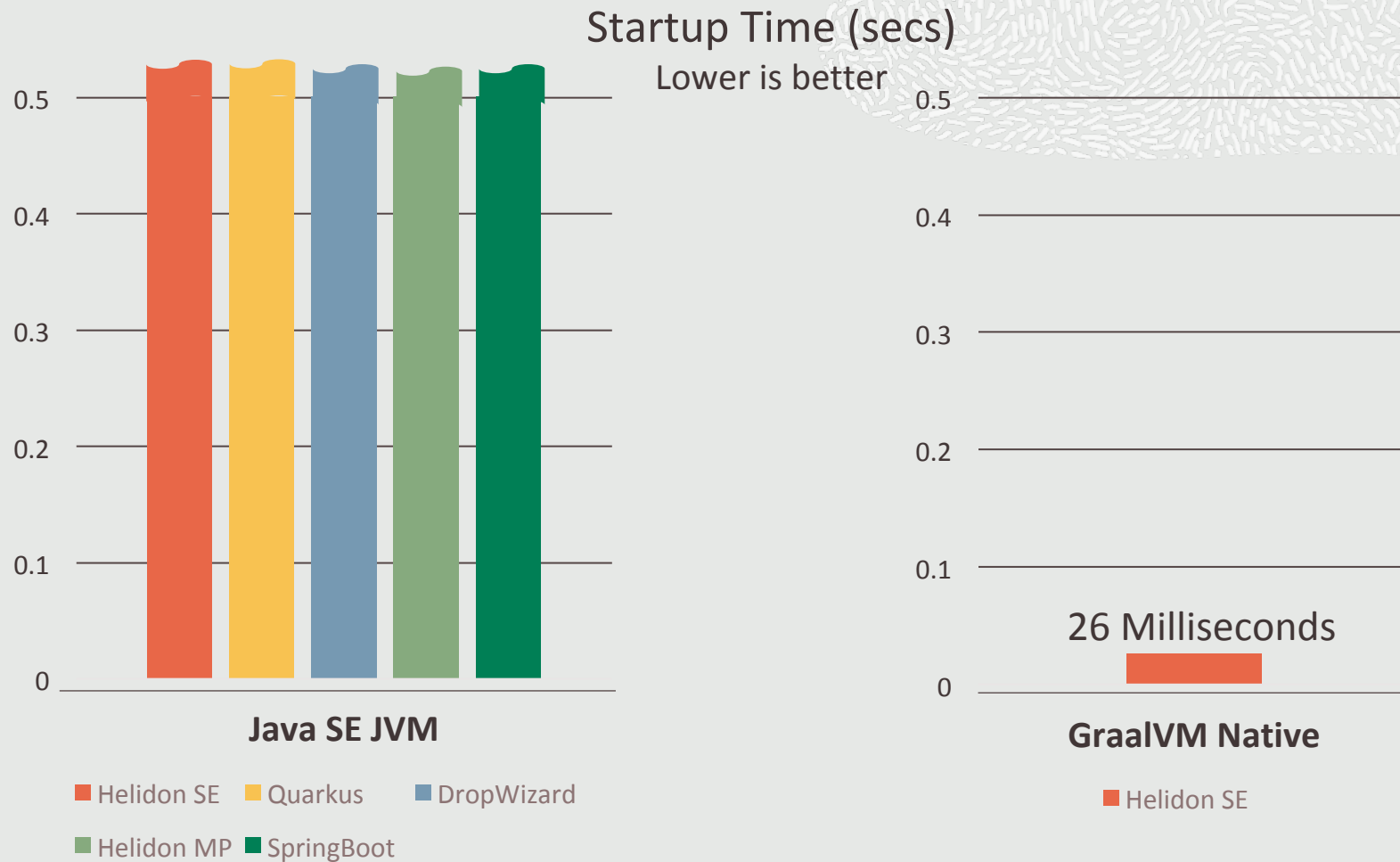
```
$ javac HelloWorld.java
$ time java HelloWorld
user 0.070s
$ native-image HelloWorld
$ time ./helloworld
user 0.005s
```



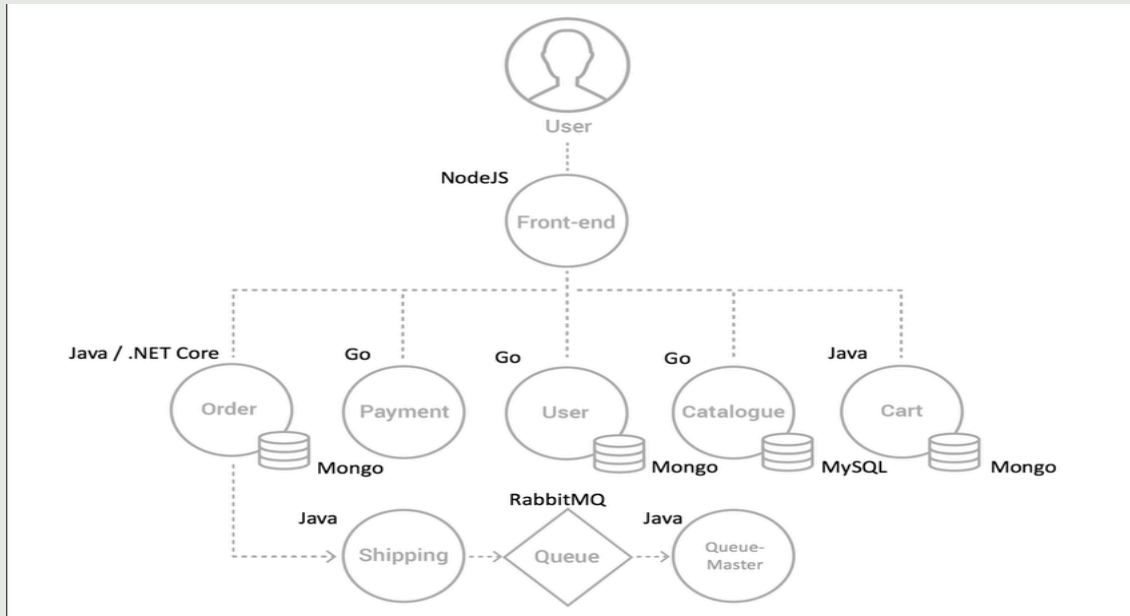
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# Helidon Has Industry Leading Start-Up Performance

## Turbocharged with GraalVM

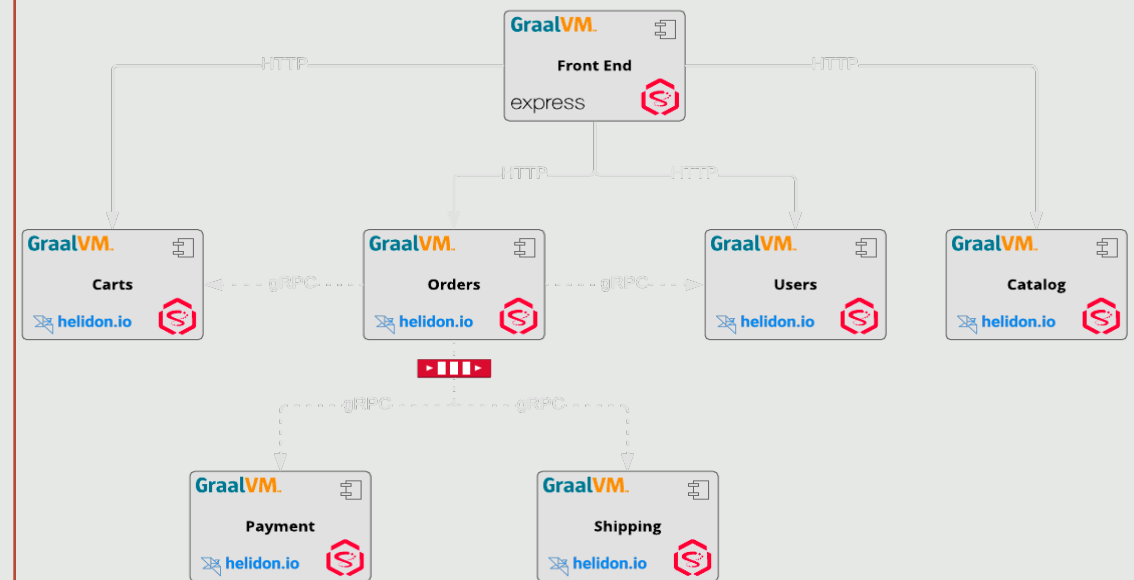


# Coherence and Helidon for Scalable Microservice Architecture



## Microservice with NoSql data store

- Microservices and Data store deploy separately
- Scaling and Failover is separate and disjoint
- Monitoring is difficult



## Helidon with Coherence Cache and GraalVM

- Microservices and Coherence share GraalVM runtime
- Scaling and HA/Failover is combined and simple
- Metrics/Monitoring/Trace is end-to-end from http to cache objects.



# Coherence and Helidon MP Microservices

- Bootstrap Coherence via CDI within Helidon MP apps
  - Ensures that the REST and gRPC services can access their data as soon as they are up
  - Helidon controls the main method, Coherence is just a library
- CDI support
  - Inject Coherence resources e.g. NamedMap into Helidon services
  - Inject CDI-managed objects into Coherence (event interceptors, cache stores, etc.)
  - Use CDI observers to handle Coherence server- and client-side events
- Metrics
  - Coherence metrics available via standard Helidon MP /metrics endpoint
- Configuration
  - Configure Coherence using MP Config
  - Use Coherence as a mutable, observable MP Config Source
- Tracing
  - Coherence tracing spans automatically included into Helidon traces

Open Tracing 1.3	Open API 1.1	Rest Client 1.4	Config 1.4
Fault Tolerance 2.1	Metrics 2.3	JWT Propagation 1.1	Health 2.2
CDI 2.0	JSON-P 1.1	JAX-RS 2.1	JSON-B 1.0

# WebLogic, Coherence, Helidon Versions

**Available  
Today**

WebLogic Versions	Standards
WebLogic 10.3.6	Java EE 5, Java SE 7
WebLogic 12.1.3	Java EE 6, Java SE 7/8
<b>WebLogic 12.2.1.4</b>	<b>Java EE 7, Java SE 8</b>
<b>WebLogic 14.1.1</b>	<b>Java EE 8/Jakarta EE 8 Java SE 8/11</b>
Coherence Versions	Standards
Coherence 3.71	Java SE 7
Coherence 12.1.3	Java SE 7/8
<b>Coherence 12.2.1.4</b>	<b>Java SE 8</b>
<b>Coherence 14.1.1</b>	<b>Java SE 8/11</b>
<b>Coherence CE 20.0.6</b>	<b>Java SE 8+</b>
Helidon Versions	Standards
Helidon 1.4	MicroProfile 3.2, Java SE 8/11
<b>Helidon 2.0</b>	<b>MicroProfile 3.2, Java SE 11</b>

<https://www.oracle.com/java/weblogic/>

<https://www.oracle.com/middleware/technologies/weblogic-server-installers-downloads.html>

<https://docs.oracle.com/en/middleware/standalone/weblogic-server/>

<https://blogs.oracle.com/weblogicserver/>

<https://www.oracle.com/middleware/coherence/>

<https://www.oracle.com/middleware/technologies/coherence-downloads.html>

<https://docs.oracle.com/en/middleware/standalone/coherence/>

<https://blogs.oracle.com/oraclecoherence/>

<https://github.com/oracle/coherence>

<https://coherence.community/>

[helidon.io](https://helidon.io)

<https://helidon.io/docs>

<https://github.com/oracle/helidon>

<https://medium.com/helidon>



Initial Project Released



Logos for Java Enterprise Edition, Jakarta EE, Oracle WebLogic, and Oracle Coherence.

Traditional Applications

Logos for Java, Spring, Apache Kafka, Coherence CE, and GraalVM.

Java Microservices

Logos for Python, Node.js, Ruby, and GraalVM.

Polyglot Microservices

A horizontal row of logos including Rancher, OpenShift, Prometheus, Istio, Elastic Stack, AWS, Jaeger, Vault, and Keycloak.

Kubernetes

Kubernetes

Kubernetes

Public Cloud

Private Cloud

Multi-Cloud

<https://github.com/verrazano>





**Initial Project  
Released**

Workload  
Management  
Across  
Environments



Integrated,  
Pre-Wired  
Observability



Application  
Lifecycle  
Management



Integrated  
Security



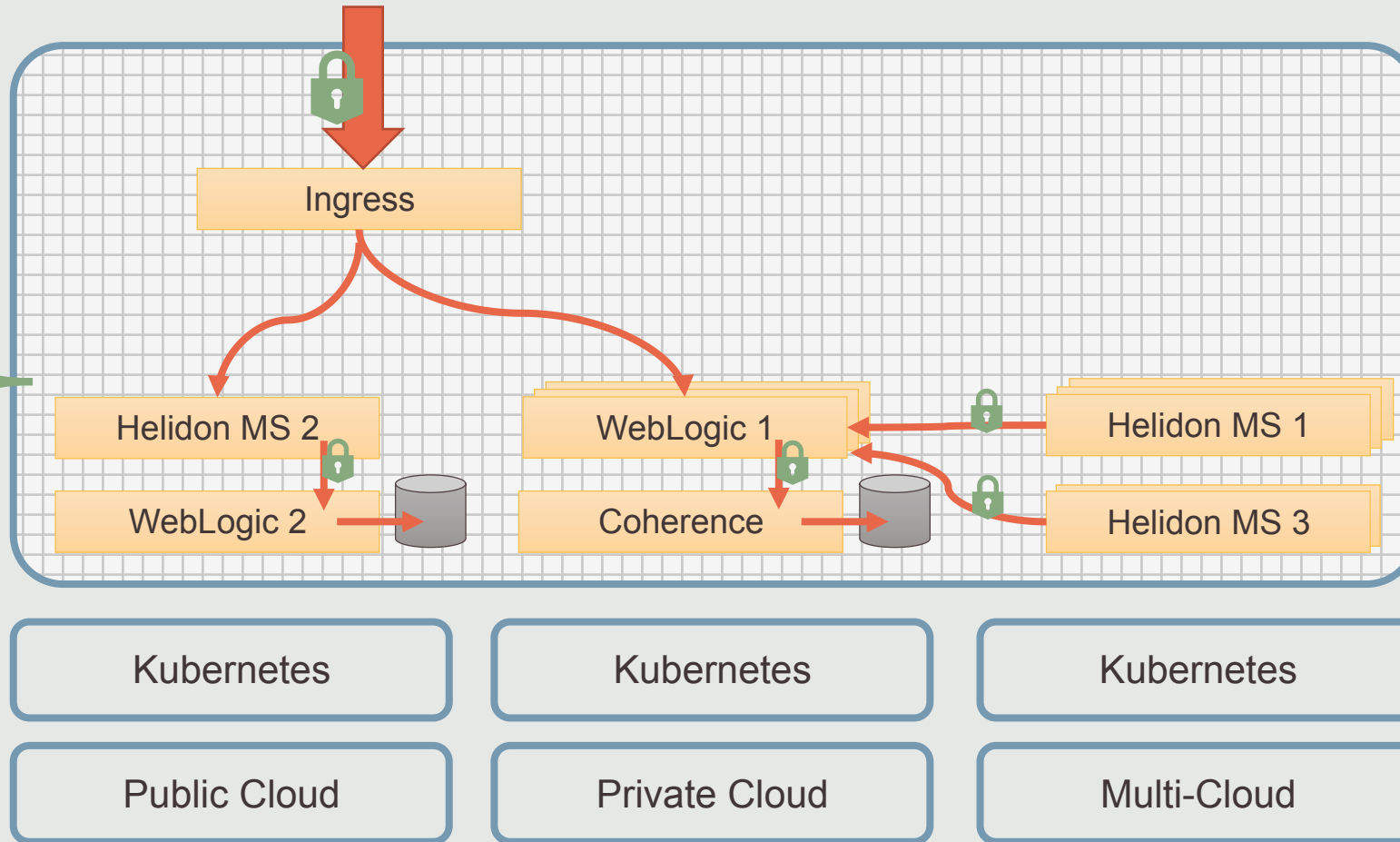
Multi-Cluster  
Infrastructure  
Management

## App Model

- WebLogic 1
- WebLogic 2
- Coherence
- Helidon MS 1
- Helidon MS 2
- Helidon MS 3
- Connections
- Etc.

## App Binding

- Placements
- Connection details
- Databases
- Ingress details
- Secrets
- Etc.



## Monitoring Stack

- Grafana
- Prometheus
- Kibana
- Elasticsearch
- ...

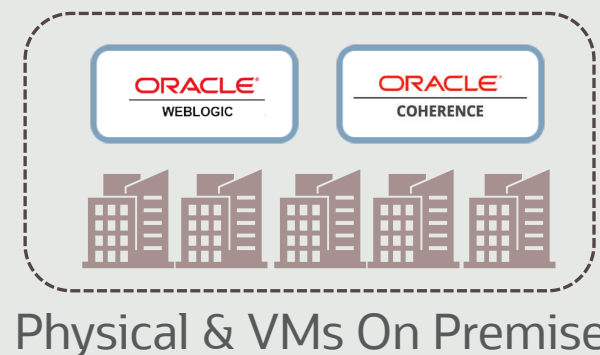
## Management Stack

- Operators
- Keycloak
- Istio
- Rancher
- ...

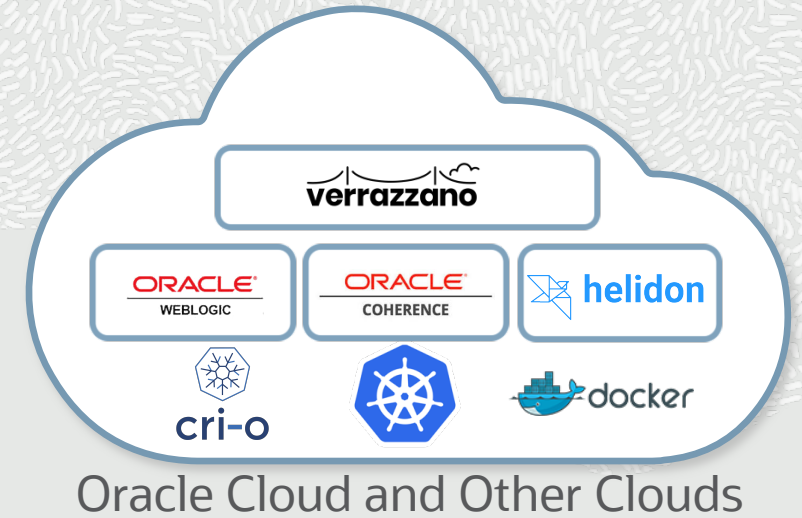
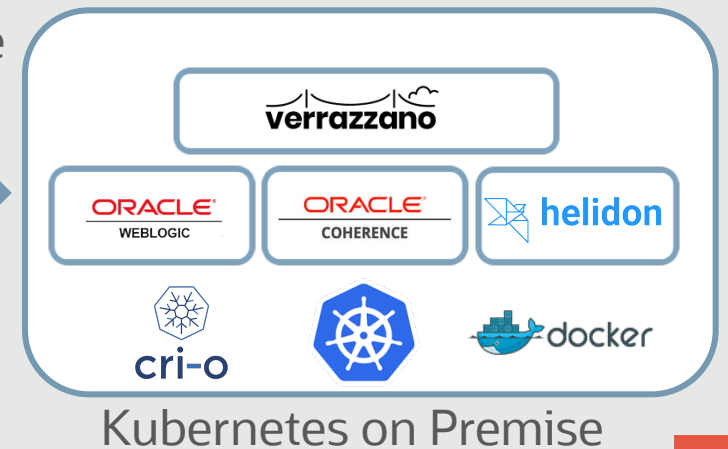


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Migrate



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# Thank You

