Kubernetes

Definition

- Kubernetes is an open-source container orchestration platform.
- Kubernetes are also known as K8s.
- That automates the deployment, scaling, and management of containerized applications.
- It provides a framework to run distributed systems resiliently, handling failover, scaling, and deployment with ease.
- Kubernetes helps ensure that application components run where and when you want, and it helps them find the resources and tools they need to work.

Uses of Kubernetes

- Kubernetes is used to automate the deployment, scaling, and management of containerized applications, ensuring efficient use of infrastructure resources.
- It enhances application resilience by managing failovers and self-healing of applications.
- Kubernetes also facilitates continuous integration and continuous delivery (CI/CD) pipelines, streamlining the development and release processes.

Kubernetes architecture

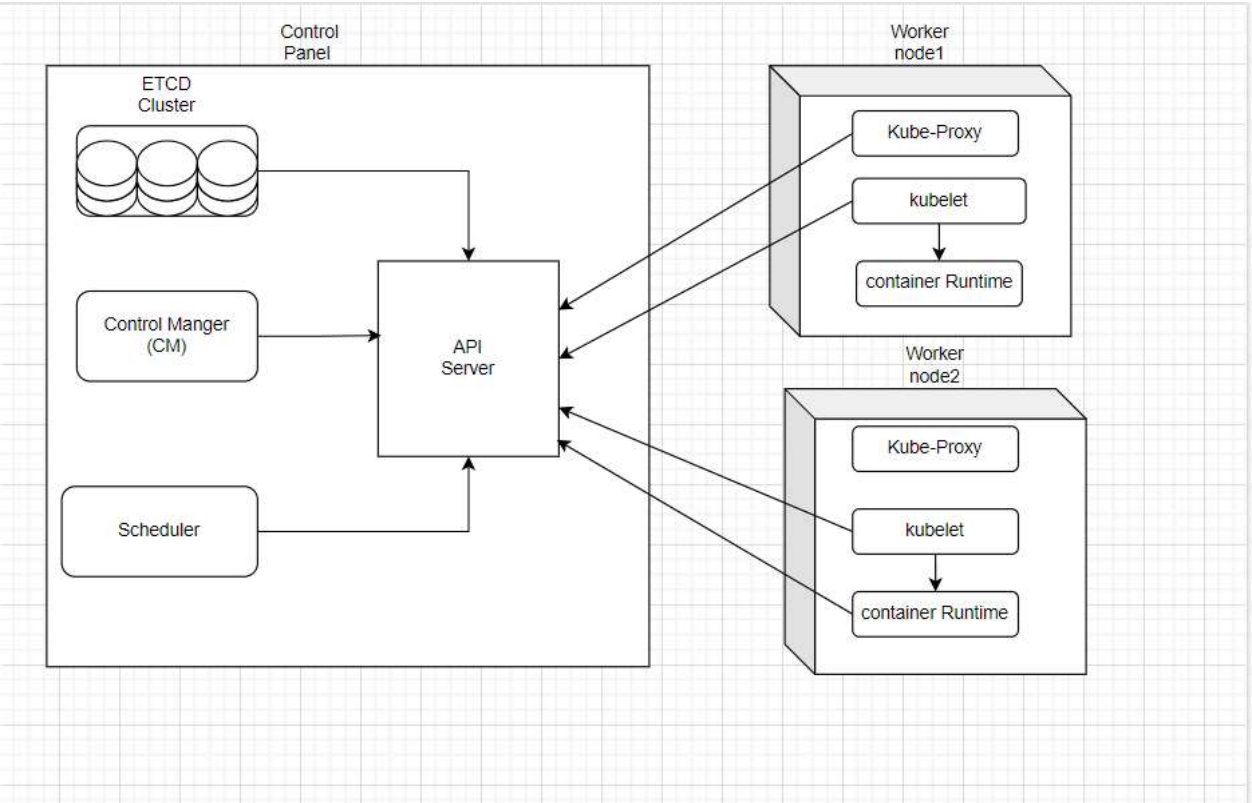
- Master node (or) control panel
- Worker node

Control panel components:

- API Server (Application program interface)
- Scheduler
- Control manger
- ETCD Cluster

Worker Node:

- Kube-proxy
- Kubelet
- Container Runtime



API Definition (Application program interface)

- An API server is a component of a software system that processes API requests, serving as an interface between clients and backend services.
- It handles request routing, authentication, authorization and data exchange, enabling interaction with the application's functionalities and data.

Scheduler:

- In Kubernetes, the scheduler is a component responsible for selecting the optimal node for newly created pods to run on.
- It makes scheduling decisions based on resource availability, constraints, and policies to ensure efficient utilization of cluster resources.

Control Manager:

- It is every 5 min to monitor the worker node.
- In case the worker node fails and goes to another worker node where it has allocated space.
- Otherwise it will be in pending state.

ETCD Cluster:

- It stores the only key values in the database.
- Every resource in the cluster.
- How much master,cluster and nodes is running count will be there information of pods.
- Every information stored in the ETCD.

Worker node:

Kube-proxy

- Kube-proxy is a network proxy in Kubernetes that manages network rules and facilitates communication between services and pods.
- It ensures efficient routing and load balancing of traffic within the cluster.

Kubelet:

- It monitors the information about the worknode.

Container Runtime:

- It is a runtime engine.
- It is used to execute the runtime container by the engine.
- If it is 1.3 below then it can be run in docker engine but if it is above 1.3 then it can run containerization.