



# **Security and data encryption**

## **Cloud Volumes ONTAP**

NetApp  
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# Security and data encryption

## Encrypting volumes with NetApp encryption solutions

Cloud Volumes ONTAP supports NetApp Volume Encryption (NVE) and NetApp Aggregate Encryption (NAE). NVE and NAE are software-based solutions that enable FIPS 140-2–compliant data-at-rest encryption of volumes. [Learn more about these encryption solutions.](#)

Both NVE and NAE are supported with an external key manager.

If you use NVE, you have the option to use your cloud provider's key vault to protect ONTAP encryption keys:

- Google Cloud Key Management Service

New aggregates will have NAE enabled by default after you set up an external key manager. New volumes that aren't part of an NAE aggregate will have NVE enabled by default (for example, if you have existing aggregates that were created before setting up an external key manager).

Cloud Volumes ONTAP doesn't support onboard key management.

### What you'll need

Your Cloud Volumes ONTAP system should be registered with NetApp support. A NetApp Volume Encryption license is automatically installed on each Cloud Volumes ONTAP system that is registered with NetApp Support.

- [Adding NetApp Support Site accounts to Cloud Manager](#)
- [Registering pay-as-you-go systems](#)



Cloud Manager doesn't install the NVE license on systems that reside in the China region.

### Steps

1. Review the list of supported key managers in the [NetApp Interoperability Matrix Tool](#).



Search for the **Key Managers** solution.

2. [Connect to the Cloud Volumes ONTAP CLI.](#)
3. Configure external key management.
  - Google Cloud: [Google Cloud Key Management Service](#)

## Manage keys with Google's Cloud Key Management Service

You can use [Google Cloud Platform's Key Management Service \(Cloud KMS\)](#) to protect your ONTAP encryption keys in a Google Cloud Platform-deployed application.

Key management with Cloud KMS can be enabled with the CLI or the ONTAP REST API.

When using Cloud KMS, be aware that by default a data SVMs LIF is used to communicate with the cloud key management endpoint. A node management network is used to communicate with the cloud provider's

authentication services (oauth2.googleapis.com). If the cluster network is not configured correctly, the cluster will not properly utilize the key management service.

### Prerequisites

- Cloud Volumes ONTAP must be running version 9.10.1 or later
- Volume Encryption (VE) license installed
- Multi-tenant Encryption Key Management (MTEKM) license installed
- You must be a cluster or SVM administrator
- An active Google Cloud Platform subscription

### Limitations

- Cloud KMS can only be configured on a data SVM

## Configuration

### Google Cloud

1. In your Google Cloud environment, [create a symmetric GCP key ring and key](#).
2. Create a custom role for your Cloud Volumes ONTAP service account.

```
gcloud iam roles create kmsCustomRole
  --project=<project_id>
  --title=<kms_custom_role_name>
  --description=<custom_role_description>

  --permissions=cloudkms.cryptoKeyVersions.get,cloudkms.cryptoKeyVersions.
list,cloudkms.cryptoKeyVersions.useToDecrypt,cloudkms.cryptoKeyVersions.
useToEncrypt,cloudkms.cryptoKeys.get,cloudkms.keyRings.get,cloudkms.loca
tions.get,cloudkms.locations.list,resourceManager.projects.get
  --stage=GA
```

3. Assign the custom role to the Cloud KMS key and Cloud Volumes ONTAP service account:  

```
gcloud kms keys add-iam-policy-binding key_name --keyring key_ring_name
  --location key_location --member serviceAccount:_service_account_Name_ --role
  projects/customer_project_id/roles/kmsCustomRole
```
4. Download service account JSON key:  

```
gcloud iam service-accounts keys create key-file --iam-account=sa-name
  @project-id.iam.gserviceaccount.com
```

### Cloud Volumes ONTAP

1. Connect to the cluster management LIF with your preferred SSH client.
2. Switch to the advanced privilege level:  

```
set -privilege advanced
```
3. Create a DNS for the data SVM.  

```
dns create -domains c.<project>.internal -name-servers server_address -vserver
  SVM_name
```

4. Create CMEK entry:

```
security key-manager external gcp enable -vserver SVM_name -project-id project  
-key-ring-name key_ring_name -key-ring-location key_ring_location -key-name  
key_name
```

5. When prompted, enter the service account JSON key from your GCP account.

6. Confirm the enabled process succeeded:

```
security key-manager external gcp check -vserver svm_name
```

7. OPTIONAL: Create a volume to test encryption `vol create volume_name -aggregate aggregate  
-vserver vserver_name -size 10G`

## Troubleshoot

If you need to troubleshoot, you can tail the raw REST API logs in the final two steps above:

1. `set d`
2. `systemshell -node node -command tail -f /mroot/etc/log/mlog/kmip2_client.log`

## Improving protection against ransomware

Ransomware attacks can cost a business time, resources, and reputation. Cloud Manager enables you to implement the NetApp solution for ransomware, which provides effective tools for visibility, detection, and remediation.

Using this feature to improve protection against ransomware addresses a separate use case from [the ONTAP anti-ransomware feature](#) that you can enable through System Manager or the ONTAP CLI.

### Steps

1. From the working environment, click the **Ransomware** icon.



2. Implement the NetApp solution for ransomware:

- a. Click **Activate Snapshot Policy**, if you have volumes that do not have a Snapshot policy enabled.

NetApp Snapshot technology provides the industry's best solution for ransomware remediation. The key to a successful recovery is restoring from uninfected backups. Snapshot copies are read-only, which prevents ransomware corruption. They can also provide the granularity to create images of a single file copy or a complete disaster recovery solution.

- b. Click **Activate FPolicy** to enable ONTAP's FPolicy solution, which can block file operations based on a file's extension.

This preventative solution improves protection from ransomware attacks by blocking common ransomware file types.

The default FPolicy scope blocks files that have the following extensions:

micro, encrypted, locked, crypto, crypt, crinf, r5a, XRNT, XTBL, R16M01D05, pzdc, good, LOL!, OMG!, RDM, RRK, encryptedRS, crjoker, EnCiPhErEd, LeChiffre



Cloud Manager creates this scope when you activate FPolicy on Cloud Volumes ONTAP. The list is based on common ransomware file types. You can customize the blocked file extensions by using the `vserver fpolicy policy scope` commands from the Cloud Volumes ONTAP CLI.

### Ransomware Protection

Ransomware attacks can cost a business time, resources, and reputation. The NetApp solution for ransomware provides effective tools for visibility, detection, and remediation. [Learn More](#)

#### 1 Enable Snapshot Copy Protection ⓘ

50 %  
Protection

1 Volumes without a Snapshot Policy

To protect your data, activate the default Snapshot policy for these volumes ⓘ

Activate Snapshot Policy

#### 2 Block Ransomware File Extensions ⓘ

ONTAP's native FPolicy configuration monitors and blocks file operations based on a file's extension.

[View Denied File Names ⓘ](#)

Activate FPolicy

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