



When DevOps Services met Functions

Or

How deliver high-quality products with minimal costs by using serverless options



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<https://www.linkedin.com/in/fmorenod>

<https://github.com/fmorenod81/whendevopsmetfunctions>

28-Feb-2023





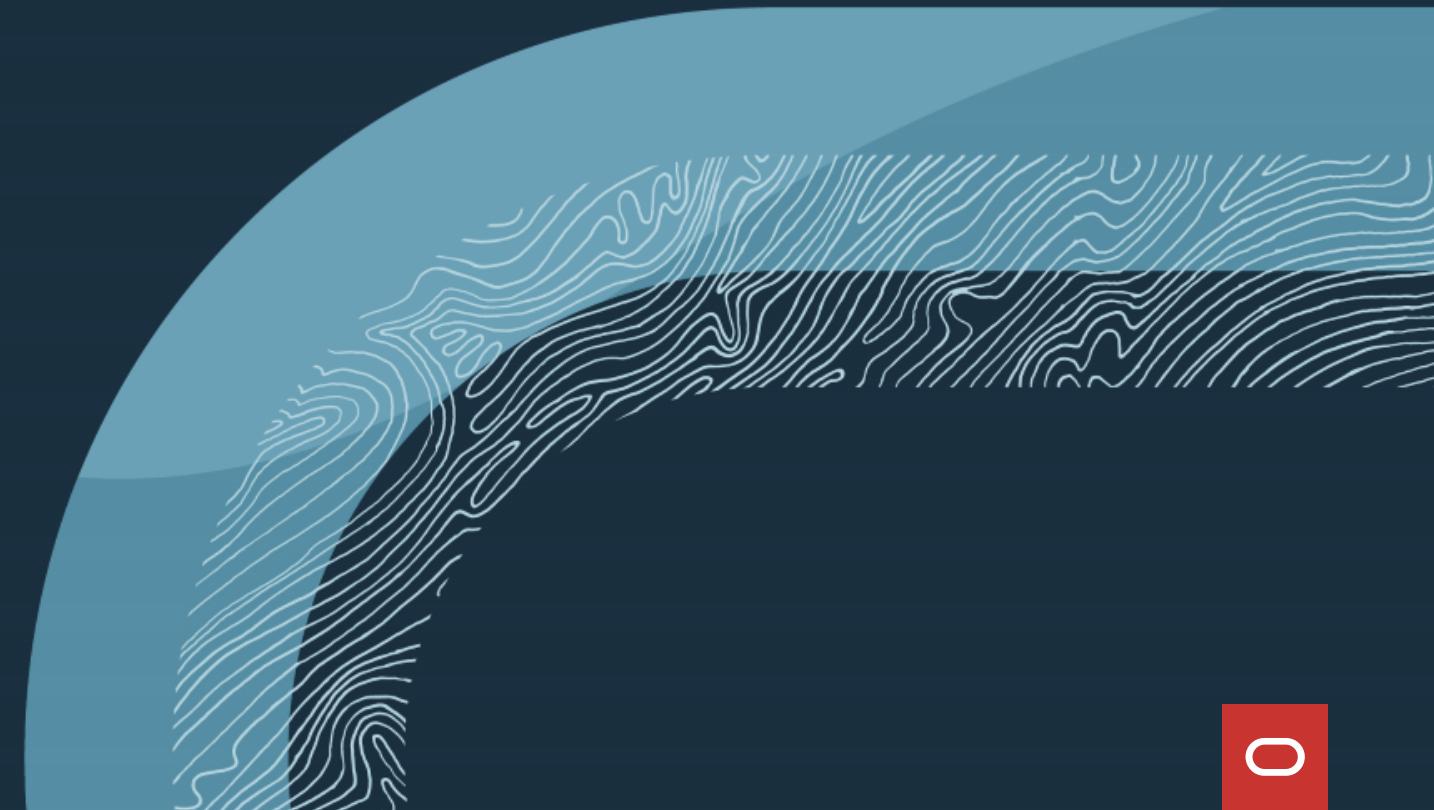
when harry met sally

Agenda

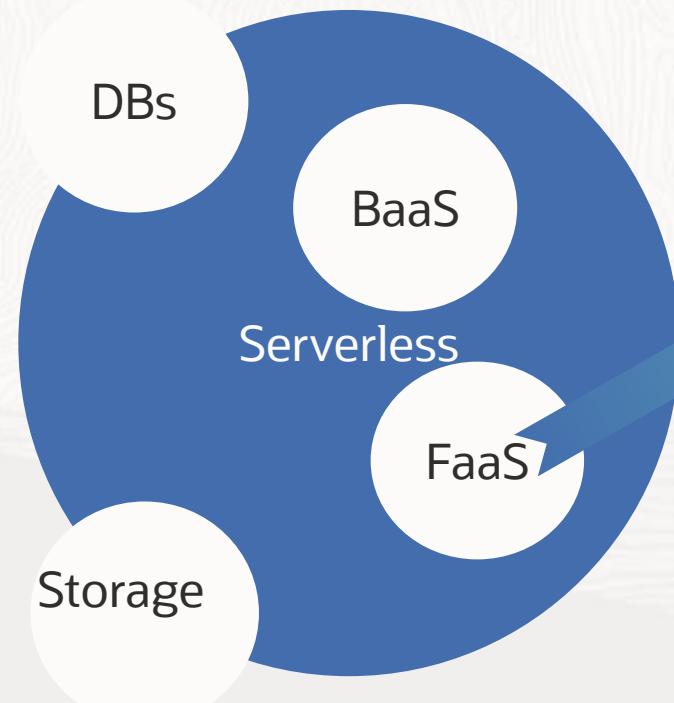
50m

1. Conditions for Serverless services
2. Purpose of DevOps
3. Oracle's Vision for Cloud Native
4. CI/CD Tool: DevOps Services
5. Video DevOps with OKE
6. Serverless Compute: Functions
7. Demo DevOps with Functions
8. References

Conditions for Serverless services



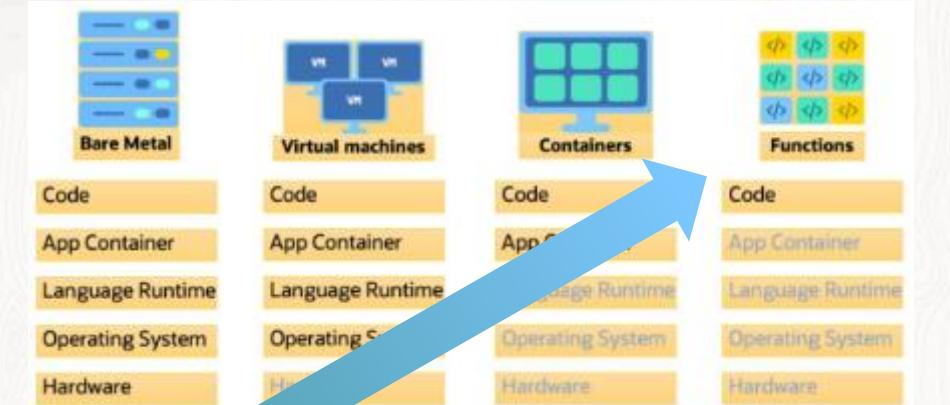
Condition for Serverless Services



Disadvantages

- Less control on servers
- Possible less performance (*Cold Start Problem*)
- Limited resources (Timeout, Memory > Complexity)

FaaS is....



Advantages:

Focus on Code



Quick development



Unpredictable workload

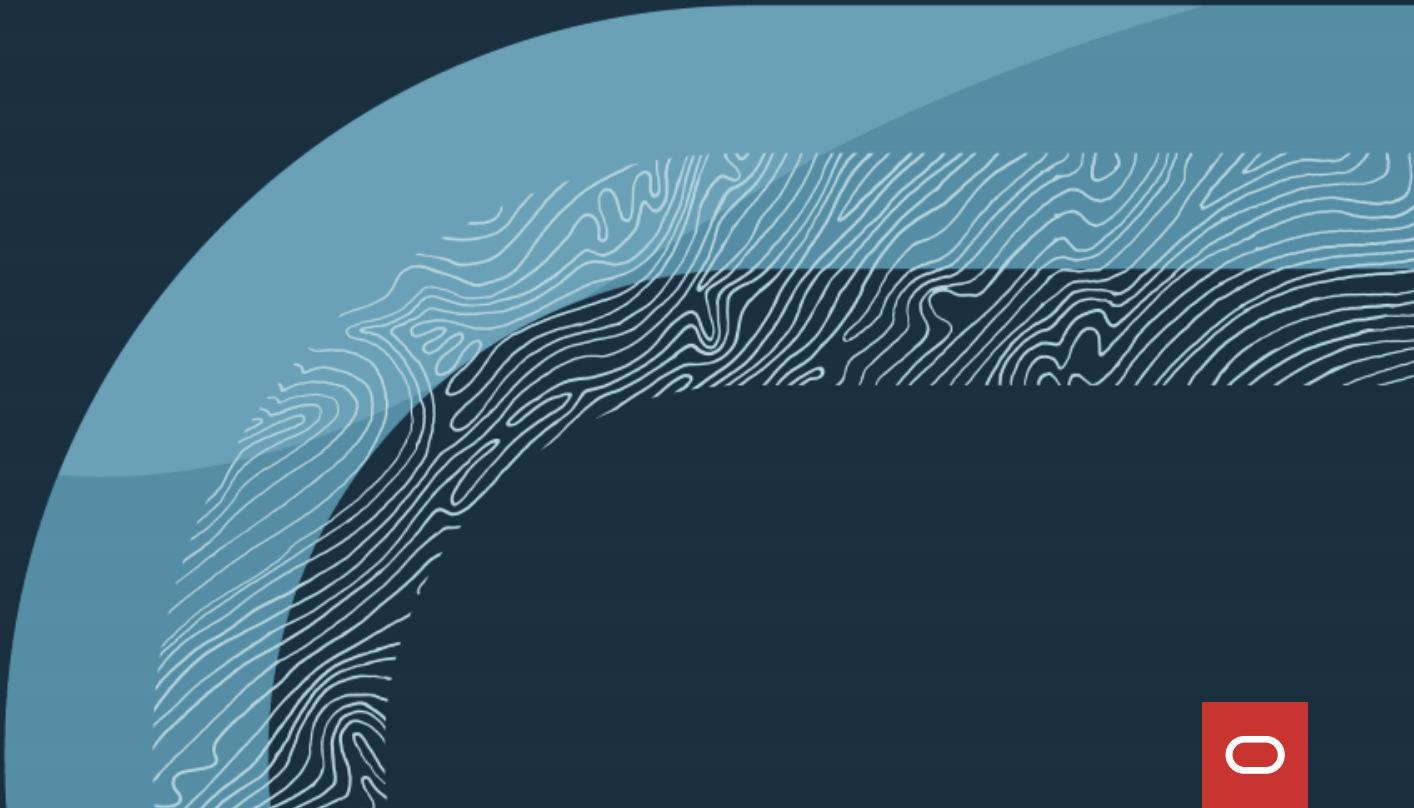


- Unpredictable Costs, according with workload**
- External Persistency

** You can limit using Quotas or alert them using Budgets



Purpose of DevOps



DevOps Concepts for Dummies



The **business people** come to have some ethereal thing (Idea)

A **designer** create a template (**Code**)

Add raw material (Dependencies Injection: Libs/Framework)

Build it in a pipeline (**Build stage on Build Pipeline**)

A **line of production** deliver a product and ship it (**Artifacts**)

A **tester** probe its quality (**Test stage on Build Pipeline**)

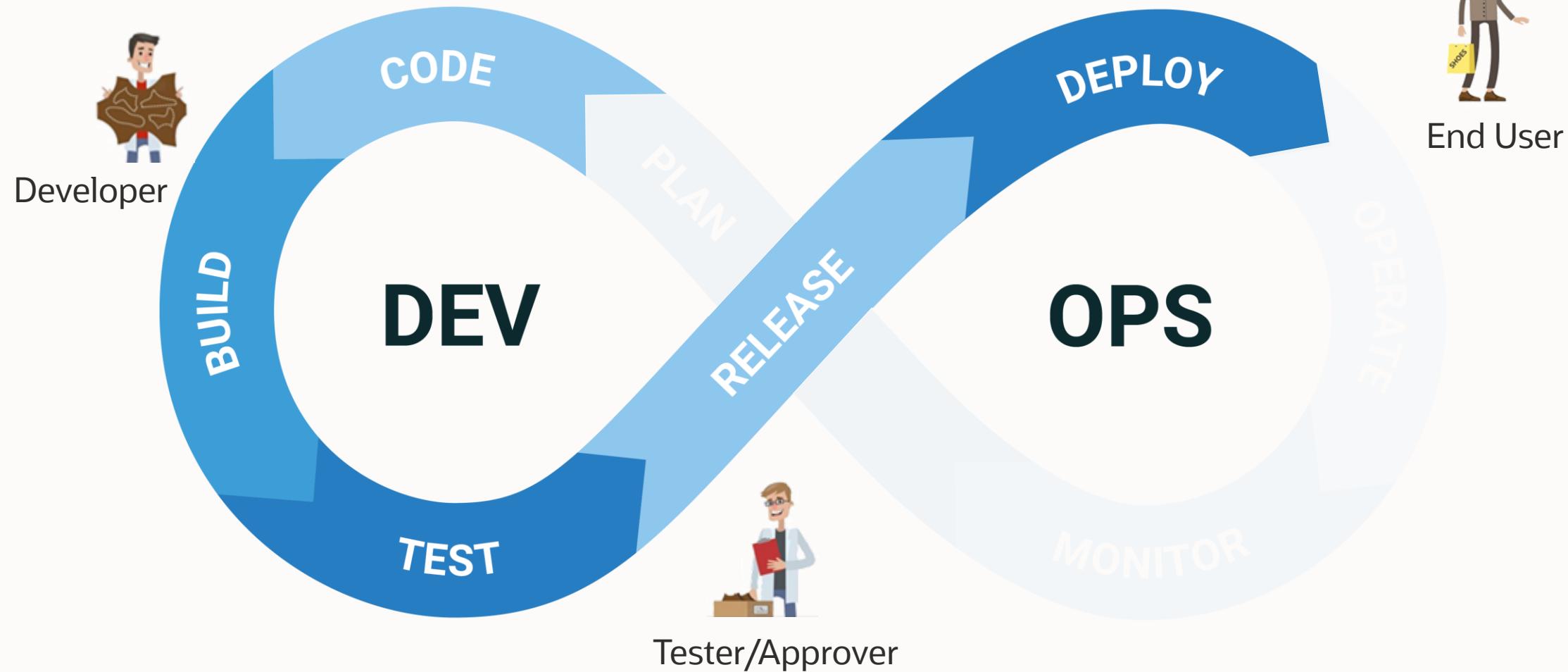
Assure circumstances for it (Configure on **Environments**)

A **line of production** deliver the product to several stores (**Deployment Pipeline**)

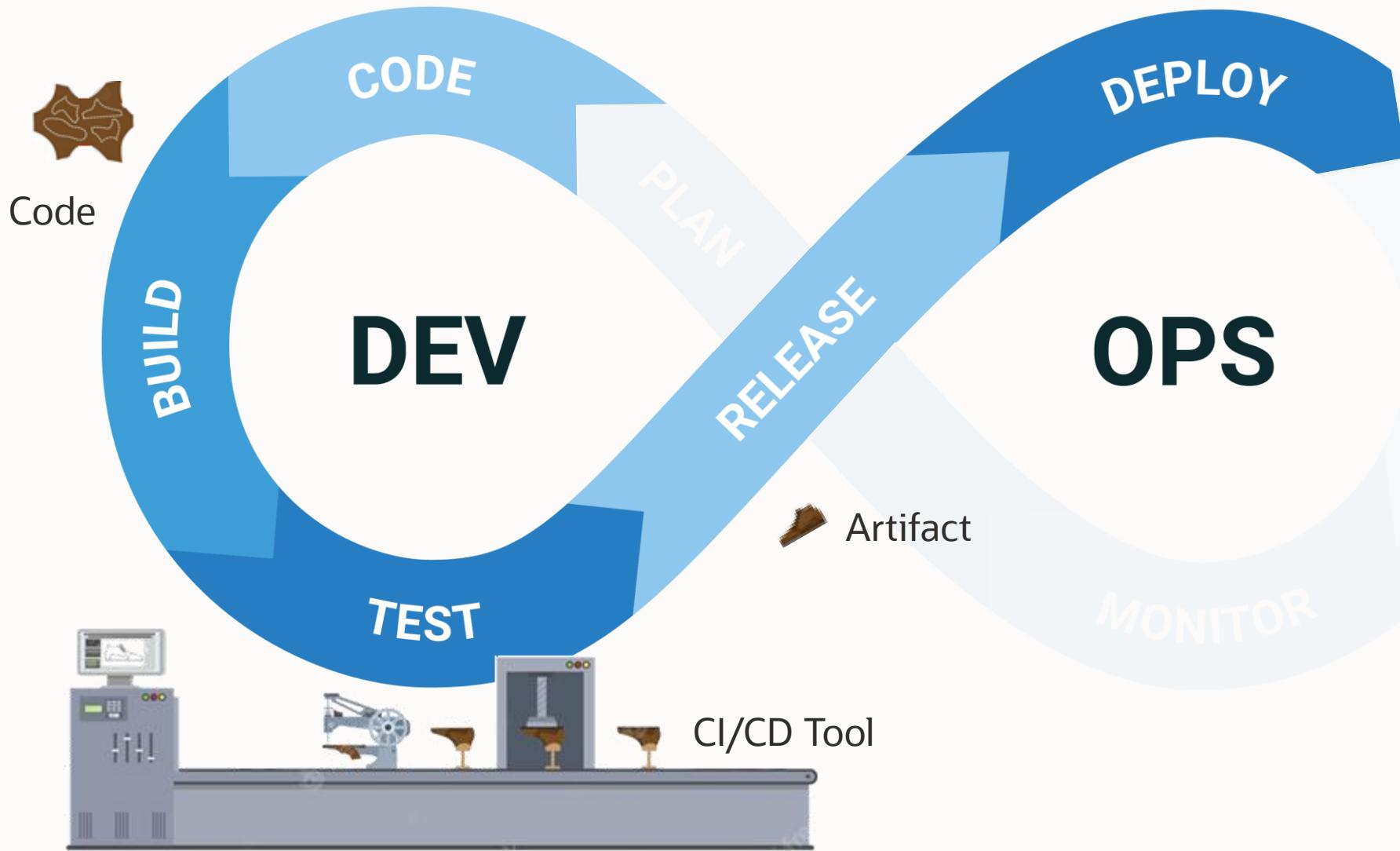
The store offer the **product** (API Exposition)

The **user** expects the product fulfils his needs, and the **user** only buys the amount that he needs and he uses it when he needs it only (**Serverless Computing**)

Idea of DevOps



Idea of DevOps



What are cloud-native applications?

Modern applications designed as:

- Loosely-coupled **microservices**
- That communicate over **APIs**
- Often packaged as **Containers**
- Developed & released **using modern DevOps** patterns & tools

But -- **there's more...**



Innovate Faster!

- Improve TTM and Lead-time
- Improve release cadence & reliability
- Improve developer productivity
- Ensure scaling + HA more easily
- Less management overhead



Loosely-coupled architectures are the **#1 predictor of DevOps success**.
Each service is developed, deployed, and operated independently – so you can move faster!



Oracle Portfolio for Cloud Native



What is Cloud Computing?



"is a model for enabling **ubiquitous**, **convenient**, **on-demand** network access to a **shared pool** of **configurable computing resources** (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned** and **released** with **minimal management effort** or service provider interaction"

NIST Definition. SP 800-145

- 1. Just user' needs**
- 2. Available**
- 3. Automatic options**

OCI Regions – Global Footprint

January 2023: 41 Regions, 8 planned; 12 Azure Interconnect Regions

100%
renewable
energy used for
Oracle Cloud
data centers in
Europe (today);
All regions (by
2025)



AWS: 31 Regions
Azure: 46 (60?) Regions
GCP: 35 Regions



Alliance for Hosting in a New Public Region - Colombia

Consequences for a Public Region for a country and surroundings

bnamericas

NEWS

Claro Colombia investing US\$25mn in datacenter for Oracle cloud

BnAmericas
Published: Saturday, August 20, 2022

Claro is part of America Movil, 6th largest mobile network operator: 18 Countries in America and 7 in Europe.



TECNOLOGÍA

Claro Colombia invertirá US\$200 millones para impulsar la productividad

Claro Colombia will invest US\$200mn to boost productivity

jueves, 18 de agosto de 2022

f t in GUARDAR

Press Release

Oracle and Claro Partner to Expand Global Cloud Services in Colombia

Claro will offer Oracle Cloud Infrastructure as part of its managed cloud services

Collaboration will enable organizations to take advantage of Oracle Cloud Infrastructure's high performance, built-in security, and lower costs

Partnership is designed to modernize IT infrastructure and stimulate the economic recovery in Colombia

Austin, TX and Bogota, Colombia—July 14, 2022

Today Oracle and Claro announced a partnership to jointly offer Oracle Cloud Infrastructure (OCI) services to public and

or organizations and enterprises in Claro will become the host partner for loud region in Colombia, which will o to offer OCI platform services along sional and managed services to help adopt cloud solutions. In addition, to re its customer service and billings

Claro will migrate over 100 on-premises servers running mission-critical workloads to OCI.



100+ Claro' on-premises servers
10 years agreement

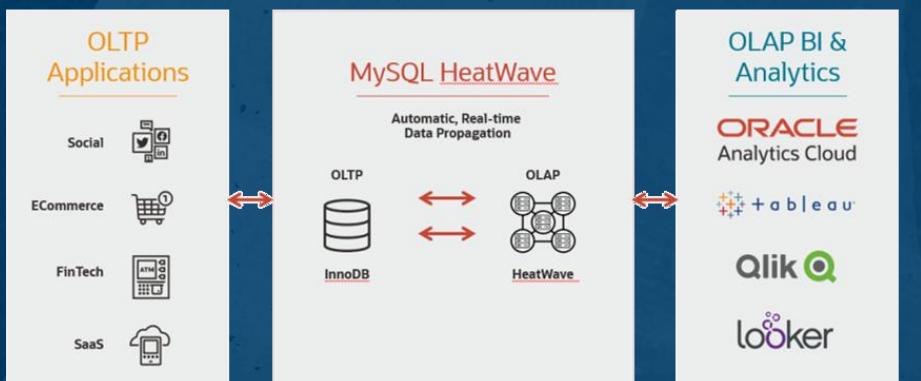


Multicloud Options

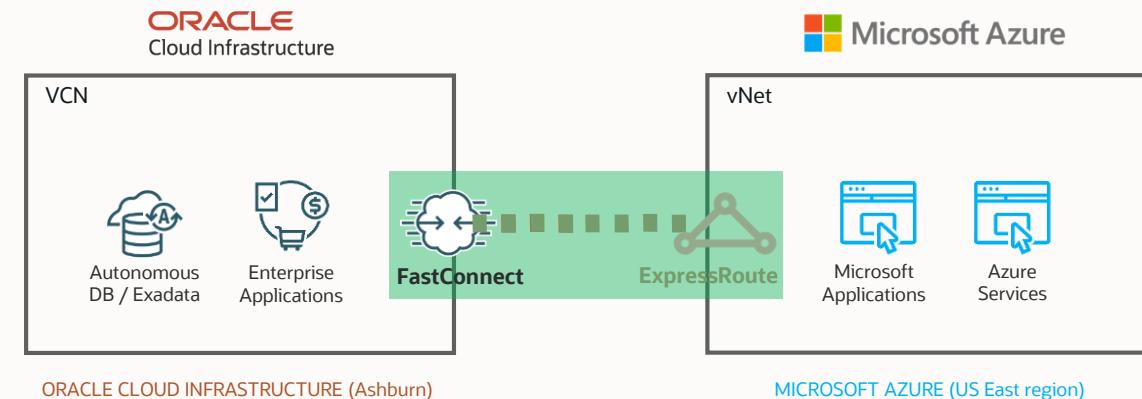
Oracle Database Services for Azure

The screenshot shows the Oracle Database Service for Azure dashboard. It includes a left sidebar with navigation links like Home, Overview, Tags, Resources, and Backups. The main area displays metrics such as Activity log, Access control (IAM), Tags, and Diagnose and solve problems. A central panel shows Oracle services like Autonomous Database, Exadata Database, and Base Database, along with options to Create a resource, Navigate, and Useful links.

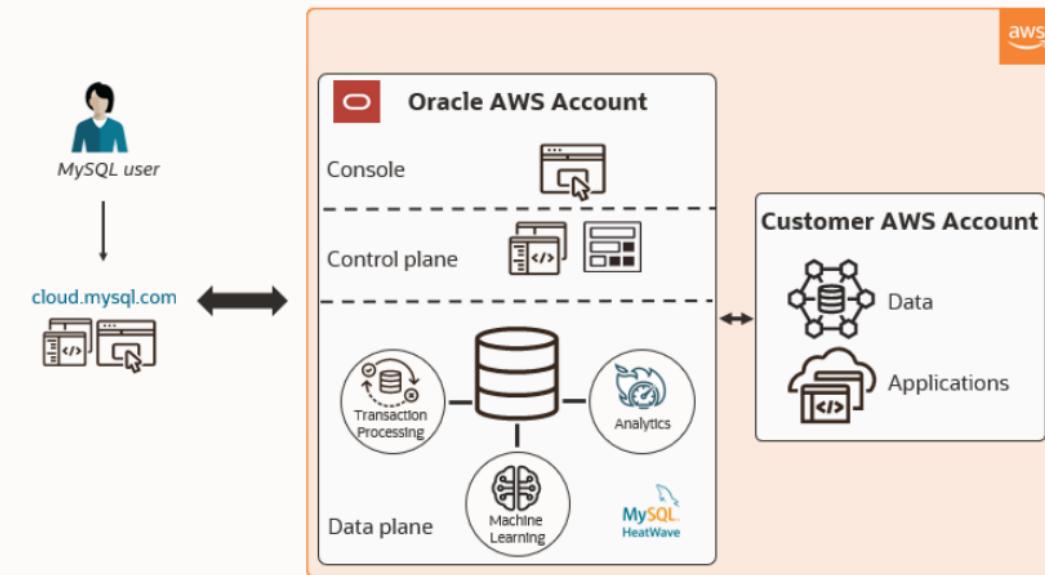
MySQL Heatwave is...



Azure Interconnect



MySQL Heatwave on AWS



Gartner Magic Quadrant for Cloud Infrastructure and Platform Services

Oracle moves from Niche to Visionary

Oracle Cloud Infrastructure is mainly focused on lift-and-shift, HPC and hybrid workloads, though OCI endeavors to have broad capabilities outside of Oracle-focused applications (i.e. Cloud Native).



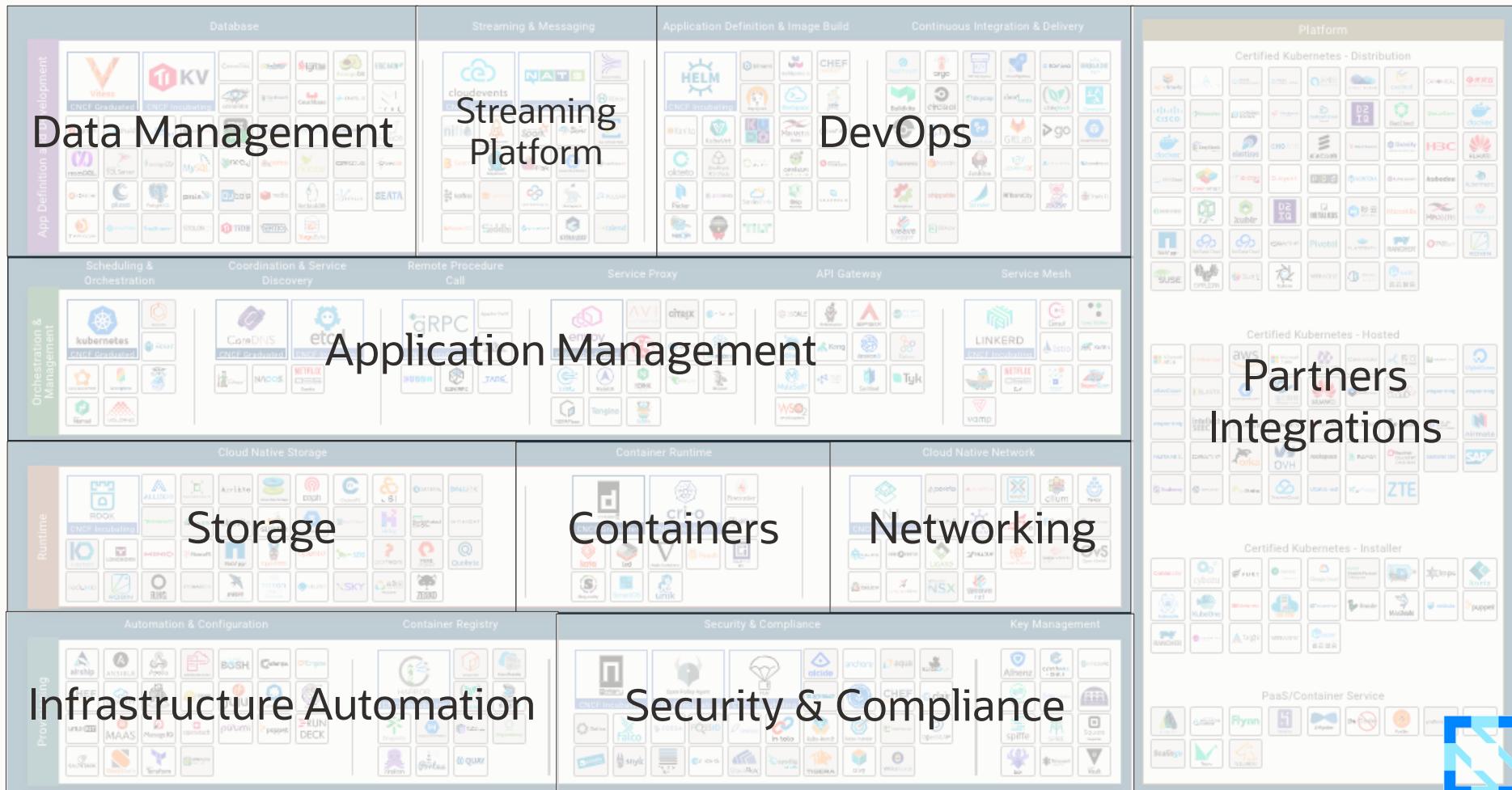
Report Oct/2022

What does each CSP offer?

	Oracle	AWS	Microsoft	Google
Functions	OCI Functions	AWS Lambda	Azure Functions	Google Cloud Functions/ Google Cloud Run *
CI/CD	Oracle DevOps Service	AWS CodeBuild AWS CodeDeploy AWS CodePipeline	GitHub Azure DevOps Azure Pipelines Visual Studio App Center	Cloud Build Google Code Deploy Tekton



Oracle vision for Cloud Native is open source, however...



Cloud Native Landscape

CLOUD NATIVE COMPUTING FOUNDATION



Open and flexible: Choice matters

Full support for OSS, 3rd party technologies, and ecosystem tools enables innovation, portability, and ensures optimal TCO for *anything* running on OCI

Managed services based on upstream open source



kubernetes



docker



Terraform

Deploy what you want, ensuring seamless operations and lowest TCO



Redhat,
Ubuntu,
CentOS,
Debian,
SUSE, Oracle



Windows
Server



Native integrations with the dev tools you're used to



ANSIBLE



kubernetes



HELM



Terraform



ATLASSIAN



Communities we contribute to



CLOUD NATIVE
COMPUTING FOUNDATION



Java



CONTAINER
INITIATIVE



THE LINUX
FOUNDATION



CD.FOUNDATION



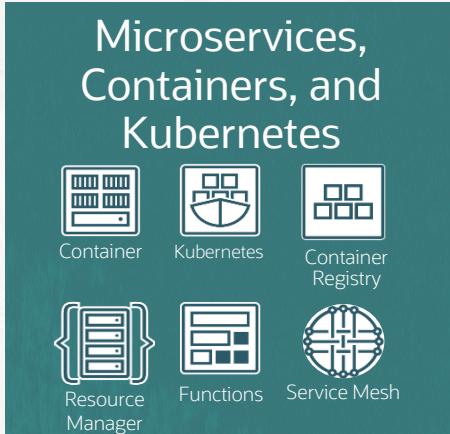
ECLIPSE
FOUNDATION



Application Modernization on OCI



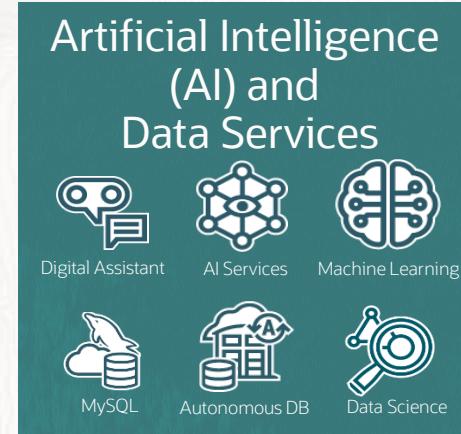
Dev Productivity



Microservices, Containers, and Kubernetes



API Management and Streaming



Artificial Intelligence (AI) and Data Services



Monitoring and Observability



Operations Reliability



OCI DevOps + Freedom of Choice with Integrated Ecosystem

Open Frameworks, 100% Upstream Compatible

Flexible Infrastructure – Configurable CPU / Memory Ratio



IAM, Security & Governance



Oracle's Modern App Dev Framework



Core requirements



Design principles



Architecture patterns



Technology recommendations



Security and compliance



Availability



Scalability



Performance



Agility



Observability



Resiliency



Cost Optimization



Portability

Common requirements that apply to any modern application

- Security Policies & Best Practices
- 24/7/365, no downtime.
- Scale gracefully
- Low latency and high throughput to improve UX
- Digital Enablers: DevOps/Cloud Native Services
- Metrics to improve Reliability
- Recover gracefully
- Total Costs
- Easy migration

Modern Application Design Principles

We're your partner on your path to modernization



Design principles

Use lightweight open-source frameworks and mature programming languages



Architecture patterns

Build apps as services that communicate through APIs



Functions

Package and ship apps as containers



Technology recommendations

Automate build, test, and deployment



DevOps

Use fully managed services to eliminate complexity across application development, runtimes and data management

Keep application tier stateless

Use converged databases with full featured support across all data

Instrument end-to-end monitoring and tracing

Eliminate single points of failure through automated data replication and failure recovery

Implement a defense-in-depth approach to secure the app lifecycle

Oracle Cloud Infrastructure Reference Architectures

Access to OCI best practices framework

Cloud Architecture Center 

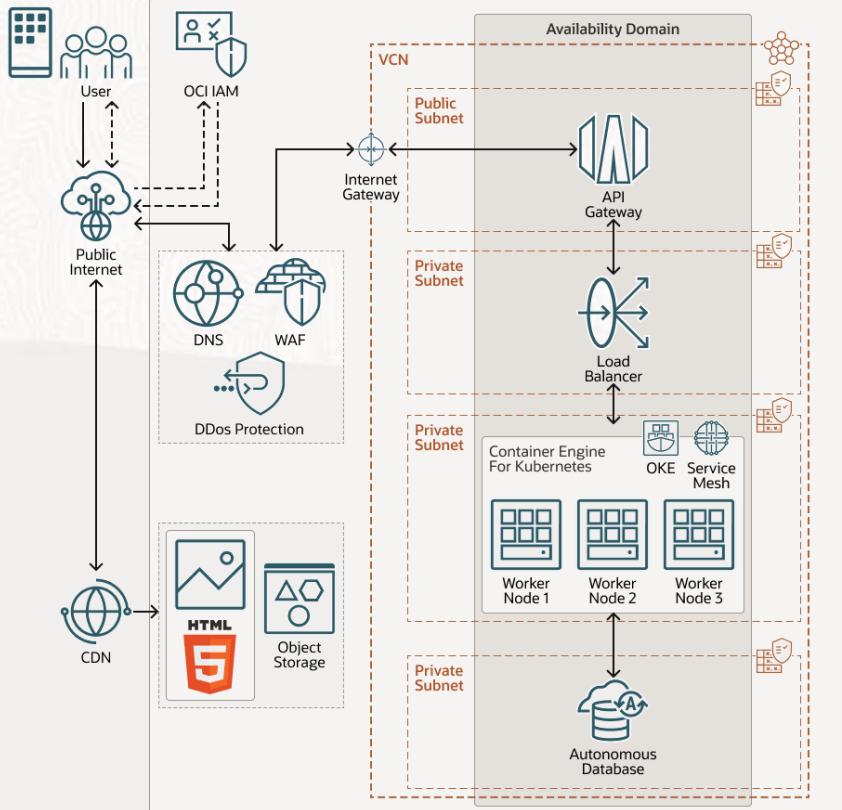


Image: Modern App Development - Web and Mobile



Architecture patterns

Access OCI reference architecture 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
- 200+ references architectures.



Technology recommendations

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](#)

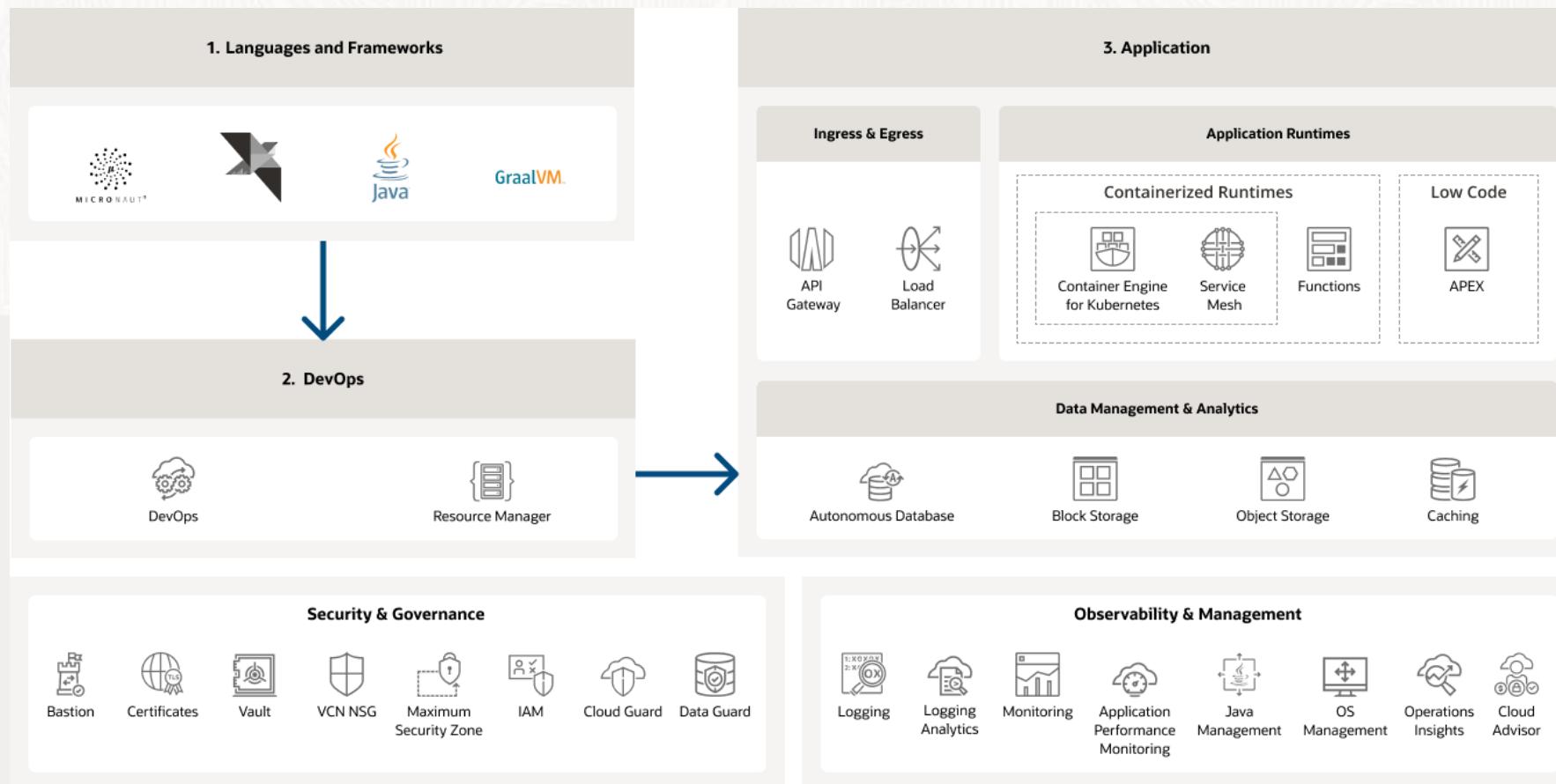
 [Go to GitHub](#)



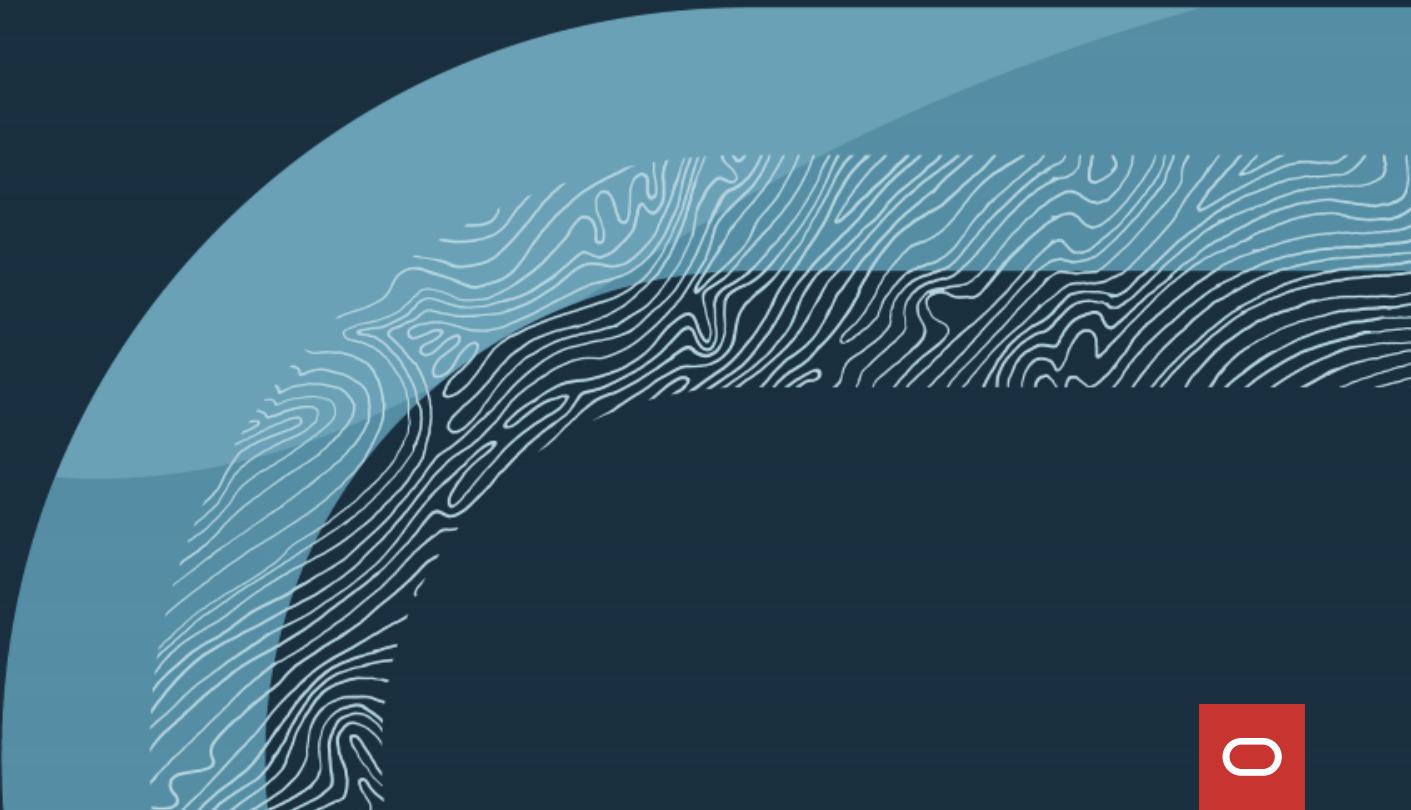
Oracle's Modern App Dev Framework



Technology recommendations



DevOps Services



O

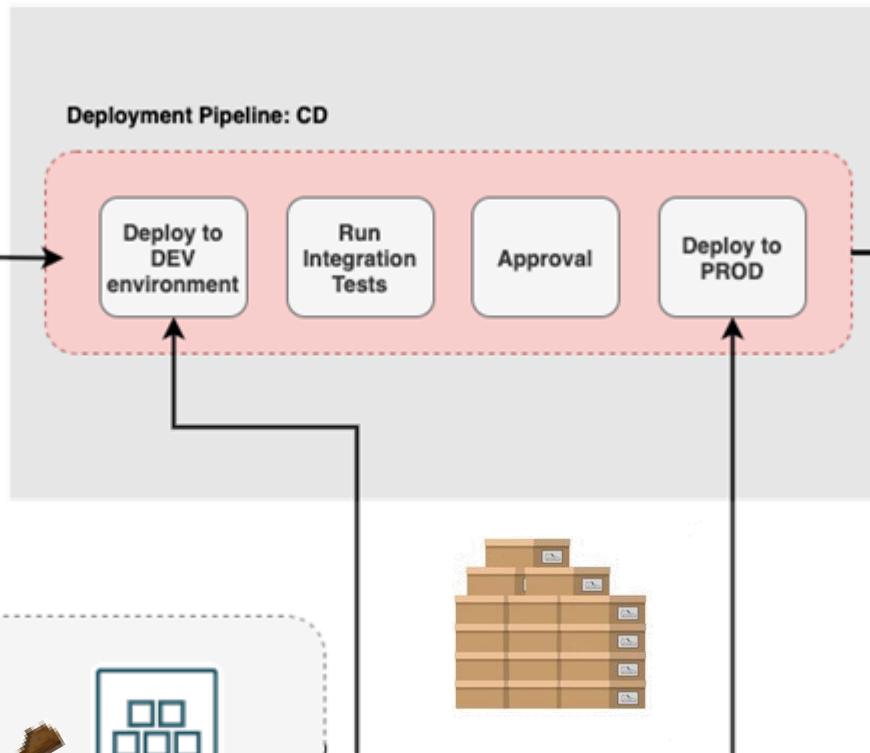
Complete CI/CD Platform



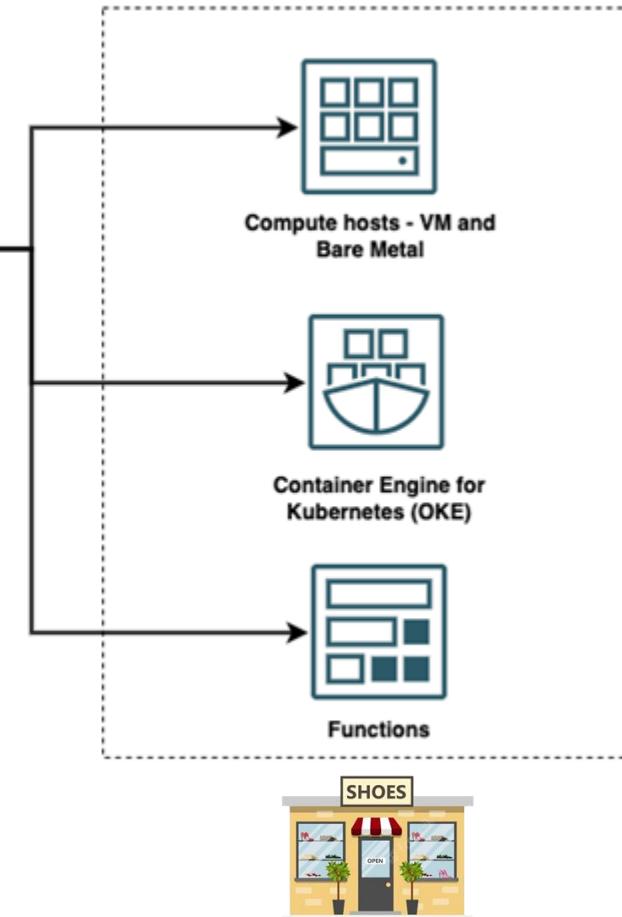
Jenkins Pipeline



OCI DevOps service



Customer Tenancy



OCI Artifact Repositories



Integrations: Jenkins, GitHub, GitLab, Spinnaker

For Code Repository:

Mirror a GitHub, GitLab or Bitbucket repo to your OCI Code Repository to speed up builds

For CI Tools:

Easier to migrate existing pipelines – keep your current Jenkins file, GitHub Actions

- Deliver Artifacts to OCI Artifact Registry
- Trigger a Deployment Pipeline

For CD Tools:

Spinnaker: open source multi-cloud orchestration for Kubernetes and VMs

- Deploy to OCI platforms



Jenkins

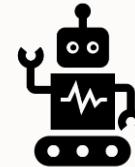


Features of General DevOps



Automation

Simplify and speed up software development



Security

Take advantage of Cloud Security



Governance

End to end Visibility



Flexible

Integrate existing CI/CD tooling.



Differences with DevOps Services

Cloud Native

Using Serverless (cheap) or Free Services to simplify

Cloud Security Services

IAM on DevOps. Scan and sign images

OCI Integration

Observability, logging and Governance.

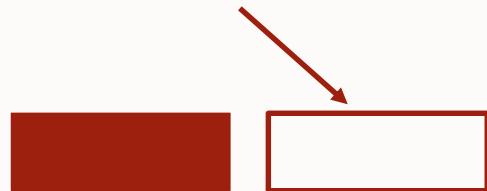


DevOps Continuous Integration (CI)



Serverless, Scalable

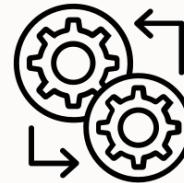
No instances to manage



Release Strategies

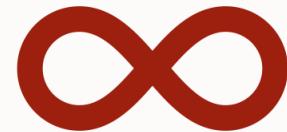
Reduce downtime, faster recovery

DevOps Continuous Deployment (CD)



Integrated

Works with your resources



Integrated

Connect your workflows



Complete

Native CI/CD Platform



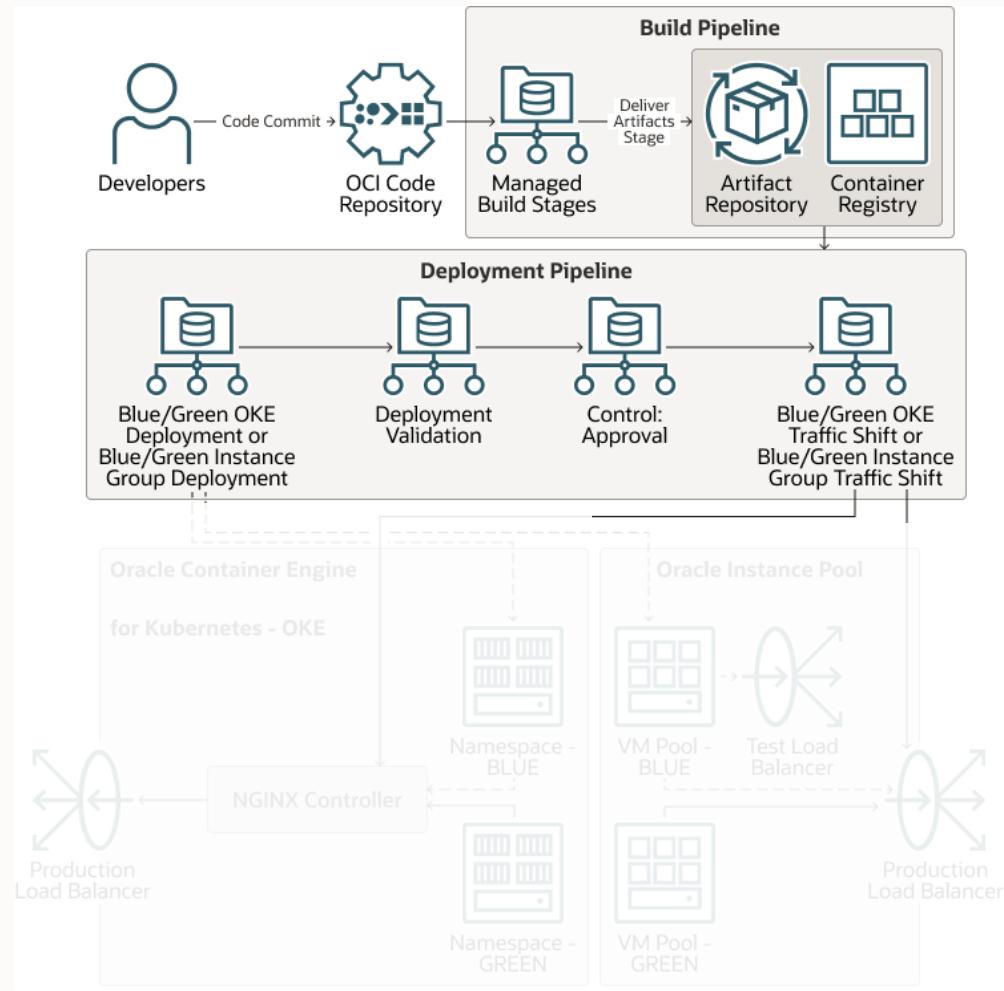
Rollback

Recover from errors



Deploy Strategies:

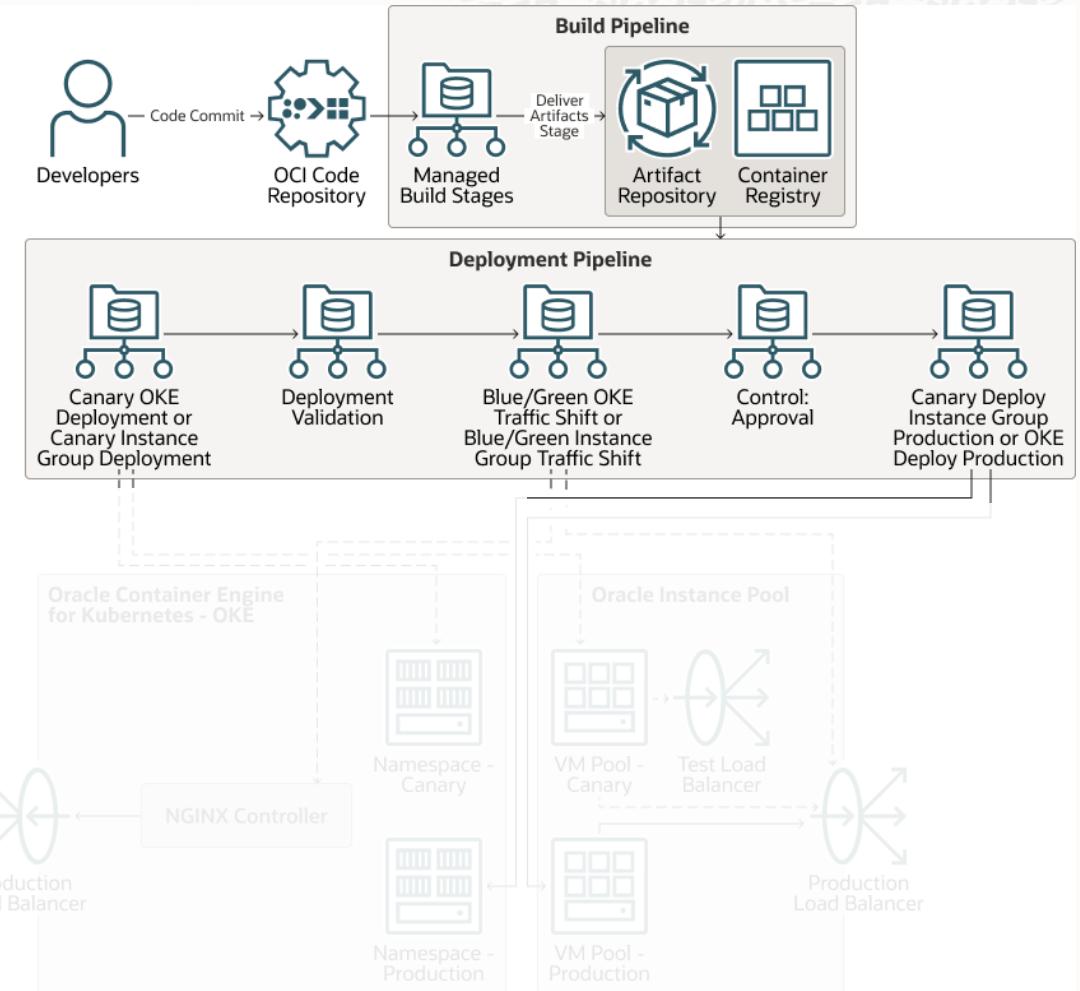
Blue/Green Deploy



OKE

BM/VM

Canary Release

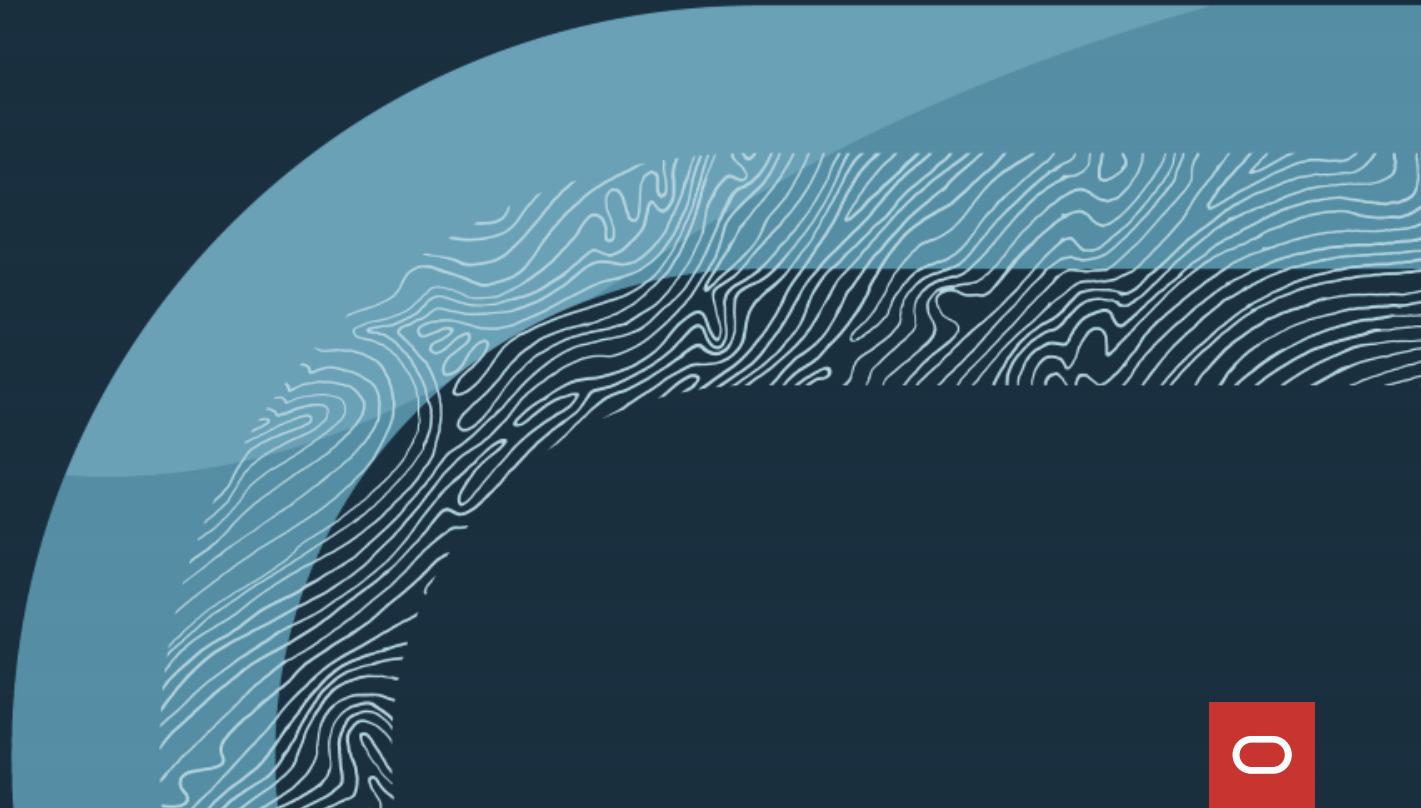


OKE

BM/VM



Video DevOps with OKE

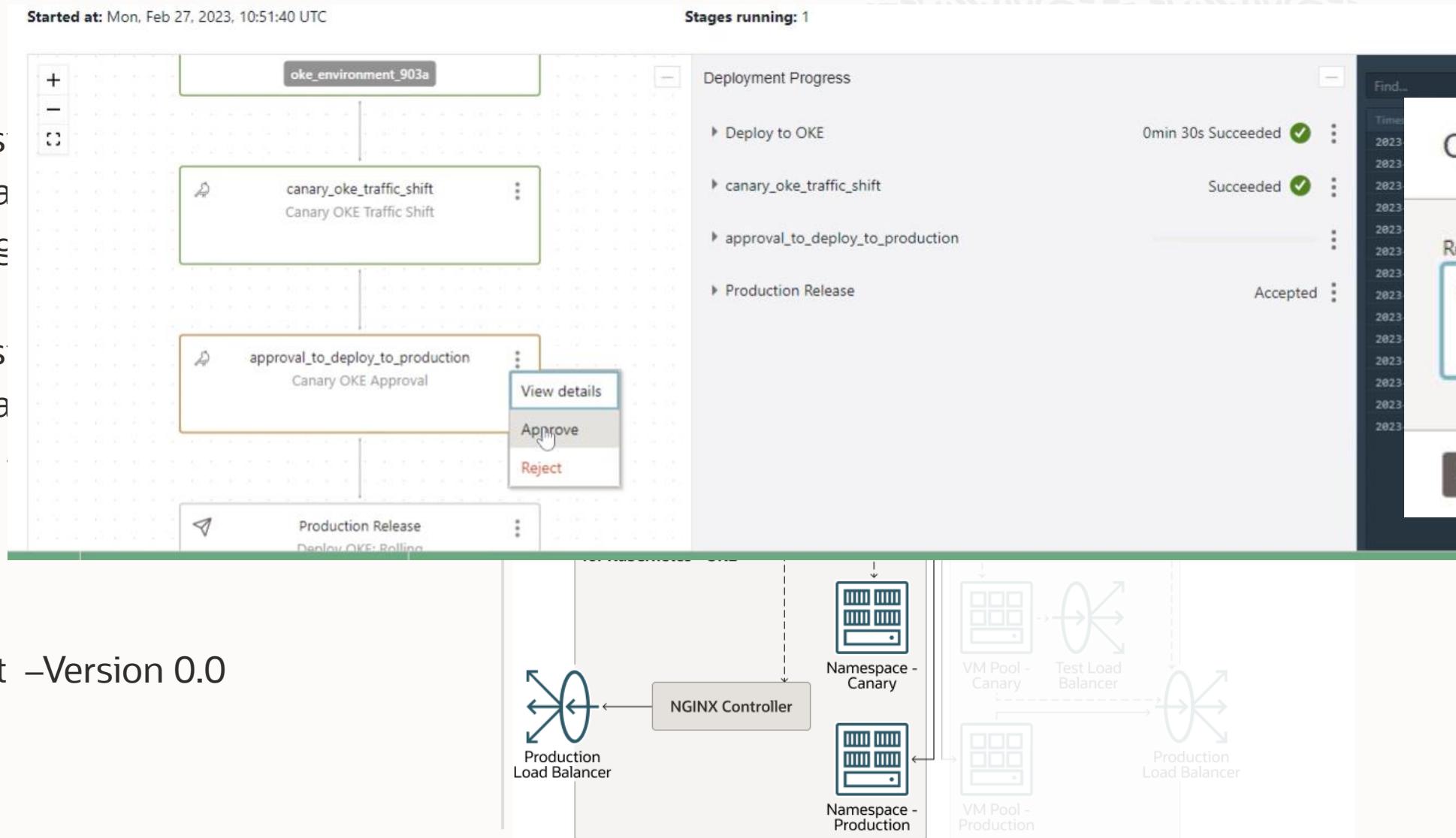


Steps

- New Deploy – Version 0.0
- Check canary release
- Approve the change

- New Deploy – Version 0.0
- Check canary release
- Reject the change

- Manual Rollback
- Select deployment – Version 0.0



Steps

- New Deploy – Version 0.0
- Check canary release (%)
- Approve the change – Version 0.1



- New Deploy – Version 1.0
- Check canary release (%) – Version 2.0
- Reject the change - Version 1.0



- Manual Rollback
- From previous deploy – Version 1.0
- Select deployment –Version 0.1



Manual Rollback - Deploy: Apply manifest to your Kubernetes cluster - oke_environment_903a - SUCCEEDED

> Deployment input ⓘ

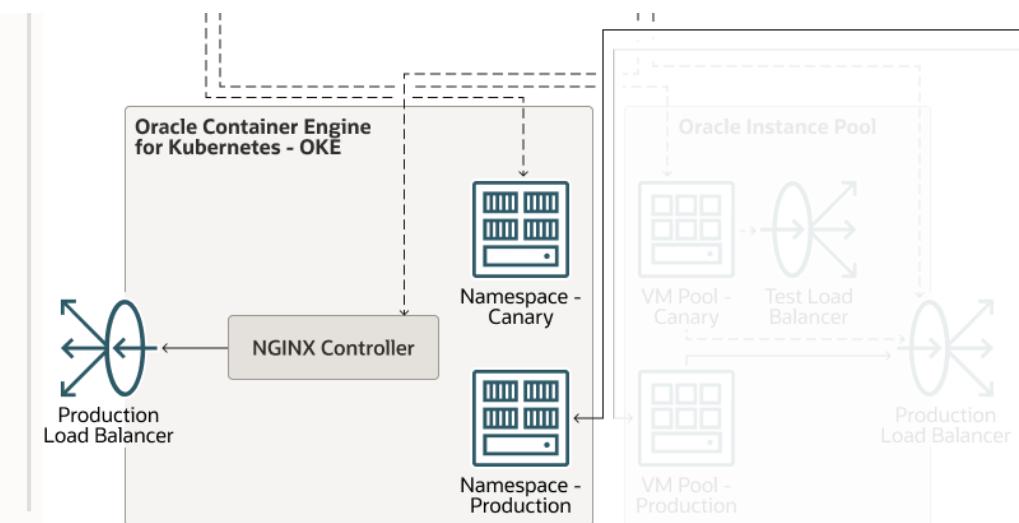
Select Previous Deployment

Name	Status	Triggered by	Duration
devopsdeployment20230227105127	Succeeded	ocid1.devopsbuildpipeline.oc1.iad.amaaaaaafekhvaaxowbjks4pch5ygmfcquhbaofzqhe6xdnnxrr4misq	2min 38s

Parameters

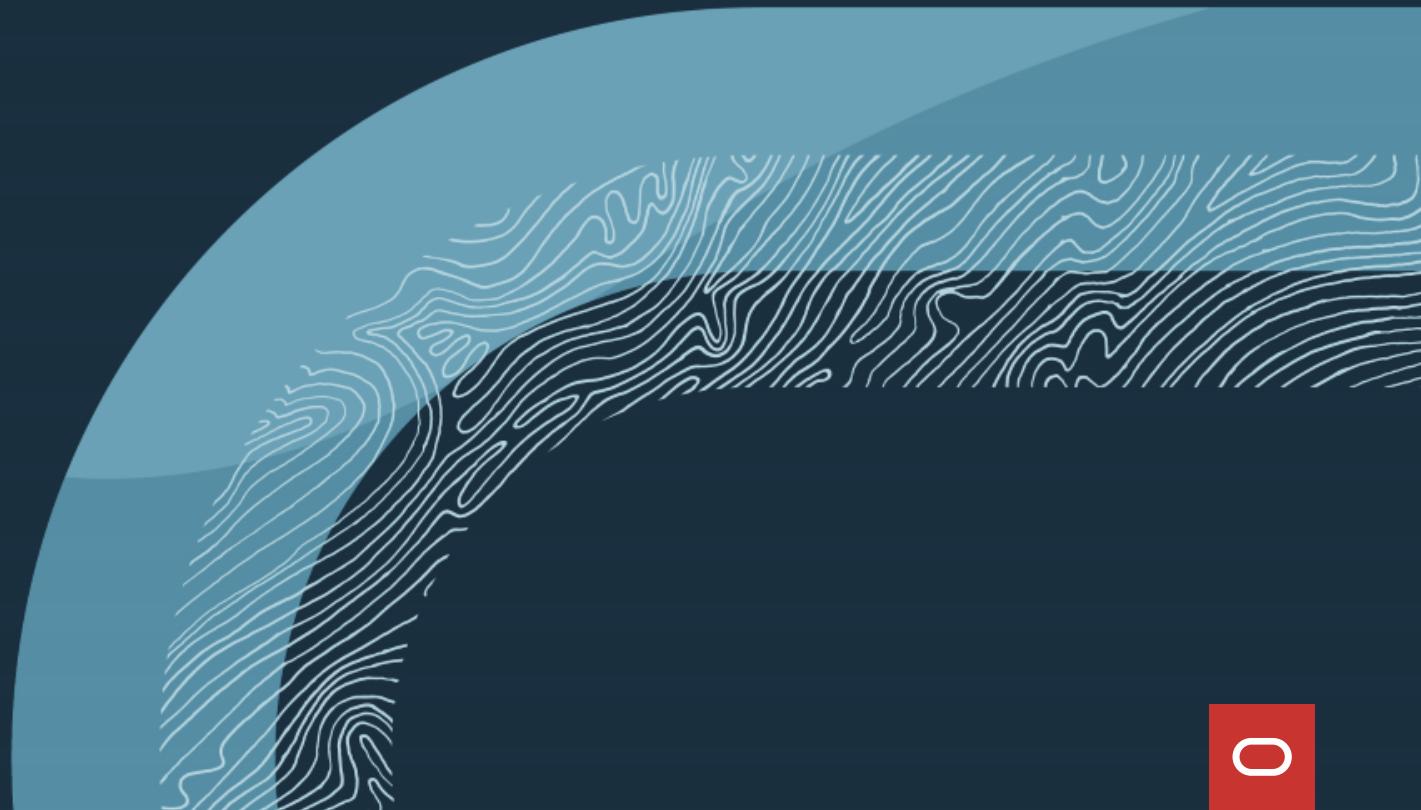
These are the Parameters provided for this deployment

Name	Value
BUILDRUN_HASH	qrybaje

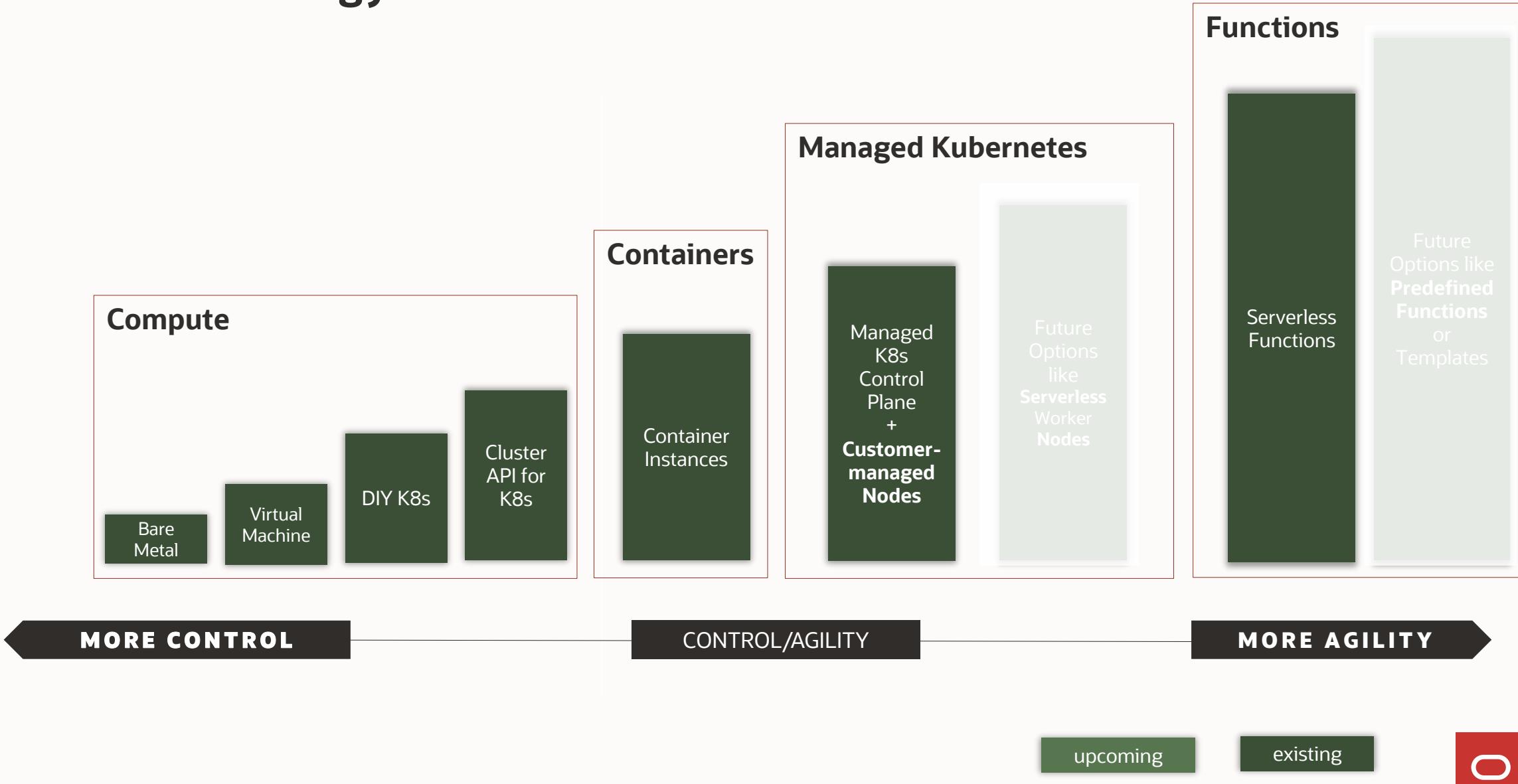


```
{"Message": "with Love from OCI Devops by FJMD", "Version": "0.0", "Namespace": "nscanaryprd"}, {"Message": "with Love from OCI Devops by FJMD", "Version": "0.0", "Namespace": "nscanaryprd"}, {"Message": "with Love from OCI Devops by FJMD", "Version": "0.1", "Namespace": "nscanarystage"}, {"Message": "with Love from OCI Devops by FJMD", "Version": "0.1", "Namespace": "nscanarystage"}, {"Message": "with Love from OCI Devops by FJMD", "Version": "0.0", "Namespace": "nscanaryprd"}, {"Message": "with Love from OCI Devops by FJMD", "Version": "0.0", "Namespace": "nscanaryprd"}
```

Functions



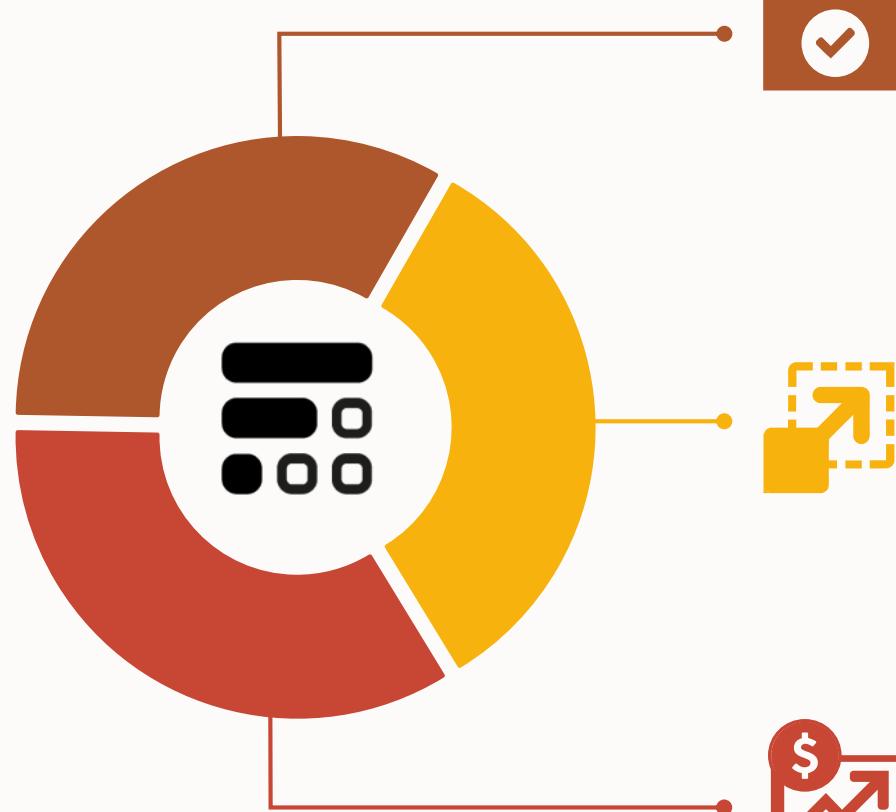
Container Strategy: Flex Runtimes



Oracle Functions

Functions-as-a-Service

Container-Base Open
Source Initiative
Cloud Integrated



Pay per use
Pay for execution,
not for idle time

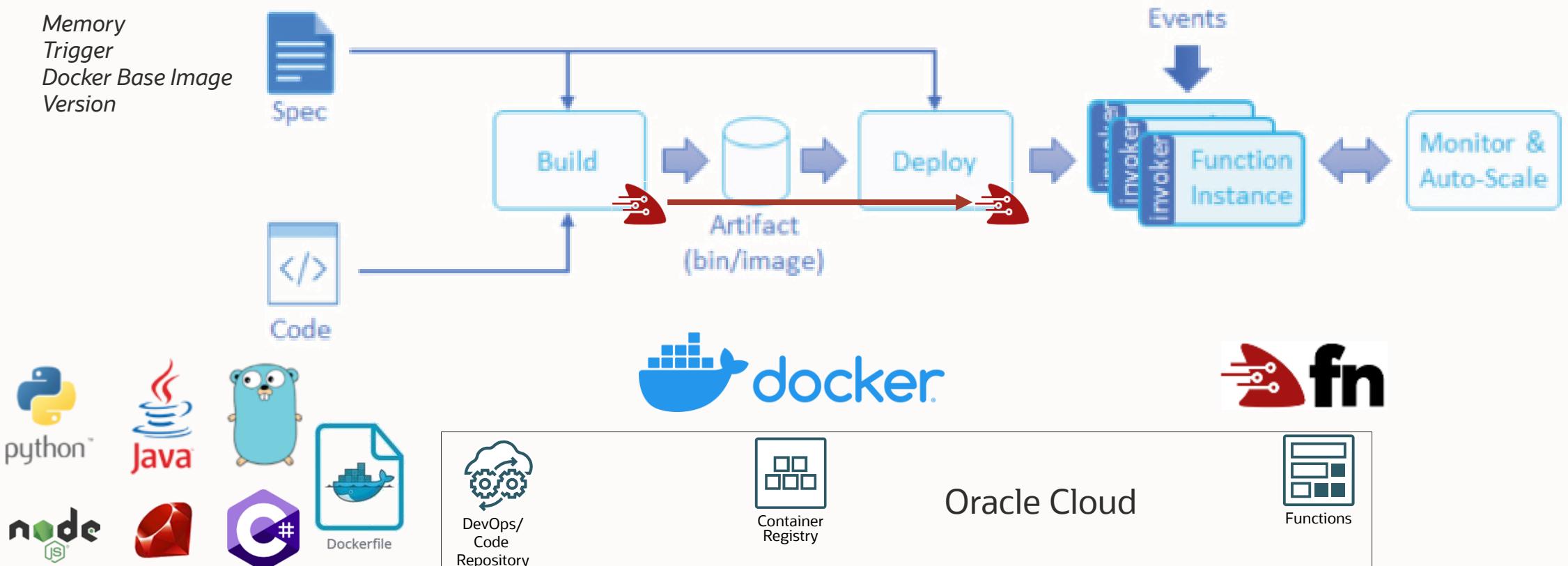
Autonomous
Platform auto-scales functions
No servers to provision, manage

Event-driven
Oracle Cloud Infrastructure
triggers to run your code



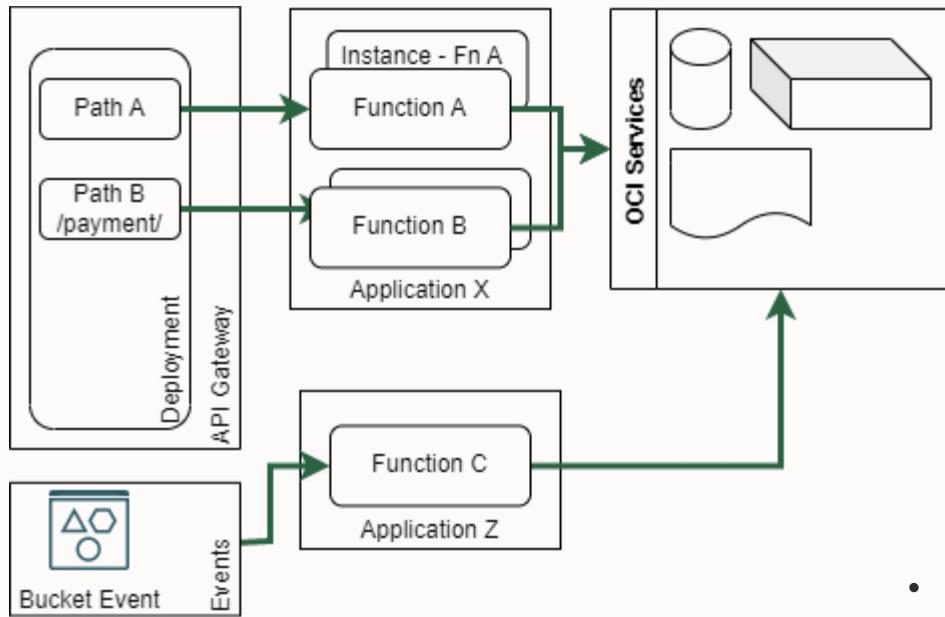
How it does it work?

Options:
Local
DataCenter
OCI

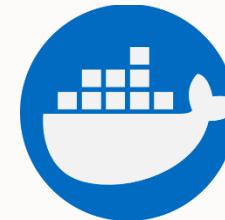


Oracle Functions: Features and Architectures

1. Type of License
2. Scope
3. Description
4. Pricing
5. Input

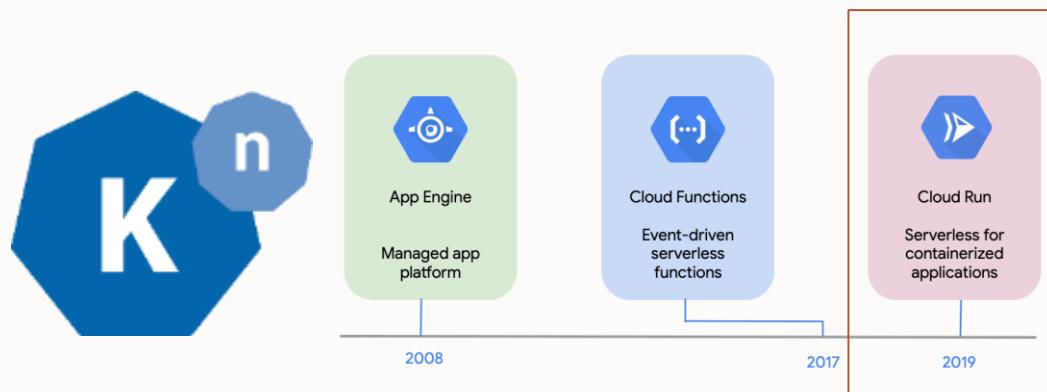


1. Open Source – Apache 2.0 License
2. Multisite - Multicloud
3. Improve DevOps experience and “On my machine works”
4. Container Native – Auto scaling – Pricing by invocations and GB-sec consume. Agnostic to orchestrator and language (hot wrap)
5. CNCF Events.



- **Application**
Logical grouping of isolated functions, with a common context (cfg vars) and resources (networks, signature verification, metrics and logs)
- **Function**
Block building for microservices, stored as Docker image, write common context (cfg vars).

Comparative with other open source options



1. Open Source / CNCF Support.
2. Multisite – Multicloud.
3. Kubernetes (Container) Native, autoscale to 0.
4. Pricing due to Kubernetes cluster. GCP 2 models.
5. Cloud Events, HTTP(S) support.



1. Open Source / Commercial Support.
2. Multisite – Multicloud.
3. Kubernetes/OpenShift/Swarm (Container) Native, autoscale to 0. PLONK - Grafana
4. Pricing due to Kubernetes cluster.
5. HTTP/TLS.

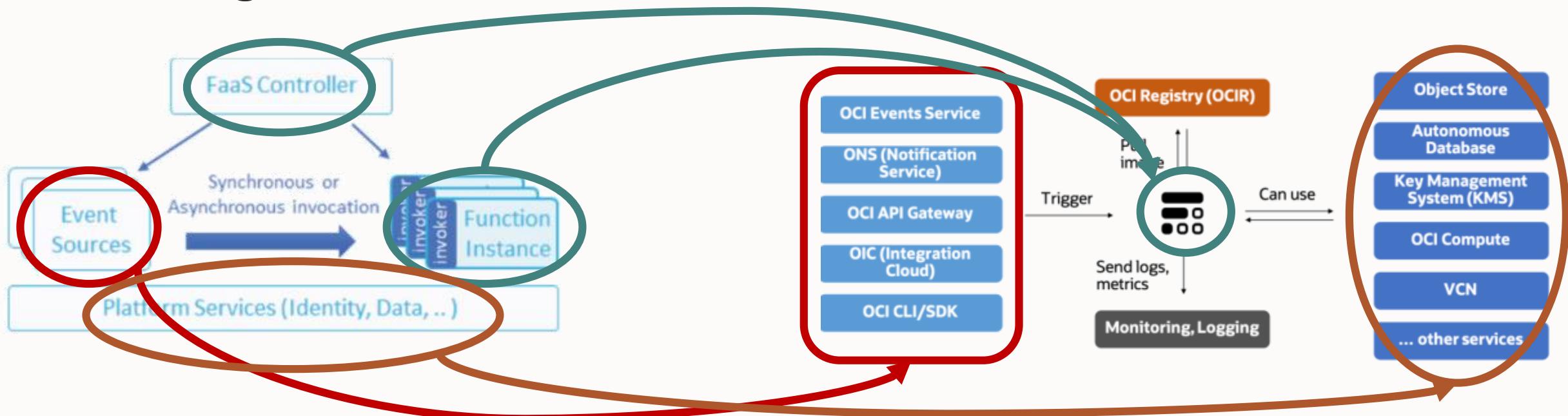


1. Open Source / Deprecated by VMWare (Dic/2021).
2. Multisite – Multicloud.
3. Kubernetes (Container) Native, autoscale to 0. Python, Node or Ruby.
4. Pricing due to Kubernetes cluster.
5. HTTP or Kafka Events.

1. Type of License
2. Scope
3. Description
4. Pricing
5. Input



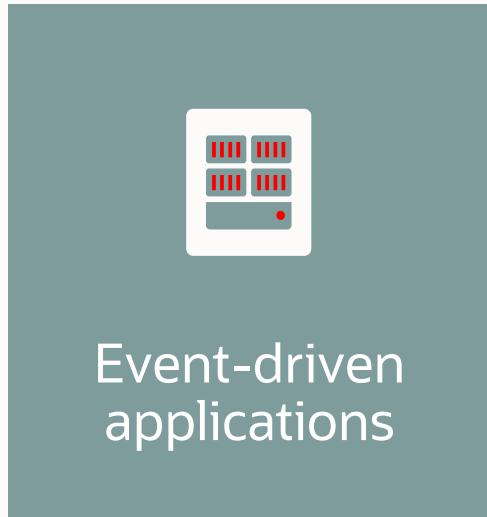
Processing Model



Events are configured to make calls to Apps/Functions.

The **FaaS Controller** (Oracle Functions) is in charge of balancing and instantiating the Functions
The integration is native from the Functions to **Cloud Services**.

Event-Driven Design Patterns: Common Use Cases



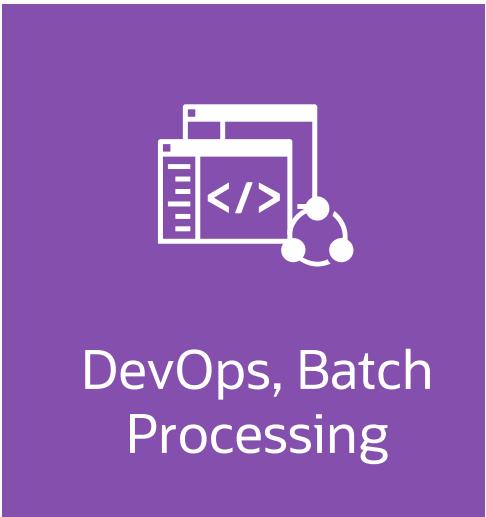
Event-driven
applications



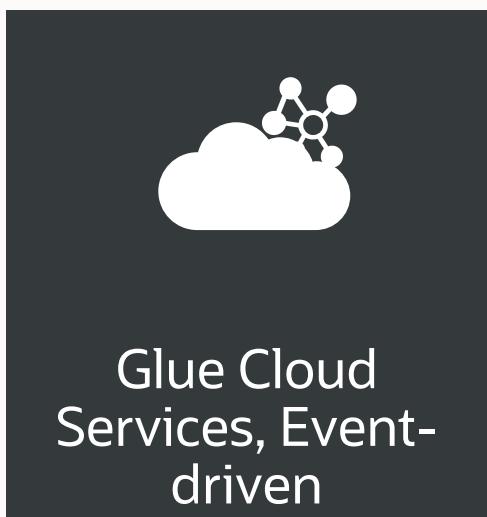
Web, Mobile, IoT
Backends



Real-time File,
Stream
Processing



DevOps, Batch
Processing



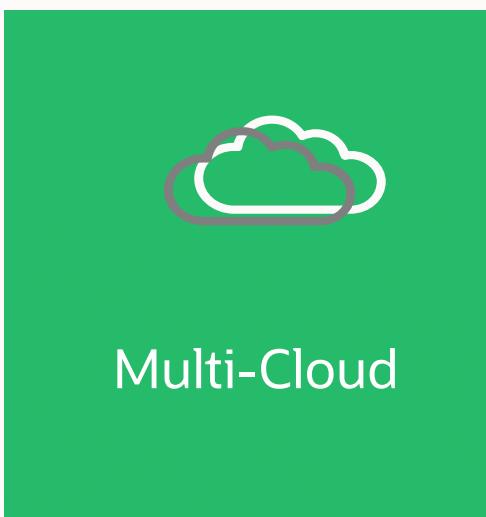
Glue Cloud
Services, Event-
driven



Security
Operations



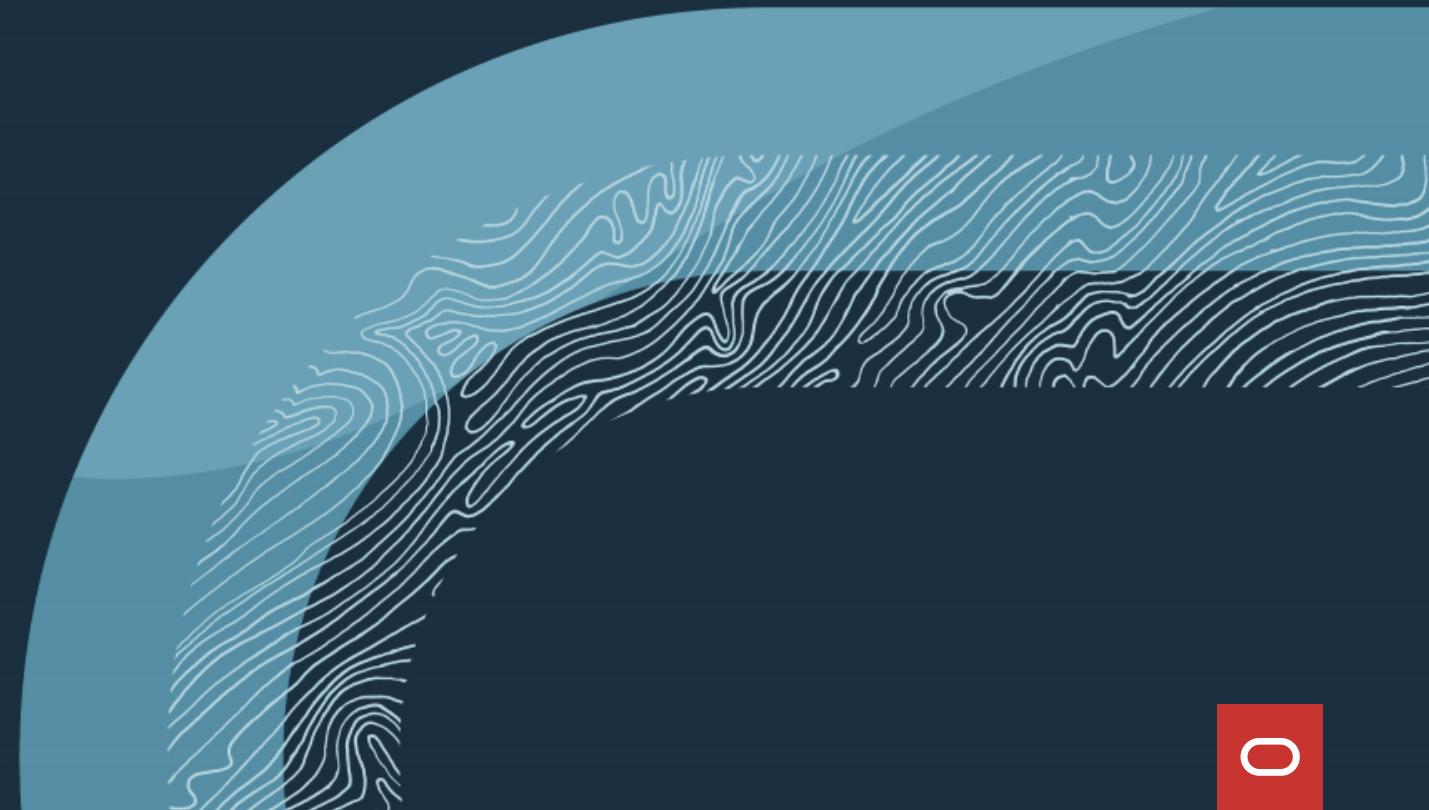
IT Operations



Multi-Cloud



Demo DevOps with Functions



Demo DevOps with Functions

<https://docs.oracle.com/en/solutions/build-cicd-pipelines-devops-function/>

Create Auth Token for the user

Launch Resource Manager (Terraform-as-a-Services)

Configure Options to the stack

In my case, the Auth Token contains:

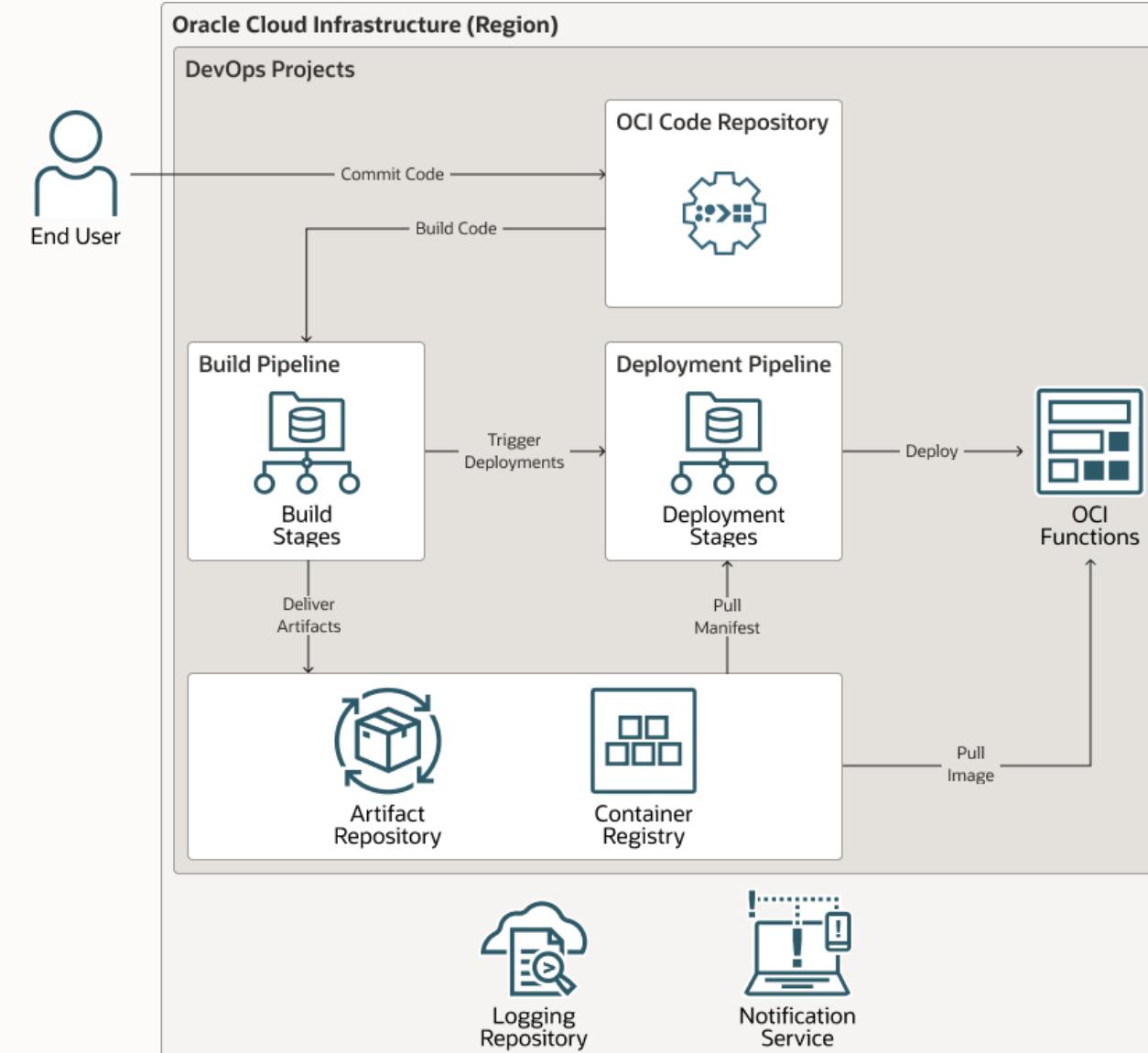
User:

ladcsemrcn/oracleidentitycloudservice/francisco.m.moreno

Password:

From OCI Cloud Console, select your username from Right Corner

Then goes to *Auth Token*



References



Explore Fn

Tutorials Fn and Sample Code

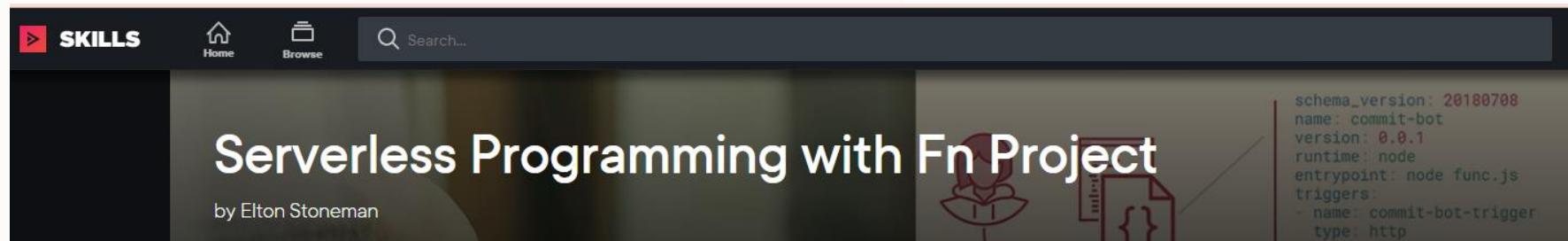
- [Create Apps with Fn](#) - Learn how to group your functions into an application/API and deploy them together.
- [Create a Function with a Docker Container](#) - This tutorial provides a simple example of how to define an Fn function using a custom built Docker container.
- [Create a Function with a Linux Command and HotWrap](#) - This tutorial provides an example of how to define an Fn function using Linux commands, HotWrap, and a custom Docker container.
- [Create a Function from a Docker image that contains a Node.js app with Oracle DB Support](#)
- [Fn Development with Multiple Contexts](#) - Shows how to setup and use multiple Fn configuration contexts for development.
- [Using Fn RuntimeContext with a Function](#) - See how to set Fn Application and Function variables and access them in your function using the Runtime Context.

<https://fnproject.io/tutorials/>

<https://app.pluralsight.com/library/courses/serverless-programming-fn-project>

Test and Monitor Functions

- [Monitor Fn metrics with Grafana and Prometheus](#) - Learn how to view Fn server metrics with Prometheus and Grafana.
- [Troubleshoot and Log functions](#) - Resolve issues at both development and deployment time.



Oracle Functions

<https://www.oracle.com/cloud-native/functions/>

Fn Project

<https://hackernoon.com/playing-with-the-fn-project-8c6939cf5cc>

<https://dev.to/kh40sz3r0/serverless-functions-with-fn-project-64e>



Official Resources to Learn



MyLearn | Oracle University



A-Team Chronicles



LAD Cloud Experts Spanish Blog

coursera

No-Official Resources



PLURALSIGHT



Oracle Cloud Blog

My personal take on Oracle's Infrastructure and Platform Coolness!!



References



Technical Blogs

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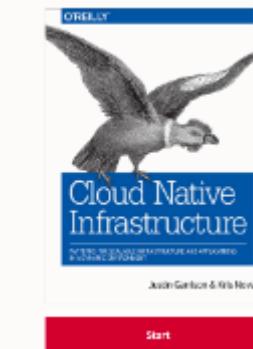
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References



General Page

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Events Service (Using CNCF Events)

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Service Mesh

<https://docs.oracle.com/en-us/iaas/Content/service-mesh/home.htm>

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Hands-on Labs for DevOps & Cloud Native

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

<https://docs.oracle.com/en/solutions/ci-cd-pipe-oci-devops/index.html>

<https://go.oracle.com/hols>

<https://apexapps.oracle.com/pls/apex/dbpm/r/livelabs/home>

Por donde iniciar?

Contenedores y Functions	Documentation & tutorials <ul style="list-style-type: none">Container Engine for KubernetesContainer RegistryFunctions	Solutions Playbooks and Reference Architectures <ul style="list-style-type: none">Set up a Kubernetes cluster for deploying containerized applicationsDeploy Cloud Native Apps with MySQLOCI for AWS ProfessionalsOCI for Azure Professionals	Labs <ul style="list-style-type: none">Build Cloud Native Java Apps with Micronaut and GraalVM OCI CertificationAutomate the Deployment of Java Apps to OCI/DevOps Pipeline Developer Community//
API y Streaming	Training: <ul style="list-style-type: none">Coursera Course: API Gateway	<ul style="list-style-type: none">API For Developers: Learn how to design, develop and manage APIs	
AI y Data Services	AI Workshops <ul style="list-style-type: none">Digital AssistantLanguageSpeech	Blogs <ul style="list-style-type: none">Develop XR With Oracle Ep 3: Computer Vision AI, ML, and MetaverseML and AI blog	
DevOps y Application Development	<ul style="list-style-type: none">DevOps service example workflows and terraform automation	<ul style="list-style-type: none">OCI DevOps Documentation	<ul style="list-style-type: none">DevOps CI/CD Reference ArchitectureDeploy a Jenkins CI/CD pipelineOCI DevOps Professional CertificationDB Operations with DevOps



Functions: Additional Features

- [Micronaut Functions and API example](#). Has Java and Java Native support. Has Gradle support.
- [Managing Functions Lifecycle with Visual Builder Studio \(CI-CD\)](#)
- [LiveLab: Develop/Deploy a Modern Application with Node.js Functions & MySQL Database Service](#)
- Functions with Oracle NoSQL DB
- [Blog: Node/ADB functions](#) using a custom Dockerfile e.g., install Oracle Client for Node
- Service Connector Hub-triggered functions e.g., [Send OCI Logs to Datadog](#)
- Function chaining with Integration Cloud

