Introduction to Kubernetes

What is container orchestration?

Docker Compose is sufficient for running a set of Docker containers on a single machine

Container orchestration involves managing containers on multiple machines, across a network

Container orchestration features

Load balancing – distributing network requests across containers efficiently

Self-healing - regularly checking and maintaining the health of containers, restarting or replacing failed containers

Auto-scaling – containers are added and removed according to demand

Automated deployment – makes it easy to set up and deploy containers

Storage management – Handle the storage needs of all the containers

Networking – Handle networking between containers

Kubernetes

Kubernetes offers all these features and more

Most popular system today for container orchestration, for Docker and other container technologies

Originally developed by Google, now open source

Alternatives include Docker Swarm

Kubernetes ecosystem 101

WORKLOAD

An application running on Kubernetes
Run inside a set of pods

POD

A set of one or more containers with shared storage, network resources, and specifications
Single-container pods are most common
Kubernetes manages pods instead of containers directly

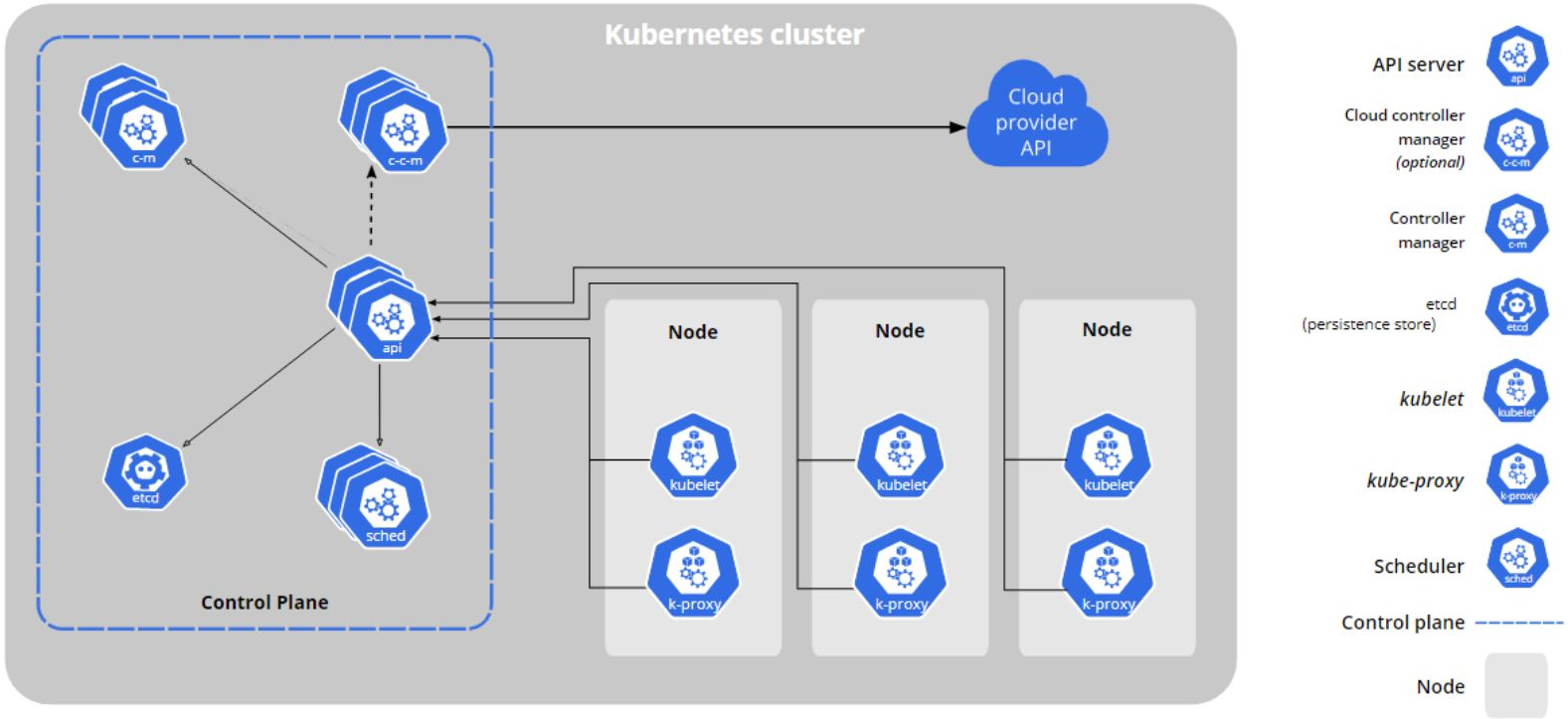
NODE

A physical or virtual machine for running containers in pods

CLUSTER

A set of one or more Nodes
Each cluster typically has multiple Nodes

Kubernetes cluster

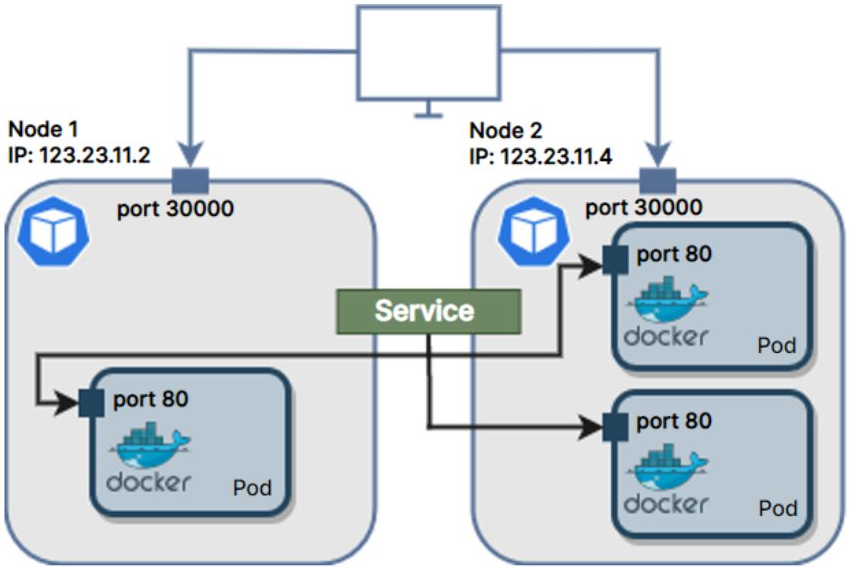


Source: https://kubernetes.io/docs/concepts/overview/components/

Kubernetes Services

"A Service in Kubernetes is an abstraction which defines a logical set of Pods and a policy by which to access them."

[Source: https://kubernetes.io/docs/concepts/services-networking/service]



Individual Kubernetes pods are ephemeral (not permanent)
They also cannot be accessed outside of their cluster
Services provide a reliable way to access logical sets of pods

Minikube & Kubectl

Minikube: Local, single-node Kubernetes for development and learning

Kubectl: CLI utility to run commands on Kubernetes clusters