



# **Cloud Volumes Service for Google Cloud documentation**

Cloud Volumes Service for Google Cloud

NetApp  
July 19, 2022

This PDF was generated from <https://docs.netapp.com/us-en/cloud-manager-cloud-volumes-service-gcp/index.html> on July 19, 2022. Always check docs.netapp.com for the latest.

# Table of Contents

Cloud Volumes Service for Google Cloud documentation . . . . .	1
What's new . . . . .	2
9 September 2020 . . . . .	2
Get started . . . . .	3
Learn about Cloud Volumes Service for Google Cloud . . . . .	3
Quick start for Cloud Volumes Service for Google Cloud . . . . .	4
Set up Google Cloud . . . . .	4
Create a Cloud Volumes Service for Google Cloud working environment. . . . .	5
Use Cloud Volumes Service for Google Cloud . . . . .	8
Create and mount volumes . . . . .	8
Manage existing volumes. . . . .	12
Manage cloud volumes snapshots. . . . .	13
Manage your Active Directory configuration. . . . .	17
Remove Cloud Volumes Service from Cloud Manager . . . . .	18
Knowledge and support . . . . .	19
Register for support . . . . .	19
Get help . . . . .	20
Legal notices . . . . .	22
Copyright . . . . .	22
Trademarks . . . . .	22
Patents . . . . .	22
Privacy policy . . . . .	22
Open source. . . . .	22

# Cloud Volumes Service for Google Cloud documentation

# What's new

Learn what's new with Cloud Volumes Service for Google Cloud in Cloud Manager.

## 9 September 2020

### Support for Cloud Volumes Service for Google Cloud

You can now manage Cloud Volumes Service for Google Cloud directly from Cloud Manager:

- Set up and create a working environment
- Create and manage NFSv3 and NFSv4.1 volumes for Linux and UNIX clients
- Create and manage SMB 3.x volumes for Windows clients
- Create, delete, and restore volume snapshots

# Get started

## Learn about Cloud Volumes Service for Google Cloud

NetApp Cloud Volumes Service for Google Cloud enables you to quickly add multi-protocol workloads as well as build and deploy both Windows-based and UNIX-based apps.

### Key features

- Migrate data between on-premises and Google Cloud.
- Provision volumes from 1 to 100 TiB in seconds.
- Multiprotocol support (you can create an NFS or SMB volume).
- Protect data with automated, efficient snapshots.
- Accelerate app development with rapid cloning.

### Cost

Volumes created by the Cloud Volumes Service for Google Cloud are charged to your subscription to the service, not through Cloud Manager.

There are no charges to discover a Cloud Volumes Service for Google Cloud region or volume from Cloud Manager.

[View pricing in the Google Cloud Marketplace](#)

### Supported regions

[View supported Google Cloud regions](#)

### Before you get started

Cloud Manager can discover existing Cloud Volumes Service for GCP subscriptions and volumes. See the [NetApp Cloud Volumes Service for Google Cloud documentation](#) if you haven't set up your subscription yet.

### Getting help

Use the Cloud Manager chat for general questions about Cloud Volumes Service operation in Cloud Manager.

For general questions about Cloud Volumes Service for Google Cloud, email NetApp's Google Cloud Team at [gcinfo@netapp.com](mailto:gcinfo@netapp.com).

For technical issues associated with your cloud volumes, you can create a technical support case from the Google Cloud Console. See [obtaining support](#) for details.

### Related links

- [NetApp Cloud Central: Cloud Volumes Service for Google Cloud](#)
- [NetApp Cloud Volumes Service for Google Cloud documentation](#)

# Quick start for Cloud Volumes Service for Google Cloud

Get started quickly by following these steps or follow the links for full details.

1

## Enable the Cloud Volumes Service API

From Google, enable the Cloud Volumes Service for GCP API so that Cloud Manager can manage the subscription and cloud volumes.

[Learn how to enable the API.](#)

2

## Create a GCP service account and download credentials

From Google, create a service account and role so that Cloud Manager can access your Cloud Volumes Service for Google Cloud account.

[Learn how to set up a service account.](#)

3

## Create a Cloud Volumes Service for GCP working environment

In Cloud Manager, click **Add Working Environment > Google Cloud > Cloud Volumes Service** and then provide details about the service account and Google Cloud project.

[Learn how to create a working environment.](#)

## Set up Google Cloud

Cloud Manager needs access to the Cloud Volumes Service API and the right permissions through a Google Cloud service account.

### Enable the Cloud Volumes Service API

In Google Cloud Shell, run the following command to enable the Cloud Volumes Service API:

```
gcloud --project=<my-cvs-project> services enable cloudvolumesgcp-api.netapp.com
```

### Set up a service account

Complete the following tasks so that Cloud Manager can access your Google Cloud project:

- Create a new service account
- Add the new service account member to your project and assign it specific roles (permissions)
- Create and download a key pair for the service account that is used to authenticate to Google

#### Steps

1. In the Google Cloud console, [go to the Service accounts page](#).
2. Click **Select a project**, choose your project, and click **Open**.

3. Click **Create service account**.
4. Enter the service account name (friendly display name) and description.

The Cloud Console generates a service account ID based on this name. Edit the ID if necessary - you cannot change the ID later.

5. To set access controls now, click **Create** and then **DONE** from the bottom of the page, and continue to the next step.
6. From the *IAM page* click **Add** and fill out the fields in the *Add Members* page:
  - a. In the New Members field, enter the full service account ID, for example, [user1-service-account-cvs@project1.iam.gserviceaccount.com](#).
  - b. Add these roles:
    - *NetApp Cloud Volumes Admin*
    - *Compute Network Viewer*
  - c. Click **Save**.
7. Click the Service Account name, and then from the *Service account details* page, click **Add key > Create new key**.
8. Select **JSON** as the key type and click **Create**.

By clicking **Create** your new public/private key pair is generated and downloaded to your system. It serves as the only copy of the private key. Store this file securely because it can be used to authenticate as your service account.

For detailed steps, refer to Google Cloud documentation:

- [Creating and managing service accounts](#)
- [Granting, changing, and revoking access to resources](#)
- [Creating and managing service account keys](#)

## Create a Cloud Volumes Service for Google Cloud working environment

Create a Cloud Volumes Service for Google Cloud working environment in Cloud Manager so that you can create and manage volumes and snapshots.

Regardless of whether you have already created volumes from the Google Cloud Console, or if you just signed up for Cloud Volumes Service for Google Cloud and have no volumes yet, the first step is to create a working environment for the volumes based on your GCP subscription.

If cloud volumes already exist for this subscription, then the volumes will appear in the new working environment. If you haven't added any cloud volumes yet for the GCP subscription, then you do that after you create the new working environment.



If you have subscriptions and volumes in multiple Google Cloud projects, you need to perform this task for each project.

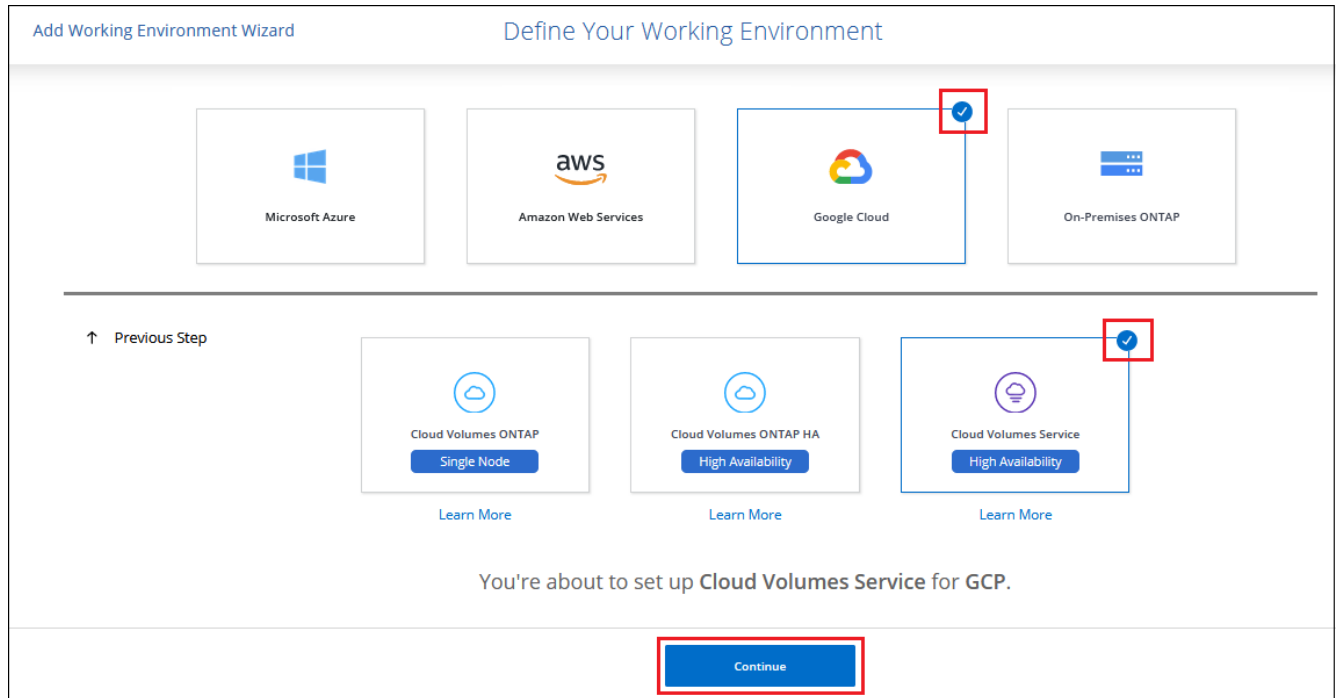
### Before you begin

You must have the following information available when adding a subscription for each project:

- Service account credentials (JSON private key you downloaded)
- Project name

### Steps

1. In Cloud Manager, add a new Working Environment, select the location **Google Cloud**, and click **Continue**.
2. Select **Cloud Volumes Service** and click **Continue**.



3. Provide information about your Cloud Volumes Service subscription:
  - a. Enter the Working Environment Name you want to use.
  - b. Copy/paste the JSON private key you downloaded in the previous steps.
  - c. Select the name of your Google Cloud project.
  - d. Click **Continue**.

The screenshot displays the 'Cloud Volumes Service Credentials' form. It contains three main sections: 'Working Environment Name' with a text input field; 'Service Account Credentials' with a large text area for pasting JSON content and an 'Apply' button; and 'Project' with a dropdown menu currently showing 'Select project...'.



## Result

Cloud Manager displays your Cloud Volumes Service for Google Cloud working environment.



If cloud volumes already exist for this subscription, then the volumes appear in the new working environment. You can add additional cloud volumes from Cloud Manager.

If no cloud volumes exist for this subscription, create them now.

## What's next?

[Start creating volumes.](#)

# Use Cloud Volumes Service for Google Cloud

## Create and mount volumes

Cloud Manager enables you to create cloud volumes based on your Cloud Volumes Service for Google Cloud subscription. After you create a volume, get the relevant mount commands so that you can mount the volume to a client.

### Create volumes

You can create NFS or SMB volumes in a new or existing Cloud Volumes Service for Google Cloud account. Cloud volumes currently support NFSv3 and NFSv4.1 for Linux and UNIX clients, and SMB 3.x for Windows clients.

#### Before you begin

- If you want to use SMB in GCP, you must have set up DNS and Active Directory.
- When planning to create an SMB volume, you must have a Windows Active Directory server available to which you can connect. You will enter this information when creating the volume. Also, make sure that the Admin user is able to create a machine account in the Organizational unit (OU) path specified.

#### Steps

1. Select the working environment and click **Add New Volume**.
2. In the Details & Location page, enter details about the volume:
  - a. Enter a name for the volume.
  - b. Specify a size within the range of 1 TiB (1024 GiB) to 100 TiB.  
[Learn more about allocated capacity.](#)
  - c. Specify a service level: Standard, Premium, or Extreme.  
[Learn more about service levels.](#)
  - d. Select the Google Cloud region.
  - e. Select the VPC Network from which the volume will be accessible. Note that the VPC cannot be changed or edited after the volume is created.
  - f. Click **Continue**.
3. In the Protocol page, select NFS or SMB and then define the details. Required entries for NFS and SMB are shown in separate sections below.
4. For NFS:
  - a. In the Volume Path field, specify the name of the volume export you will see when you mount the volume.
  - b. Select NFSv3, NFSv4.1, or both depending on your requirements.
  - c. Optionally, you can create an export policy to identify the clients that can access the volume. Specify the:

- Allowed clients by using an IP address or Classless Inter-Domain Routing (CIDR).
- Access rights as Read & Write or Read Only.
- Access protocol (or protocols if the volume allows both NFSv3 and NFSv4.1 access) used for users.
- Click **+ Add Export Policy Rule** if you want to define additional export policy rules.

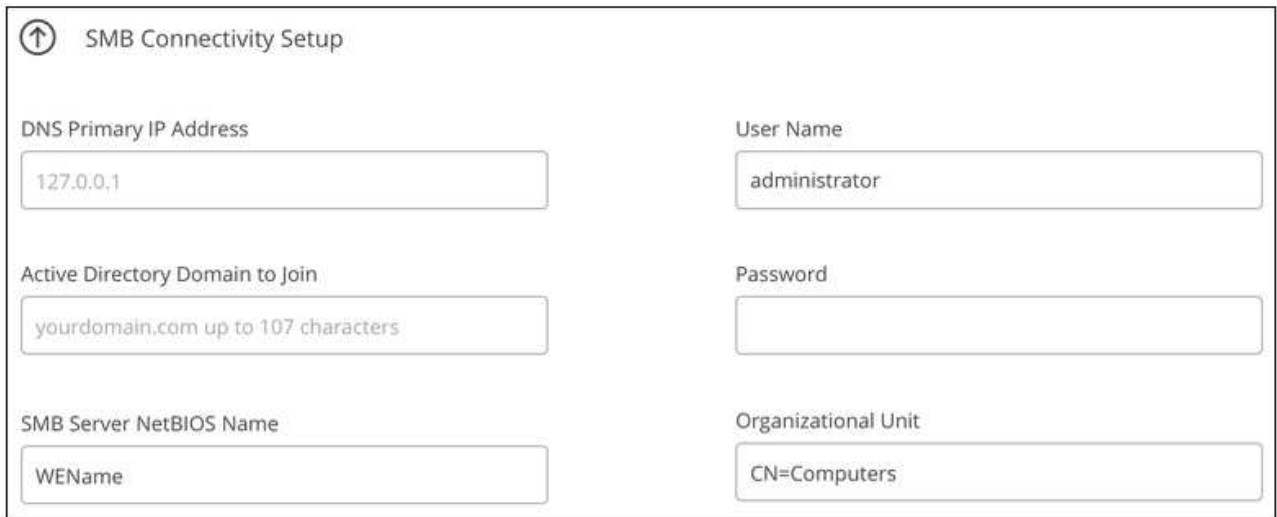
The following image shows the Volume page filled out for the NFS protocol:

##### 5. For SMB:

- In the Volume Path field, specify the name of the volume export you will see when you mount the volume and click **Continue**.
- If Active Directory has been set up, you see the configuration. If it is the first volume being set up and no Active Directory has been set up, you can enable SMB session encryption in the SMB Connectivity Setup page:

Field	Description
DNS Primary IP Address	The IP addresses of the DNS servers that provide name resolution for the SMB server. Use a comma to separate the IP addresses when referencing multiple servers, for example, 172.31.25.223, 172.31.2.74..
Active Directory Domain to join	The FQDN of the Active Directory (AD) domain that you want the SMB server to join.
SMB Server NetBIOS name	A NetBIOS name for the SMB server that will be created.
Credentials authorized to join the domain	The name and password of a Windows account with sufficient privileges to add computers to the specified Organizational Unit (OU) within the AD domain.
Organizational Unit	The organizational unit within the AD domain to associate with the SMB server. The default is CN=Computers for connections to your own Windows Active Directory server.

The following image shows the Volume page filled out for the SMB protocol:



The screenshot shows a form titled "SMB Connectivity Setup" with a back arrow icon. It contains six input fields arranged in two columns. The left column fields are: "DNS Primary IP Address" with the value "127.0.0.1", "Active Directory Domain to Join" with the placeholder "yourdomain.com up to 107 characters", and "SMB Server NetBIOS Name" with the value "WEName". The right column fields are: "User Name" with the value "administrator", "Password" (empty), and "Organizational Unit" with the value "CN=Computers".

6. Click **Continue**.
7. If you want to create the volume based on a snapshot of an existing volume, select the snapshot from the Snapshot Name drop-down list. Otherwise just click **Continue**.
8. In the Snapshot Policy page, you can enable Cloud Volumes Service to create snapshot copies of your volumes based on a schedule. You can do this now by moving the selector to the right, or you can edit the volume later to define the snapshot policy.

Learn how to [create a snapshot policy](#).

9. Click **Add Volume**.

## Result

The new volume is added to the working environment.

Continue with mounting the cloud volume.

## Mount cloud volumes

Access mounting instructions from within Cloud Manager so you can mount the volume to a host.



Use the highlighted protocol/dialect supported by your client.

## Steps

1. Open the working environment.
2. Hover over the volume and click **Mount the volume**.

NFS and SMB volumes display mount instructions for that protocol.

3. Hover over the commands and copy them to your clipboard to make this process easier. Just add the destination directory/mount point at the end of the command.

**NFS example:**

## Mount the volume - testk

### Setting up your instance

1. Open an SSH client and connect to your instance.
2. Install the nfs client on your instance.

On Red Hat Enterprise Linux or SuSE Linux instance:

```
$ sudo yum install -y nfs-utils
```

On an Ubuntu or Debian instance:

```
$ sudo apt-get install nfs-common
```

### Mounting your volume

1. Create a new directory on your instance:

```
$ sudo mkdir /dir
```

2. Mount your NFSv3 volume using the command below:

```
sudo mount -t nfs -o rw,hard,rsize=65536,wsiz=65536,vers=3,tc...
```

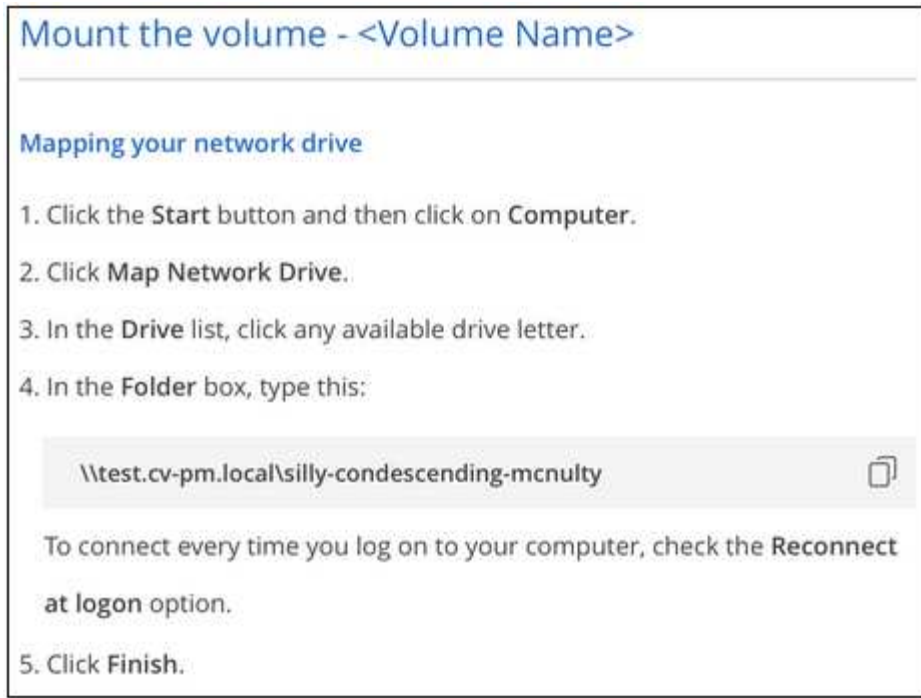
3. Mount your NFSv4.1 volume using the command below:

```
sudo mount -t nfs -o rw,hard,rsize=65536,wsiz=65536,vers=4.1,t...
```

The maximum I/O size defined by the `rsize` and `wsiz` options is 1048576, however 65536 is the recommended default for most use cases.

Note that Linux clients will default to NFSv4.1 unless the version is specified with the `vers=<nfs_version>` option.

### SMB example:



4. Map your network drive by following the mount instructions for your instance.

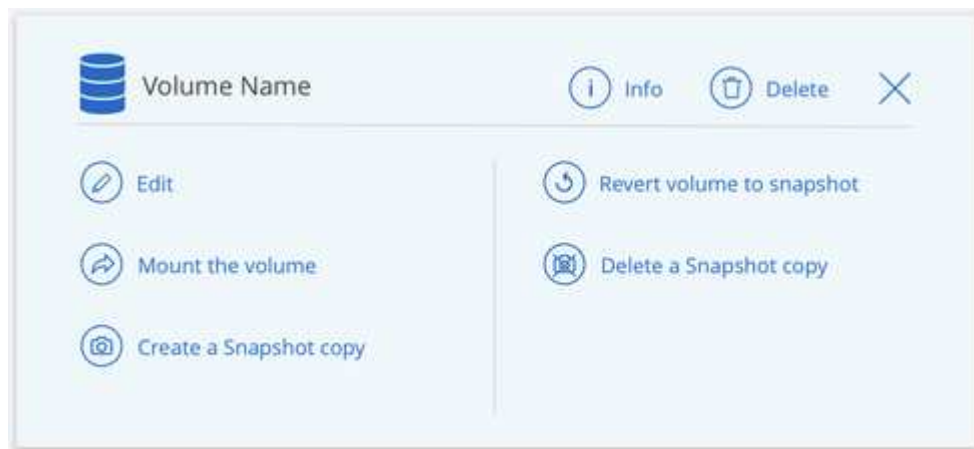
After completing the steps in the mount instructions, you have successfully mounted the cloud volume to your GCP instance.

## Manage existing volumes

You can manage existing volumes as your storage needs change. You can view, edit, restore, and delete volumes.

### Steps

1. Open the working environment.
2. Hover over the volume.



3. Manage your volumes:

Task	Action
View information about a volume	Click <b>Info</b> .
Edit a volume (including snapshot policy)	a. Click <b>Edit</b> . b. Modify the volume's properties and then click <b>Update</b> .
Get the NFS or SMB mount command	a. Click <b>Mount the volume</b> . b. Click <b>Copy</b> to copy the command(s).
Create a Snapshot copy on demand	a. Click <b>Create a Snapshot copy</b> . b. Change the name, if needed, and then click <b>Create</b> .
Replace the volume with the contents of a Snapshot copy	a. Click <b>Revert volume to snapshot</b> . b. Select a Snapshot copy and click <b>Restore</b> .
Delete a Snapshot copy	a. Click <b>Delete a Snapshot copy</b> . b. Select the snapshot and click <b>Delete</b> . c. Click <b>Delete</b> again when prompted to confirm.
Delete a volume	a. Unmount the volume from all clients: <ul style="list-style-type: none"> <li>◦ On Linux clients, use the <code>umount</code> command.</li> <li>◦ On Windows clients, click <b>Disconnect network drive</b>.</li> </ul> b. Select a volume, and then click <b>Delete</b> . c. Click <b>Delete</b> again to confirm.

## Manage cloud volumes snapshots

You can create a snapshot policy for each volume so that you can recover or restore the entire contents of a volume from an earlier time. You can also create an on-demand snapshot of a cloud volume when needed.

### Create an on-demand snapshot

You can create an on-demand snapshot of a cloud volume if you want to create a snapshot with the current volume state.

#### Steps

1. Open the working environment.
2. Hover over the volume and click **Create a snapshot copy**.
3. Enter a name for the snapshot, or use the automatically generated name, and click **Create**.

### Create a Snapshot Copy - <Volume Name>

A NetApp Snapshot copy is a read-only, point-in-time image of a volume. The image protects your data with no performance impact and requires minimal storage.

Snapshot Copy Name

manually.2020-05-04\_1722

Create

The snapshot is created.

## Create or modify a snapshot policy

You can create or modify a snapshot policy as necessary for a cloud volume. You define the snapshot policy from the *Snapshot Policy* tab either when creating a volume or when editing a volume.

### Steps

1. Open the working environment.
2. Hover over the volume and click **Edit**.
3. From the *Snapshot Policy* tab, move the enable snapshots slider to the right.
4. Define the schedule for snapshots:
  - a. Select the frequency: **Hourly**, **Daily**, **Weekly**, or **Monthly**
  - b. Select the number of snapshots you want to keep.
  - c. Select the day, hour, and minute when the snapshot should be taken.



**Schedule Snapshot Policies:**

<input checked="" type="checkbox"/> <b>Hourly</b>	Number of Snapshot to Keep	Minute	
	<input type="text" value="12"/>	<input type="text" value="30"/>	
<input type="checkbox"/> <b>Daily</b>	Number of Snapshot to Keep	Hour	Minute
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/> <b>Weekly</b>	Number of Snapshot to Keep	Days	Hour Minute
	<input type="text" value="3"/>	<div>Sunday x</div>	<input type="text" value="0"/> <input type="text" value="0"/>
<input type="checkbox"/> <b>Monthly</b>	Number of Snapshot to Keep		Hour Minute
	<input type="text" value="0"/>	<div> <input type="checkbox"/> Sunday  <input type="checkbox"/> Monday  <input type="checkbox"/> Tuesday </div>	<input type="text" value="0"/> <input type="text" value="0"/>

5. Click **Add volume** or **Update volume** to save your policy settings.

## Disable a snapshot policy

You can disable a snapshot policy to stop snapshots from being created for a short period of time while retaining your snapshot policy settings.

### Steps

1. Open the working environment.
2. Hover over the volume and click **Edit**.
3. From the *Snapshot Policy* tab, move the enable snapshots slider to the left.

Enable automatic Snapshot copies

When disabled, Cloud Volumes Service does not create Snapshot copies of your volumes.

4. Click **Update volume**.

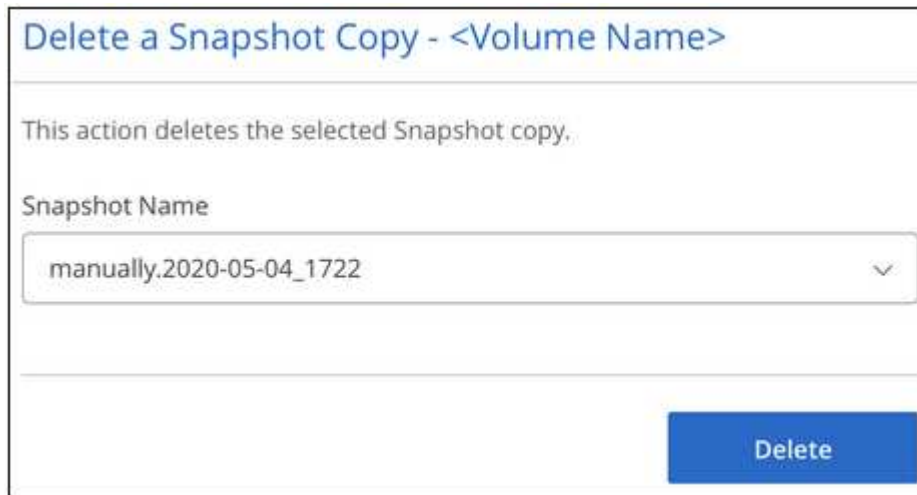
When you want to re-enable the snapshot policy, move the enable snapshots slider to the right and click **Update volume**.

## Delete a snapshot

You can delete a snapshot if it is no longer needed.

### Steps

1. Open the working environment.
2. Hover over the volume and click **Delete a Snapshot copy**.
3. Select the snapshot from the drop-down list and click **Delete**.



The screenshot shows a dialog box titled "Delete a Snapshot Copy - <Volume Name>". Inside the dialog, there is a message: "This action deletes the selected Snapshot copy." Below this message, there is a label "Snapshot Name" followed by a dropdown menu. The dropdown menu is open, showing the selected item "manually.2020-05-04\_1722" with a downward arrow on the right. At the bottom right of the dialog, there is a blue button labeled "Delete".

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

### Restore a snapshot to a new volume

You can restore a snapshot to a new volume as necessary.

### Steps

1. Open the working environment.
2. Hover over the volume and click **Restore to a new volume**.
3. Select the snapshot that you want to use to create the new volume from the drop-down list.
4. Enter a name for the new volume and click **Restore**.

### Restore to a new volume - <Volume Name>

This operation restores data from a Snapshot copy to a new volume.

Snapshot Name

manually.2020-05-04\_1722

Restored Volume Name:

vol\_restore

Restore

The volume is created in the working environment.

5. If you need to change any of the volume attributes, such as volume path or service level:
  - a. Hover over the volume and click **Edit**.
  - b. Make your changes and click **Update volume**.


#### After you finish


Continue with [Mounting the cloud volume](#).

## Manage your Active Directory configuration

If you changed your DNS servers or Active Directory domain, you need to modify the SMB server in Cloud Volumes Service so that it can continue to serve storage to clients.

#### Steps

1. Open the working environment.
2. Click the  button at the top of the page and click **Manage Active Directory**.

If no Active Directory is configured, you can add one now. If one is configured, you can modify or delete the settings using the  button.

3. Specify the settings for the SMB server:

Field	Description
DNS Primary IP Address	The IP addresses of the DNS servers that provide name resolution for the SMB server. Use a comma to separate the IP addresses when referencing multiple servers, for example, 172.31.25.223, 172.31.2.74.

Field	Description
Active Directory Domain to join	The FQDN of the Active Directory (AD) domain that you want the SMB server to join.
SMB Server NetBIOS name	A NetBIOS name for the SMB server that will be created.
Credentials authorized to join the domain	The name and password of a Windows account with sufficient privileges to add computers to the specified Organizational Unit (OU) within the AD domain.
Organizational Unit	The organizational unit within the AD domain to associate with the SMB server. The default is CN=Computers for connections to your own Windows Active Directory server.

4. Click **Save** to save your settings.


## Remove Cloud Volumes Service from Cloud Manager

You can remove a Cloud Volumes Service for Google Cloud subscription and all existing volumes from Cloud Manager. The volumes are not deleted, they are just removed from the Cloud Manager interface.



Deleting your Cloud Volumes Service for Google Cloud subscription from Cloud Manager isn't supported. You can do this only through the Google Cloud Console.

### Steps

1. Open the working environment.
2. Click the  button at the top of the page and click **Remove Cloud Volumes Service**.
3. In the confirmation dialog box, click **Remove**.

# Knowledge and support

## Register for support

Before you can open a support case with NetApp technical support, you need to add a NetApp Support Site account to Cloud Manager and then register for support.

### Add an NSS account

The Support Dashboard enables you to add and manage all of your NetApp Support Site accounts from a single location.

#### Steps

1. If you don't have a NetApp Support Site account yet, [register for one](#).
2. In the upper right of the Cloud Manager console, click the Help icon, and select **Support**.



3. Click **NSS Management > Add NSS Account**.
4. When you're prompted, click **Continue** to be redirected to a Microsoft login page.  
  
NetApp uses Microsoft Azure Active Directory as the identity provider for authentication services specific to support and licensing.
5. At the login page, provide your NetApp Support Site registered email address and password to perform the authentication process.

This action enables Cloud Manager to use your NSS account.

Note the account must be a customer-level account (not a guest or temp account).

### Register your account for support

Support registration is available from Cloud Manager in the Support Dashboard.

#### Steps

1. In the upper right of the Cloud Manager console, click the Help icon, and select **Support**.



2. In the **Resources** tab, click **Register for Support**.
3. Select the NSS credentials that you want to register and then click **Register**.

## Get help

NetApp provides support for Cloud Manager and its cloud services in a variety of ways. Extensive free self-support options are available 24x7, such as knowledgebase (KB) articles and a community forum. Your support registration includes remote technical support via web ticketing.

### Self support

These options are available for free, 24 hours a day, 7 days a week:

- [Knowledge base](#)

Search through the Cloud Manager knowledge base to find helpful articles to troubleshoot issues.

- [Communities](#)

Join the Cloud Manager community to follow ongoing discussions or create new ones.

- [Documentation](#)

The Cloud Manager documentation that you're currently viewing.

- [Feedback email](#)

We value your input. Submit feedback to help us improve Cloud Manager.

### NetApp support

In addition to the self-support options above, you can work with a NetApp Support Engineer to resolve any issues after you activate support.

## Steps

1. In Cloud Manager, click **Help > Support**.
2. Choose one of the available options under Technical Support:
  - a. Click **Call Us** to find phone numbers for NetApp technical support.
  - b. Click **Open an Issue**, select one the options, and then click **Send**.

A NetApp representative will review your case and get back to you soon.

# Legal notices

Legal notices provide access to copyright statements, trademarks, patents, and more.

## Copyright

<http://www.netapp.com/us/legal/copyright.aspx>

## Trademarks

NETAPP, the NETAPP logo, and the marks listed on the NetApp Trademarks page are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.

<http://www.netapp.com/us/legal/netapptmlist.aspx>

## Patents

A current list of NetApp owned patents can be found at:

<https://www.netapp.com/us/media/patents-page.pdf>

## Privacy policy

<https://www.netapp.com/us/legal/privacypolicy/index.aspx>

## Open source

Notice files provide information about third-party copyright and licenses used in NetApp software.

[Notice for Cloud Manager 3.9](#)



## Copyright Information

Copyright © 2022 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## Trademark Information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.