Cloud Provider:AWS
Server:Ubuntu 18.04 x6
Server List: 2 Controller(Master), 2(Worker), 1 Nginx(Reverse Proxy), 1 Ubuntu 18.04(local)

What is etcd?

- etcd is a distributed key value store that provides a reliable way to store data across a cluster of machines.
- etcd provides a way to store data across a distributed cluster of machines and makes sure the data is synchronized across all machines.

How is etcd used in Kubernetes?

- Kubernetes uses etcd to store all of its internal data about cluster state.
- This data needs to be stored, but also needs to be reliably synchronized across all controller nodes in the cluster.etcd fulfills that purpose
- Must install etcd on each of our Kubernetes controller nodes and create an etcd cluster that includes all of those controller nodes

//Here are the commands used in the demo (note that these have to be run on both controller servers, with a few differences between them):

```
$ wget -q --show-progress --https-only --timestamping \
"https://github.com/coreos/etcd/releases/download/v3.3.5/etcd-v3.3.5-linux-amd64.tar.gz"
$ tar -xvf etcd-v3.3.5-linux-amd64.tar.gz
$ sudo mv etcd-v3.3.5-linux-amd64/etcd* /usr/local/bin/
$ sudo mkdir -p /etc/etcd /var/lib/etcd
$ sudo cp ca.pem kubernetes-key.pem kubernetes.pem /etc/etcd/
```

//Set up the following environment variables. Be sure you replace all of the <placeholder values> with their corresponding real values:

```
$ ETCD_NAME=<cloud server hostname>
$ INTERNAL_IP=$(curl http://169.254.169.254/latest/meta-data/local-ipv4)
$ INITIAL_CLUSTER=<controller 1 hostname>=https://<controller 1 private
ip>:2380,<controller 2 hostname>=https://<controller 2 private ip>:2380
```

//Create the systemd unit file for etcd using this command. Note that this command uses the environment variables that were set earlier:

```
$ cat << EOF | sudo tee /etc/systemd/system/etcd.service
[Unit]
Description=etcd
Documentation=https://github.com/coreos

[Service]
ExecStart=/usr/local/bin/etcd \\
  --name ${ETCD_NAME} \\
  --cert-file=/etc/etcd/kubernetes.pem \\
  --key-file=/etc/etcd/kubernetes-key.pem \\
```

```
  --peer-cert-file=/etc/etcd/kubernetes.pem \\
  --peer-key-file=/etc/etcd/kubernetes-key.pem \\
  --trusted-ca-file=/etc/etcd/ca.pem \\
  --peer-trusted-ca-file=/etc/etcd/ca.pem \\
  --peer-client-cert-auth \\
  --client-cert-auth \\
  --initial-advertise-peer-urls https://${INTERNAL_IP}:2380 \\
  --listen-peer-urls https://${INTERNAL_IP}:2380 \\
  --listen-client-urls https://${INTERNAL_IP}:2379,https://127.0.0.1:2379 \\
  --advertise-client-urls https://${INTERNAL_IP}:2379 \\
  --initial-cluster-token etcd-cluster-0 \\
  --initial-cluster ${INITIAL_CLUSTER} \\
  --initial-cluster-state new \\
  --data-dir=/var/lib/etcd
Restart=on-failure
RestartSec=5

[Install]
WantedBy=multi-user.target
EOF
```

//Start and enable the etcd service:

```
$ sudo systemctl daemon-reload
$ sudo systemctl enable etcd
$ sudo systemctl start etcd
```

//You can verify that the etcd service started up successfully like so:

```
$ sudo systemctl status etcd
```

//Use this command to verify that etcd is working correctly. The output should list your two etcd nodes:

```
$ sudo ETCDCTL_API=3 etcdctl member list \
  --endpoints=https://127.0.0.1:2379 \
  --cacert=/etc/etcd/ca.pem \
  --cert=/etc/etcd/kubernetes.pem \
  --key=/etc/etcd/kubernetes-key.pem
```