Summary

- Types of storage
  - Ephemeral storage:- It is temporary in nature when instance/os terminates the storage is gone.
  - Persistent storage: - It's permanent in nature. Even if the os is terminated the data will be there in storage
- The storage provided by Docker / Podman is ephemeral in nature
- How to make permanent storage in a container
  - Launching the container

```
[root@localhost ~]# mkdir /mydata1
[root@localhost ~]# podman  run -dit --name w4
             -v   /mydata1:/var/www/images    vimal13/apache-webserver-php
```

  - Stopping SELinux

```
[root@localhost ~]# getenforce
Enforcing
[root@localhost ~]# setenforce  0
[root@localhost ~]# getenforce
Permissive
[root@localhost ~]#
```

  - Storing files in a container
    - For entering inside the container
      - Command:- podman exec -it (Name of the container) bash

```
[root@0f14a7faf4ac images]# ls
[root@0f14a7faf4ac images]# touch vimal.png
[root@0f14a7faf4ac images]# ls
vimal.png
[root@0f14a7faf4ac images]# pwd
/var/www/images
[root@0f14a7faf4ac images]# exit
exit
```

  - Checking file after container removed

```
[root@0f14a7faf4ac images]# ls
[root@0f14a7faf4ac images]# touch vimal.png
[root@0f14a7faf4ac images]# ls
vimal.png
[root@0f14a7faf4ac images]# pwd
/var/www/images
[root@0f14a7faf4ac images]# exit
exit
```

- The storage given by Kubernetes is also ephemeral in nature
- Storage in Kubernetes

  - Persistent volume claim (PVC):- It is a request for volume by the user
  - Persistent volume (PV):- The Kubernetes admin fulfills the PVC by providing the persistent volume as per the claim. This process is called PV
- Storage provisioning in Kubernetes
  - Manual provisioning: It is given by the Kubernetes admin
  - Dynamic provisioning: As soon as the request comes for PV dynamic PV is created
- Practical:- Storage provisioning in Kubernetes
  - Manifest file for PVC

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: myrahulpvc
spec:
  accessModes:
  - ReadWriteOnce
  resources:
    requests:
      storage: 1G
```

  - Creating PVC from the manifest file

```
C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl create -f mypvc.yml
persistentvolumeclaim/myrahulpvc created

C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl get pvc
NAME         STATUS    VOLUME   CAPACITY   ACCESS MODES   STORAGECLASS   AGE
myrahulpvc   Pending                                                     11s
```

  - Manifest file for PV

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: mypvtorahul
spec:
  accessModes:
  - ReadWriteOnce
  capacity:
    storage: 1G
  hostPath:
    path: /mnt/myrahul
```

  - Creating PV from the manifest file

```
C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl create -f mypvc.yml
persistentvolumeclaim/myrahulpvc created

C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl get pvc
NAME         STATUS    VOLUME    CAPACITY   ACCESS MODES   STORAGECLASS   AGE
myrahulpvc   Pending                                                      11s
```

- The PVC will be automatically bound to the PV as soon as it is created

```
C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl get pv
NAME          CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM                 STORAGECLASS
 AGE
mypvtorahul   1G         RWO            Retain           Bound    default/myrahulpvc
 28s

C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl get pvc
NAME         STATUS   VOLUME        CAPACITY   ACCESS MODES   STORAGECLASS   AGE
myrahulpvc   Bound    mypvtorahul   1G         RWO                           10m
```

- Manifest file for pod with PV

```
kind: Pod
metadata:
  name: "mypod3"
  labels:
    region: IN
spec:
  volumes:
  - name: s1
    persistentVolumeClaim:
       claimName: myrahulpvc

  containers:
  - name: "myc2"
    image: "vimal13/apache-webserver-php"
    volumeMounts:
     - mountPath: /var/www/data
       name: s1
```

- Creating the pod from the manifest file & storing the data in the pod

```
C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl create -f pvc_pod.yml
pod/mypod3 created

C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl get pods
NAME     READY   STATUS    RESTARTS   AGE
mypod1   1/1     Running   0          57m
mypod3   1/1     Running   0          7s

C:\Users\Vimal Daga\Documents\Container2021-ws>kubectl exec -it mypod3 -- sh
sh-4.2# cd /var/www/data
sh-4.2# ls
sh-4.2# touch a b c
sh-4.2# ls
a  b  c
sh-4.2# cat > pop.txt
ppppppppppp
sh-4.2# touch vimal.png
sh-4.2# ls
a  b  c  pop.txt  vimal.png
sh-4.2# pwd
/var/www/data
sh-4.2# exit
exit
```

- After removing the pod, checking the data stored in it

- Login in to minikube vm
  - Minikube login: docker
  - Password: tcuser