

Desarrollo de Aplicaciones Cloud Native (3/3)

Innove e incrementa la velocidad de entrega y valor mediante aplicaciones Cloud Native

Francisco Moreno

Cloud Solution Engineer
LAD Cloud Tech Knowledge
30 Septiembre, 2022



Agenda

1 h

Arquitecturas para Aplicaciones Modernas

Visión Oracle para DevOps y Cloud Native

Herramientas

- CI/CD: DevOps Services (3)
- DevSecOps: Herramientas variadas (3)
- IaC: Resource Manager (Terraform) (3)

Servicios

- Oracle Kubernetes Engine (OKE) (1)
- Service Mesh on OKE (1)
- Functions (2)



No hay nada tan estable como el cambio.
- Bob Dylan -

8x



2x



TOGAF®  UNIVERSITY
of York



ORACLE

Arquitecturas de Aplicaciones Modernas

Beneficios, Características y Patrones: Más que solamente hardware

Francisco Moreno

State of DevOps: Importance of Automation & Security to Business

973x

More deployments -
increasing speed

6570x

Faster time to recover
from incidents

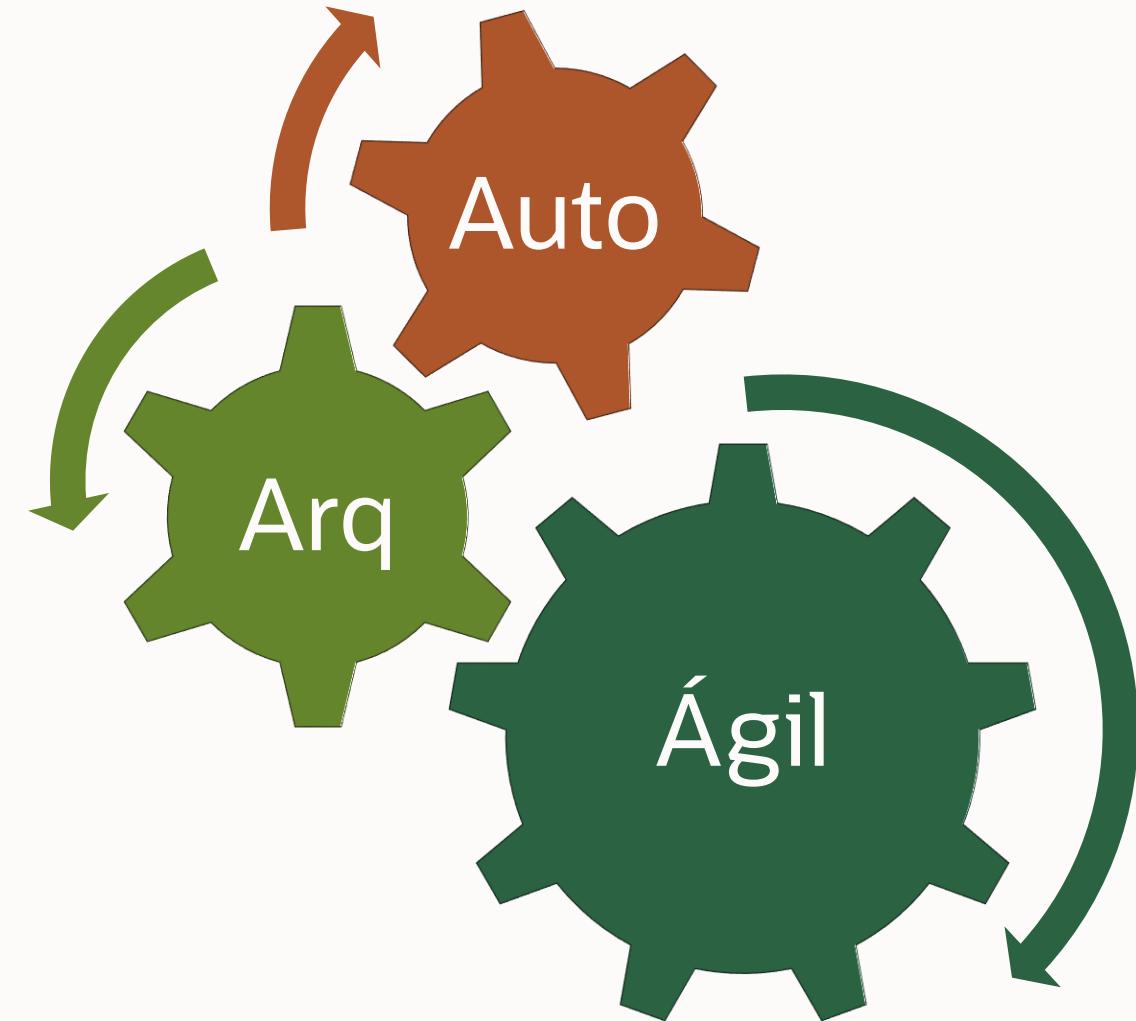
Characteristics of Elite Organizations

Software delivery performance metric	Elite	High	Medium	Low
Deployment frequency For the primary application or service you work on, how often does your organization deploy code to production or release it to end users?	On-demand (multiple deploys per day)	Between once per week and once per month	Between once per month and once every 6 months	Fewer than once per six months
Lead time for changes For the primary application or service you work on, what is your lead time for changes (i.e., how long does it take to go from code committed to code successfully running in production)?	Less than one hour	Between one day and one week	Between one month and six months	More than six months
Time to restore service For the primary application or service you work on, how long does it generally take to restore service when a service incident or a defect that impacts users occurs (e.g., unplanned outage or service impairment)?	Less than one hour	Less than one day	Between one day and one week	More than six months
Change failure rate For the primary application or service you work on, what percentage of changes to production or released to users result in degraded service (e.g., lead to service impairment or service outage) and subsequently require remediation (e.g., require a hotfix, rollback, fix forward, patch)?	0%-15%	16%-30%	16%-30%	16%-30%

Source: DORA - State of DevOps 2021
32,000 professionals worldwide surveyed over 7 years

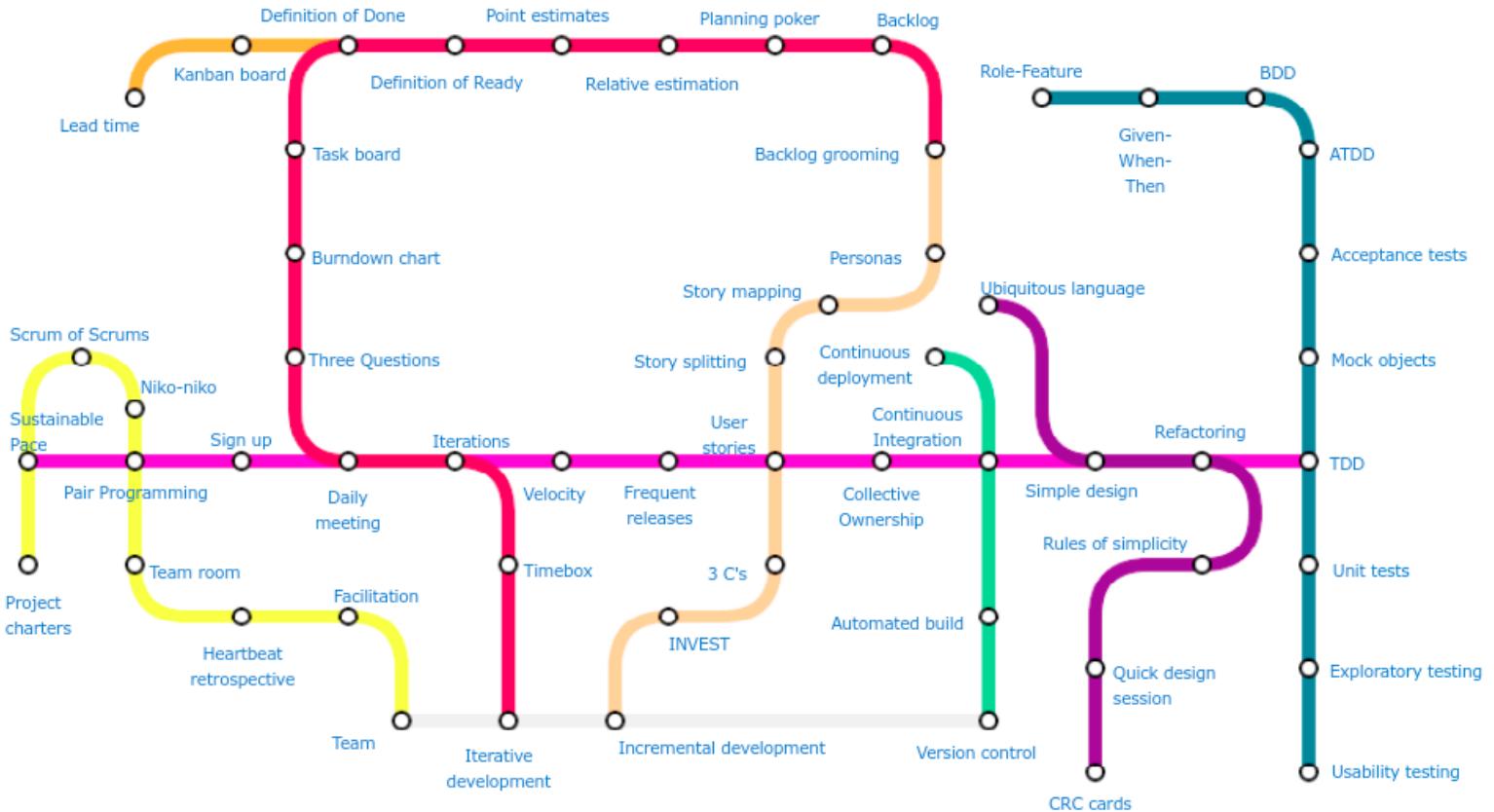


Pilares fundacionales para desarrollo Cloud Native



- | | |
|-------------|--|
| Auto | Herramientas y Servicios: IaC, Contenedores y Orquestadores |
| Arq | Arquitectura y Patrones: Microservicios y Eventos >> Orquestación y Coreografía |
| Agil | Metodologías: Scrum, SAFe |

Mapa de Practicas Agiles



Lines represent practices from the various Agile "tribes" or areas of concern:

Extreme Programming	Scrum	Design
Teams	Product management	Testing
Lean	Devops	Fundamentals

Subway

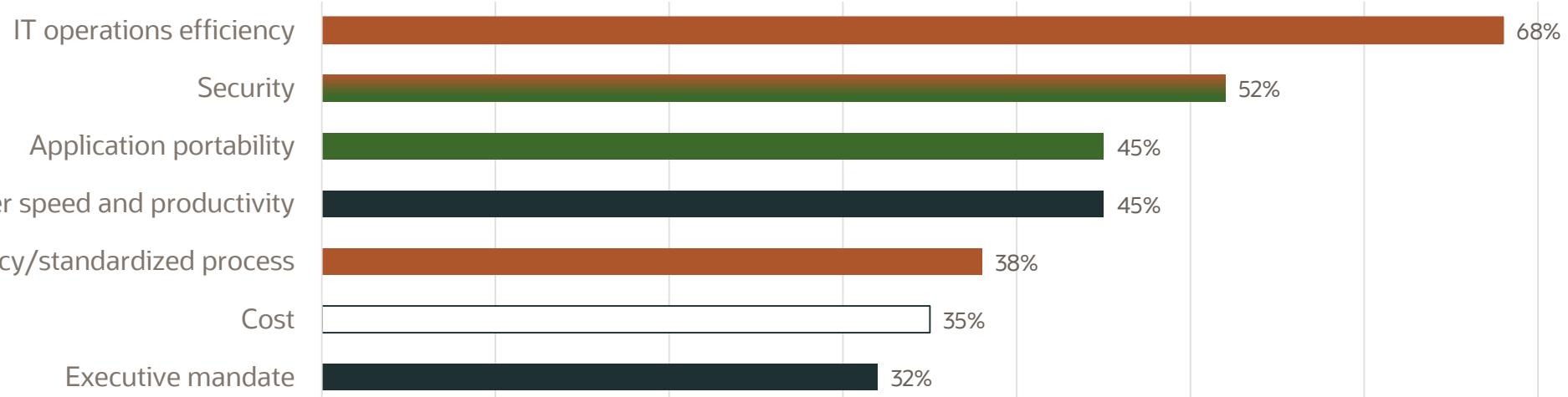


Porqué desarrollar aplicación Cloud-Native

451
Research

S&P Global
Market Intelligence

Top benefits of containers, serverless, and other cloud-native technologies



Tomado de: [451 Research's Voice of the Enterprise: DevOps, Workloads and Key Projects 2020](#)

Que son las aplicaciones nativas?

Aplicaciones modernas están diseñadas:

- Basadas en **microservicios** con **baja cohesión** **Arq**
- Se comunica por **APIs** **Arq**
- Usualmente desplegadas **Contenedores** **Auto**
- Desarrolladas y desplegadas usando patrones y herramientas **DevOps Modernas** **Ágil**

Pero -- más

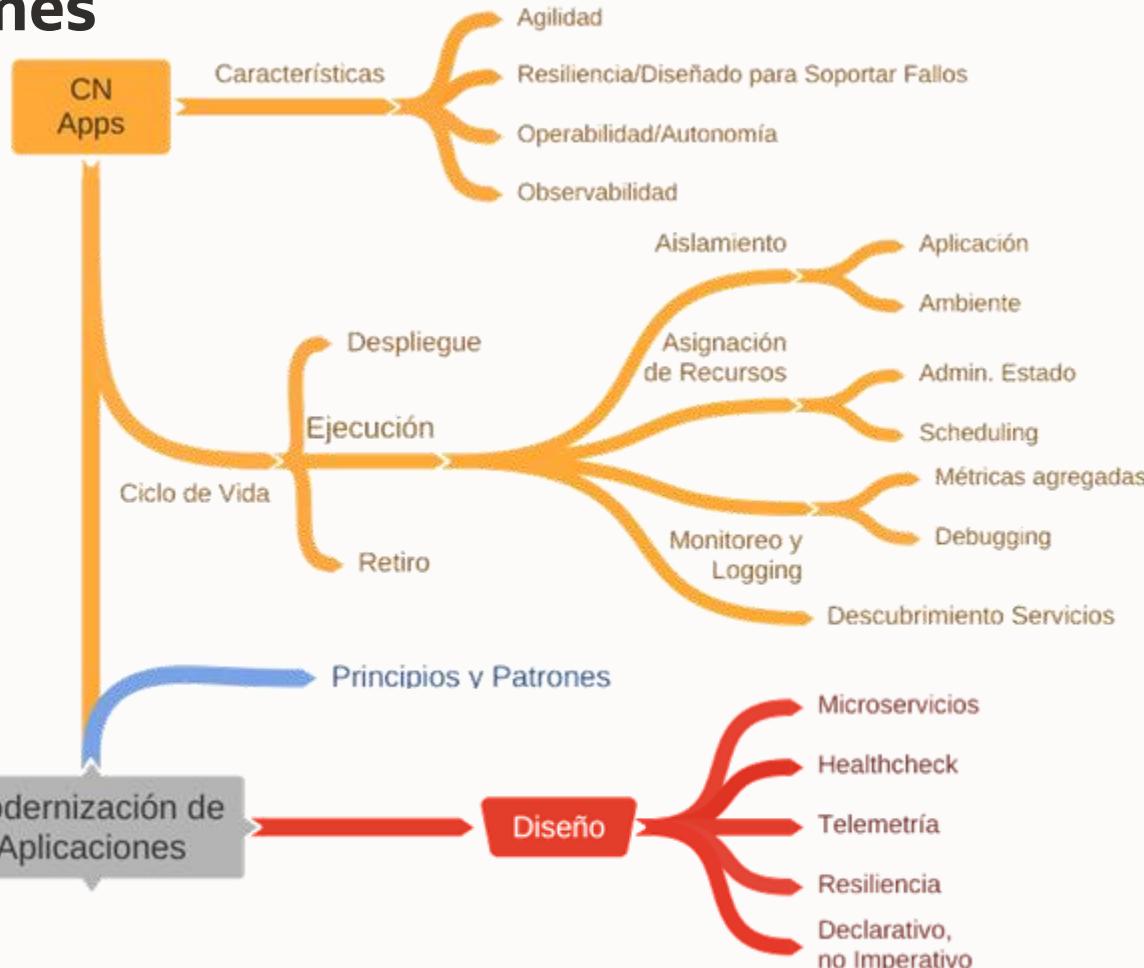
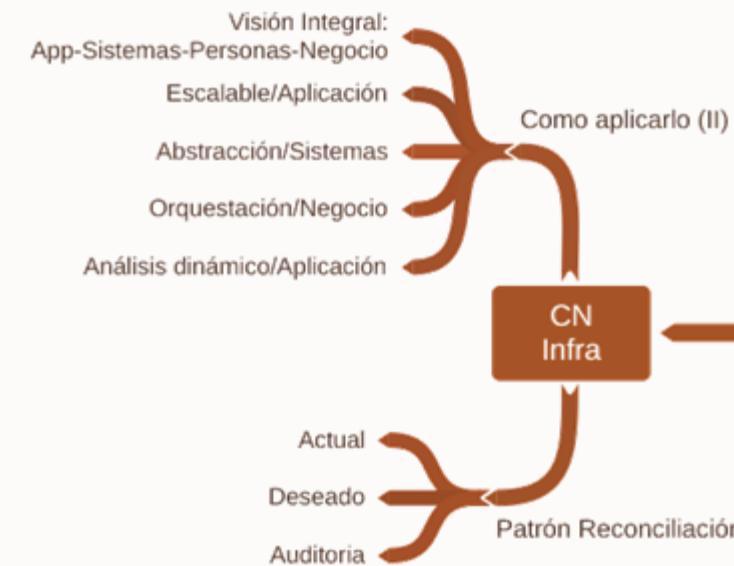


Arquitecturas con baja cohesión son el **predictor #1 del éxito de DevOps**

Cada servicio es desarrollados, desplegado y operado independientemente – Por eso puede moverse **rápidamente!**



Modernizar Aplicaciones



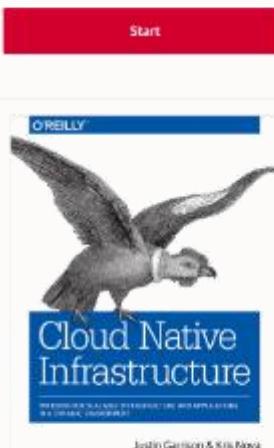
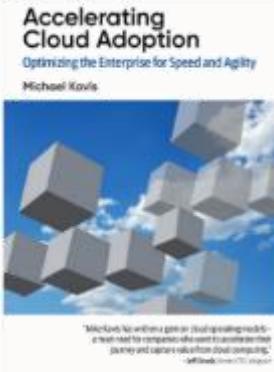
“(..) empower organizations to build and run **scalable** applications in(..) clouds.

Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

(..) enable **loosely coupled** systems that are **resilient, manageable, and observable**.

Combined with robust automation, they allow engineers to make high-impact **changes frequently** and predictably with minimal toil.”

CNCF Definition

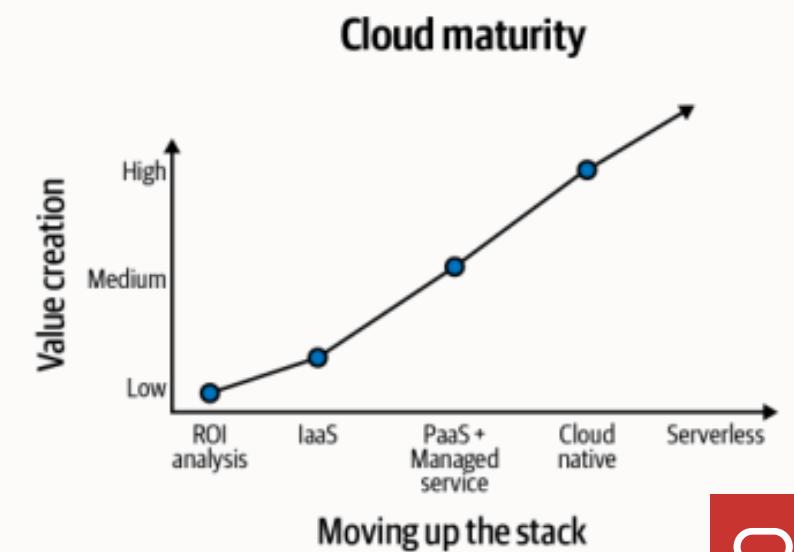
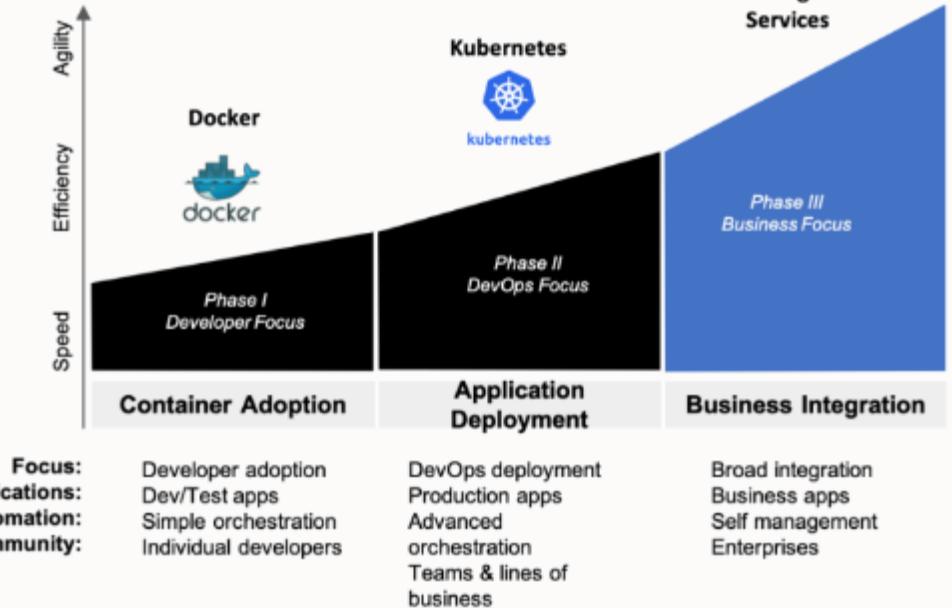
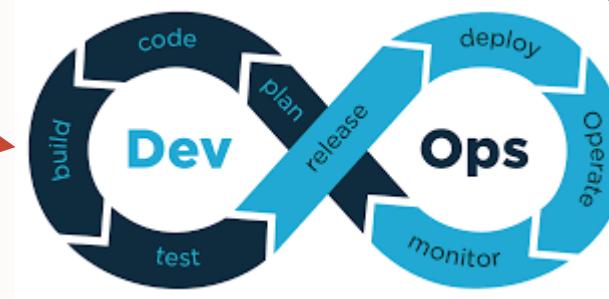
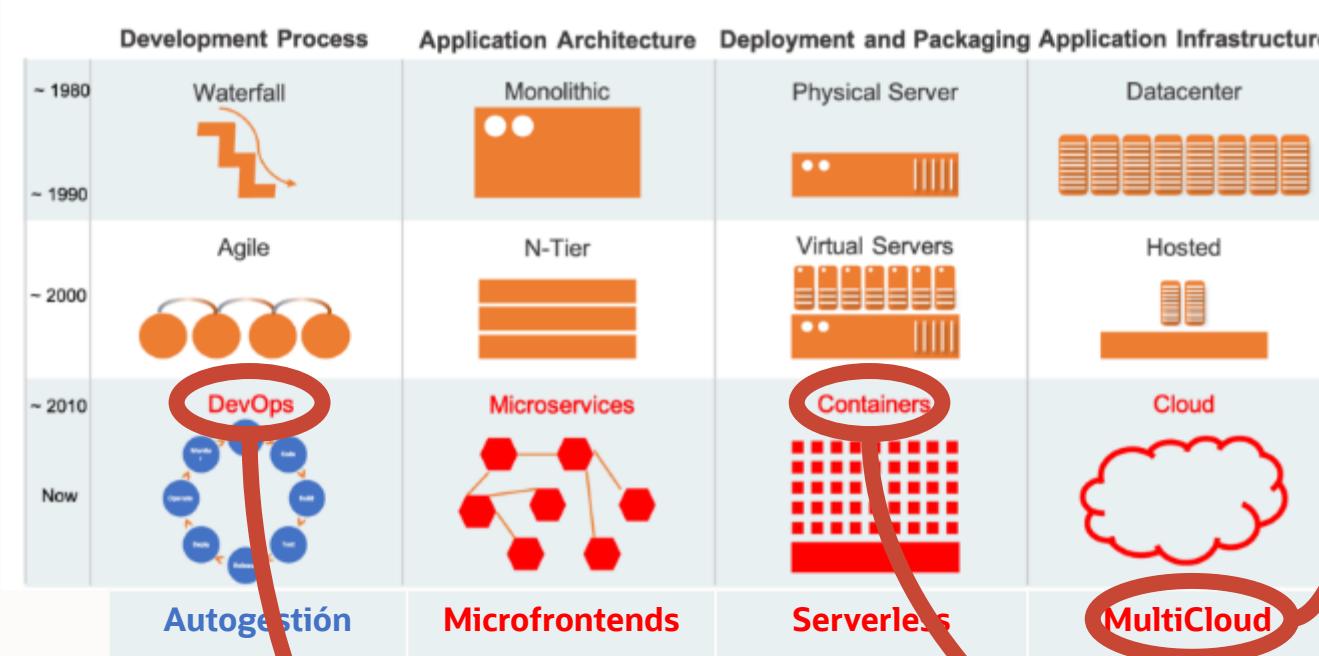


Del Agilismo a los DevOps

Agil

Arq

Auto



Principios de Diseño de Aplicaciones Modernas

- Uso de frameworks ligeros y de código abierto así como lenguajes de programación maduros
- Construcción de aplicaciones como servicios que se comunican a través de APIs
- Empaquetado y despliegue de apps como contenedores
- Construcción, prueba y despliegue automático
- Servicios completamente administrados para eliminar complejidad a través de desarrollo de aplicaciones, runtimes y datos
- Mantener capa de aplicación sin estado
- Uso de bases de datos convergente con soporte completo a través de cualquier tipo de dato
- Recolectar métricas end-to-end (E2E) y monitoreo
- Eliminar puntos de falla (SPOF) a través de datos replicados y recuperación de fallas
- Implementar una aproximación de defensa en profundidad para asegurar el ciclo de vida de las aplicaciones

Principios y Patrones

Modernización de
Aplicaciones



Las Cloud Native Apps son maravillosas



Características

Agilidad

Time-to-market reducido

Escalable

**Agnóstico a
plataforma y lenguaje**

Seguridad

Beneficio

Acelerara la entrega de servicios de alta calidad usando CI/CD y automatización

Construcción, iteración y despliegue de aplicaciones mas rápido

Construcción de aplicaciones low-code

Escalar automáticamente

Adopción de Estándares de código abiertos y portables para evitar el *vendor lock-in*

Selección correcta de lenguajes de programación y frameworks basado en la necesidad de la aplicación

Mejores practicas por defecto

Facilidad para ejecutar apps en una gestión segura (CSP)

Pero las nuevas aplicaciones son complejas, un aliado simplifica el camino



Características

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Diferenciador OCI

Blueprint para el Desarrollo de Aplicaciones

Plataforma completa para migrar, optimizar y modernizar aplicaciones

Infraestructura flexible con auto escalamiento (y redimensionamiento): Horizontal y Vertical

Soporte los estándares de código abierto, servicios y frameworks así como su extensión
DevOps Toolchain para automatización

Seguridad Sencilla, Prescriptible e Integrada a través de IaaS, PaaS y SaaS



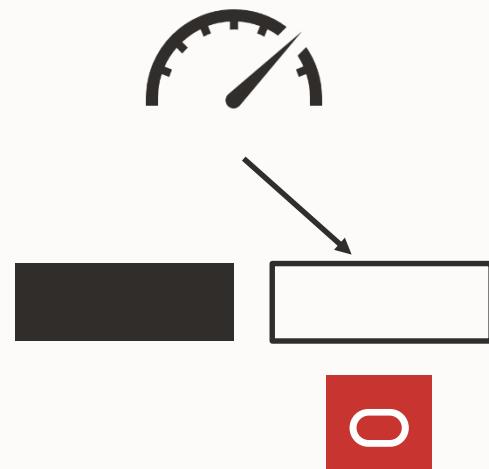
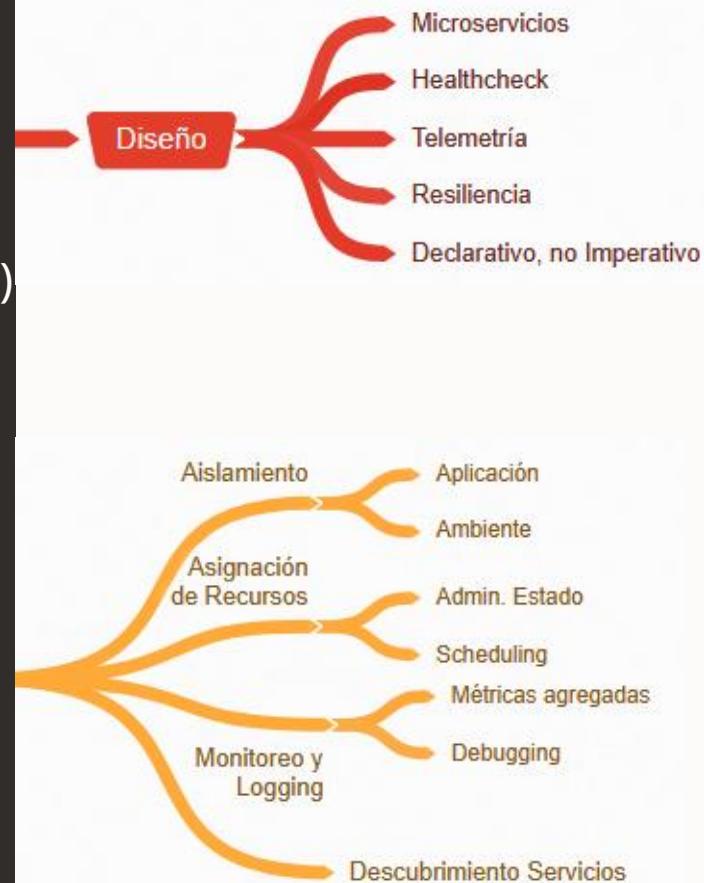
Como lo hace y como se ejecuta?

• Diseño:

- Microservicios: Contenedores y Funciones (Serverless)
- Healthcheck: Sondas y Agentes
- Telemetría: Métricas sobre funcionamiento
- Declarativo: Características de la aplicación

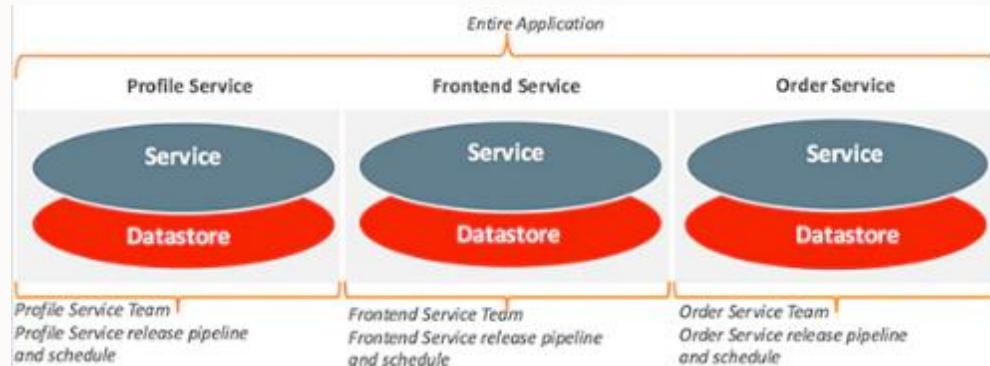
• Ejecución:

- Aislamiento: Dividir funcionalmente.
- Asignación de Recursos: Disponible y Adecuado.
- Monitoreo y Logging: Comportamiento y Mejora.
- Asignación de Recursos/Monitoreo y Logging: Escalamiento.

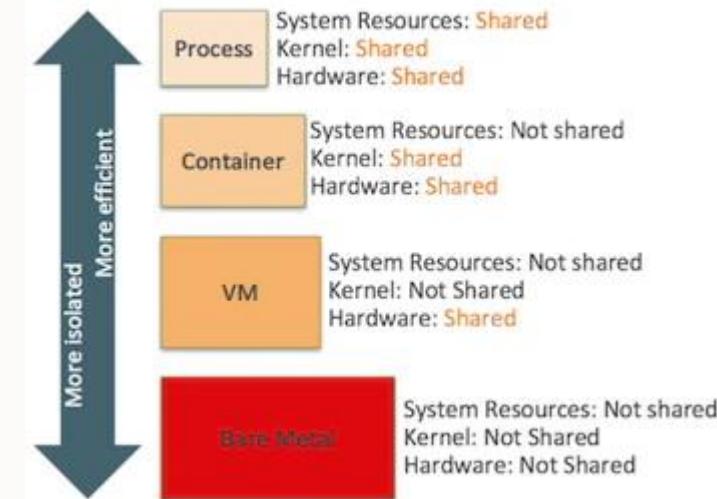


Retos Diseño I

Arq

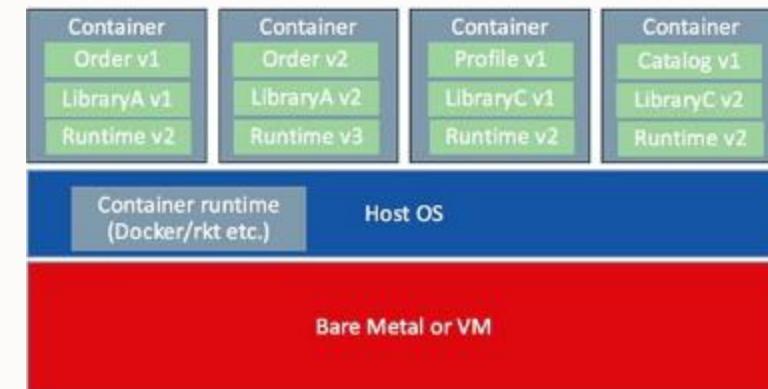


Density & Isolation levels



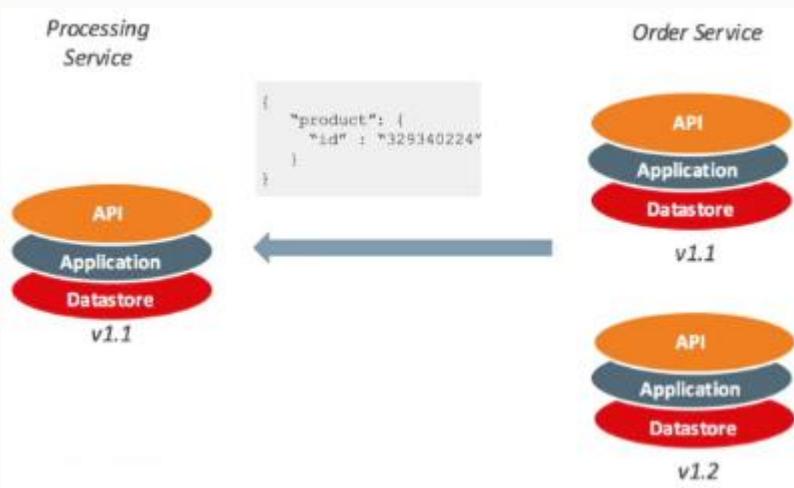
Aislamiento: Funcional (Microservicios), Aplicación (Contenedores), Ambiente (IaC).

Optimización: Uso Hardware (Contenedores), Costo (Serverless)



Retos Diseño II

Arq

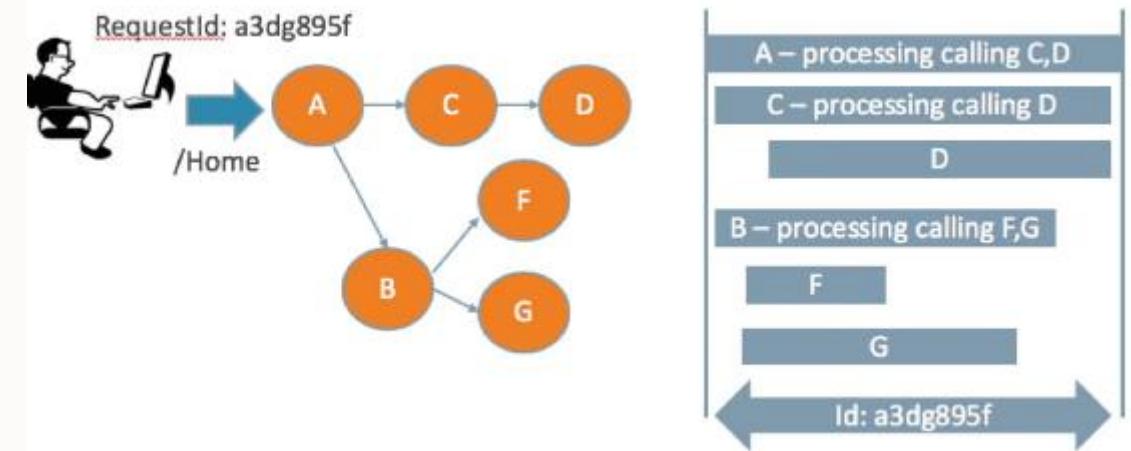


Necesidad Versiones y Compatibilidad hacia atrás

```
{  
  "credit" : {  
    "forAccount" : "12345"  
  "amount" : "100",  
  }  
}
```

```
{  
  "credit" : {  
    "creditID" : "124e456-e89b-12d3-a456-426655",  
    "forAccount" : "12345"  
  "amount" : "100",  
  }  
}
```

Necesidad Idempotencia en Trx.



Trazabilidad Distribuida

Patrones de Diseño:

Queries: Request/Response, Materialized View, Request/Reply (Queue Directional/2).

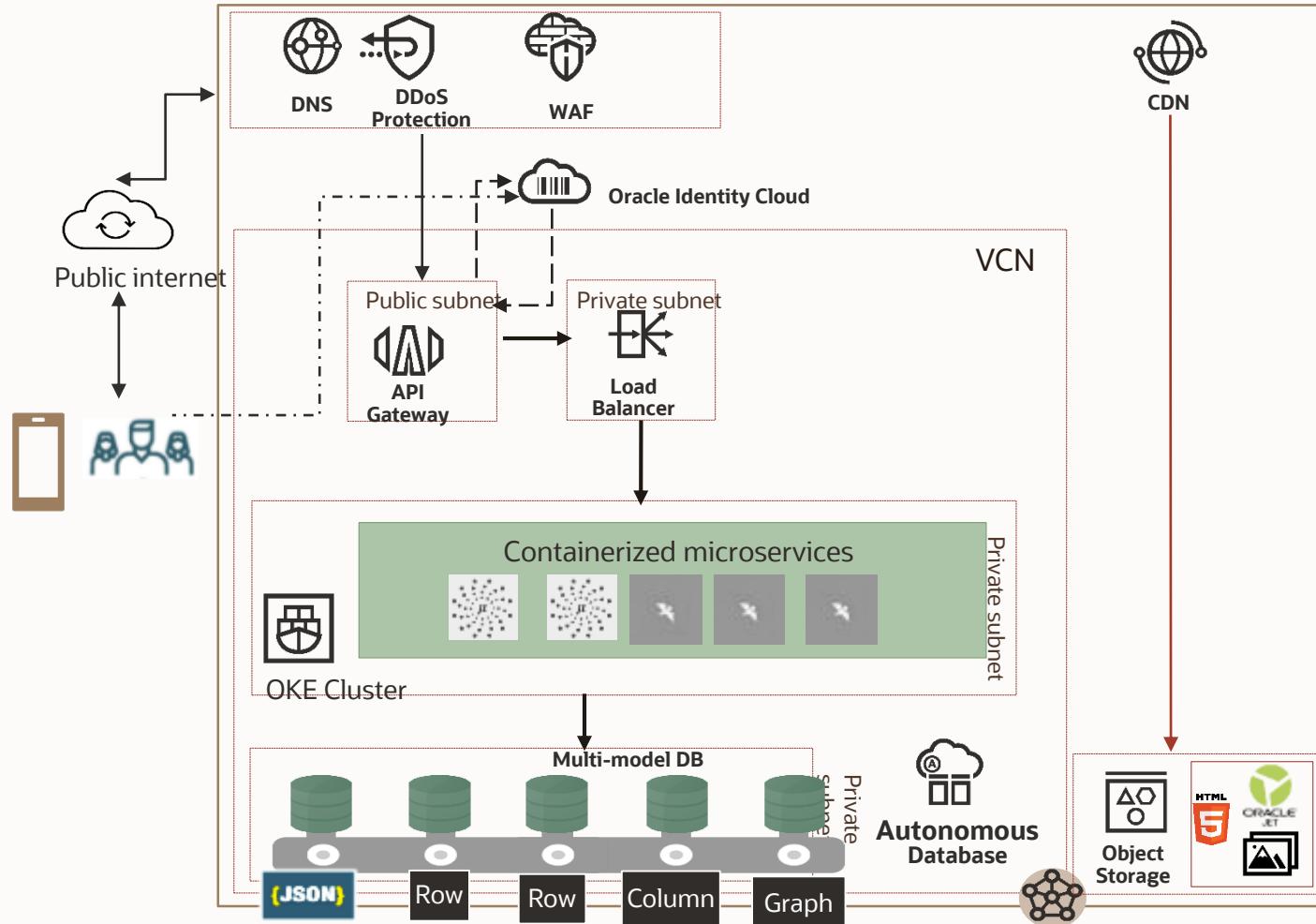
Command: Una Cola. Otro canal para replicar (i.e. PSE)

Events: Choreography

Políticas: Reintento, Circuit Breaker, Bulkhead (Limitar alcance servicios), Cache, Fallback.

Web/ Mobile Microservices

Patrón de arquitectura



Visión Oracle

- Framework Ligeros y abiertos
- DB convergentes y multimodelo
- Poliglota es adecuado, use según necesidad
- Seguridad en cada capa
- Automatización DevOps

Beneficios

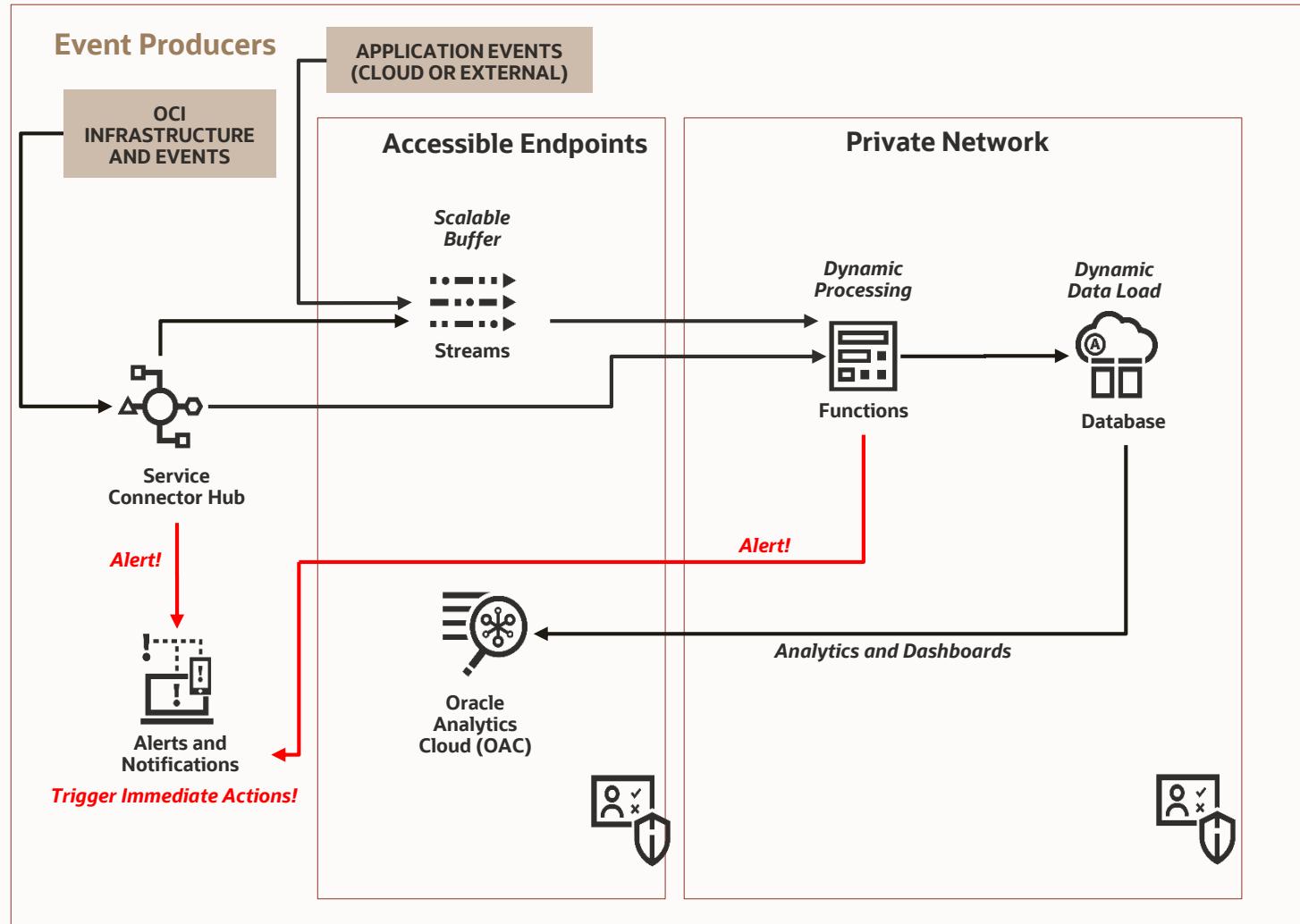
- Use su lenguaje y framework favorito
- Contenedores manejados reducen tiempo de despliegue
- DB convergente reduce administración, independencia de ciclos de desarrollo, etc.

Casos de Uso

- e-commerce
- Online banking
- Apps de Entregas
- Sistemas de Recomendación

Event-driven Architecture

Patrón de Arquitectura



Visión Oracle

- Permite arquitectura serverless
- Componentes bajo acoplamiento
- Entrega de mensajes idempotentes
- Automatización DevOps

Casos de Uso

- IoT streaming
- Manejo de alertas
- Aplicaciones de Entrega
- Comunicación entre aplicaciones distribuidas

Recomendaciones

- OCI Streaming (Kafka)
- OCI Functions
- OCI Notifications
- Service Connector Hub
- Oracle Autonomous Database
- Oracle Analytics Cloud



Visión Oracle para DevOps y Cloud Native

DevOps Services, Resource Manager, Oracle Kubernetes Engine,
Functions, Monitoreo y Observabilidad, y Multicloud

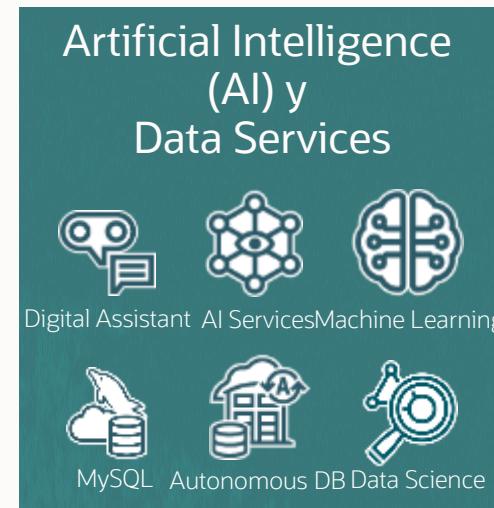
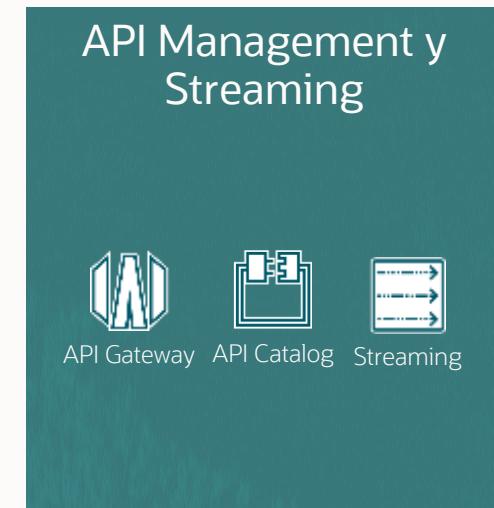
Francisco Moreno



Desarrollo Cloud Native en OCI



Productividad
en Desarrollo



OCI DevOps + Libertad de escoger un Ecosistema Integrado



Confiabilidad
en
Operaciones

Operación Autónoma

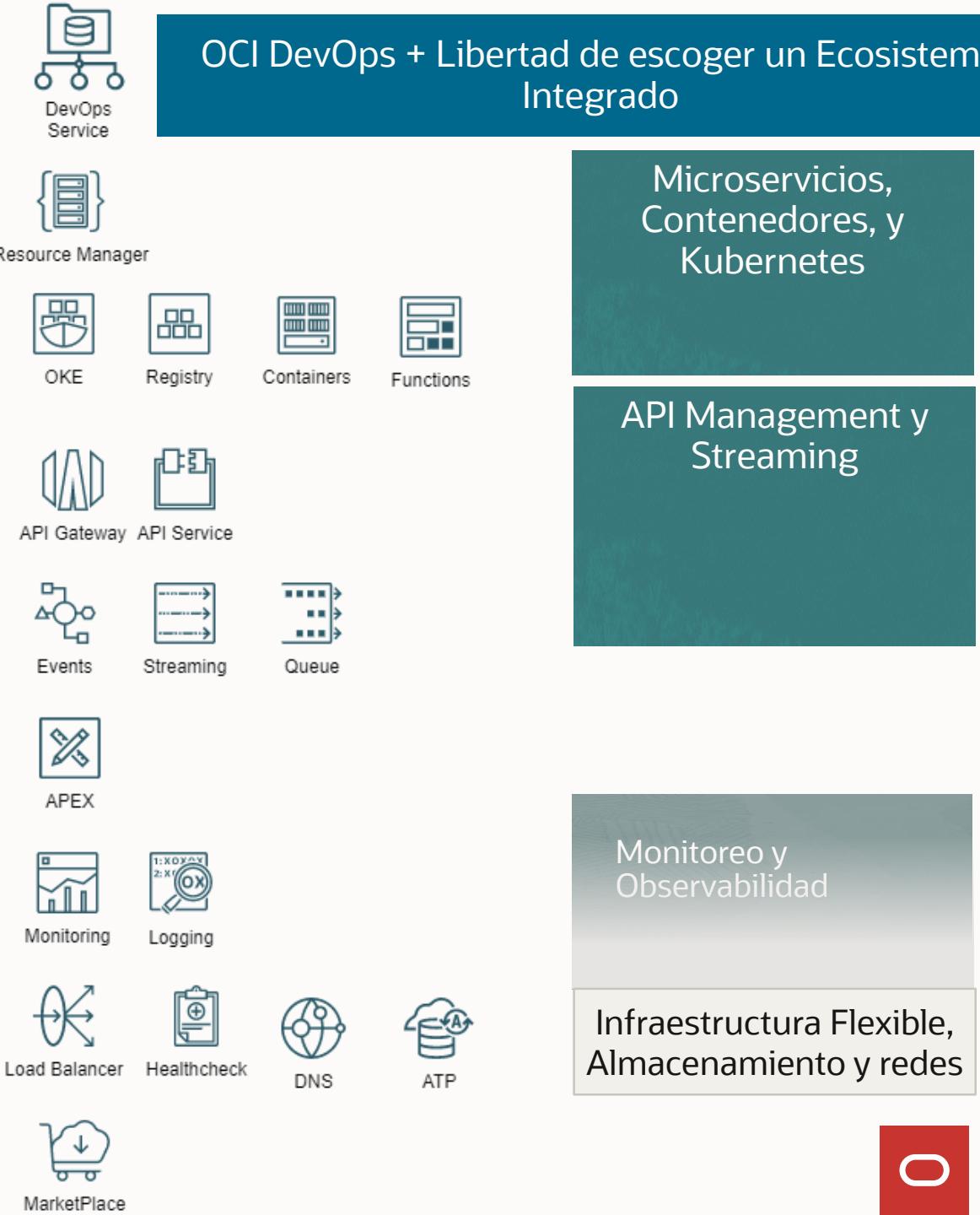
Servicios Datos Compartidos

Infraestructura Flexible, Almacenamiento y redes: cualquier tamaño, carga en cualquier lugar

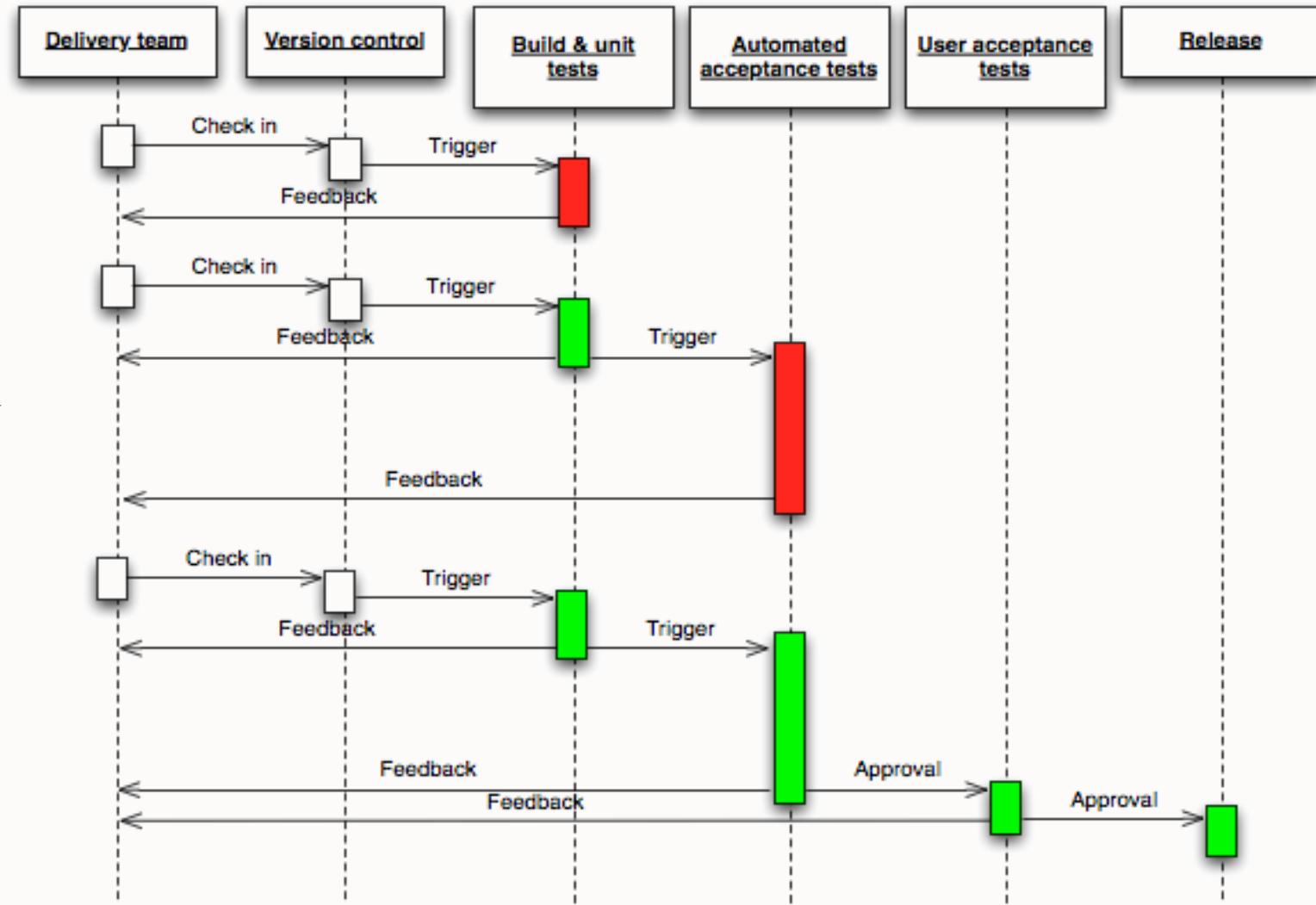
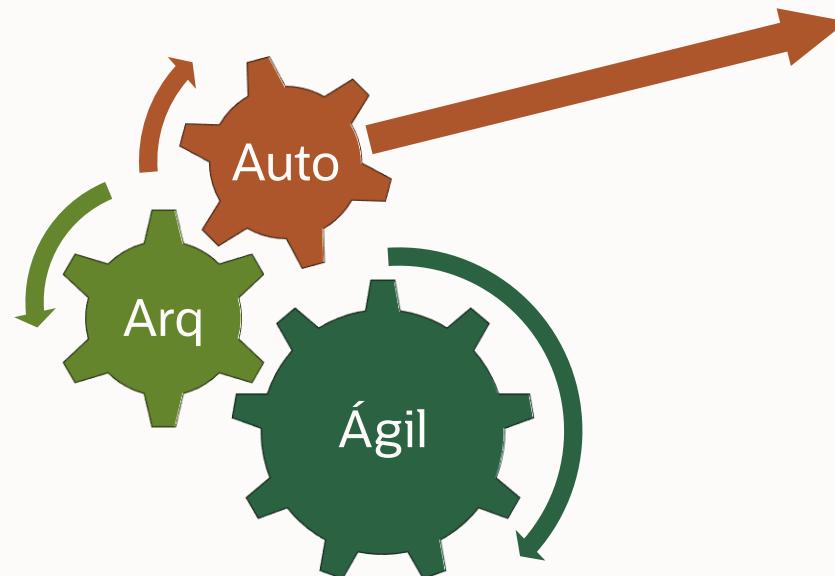
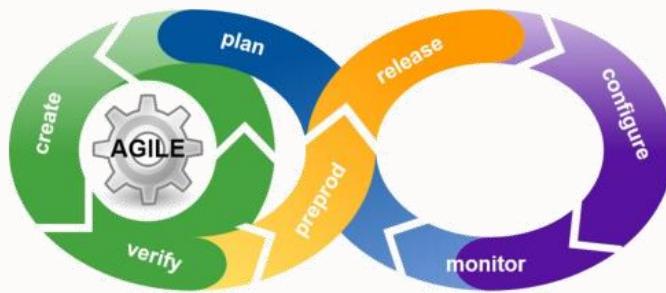
IAM, Seguridad y gobierno a través de un ciclo de desarrollo

Desde capa gratuita hasta hiper-escala – en una misma plataforma

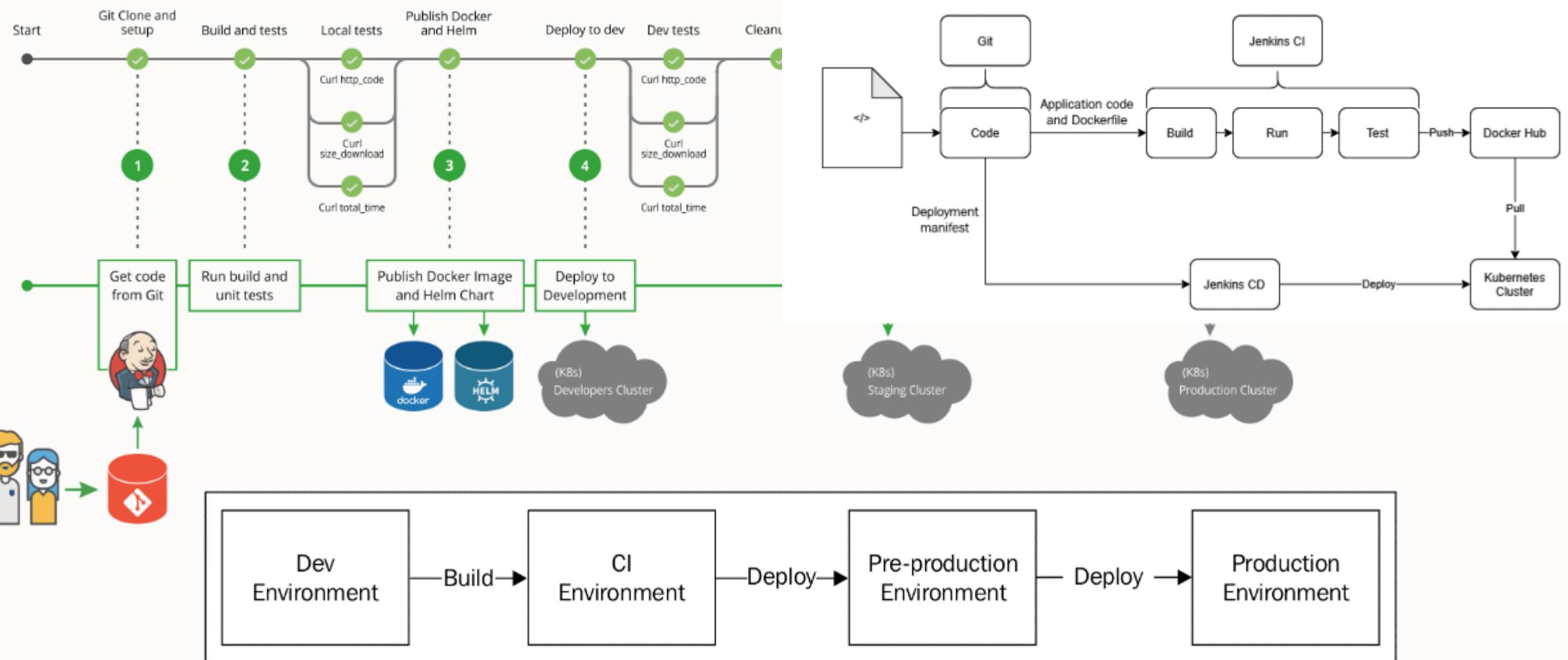
Administración e Infraestructura Cloud Native



Continuous Integration/Continuous Delivery (CI/CD)



Continuous Integration/Continuous Delivery (CI/CD)





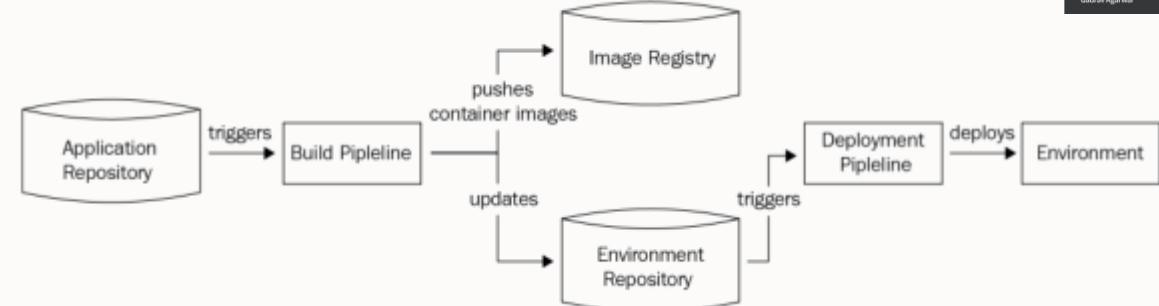
GitOps

Implementación DevOps en que el Git forma la única fuente de verdad

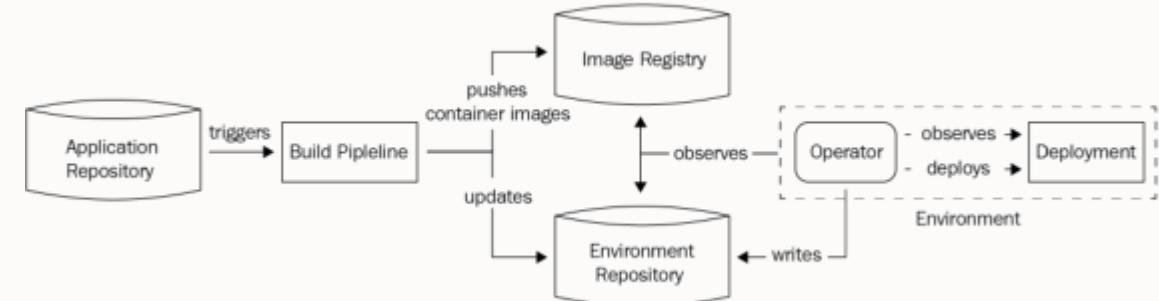
- Sistema declarativo
- Estado deseado
- Aplicar cambios aprobados
- Agentes para corrección

>> Autenticación única
>> Aprobación mediante merge
>> Auto documentación
>> Transparencia

Modelo Push



Modelo Pull

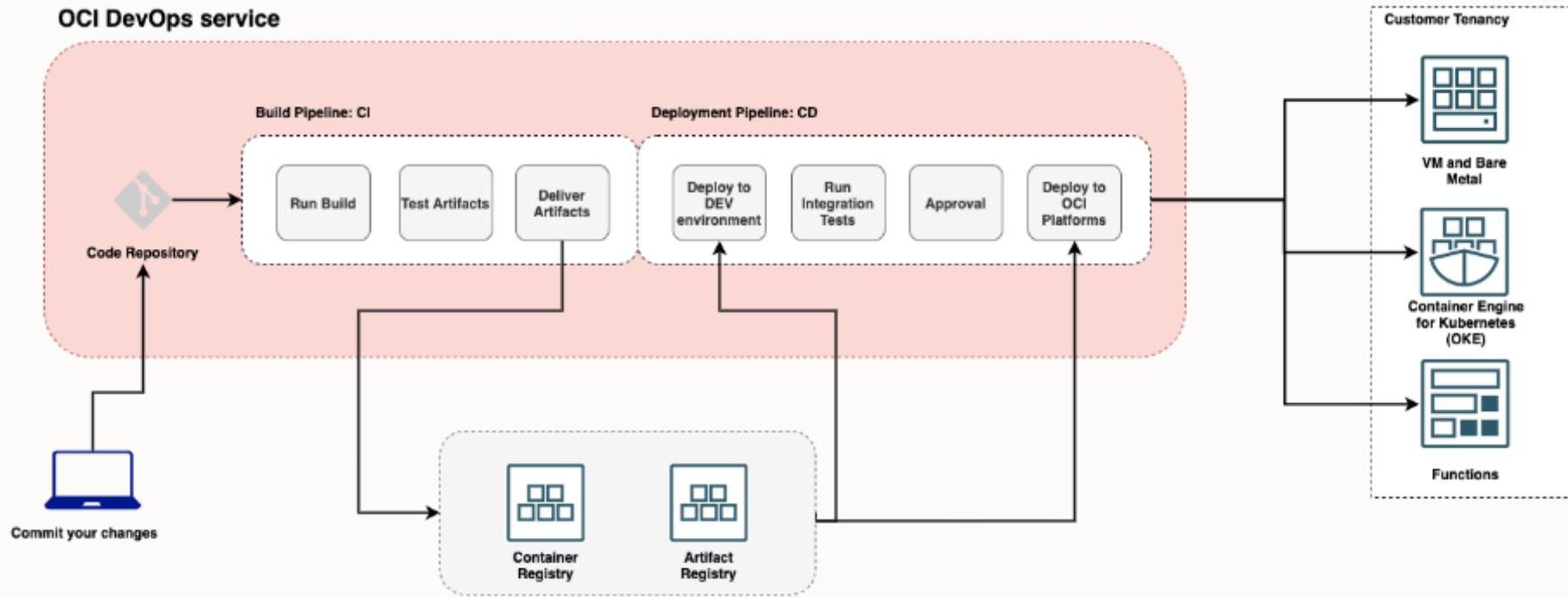


Metodos Branching

- GitFlow
- Github Flow

Construcción: DevOps Service

OCI DevOps service



Serverless: PAY2G, Acciones Concurrentes.



Estrategias: Blue/Green, Canary y otros.

CI



Integración: GitHub, GitLab, BitBucket, VB Studio, OCI Git.



Plataforma completa:
OCI Svcs: Artifact, Vault, etc.

CD



Integración: Plugin Jenkins, Multicloud.



Rollback



Automatización:
Velocidad/Confiabilidad



Seguridad IAM:
Usuarios, Servicios

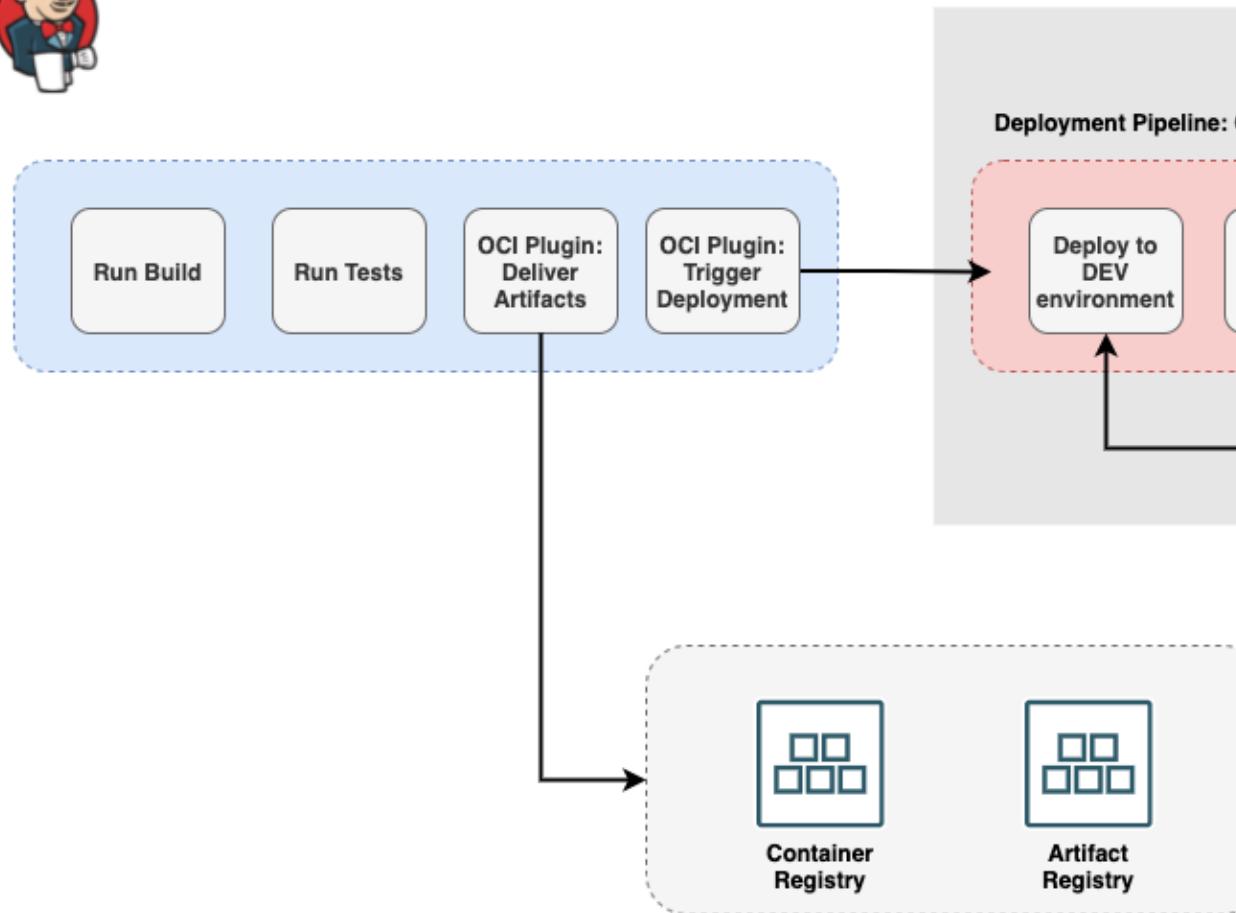


Gobierno: Observabilidad,
Monitoreo y Gobierno

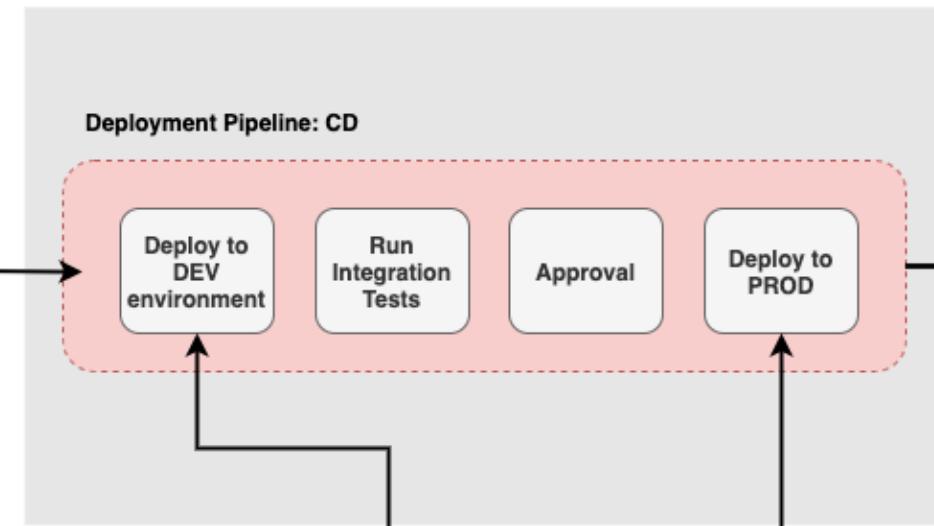
DevOps Service: Pantallazos



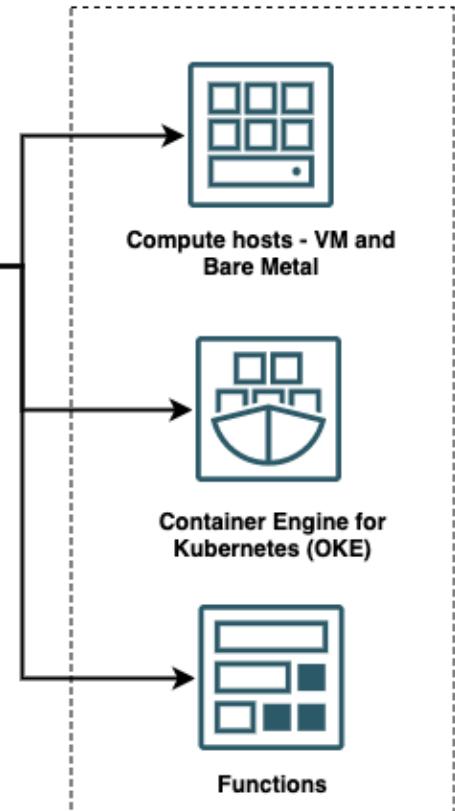
Jenkins Pipeline



OCI DevOps service



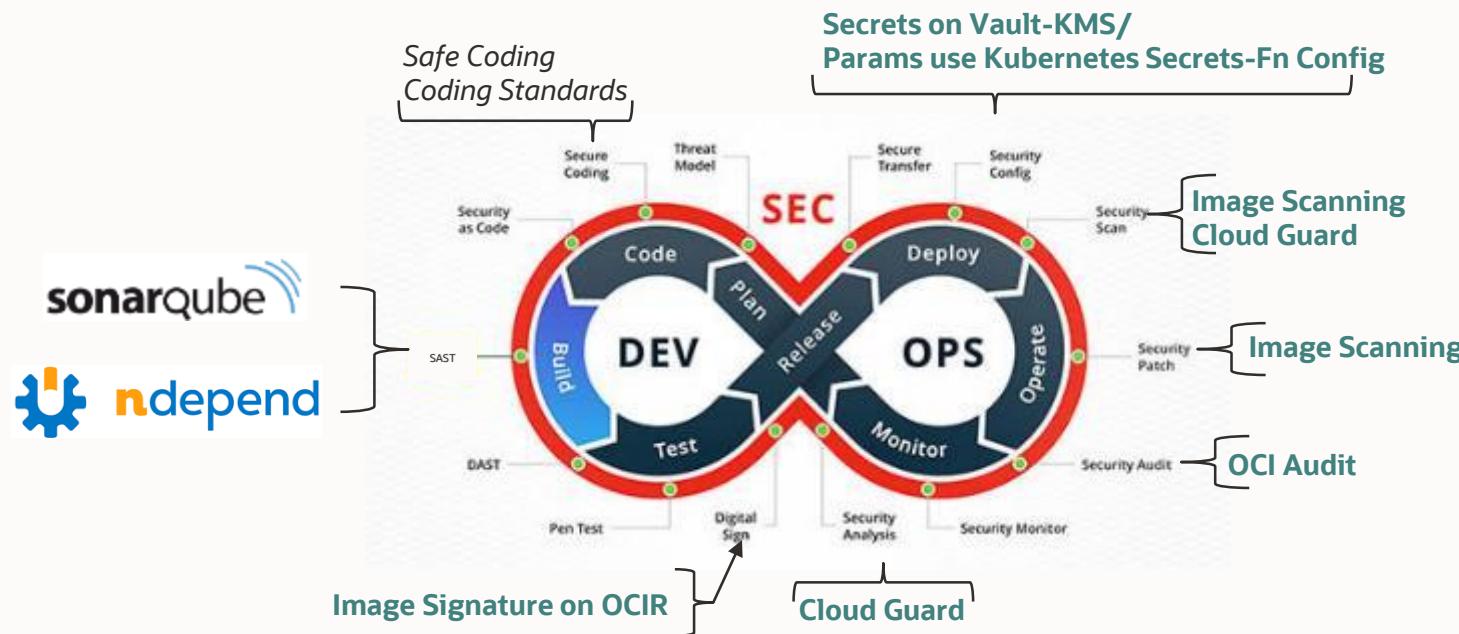
Customer Tenancy



OCI Artifact Repositories

<div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; width: fit-content; margin-bottom: 10px;"> ✓ Run Deployment to OKE Trigger Deployment </div> <div style="border: 1px solid #ccc; padding: 5px; border-radius: 5px; width: fit-content; margin-bottom: 10px;"> ✓ Deliver getting started container image </div>	NPM install 0min 29s ✓ Run Tests 0min 2s ✓ Build container image 0min 10s ✓ SAVE_OUTPUT_ARTIFACTS 0min 6s ✓	2021-09-24T16:51:21.893Z Completed PARSE_BUILD_SPEC 2021-09-24T16:51:21.894Z Starting BUILD_SPEC_EXECUTION 2021-09-24T16:51:21.894Z Starting DOWNLOAD_INPUT_ARTIFACTS 2021-09-24T16:51:21.894Z Completed DOWNLOAD_INPUT_ARTIFACTS successful 2021-09-24T16:51:22.007Z Starting EXECUTE_BUILD_SPEC_STEPS 2021-09-24T16:51:22.009Z Executing BUILD_SPEC_STEPS - Export variables 2021-09-24T16:51:22.014Z Executing step: Export variables with shell 2021-09-24T16:51:22.093Z LAGC_BUILDD_TASK_ID: mycbb9
	▶ Deliver getting started container image	1min 32s ✓

Aspectos de Seguridad dentro del ciclo de vida de Desarrollo



Foco en desarrollo o arquitectura, en vez de equipos especializados (Perimetral – WAF, DDoS, LB).

Oracle as Development Company, <https://www.oracle.com/corporate/security-practices/assurance/development/analysis-testing.html>

Ejemplos Image Scanner & Logging

```
buckets.tf M func.py 1, M X file3.csv U file4.csv U
oci-arch-load-file-into-adw-python-stack-latest > functions > LoadFileIntoAdw > func.py
12 import requests
13
14 from fdk import response
15
16
17 def soda_insert(ordbsbaseurl, schema, dbuser,
18 auth=(dbuser, dbpwd)
19 sodaurl = ordbsbaseurl + schema + '/soda/'
20 collectionurl = sodaurl + "regionsnumber"
21 headers = {'Content-Type': 'application/json'}
22 print("INFO FJMD - soda_insert: collectionurl = " + collectionurl)
23 print("INFO FJMD - soda_insert: data = " + str(data))
24 r = requests.post(collectionurl, auth=auth)
25 r_json = {}
26 try:
27     r_json = json.loads(r.text)
28 except ValueError as e:
29     print("ERROR FJMD - soda_insert: " + str(e))
30     raise
31
32 return r_json
```

Scan details

Repository: vulnerability

Image: concve

Risk level: Critical

Issues four

Scan starte

Scan comp

Issues found

Issue	Risk level	Description
CVE-2021-45046	Critical	It was found that the fix to address CVE-2021-44228 in Apache Log4j Thread Context Map (MDC) input data when the logging configuration Context Map pattern (%X, %mdc, or %MDC) to craft malicious input environments and local code execution in all environments. Log4j 2.11 disabling JNDI functionality by default.
CVE-2021-44228	Critical	Apache Log4j2 2.0-beta9 through 2.15.0 (excluding security releases protect against attacker controlled LDAP and other JNDI related endpoint loaded from LDAP servers when message lookup substitution is enabled (2.12.3, and 2.3.1), this functionality has been completely removed. No longer supported in Log4j 2.11 and later versions. Log4j 2.11 and later versions do not support JNDI functionality by default.

Explore Log

Sort

Filter by time

Newest

Past 5 minutes

Number of log events per minute

No data to display

[Explore with Log Search](#)

datetime	type	x	data.message	x
Sep 27, 2022, 23:48:04 UTC	functions.application.functioninvoke	x	Served function invocation request in 15.266 seconds	x
Sep 27, 2022, 23:48:00 UTC	functions.application.functioninvoke	x	01GE0NJZJD1BT1B1GZJ006ZYM9 - urllib3.connectionpool - DEBUG - Starting new HTTPS connect...	x
Sep 27, 2022, 23:48:00 UTC	functions.application.functioninvoke	x	INFO FJMD - soda_insert: data = {"region": "X1", "col1": "1", "col2": "2", "col3": "3", "col4": "AA"}	x
Sep 27, 2022, 23:48:00 UTC	functions.application.functioninvoke	x	INFO FJMD - soda_insert: collectionurl = https://KZDLDWSJBQJKXRQ-ADWDB1.adb.us-ashburn-1.or...	x
Sep 27, 2022, 23:48:00 UTC	functions.application.functioninvoke	x	INFO FJMD - {"region": "X1", "col1": "1", "col2": "2", "col3": "3", "col4": "AA"}	x

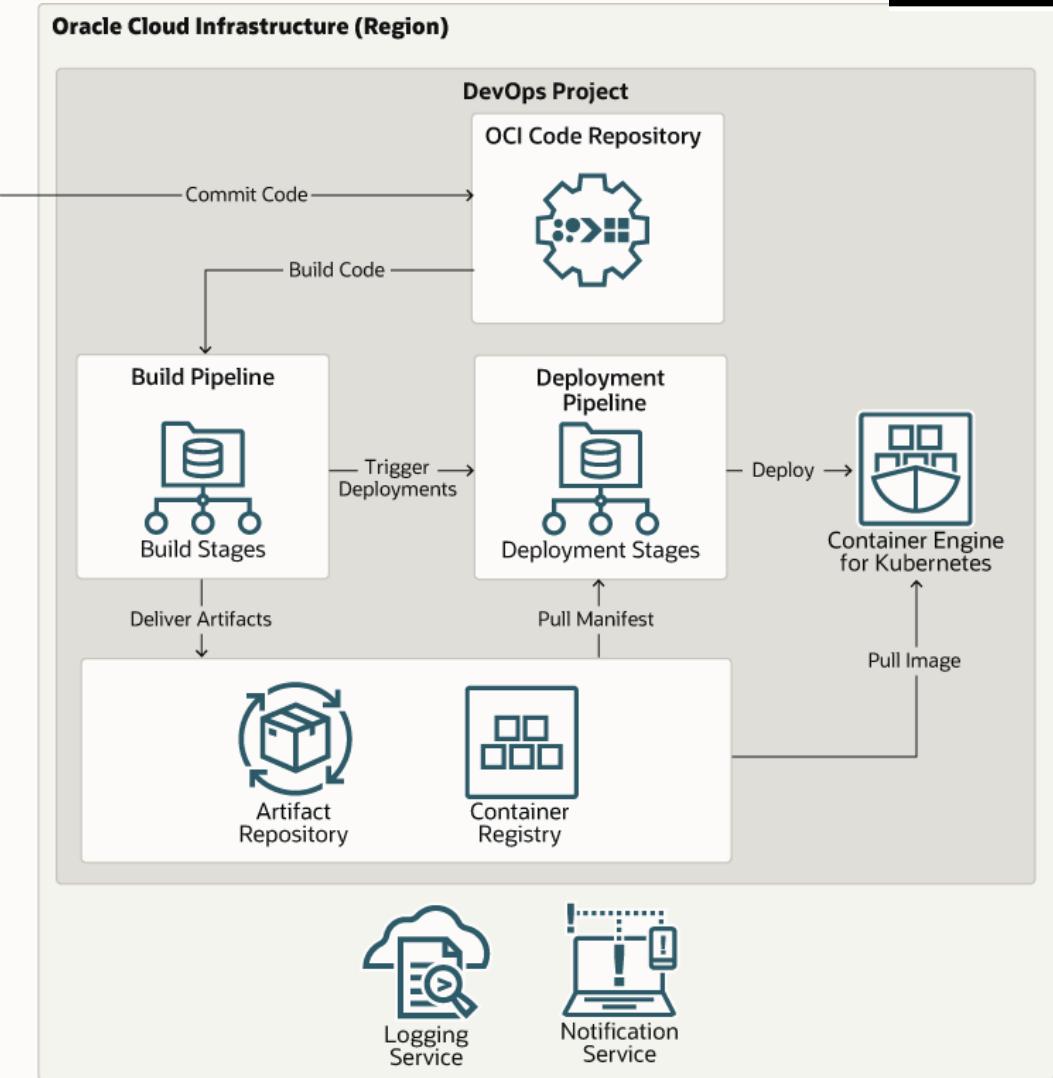
Ejemplo del DevOps

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

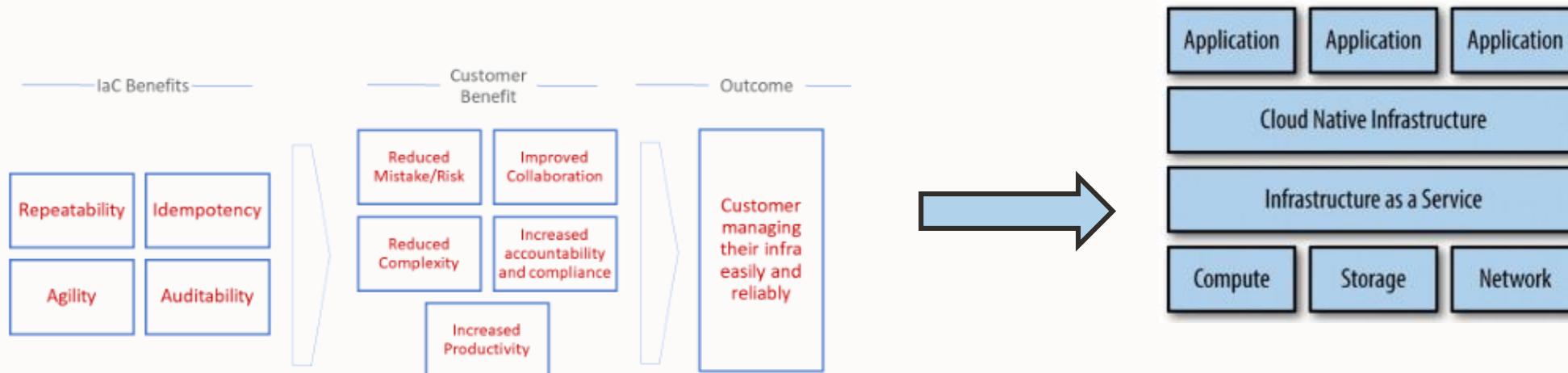
Lanzamiento del Resource Manager
Generación del Auth Token y usuario (Se puede probar desde Docker Login)

En mi caso, era
Usuario:
ladcsemrcn/oracleidentitycloudservice/francisco.m.moreno

Auth Token:
Obtenido desde User >> Auth Token



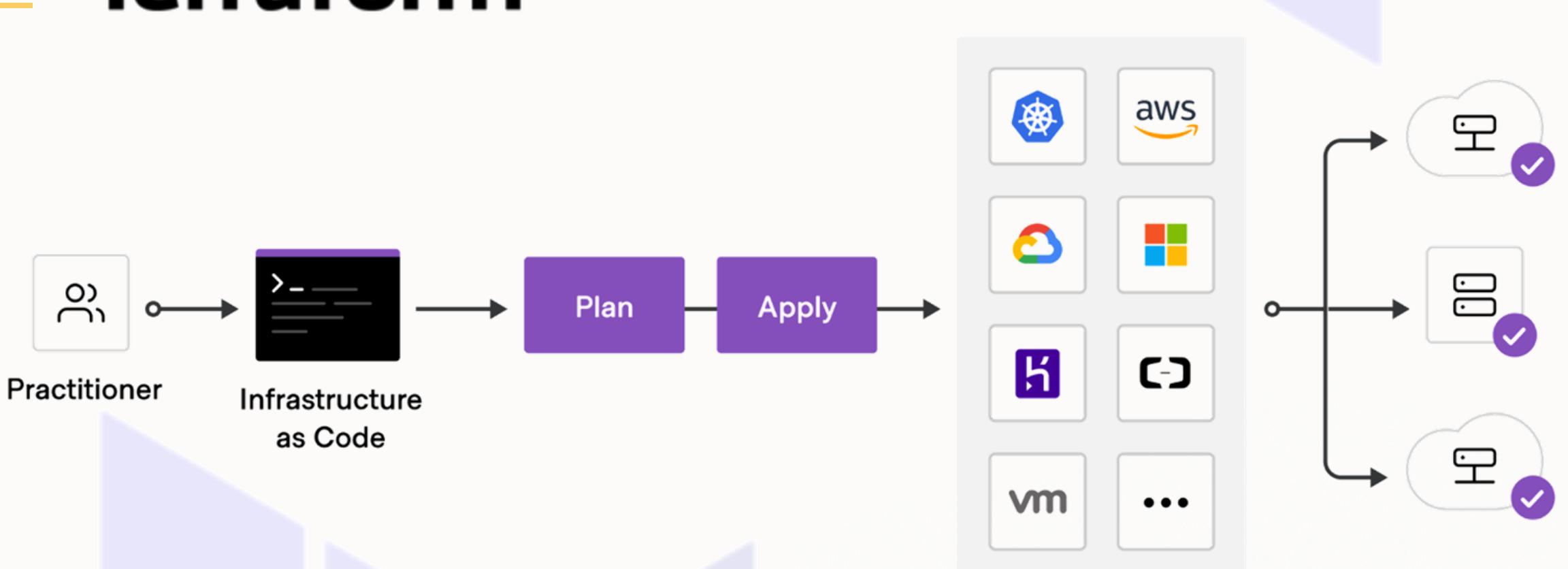
Despliegue: Resource Manager



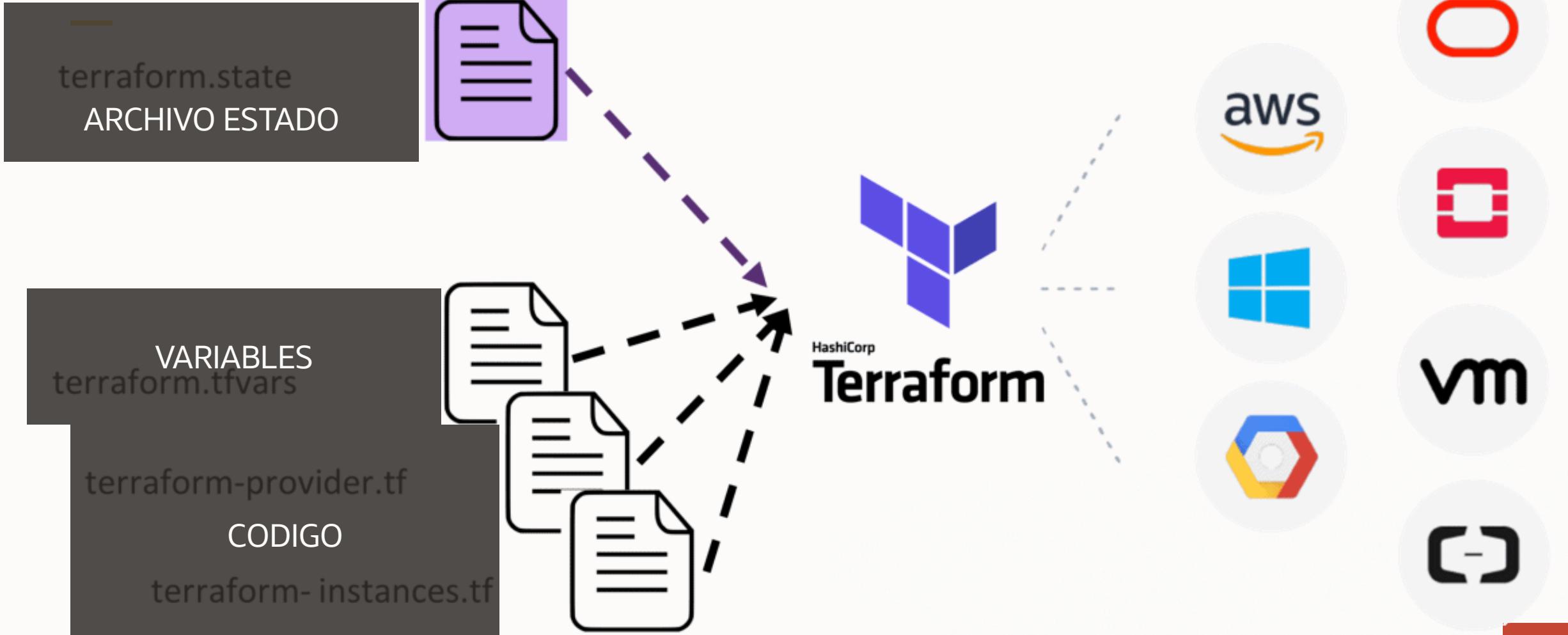
Terraform	
Visión Integral	Puede ser estricta
Escalable	Stack/Anidado
Abstracción	Compartiment (Solo OCI) o Modular (TF)
Orquestación	Grafos Internos.
Análisis Dinámico	N/A
Patrón Reconciliación	Completo.

HashiCorp

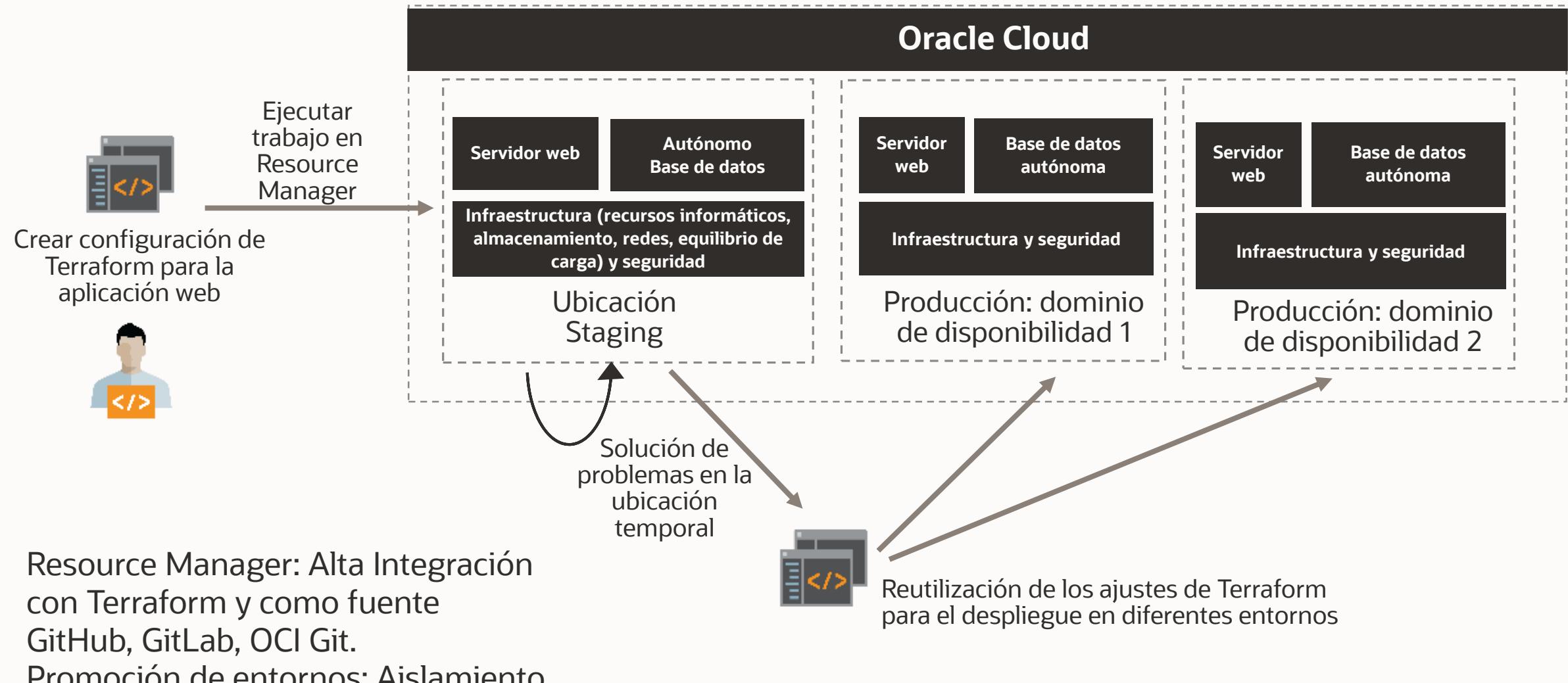
Terraform



Archivos



Resource Manager: Terraform



- Resource Manager: Alta Integración con Terraform y como fuente GitHub, GitLab, OCI Git.
- Promoción de entornos: Aislamiento

Resource Manager: Terraform

1

Resource Manager > Stacks > Stack details

The screenshot shows the Oracle Cloud Resource Manager interface. On the left, there's a sidebar with navigation links: 'Jobs' (which is selected), 'Variables', 'Work requests', 'Stack resources', and 'View state'. Below the sidebar, a large green button labeled 'RMS' in white is shown with the word 'ACTIVE' underneath it. A yellow arrow points from this 'ACTIVE' text towards the top right of the main content area. The main content area displays a stack named 'from-compartment-TestTerraform-202209291'. At the top, there are buttons for 'Edit', 'Plan', 'Apply' (which is highlighted in red), 'Destroy', and 'More actions'. The 'More actions' dropdown menu is open, showing options like 'Import state', 'Run drift detection', 'View drift detection report', 'Download Terraform state', 'Move resource', 'Add tags', and 'Delete stack'. Below the dropdown, the 'Stack information' section provides details: Compartment: franciscommoreno (root), OCID: ...k2kbia, Terraform configuration: Download, Created: Thu, Sep 29, 2022, 20:43:25 UTC, Terraform version: 1.1.x, Time of drift detection (last run): N/A, and Status of drift detection (Last run): Not checked. A yellow arrow also points from the 'Jobs' link in the sidebar towards the 'Jobs' section in the main content area.

Una pila (stack) es un conjunto de recursos de infraestructura

Un trabajo es un conjunto de comandos de Terraform que se pueden ejecutar en una pila (stack)

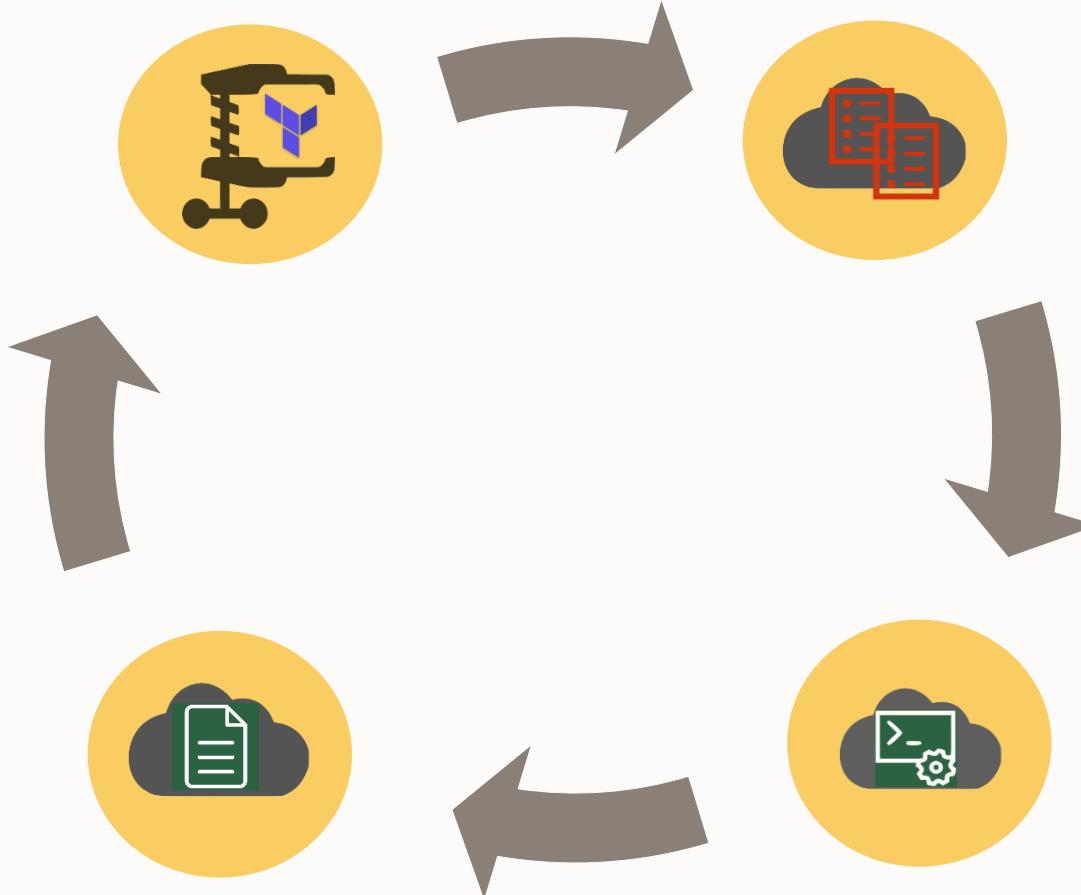
Este ejemplo, es uno que descubre recursos en un compartment y entrega un Terraform en JSON

Puede planificar (realizar comprobaciones), aplicar (crear recursos) o destruir pilas (destruir recursos)

Como funciona?

Codifica/Actualiza

- Archivos Terraform (Zip)
- Sample templates
- Private templates
- Importar infraestructura
- Repositorio Código Fuente
- Asistente (Wizard)

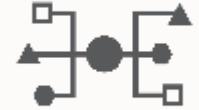


Crea/Actualiza Stack usando

- Console Web
- SDK
- CLI

Ejecuta Job

- Plan/
 - Apply/
 - Destroy/
 - Import State
- Para aprovisiona y manejar recursos



Oracle Cloud Infrastructure Events Service

¿Qué son los eventos y Oracle Events Service?

- Los eventos son cambios de recursos
- Events Service permite el seguimiento y la respuesta a eventos
- Las respuestas se activan casi en tiempo real mediante Oracle Functions y los servicios de notificaciones y streaming.

¿Por qué elegir Events Service?

- No implica gastos generales: el seguimiento manual de los cambios (sondeo) requiere recursos de infraestructura e ingeniería
- Activa las respuestas a eventos en tiempo real

Exclusividad de Oracle

- **Sólida integración:** se activa un conjunto completo de servicios de OCI para eventos
- **Multinube:** el formato de eventos estándar del sector (CNCF CloudEvents) permite el uso de aplicaciones entre proveedores de nube de terceros, por ejemplo, Microsoft Azure
- **Gratis**



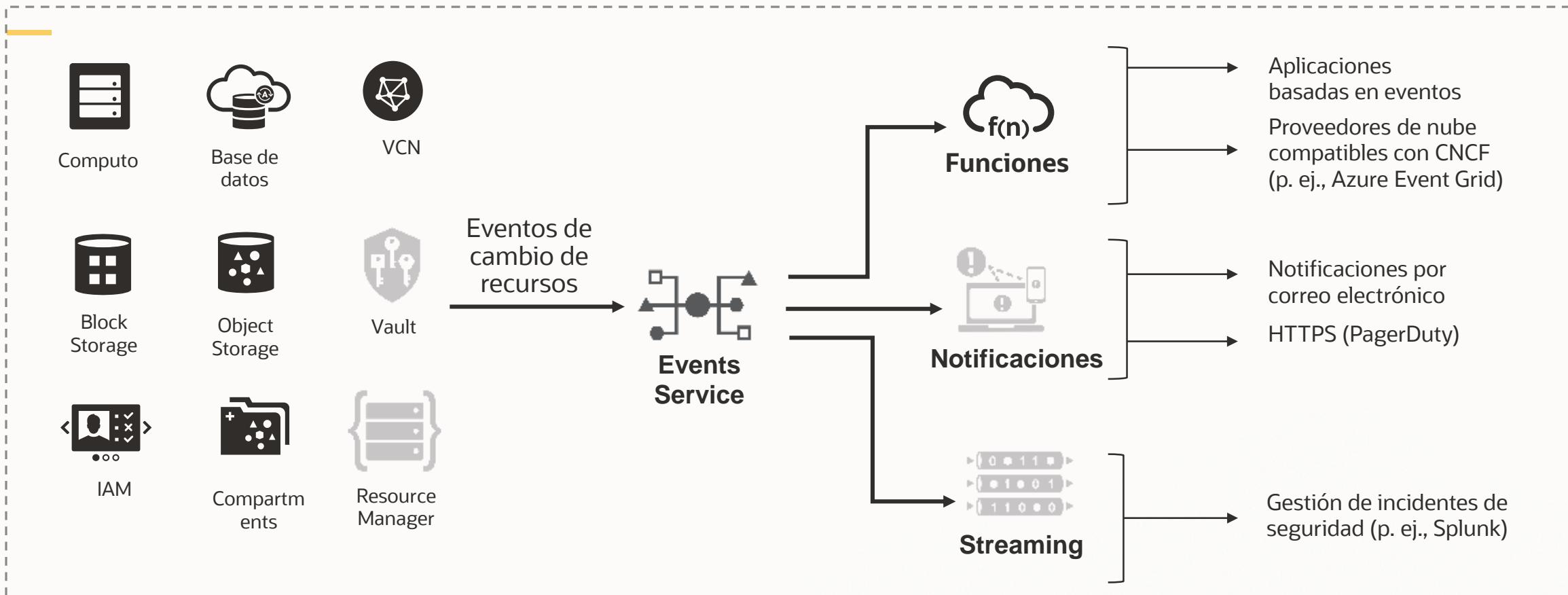
cloudevents

ORACLE®

Cloud Infrastructure



Casos de uso de Events Service



Ejemplo de Regla de un Event Service

Edit Rule

Display Name

BucketCreateObjectTrigger

Description

Describe what the rule does. Example: Sends a notification when backups complete.

Rule Conditions

Limit the events that trigger actions by defining conditions based on event types, attributes, and filter tags. [Learn more](#)

Condition

Service Name

Event Type

Event Type

Object Storage

Object - Create X



To emit events for object state changes, enable Emit Object Events on the bucket details page. [Learn more](#).

+ Another Condition

Rule Logic

```
MATCH event WHERE (
  eventType EQUALS ANY OF (
    com.oraclecloud.objectstorage.createobject
  )
)
```

[View example events \(JSON\)](#)

[Validate Rule](#)

Actions

Actions trigger for the specified event conditions. [Learn more](#).

Action Type

Function Compartment

Function Application

Function

Functions

CO-Francisco-Moreno

LoadFileIntoAdwFnApp

LoadFileIntoAdwFn

+ Another Action





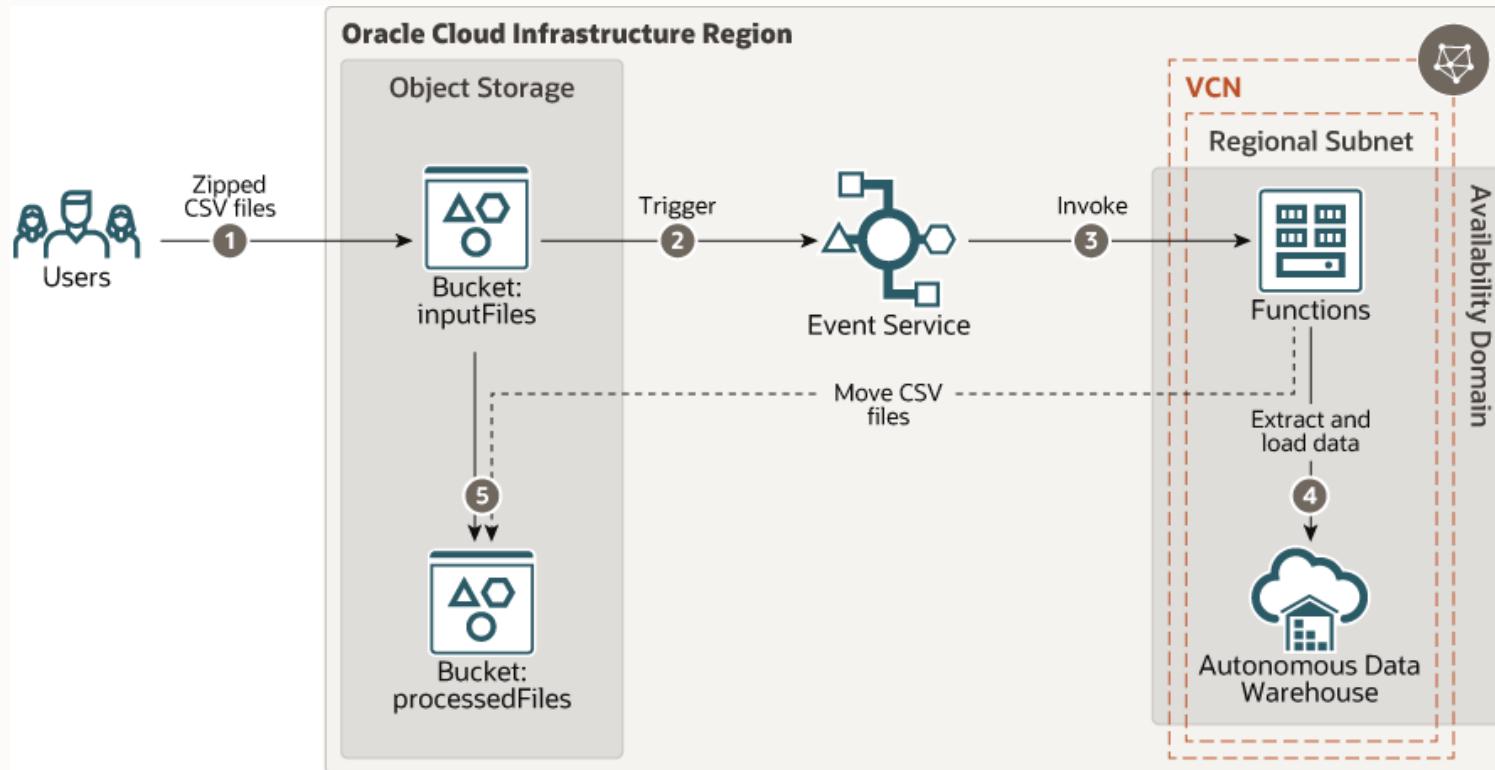
Demos Terraform y Resource Manager

Francisco Moreno

https://github.com/fmorenod81/OCI_TF (CLI, Ansible y Terraform en Always Free Tier)

<https://github.com/fmorenod81/oci-cloudnative>

Demo avanzado



Opciones:

- Terraform Local
- Resource Manager desde Enlace

Pasos

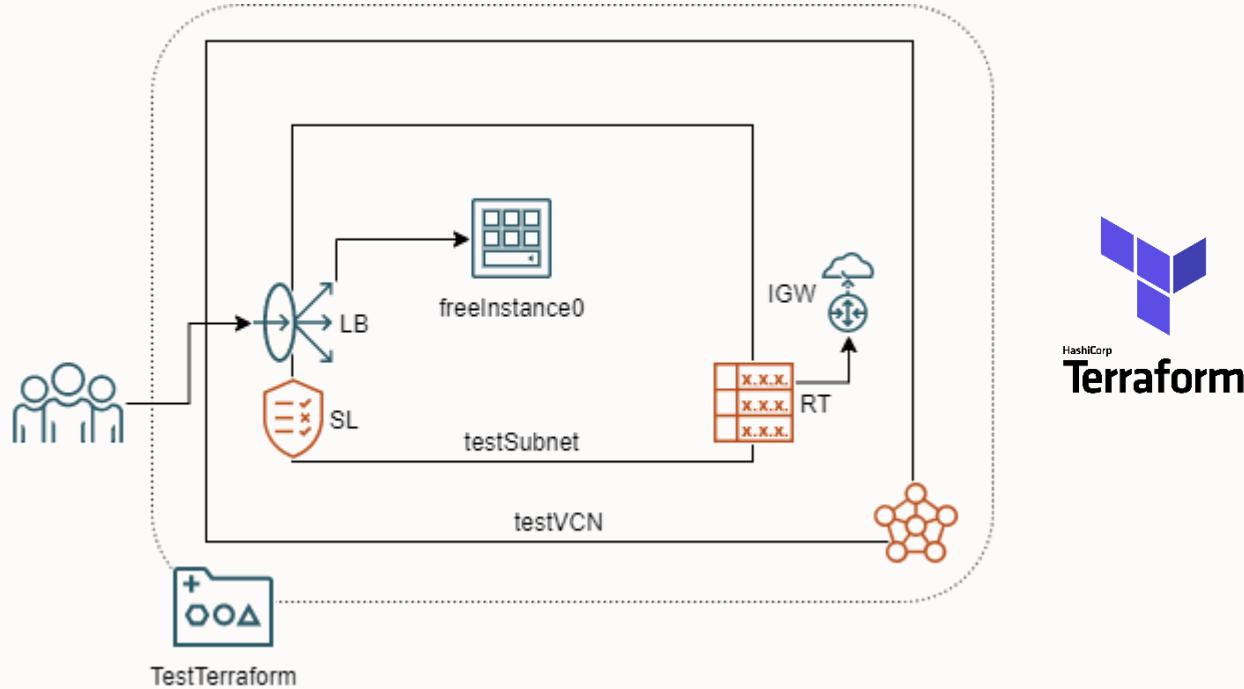
1. Si es Terraform Local, iniciar Fn Server
2. Si es RM, lanzarlo desde OCI Console.
3. Cargar archivos de ejemplo en el bucket de entrada
3. Verificar datos cargados desde CLI o consola SQL

Adaptado de:

<https://github.com/oracle-quickstart/oci-arch-load-file-into-adw-python> y de:

<https://github.com/fmoren0d81/oci-cloudnative/tree/main/oci-arch-load-file-into-adw-python-stack-latest>

Infraestructura Sencilla usando Terraform Local



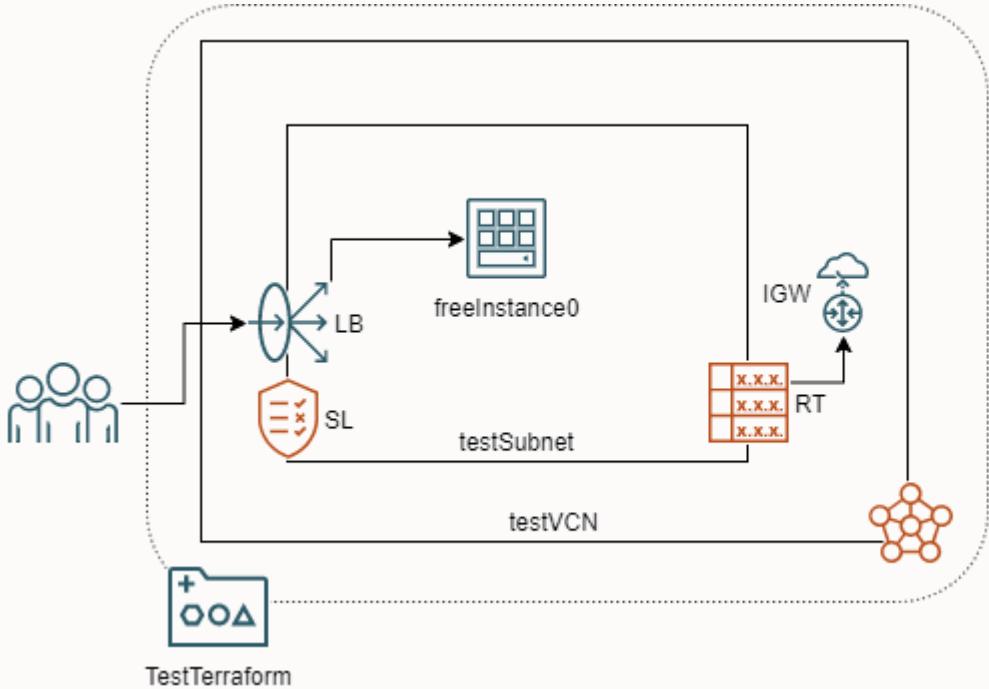
Pasos

1. Configurar OCI CLI
2. Configurar Terraform
3. Descargar código
4. Cambiar a Desde_CLI
5. Desplegar desde Terraform

https://github.com/fmorenod81/OCI_TF

https://github.com/fmorenod81/OCI_TF/tree/main/Desde_CLI

Infraestructura sencilla usando Resource Manager



Pasos

1. Descargar ZIP
2. Codificar cloud-init en base64
3. Ejecutar el Resource Manager

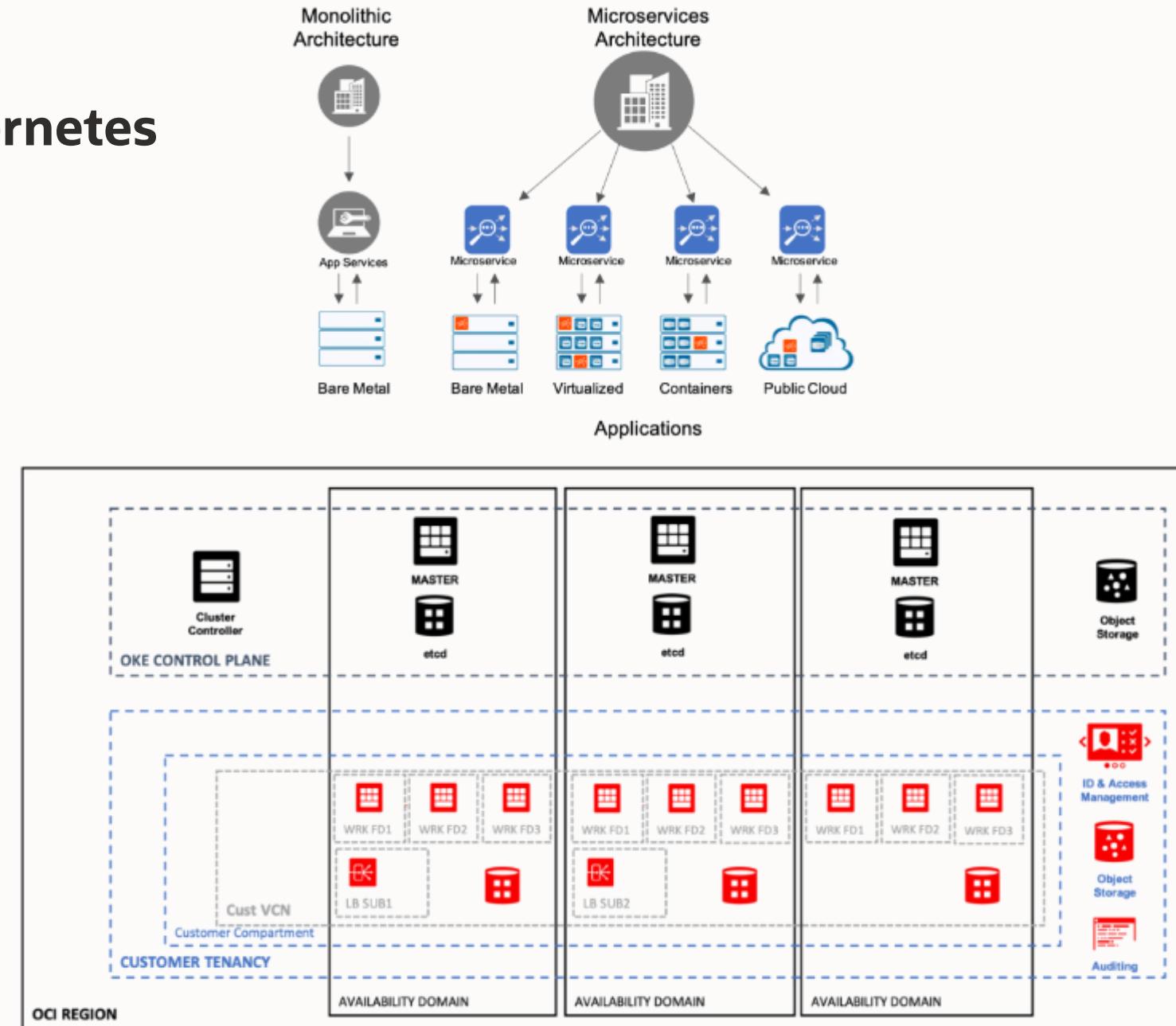
https://github.com/fmorenod81/OCI_TF/Desde_RM.zip

https://github.com/fmorenod81/OCI_TF/tree/main/Desde_RM

Despliegue y Ejecución: Kubernetes

	Oracle Kubernetes Engine: OKE
Visión Integral	Cluster/Clusters (Verazzano)
Escalable	Replicaset (Adecuado) /DaemonSet (1 Agente)
Abstracción	Deployment
Orquestación	Por Diseño
Análisis Dinámico	Servicio
Patrón Reconciliación	Completo

Integración y Opciones usando Recursos OCI: Compute, Load Balancers, Storage.



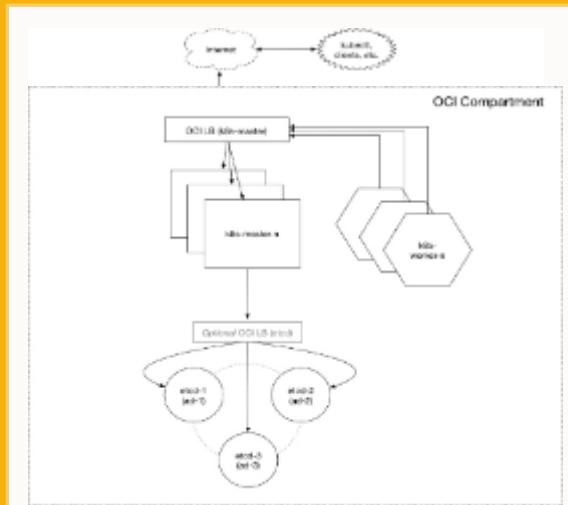
Maneras de Ejecutar Kubernetes en OCI

Oracle Cloud Infrastructure



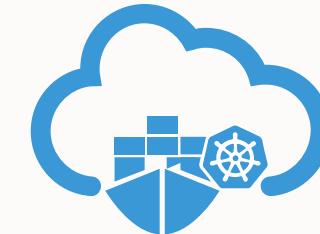
Roll-Your-Own
Container Management

Quickstart Experience
(OSS Terraform Installer on GitHub)



Pre-Built Kubernetes
Installer

Container Engine for Kubernetes
(OKE)



Enterprise Class Managed
Kubernetes Service

Container Engine for Kubernetes - OKE y Registry

Cloud Native

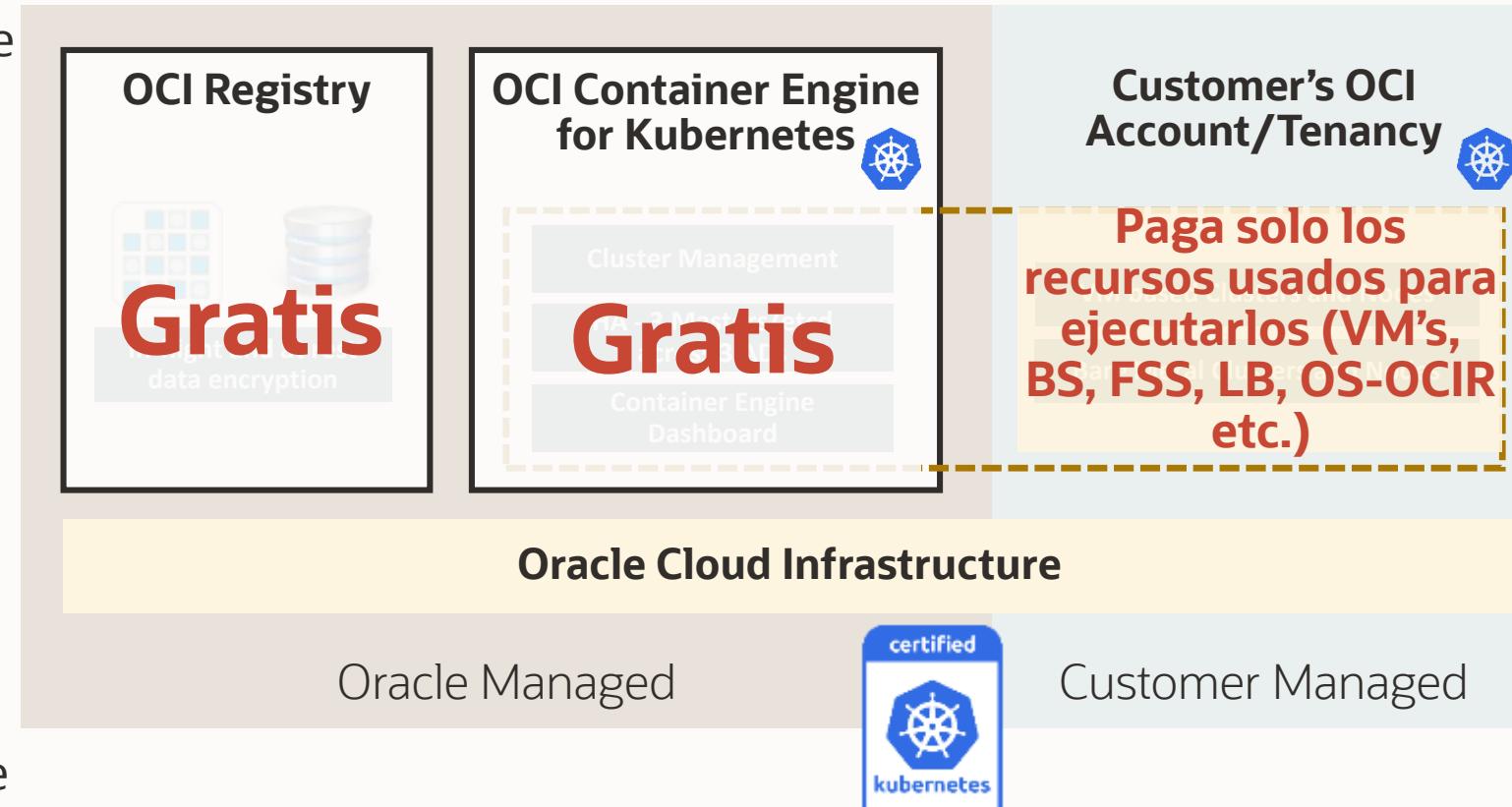
- Standard Docker y Kubernetes
- Integración con Registry, Red y Storage

Integración con Desarrollo

- Streamlined workflow
- Full REST API
- Add-ons de Cluster preconstruidos
- Estándares Abiertos – Kubernetes sin modificar.

Enfoque Empresarial

- Operadores Simples para Clúster
- Rendimiento para Full BM y HA IaaS (GPU, ARM)
- Clústeres Autónomos (Zero Downtime para Updates)



Costos

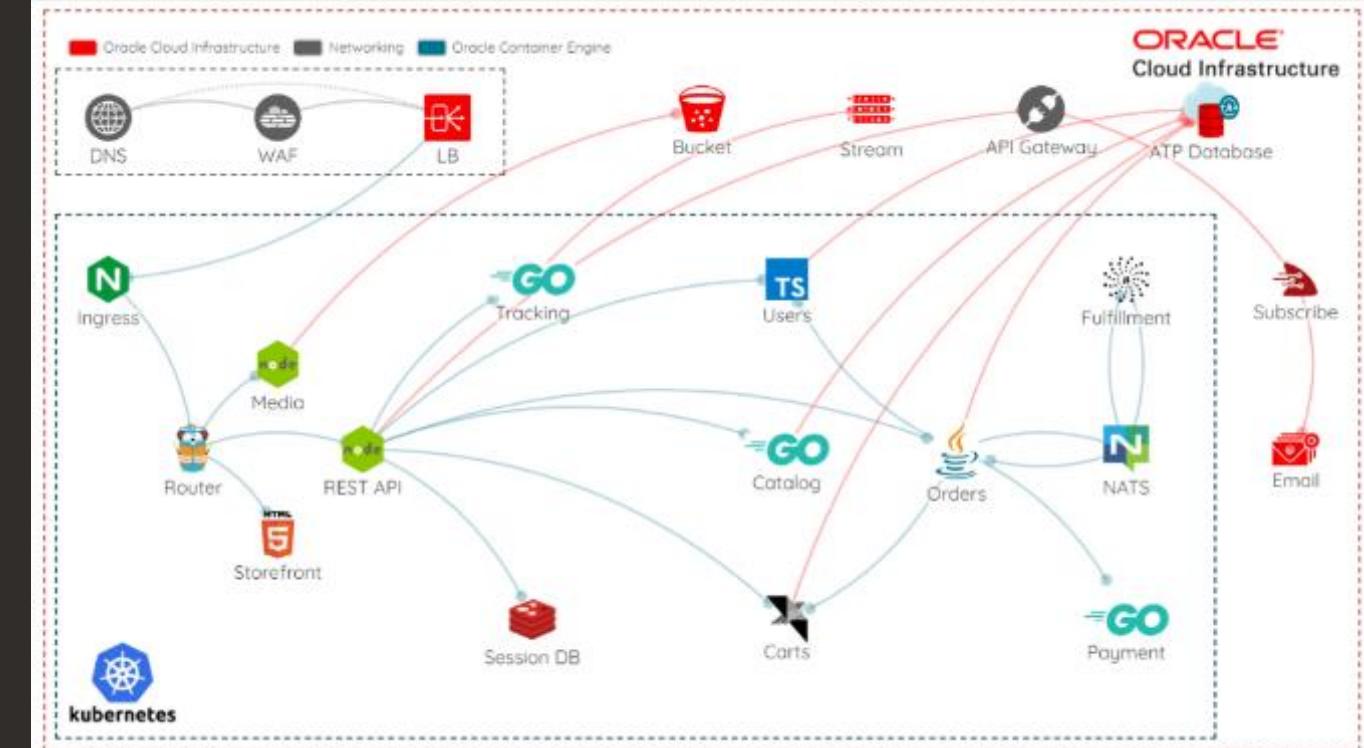
Sin costo para el Control Plane, Trafico entre AD, Zonas de Seguridad y Cloud Guard.

Ejemplo del Cloud Native (OKE y Functions)

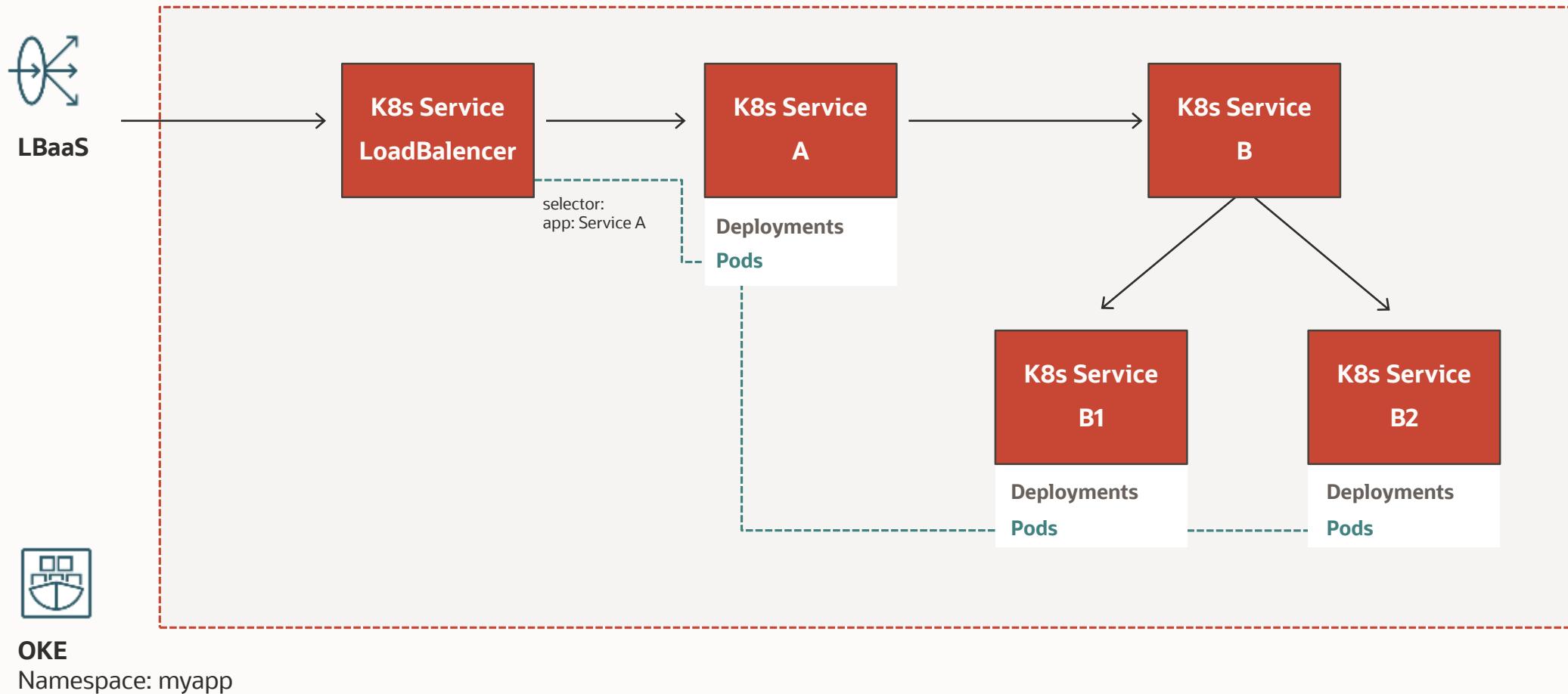
<https://github.com/oracle-quickstart/oci-cloudnative/>

Lanzamiento del Resource Manager
Variables, Recursos, Actualizaciones, Salidas

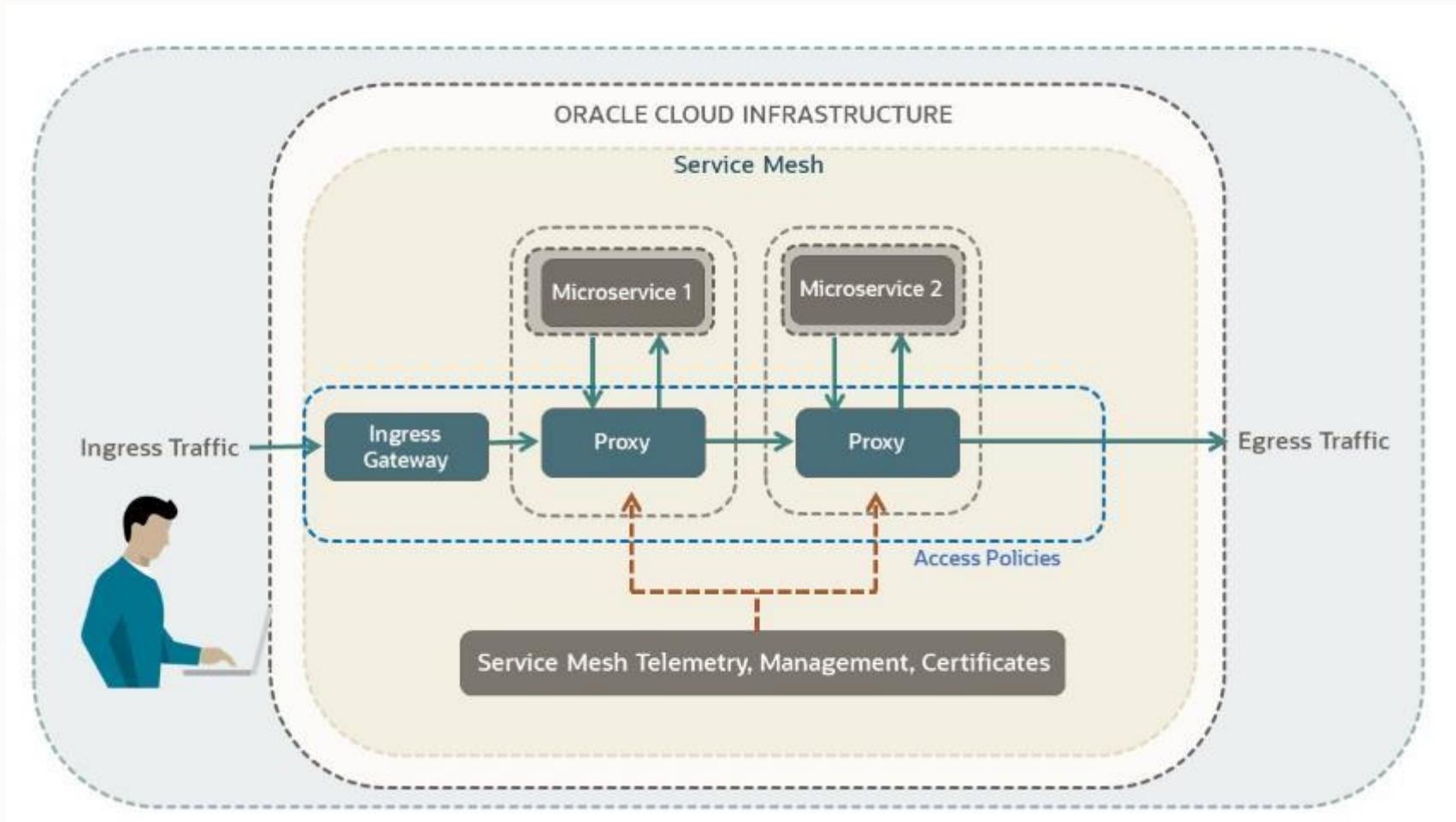
Métricas Prometheus en Grafana.
Acceso al OKE desde CLI Shell: Pods, Services, Deployments



Caso de Uso: Myapp



Visión de Oracle para el Service Mesh



OCI Service Mesh: Asegure, Observe y conecte sus microservicios fácilmente

Un servicio gratuito y gestionado para simplificar el desarrollo y las operaciones de aplicaciones nativas de la nube

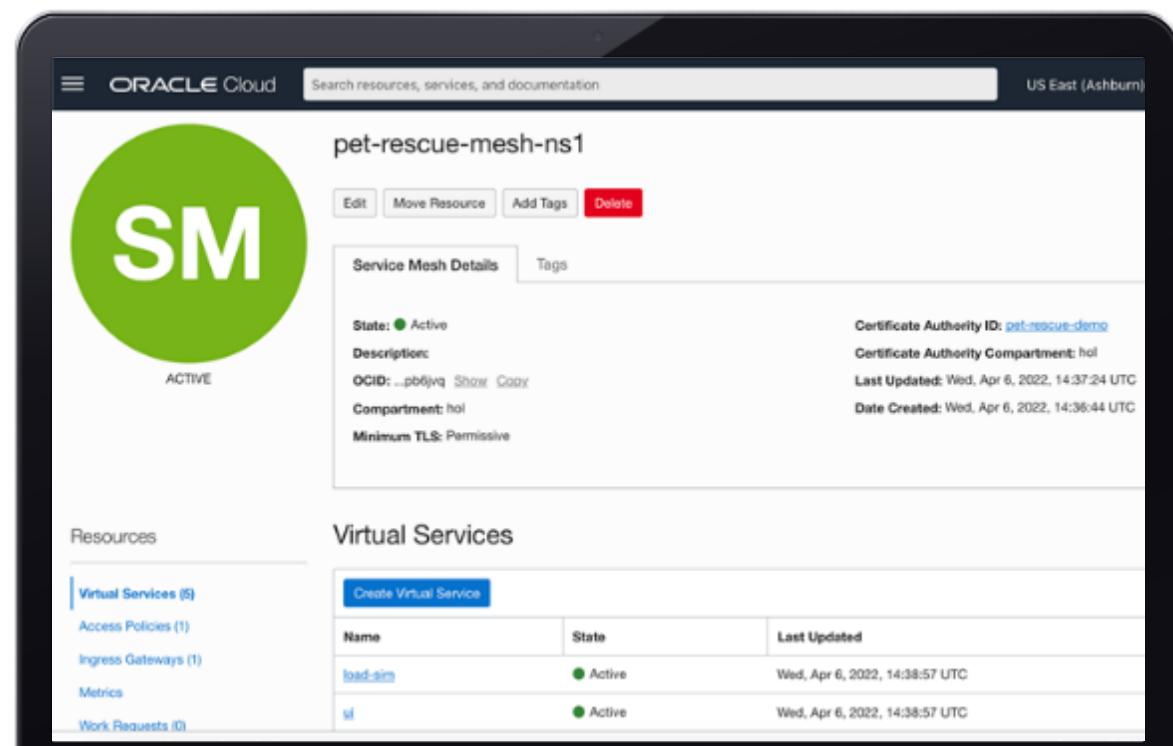
Aumente la productividad del desarrollador

Mejore la eficiencia operativa

Asegure la carga de trabajo

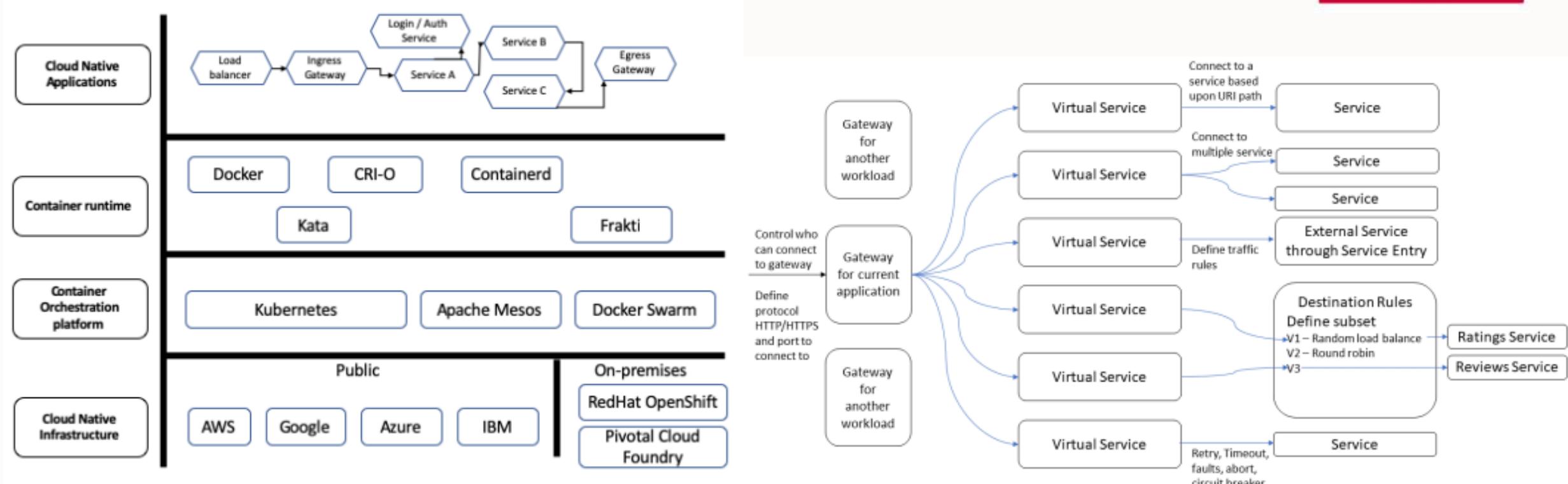
Habilite la visibilidad punta-a-punta

Conecte microservicios dinámicamente





Visión Agnóstica del Service Mesh



La selección importa y nuestro énfasis en estándares abiertos y flexibles

Soporte completo de *Open Source*, tecnología de 3eros, y herramientas de ecosistemas que permite la innovación, portabilidad y permitir un optimo TCO para cualquier recurso ejecutándose en OCI

Servicios gestionados
basados en código abierto



Implemente lo que desee, asegurando
ops sin interrupciones y un menor TCO



Comunidades a las que contribuimos



No siga la moda...

Conversación interna y sincera

Cloud maturity

Value creation
High
Medium
Low
ROI analysis



Figure 1-1. The

Increasing focus on business logic
↑

Cloud native

Serverless

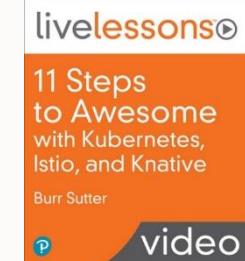
Container Orchestration

Decreasing concern (and control) over stack implementation

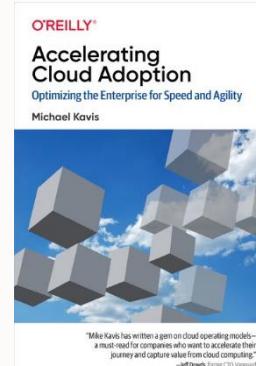
FaaS Kubernetes Players



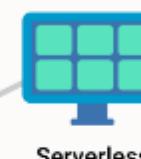
nuclio



fission

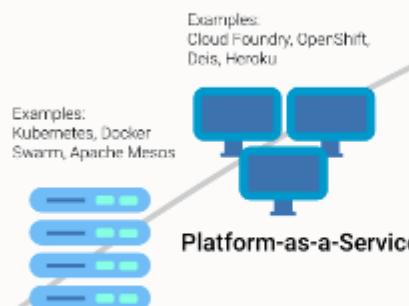


Examples:
AWS Lambda, Azure Functions,
IBM Cloud Functions



Serverless

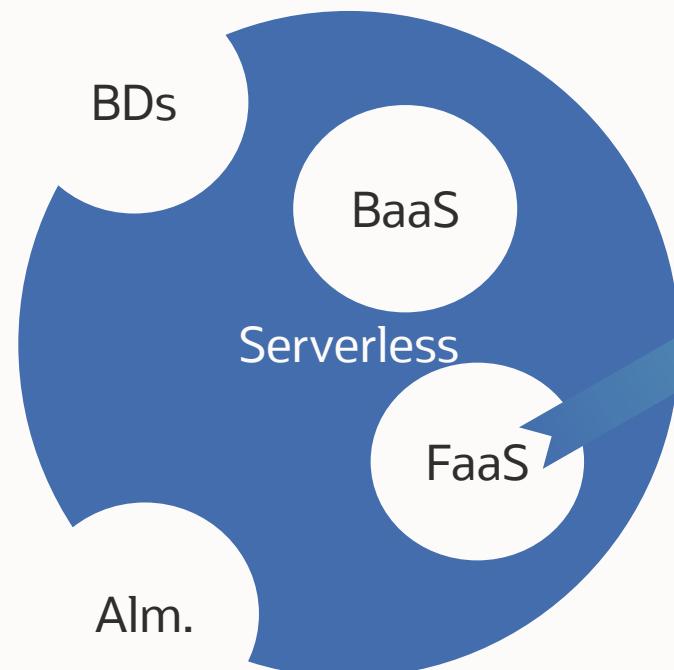
Examples:
Cloud Foundry, OpenShift,
Deis, Heroku



CNCF WG-Serverless Whitepaper v1.0

Cuestionario para seleccionar una opción preferida

Que es Serverless....

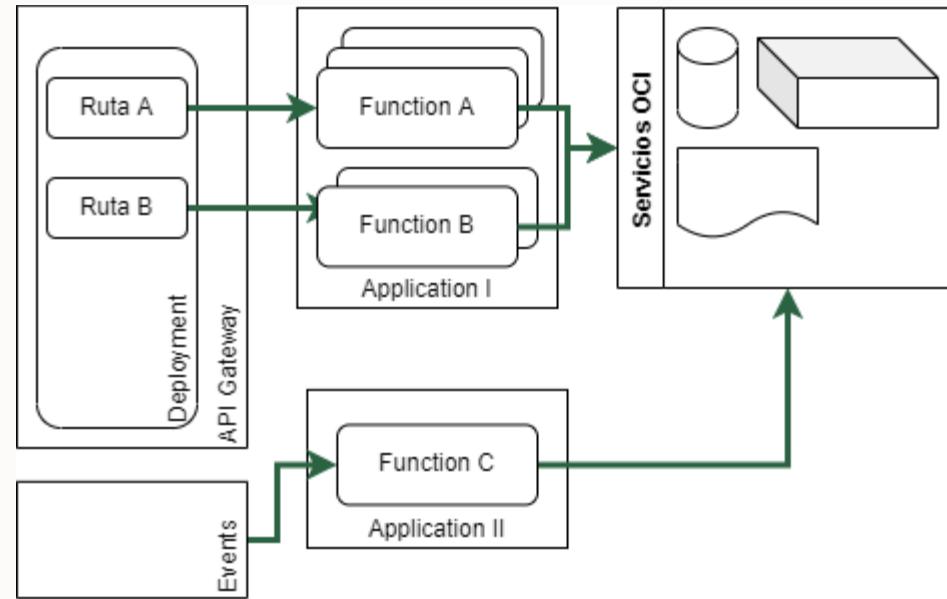
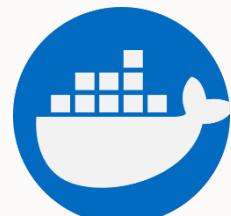
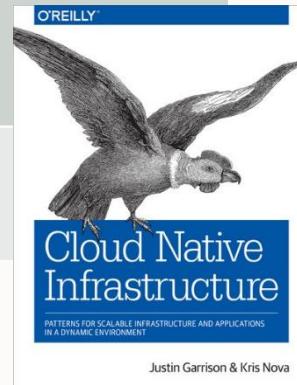


Que es FaaS....



Despliegue y Ejecución: Serverless

Function Fn: Serverless	
Visión Integral	Dentro de su App.
Escalable	Nativo
Abstracción	2 niveles: App y Function
Orquestación	Externa.
Descubrimiento Dinámico	N/A
Patrón Reconciliación	N/A



1. Open Source – Apache 2.0 License
2. Multisite - Multicloud
3. Mejora la experiencia Dev-QA y el comentario “En mi maquina funciona”
4. Container Native - Autoescalable
5. Modelo de Programación – Diseño, Costo, **TODOS** los lenguajes (Hotwrap)
6. Agnóstico al orquestador

Comparación con otras Opciones



KNative

1. Open Source / Apoyado por RedHat
2. Multisite – Multicloud.
3. Kubernetes (Container) Native, autoscaling a 0.
4. Costo en Nube.
5. Cloud Events, soporta HTTP(S).



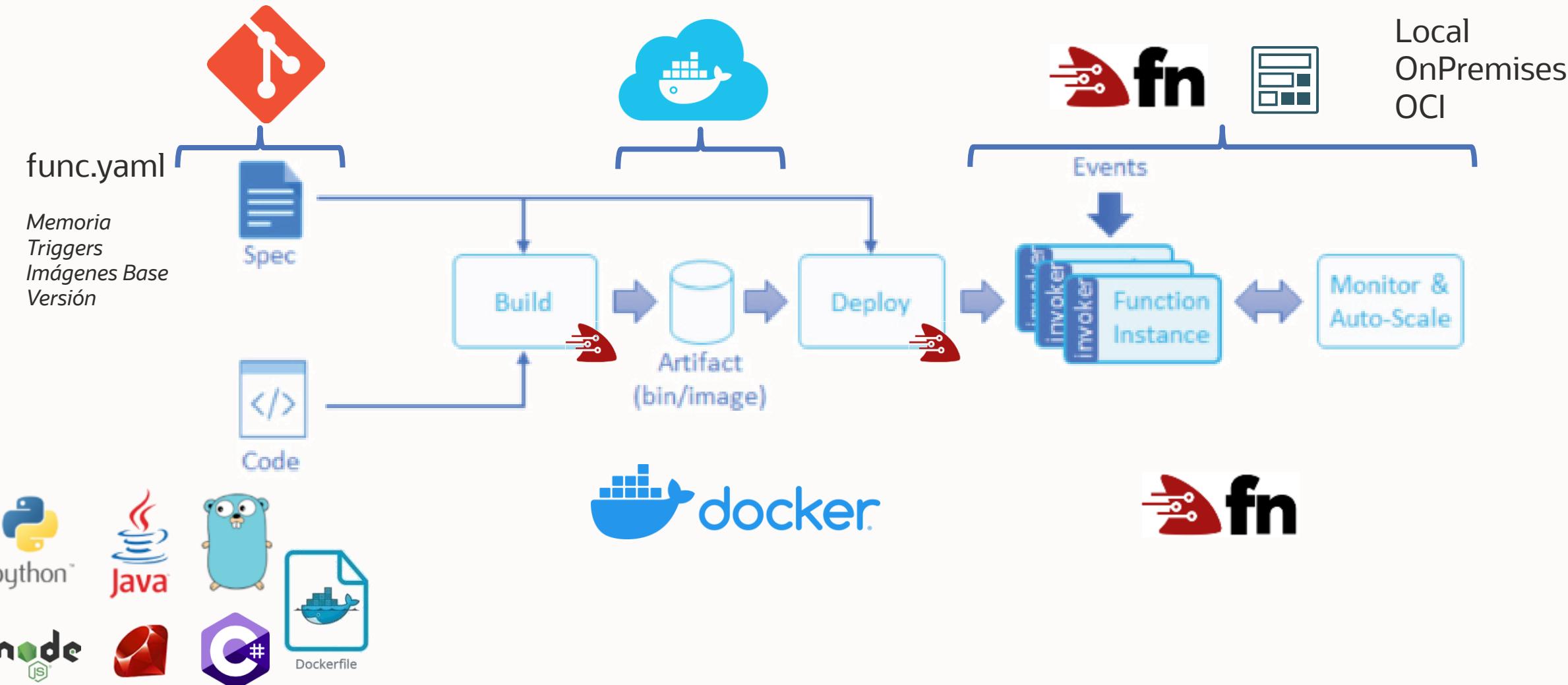
1. Open Source / Soporte Comercial
2. Multisite – Multicloud.
3. Kubernetes/OpenShift/Swarm (Container) Native, autoscaling a 0.
4. Costo en Nube.
5. PLONK - Grafana



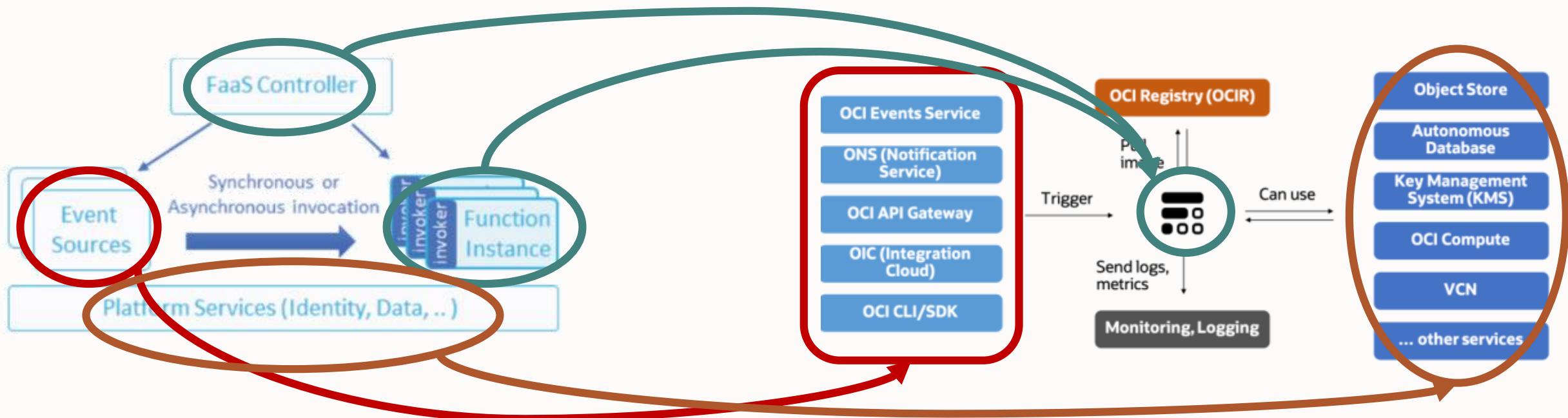
1. Open Source / Obsoleto por VMWare.
2. Multisite – Multicloud.
3. Kubernetes (Container) Native, autoscaling a 0.
4. Costo en Nube.
5. HTTP or Kafka Events.

1. Tipo
2. Alcance
3. Descripción
4. Costo
5. Entradas

Proceso de Desarrollo y Despliegue



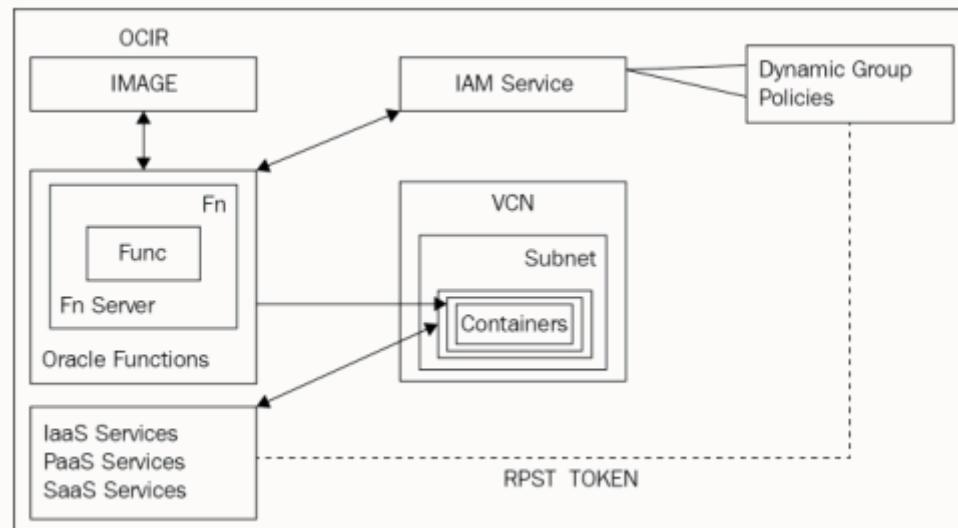
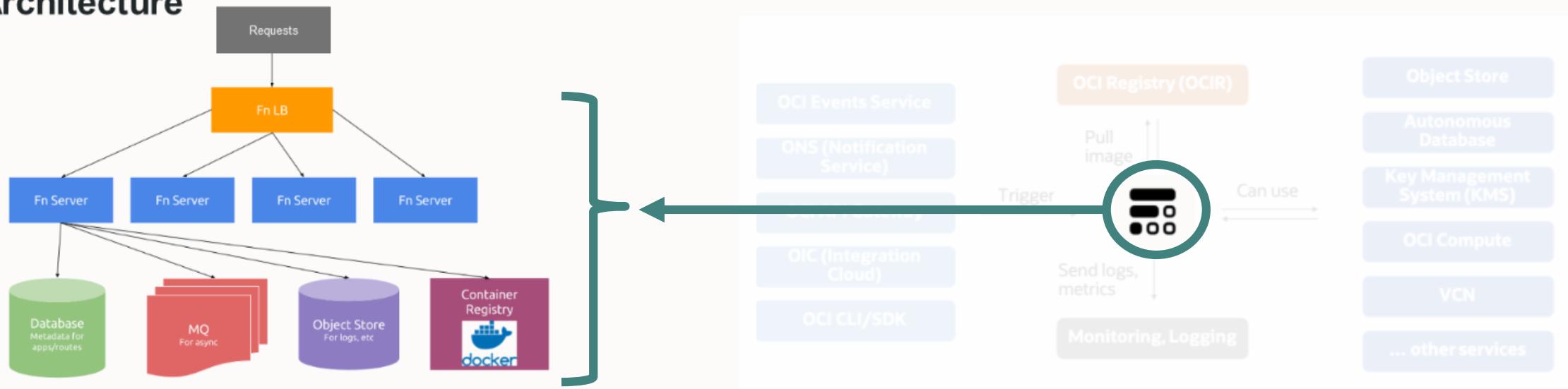
Modelo de Procesamiento



Se configuran los **Eventos** para hacer las llamadas a las Apps/Functions.
El **FaaS Controller** (Oracle Functions) se encarga de balancear e instanciar las Functions
La integración es nativa desde las Functions hacia los **Servicios de la Nube**.

Construcción Local y ambientes separados

Fn Architecture



Seguridad y Configuración:

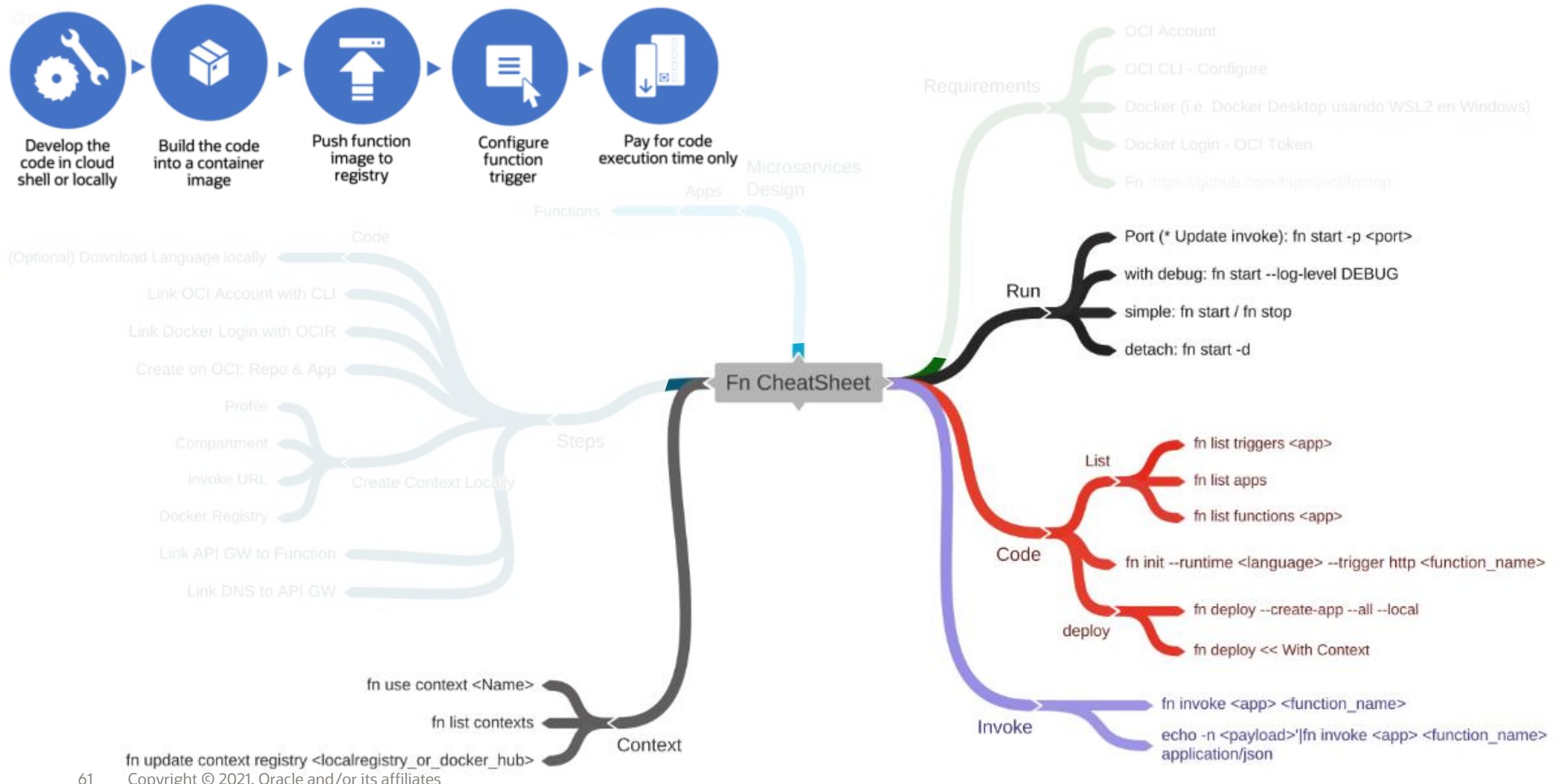
- Subred
- Firewall de entrada y salida
- Repositorio de Imágenes Docker
- Permisos de ejecución



Conceptos de Functions

- **Application**
 - Colección de funciones
 - Conectadas a la VCN/Subredes usadas para tráfico de salida
 - Unidad de aislamiento de carga de trabajo
 - Habilitar o deshabilitar registros, y se establecen parámetros de configuración comunes
- **Function**
 - Imagen Docker (Almacenada en el Container registry)
 - Metadata: Localización de la imagen, memoria, timeout, parámetros de configuración
- **Fn CLI**
 - Comandos para compilar y empaquetar el código de la función como una imagen de Docker e insertar en el registro
 - Genera código Functions sencillo

Mindmap – Pasos Lab



Pasos locales

Verificar ambiente

Paso 1: Hello World

Crear HelloWorld

Desplegarlo localmente

Invocarlo

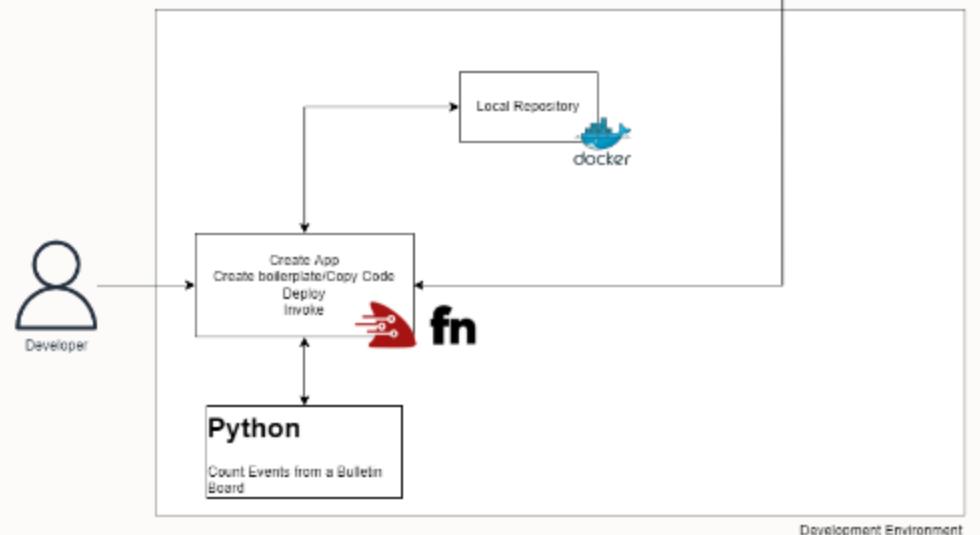
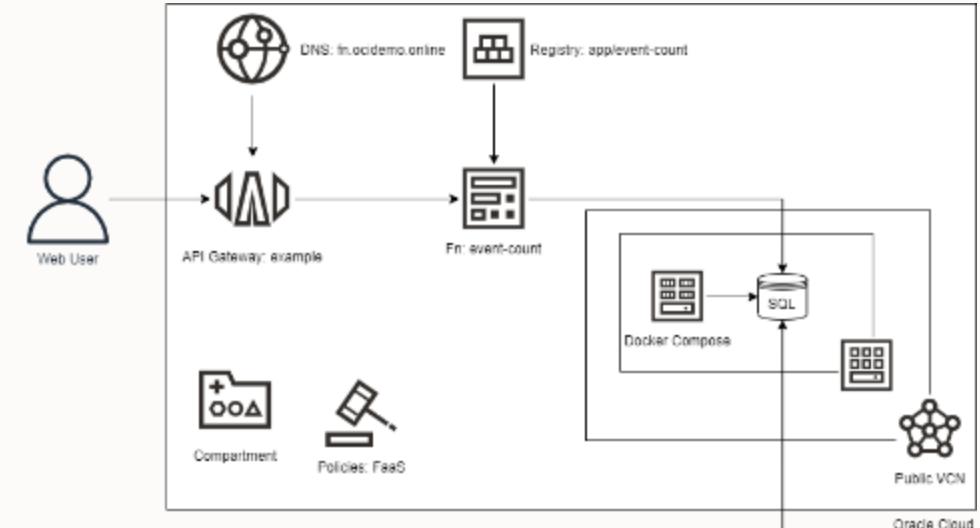
Paso 2: Event-Count

Modificar Código event-count

Desplegarlo localmente

Invocarlo

<https://github.com/fmorenod81/oci-cloudnative>



Pasos remotos

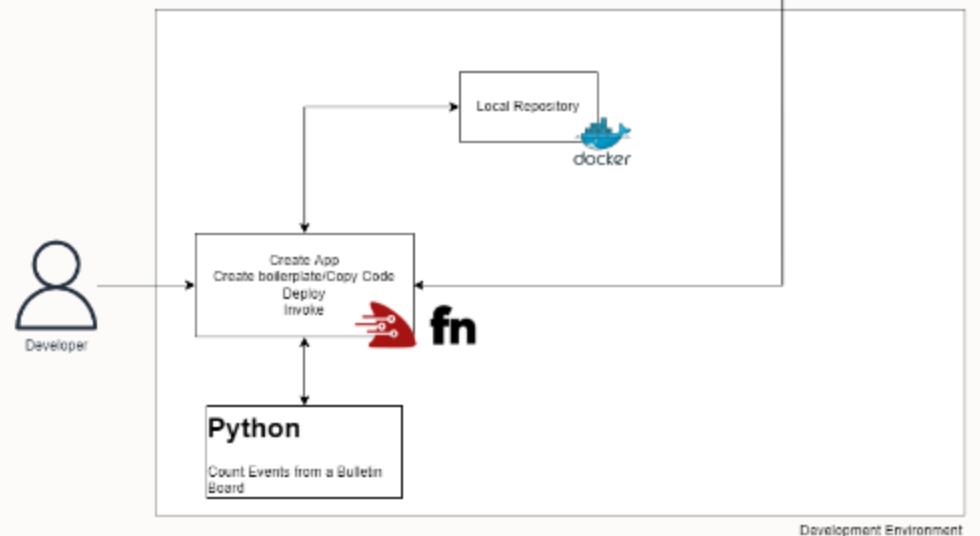
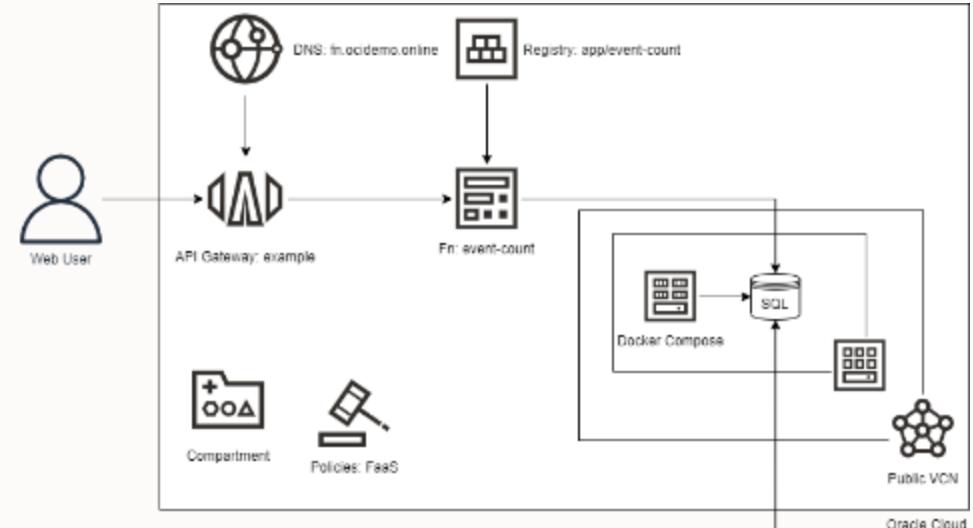
Verificar configuración remota

Paso 3:

Invocar remotamente

Configurar API Gateway

Configurar DNS



Desarrollo en Functions

Ambiente de Desarrollo	Frameworks & Lenguajes	Empaquetado	Herramientas en Ciclo de Vida
<ul style="list-style-type: none">✓ OCI Cloud Shell✓ Maquina Local✓ Instancia en OCI	<ul style="list-style-type: none">✓ Fn Java FDK✓ Fn Python FDK✓ Fn Node FDK✓ Fn Go FDK✓ Fn Ruby FDK✓ Micronaut*	<ul style="list-style-type: none">✓ Fn Dockerfile✓ BYO Dockerfile✓ Graal Native*	<ul style="list-style-type: none">✓ Fn Server✓ Fn CLI✓ OCI Console✓ OCI CLI✓ Docker CLI✓ Terraform✓ Visual Builder Studio CI-CD

* -- 3rd Party/Oracle contribution

Usos de casos comunes

Código ejecutado en respuesta a Eventos



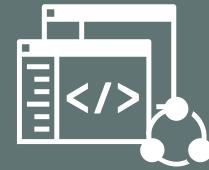
Gobierno basado
en Eventos



Web, Mobile API
Backends

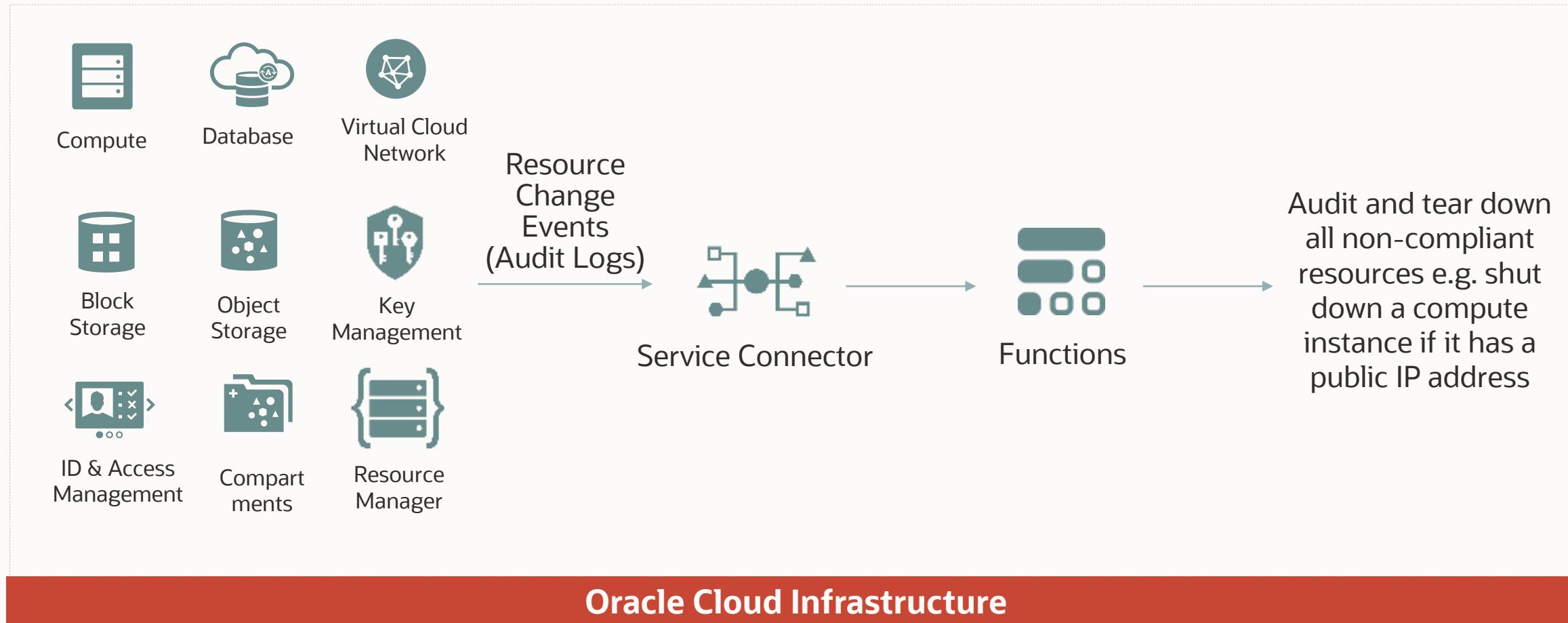


Proc. en tiempo
real de Archivos,
Streaming

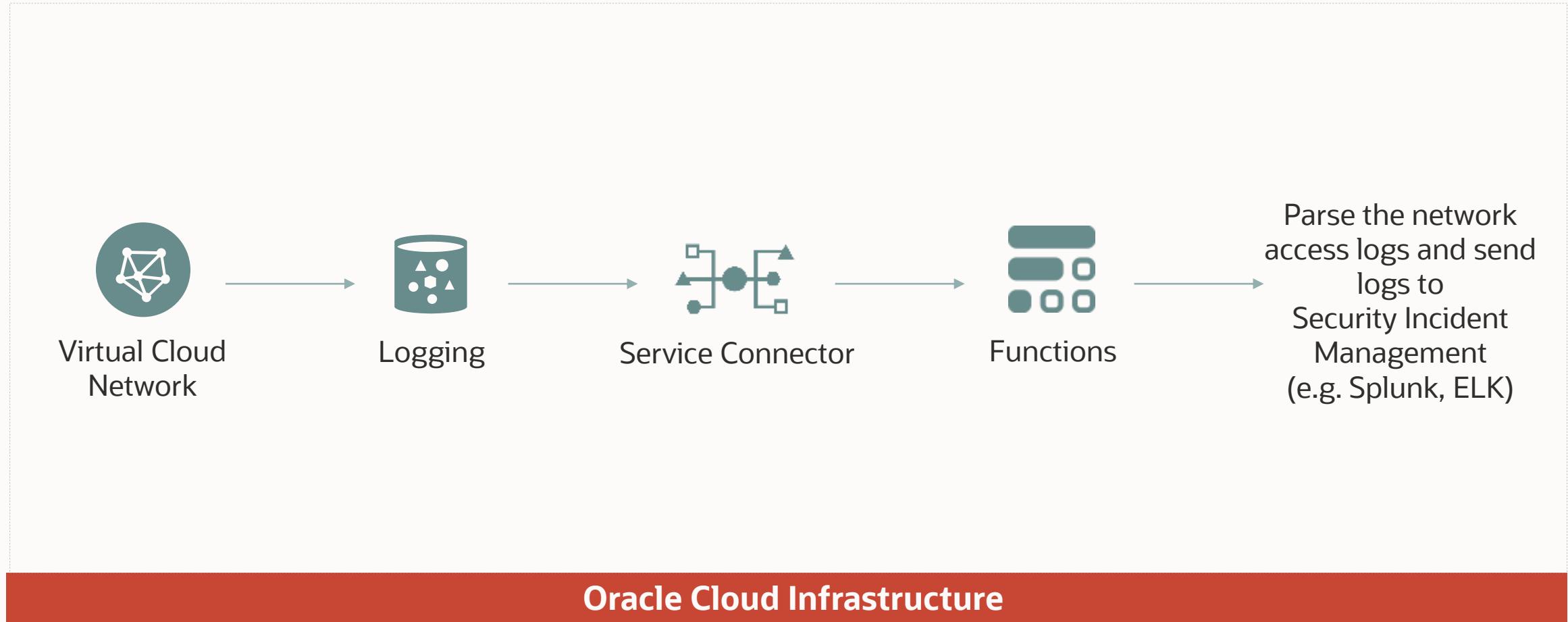


Machine Learning,
DevOps

Use Case 1: Enforce Corporate Security Policies and Governance Rules

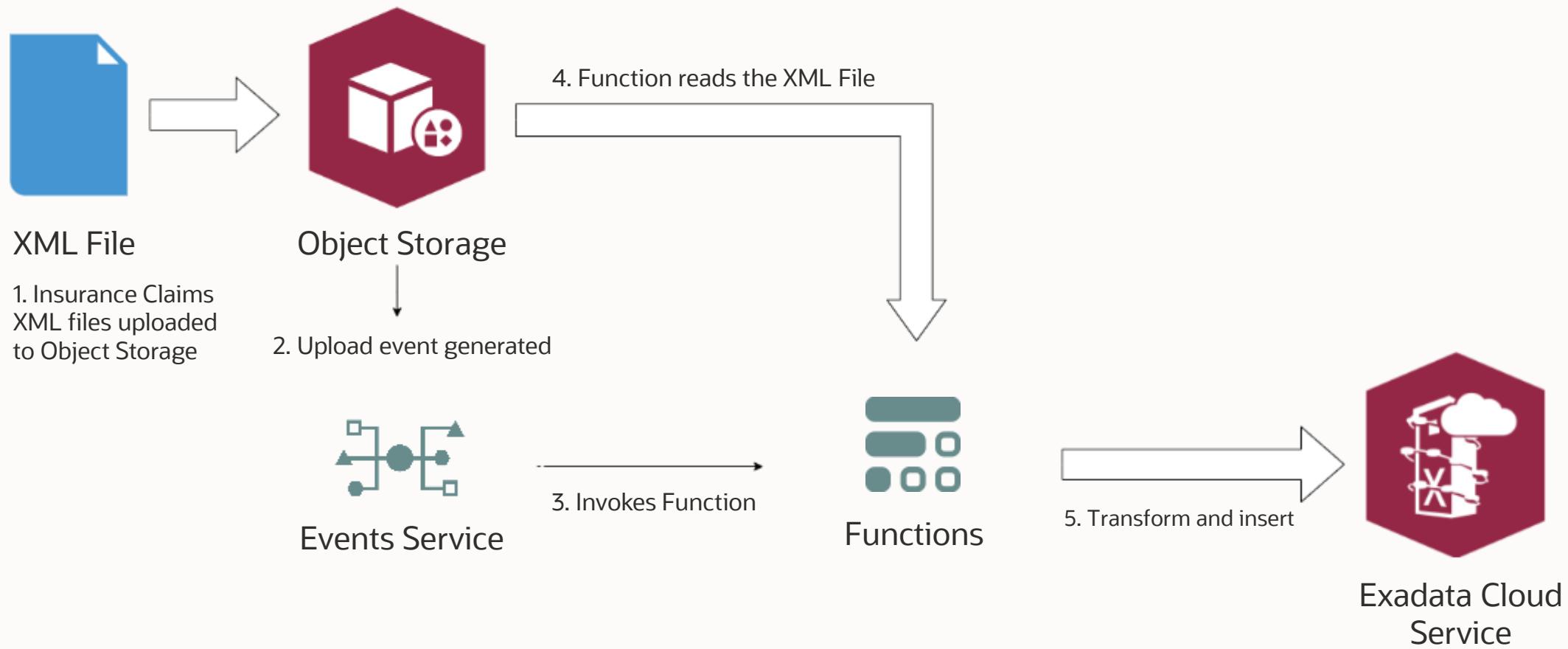


Use Case 2: Ingest Access Logs in Security Incident Management

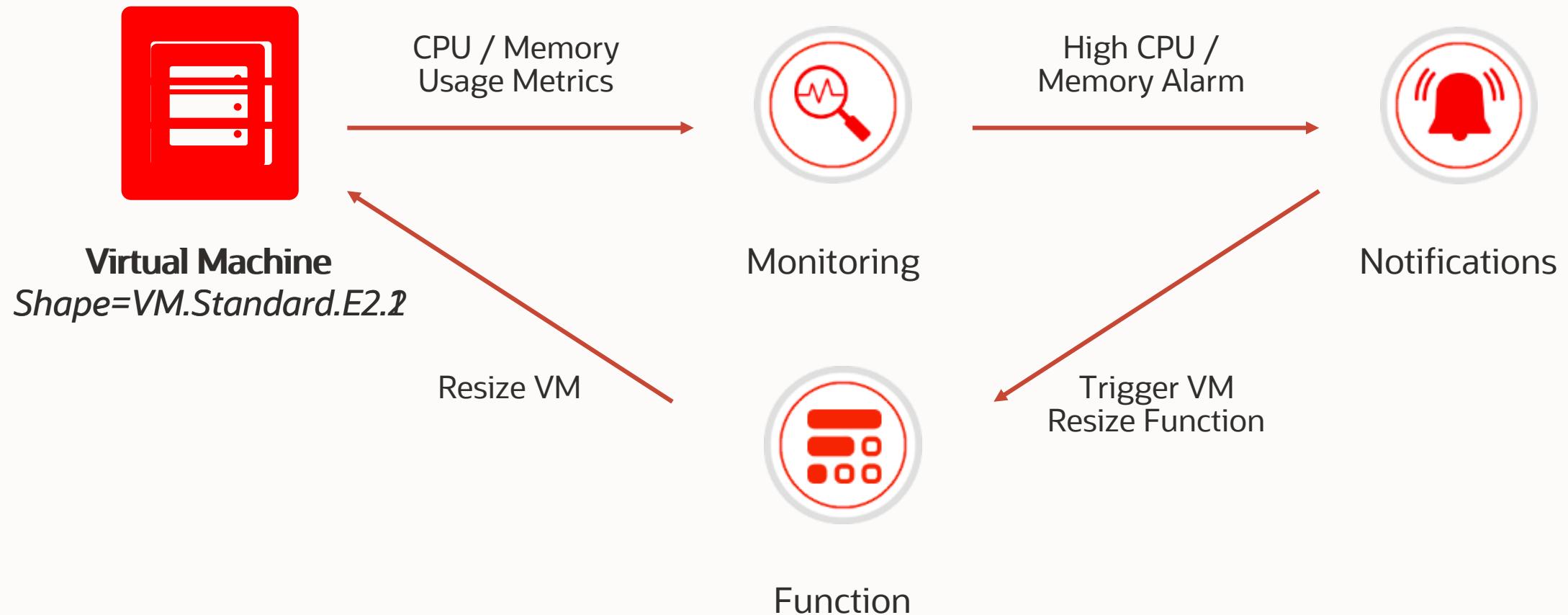


Use Case 3: High Volume ETL Solution

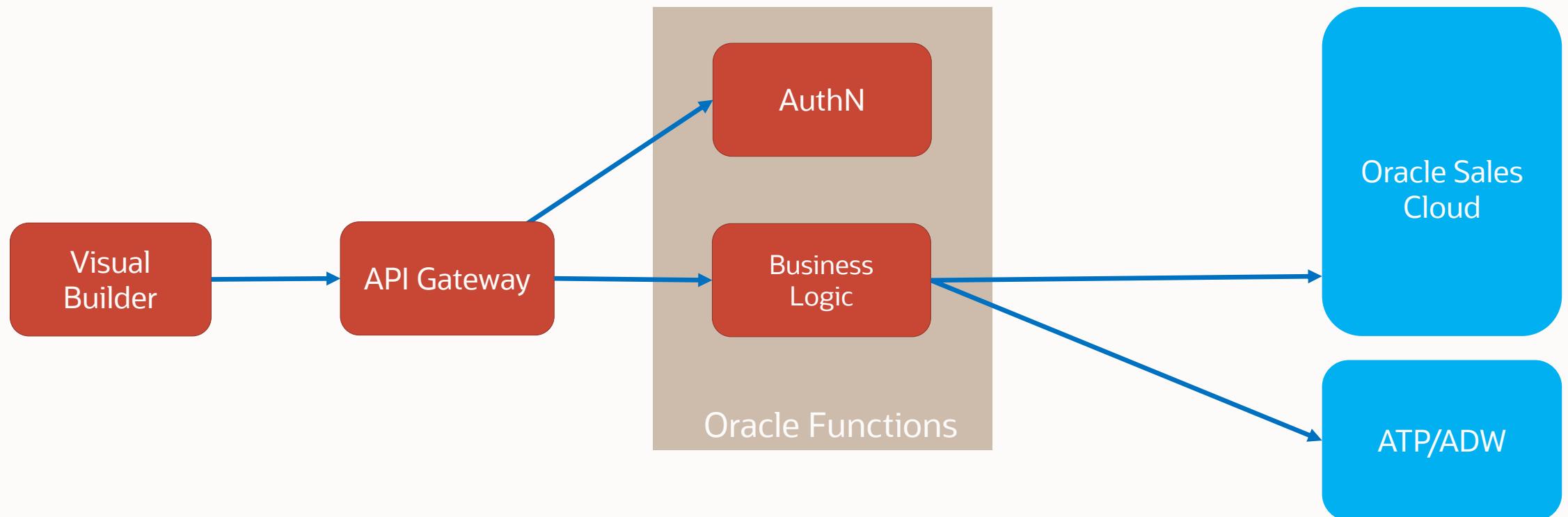
Processes ~1-1.5 million files per day



Use Case 4: Resize Virtual Machine



Use Case 5: Functions as API Backends to Extend Oracle Sales Cloud



Functions Onboarding



- [Quick Start Guides](#)
 - [OCI Live Labs](#)
 - [OCI Tutorials](#)
-
- [Ejemplos en GitHub](#)
 - [Service Documentation](#)
 - [Blogs](#)
-
- [Reference Architectures](#)
 - [Solution Playbooks](#)

Tutorials Fn y Sample Code

Explore Fn

- [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.

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.

Orchestrate with Fn Flow

Fn Flow provides a way to orchestrate functions to build sophisticated applications, initially using Java, and soon with other programming languages.

- [Flow 101](#)
- [Flow 102](#)
- [Fn Flow Saga](#) - In this tutorial you will use Fn Flow to implement a Java travel booking system that leverages functions written in a variety of languages.

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

Costos – Functions y API Gateway

OCI Functions

Invocation Pricing		
	Pay as You Go	Metric
First 2 million per month	Free	Function invocation
Over 2 million per month	US\$0.0000002	Function invocation

Execution Time Pricing		
	Pay as You Go	Metric
First 400,000 per month	Free	Gigabyte memory-seconds
Over 400,000 per month	US\$0.00001417	Gigabyte memory-seconds

OCI API Gateway

API Management			
Service	Pay as You Go	Metric	
API Gateway	\$3.00	1 Million API Calls Per Month	

* Tomado de <https://www.oracle.com/cloud-native/functions/> y <https://www.oracle.com/cloud-native/api-management/>

Preguntas?



Libros de Referencia

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SARKAR, Prasenjit y RUIZ, Guillermo . Oracle Cloud Infrastructure for Solutions Architects, O'Reilly Media, Oct 2021.

<https://www.oreilly.com/library/view/oracle-cloud-infrastructure/9781800566460/>

Blogs Técnicos

SCHOLL, Boris. Getting Started with Microservices, Taken from Dic, 2021. 3 Articles.

<https://blogs.oracle.com/developers/post/getting-started-with-microservices-part-1-advantages-and-considerations>

RESELMAN, Bob. Design principles for microservices, Taken from Jan, 2021.

https://developers.redhat.com/articles/2022/01/11/5-design-principles-microservices#five_design_principles_for_microservices

Cloud Native Computing Foundation

<https://www.cncf.io/>



Frameworks Ligeros

<https://helidon.io/>

<https://micronaut.io/>

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



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Libro De Referencia

KHATRI, Anjali y otros. Mastering Service Mesh. Packt Publishing, May 2020.

<https://learning.oreilly.com/library/view/mastering-service-mesh/9781789615791/>

Example DevOps Service

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

OCI Cloud Native

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

Ejemplo Cloud Native de los Demos

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

Oracle Kubernetes Engine

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

Oracle Functions

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

Fn Project

<https://fnproject.io/>

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

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

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

Events Service (usando CNCF Events)

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

API Management

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API Management

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

Verazzano

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

<https://github.com/verrazzano/verrazzano>

Mas Información

<https://oracle.com/application-development>

Hands-on Labs

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

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

Architecture Center - Reference Architecture

<https://docs.oracle.com/solutions/?lang=en>



Preguntas?



Service Mesh

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

Nuevas VCN para Kubernetes

<https://blogs.oracle.com/cloud-infrastructure/post/announcing-vcn-native-pod-networking-for-kubernetes-in-oci> (15-Julio-22)

Enable Service Mesh on OKE

<https://docs.oracle.com/en/solutions/oci-service-mesh-oke/index.html#GUID-12216A44-2E62-48D8-8C89-864335BE9EF6>

Example DevOps Service

https://learning.oreilly.com/videos/11-steps-to/9780135945346/9780135945346-esak_01_10_01_00/

<https://www.bmc.com/blogs/serverless-faas/#:~:text=This%20offers%20users%20more%20flexibility,not%20limited%20to%20creating%20functions.>

<https://kubesphere.io/blogs/serverless-vs-faas/>

Mas Información

<https://oracle.com/application-development>

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

Architecture Center - Reference Architecture

<https://docs.oracle.com/solutions/?lang=en>



Por donde iniciar?

Contenedores y Functions	Documentation & tutorials	Solutions Playbooks and Reference Architectures	Labs
	<ul style="list-style-type: none">Container Engine for KubernetesContainer RegistryFunctions	<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	<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">API For Developers: Learn how to design, develop and manage APIs	
AI y Data Services	AI Workshops		Blogs
	<ul style="list-style-type: none">Digital AssistantLanguageSpeech	<ul style="list-style-type: none">VisionAnomaly DetectionForecasting	<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