Kubernetes
Architecture

edureka!

Topics For Today's DevOps Training

1. What is Kubernetes
2. Discuss the Kubernetes Architecture
3. Components for Master and Worker Nodes
4. Etcd : Cluster State Management
5. Network Setup Requirements

What is Kubernetes?

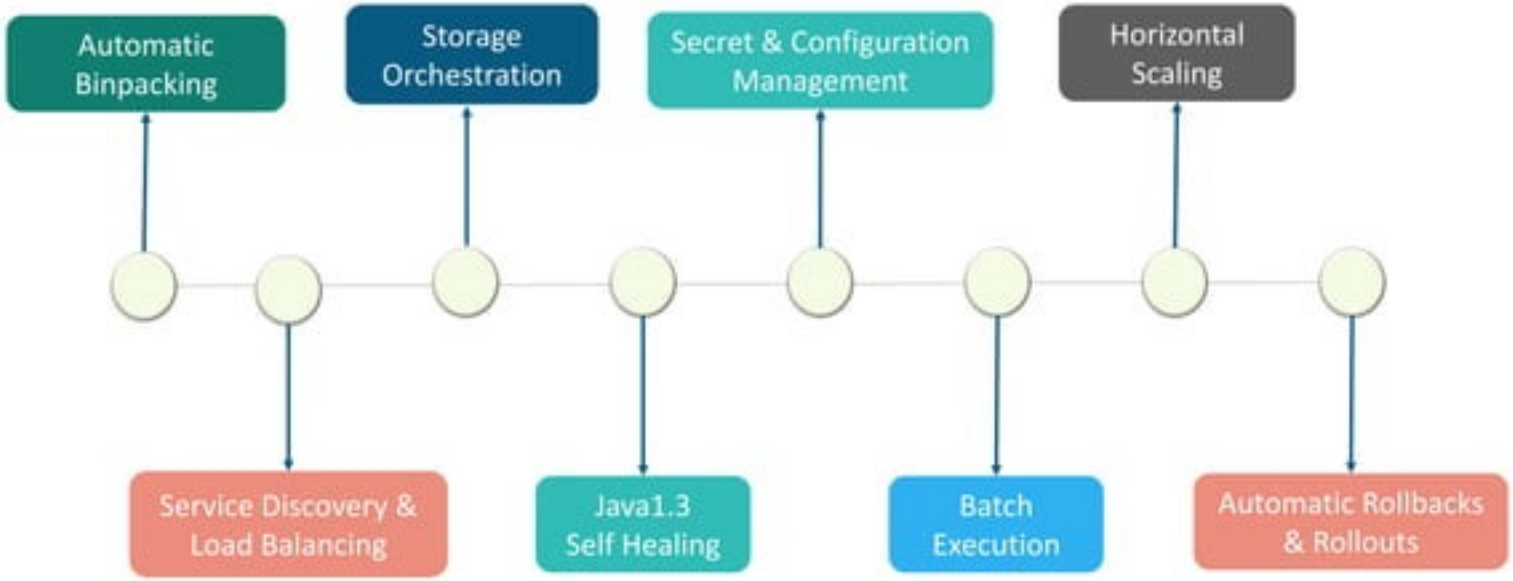
Kubernetes is an open-source **Container Management** tool which automates *container deployment, container (de)scaling & container load balancing.*

Benefit**: Works brilliantly with all cloud vendors: **Public, Hybrid & On-Premises.

Features Of Kubernetes

1. Automatic Binpacking
2. Service Discovery & Load Balancing
3. Storage Orchestration
4. Self Healing
5. Secret & Configuration Management
6. Batch Execution
7. Horizontal Scaling
8. Automatic Rollbacks & Rollouts

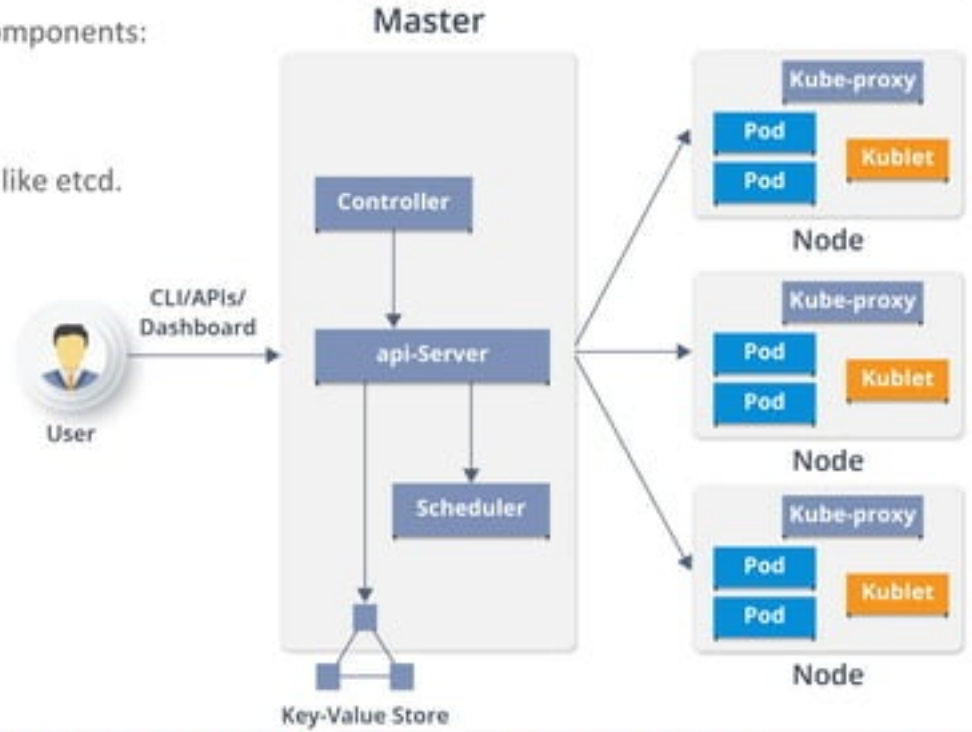
Features Of Kubernetes



Kubernetes Architecture

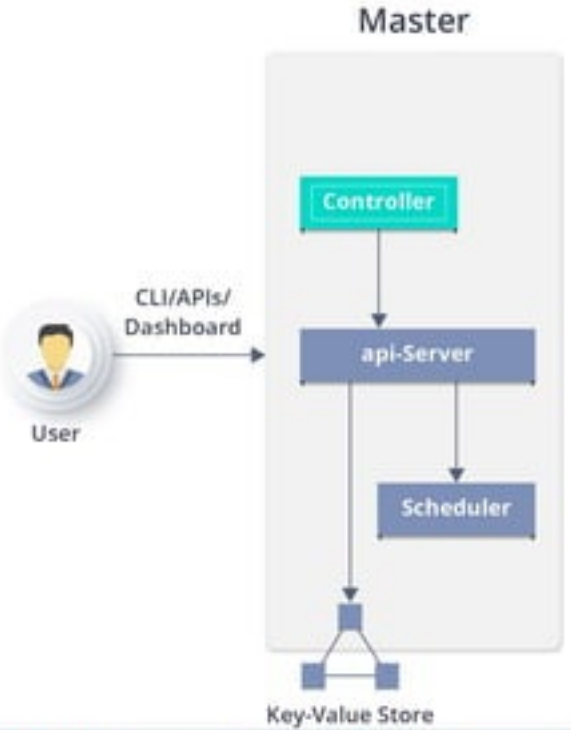
Kubernetes Architecture

- Kubernetes has the following main components:
  - Master nodes
  - Worker nodes
  - Distributed key-value store, like etcd.



Kubernetes Architecture - Master Node

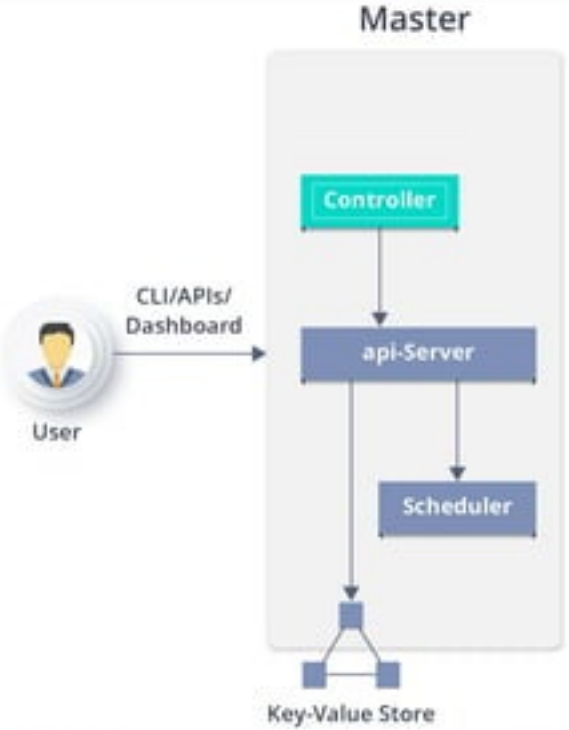
- Responsible for managing the Kubernetes cluster
- It is the entry point for all administrative tasks
- Can be more than one master node in the cluster
- Only one of them will be the leader
- Kubernetes uses etcd



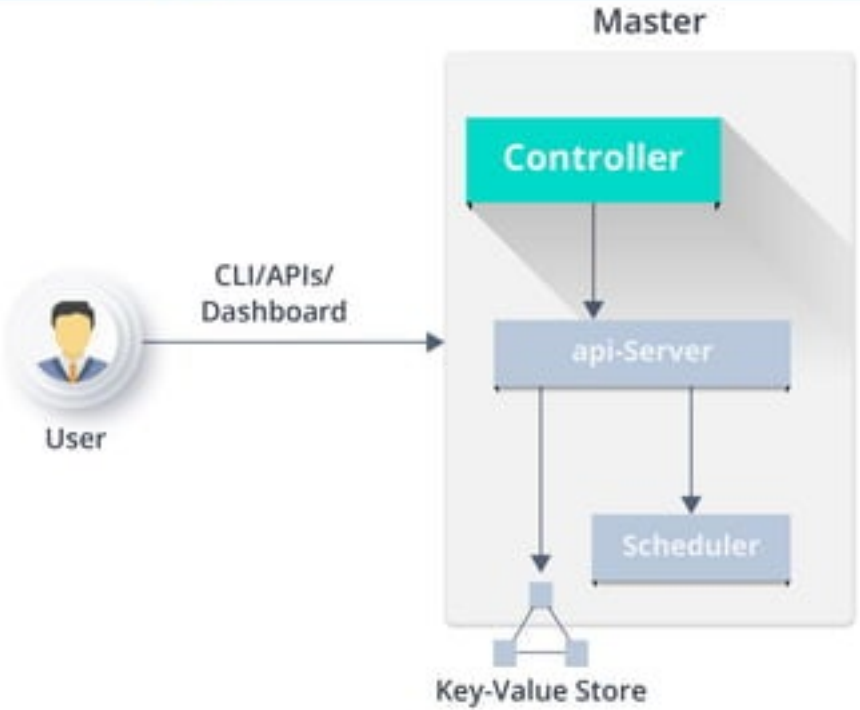
Master Node Components

Kubernetes Architecture - Master Node Components

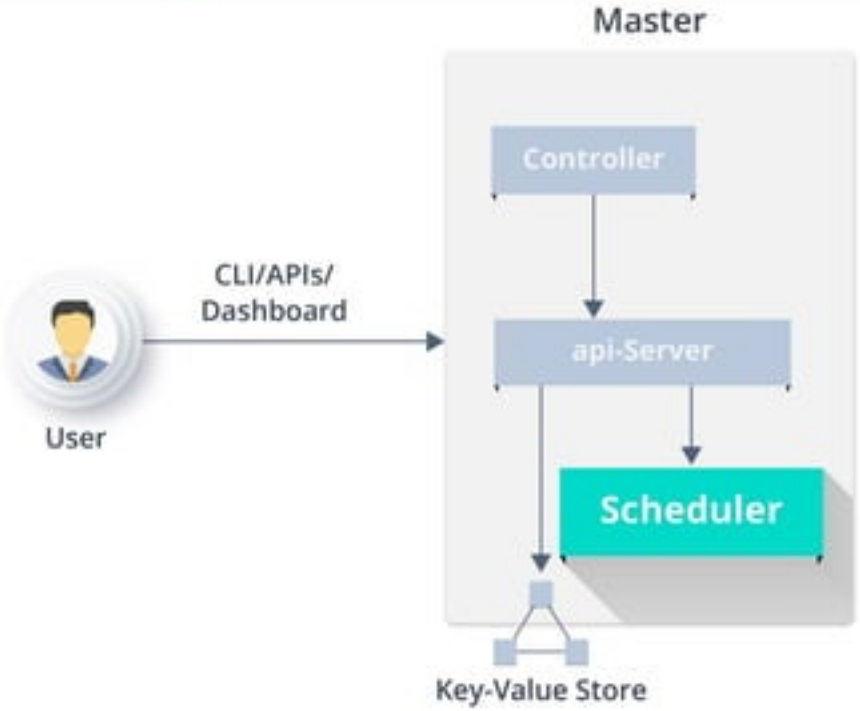
- A master node has the following components:
  - API server
  - Scheduler
  - Controller manager
  - etcd.



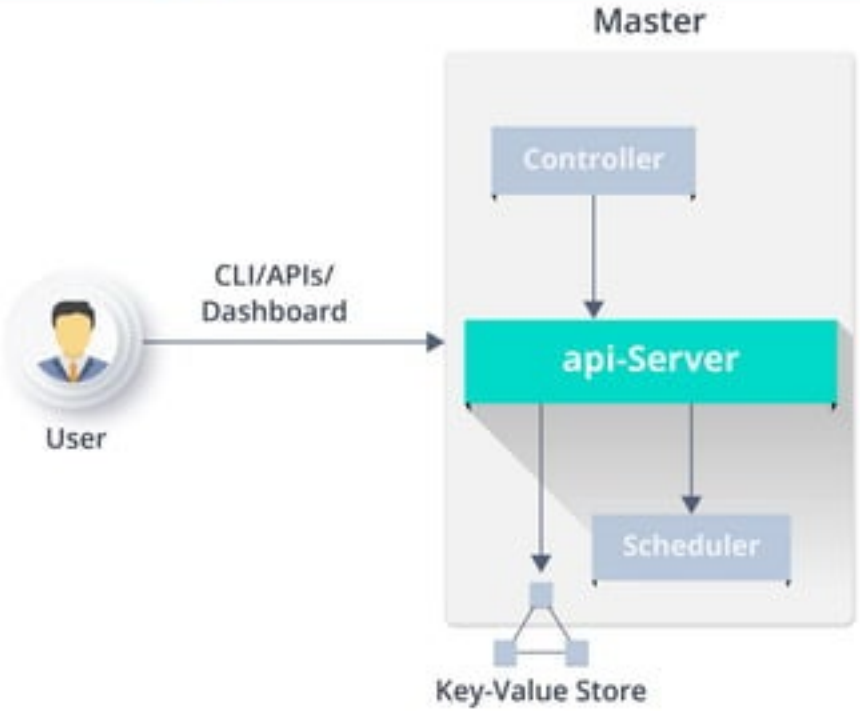
Master Node Components: Controller Manager



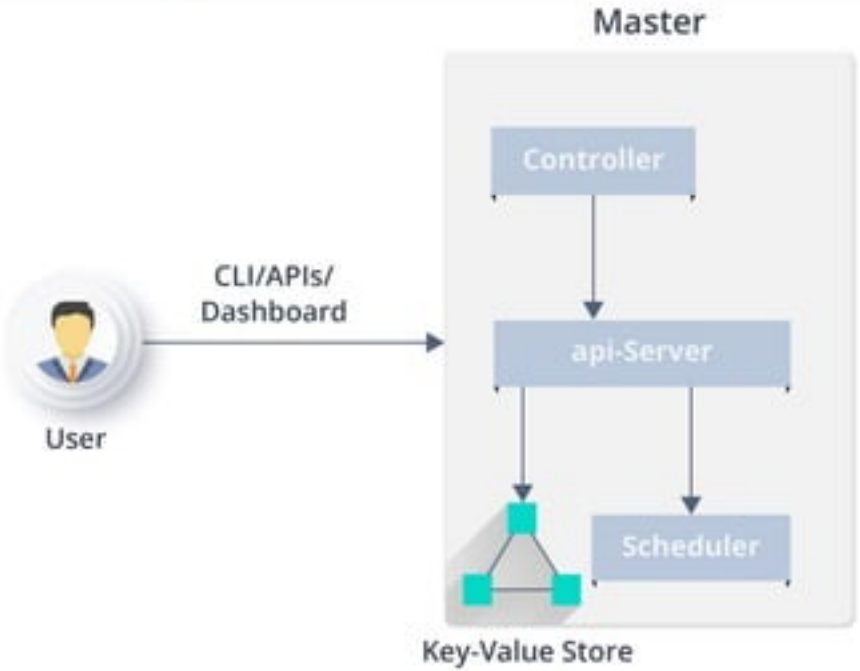
Master Node Components: Scheduler



Master Node Components: API Server

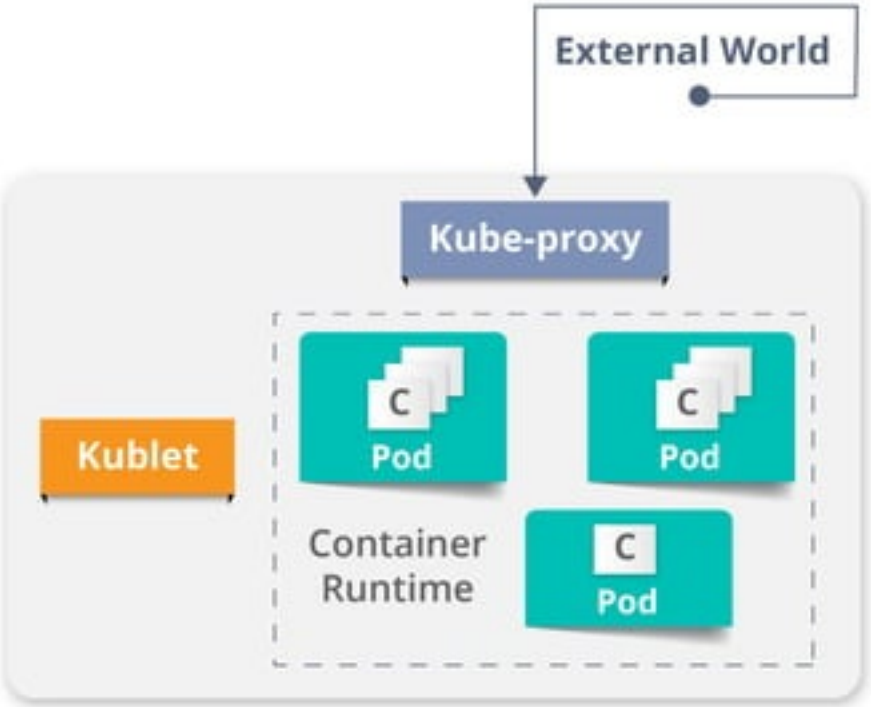


Master Node Components: etcd



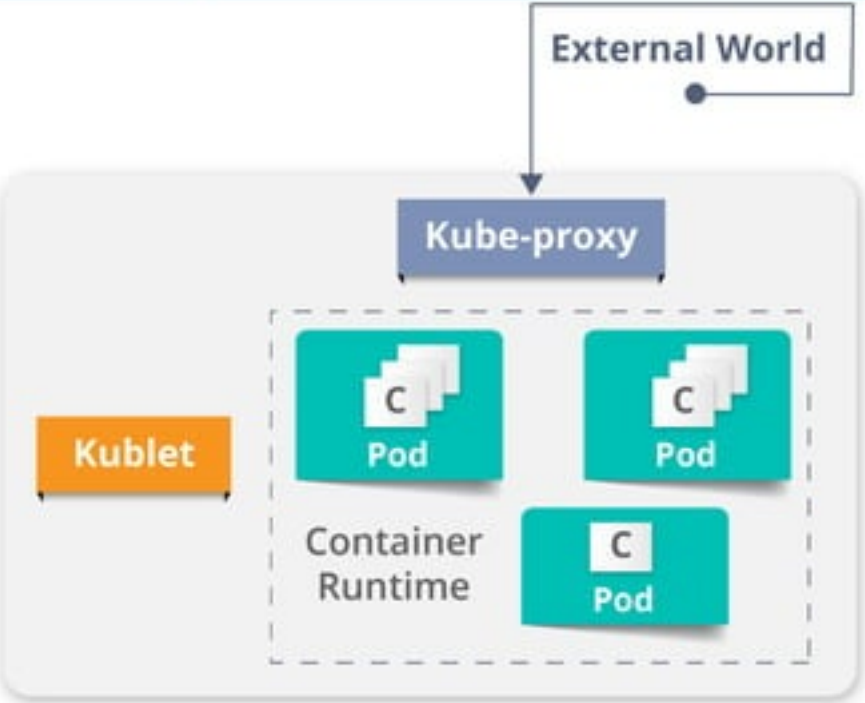
Worker Node

Worker Node

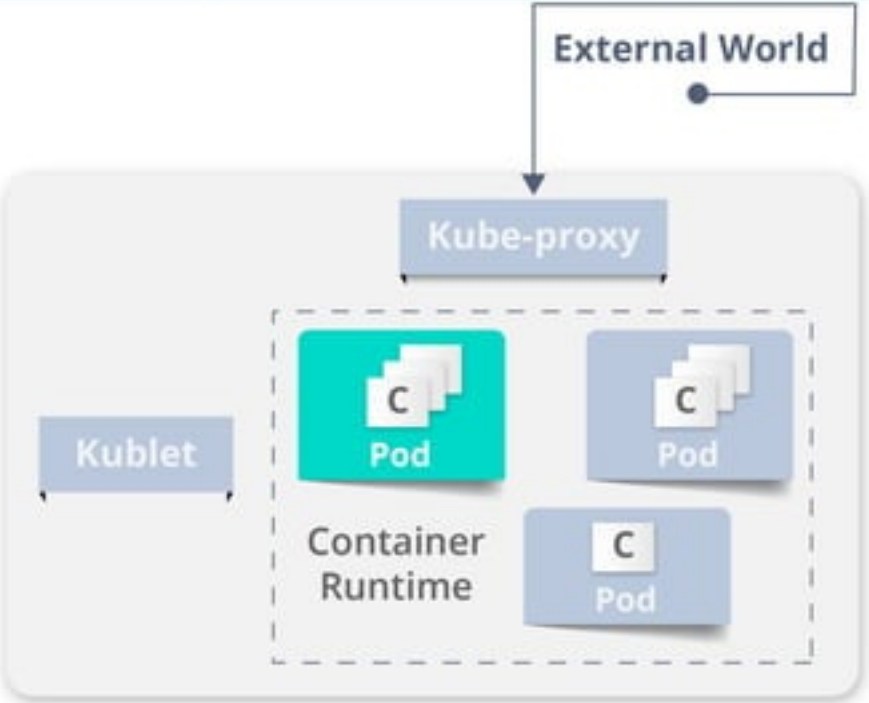

External World
Kube-proxy
Kublet
C
Pod
C
Pod
Container
Runtime
C
Pod

Worker Node : Components

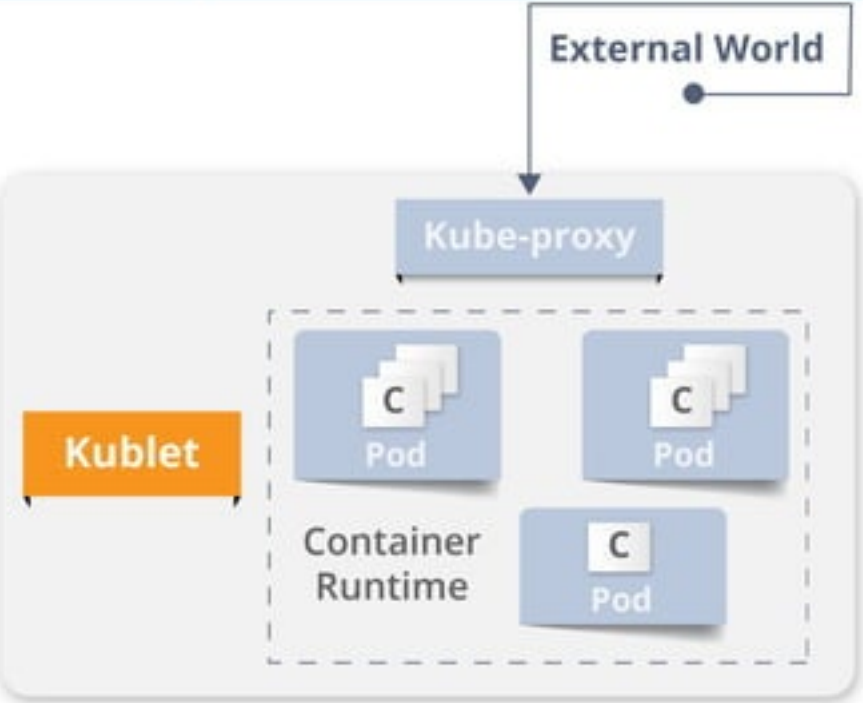
Worker Node Components



Worker Node Components: Container Runtime

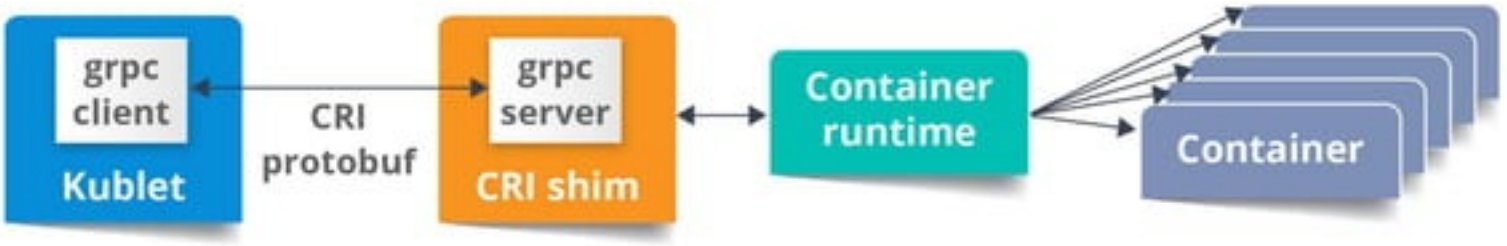


Worker Node Components: kubelet



Kubelet : CRI shims

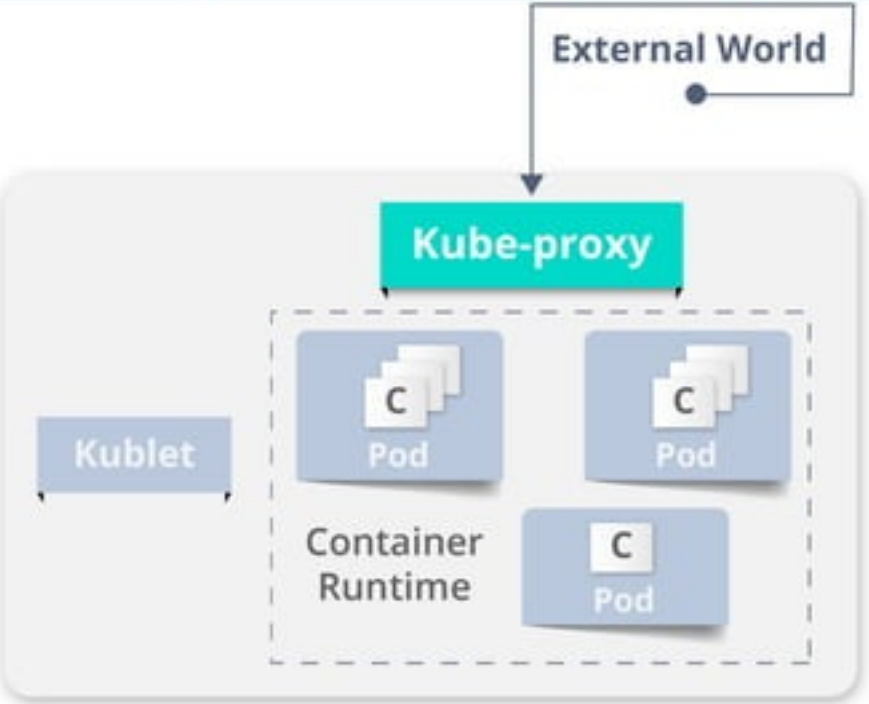
Worker Node Components: kubelet



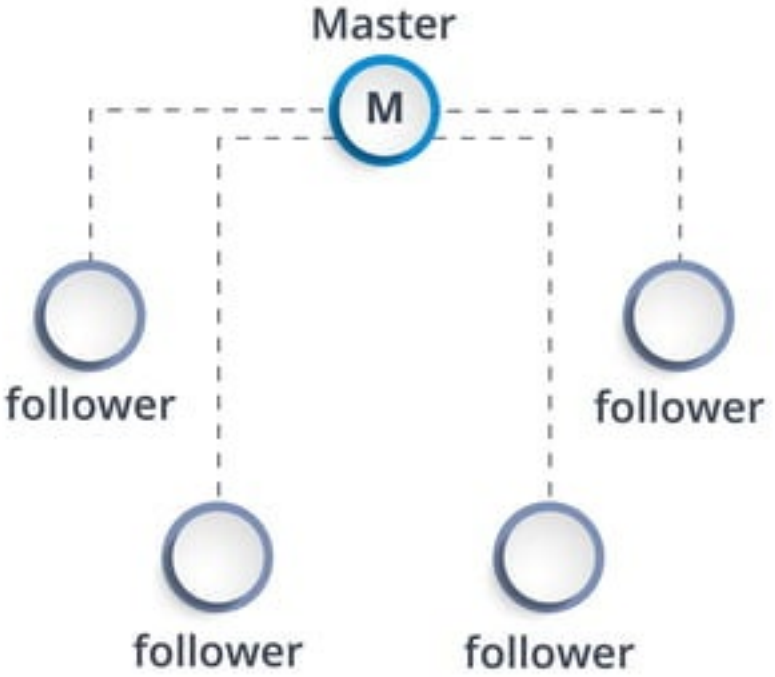
Worker Node Components: kubelet: CRI shims

- Below you will find some examples of CRI shims:

Worker Node Components: kube-proxy



State Management with etcd

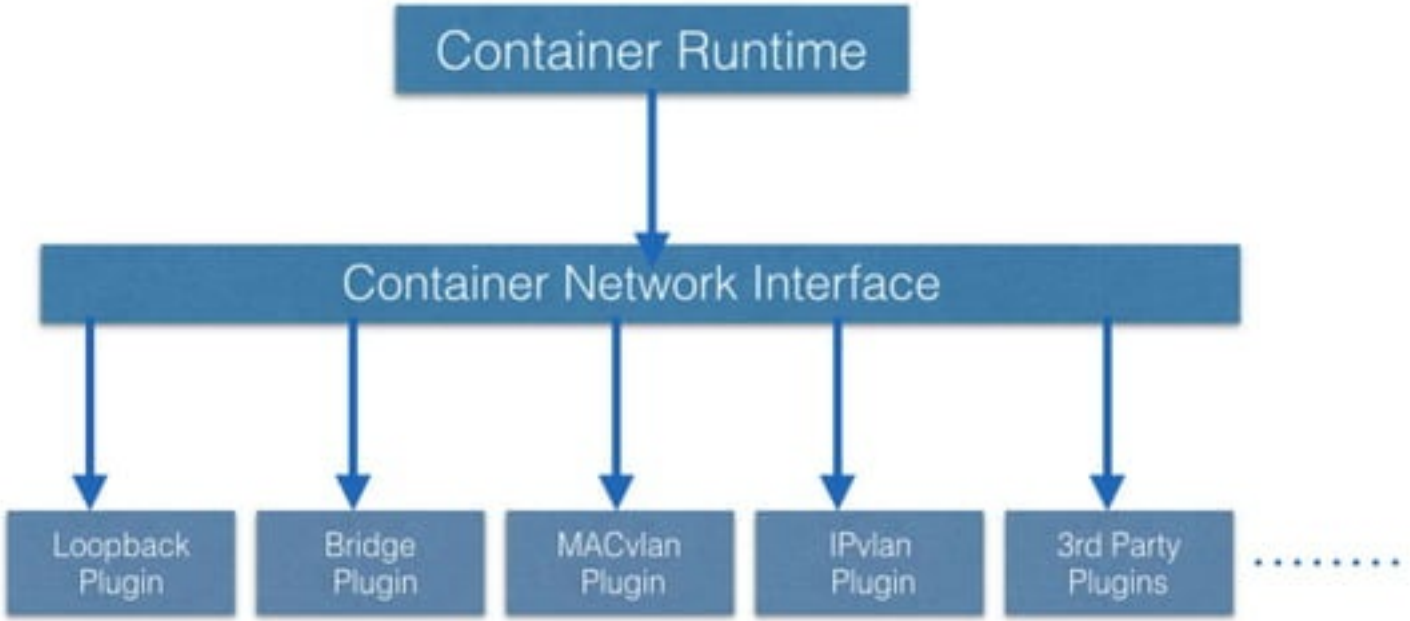


Challenges:
Kubernetes Network

Network Setup Challenges

Network Setup Challenges

Assigning a Unique IP Address to Each Pod

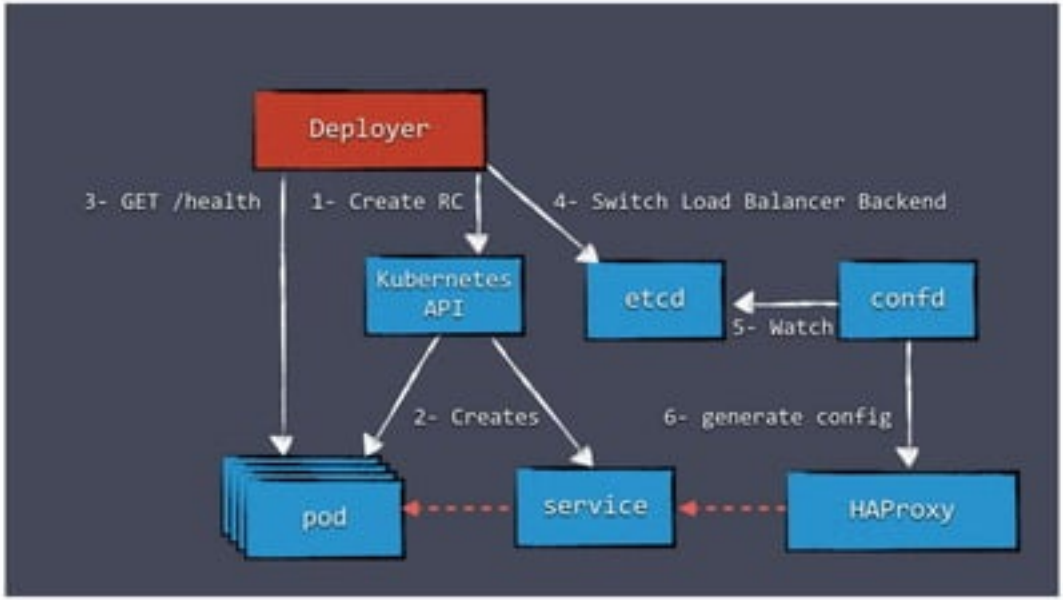


Container-to-Container Communication Inside a Pod

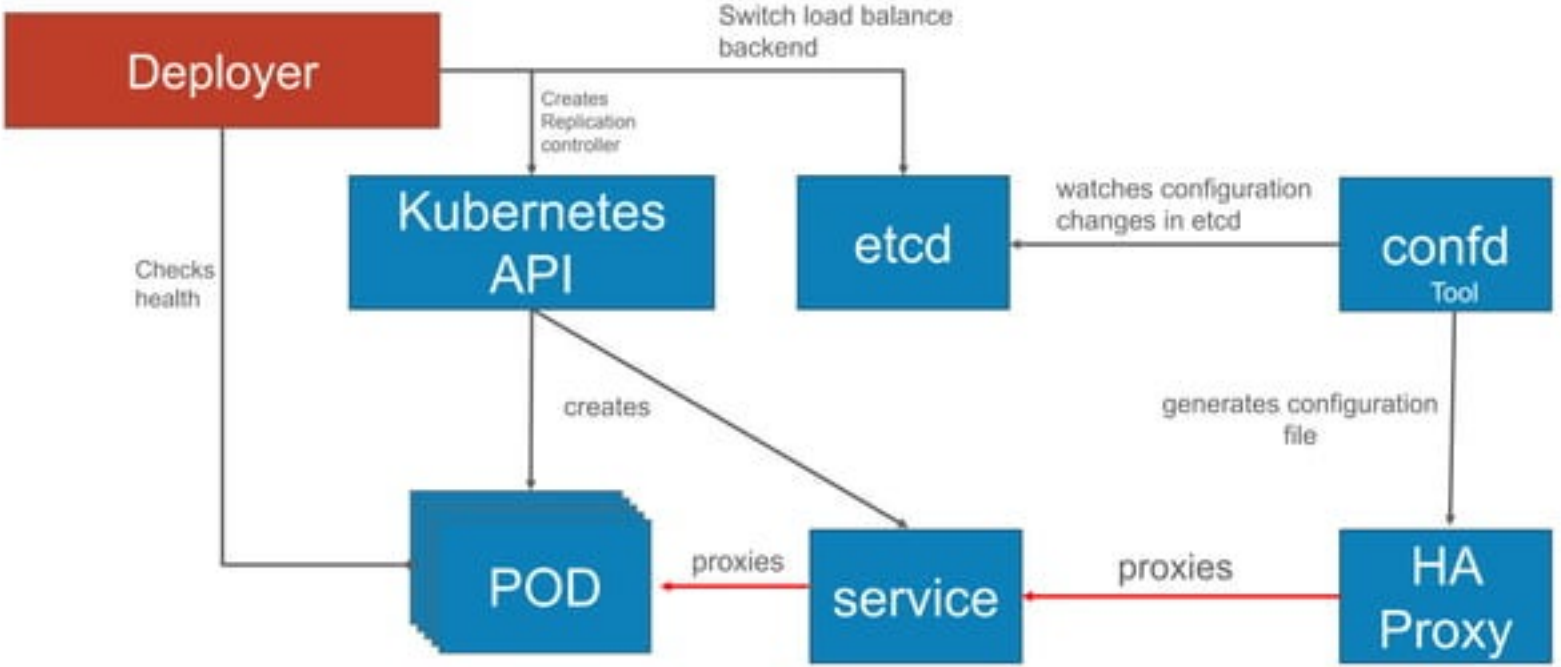
Pod-to-Pod Communication Across Nodes

Communication Between the External World and Pods

Communication Between the External World and Pods

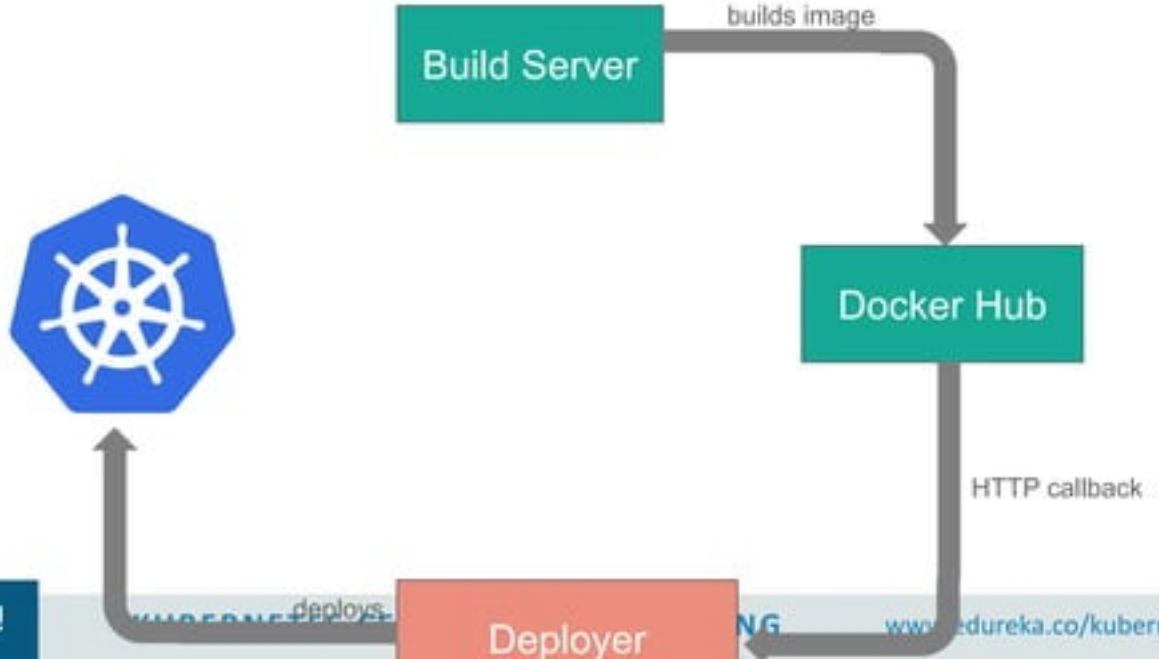


Communication Between the External World and Pods

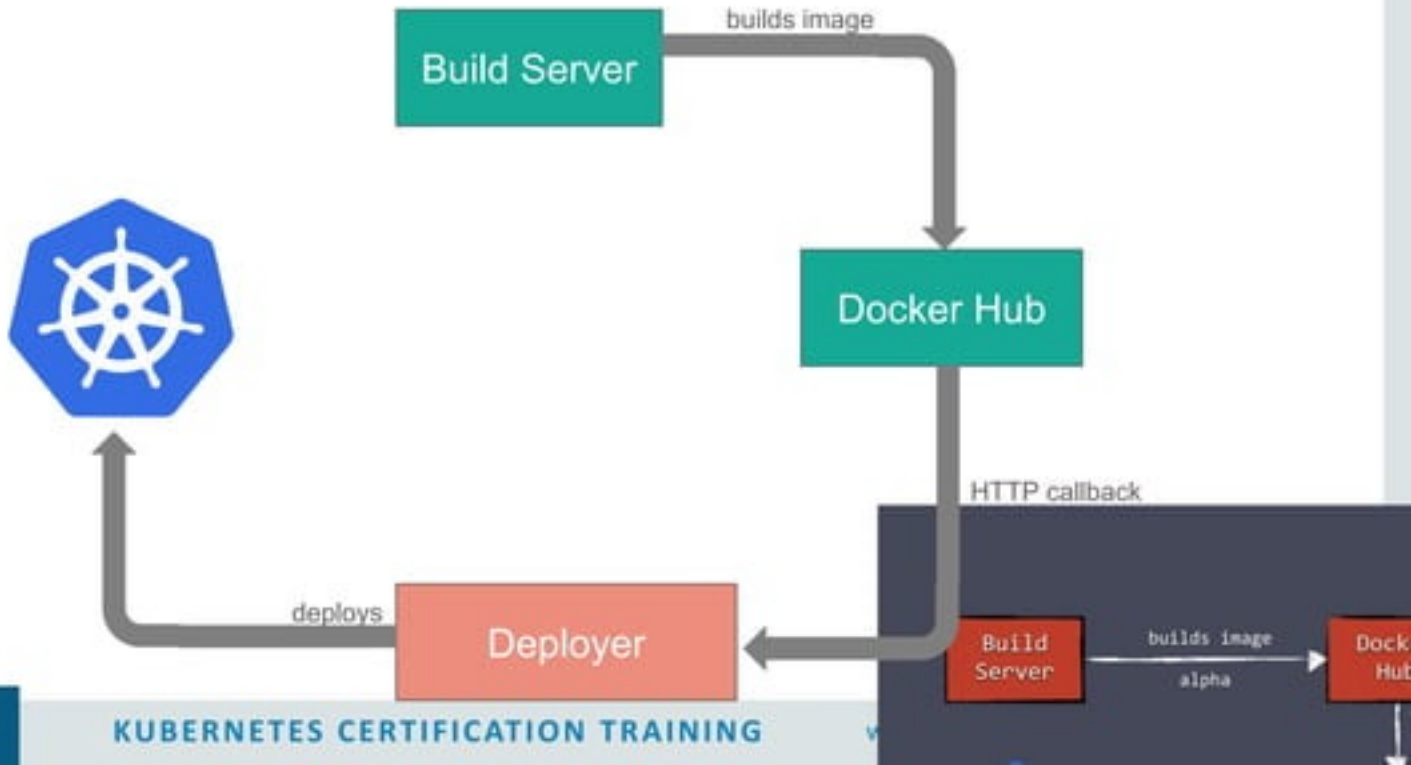


Communication Between the External World and Pods

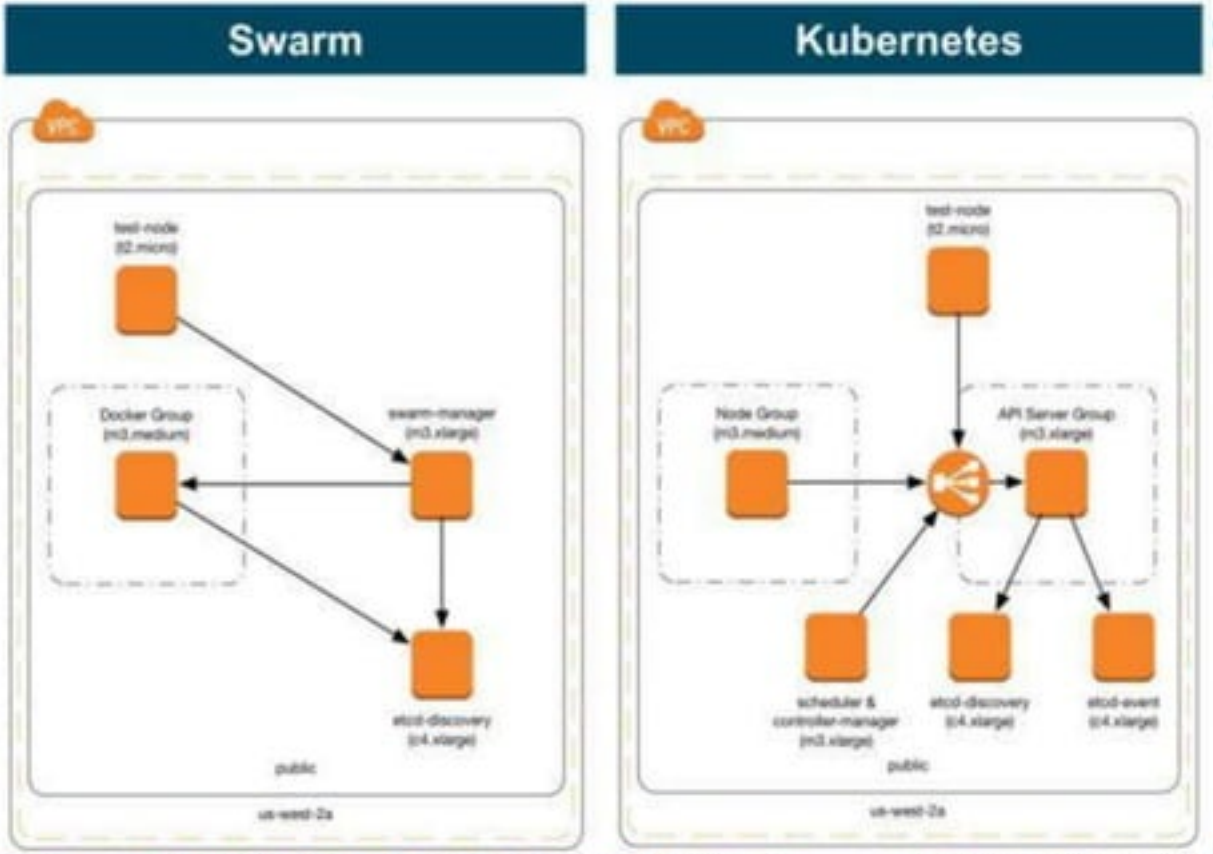
- **Container Deployment Pipeline**



Communication Between the External World and Pods



Comr ods


Swarm
Kubernetes
VPC
test-node
(t2.micro)
Docker Group
(m3.medium)
swarm-manager
(m3.xlarge)
etcd-discovery
(c4.xlarge)
public
us-west-2a
VPC
test-node
(t2.micro)
Node Group
(m3.medium)
API Server Group
(m3.xlarge)
scheduler &
controller-manager
(m3.xlarge)
etcd-discovery
(c4.xlarge)
etcd-event
(c4.xlarge)
public
us-west-2a

Thank You

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