Back up data to the cloud

Cloud Manager

NetApp
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Learn about Cloud Backup

Cloud Backup is a service for Cloud Volumes ONTAP and on-premises ONTAP clusters that delivers backup and restore capabilities for protection, and long-term archive of your data. Backups are automatically generated and stored in an object store in your public or private cloud account, independent of volume Snapshot copies used for near-term recovery or cloning.

When necessary, you can restore an entire *volume*, or one or more *files*, from a backup to the same or different Cloud Volumes ONTAP or on-premises ONTAP cluster.

Learn more about Cloud Backup.

Features

- Back up independent copies of your data volumes to low-cost object storage.
- Back up from cloud to cloud, and from on-premises ONTAP systems to public or private cloud.
- Backups can reside on a different subscription/account or different region than your Cloud Volumes ONTAP system.
- Backup data is secured with AES-256 bit encryption at-rest and TLS 1.2 HTTPS connections in-flight.
- Support for up to 4,000 backups of a single volume.
- Restore data from a specific point in time.
- Restore a volume, or individual files, to the source system or to a different system.
- Restore data to a working environment using a different subscription/account or that is in a different region.
- Restores data on a block level, placing the data directly in the location you specify, all while preserving the original ACLs.
- Browsable file catalog for selecting individual files for single file restore.

Supported working environments and object storage providers

Cloud Backup enables you to back up volumes from the following working environments to object storage in the following cloud providers:

Source Working Environment	Backup File Destination
Cloud Volumes ONTAP in AWS	Amazon S3
Cloud Volumes ONTAP in Azure	Azure Blob
Cloud Volumes ONTAP in Google	Google Cloud Storage
On-premises ONTAP system	Amazon S3 Azure Blob Google Cloud Storage NetApp StorageGRID

You can restore a volume, or individual files, from a backup file to the following working environments:

Backup File Location	Destination Working Environment	
	Volume Restore	**File Restore**
Amazon S3	Cloud Volumes ONTAP in AWS On-premises ONTAP system	Cloud Volumes ONTAP in AWS On-premises ONTAP system
Azure Blob	Cloud Volumes ONTAP in Azure On-premises ONTAP system	Cloud Volumes ONTAP in Azure On-premises ONTAP system
Google Cloud Storage	Cloud Volumes ONTAP in Google On-premises ONTAP system	
NetApp StorageGRID	On-premises ONTAP system	

Cost

There are two types of costs associated with using Cloud Backup: resource charges and service charges.

Resource charges

Resource charges are paid to the cloud provider for storage and for running a virtual machine/instance in the cloud.

- For Backup, you pay your cloud provider for object storage costs. (There are no storage costs when creating backups on your StorageGRID systems.)

  Since Cloud Backup preserves the storage efficiencies of the source volume, you pay the cloud provider object storage costs for the data *after* ONTAP efficiencies (for the smaller amount of data after deduplication and compression have been applied).

- For File Restore, you pay your cloud provider for compute costs only when the Restore instance is running.

  The instance resides in the same subnet as the Connector, and it runs only when browsing a backup file to locate the individual files you want to restore. The instance is turned off when not in use to save costs.

  - In AWS, the Restore instance runs on an m5n.xlarge instance with 4 CPUs, 16 GiB memory, and EBS Only instance storage. The operating system image is Amazon Linux 2.

    In regions where m5n.xlarge instance isn't available, Restore runs on an m5.xlarge instance instead.

  - In Azure, the Restore virtual machine runs on a Standard_D4s_v3 VM with 4 CPUs, 16 GiB memory, and a 32 GB disk. The operating system image is CentOS 7.5).

    The instance is named *Cloud-Restore-Instance* with your Account ID concatenated to it. For example: *Cloud-Restore-Instance-MyAccount*.

- For Volume Restore there is no cost because no separate instance or virtual machine is required.

Service charges

Backup service charges are paid to NetApp and cover both the cost to *create* backups and to *restore* volumes, or files, from those backups. You pay only for the data that you protect, calculated by the target backup capacity *before* ONTAP efficiencies.

There are three ways to pay for the Backup service. The first option is to subscribe from your cloud provider, which enables you to pay per month based on the amount of backed up data. The second option is to get an annual contract - this is only available through AWS. The third option is to purchase licenses directly from NetApp. Read the Licensing section for details.

Licensing

Cloud Backup is available in three licensing options: Pay As You Go (PAYGO), an annual contract from the AWS Marketplace, and Bring Your Own License (BYOL). A 30-day free trial is available if you don't have a license.

Free trial

When using the 30-day free trial, you are notified about the number of free trial days that remain. At the end of your free trial, backups stop being created. You must subscribe to the service or purchase a license to continue using the service.

Backup are not deleted when the service is disabled. You'll continue to be charged by your cloud provider for object storage costs for the capacity that your backups use unless you delete the backups.

Pay-as-you-go subscription

Cloud Backup offers consumption-based licensing in a pay-as-you-go model. The licensing costs are based on target backup capacity (before ONTAP storage efficiencies). After subscribing through your cloud provider's marketplace, you pay per GB for data that's backed up—there's no up-front payment. You are billed by your cloud provider through your monthly bill.

You should subscribe even if you have a free trial or if you bring your own license (BYOL):

- Subscribing ensures that there's no disruption of service after your free trial ends.

  When the trial ends, you'll be charged hourly according to the amount of data that you back up.

- If you back up more data than allowed by your BYOL license, then data backup continues through your pay-as-you-go subscription.

  For example, if you have a 10 TB BYOL license, all capacity beyond the 10 TB is charged through the pay-as-you-go subscription.

You won't be charged from your pay-as-you-go subscription during your free trial or if you haven't exceeded your BYOL license.

Learn how to set up a pay-as-you-go subscription.

Annual contract (AWS only)

Two annual contracts are available from the AWS Marketplace:

- An annual contract that enables you to back up Cloud Volumes ONTAP data and on-premises ONTAP data.

  You'll also need to pay for Cloud Volumes ONTAP using this annual contract subscription, since you can assign only one active subscription to your AWS credentials in Cloud Manager.

- A Professional Package that enables you to bundle Cloud Volumes ONTAP and Cloud Backup Service by using an annual contract for 12 months, 24 months, or 36 months. This option doesn't enable you to back up on-prem data.

  You can set up the annual contract when you create a Cloud Volumes ONTAP working environment and Cloud Manager will prompt you to subscribe to the AWS Marketplace.

Learn how to set up yearly AWS contracts.

Bring your own license

BYOL is term-based (1YR/2YR/3YR) and capacity-based in 1 TB increments, based on the logical (before ONTAP storage efficiencies) backed up capacity. You pay NetApp to use the service for a period of time, say 1 year, and for a maximum amount backup capacity, say 10 TB, and you'll need to pay your cloud provider for object storage costs (as described earlier).

Backup to StorageGRID does require a BYOL license, but there is no cost for cloud provider storage space in this case.

You'll receive a serial number that you enter in the Cloud Manager Digital Wallet page to enable the service. When either limit is reached you'll need to renew the license. The Backup BYOL license applies to all Cloud Volumes ONTAP and on-premises ONTAP systems associated with your Cloud Central account.

Learn how to manage your BYOL licenses.

BYOL license considerations

When using a Cloud Backup BYOL license, Cloud Manager displays a warning in the user interface when backups are nearing the capacity limit or nearing the license expiration date. You receive these warnings:

- When backups have reached 80% of licensed capacity, and again when you have reached the limit
- 30 days before a license is due to expire, and again when the license expires

Use the chat icon in the lower right of the Cloud Manager interface to renew your license when you see these warnings.

Two things can happen when your license expires:

- If the account you are using for your ONTAP systems has a marketplace account, the backup service continues to run, but you are shifted over to a PAYGO licensing model. You are charged by your cloud provider for object storage costs, and by NetApp for backup licensing costs, for the capacity that your backups are using.
- If the account you are using for your ONTAP systems does not have a marketplace account, the backup service continues to run, but you will continue to see the warnings.

Once you renew your BYOL subscription, Cloud Manager automatically obtains the new license from NetApp and installs it. If Cloud Manager can't access the license file over the secure internet connection, you can obtain the file yourself and manually upload it to Cloud Manager. For instructions, see how to update a Cloud Backup license.

Systems that were shifted over to a PAYGO license are returned to the BYOL license automatically. And systems that were running without a license will stop seeing the warnings and will be charged for backup activity that occurred while the license was expired.

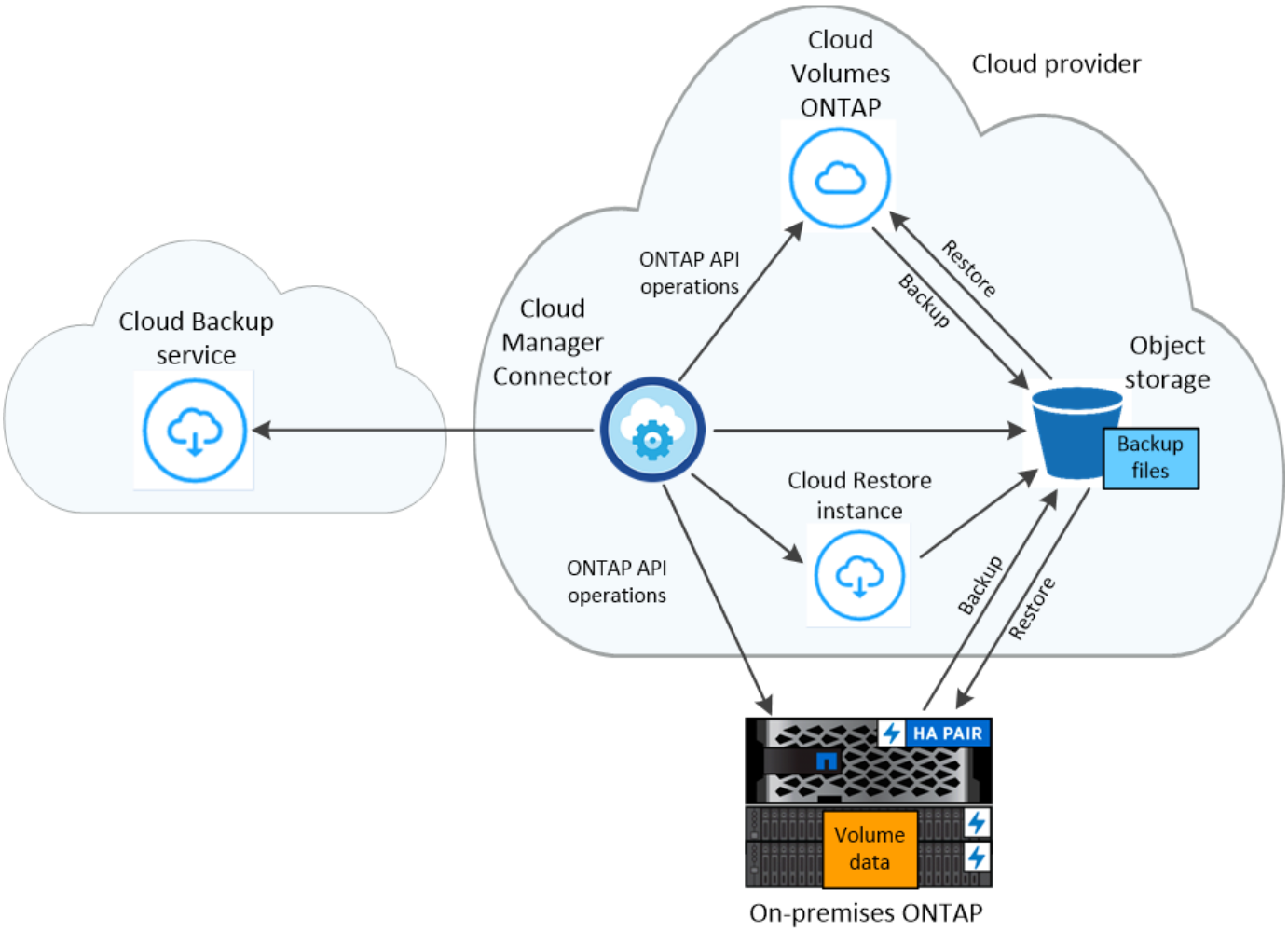
How Cloud Backup works

When you enable Cloud Backup on a Cloud Volumes ONTAP or on-premises ONTAP system, the service performs a full backup of your data. Volume snapshots are not included in the backup image. After the initial backup, all additional backups are incremental, which means that only changed blocks and new blocks are backed up. This keeps network traffic to a minimum.

In most cases you will use Cloud Manager for all backup and restore operations. However, starting with ONTAP 9.9.1 you can initiate volume backup operations of your on-premises ONTAP clusters using ONTAP System Manager. See how to use System Manager to back up your volumes to the cloud using Cloud Backup.

Any actions taken directly from your cloud provider environment to manage or change backup files may corrupt the files and will result in an unsupported configuration.

The following image shows the relationship between each component:



Where backups reside

Backup copies are stored in an object store that Cloud Manager creates in your cloud account. You identify the region when you enable the service.

There's one object store per Cloud Volumes ONTAP or on-premises ONTAP system. Cloud Manager names the object store as follows: "netapp-backup-*clusteruuid*". Be sure not to delete this object store.

- In AWS, Cloud Manager enables the Amazon S3 Block Public Access feature on the S3 bucket.
- In Azure, Cloud Manager uses a new or existing resource group with a storage account for the Blob container. Cloud Manager blocks public access to your blob data by default.
- In GCP, Cloud Manager uses a new or existing project with a storage account for the Google Cloud Storage bucket.
- In StorageGRID, Cloud Manager uses an existing storage account for the object store bucket.

Supported storage classes or access tiers

- In AWS, backups start in the *Standard* storage class and transition to the *Standard-Infrequent Access* storage class after 30 days.
- In Azure, backups are associated with the *Cool* access tier.
- In GCP, backups are associated with the *Standard* storage class by default.

  You can also use the lower cost *Nearline* storage class, or the *Coldline* or *Archive* storage classes. See the Google topic Storage classes for information about changing the storage class.

- In StorageGRID, backups are associated with the *Standard* storage class.

Backup settings are system wide

When you enable Cloud Backup, all the volumes you identify on the system are backed up to the cloud.

The schedule and number of backups to retain are defined at the system level. The backup settings affect all volumes on the system.

The schedule is hourly, daily, weekly, monthly, or a combination

You can choose a combination of hourly, daily, weekly, and monthly backups of all volumes. You can also select one of the system-defined policies that provide backups and retention for 3 months, 1 year, and 7 years. These policies are:

Backup Policy Name	Backups per interval…			Max. Backups
	Daily	Weekly	Monthly	
Netapp3MonthsRetention	30	13	3	46
Netapp1YearRetention	30	13	12	55
Netapp7YearsRetention	30	53	84	167

Backup protection policies that you have created on the system using ONTAP System Manager or the ONTAP CLI are also available as selections.

You can also create an on-demand backup of a volume from the Backup Dashboard in addition to those backup files created from the scheduled backups.

Once you have reached the maximum number of backups for a category, or interval, older backups are removed so you always have the most current backups.

Note that the retention period for backups of data protection volumes is the same as defined in the source SnapMirror relationship. You can change this if you want by using the API.

Backups are taken at midnight

- Hourly backups start 5 minutes past the hour, every hour.
- Daily backups start just after midnight each day.
- Weekly backups start just after midnight on Sunday mornings.
- Monthly backups start just after midnight on the first day of each month.

The start time is based on the time zone set on each source ONTAP system. You can't schedule backup operations at a user-specified time from the UI. For more information, contact your System Engineer.

Backup copies are associated with your Cloud Central account

Backup copies are associated with the Cloud Central account in which Cloud Manager resides.

If you have multiple Cloud Manager systems in the same Cloud Central account, each Cloud Manager system will display the same list of backups. That includes the backups associated with Cloud Volumes ONTAP and on-premises ONTAP instances from other Cloud Manager systems.

Supported volumes

Cloud Backup supports FlexVol read-write volumes and data protection (DP) volumes.

FlexGroup volumes and SnapLock volumes aren't currently supported.

FabricPool tiering policy considerations

There are certain things you need to be aware of when the volume you are backing up resides on a FabricPool aggregate and it has an assigned policy other than `none`:

- The first backup of a FabricPool-tiered volume requires retrieval of all local and all tiered data (from the object store). This operation could cause a one-time increase in cost to read the data from your cloud provider.
  - Subsequent backups are incremental and do not have this effect.
  - If the tiering policy is assigned to the volume when it is initially created you will not see this issue.
- Consider the impact of backups before assigning the `all` tiering policy to volumes. Because data is tiered immediately, Cloud Backup will read data from the cloud tier rather than from the local tier. Because concurrent backup operations share the network link to the cloud object store, performance degradation might occur if network resources become saturated. In this case, you may want to proactively configure multiple network interfaces (LIFs) to decrease this type of network saturation.
- A backup operation does not "reheat" the cold data tiered in object storage.

Limitations

- When making backups from on-premises ONTAP systems to public cloud storage, the Connector must be deployed in the cloud.
- When making backups from on-premises ONTAP systems to StorageGRID (private cloud), the Connector must be deployed on premises.

- When backing up data protection (DP) volumes, relationships with the following SnapMirror labels will not be backed up to cloud:
  - app_consistent
  - all_source_snapshot
- In Azure, if you enable Cloud Backup when Cloud Volumes ONTAP is deployed, Cloud Manager creates the resource group for you and you cannot change it. If you want to pick your own resource group when enabling Cloud Backup, **disable** Cloud Backup when deploying Cloud Volumes ONTAP and then enable Cloud Backup and choose the resource group from the Cloud Backup Settings page.
- When backing up volumes from Cloud Volumes ONTAP systems, volumes that you create outside of Cloud Manager aren't automatically backed up. For example, if you create a volume from the ONTAP CLI, ONTAP API, or System Manager, then the volume won't be automatically backed up. If you want to back up these volumes, you would need to disable Cloud Backup and then enable it again.
- ILM (tiering) from the object storage, or direct write to AWS Glacier or similar lower tier object storage, is not supported.
- SVM-DR and SM-BC configurations are not supported.
- MetroCluster (MCC) backup is supported from ONTAP secondary only: MCC > SnapMirror > ONTAP > Cloud Backup Service > object storage.
- WORM/Compliance mode on an object store is not supported.

Single File Restore limitations

- Single file restore can restore up to 100 individual files at a time. There is currently no support for restoring folders/directories.
- The file being restored must be using the same language as the language on the destination volume. You will receive an error message if the languages are not the same.
- Single file restore is not supported when using the same account with different Cloud Managers in different subnets.

Get started

Backing up Cloud Volumes ONTAP data to Amazon S3

Complete a few steps to get started backing up data from Cloud Volumes ONTAP to Amazon S3.

Quick start

Get started quickly by following these steps or scroll down to the remaining sections for full details.

Verify support for your configuration

- You're running Cloud Volumes ONTAP 9.6 or later in AWS.
- You have a valid cloud provider subscription for the storage space where your backups will be located.
- You have subscribed to the Cloud Manager Marketplace Backup offering, an AWS annual contract, or you have purchased and activated a Cloud Backup BYOL license from NetApp.

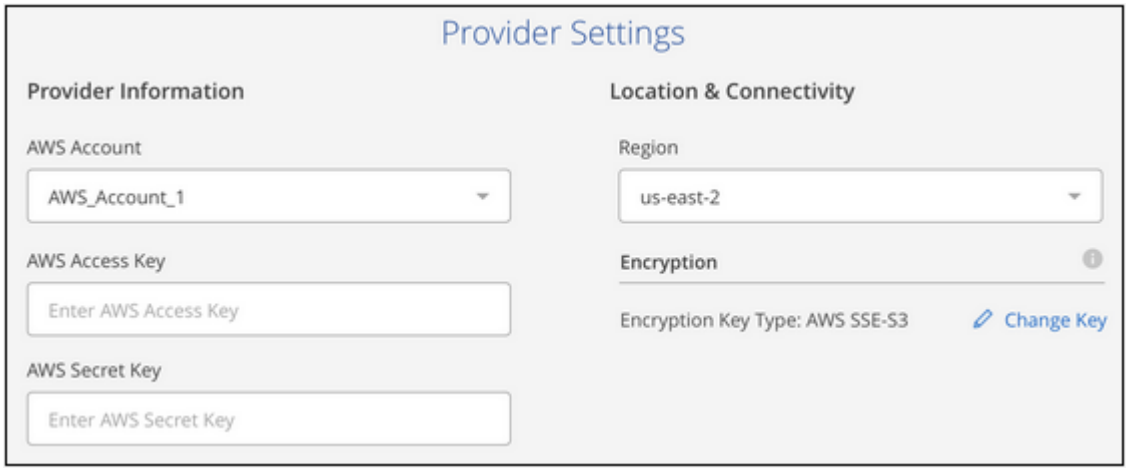
- The IAM role that provides the Cloud Manager Connector with permissions includes S3 permissions from the latest Cloud Manager policy.

Enable Cloud Backup on your new or existing system

- New systems: Cloud Backup is enabled by default in the working environment wizard. Be sure to keep the option enabled.
- Existing systems: Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel, and then follow the setup wizard.

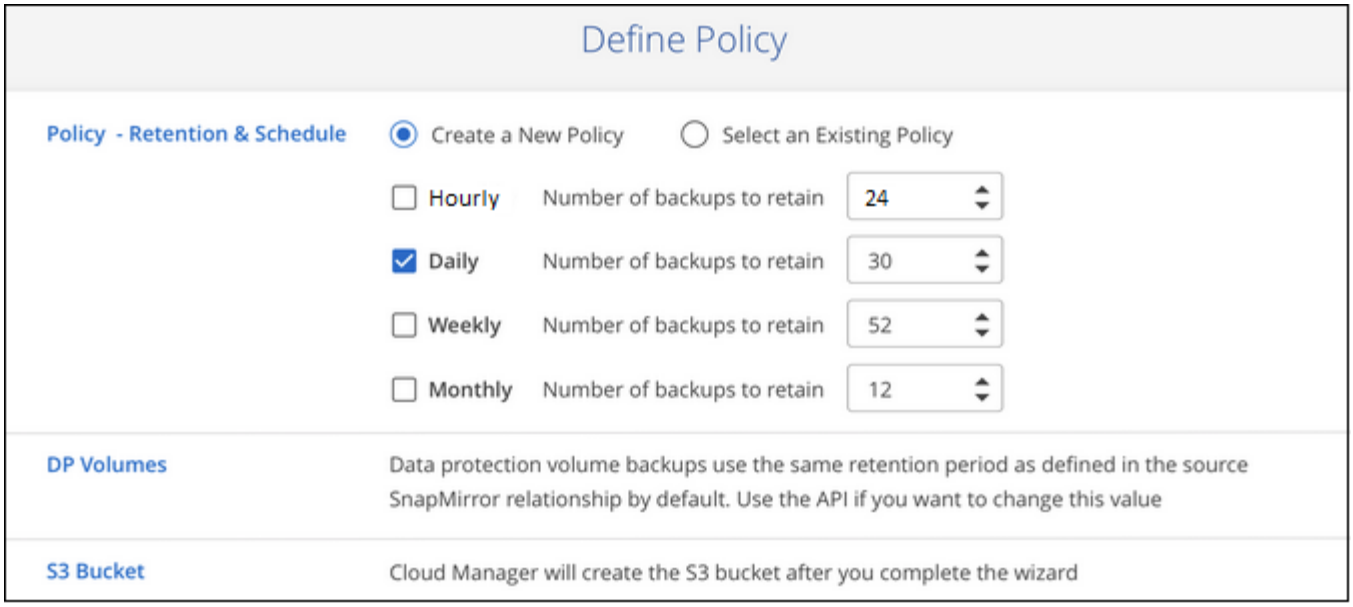
Enter the provider details

Select the AWS Account and the region where you want to create the backups. You can also choose your own customer-managed key for data encryption instead of using the default Amazon S3 encryption key.



Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options. You can also change the number of backup copies to retain.



5 Select the volumes that you want to back up

Identify which volumes you want to back up in the Select Volumes page.

6 Restore your data, as needed

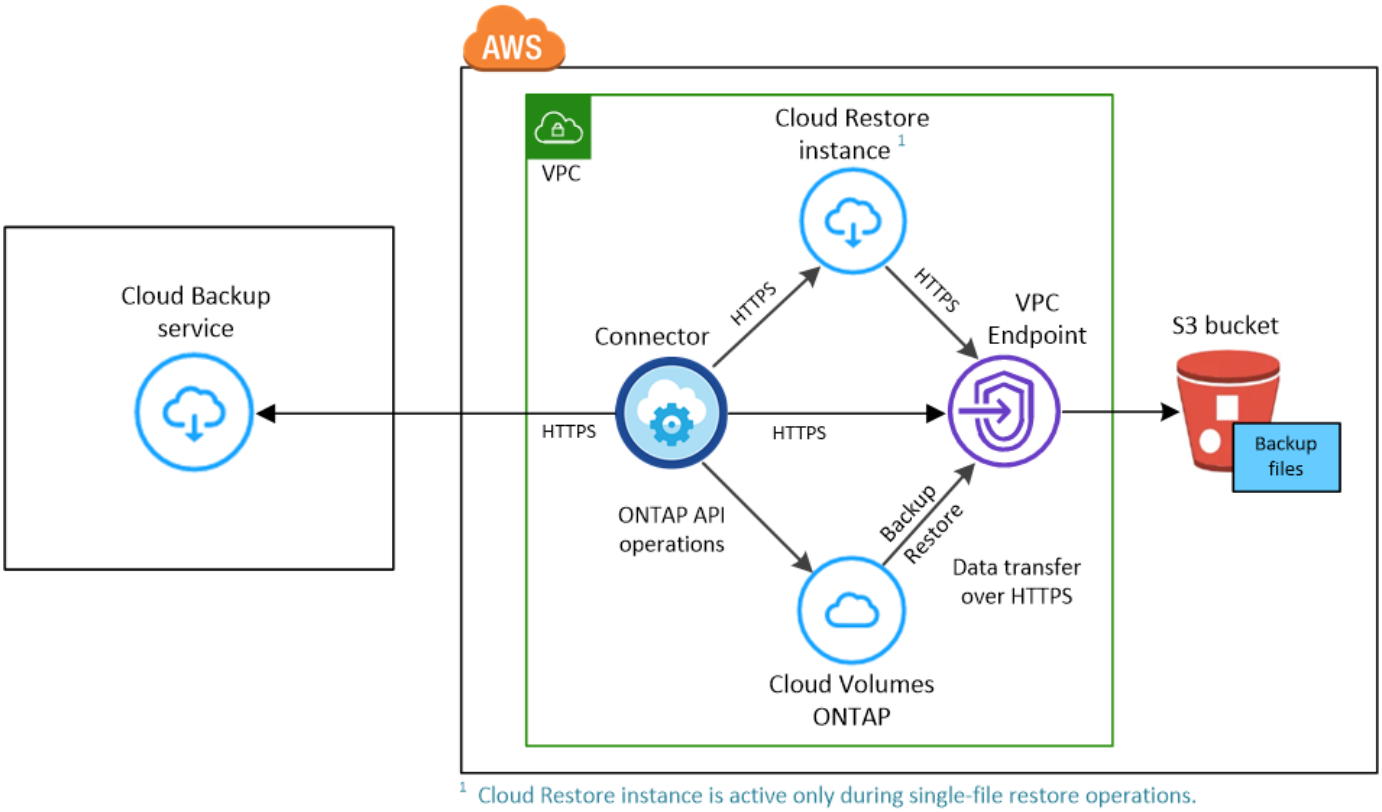
Choose to restore an entire backup to a new volume, or to restore individual files from the backup to an existing volume. You can restore data to a Cloud Volumes ONTAP system in AWS, or to an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure that you have a supported configuration before you start backing up volumes to S3.

The following image shows each component and the connections that you need to prepare between them:



When the Cloud Restore instance is deployed in the cloud, it is located in the same subnet as the Connector.

Supported ONTAP versions

Cloud Volumes ONTAP 9.6 and later.

License requirements

For Cloud Backup PAYGO licensing, a Cloud Manager subscription is available in the AWS Marketplace that enables deployments of Cloud Volumes ONTAP and Cloud Backup. You need to subscribe to this Cloud Manager subscription before you enable Cloud Backup. Billing for Cloud Backup is done through this subscription.

For an annual contract that enables you to back up both Cloud Volumes ONTAP data and on-premises ONTAP data, you need to subscribe from the AWS Marketplace page and then associate the subscription with your AWS credentials.

For an annual contract that enables you to bundle Cloud Volumes ONTAP and Cloud Backup Service, you must set up the annual contract when you create a Cloud Volumes ONTAP working environment. This option doesn't enable you to back up on-prem data.

For Cloud Backup BYOL licensing, you need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

And you need to have an AWS account for the storage space where your backups will be located.

Supported AWS regions

Cloud Backup is supported in all AWS regions where Cloud Volumes ONTAP is supported.

Required setup for creating backups in a different AWS account

By default, backups are created using the same account as the one used for your Cloud Volumes ONTAP system. If you want to use a different AWS account for your backups, you must log in to the AWS portal and link the two accounts.

Required information for using customer-managed keys for data encryption

You can choose your own customer-managed keys for data encryption in the activation wizard instead of using the default Amazon S3 encryption keys. In this case you'll need to have the encryption managed keys already set up. See how to use your own keys.

AWS Backup permissions required

The IAM role that provides Cloud Manager with permissions must include S3 permissions from the latest Cloud Manager policy.

Here are the specific permissions from the policy:

```
{
            "Sid": "backupPolicy",
            "Effect": "Allow",
            "Action": [
                "s3:DeleteBucket",
                "s3:GetLifecycleConfiguration",
                "s3:PutLifecycleConfiguration",
                "s3:PutBucketTagging",
                "s3:ListBucketVersions",
                "s3:GetObject",
                "s3:DeleteObject",
                "s3:ListBucket",
                "s3:ListAllMyBuckets",
                "s3:GetBucketTagging",
                "s3:GetBucketLocation",
                "s3:GetBucketPolicyStatus",
                "s3:GetBucketPublicAccessBlock",
                "s3:GetBucketAcl",
                "s3:GetBucketPolicy",
                "s3:PutBucketPublicAccessBlock"
            ],
            "Resource": [
                "arn:aws:s3:::netapp-backup-*"
            ]
        },
```

AWS Restore permissions required

The following EC2 permissions are needed for the IAM role that provides Cloud Manager with permissions so that it can start, stop, and terminate the Cloud Restore instance:

```
            "Action": [
                "ec2:DescribeInstanceTypeOfferings",
                "ec2:StartInstances",
                "ec2:StopInstances",
                "ec2:TerminateInstances"
            ],
```

Required outbound internet access for AWS deployments

The Cloud Restore instance requires outbound internet access. If your virtual or physical network uses a proxy server for internet access, ensure that the instance has outbound internet access to contact the following endpoints.

Endpoints	Purpose
http://amazonlinux.us-east-1.amazonaws.com/2/extras/docker/stable/x86_64/4bf88ee77c395ffe1e0c3ca68530dfb3a683ec65a4a1ce9c0ff394be50e922b2/	CentOS package for the Cloud Restore Instance AMI.
http://cloudmanagerinfraprod.azurecr.io https://cloudmanagerinfraprod.azurecr.io	Cloud Restore Instance image repository.

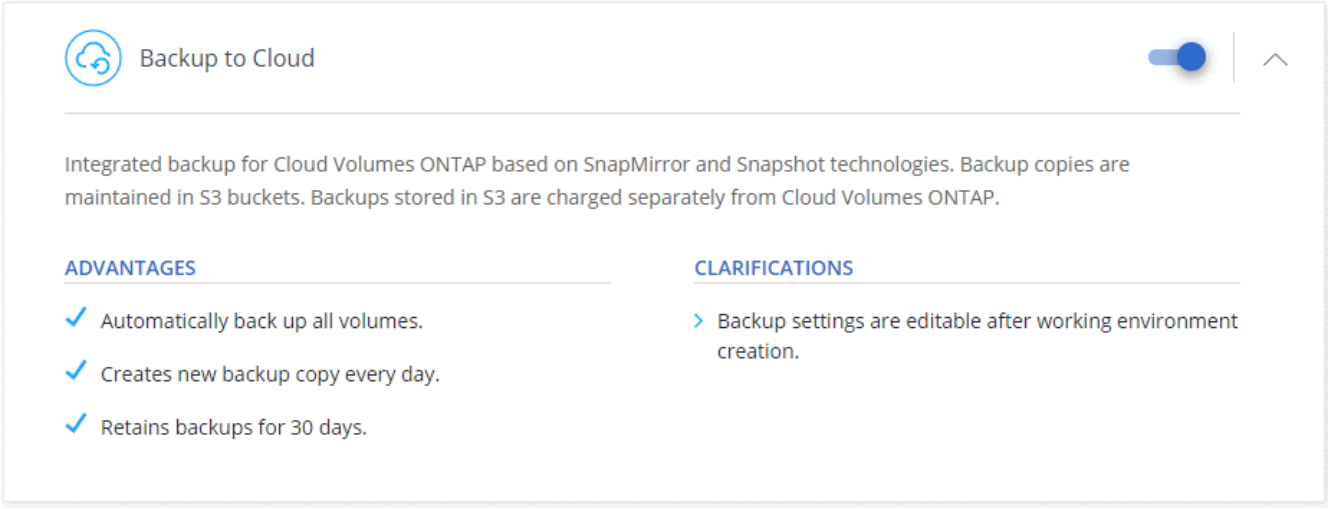
Enabling Cloud Backup on a new system

Cloud Backup is enabled by default in the working environment wizard. Be sure to keep the option enabled.

See Launching Cloud Volumes ONTAP in AWS for requirements and details for creating your Cloud Volumes ONTAP system.

Steps

1. Click **Create Cloud Volumes ONTAP**.
2. Select Amazon Web Services as the cloud provider and then choose a single node or HA system.
3. Fill out the Details & Credentials page.
4. On the Services page, leave the service enabled and click **Continue**.



5. Complete the pages in the wizard to deploy the system.

Result

Cloud Backup is enabled on the system and backs up volumes every day and retains the most recent 30 backup copies.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

Enabling Cloud Backup on an existing system

Enable Cloud Backup at any time directly from the working environment.

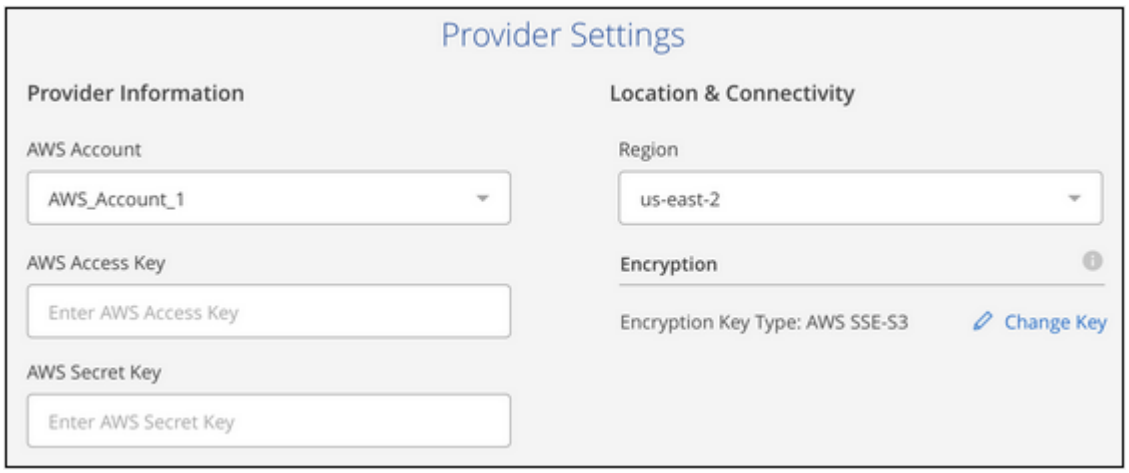
Steps

1. Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel.

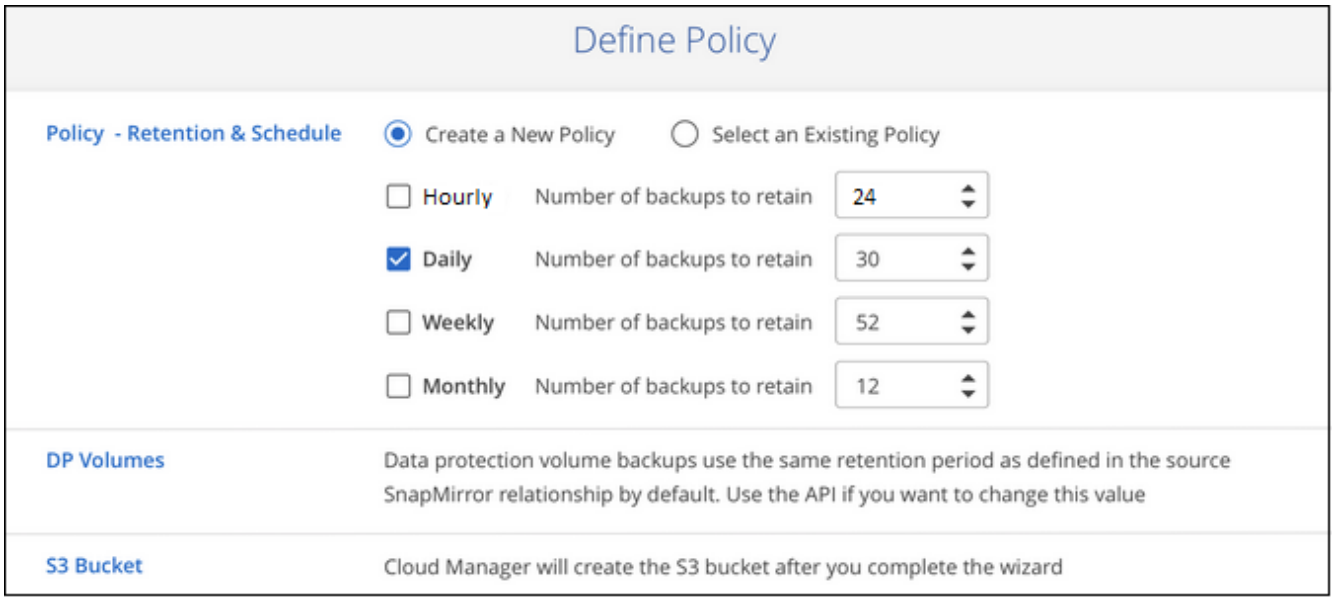
2. Select the provider details and click **Next**.
   a. The AWS Account used to store the backups. This can be a different account than where the Cloud Volumes ONTAP system resides.

      If you want to use a different AWS account for your backups, you must log in to the AWS portal and link the two accounts.

   b. The region where the backups will be stored. This can be a different region than where the Cloud Volumes ONTAP system resides.
   c. Whether you'll use the default Amazon S3 encryption keys or choose your own customer-managed keys to manage encryption of your data. (See how to use your own keys).



3. Define the backup schedule and retention value and click **Next**.



See the list of existing policies.

4. Select the volumes that you want to back up and click **Activate Backup**.

- To back up all volumes, check the box in the title row (Volume Name).
- To back up individual volumes, check the box for each volume (Volume_1).

Result

Cloud Backup starts taking the initial backups of each selected volume and the Backup Dashboard is displayed so you can monitor the state of the backups.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

Backing up Cloud Volumes ONTAP data to Azure Blob storage

Complete a few steps to get started backing up data from Cloud Volumes ONTAP to

Azure Blob storage.

Quick start

Get started quickly by following these steps or scroll down to the remaining sections for full details.

1 Verify support for your configuration

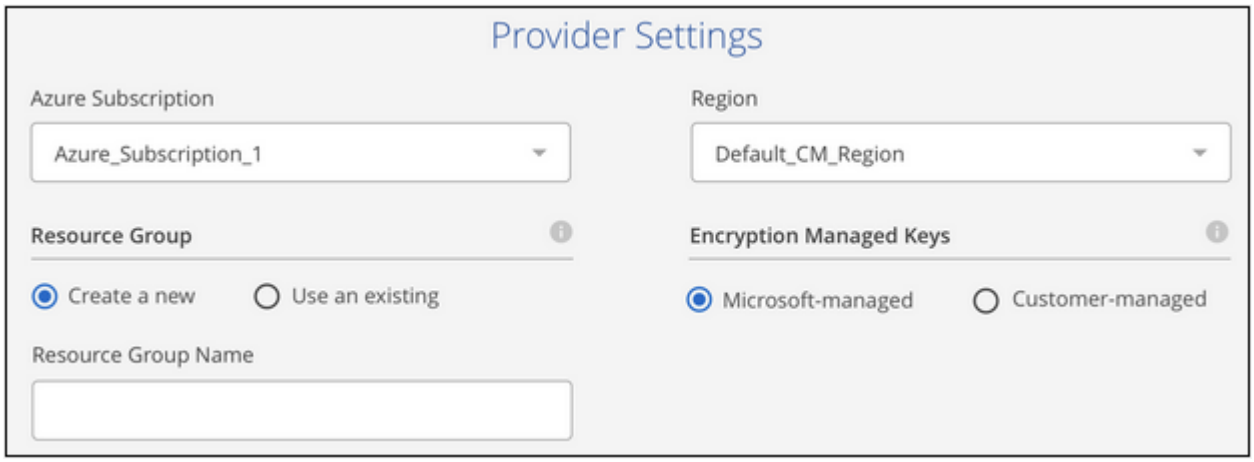
- You're running Cloud Volumes ONTAP 9.7 or later in Azure.
- You have a valid cloud provider subscription for the storage space where your backups will be located.
- You have subscribed to the Cloud Manager Marketplace Backup offering, or you have purchased and activated a Cloud Backup BYOL license from NetApp.

2 Enable Cloud Backup on your new or existing system

- New systems: Cloud Backup is enabled by default in the working environment wizard. Be sure to keep the option enabled.
- Existing systems: Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel, and then follow the setup wizard.

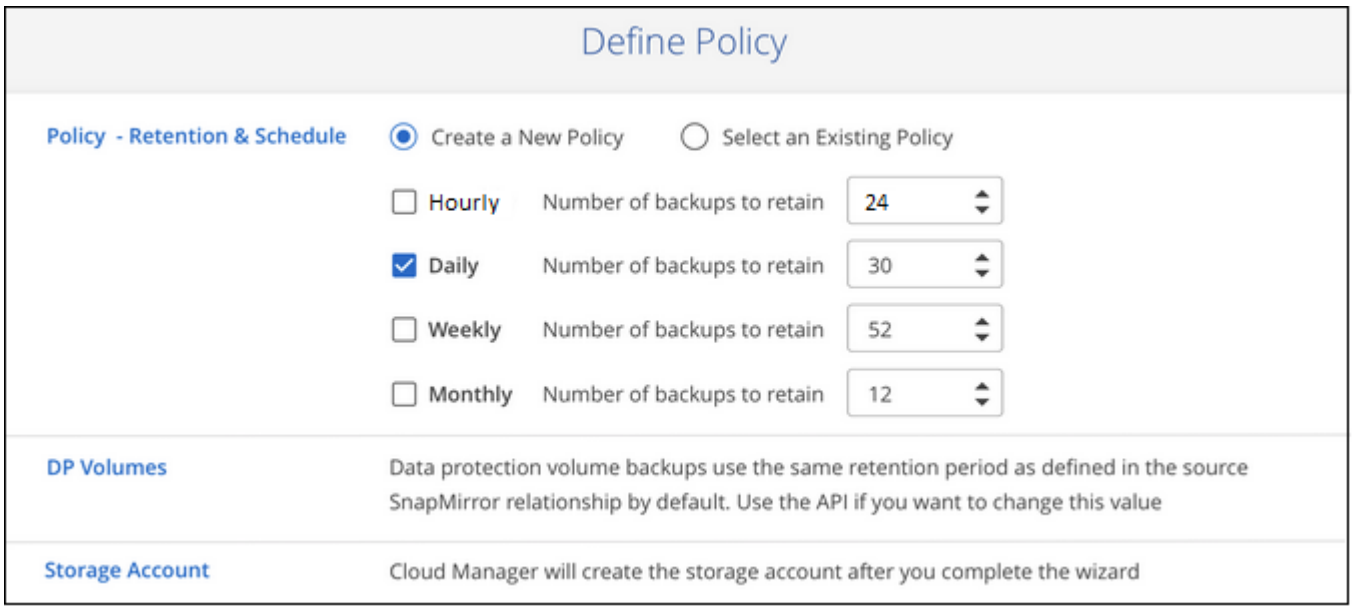
3 Enter the provider details

Select the provider subscription and region, and choose whether you want to create a new resource group or use an already existing resource group. You can also choose your own customer-managed keys for data encryption instead of using the default Microsoft-managed encryption key.



Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options. You can also change the number of backup copies to retain.



Select the volumes that you want to back up

Identify which volumes you want to back up in the Select Volumes page.

Restore your data, as needed

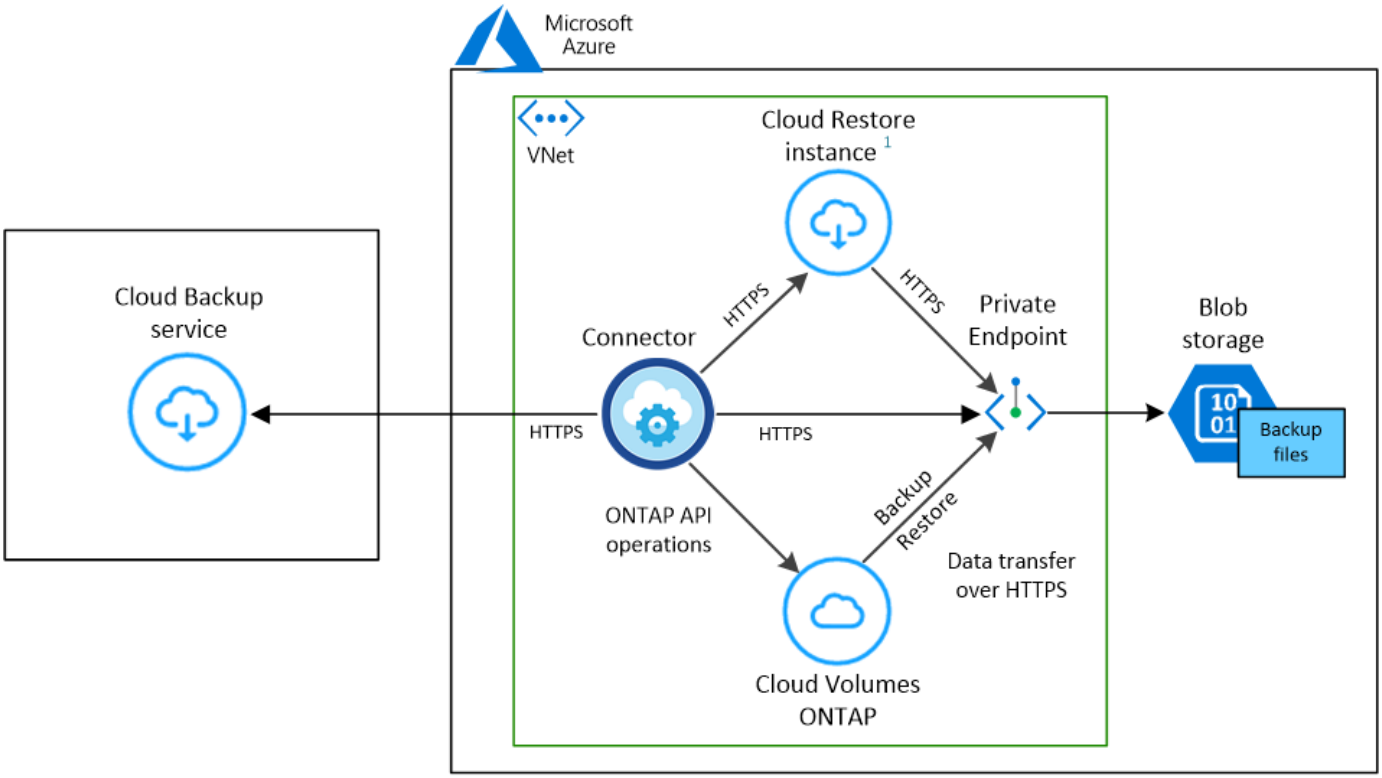
Choose to restore an entire backup to a new volume, or to restore individual files from the backup to an existing volume. You can restore data to a Cloud Volumes ONTAP system in Azure, or to an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure that you have a supported configuration before you start backing up volumes to Azure Blob storage.

The following image shows each component and the connections that you need to prepare between them:



When the Cloud Restore virtual machine is deployed in the cloud, it is located in the same subnet as the Connector.

Supported ONTAP versions

Cloud Volumes ONTAP 9.7 and later.

License requirements

For Cloud Backup PAYGO licensing, a subscription through the Azure Marketplace is required before you enable Cloud Backup. Billing for Cloud Backup is done through this subscription. You can subscribe from the Details & Credentials page of the working environment wizard.

For Cloud Backup BYOL licensing, you need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

And you need to have a Microsoft Azure subscription for the storage space where your backups will be located.

Supported Azure regions

Cloud Backup is supported in all Azure regions where Cloud Volumes ONTAP is supported.

Required setup for creating backups in a different Azure subscription

By default, backups are created using the same subscription as the one used for your Cloud Volumes ONTAP system. If you want to use a different Azure subscription for your backups, you must log in to the Azure portal and link the two subscriptions.

Required information for using customer-managed keys for data encryption

You can use your own customer-managed keys for data encryption in the activation wizard instead of using the default Microsoft-managed encryption keys. In this case you will need to have the Azure Subscription, Key Vault name, and the Key. See how to use your own keys.

Required outbound internet access for Azure deployments

The Cloud Restore virtual machine requires outbound internet access. If your virtual or physical network uses a proxy server for internet access, ensure that the instance has outbound internet access to contact the following endpoints.

Endpoints	Purpose
http://olcentgbl.trafficmanager.net https://olcentgbl.trafficmanager.net	Provides CentOS packages for the Cloud Restore virtual machine.
http://cloudmanagerinfraprod.azurecr.io https://cloudmanagerinfraprod.azurecr.io	Cloud Restore virtual machine image repository.

Enabling Cloud Backup on a new system

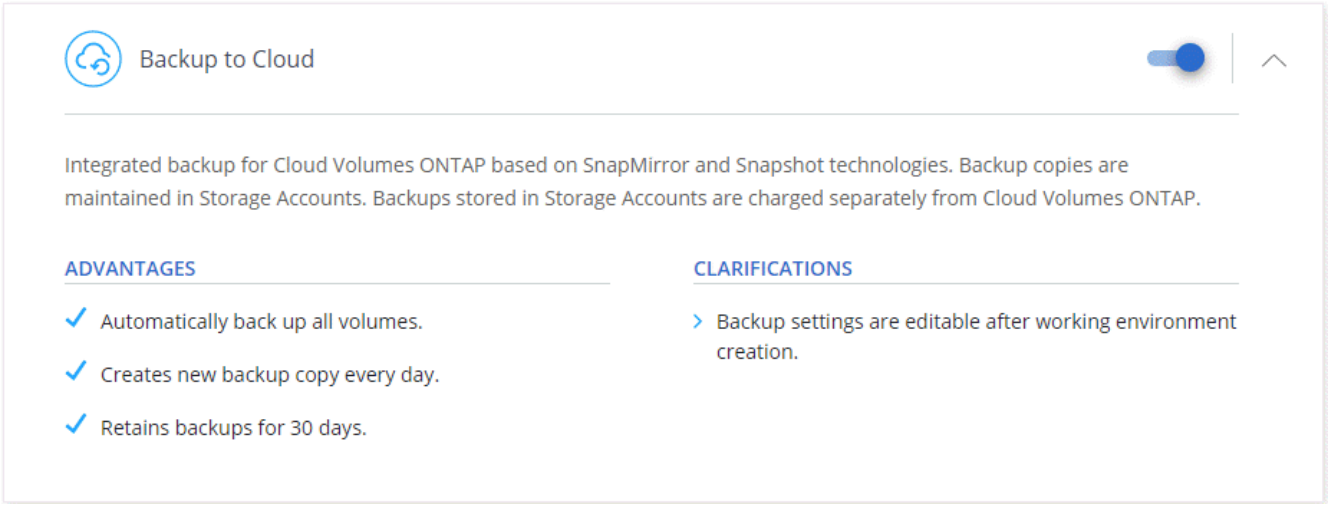
Cloud Backup is enabled by default in the working environment wizard. Be sure to keep the option enabled.

See Launching Cloud Volumes ONTAP in Azure for requirements and details for creating your Cloud Volumes ONTAP system.

If you want to pick the name of the resource group, **disable** Cloud Backup when deploying Cloud Volumes ONTAP. Follow the steps for enabling Cloud Backup on an existing system to enable Cloud Backup and choose the resource group.

Steps

1. Click **Create Cloud Volumes ONTAP**.
2. Select Microsoft Azure as the cloud provider and then choose a single node or HA system.
3. In the Define Azure Credentials page, enter the credentials name, client ID, client secret, and directory ID, and click **Continue**.
4. Fill out the Details & Credentials page and be sure that an Azure Marketplace subscription is in place, and click **Continue**.
5. On the Services page, leave the service enabled and click **Continue**.



6. Complete the pages in the wizard to deploy the system.

Result

Cloud Backup is enabled on the system and backs up volumes every day and retains the most recent 30 backup copies.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

Enabling Cloud Backup on an existing system

Enable Cloud Backup at any time directly from the working environment.

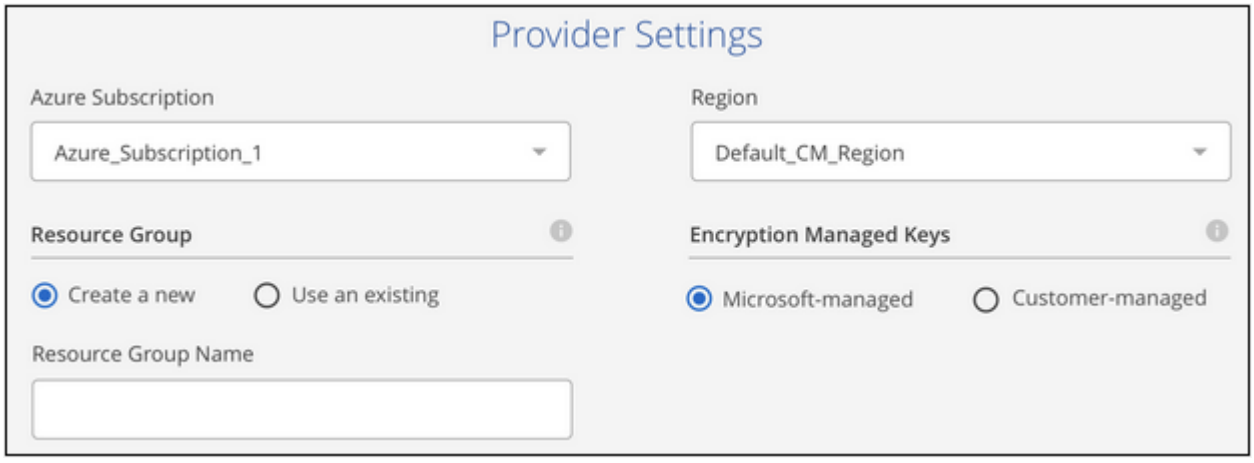
Steps

1. Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel.

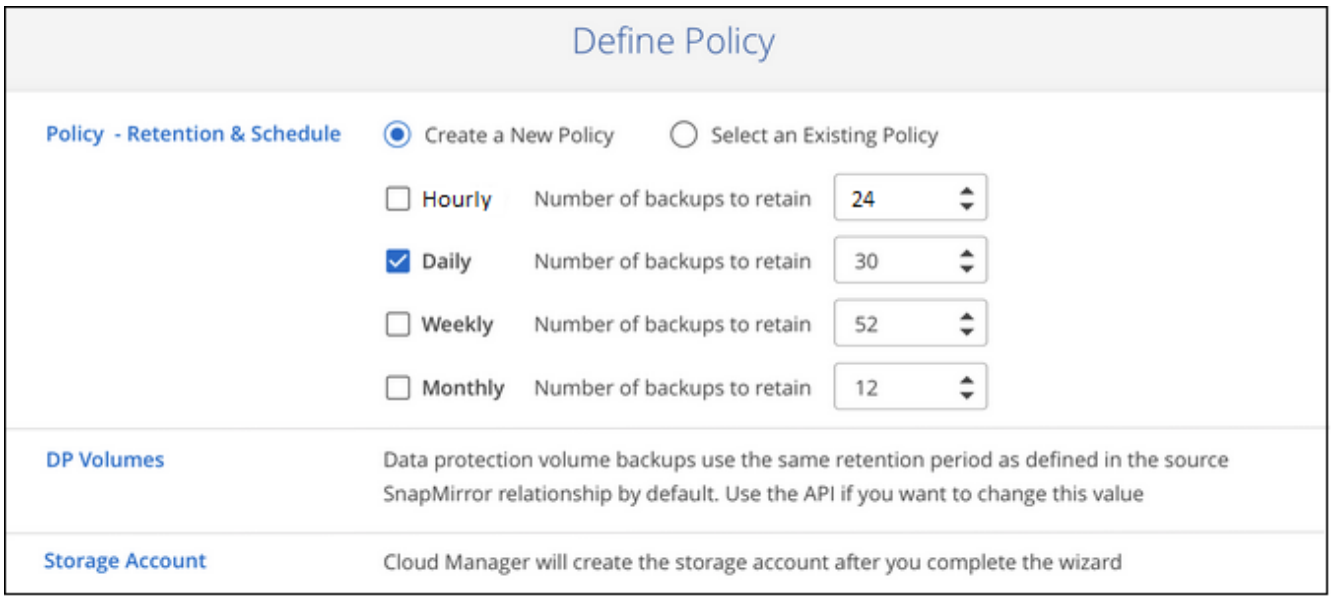
2. Select the provider details and click **Next**:
   a. The Azure subscription used to store the backups. This can be a different subscription than where the Cloud Volumes ONTAP system resides.

      If you want to use a different Azure subscription for your backups, you must log in to the Azure portal and link the two subscriptions.

   b. The region where the backups will be stored. This can be a different region than where the Cloud Volumes ONTAP system resides.
   c. The resource group that manages the Blob container - you can create a new resource group or select an existing resource group.
   d. Whether you'll use the default Microsoft-managed encryption key or choose your own customer-managed keys to manage encryption of your data. (See how to use your own keys).

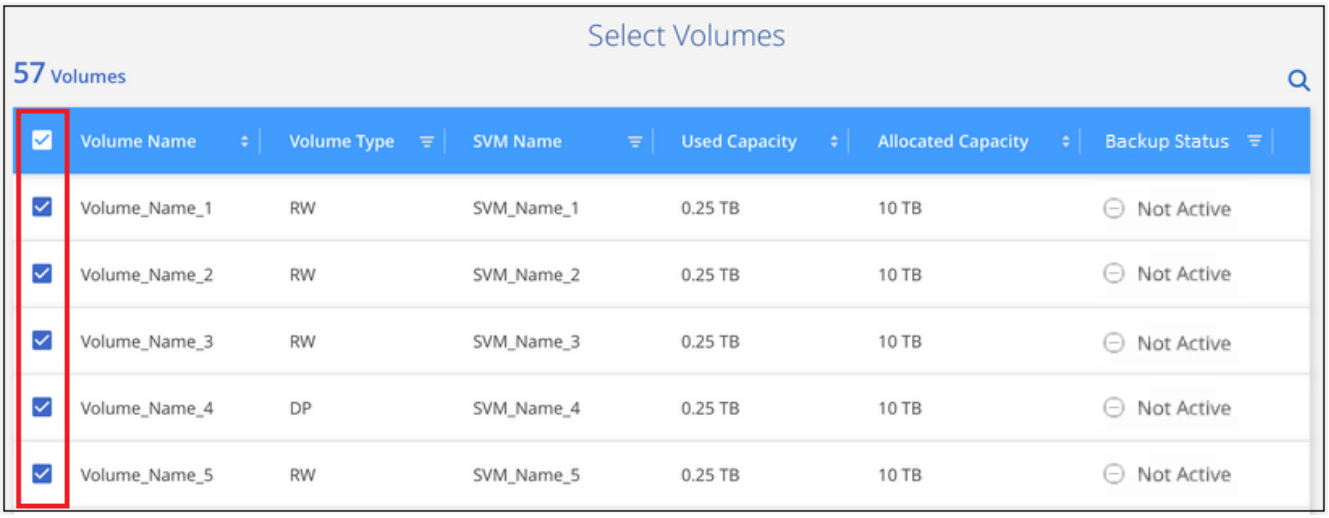


3. In the *Define Policy* page, select the backup schedule and retention value and click **Next**.



See the list of existing policies.

4. Select the volumes that you want to back up and click **Activate Backup**.



- To back up all volumes, check the box in the title row (Volume Name).
- To back up individual volumes, check the box for each volume (Volume_1).

Result

Cloud Backup starts taking the initial backups of each selected volume and the Backup Dashboard is displayed so you can monitor the state of the backups.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

Backing up Cloud Volumes ONTAP data to Google Cloud Storage

Complete a few steps to get started backing up data from Cloud Volumes ONTAP to

Google Cloud Storage.

Quick start

Get started quickly by following these steps or scroll down to the remaining sections for full details.

Verify support for your configuration

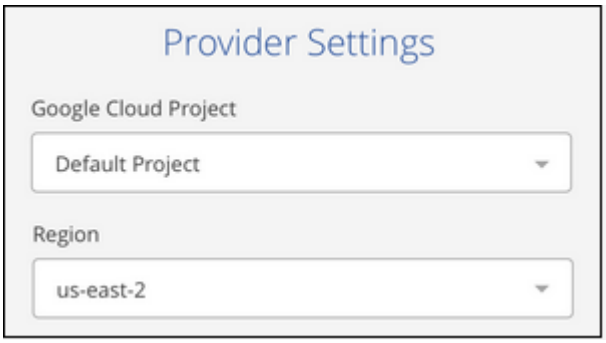
- You're running Cloud Volumes ONTAP 9.7P5 or later in GCP.
- You have a valid GCP subscription for the storage space where your backups will be located.
- You have a service account in your Google Cloud Project that has the predefined Storage Admin role.
- You have subscribed to the Cloud Manager Marketplace Backup offering, or you have purchased and activated a Cloud Backup BYOL license from NetApp.

Enable Cloud Backup on your new or existing system

- New systems: Cloud Backup can be enabled when you complete the new working environment wizard.
- Existing systems: Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel, and then follow the setup wizard.

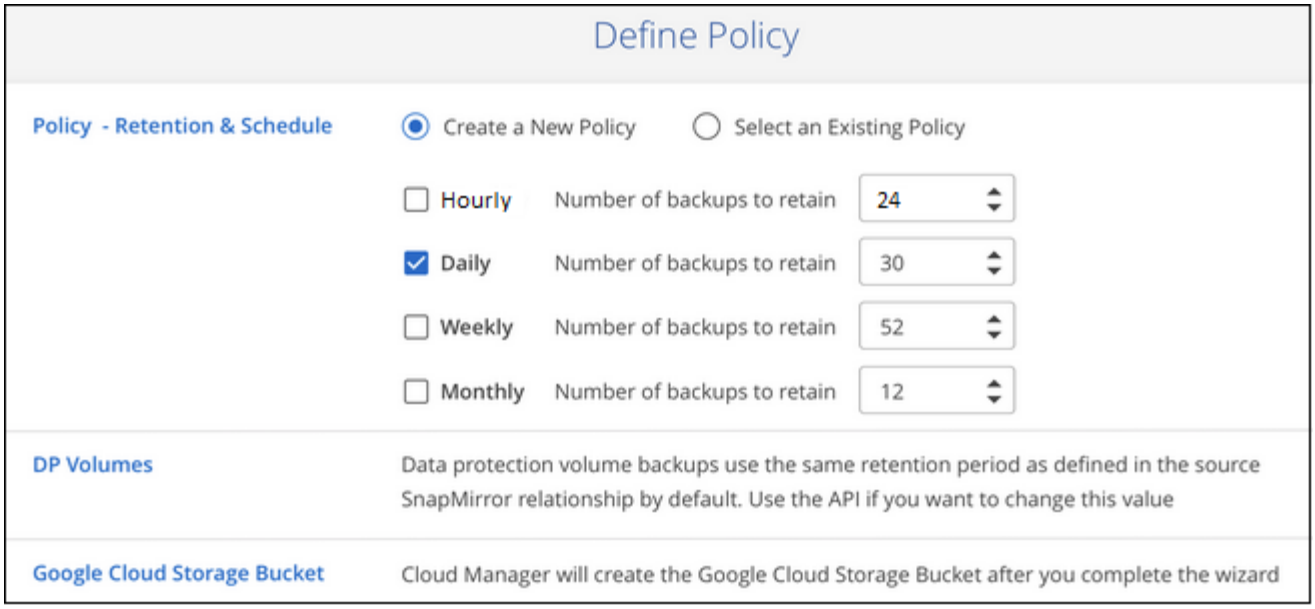
Enter the provider details

Select the Google Cloud Project where you want the Google Cloud Storage bucket to be created for backups.



Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options.



5 Select the volumes that you want to back up

Identify which volumes you want to back up in the Select Volumes page.

6 Restore your data, as needed

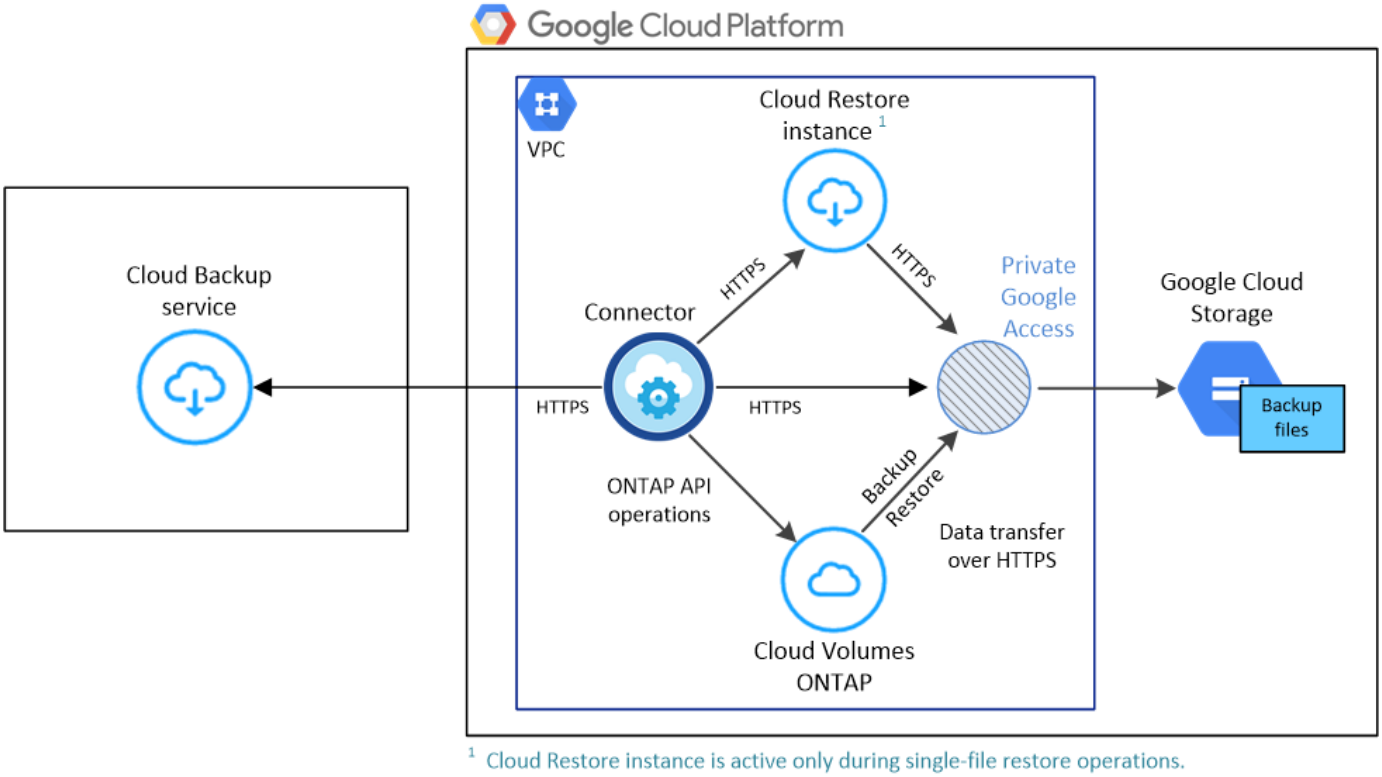
Restore a backup to a new volume. You can restore data to a Cloud Volumes ONTAP system in Google. A Service Account is required on the Cloud Volumes ONTAP system where you are performing the restore.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure that you have a supported configuration before you start backing up volumes to Google Cloud storage.

The following image shows each component and the connections that you need to prepare between them:



Supported ONTAP versions

Cloud Volumes ONTAP 9.7P5 and later.

Supported GCP regions

Cloud Backup is supported in all GCP regions where Cloud Volumes ONTAP is supported.

License requirements

For Cloud Backup PAYGO licensing, a subscription through the GCP Marketplace is required before you enable Cloud Backup. Billing for Cloud Backup is done through this subscription. You can subscribe from the Details & Credentials page of the working environment wizard.

For Cloud Backup BYOL licensing, you need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

And you need to have a Google subscription for the storage space where your backups will be located.

GCP Service Account

You need to have a service account in your Google Cloud Project that has the predefined Storage Admin role. Learn how to create a service account.

Enabling Cloud Backup on a new system

Cloud Backup can be enabled when you complete the working environment wizard to create a new Cloud Volumes ONTAP system.

You must have a Service Account already configured. If you don't select a service account when you create the Cloud Volumes ONTAP system, then you'll need to turn off the system and add the service account to Cloud Volumes ONTAP from the GCP console.

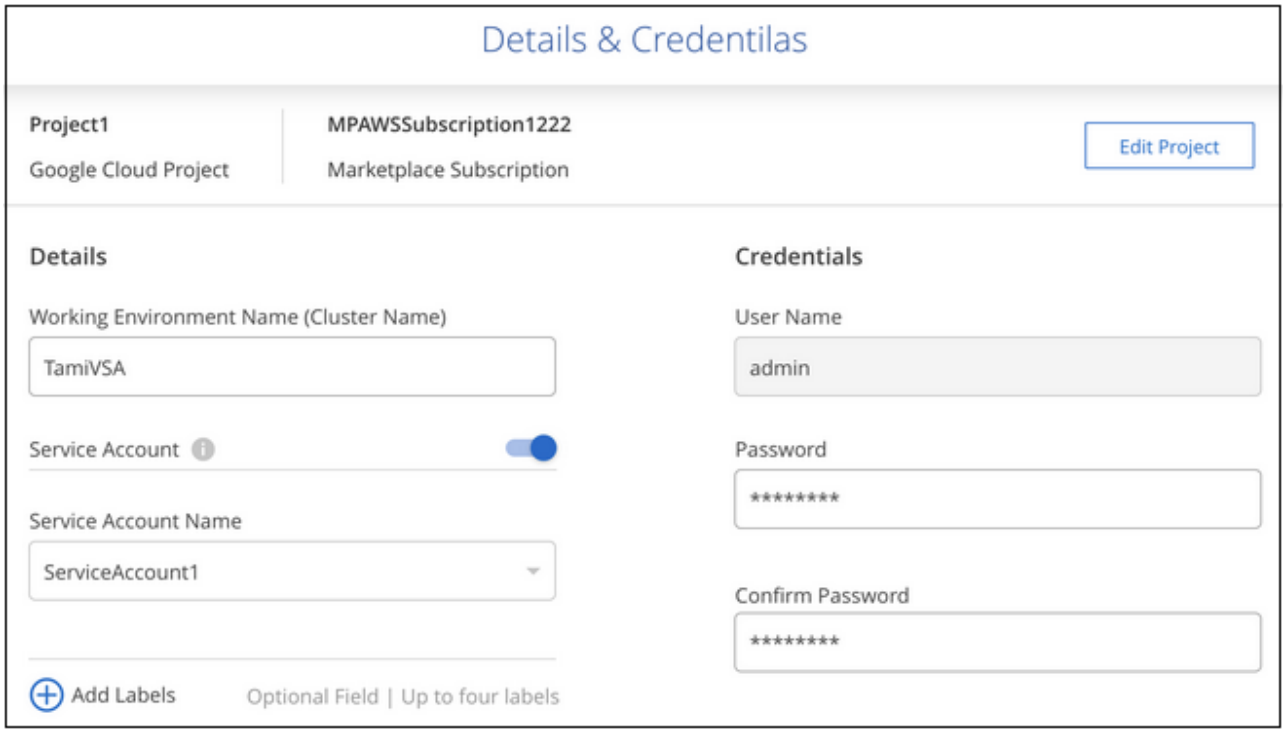
See Launching Cloud Volumes ONTAP in GCP for requirements and details for creating your Cloud Volumes

ONTAP system.

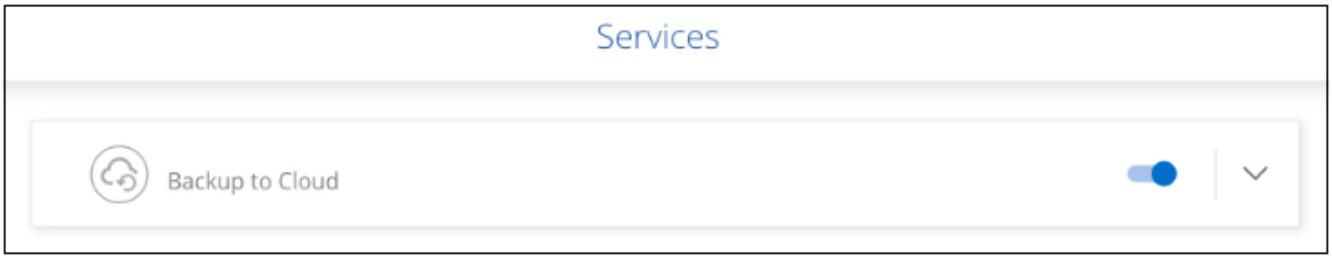
Steps

1. On the Working Environments page, click **Add Working Environment** and follow the prompts.
2. **Choose a Location**: Select **Google Cloud Platform**.
3. **Choose Type**: Select **Cloud Volumes ONTAP** (either single-node or high-availability).
4. **Details & Credentials**: Enter the following information:
   a. Click **Edit Project** and select a new project if the one you want to use is different than the default Project (where Cloud Manager resides).
   b. Specify the cluster name.
   c. Enable the **Service Account** switch and select the Service Account that has the predefined Storage Admin role. This is required to enable backups and tiering.
   d. Specify the credentials.

      Make sure that a GCP Marketplace subscription is in place.



5. **Services**: Leave the Cloud Backup service enabled and click **Continue**.



6. Complete the pages in the wizard to deploy the system as described in Launching Cloud Volumes ONTAP in GCP.

Result

Cloud Backup is enabled on the system and backs up the volume you created every day and retains the most recent 30 backup copies.

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

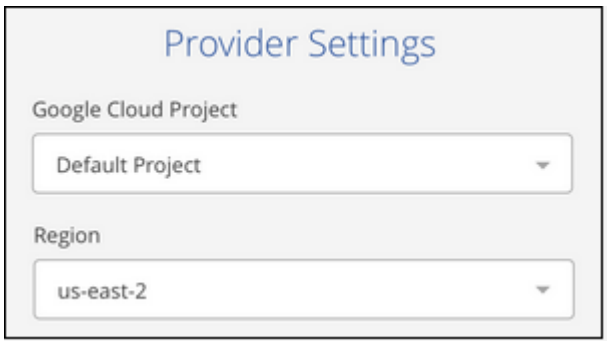
Enabling Cloud Backup on an existing system

You can enable Cloud Backup at any time directly from the working environment.

Steps

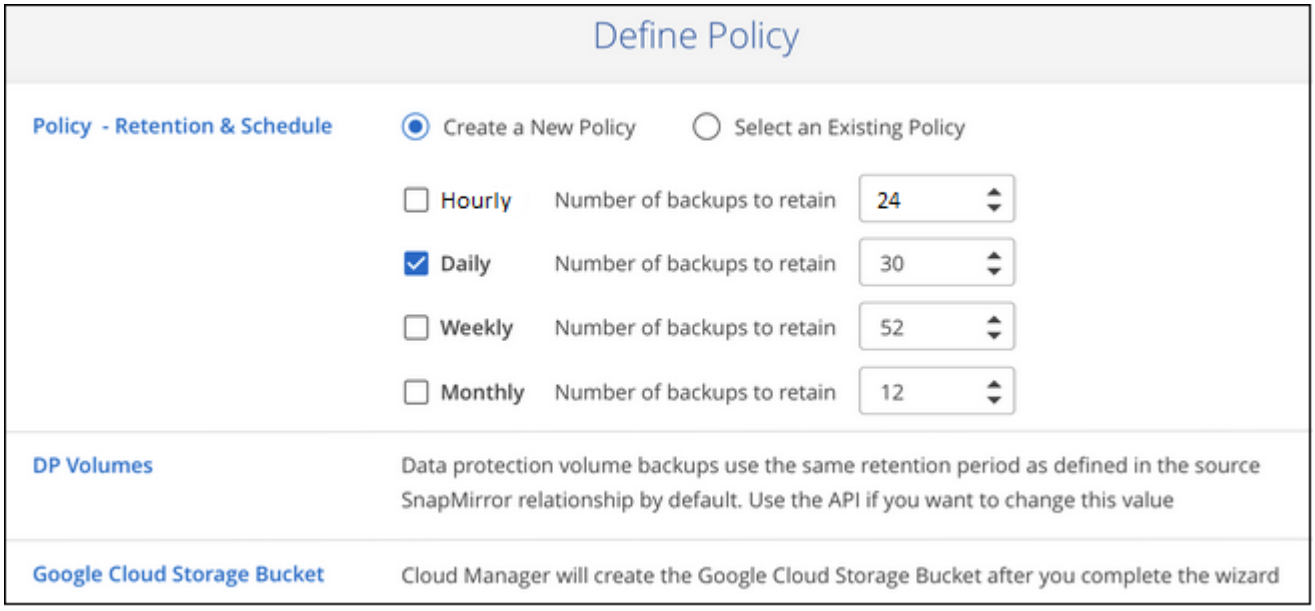
1. Select the working environment and click **Enable** next to the Backup & Restore service in the right-panel.

2. Select the Google Cloud Project and region where you want the Google Cloud Storage bucket to be created for backups, and click **Next**.



Note that the Project must have a Service Account that has the predefined Storage Admin role.

3. In the *Define Policy* page, select the backup schedule and retention value and click **Next**.



See the list of existing policies.

4. Select the volumes that you want to back up and click **Activate Backup**.

   - To back up all volumes, check the box in the title row (Volume Name).
   - To back up individual volumes, check the box for each volume (Volume_1).

Result

Cloud Backup starts taking the initial backups of each selected volume and the Backup Dashboard is displayed so you can monitor the state of the backups.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

Backing up on-premises ONTAP data to Amazon S3

Complete a few steps to get started backing up data from your on-premises ONTAP systems to Amazon S3 storage.

TIP

In most cases you'll use Cloud Manager for all backup and restore operations. However, starting with ONTAP 9.9.1 you can initiate volume backup operations of your on-premises ONTAP clusters using ONTAP System Manager. See how to use System Manager to back up your volumes to the cloud using Cloud Backup.

A Beta feature released in January 2021 allows you to run compliance scans on the backed up volumes from your on-premises systems. Typically, compliance scans are free up to 1 TB of data, and then a cost for the service is applied for data over 1 TB. When combining Backup and Data Sense for your on-premises volumes, the cost for scans on those on-prem volumes is free. Learn more about how Cloud Data Sense can get your business applications and cloud environments privacy ready.

Quick start

Get started quickly by following these steps, or scroll down to the remaining sections for full details.

Verify support for your configuration

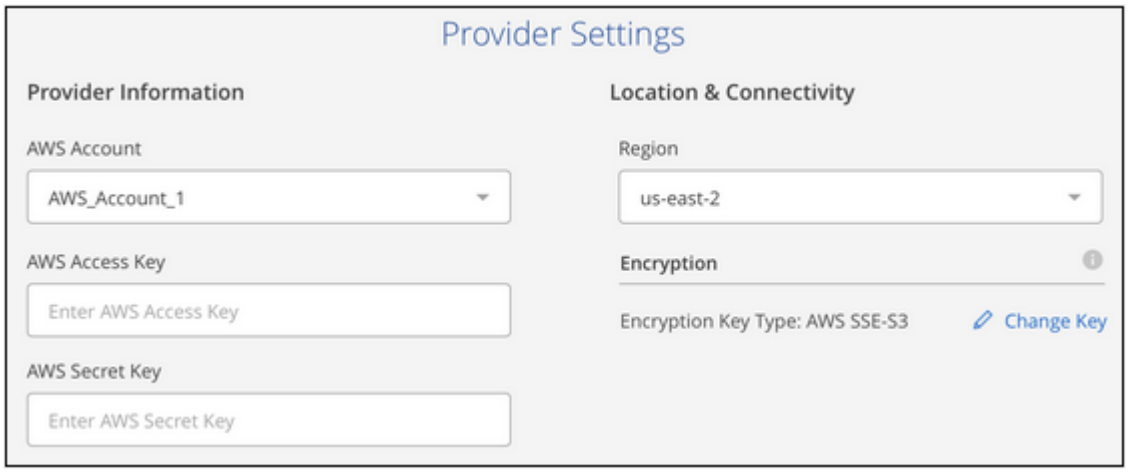
- You have discovered the on-premises cluster and added it to a working environment in Cloud Manager. See Discovering ONTAP clusters for details.
  - The cluster is running ONTAP 9.7P5 or later.
  - The cluster has a SnapMirror license — it is included as part of the Premium Bundle or Data Protection Bundle.
- The cluster must have the required network connections to S3 storage and to the Connector.
- The Connector must have the required network connections to S3 storage and to the cluster, and the required permissions.
- You have a valid AWS subscription for the object storage space where your backups will be located.
- You have an AWS Account with an access key and secret key, and the required permissions so the ONTAP cluster can back up and restore data.

Enable Cloud Backup on the system

Select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel, and then follow the setup wizard.

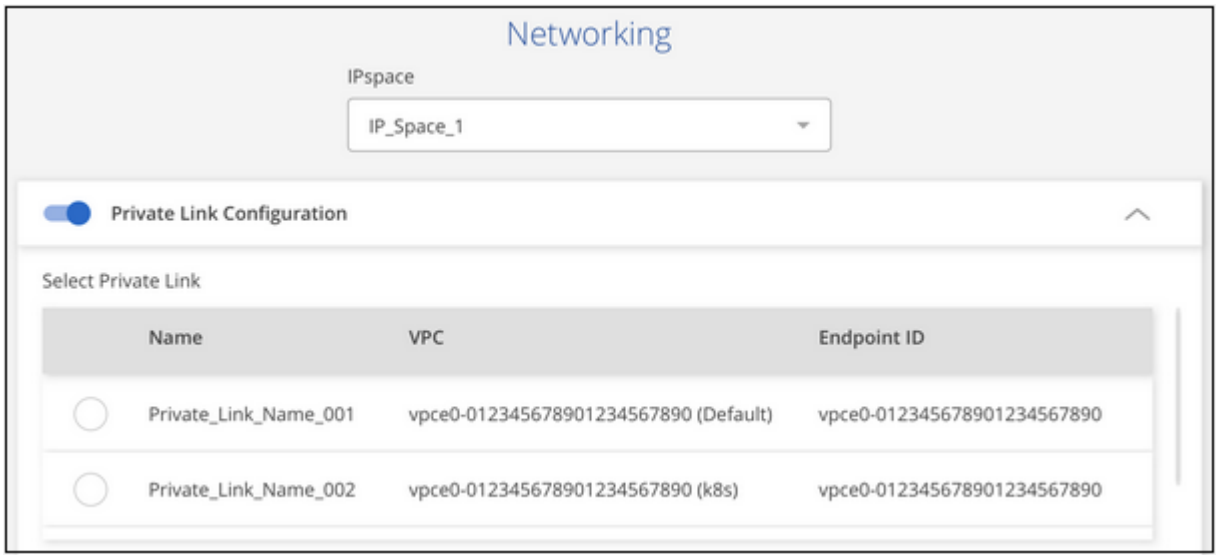
Select the cloud provider and enter the provider details

Select Amazon Web Services as your provider and then enter the provider details. You'll need to select the AWS Account and the region where you want to create the backups. You can also choose your own customer-managed key for data encryption instead of using the default Amazon S3 encryption key.



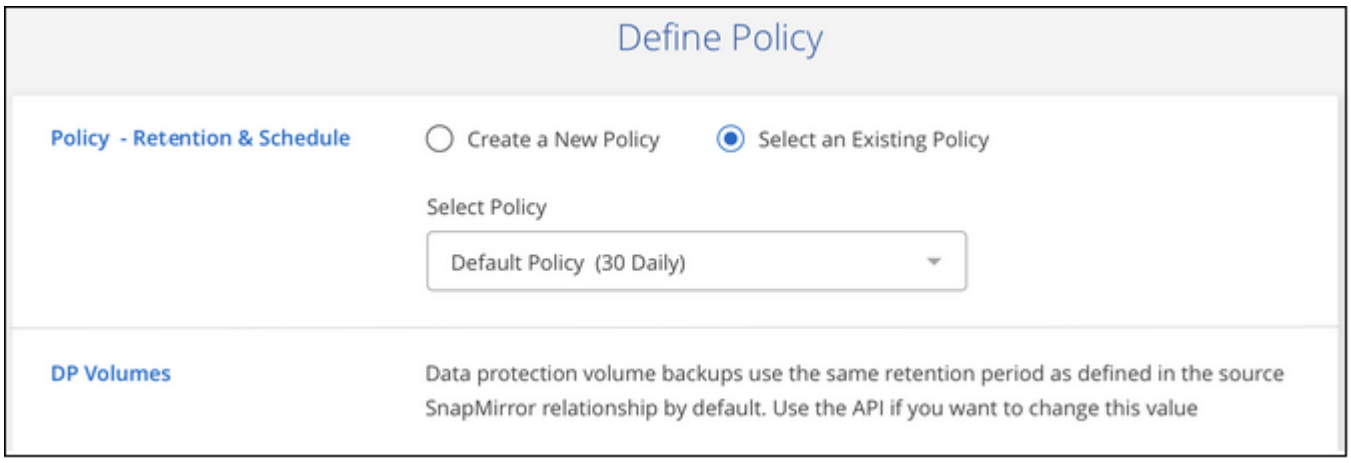
Select the cluster IPspace and optionally select an AWS PrivateLink connection

Select the IPspace in the ONTAP cluster where the volumes reside. You can also choose to use an existing AWS PrivateLink configuration for a more secure connection to the VPC from your on-prem data center.



Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options. You can also change the number of backup copies to retain.



Select the volumes that you want to back up

Identify which volumes you want to back up from the cluster.

Activate Compliance scans on the backed up volumes (optional)

Choose whether you want to have Cloud Data Sense scan the volumes that are backed up in the cloud.

Restore your data, as needed

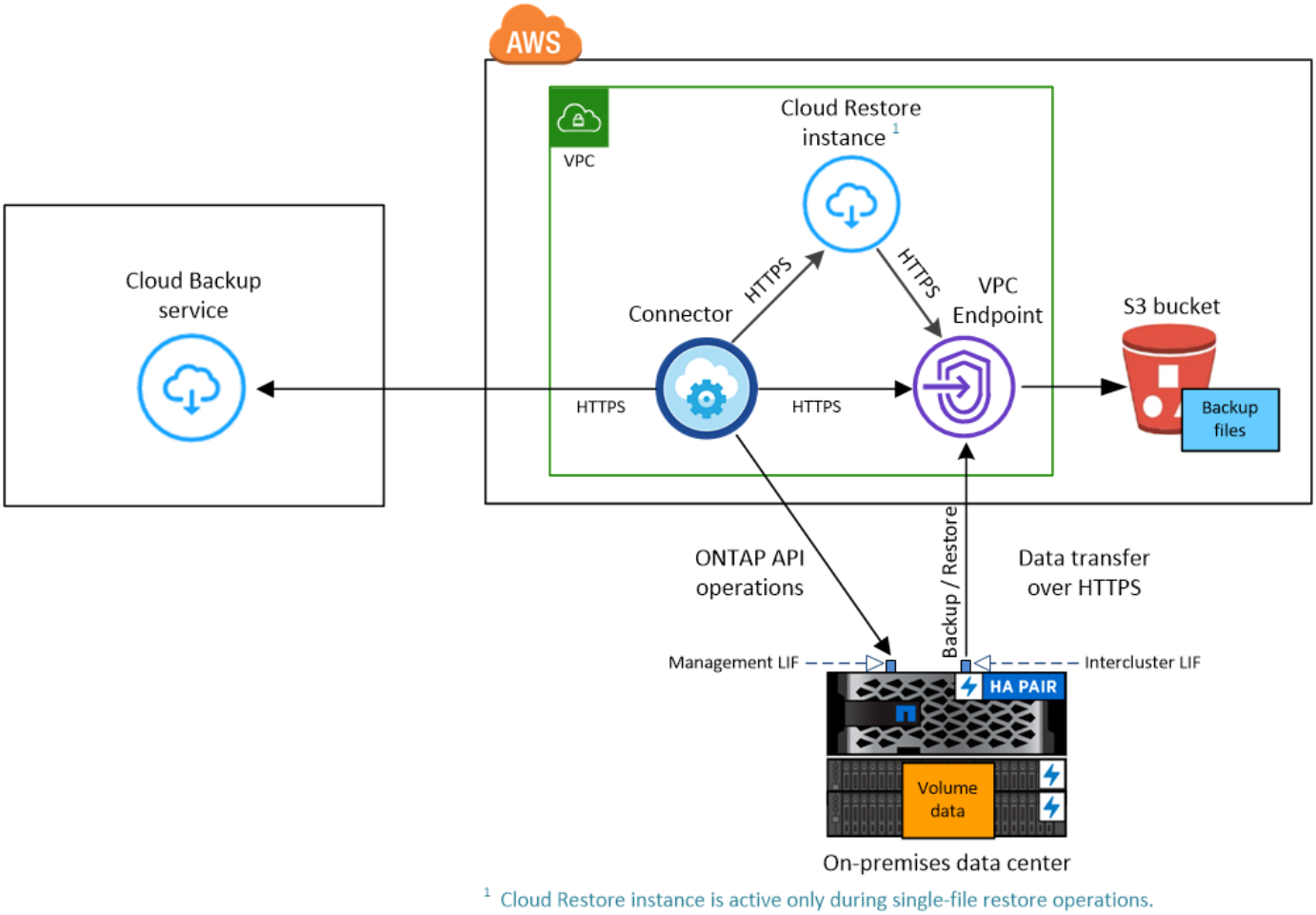
Choose to restore an entire backup to a new volume, or to restore individual files from the backup to an existing volume. You can restore data to a Cloud Volumes ONTAP system in AWS, or to an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure you have a supported configuration before you start backing up on-premises volumes to S3 storage.

The following image shows each component and the connections that you need to prepare between them:



[1] Cloud Restore instance is active only during single-file restore operations.

Note that when the Cloud Restore instance is deployed in the cloud, it is located in the same subnet as the Connector.

Preparing your ONTAP clusters

You need to discover your on-premises ONTAP clusters in Cloud Manager before you can start backing up volume data.

Learn how to discover a cluster.

ONTAP requirements

- ONTAP 9.7P5 and later.
- A SnapMirror license (included as part of the Premium Bundle or Data Protection Bundle).

  Note: The "Hybrid Cloud Bundle" is not required when using the Cloud Backup service.

  See how to manage your cluster licenses.

- Time and time zone are set correctly.

  See how to configure your cluster time.

Cluster networking requirements

- The ONTAP cluster initiates an HTTPS connection over port 443 from the intercluster LIF to Amazon S3 storage for backup and restore operations.

  ONTAP reads and writes data to and from object storage. The object storage never initiates, it just responds.

- ONTAP requires an inbound connection from the Connector to the cluster management LIF. The Connector can reside in an AWS VPC.
- An intercluster LIF is required on each ONTAP node that hosts the volumes you want to back up. The LIF must be associated with the *IPspace* that ONTAP should use to connect to object storage. Learn more about IPspaces.

  When you set up Cloud Backup, you are prompted for the IPspace to use. You should choose the IPspace that each LIF is associated with. That might be the "Default" IPspace or a custom IPspace that you created.

- The nodes' intercluster LIFs are able to access the internet.
- DNS servers have been configured for the storage VM where the volumes are located. See how to configure DNS services for the SVM.
- Note that if you use are using a different IPspace than the Default, then you might need to create a static route to get access to the object storage.
- Update firewall rules, if necessary, to allow Cloud Backup service connections from ONTAP to object storage through port 443 and name resolution traffic from the storage VM to the DNS server over port 53 (TCP/UDP).

Creating or switching Connectors

A Connector is required to back up data to the cloud, and the Connector must be in an AWS VPC when backing up data to AWS S3 storage. You can't use a Connector that's deployed on-premises. You'll either need to create a new Connector or make sure that the currently selected Connector resides in the correct provider.

- Learn about Connectors

- Creating a Connector in AWS
- Switching between Connectors

Preparing networking for the Connector

Ensure that the Connector has the required networking connections.

Steps

1. Ensure that the network where the Connector is installed enables the following connections:
    - An outbound internet connection to the Cloud Backup service over port 443 (HTTPS)
    - An HTTPS connection over port 443 to your S3 object storage
    - An HTTPS connection over port 443 to your ONTAP clusters
2. Enable a VPC Endpoint to S3. This is needed if you have a Direct Connect or VPN connection from your ONTAP cluster to the VPC and you want communication between the Connector and S3 to stay in your AWS internal network.

Supported regions

You can create backups from on-premises systems to Amazon S3 in all regions where Cloud Volumes ONTAP is supported. You specify the region where the backups will be stored when you set up the service.

License requirements

Before your 30-day free trial of the Cloud Backup service expires, you need to subscribe to a pay-as-you-go (PAYGO) Cloud Manager Marketplace offering from AWS, or purchase and activate a Cloud Backup BYOL license from NetApp. These licenses are for the account and can be used across multiple systems.

- For Cloud Backup PAYGO licensing, you'll need a subscription to the AWS Cloud Manager Marketplace offering to continue using Cloud Backup. Billing for Cloud Backup is done through this subscription.
- For Cloud Backup BYOL licensing, you don't need a subscription. You need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

You need to have an AWS subscription for the object storage space where your backups will be located.

A SnapMirror license is required on the cluster. Note that the "Hybrid Cloud Bundle" is not required when using Cloud Backup.

Preparing Amazon S3 for backups

When you are using Amazon S3, you must configure permissions for the Connector to create and manage the S3 bucket, and you must configure permissions so the on-premises ONTAP cluster can read and write to the S3 bucket.

Steps

1. Confirm that the following S3 permissions (from the latest Cloud Manager policy) are part of the IAM role that provides the Connector with permissions:

```
{
            "Sid": "backupPolicy",
            "Effect": "Allow",
            "Action": [
                "s3:DeleteBucket",
                "s3:GetLifecycleConfiguration",
                "s3:PutLifecycleConfiguration",
                "s3:PutBucketTagging",
                "s3:ListBucketVersions",
                "s3:GetObject",
                "s3:ListBucket",
                "s3:ListAllMyBuckets",
                "s3:GetBucketTagging",
                "s3:GetBucketLocation",
                "s3:GetBucketPolicyStatus",
                "s3:GetBucketPublicAccessBlock",
                "s3:GetBucketAcl",
                "s3:GetBucketPolicy",
                "s3:PutBucketPublicAccessBlock"
            ],
            "Resource": [
                "arn:aws:s3:::netapp-backup-*"
            ]
        },
```

2. Add the following EC2 permissions to the IAM role that provides the Connector with permissions so that it can start, stop, and terminate the Cloud Restore instance:

```
            "Action": [
                "ec2:DescribeInstanceTypeOfferings",
                "ec2:StartInstances",
                "ec2:StopInstances",
                "ec2:TerminateInstances"
            ],
```

3. During the Backup wizard you will be prompted to enter an access key and secret key. For that, you will need to create an IAM user with the following permissions. Cloud Backup passes these credentials on to the ONTAP cluster so that ONTAP can backup and restore data to the S3 bucket.

```
"s3:ListAllMyBuckets",
"s3:ListBucket",
"s3:GetBucketLocation",
"s3:GetObject",
"s3:PutObject",
"s3:DeleteObject"
```

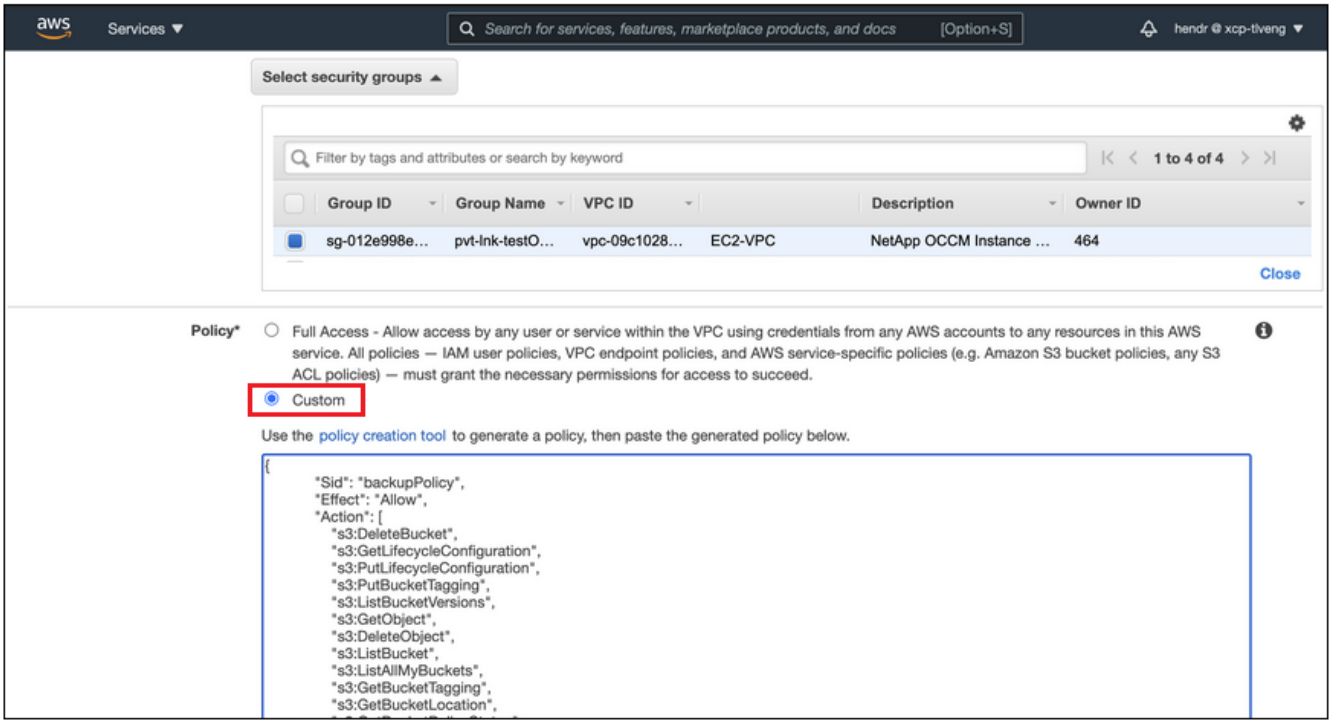
See the AWS Documentation: Creating a Role to Delegate Permissions to an IAM User for details.

4. If your virtual or physical network uses a proxy server for internet access, ensure that the Cloud Restore instance has outbound internet access to contact the following endpoints.

Endpoints	Purpose
http://amazonlinux.us-east-1.amazonaws.com/2/extras/docker/stable/x86_64/4bf88ee77c395ffe1e0c3ca68530dfb3a683ec65a4a1ce9c0ff394be50e922b2/	CentOS package for the Cloud Restore Instance AMI.
http://cloudmanagerinfraprod.azurecr.io https://cloudmanagerinfraprod.azurecr.io	Cloud Restore Instance image repository.

5. You can choose your own custom-managed keys for data encryption in the activation wizard instead of using the default Amazon S3 encryption keys. In this case you'll need to have the encryption managed keys already set up. See how to use your own keys.
6. If you want to have a more secure connection over the public internet from your on-prem data center to the VPC, there is an option to select an AWS PrivateLink connection in the activation wizard. It is required if you are connecting your on-premises system via VPN/DirectConnect. In this case you'll need to have created an Interface endpoint configuration using the Amazon VPC console or the command line. See details about using AWS PrivateLink.

   Note that you'll also need to modify the security group configuration that is associated with the Cloud Manager Connector. You must change the policy to "Custom" (from "Full Access"), and you must add the permissions from the backup policy as shown earlier (above).



Enabling Cloud Backup

Enable Cloud Backup at any time directly from the on-premises working environment.

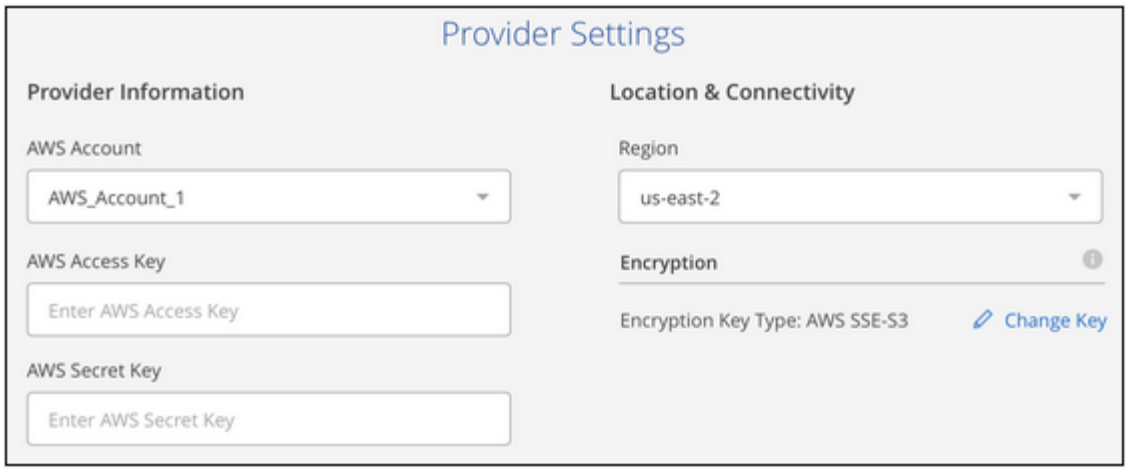
Steps

1. From the Canvas, select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel.

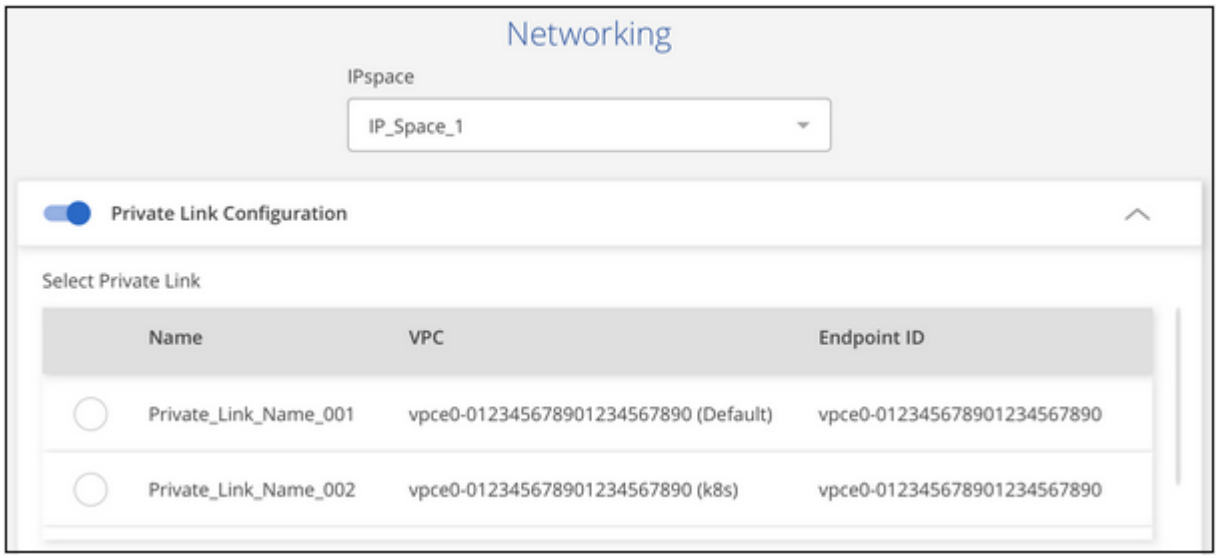
2. Select Amazon Web Services as your provider and click **Next**.
3. Enter the provider details. Note that you can't change this information after the service has started.
   a. The AWS Account, the AWS Access Key, and the Secret Key used to store the backups.

      The access key and secret key are for the user you created to give the ONTAP cluster access to the S3 bucket.

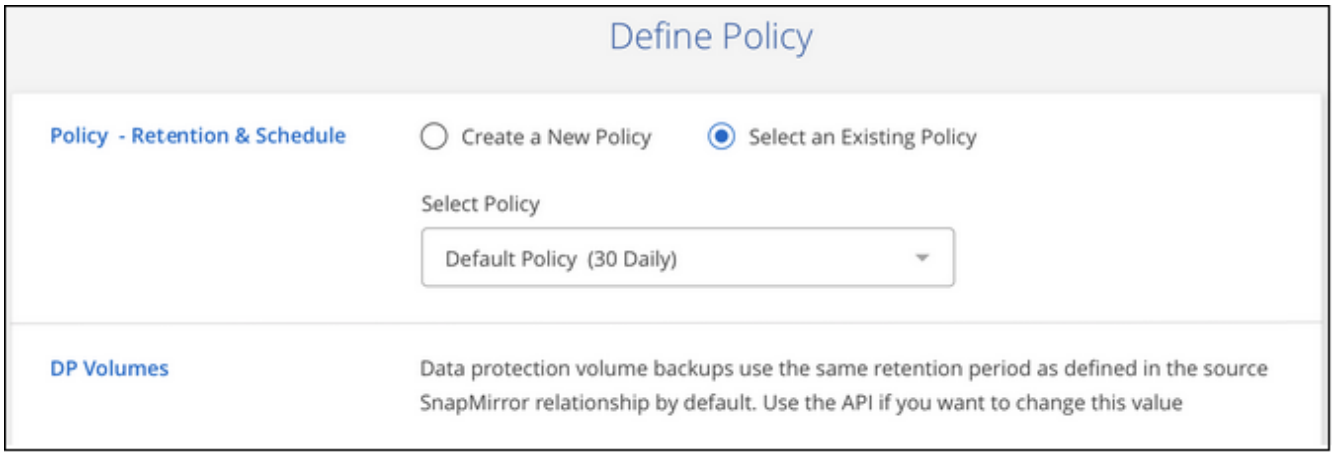
   b. The AWS region where the backups will be stored.
   c. Whether you'll use the default Amazon S3 encryption keys or choose your own customer-managed keys to manage encryption of your data. (See how to use your own keys).



4. Click **Next** after you've entered the provider details.
5. Enter the networking details and click **Next**.
   a. The IPspace in the ONTAP cluster where the volumes you want to back up reside. The intercluster LIFs for this IPspace must have outbound internet access.
   b. Optionally, choose whether you'll use an AWS PrivateLink. See details about using an AWS PrivateLink.



6. Select an existing backup schedule and retention value, or define a new backup policy, and click **Next**.

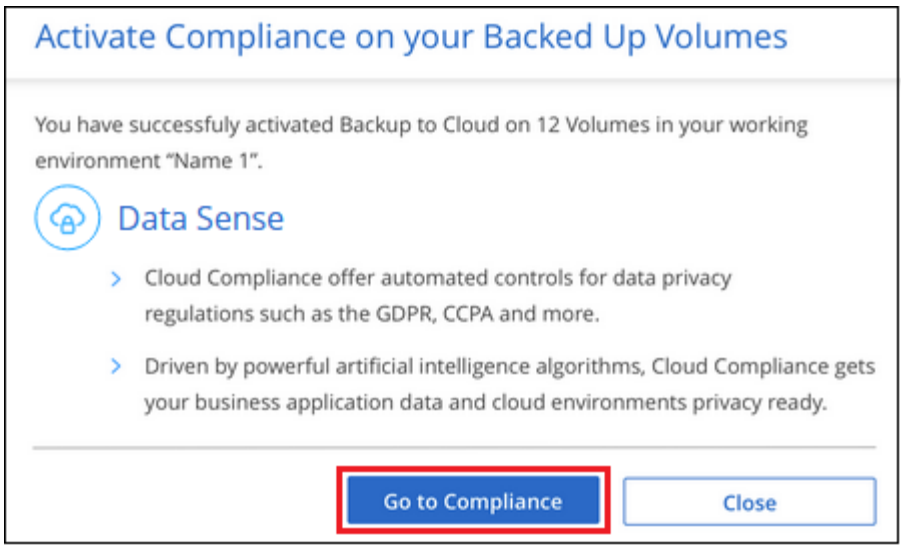


See the list of existing policies.

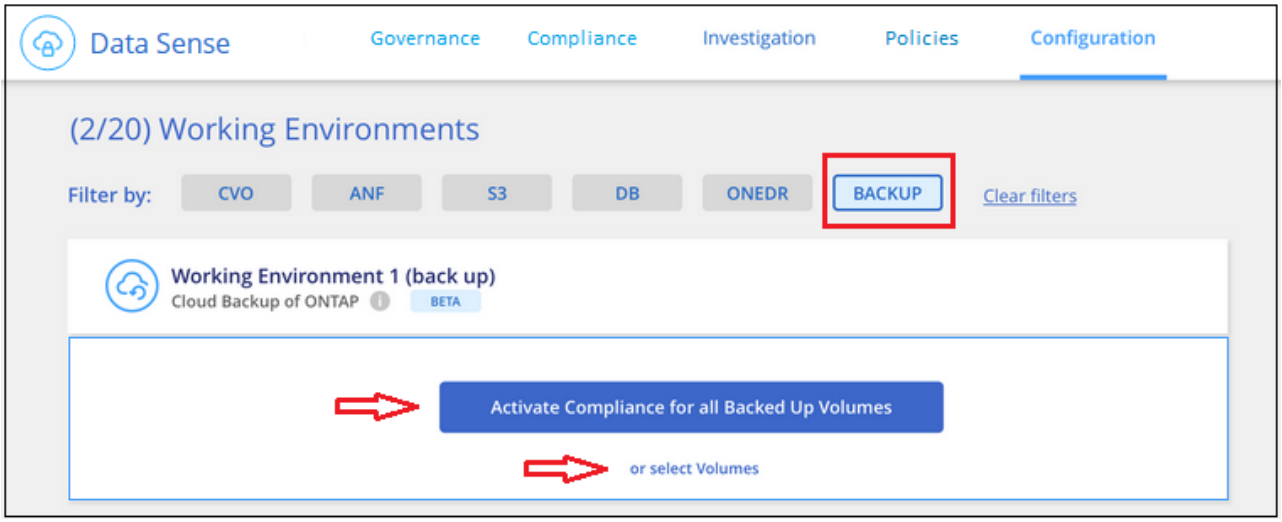
7. Select the volumes that you want to back up.
   - To back up all volumes, check the box in the title row (Volume Name).
   - To back up individual volumes, check the box for each volume (Volume_1).

8. Click **Activate Backup** and Cloud Backup starts taking the initial backups of your volumes.

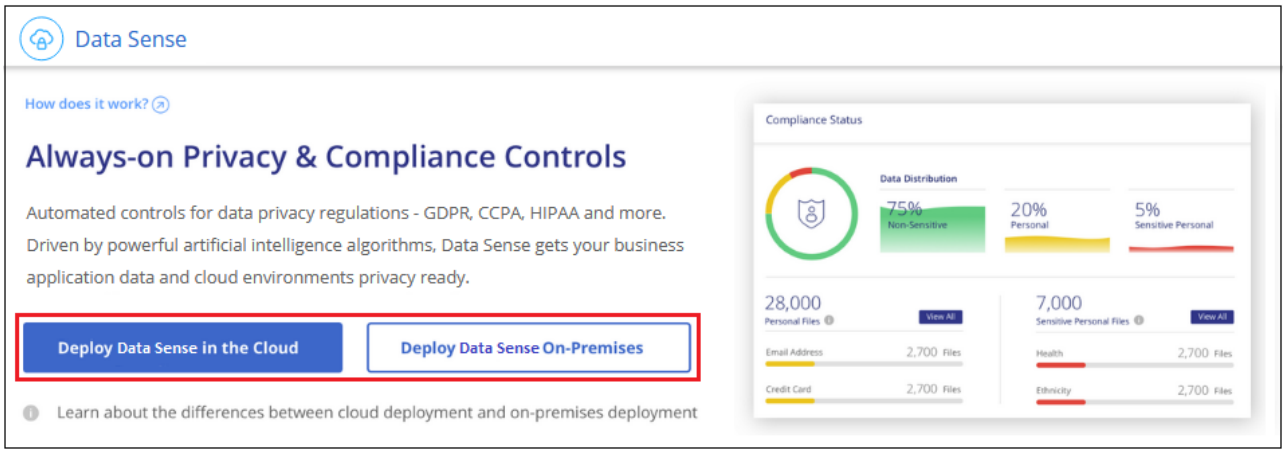
   You are prompted whether you want to run compliance scans on the backed up volumes. Cloud Data Sense scans are free when you run them on the backed up volumes (except for the cost of the deployed Cloud Data Sense instance).



9. Click **Go to Compliance** to activate compliance scans on the volumes. (If you choose **Close** and not to scan these backed up volumes, you can always enable this functionality later from Cloud Data Sense.)
    - If an instance of Cloud Data Sense is already deployed in your environment, you are directed to the Configuration page to select the volumes you want to scan in each on-premises working environment that has backups. See how to choose the volumes.



    - If Cloud Data Sense has not been deployed, you are directed to the Compliance page where you can choose to deploy Compliance in the cloud or in your premises. We strongly recommend deploying it in the cloud. Go here for installation requirements and instructions.



After you have deployed Compliance you can choose the volumes you want to scan as described above.

Result

Cloud Backup backs up your volumes from the on-premises ONTAP system, and optionally, Cloud Data Sense runs compliance scans on the backed up volumes.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

You can also view the results of the compliance scans and review other features of Cloud Data Sense that can help you understand data context and identify sensitive data in your organization.

The scan results are not available immediately because Cloud Backup has to finish creating the backups before Cloud Data Sense can start compliance scans.

Backing up on-premises ONTAP data to Azure Blob storage

Complete a few steps to get started backing up data from your on-premises ONTAP systems to Azure Blob storage.

TIP

In most cases you'll use Cloud Manager for all backup and restore operations. However, starting with ONTAP 9.9.1 you can initiate volume backup operations of your on-premises ONTAP clusters using ONTAP System Manager. See how to use System Manager to back up your volumes to the cloud using Cloud Backup.

A Beta feature released in January 2021 allows you to run compliance scans on the backed up volumes from your on-premises systems. Typically, compliance scans are free up to 1 TB of data, and then a cost for the service is applied for data over 1 TB. When combining Backup and Data Sense for your on-premises volumes, the cost for scans on those on-prem volumes is free. Learn more about how Cloud Data Sense can get your business applications and cloud environments privacy ready.

Quick start

Get started quickly by following these steps, or scroll down to the remaining sections for full details.

Verify support for your configuration

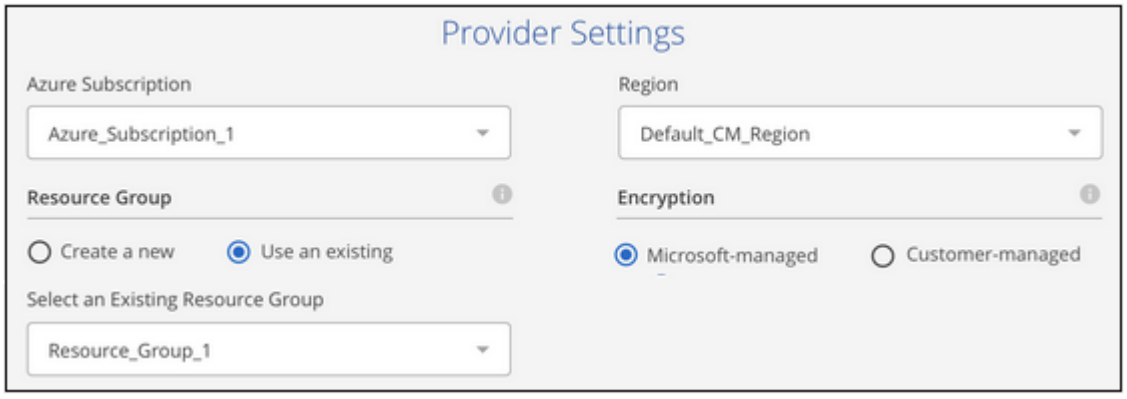
- You have discovered the on-premises cluster and added it to a working environment in Cloud Manager. See Discovering ONTAP clusters for details.
  - The cluster is running ONTAP 9.7P5 or later.
  - The cluster has a SnapMirror license — it is included as part of the Premium Bundle or Data Protection Bundle.
- The cluster must have the required network connections to Blob storage and to the Connector.
- The Connector must have the required network connections to Blob storage and to the cluster, and the required permissions.
- You have a valid Azure subscription for the object storage space where your backups will be located.

Enable Cloud Backup on the system

Select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel, and then follow the setup wizard.

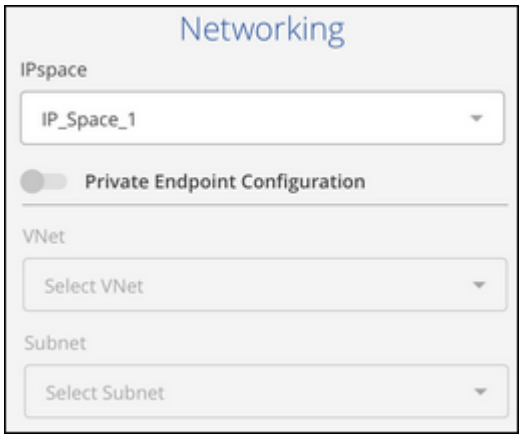
Select the cloud provider and enter the provider details

Select Microsoft Azure as your provider and then enter the provider details. You'll need to select the Azure Subscription and the region where you want to create the backups. You can also choose your own customer-managed key for data encryption instead of using the default Microsoft-managed encryption key.



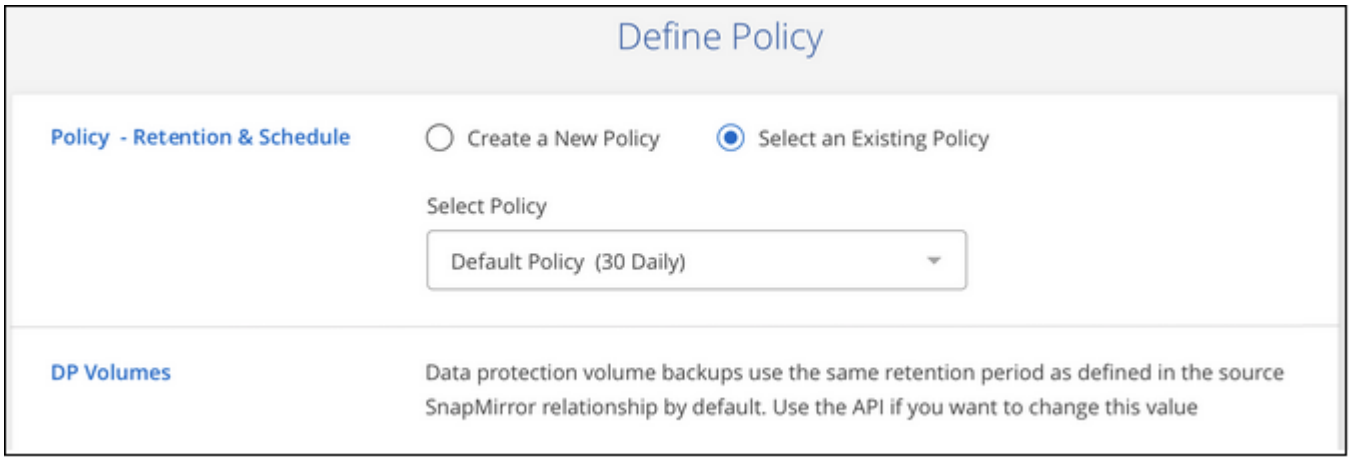
Select the cluster IPspace and optional use of a private VNet endpoint

Select the IPspace in the ONTAP cluster where the volumes reside. You can also choose to use an existing Azure Private Endpoint for a more secure connection to the VNet from your on-prem data center.



5 Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options. You can also change the number of backup copies to retain.



6 Select the volumes that you want to back up

Identify which volumes you want to back up from the cluster.

7 Activate Compliance scans on the backed up volumes (optional)

Choose whether you want to have Cloud Data Sense scan the volumes that are backed up in the cloud.

8 Restore your data, as needed

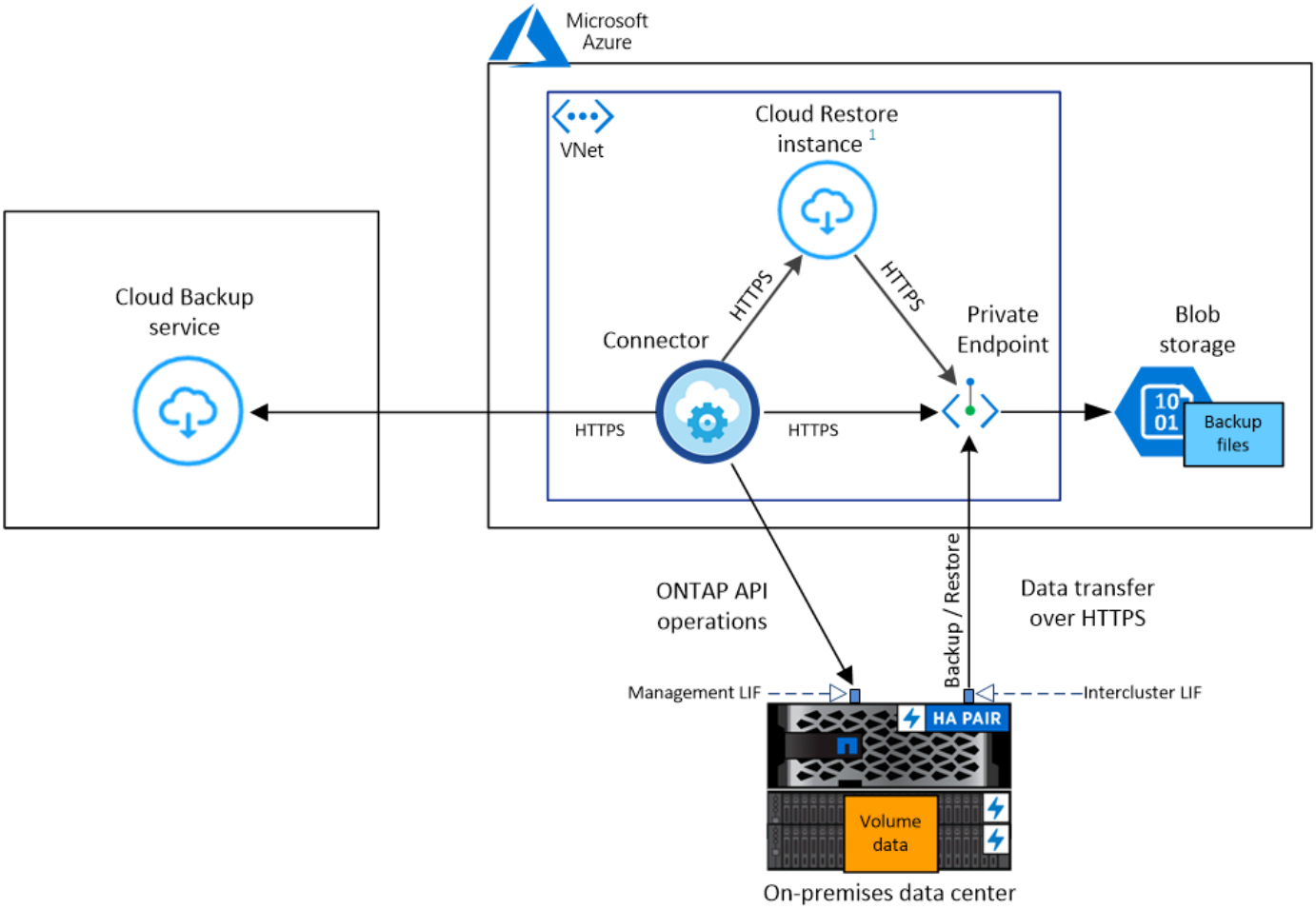
Choose to restore an entire backup to a new volume, or to restore individual files from the backup to an existing volume. You can restore data to a Cloud Volumes ONTAP system in Azure, or to an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure you have a supported configuration before you start backing up on-premises volumes to Azure Blob storage.

The following image shows each component and the connections that you need to prepare between them:



[1] Cloud Restore instance is active only during single-file restore operations.

Note that when the Cloud Restore instance is deployed in the cloud, it is located in the same subnet as the Connector.

Preparing your ONTAP clusters

You need to discover your on-premises ONTAP clusters in Cloud Manager before you can start backing up volume data.

Learn how to discover a cluster.

ONTAP requirements

- ONTAP 9.7P5 and later.
- A SnapMirror license (included as part of the Premium Bundle or Data Protection Bundle).

  Note: The "Hybrid Cloud Bundle" is not required when using the Cloud Backup service.

See how to manage your cluster licenses.

- Time and time zone are set correctly.

  See how to configure your cluster time.

Cluster networking requirements

- The ONTAP cluster initiates an HTTPS connection over port 443 from the intercluster LIF to Azure Blob storage for backup and restore operations.

  ONTAP reads and writes data to and from object storage. The object storage never initiates, it just responds.

- ONTAP requires an inbound connection from the Connector to the cluster management LIF. The Connector can reside in an Azure VNet.
- An intercluster LIF is required on each ONTAP node that hosts the volumes you want to back up. The LIF must be associated with the *IPspace* that ONTAP should use to connect to object storage. Learn more about IPspaces.

  When you set up Cloud Backup, you are prompted for the IPspace to use. You should choose the IPspace that each LIF is associated with. That might be the "Default" IPspace or a custom IPspace that you created.

- The nodes' and intercluster LIFs are able to access the internet.
- DNS servers have been configured for the storage VM where the volumes are located. See how to configure DNS services for the SVM.
- Note that if you use are using a different IPspace than the Default, then you might need to create a static route to get access to the object storage.
- Update firewall rules, if necessary, to allow Cloud Backup service connections from ONTAP to object storage through port 443 and name resolution traffic from the storage VM to the DNS server over port 53 (TCP/UDP).

Creating or switching Connectors

A Connector is required to back up data to the cloud, and the Connector must be in an Azure VNet when backing up data to Azure Blob storage. You can't use a Connector that's deployed on-premises. You'll either need to create a new Connector or make sure that the currently selected Connector resides in the correct provider.

- Learn about Connectors
- Creating a Connector in Azure
- Switching between Connectors

Preparing networking for the Connector

Ensure that the Connector has the required networking connections.

Steps

1. Ensure that the network where the Connector is installed enables the following connections:
   - An outbound internet connection to the Cloud Backup service over port 443 (HTTPS)

- An HTTPS connection over port 443 to your Blob object storage
- An HTTPS connection over port 443 to your ONTAP clusters

2. Enable a VNet Private Endpoint to Azure storage. This is needed if you have an ExpressRoute or VPN connection from your ONTAP cluster to the VNet and you want communication between the Connector and Blob storage to stay in your virtual private network.

Supported regions

You can create backups from on-premises systems to Azure Blob in all regions where Cloud Volumes ONTAP is supported. You specify the region where the backups will be stored when you set up the service.

License requirements

Before your 30-day free trial of the Cloud Backup service expires, you need to subscribe to a pay-as-you-go (PAYGO) Cloud Manager Marketplace offering from Azure, or purchase and activate a Cloud Backup BYOL license from NetApp. These licenses are for the account and can be used across multiple systems.

- For Cloud Backup PAYGO licensing, you'll need a subscription to the Azure Cloud Manager Marketplace offering to continue using Cloud Backup. Billing for Cloud Backup is done through this subscription.
- For Cloud Backup BYOL licensing, you don't need a subscription. You need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

You need to have an Azure subscription for the object storage space where your backups will be located.

A SnapMirror license is required on the cluster. Note that the "Hybrid Cloud Bundle" is not required when using Cloud Backup.

Preparing Azure Blob storage for backups

1. If your virtual or physical network uses a proxy server for internet access, ensure that the Cloud Restore virtual machine has outbound internet access to contact the following endpoints.

Endpoints	Purpose
http://olcentgbl.trafficmanager.net https://olcentgbl.trafficmanager.net	Provides CentOS packages for the Cloud Restore virtual machine.
http://cloudmanagerinfraprod.azurecr.io https://cloudmanagerinfraprod.azurecr.io	Cloud Restore virtual machine image repository.

2. You use choose your own custom-managed keys for data encryption in the activation wizard instead of using the default Microsoft-managed encryption keys. In this case you will need to have the Azure Subscription, Key Vault name, and the Key. See how to use your own keys.
3. If you want to have a more secure connection over the public internet from your on-prem data center to the VNet, there is an option to configure an Azure Private Endpoint in the activation wizard. In this case you will need to know the VNet and Subnet for this connection. See details about using a Private Endpoint.

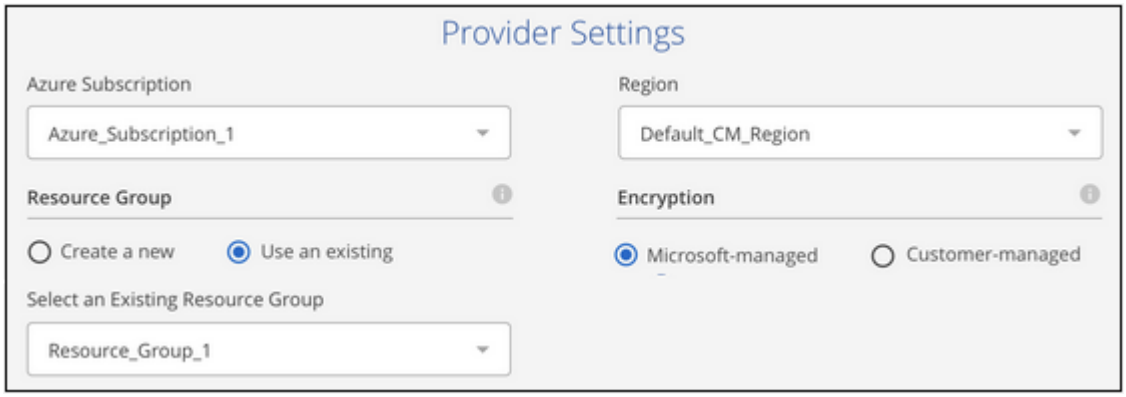
Enabling Cloud Backup

Enable Cloud Backup at any time directly from the on-premises working environment.

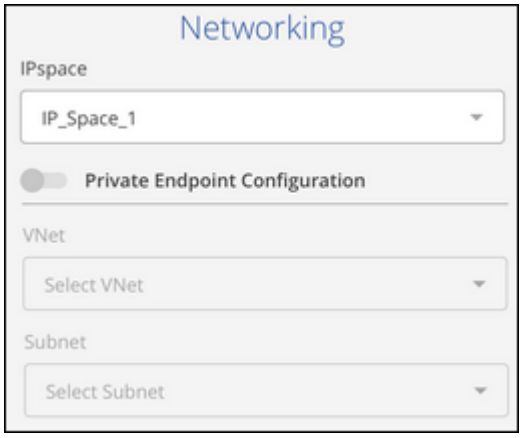
Steps

1. From the Canvas, select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel.

2. Select Microsoft Azure as your provider and click **Next**.
3. Enter the provider details. Note that you can't change this information after the service has started.
   a. The Azure subscription used for backups and the Azure region where the backups will be stored.
   b. The resource group that manages the Blob container - you can create a new resource group or select an existing resource group.
   c. Whether you will use the default Microsoft-managed encryption key or choose your own customer-managed keys to manage encryption of your data. (See how to use your own keys).

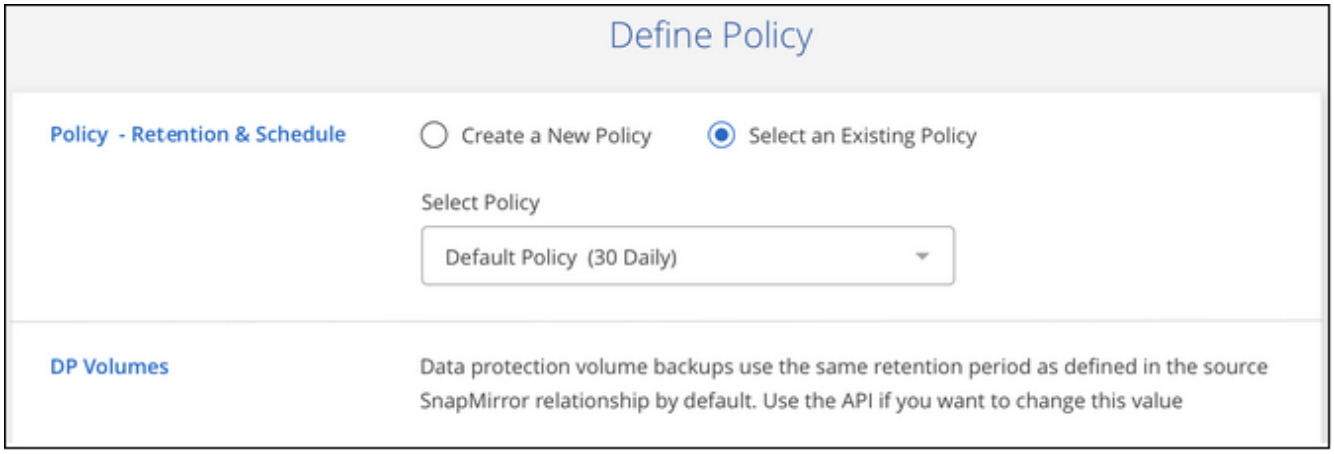


4. Click **Next** after you've entered the provider details.
5. Enter the networking details and click **Next**.
   a. The IPspace in the ONTAP cluster where the volumes you want to back up reside. The intercluster LIFs for this IPspace must have outbound internet access.
   b. Optionally, choose whether you will configure an Azure Private Endpoint. See details about using a Private Endpoint.



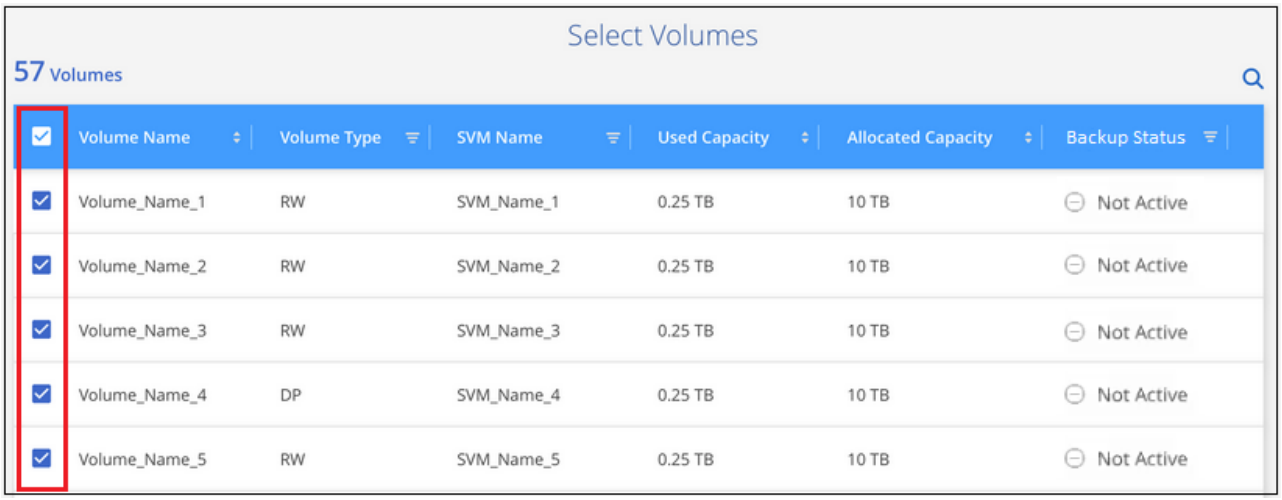
6. In the *Define Policy* page, select an existing backup schedule and retention value, or define a new backup

policy, and click **Next**.



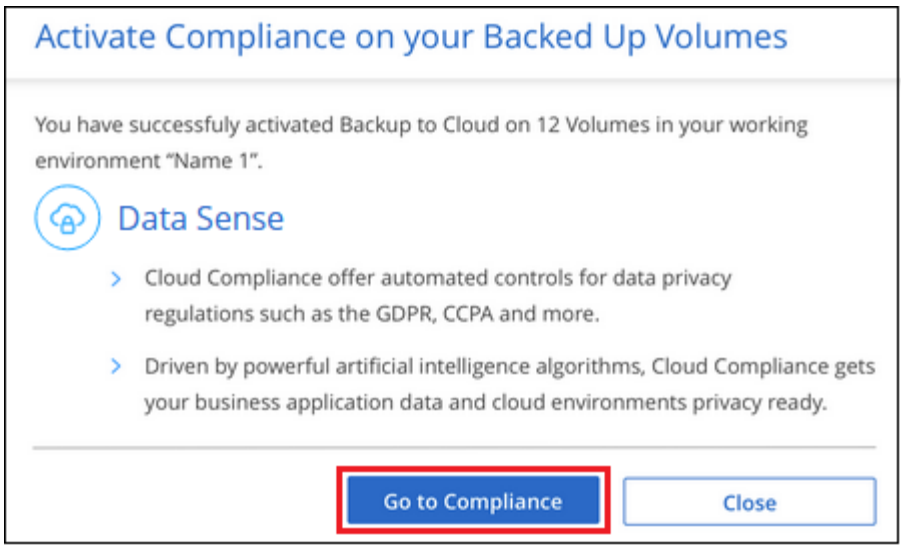
See the list of existing policies.

7. Select the volumes that you want to back up.
   - To back up all volumes, check the box in the title row (Volume Name).
   - To back up individual volumes, check the box for each volume (Volume_1).

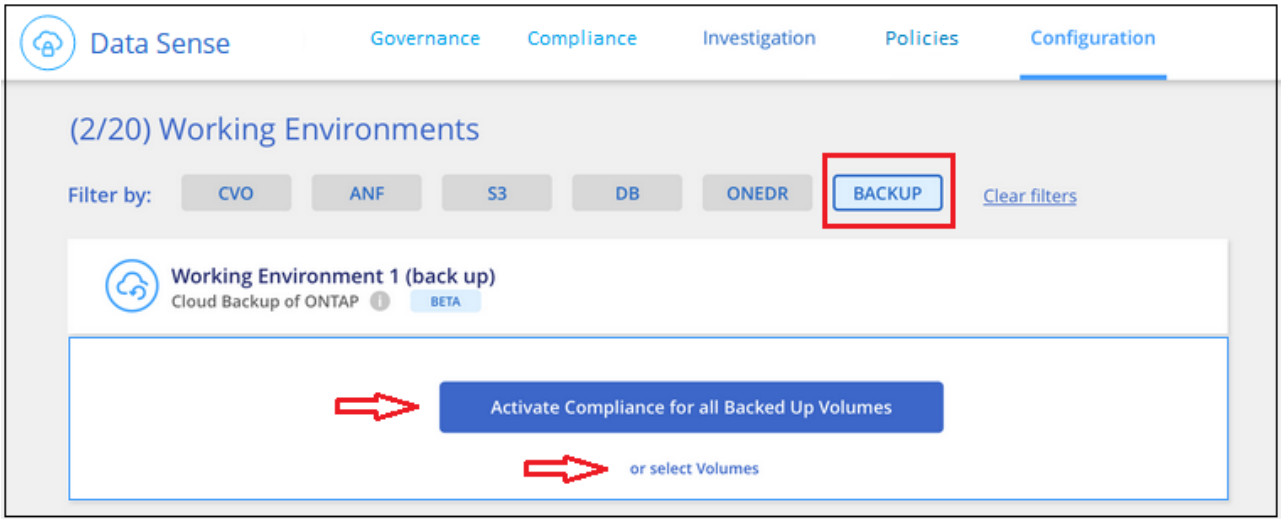


8. Click **Activate Backup** and Cloud Backup starts taking the initial backups of your volumes.

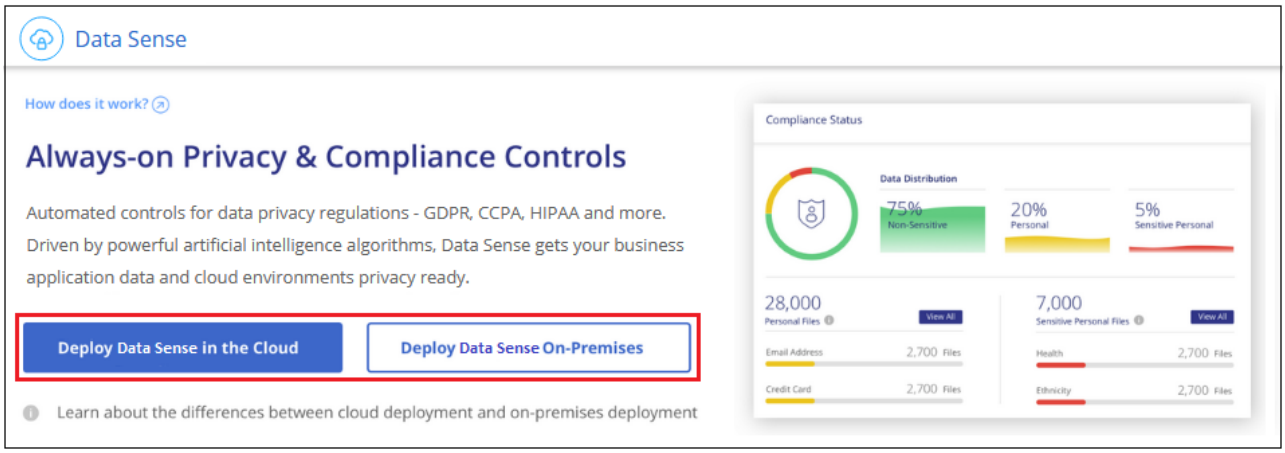
   You are prompted whether you want to run compliance scans on the backed up volumes. Cloud Data Sense scans are free when you run them on the backed up volumes (except for the cost of the deployed Cloud Data Sense instance).



9. Click **Go to Compliance** to activate compliance scans on the volumes. (If you choose **Close** and not to scan these backed up volumes, you can always enable this functionality later from Cloud Data Sense.)
    - If an instance of Cloud Data Sense is already deployed in your environment, you are directed to the Configuration page to select the volumes you want to scan in each on-premises working environment that has backups. See how to choose the volumes.



    - If Cloud Data Sense has not been deployed, you are directed to the Compliance page where you can choose to deploy Compliance in the cloud or in your premises. We strongly recommend deploying it in the cloud. Go here for installation requirements and instructions.



After you have deployed Compliance you can choose the volumes you want to scan as described above.

Result

Cloud Backup backs up your volumes from the on-premises ONTAP system, and optionally, Cloud Data Sense runs compliance scans on the backed up volumes.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes or individual files from a backup file.

You can also view the results of the compliance scans and review other features of Cloud Data Sense that can help you understand data context and identify sensitive data in your organization.

The scan results are not available immediately because Cloud Backup has to finish creating the backups before Cloud Data Sense can start compliance scans.

Backing up on-premises ONTAP data to Google Cloud Storage

Complete a few steps to get started backing up data from your on-premises ONTAP systems to Google Cloud Storage.

TIP

In most cases you'll use Cloud Manager for all backup and restore operations. However, starting with ONTAP 9.9.1 you can initiate volume backup operations of your on-premises ONTAP clusters using ONTAP System Manager. See how to use System Manager to back up your volumes to the cloud using Cloud Backup.

A Beta feature released in January 2021 allows you to run compliance scans on the backed up volumes from your on-premises systems. Typically, compliance scans are free up to 1 TB of data, and then a cost for the service is applied for data over 1 TB. When combining Backup and Data Sense for your on-premises volumes, the cost for scans on those on-prem volumes is free. Learn more about how Cloud Data Sense can get your business applications and cloud environments privacy ready.

Quick start

Get started quickly by following these steps, or scroll down to the remaining sections for full details.

Verify support for your configuration

- You have discovered the on-premises cluster and added it to a working environment in Cloud Manager. See Discovering ONTAP clusters for details.
  - The cluster is running ONTAP 9.7P5 or later.
  - The cluster has a SnapMirror license — it is included as part of the Premium Bundle or Data Protection Bundle.
- The cluster must have the required network connections to Google storage and to the Connector.
- The Connector must have the required network connections to Google storage and to the cluster.
- You have a valid Google subscription for the object storage space where your backups will be located.
- You have a Google account with an access key and secret key so the ONTAP cluster can back up and restore data.

Enable Cloud Backup on the system

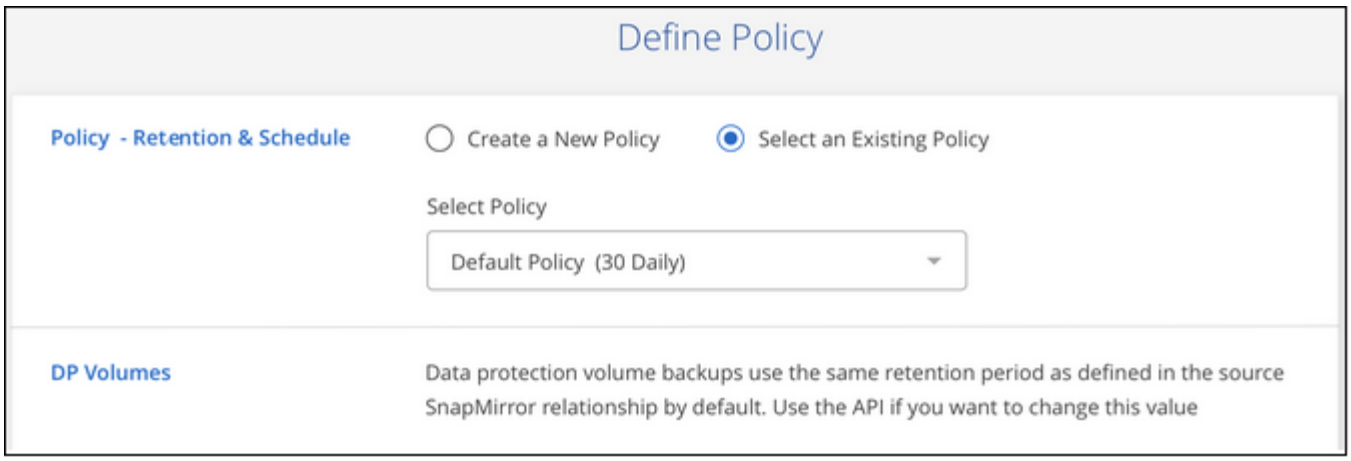
Select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel, and then follow the setup wizard.

Select the cloud provider and enter the provider details

Select Google Cloud as your provider and then enter the provider details. You also need to specify the IPspace in the ONTAP cluster where the volumes reside.

Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options. You can also change the number of backup copies to retain.



5 Select the volumes that you want to back up

Identify which volumes you want to back up from the cluster.

6 Activate Compliance scans on the backed up volumes (optional)

Choose whether you want to have Cloud Data Sense scan the volumes that are backed up in the cloud.

7 Restore your data, as needed

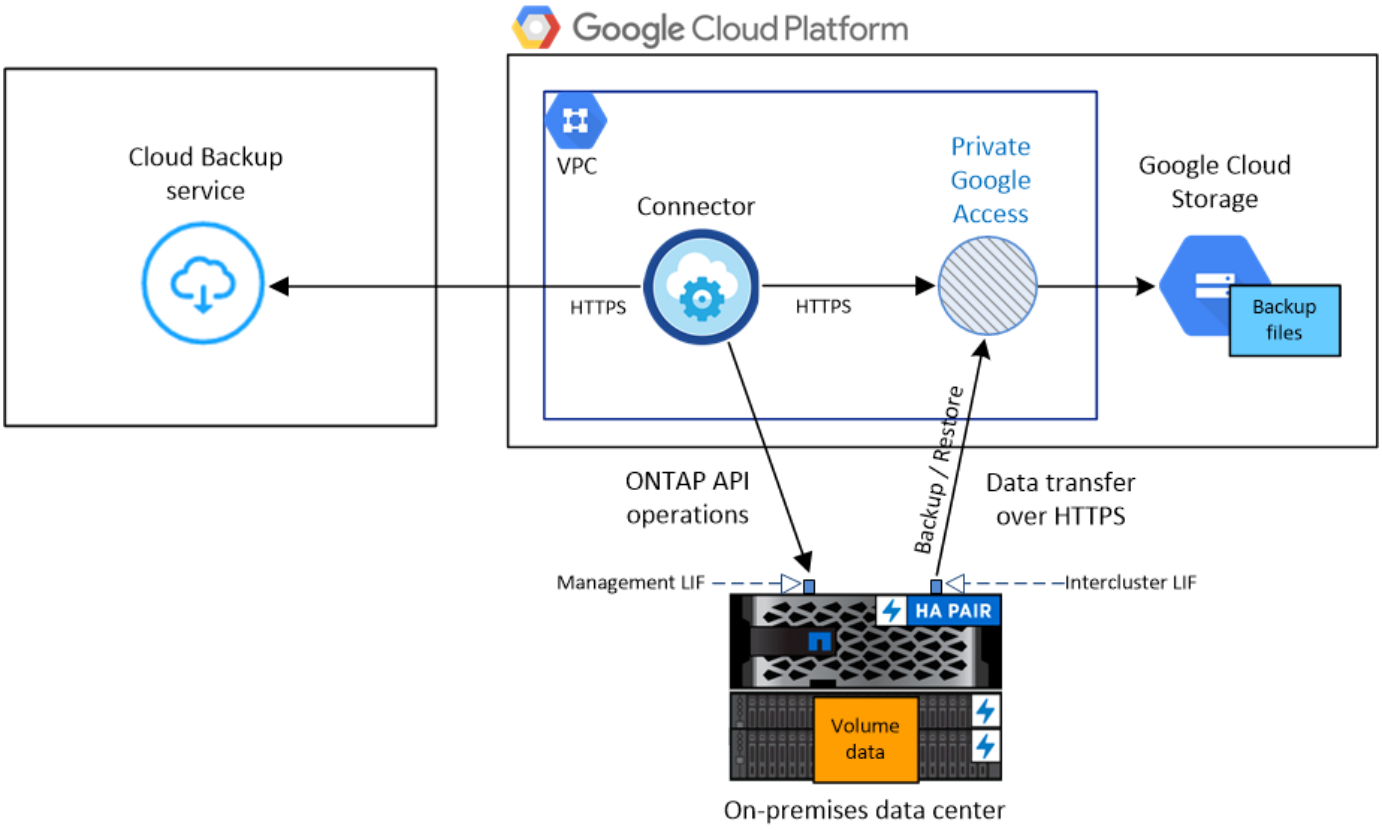
Restore a backup to a new volume. You can restore data to a Cloud Volumes ONTAP system in Google, or to an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure you have a supported configuration before you start backing up on-premises volumes to Google Cloud storage.

The following image shows each component and the connections that you need to prepare between them:



Note that the Cloud Restore instance is not shown in this diagram because single-file restore is not currently supported in GCP.

Preparing your ONTAP clusters

You need to discover your on-premises ONTAP clusters in Cloud Manager before you can start backing up volume data.

Learn how to discover a cluster.

ONTAP requirements

- ONTAP 9.7P5 and later.
- A SnapMirror license (included as part of the Premium Bundle or Data Protection Bundle).

  Note: The "Hybrid Cloud Bundle" is not required when using the Cloud Backup service.

  See how to manage your cluster licenses.

- Time and time zone are set correctly.

  See how to configure your cluster time.

Cluster networking requirements

- The ONTAP cluster initiates an HTTPS connection over port 443 from the intercluster LIF to Google Cloud storage for backup and restore operations.

  ONTAP reads and writes data to and from object storage. The object storage never initiates, it just responds.

- ONTAP requires an inbound connection from the Connector to the cluster management LIF. The Connector can reside in a Google Cloud Platform VPC.
- An intercluster LIF is required on each ONTAP node that hosts the volumes you want to back up. The LIF must be associated with the *IPspace* that ONTAP should use to connect to object storage. Learn more about IPspaces.

  When you set up Cloud Backup, you are prompted for the IPspace to use. You should choose the IPspace that each LIF is associated with. That might be the "Default" IPspace or a custom IPspace that you created.
- The nodes' intercluster LIFs are able to access the internet.
- DNS servers have been configured for the storage VM where the volumes are located. See how to configure DNS services for the SVM.
- Note that if you use are using a different IPspace than the Default, then you might need to create a static route to get access to the object storage.
- Update firewall rules, if necessary, to allow Cloud Backup service connections from ONTAP to object storage through port 443 and name resolution traffic from the storage VM to the DNS server over port 53 (TCP/UDP).

Creating or switching Connectors

A Connector is required to back up data to the cloud, and the Connector must be in a Google Cloud Platform VPC when backing up data to Google Cloud storage. You can't use a Connector that's deployed on-premises. You'll either need to create a new Connector or make sure that the currently selected Connector resides in the correct provider.

- Learn about Connectors
- Creating a Connector in GCP
- Switching between Connectors

Preparing networking for the Connector

Ensure that the Connector has the required networking connections.

Steps

1. Ensure that the network where the Connector is installed enables the following connections:
   - An outbound internet connection to the Cloud Backup service over port 443 (HTTPS)
   - An HTTPS connection over port 443 to your Google Cloud storage
   - An HTTPS connection over port 443 to your ONTAP clusters
2. Enable Private Google Access on the subnet where you plan to deploy the Connector. Private Google Access is needed if you have a direct connection from your ONTAP cluster to the VPC and you want communication between the Connector and Google Cloud Storage to stay in your virtual private network.

   Note that Private Google Access works with VM instances that have only internal (private) IP addresses (no external IP addresses).

Supported regions

You can create backups from on-premises systems to Google Cloud storage in all regions where Cloud Volumes ONTAP is supported. You specify the region where the backups will be stored when you set up the

service.

License requirements

Before your 30-day free trial of the Cloud Backup service expires, you need to subscribe to a pay-as-you-go (PAYGO) Cloud Manager Marketplace offering from Google, or purchase and activate a Cloud Backup BYOL license from NetApp. These licenses are for the account and can be used across multiple systems.

- For Cloud Backup PAYGO licensing, you'll need a subscription to the Google Cloud Manager Marketplace offering to continue using Cloud Backup. Billing for Cloud Backup is done through this subscription.
- For Cloud Backup BYOL licensing, you don't need a subscription. You need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

You need to have a Google subscription for the object storage space where your backups will be located.

A SnapMirror license is required on the cluster. Note that the "Hybrid Cloud Bundle" is not required when using Cloud Backup.

Preparing Google Cloud Storage for backups

When you set up backup, you need to provide storage access keys for a service account that has Storage Admin permissions. A service account enables Cloud Backup to authenticate and access Cloud Storage buckets used to store backups. The keys are required so that Google Cloud Storage knows who is making the request.

Steps

1. Create a service account that has the predefined Storage Admin role.
2. Go to GCP Storage Settings and create access keys for the service account:
   a. Select a project, and click **Interoperability**. If you haven't already done so, click **Enable interoperability access**.
   b. Under **Access keys for service accounts**, click **Create a key for a service account**, select the service account that you just created, and click **Create Key**.

      You'll need to enter the keys in Cloud Backup later when you configure the backup service.

Enabling Cloud Backup

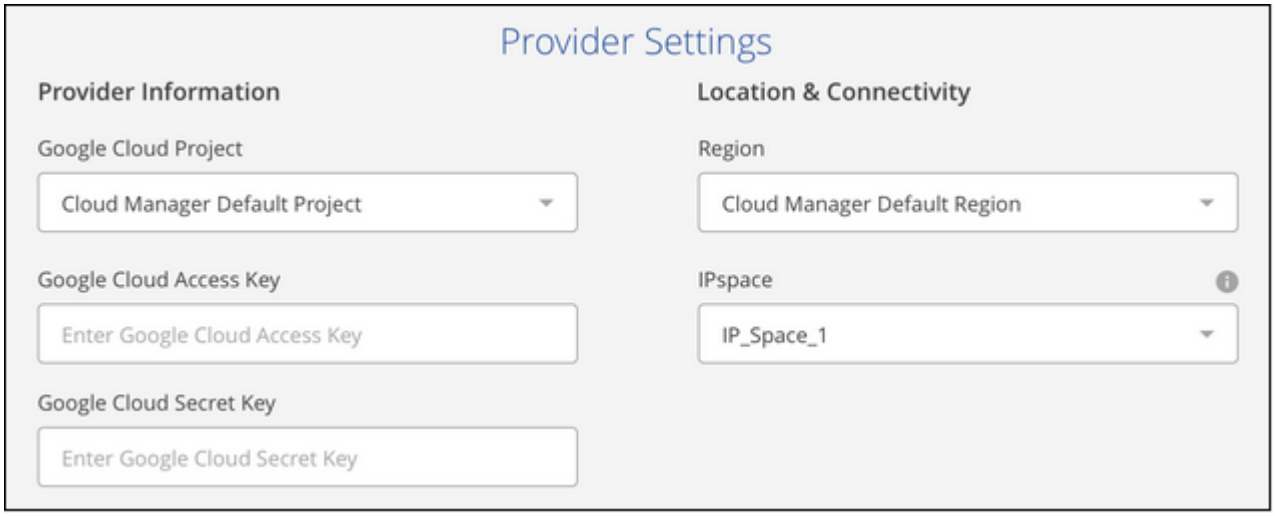
Enable Cloud Backup at any time directly from the on-premises working environment.

Steps

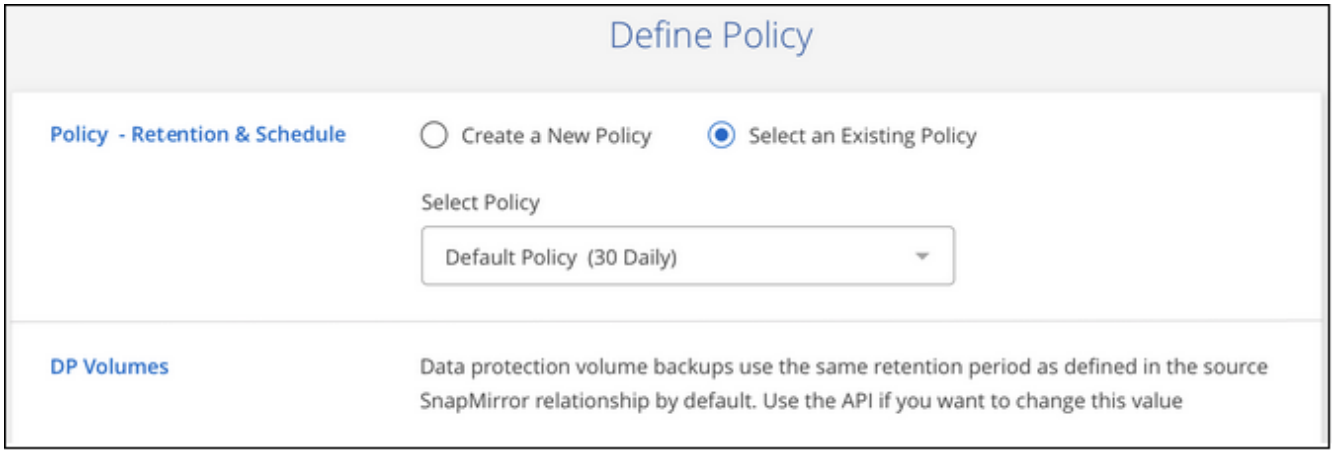
1. From the Canvas, select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel.

2. Select Google Cloud as your provider and click **Next**.

3. Enter the provider details. Note that you can't change this information after the service has started.
   a. The Google Cloud Project where you want the Google Cloud Storage bucket to be created for backups. (The Project must have a Service Account that has the predefined Storage Admin role.)
   b. The Google Access Key and Secret Key used to store the backups.
   c. The Google region where the backups will be stored.
   d. The IPspace in the ONTAP cluster where the volumes you want to back up reside. The intercluster LIFs for this IPspace must have outbound internet access.



4. Click **Next** after you've entered the provider details.
5. In the *Define Policy* page, select an existing backup schedule and retention value, or define a new backup policy, and click **Next**.

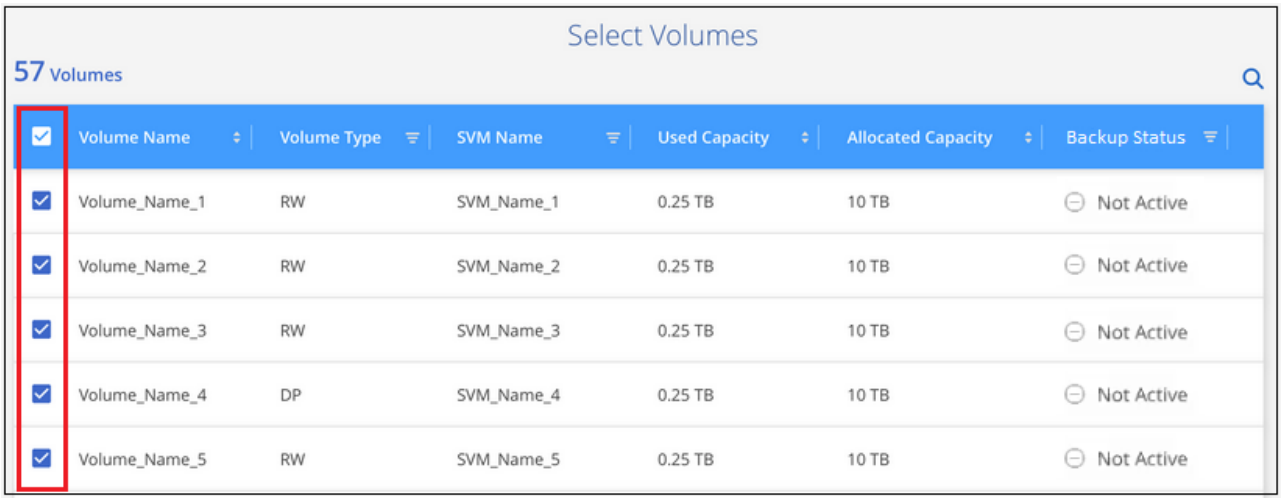


   See the list of existing policies.

6. Select the volumes that you want to back up.
   - To back up all volumes, check the box in the title row (

).
   - To back up individual volumes, check the box for each volume (

).



7. Click **Activate Backup** and Cloud Backup starts taking the initial backups of your volumes.

Result

Cloud Backup starts taking the initial backups of each selected volume and the Backup Dashboard is displayed so you can monitor the state of the backups.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes from a backup file.

Backing up on-premises ONTAP data to StorageGRID

Complete a few steps to get started backing up data from your on-premises ONTAP systems to object storage in your NetApp StorageGRID systems.

Quick start

Get started quickly by following these steps, or scroll down to the remaining sections for full details.

Verify support for your configuration

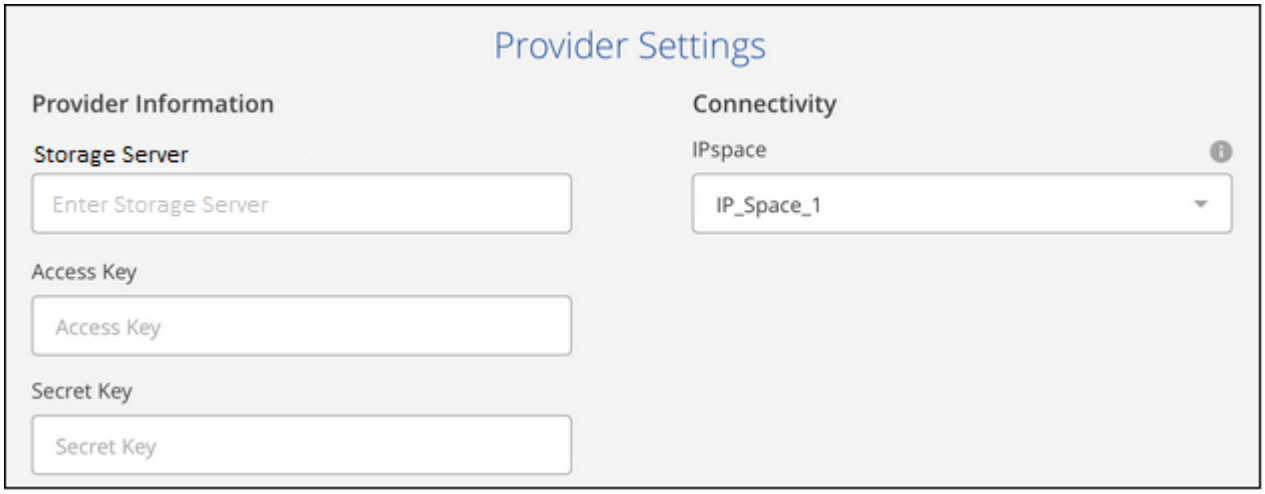
- You have discovered the on-premises cluster and added it to a working environment in Cloud Manager. See Discovering ONTAP clusters for details.
  - The cluster is running ONTAP 9.7P5 or later.
  - The cluster has a SnapMirror license — it is included as part of the Premium Bundle or Data Protection Bundle.
- The cluster must have the required network connections to StorageGRID and to the Connector.
- You have a Connector installed on your premises.
  - Networking for the Connector enables an outbound HTTPS connection to the ONTAP cluster and to StorageGRID.
- You have purchased and activated a Cloud Backup BYOL license from NetApp.
- Your StorageGRID has version 10.3 or later with access keys that have S3 permissions.

Enable Cloud Backup on the system

Select the working environment and click **Enable** next to the Backup & Compliance service in the right-panel, and then follow the setup wizard.

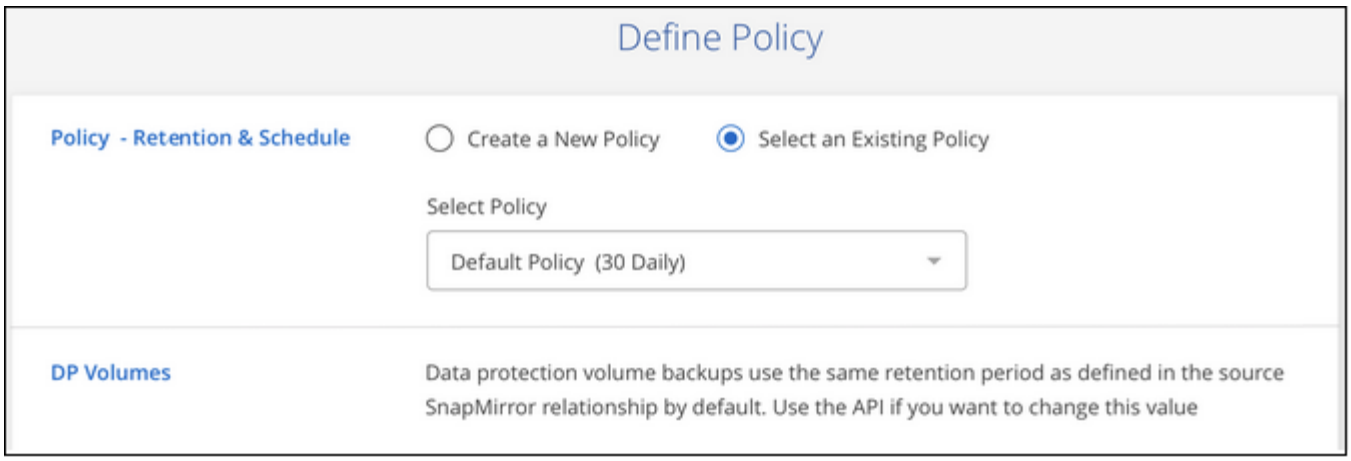
Enter the StorageGRID details

Select StorageGRID as the provider, and then enter the StorageGRID details. You also need to specify the IPspace in the ONTAP cluster where the volumes reside.



Define the backup policy

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. Change to hourly, daily, weekly, or monthly backups, or select one of the system-defined policies that provide more options.



5 Select the volumes that you want to back up

Identify which volumes you want to back up from the cluster.

6 Restore your data, as needed

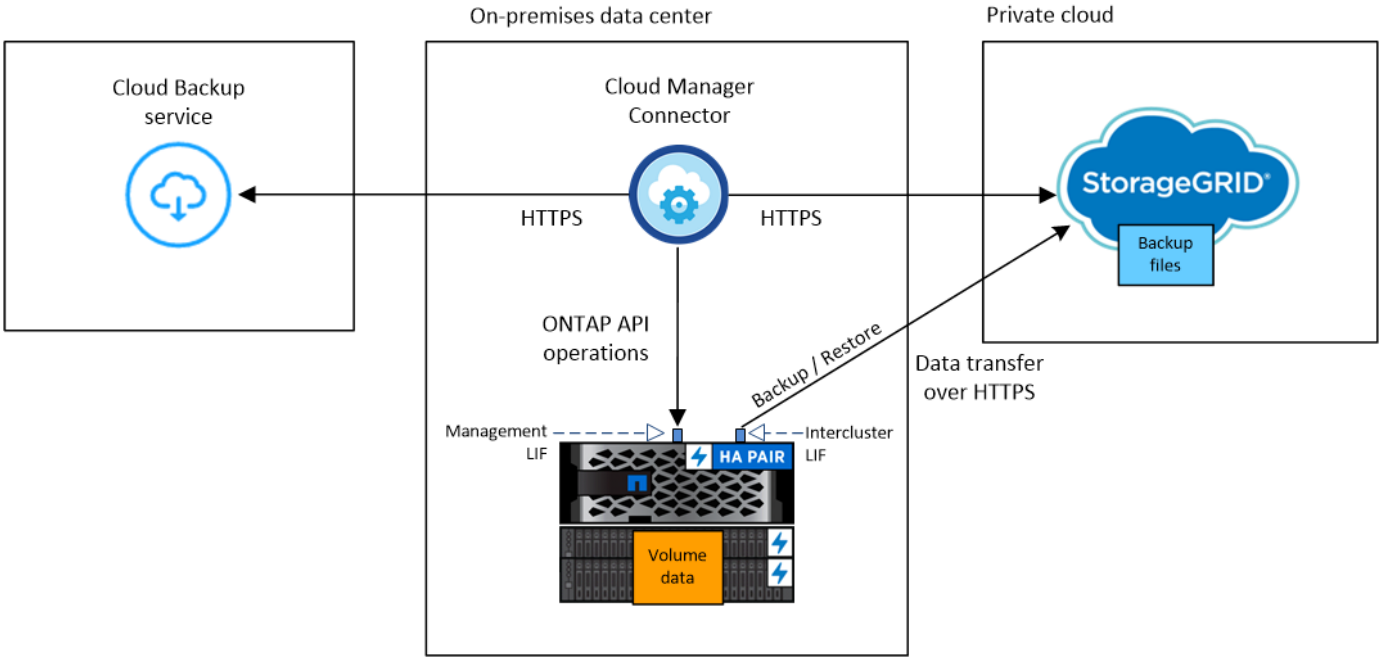
If necessary, choose the backup file to restore an entire backup to a new volume on an on-premises ONTAP system.

See Restoring volume data from backup files for details.

Requirements

Read the following requirements to make sure you have a supported configuration before you start backing up on-premises volumes to StorageGRID.

The following image shows each component when backing up an on-prem ONTAP system to StorageGRID and the connections that you need to prepare between them:



Note that the Cloud Restore instance is not shown in this diagram because single-file restore is not currently supported when using StorageGRID.

Preparing your ONTAP clusters

You need to discover your on-premises ONTAP clusters in Cloud Manager before you can start backing up volume data.

Learn how to discover a cluster.

ONTAP requirements

- ONTAP 9.7P5 and later.
- A SnapMirror license (included as part of the Premium Bundle or Data Protection Bundle).

  Note: The "Hybrid Cloud Bundle" is not required when using the Cloud Backup service.

  See how to manage your cluster licenses.

- Time and time zone are set correctly.

  See how to configure your cluster time.

Cluster networking requirements

- The ONTAP cluster initiates an HTTPS connection over a user-specified port from the intercluster LIF to StorageGRID for backup and restore operations. The port is configurable during backup setup.

  ONTAP reads and writes data to and from object storage. The object storage never initiates, it just responds.

- ONTAP requires an inbound connection from the Connector to the cluster management LIF. The Connector must reside on your premises.
- An intercluster LIF is required on each ONTAP node that hosts the volumes you want to back up. The LIF must be associated with the *IPspace* that ONTAP should use to connect to object storage. Learn

more about IPspaces.

When you set up Cloud Backup, you are prompted for the IPspace to use. You should choose the IPspace that each LIF is associated with. That might be the "Default" IPspace or a custom IPspace that you created.

- The nodes' intercluster LIFs are able to access the internet.
- DNS servers have been configured for the storage VM where the volumes are located. See how to configure DNS services for the SVM.
- Note that if you use are using a different IPspace than the Default, then you might need to create a static route to get access to the object storage.
- Update firewall rules, if necessary, to allow Cloud Backup service connections from ONTAP to object storage through the port you specified (typically port 443) and name resolution traffic from the storage VM to the DNS server over port 53 (TCP/UDP).

Preparing StorageGRID

StorageGRID must meet the following requirements. See the StorageGRID documentation for more information.

Supported StorageGRID versions

StorageGRID 10.3 and later is supported.

S3 credentials

When you set up backup to StorageGRID, the backup wizard prompts you for an S3 access key and secret key for a service account. A service account enables Cloud Backup to authenticate and access the StorageGRID buckets used to store backups. The keys are required so that StorageGRID knows who is making the request.

These access keys must be associated with a user who has the following permissions:

```
"s3:ListAllMyBuckets",
"s3:ListBucket",
"s3:GetObject",
"s3:PutObject",
"s3:DeleteObject",
"s3:CreateBucket"
```

Object versioning

You must not enable StorageGRID object versioning on the object store bucket.

Creating or switching Connectors

When backing up data to StorageGRID, a Connector must be available on your premises. You'll either need to install a new Connector or make sure that the currently selected Connector resides on-prem.

- Learn about Connectors
- Connector host requirements
- Installing the Connector on an existing Linux host

- Switching between Connectors

Preparing networking for the Connector

Ensure that the Connector has the required networking connections.

Steps

1. Ensure that the network where the Connector is installed enables the following connections:
   - An outbound internet connection to the Cloud Backup service over port 443 (HTTPS)
   - An HTTPS connection over port 443 to StorageGRID
   - An HTTPS connection over port 443 to your ONTAP clusters

License requirements

Before your 30-day free trial of the Cloud Backup service expires, you need to purchase and activate a Cloud Backup BYOL license from NetApp. This license is for the account and can be used across multiple systems.

You'll need the serial number from NetApp that enables you to use the service for the duration and capacity of the license. Learn how to manage your BYOL licenses.

TIP

PAYGO licensing is not currently supported when backing up files to StorageGRID.

A SnapMirror license is required on the cluster. Note that the "Hybrid Cloud Bundle" is not required when using Cloud Backup.

Enabling Cloud Backup to StorageGRID

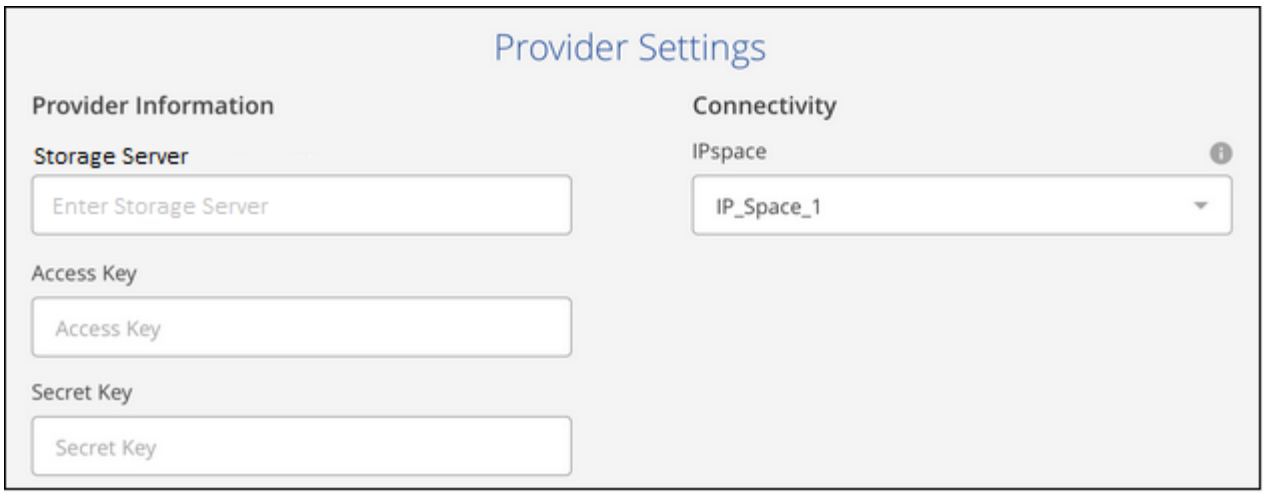
Enable Cloud Backup at any time directly from the on-premises working environment.

Steps

1. From the Canvas, select the on-premises working environment and click **Enable** next to the Backup & Compliance service in the right-panel.

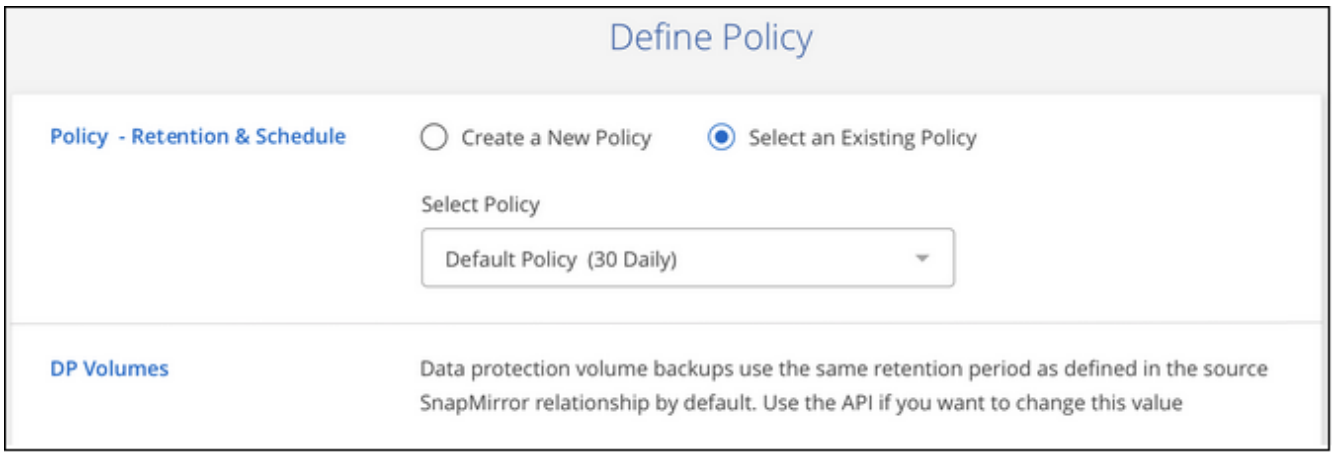
2. Select **StorageGRID** as the provider, click **Next**, and then enter the provider details:
   a. The FQDN of the StorageGRID server and the port that ONTAP should use for HTTPS communication with StorageGRID; for example: `s3.eng.company.com:8082`
   b. The Access Key and the Secret Key used to access the bucket to store backups.
   c. The IPspace in the ONTAP cluster where the volumes you want to back up reside. The intercluster LIFs for this IPspace must have outbound internet access.

      Selecting the correct IPspace ensures that Cloud Backup can set up a connection from ONTAP to your StorageGRID object storage.



Note that you cannot change this information after the service has started.

3. In the *Define Policy* page, select the backup schedule and retention value and click **Next**.

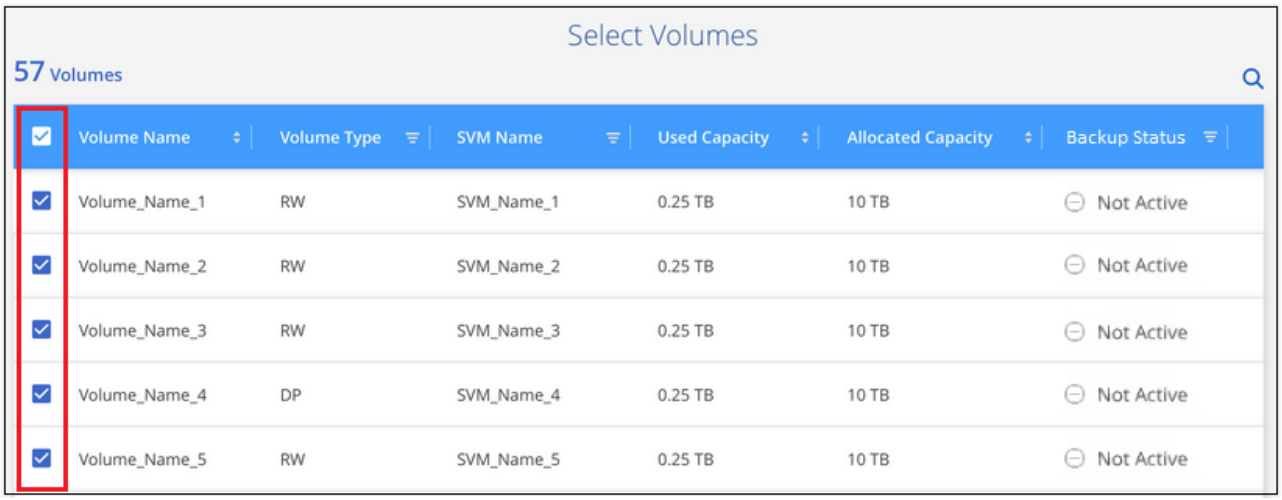


See the list of existing policies.

4. Select the volumes that you want to back up.
   - To back up all volumes, check the box in the title row (

).
   - To back up individual volumes, check the box for each volume (

).



5. Click **Activate Backup** and Cloud Backup starts taking the initial backups of each selected volume and the Backup Dashboard is displayed so you can monitor the state of the backups.

Result

Cloud Backup backs up your volumes from the on-premises ONTAP system.

What's next?

You can start and stop backups for volumes or change the backup schedule and you can restore entire volumes from a backup file.

Set up licensing for Cloud Backup

As mentioned in the Licensing overview, you can pay for Cloud Backup using a pay-as-you-go (PAYGO) subscription through your cloud provider, an annual contract through AWS, or a bring-your-own license (BYOL) from NetApp. If you want to pay as you go or use an annual contract, then you need to subscribe from the marketplace for the cloud provider to which you want to back up data. There's no need to subscribe from every marketplace.

Set up a PAYGO subscription

For pay-as-you-go you'll need to pay your cloud provider for object storage costs and NetApp for backup licensing costs. The licensing costs are based on target backup capacity (*before* ONTAP storage efficiencies). Use these links to subscribe to Cloud Backup from your cloud provider marketplace:

- AWS: Go to the Cloud Manager Marketplace offering for pricing details.
- Azure: Go to the Cloud Manager Marketplace offering for pricing details.
- GCP: Go to the Cloud Manager Marketplace offering for pricing details.

Subscribe to yearly contracts through AWS

There are two annual contracts available from the AWS Marketplace:

- An annual contract that enables you to back up Cloud Volumes ONTAP data and on-premises ONTAP data.

Go to the AWS Marketplace page to view pricing details.

If you want to use this option, set up your subscription from the Marketplace page and then associate the subscription with your AWS credentials. Note that you'll also need to pay for Cloud Volumes ONTAP using this annual contract subscription since you can assign only one active subscription to your AWS credentials in Cloud Manager.

- A Professional Package that enables you to bundle Cloud Volumes ONTAP and Cloud Backup service by using an annual contract for 1, 2, or 3 years. Payment is per TiB. This option doesn't enable you to back up on-premises ONTAP data.

  Go to the AWS Marketplace page to view pricing details and go to the Cloud Volumes ONTAP Release Notes to learn more about this licensing option.

  If you want to use this option, you can set up the annual contract when you create a Cloud Volumes ONTAP working environment and Cloud Manager prompts you to subscribe to the AWS Marketplace.

Use a Cloud Backup BYOL license

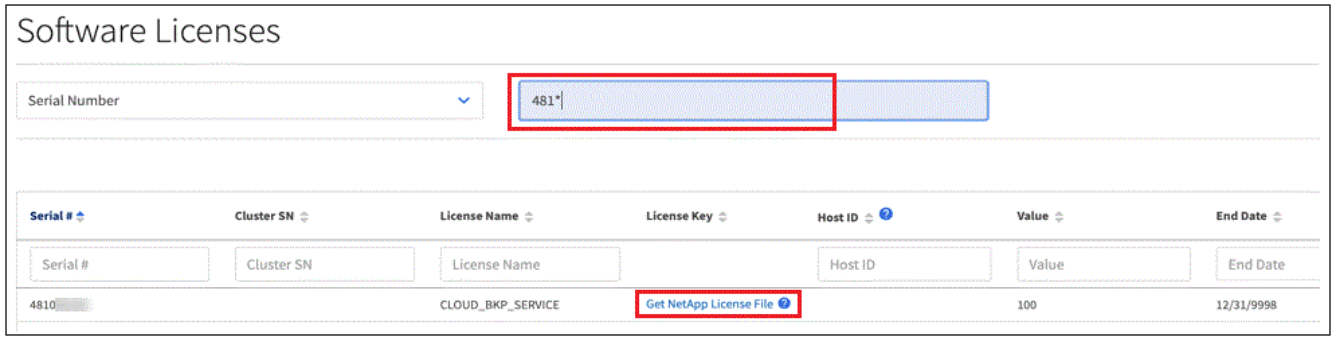
Bring-your-own licenses from NetApp provide 1-, 2-, or 3-year terms. You use the Digital Wallet page in Cloud Manager to manage BYOL licenses for the Cloud Backup service. You can add new licenses and update existing licenses.

Obtain your Cloud Backup license file

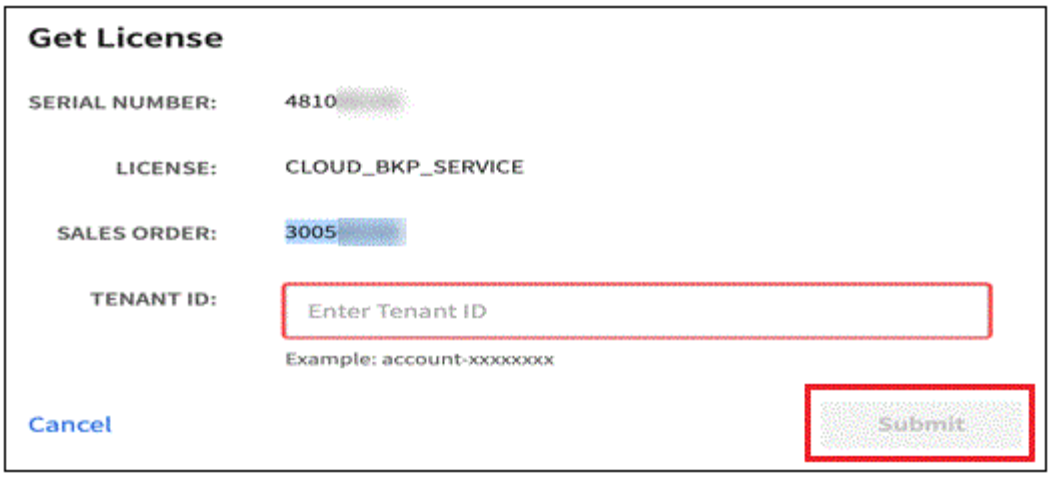
After you have purchased your Cloud Backup license, you activate the license in Cloud Manager by entering the Cloud Backup serial number and NSS account, or by uploading the NLF license file. The steps below show how to get the NLF license file if you plan to use that method.

Steps

1. Sign in to the NetApp Support Site and click **Systems > Software Licenses**.
2. Enter your Cloud Backup license serial number.



3. Under **License Key**, click **Get NetApp License File**.
4. Enter your Cloud Manager Account ID (this is called a Tenant ID on the support site) and click **Submit** to download the license file.



You can find your Cloud Manager Account ID by selecting the **Account** drop-down from the top of Cloud Manager, and then clicking **Manage Account** next to your account. Your Account ID is in the Overview tab.

Add Cloud Backup BYOL licenses to your account

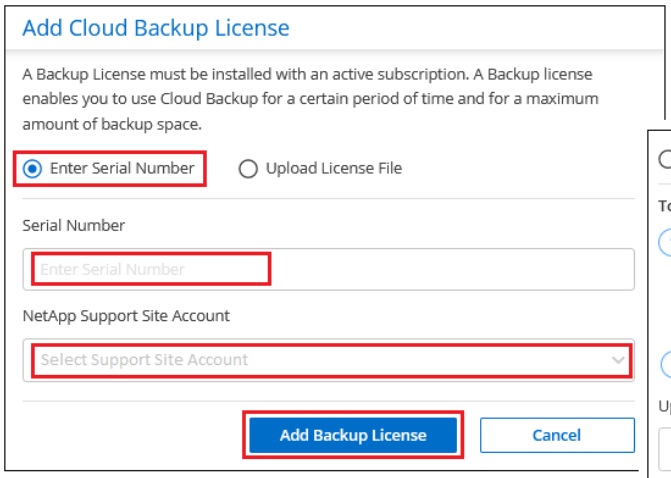
After you purchase a Cloud Backup license for your NetApp account, you need to add the license to Cloud Manager to use the Cloud Backup service.

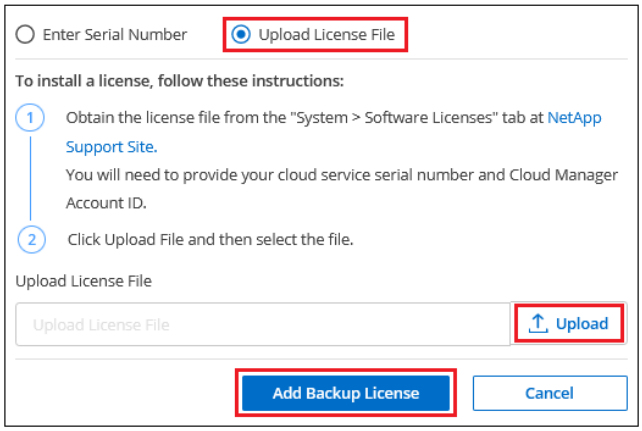
Steps

1. Click **All Services > Digital Wallet > Cloud Backup Licenses**.
2. Click **Add Backup License**.
3. In the *Add Cloud Backup License* dialog, enter the license information and click **Add Backup License**:
   - If you have the backup license serial number and know your NSS account, select the **Enter Serial Number** option and enter that information.

     If your NetApp Support Site account isn't available from the drop-down list, add the NSS account to Cloud Manager.

   - If you have the backup license file, select the **Upload License File** option and follow the prompts to attach the file.





Result

Cloud Manager adds the license so that your Cloud Backup service is active.

Update a Cloud Backup BYOL license

If your licensed term is nearing the expiration date, or if your licensed capacity is reaching the limit, you'll be notified. This status also appears in the Digital Wallet page.

You can update your Cloud Backup license before it expires so that there is no interruption in your ability to back up and restore your data.

Steps

1. Click the chat icon in the lower-right of Cloud Manager to request an extension or capacity add-on to your Cloud Backup license for the particular serial number.

   After you pay for the license and it is registered with the NetApp Support Site, in most cases, Cloud Manager can automatically obtain your updated license file and the Cloud Backup Licenses page will reflect the change in 5 to 10 minutes.

2. If Cloud Manager can't automatically update the license, then you'll need to manually upload the license file.
   a. You can obtain the license file from the NetApp Support Site.
   b. On the *Cloud Backup Licenses* page, click **Update Backup License**.
   c. In the *Update Cloud Backup License* dialog, enter the license information and click **Update Backup License**.

Result

Cloud Manager updates the license so that your Cloud Backup service continues to be active.

Managing backups for Cloud Volumes ONTAP and on-premises ONTAP systems

You can manage backups for Cloud Volumes ONTAP and on-premises ONTAP systems by changing the backup schedule, enabling/disabling volume backups, creating an on-demand backup, deleting backups, and more.

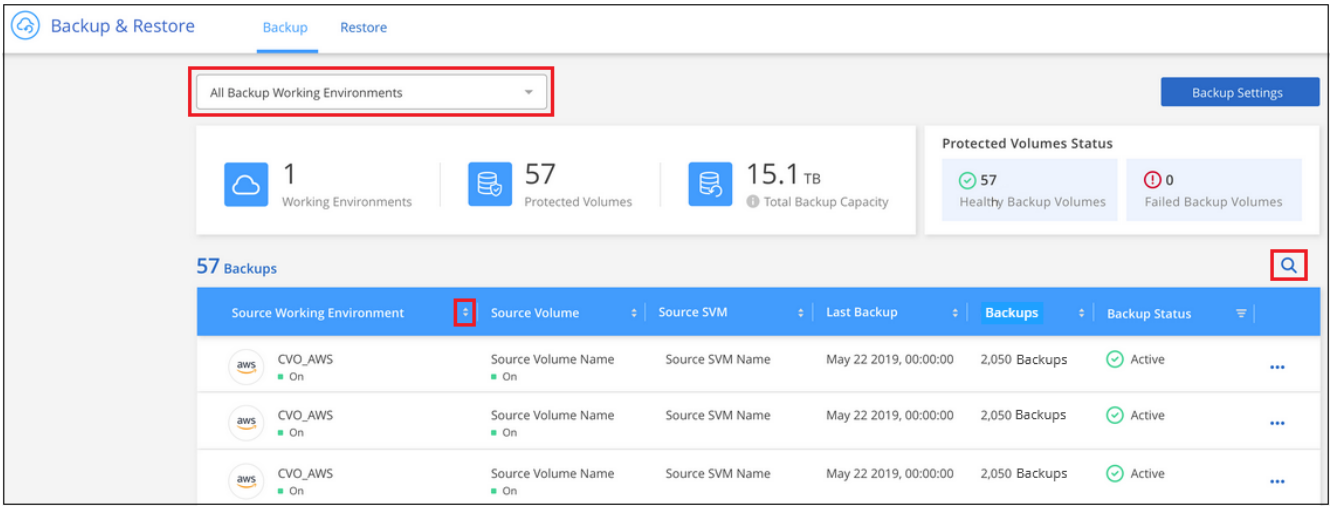
Do not manage or change backup files directly from your cloud provider environment. This may corrupt the files and will result in an unsupported configuration.

Viewing the volumes that are being backed up

You can view a list of all the volumes that are currently being backed up in the Backup Dashboard.

Steps

1. Click the **Backup & Restore** tab.
2. Click the **Backup** tab and the Backup Dashboard is displayed.



If you are looking for specific volumes in certain working environments, you can refine the list by working environment and volume, or you can use the search filter.

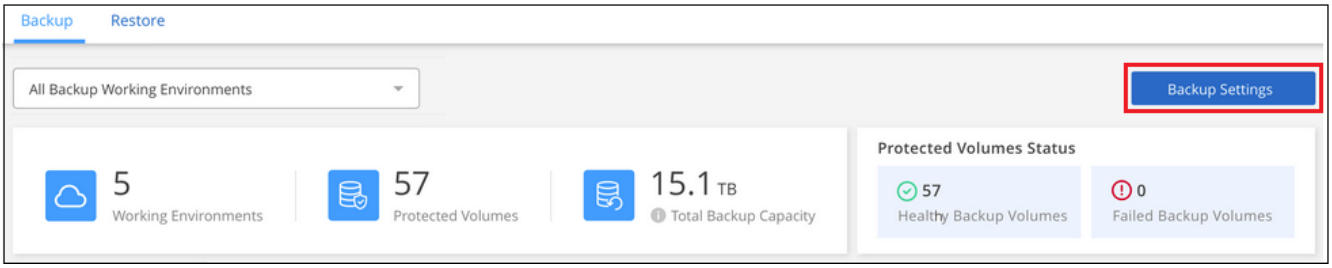
Changing the schedule and backup retention

The default policy backs up volumes every day and retains the most recent 30 backup copies of each volume. You can change to a combination of hourly, daily, weekly, or monthly backups and you can change the number of backup copies to retain. You can also select one of the system-defined policies that provide scheduled backups for 3 months, 1 year, and 7 years.

Changing the backup policy affects both new volumes created after you change the schedule, and any existing volumes that were using the original policy.

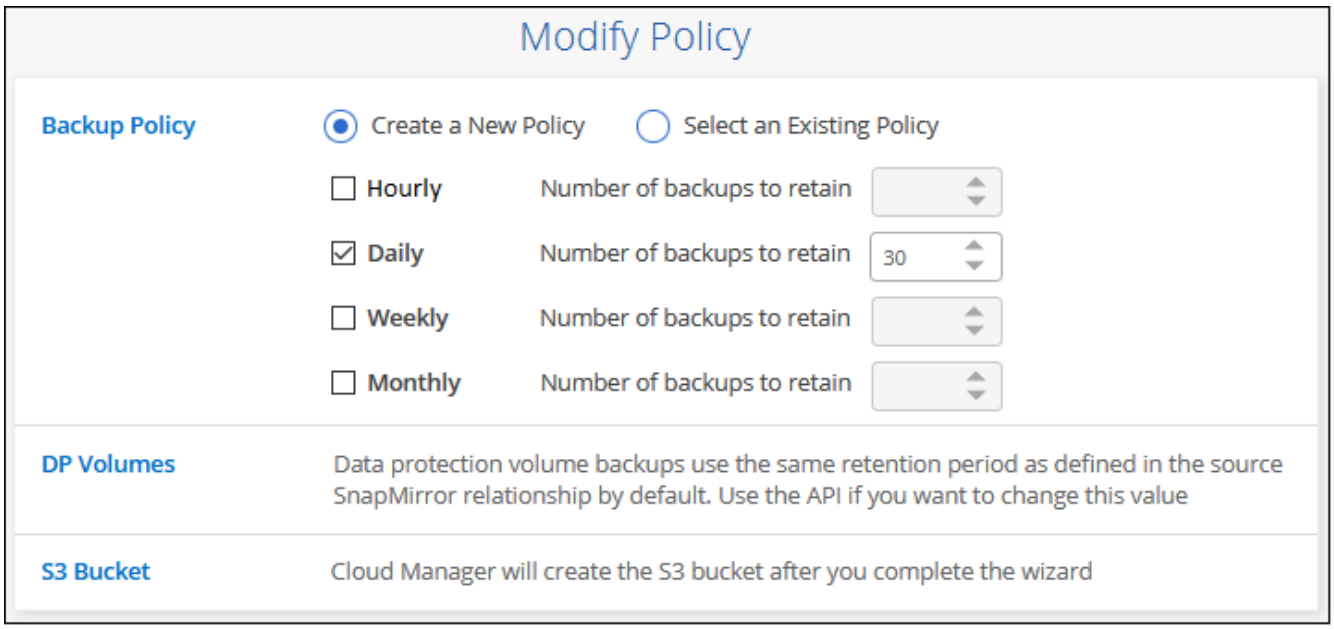
Steps

1. From the Backup Dashboard, select **Backup Settings**.



2. From the *Backup Settings page*, click ••• for the working environment where you want to change the settings and select **Modify Policy**.

3. From the *Modify Policy* page, change the schedule and backup retention and then click **Save**.

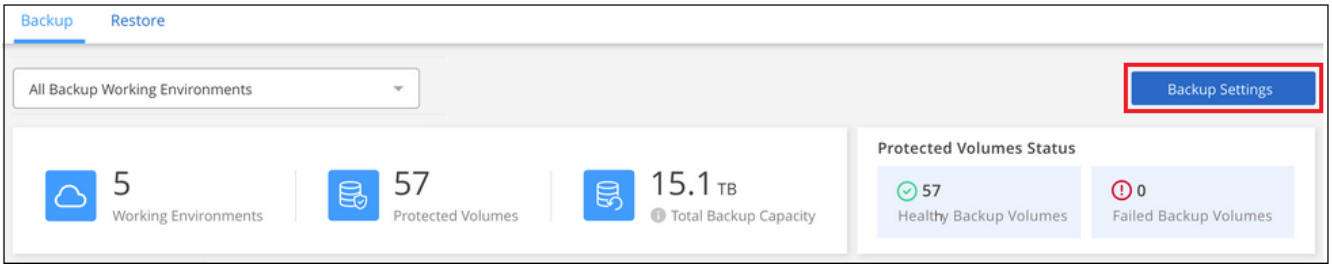


Starting and stopping backups of volumes

You can stop backing up a volume if you do not need backup copies of that volume and you do not want to pay for the cost to store the backups. You can also add a new volume to the backup list if it is not currently being backed up.

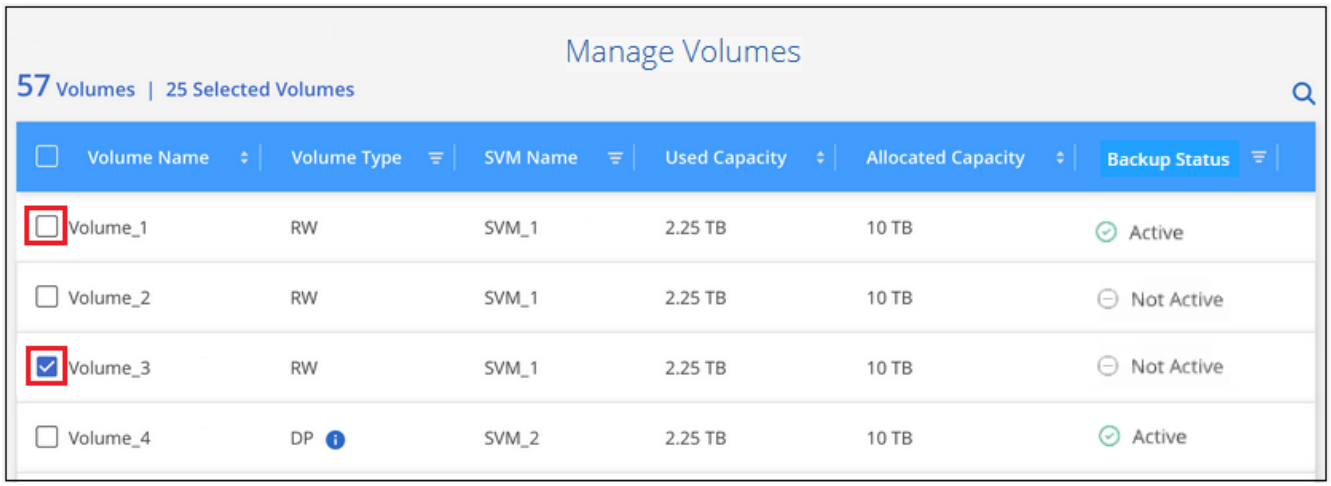
Steps

1. From the Backup Dashboard, select **Backup Settings**.



2. From the *Backup Settings page*, click ••• for the working environment and select **Manage Volumes**.

3. Select the checkbox for volumes that you want to start backing up, and deselect the checkbox for volumes that you want to stop backing up.



4. Click **Save** to commit your changes.

Note: When stopping a volume from being backed up you'll continue to be charged by your cloud provider for object storage costs for the capacity that the backups use unless you delete the backups.

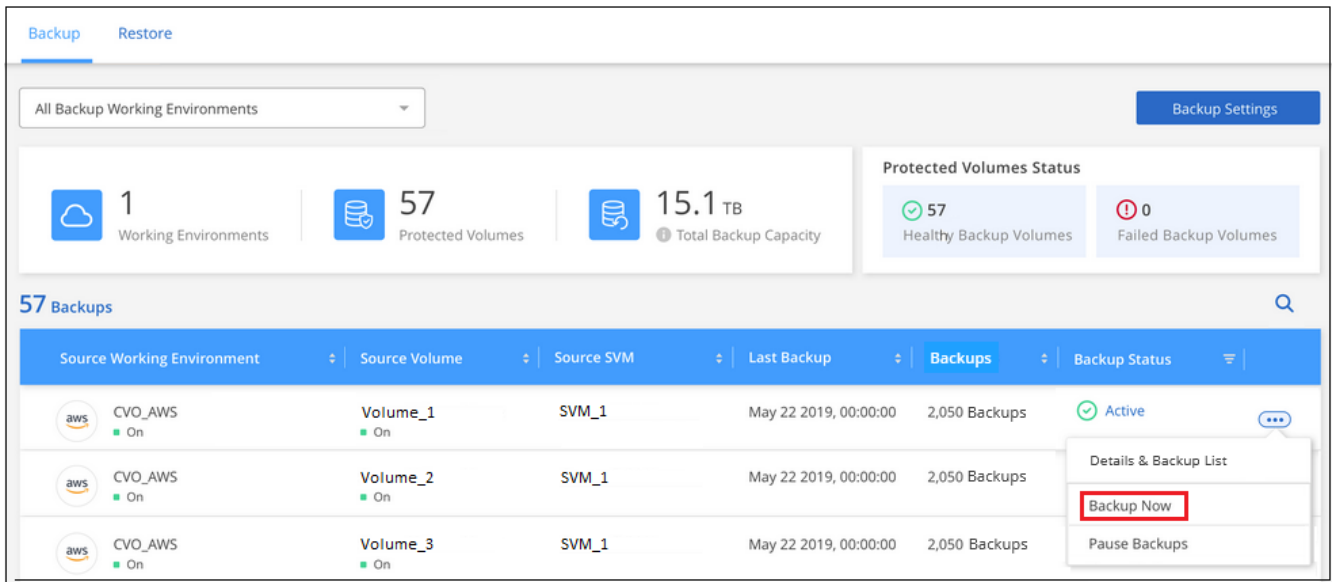
Creating a manual volume backup at any time

You can create an on-demand backup at any time to capture the current state of the volume. This can be useful if very important changes have been made to a volume and you don't want to wait for the next scheduled backup to protect that data, or if the volume is not currently being backed up and you want to capture its current state.

The backup name includes the timestamp so you can identify your on-demand backup from other scheduled backups.

Steps

1. From the Backup Dashboard, click ••• for the volume and select **Backup Now**.



The Backup Status column for that volume displays "In Progress" until the backup is created.

Viewing the list of backups for each volume

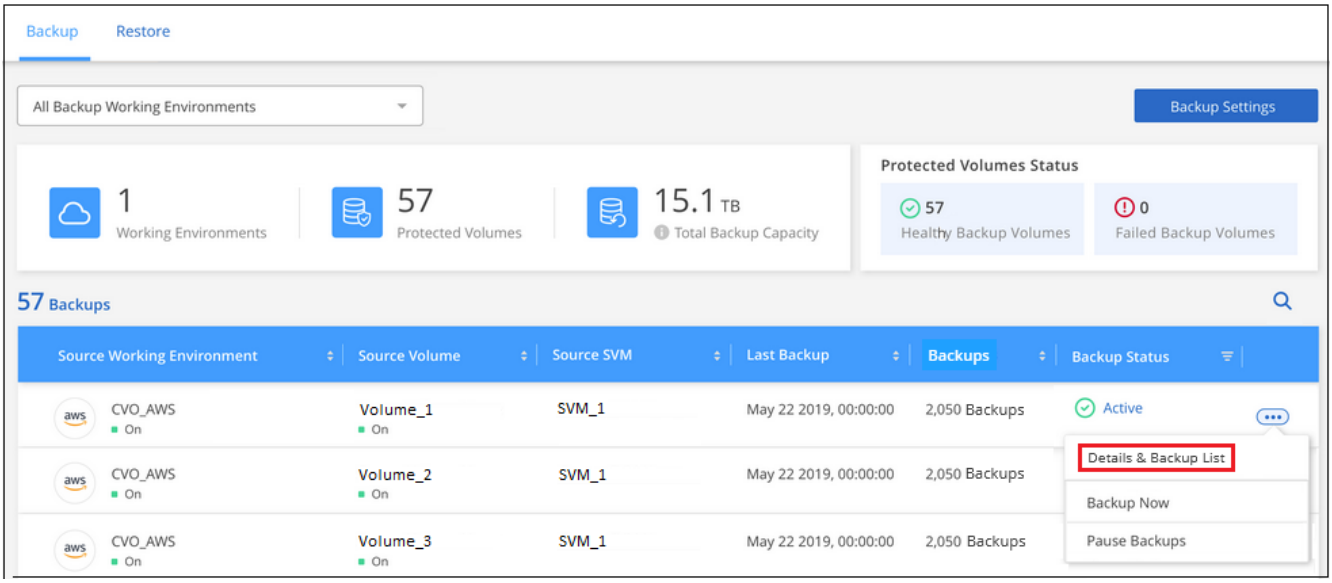
You can view the list of all backup files that exist for each volume. This page displays details about the source volume, destination location, and backup details such as last backup taken, the current backup policy, and more.

This page also enables you perform the following tasks:

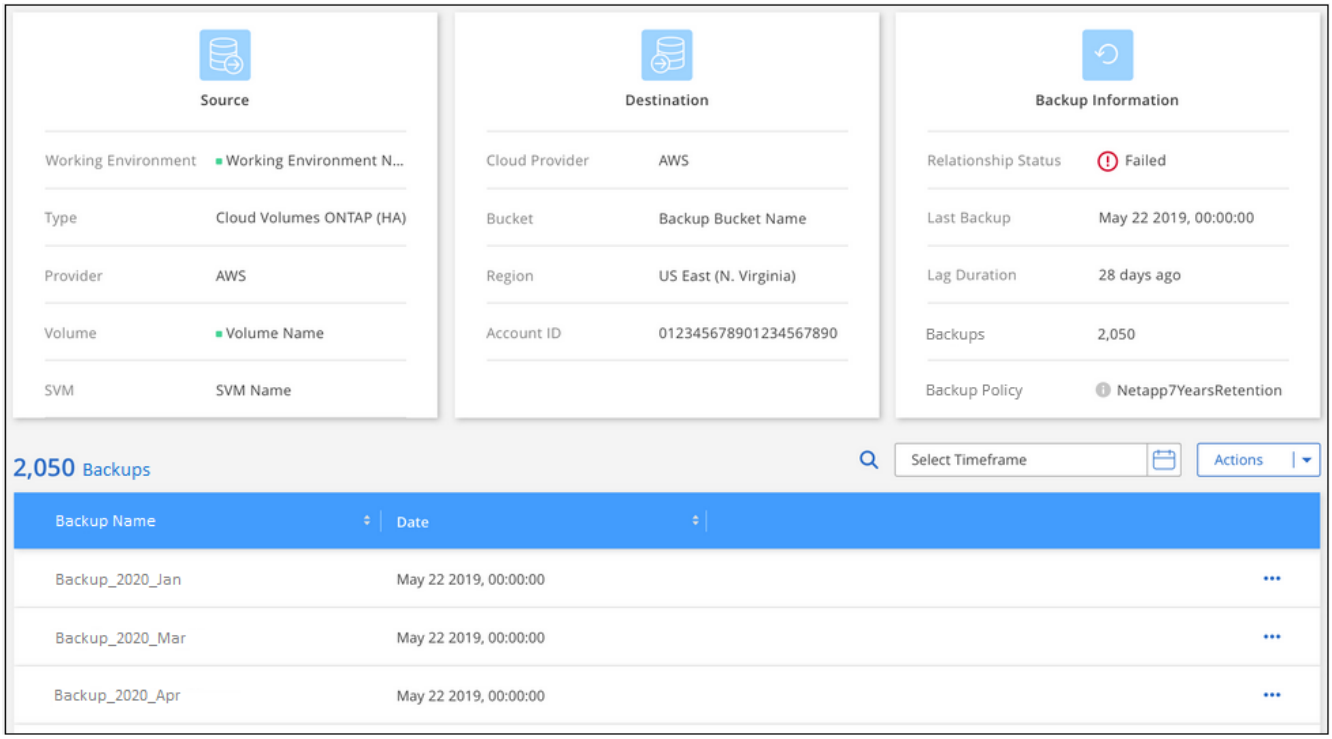
- Delete all backup files for the volume
- Delete individual backup files for the volume
- Download a backup report for the volume

Steps

1. From the Backup Dashboard, click ••• for the source volume and select **Details & Backup List**.



The list of all backup files is displayed along with details about the source volume, destination location, and backup details.



Deleting backups

Cloud Backup enables you to delete a single backup file, delete all backups for a volume, or delete all backups of all volumes in a working environment. You might want to delete all backups if you no longer need the backups or if you deleted the source volume and want to remove all backups.

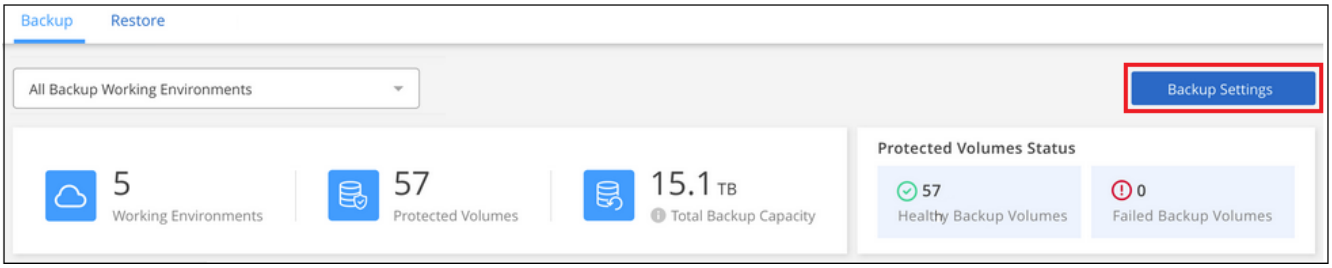
Note that deleting all backups does not disable further backups of this volume or the working environment. If you want to stop creating backups of a volume, you can disable backups as described here. If you want to stop creating backups of all volumes in a working environment, you can deactivate backups as described here.

> If you plan to delete a Cloud Volumes ONTAP or on-premises ONTAP system that has backups, you must delete the backups **before** deleting the system. Cloud Backup doesn't automatically delete backups when you delete a system, and there is no current support in the UI to delete the backups after the system has been deleted. You'll continue to be charged for object storage costs for any remaining backups.

Deleting all backup files for a working environment

Steps

1. From the Backup Dashboard, select **Backup Settings**.



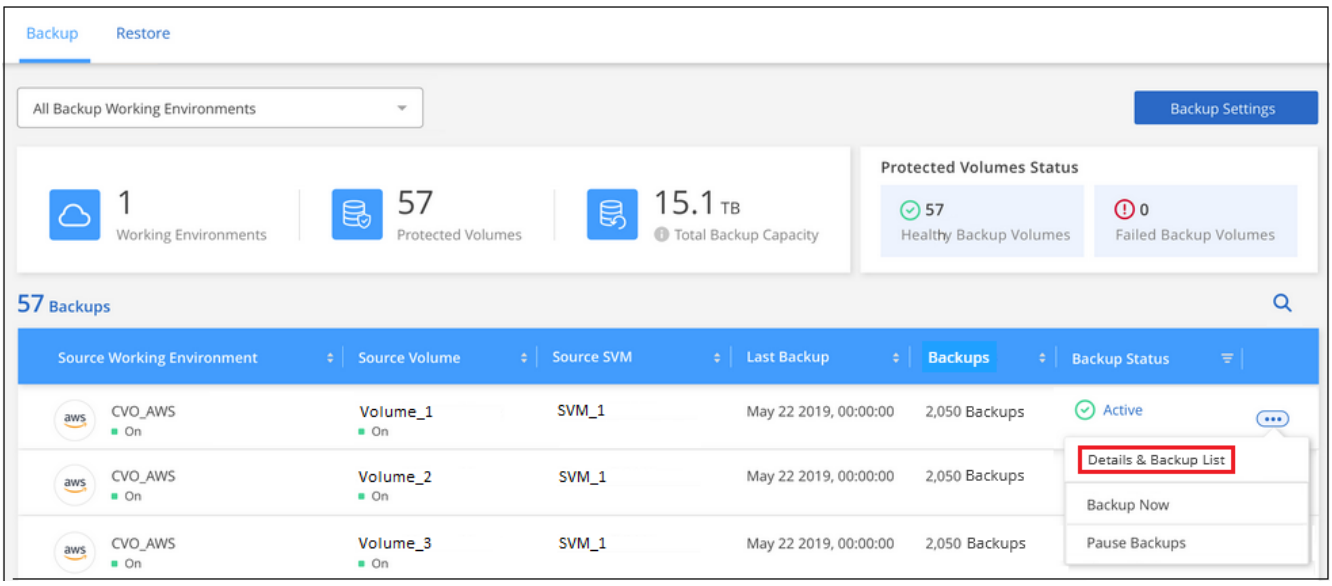
2. Click ••• for the working environment where you want to delete all backups and select **Delete All Backups**.

3. In the confirmation dialog box, click **Delete**.

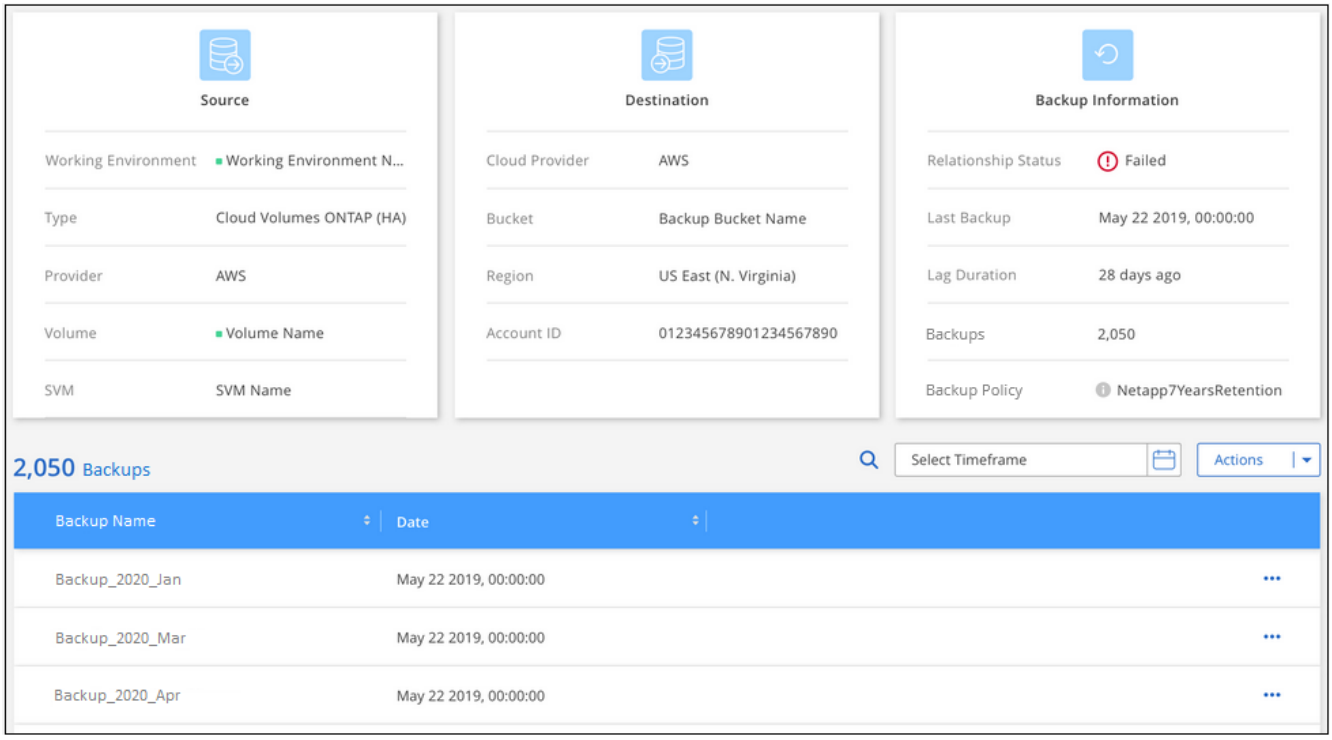
Deleting all backup files for a volume

Steps

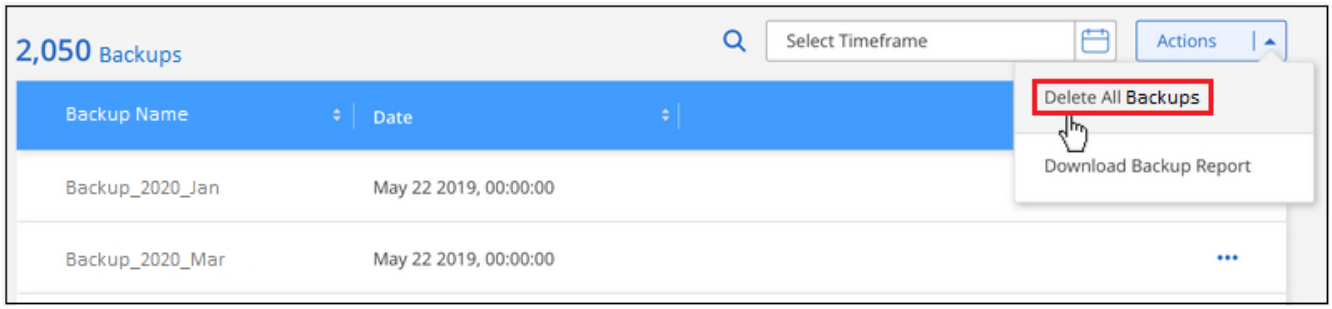
1. From the Backup Dashboard, click ••• for the source volume and select **Details & Backup List**.



The list of all backup files is displayed.



2. Click **Actions** > **Delete all Backups**.



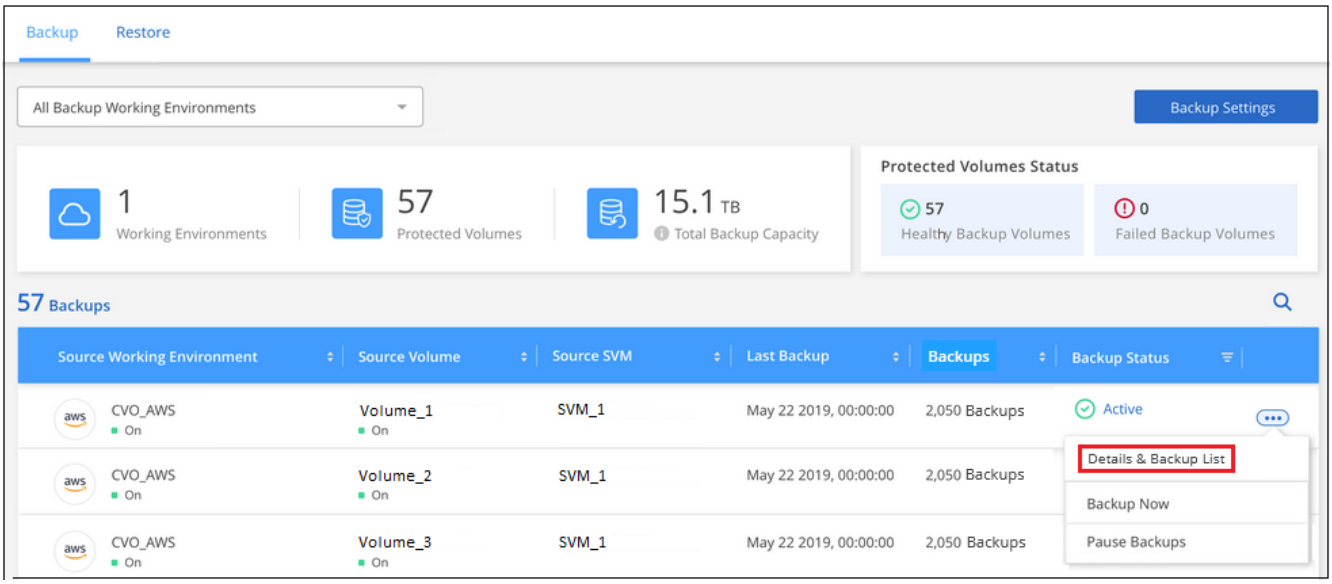
3. In the confirmation dialog box, enter the volume name and click **Delete**.

Deleting a single backup file for a volume

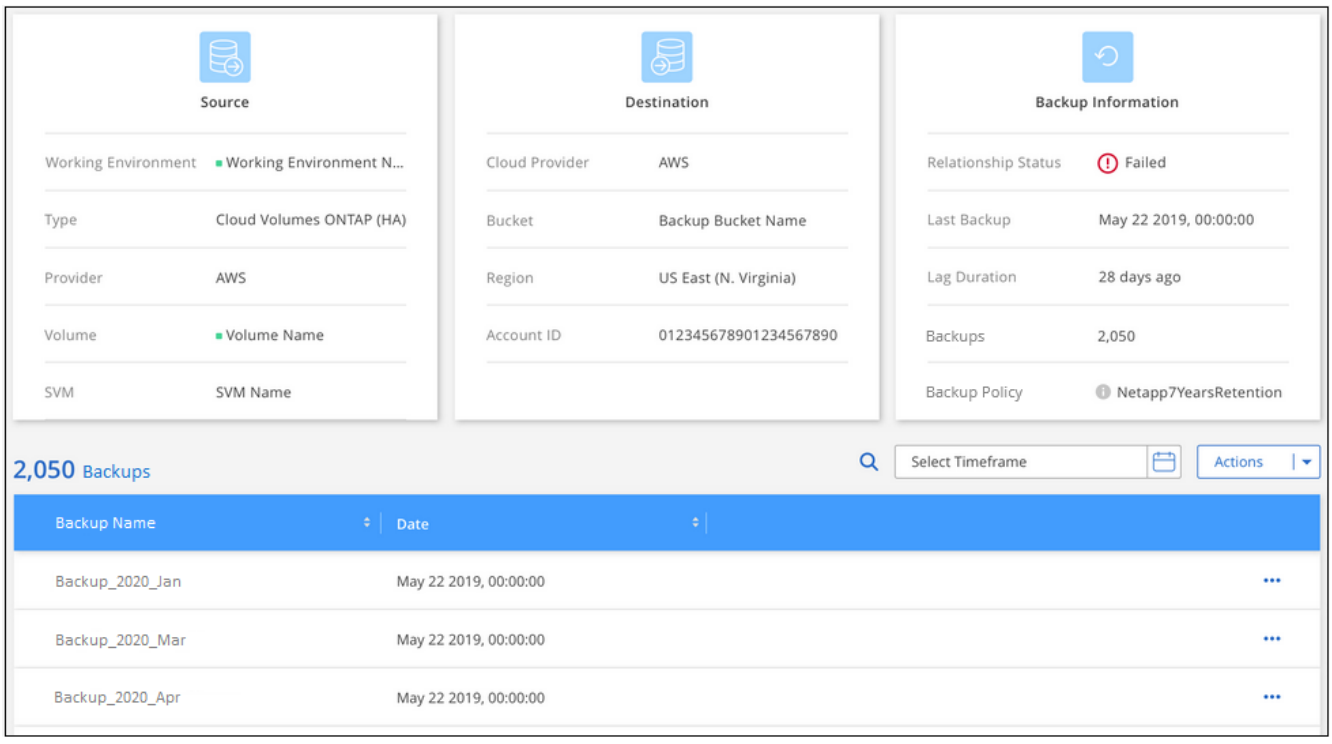
You can delete a single backup file. This feature is available only if the volume backup was created from a system with ONTAP 9.8 or greater.

Steps

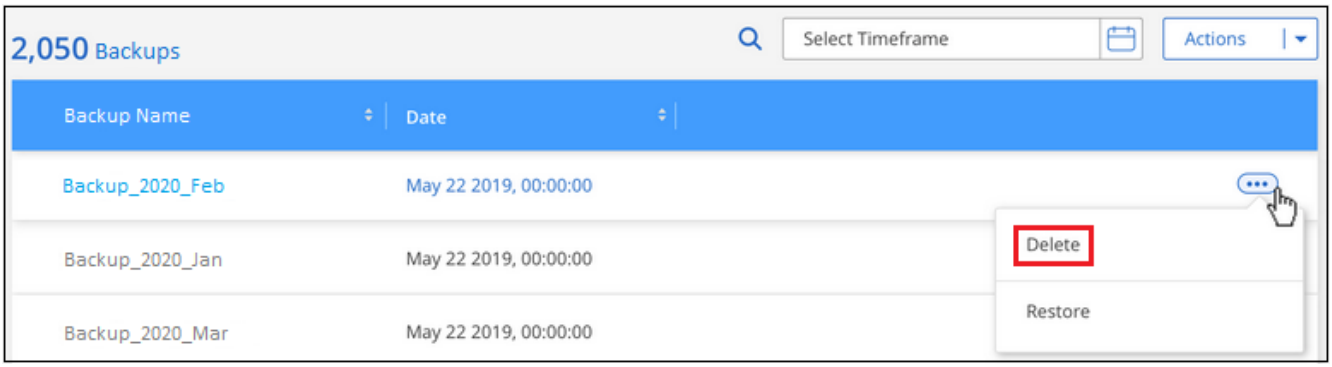
1. From the Backup Dashboard, click ••• for the source volume and select **Details & Backup List**.



The list of all backup files is displayed.



2. Click ••• for the volume backup file you want to delete and click **Delete**.



3. In the confirmation dialog box, click **Delete**.

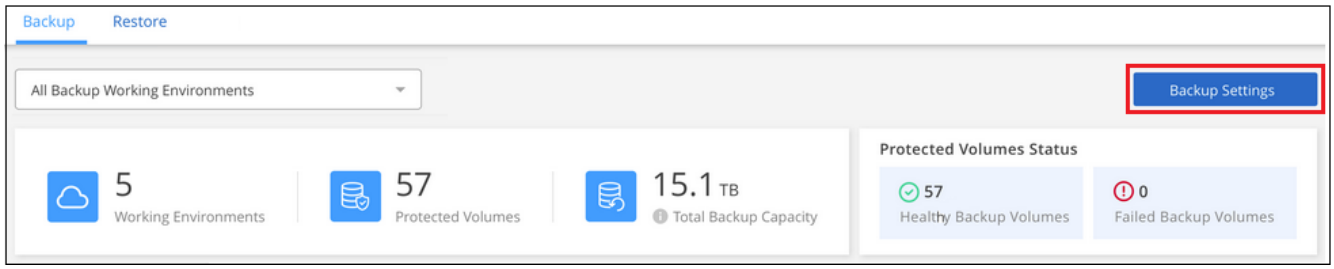
Disabling Cloud Backup for a working environment

Disabling Cloud Backup for a working environment disables backups of each volume on the system, and it also disables the ability to restore a volume. Any existing backups will not be deleted.

Note that you'll continue to be charged by your cloud provider for object storage costs for the capacity that your backups use unless you delete the backups.

Steps

1. From the Backup Dashboard, select **Backup Settings**.



2. From the *Backup Settings page*, click ••• for the working environment where you want to disable backups and select **Deactivate Backup**.

3. In the confirmation dialog box, click **Deactivate**.

The "Deactivate Backup" button changes to "Activate Backup" while backup is disabled on that working environment. You can click **Activate Backup** if you want to enable all backup functionality for that working environment.

Restoring data from backup files

Backups are stored in an object store in your cloud account so that you can restore data from a specific point in time. You can restore an entire volume from a saved backup file, or if you only need to restore a few files, you can restore individual files from a saved backup file.

You can restore an entire volume to the same working environment, to a different working environment that's using the same cloud account, or to an on-premises ONTAP system. See Restoring a volume from a backup.

You can restore files to a volume in the same working environment, to a volume in a different working

environment that's using the same cloud account, or to a volume on an on-premises ONTAP system. See Restoring files from a backup.

Supported working environments and object storage providers

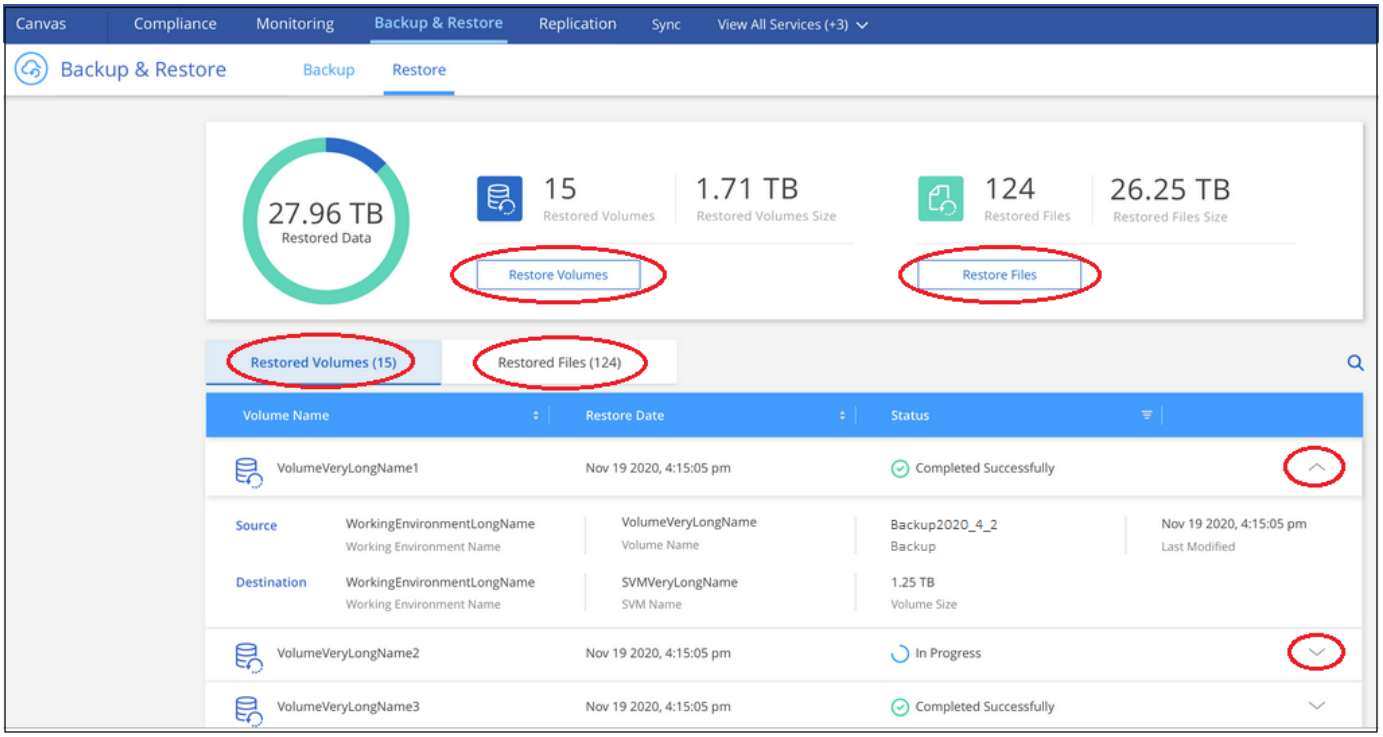
You can restore a volume, or individual files, from a backup file to the following working environments:

Backup File Location	Destination Working Environment	
	Volume Restore	**File Restore**
Amazon S3	Cloud Volumes ONTAP in AWS On-premises ONTAP system	Cloud Volumes ONTAP in AWS On-premises ONTAP system
Azure Blob	Cloud Volumes ONTAP in Azure On-premises ONTAP system	Cloud Volumes ONTAP in Azure On-premises ONTAP system
Google Cloud Storage	Cloud Volumes ONTAP in Google On-premises ONTAP system	
NetApp StorageGRID	On-premises ONTAP system	

The Restore Dashboard

You access the Restore Dashboard by clicking the **Backup & Restore** tab from the top of Cloud Manager, or you can click > **View Restore Dashboard** from the Backup & Restore service from the Services panel.

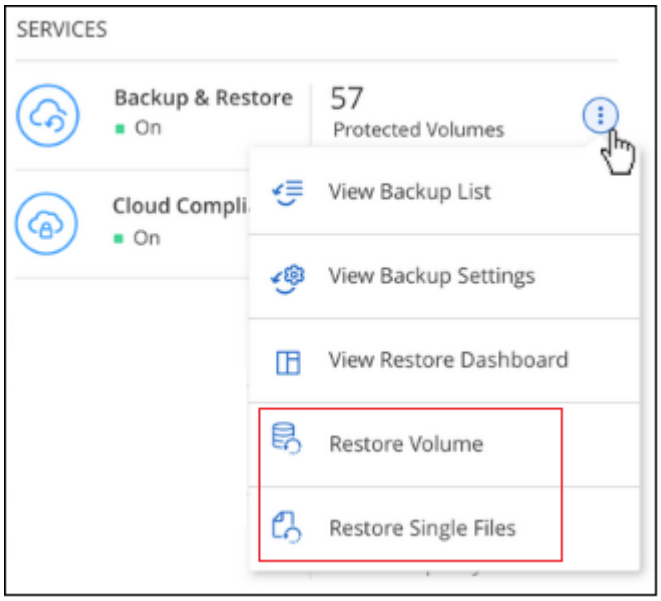
The Cloud Backup service must already be activated for at least one working environment.



The Restore Dashboard provides buttons for you to restore volumes and files. Clicking the *Restore Volumes* or *Restore Files* buttons starts a wizard that walks you through the steps to restore that data.

The dashboard also provides a list of all the volumes and all the files you have restored in case you need a history of previous restore actions. You can expand the row for each restored volume or file to view the details about the source and destination locations for the volume or file.

Note that you can also initiate a volume or file restore operation from a working environment in the Services panel. When started from this location the source working environment selection is automatically filled with the name of the current working environment.



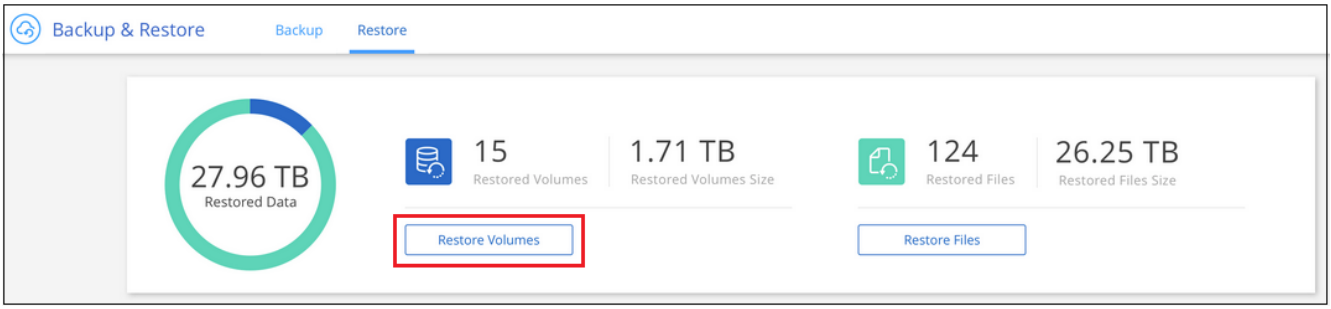
Restoring a volume from a backup file

When you restore a volume from a backup file, Cloud Manager creates a *new* volume using the data from the backup. You can restore the data to a volume in the same working environment or to a different working environment that's located in the same cloud account as the source working environment. You can also restore files to an on-premises ONTAP system.

You should know the name of the volume you want to restore and the date of the backup file you want to use to create the newly restored volume.

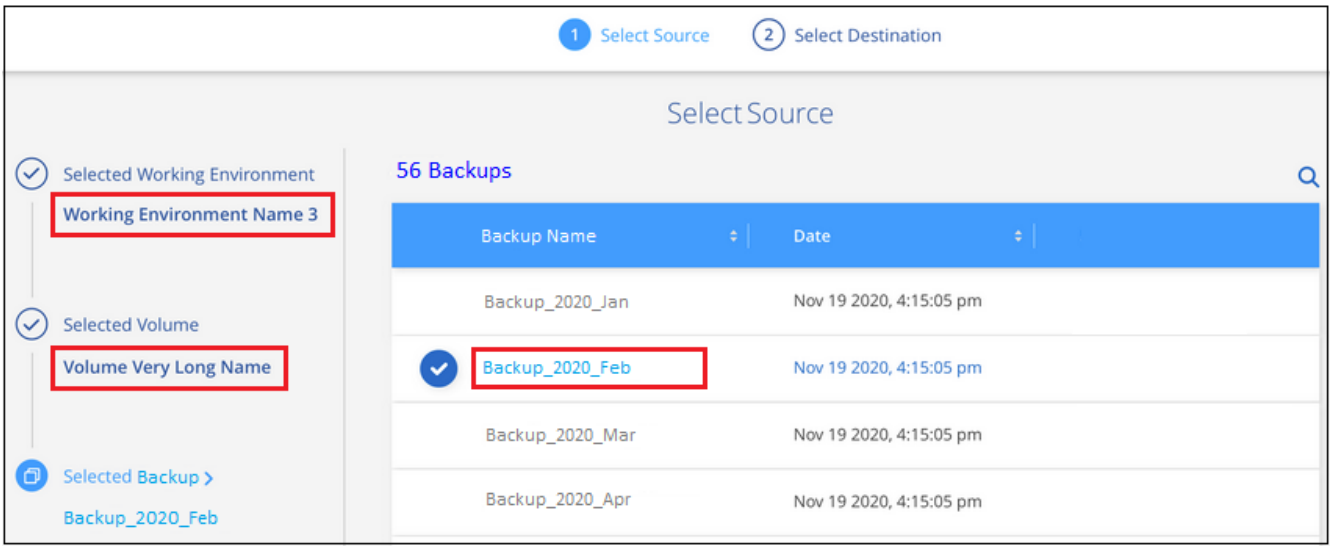
Steps

1. Select the **Backup & Restore** tab.
2. Click the **Restore** tab and the Restore Dashboard is displayed.
3. Click **Restore Volumes**.

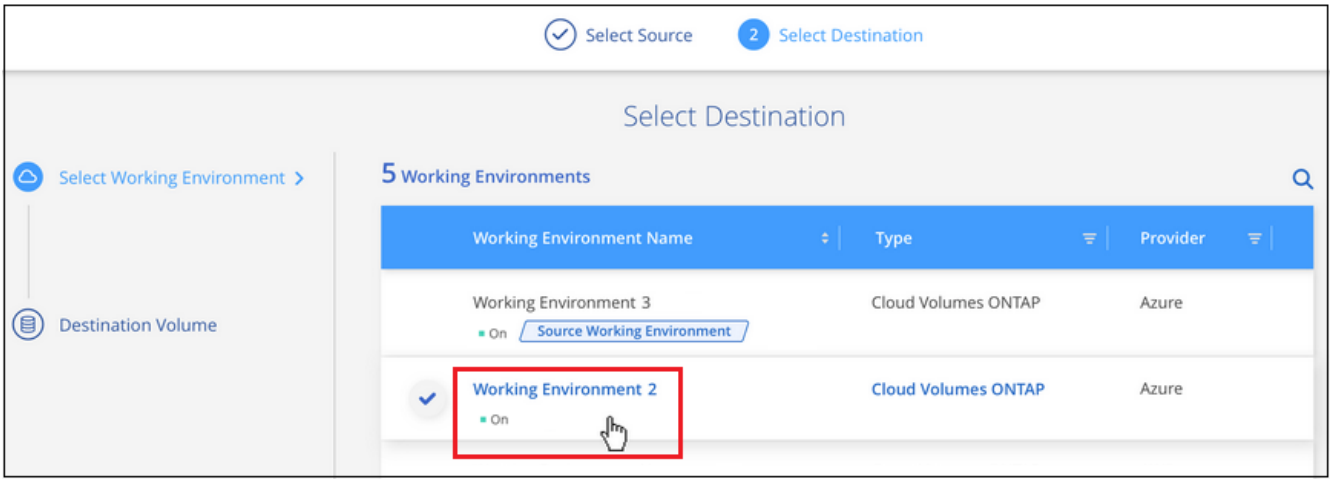


4. In the *Select Source* page, navigate to the backup file for the volume you want to restore. Select the **Working Environment**, the **Volume**, and the **Backup** that has the date/time stamp that you want to

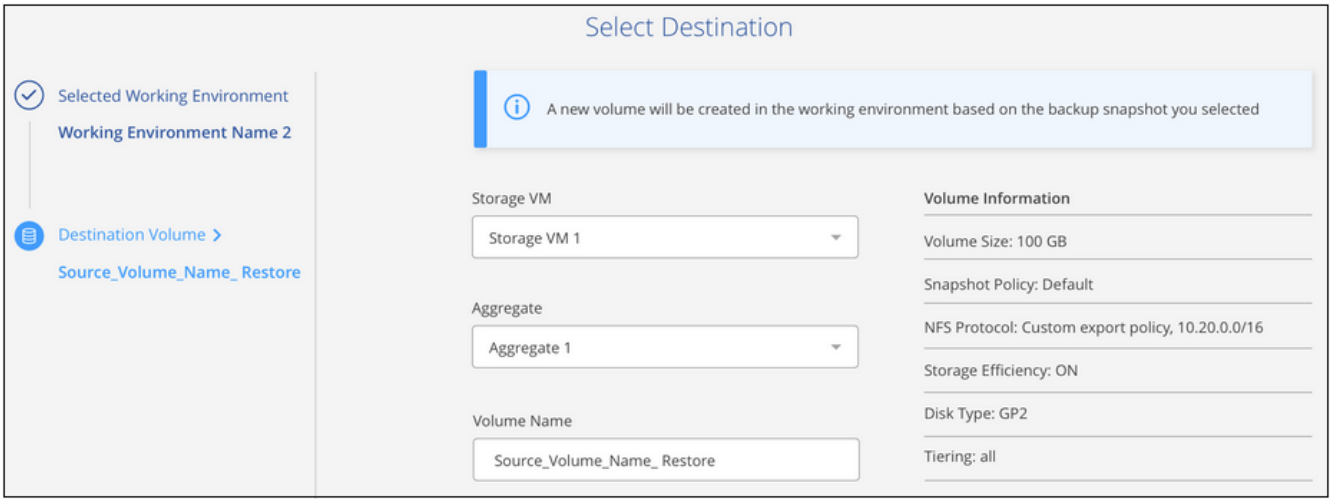
restore.



5. Click **Continue**.
6. In the *Select Destination* page, select the **Working Environment** where you want to restore the volume.



7. If you select an on-premises ONTAP system and you haven't already configured the cluster connection to the object storage, you are prompted for additional information:
   - When restoring from Amazon S3, select the AWS Account and the Access Key and Secret Key to access the object storage, the region where the backups are stored, and the IPspace in the ONTAP cluster where the destination volumes reside.
   - When restoring from Azure Blob, select the Azure Subscription to access the object storage, the region where the backups are stored, and the IPspace in the ONTAP cluster where the destination volumes reside.
   - When restoring from Google Cloud Storage, select the Google Cloud Project and the Access Key and Secret Key to access the object storage, the region where the backups are stored, and the IPspace in the ONTAP cluster where the destination volumes reside.
   - When restoring from StorageGRID, select the Access Key and Secret Key needed to access the object storage, and the IPspace in the ONTAP cluster where the destination volumes reside.
8. Select the Storage VM where the volume will reside and enter the name you want to use for the restored volume. By default, **<source_volume_name>_Restore** is used as the volume name.



You can select the Aggregate that the volume will use for its' capacity only when restoring a volume to an on-premises ONTAP system.

9. Click **Restore** and you are returned to the Restore Dashboard so you can review the progress of the restore operation.

Result

Cloud Manager creates a new volume based on the backup you selected. You can manage this new volume as required.

Restoring files from a backup

If you only need to restore a few files from a volume, you can choose to restore individual files instead of restoring the entire volume. You can restore files to a volume in the same working environment, or to a different working environment that's using the same cloud account. You can also restore files to an on-premises ONTAP system.

All the files are restored to the same destination volume that you choose. If you want to restore files to different volumes, you need run the restore process a second time.

Prerequisites

- The ONTAP version must be 9.6 or greater in your Cloud Volumes ONTAP or on-premises ONTAP systems to perform file restore operations.
- Restoring individual files from a backup file uses a separate Restore instance/virtual machine. See the AWS Requirements or Azure Requirements to make sure your environment is ready.
- Restoring files also requires that specific EC2 permissions are added to the user role that provides Cloud Manager with permissions. Make sure all the permissions are configured correctly.
- AWS cross-account restore requires manual action in the cloud provider console. See the AWS topic granting cross-account bucket permissions for details.

File Restore process

The process goes like this:

1. When you want to restore one or more files from a volume, click the **Restore** tab, click **Restore Files**, and select the backup file in which the file (or files) reside.

2. The Restore instance starts up and displays the folders and files that exist within the backup file.

   Note: The Restore instance is deployed in your cloud providers' environment the first time you restore a file.

3. Choose the file (or files) that you want to restore from that backup.
4. Select the location where you want the file(s) to be restored (the working environment, volume, and folder), and click **Restore**.
5. The file(s) are restored, and then the Restore instance is shut down to save costs after a period of inactivity.

Restoring files from a backup file

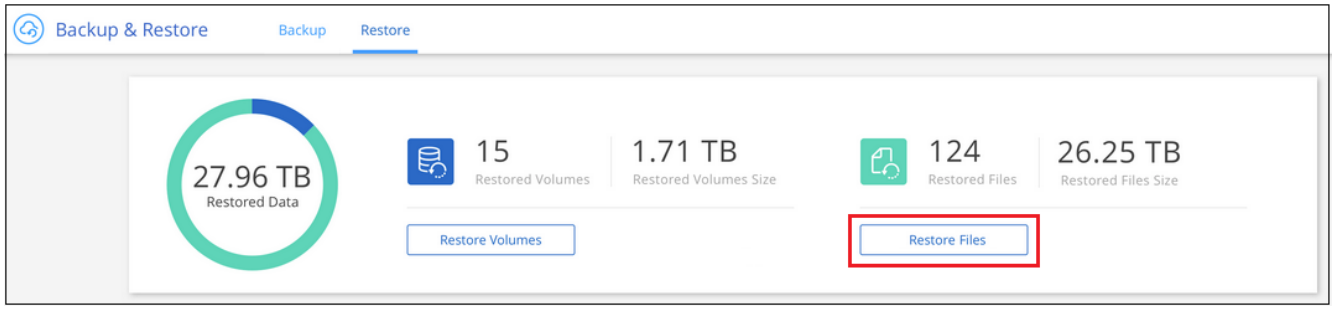
Follow these steps to restore files from a volume backup to a volume. You should know the name of the volume and the date of the backup file that you want to use to restore the file, or files. This functionality uses Live Browsing so that you can view the list of directories and files within the backup file.

The following video shows a quick walkthrough of restoring a single file:

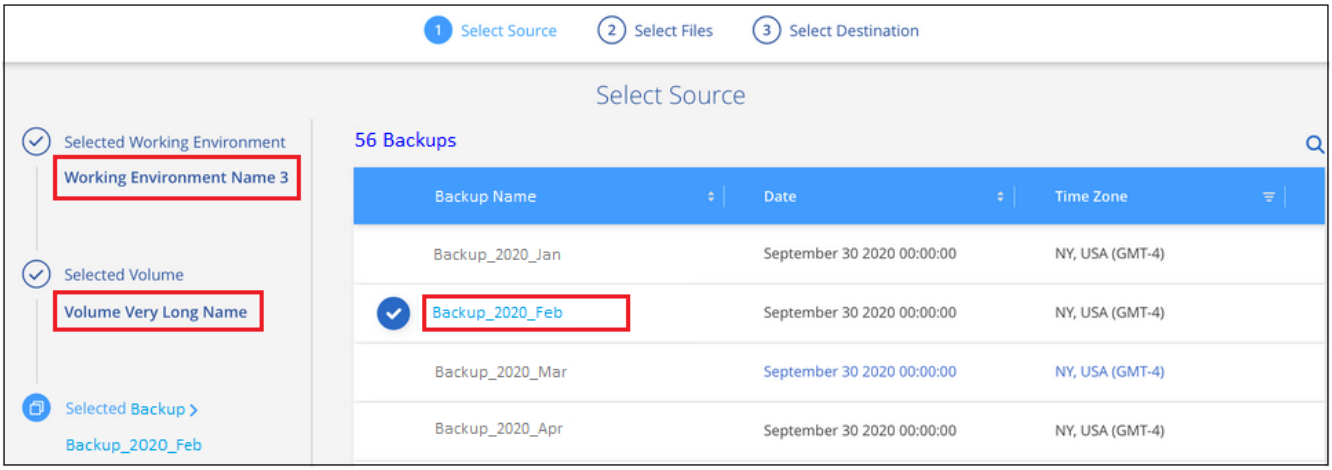
[] | *https://img.youtube.com/vi/ROAY6gPL9N0/maxresdefault.jpg*

Steps

1. Select the **Backup & Restore** tab.
2. Click the **Restore** tab and the Restore Dashboard is displayed.
3. Click the **Restore Files** button.

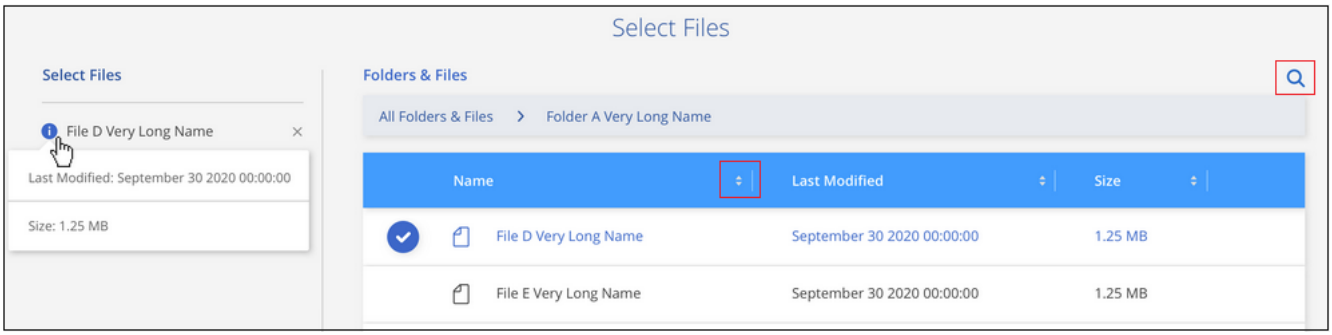


4. In the *Select Source* page, navigate to the backup file for the volume that contains the files you want to restore. Select the **Working Environment**, the **Volume**, and the **Backup** that has the date/time stamp from which you want to restore files.



5. Click **Continue** and the Restore instance is started. After a few minutes the Restore instance displays the list of folders and files from the volume backup.

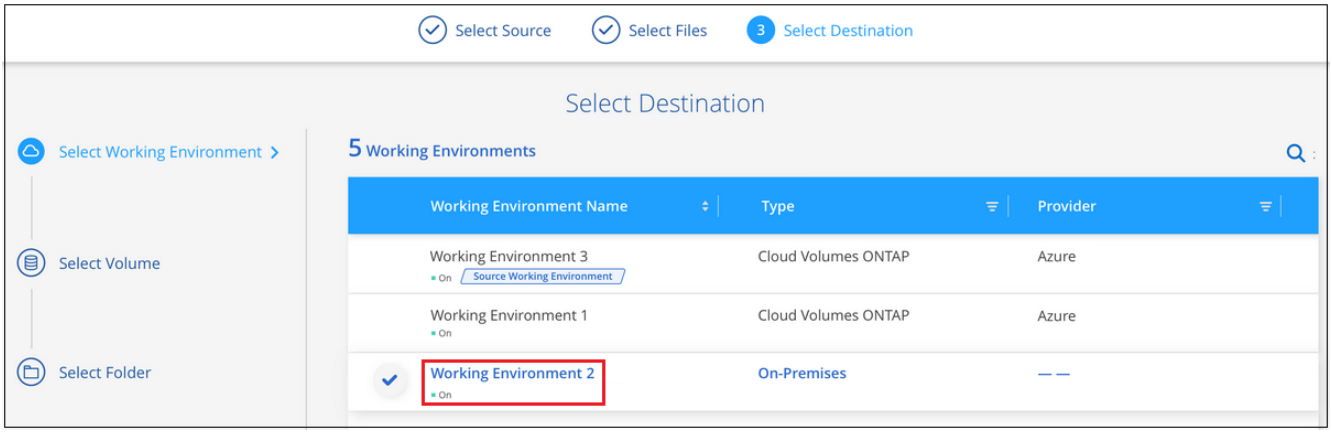
   Note: The Restore instance is deployed in your cloud providers' environment the first time you restore a file, so this step could take a few minutes longer the first time.



6. In the *Select Files* page, select the file or files that you want to restore and click **Continue**.
   - You can click the search icon and enter the name of the file to navigate directly to the file.
   - You can click the file name if you see it.
   - You can navigate down levels in folders using the › button at the end of the row to find the file.

     As you select files they are added to the left side of the page so you can see the files that you have already chosen. You can remove a file from this list if needed by clicking the **x** next to the file name.

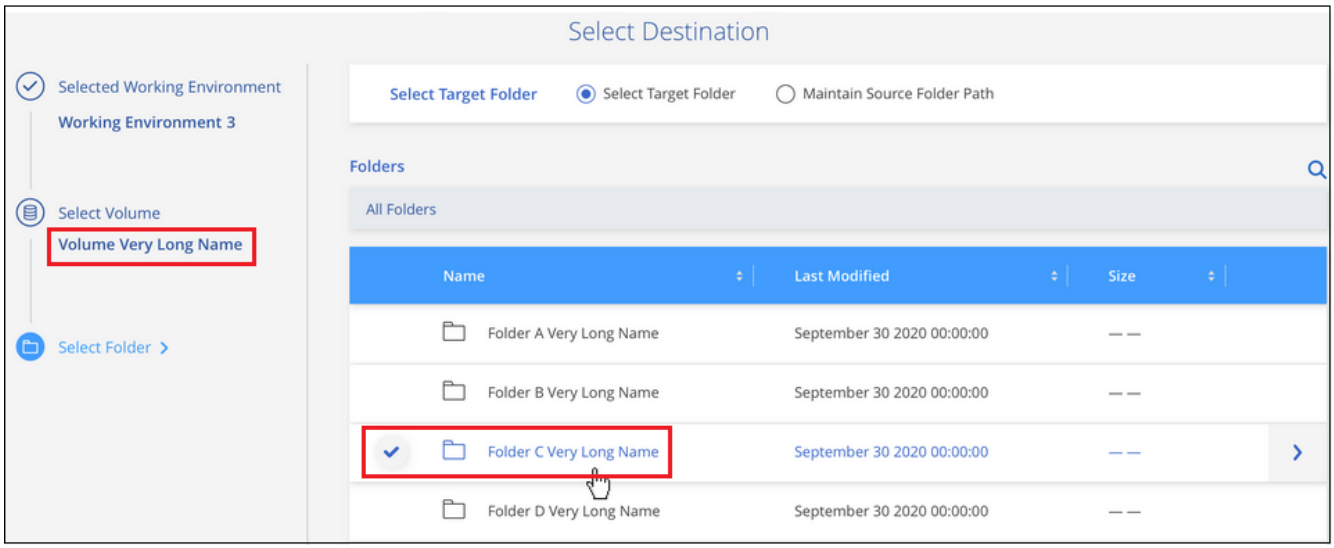
7. In the *Select Destination* page, select the **Working Environment** where you want to restore the files.



If you select an on-premises cluster and you haven't already configured the cluster connection to the object storage, you are prompted for additional information:

- When restoring from Amazon S3, enter the IPspace in the ONTAP cluster where the destination volumes reside, and the AWS Access Key and Secret Key needed to access the object storage.
- When restoring from Azure Blob, enter the IPspace in the ONTAP cluster where the destination volumes reside.

8. Then select the **Volume** and the **Folder** where you want to restore the files.



You have a few options for the location when restoring files.

- When you have chosen **Select Target Folder**, as shown above:
  - You can select any folder.
  - You can hover over a folder and click ❯ at the end of the row to drill down into subfolders, and then select a folder.
- If you have selected the same destination Working Environment and Volume as where the source file was located, you can select **Maintain Source Folder Path** to restore the file, or all files, to the same folder where they existed in the source structure. All the same folders and sub-folders must already exist; folders are not created.

9. Click **Restore** and you are returned to the Restore Dashboard so you can review the progress of the restore operation.

The Restore instance is shut down after a certain period of inactivity to save you money so that you incur costs only when it is active.

Cross-account and cross-region configurations

These topics describe how to configure Cloud Backup for cross account configurations when using different cloud providers.

- Configure Cloud Backup for multi-account access in AWS
- Configure Cloud Backup for multi-account access in Azure

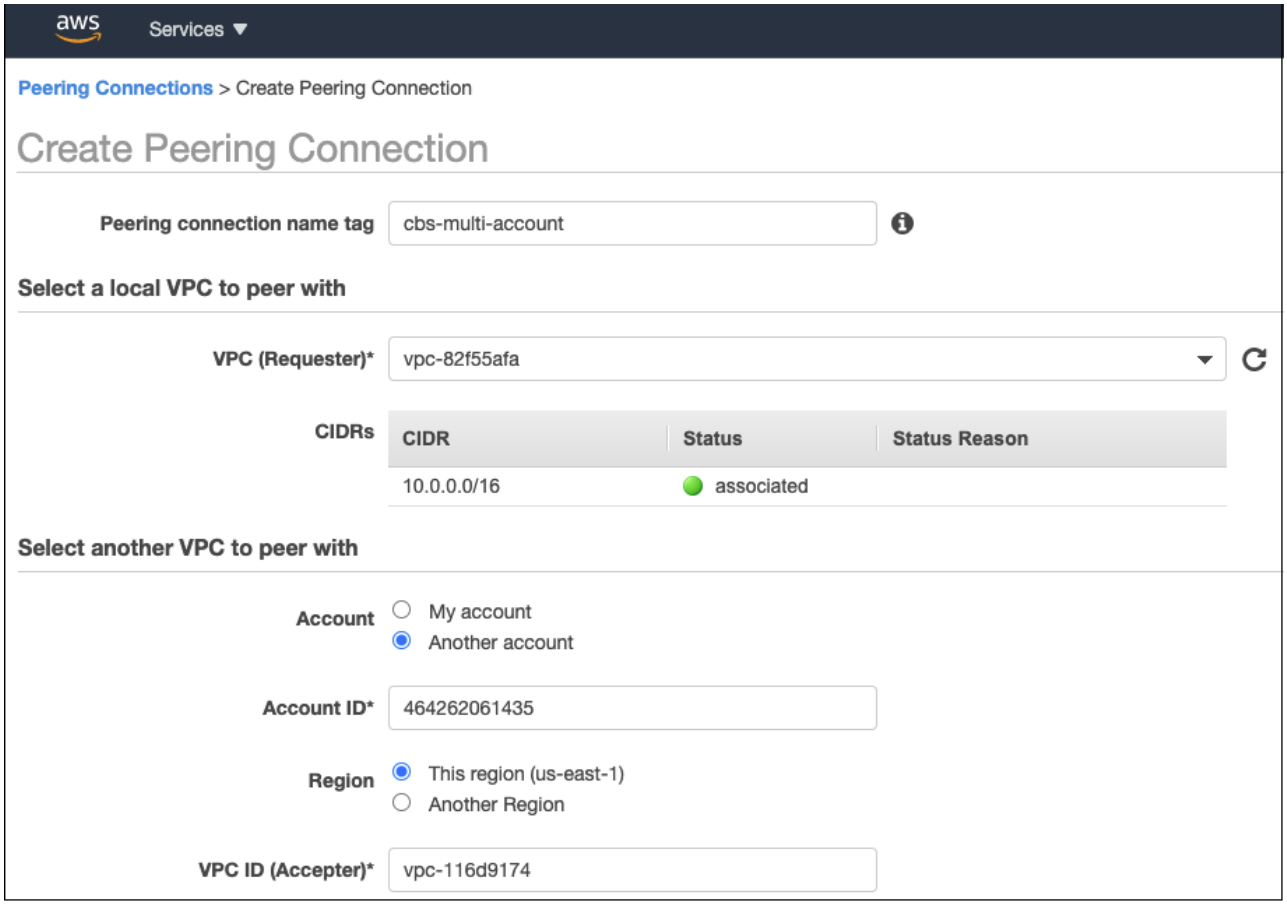
Configure backup for multi-account access in AWS

Cloud Backup enables you to create backup files in an AWS account that is different than where your source volumes reside. And both of those accounts can be different than the account where the Cloud Manager Connector resides.

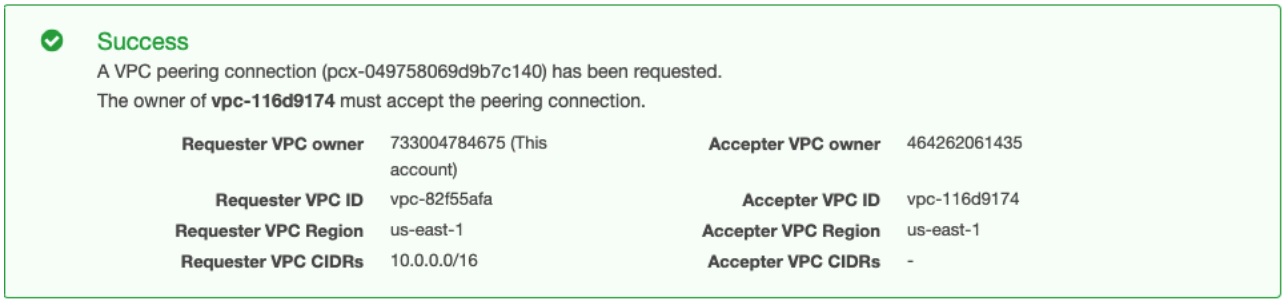
Just follow the steps below to set up your configuration in this manner.

Set up VPC peering between accounts

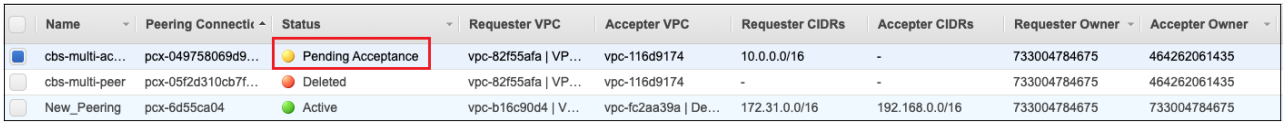
1. Log in to second account and Create Peering Connection:
   a. Select a local VPC: Select the VPC of the second account.
   b. Select another VPC: Enter the account ID of the first account.
   c. Select the Region where the Cloud Manager Connector is running. In this test setup both accounts are running in same region.
   d. VPC ID: Log into first account and enter the acceptor VPC ID. This is the VPC ID of the Cloud Manager Connector.



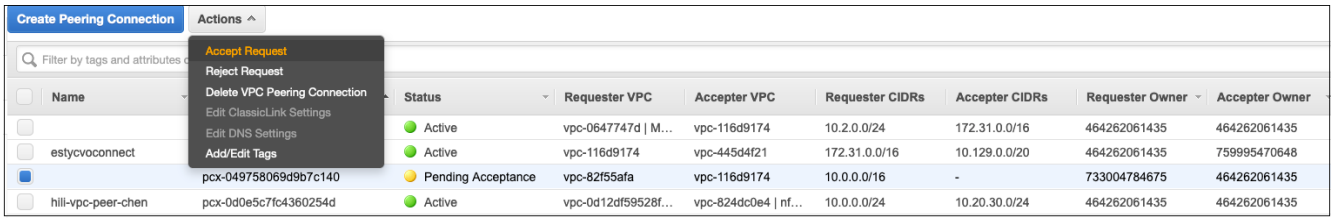
   A Success dialog displays.



The status of the peering connection shows as Pending Acceptance.



2. Log into the first account and accept the peering request:



a. Click **Yes**.

The connection now shows as Active. We have also added a Name tag to identify the peering connection called `cbs-multi-account`.

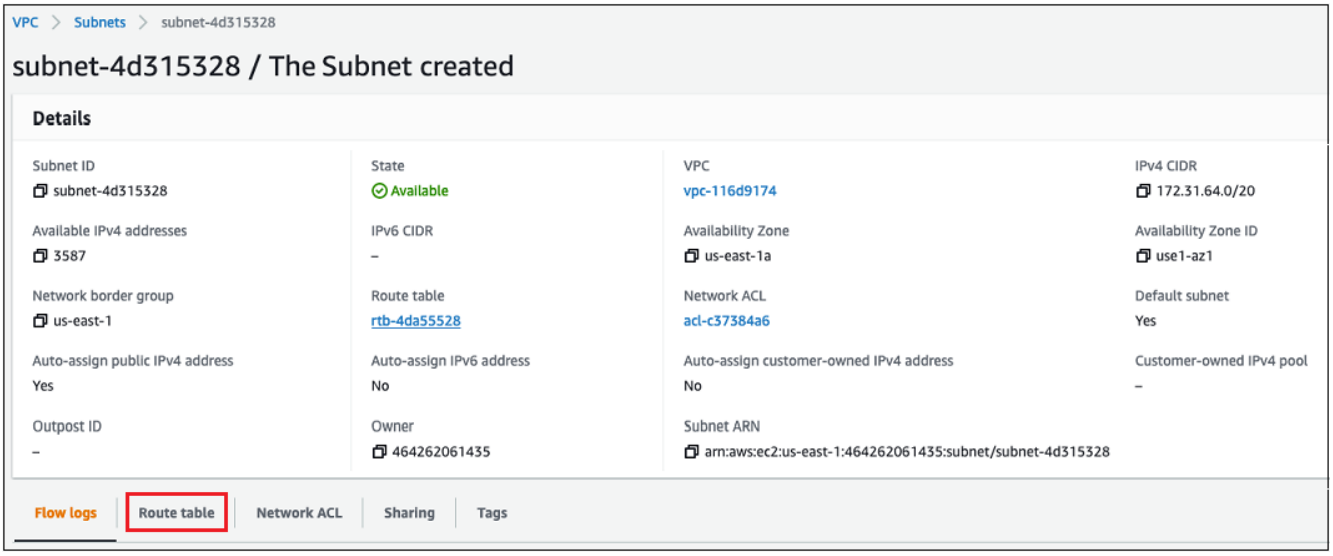
Name	Peering Connection	Status	Requester VPC	Accepter VPC	Requester CIDRs	Accepter CIDRs	Requester Owner	Accepter Owner
	pcx-004715531514cb0d8	Active	vpc-0647747d | M…	vpc-116d9174	10.2.0.0/24	172.31.0.0/16	464262061435	464262061435
estycvoconnect	pcx-0305041f9cc2dfbdb	Active	vpc-116d9174	vpc-445d4f21	172.31.0.0/16	10.129.0.0/20	464262061435	759995470648
cbs-multi-account	pcx-049758069d9b7c140	Active	vpc-82f55afa	vpc-116d9174	10.0.0.0/16	172.31.0.0/16	733004784675	464262061435
hill-vpc-peer-chen	pcx-0d0e5c7fc4360254d	Active	vpc-0d12df59528f…	vpc-824dc0e4 | nf…	10.0.0.0/24	10.20.30.0/24	464262061435	464262061435

b. Refresh the peering connection in the second account and notice that the status changes to Active.

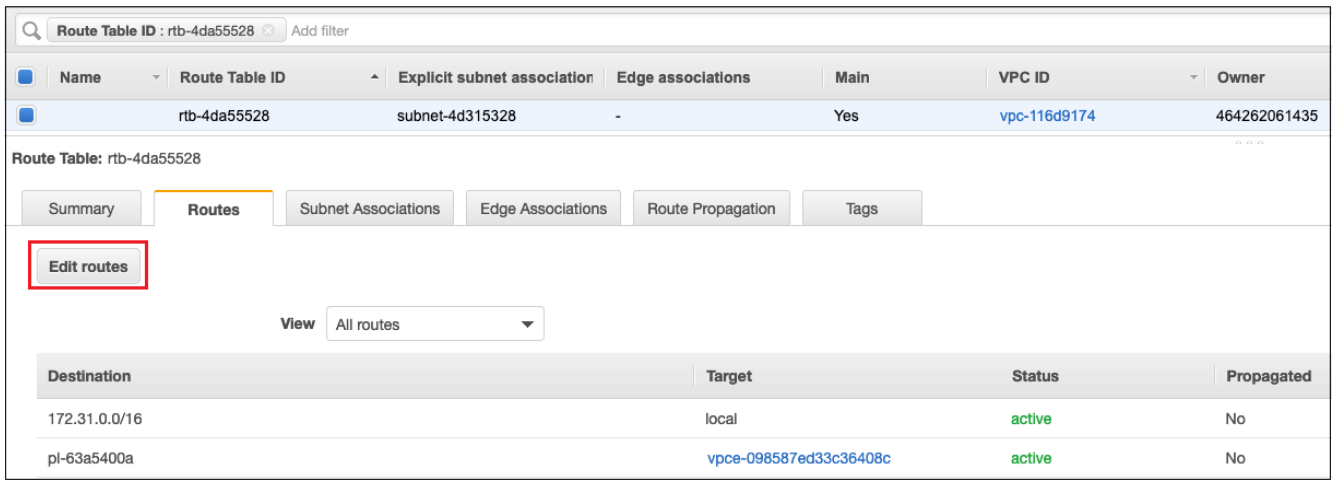
Name	Peering Connection	Status	Requester VPC	Accepter VPC	Requester CIDRs	Accepter CIDRs	Requester Owner	Accepter Owner
cbs-multi-account	pcx-049758069d9b7c140	Active	vpc-82f55afa | VP…	vpc-116d9174	10.0.0.0/16	172.31.0.0/16	733004784675	464262061435
New_Peering	pcx-6d55ca04	Active	vpc-b16c90d4 | V…	vpc-fc2aa39a | De…	172.31.0.0/16	192.168.0.0/16	733004784675	733004784675

Add a route to the route tables in both accounts

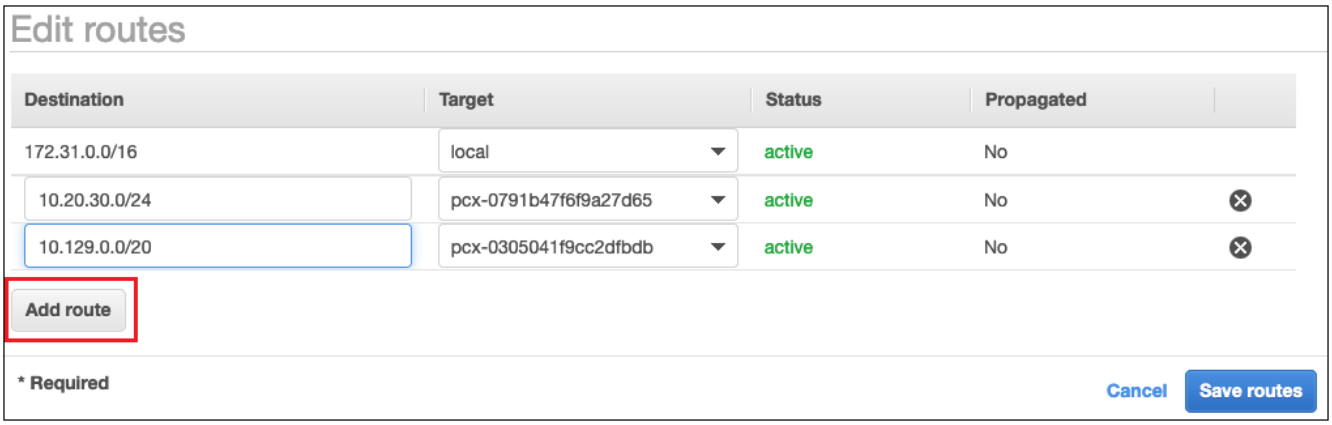
1. Go to VPC > Subnet > Route table.



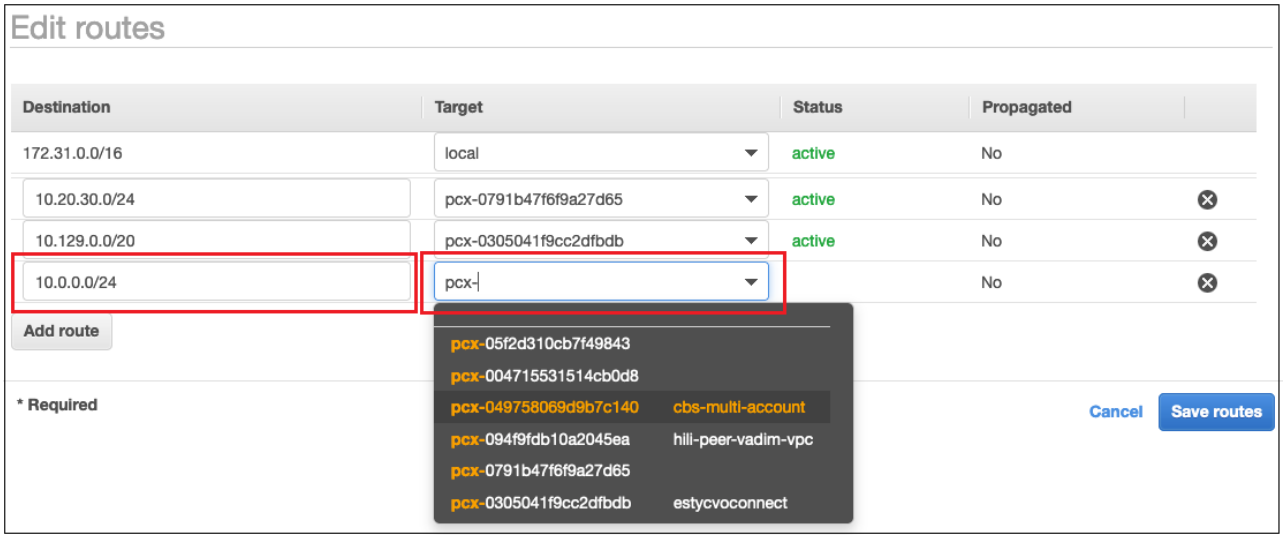
2. Click on the Routes tab.



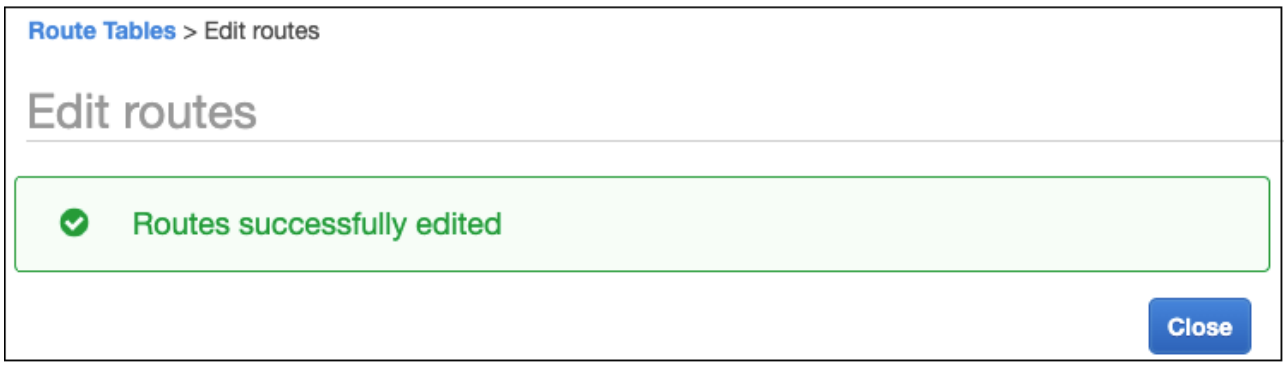
3. Click **Edit routes**.



4. Click **Add route**, and from the Target drop-down list select **Peering Connection**, and then select the peering connection that you created.
   a. In the Destination, enter the other account's subnet CIDR.

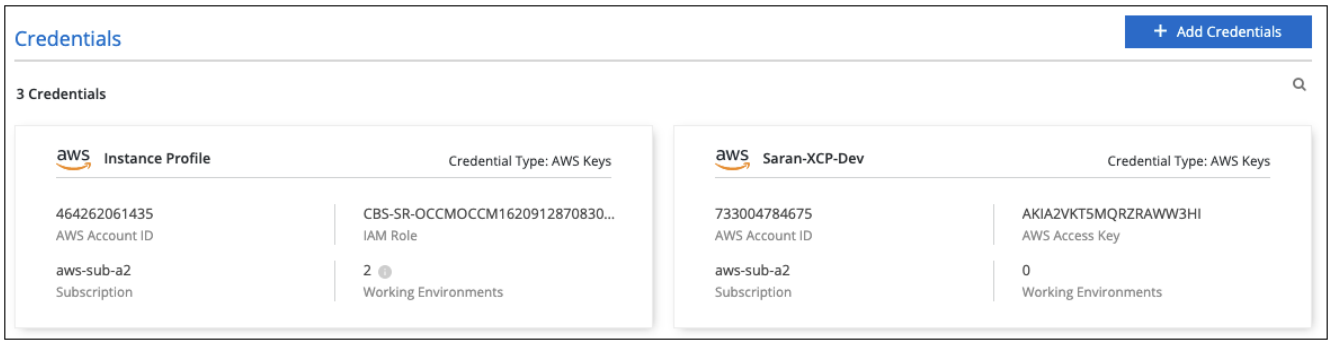


   b. Click **Save routes** and a Success dialog displays.

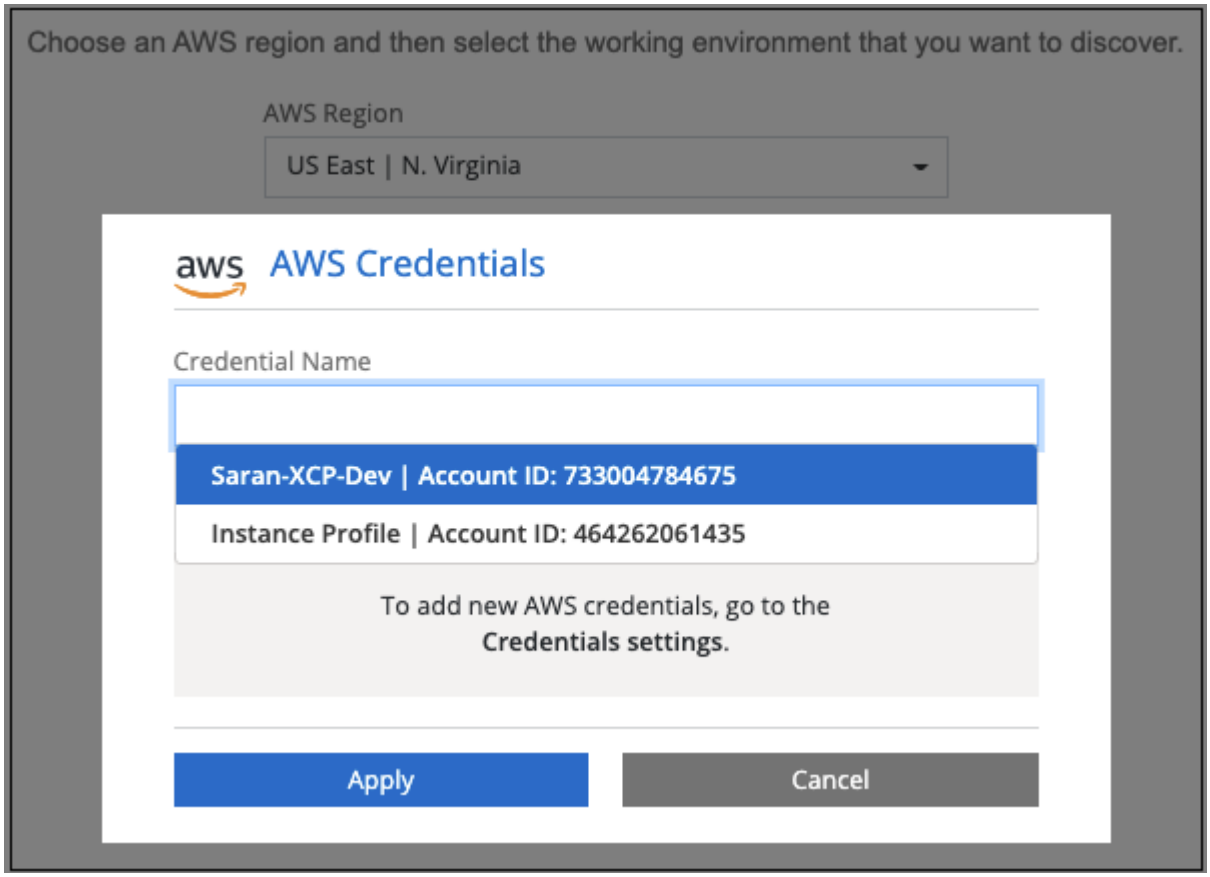


Add the second AWS account credentials in Cloud Manager

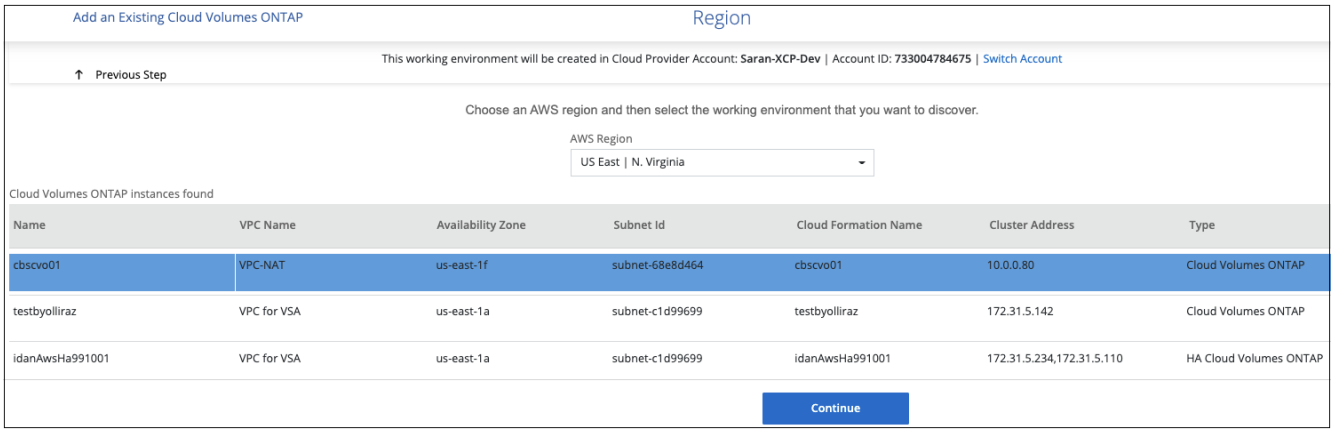
1. Add the second AWS account, for example, *Saran-XCP-Dev*.



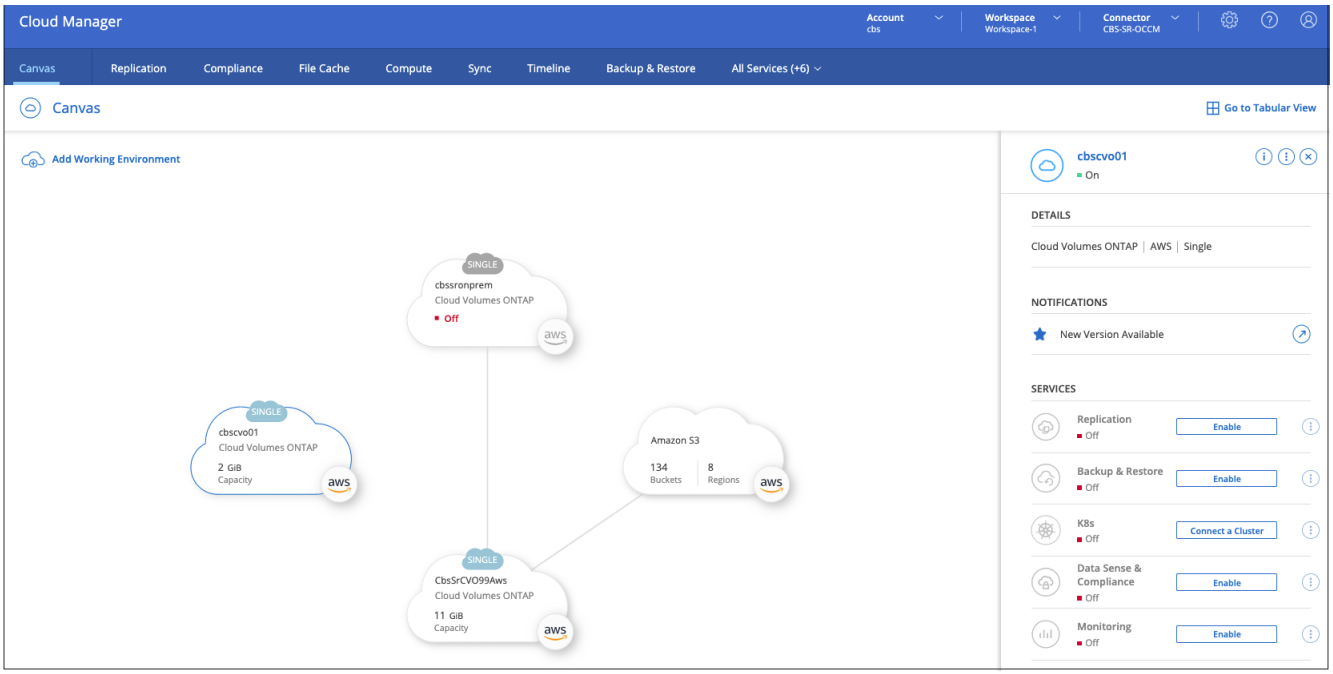
2. In the Discover Cloud Volumes ONTAP page, select the newly added credentials.



3. Select the Cloud Volumes ONTAP system you want to discover from second account. You can also deploy a new Cloud Volumes ONTAP system in the second account.

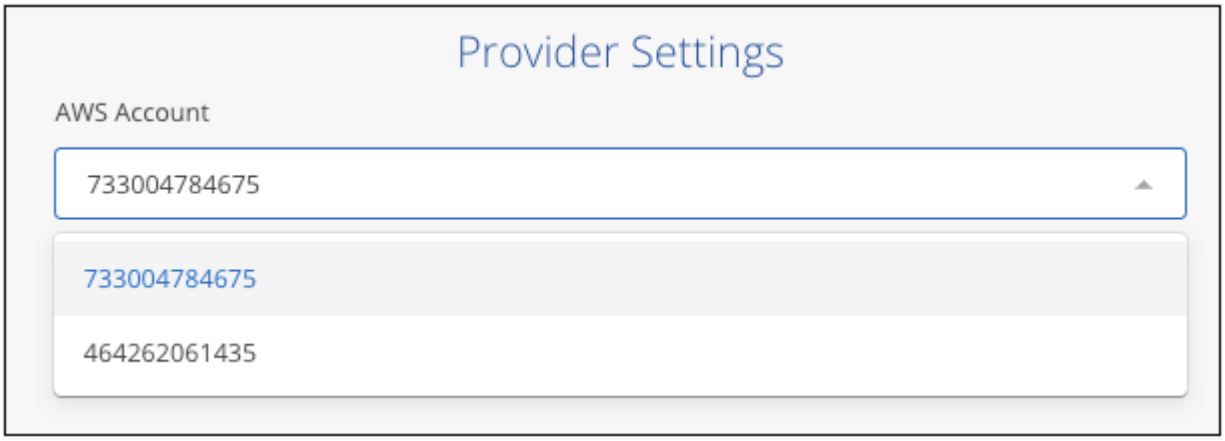


The Cloud Volumes ONTAP system from the second account is now added to Cloud Manager which is running in a different account.



Enable backup in the other AWS account

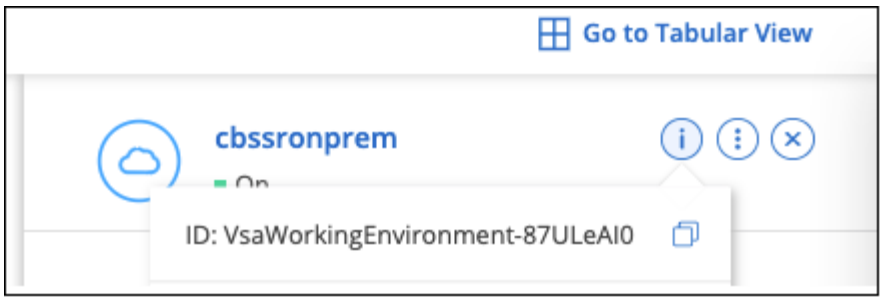
1. In Cloud Manager, enable backup for the Cloud Volumes ONTAP system running in the first account, but select the second account as the location for creating the backup files.



2. Then select a backup policy and the volumes you want to back up, and Cloud Backup attempts to create a new bucket in the selected account.

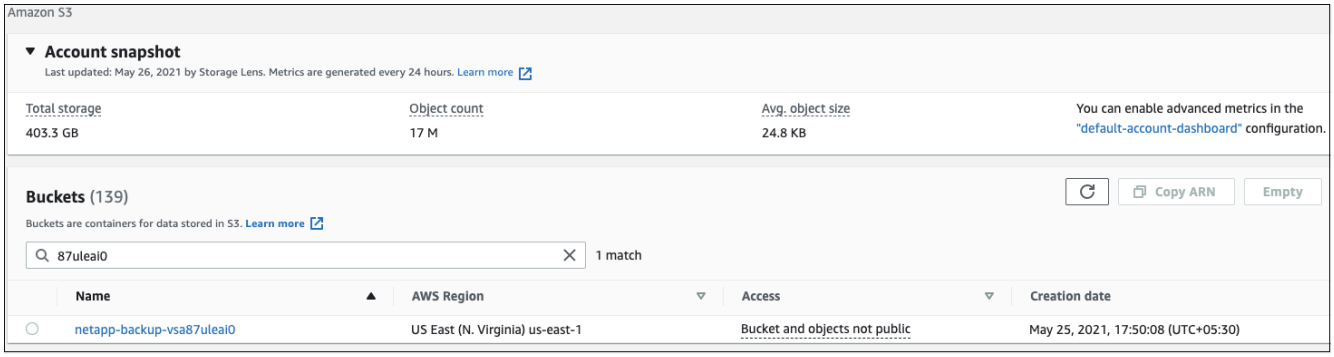
   However, adding the bucket to the Cloud Volumes ONTAP system will fail because Cloud Backup uses the instance profile to add the bucket and the Cloud Manager instance profile doesn't have access to the resources in the second account.

3. Get the working environment ID for the Cloud Volumes ONTAP system.

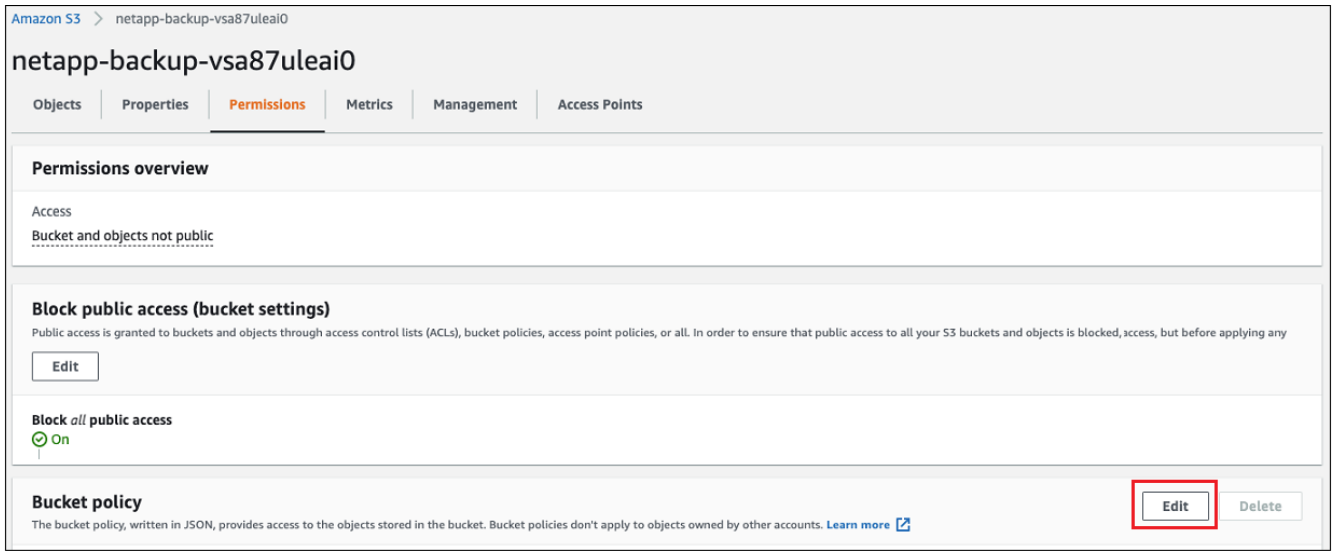


Cloud Backup creates every bucket with the prefix `Netapp-backup-` and will include the working environment ID; for example: `87ULeA10`

4. In the EC2 portal, go to S3 and search for the bucket with name ending with `87uLeA10` and you'll see the bucket name displayed as `Netapp-backup-vsa87uLeA10`.



5. Click on the bucket, then click the Permissions tab, and then click **Edit** in the Bucket policy section.



6. Add a bucket policy for the newly created bucket to provide access to the Cloud Manager's AWS account, and then Save the changes.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "PublicRead",
      "Effect": "Allow",
      "Principal": {
        "AWS": "arn:aws:iam::464262061435:root"
      },
      "Action": [
        "s3:ListBucket",
        "s3:GetBucketLocation",
        "s3:GetObject",
        "s3:PutObject",
        "s3:DeleteObject"
      ],
      "Resource": [
        "arn:aws:s3:::netapp-backup-vsa87uleai0",
        "arn:aws:s3:::netapp-backup-vsa87uleai0/*"
      ]
    }
  ]
}
```

Note that "AWS": "arn:aws:iam::464262061435:root" gives complete access this bucket for all resources in account 464262061435. If you want to reduce it to specific role, level, you can update the policy with specific role(s). If you are adding individual roles, ensure that occm role also added, otherwise backups will not get updated in the Cloud Backup UI.

For example: "AWS": "arn:aws:iam::464262061435:role/cvo-instance-profile-version10-d8e-IamInstanceRole-IKJPJ1HC2E7R"

7. Retry enabling Cloud Backup on the Cloud Volumes ONTAP system and this time it should be successful.

Configure backup for multi-account access in Azure

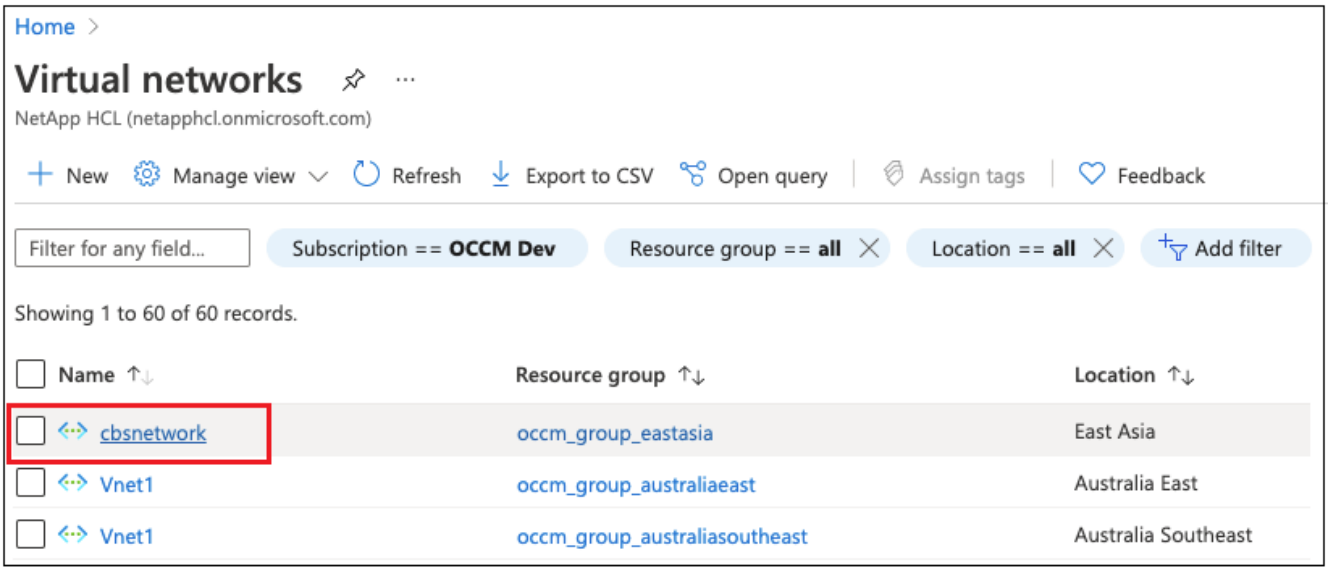
Cloud Backup enables you to create backup files in an Azure account that is different than where your source volumes reside. And both of those accounts can be different than the account where the Cloud Manager Connector resides.

Just follow the steps below to set up your configuration in this manner.

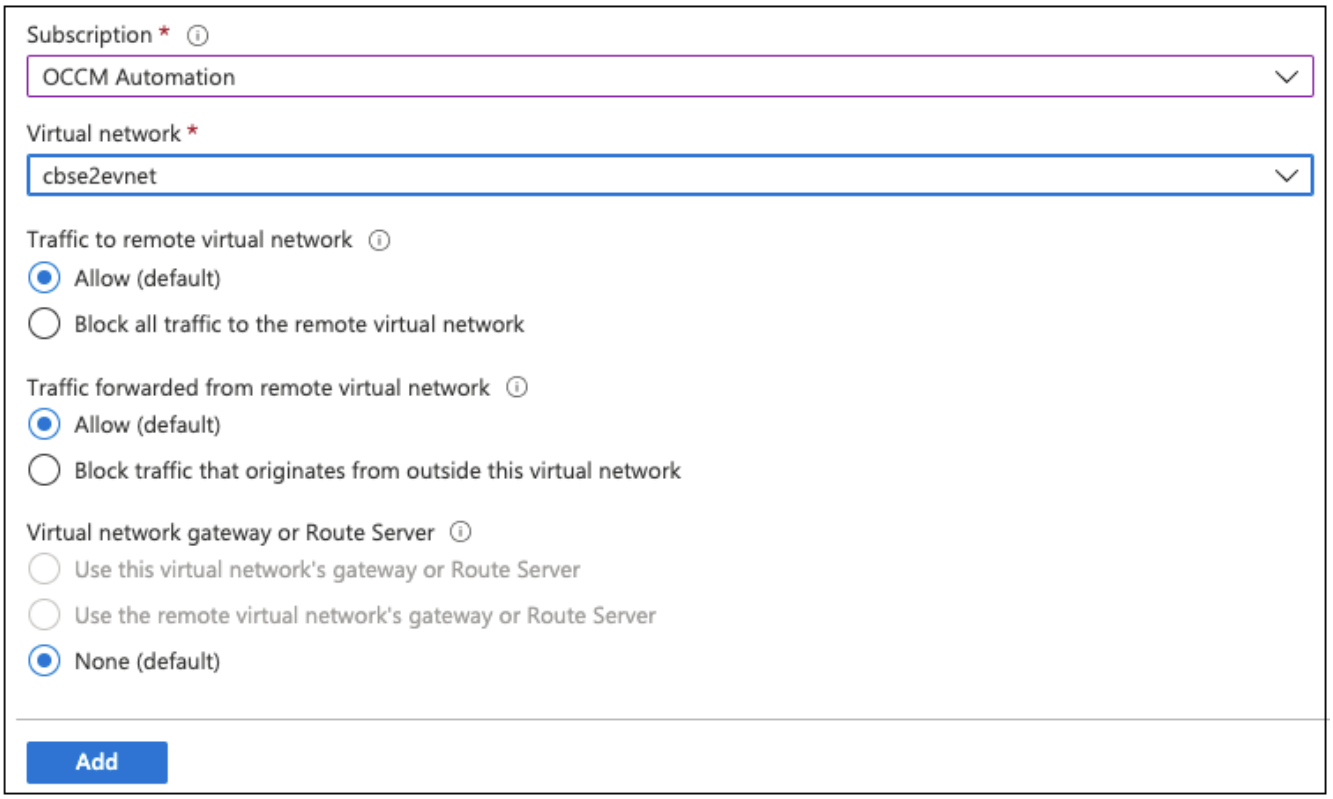
Set up VNet peering between accounts

Note that if you want Cloud Manager to manage your Cloud Volumes ONTAP system in a different account/region, then you need to setup VNet peering. VNet peering is not required for storage account connectivity.

1. Log in to the Azure portal and from home, select Virtual Networks.
2. Select the subscription you are using as subscription 1 and click on the VNet where you want to set up peering.

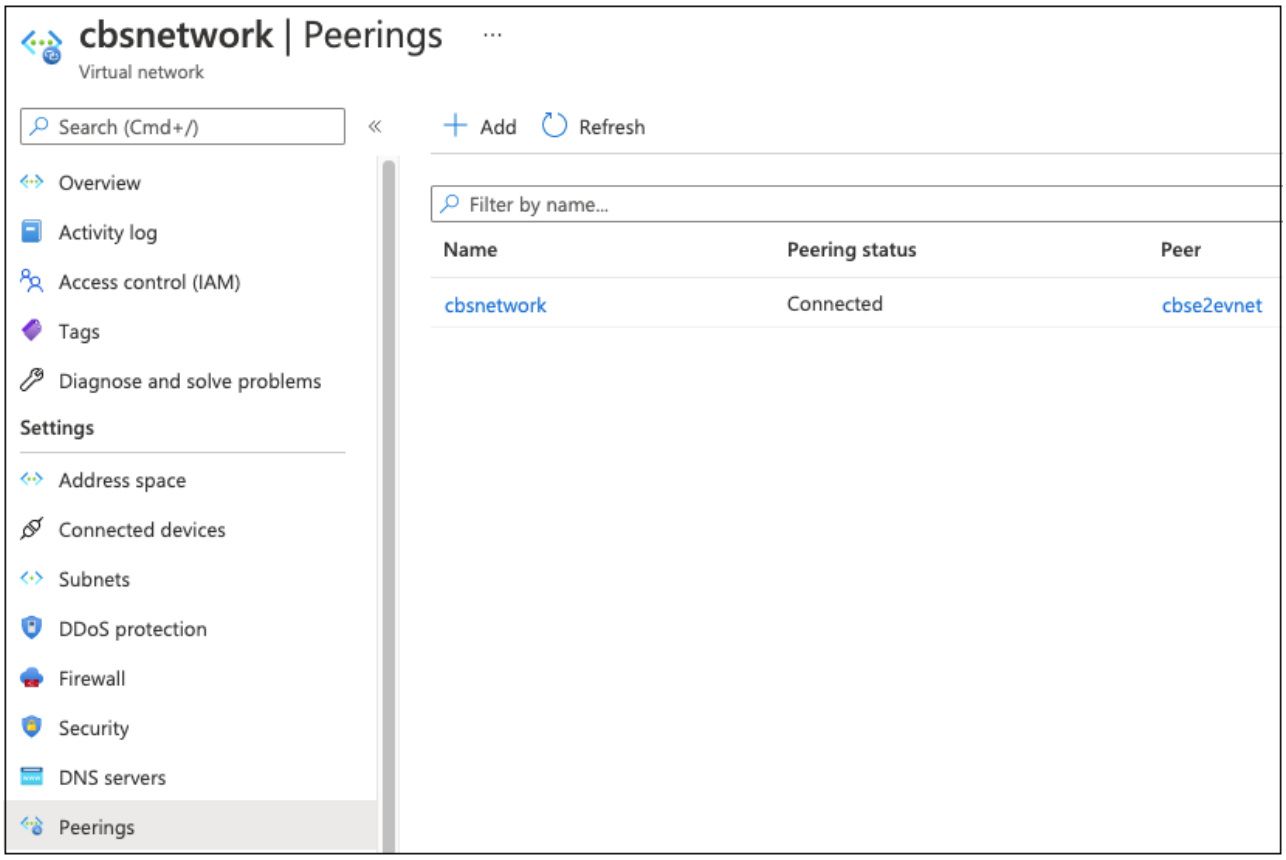


3. Select **cbsnetwork** and from the left panel, click on **Peerings**, and then click **Add**.

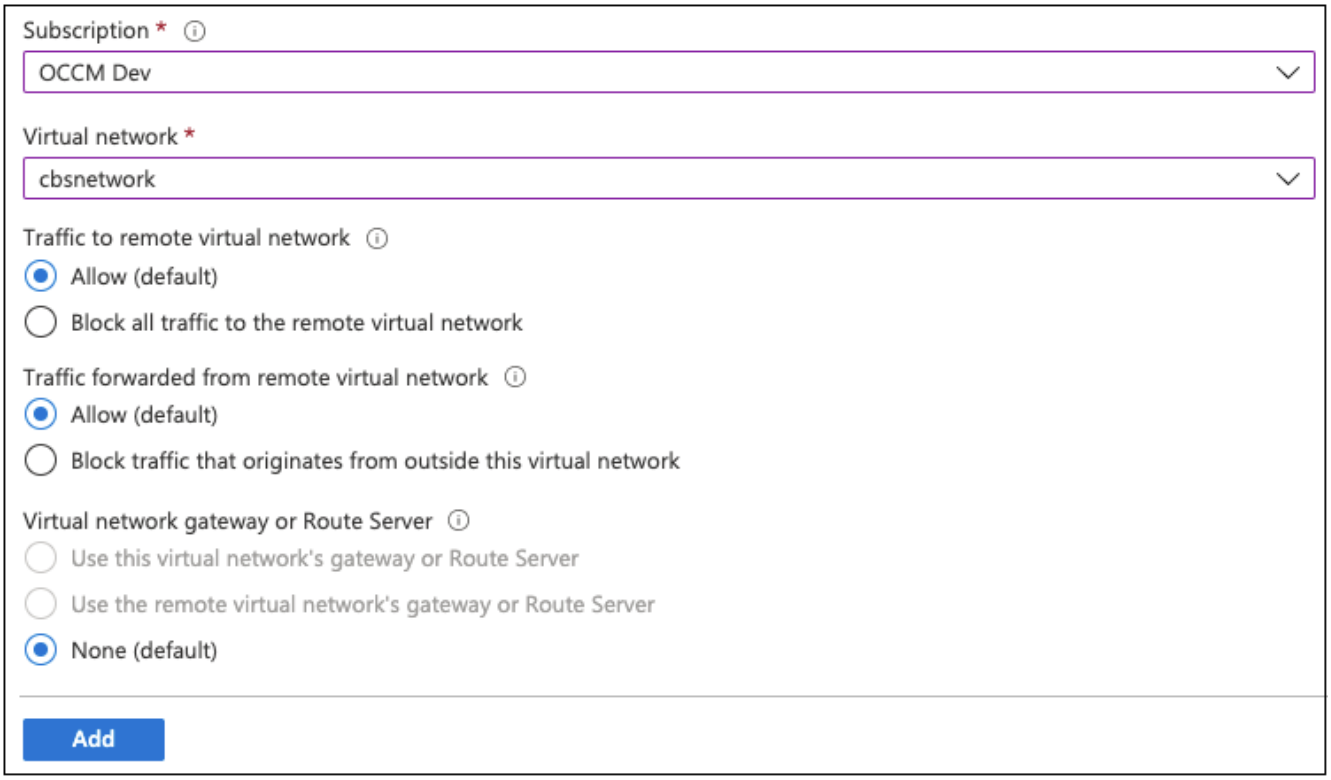


4. Enter the following information on the Peering page and then click **Add**.
   - Peering link name for this network: you can give any name to identify the peering connection.
   - Remote virtual network peering link name: enter a name to identify the remote VNet.
   - Keep all the selections as default values.

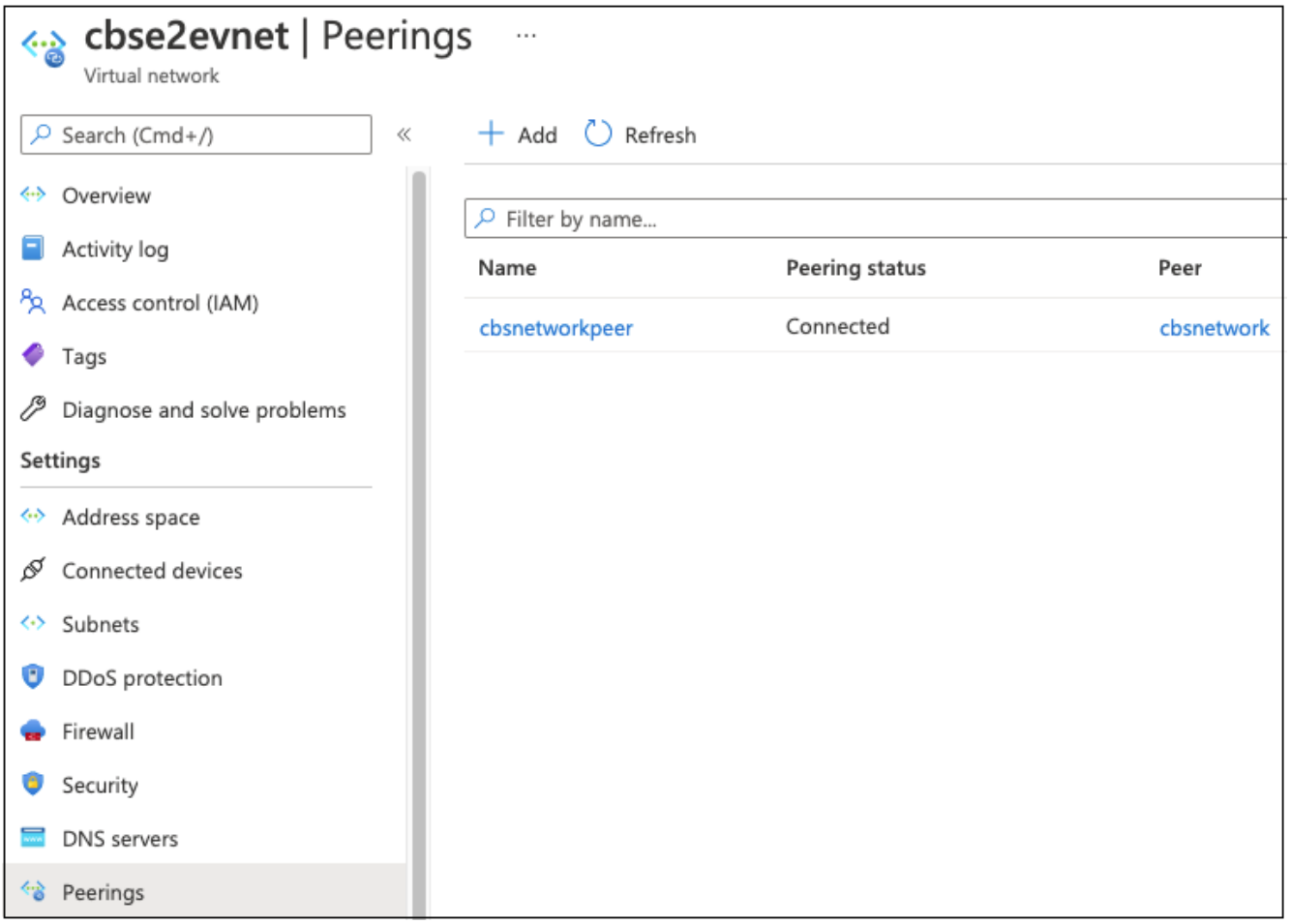
- Under subscription, select the subscription 2.
- Virtual network, select the virtual network in subscription 2 to which you want to set up the peering.



5. Perform the same steps in subscription 2 VNet and specify the subscription and remote VNet details of subscription 1.



The peering settings are added.



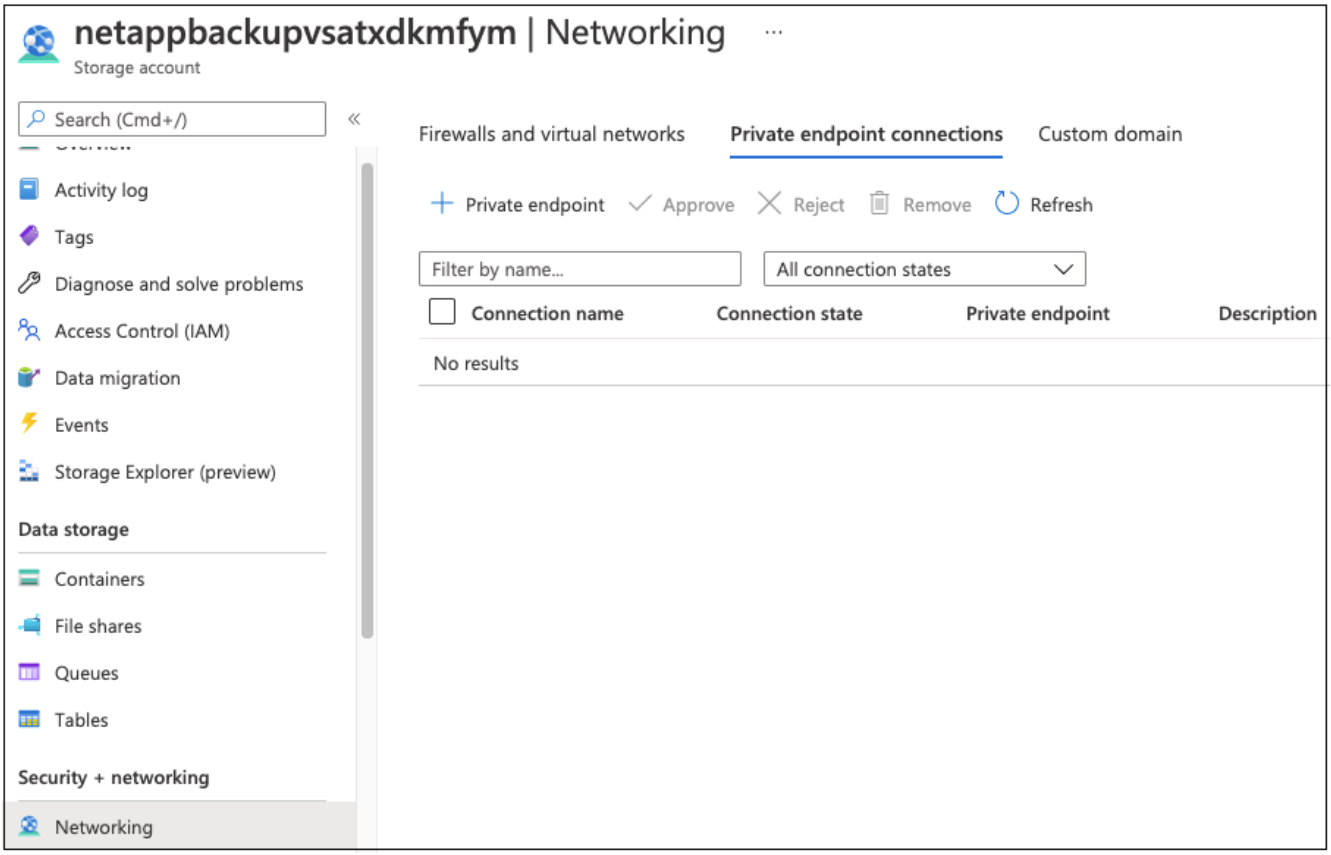
Create a private endpoint for the storage account

Now you need to create a private endpoint for the storage account. In this example, the storage account is created in subscription 1 and the Cloud Volumes ONTAP system is running in subscription 2.

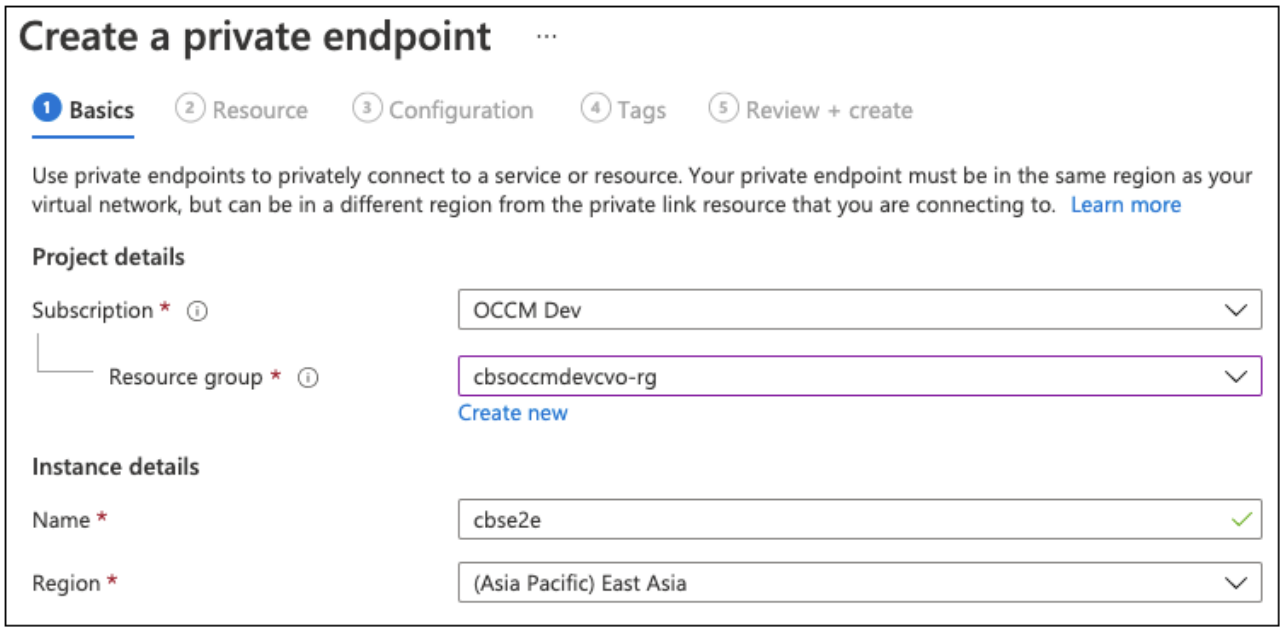
You need network contributor permission to perform the following action.

```
{
  "id": "/subscriptions/d333af45-0d07-4154-
943dc25fbbce1b18/providers/Microsoft.Authorization/roleDefinitions/4d97b98
b-1d4f-4787-a291-c67834d212e7",
  "properties": {
    "roleName": "Network Contributor",
    "description": "Lets you manage networks, but not access to them.",
    "assignableScopes": [
      "/"
    ],
    "permissions": [
      {
        "actions": [
          "Microsoft.Authorization/*/read",
          "Microsoft.Insights/alertRules/*",
          "Microsoft.Network/*",
          "Microsoft.ResourceHealth/availabilityStatuses/read",
          "Microsoft.Resources/deployments/*",
          "Microsoft.Resources/subscriptions/resourceGroups/read",
          "Microsoft.Support/*"
        ],
        "notActions": [],
        "dataActions": [],
        "notDataActions": []
      }
    ]
  }
}
```

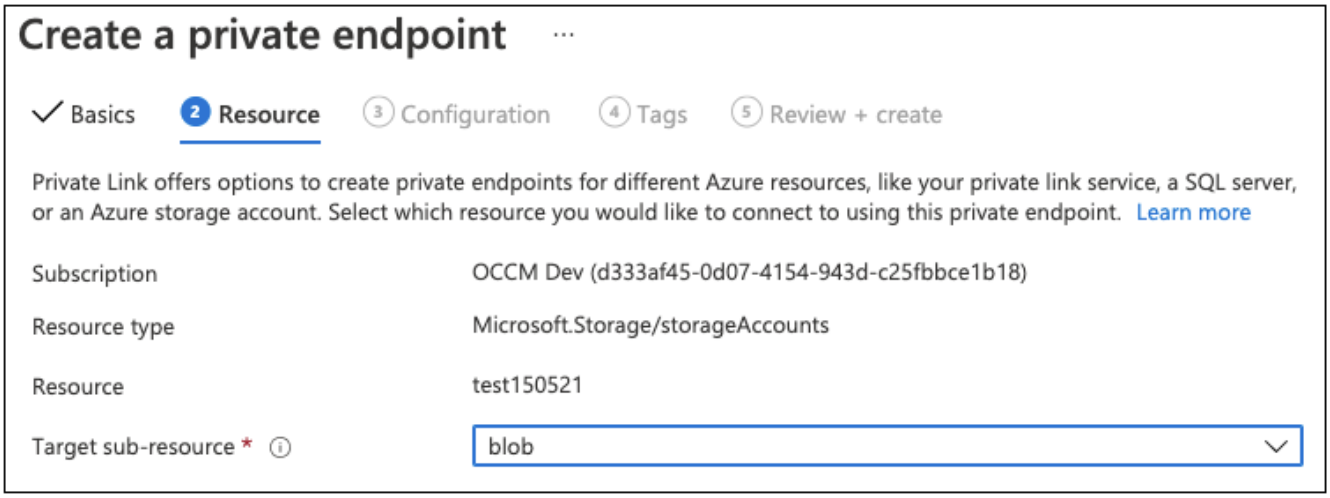
1. Go to the storage account > Networking > Private endpoint connections and click **+ Private endpoint**.



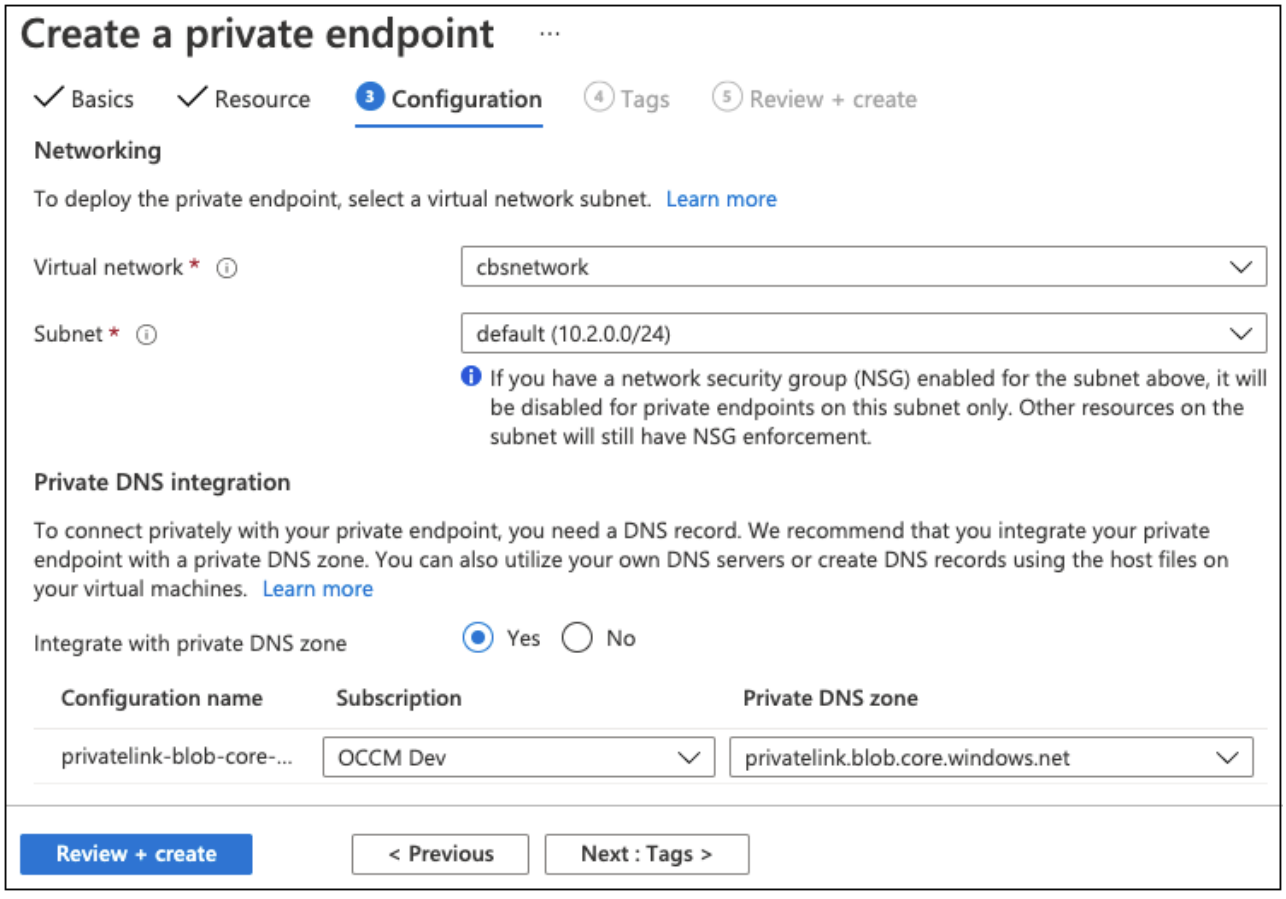
2. In the Private Endpoint *Basics* page:
   - Select subscription 2 (where the Cloud Manager Connector and Cloud Volumes ONTAP system are deployed) and the resource group.
   - Enter an endpoint name.
   - Select the region.



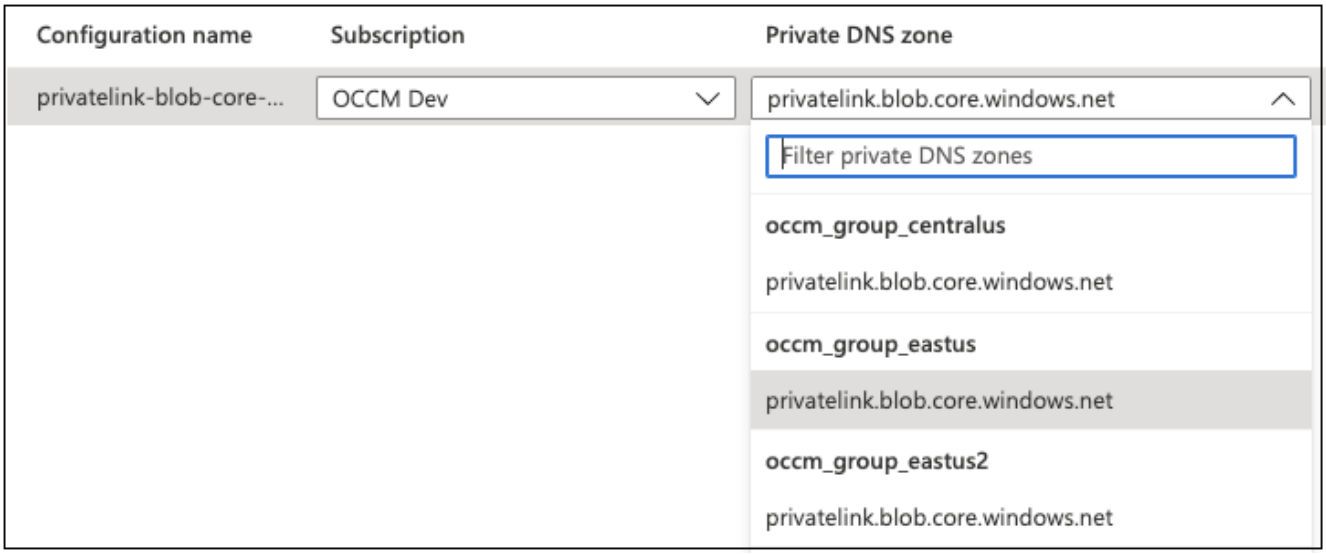
3. In the *Resource* page, select Target sub-resource as **blob**.



4. In the Configuration page:
   - Select the virtual network and subnet.
   - Click the **Yes** radio button to "Integrate with private DNS zone".



5. In the Private DNS zone list, ensure that the Private Zone is selected from the correct Region, and click **Review + Create**.



Now the storage account (in subscription 1) has access to the Cloud Volumes ONTAP system which is running in subscription 2.

6. Retry enabling Cloud Backup on the Cloud Volumes ONTAP system and this time it should be successful.