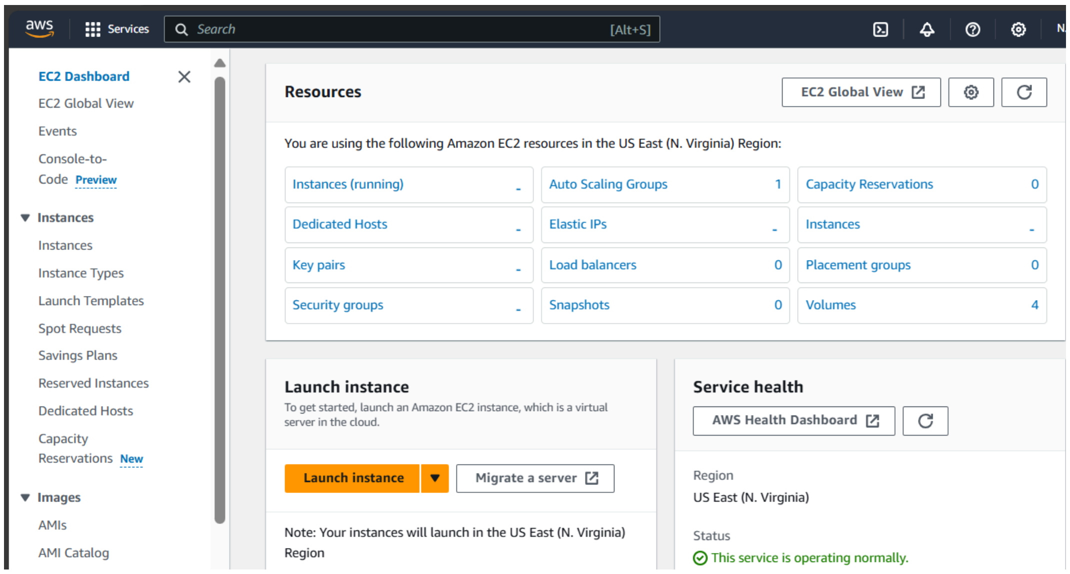
# EXPERIMENT NO. 3

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

**Procedure:**

1. **Creation Of Instance**

- 

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

| | | | | | |
|---|---|---|---|---|---|
| Instances (running) | - | Auto Scaling Groups | 1 | Capacity Reservations | 0 |
| Dedicated Hosts | - | Elastic IPs | - | Instances | - |
| Key pairs | - | Load balancers | 0 | Placement groups | 0 |
| Security groups | - | Snapshots | 0 | Volumes | 4 |

Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

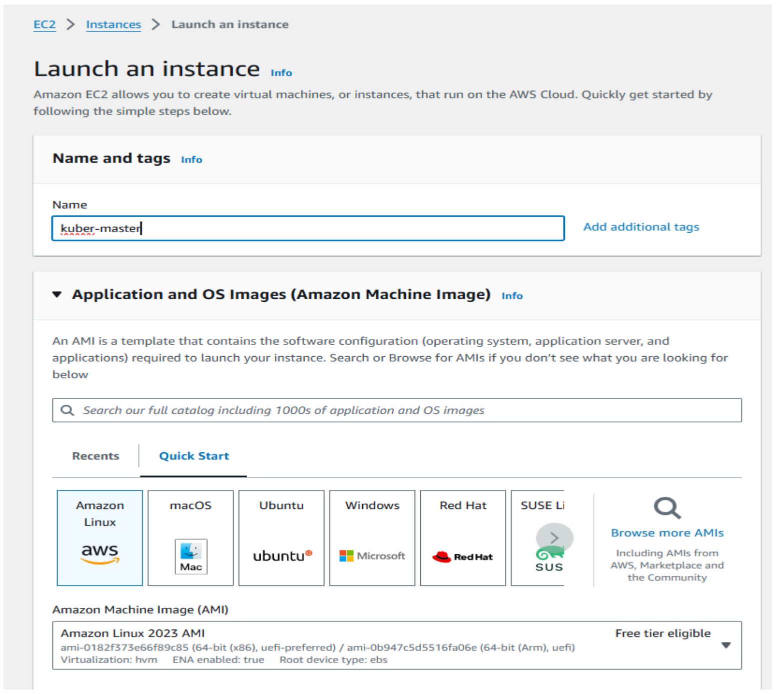
Note: Your instances will launch in the US East (N. Virginia) Region

Service health

Region: US East (N. Virginia)

Status: This service is operating normally.

Search EC-2 instance. Then create three EC-2 instances and choose Amazon Linux as OS and also allow ssh traffic from anywhere.



EC2 > Instances > Launch an instance

Launch an instance

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags

Name: kuber-master

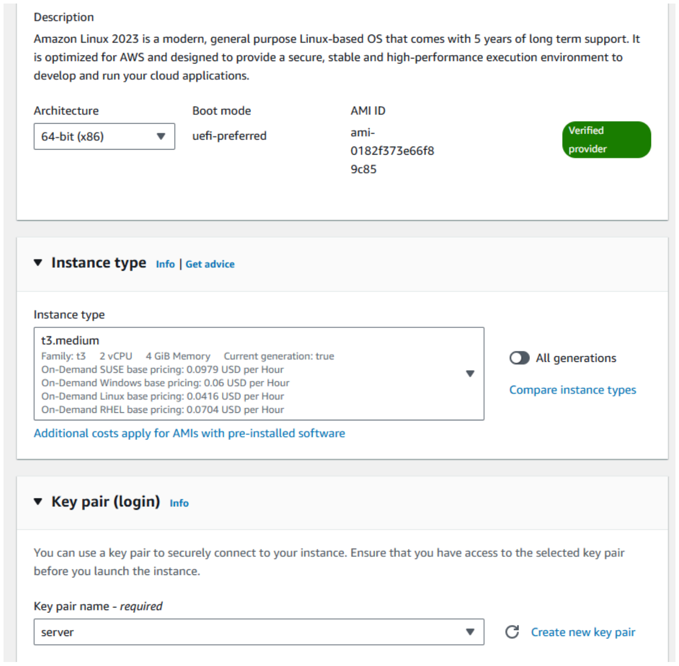
Application and OS Images (Amazon Machine Image)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Amazon Machine Image (AMI)

Amazon Linux 2023 AMI — Free tier eligible
ami-0182f373e66f89c85 (64-bit (x86), uefi-preferred) / ami-0b947c5d5516fa06e (64-bit (Arm), uefi)
Virtualization: hvm ENA enabled: true Root device type: ebs

Info
Add additional tags
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Li
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community



Description
Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.

| Architecture | Boot mode | AMI ID | |
|---|---|---|---|
| 64-bit (x86) | uefi-preferred | ami-0182f373e66f89c85 | Verified provider |

**Instance type** Info | Get advice

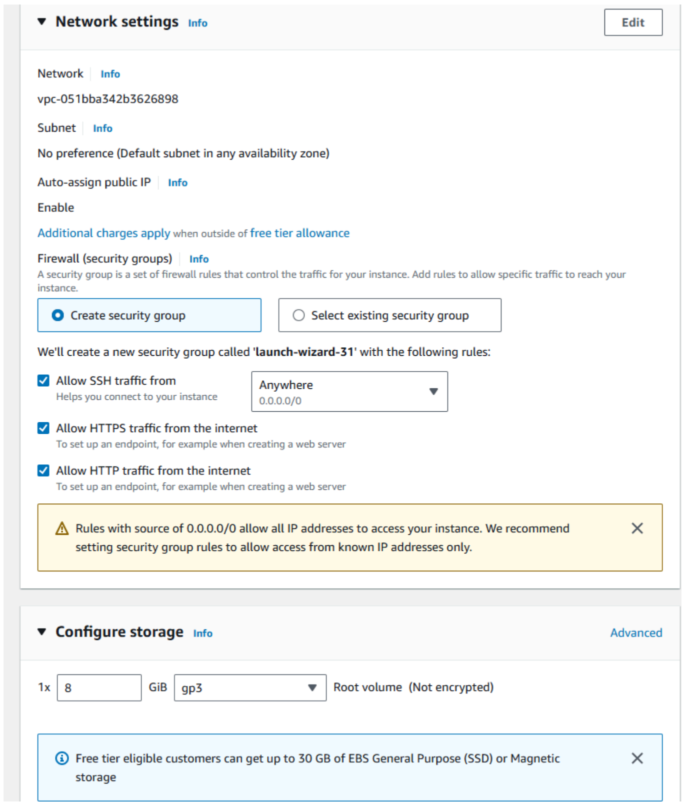
Instance type
t3.medium
Family: t3 2 vCPU 4 GiB Memory Current generation: true
On-Demand SUSE base pricing: 0.0979 USD per Hour
On-Demand Windows base pricing: 0.06 USD per Hour
On-Demand Linux base pricing: 0.0416 USD per Hour
On-Demand RHEL base pricing: 0.0704 USD per Hour

All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software

**Key pair (login)** Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*
server
Create new key pair



**Network settings** Info Edit

Network Info
vpc-051bba342b3626898

Subnet Info
No preference (Default subnet in any availability zone)

Auto-assign public IP Info
Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

[✓ Create security group] Select existing security group

We'll create a new security group called '**launch-wizard-31**' with the following rules:

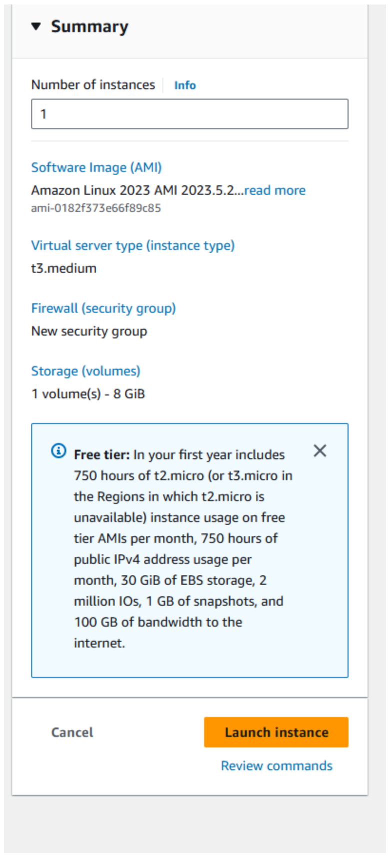
- [x] Allow SSH traffic from — Anywhere 0.0.0.0/0
  Helps you connect to your instance
- [x] Allow HTTPS traffic from the internet
  To set up an endpoint, for example when creating a web server
- [x] Allow HTTP traffic from the internet
  To set up an endpoint, for example when creating a web server

⚠ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

**Configure storage** Info Advanced

1x 8 GiB gp3 Root volume (Not encrypted)

ⓘ Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage



**Summary**

Number of instances Info
1

Software Image (AMI)
Amazon Linux 2023 AMI 2023.5.2...read more
ami-0182f373e66f89c85

Virtual server type (instance type)
t3.medium

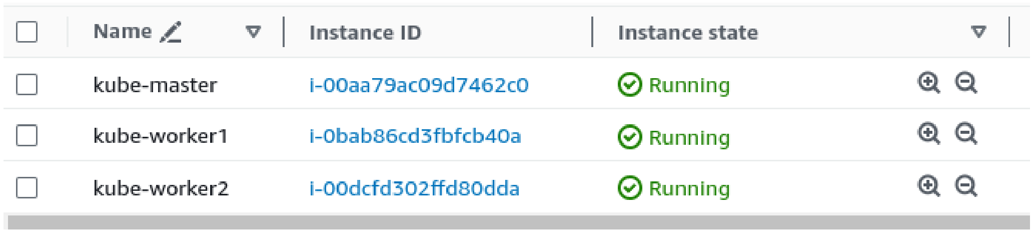
Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB

ⓘ **Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

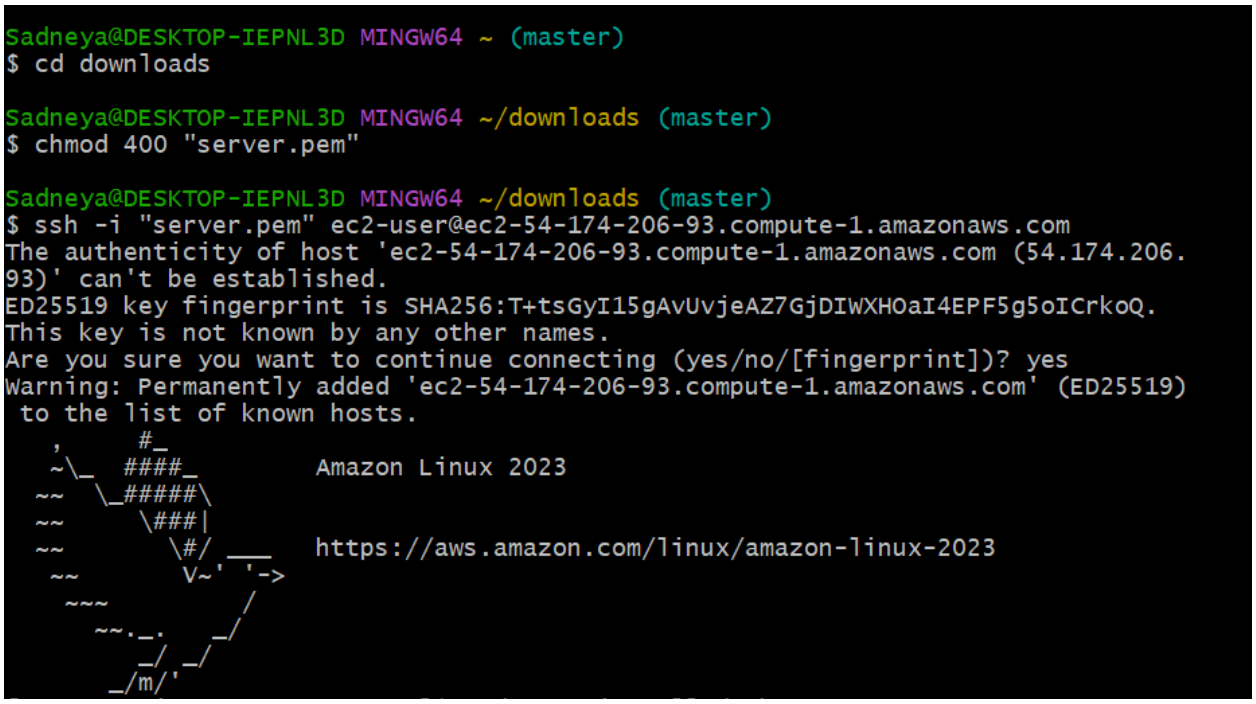
Cancel Launch instance
Review commands

To efficiently run kubernetes cluster select instance type of at least t3.medium as kubernetes recommends at least 2 vCPU to run smoothly on it.



| | Name | Instance ID | Instance state |
|---|---|---|---|
| ☐ | kube-master | i-00aa79ac09d7462c0 | Running |
| ☐ | kube-worker1 | i-0bab86cd3fbfcb40a | Running |
| ☐ | kube-worker2 | i-00dcfd302ffd80dda | Running |

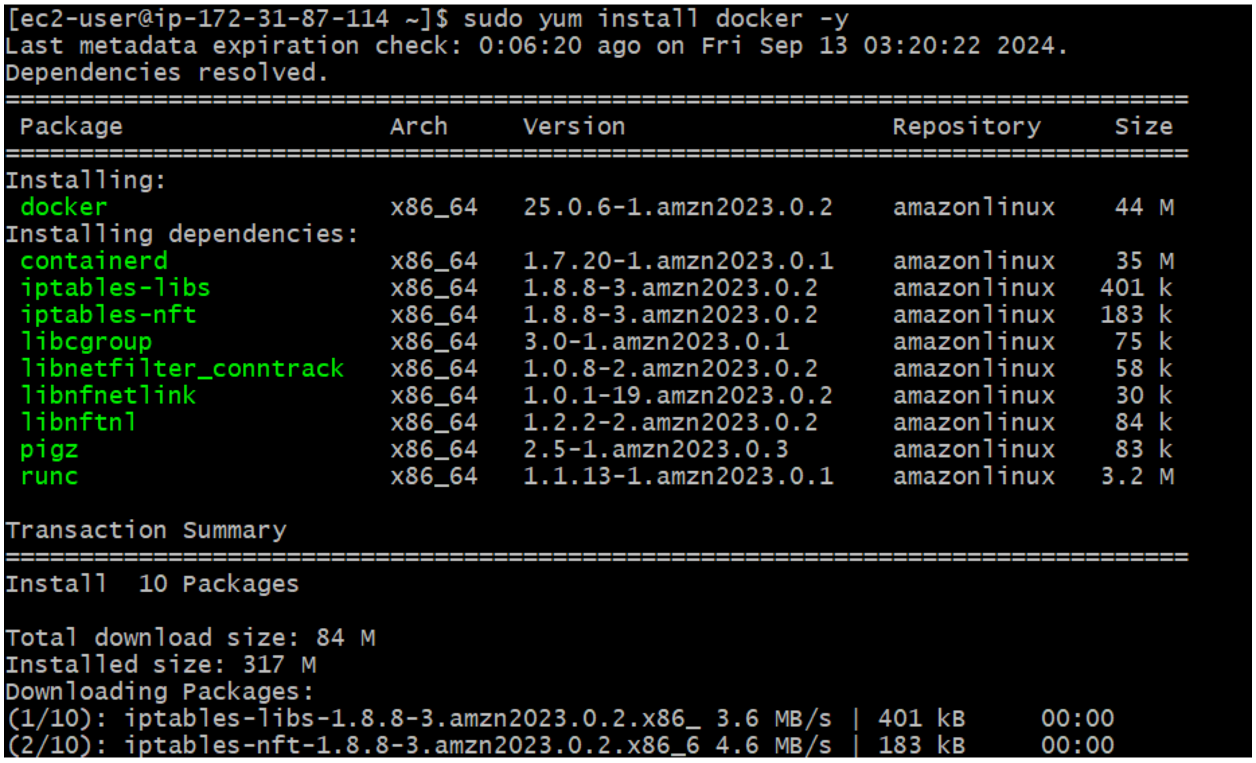
- Then for making connection through SSH into all 3 machines each in separate terminal Use this following command:
ssh -i <keyname>.pem ubuntu@<public_ip_address>  where keyname is name of the key you created here i created key server.pem and use public IP address.(I have entered this command on git bash where i entered in downloads where server.pem is stored then as the key is not accessible hence we need to change its mode using chmod 400 "key name.pem". Then use the given command for making connections).



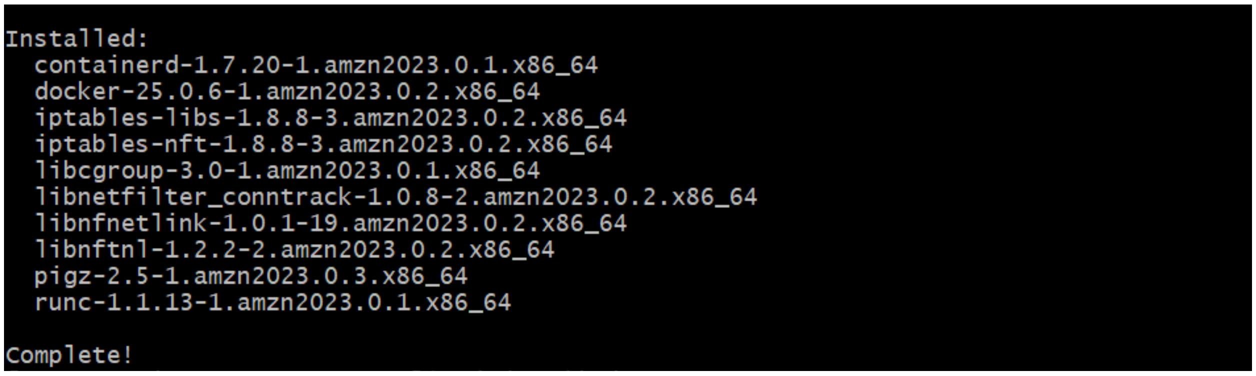
```
Sadneya@DESKTOP-IEPNL3D MINGW64 ~ (master)
$ cd downloads

Sadneya@DESKTOP-IEPNL3D MINGW64 ~/downloads (master)
$ chmod 400 "server.pem"

Sadneya@DESKTOP-IEPNL3D MINGW64 ~/downloads (master)
$ ssh -i "server.pem" ec2-user@ec2-54-174-206-93.compute-1.amazonaws.com
The authenticity of host 'ec2-54-174-206-93.compute-1.amazonaws.com (54.174.206.
93)' can't be established.
ED25519 key fingerprint is SHA256:T+tsGyI15gAvUvjeAZ7GjDIWXHOaI4EPF5g5oICrkoQ.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-54-174-206-93.compute-1.amazonaws.com' (ED25519)
 to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
```

## 2. Installation Of Docker on three machines

- For installation of Docker into all three machines run the following command:
  sudo yum install docker -y



```
[ec2-user@ip-172-31-87-114 ~]$ sudo yum install docker -y
Last metadata expiration check: 0:06:20 ago on Fri Sep 13 03:20:22 2024.
Dependencies resolved.
================================================================================
 Package                   Arch     Version                 Repository     Size
================================================================================
Installing:
 docker                    x86_64   25.0.6-1.amzn2023.0.2    amazonlinux    44 M
Installing dependencies:
 containerd                x86_64   1.7.20-1.amzn2023.0.1    amazonlinux    35 M
 iptables-libs             x86_64   1.8.8-3.amzn2023.0.2     amazonlinux   401 k
 iptables-nft              x86_64   1.8.8-3.amzn2023.0.2     amazonlinux   183 k
 libcgroup                 x86_64   3.0-1.amzn2023.0.1       amazonlinux    75 k
 libnetfilter_conntrack    x86_64   1.0.8-2.amzn2023.0.2     amazonlinux    58 k
 libnfnetlink              x86_64   1.0.1-19.amzn2023.0.2    amazonlinux    30 k
 libnftnl                  x86_64   1.2.2-2.amzn2023.0.2     amazonlinux    84 k
 pigz                      x86_64   2.5-1.amzn2023.0.3       amazonlinux    83 k
 runc                      x86_64   1.1.13-1.amzn2023.0.1    amazonlinux   3.2 M

Transaction Summary
================================================================================
Install  10 Packages

Total download size: 84 M
Installed size: 317 M
Downloading Packages:
(1/10): iptables-libs-1.8.8-3.amzn2023.0.2.x86_ 3.6 MB/s | 401 kB     00:00
(2/10): iptables-nft-1.8.8-3.amzn2023.0.2.x86_6 4.6 MB/s | 183 kB     00:00
```

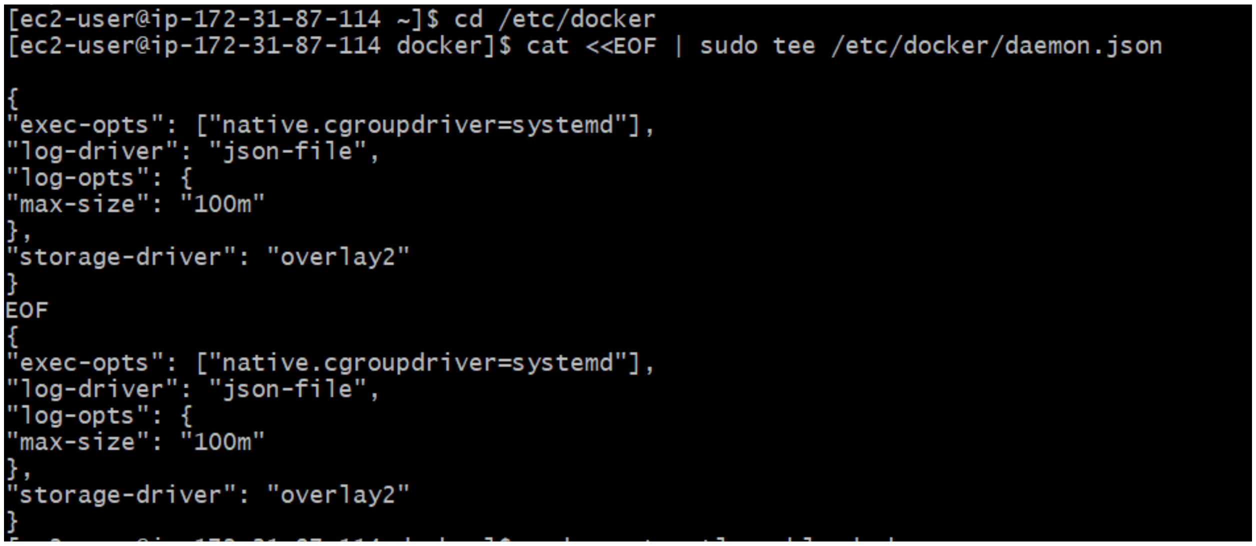


```
Installed:
  containerd-1.7.20-1.amzn2023.0.1.x86_64
  docker-25.0.6-1.amzn2023.0.2.x86_64
  iptables-libs-1.8.8-3.amzn2023.0.2.x86_64
  iptables-nft-1.8.8-3.amzn2023.0.2.x86_64
  libcgroup-3.0-1.amzn2023.0.1.x86_64
  libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64
  libnfnetlink-1.0.1-19.amzn2023.0.2.x86_64
  libnftnl-1.2.2-2.amzn2023.0.2.x86_64
  pigz-2.5-1.amzn2023.0.3.x86_64
  runc-1.1.13-1.amzn2023.0.1.x86_64

Complete!
```

- Then, configure cgroup in a daemon.json file by using following commands

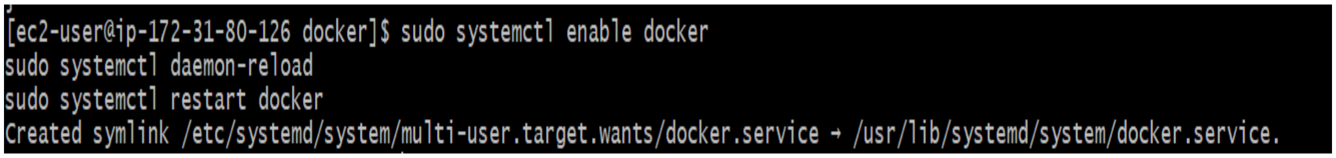
```
cd /etc/docker
cat <<EOF | sudo tee /etc/docker/daemon.json
{
"exec-opts": ["native.cgroupdriver=systemd"],
"log-driver": "json-file",
"log-opts": {
"max-size": "100m"
},
```

"storage-driver": "overlay2"
}
EOF



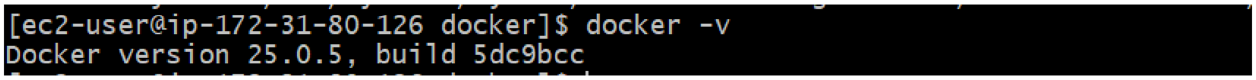
```
[ec2-user@ip-172-31-87-114 ~]$ cd /etc/docker
[ec2-user@ip-172-31-87-114 docker]$ cat <<EOF | sudo tee /etc/docker/daemon.json

{
"exec-opts": ["native.cgroupdriver=systemd"],
"log-driver": "json-file",
"log-opts": {
"max-size": "100m"
},
"storage-driver": "overlay2"
}
EOF
{
"exec-opts": ["native.cgroupdriver=systemd"],
"log-driver": "json-file",
"log-opts": {
"max-size": "100m"
},
"storage-driver": "overlay2"
}
```

- Then after this run the following command to enable and start docker and also to load the daemon.json file.
  sudo systemctl enable docker
  sudo systemctl daemon-reload
  sudo systemctl restart docker



```
[ec2-user@ip-172-31-80-126 docker]$ sudo systemctl enable docker
sudo systemctl daemon-reload
sudo systemctl restart docker
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
```

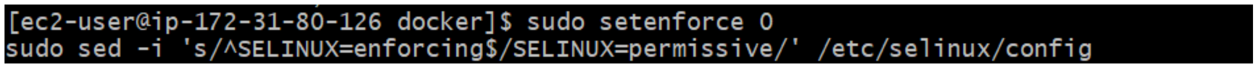
- Then check the version of docker installed.
  docker -v



```
[ec2-user@ip-172-31-80-126 docker]$ docker -v
Docker version 25.0.5, build 5dc9bcc
```

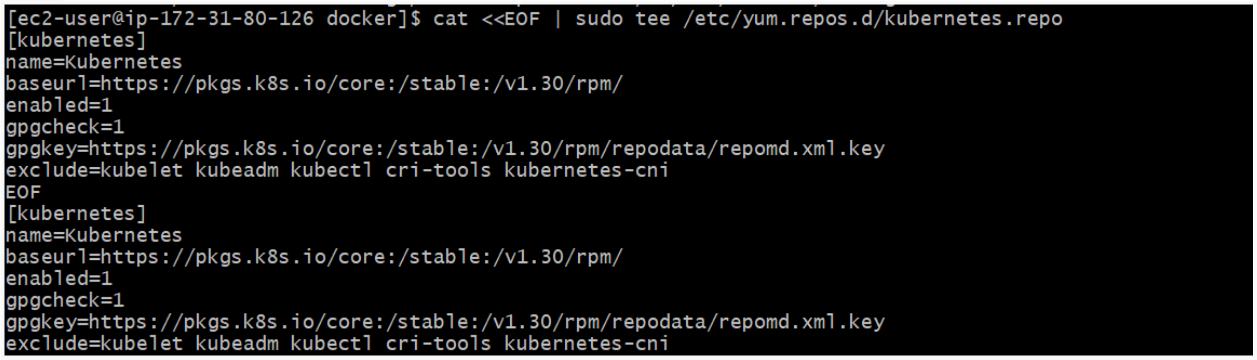
3. **Installation Of Kubernetes on three machines**

- SELinux needs to be disable before configuring kubelet thus run the following command
  sudo setenforce 0
  sudo sed -i 's/^SELINUX=enforcing$/SELINUX=permissive/' /etc/selinux/config



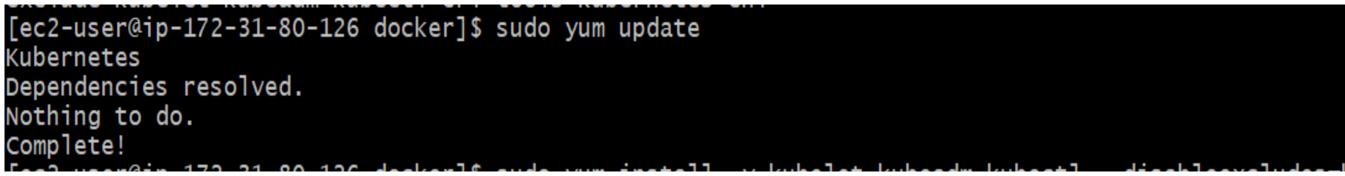
```
[ec2-user@ip-172-31-80-126 docker]$ sudo setenforce 0
sudo sed -i 's/^SELINUX=enforcing$/SELINUX=permissive/' /etc/selinux/config
```

- Here We are adding kubernetes using the repository whose command is given below.
  cat <<EOF | sudo tee /etc/yum.repos.d/kubernetes.repo
  [kubernetes]
  name=Kubernetes
  baseurl=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/
  enabled=1
  gpgcheck=1
  gpgkey=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/repodata/repomd.xml.key
  exclude=kubelet kubeadm kubectl cri-tools kubernetes-cni
  EOF



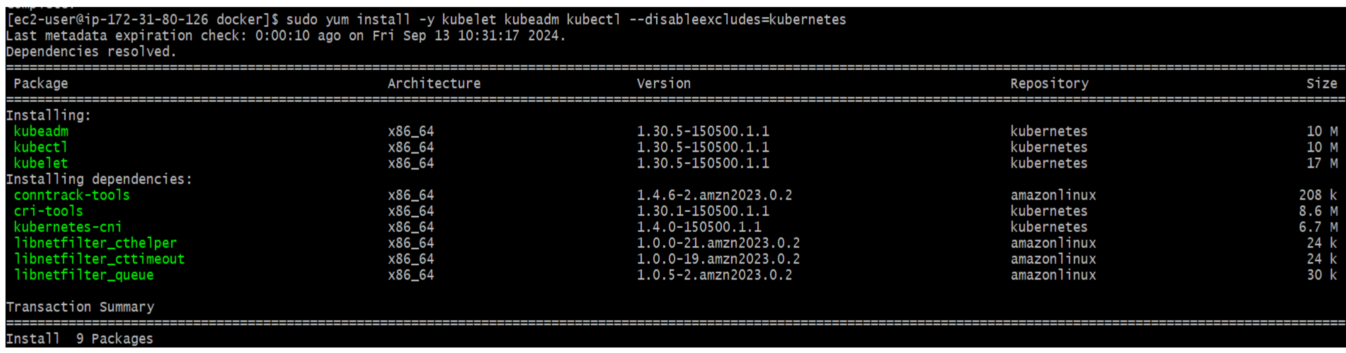
```
[ec2-user@ip-172-31-80-126 docker]$ cat <<EOF | sudo tee /etc/yum.repos.d/kubernetes.repo
[kubernetes]
name=Kubernetes
baseurl=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/
enabled=1
gpgcheck=1
gpgkey=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/repodata/repomd.xml.key
exclude=kubelet kubeadm kubectl cri-tools kubernetes-cni
EOF
[kubernetes]
name=Kubernetes
baseurl=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/
enabled=1
gpgcheck=1
gpgkey=https://pkgs.k8s.io/core:/stable:/v1.30/rpm/repodata/repomd.xml.key
exclude=kubelet kubeadm kubectl cri-tools kubernetes-cni
```

- After that Run following command to make the updation and also to install kubelet ,kubeadm, kubectl: sudo yum update

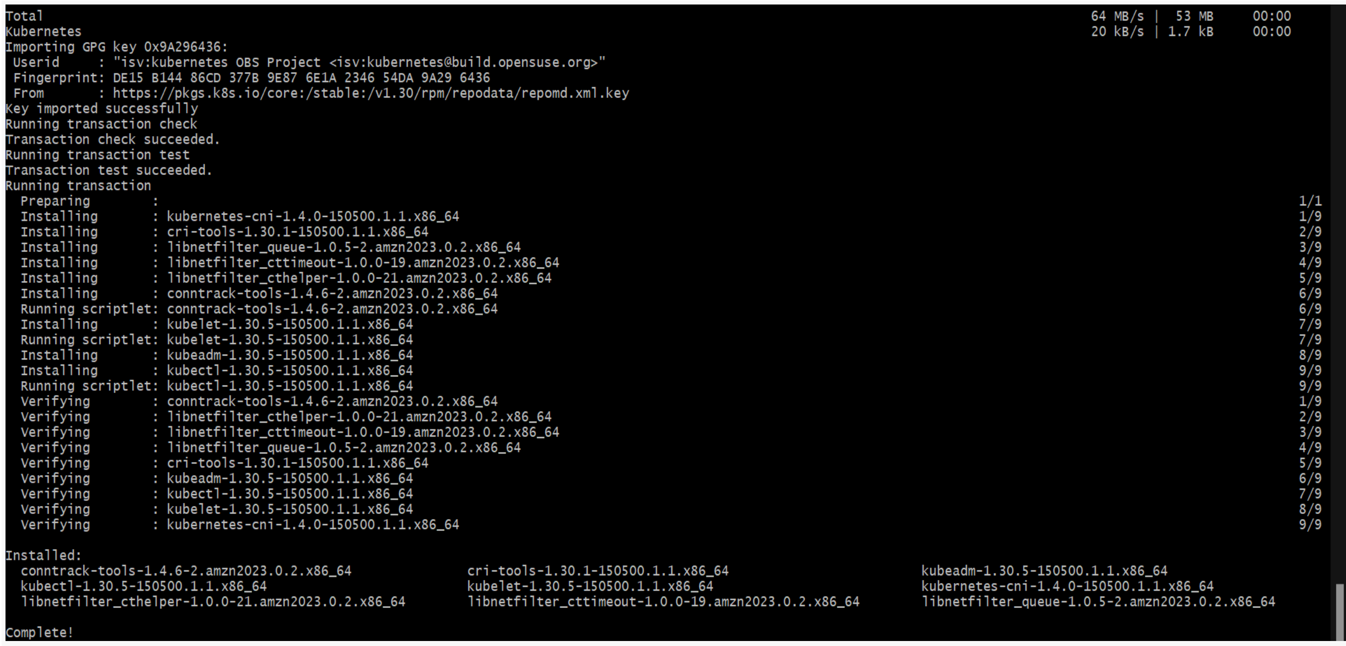


```
[ec2-user@ip-172-31-80-126 docker]$ sudo yum update
Kubernetes
Dependencies resolved.
Nothing to do.
Complete!
```

sudo yum install -y kubelet kubeadm kubectl --disableexcludes=kubernetes

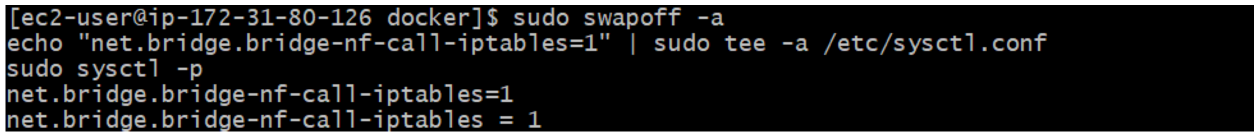


```
[ec2-user@ip-172-31-80-126 docker]$ sudo yum install -y kubelet kubeadm kubectl --disableexcludes=kubernetes
Last metadata expiration check: 0:00:10 ago on Fri Sep 13 10:31:17 2024.
Dependencies resolved.
==============================================================================================================================================================
 Package                                     Architecture                   Version                                        Repository                    Size
==============================================================================================================================================================
Installing:
 kubeadm                                     x86_64                         1.30.5-150500.1.1                              kubernetes                    10 M
 kubectl                                     x86_64                         1.30.5-150500.1.1                              kubernetes                    10 M
 kubelet                                     x86_64                         1.30.5-150500.1.1                              kubernetes                    17 M
Installing dependencies:
 conntrack-tools                             x86_64                         1.4.6-2.amzn2023.0.2                           amazonlinux                  208 k
 cri-tools                                   x86_64                         1.30.1-150500.1.1                              kubernetes                   8.6 M
 kubernetes-cni                              x86_64                         1.4.0-150500.1.1                               kubernetes                   6.7 M
 libnetfilter_cthelper                       x86_64                         1.0.0-21.amzn2023.0.2                          amazonlinux                   24 k
 libnetfilter_cttimeout                      x86_64                         1.0.0-19.amzn2023.0.2                          amazonlinux                   24 k
 libnetfilter_queue                          x86_64                         1.0.5-2.amzn2023.0.2                           amazonlinux                   30 k

Transaction Summary
==============================================================================================================================================================
Install  9 Packages
```



```
Total                                                                                                                        64 MB/s |  53 MB     00:00
Kubernetes                                                                                                                   20 kB/s | 1.7 kB     00:00
Importing GPG key 0x9A296436:
 Userid     : "isv:kubernetes OBS Project <isv:kubernetes@build.opensuse.org>"
 Fingerprint: DE15 B144 86CD 377B 9E87 6E1A 2346 54DA 9A29 6436
 From       : https://pkgs.k8s.io/core:/stable:/v1.30/rpm/repodata/repomd.xml.key
Key imported successfully
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                                                                                                    1/1
  Installing       : kubernetes-cni-1.4.0-150500.1.1.x86_64                                                                                             1/9
  Installing       : cri-tools-1.30.1-150500.1.1.x86_64                                                                                                 2/9
  Installing       : libnetfilter_queue-1.0.5-2.amzn2023.0.2.x86_64                                                                                     3/9
  Installing       : libnetfilter_cttimeout-1.0.0-19.amzn2023.0.2.x86_64                                                                                4/9
  Installing       : libnetfilter_cthelper-1.0.0-21.amzn2023.0.2.x86_64                                                                                 5/9
  Installing       : conntrack-tools-1.4.6-2.amzn2023.0.2.x86_64                                                                                        6/9
  Running scriptlet: conntrack-tools-1.4.6-2.amzn2023.0.2.x86_64                                                                                        6/9
  Installing       : kubelet-1.30.5-150500.1.1.x86_64                                                                                                   7/9
  Running scriptlet: kubelet-1.30.5-150500.1.1.x86_64                                                                                                   7/9
  Installing       : kubeadm-1.30.5-150500.1.1.x86_64                                                                                                   8/9
  Installing       : kubectl-1.30.5-150500.1.1.x86_64                                                                                                   9/9
  Running scriptlet: kubectl-1.30.5-150500.1.1.x86_64                                                                                                   9/9
  Verifying        : conntrack-tools-1.4.6-2.amzn2023.0.2.x86_64                                                                                        1/9
  Verifying        : libnetfilter_cthelper-1.0.0-21.amzn2023.0.2.x86_64                                                                                 2/9
  Verifying        : libnetfilter_cttimeout-1.0.0-19.amzn2023.0.2.x86_64                                                                                3/9
  Verifying        : libnetfilter_queue-1.0.5-2.amzn2023.0.2.x86_64                                                                                     4/9
  Verifying        : cri-tools-1.30.1-150500.1.1.x86_64                                                                                                 5/9
  Verifying        : kubeadm-1.30.5-150500.1.1.x86_64                                                                                                   6/9
  Verifying        : kubectl-1.30.5-150500.1.1.x86_64                                                                                                   7/9
  Verifying        : kubelet-1.30.5-150500.1.1.x86_64                                                                                                   8/9
  Verifying        : kubernetes-cni-1.4.0-150500.1.1.x86_64                                                                                             9/9

Installed:
  conntrack-tools-1.4.6-2.amzn2023.0.2.x86_64              cri-tools-1.30.1-150500.1.1.x86_64                       kubeadm-1.30.5-150500.1.1.x86_64
  kubectl-1.30.5-150500.1.1.x86_64                         kubelet-1.30.5-150500.1.1.x86_64                         kubernetes-cni-1.4.0-150500.1.1.x86_64
  libnetfilter_cthelper-1.0.0-21.amzn2023.0.2.x86_64       libnetfilter_cttimeout-1.0.0-19.amzn2023.0.2.x86_64      libnetfilter_queue-1.0.5-2.amzn2023.0.2.x86_64

Complete!
```

- After installing Kubernetes, we need to configure internet options to allow bridging.
    1. sudo swapoff -a
    2. echo "net.bridge.bridge-nf-call-iptables=1" | sudo tee -a /etc/sysctl.conf
    3. sudo sysctl -p

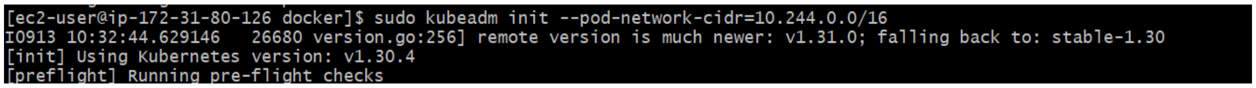


```
[ec2-user@ip-172-31-80-126 docker]$ sudo swapoff -a
echo "net.bridge.bridge-nf-call-iptables=1" | sudo tee -a /etc/sysctl.conf
sudo sysctl -p
net.bridge.bridge-nf-call-iptables=1
net.bridge.bridge-nf-call-iptables = 1
```

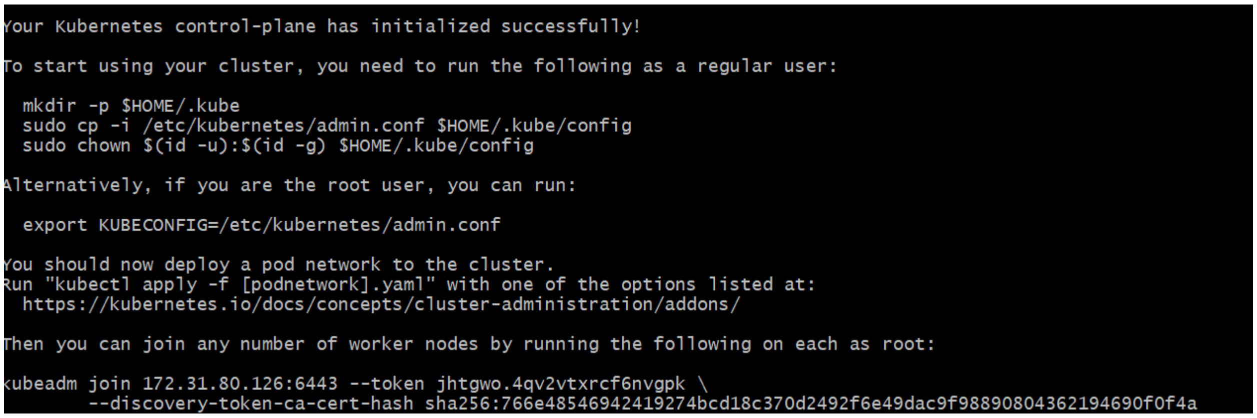
4. **Perform this ONLY on the Master machine**

- Initialize kubernetes by typing below command

  sudo kubeadm init --pod-network-cidr=10.244.0.0/16 --ignore-preflight-errors=all



```
[ec2-user@ip-172-31-80-126 docker]$ sudo kubeadm init --pod-network-cidr=10.244.0.0/16
I0913 10:32:44.629146   26680 version.go:256] remote version is much newer: v1.31.0; falling back to: stable-1.30
[init] Using Kubernetes version: v1.30.4
[preflight] Running pre-flight checks
```

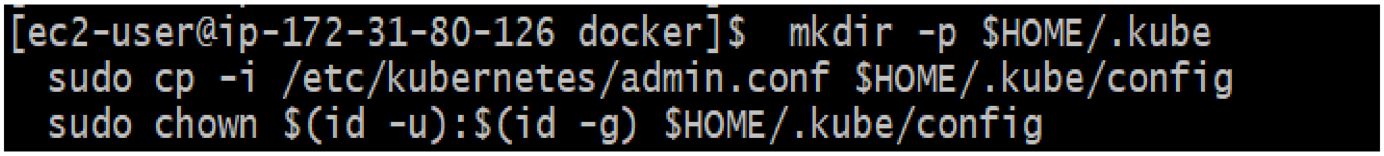


```
Your Kubernetes control-plane has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

  mkdir -p $HOME/.kube
  sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
  sudo chown $(id -u):$(id -g) $HOME/.kube/config

Alternatively, if you are the root user, you can run:

  export KUBECONFIG=/etc/kubernetes/admin.conf

You should now deploy a pod network to the cluster.
Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:
  https://kubernetes.io/docs/concepts/cluster-administration/addons/

Then you can join any number of worker nodes by running the following on each as root:

kubeadm join 172.31.80.126:6443 --token jhtgwo.4qv2vtxrcf6nvgpk \
        --discovery-token-ca-cert-hash sha256:766e48546942419274bcd18c370d2492f6e49dac9f98890804362194690f0f4a
```

- So after initialization you will get token at the end for joining master and worker. Like here I got this :(save this token as it is required later.Then you can join any number of worker nodes by running the following on each as root.)

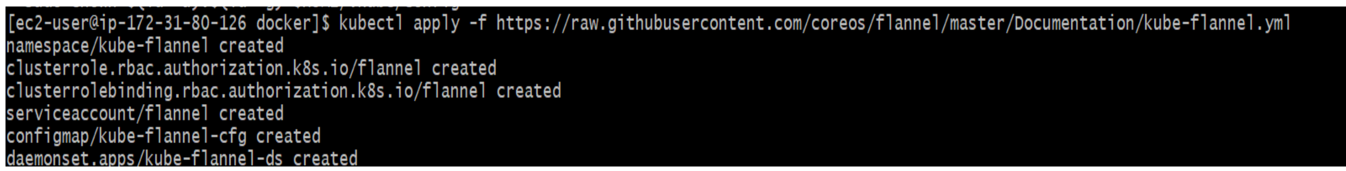
  kubeadm join 172.31.80.126:6443 --token jhtgwo.4qv2vtxrcf6nvgpk\
  --discovery-token-ca-cert-hash
  sha256:766e48546942419274bcd18c370d2492f6e49dac9f98890804362194690f0f4a

- Also,Copy the mkdir and chown commands from the top and execute them
  mkdir -p $HOME/.kube
  sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
  sudo chown $(id -u):$(id -g) $HOME/.kube/config



```
[ec2-user@ip-172-31-80-126 docker]$  mkdir -p $HOME/.kube
  sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
  sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

- Then, add a common networking plugin called flammel file as mentioned in the code.
  kubectl apply -f
  https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml



```
[ec2-user@ip-172-31-80-126 docker]$ kubectl apply -f https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml
namespace/kube-flannel created
clusterrole.rbac.authorization.k8s.io/flannel created
clusterrolebinding.rbac.authorization.k8s.io/flannel created
serviceaccount/flannel created
configmap/kube-flannel-cfg created
daemonset.apps/kube-flannel-ds created
```

- Now to Check the created pod use this command
  kubectl get pods

5. **Perform this ONLY on the worker machines**

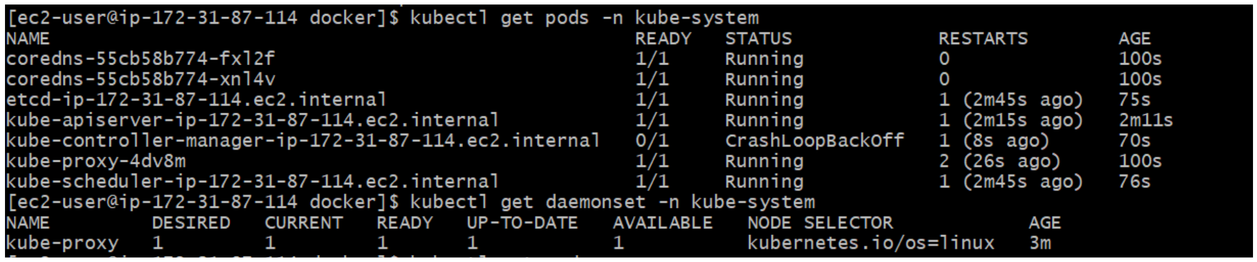
Paste the below command on all 2 worker machines
- sudo yum install iproute-tc -y
- sudo systemctl enable kubelet
- sudo systemctl restart kubelet

Now use this
kubeadm join 172.31.80.126:6443 --token jhtgwo.4qv2vtxrcf6nvgpk\
--discovery-token-ca-cert-hash
sha256:766e48546942419274bcd18c370d2492f6e49dac9f98890804362194690f0f4a

(Optional To check the status of pods executed these commands:

Kubectl get pods -n kube-system :gives status of all pods

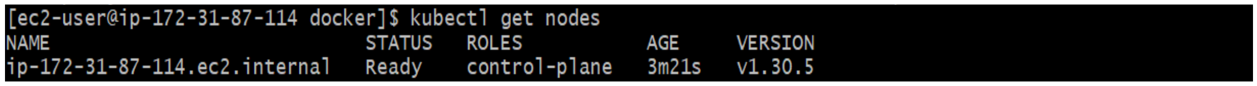
Kubectl get daemonstat -n kube-system: gives status of pod named daemonstat



```
[ec2-user@ip-172-31-87-114 docker]$ kubectl get pods -n kube-system
NAME                                                   READY   STATUS             RESTARTS        AGE
coredns-55cb58b774-fxl2f                               1/1     Running            0               100s
coredns-55cb58b774-xnl4v                               1/1     Running            0               100s
etcd-ip-172-31-87-114.ec2.internal                     1/1     Running            1 (2m45s ago)   75s
kube-apiserver-ip-172-31-87-114.ec2.internal           1/1     Running            1 (2m15s ago)   2m11s
kube-controller-manager-ip-172-31-87-114.ec2.internal  0/1     CrashLoopBackOff   1 (8s ago)      70s
kube-proxy-4dv8m                                       1/1     Running            2 (26s ago)     100s
kube-scheduler-ip-172-31-87-114.ec2.internal           1/1     Running            1 (2m45s ago)   76s
[ec2-user@ip-172-31-87-114 docker]$ kubectl get daemonset -n kube-system
NAME         DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR            AGE
kube-proxy   1         1         1       1            1           kubernetes.io/os=linux   3m
```

)

Now to see whether master and workers get connected successfully or not run **kubectl get nodes** command on master machine



```
[ec2-user@ip-172-31-87-114 docker]$ kubectl get nodes
NAME                           STATUS   ROLES           AGE     VERSION
ip-172-31-87-114.ec2.internal  Ready    control-plane   3m21s   v1.30.5
```

**Conclusion:** In these EC-2 instance created successfully on AWS Linux. Then I installed docker ,kuberneted and then kubelet ,kubeadm, kubectl.Then on Master machine ,I initailized the kubernetes which given me the token which will be used for connection of master and workers.then on slave I installed iproute and enabled and restarted kubelet then i enter the token which i got from master but there was an issue in joint.that is why on output i just got of only one pc mater on performing command kubectl get nodes.