Configuring a Google Cloud Virtual Machine as Global-Active Device Quorum

Implementation Guide

Hitachi Vantara

May 2022

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Notices and Disclaimer

About This Guide

This guide provides instructions for deploying a virtual machine in Google Cloud and configuring it as an iSCSI target. We will use the Linux package “targetcli” to create and manage block devices on the virtual machine. The objective is to leverage volumes from the iSCSI target virtual machine running on Google Cloud as quorum volumes for Global-active device (GAD).

Intended Audience

This document is intended for Hitachi Vantara and Hitachi partner representatives who need a foundation of knowledge on this product to best represent it to potential buyers.

Document Revisions

Revision Number	Date	Details
1.0	May 2022	Initial release.

References

- Hitachi Global-Active Device User Guide
- Linux SCSI Target: Targetcli

Contributors

The information included in this document represents the expertise, feedback, and suggestions of a number of skilled practitioners. The author (Kevin Tang) wants to recognize and thank the following contributors and reviewers of this document (listed alphabetically by last name):

- Tom Attanese - Product Management
- Paul Romero - Global Product & Solutions Enablement

Comments

Please send your comments on this document to gpse.replicationsoftware@hitachivantara.com. Include the document title and number, including the revision level, and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Vantara.

Thank You!

Configuration and Specifications

Introduction

This guide provides instructions for deploying a virtual machine in Google Cloud and configuring it as an iSCSI target. We will use the Linux package “targetcli” to create and manage block devices on the virtual machine. The objective is to leverage volumes from the iSCSI target virtual machine running in Google Cloud as quorum volumes for Global-active device (GAD).

Only use volumes from an iSCSI target virtual machine for global-active device quorums. Do not use them as data volumes.

This guide does not include instructions for establishing a VPN connection to Google Cloud documentation, such as https://cloud.google.com/network-connectivity/docs/vpn/how-to/adding-a-tunnel.

Figure 1 illustrates the test environment. The on-premises datacenter is connected to Google Cloud using a VPN tunnel. Network traffic is passed between the on-premises storage systems and the iSCSI target virtual machine in Google Cloud using the VPN tunnel.

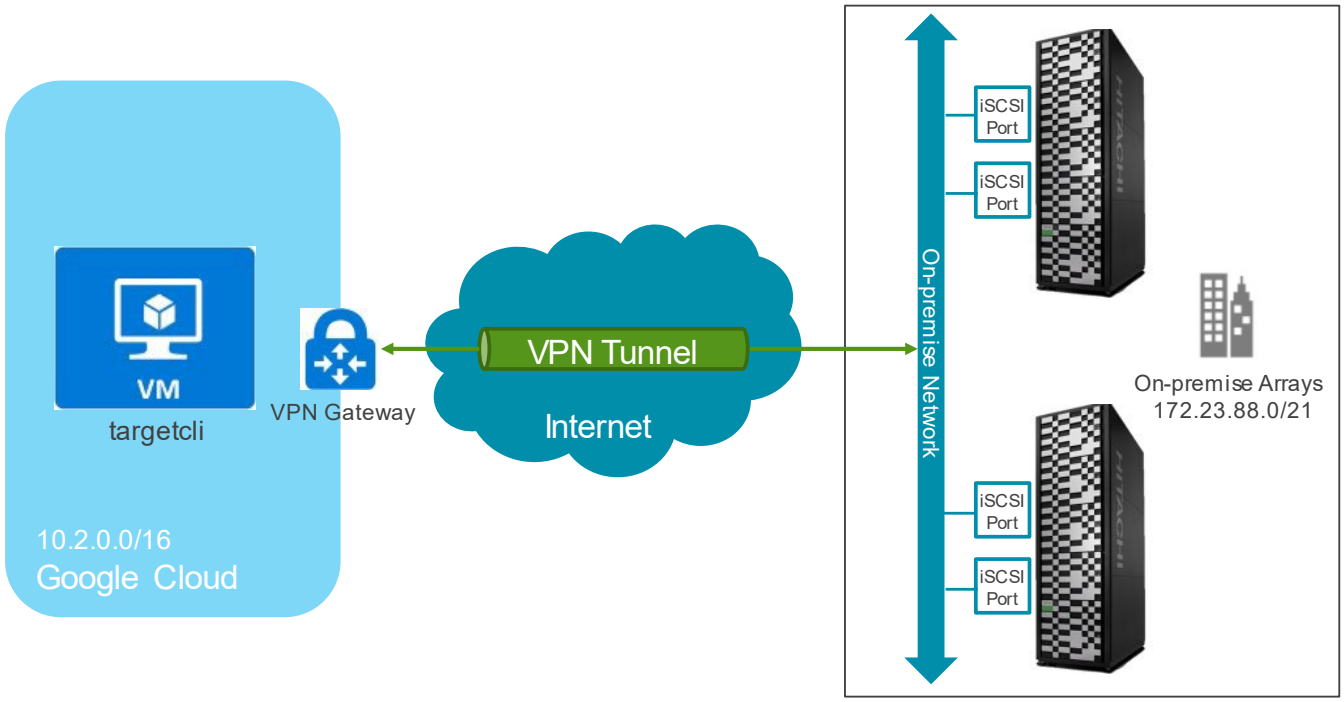


Figure 1. *Test Environment*

Google Cloud Virtual Machine

The following settings were used for the virtual machine image:

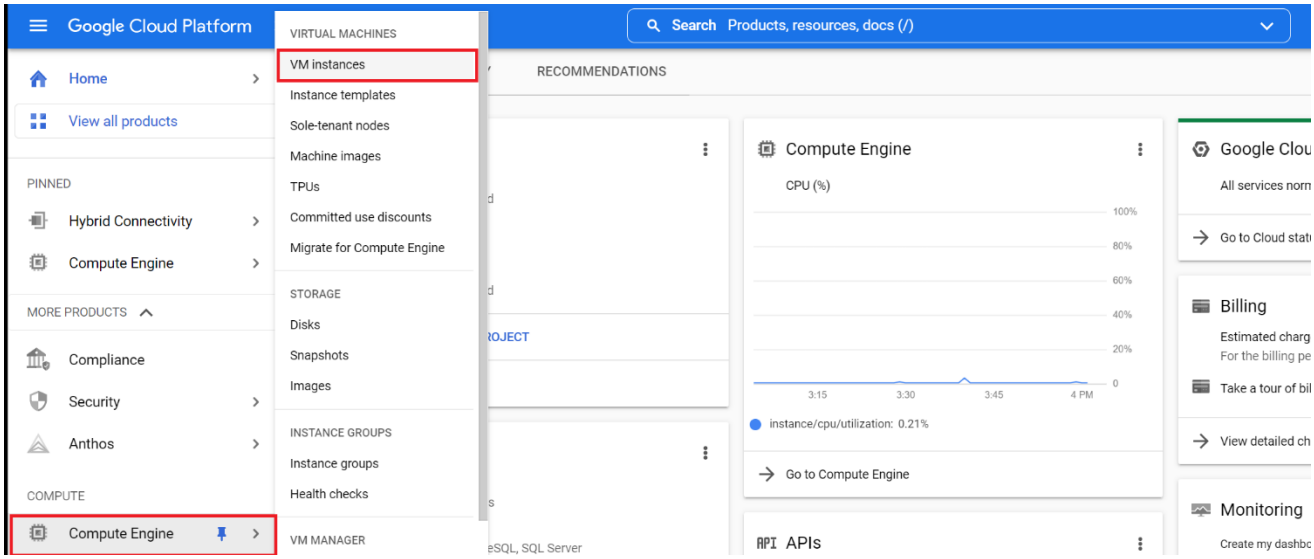
- Operating system: SUSE Linux Enterprise Server 15 SP1
- Kernel: 4.12.14-197.83-default
- Instance type: e2-medium
  - CPU: 1 virtual CPU
  - Memory: 4 GB
- Targetcli version: targetcli-2.1.fb49

Google Cloud Virtual Machine Instance

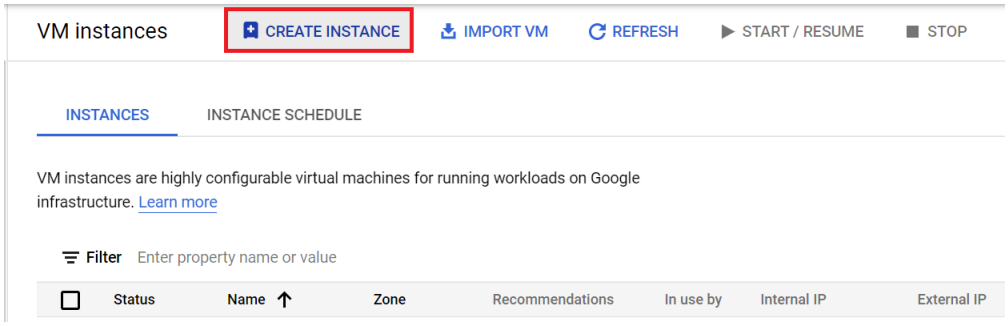
Deployment

This section provides instructions for deploying the virtual machine on Google Cloud.

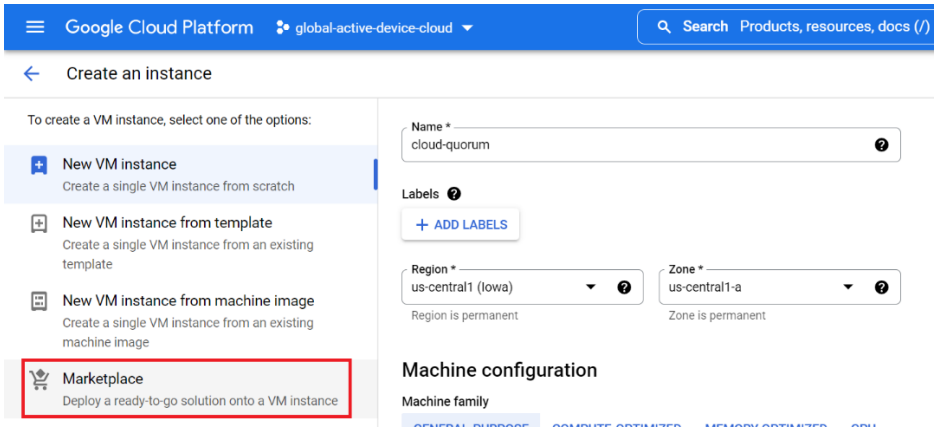
1. From the Google Cloud Platform home page, navigate to **Compute Engine**, and then click **VM instances**.



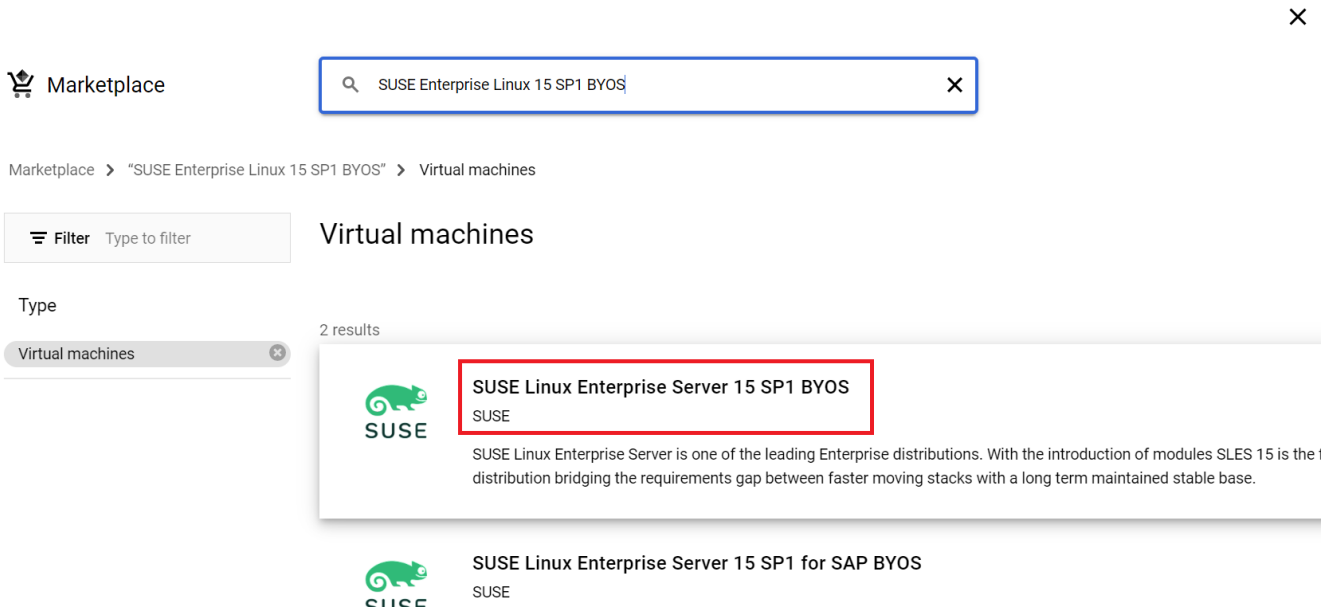
2. Click **Create Instance**.



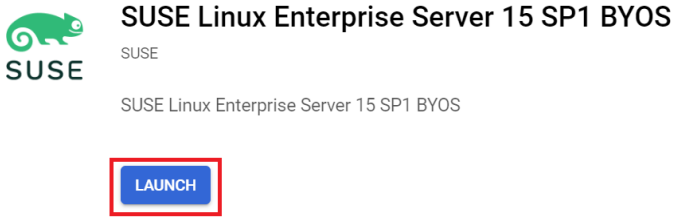
3. Click **Marketplace**.



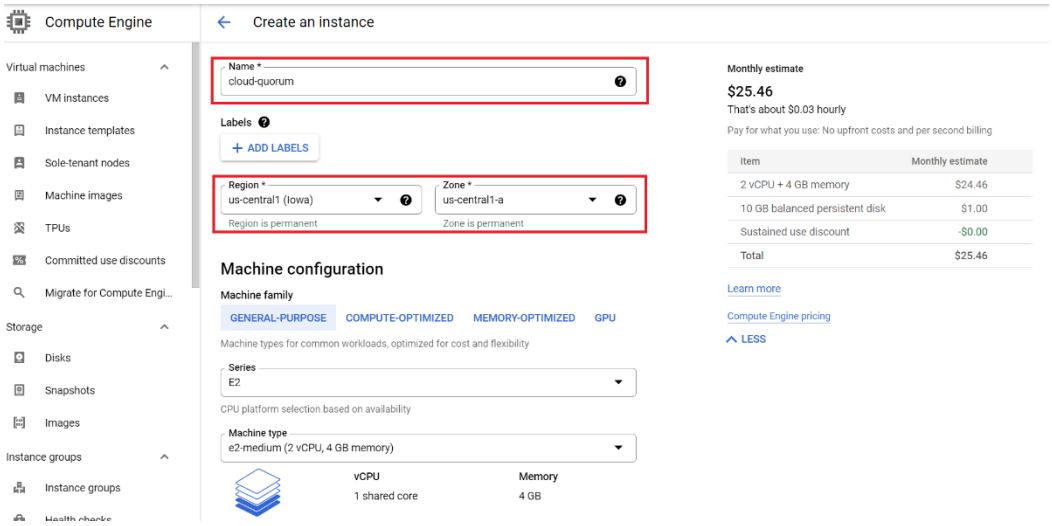
4. On the marketplace page, search for **SUSE Enterprise Linux 15 SP1 BYOS.**



5. Click **Launch**.

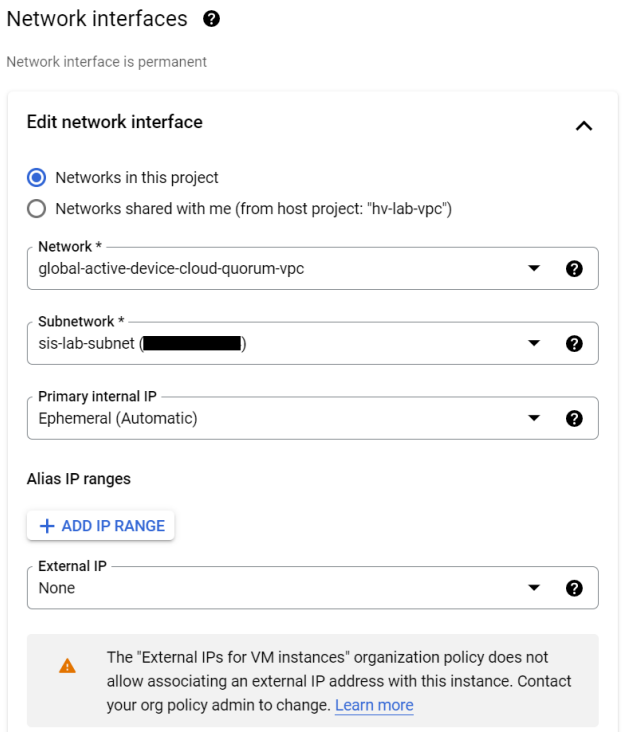


6. Enter a name for your virtual machine and select a **Region** and **Zone** for which you have configured your VPN tunnel. Keep the default values for **Series** and **Machine type**: E2 and e2-medium.

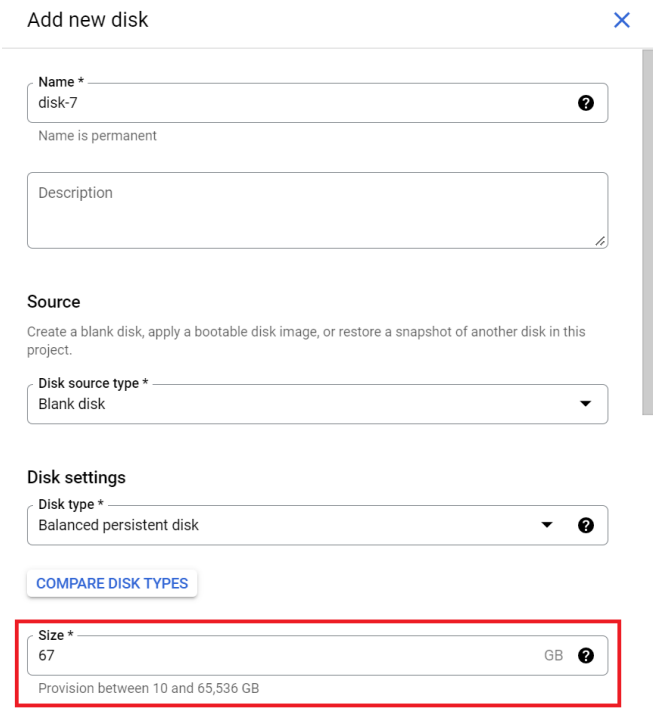


7. Scroll down and expand the **NETWORKING, DISKS, SECURITY, MANAGEMENT, SOLE-TENANCY** option.

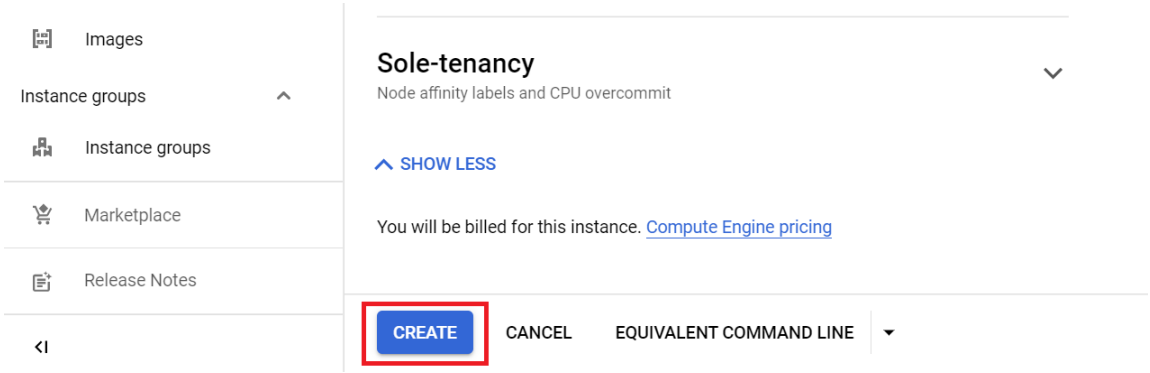
8. Under **Network interfaces,** verify that you have selected the network interface and subnet for your VPN tunnel.



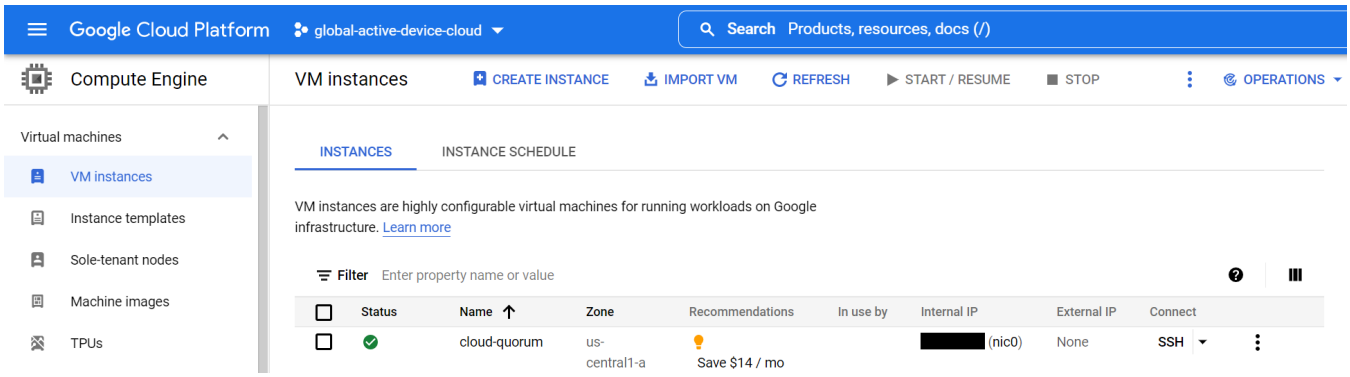
9. Under **Disks**, click **ADD NEW DISK** and add a disk of minimum 67 GB.



10. Verify the settings and click **CREATE.**



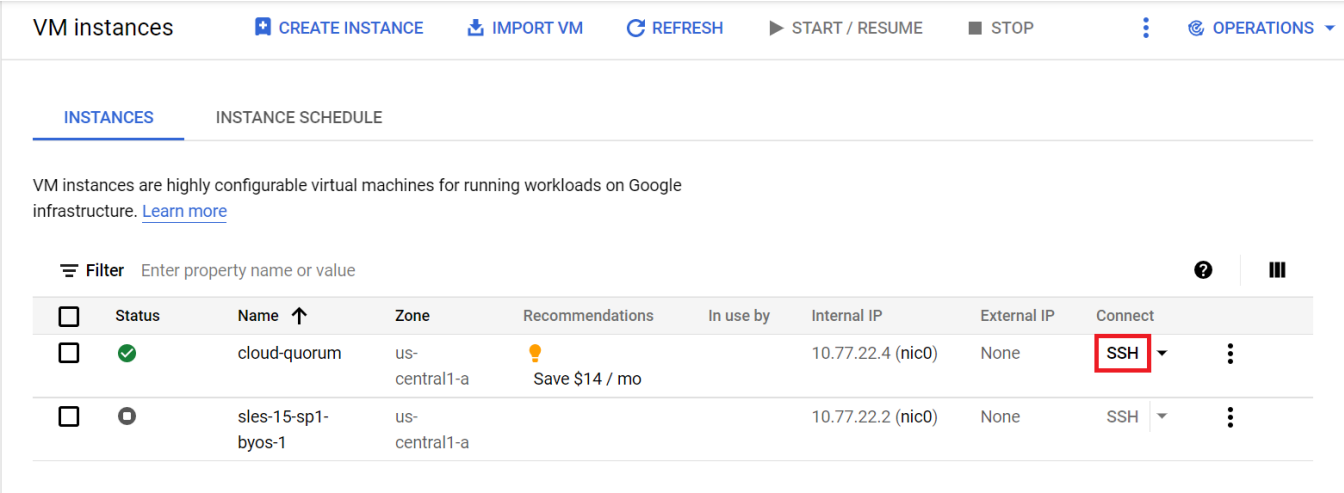
11. Verify that the new instance is running on the **VM Instances** screen.



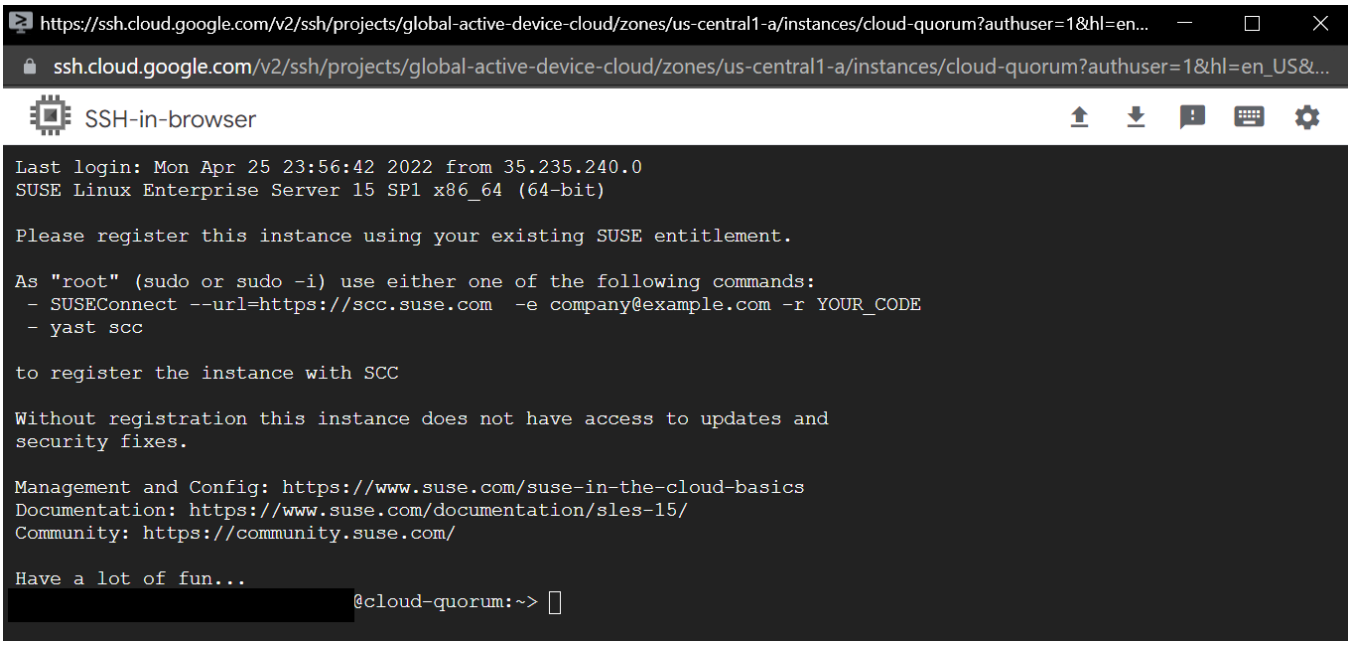
Remote Access

This section provides instructions for remotely accessing the virtual machine using the Google Cloud Platform SSH client.

On the **VM Instances** page, go to the entry for the cloud quorum VM and click **SSH**.



An **SSH-in-browser** window opens that is logged into your virtual machine. If you have trouble connecting, follow the prompts.



Storage Repository

This section provides instructions for automatically configuring a storage repository on the virtual machine to contain the volumes to use as GAD Quorum devices.

1. Log in to the virtual machine using SSH.
2. Create a file by entering `vi quorum_setup.sh` and then copy and paste the following script into the file:

```
function startTC(){
       sudo systemctl enable --now targetcli >> ~/setup_log.txt
}
function checkFSTAB(){
       existing_vol=$(grep "/dev/vg_quorums/lvol0 /quorums xfs defaults 0 0" /etc/fstab)
       if [ "$existing_vol" = "" ]
       then
         sudo sh -c "echo /dev/vg_quorums/lvol0 /quorums xfs defaults 0 0 >> /etc/fstab"
       fi
       sudo mount /quorums >> ~/setup_log.txt
       df -h
}
function configFDISK(){
       (echo "n"
        echo "p"
        echo "1"
        echo ""
        echo ""
        echo "p"
        echo "w") | sudo fdisk /dev/"$1" > ~/setup_log.txt
}
function configVOLS(){
       sudo vgcreate vg_quorums /dev/"$1"1 >> ~/setup_log.txt
       sudo lvcreate -l 100%VG vg_quorums >> ~/setup_log.txt
       sudo mkfs.xfs /dev/vg_quorums/lvol0 >> ~/setup_log.txt
       sudo mkdir /quorums >> ~/setup_log.txt
}
function volsToTCLI(){
       (echo "backstores/fileio create volume0 /quorums/volume0 13g"
        echo "/iscsi create"
        echo "exit")| sudo targetcli > ~/temp.txt
}
function getTargetName(){
       cat ~/temp.txt >> ~/setup_log.txt
       target_name="$(grep iqn ~/temp.txt | awk '{ print $4 }')"
       target_name=${target_name%.}
}
function getIP(){
       my_ip="$(hostname -I)"
}
function getInitiatorID(){
        (echo "cd /iscsi/$target_name/tpg1/acls/"
         echo "ls"
         echo "create $1"
         echo "exit") | sudo targetcli >> ~/setup_log.txt
}
function mapLUNS(){
(echo "cd /iscsi/$target_name/tpg1/portals/"
 echo "delete 0.0.0.0 3260"
 echo "create $my_ip"
 echo "ls"
 echo "cd ../luns"
 echo "create /backstores/fileio/volume0"
 echo "cd /"
 echo "ls"
 echo "saveconfig") | sudo targetcli >> ~/setup_log.txt
}
function checkSetup(){
        check="$(echo ls | sudo targetcli | grep iscsi | grep "Targets: 0")"
        if [ "$check" == "" ]; then
                echo "Quorum already configured."
                exit 0
```

```
        fi
}
checkSetup
DISK="$(sudo fdisk -l | grep "Disk /dev/" | tail -n 1 | cut -d "/" -f3 | cut -d ":" -f1)"
configFDISK "$DISK"
configVOLS "$DISK"
checkFSTAB
startTC
volsToTCLI
getTargetName
getIP
for iqn in "$@"
do
        getInitiatorID "$iqn"
done
mapLUNS
rm ~/temp.txt
```

3. To save the file content, press **Esc**, type :**wq,** and then press **Enter**.

```
getTargetName
getIP
for iqn in "$@"
do
        getInitiatorID "$iqn"
done
mapLUNS
rm ~/temp.txt

:wq
```

4. To make the file executable, run the following command:

   ```
   sudo chmod 555 quorum_setup.sh
   ```

```
Management and Config: https://www.suse.com/suse-in-the-cloud-basics
Documentation: https://www.suse.com/documentation/sles-15/
Community: https://community.suse.com/

Have a lot of fun...
kevin_tang_hitachivantara_com@cloud-quorum:~> vi quorum_setup.sh
kevin_tang_hitachivantara_com@cloud-quorum:~> sudo chmod 555 quorum_setup.sh
```

5. Run the following command followed by the IQNs of the iSCSI ports on your storage systems:

   ```
   quorum_setup.sh
   ```

   The following is an example of the output:

```
                        _com@cloud-quorum:~> ./quorum_setup.sh iqn.1994-04
.jp.co.hitachi:rsd.r90.i.08758b.1e iqn.1994-04.jp.co.hitachi:rsd.r90.i.0875
8b.2e iqn.1994-04.jp.co.hitachi:rsd.r90.i.08758a.1e iqn.1994-04.jp.co.hitac
hi:rsd.r90.i.08758a.2e
Filesystem                    Size  Used Avail Use% Mounted on
devtmpfs                      2.0G  8.0K  2.0G   1% /dev
tmpfs                         2.0G     0  2.0G   0% /dev/shm
tmpfs                         2.0G  9.0M  2.0G   1% /run
tmpfs                         2.0G     0  2.0G   0% /sys/fs/cgroup
/dev/sda3                      10G  1.6G  8.5G  16% /
/dev/sda2                      20M  2.8M   18M  14% /boot/efi
tmpfs                         394M     0  394M   0% /run/user/1629402879
/dev/mapper/vg_quorums-lvol0  100G  135M  100G   1% /quorums
Created symlink /etc/systemd/system/remote-fs.target.wants/targetcli.servic
e → /usr/lib/systemd/system/targetcli.service.
                        _com@cloud-quorum:~>
```

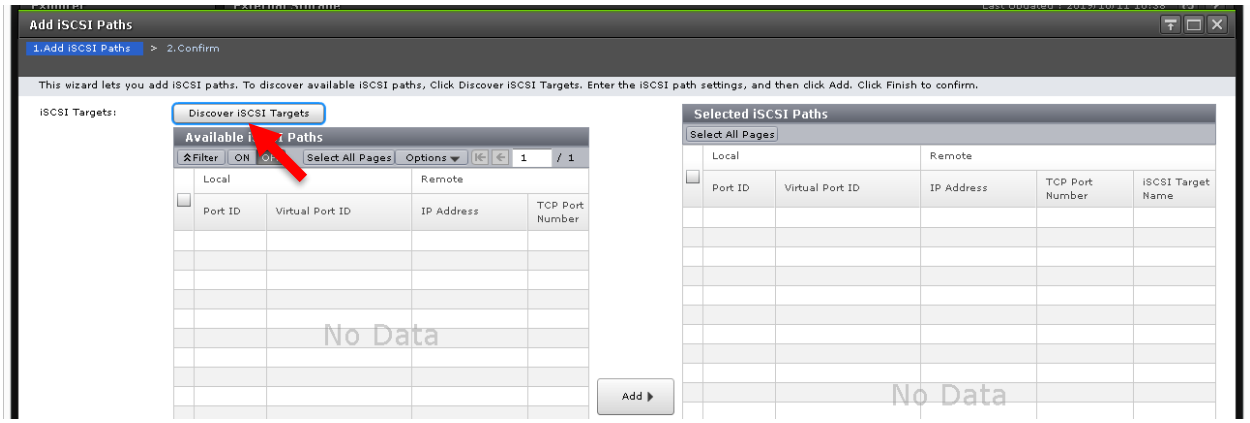
Global-Active Device Quorums

This section describes how to discover the volumes from the iSCSI target virtual machine and turn them into GAD quorums. The procedure is the same as it is to virtualize a physical Fiber Channel or iSCSI storage system.

Create iSCSI Paths

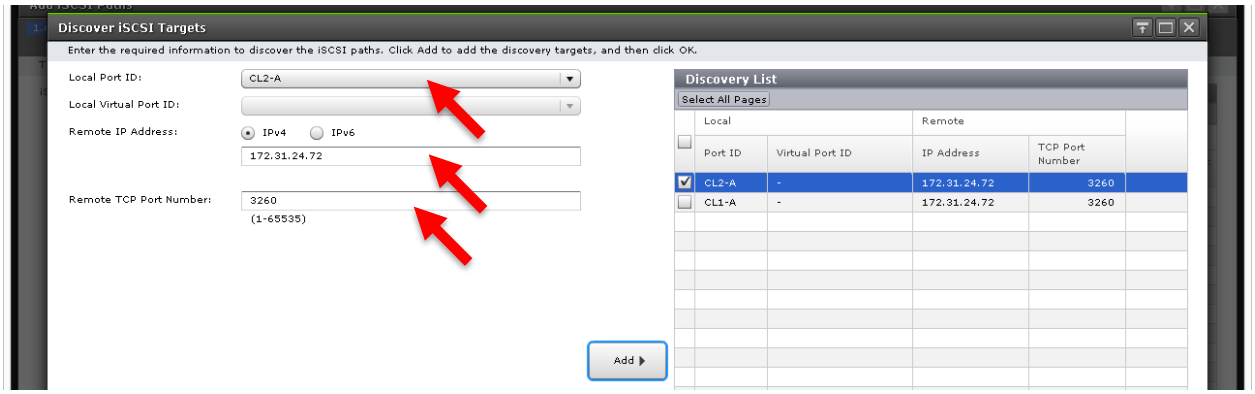
1. Log in to Storage Navigator.
2. On the left side, select **External Storage**, and then select the **iSCSI Paths** tab.

3. Click **Add iSCSI Paths**.
4. Click **Discover iSCSI Targets**.



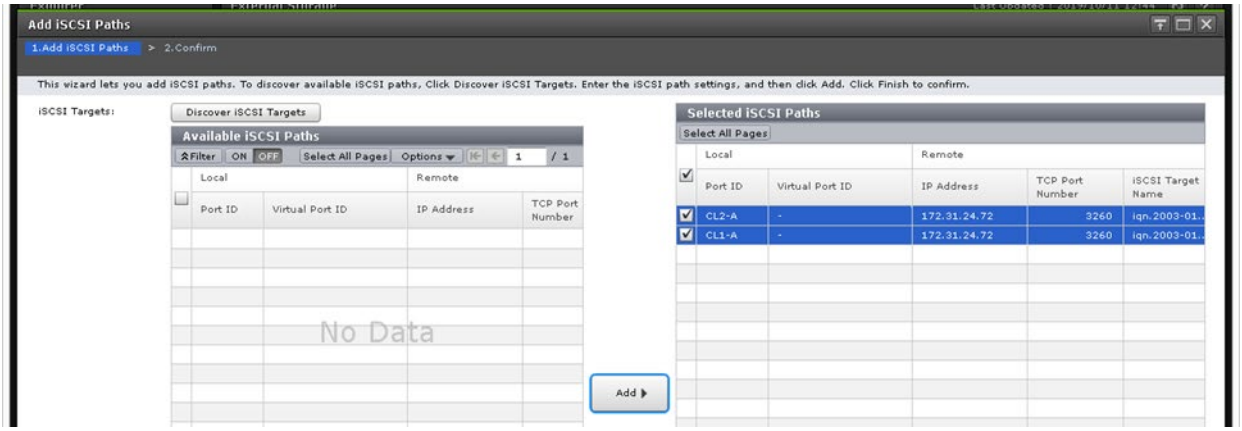
5. Add both iSCSI paths. Repeat this step for both paths.
    a. Select the storage port from the **Local Port ID** list.
    b. Enter the private IP address of the virtual machine.
    c. For **Remote TCP Port Number,** enter **3260**.

d. Click **Add**.



6. After creating both iSCSI paths, click **OK**.
7. In the **Add iSCSI Paths** window, set the following:
   a. From the **Authentication Method** drop-down list, click **None**.
   b. For **Mutual CHAP**, click **Disable**.

8. Click **Add** and then click **Finish**.

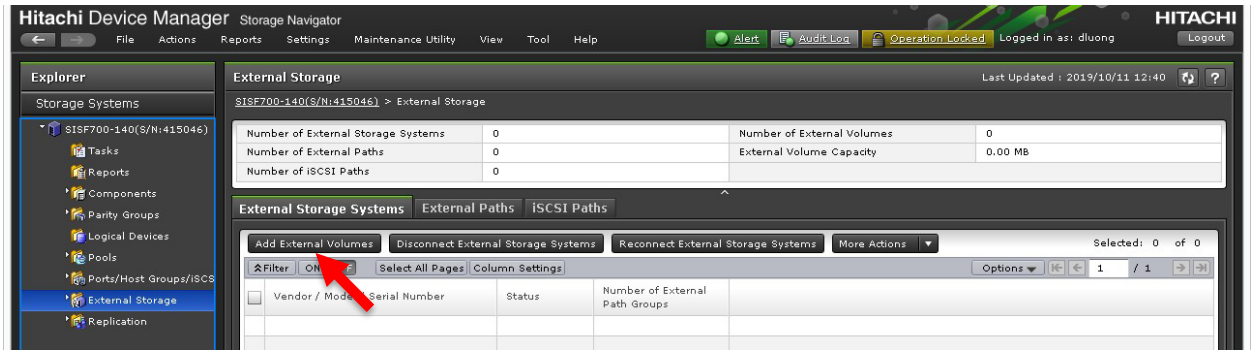


The following shows the created paths:

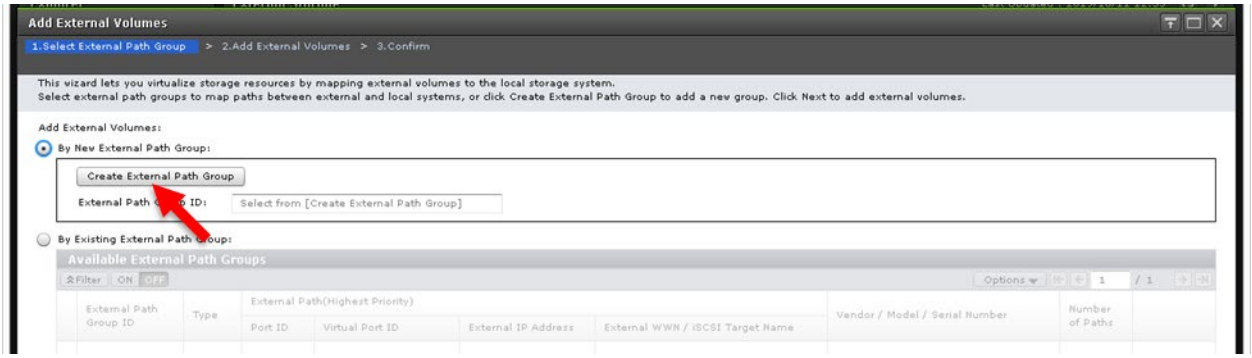
Discover External Volumes

This section describes how to discover the volumes from the iSCSI virtual machine and virtualize them.

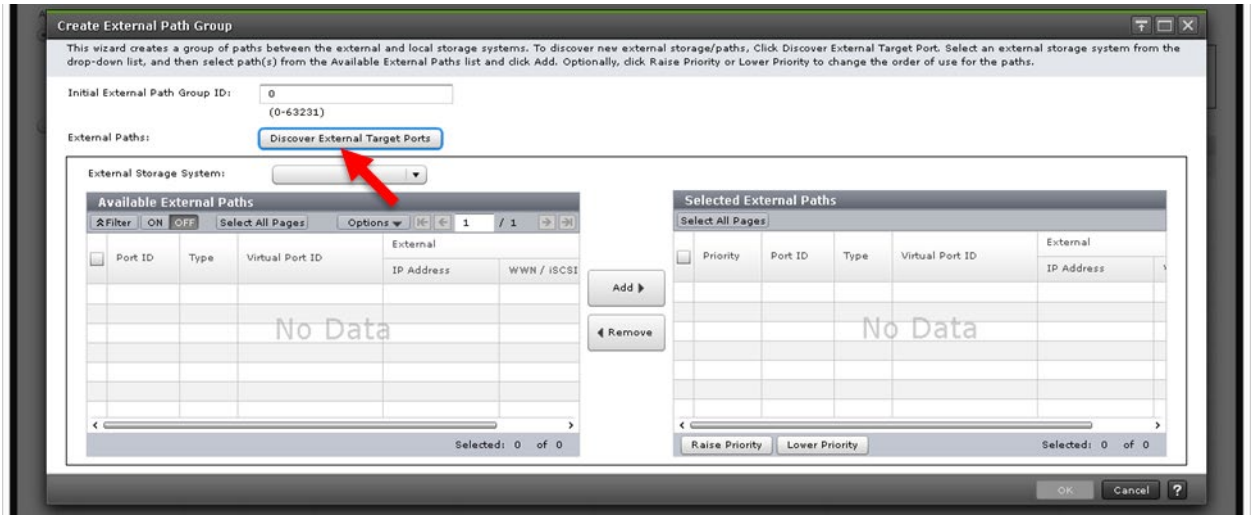
1. Select the **External Storage Systems** tab and then click **Add External Volumes**.



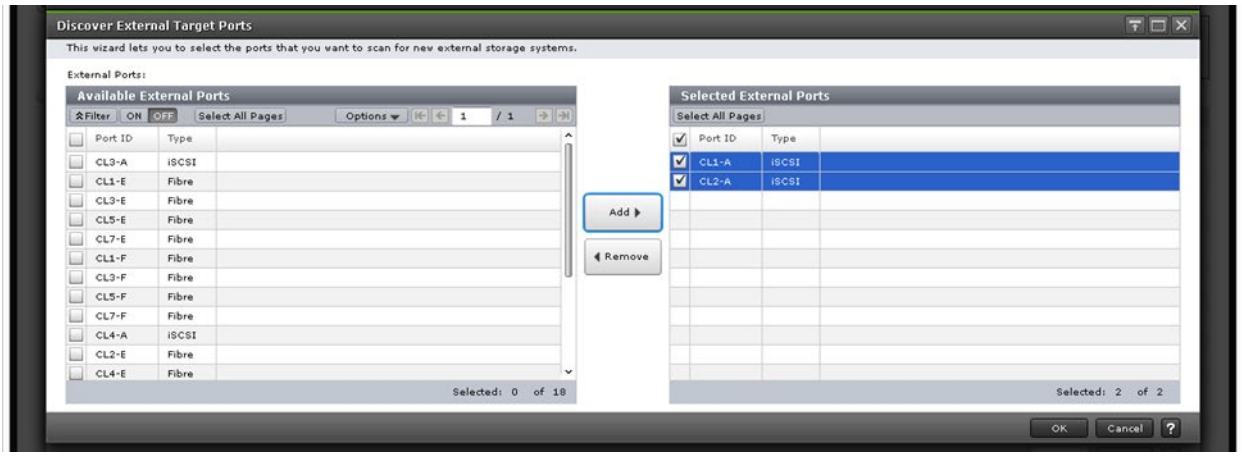
2. Click **Create External Path Group**.



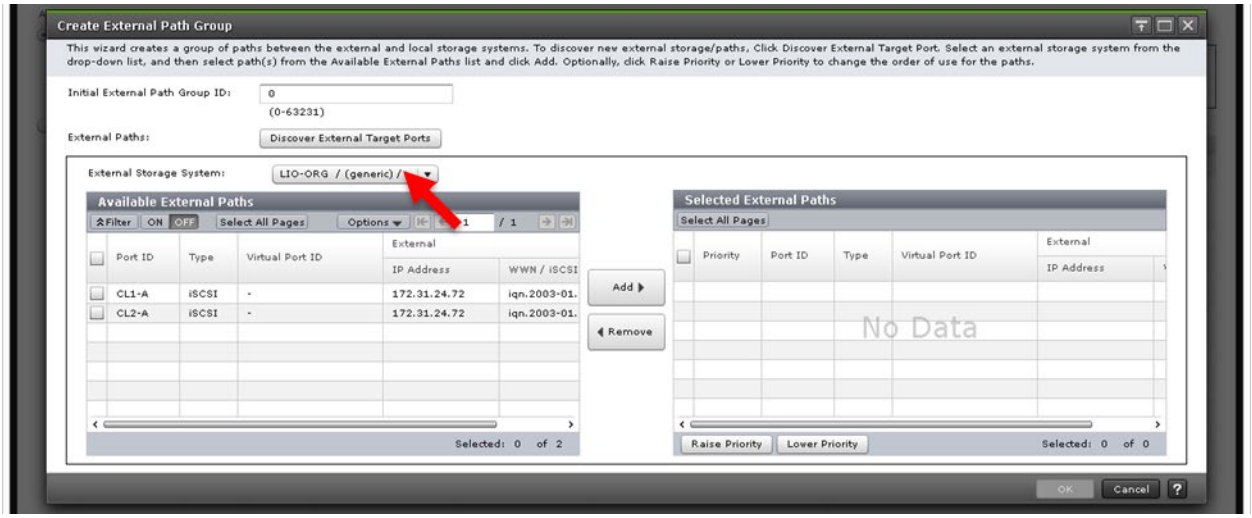
3. Click **Discover External Target Ports**.



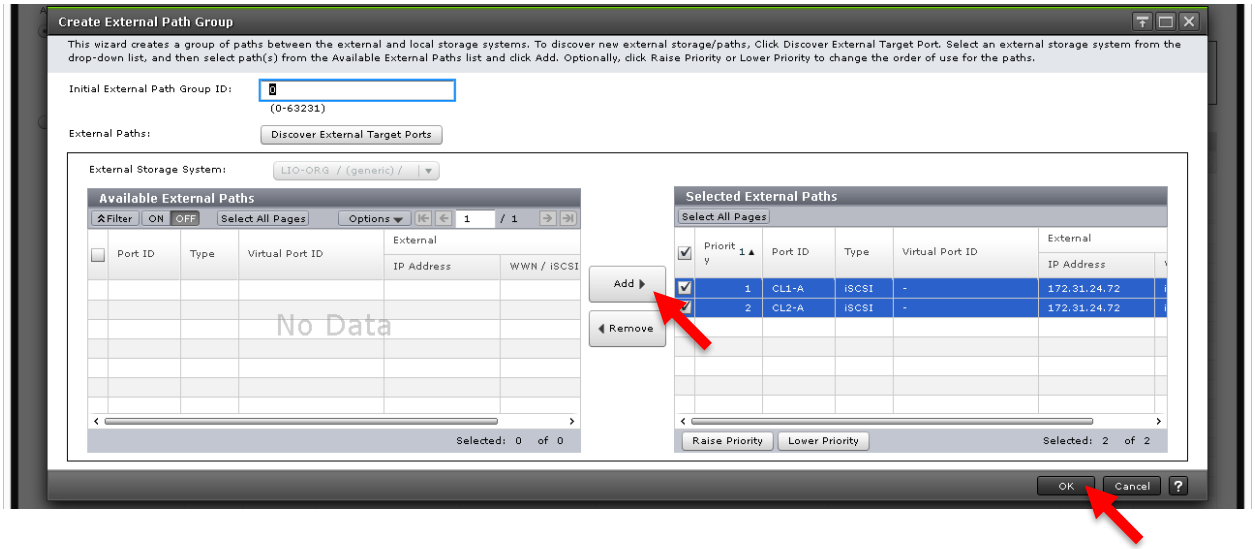
4. Select the iSCSI ports, click **Add**, and then click **OK**.



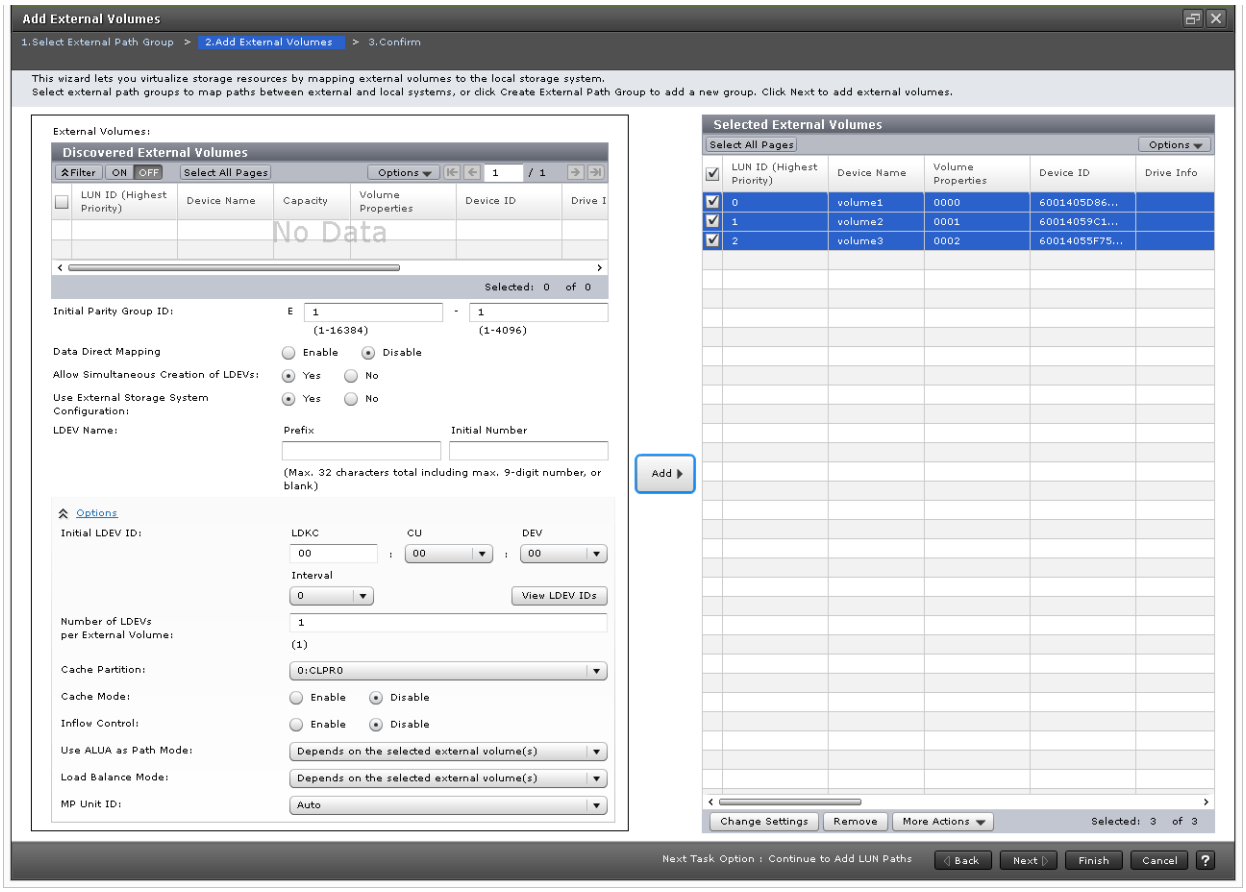
If the discovery is successful, the virtual machine shows up as LIO-ORG.



5. Select the discovered external paths, click **Add**, and then click **OK**.

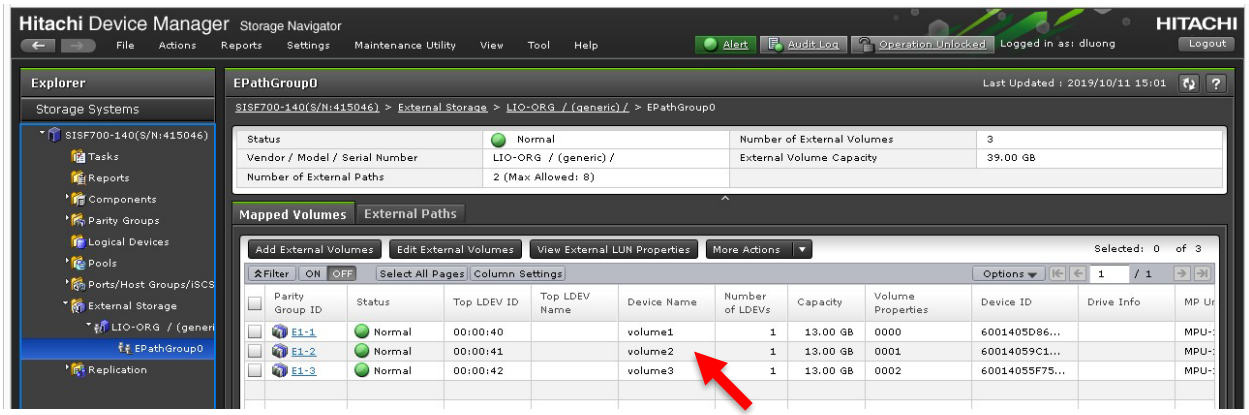


6. On the Add External Volumes window, click **Next**.
7. Select the discovered volumes and click **Add**.



8. Click **Finish** and then click **Apply**.

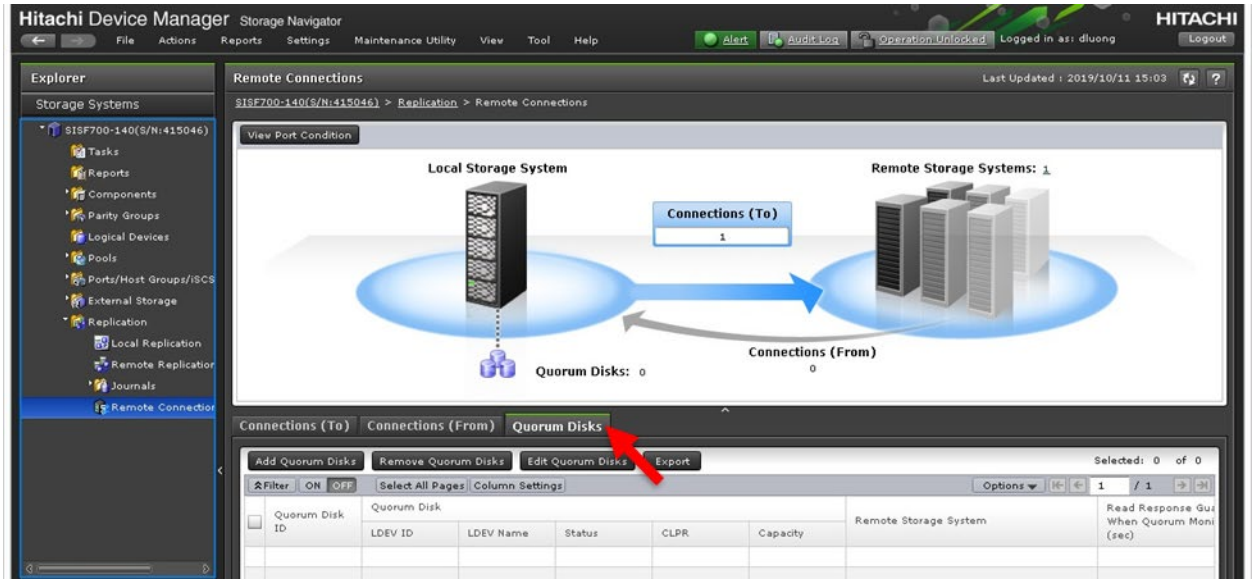
   The following shows the external volumes after they have been virtualized:



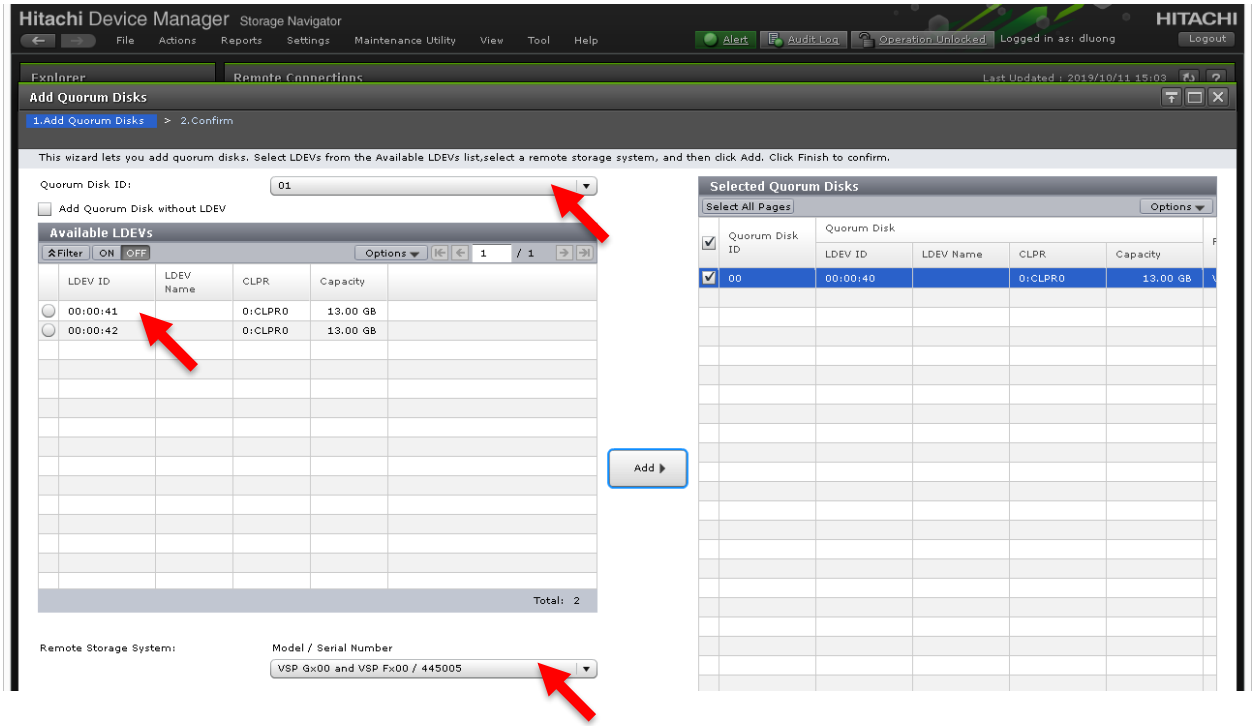
Define Global-Active Device Quorums

This section describes how to turn the external volumes into GAD quorums. The procedure is the same as it is to a virtualized physical Fiber Channel or iSCSI storage system.

1. Select **Replication** > **Remote Connections**, and then select the **Quorum Disks** tab.



2. Click **Add Quorum Disks**.
3. In the Add Quorum Disks screen, choose the appropriate option from the **Quorum Disk ID** and the **Remote Storage System** list.
4. From the Available LDEVs table, select the external volume you want to use and click **Add**.



5. Click **Finish** and then click **Apply**.

The following shows the quorum after it has been created: