



Google Cloud NetApp Volumes

Astra Trident

NetApp
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Google Cloud NetApp Volumes

Configure a Google Cloud NetApp Volumes backend

You can now configure Google Cloud NetApp Volumes as the backend for Astra Trident. You can attach NFS volumes using a Google Cloud NetApp Volumes backend.

Google Cloud NetApp Volumes is a tech preview feature in Astra Trident 24.06.

Google Cloud NetApp Volumes driver details

Astra Trident provides the `google-cloud-netapp-volumes` driver to communicate with the cluster. Supported access modes are: *ReadWriteOnce* (RWO), *ReadOnlyMany* (ROX), *ReadWriteMany* (RWX), *ReadWriteOncePod* (RWOP).

Driver	Protocol	volumeMode	Access modes supported	File systems supported
<code>google-cloud-netapp-volumes</code>	NFS	Filesystem	RWO, ROX, RWX, RWOP	<code>nfs</code>

Prepare to configure a Google Cloud NetApp Volumes backend

Before you can configure your Google Cloud NetApp Volumes backend, you need to ensure the following requirements are met.

Prerequisites for NFS volumes

If you are using Google Cloud NetApp Volumes for the first time or in a new location, some initial configuration is required to set up Google Cloud NetApp Volumes and create an NFS volume. Refer to [Before you begin](#).

Ensure that you have the following before configuring Google Cloud NetApp Volumes backend:

- A Google Cloud account configured with Google Cloud NetApp Volumes service. Refer to [Google Cloud NetApp Volumes](#).
- Project number of your Google Cloud account. Refer to [Identifying projects](#).
- A Google Cloud service account with the NetApp Volumes Admin (`netappcloudvolumes.admin`) role. Refer to [Identity and Access Management roles and permissions](#).
- API key file for your GCNV account. Refer to [Authenticate by using API keys](#)
- A storage pool. Refer to [Storage pools overview](#).

For more information about how to set up access to Google Cloud NetApp Volumes, refer to [Set up access to Google Cloud NetApp Volumes](#).

Google Cloud NetApp Volumes backend configuration options and examples

Learn about NFS backend configuration options for Google Cloud NetApp Volumes and review configuration examples.

Backend configuration options

Each backend provisions volumes in a single Google Cloud region. To create volumes in other regions, you can define additional backends.

Parameter	Description	Default
version		Always 1
storageDriverName	Name of the storage driver	The value of <code>storageDriverName</code> must be specified as "google-cloud-netapp-volumes".
backendName	(Optional) Custom name of the storage backend	Driver name + "_" + part of API key
storagePools	Optional parameter used to specify storage pools for volume creation.	
projectNumber	Google Cloud account project number. The value is found on the Google Cloud portal home page.	
location	<p>The Google Cloud location where Astra Trident creates GCNV volumes. When creating cross-region Kubernetes clusters, volumes created in a <code>location</code> can be used in workloads scheduled on nodes across multiple Google Cloud regions.</p> <p>Cross-region traffic incurs an additional cost.</p>	
apiKey	<p>API key for the Google Cloud service account with the <code>netappcloudvolumes.admin</code> role.</p> <p>It includes the JSON-formatted contents of a Google Cloud service account's private key file (copied verbatim into the backend configuration file).</p> <p>The <code>apiKey</code> must include key-value pairs for the following keys: <code>type</code>, <code>project_id</code>, <code>client_email</code>, <code>client_id</code>, <code>auth_uri</code>, <code>token_uri</code>, <code>auth_provider_x509_cert_url</code>, and <code>client_x509_cert_url</code>.</p>	
nfsMountOptions	Fine-grained control of NFS mount options.	"nfsvers=3"
limitVolumeSize	Fail provisioning if the requested volume size is above this value.	"" (not enforced by default)

Parameter	Description	Default
serviceLevel	The service level of a storage pool and its volumes. The values are flex, standard, premium, or extreme.	
network	Google Cloud network used for GCNV volumes.	
debugTraceFlags	Debug flags to use when troubleshooting. Example, {"api":false, "method":true}. Do not use this unless you are troubleshooting and require a detailed log dump.	null
supportedTopologies	Represents a list of regions and zones that are supported by this backend. For more information, refer to Use CSI Topology . For example: supportedTopologies: - topology.kubernetes.io/region: europe-west6 topology.kubernetes.io/zone: europe-west6-b	

Volume provisioning options

You can control default volume provisioning in the `defaults` section of the configuration file.

Parameter	Description	Default
exportRule	The export rules for new volumes. Must be a comma-separated list of any combination of IPv4 addresses.	"0.0.0.0/0"
snapshotDir	Access to the <code>.snapshot</code> directory	"false"
snapshotReserve	Percentage of volume reserved for snapshots	"" (accept default of 0)
unixPermissions	The unix permissions of new volumes (4 octal digits).	""

Example configurations

The following examples show basic configurations that leave most parameters to default. This is the easiest way to define a backend.


```
XsYg6gyxy4zq70lwWgLwGa==
```

```
-----END PRIVATE KEY-----
```

```
---
```

```
apiVersion: trident.netapp.io/v1
```

```
kind: TridentBackendConfig
```

```
metadata:
```

```
  name: backend-tbc-gcnv
```

```
spec:
```

```
  version: 1
```

```
  storageDriverName: google-cloud-netapp-volumes
```

```
  projectNumber: '123455380079'
```

```
  location: europe-west6
```

```
  serviceLevel: premium
```

```
  apiKey:
```

```
    type: service_account
```

```
    project_id: my-gcnv-project
```

```
    client_email: myproject-prod@my-gcnv-
```

```
project.iam.gserviceaccount.com
```

```
    client_id: '103346282737811234567'
```

```
    auth_uri: https://accounts.google.com/o/oauth2/auth
```

```
    token_uri: https://oauth2.googleapis.com/token
```

```
    auth_provider_x509_cert_url:
```

```
https://www.googleapis.com/oauth2/v1/certs
```

```
    client_x509_cert_url:
```

```
https://www.googleapis.com/robot/v1/metadata/x509/myproject-prod%40my-  
gcnv-project.iam.gserviceaccount.com
```

```
  credentials:
```

```
    name: backend-tbc-gcnv-secret
```



```
version: 1
storageDriverName: google-cloud-netapp-volumes
projectNumber: '123455380079'
location: europe-west6
serviceLevel: premium
storagePools:
- premium-pool1-europe-west6
- premium-pool2-europe-west6
apiKey:
  type: service_account
  project_id: my-gcnv-project
  client_email: myproject-prod@my-gcnv-
project.iam.gserviceaccount.com
  client_id: '103346282737811234567'
  auth_uri: https://accounts.google.com/o/oauth2/auth
  token_uri: https://oauth2.googleapis.com/token
  auth_provider_x509_cert_url:
https://www.googleapis.com/oauth2/v1/certs
  client_x509_cert_url:
https://www.googleapis.com/robot/v1/metadata/x509/myproject-prod%40my-
gcnv-project.iam.gserviceaccount.com
  credentials:
    name: backend-tbc-gcnv-secret
```



```
znHczZsrtrHisIsAbOguSaPIKeyAZNchRAGz1zZE4jK3bl/qp8B4Kws8zX5ojY9m
znHczZsrtrHisIsAbOguSaPIKeyAZNchRAGz1zZE4jK3bl/qp8B4Kws8zX5ojY9m
znHczZsrtrHisIsAbOguSaPIKeyAZNchRAGz1zZE4jK3bl/qp8B4Kws8zX5ojY9m
XsYg6gyxy4zq7O1wWgLwGa==
-----END PRIVATE KEY-----
```

```
apiVersion: trident.netapp.io/v1
kind: TridentBackendConfig
metadata:
  name: backend-tbc-gcnv
spec:
  version: 1
  storageDriverName: google-cloud-netapp-volumes
  projectNumber: '123455380079'
  location: europe-west6
  apiKey:
    type: service_account
    project_id: my-gcnv-project
    client_email: myproject-prod@my-gcnv-
project.iam.gserviceaccount.com
    client_id: '103346282737811234567'
    auth_uri: https://accounts.google.com/o/oauth2/auth
    token_uri: https://oauth2.googleapis.com/token
    auth_provider_x509_cert_url:
https://www.googleapis.com/oauth2/v1/certs
    client_x509_cert_url:
https://www.googleapis.com/robot/v1/metadata/x509/myproject-prod%40my-
gcnv-project.iam.gserviceaccount.com
  credentials:
    name: backend-tbc-gcnv-secret
  defaults:
    snapshotReserve: '10'
    exportRule: 10.0.0.0/24
  storage:
    - labels:
        performance: extreme
        serviceLevel: extreme
      defaults:
        snapshotReserve: '5'
        exportRule: 0.0.0.0/0
    - labels:
        performance: premium
        serviceLevel: premium
    - labels:
```

```
performance: standard
serviceLevel: standard
```

What's next?

After you create the backend configuration file, run the following command:

```
kubectl create -f <backend-file>
```

To verify that the backend is successfully created, run the following command:

```
kubectl get tridentbackendconfig
```

NAME	PHASE	STATUS	BACKEND NAME	BACKEND UUID
backend-tbc-gcnv	Bound	Success	backend-tbc-gcnv	b2fd1ff9-b234-477e-88fd-713913294f65

If the backend creation fails, something is wrong with the backend configuration. You can describe the backend using the `kubectl get tridentbackendconfig <backend-name>` command or view the logs to determine the cause by running the following command:

```
tridentctl logs
```

After you identify and correct the problem with the configuration file, you can delete the backend and run the create command again.

More examples

Storage class definition examples

The following is a basic `StorageClass` definition that refers to the backend above.

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: gcnv-nfs-sc
provisioner: csi.trident.netapp.io
parameters:
  backendType: "google-cloud-netapp-volumes"
```

Example definitions using the `parameter.selector` field:

Using `parameter.selector` you can specify for each `StorageClass` the [virtual pool](#) that is used to host a volume. The volume will have the aspects defined in the chosen pool.

```
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: extreme-sc
provisioner: csi.trident.netapp.io
parameters:
  selector: "performance=extreme"
  backendType: "google-cloud-netapp-volumes"
---
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: premium-sc
provisioner: csi.trident.netapp.io
parameters:
  selector: "performance=premium"
  backendType: "google-cloud-netapp-volumes"
---
apiVersion: storage.k8s.io/v1
kind: StorageClass
metadata:
  name: standard-sc
provisioner: csi.trident.netapp.io
parameters:
  selector: "performance=standard"
  backendType: "google-cloud-netapp-volumes"
```

For more details on storage classes, refer to [Create a storage class](#).

PVC definition example

```
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: gcnv-nfs-pvc
spec:
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 100Gi
  storageClassName: gcnv-nfs-sc
```

To verify if the PVC is bound, run the following command:

```
kubectl get pvc gcnv-nfs-pvc
```

NAME	STATUS	VOLUME	CAPACITY
gcnv-nfs-pvc	Bound	pvc-b00f2414-e229-40e6-9b16-ee03eb79a213	100Gi
ACCESS MODES		STORAGECLASS AGE	
RWX		gcnv-nfs-sc 1m	

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