Guest Connected storage for GCVE

NetApp Solutions

NetApp
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NetApp Storage Options for GCP

GCP supports guest connected NetApp storage with Cloud Volumes ONTAP (CVO) or Cloud Volumes Service (CVS).

Cloud Volumes ONTAP (CVO)

Cloud volumes ONTAP, or CVO, is the industry-leading cloud data management solution built on NetApp's ONTAP storage software, available natively on Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform (GCP).

It is a software-defined version of ONTAP that consumes cloud-native storage, allowing you to have the same storage software in the cloud and on-premises, reducing the need to retrain you IT staff in all-new methods to manage your data.

CVO gives customers the ability to seamlessly move data from the edge, to the data center, to the cloud and back, bringing your hybrid cloud together — all managed with a single-pane management console, NetApp Cloud Manager.

By design, CVO delivers extreme performance and advanced data management capabilities to satisfy even your most demanding applications in the cloud

Cloud Volumes ONTAP (CVO) as guest connected storage

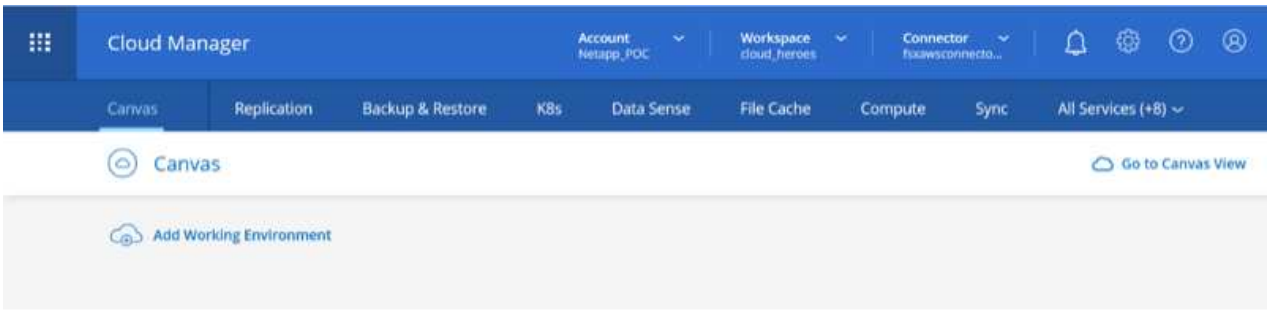
Deploy Cloud Volumes ONTAP in Google Cloud (Do It Yourself)

Cloud Volumes ONTAP shares and LUNs can be mounted from VMs that are created in the GCVE private cloud environment. The volumes can also be mounted on the Linux client and on Windows client and LUNS can be accessed on Linux or Windows clients as block devices when mounted over iSCSI because Cloud Volumes ONTAP supports iSCSI, SMB, and NFS protocols. Cloud Volumes ONTAP volumes can be set up in a few simple steps.

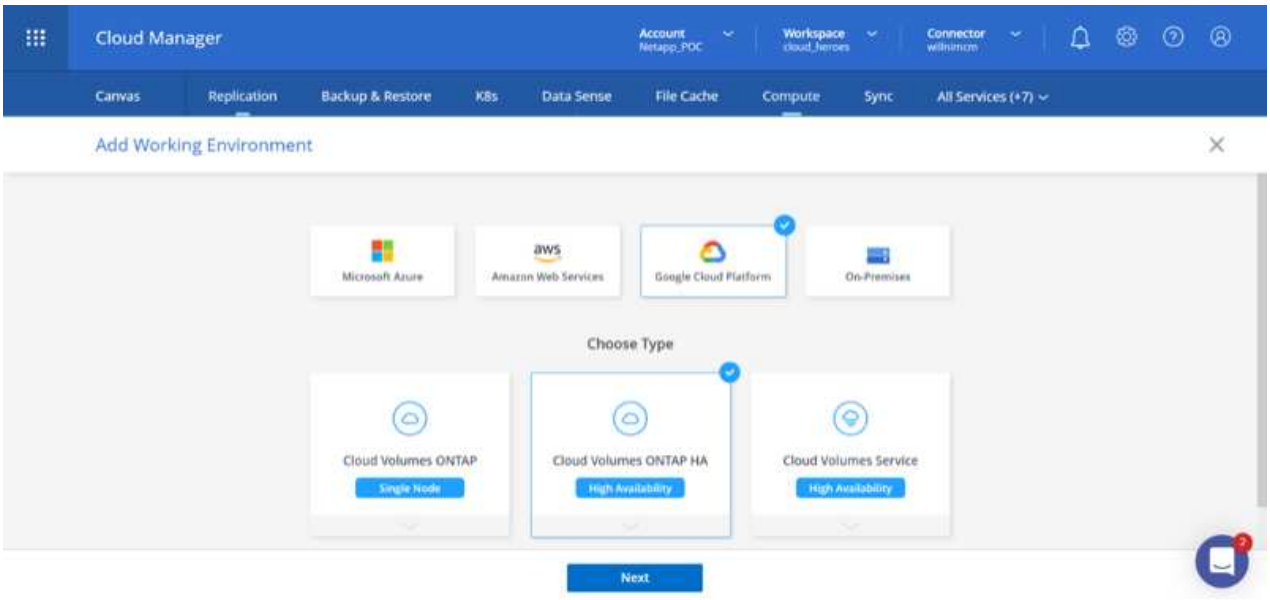
To replicate volumes from an on-premises environment to the cloud for disaster recovery or migration purposes, establish network connectivity to Google Cloud, either using a site-to-site VPN or Cloud Interconnect. Replicating data from on-premises to Cloud Volumes ONTAP is outside the scope of this document. To replicate data between on-premises and Cloud Volumes ONTAP systems, see xref:./ehc/gcp/Setting up data replication between systems.

Use Cloud Volumes ONTAP sizer to accurately size the Cloud Volumes ONTAP instances. Also monitor on-premises performance to use as inputs in the Cloud Volumes ONTAP sizer.

1. Log in to NetApp Cloud Central—the Fabric View screen is displayed. Locate the Cloud Volumes ONTAP tab and select Go to Cloud Manager. After you are logged in, the Canvas screen is displayed.

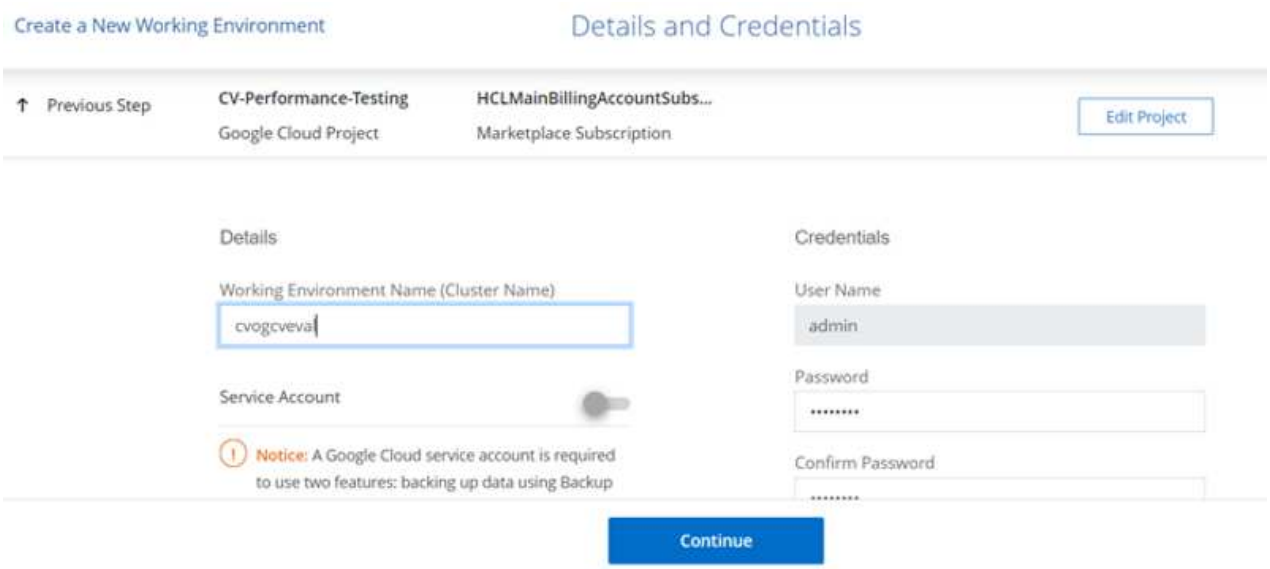


2. On the Cloud Manager Canvas tab, click Add a Working Environment and then select Google Cloud Platform as the cloud and the type of the system configuration. Then, click Next.



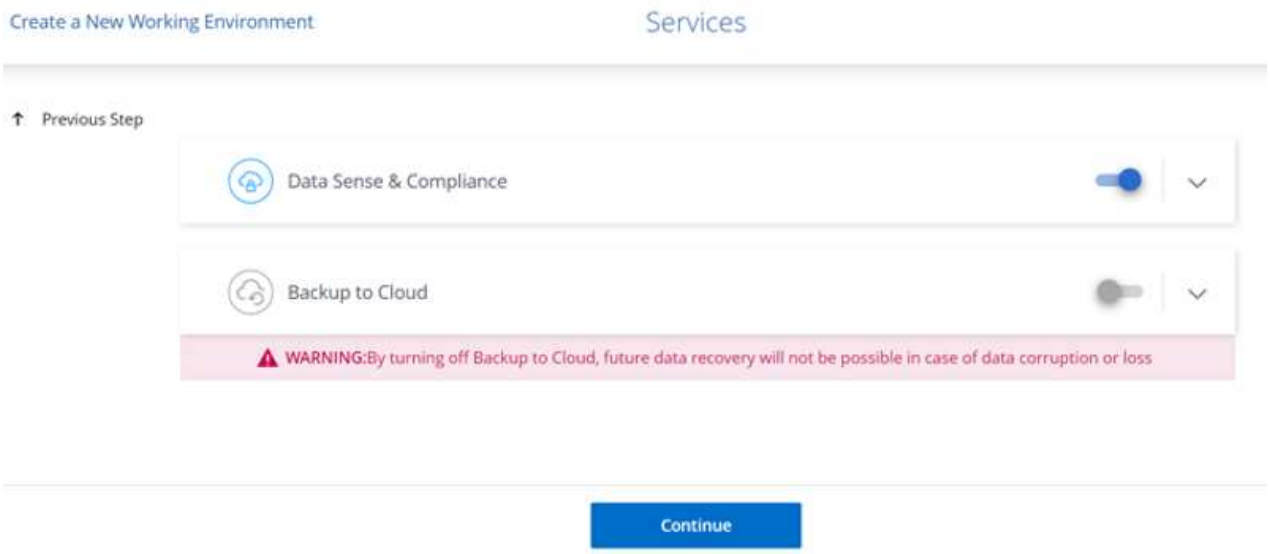
3. Provide the details of the environment to be created including the environment name and admin

credentials. After you are done, click Continue.

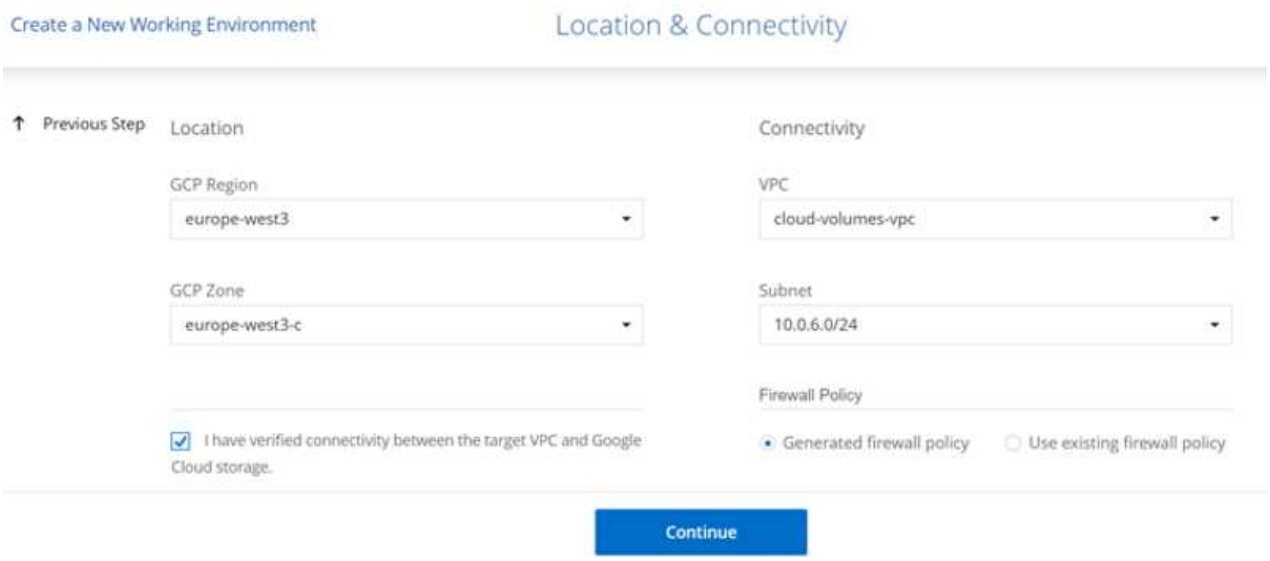


4. Select or deselect the add-on services for Cloud Volumes ONTAP deployment, including Data Sense & Compliance or Backup to Cloud. Then, click Continue.

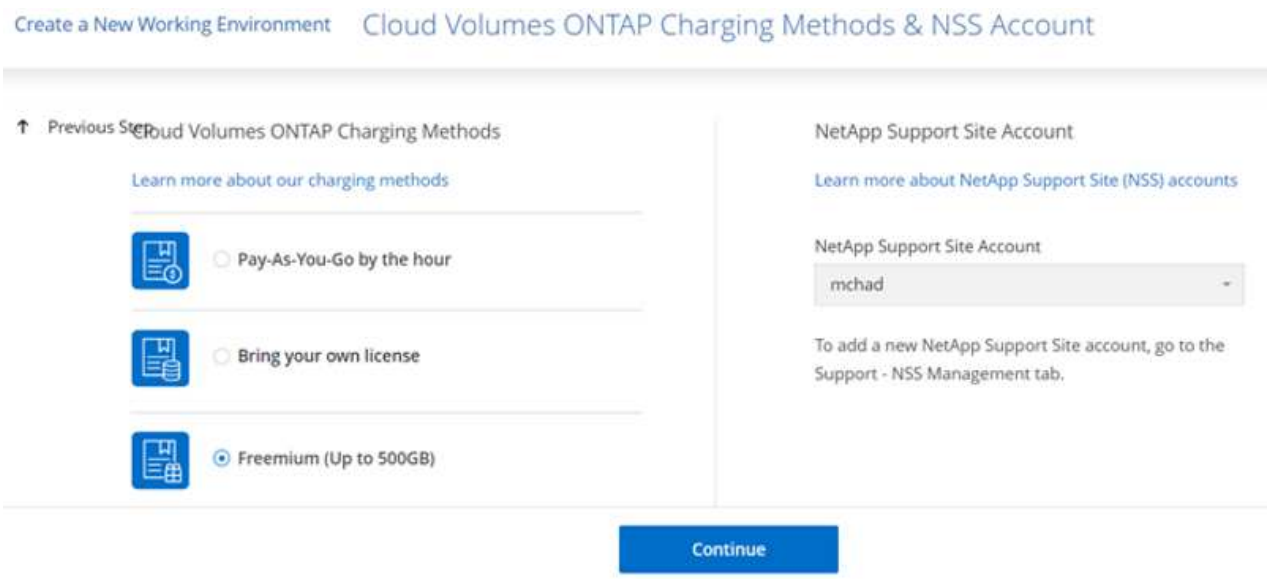
   HINT: A verification pop-up message will be displayed when deactivating add-on services. Add-on services can be added/removed after CVO deployment, consider to deselect them if not needed from the beginning to avoid costs.



5. Select a location, choose a firewall policy, and select the checkbox to confirm network connectivity to Google Cloud storage.

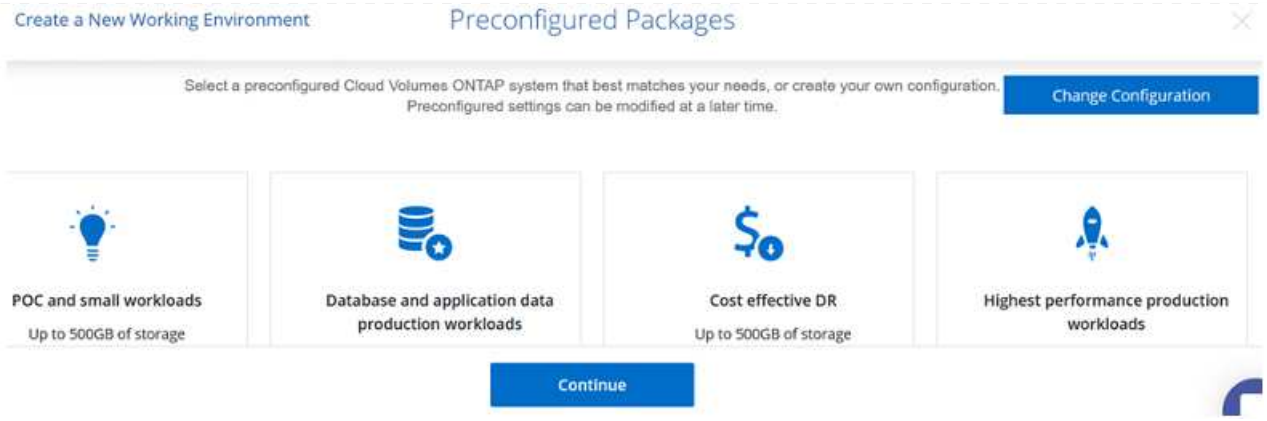


6. Select the license option: Pay-As-You-Go or BYOL for using existing license. In this example, Freemium option is used. Then, click on Continue.

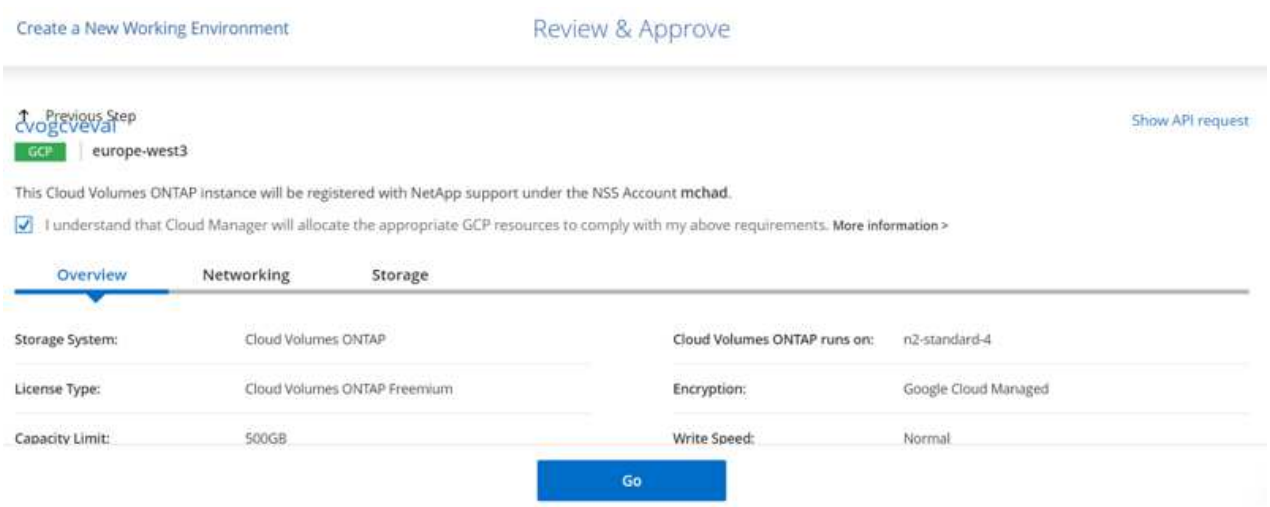


7. Select between several preconfigured packages available based on the type of workload that will be deployed on the VMs running on VMware cloud on AWS SDDC.

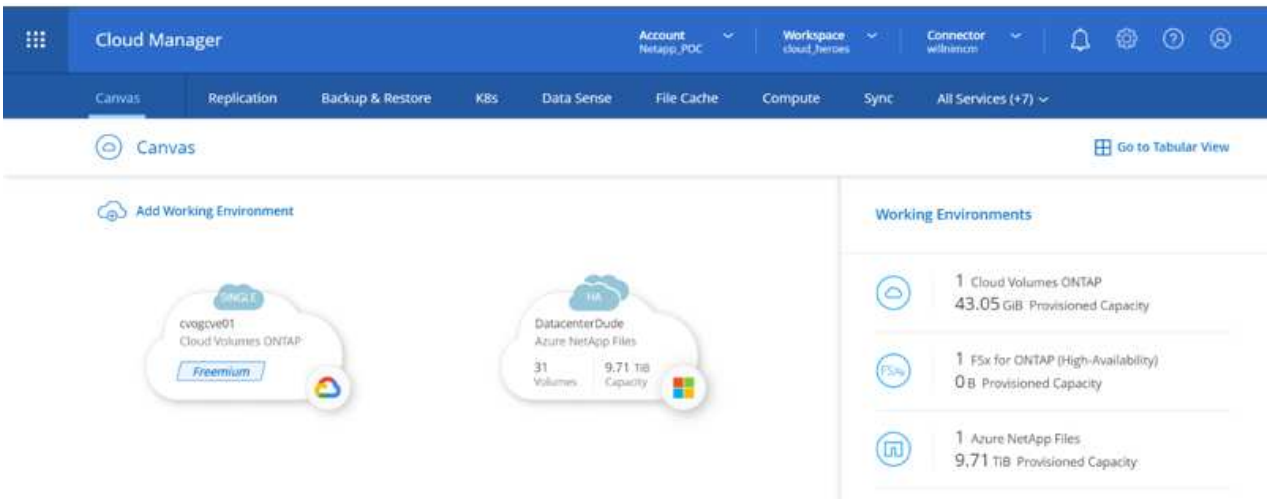
   HINT: Hoover your mouse over the tiles for details or customize CVO components and ONTAP version by clicking on Change Configuration.



8. On the Review & Approve page, review and confirm the selections.To create the Cloud Volumes ONTAP instance, click Go.



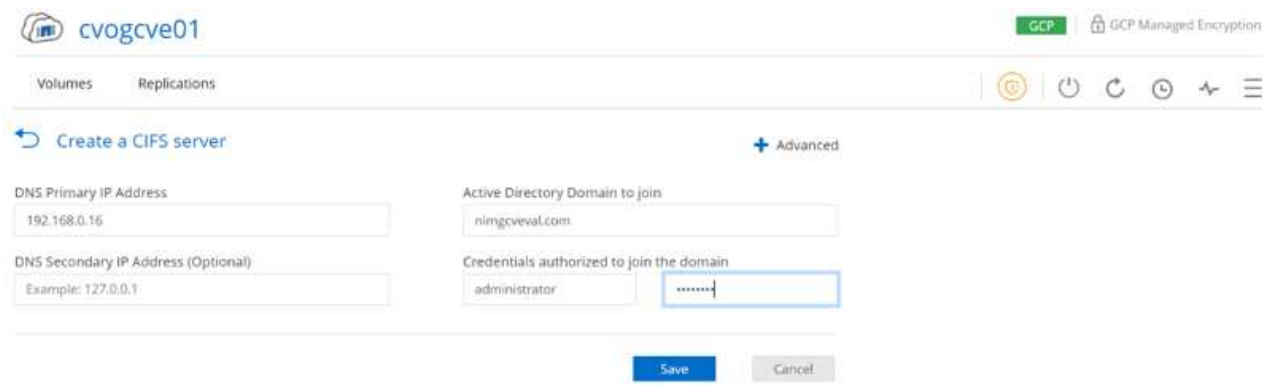
9. After Cloud Volumes ONTAP is provisioned, it is listed in the working environments on the Canvas page.



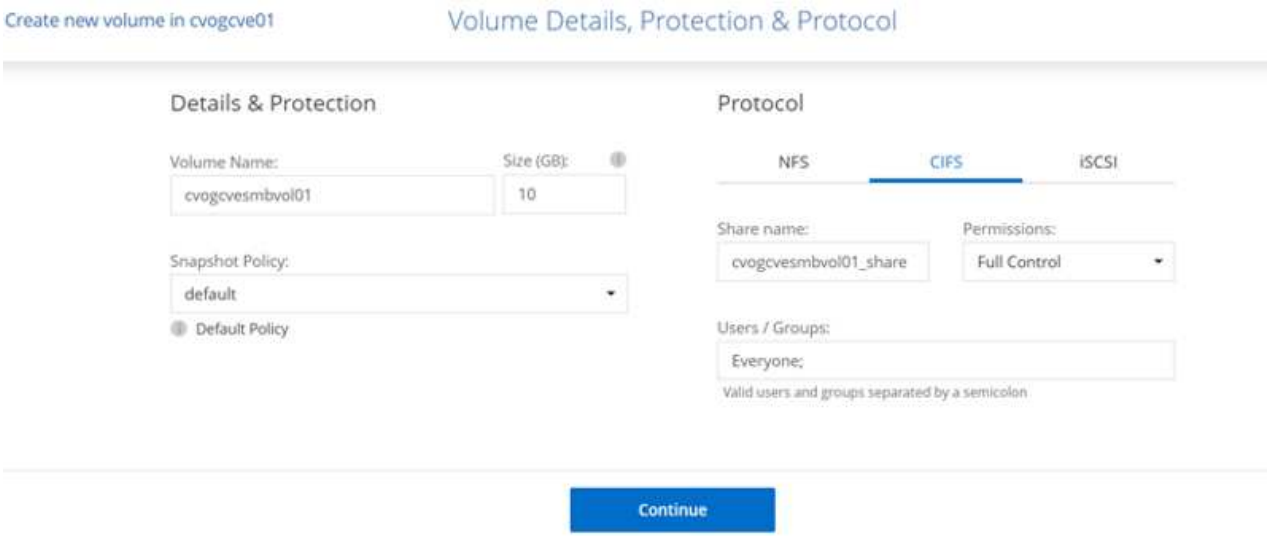
Additional configurations for SMB volumes

1. After the working environment is ready, make sure the CIFS server is configured with the appropriate DNS and Active Directory configuration parameters. This step is required before you can create the SMB volume.

   HINT: Click on the Menu Icon (º), select Advanced to display more options and select CIFS setup.



2. Creating the SMB volume is an easy process. At Canvas, double-click the Cloud Volumes ONTAP working environment to create and manage volumes and click on the Create Volume option. Choose the appropriate size and cloud manager chooses the containing aggregate or use advanced allocation mechanism to place on a specific aggregate. For this demo, CIFS/SMB is selected as the protocol.

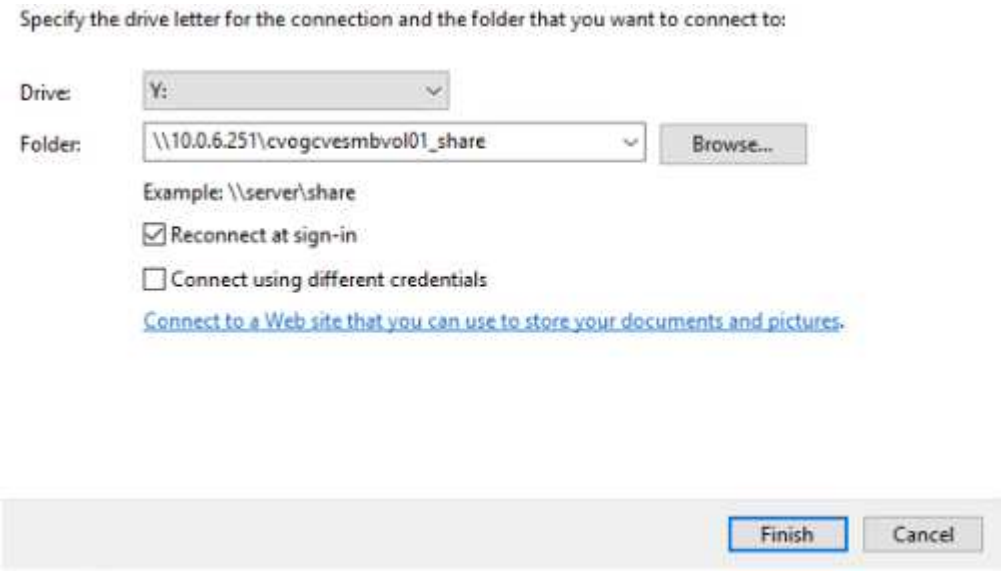


3. After the volume is provisioned, it will be availabe under the Volumes pane. Because a CIFS share is provisioned, give your users or groups permission to the files and folders and verify that those users can access the share and create a file. This step is not required if the volume is replicated from an on-premises environment because the file and folder permissions are all retained as part of SnapMirror replication.

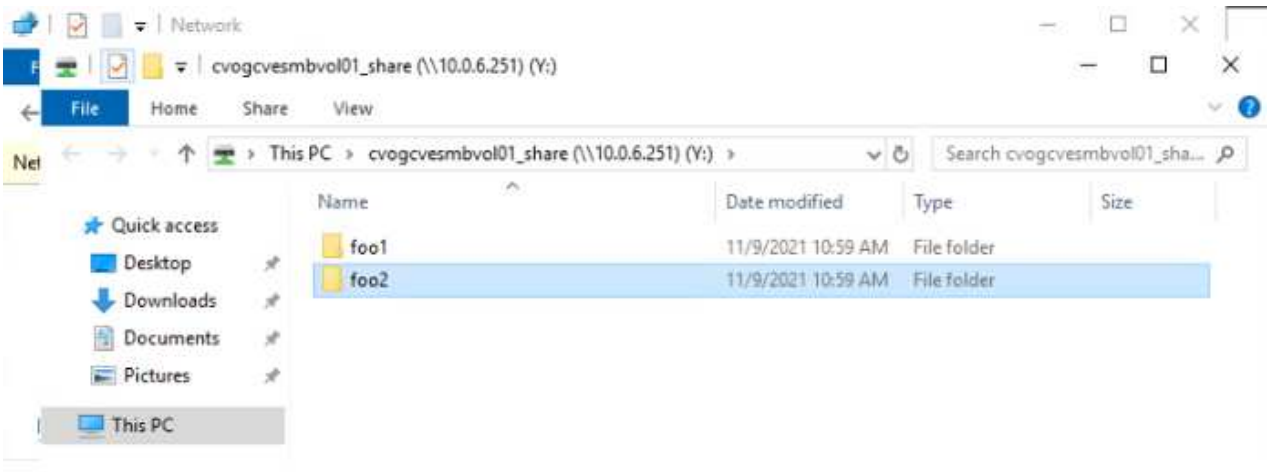
   HINT: Click on the volume menu (º) to display its options.

4. After the volume is created, use the mount command to display the volume connection instructions, then connect to the share from the VMs on Google Cloud VMware Engine.

5. Copy the following path and use the Map Network Drive option to mount the volume on the VM running on the Google Cloud VMware Engine.



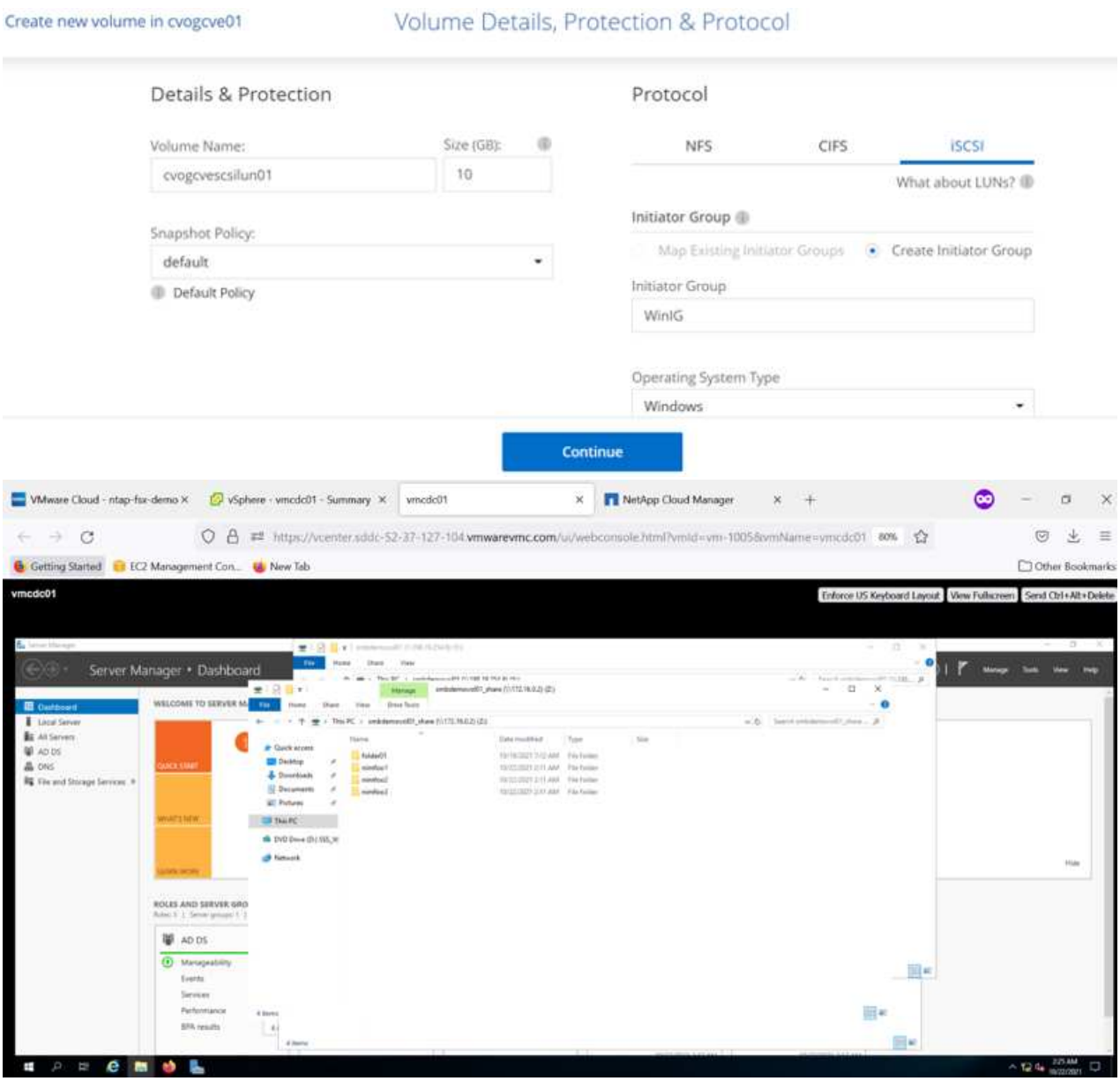
Once mapped, it can be easily accessed, and the NTFS permissions can be set accordingly.



Connect the LUN on Cloud Volumes ONTAP to a host

To connect the cloud volumes ONTAP LUN to a host, complete the following steps:

1. On the Canvas page, double-click the Cloud Volumes ONTAP working environment to create and manage volumes.
2. Click Add Volume > New Volume and select iSCSI and click Create Initiator Group. Click Continue.



3. After the volume is provisioned, select the volume menu (º), and then click Target iQN. To copy the iSCSI Qualified Name (iQN), click Copy. Set up an iSCSI connection from the host to the LUN.

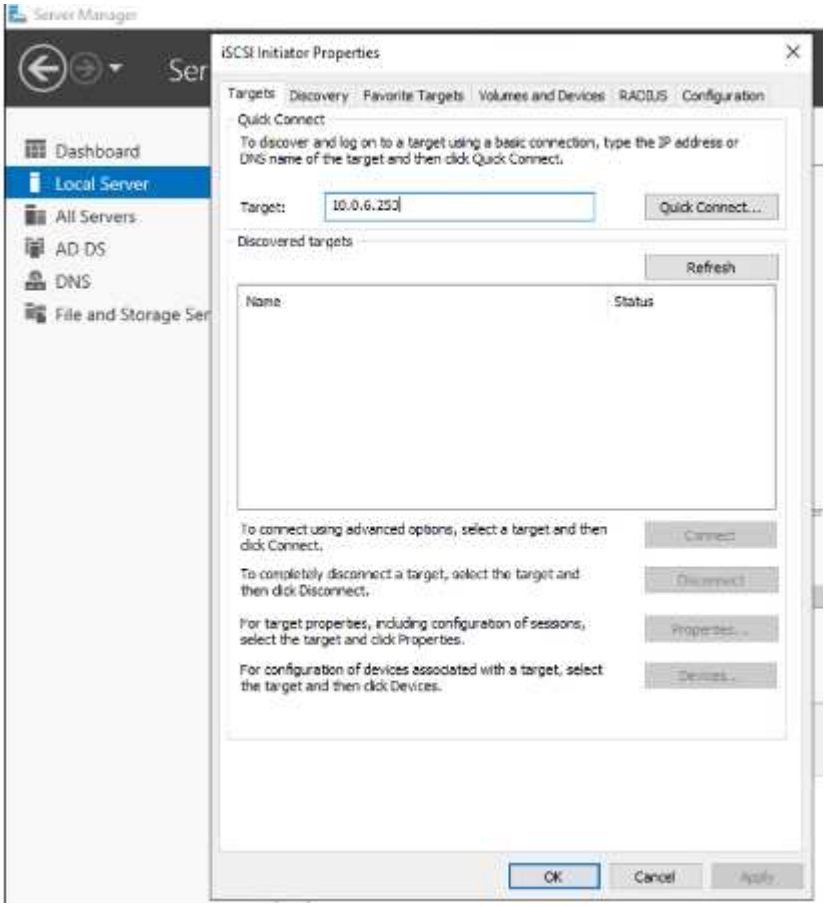
To accomplish the same for the host residing on Google Cloud VMware Engine:

a. RDP to the VM hosted on Google Cloud VMware Engine.
b. Open the iSCSI Initiator Properties dialog box: Server Manager > Dashboard > Tools > iSCSI Initiator.
c. From the Discovery tab, click Discover Portal or Add Portal and then enter the IP address of the iSCSI target port.

d. From the Targets tab, select the target discovered and then click Log on or Connect.

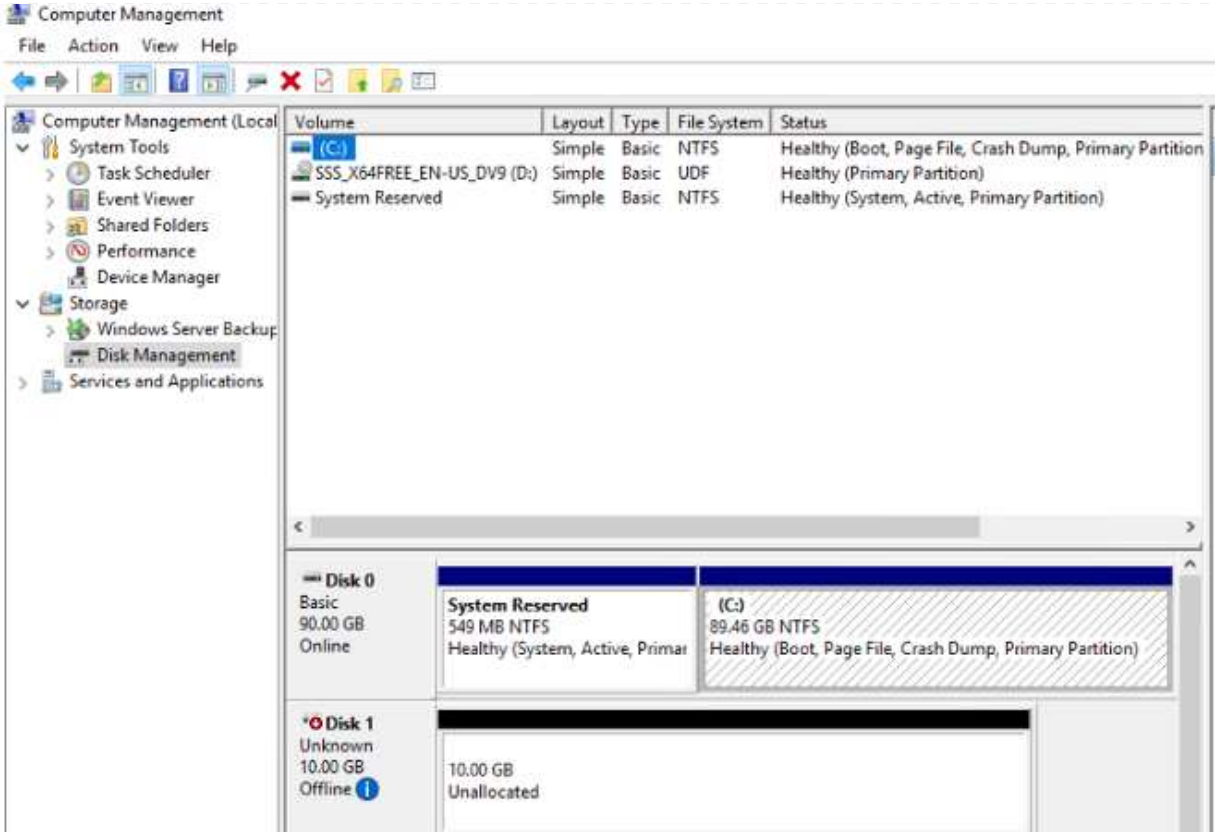
e. Select Enable multipath, and then select Automatically Restore This Connection When the Computer Starts or Add This Connection to the List of Favorite Targets. Click Advanced.

> The Windows host must have an iSCSI connection to each node in the cluster. The native DSM selects the best paths to use.



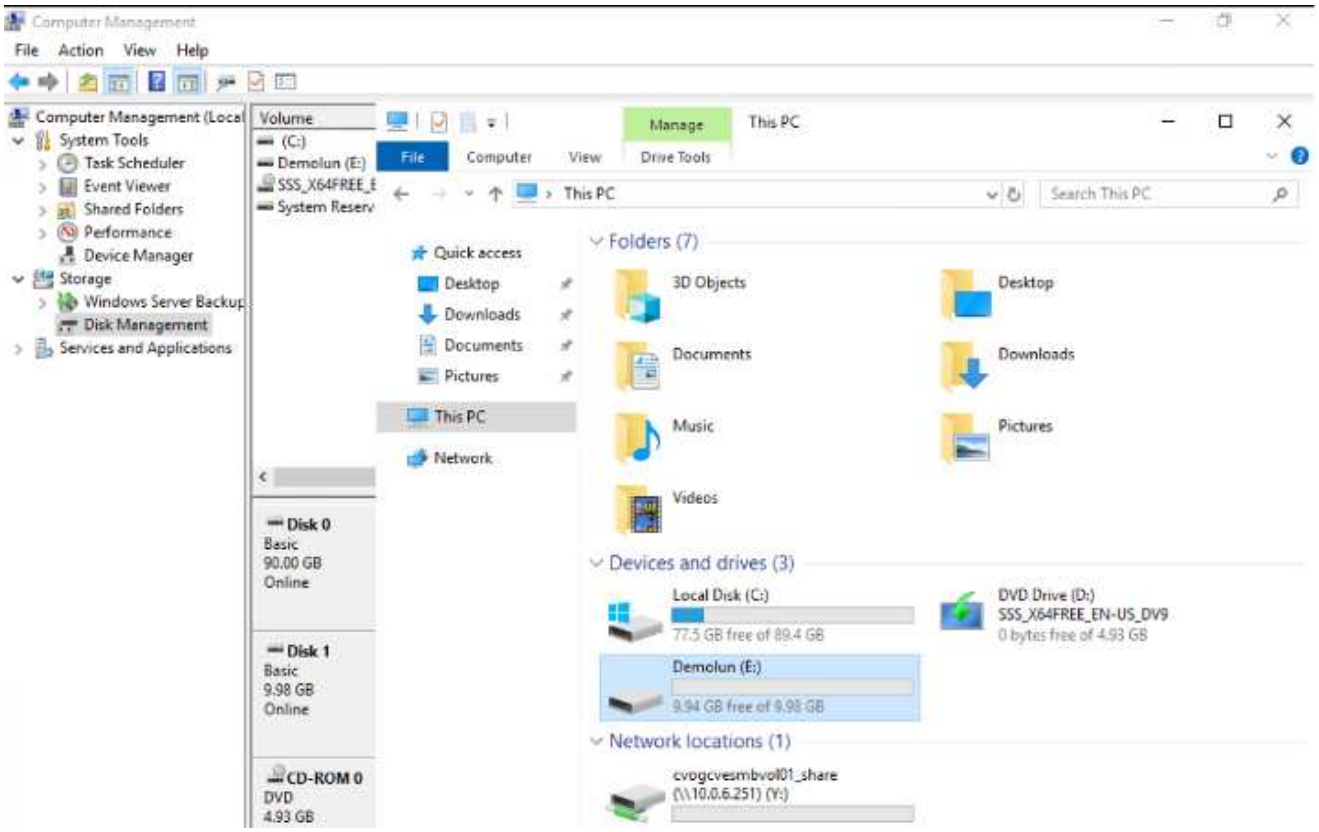
LUNs on storage virtual machine (SVM) appear as disks to the Windows host. Any new disks that are added are not automatically discovered by the host. Trigger a manual rescan to discover the disks by completing the following steps:

1. Open the Windows Computer Management utility: Start > Administrative Tools > Computer Management.
2. Expand the Storage node in the navigation tree.
3. Click Disk Management.
4. Click Action > Rescan Disks.



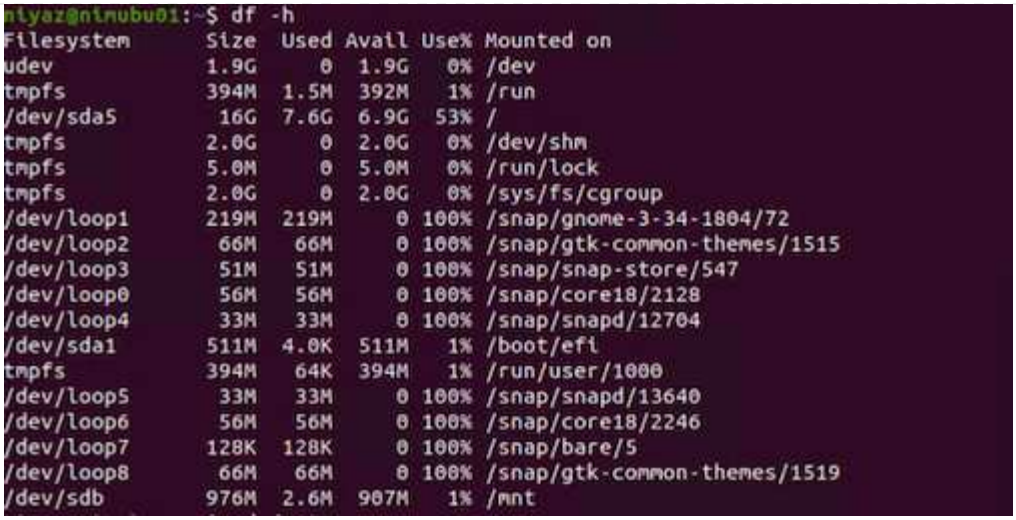
When a new LUN is first accessed by the Windows host, it has no partition or file system. Initialize the LUN; and optionally, format the LUN with a file system by completing the following steps:

5. Start Windows Disk Management.
6. Right-click the LUN, and then select the required disk or partition type.
7. Follow the instructions in the wizard. In this example, drive F: is mounted.



On the Linux clients, ensure the iSCSI daemon is running. Once the LUNs are provisioned, refer to the detailed guidance on iSCSI configuration with Ubuntu as an example here. To verify, run lsblk cmd from the shell.

```
niyaz@nimubu01:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0    7:0    0 55.4M  1 loop /snap/core18/2128
loop1    7:1    0  219M  1 loop /snap/gnome-3-34-1804/72
loop2    7:2    0 65.1M  1 loop /snap/gtk-common-themes/1515
loop3    7:3    0   51M  1 loop /snap/snap-store/547
loop4    7:4    0 32.3M  1 loop /snap/snapd/12704
loop5    7:5    0 32.5M  1 loop /snap/snapd/13640
loop6    7:6    0 55.5M  1 loop /snap/core18/2246
loop7    7:7    0    4K  1 loop /snap/bare/5
loop8    7:8    0 65.2M  1 loop /snap/gtk-common-themes/1519
sda      8:0    0   16G  0 disk
├─sda1   8:1    0  512M  0 part /boot/efi
├─sda2   8:2    0    1K  0 part
└─sda5   8:5    0 15.5G  0 part /
sdb      8:16   0    1G  0 disk
```

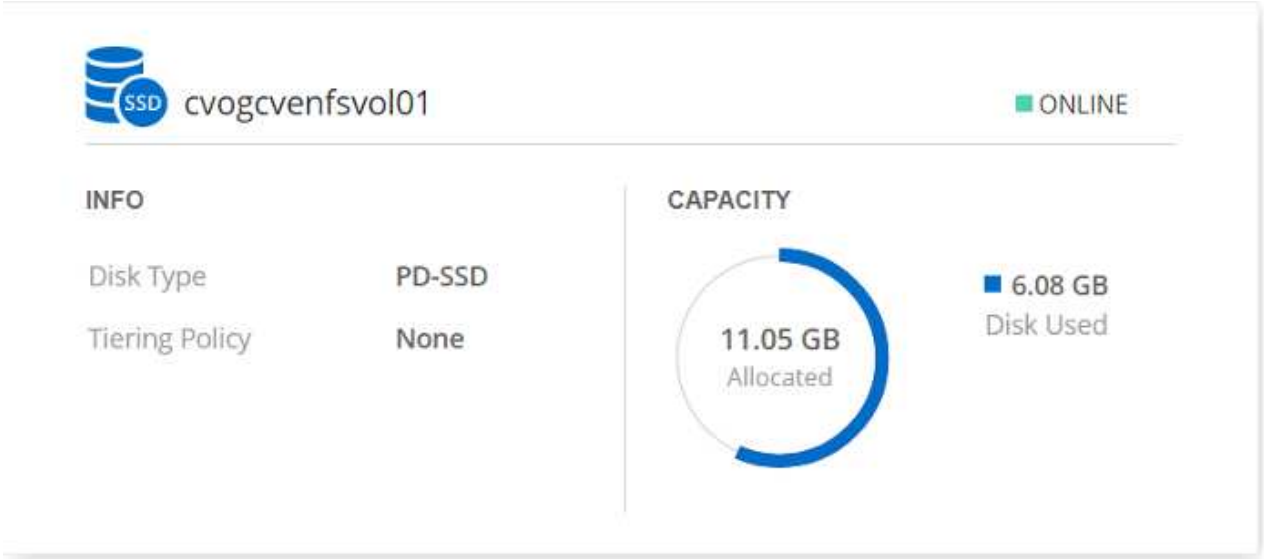

niyaz@ninubu01:~$ df -h
Filesystem Size Used Avail Use% Mounted on
udev 1.9G 0 1.9G 0% /dev
tmpfs 394M 1.5M 392M 1% /run
/dev/sda5 16G 7.6G 6.9G 53% /
tmpfs 2.0G 0 2.0G 0% /dev/shm
tmpfs 5.0M 0 5.0M 0% /run/lock
tmpfs 2.0G 0 2.0G 0% /sys/fs/cgroup
/dev/loop1 219M 219M 0 100% /snap/gnome-3-34-1804/72
/dev/loop2 66M 66M 0 100% /snap/gtk-common-themes/1515
/dev/loop3 51M 51M 0 100% /snap/snap-store/547
/dev/loop0 56M 56M 0 100% /snap/core18/2128
/dev/loop4 33M 33M 0 100% /snap/snapd/12704
/dev/sda1 511M 4.0K 511M 1% /boot/efi
tmpfs 394M 64K 394M 1% /run/user/1000
/dev/loop5 33M 33M 0 100% /snap/snapd/13640
/dev/loop6 56M 56M 0 100% /snap/core18/2246
/dev/loop7 128K 128K 0 100% /snap/bare/5
/dev/loop8 66M 66M 0 100% /snap/gtk-common-themes/1519
/dev/sdb 976M 2.6M 907M 1% /mnt

Mount Cloud Volumes ONTAP NFS volume on Linux client

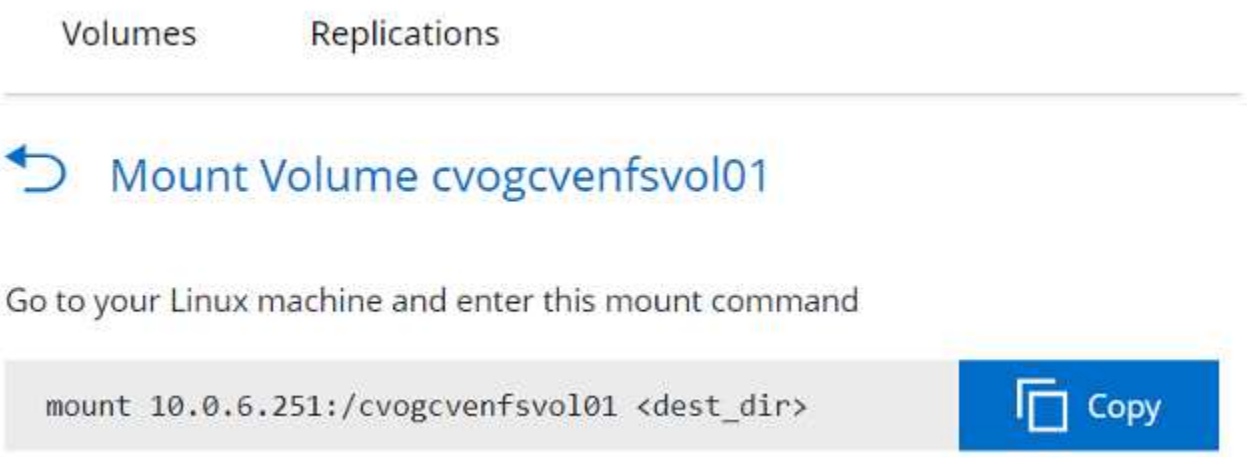
To mount the Cloud Volumes ONTAP (DIY) file system from VMs within Google Cloud VMware Engine, follow the below steps:

Provision the volume following the below steps

1. In the Volumes tab, click Create New Volume.
2. On the Create New Volume page, select a volume type:



3. In the Volumes tab, place your mouse cursor over the volume, select the menu icon (º), and then click Mount Command.



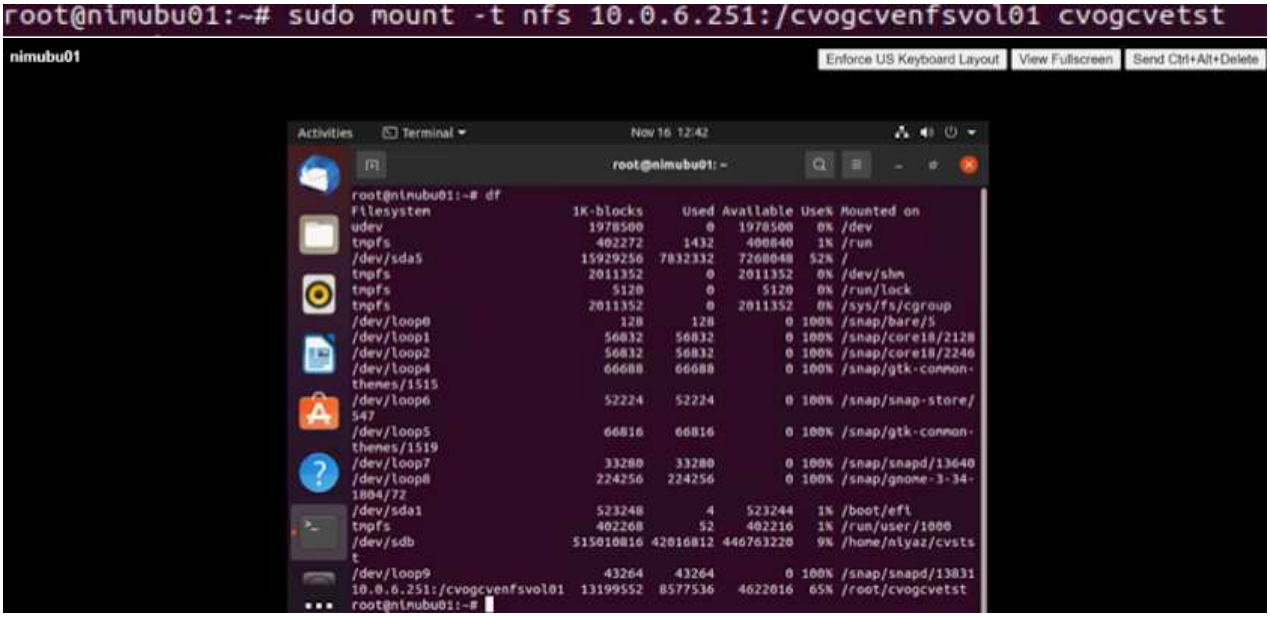
4. Click Copy.
5. Connect to the designated Linux instance.
6. Open a terminal on the instance using secure shell (SSH) and log in with the appropriate credentials.
7. Make a directory for the volume's mount point with the following command.

```
$ sudo mkdir /cvogcvetst
```

```
root@nimubu01:~# sudo mkdir cvogcvetst
```

8. Mount the Cloud Volumes ONTAP NFS volume to the directory that is created in the previous step.

```
sudo mount 10.0.6.251:/cvogcvenfsvol01 /cvogcvetst
```



Cloud Volumes Service (CVS)

Cloud Volumes Services (CVS) is a complete portfolio of data services to deliver advanced cloud solutions. Cloud Volumes Services supports multiple file access protocols for major cloud providers (NFS and SMB support).

Other benefits and features include: data protection and restore with Snapshot; special features to replicate, sync and migrate data destinations on-prem or in the cloud; and consistent high performance at the level of a dedicated flash storage system.

Cloud Volumes Service (CVS) as guest connected storage

Configure Cloud Volumes Service with VMware Engine

Cloud Volumes Service shares can be mounted from VMs that are created in the VMware Engine environment. The volumes can also be mounted on the Linux client and mapped on the Windows client because Cloud Volumes Service supports SMB and NFS protocols. Cloud Volumes Service volumes can be set up in simple steps.

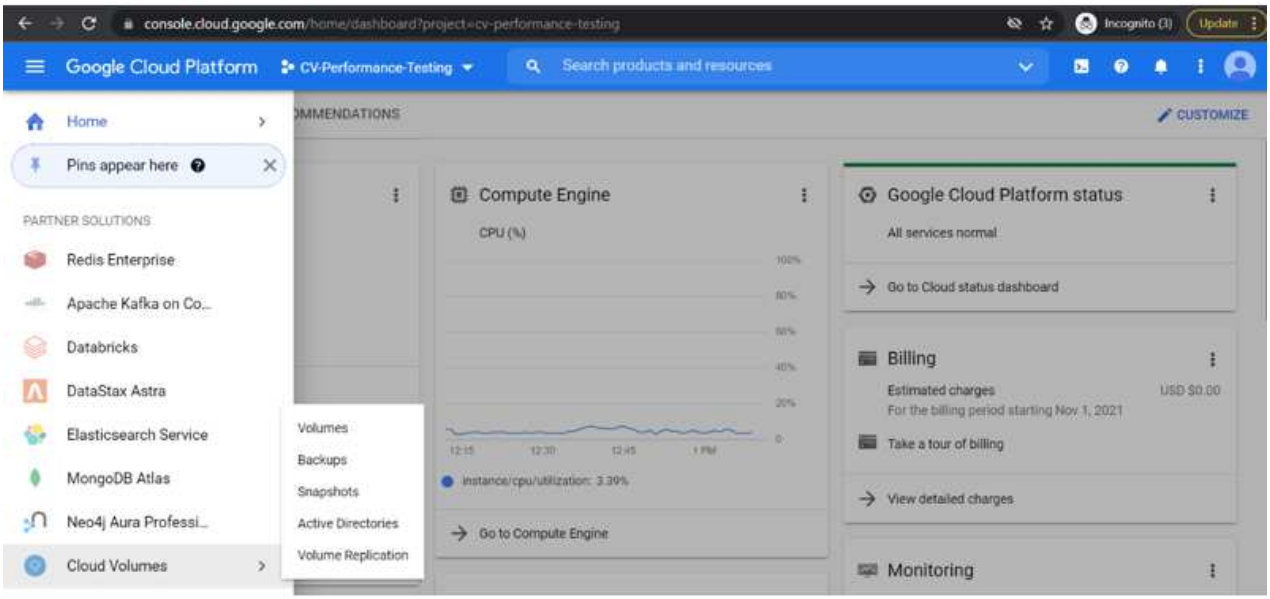
Cloud Volume Service and Google Cloud VMware Engine private cloud must be in the same region.

To purchase, enable and configure NetApp Cloud Volumes Service for Google Cloud from the Google Cloud Marketplace, follow this detailed guide.

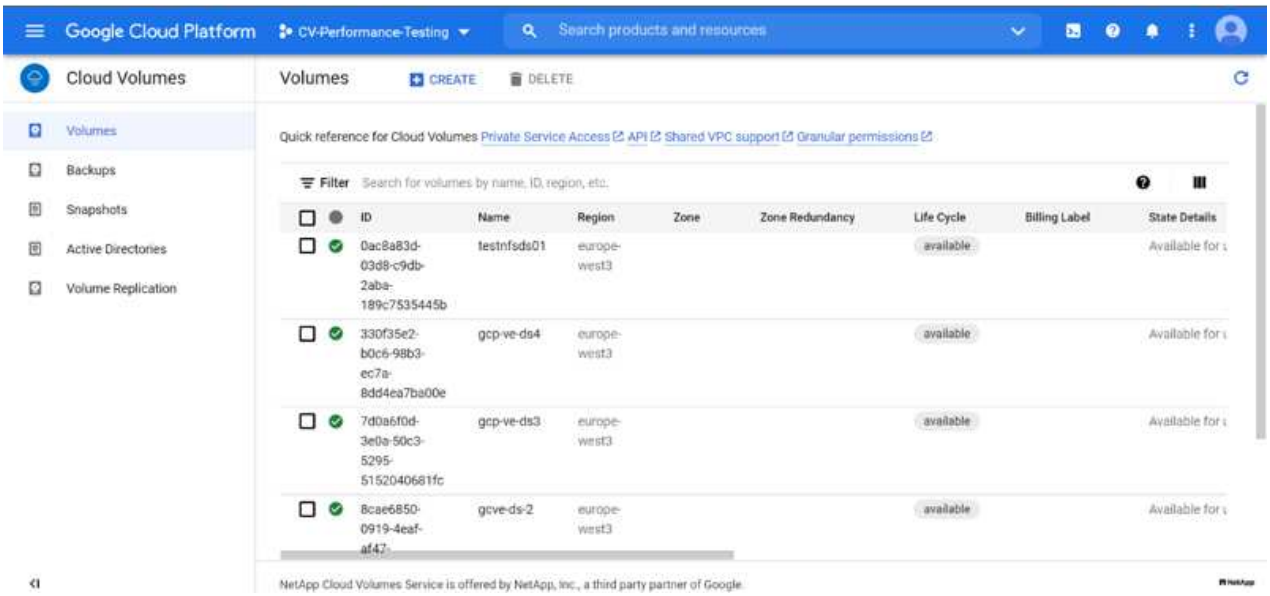
Create a CVS NFS volume to GCVE private cloud

To create and mount NFS volumes, complete the following steps:

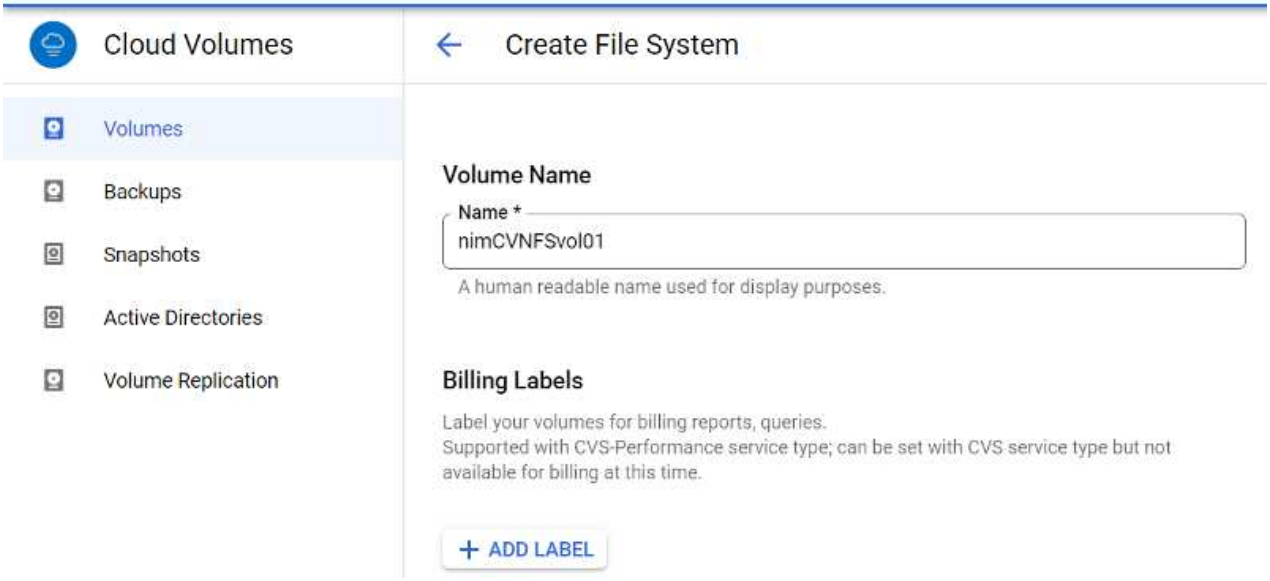
1. Access Cloud Volumes from Partner Solutions within the Google cloud console.



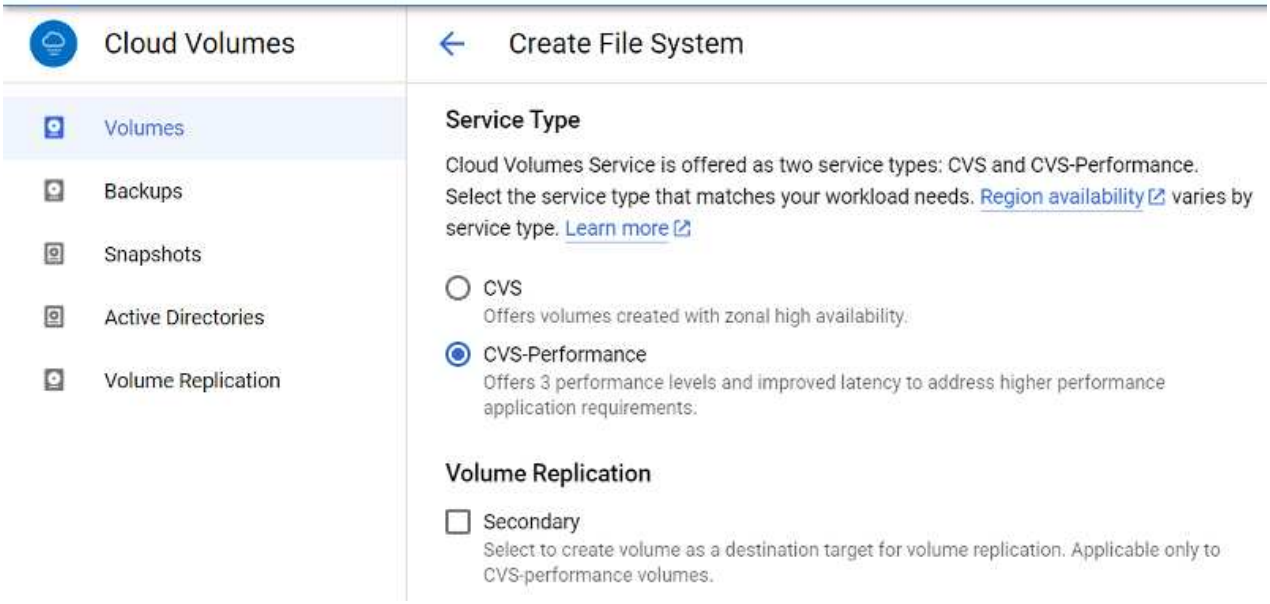
2. In the Cloud Volumes Console, go to the Volumes page and click Create.



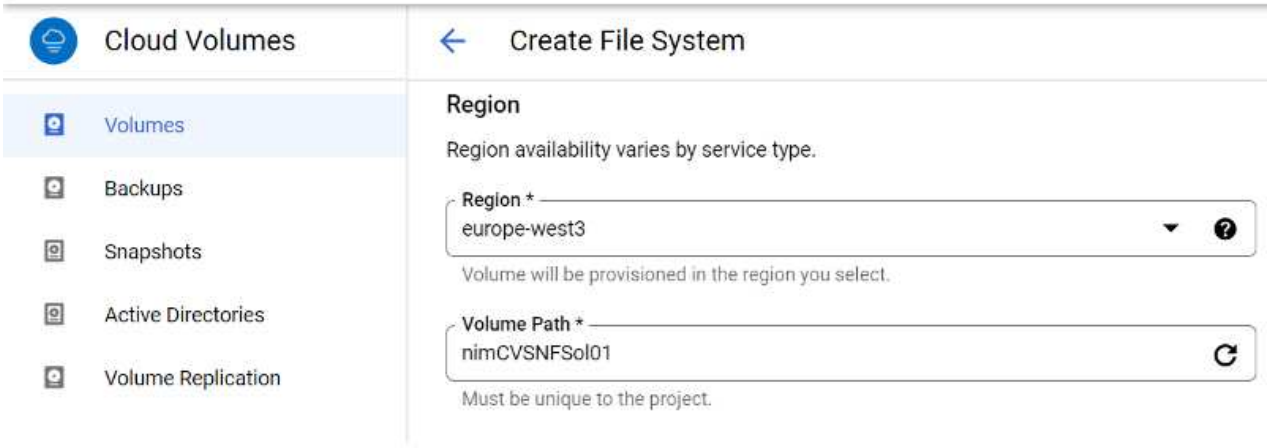
3. On the Create File System page, specify the volume name and billing labels as required for chargeback mechanisms.



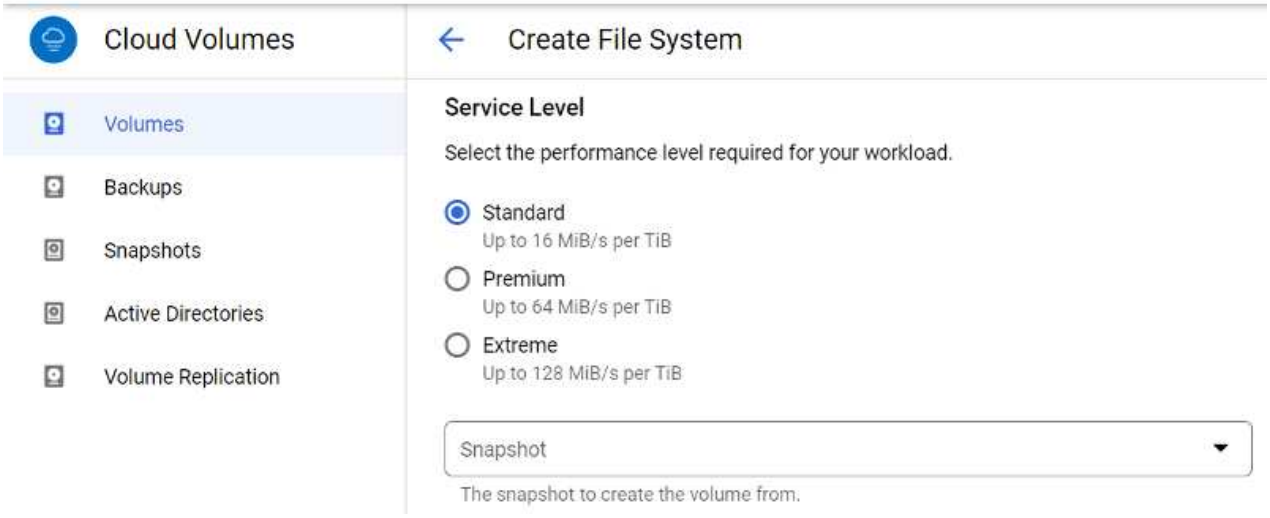
4. Select the appropriate service. For GCVE, choose CVS-Performance and desired service level for improved latency and higher performance based on the application workload requirements.



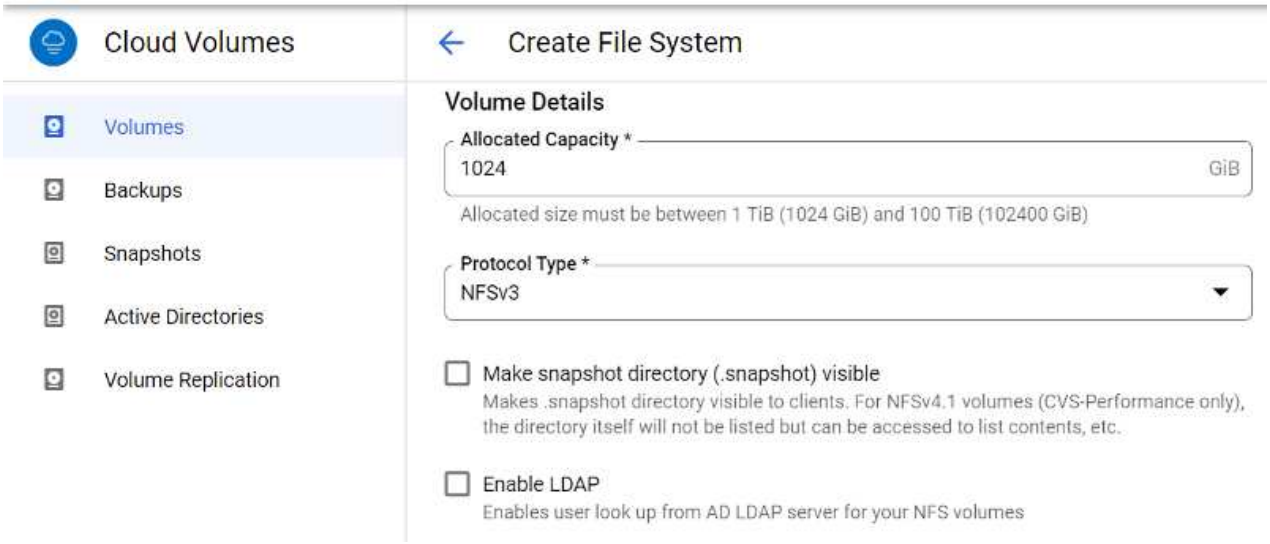
5. Specify the Google Cloud region for the volume and volume path (The volume path must be unique across all of cloud volumes in the project)



6. Select the level of performance for the volume.

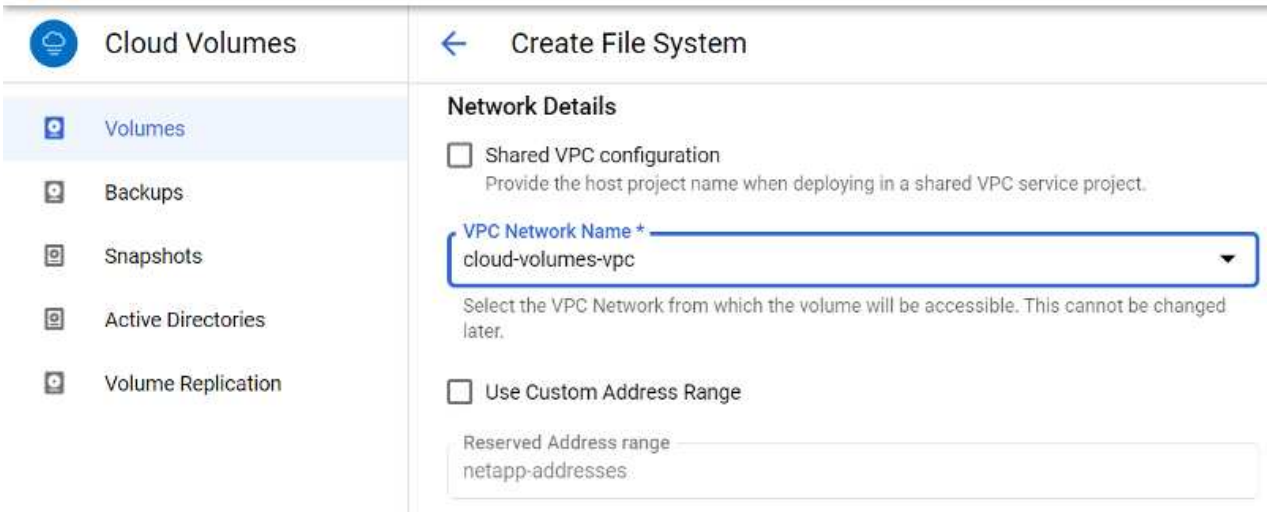


7. Specify the size of the volume and the protocol type. In this testing, NFSv3 is used.



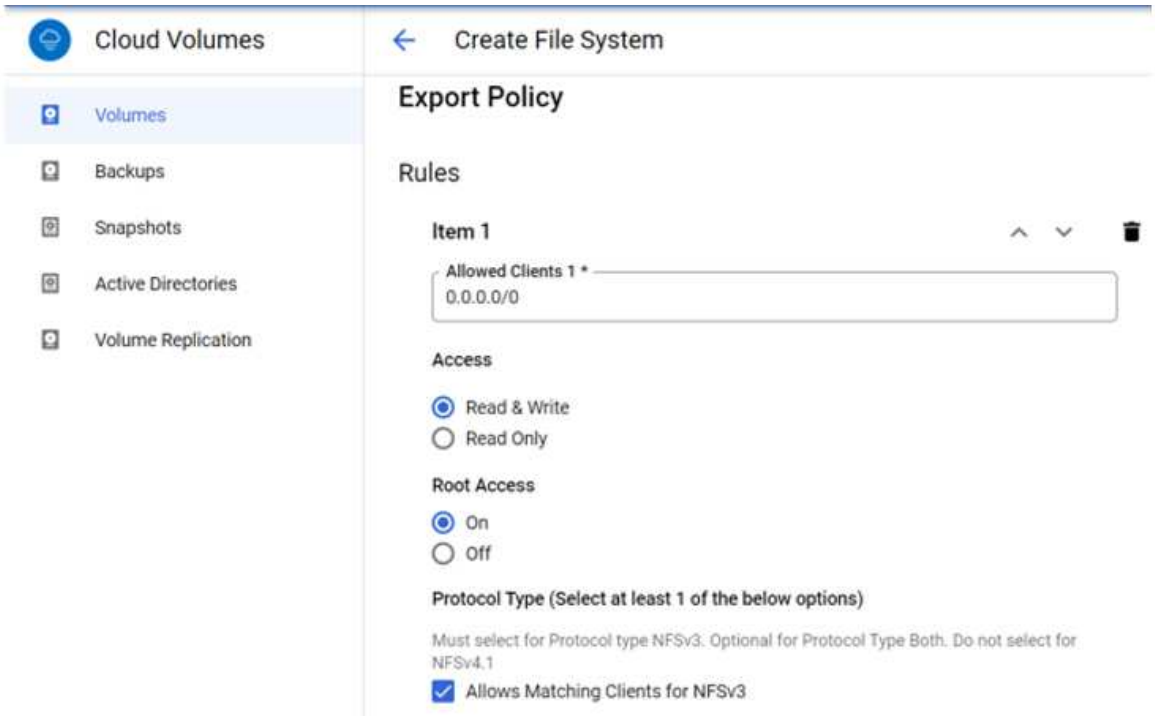
8. In this step, select the VPC Network from which the volume will be accessible. Ensure VPC peering is in place.

HINT: If VPC peering has not been done, a pop-up button will be displayed to guide you through the peering commands. Open a Cloud Shell session and execute the appropriate commands to peer your VPC with Cloud Volumes Service producer. In case you decide to prepare VPC peering in beforehand, refer to these instructions.



9. Manage the Export policy rules by adding the appropriate rules and Select the checkbox for the corresponding NFS version.

   Note: Access to NFS volumes won't be possible unless an export policy is added.



10. Click Save to create the volume.

Mounting NFS exports to VMs running on VMware Engine

Before preparing to mount the NFS volume, ensure the peering status of private connection is listed as Active. Once status is Active, use the mount command.

To mount an NFS volume, do the following:

1. In the Cloud Console, go to Cloud Volumes > Volumes.
2. Go to the Volumes page
3. Click the NFS volume for which you want to mount NFS exports.
4. Scroll to the right, under Show More, click Mount Instructions.

To perform the mounting process from within the guest OS of the VMware VM, follow the below steps:

1. Use SSH client and SSH to the virtual machine.
2. Install the nfs client on the instance.
   a. On Red Hat Enterprise Linux or SuSE Linux instance:

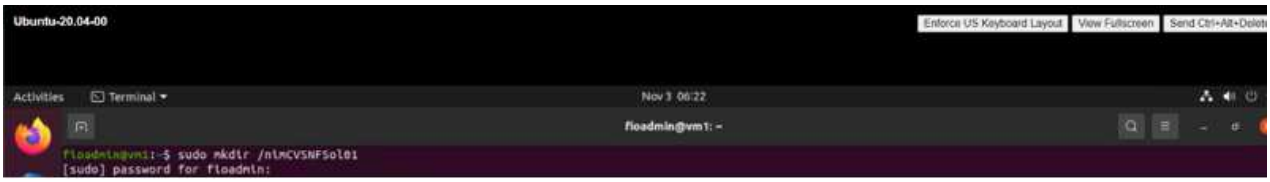
```
sudo yum install -y nfs-utils
```

   b. On an Ubuntu or Debian instance:

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

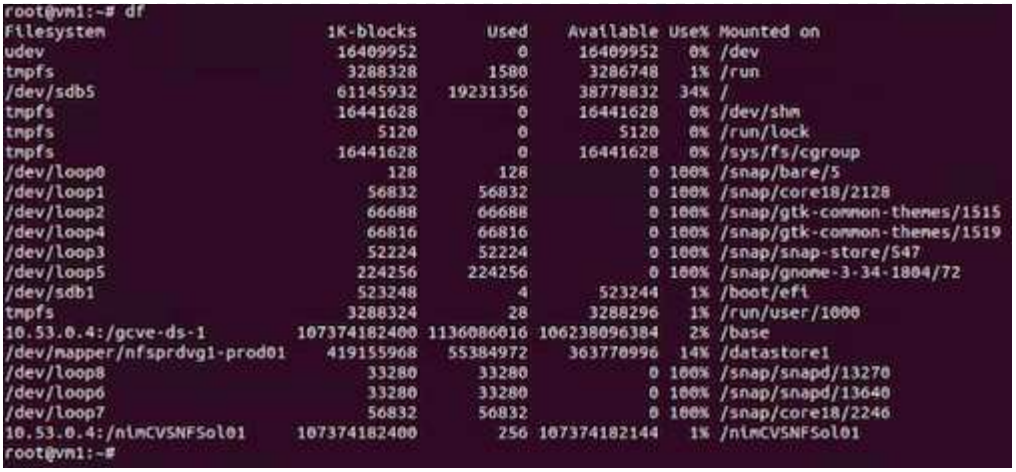
3. Create a new directory on the instance, such as "/nimCVSNFSol01":

```
sudo mkdir /nimCVSNFSol01
```



4. Mount the volume using the appropriate command. Example command from the lab is below:

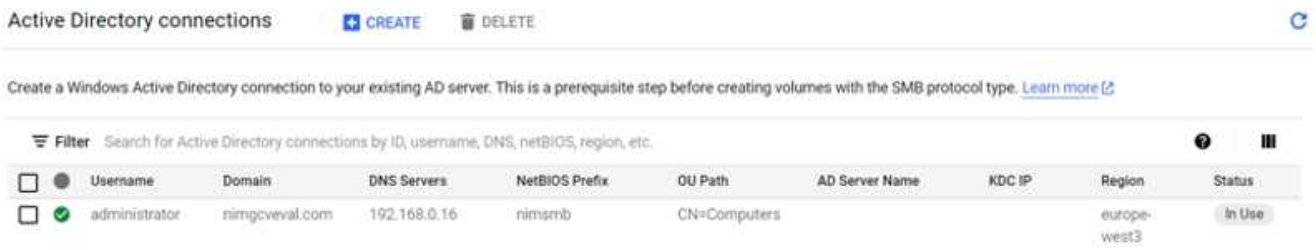
```
sudo mount -t nfs -o rw,hard,rsize=65536,wsize=65536,vers=3,tcp
10.53.0.4:/nimCVSNFSol01 /nimCVSNFSol01
```



```
root@vm1:~# df
Filesystem                     1K-blocks        Used    Available Use% Mounted on
udev                            16409952           0     16409952   0% /dev
tmpfs                            3288328        1580      3286748   1% /run
/dev/sdb5                       61145932    19231356     38778832  34% /
tmpfs                           16441628           0     16441628   0% /dev/shm
tmpfs                               5120           0         5120   0% /run/lock
tmpfs                           16441628           0     16441628   0% /sys/fs/cgroup
/dev/loop0                            128         128            0 100% /snap/bare/5
/dev/loop1                          56832       56832            0 100% /snap/core18/2128
/dev/loop2                          66688       66688            0 100% /snap/gtk-common-themes/1515
/dev/loop4                          66816       66816            0 100% /snap/gtk-common-themes/1519
/dev/loop3                          52224       52224            0 100% /snap/snap-store/547
/dev/loop5                         224256      224256            0 100% /snap/gnome-3-34-1804/72
/dev/sdb1                          523248           4       523244   1% /boot/efi
tmpfs                             3288324          28      3288296   1% /run/user/1000
10.53.0.4:/gcve-ds-1          107374182400  1136086016 106238096384   2% /base
/dev/mapper/nfsprdvg1-prod01    419155968    55384972    363770996  14% /datastore1
/dev/loop8                          33280       33280            0 100% /snap/snapd/13270
/dev/loop6                          33280       33280            0 100% /snap/snapd/13640
/dev/loop7                          56832       56832            0 100% /snap/core18/2246
10.53.0.4:/nlmCVSNFSol01      107374182400         256 107374182144   1% /nlmCVSNFSol01
root@vm1:~#
```

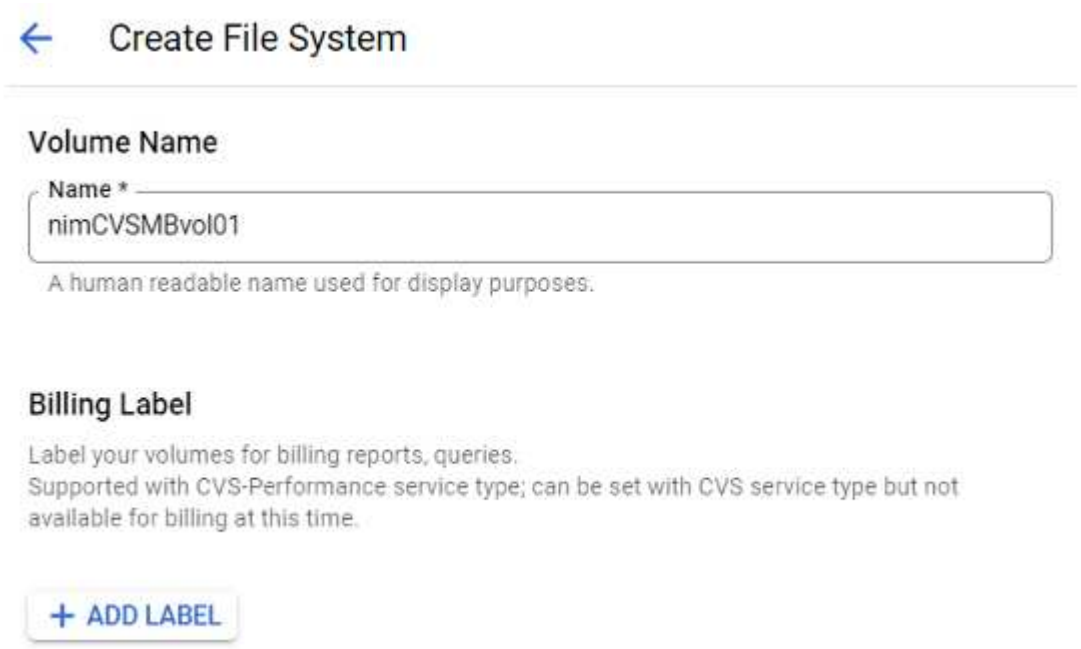
Creating and Mounting SMB Share to VMs running on VMware Engine

For SMB volumes, make sure the Active Directory connections is configured prior to creating the SMB volume.

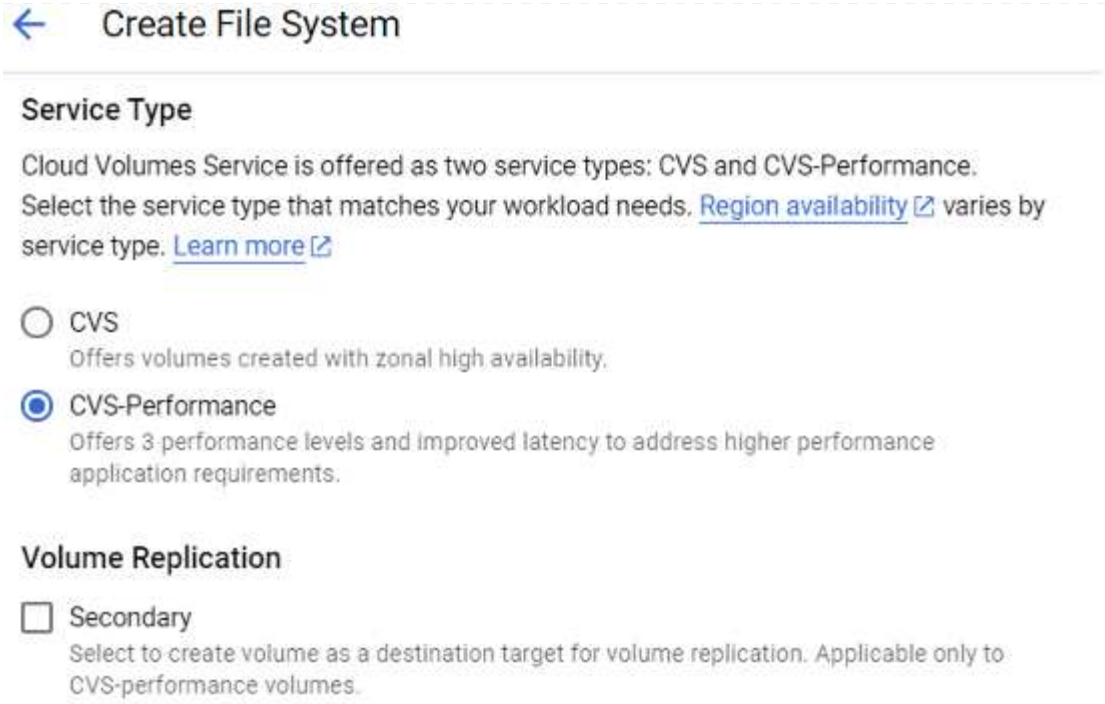


Once the AD connection is in place, create the volume with the desired service level. The steps are like creating NFS volume except selecting the appropriate protocol.

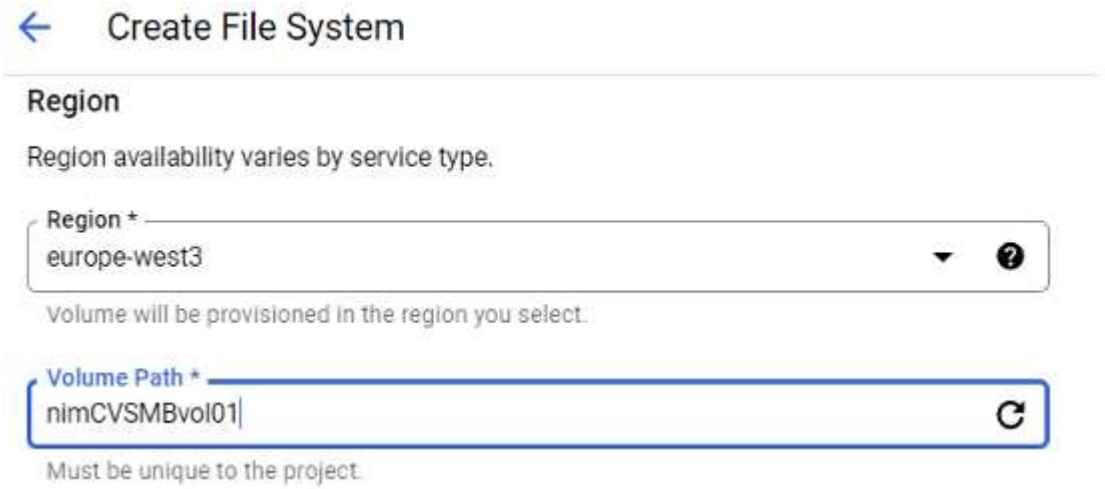
1. In the Cloud Volumes Console, go to the Volumes page and click Create.
2. On the Create File System page, specify the volume name and billing labels as required for chargeback mechanisms.



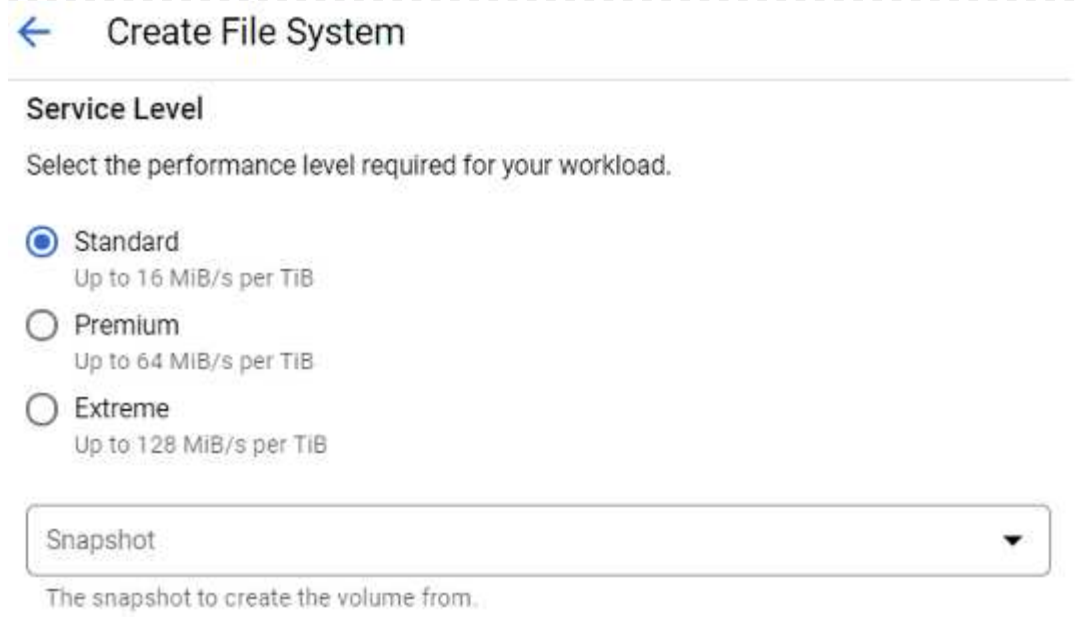
3. Select the appropriate service. For GCVE, choose CVS-Performance and desired service level for improved latency and higher performance based on the workload requirements.



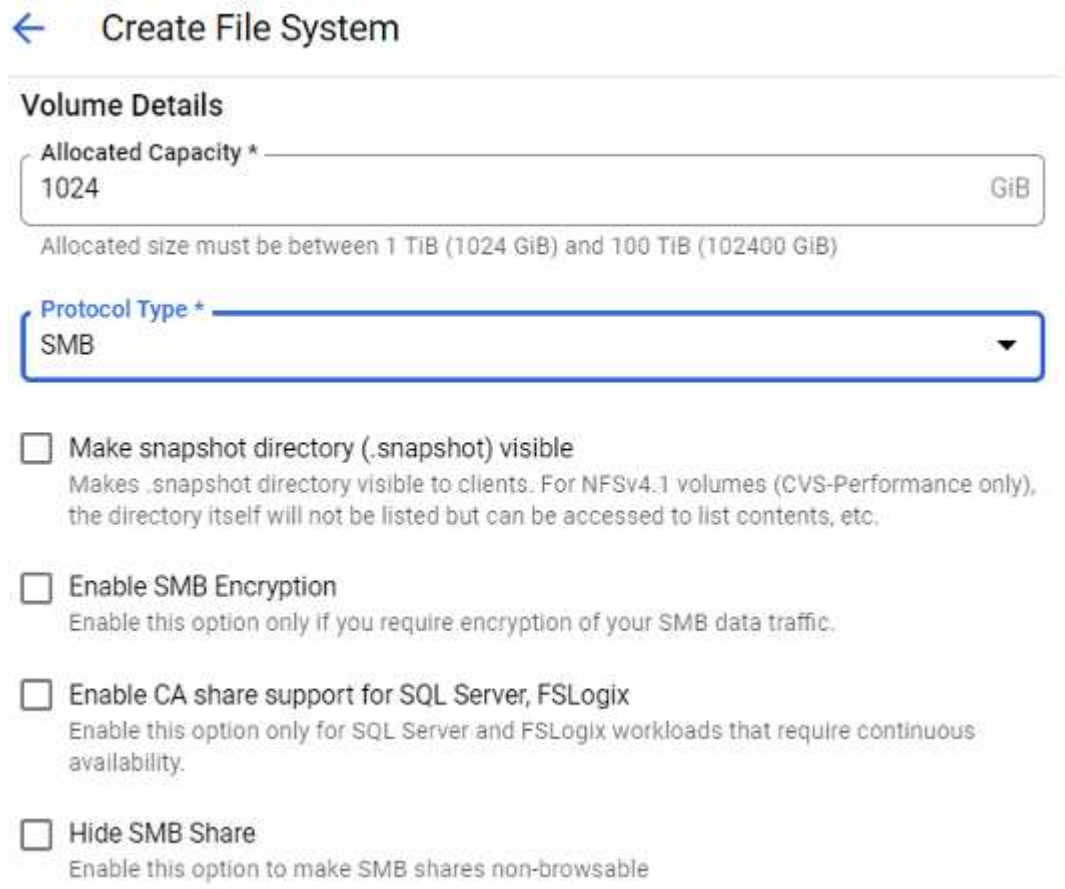
4. Specify the Google Cloud region for the volume and volume path (The volume path must be unique across all of cloud volumes in the project)



5. Select the level of performance for the volume.



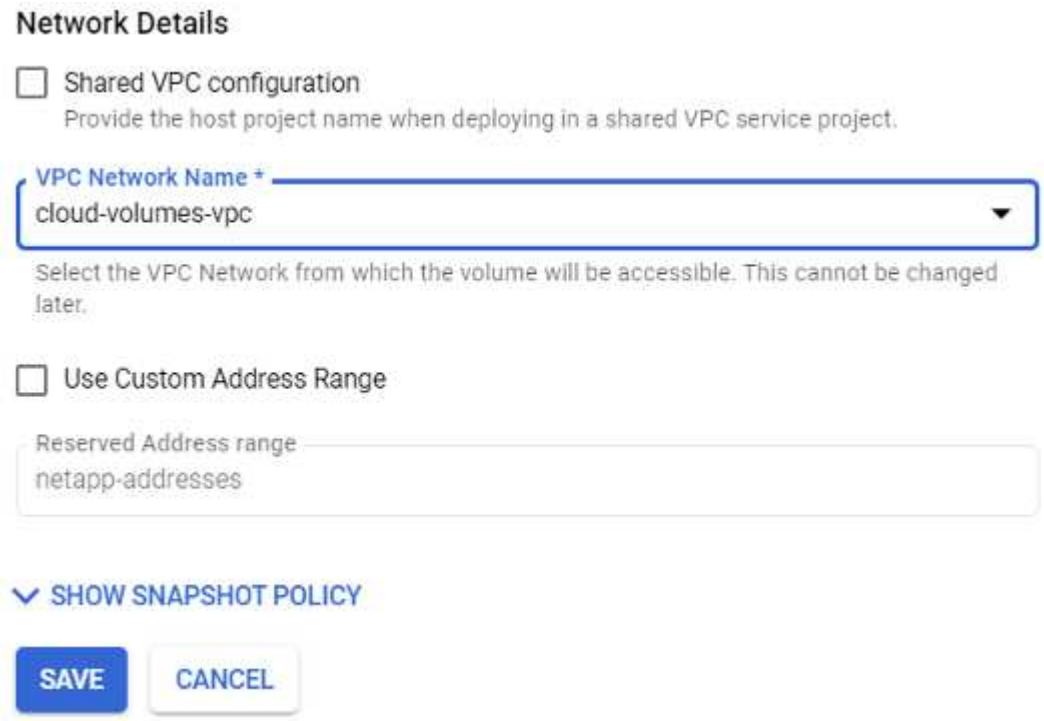
6. Specify the size of the volume and the protocol type. In this testing, SMB is used.



7. In this step, select the VPC Network from which the volume will be accessible. Ensure VPC peering is in place.

   HINT: If VPC peering has not been done, a pop-up button will be displayed to guide you through the peering commands. Open a Cloud Shell session and execute the appropriate commands to peer your VPC with Cloud Volumes Service producer. In case you decide to prepare VPC peering in

beforehand, refer to these instructions.



8. Click Save to create the volume.

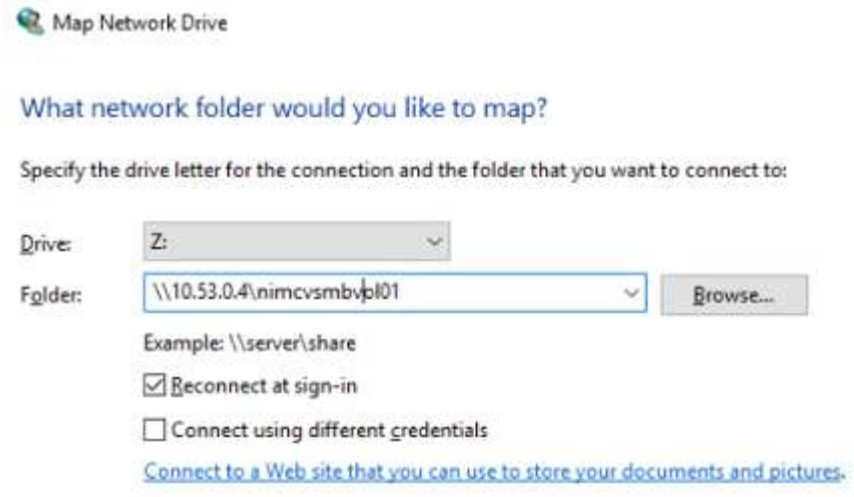
To mount the SMB volume, do the following:

1. In the Cloud Console, go to Cloud Volumes > Volumes.
2. Go to the Volumes page
3. Click the SMB volume for which you want to map an SMB share.
4. Scroll to the right, under Show More, click Mount Instructions.

To perform the mounting process from within the Windows guest OS of the VMware VM, follow the below steps:

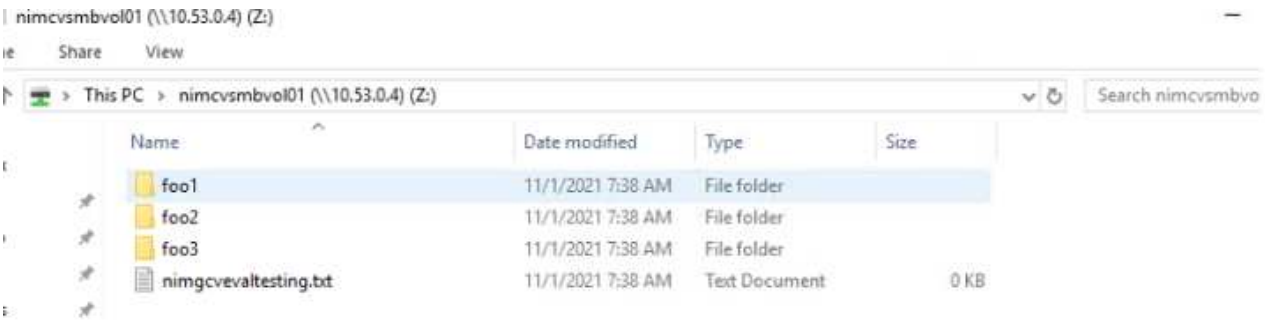
1. Click the Start button and then click on Computer.
2. Click Map Network Drive.
3. In the Drive list, click any available drive letter.
4. In the folder box, type:

```
\\nimsmb-3830.nimgcveval.com\nimCVSMBvol01
```



To connect every time you log on to your computer, select the Reconnect at sign-in check box.

5. Click Finish.



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