Kubernetes

Container orchestration

Recap - Containers are...

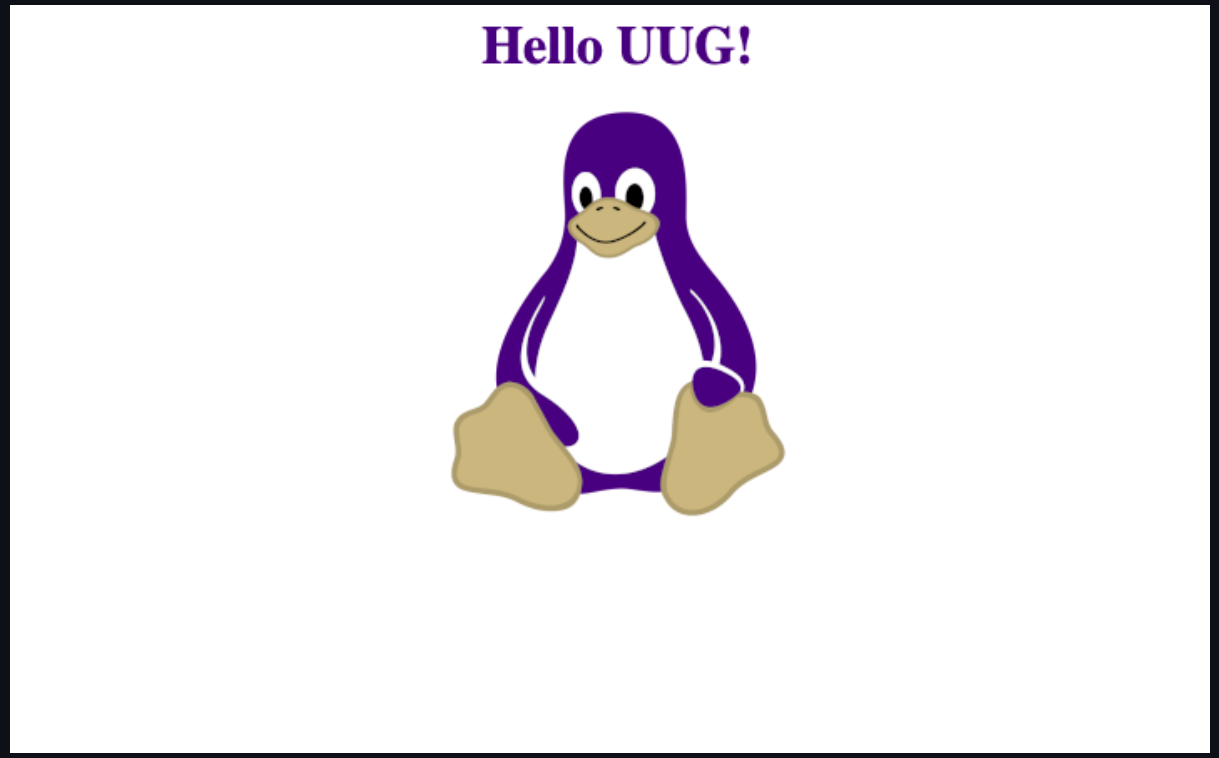
- lightweight
- portable
- isolated

Recap - Containers are...

Abstractions for a collection of process isolation tecniques.

- Namespaces
- Cgroups

Scenerio



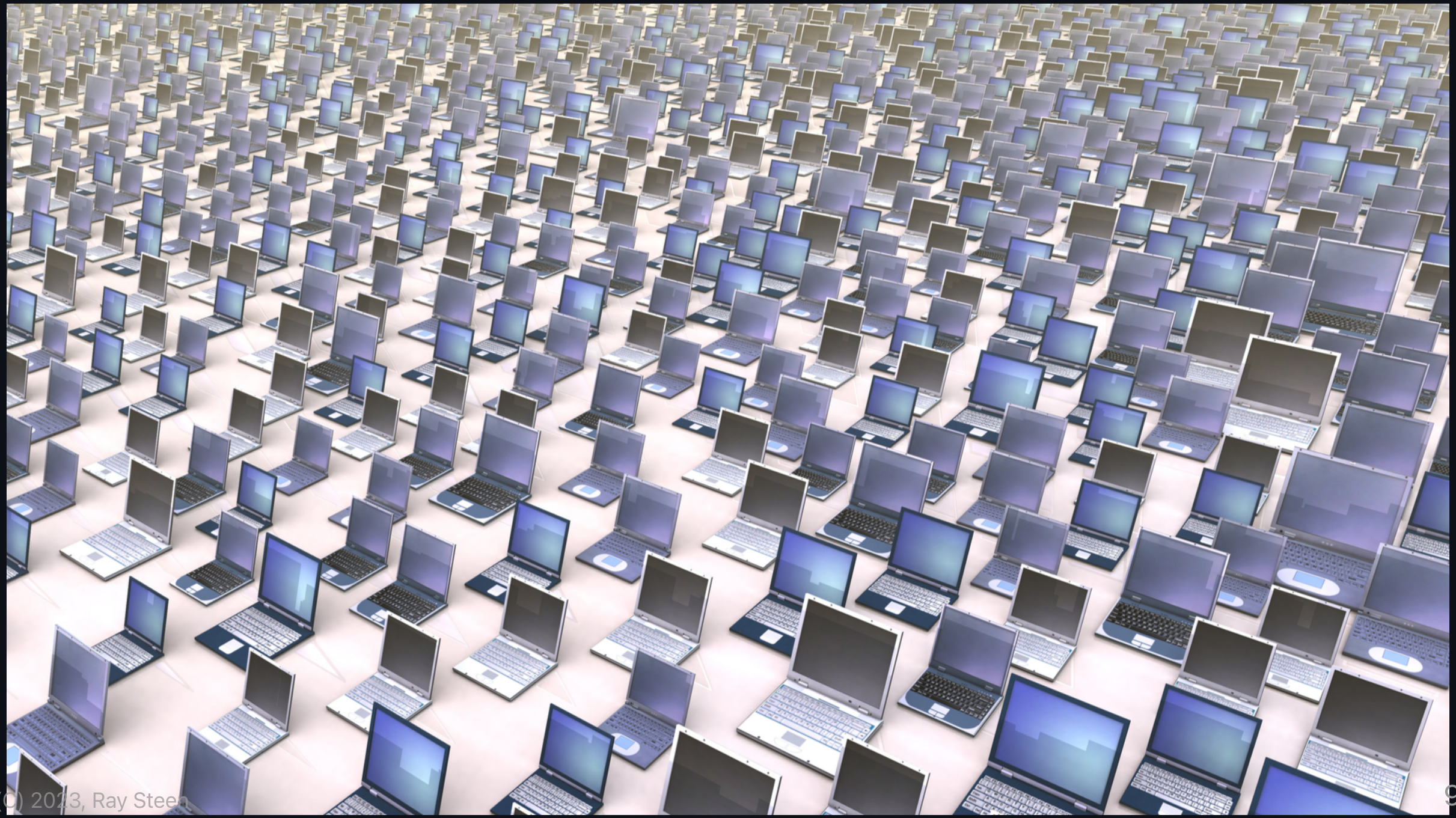
Problem

Solution 1

Scale Vertically

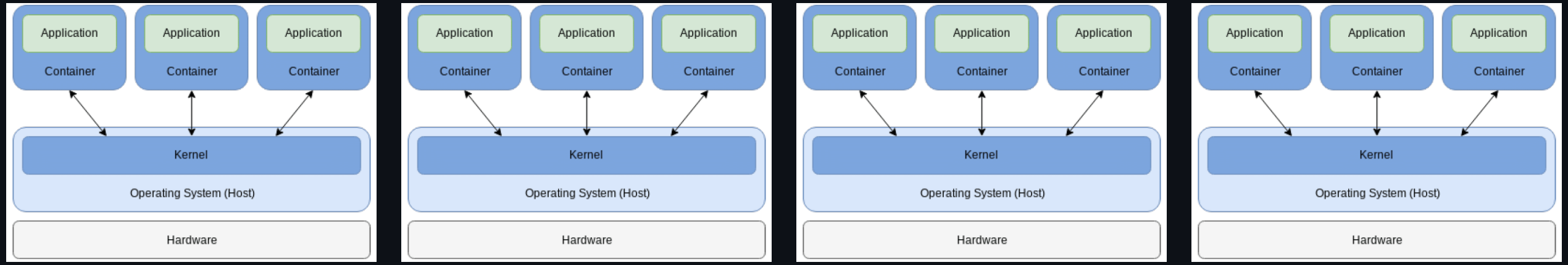
Solution 2

Scale Horizontally



How do we do that?

Docker

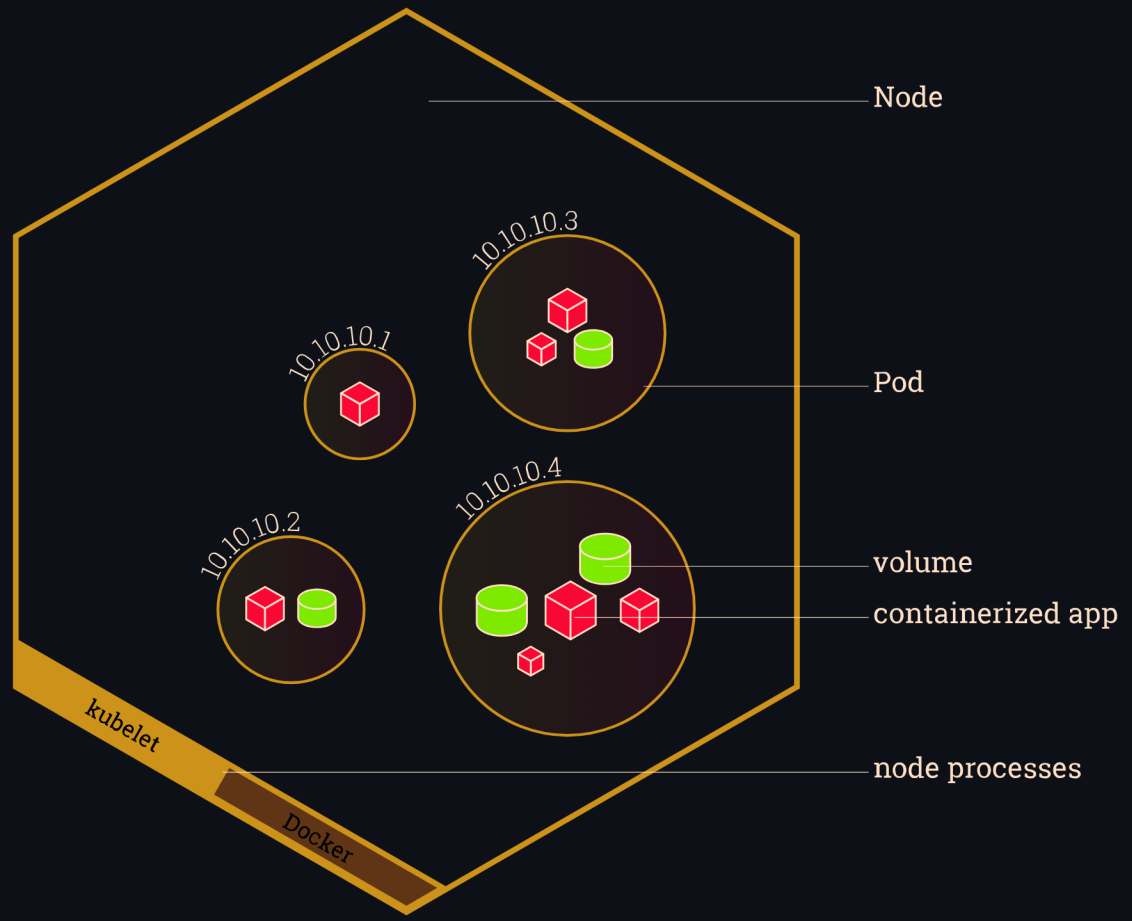


What is Kubernetes (k8s)?

Kubernetes is an open-source container orchestration platform designed to automate the deployment, scaling, and management of containerized applications.

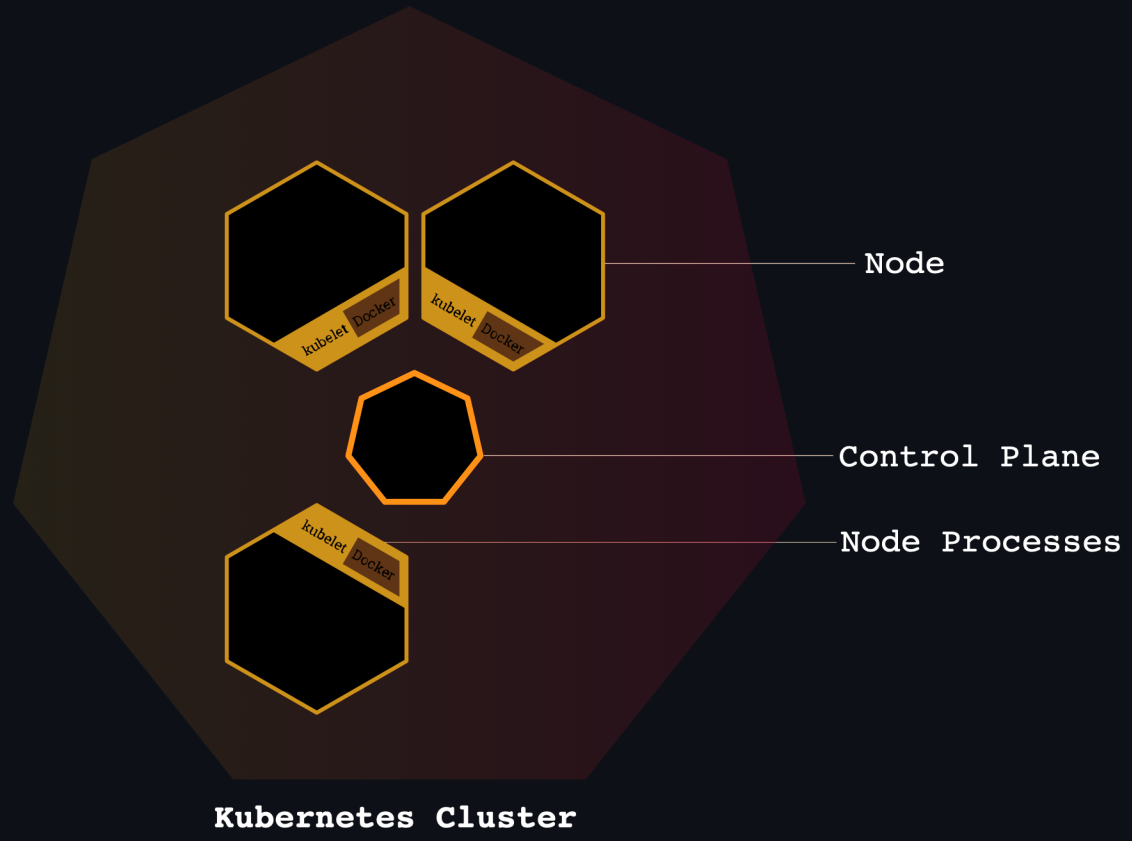
Key concepts - Nodes

- Physical or virtual machines running containerized applications.
- Each node has a container runtime (e.g., Docker) and services to communicate with the master and other nodes.
- Nodes collectively form the infrastructure where containerized applications run.



Key concepts - Control Plane

- Manages the state of the Kubernetes cluster.
- Responsible for scheduling applications, scaling, and rolling out updates.
- Acts as the central coordinator for the entire Kubernetes cluster.

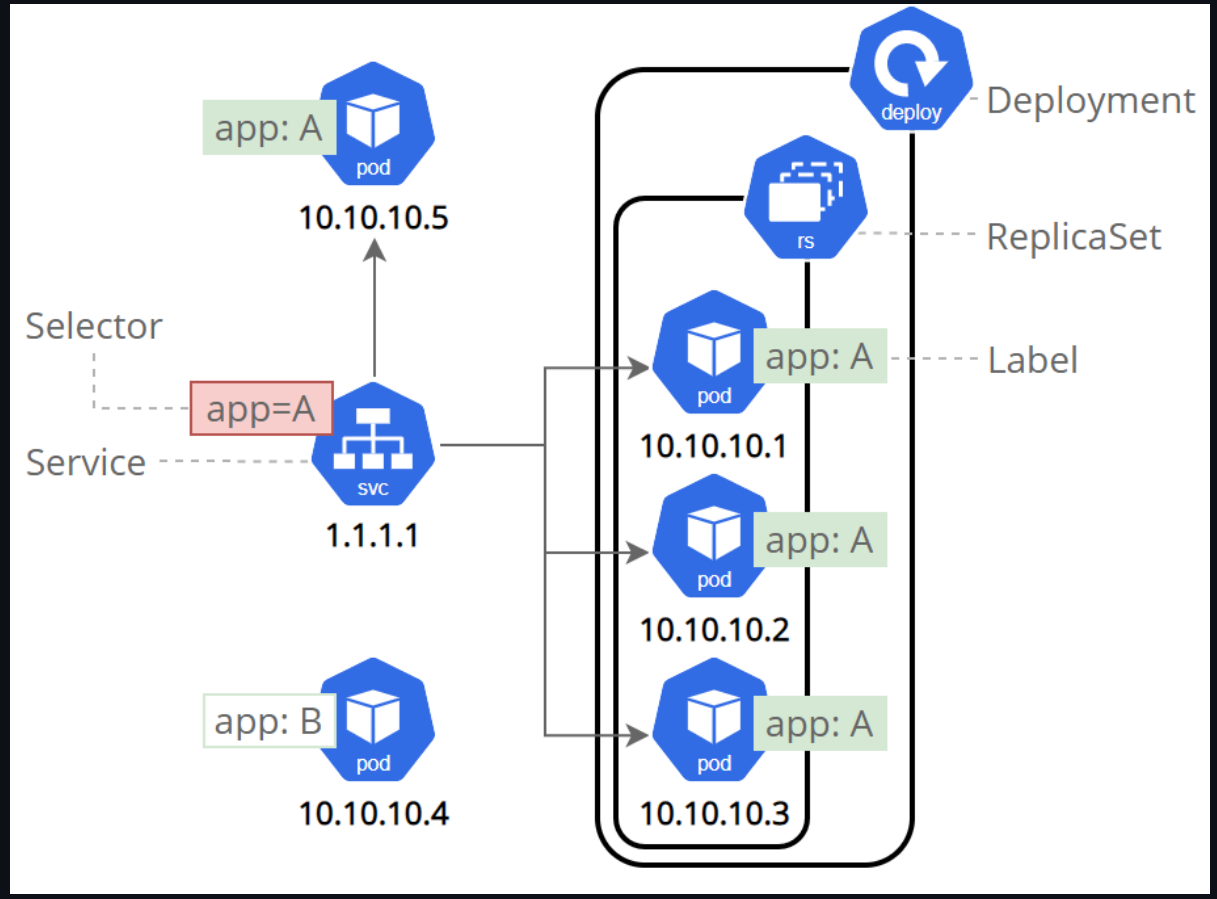


Key concepts - Pods

- Basic deployable unit, representing a single instance of a running process.
- Pods contain one or more tightly coupled containers sharing resources and network.
- Fundamental for managing and scaling containerized applications.

Key concepts - Services

- Abstraction defining a set of pods and a policy for accessing them.
- Enables loose coupling between different parts of an application.
- Provides stable endpoints for communication within the Kubernetes cluster.

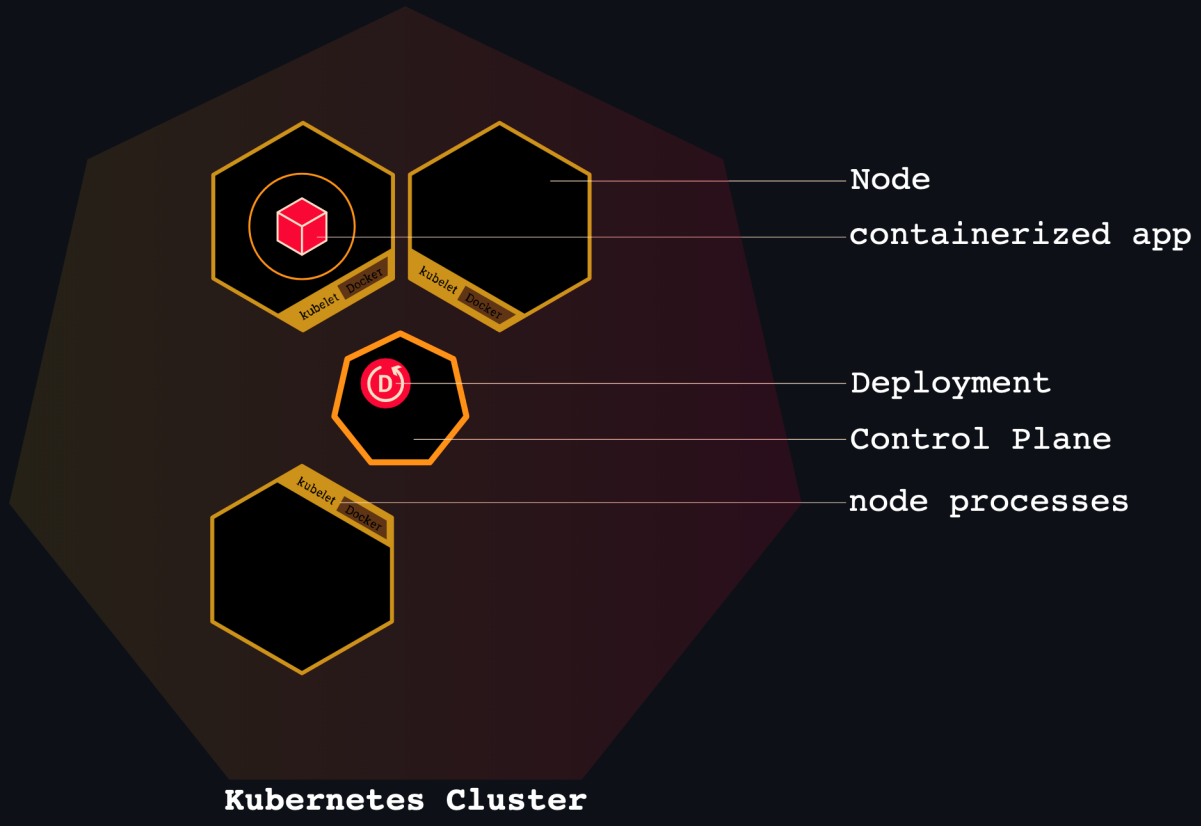


Key concepts - ReplicaSets

- Manages and ensures a specified number of pod replicas are running at all times.
- Supports scaling applications horizontally by adjusting the number of replicas.
- Ensures high availability and fault tolerance for containerized applications.

Key concepts - Deployments

- Higher-level abstraction over ReplicaSets for declarative updates to applications.
- Describes how applications should be deployed and updated over time.
- Simplifies scaling, rolling updates, and rollbacks for containerized applications.



Demo time

`tinyurl.com/uug-killer`

Resources

- Killercoda demo
- Learn Kubernetes Basics
- Kubernetes Tutorials
- minikube Getting Started
- Kubernetes Getting started