Static Volume Provisioning

Concept

Udemy

Objectives

Concept

a. Overview of Static Provisioning of Volume

Review Demo

a. Persistence Volume (PV)

b. Persistent Volume Claim (PVC)

c. Reference claim in Pod

d. Test use case

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Provisioning → Binding → Using → Reclaiming

Provisioning

Static

PV needs to be **created before** PVC

Dynamic

PV is **created at same time** of PVC

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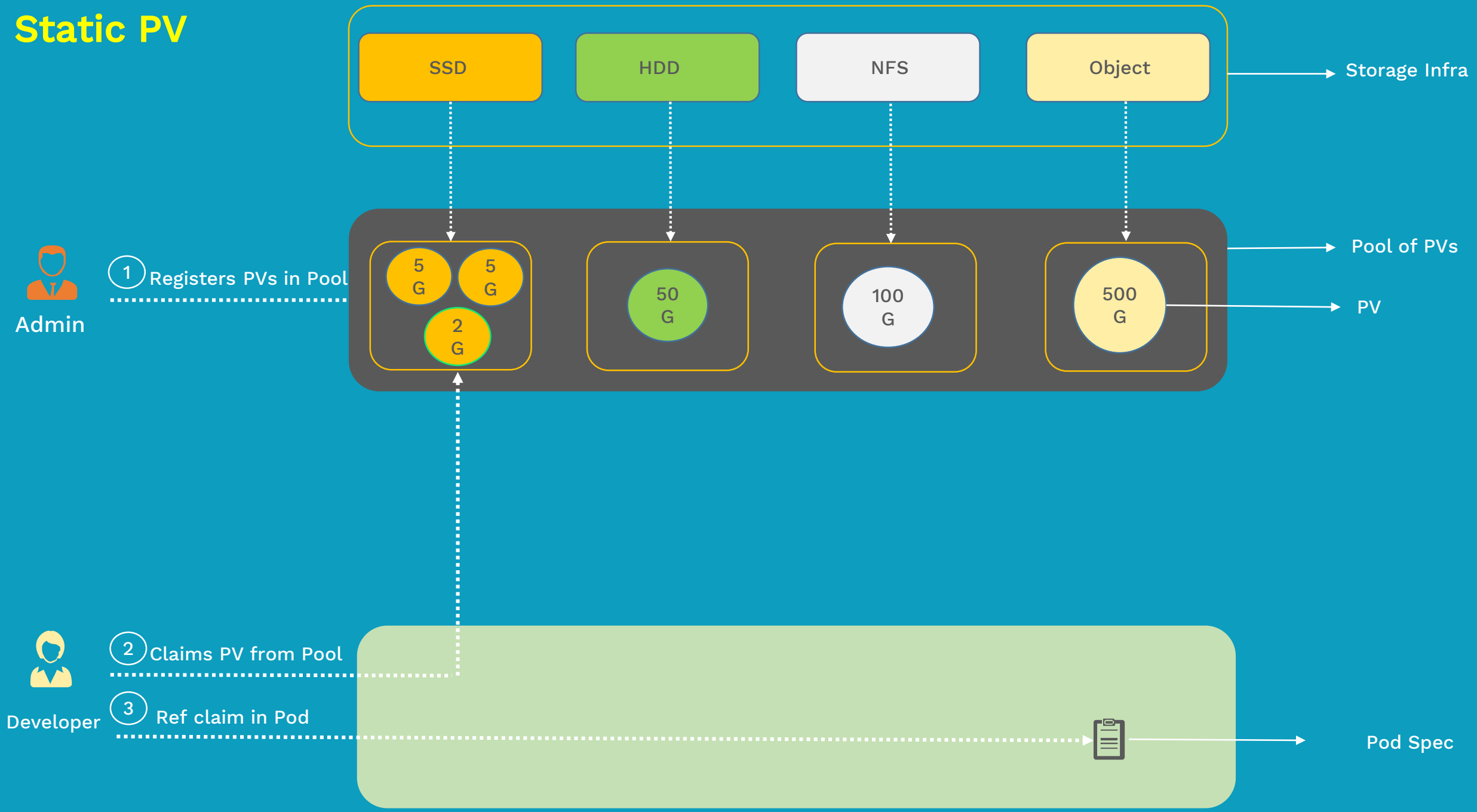
Static PV



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Persistent Volume

Persistent Volume Claim

Referencing claim in Pod

Test use case

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1. Persistent Volume

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Persistent Volume → Persistent Volume Claim → Referencing claim in Pod

1 Persistent Volume (PV)

```yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv-gce
spec:
  capacity:
    storage: 15Gi
  accessModes:
    - ReadWriteOnce
  storageClassName: slow
  gcePersistentDisk:
    pdName: my-data-disk
    fsType: ext4
```

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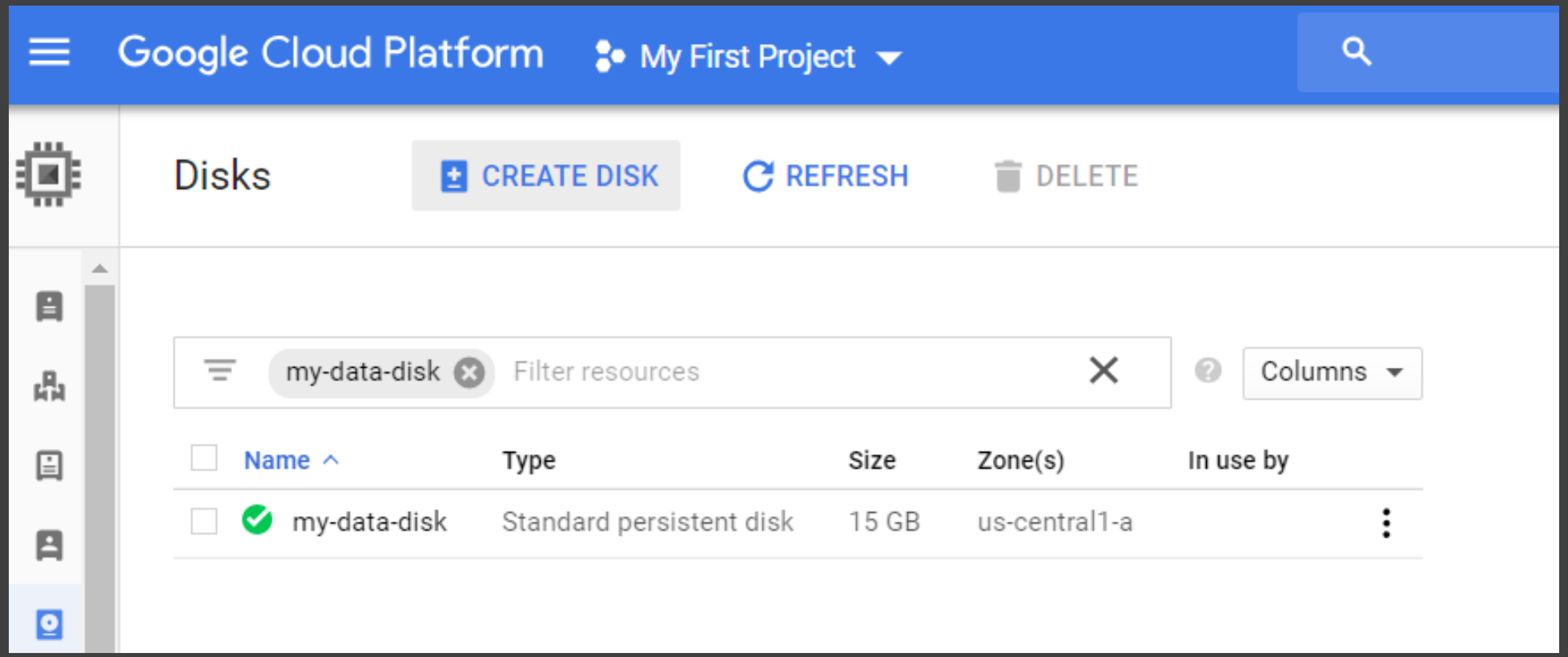
Persistent Volume – Config Create

```
srinath@master:$ kubectl create -f pv.yaml
Error from server (Forbidden): error when creating "pv.yaml": persistentvolumes "pv-gce"
is forbidden: error querying GCE PD volume my-data-disk: disk is not found
```



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Persistent Volume – Describe PV

```
srinath@master  kubectl get pv
NAME      CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM     STORAGECLASS   REASON    AGE
pv-gce    15Gi       RWO            Retain           Available             slow                     34s
```

```
srinath@master  kubectl describe pv pv-gce
Name:            pv-gce
...
StorageClass:    slow
Status:          Available
Claim:
Reclaim Policy:  Retain
Access Modes:    RWO
Capacity:        15Gi
Message:
Source:
    Type:        GCEPersistentDisk (a Persistent Disk resource in Google Compute Engine)
    PDName:      my-data-disk
    FSType:      ext4
    Partition:   0
    ReadOnly:    false
Events:          <none>
```

2. Persistent Volume Claim

Spec: Persistent Volume → Persistent Volume Claim

1 Persistent Volume (PV)

```yaml
# pv.yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv-gce
spec:
  capacity:
    storage: 15Gi
  accessModes:
    - ReadWriteOnce
  storageClassName: slow
  gcePersistentDisk:
    pdName: my-disk-123
    fsType: ext4
```

2 Persistent Volume Claim (PVC)

```yaml
# pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: my-disk-claim
spec:
  resources:
    requests:
      storage: 15Gi
  accessModes:
    - ReadWriteOnce
  storageClassName: slow
```

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Persistent Volume Claim– Create & Display

```
srinath@master:$ kubectl create -f pvc.yaml
persistentvolumeclaim "my-disk-claim" created
```

```
srinath@master:$ kubectl get pvc
NAME            STATUS    VOLUME    CAPACITY   ACCESS MODES   STORAGECLASS   AGE
my-disk-claim   Bound     pv-gce    15Gi       RWO            slow           1m
```

```
srinath@master:$ kubectl get pv
NAME      CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS    CLAIM                   STORAGECLASS   REASON    AGE
pv-gce    15Gi       RWO            Retain           Bound     default/my-disk-claim   slow                     48s
```

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3. Reference Claim in Pod

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Spec: Persistent Volume → Persistent Volume Claim → Referencing claim in Pod

1 Persistent Volume (PV)

```yaml
# pv.yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv-gce
spec:
  capacity:
    storage: 15Gi
  accessModes:
    - ReadWriteOnce
  storageClassName: slow
  gcePersistentDisk:
    pdName: my-disk-123
    fsType: ext4
```

2 Persistent Volume Claim (PVC)

```yaml
# pvc.yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: my-disk-claim
spec:
  resources:
    requests:
      storage: 15Gi
  accessModes:
    - ReadWriteOnce
  storageClassName: slow
```

3 Referencing claim in Pod

```yaml
# nginx-pv.yaml
apiVersion: v1
kind: Pod
metadata:
  name: pv-pod
spec:
  containers:
  - name: test-container
    image: nginx
    volumeMounts:
    - mountPath: /test-pd
      name: test-volume
  volumes:
  - name: test-volume
    persistentVolumeClaim:
      claimName: my-disk-claim
```

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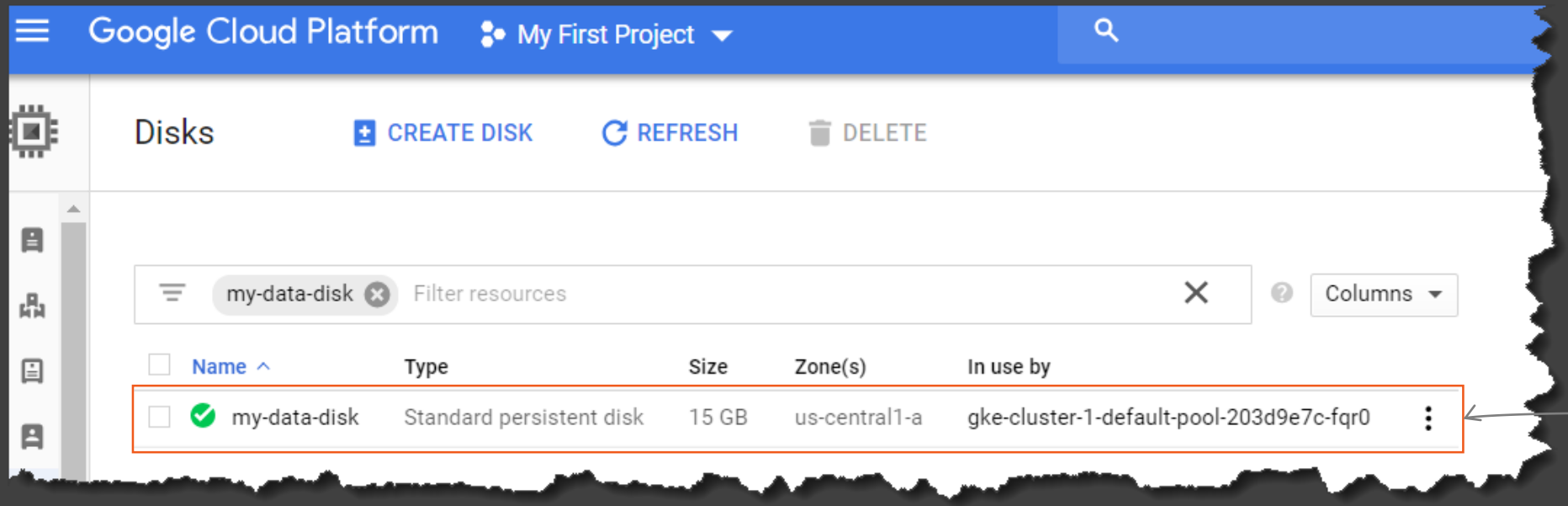
Reference Claim in Pod

```
srinath@master:$ kubectl create -f nginx-pv.yaml
pod/pv-pod created
```

```
srinath@master:$ kubectl get po -o wide
NAME         READY   STATUS    RESTARTS   AGE       IP          NODE
pod/pv-pod   1/1     Running   0          1m        10.8.3.9    gke-cluster-1-default-pool-203d9e7c-fqr0
```



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4. Testing Use Case

1. Create a test file inside the mount where the disk is mounted
2. Create a sample test file with some content in it.
3. Delete the Pod
4. Recreate the Pod with same configuration
5. Verify the data created in step-2 is still available

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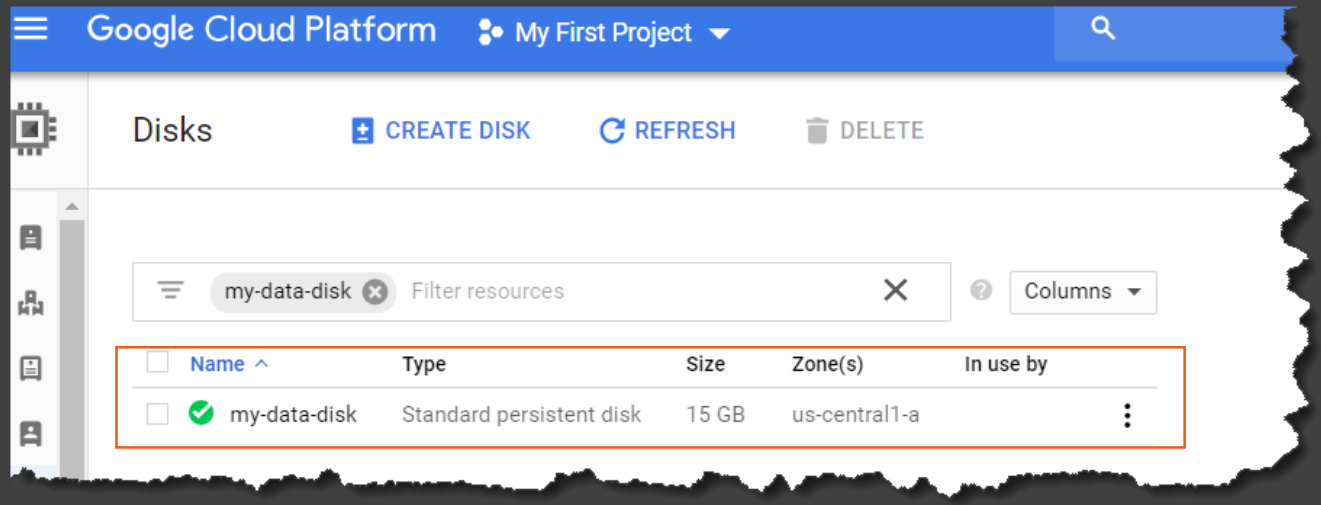
Testing-1

```
srinath@master:$ kubectl exec pv-pod -it -- /bin/sh
# df -h /test-pd
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdb         15G   41M   14G   1% /test-pd
#
# cd /test-pd
# echo "From first pod" > test1.txt
# exit
```

```
srinath@master:$ kubectl delete -f nginx-pv.yaml
pod "pv-pod" deleted
```



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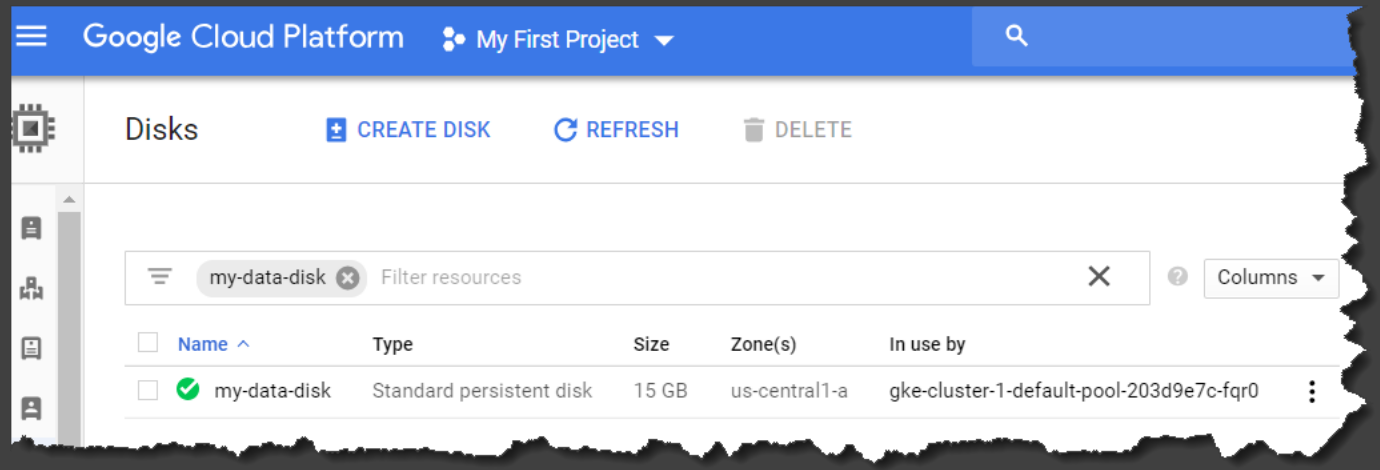
Testing-2

```
srinath@master:$ kubectl create -f nginx-pv.yaml
pod "pv-pod" created
```

```
srinath@master:$ kubectl get po -o wide
NAME           READY     STATUS    RESTARTS   AGE       IP           NODE
pv-pod         1/1       Running   0          5m        10.8.3.10    gke-cluster-1-default-pool-203d9e7c-fqr0
```



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Validation

```
srinath@master:$ kubectl exec pv-pod df /test-pd
Filesystem     1K-blocks  Used Available Use% Mounted on
/dev/sdb        10255636 36892   9678072   1% /test-pd
```

```
srinath@master:$  kubectl exec pv-pod ls /test-pd/
lost+found
test1.txt
```

```
srinath@master:$  kubectl exec pv-pod cat /test-pd/test1.html
From first pod
```

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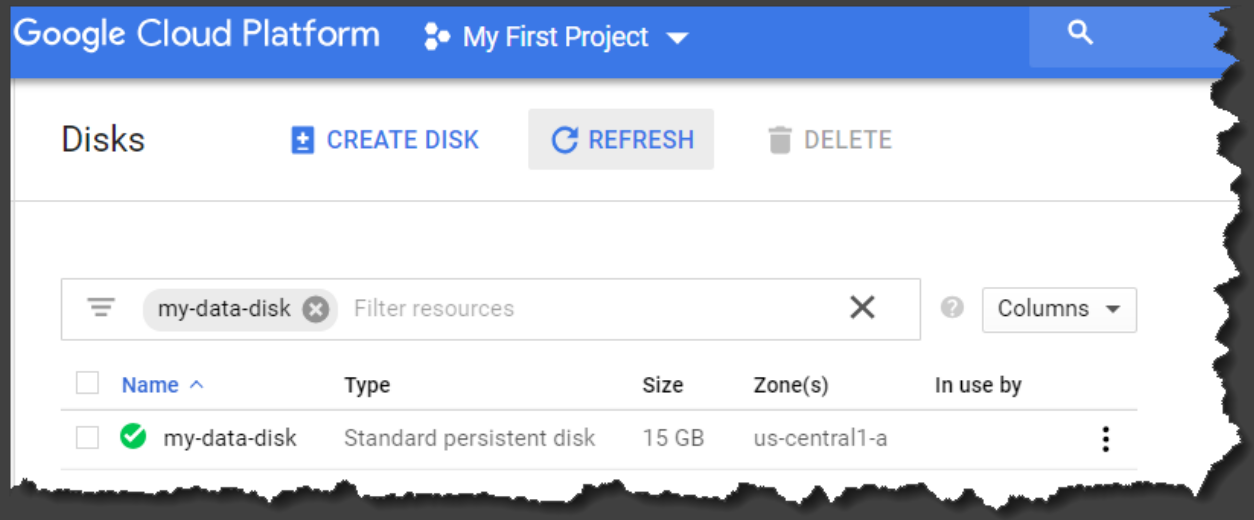
Cleanup

```
srinath@master:$ kubectl delete -f nginx-pv2.yaml
pod "task-pv-pod2" deleted
```

```
srinath@master:$ kubectl delete -f pvc.yaml
persistentvolumeclaim "my-disk-claim" deleted
```

```
srinath@master:$  kubectl delete -f pv.yaml
persistentvolume "pv-gce" deleted
```



Summary

Concept

a. Overview of Static Provisioning of Volume

Review Demo

a. Persistence Volume (PV)

b. Persistent Volume Claim (PVC)

c. Reference claim in Pod

d. Test use case

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Coming up...

Demo

Static Volume Provisioning

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