Kubernetes Cluster Setup Guide

1. Prerequisites

- Minimum 2 VMs (1 master, 1 worker)
- Each VM: 2 CPU cores, 2GB RAM
- Ubuntu 20.04 or later
- User with sudo privileges
- Disable swap:
- sudo swapoff -a
- Make swap disable permanent:
- sudo sed -i '/ swap / s/^/#/' /etc/fstab

2. Update System Packages

Update and upgrade the system:

sudo apt update && sudo apt upgrade -y

3. Install Required Dependencies

Install essential packages:

sudo apt install -y apt-transport-https ca-certificates curl

4. Install Docker

Install and enable Docker:

sudo apt install -y docker.io

sudo systemctl enable docker

sudo systemctl start docker

5. Configure Docker Daemon

Modify Docker settings:

- Create or edit /etc/docker/daemon.json:
- {
- "exec-opts": ["native.cgroupdriver=systemd"],
- "log-driver": "json-file",
- "log-opts": {
- "max-size": "100m"
- },
- "storage-driver": "overlay2"

- }
- Restart Docker:
- sudo systemctl restart docker

6. Install Kubernetes Components

Add Kubernetes repository and install components:

curl -fsSL https://packages.cloud.google.com/apt/doc/apt-key.gpg | sudo apt-key add -

echo "deb https://apt.kubernetes.io/ kubernetes-xenial main" | sudo tee /etc/apt/sources.list.d/kubernetes.list

sudo apt update

sudo apt install -y kubelet kubeadm kubectl

sudo apt-mark hold kubelet kubeadm kubectl

7. Initialize the Kubernetes Cluster (Master Node Only)

Initialize cluster on the master node:

sudo kubeadm init --pod-network-cidr=192.168.0.0/16

Set up kubeconfig:

mkdir -p $HOME/.kube

sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config

sudo chown $(id -u):$(id -g) $HOME/.kube/config

8. Install a Pod Network (CNI)

Apply Flannel CNI:

kubectl apply -f https://github.com/flannel-io/flannel/releases/latest/download/kube-flannel.yml

9. Join Worker Nodes to Cluster

Run the command provided by the master node on each worker node:

sudo kubeadm join <MASTER_IP>:6443 --token <TOKEN> --discovery-token-ca-cert-hash sha256:<HASH>

10. Verify Cluster Setup

Check if nodes are ready:

kubectl get nodes

If all nodes show **Ready**, the setup is complete.

This guide provides step-by-step instructions to set up a basic Kubernetes cluster with one master and one worker node.