

Introduction to Linux Container Orchestration with Kubernetes

13:00 12 February 2022

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Introduction

```
package main

import "fmt"

type Presenter struct {
    Name      string
    Employeeer string
    Title     string
}

func main() {
    x := Presenter{}
    x.Name = "Sean Malloy"
    x.Employeeer = "Kohl's Departments Stores"
    x.Title = "Platform Engineer"
    fmt.Println(x.Name)
    fmt.Println(x.Employeeer)
    fmt.Println(x.Title)
}
```

Run

Problem Statement

Deploying new versions of applications takes too long and is a labor intensive process.

Kubernetes To The Rescue!

- Open Source Apache 2.0 License

- CNCF Project(vendor neutral and part of Linux Foundation)
- Linux container orchestrator
- Can be installed on public cloud infrastructure and on-premise infrastructure
- Abbreviated k8s

Software Versions

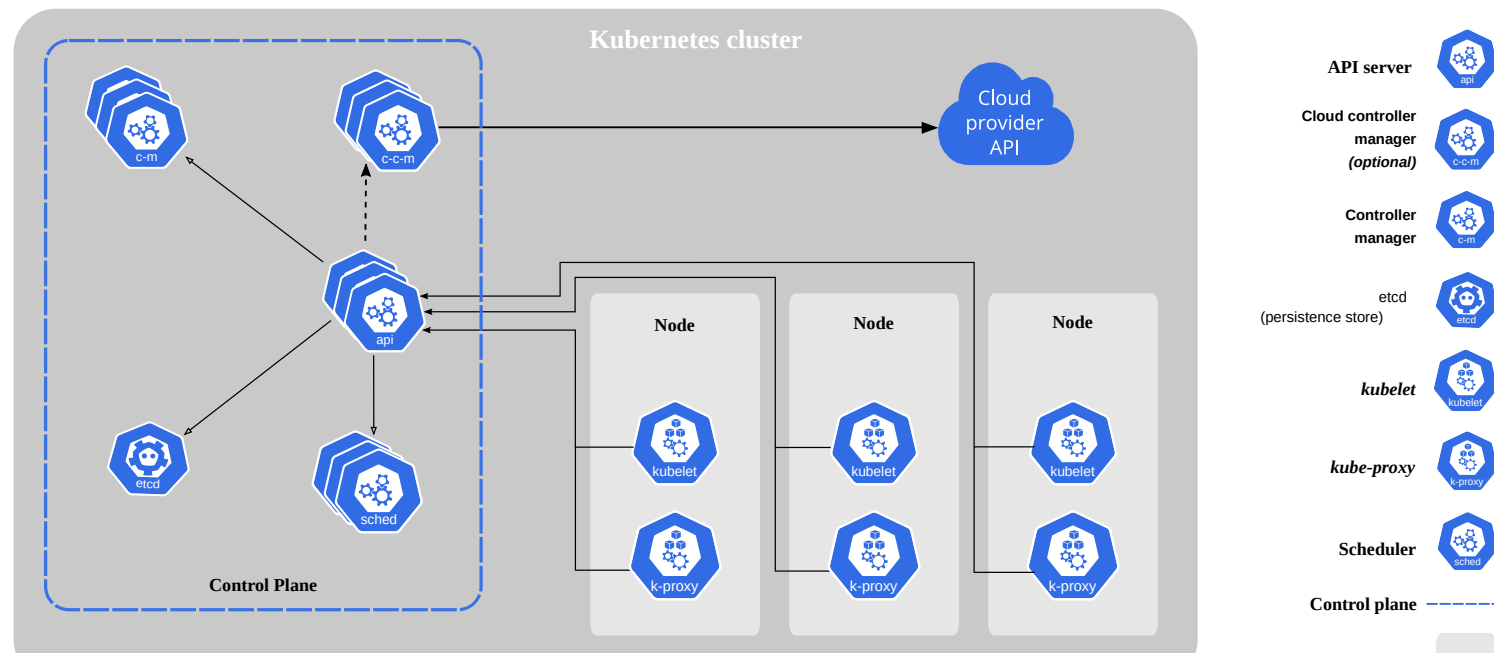
- k8s v1.23.3
- kind v0.11.1

Basics - Architecture

A k8s deployment consists of a control plane and one or more worker nodes.

- Nodes are virtual machines or physical servers
- Control Plane(api-server, scheduler, etcd, controller-manager)
- Worker nodes run application work loads

Basics - Diagram



kubernetes.io/docs/concepts/overview/components/ (<https://kubernetes.io/docs/concepts/overview/components/>)

Basics - Run Locally

```
#!/bin/bash
```

```
kind create cluster --image kindest/node:v1.23.3 --wait 60s  
kubectl get pods -A
```

Run

- Pods vs Containers
- List pods
- List nodes
- Namespaces are tenants
- YAML all the things

Basics - Deploy An Application

Creates a k8s namespace and deployment with a single pod.

```
#!/bin/bash  
  
kubectl apply -f ./code/k8s-deployment-pause.yml
```

[Run](#)

Deploy nginx with three pods.

```
#!/bin/bash  
  
kubectl apply -f ./code/k8s-deployment-nginx.yml  
#kubectl port-forward -n nginx service/nginx 3000:80
```

[Run](#)

Basics - Build a Container Image

There are many tools that can build a container image. Here is a demo using docker.

- github.com/GoogleContainerTools/jib (<https://github.com/GoogleContainerTools/jib>)
- github.com/GoogleContainerTools/kaniko (<https://github.com/GoogleContainerTools/kaniko>)

- buildah.io (<https://buildah.io>)

Production Deployment

You can deploy your own clusters or use a cloud provider cluster as a service offering.

- kubernetes.io/docs/setup/production-environment/tools/kubeadm/create-cluster-kubeadm (<https://kubernetes.io/docs/setup/production-environment/tools/kubeadm/create-cluster-kubeadm>)
- github.com/kubernetes-sigs/kubespray (<https://github.com/kubernetes-sigs/kubespray>)
- GKE, AKS, EKS, etc.
- Rancher, OpenShift, VMware

Other Topics

- Ingress
- Storage
- Advanced Deployment Tools(Helm, ArgoCD, FluxCD)
- Many others

References

- kubernetes.io (<https://kubernetes.io>)
- github.com/kubernetes (<https://github.com/kubernetes>)
- kind.sigs.k8s.io (<https://kind.sigs.k8s.io>)
- www.cncf.io (<https://www.cncf.io>)

Questions

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Thank you

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