

## KumoScale CSI Driver Snapshot Management

This section explains how to create and manage snapshots using the KumoScale CSI Driver

For general information about snapshots, see the [Snapshot](#) section of the [KumoScale User Guide: Volume Management](#) page.

### Using Snapshots

The CSI driver can support up to 8 snapshots per volume. Up to 512 snapshot volumes can be created from each of these snapshots. Snapshot volumes can be either *Read/Write* or *Read Only*. This assumed the application layer is responsible for bringing the data into a state suitable for backups to maintain data coherency.

Before proceeding, if you are using Kubernetes version:

- 20 or higher, you should have installed the plug-ins as explained in [Install the Snapshot Plug-ins](#)
- 16- 1.19, you must complete the steps [Prepare the Environment for Features in Beta](#).
- The KumoScale\_CSI directory contains the following sample files you should reference when creating and managing snapshots:
  - **SnapshotClass.yaml** – an example for a volume snapshot class.
  - **Snapshot.yaml**-
  - **SnapshotVolume .yaml** – an example for a writable snapshot volume.
  - **ROSnapshotVolume.yaml** – an example for a read-only snapshot
  - **ReadOnlyStorageClass.yaml**- an example of a read-only storage class (use with the above)

This page includes instructions on how to:

- [Create a snapshot class](#)
- [Create a snapshot](#).
- [Create a snapshot volume](#), writeable or read-only
- [List snapshots](#)

### Creating a Snapshot Class

1. Create a VolumeSnapshotClass using the sample file **SnapshotClass.yaml** as an example. Edit the file and specify the parameters you wish:

#### Snapshot Class Parameters

- **name** is the name of the snapshot class
- **reservedSpacePercentage** indicates the percentage of the original volume’s capacity a snapshot may utilize (the default value is 10).

For example, the following defines the snapshot class kumoscale-snapshot-class with 15% reserved space.

```
apiVersion: snapshot.storage.k8s.io/v1alpha1
kind: VolumeSnapshotClass
metadata:
  name: kumoscale-snapshot-class
snapshotter: kumoscale.csi.kioxia.com
parameters:
  #The space to reserve for original volume changes in (%) from original volume size
  #default 10
  reservedSpacePercentage: "15"
  csi.storage.k8s.io/snapshotter-secret-name: kumoscale-provisioner
  csi.storage.k8s.io/snapshotter-secret-namespace: kube-system
```

2. Save the file and create the class. For example, using SnapshotClass.yaml:

```
kubectl apply -f SnapshotClass.yaml
```

### Creating a Snapshot

To create a snapshot:

1. Create a PVC for a non-resilient volume (numReplica=1 in the storage class). Using **kube1PVC.yaml** from [KumoScale CSI Storage Provisioning and Volume Management](#) create **kumoscale-simple-volume**.
2. Edit the Snapshot CRD and specify the PVC of step 1. For example, using **Snapshot.yaml**, create **myFirstSnapshot**

```
apiVersion: snapshot.storage.k8s.io/v1alpha1
kind: VolumeSnapshot
metadata:
  name: myFirstSnapshot
spec:
  snapshotClassName: kumoscale-snapshot-class
```

```
source:
  name: kumoscale-simple-volume
  kind: PersistentVolumeClaim
```

3. Create the snapshot with:

```
kubect1 apply -f Snapshot.yaml
```

Alternatively, you can add a snapshot to a volume using the KumoScale Cluster Manager CLI command [snapshot-add](#).

### Creating a Snapshot Volume

To create a snapshot volume use the **SnapshotVolume.yaml** as an example. For example, to create a writable snapshot volume, **writeable-snapshot-volume** below is the SnapshotVolume.yaml

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: writeable-snapshot-volume
spec:
  storageClassName: kumoscale-snapshot-class
  dataSource:
    name: writeable-snap-1
    kind: VolumeSnapshot
    apiGroup: snapshot.storage.k8s.io
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 1Ti
```

When creating a writable snapshot volume using the **SnapshotVolume.yaml** example, a different class can be provided to configure the reserved space with a value other than the value in SnapshotClass.

To create a read-only snapshot volume, follow the specifications as shown in the example files **ROSnapshotVolume.yaml** and **ReadOnlyStorageClass.yaml**

Alternatively, you can use the KumoScale Cluster Manager CLI command [snapshot-volume-add](#).

### Listing Snapshots

You can list all snapshots taken from a volume using the list snapshot command:

- KumoScale Cluster Manager CLI: [snapshot-show](#).
- KumoScale Provisioner REST API: **Get Snapshots by Volume**.

### Deleting a Snapshot Volume

To delete a snapshot, you must delete components in this order:

1. Delete all snapshot volumes.
2. Delete the snapshot.
3. Delete the original volume (PVC).

[1] Definition of capacity - KIOXIA Corporation defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1Gbit = 230 bits = 1,073,741,824 bits, 1GB = 230 bytes = 1,073,741,824 bytes and 1TB = 240 bytes = 1,099,511,627,776 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

