Persistent Volume in Kubernetes

Exploring Persistent Volume

K8s Storage Overview

- ➔ Persistent Volumes
- ➔ Storage Classes
- ➔ PersistentVolume Claims
- ➔ Resizing Persistent Volume Claim

Persistent Volumes

- **PersistentVolumes** are k8s Object that allow user to treat Storage as an Abstract Resource.
- **PV** is resource in the cluster just like a node is a cluster resource.
- **PV** uses a set of Attribute to describe the underlying storage resources (Disk or Cloud Storage), which will be used to store data.

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: static-persistent-volume
spec:
  capacity:
    storage: 1Gi
  accessModes:
    - ReadWriteMany
  hostPath:
    path: /var/tmp
  storageClassName: local-storage
```

Storage Classes

- **StorageClass** allows K8s Administrator to Specify all type of Storage Service they offer on their Platform.

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: local-storage
provisioner: kubernetes.io/no-provisioner
volumeBindingMode: WaitForFirstConsumer
```

Storage Classes

- Admin cloud create a StorageClass called **Slow** to describe inexpensive storage for general Development use.

- Admin cloud create a StorageClass called **Fast** for High I/O Operation Applications.

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: slow
provisioner: kubernetes.io/aws-ebs
parameters:
  type: io1
  iopsPerGB: "10"
  fsType: ext4
```

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: fast
provisioner: kubernetes.io/gce-pd
parameters:
  type: pd-ssd
allowedTopologies:
- matchLabelExpressions:
  - key: failure-domain.beta.kubernetes.io/zone
    values:
    - us-central1-a
```

allowVolume Expansion

- **allowVolumeExpansion** - This field can accept boolean value only.
- This is the property of StorageClass and define whether StorageClass supports the ability to resize after they are created.
- All Cloud Disk Supports this property.

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: local-storage
provisioner: kubernetes.io/no-provisioner
volumeBindingMode: WaitForFirstConsumer
allowVolumeExpansion: true
```

Reclaim Policy

- **persistentVolumeReclaimPolicy** - This define, how the storage will be reused, when the **PVs** associated **PVCs** are deleted.

- **Retain** - Keep all the data. This require manual data cleanup and prepare for reuse.
- **Delete** - Delete underlying storage resources automatically (Support for Cloud Resource Only).
- **Recycle** - Automatically delete all data in underlying storage. Allow PVs to be reuse.

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: static-persistent-volume
spec:
  capacity:
    storage: 1Gi
  accessModes:
    - ReadWriteMany
  hostPath:
    path: /var/tmp
  storageClassName: local-storage
  persistentVolumeReclaimPolicy:
Recycle
```

PersistentVolumeClaim

- **PersistentVolumeClaim (PVC)** is a request for storage by a user.
- **PVCs** define a set of attribute Similar to those of PVs.
- **PVCs** look for a **PVs** that is able to meet the criteria. If it found one, will automatically be **bound** to that PV.

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: myclaim
spec:
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 1Gi
  storageClassName: local-storage
```

Hands On Demonstration

Thank You...

Don’t be the Same! Be Better!!!