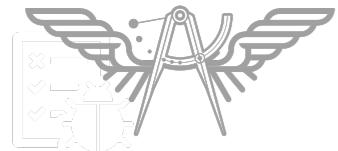


Kubernetes workshop







Page

Messages

Notifications 3

Insights

Publishing Tools

Settings

Help ▾



somkiat.cc

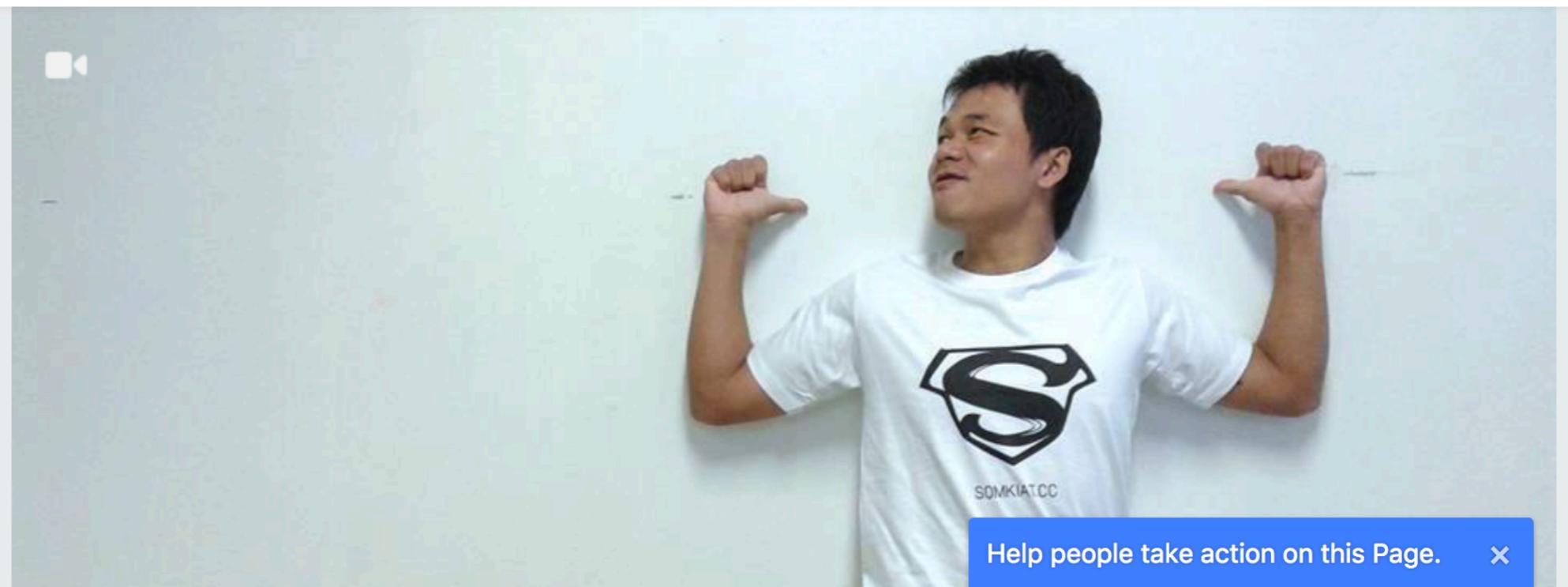
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Home

Posts

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Photos





kubernetes



Kubernetes Cluster



Kubernetes (K8s)

Container **orchestration** platform

Manage containers from many **container runtimes**

Provide API interface to manage complex system

Focus on application deployment and scaling



Container runtimes

Containerd

CRI-O

Docker engine

Mirantis Container Runtime

<https://kubernetes.io/docs/setup/production-environment/container-runtimes/>



Kubernetes

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Docker

Containerization platform and runtime

Build

Deploy

Run

<https://www.docker.com/>



Kubernetes can be used without Docker





Large open source ecosystem

**Managed offerings
by cloud vendors**

**Can handle needs of
complex applications**

Orchestrate across clusters

On-prem or cloud

APIs and tools for managing



**Tightly integrated with
Docker ecosystem**

**Less configuration
and choices**

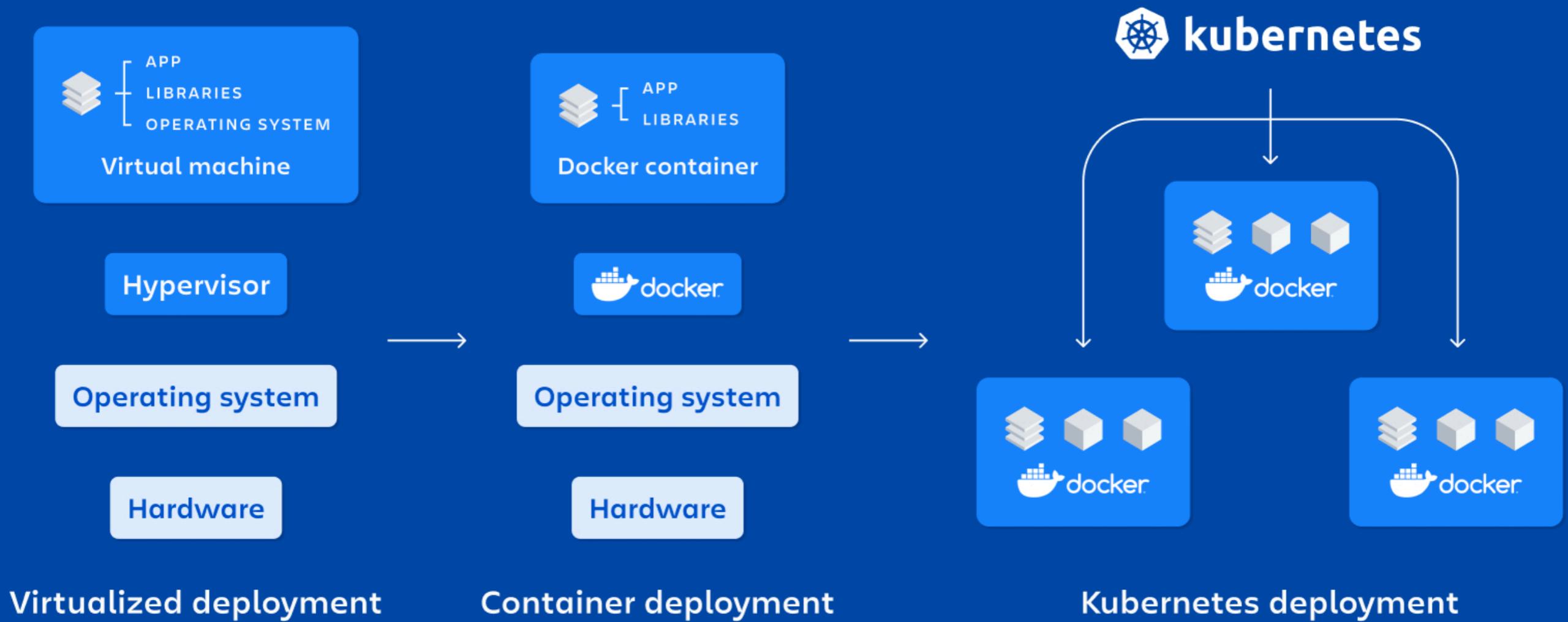
Easier to learn

<https://www.atlassian.com/microservices/microservices-architecture/kubernetes-vs-docker>



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<https://www.atlassian.com/microservices/microservices-architecture/kubernetes-vs-docker>



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Use cases of K8s

Large scale
application

Manage
microservices

Hybrid
deployment

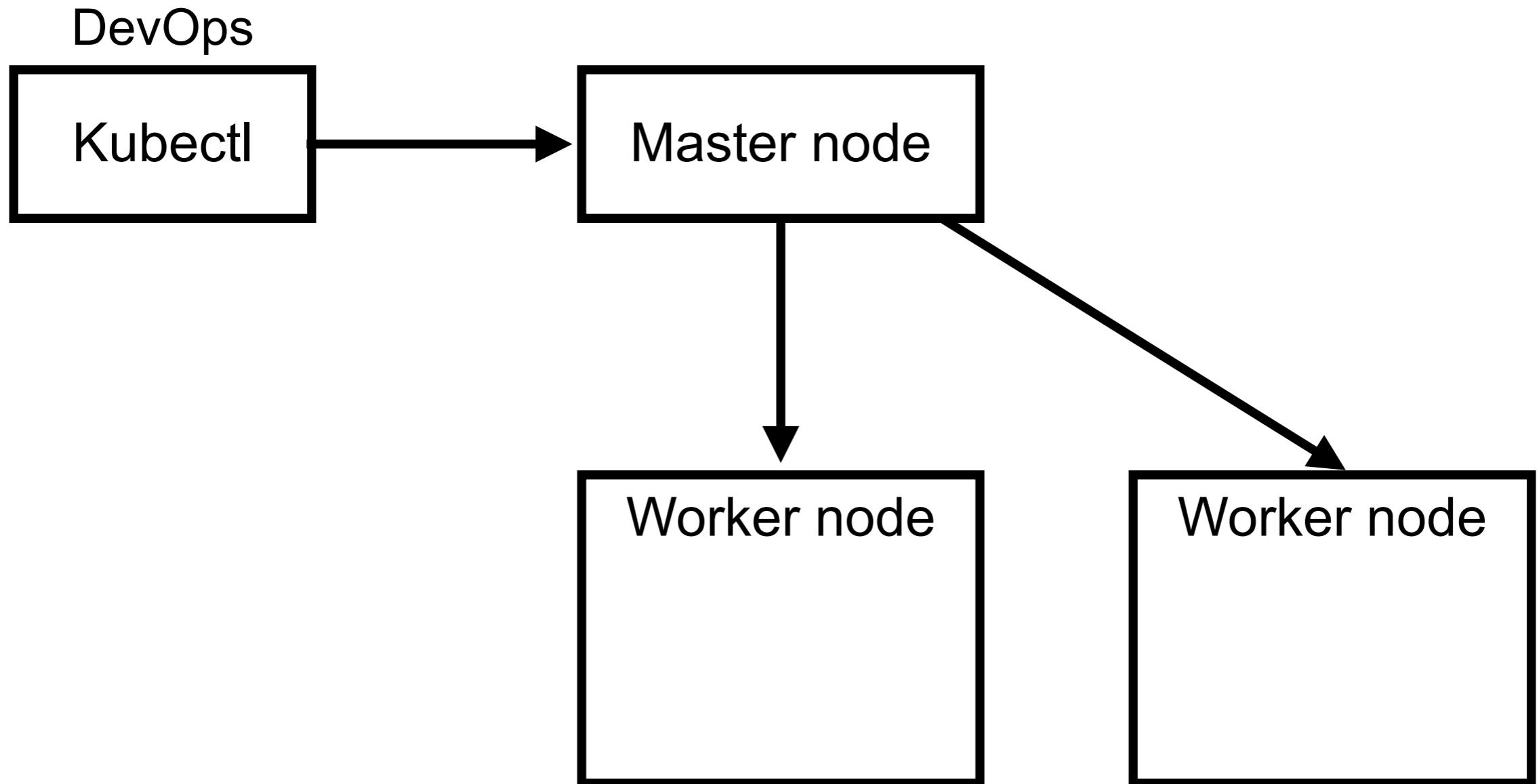
CI/CD

Big Data
processing

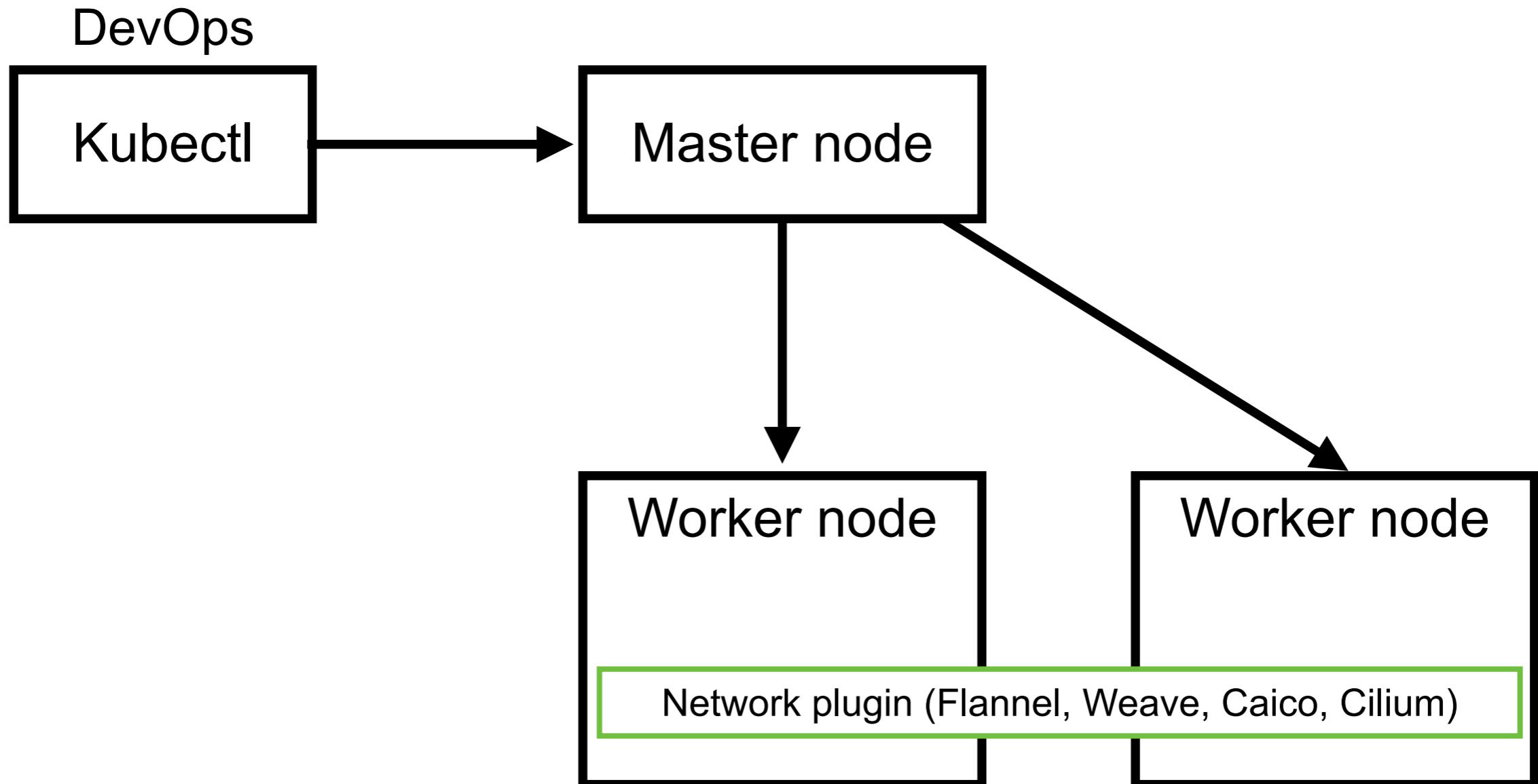
Machine
Learning



Kubernetes Architecture



Kubernetes Architecture



<https://kubernetes.io/docs/concepts/extend-kubernetes/compute-storage-net/network-plugins/>



Network plugins performance

CNI Benchmark August 2020 infraBuilder	Config	Performances (bandwidth)				Resources consumption (cpu/ram)					Security features				
		MTU	Pod to Pod		Pod to Service		Idle	Pod to Pod		Pod to Service		Network Policies		Encryption	
	setting	setting	TCP	UDP	TCP	UDP	none	TCP	UDP	TCP	UDP	in	out	activation	Performance
Antrea	auto	Very fast	Very fast	Very fast	Slow	Low	Low	Low	Low	Low	Low	yes	yes	at deploy time	Slow
Calico	manual	Very fast	Very fast	Very fast	Fast	Low	Very low	Very low	Very low	Very low	Very low	yes	yes	anytime	Very fast
Canal	manual	Very fast	Very fast	Very fast	Very fast	Low	Very low	Very low	Very low	Very low	Very low	yes	yes	no	n/a
Cilium	auto	Fast	Very fast	Very fast	Very fast	High	High	High	High	High	High	yes	yes	at deploy time	Slow
Flannel	auto	Very fast	Very fast	Very fast	Very fast	Very low	Very low	Very low	Very low	Very low	Very low	no	no	no	n/a
Kube-OVN	auto	Fast	Very slow	Fast	Very slow	High	High	High	High	High	High	yes	yes	no	n/a
Kube-router	none	Slow	Very slow	Slow	Very slow	Low	Very low	Low	Very low	Low	Low	yes	yes	no	n/a
Weave Net	manual	Very fast	Very fast	Very fast	Fast	Very low	Low	Low	Low	Low	Low	yes	yes	at deploy time	Slow

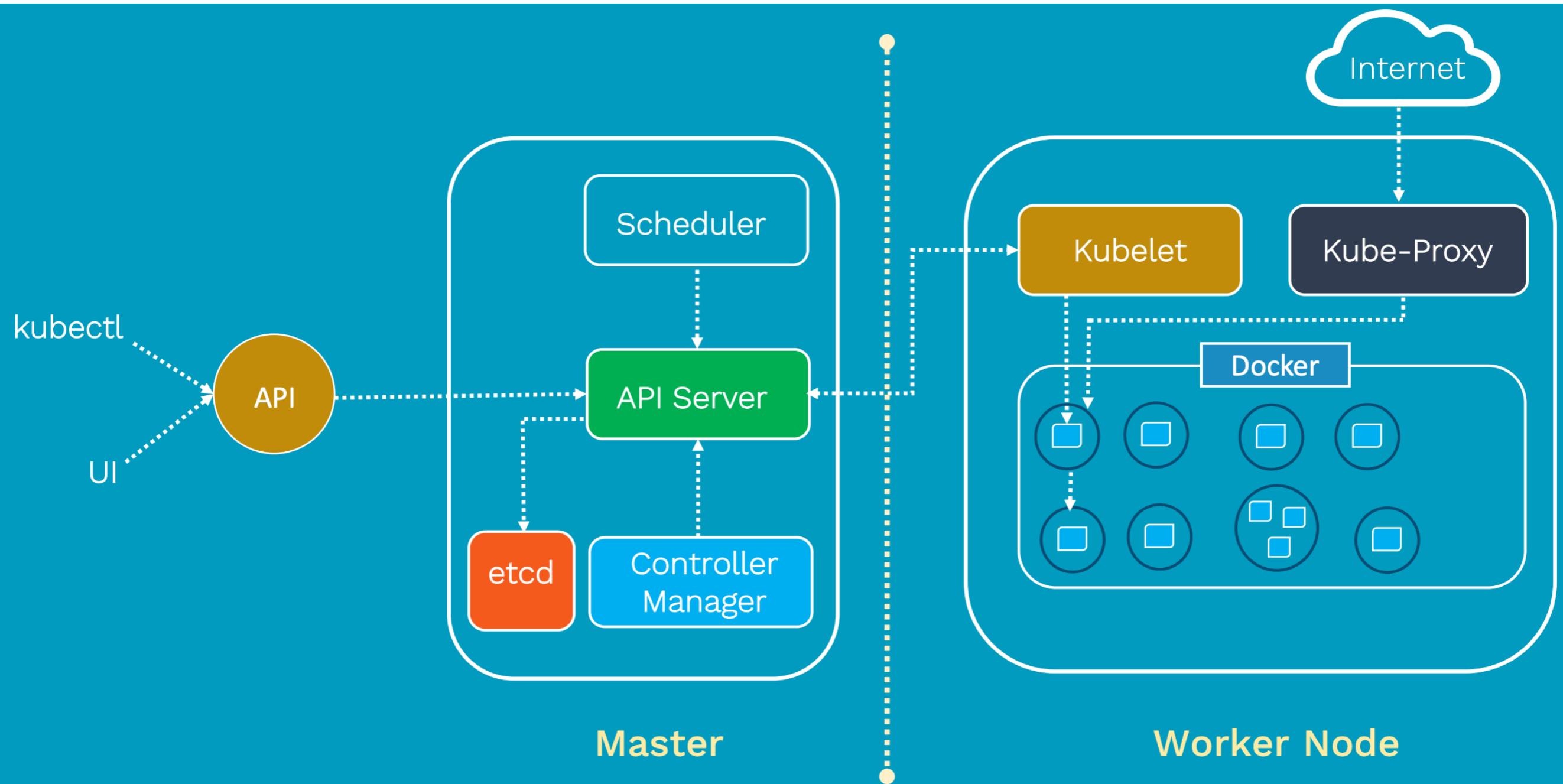
<https://itnext.io/benchmark-results-of-kubernetes-network-plugins-cni-over-10gbit-s-network-updated-august-2020-6e1b757b9e49>



Kubernetes

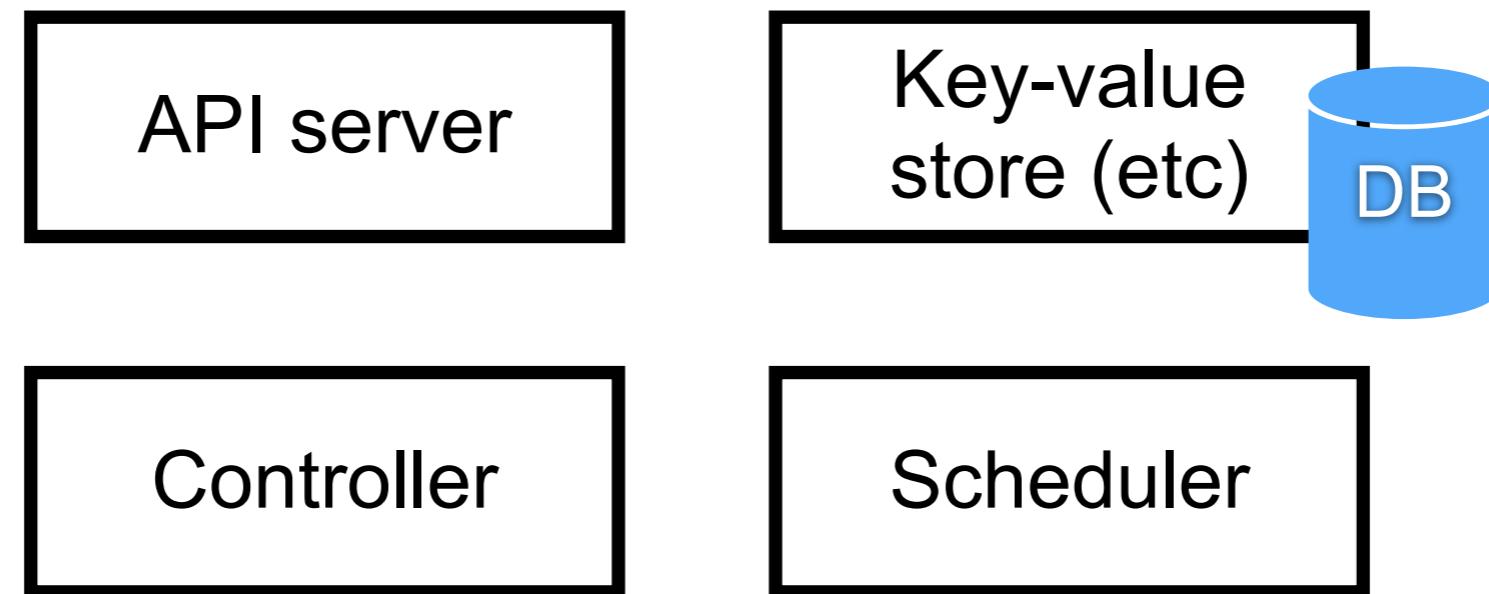
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Kubernetes Architecture



Master Nodes

Maintain communication within cluster



Master Nodes

API Server

Used for communication with all components in cluster

Key-value store (etcd)

Lightweight distributed store used to keep all data in cluster

Controller

Uses by API server to monitor the cluster state

Scheduler

Used for scheduling new pods onto worker nodes



Worker Nodes

Perform tasks assigned by master nodes

Kubelet

Container
runtime

Kube proxy

Add-ons



Worker Nodes

Kubelet

A daemon that runs on each node and response to master node

Container runtime

Download images and start/stop containers

Kube proxy

Network proxy that maintain communication to pods



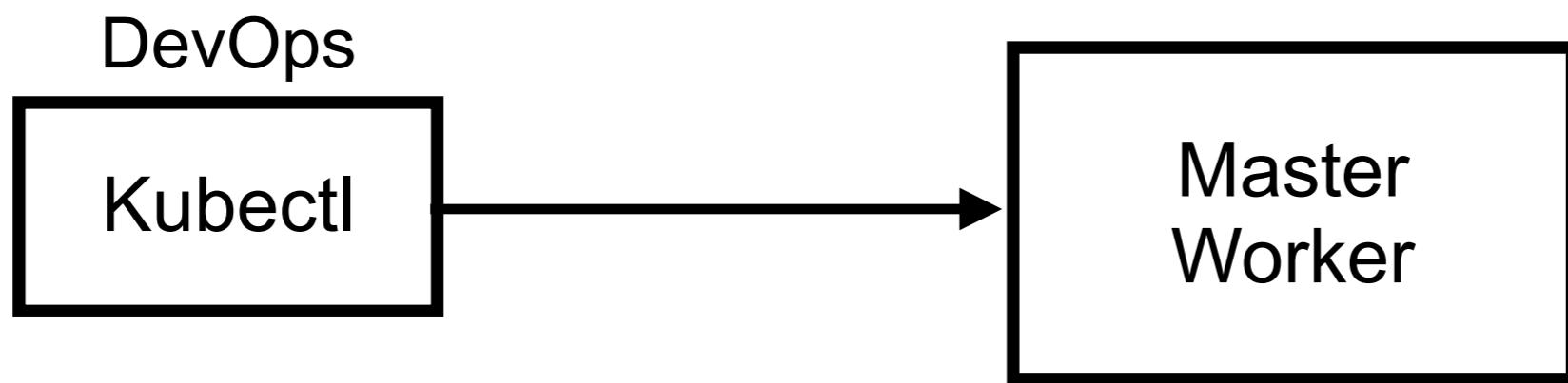
Docker ?



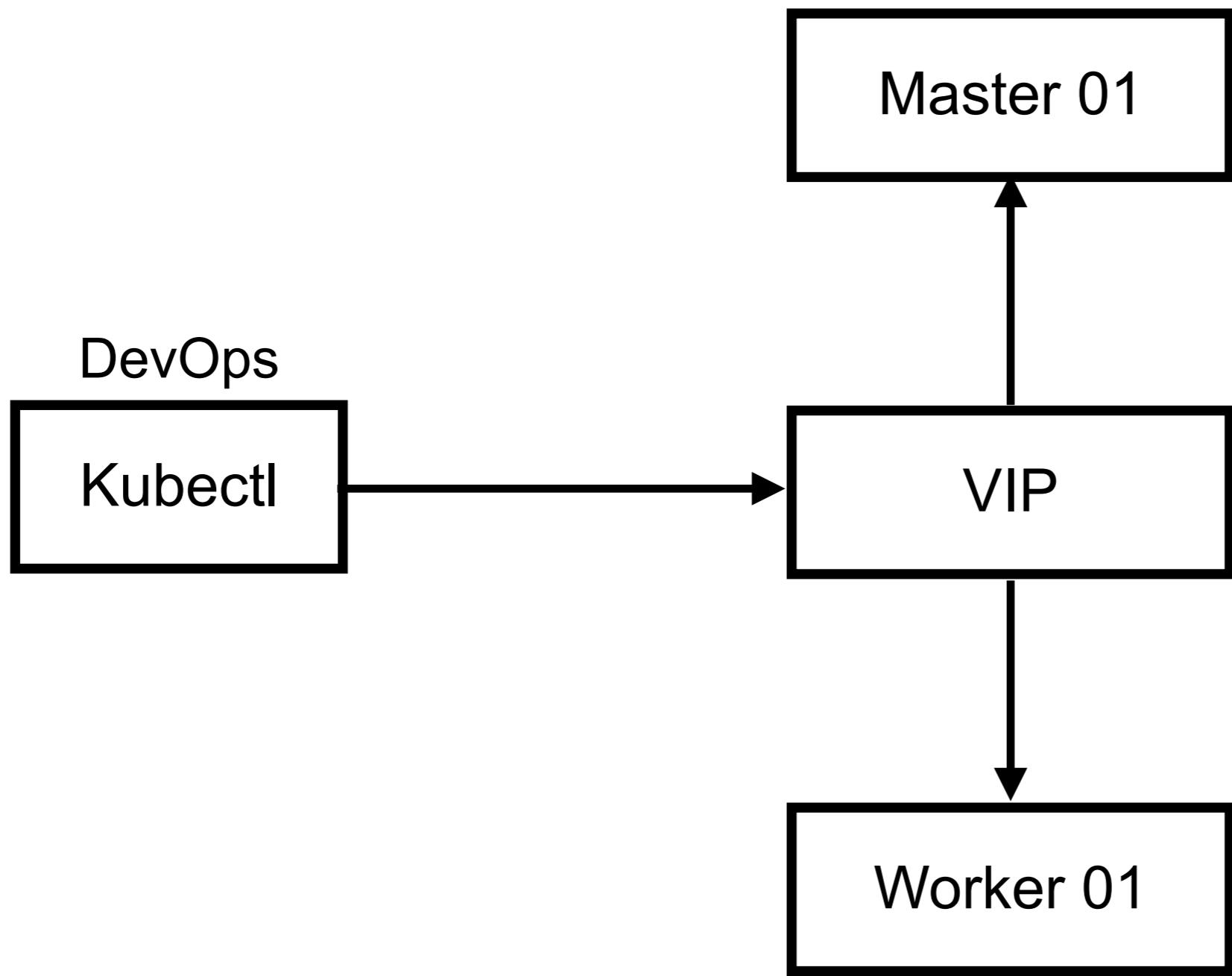
Install simple cluster



Simple cluster #1

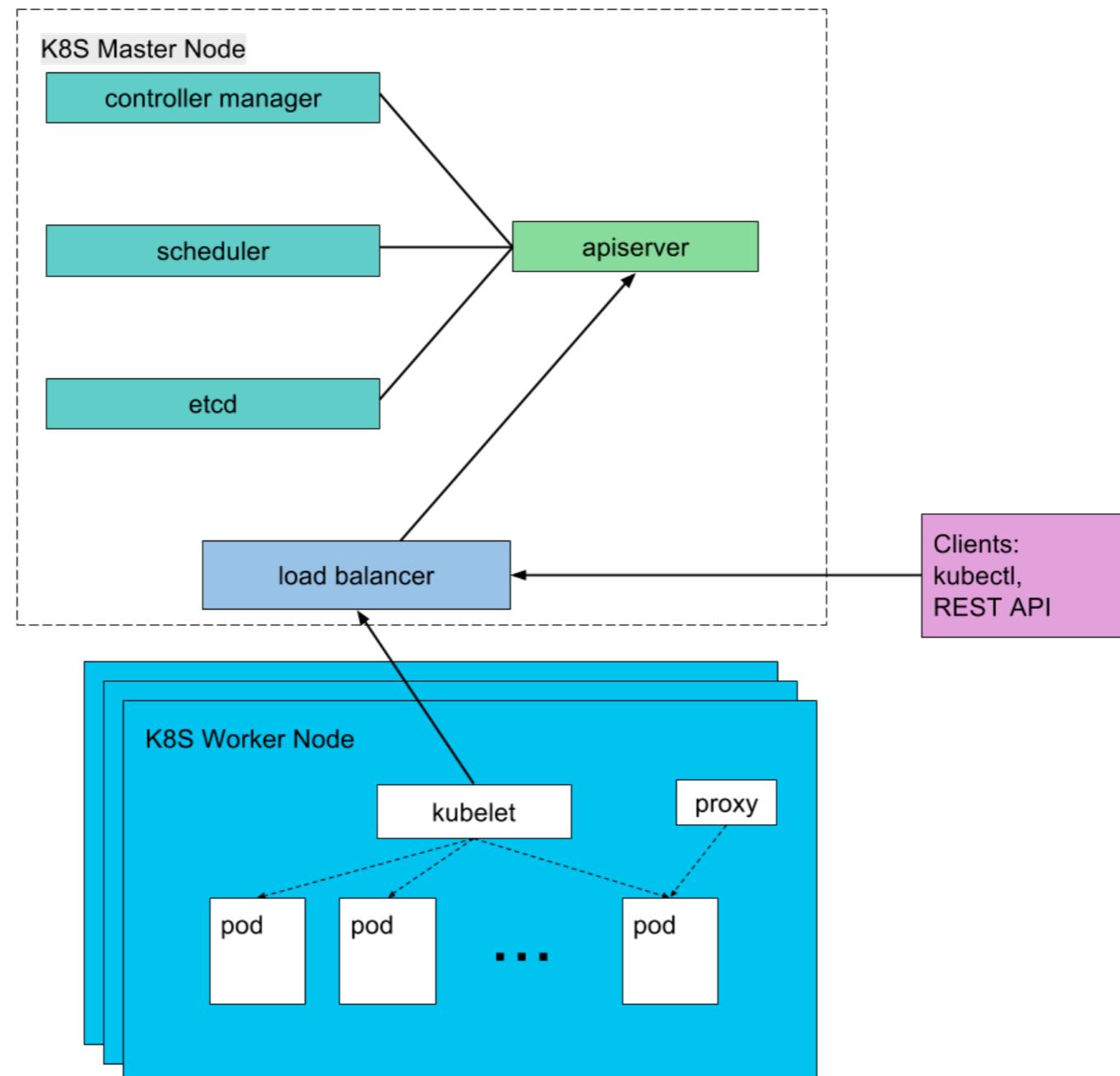


Simple cluster #2



Simple cluster

Kubernetes Cluster



<https://platform9.com/blog/create-highly-available-kubernetes-cluster/>



Kubernetes

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Failure scenarios

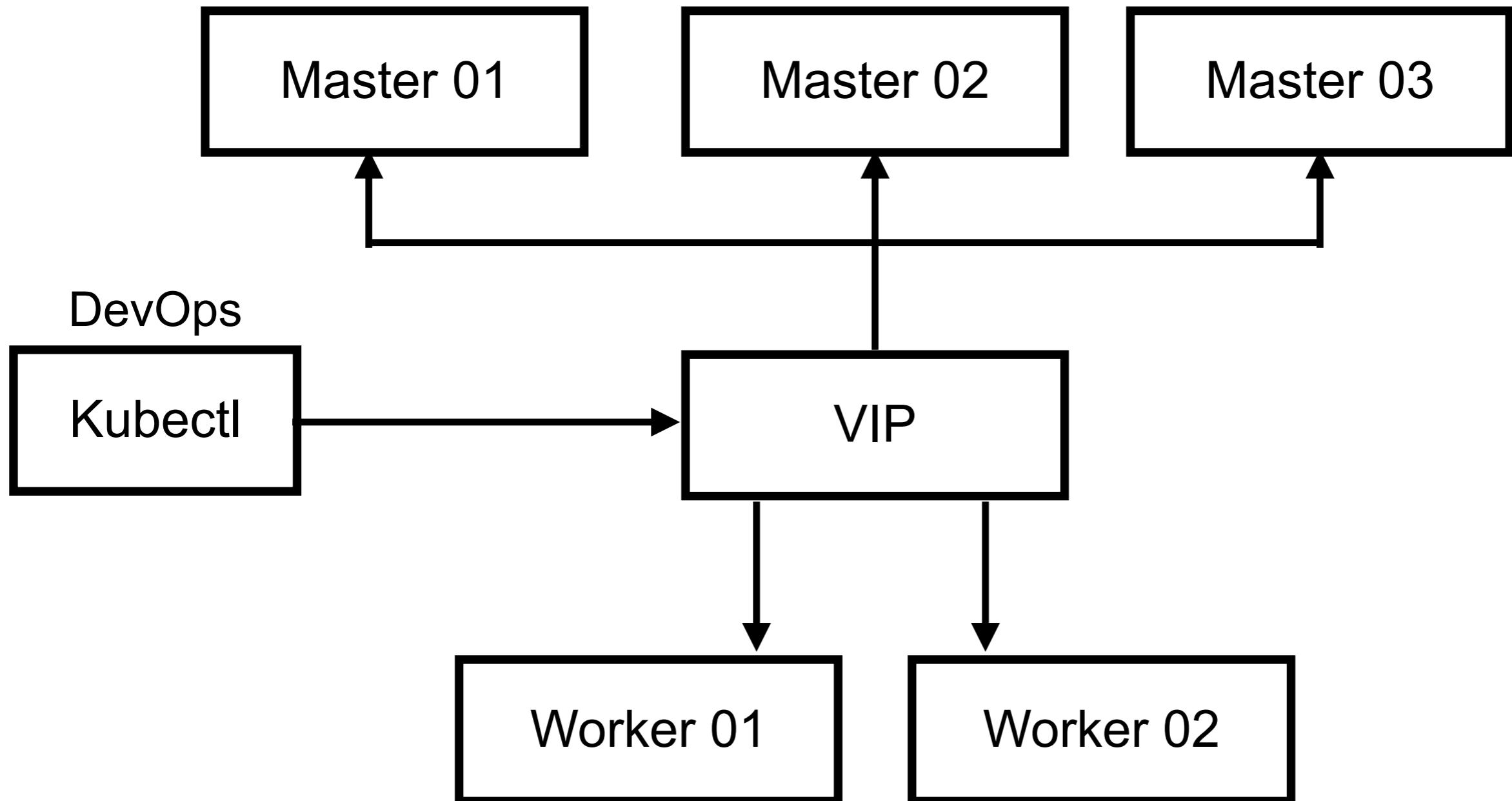
- Loss of master node
- Loss of etcd service
- Loss of worker node



Install High Availability cluster

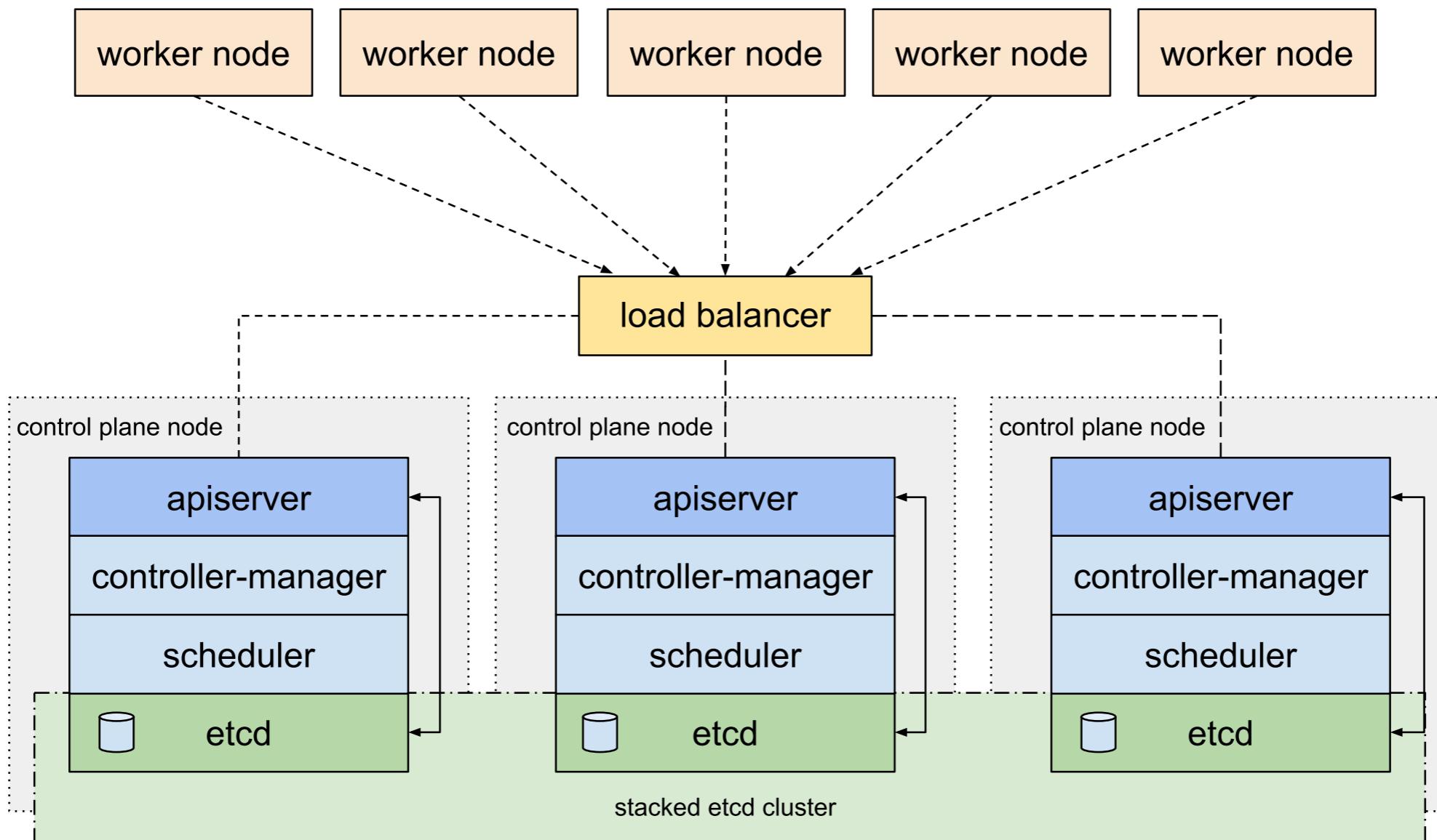


High Availability cluster



HA cluster #1

kubeadm HA topology - stacked etcd



<https://kubernetes.io/docs/setup/production-environment/tools/kubeadm/ha-topology/>

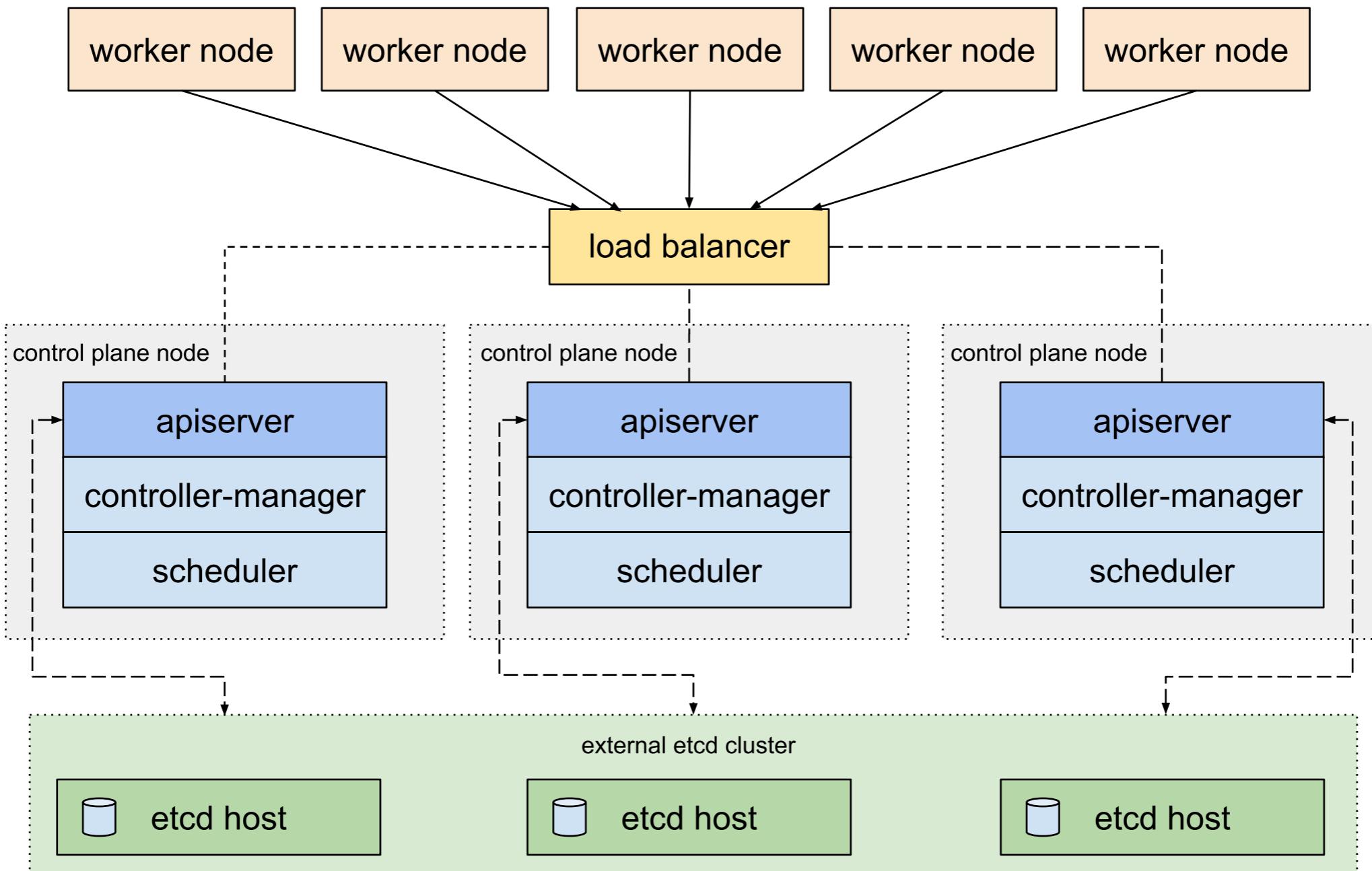


Kubernetes

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HA cluster #2

kubeadm HA topology - external etcd



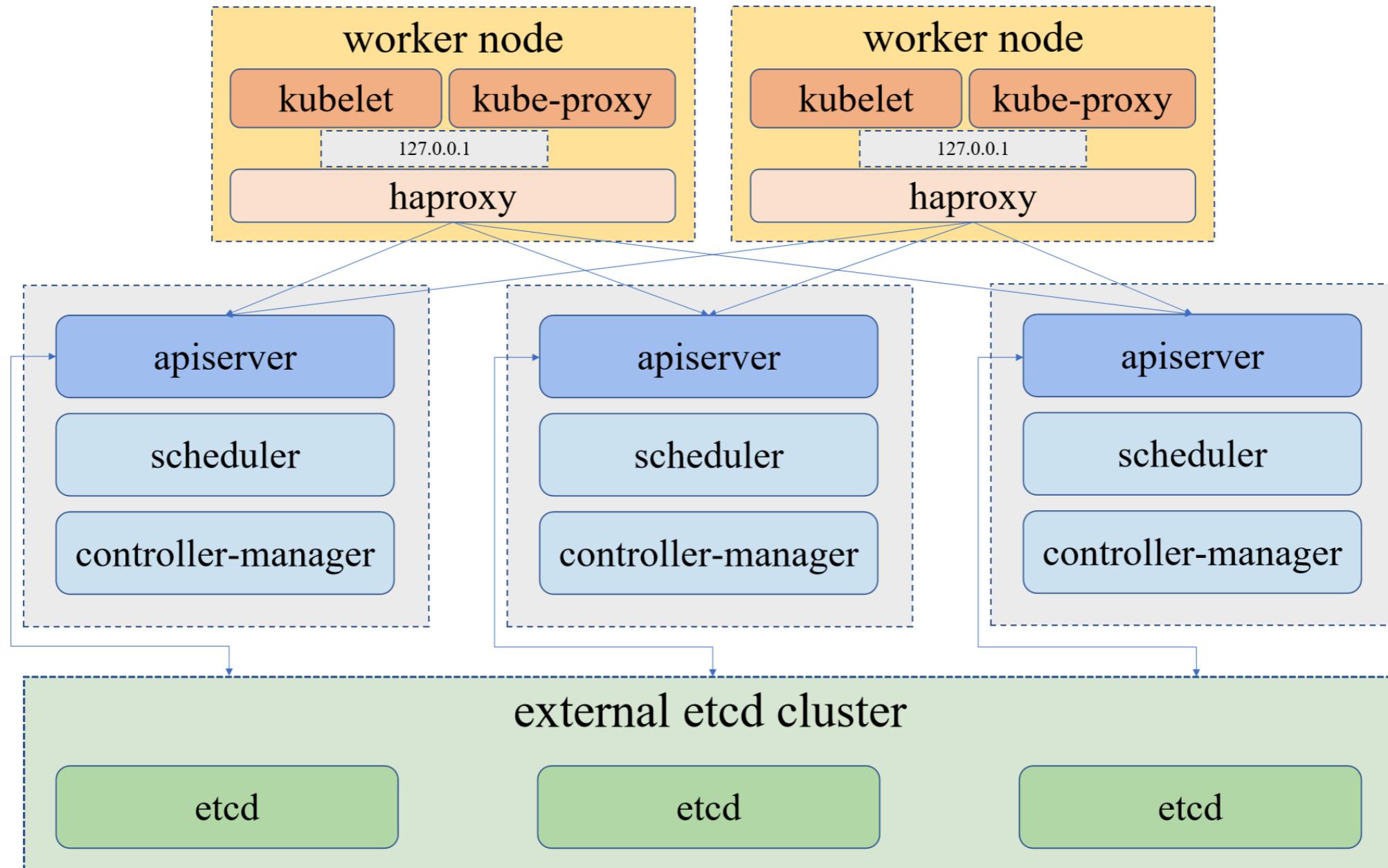
<https://kubernetes.io/docs/setup/production-environment/tools/kubeadm/ha-topology/>



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HA cluster #3



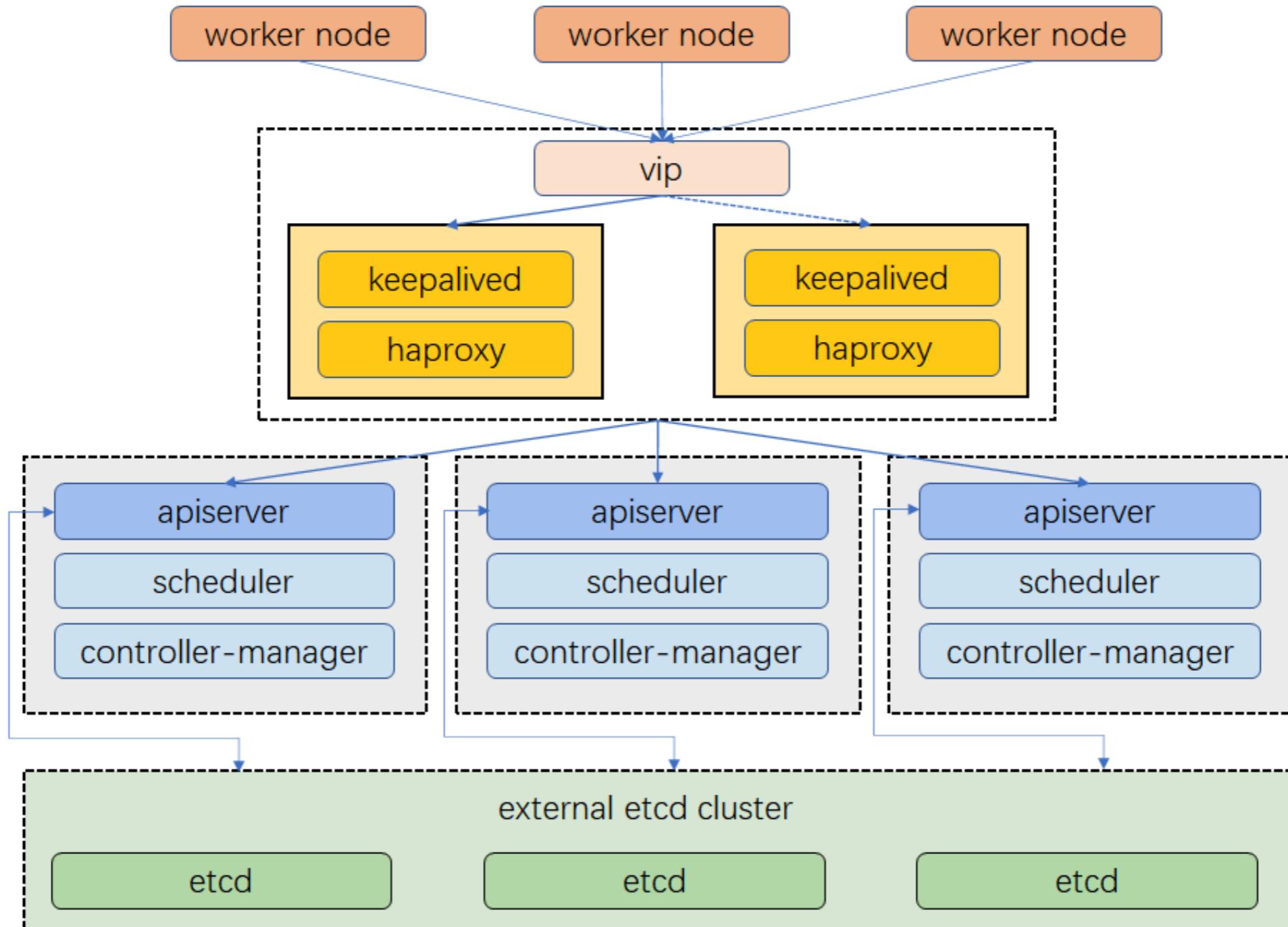
<https://kubesphere.io/docs/v3.4/installing-on-linux/high-availability-configurations/internal-ha-configuration/>



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HA cluster #4



<https://kubesphere.io/docs/v3.4/installing-on-linux/high-availability-configurations/set-up-ha-cluster-using-keepalived-haproxy/>



Kubernetes

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Resources / Components



Resources / Components

Pods

Deployment

ReplicaSet

Service

Ingress
controller

PV/PVC

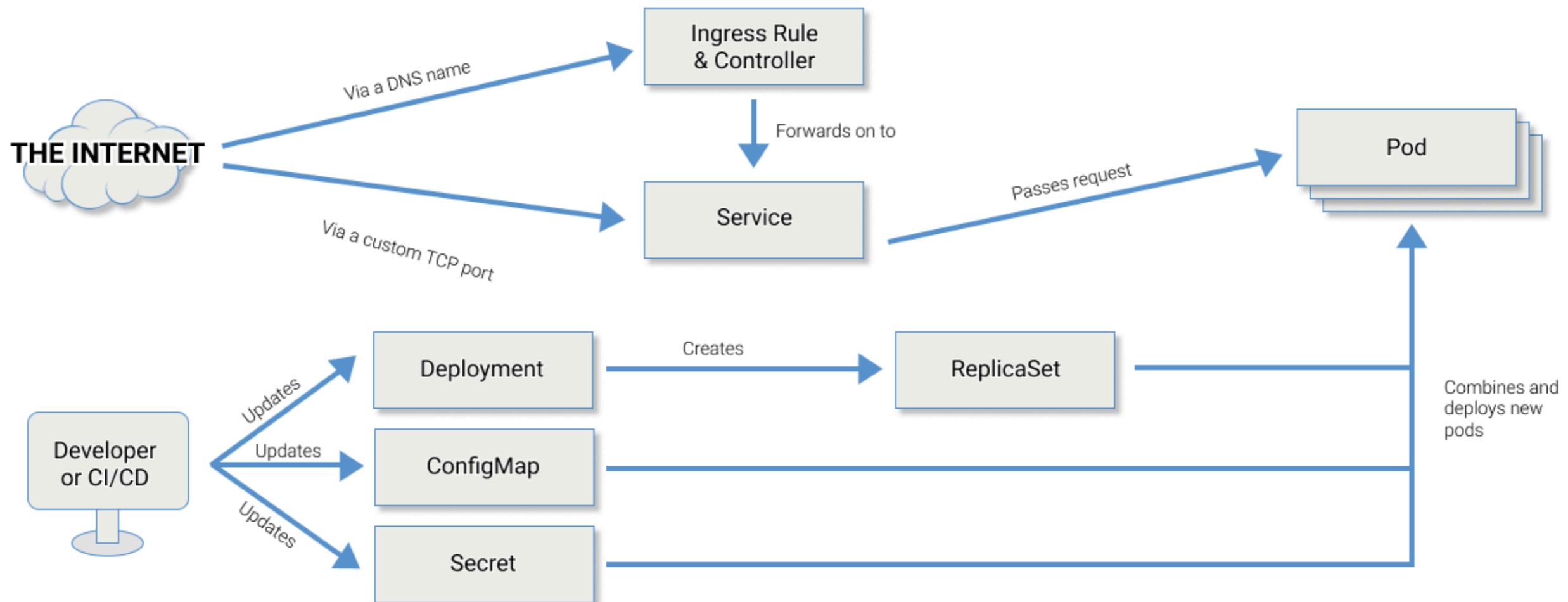
Config Map

Secret

Gateway



Resources / Components



<https://www.civo.com/blog/kubernetes-vs-docker-a-comprehensive-comparison>



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Deployment to K8S Cluster



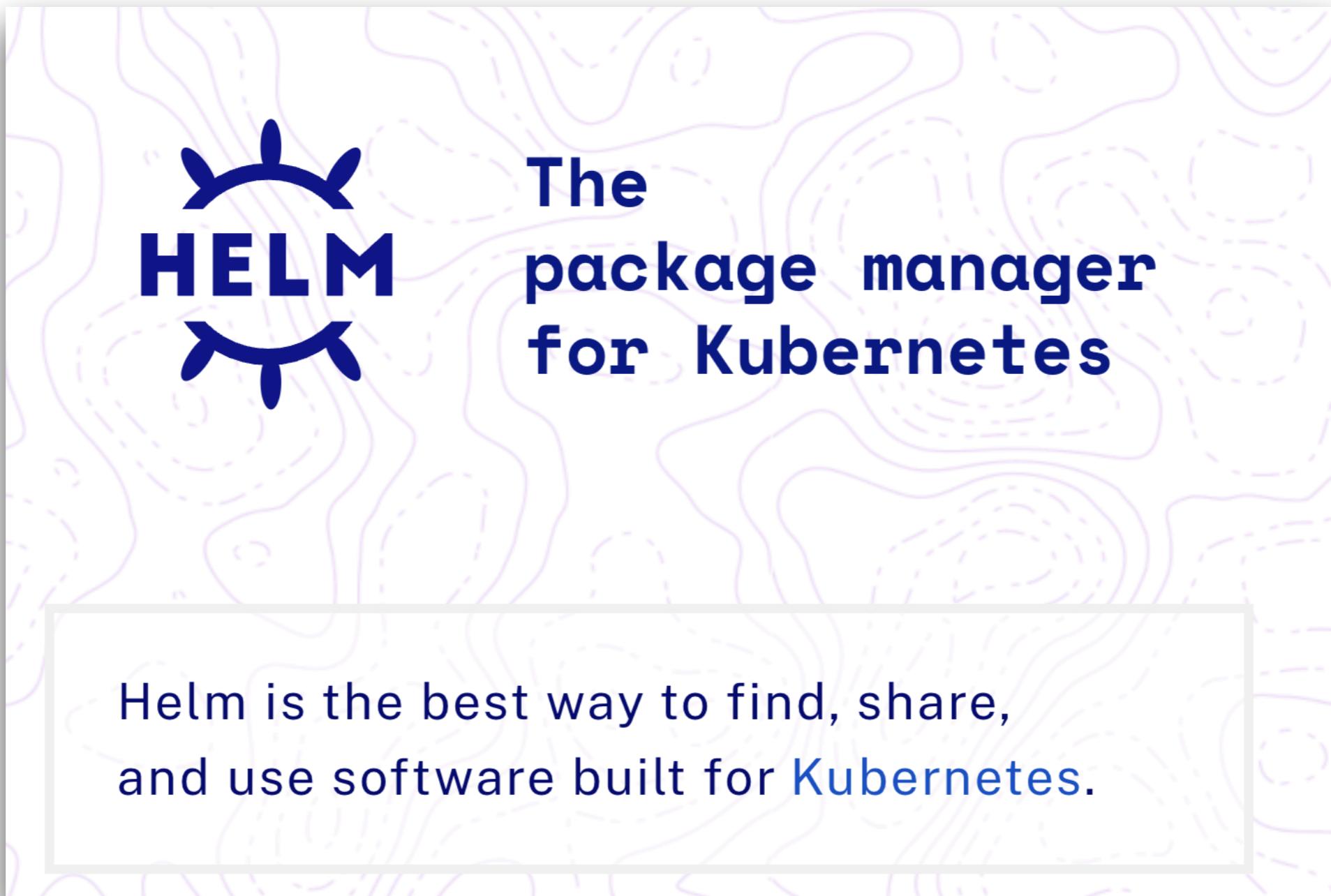
Monitoring



Helm



Helm



The logo consists of the word "HELM" in a bold, sans-serif font, flanked by two stylized blue icons resembling suns or eyes with rays. To the right of the logo, the text "The package manager for Kubernetes" is written in a large, bold, dark blue font. Below this, a white rectangular box contains the text "Helm is the best way to find, share, and use software built for Kubernetes." in a smaller dark blue font.

The background features a light gray gradient with faint, overlapping purple wavy lines.

**The package manager
for Kubernetes**

Helm is the best way to find, share,
and use software built for Kubernetes.

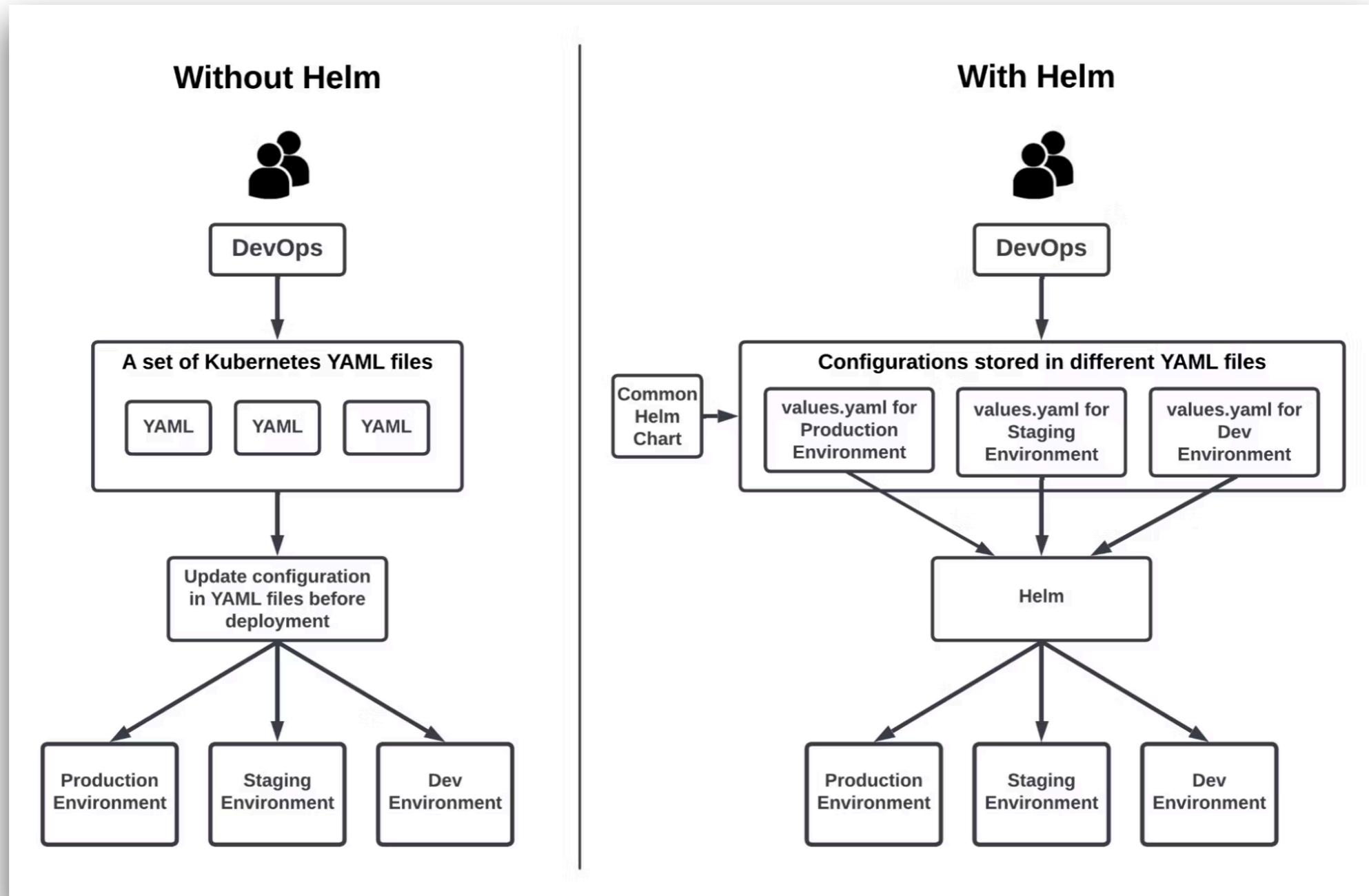
<https://helm.sh/>



Kubernetes

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Kubectl vs Helm



Q/A

