Backup and Restore methods

1) To take snapshots

use the `etcdctl snapshot save` command.

you will have to make use of additional flags to connect to ETCD server.

--endpoints: Optional flag, points to the address where ETCD is running (127.0.0.1:2379)

--cacert: Mandatory flag (Absolute path to the CA certificate file)

--cert: Mandatory flag (Absolute path to the server certificate file)

--key: Mandatory flag (Absolute path to the keyfile)

Take snapshot of the ETCD database using the built-in snapshot functionality. Store the backup file at /opt/snapshot-pre-boot.db

Backup etcd to /opt/snapshot-pre-boot.db

```
ETCDCTL_API=3 etcdctl --endpoints=https://[127.0.0.1]:2379 \
--cacert=/etc/kubernetes/pki/etcd/ca.crt \
--cert=/etc/kubernetes/pki/etcd/server.crt \
--key=/etc/kubernetes/pki/etcd/server.key \
snapshot save /opt/snapshot-pre-boot.db
```

Restore:-

Restore the etcd to a new directory from the snapshot by using the etcdctl snapshot restore command. Once the directory is restored, update the ETCD configuration to use the restored directory.

First:

Using the etcdutl command, restore the snapshot

etcdutl snapshot restore /opt/snapshot-pre-boot.db
--data-dir /var/lib/etcd-from-backup

Eg output

etcdutl snapshot restore /opt/snapshot-pre-boot.db
--data-dir /var/lib/
etcd-from-backup

NOTE:

In this case, we're restoring the snapshot to a different directory which is in the same server where we took the backup (the controlplane node). As a result, the only required option for the restore command is the --data-dir

Next, we need to update the /etc/kubernetes/manifests/etcd.yaml to point to the newly restored directory, which is /var/lib/etcd-from-backup, the only change that we need to make to the YAML file, is to change the hostpath for the volume called etcd-data from old directory /var/lib/etcd to the new directory /var/lib/etcd-from-backup

```
...
Volumes:
- hostPath:
    path: /var/lib/etcd-from-backup
    type: DirectoryOrCreate
  name: etcd-data
```

with this change /var/lib/etcd on the container points to /var/lib/etcd-from-backup on the controlplane

when this file is updated, the ETCD pod is automatically re-created as this is a static pod placed under the /etc/~~manifests~~/kubernetes/manifests/ directory.

This may take a few minutes, if it is expected that kube-controller manager & kube-scheduler

To check the containers being restarted

`watch crictl ps`

once those pods are up, verify the by

`kubectl get deployments, services`

NOTES.

what is etcd?

⇒ Think of etcd as kubernetes brain.

⇒ It's a key value database where kubernetes stores:

* Cluster Configuration * Nodes * pods * Secrets

*Everything that defines cluster

⇒ If etcd is lost, your k8s cluster becomes like a person with amnesia - running but forgetful

why take backups?

Because:

* A bad upgrade or crash could wipe etcd
* you want to restore cluster state after failures
* Before major changes (like version upgrade)

Tools used

Tool	Use case
etcdctl	CLI to interact with etcd (etcd for backup/restore)
etcdutl	Newer CLI (optional, used in etcd 3.5+)

How to take a backup (Snapshot)

1) Export API version

```
export ETCDCTL_API=3
```

2) Run the snapshot command

```
etcdctl snapshot save /opt/etcd-backup.db \
  --endpoints=https://127.0.0.1:2379 \
  --cacert=/etc/kubernetes/pki/etcd/ca.crt \
  --cert=/etc/kubernetes/pki/etcd/server.crt \
  --key=/etc/kubernetes/pki/etcd/server.key
```

This saves the full etcd database to /opt/etcd-backup.db.

How to restore etcd from backup

Imagine the cluster is broken & you want to bring it back using that backup.

Step1: Stop etcd [Don't follow Step1]

Because you can't restore while etcd is running

If its a static pod:

```
mv /etc/kubernetes/manifests/etcd.yaml /etc/kubernetes/manifests/
                                                    etcd.yaml.bk
```

Step2: Restore Snapshot

```
etcdctl snapshot restore /opt/etcd-backup.db \
  --data-dir /var/lib/etcd-from-backup
```

This creates a new folder with restored data.

Step3: Reconfigure etcd to use new data

Edit this file

```
vi /etc/kubernetes/manifests/etcd.yaml
```

Change --data-dir argument to

```
--data-dir=/var/lib/etcd-from-backup
```

(xx) In the volume [redacted] named: etcd-data, change the path to /var/lib/etcd-from-backup

Save the file, kubelet will restart etcd using restored data.

Step 4:- Confirm etcd is working

once etcd pod restarts, run

```
kubectl get pods -n kube-system
```

* Verify

```
etcdctl endpoint health
```