

Operadores de Kubernetes



Introducción



Lima, Peru 2023

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- Embajadora de Cloud Native Computing Foundation
- Capitan de Docker
- Colaborador de código abierto: Apache Airflow, Kubernetes Website



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Agenda

- ¿Por qué Percona decide implementar Operadores de Kubernetes?
- Kubernetes
 - Terminología, ejemplo y arquitectura
- Operadores de Kubernetes
 - CRD, Controllers, Con y Sin Operadores, Capability Model
 - Operator Hub, Operator Pattern and SDKs

START



¿Por qué Percona decide implementar Operadores de Kubernetes?



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- Decisión impulsada por el cliente/comunidad
- Contenedores -> Kubernetes
- Operadores = Simplificación + Automatización
 - Despliegue
 - Administración
 - Configuración
- Aplicaciones complejas -> base de datos

Kubernetes

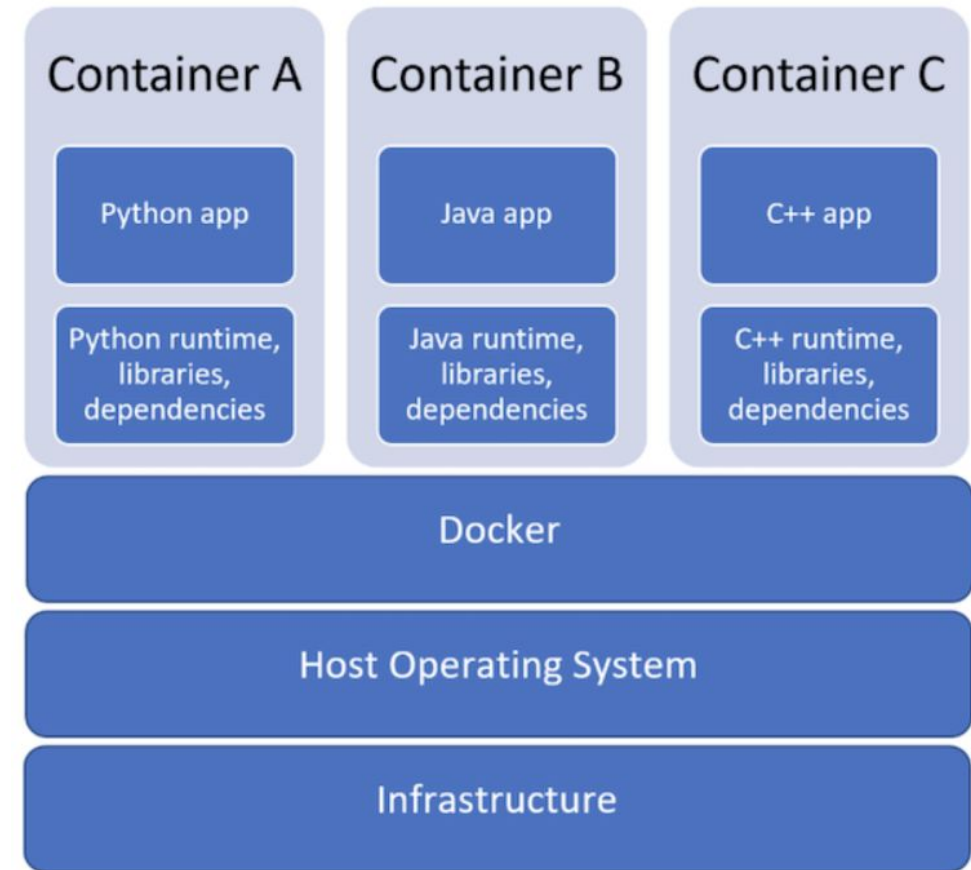


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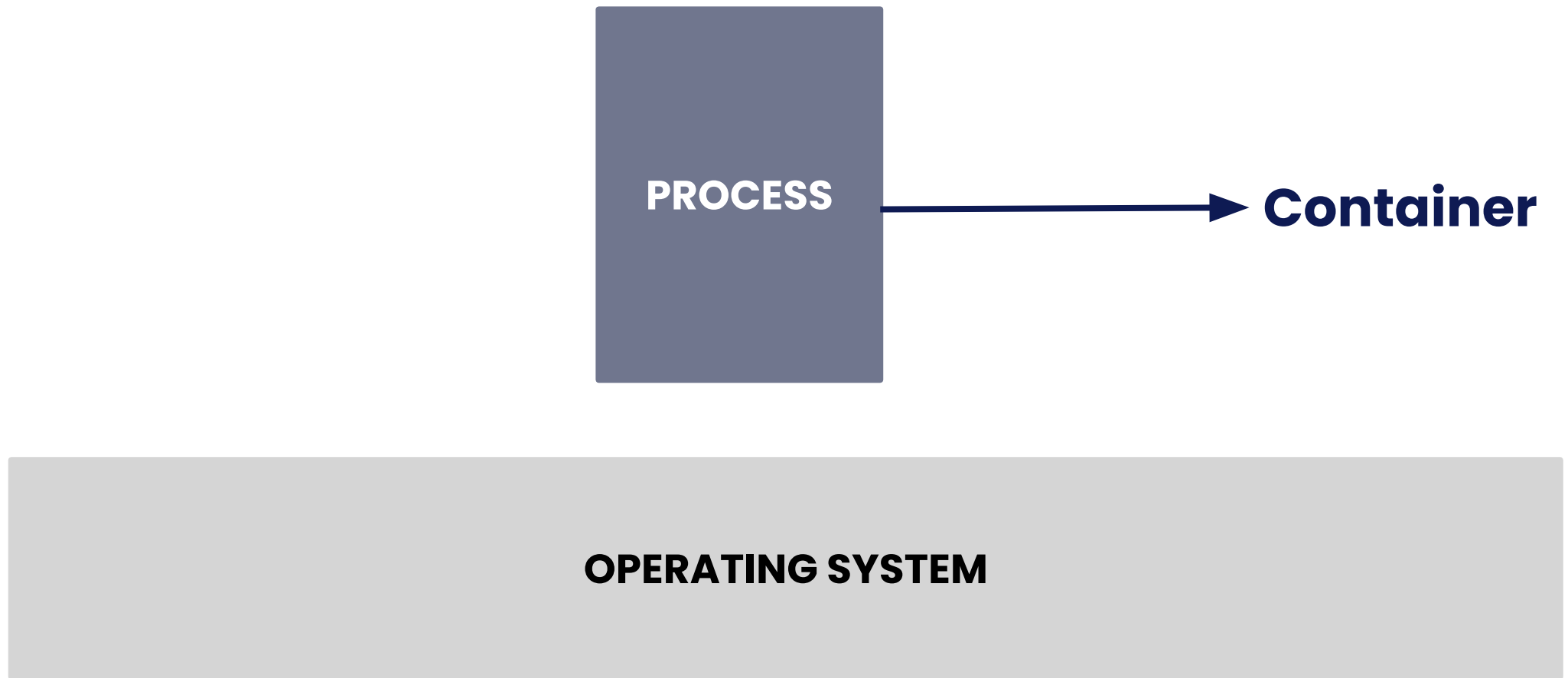
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Contenedores

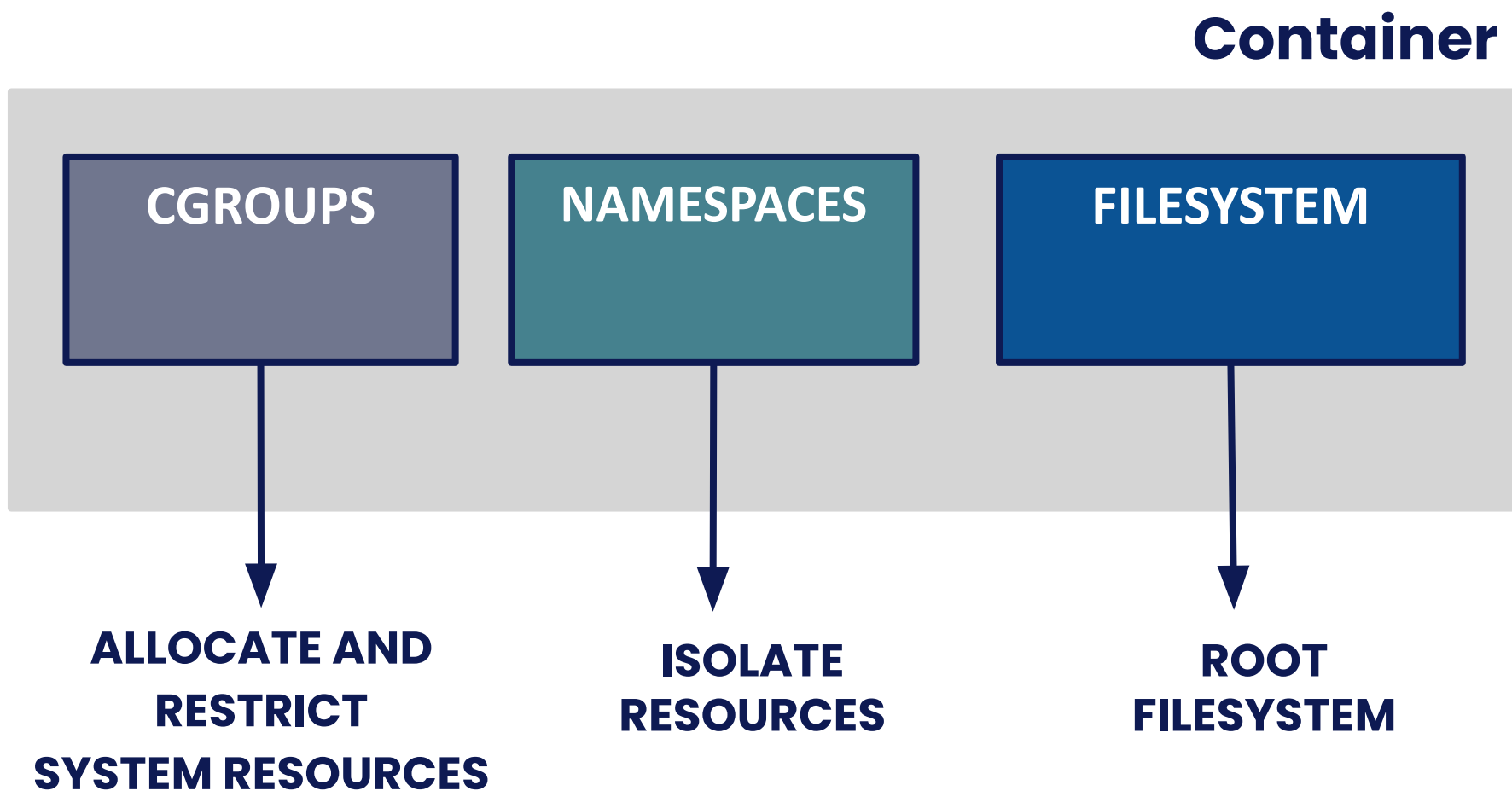
- Application
- Runtime
- Dependencies



Simplificándolo



¿Qué hace un contenedor?



Desafíos con contenedores a escala

- Automatización
- Administrar servicios , Equilibrio de carga
- Gestión eficiente de los recursos
- Capacidades de autocuración (Self-healing capabilities)
- Provisión para actualización y reversión(update and rollback)



kubernetes

Advantages of Kubernetes

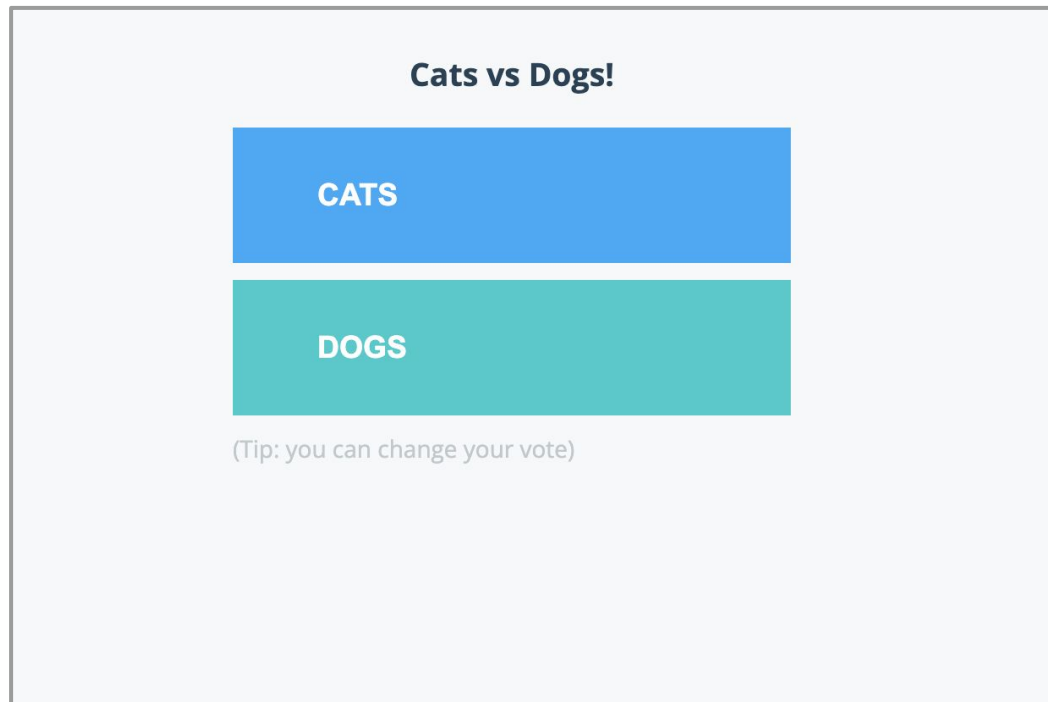
- Portabilidad de aplicaciones
- Sin bloqueo de proveedor (No Vendor lock-in)
- Buena opción para microservicios
- Comunidad activa (03 lanzamientos por año).
- Amplia adopción
- Community

Terminología Kubernetes

- Pods
- Deployments
- Services

Ejemplo: Application de Voto

voting-app

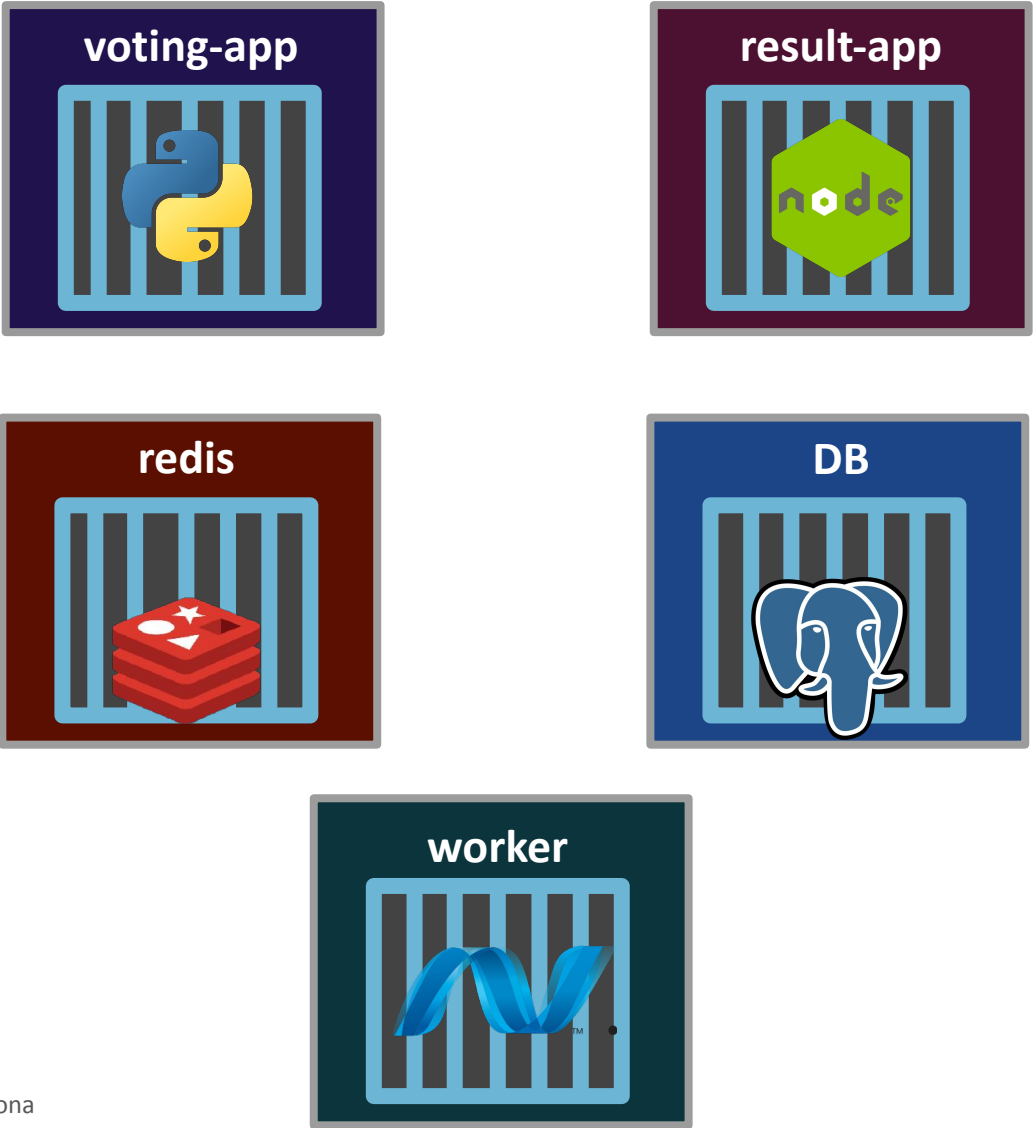


result-app

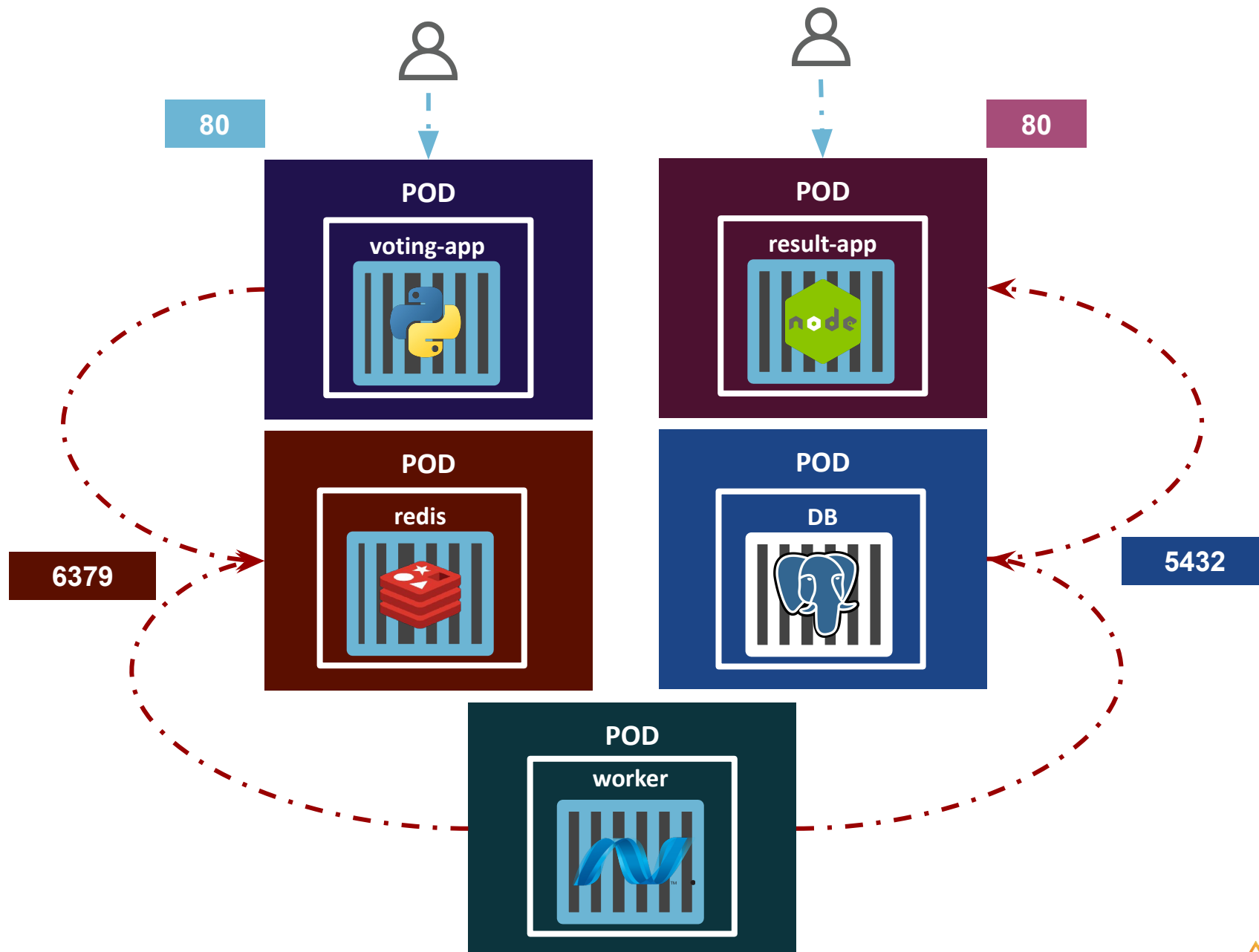


KodeKloud: www.youtube.com/watch?v=XuSQU5Grvlg

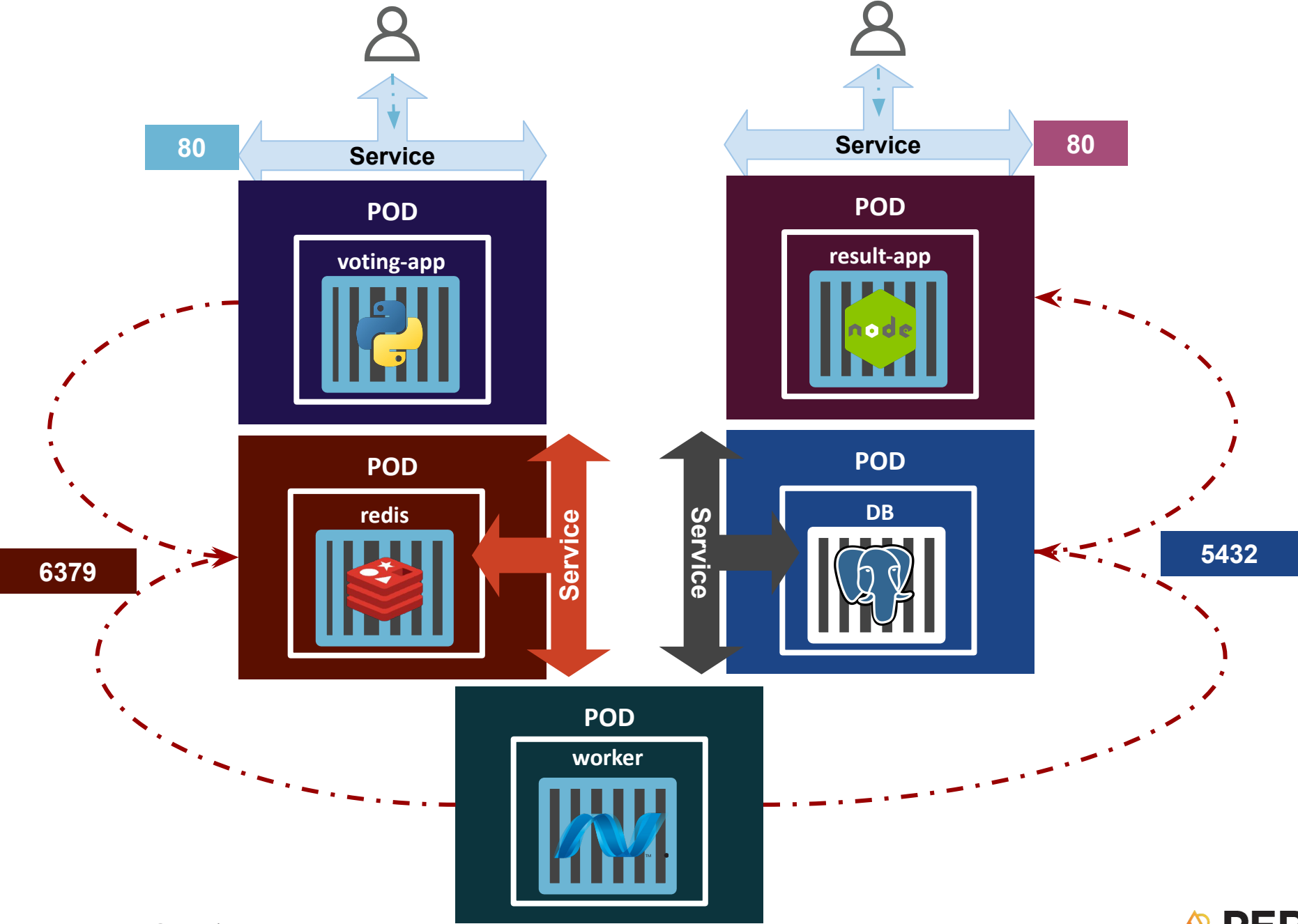
Ejemplo: Application de Voto

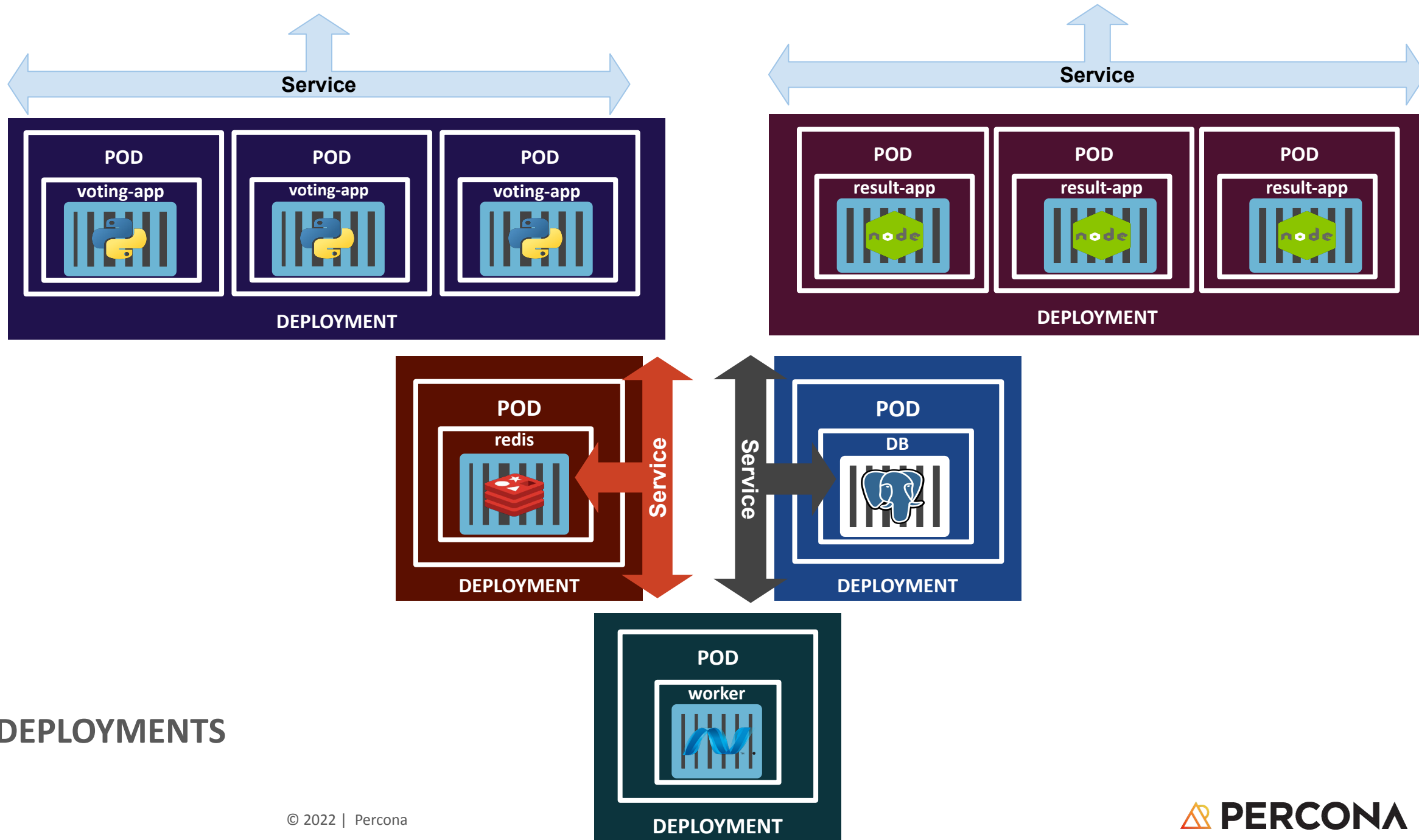


PODS



SERVICES





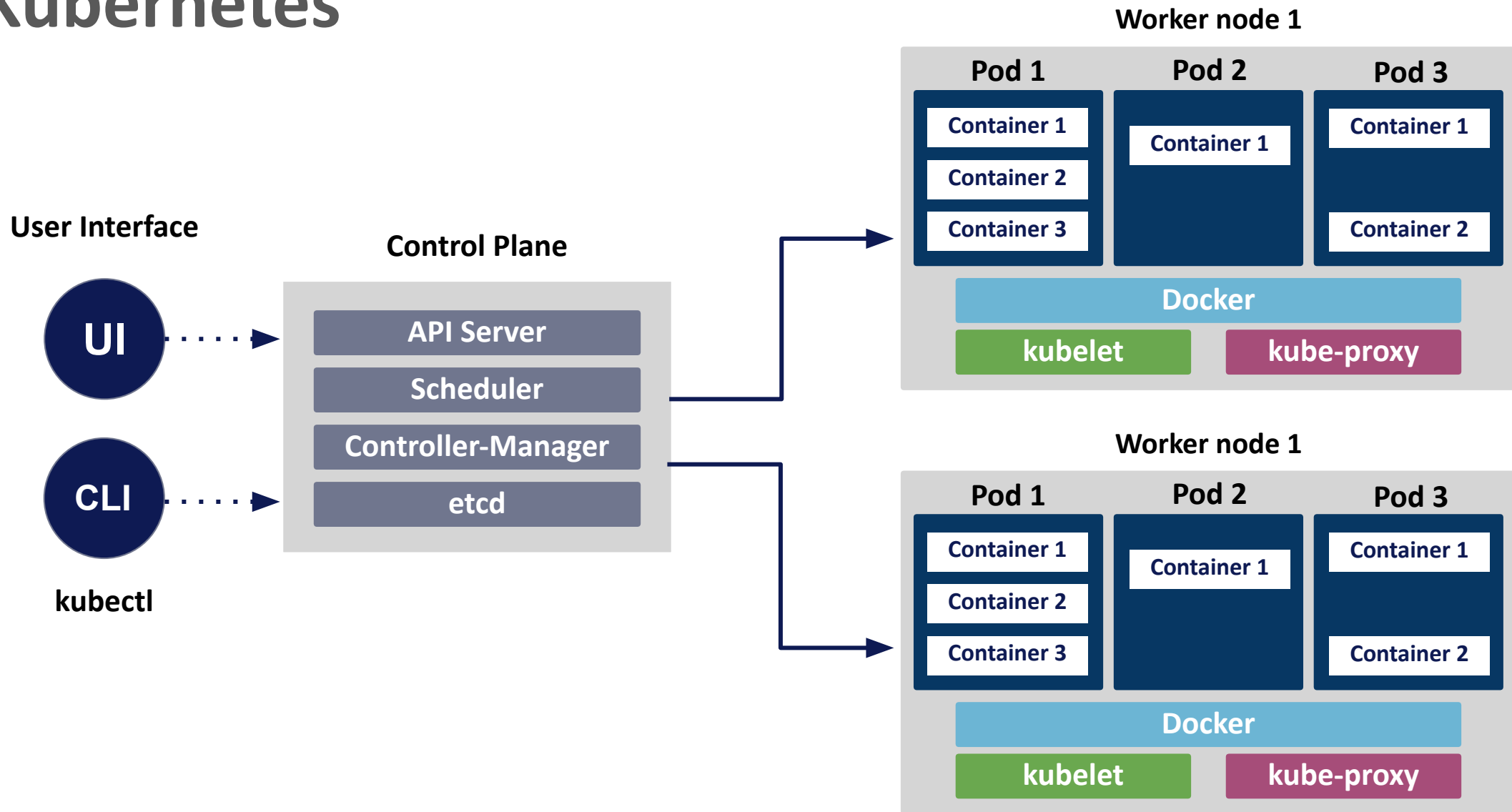
DEPLOYMENTS

YAML

File: **voting-app-deploy.yaml**

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: voting-app-deploy
  labels:
    name: voting-app-deploy
    app: demo-voting-app
spec:
  replicas: 1
  selector:
    matchLabels:
      name: voting-app-pod
      app: demo-voting-app
  template:
    metadata:
      name: voting-app-pod
      labels:
        name: voting-app-pod
        app: demo-voting-app
    spec:
      containers:
        - name: voting-app
          image: kodekloud/examplevotingapp_vote:v1
          ports:
            - containerPort: 80
```

Arquitectura de Kubernetes



Kubernetes Operators



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Escalado de aplicaciones sin estado: **fácil**

\$ kubectl scale deploy/staticweb --replicas=4

¿Qué pasa con las aplicaciones que **almacenan datos?**

“Deployar” una base de datos: fácil

Ejecutar una base de datos **a lo largo del tiempo** es lo más difícil



Operators: Extienden la API de Kubernetes

1. Application-specific custom **controllers**
2. Custom Resource Definitions (**CRD**)

Los operadores siguen los principios de Kubernetes, en particular el **ciclo de control** (control loop).

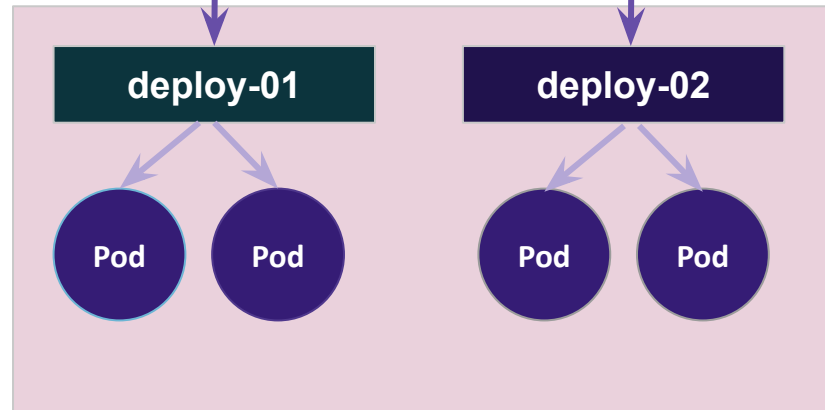
Kubernetes Operators

SIN



apiVersion: apps/v1
kind: Deployment
metadata:
name: deploy-01

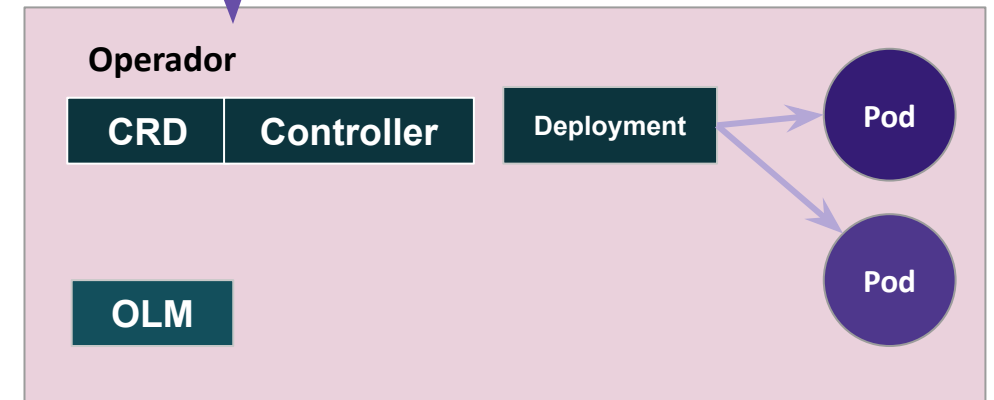
apiVersion: apps/v1
kind: Deployment
metadata:
name: deploy-02



CON



apiVersion: apiextensions.k8s.io/v1
kind: MyApp
metadata:
name: my-app



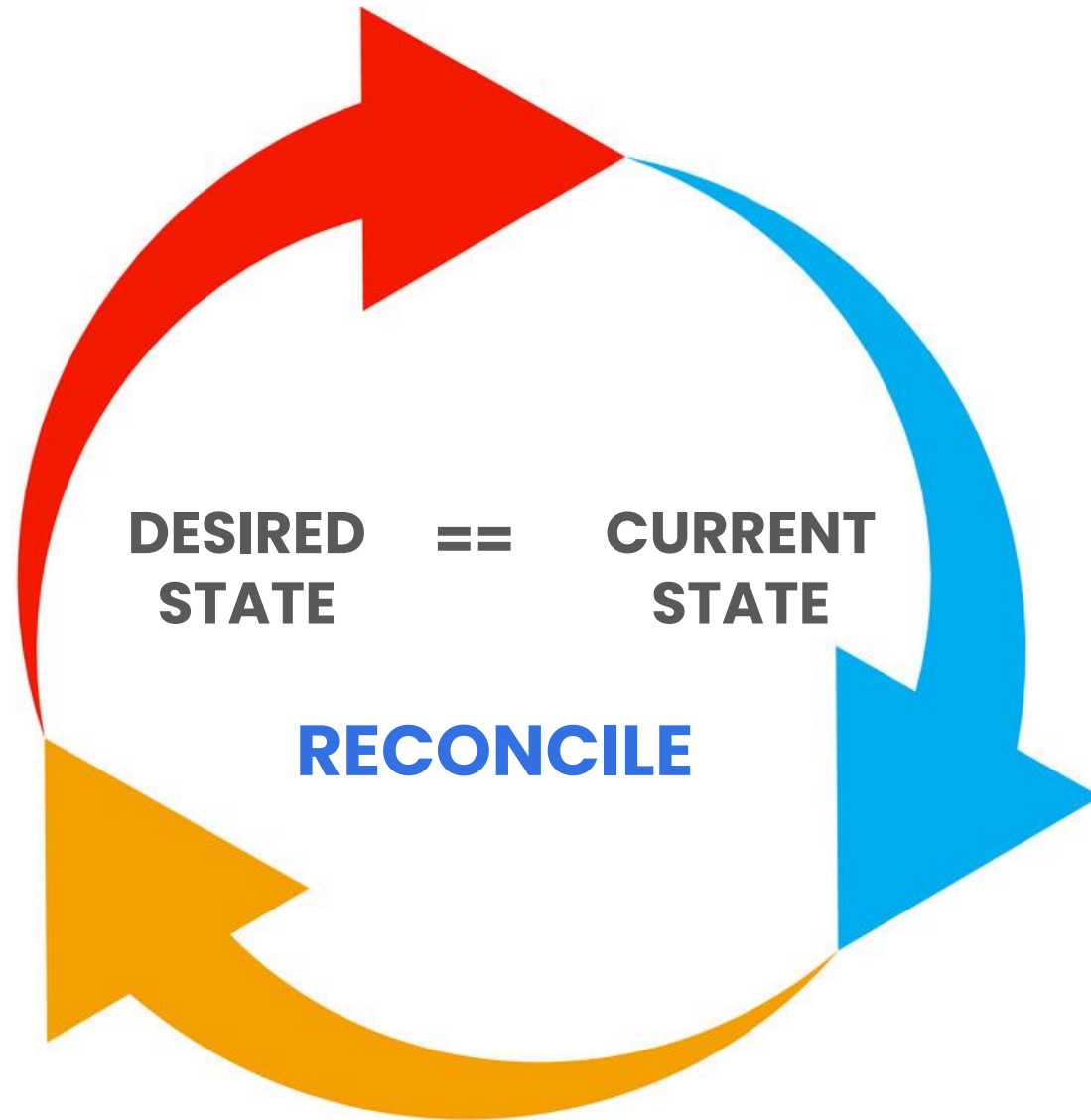
Control Loop

Observe

Act

Diff

Custom Controller

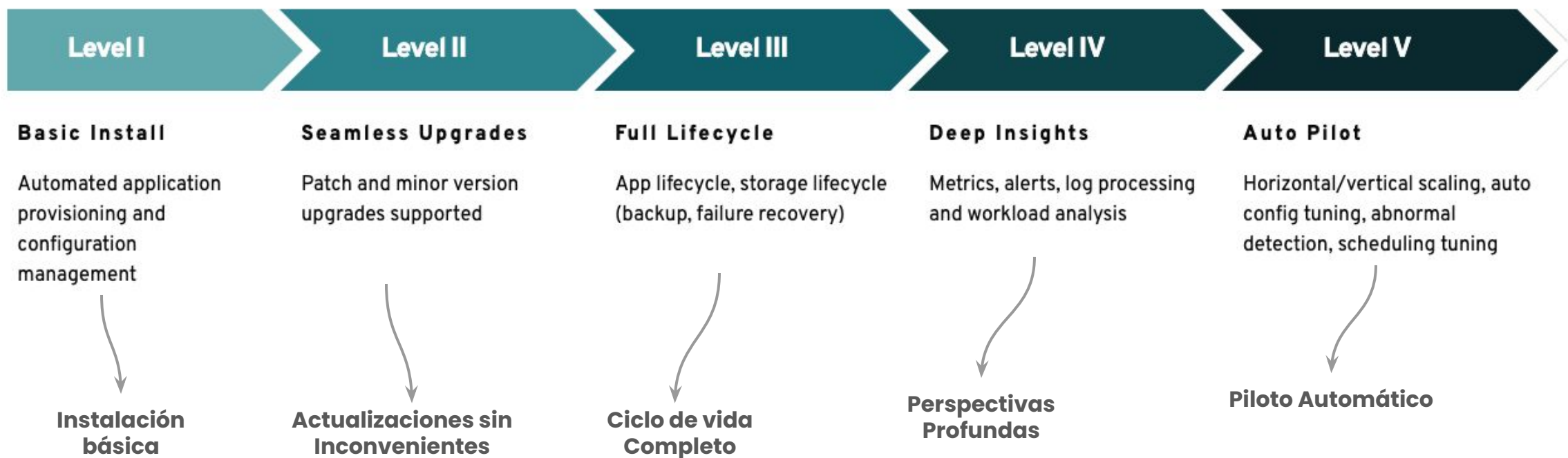


Custom
Resource

Optionally
Modify

Other K8s
objects

Capability Model (Modelo de Capacidad)



CATEGORIES

AI/Machine Learning

Application Runtime

Big Data

Cloud Provider

Database

Developer Tools

Drivers and plugins

Integration & Delivery

Logging & Tracing

Modernization & Migration

Monitoring

Networking

OpenShift Optional

Security

Storage

Streaming & Messaging

PROVIDER

Aerospike (1)

312 ITEMS

VIEW SORT A-Z



Aerospike Kubernetes Operator

provided by Aerospike

The Aerospike Kubernetes Operator automates the



Aiven Operator

provided by aiven

Manage your https://aiven.io resources with Kubernetes.



Akka Cluster Operator

provided by Lightbend, Inc.

Run Akka Cluster applications on Kubernetes.



Altinity Operator for ClickHouse

provided by Altinity

ClickHouse Operator manages full lifecycle of ClickHouse



Alvearie Imaging Ingestion Operator

provided by Alvearie

The Alvearie Imaging Ingestion provides a collection of



Anchore Engine Operator

provided by Anchore Inc.

Anchore Engine - container image scanning service for policy-based security, best



Ansible Galaxy

provided by Galaxy Community

Ansible Galaxy is Ansible's official hub for sharing Ans



Apache Spark Operator

provided by radanalytics.io

An operator for managing the Apache Spark clusters and intelligent applications that



API Operator for Kubernetes

provided by WSO2

API Operator provides a fully automated experience for



APIcast

provided by Red Hat

APIcast is an API gateway built on top of NGINX. It is part of the Red Hat 3scale API

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Percona Operator for MySQL based on Percona XtraDB Cluster

Percona Operator for MySQL based on Percona XtraDB Cluster manages the lifecycle of Percona XtraDB cluster instances.

[Home](#) > Percona Operator for MySQL based on Percona XtraDB Cluster

Percona Operator for MySQL based on Percona XtraDB Cluster

Install

Percona is Cloud Native

Percona Operator for MySQL based on Percona XtraDB Cluster is an open-source drop in replacement for MySQL Enterprise with synchronous replication running on Kubernetes. It automates the deployment and management of the members in your Percona XtraDB Cluster environment. It can be used to instantiate a new Percona XtraDB Cluster, or to scale an existing environment.

Consult the [documentation](#) on the Percona Operator for MySQL based on Percona XtraDB Cluster for complete details on capabilities and options.

Supported Features

- **Scale Your Cluster** change the size parameter to [add or remove members](#) of the cluster. Three is the minimum recommended size for a functioning cluster.
- **Manage Your Users** [add, remove, or change](#) the privileges of database users
- **Automate Your Backups** [configure cluster backups](#) to run on a scheduled basis. Backups can be stored on a persistent volume or S3-compatible storage. Leverage [Point-in-time recovery](#) to reduce RPO/RTO.
- **Proxy integration** choose HAProxy or ProxySQL as a proxy in front of the Percona XtraDB Cluster. Proxies are deployed and configured automatically with the

CHANNEL

stable

VERSION

1.12.0 (Current)

CAPABILITY LEVEL ?

- ☒ Basic Install
- ☒ Seamless Upgrades
- ☒ Full Lifecycle
- ☒ Deep Insights
- ☐ Auto Pilot

PROVIDER

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LINKS

¿Interesado en contribuir?

Join us on Slack at **DoK.community**, and then join the **#sig-operator** channel!

dok.community slack:
shorturl.at/rsyK0



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Thank You :)

