

System Administration & Security



COMP 175 | Fall 2021 | University of the Pacific | Jeff Shafer



Kubernetes

(Cluster of
Containerized Applications)

Kubernetes Overview

Learn

A man with a full beard and a surprised expression is sitting in a wooden boat. He is holding a glowing blue hexagonal icon with a white ship's wheel inside, which is the Kubernetes logo. The background is a dark blue space with white stars. The word 'Learn' is written in large white letters at the top left, and 'Kubernetes' is written in large yellow letters at the bottom.

Kubernetes

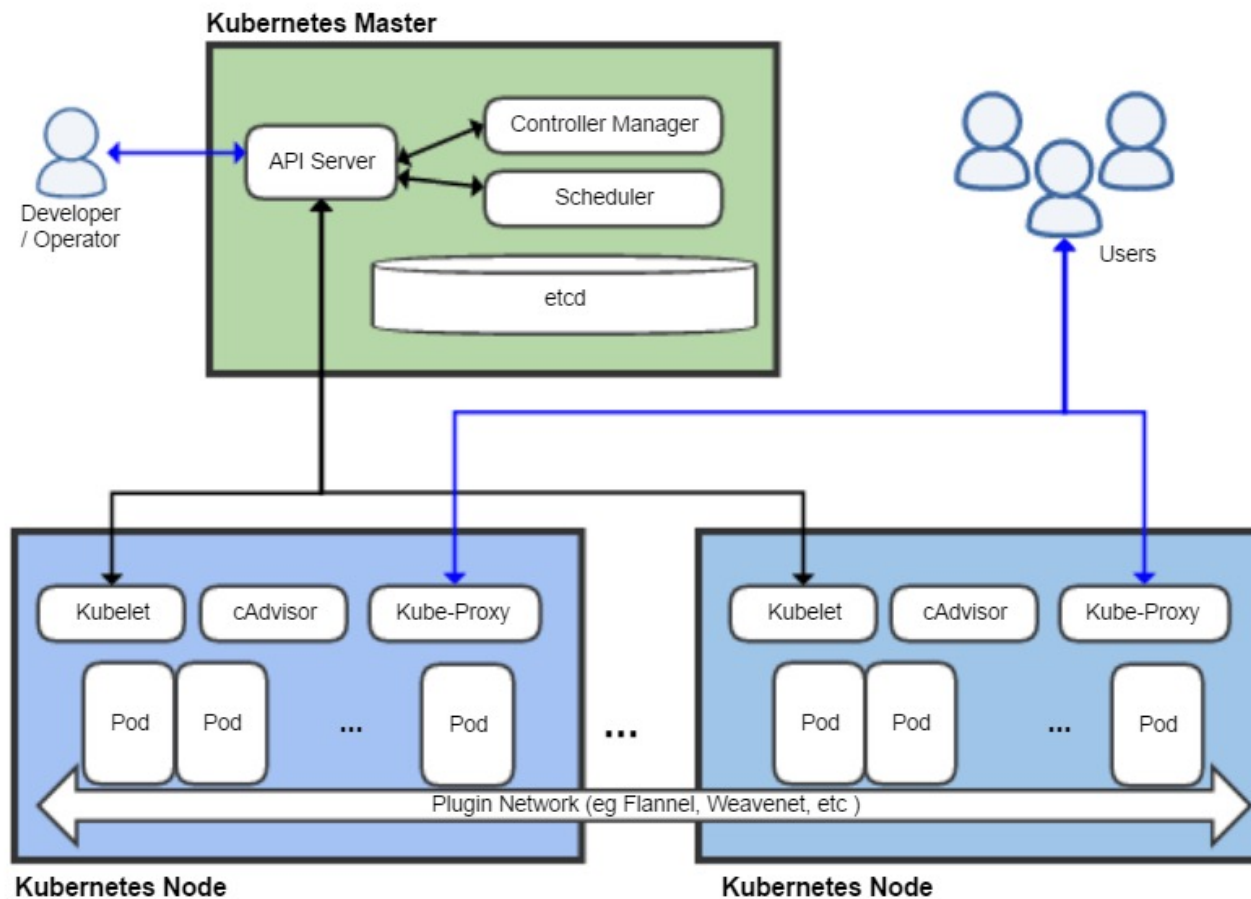


Kubernetes = (“coo-burr-NET-eez”)

Kubectl = (“coob-control”)

Kubelet = (“coob-let”)

Kubernetes Architecture



Kubernetes Pod

- **Pod** is basic building block for applications
 - One or more containers that are co-located on the same host
- Fundamental unit for *scheduling*
- **ReplicaSet** maintains the desired number of Pod *replicas* (identical copies) to meet application needs

Kubernetes Networking

- Each pod is assigned a *unique IP address* within the cluster
 - Allows applications to use ports without conflicts
- Pod IP addresses are *ephemeral* – never use them directly!
 - Pods may be stopped and restarted on other nodes later
 - Instead, use *Service* reference, which will always refer to the current pod location

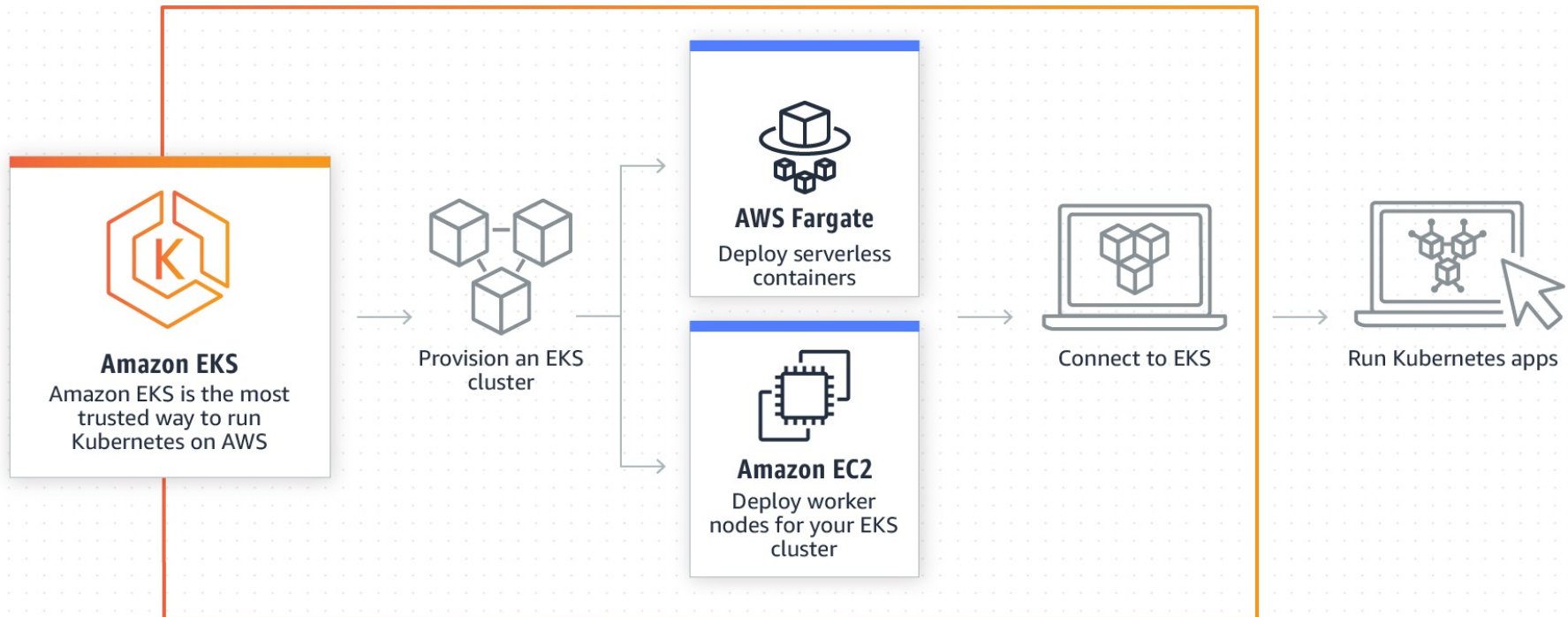
Kubernetes Services

- **Service** is a set of pods (w/ containers) working together towards a common purpose
- Service provides
 - Stable IP address (even as Pods are added or removed)
 - Stable DNS name
 - Round-robin load balancing of requests to specific Pods in service

Kubernetes on AWS

- Amazon Elastic Kubernetes Service (**EKS**)
 - “Serverless” – You don’t provision or manage individual servers at all
 - Billed by application resource usage
 - <https://aws.amazon.com/eks>

Kubernetes on AWS



Amazon EKS



Amazon Elastic Container Service for Kubernetes (Amazon EKS)

Kubernetes on AWS

- We won't use Amazon EKS for our labs
- Instead, we will install and configure Kubernetes from scratch as-if we were using dedicated hardware

Wrap-Up

➤ Questions?

➤ Concerns?

➤ This Week

➤ **Video Peer Review** – 11/9

➤ **Lab 12** – Kubernetes