NetApp Astra Trident Configuration
NetApp Solutions
NetApp
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Example Astra Trident Backends for NetApp AlPod Deployments

Before you can use Astra Trident to dynamically provision storage resources within your Kubernetes cluster, you must create one or more Trident Backends. The examples that follow represent different types of Backends that you might want to create if you are deploying components of this solution on a NetApp AlPod. For more information about Backends, see the Astra Trident documentation.

1. NetApp recommends creating a FlexGroup-enabled Trident Backend for your AlPod.

   The example commands that follow show the creation of a FlexGroup-enabled Trident Backend for an AlPod storage virtual machine (SVM). This Backend uses the `ontap-nas-flexgroup` storage driver. ONTAP supports two main data volume types: FlexVol and FlexGroup. FlexVol volumes are size-limited (as of this writing, the maximum size depends on the specific deployment). FlexGroup volumes, on the other hand, can scale linearly to up to 20PB and 400 billion files, providing a single namespace that greatly simplifies data management. Therefore, FlexGroup volumes are optimal for AI and ML workloads that rely on large amounts of data.

   If you are working with a small amount of data and want to use FlexVol volumes instead of FlexGroup volumes, you can create Trident Backends that use the `ontap-nas` storage driver instead of the `ontap-nas-flexgroup` storage driver.
2. NetApp also recommends creating a FlexVol-enabled Trident Backend. You may want to use FlexVol volumes for hosting persistent applications, storing results, output, debug information, and so on. If you want to use FlexVol volumes, you must create one or more FlexVol-enabled Trident Backends. The example commands that follow show the creation of a single FlexVol-enabled Trident Backend.
Before you can use Astra Trident to dynamically provision storage resources within your Kubernetes cluster, you must create one or more Kubernetes StorageClasses. The examples that follow represent different types of StorageClasses that you might want to
create if you are deploying components of this solution on a NetApp AlPod. For more information about StorageClasses, see the Astra Trident documentation.

1. NetApp recommends creating a StorageClass for the FlexGroup-enabled Trident Backend that you created in the section Example Astra Trident Backends for NetApp AlPod Deployments, step 1. The example commands that follow show the creation of multiple StorageClasses that corresponds to the two example Backend that was created in the section Example Astra Trident Backends for NetApp AlPod Deployments, step 1 - one that utilizes NFS over RDMA and one that does not.

So that a persistent volume isn't deleted when the corresponding PersistentVolumeClaim (PVC) is deleted, the following example uses a reclaimPolicy value of Retain. For more information about the reclaimPolicy field, see the official Kubernetes documentation.

Note: The following example StorageClasses use a maximum transfer size of 262144. To use this maximum transfer size, you must configure the maximum transfer size on your ONTAP system accordingly. Refer to the ONTAP documentation for details.

Note: To use NFS over RDMA, you must configure NFS over RDMA on your ONTAP system. Refer to the link https://docs.netapp.com/us-en/ontap/nfs-rdma/[ONTAP documentation] for details.

Note: In the following example, a specific Backend is not specified in the storagePool field in StorageClass definition file.
$ cat << EOF > ./storage-class-aipod-flexgroups-retain.yaml
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: aipod-flexgroups-retain
provisioner: csi.trident.netapp.io
mountOptions: ["vers=4.1", "nconnect=16", "rsize=262144",
  "wsize=262144"]
parameters:
  backendType: "ontap-nas-flexgroup"
  storagePools: "aipod-flexgroups-iface1:.*"
reclaimPolicy: Retain
EOF
$kubectl create -f ./storage-class-aipod-flexgroups-retain.yaml
storageclass.storage.k8s.io/aipod-flexgroups-retain created
$ cat << EOF > ./storage-class-aipod-flexgroups-retain-rdma.yaml
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: aipod-flexgroups-retain-rdma
provisioner: csi.trident.netapp.io
mountOptions: ["vers=4.1", "proto=rdma", "max_connect=16",
  "rsize=262144", "wsize=262144"]
parameters:
  backendType: "ontap-nas-flexgroup"
  storagePools: "aipod-flexgroups-iface1:.*"
reclaimPolicy: Retain
EOF
$kubectl create -f ./storage-class-aipod-flexgroups-retain-rdma.yaml
storageclass.storage.k8s.io/aipod-flexgroups-retain-rdma created

$ kubectl get storageclass

NAME                    PROVISIONER             AGE
aipod-flexgroups-retain  csi.trident.netapp.io  0m
aipod-flexgroups-retain-rdma csi.trident.netapp.io  0m

2. NetApp also recommends creating a StorageClass that corresponds to the FlexVol-enabled Trident Backend that you created in the section Example Astra Trident Backends for AIPod Deployments, step 2. The example commands that follow show the creation of a single StorageClass for FlexVol volumes.

Note: In the following example, a particular Backend is not specified in the storagePool field in StorageClass definition file. When you use Kubernetes to administer volumes using this StorageClass, Trident attempts to use any available backend that uses the ontap-nas driver.
$ cat << EOF > ./storage-class-aipod-flexvols-retain.yaml
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: aipod-flexvols-retain
provisioner: netapp.io/trident
parameters:
  backendType: "ontap-nas"
reclaimPolicy: Retain
EOF
$ kubectl create -f ./storage-class-aipod-flexvols-retain.yaml
storageclass.storage.k8s.io/aipod-flexvols-retain created
$ kubectl get storageclass
<table>
<thead>
<tr>
<th>NAME</th>
<th>PROVISIONER</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>aipod-flexgroups-retain</td>
<td>csi.trident.netapp.io</td>
<td>0m</td>
</tr>
<tr>
<td>aipod-flexgroups-retain-rdma</td>
<td>csi.trident.netapp.io</td>
<td>0m</td>
</tr>
<tr>
<td>aipod-flexvols-retain</td>
<td>csi.trident.netapp.io</td>
<td>0m</td>
</tr>
</tbody>
</table>
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