Kubernetes

What is Kubernetes?

- Kubernetes also known as K8s, is an open-source orchestration tool for automating deployment, scaling, and management of containerized application.
- It manages your containers

Histroy of Kubernetes

- K8's is developed by google in 2009 written by Go-Language(Google Language)
- (2009-2013) It used as an internal project by google
- (2013) Google donated k8's project to cncp (Cloud Native Computing Foundation).
- (2013) K8's become a open source software and first orchestrator in the market.
- It defactors standard for running your container apps because of more Popularity.

Job of Orchestrator

- It creates a cluster network between the machine/node for your container.
- Orchestration has same in-build controller.
- High availability and Fall Tolerance.

Alternatives

- Docker swarm
- Apache Mesosphere

Three Major Components

- Master Components
- Worker Components
- User Interface Components

Master Components

- Cube API Server
  - It is a primary component of control plane and its allows the end-user to talk to kubernetes
  - It have bunch of API act as gateway of entire Cluster
  - API-Server has a cache when a user run a commands in CLI. It putting a command in yaml file format
- Control Manager
  - Maintain the state of cluster
  - Will notice the pod are running or not?
  - Scaling the pod
  - Upgrade the pod
  - Rollback
- ETCD
  - It act as a primary database of cluster
- Kuber Scheduler
  - It assign the possible worker node and execute a new pod
  - It decides the pod where to be created in which worker node
  - Filteration [Filter the best worker node in the cluster]
  - Pioritization [Allocated the space to each and every node]

Worker Components

- Kubelet
  - It is a agent that run every node and resposible for setting up pods on the node

- Kube-proxy
  - It is responsible for direct TCP, UDP pocket forwarding
  - It allows services to communicate to Pods
- Container run time
  - It is a engine that manage the containers

> **Info**
>
> - Worker node always send a Node status to master node
> - Node Status contains Conditions, Capacity, Allocations, General Node info, Addresses
> - By Default, Every one minute to send node status
> - Node lease is the high weight version of Node status

Types of Kubernetes

- Cloud Managed kubernetes cluster
- Self-Managed kubernetes cluster

Workflows

- Kubernetes never manages the container directly
- We always create a pod's
- Pod is basic unit of scheduling in k8's
- Inside a pod we have a container

Workflow Chart

Kubernetes Structure