Kubernetes 1.30.2 Cluster Setup on Ubuntu 22.04

Step 1: Update the System

```
sudo apt update && sudo apt upgrade -y
```

Step 2: Disable Swap

```
sudo swapoff -a
sudo sed -i '/ swap / s/^/#/' /etc/fstab
```

Step 3: Load Required Kernel Modules

```
cat <<EOF | sudo tee /etc/modules-load.d/k8s.conf
overlay
br_netfilter
EOF

sudo modprobe overlay
sudo modprobe br_netfilter
```

Step 4: Set Kernel Parameters for Kubernetes

```
cat <<EOF | sudo tee /etc/sysctl.d/k8s.conf
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
net.ipv4.ip_forward = 1
EOF

sudo sysctl --system
```

Step 5: Install Container Runtime (containerd)

```
sudo apt install -y containerd
sudo mkdir -p /etc/containerd
containerd config default | sudo tee /etc/containerd/config.toml > /dev/null
sudo systemctl restart containerd
sudo systemctl enable containerd
```

Step 6: Add Kubernetes Repository

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

curl -fsSL https://pkgs.k8s.io/core:/stable:/v1.30/deb/Release.key | sudo gpg --dearmor -o /etc/apt/trusted.gpg.d/kubernetes-apt-keyring.gpg

echo "deb https://pkgs.k8s.io/core:/stable:/v1.30/deb/ /" | sudo tee /etc/apt/sources.list.d/kubernetes.list

sudo apt update

Step 7: Install Kubernetes Components

sudo apt install -y kubelet=1.30.2-1.1 kubeadm=1.30.2-1.1 kubectl=1.30.2-1.1

sudo apt-mark hold kubelet kubeadm kubectl

Step 8: Initialize the Kubernetes Cluster (On Master Node)

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

Step 9: Set Up kubeconfig (For User Access)

mkdir -p $HOME/.kube

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

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

Step 10: Install a Network Plugin (Calico)

kubectl apply -f https://raw.githubusercontent.com/projectcalico/calico/v3.26.1/manifests/calico.yaml

Step 11: Join Worker Nodes to Cluster

Run the command provided by kubeadm init on each worker node. Example:

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

Step 12: Verify Cluster Status

kubectl get nodes

kubectl get pods -A

Your Kubernetes 1.30.2 cluster should now be up and running!