VOLUMES

Volume:

- A volume is a directory, possibly with data in it, which is accessible to all containers in a Pod.
- The data in a volume is stored independently of the container's lifecycle, which means the data can persist across container restarts, crashes, and Pod rescheduling.

Types of volume:

1. **EmptyDir**: This volume is initially empty and is created when a Pod is first assigned to a node. It's erased when the Pod is removed. The volume can be stored on whatever medium is backing the node, such as SSD or HDD.
2. **HostPath**: This volume mounts a file or directory from the host node's filesystem into the Pod. It's mostly used for single-node setups.
3. **NFS**: Allows mounting an NFS (Network File System) share into the Pod.

Create EmptyDir:

Define the Pod with an EmptyDir Volume:

vi emptydir-pod.yaml

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: emptydir-pod
spec:
  containers:
  - name: nginx-container
    image: nginx
    volumeMounts:
    - name: emptydir-volume
      mountPath: /mnt/suba
  volumes:
  - name: emptydir-volume
    emptyDir: {}
```

Create the Pod:

kubectl apply -f my-emptydir-pod.yaml

```
controlplane $ k create -f emptydir-pod.yaml
pod/emptydir-pod created
```

Verify the Pod and Volume:

kubectl get pods my-emptydir-pod

```
controlplane $ kubectl get pods
NAME           READY   STATUS    RESTARTS   AGE
emptydir-pod   1/1     Running   0          70s
```

Login in to pod:

kubectl exec -it my-emptydir-pod -- bash

```
controlplane $ kubectl exec -it emptydir-pod -- bash
root@emptydir-pod:/# cd /mnt
root@emptydir-pod:/mnt# ls
suba
root@emptydir-pod:/mnt# cd suba
root@emptydir-pod:/mnt/suba# mkdir suba1 suba2 suba3
root@emptydir-pod:/mnt/suba# ls
suba1  suba2  suba3
```

Delete pod:

kubectl delete pod <pod name>

```
controlplane $ kubectl delete pod emptydir-pod
pod "emptydir-pod" deleted
```

Any data you write to /mnt/data in this example will be lost if the Pod is removed from the node for any reason.

HostPath Volume:

Create yaml file for hostpath volume:

vi hostpath-pod.yaml

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: hostpath-pod
spec:
  containers:
  - name: nginx-container
    image: nginx
    volumeMounts:
    - name: hostpath-volume
      mountPath: /mnt/host
  volumes:
  - name: hostpath-volume
    hostPath:
      path: /var/suba
```

Create pod for hostpath volume:

kubectl create hostpath.yaml

```
controlplane $ kubectl create -f hostpath.yaml
pod/hostpath-pod created
```

Delete the hostpath pod:

kubectl delete pod hostpath pod

```
controlplane $ kubectl delete pod hostpath-pod
pod "hostpath-pod" deleted
```

Even I deleted the pod in master node ,the data in the container saved in the host path in worker node.

NFS Volume in Kubernetes:

Create yaml file for nfs volume:

nfs-pod.yaml

```
apiVersion: v1
kind: Pod
metadata:
  name: my-nfs-pod
spec:
  containers:
  - name: my-container
    image: nginx
    volumeMounts:
    - name: my-nfs-volume
      mountPath: /mnt/nfs
  volumes:
  - name: my-nfs-volume
    nfs:
      server: nfs-server.example.com
      path: /shared
```