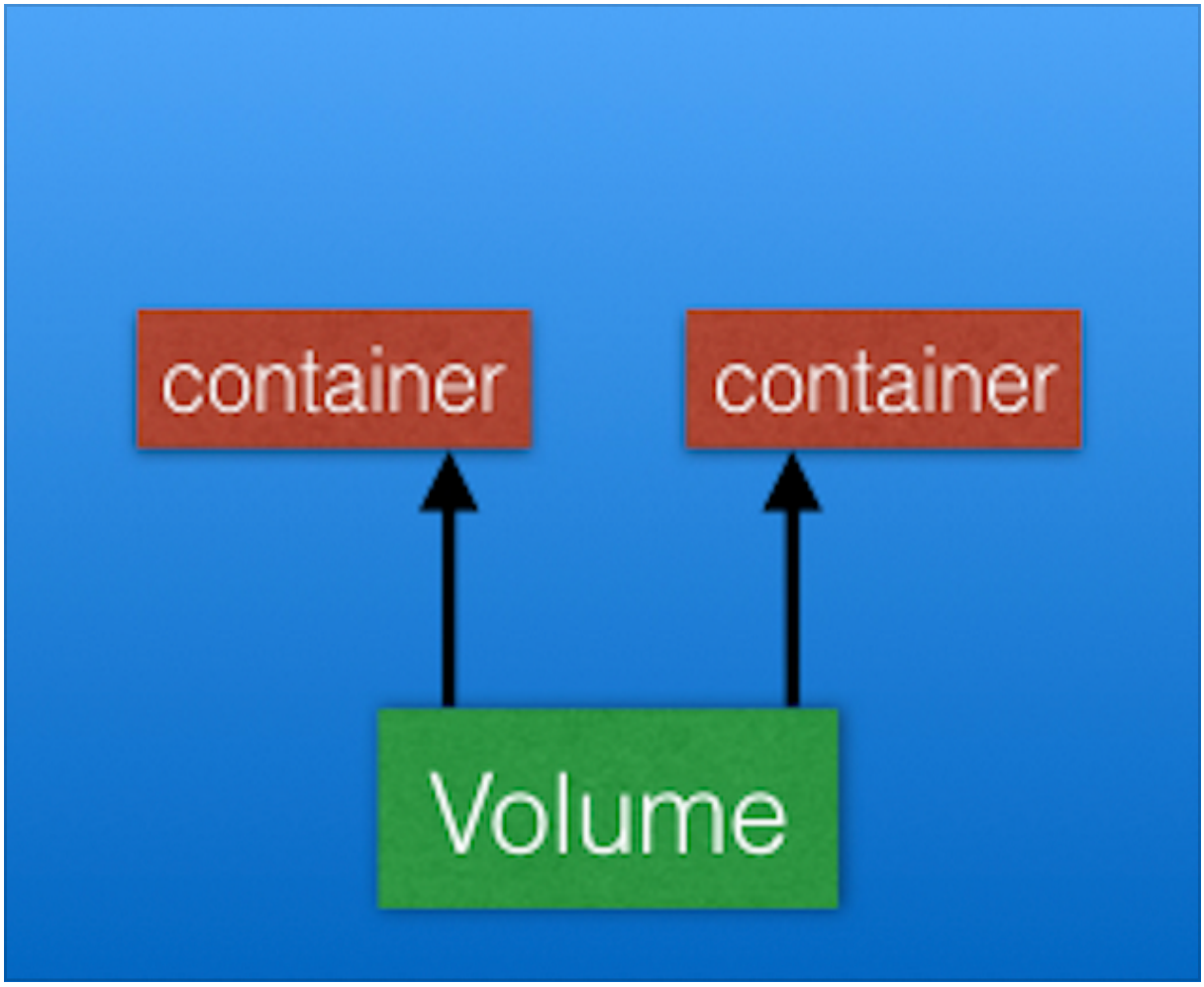
Chapter 12 Kubernetes Volume Management

Volumes

When container is restarted, old data is not restored.

Volume is a directory backed by a storage medium.



Volume is attached to a Pod (same lifespan) and allows data to be preserved across containers in the pod.

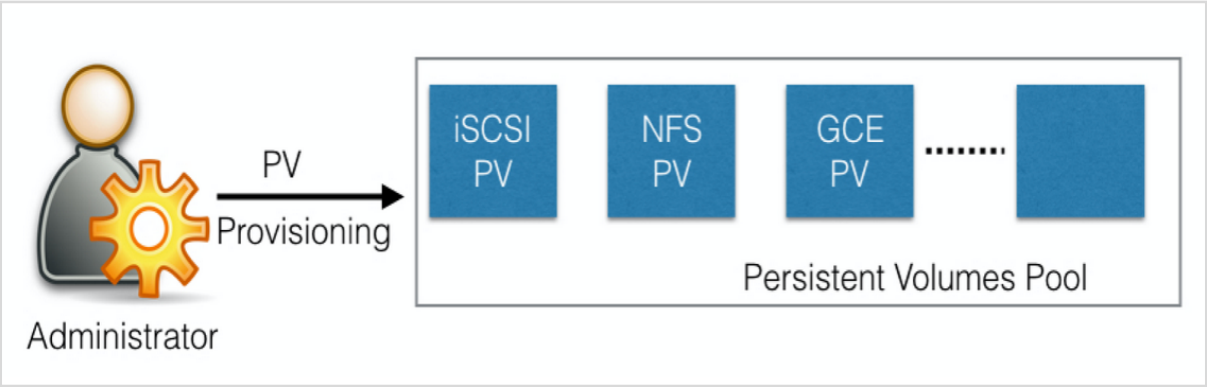
Volume Types

- emptyDir
  - created for the Pod as soon as it is scheduled on the worker node
  - contents deleted forever when Pod is terminated
- hostPath
  - share a directory from the host to the Pod
  - persistent even when Pod is terminated (on the host)
- gcePersistentDisk/awsElasticBlockStore/azureDisk/azureFile
- cephfs
  - existing CephFS volume can be mounted

    - when Pod terminates, volume is unmounted and contents are preserved
- nfs/iscsi
    - mount NFS/iSCSI share into a Pod
- secret
    - for sensitive information
- configMap
    - provide configuration data, shell commands, and arguments
- persistentVolumeClaim
    - attach a PersistentVolume

PersistentVolumes

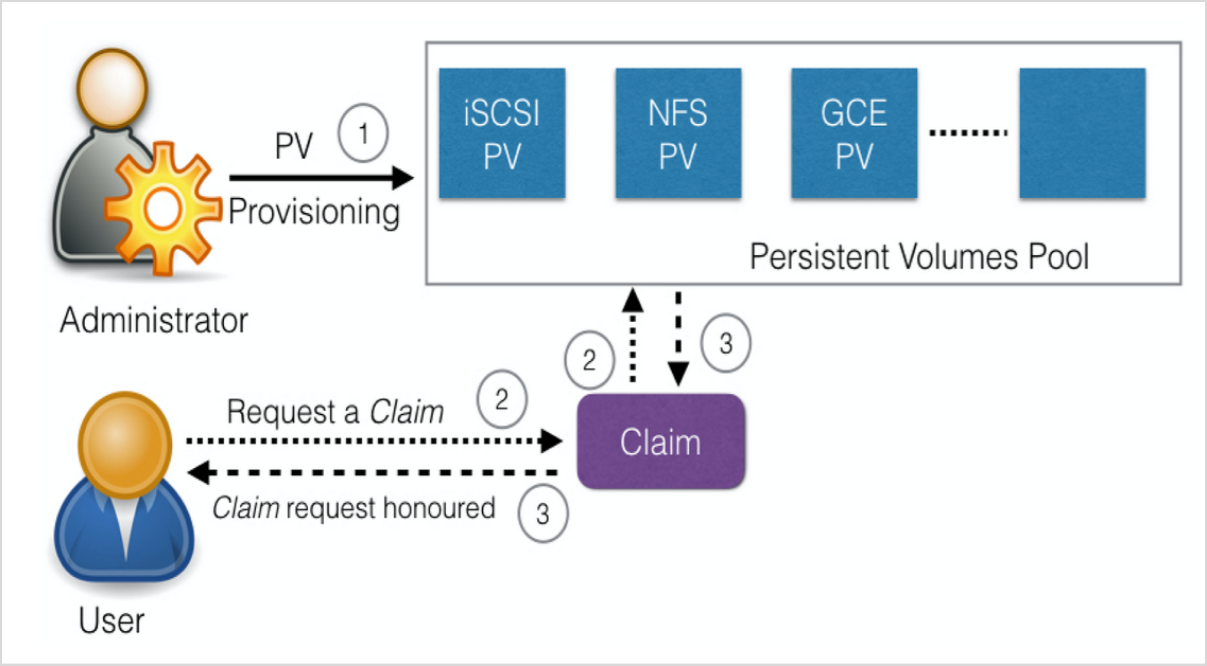
- PersistentVolume (PV) subsystem provides APIs for users and admins to manage and consume persistent storage
- PersistentVolumeClaim API resource type to consume the Volume



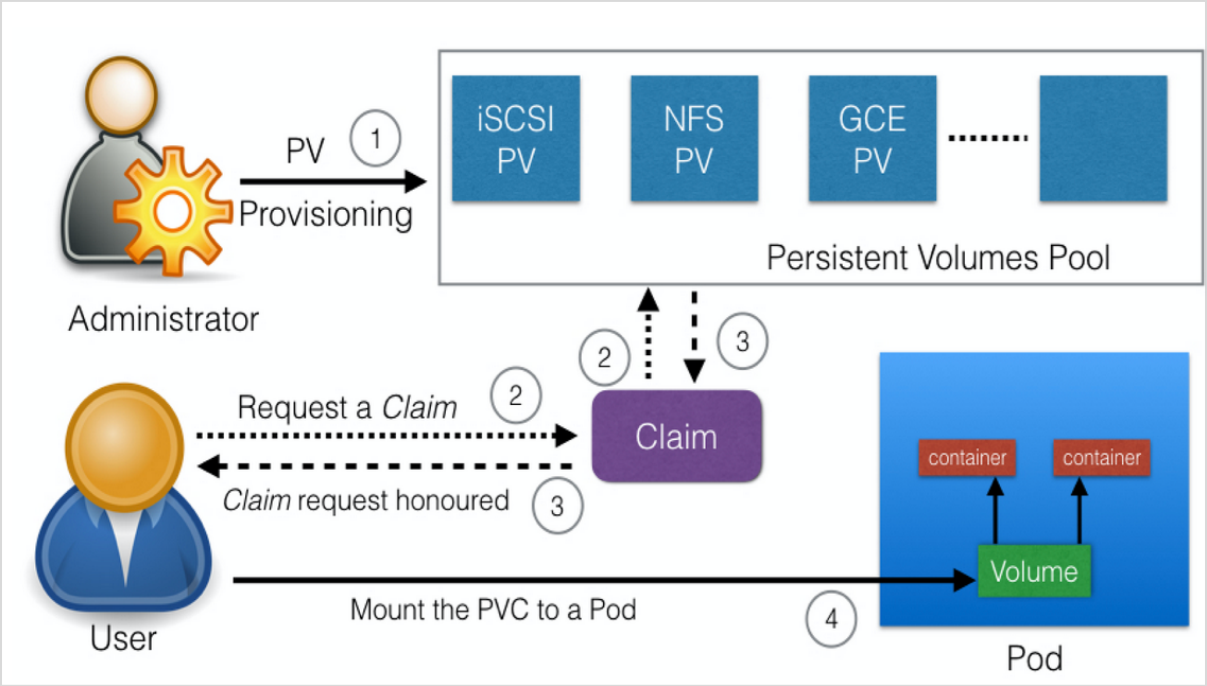
- PersistentVolumes can be dynamically provisioned based on the StorageClass resource
- StorageClass contains pre-defined provisioners and params to create a PersistentVolume
- Using PersistentVolumeClaims, a user sends the request for dynamic PV creation, which gets wired to the StorageClass resource

PersistentVolumeClaims

- Request for storage by a user
- Based on type, access mode, and size
- Three access modes
    - ReadWriteOnce: read-write by a single node
    - ReadOnlyMany: read-only by many nodes
    - ReadWriteMany: read-write by many nodes



- Once a suitable PersistentVolume is found, it is bound to a PersistentVolumeClaim



- After a successful bound, the PersistentVolumeClaim resource can be used in a Pod
- Attached PersistentVolumes can be released for it to be reclaimed, deleted, or recycled for future usage (data deleted)

- Container Storage Interface (CSI) is standardized in order to work on different container orchestrators for managing external storage like Volumes