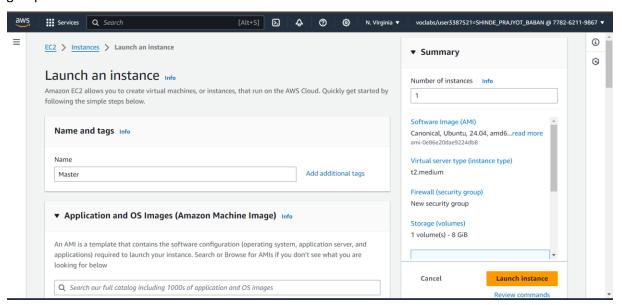
#### **ADVANCE DEVOPS EXP-3**

Name: Prajyot Shinde

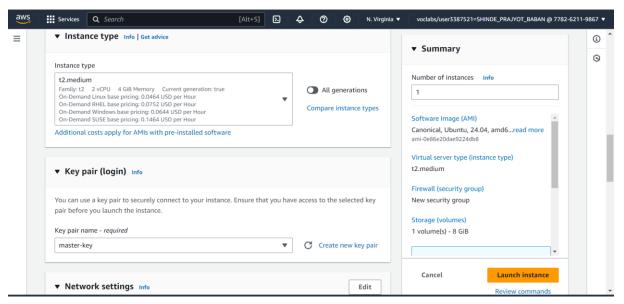
**Roll No:** 57

**Aim:** To understand the Kubernetes Cluster Architecture, install and Spin Up a Kubernetes Cluster on Linux Machines/Cloud Platforms.

**Step 1:** Create 2 Security Groups for Master and Nodes and add the following inbound rules in those groups:



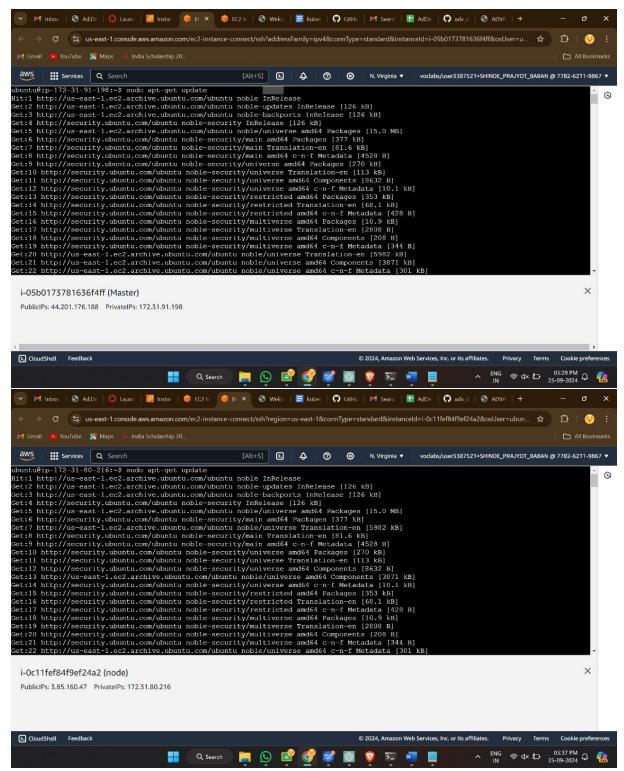
### Generate a key pair for the same:



	node 2	i-05c78ee26bbc9b179	② Pending ⊕ Q	t2.medium	-	View alarms +	ap-south-1a	ec2-13-20
	node 1	i-0b1270d945da2029e	⊗ Running  ②  Q	t2.medium	<ul><li>Initializing</li></ul>	View alarms +	ap-south-1a	ec2-13-23
	Master	i-0f13653cfd3d300e3	⊗ Running  ℚ  Q	t2.medium		View alarms +	ap-south-1a	ec2-13-20
4								<b>)</b>

# Step2:

Open Master and node on EC2 terminal:



#### Step 3:

#### Install Docker

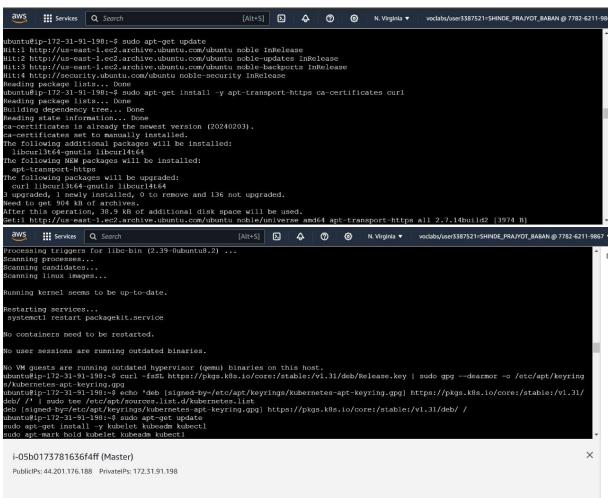
```
ubuntu@ip-172-31-91-198:-$ sudo apt-get install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Reading state information... Done
The following additional packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
ifupdown aufs-tools ogroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 139 not upgraded.
Need to get 76.8 MB of archives.
After this operation, 289 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

# Step 4:

Install kubeadm, kubelet, kubectl:

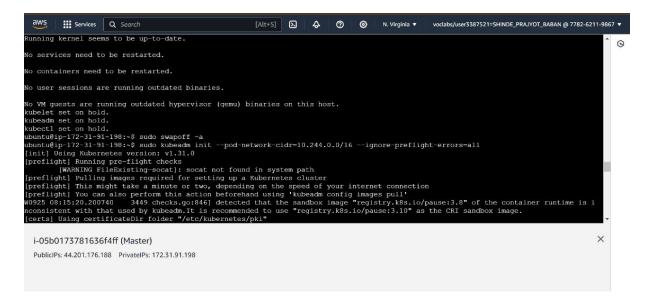
```
whuntu@ip-172-31-91-198:-$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-pdates InRelease
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:1 http://security.ubuntu.com/ubuntu noble-backports InRelease
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Hulding dependency tree... Done
Reading package lists... Done
Reading package lists... Done
Reading state information... Done
ca-certificates is already the newest version (20240203).
ca-certificates is already the newest version (20240203).
Ca-certificates to manually installed.
The following MSW packages will be installed:
libcurl3164-gnutls libcurl4t64
The following NSW packages will be installed:
apt-transport-https
The following packages will be upgraded:
curl libcurl31664-gnutls libcurl4t64
3 upgraded, 1 newly installed, 0 to remove and 136 not upgraded.
Need to get 994 kB of archives.

After this operation, 38.9 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 apt-transport-https all 2.7.14build2 [3974 B]
```



# Step5:

Disable Swap (Kubernetes requires swap to be off):



### Step 6:

#### Initialize the Kubernetes Cluster on Master Node On the master node: sudo

kubeadm init --pod-network-cidr=10.244.0.0/16

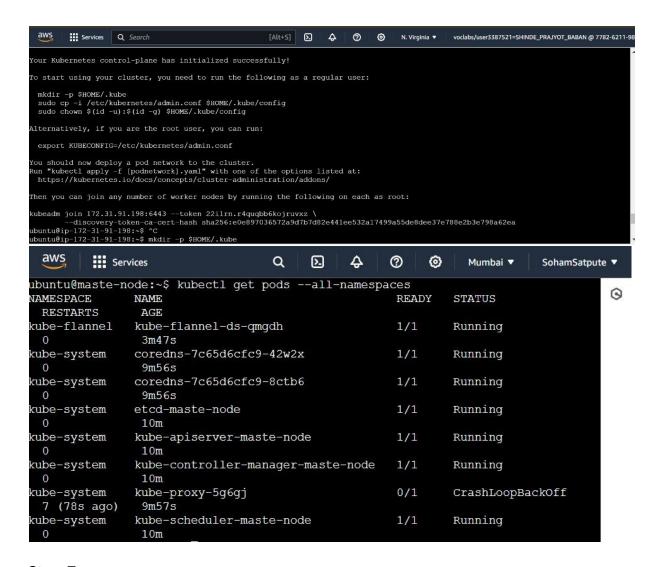
Set up kubectl on the master node:

mkdir -p \$HOME/.kube sudo cp -i

/etc/kubernetes/admin.conf \$HOME/.kube/config sudo

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

```
ubuntu@ip-172-31-91-198:~$ mkdir -p $HOME/.kube
ubuntu@ip-172-31-91-198:~$ sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
ubuntu@ip-172-31-91-198:~$ sudo chown $(id -u):$(id -g) $HOME/.kube/config
ubuntu@ip-172-31-91-198:~$ kubectl apply -f https://github.com/flannel-io/flannel/releases/latest/download/kube-flannel.yml
namespace/kube-flannel created
serviceaccount/flannel created
clusterrole.rbac.authorization.k8s.io/flannel created
clusterrolebinding.rbac.authorization.k8s.io/flannel created
clusterrolebinding.rbac.authorization.k8s.io/flannel created
daemonset.apps/kube-flannel-cfg created
daemonset.apps/kube-flannel-ds created
```



# Step 7:

Join Worker Nodes to the Cluster On the worker nodes, run the command provided by the master node during initialization:

ubuntu@maste-node:~\$ sudo kubeadm join 172.31.32.117:6443 --token t2jpj2.rauz0s7fimwpdo4a --discovery-token-ca-cert-hash sha2 288b9cf34dd1cff8161d84586cd50b

### Step 8:

Verify the Cluster Once the worker node joins, check the status on the master node

```
ubuntu@ip-172-31-91-198:-$ kubectl get nodes
NAME STATUS ROLES AGE VERSION
ip-172-31-80-216 Ready <none> 14s v1.31.1
ip-172-31-91-198 Ready control-plane 3m35s v1.31.1
```