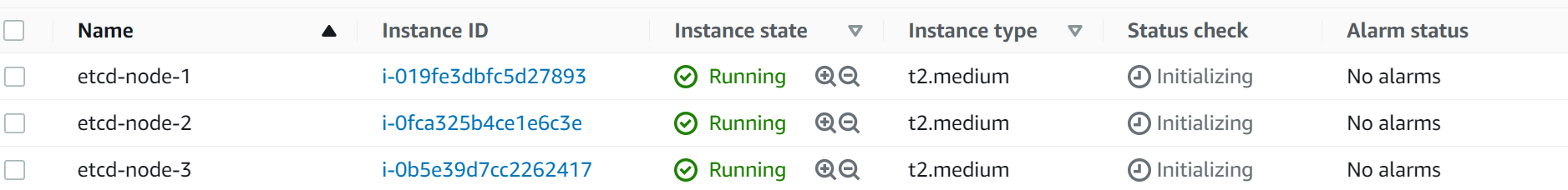
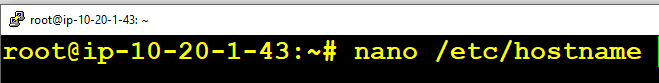
Deploying Highly Available ETCD Cluster on Ubuntu 20.04 for Kubernetes Cluster

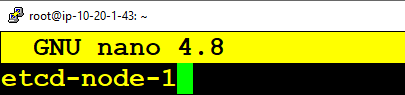
1. Create 3 servers in different availability zone using t2. medium.

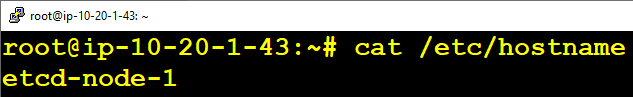


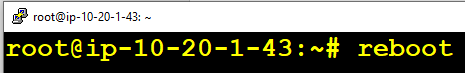
1. Update the hostname as shown below and reboot.

nano /etc/hostname

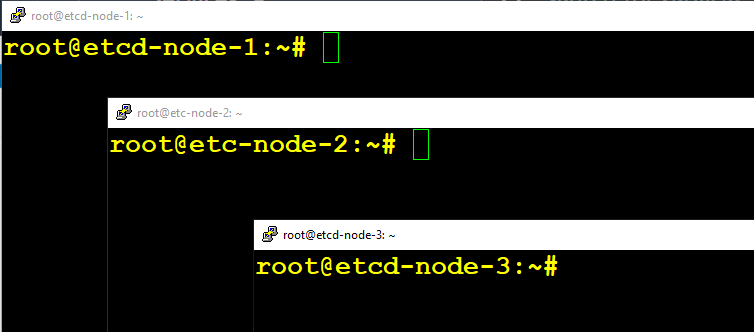




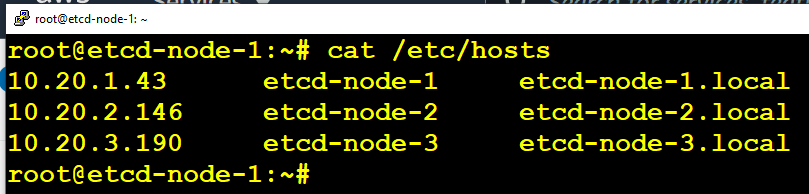


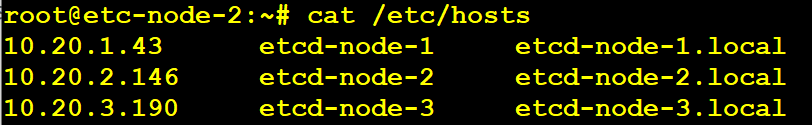


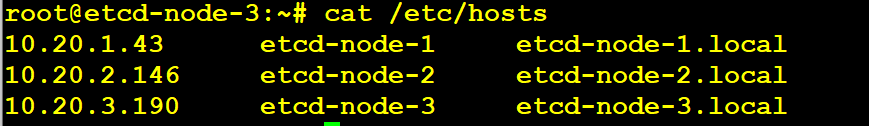
1. Follow the same steps on the other 2 nodes. As you can see all nodes are renamed.



1. Updates the /etc/hosts so that all 3 nodes reach other over the name.







1. Download and copy etcd and etcdctl binaries to all servers in /usr/local/bin location.

Download etcd latest version from <https://github.com/etcd-io/etcd/releases>

------------------------------------------------------------------------------------------------

ETCD\_VER=v3.5.1

GOOGLE\_URL=https://storage.googleapis.com/etcd

GITHUB\_URL=https://github.com/etcd-io/etcd/releases/download

DOWNLOAD\_URL=${GOOGLE\_URL}

curl -L ${DOWNLOAD\_URL}/${ETCD\_VER}/etcd-${ETCD\_VER}-linux-amd64.tar.gz -o /tmp/etcd-${ETCD\_VER}-linux-amd64.tar.gz

cd /tmp && ls -al

tar xzvf /tmp/etcd-${ETCD\_VER}-linux-amd64.tar.gz

mv /tmp/etcd-v3.5.1-linux-amd64/etcd\* /usr/local/bin/

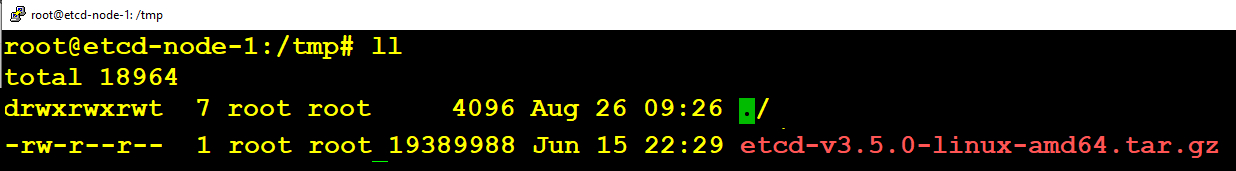
rm -f /tmp/etcd-${ETCD\_VER}-linux-amd64.tar.gz

rm -rf etcd-v3.5.1-linux-amd64

ls -al /usr/local/bin/

------------------------------------------------------------------------------------------------



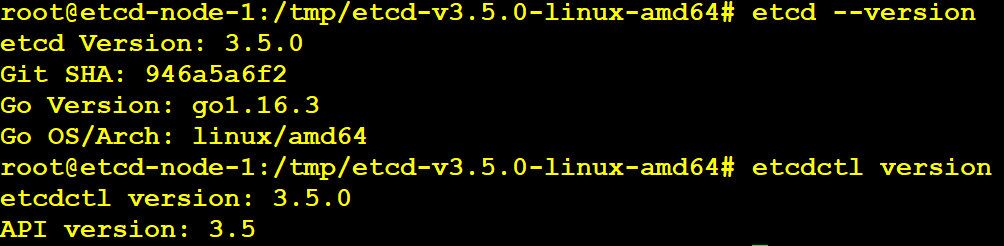




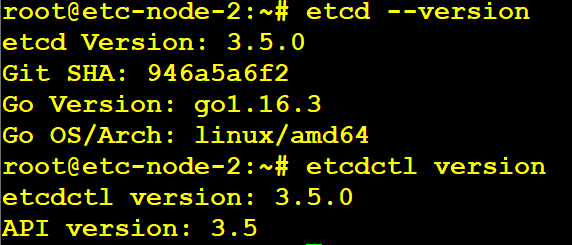
1. Moving etcd and etcdctl to /usr/local/bin

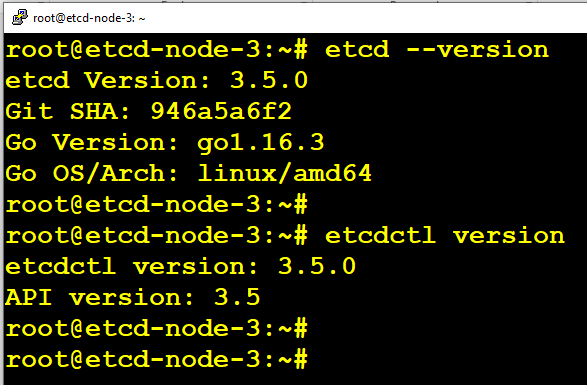


1. Check etcd and etcdctl version



1. Perform steps 5,6,7 in etcd-node-2 & etcd-node-3

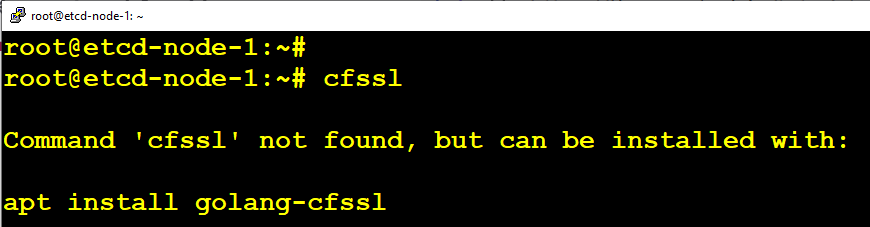




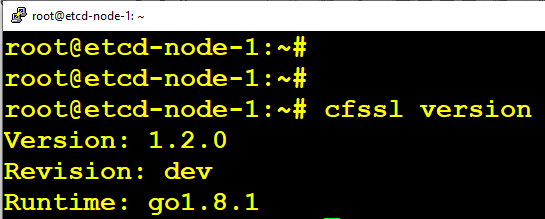
Generating certificates for ETCD Secure connectivity:

Installing Cloudflare SSL generation tool:

apt update && apt install -y golang-cfssl





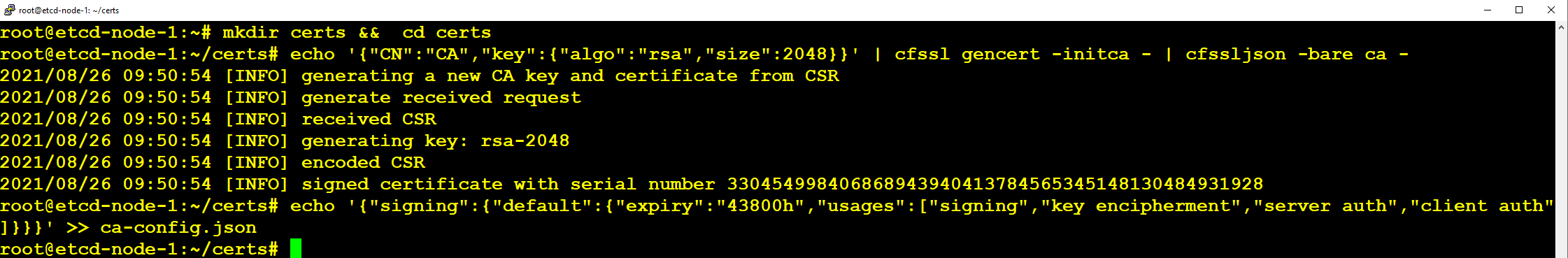


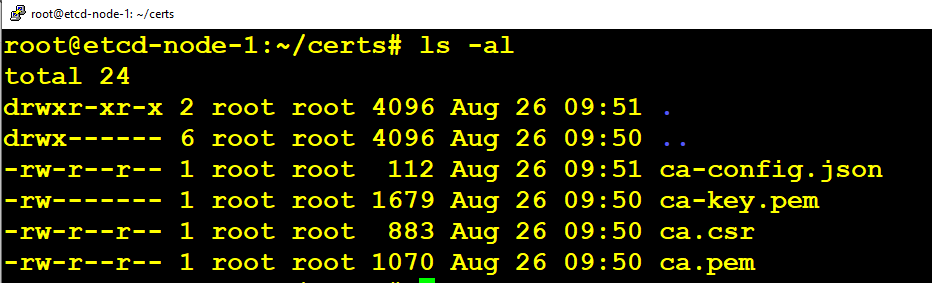
Generating Certificates for ETCD and Nodes:

mkdir certs && cd certs

echo '{"CN":"CA","key":{"algo":"rsa","size":2048}}' | cfssl gencert -initca - | cfssljson -bare ca -

echo '{"signing":{"default":{"expiry":"43800h","usages":["signing","key encipherment","server auth","client auth"]}}}' >> ca-config.json





Change NAME and ADDRESS in the below commands:

export NAME=etcd-node-1

export ADDRESS=10.20.1.43,$NAME

echo '{"CN":"'$NAME'","hosts":[""],"key":{"algo":"rsa","size":2048}}' | cfssl gencert -config=ca-config.json -ca=ca.pem -ca-key=ca-key.pem -hostname="$ADDRESS" - | cfssljson -bare $NAME

export NAME=etcd-node-2

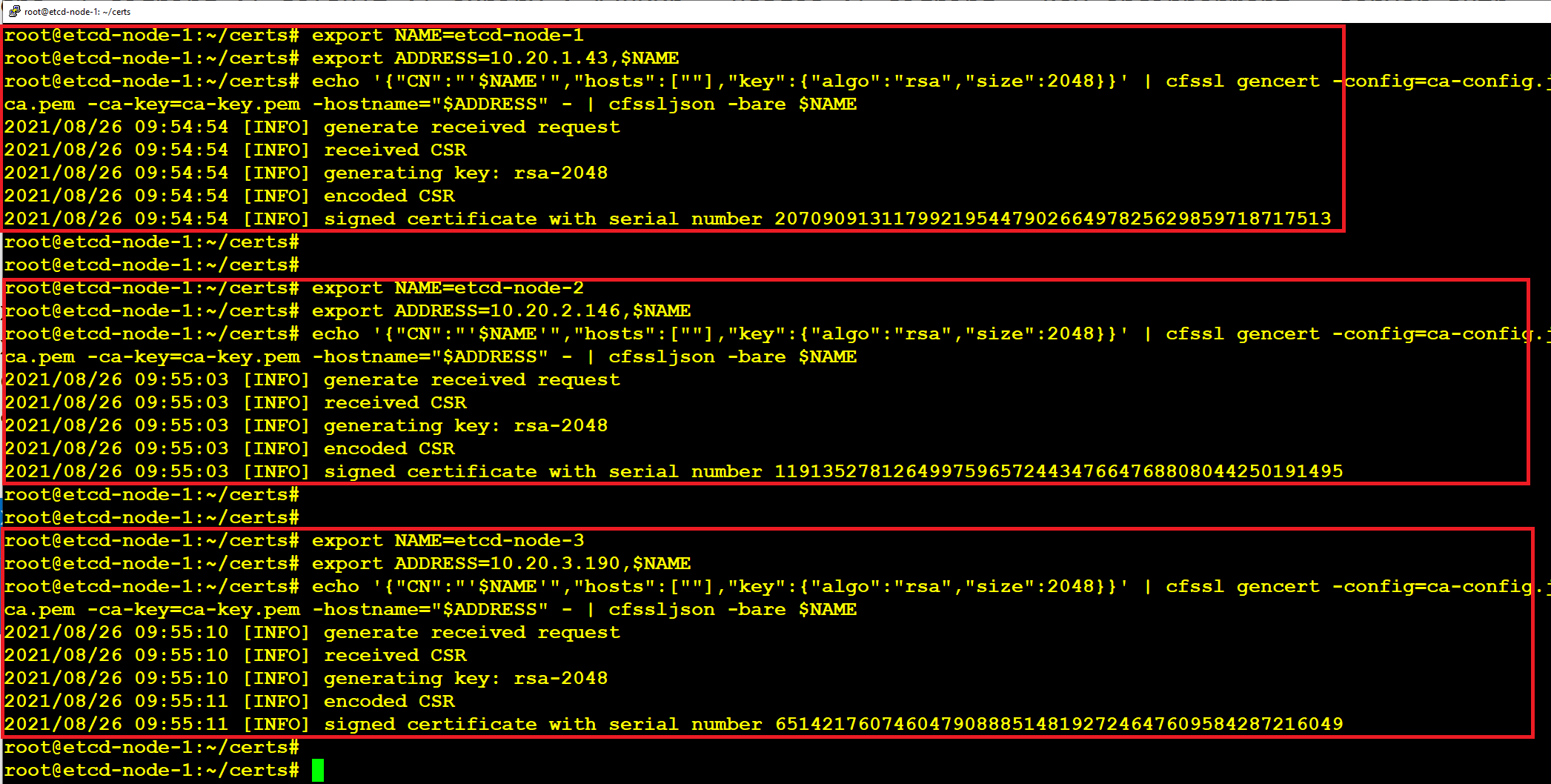
export ADDRESS=10.20.2.146,$NAME

echo '{"CN":"'$NAME'","hosts":[""],"key":{"algo":"rsa","size":2048}}' | cfssl gencert -config=ca-config.json -ca=ca.pem -ca-key=ca-key.pem -hostname="$ADDRESS" - | cfssljson -bare $NAME

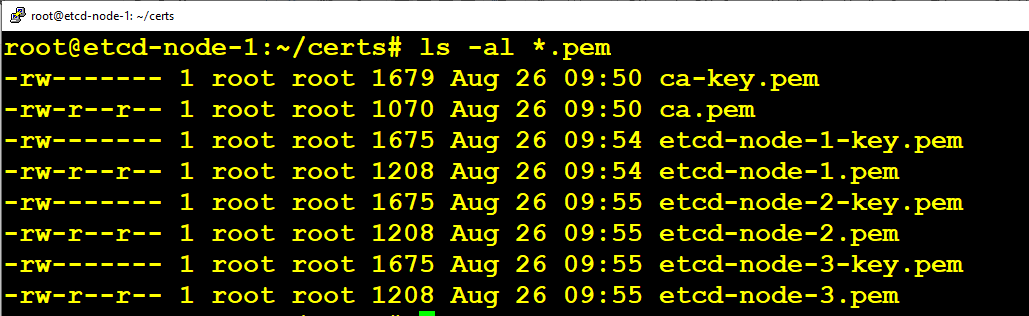
export NAME=etcd-node-3

export ADDRESS=10.20.3.190,$NAME

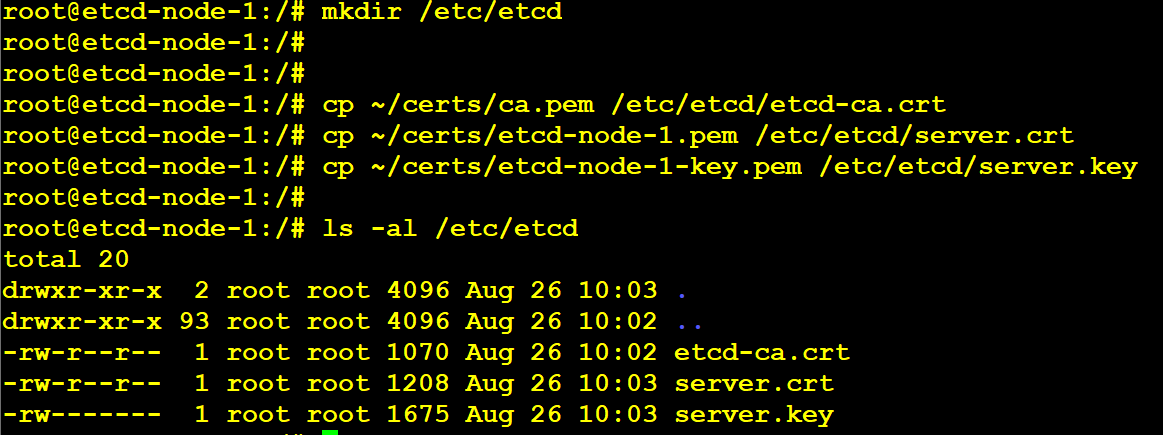
echo '{"CN":"'$NAME'","hosts":[""],"key":{"algo":"rsa","size":2048}}' | cfssl gencert -config=ca-config.json -ca=ca.pem -ca-key=ca-key.pem -hostname="$ADDRESS" - | cfssljson -bare $NAME



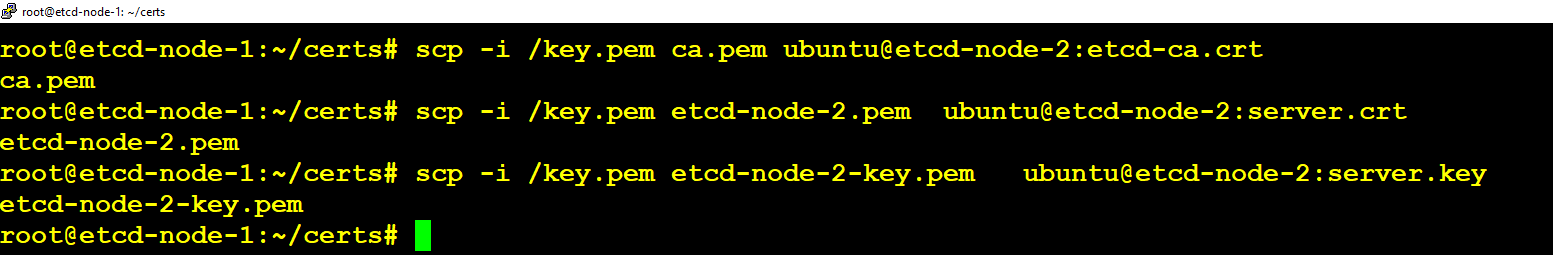
Following are the list of certificates created using CFSSL

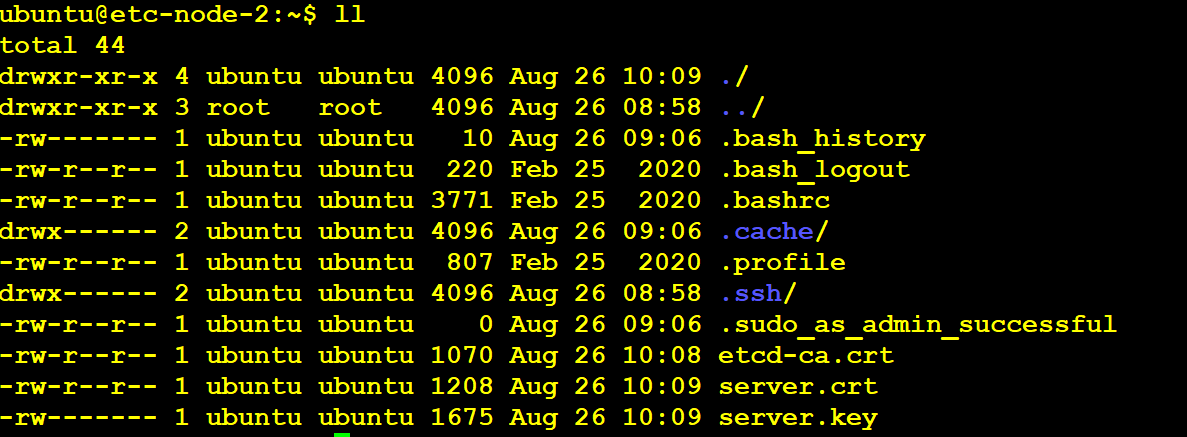


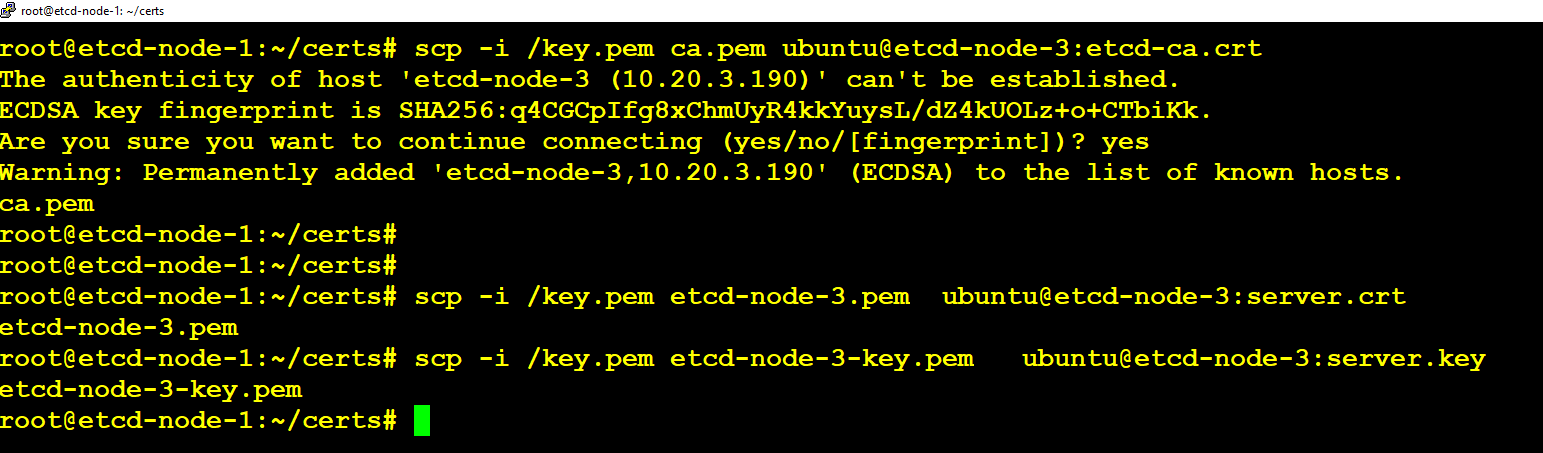
Create etcd directory under /etc folder. Copy certificates as shown below in to the nodes.

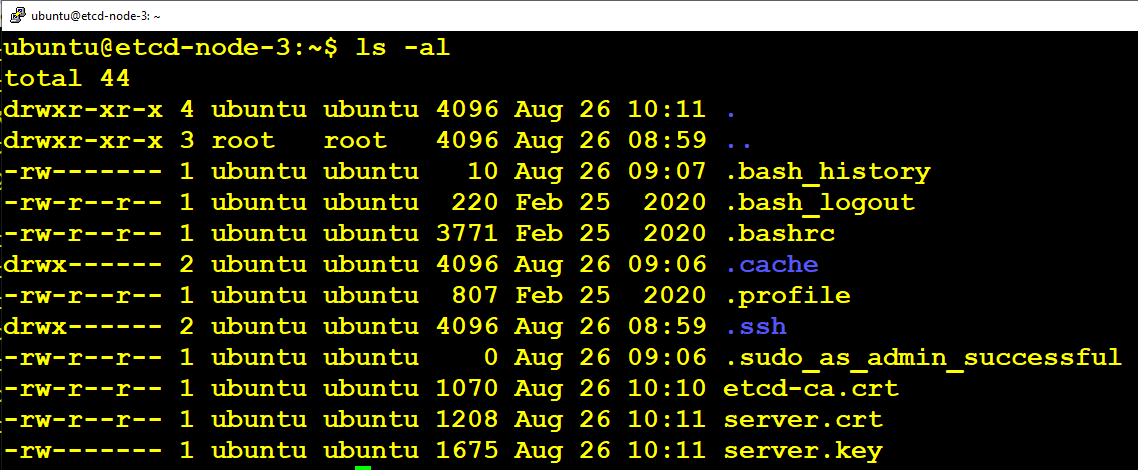


Copy the ca.pem and node.pem and node.key using SCP to other nodes.

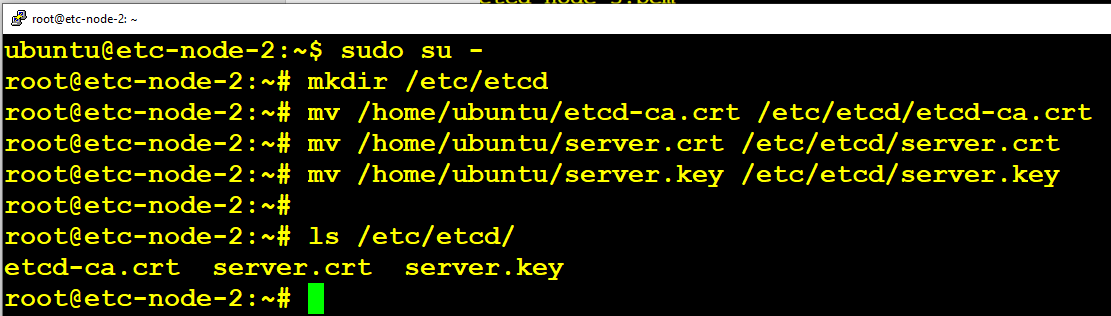


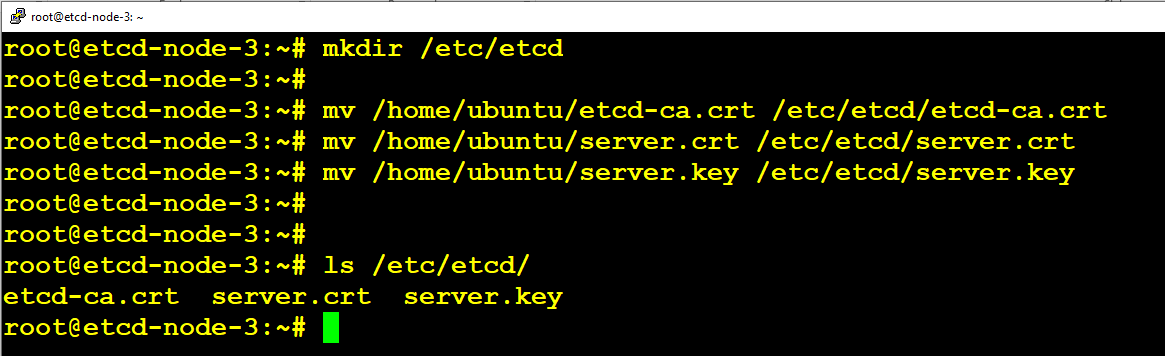






We need to move the certificates to /etc/etcd in etcd-node-2 & etcd-node-3





Need to create etcd.conf files for all the nodes inside /etc/etcd folder as shown below. Repalce name and IP as per your environment.

ETCD\_NAME=etcd-node-1

ETCD\_LISTEN\_PEER\_URLS="https://10.20.1.43:2380"

ETCD\_LISTEN\_CLIENT\_URLS="https://10.20.1.43:2379"

ETCD\_INITIAL\_CLUSTER\_TOKEN="etcd-cluster"

ETCD\_INITIAL\_CLUSTER="etcd-node-1=https://10.20.1.43:2380,etcd-node-2=https://10.20.2.146:2380,etcd-node-3=https://10.20.3.190:2380"

ETCD\_INITIAL\_ADVERTISE\_PEER\_URLS="https://10.20.1.43:2380"

ETCD\_ADVERTISE\_CLIENT\_URLS="https://10.20.1.43:2379"

ETCD\_TRUSTED\_CA\_FILE="/etc/etcd/etcd-ca.crt"

ETCD\_CERT\_FILE="/etc/etcd/server.crt"

ETCD\_KEY\_FILE="/etc/etcd/server.key"

ETCD\_PEER\_CLIENT\_CERT\_AUTH=true

ETCD\_PEER\_TRUSTED\_CA\_FILE="/etc/etcd/etcd-ca.crt"

ETCD\_PEER\_KEY\_FILE="/etc/etcd/server.key"

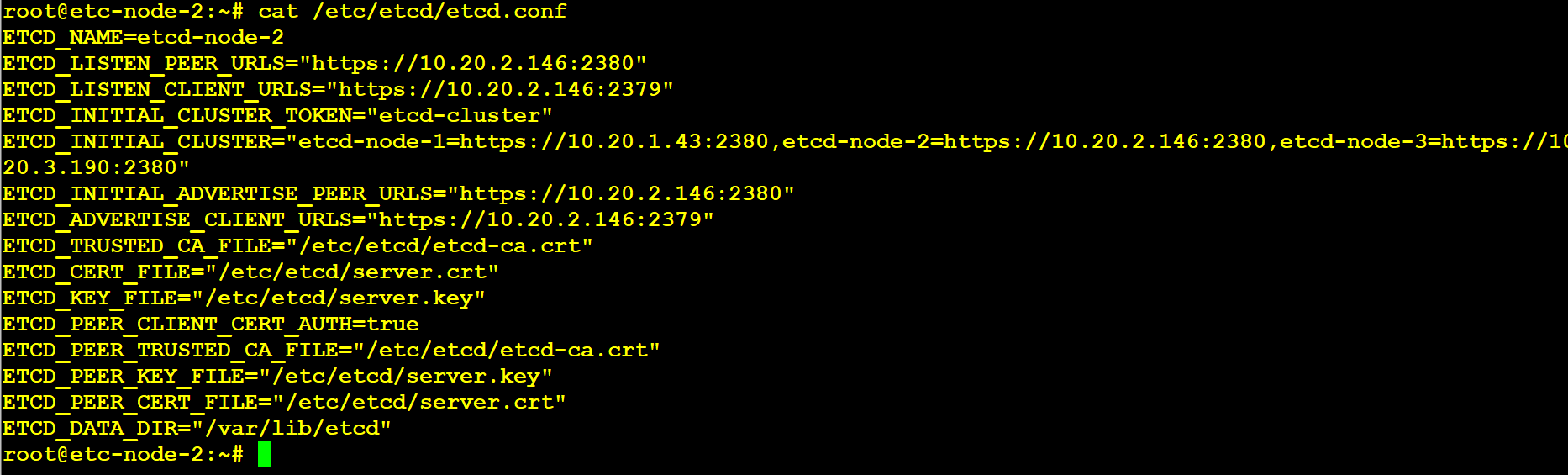
ETCD\_PEER\_CERT\_FILE="/etc/etcd/server.crt"

ETCD\_DATA\_DIR="/var/lib/etcd"

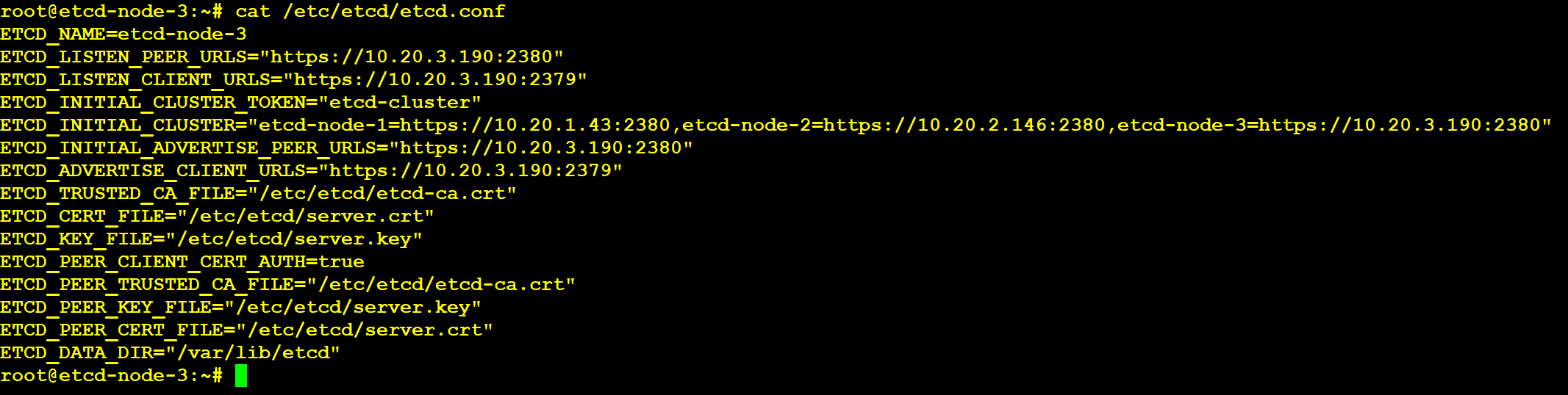
etcd-node-1 Configuration:



etcd-node-2 Configuration:



etcd-node-3 Configuration:



nano /lib/systemd/system/etcd.service

[Unit]

Description=etcd key-value store

Documentation=https://github.com/etcd-io/etcd

After=network.target

[Service]

Type=notify

EnvironmentFile=/etc/etcd/etcd.conf

ExecStart=/usr/local/bin/etcd

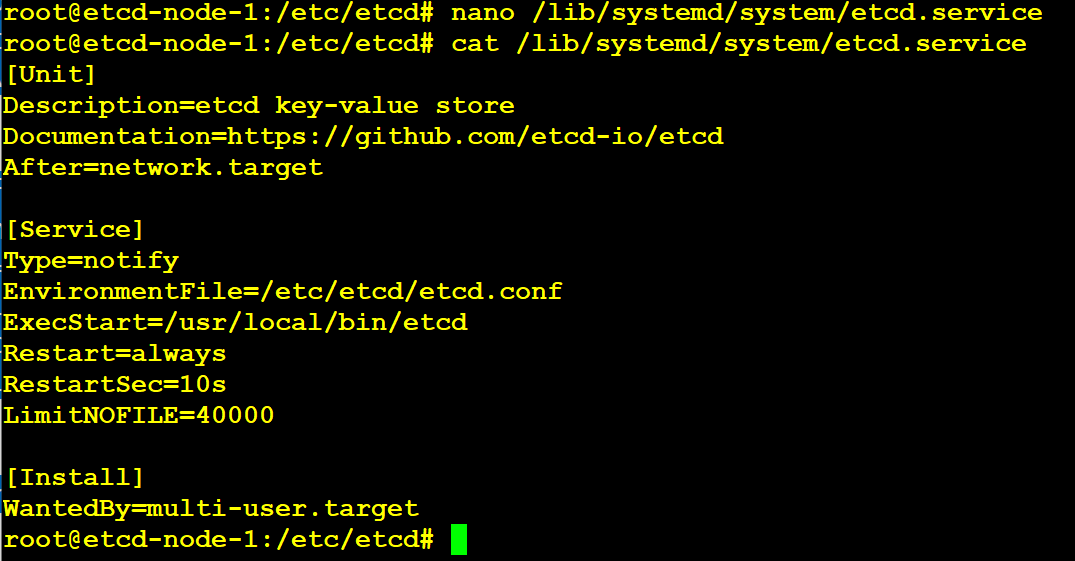
Restart=always

RestartSec=10s

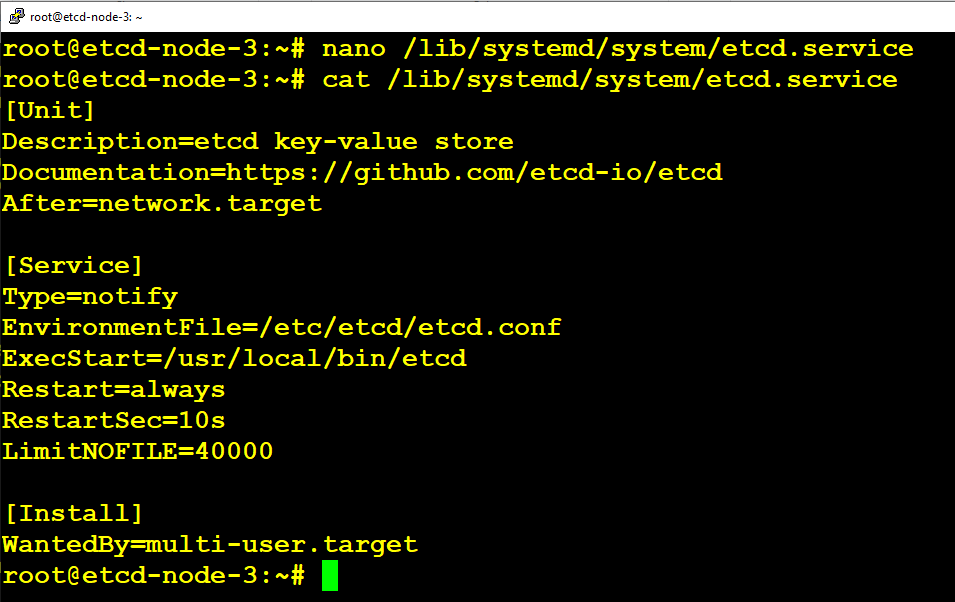
LimitNOFILE=40000

[Install]

WantedBy=multi-user.target







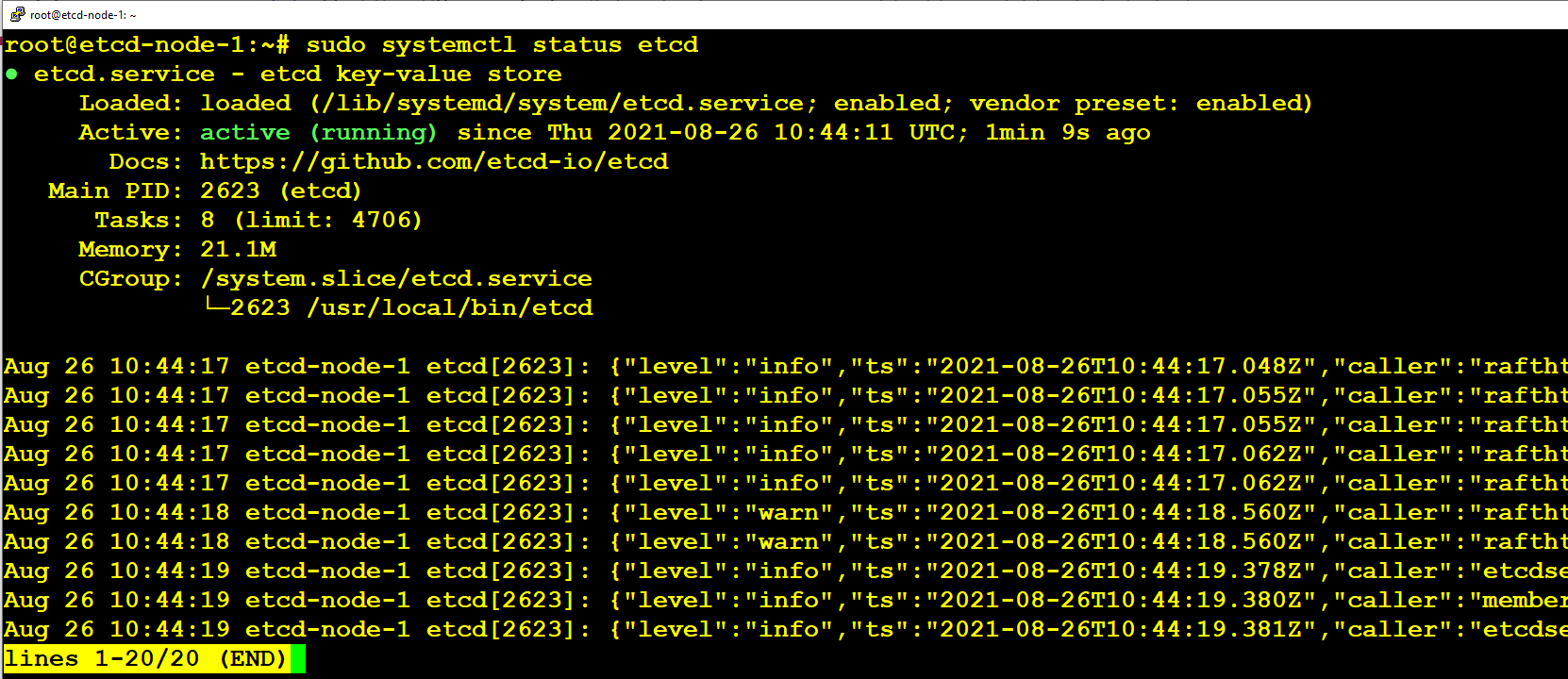
We are now ready to start the service. Run the below command on each node to start the etcd cluster.

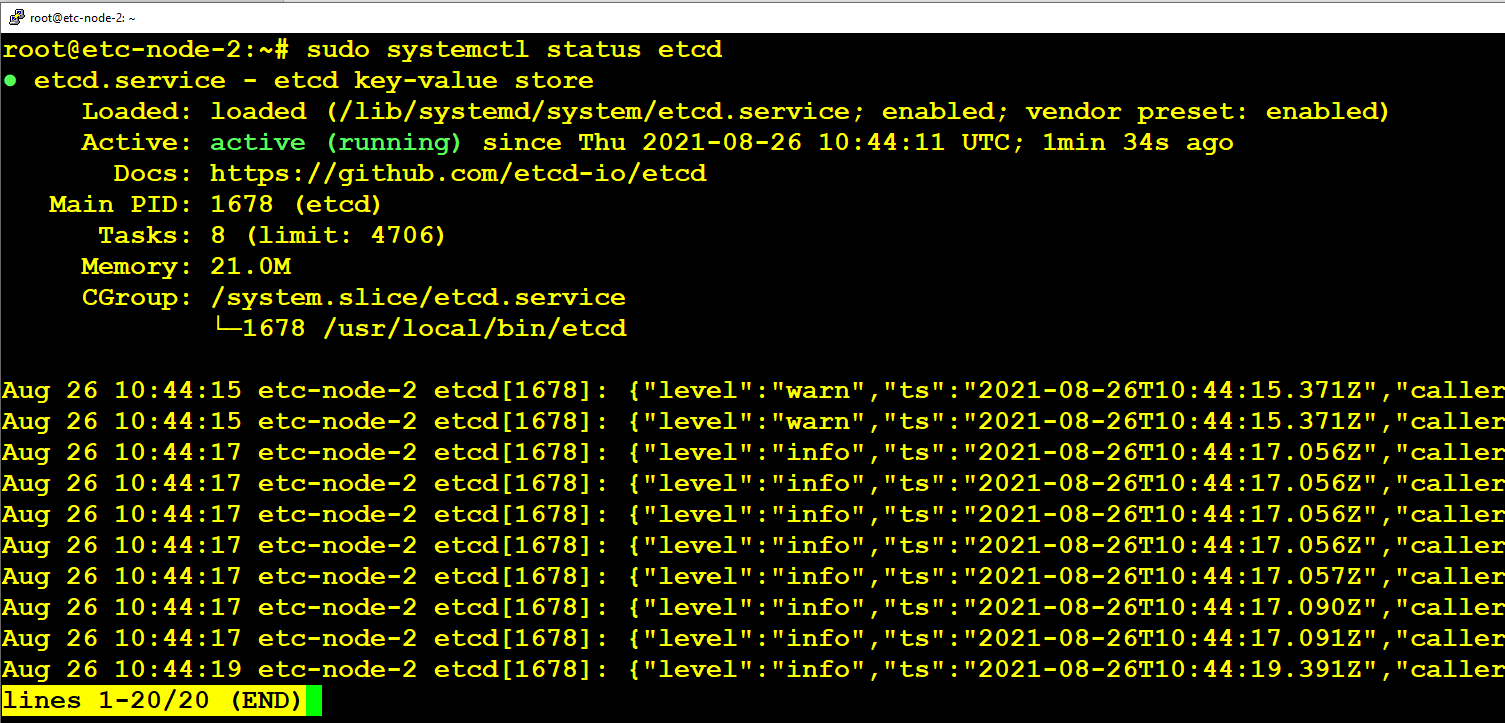
sudo systemctl daemon-reload

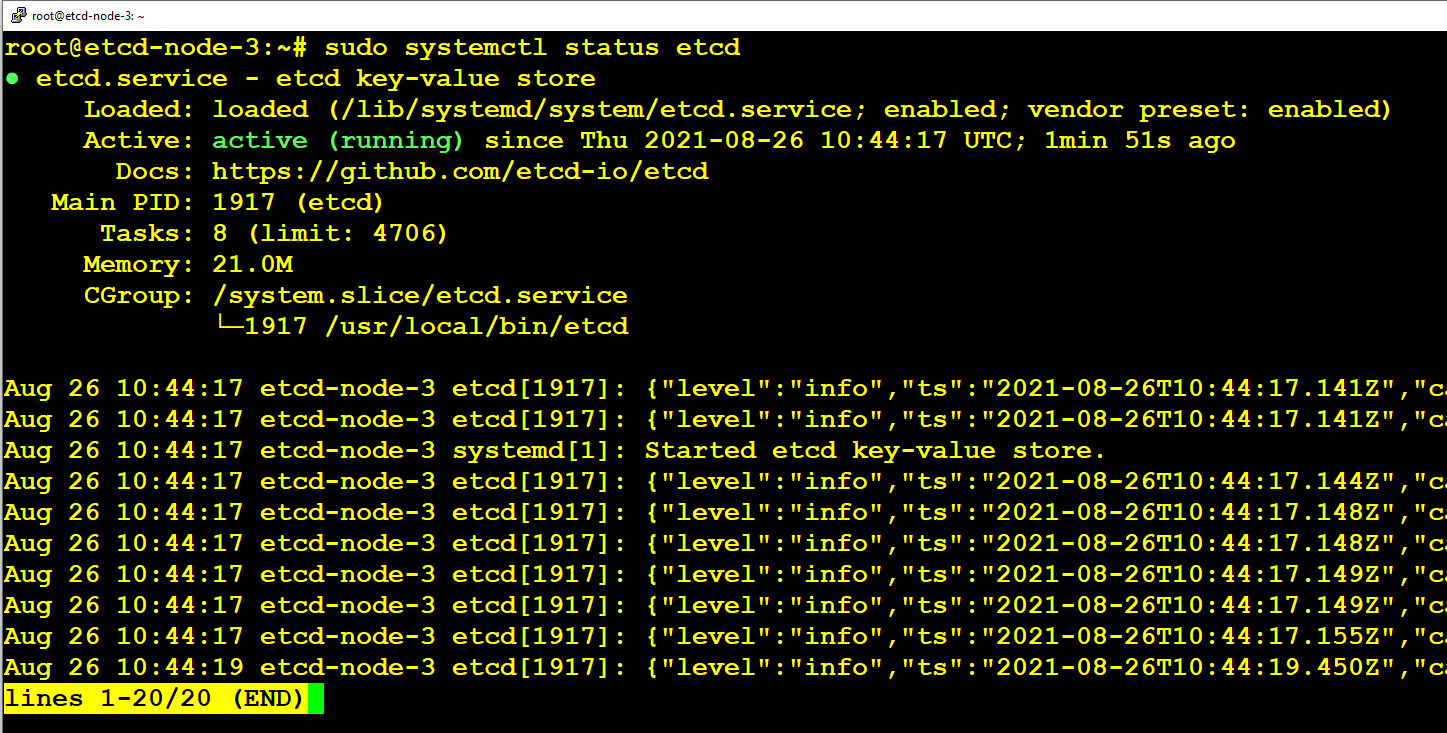
sudo systemctl enable etcd

sudo systemctl start etcd

sudo systemctl status etcd







etcdctl --endpoints https://10.20.1.43:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key put foo bar

etcdctl --endpoints https://10.20.1.43:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get foo

etcdctl --endpoints https://10.20.2.146:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get foo

etcdctl --endpoints https://10.20.3.190:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get foo

etcdctl --endpoints https://10.20.1.43:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get Chiru

etcdctl --endpoints https://10.20.2.146:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get Nag

etcdctl --endpoints https://10.20.3.190:2379 --cert /etc/etcd/server.crt --cacert /etc/etcd/etcd-ca.crt --key /etc/etcd/server.key get AArjun

Chiranjeevi => Megastar

Nagarjura => YuvaSamrat

Venkatesh => Victory

NTR => YoungTiger

**---PUT\_DATA\_IN\_ETCD--**

etcdctl --endpoints https://192.168.1.46:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key put Chiranjeevi Megastar

etcdctl --endpoints https://192.168.1.137:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key put Nagarjura YuvaSamrat

etcdctl --endpoints https://192.168.1.227:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key put Venkatesh Victory

**---GET\_DATA\_IN\_ETCD--**

etcdctl --endpoints https://192.168.1.46:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key get Chiranjeevi

etcdctl --endpoints https://192.168.1.137:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key get Nagarjura

etcdctl --endpoints https://192.168.1.227:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key get Venkatesh

**etcdctl commands:**

etcdctl --endpoints https://192.168.1.227:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key member list

**To get leader execute below command:**

ETCDCTL\_API=3 etcdctl --endpoints https://192.168.1.227:2379 --cert /etc/etcd/server.crt \

--cacert /etc/etcd/etcd-ca.crt \

--key /etc/etcd/server.key \

-w table --endpoints=etcd-node-1:2379,etcd-node-2:2379,etcd-node-3:2379 endpoint status