Hitachi Content Platform Gateway Windows Cluster Setup with SAN Storage

V4.3.8

Windows Failover Clustering for Virtual and Physical Servers

The objective of this document is to cover the setup of Microsoft Windows Failover Clustering with two Hitachi Content Platform Gateway nodes running on VMware or Physical machines.

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Chapter 1 Introduction

This document provides installation instruction on adding Windows Failover Clustering to two existing Hitachi Content Platform Gateway (HCP Gateway) instances that are identical and are on the same VMWare ESXi host, a configuration known as cluster-in-a-box. If the HCP Gateway instances are on different VMWare ESXi hosts, a configuration known as cluster-across-boxes, there follow the NOTE in Chapter 7 when configuring the Sharing setting on the VMs. The document covers the installation of two HCP Gateway Virtual or Physical Machines using shared disks. Ensure that you have a unique computer name for the two HCP Gateway Virtual or Physical Machines because you are required to add them to a Windows Active Directory domain (see Chapter 8 for details) before starting these steps. Contact your system administrator if you need assistance with those tasks.

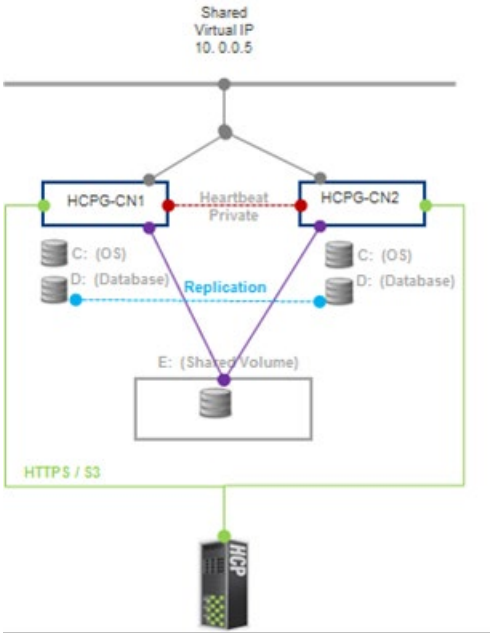
WARNING: The account being used to install the Cluster **must** have the ability to create a **cluster named object (CNO)**. Refer to the Microsoft Website Configuring cluster accounts in Active Directory, and follow the section titled: **'Steps for configuring the account for the person who installs the cluster'**.

The installation will cover setting up shared disks, assigning network adapters, setting up a Windows Failover Cluster, and then adding a Generic Service Role for the HCP Gateway service.

The word 'node' means a virtual or physical machine. Node 1 is the first machine and Node 2 is the second machine. In the cluster, Node 1 is the primary machine and Node 2 is the secondary machine. The primary machine is also called the active machine or active node, and the secondary is called the passive or standby node.

The end result of this document is to develop a Fail-over cluster using an active/passive Windows cluster similar to the diagram below.

Figure 1 - Windows Server Failover Cluster



NOTE:

Notepad++ changed their licensing policy, so we can no longer install and ship Notepad++ on the HCP Gateway. You can either download and install Notepad++ version 8.1.5 or older or use Windows Notepad in place of Notepad++ when editing files.

Chapter 2 HCP and HCP Gateway Configuration

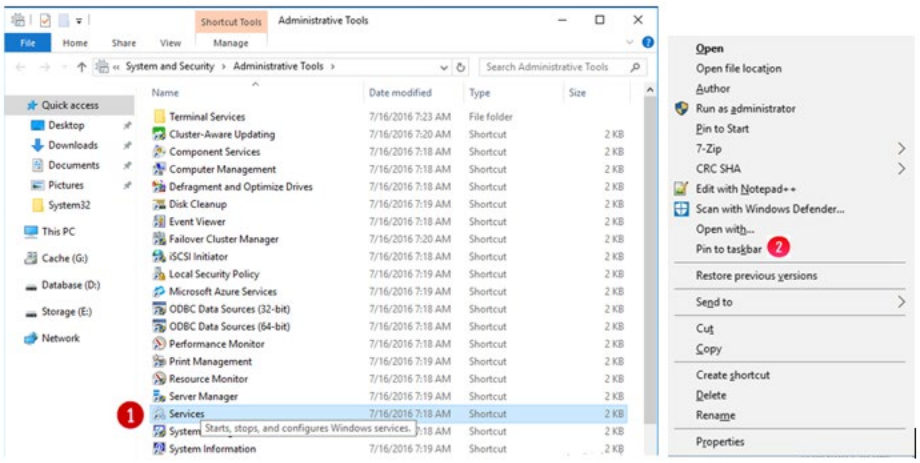
The first step is to login to the HC7.30P Gateway as the local Administrator and run Windows Updates on both nodes of the cluster. Once that is complete, in the following steps in this chapter you will stop the HCP Gateway service and then update the configuration file on both nodes so the default cluster shared volume will be assigned to drive '**G:**'.

Step 1: Open the Desktop, click on the Windows Start Menu located at the bottom left of the screen. In the pop-up window, select '**Windows Administrative Tools**' (Figure 2.1.1)

Figure 2.1 - Windows Start Menu

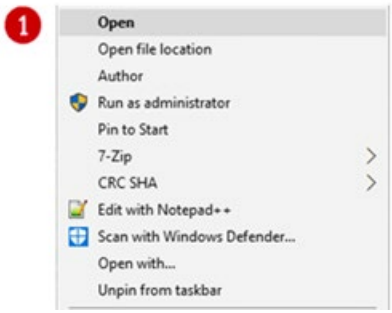
Step 2: In the 'Administrative Tools' window, scroll down to 'Services.' Services will be used enough that it should be pinned to the task bar for easier access. Right click on '**Services**' (Figure 2.2.1) and select '**Pin to taskbar**' (Figure 2.2.2). Note that if you deployed the HCP Gateway Cluster VMs, this step is not necessary, just click on the Services icon in the taskbar and skip to Step 4.

Figure 2.2 - Administrative Tools



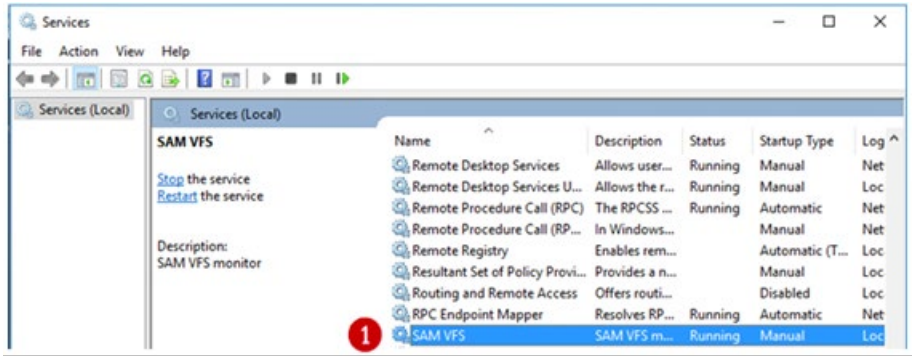
Step 3: Right click on **Services** and select **Open** (Figure 2.3.1)

Figure 2.3 - Open Services



Step 4: Scroll down the '**Services**' window to locate the '**SAM VFS**' service (Figure 2.4.1).

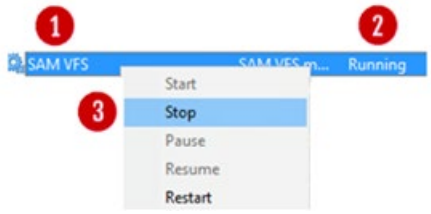
Figure 2.4 - Windows Services



Step 5: Right-click on the '**SAM VFS**' service (Figure 2.5.1) and check to see if the Service is running (Figure 2.5.2), if it is then select '**Stop**'

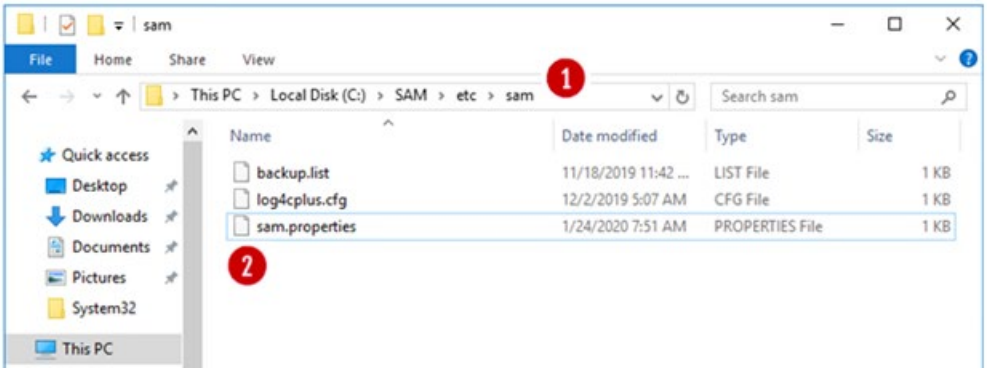
(Figure 2.5.3) on both nodes. Ensure that the '**Startup Type**' of the service is set to '**Manual**' on both nodes.

Figure 2.5 - Stop SAM VFS Service



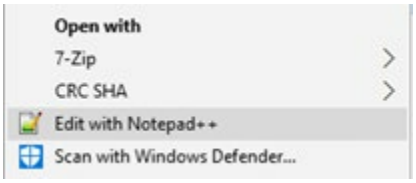
Step 6: Change the HCP Gateway Configuration File. Open a DOS Command Prompt running as Administrator and issue the command **explorer.exe** to open Windows File Explorer as the Administrator, browse to the '**C:\SAM\etc\sam**' (Figure 2.6.1) folder.

Figure 2.6 - Find properties file



Step 7: Right-click on the file '**sam.properties**' (Figure 2.6.2) and select '**Edit with Notepad++**' (Figure 2.7).

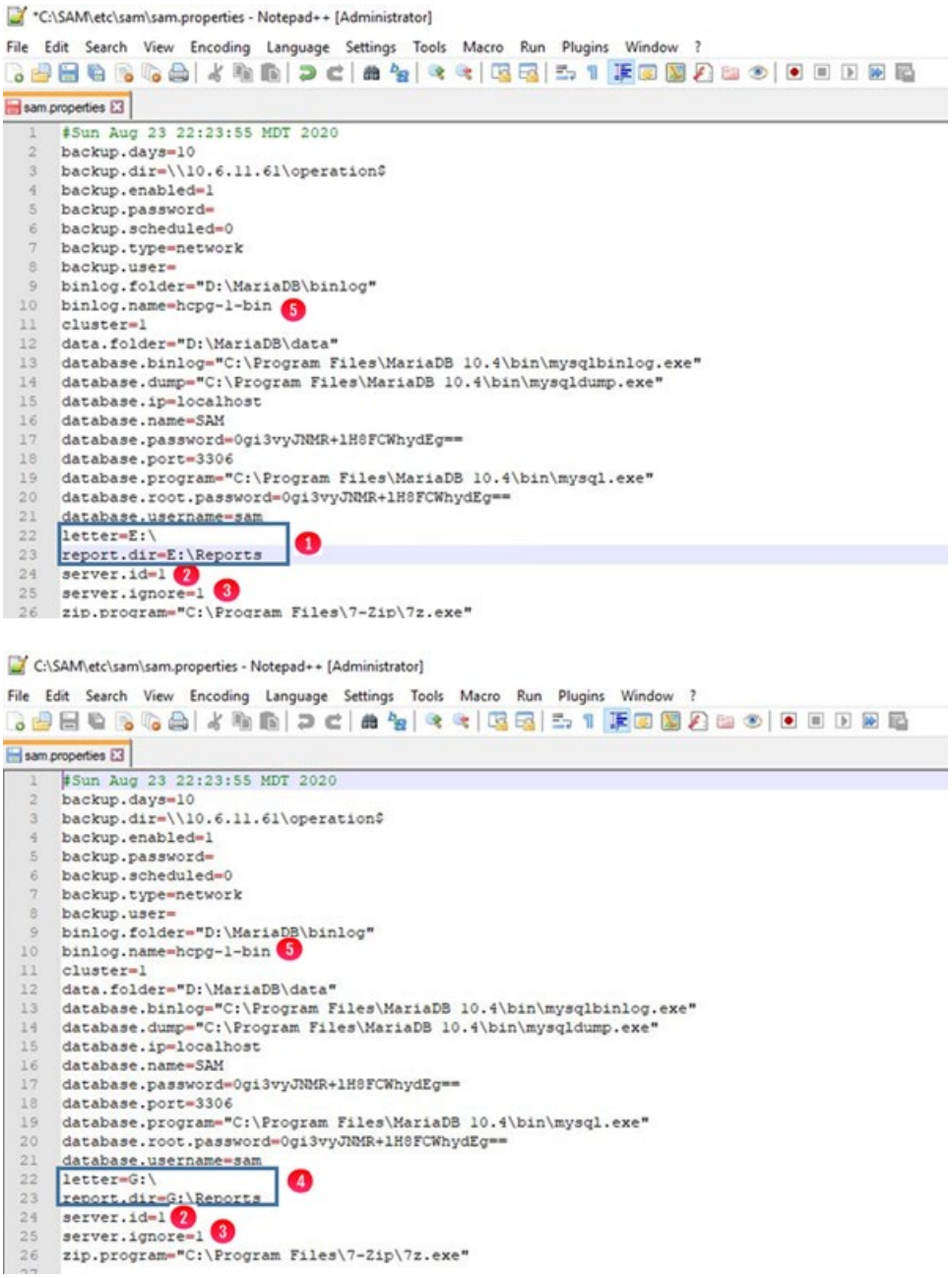
Figure 2.7 - Edit with Notepad++



Step 8: Locate the lines for the parameters '**letter**' and '**report.dir**' (Figure 2.8.1) and verify that they are set to the shared cluster drive '**G:**' (Figure 2.8.4). For Node 1, verify that the parameter '**server.id**' is '**1**' (Figure 2.8.2) and for Node 2, verify the parameter '**server.id**' is '**2**', making changes where the values are different than this document. For Node 1, verify that the parameter '**binlog.name**' is '**hcpg-1-bin**' (Figure 2.8.5) and for Node 2, verify the parameter '**binlog.name**' is '**hcpg-2-bin**', making changes where the values are different than this document. Also verify

that '**cluster**' is set to '**1**' on both nodes (Figure 2.8.5). When deploying a cluster with a shared cache and only 1 node will be active at a time, add or verify the parameter '**server.ignore=1**' (Figure 2.8.3) is configured. Then save the C:\SAM\etc\sam\sam.properties file and exit Notepad++.

Figure 2.8 - Edit sam.properties Files



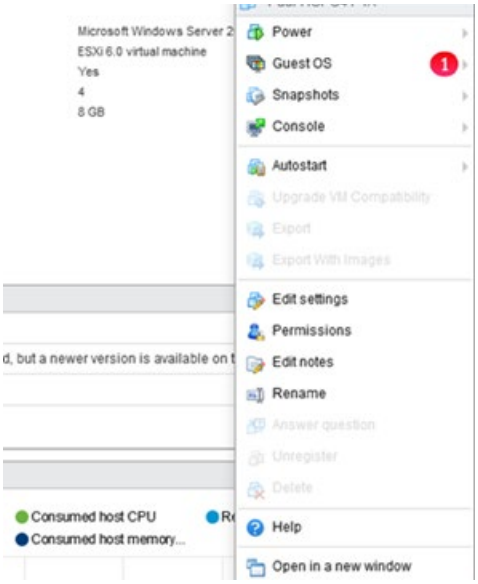
Step 9: Leave the SAM service not running.

Step 10: **Note that if you have not already setup the database replication, then refer to the HCP Gateway Replication Setup**

Windows Guide, Chapter 1 Introduction for the basic settings. Then refer to the **HCP Gateway Replication Setup Windows Guide Chapter 3 Two Node: Master node to Master node Replication (Manual DR Failover)** for instructions setting up a 2 node cluster or **Chapter 6 Four Nodes: Master to Master Replication for HA Cluster with DR Failover to another HA Cluster** for instructions setting up a 4 node cluster.

Step 11: Make sure the VMWare Tools on each node are up to date. Login to the ESXi Host Console that the nodes are running on, select '**Guest OS**' (Figure 2.9.1) then select '**Upgrade VMWare Tools**'. After a few minutes, VMWare will upgrade the VMWare Tools and then reboot the node. Repeat this on each node in the cluster.

Figure 2.9 – Select Guest OS



In the ESXi Host Console, the VMWare Tools status will change to '**Compliant**' (Figure 2.10.1).

Figure 2.10 – VMWare Tools Status

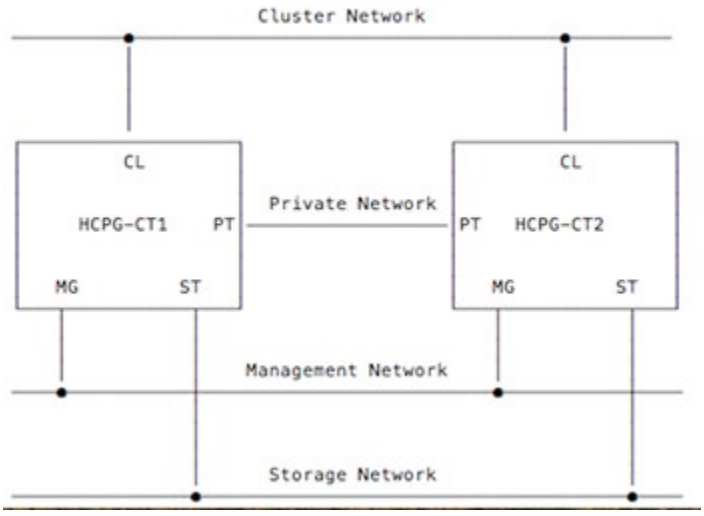
Step 12: A backup namespace must be created that the HCPG will use to store backups of the HCP Gateway configuration and database. No user data will be stored on this namespace. The share name for the backup namespace is required to be '**operation$**', which is a hidden share. 54Refer to the **HCP Gateway Administration Guide, HCP Gateway Operations** chapter, **Backup to HCP Storage** section for additional details.

Chapter 3 Host IP Address Assignments

This document will only cover the typical Active/Passive Two Node Cluster (Figure 3.1).

The Active/Passive Two Node Cluster has four networks and requires 10 IP addresses assignments. If only 3 networks are available, you will need to decide whether to put the Storage Network traffic on the Management or the Cluster Network. The Dedicated Cluster Network requires 4 DNS names each with a unique IP address. The clients will access the cluster shares and UI using this network. The cluster shares and UI will be accessed with the Cluster Role identified below. The Management network is used to access each cluster node server. The Private network is used internally by the cluster and is effectively a point-to-point connection between the two Cluster Nodes, no other network traffic should use this network.

Figure 3.1 - Active/Passive Two Node Cluster Networks



Active/Passive Two Node Cluster

To facilitate the IP address assignment, it is useful to create a simple text table to track the nodes and the assigned IP addresses.

Interface Assignments

A. Management Interface Assignments

		IP Address	Netmask	Gateway
hcpg-cn1	Node 1 Management	10.6.15.21	255.255.255.0	10.6.0.1
hcpg-cn2	Node 2 Management	10.6.15.22	255.255.255.0	10.6.0.1

B. Cluster Interface Assignments

		IP Address	Netmask	Gateway
hcpg-cl	Cluster Services	10.6.11.20	255.255.255.0	10.6.0.1
hcpg-cl1	Node 1 Cluster	10.6.11.21	255.255.255.0	10.6.0.1
hcpg-cl2	Node 2 Cluster	10.6.11.22	255.255.255.0	10.6.0.1
hcpg	Cluster Role	10.6.11.23	255.255.255.0	10.6.0.1

C. Private Interface Assignments

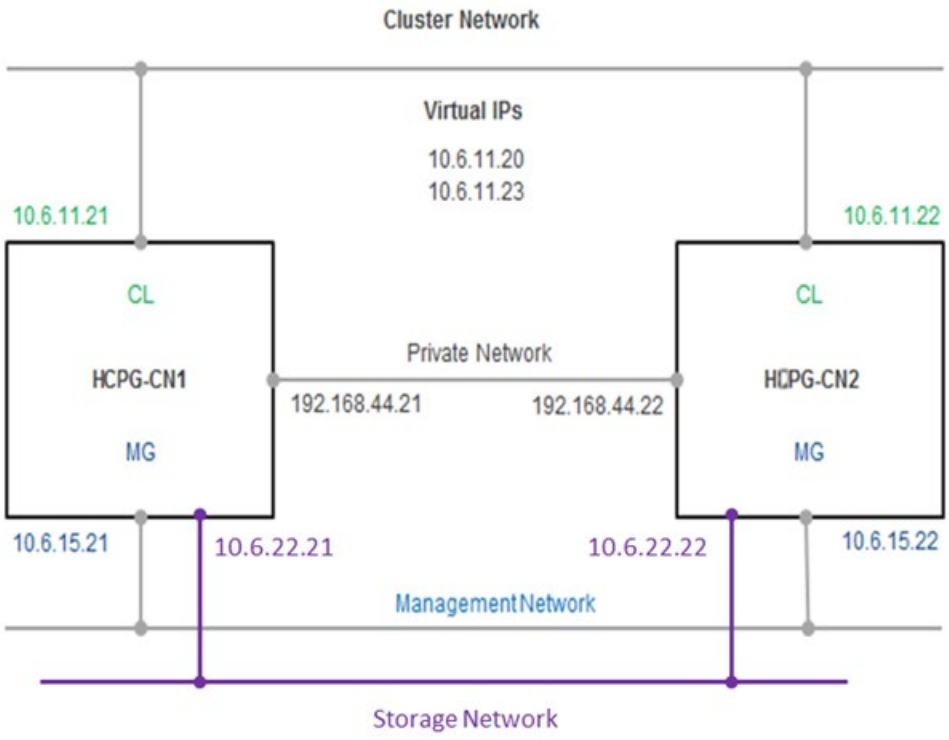
		IP Address	Netmask	Gateway
hcpg-p1	Node 1 Private	192.168.44.21	255.255.240.0	N/A
hcpg-p2	Node 2 Private	192.168.44.22	255.255.240.0	N/A

D. Storage Interface Assignments

		IP Address	Netmask	Gateway
hcpg-s1	Node 1 Storage	10.6.22.21	255.255.255.0	10.6.0.1
hcpg-s2	Node 2 Storage	10.6.22.22	255.255.255.0	10.6.0.1

Completed Network Diagram with IP Addresses

Figure 3.3 – Completed Network Diagram



Chapter 4 DNS Setup

The network Administrator must add the storage, node and cluster interface names and IP addresses to the DNS server. The private interfaces are not required in DNS, as the cluster will use the IP addresses for these instead of the name.

Example of typical entries in a Windows DNS Server is displayed in Figure 4 below.

Figure 4 – DNS

It is required to test the Forward Lookup Fully-Qualified Domain Name (FQDN), for example, **nslookup HCPG-CN1.fqdn.com** and verify the IP address is correct for each of the Storage, Management and Cluster DNS Names. Then test the Reverse Lookup for each of the Management and Cluster IP addresses, for example **nslookup 10.6.15.21** and verify the DNS name is correct. Perform these checks on both nodes. You must correct any issues with the DNS names and IP addresses before continuing.

Chapter 5 Verify Network Adapters

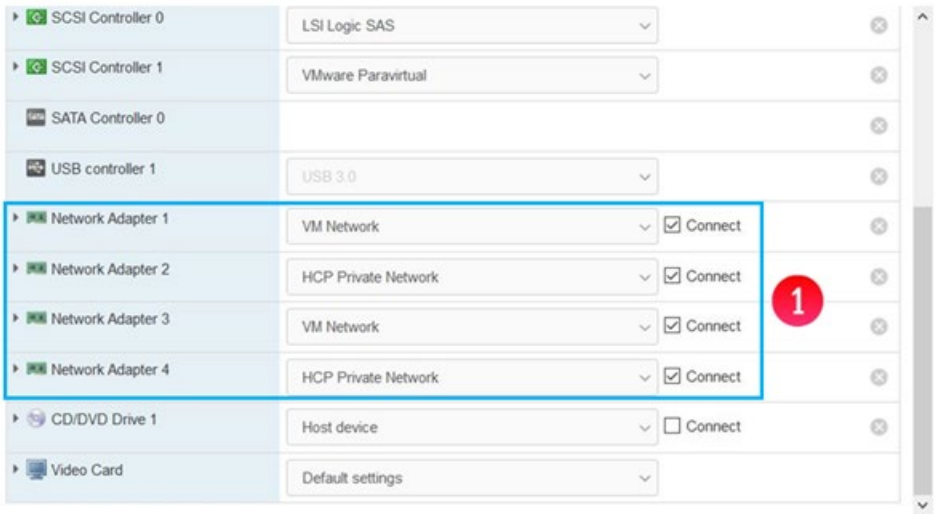
The HCP Gateway VM is configured with 4 network adapters. If you are using a physical server, make sure you have the network adapters connected to the appropriate network switches. All 4 networks are recommended, but the cluster will work if only 3 networks are available. If only 3 networks are available, you will need to decide whether to put the Storage Network traffic on the Management or the Cluster Network.

If you are configuring the cluster using Physical machines, ensure that your network cabling matches the VMWare ESXi configuration steps and follow Step 5 and then Step 7.

Step 1: Login to the ESXi Console that the nodes are running on, select '**Edit**' to access the Settings configuration for the primary node, Node 1.

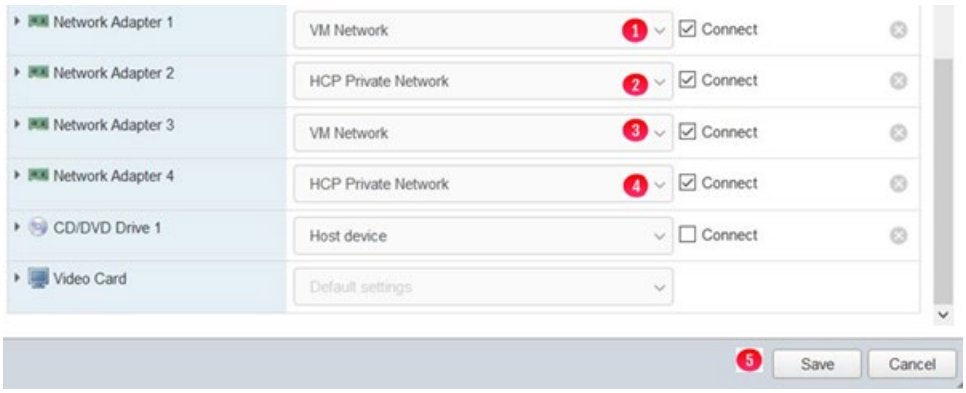
Step 2: In the main settings menu, scroll down until you see all 4 Network Adapters (Figure 5.1).

Figure 5.1 – View Network Adapters



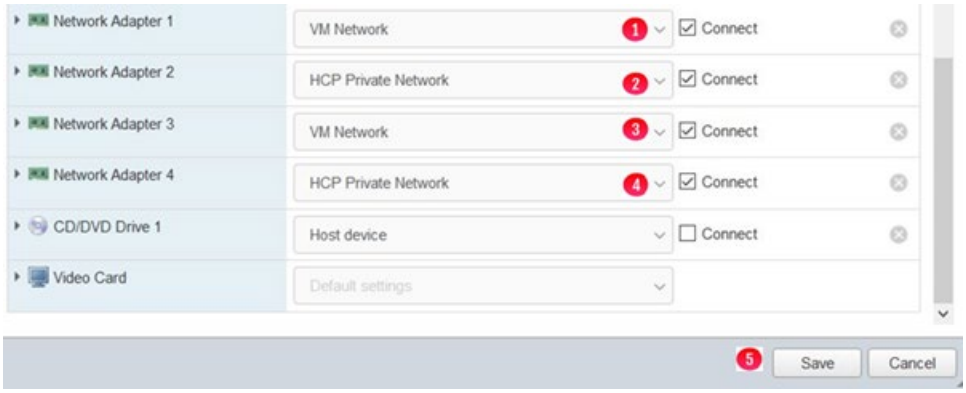
Step 3: Click on the network selection for each one (Figure 5.2.1, 5.2.2, 5.2.3 and 5.2.4) and assign it as appropriate. For this example, the first Network Adapter is set to '**VM Network**' and the second is set to '**HCP Private Network**'. Make sure the Connect box is enabled for each new adapter. If you change any settings, click the '**Save**' button (Figure 5.2.5) to save the changes.

Figure 5.2 – Configure Network Adapters on Node 1



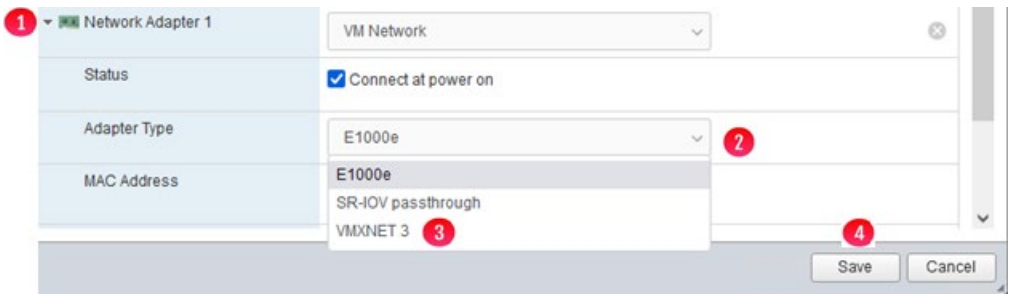
Step 4: Repeat the process for the second node, verify the network adapters and assign them to the appropriate networks (Figure 5.3.1 and 5.3.2).

Figure 5.3 – Configure Network Adapters on Node 2



Step 5: VMWare recommends using the **VMXNET 3** adapter type, so open each Network Adapter (Figure 5.4.1), select **Adapter Type** (Figure 5.4.2) and if available, set the Adapter Type to **VMXNET 3** (Figure 5.4.3). Repeat this step on every Network Adapter on this node, then select **Save** (Figure 5.4.4) to save the settings. Repeat this step on the other cluster node.

Figure 5.4 – Configure Network Adapter Type

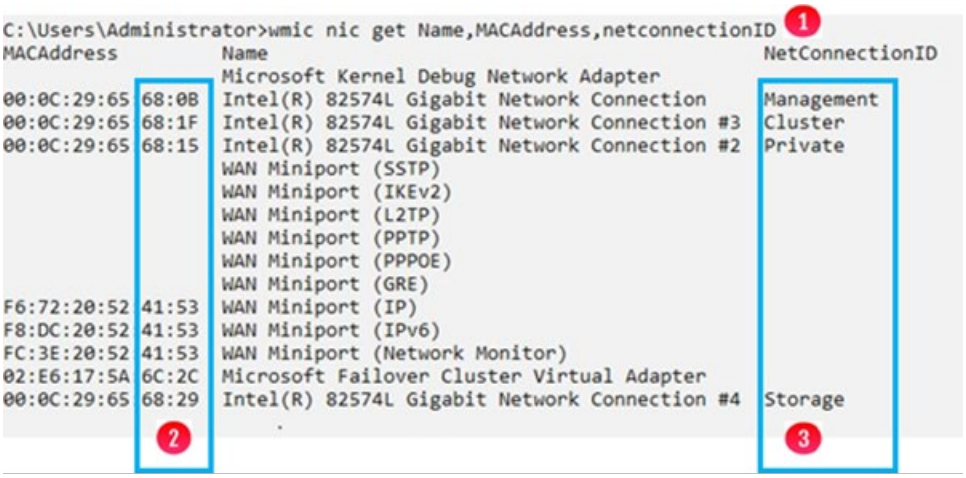


Step 6: Get MAC Addresses to update the Windows Networks

A. Updating the Windows Network information will require obtaining the network hardware addresses (also called MAC addresses) for the interfaces, then using the hardware address to link to the network interface assigned by the Virtual Host (ESXi server). In Windows, the hardware address is called a 'Physical Address'.

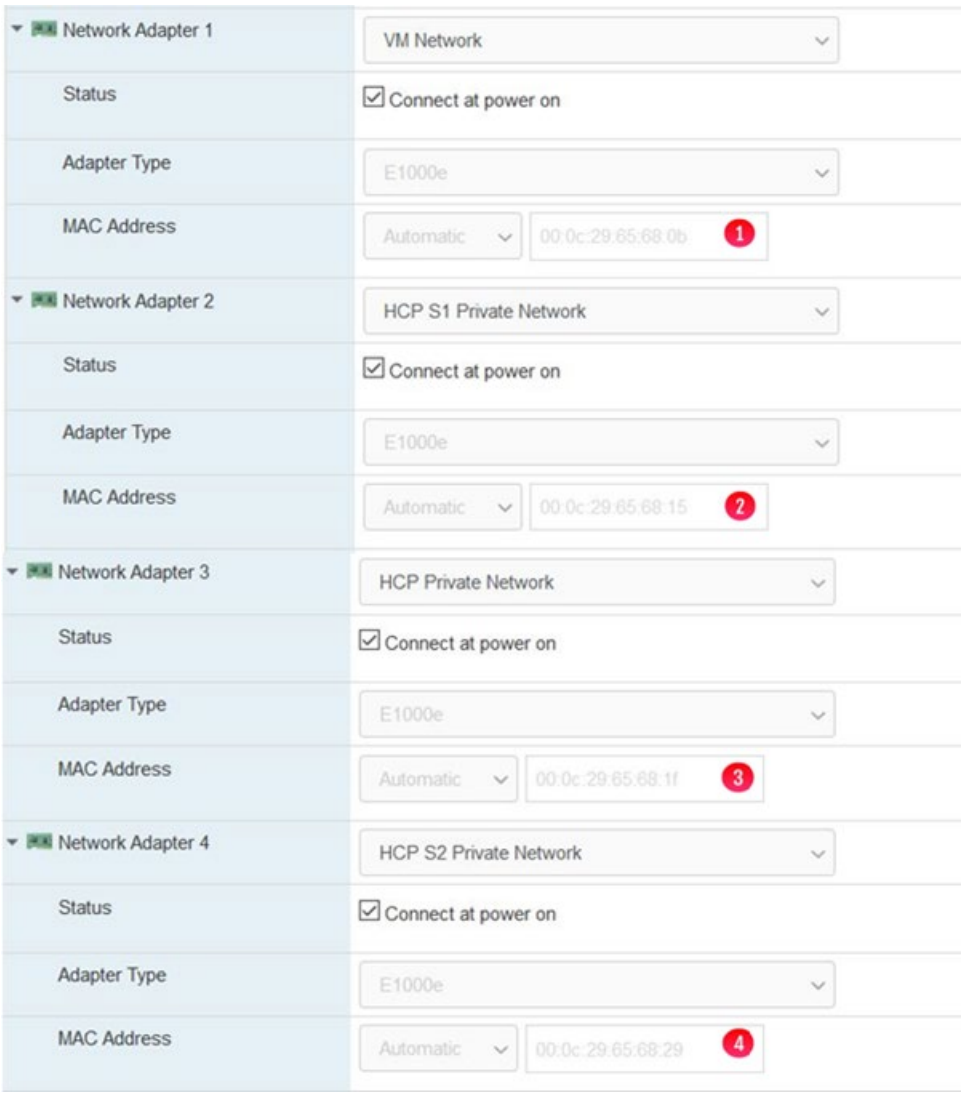
B. To obtain the Network Hardware Addresses, login to node 1 and open a DOS command prompt window. In the DOS command prompt window, enter the following text '**wmic nic get Name, MACAddress**, **NetConnectionID**' (Figure 5.5.1) and press the enter key. Make a note of the last 2 pairs of characters of each 'Physical Address'. An example of the last two pairs of characters is highlighted in the blue box (Figure 5.5.2). Make a note of the name of each network connection (Figure 5.5.3).

Figure 5.5 – Get Node 1 MAC Address



Step 7: In the ESXi console, for each node, select 'Edit' to edit the **VM settings**, then expand each of the Network Adapters (Figures 5.6.1, 5.6.2, 5.6.3 and 5.6.4) to show the hardware address assignment.

Figure 5.6 – ESXi MAC Addresses



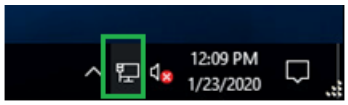
Step 8: Create a table with the interface information. Repeat Steps 5-7 for the second node. Repeat Steps 3 and 4 if any of the ESXi Network adapters are using the wrong Network Name.

Windows	**Address**	**ESXi Adapter**	**Address**	**Network Name**
Management	68:0B	Adapter 1	68:OB	VM Network
Cluster	68:1F	Adapter 2	68:1F	HCP S1 Private Network
Private	68:15	Adapter 3	68:15	HCP Private Network
Storage	68:29	Adapter 4	68:29	HCP S2 Private Network

Chapter 6 Set IP Addresses

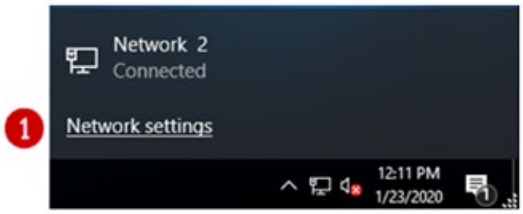
Step 1: From the Node 1 desktop, access the Windows network interfaces by clicking the icon with the image of a plug (Figure 6.1) in the windows taskbar.

Figure 6.1 – Network Interfaces



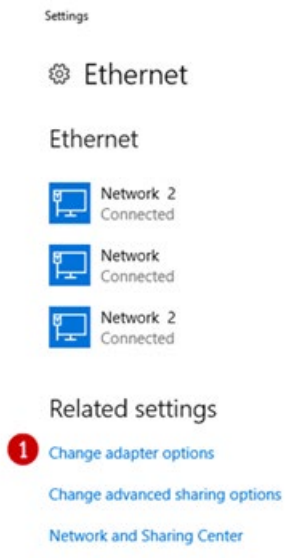
Step 2: In the pop-up menu, select '**Network Settings**' (Figure 6.2.1). Note for Windows 2019, the option to select is **'Network & Internet Settings'**.

Figure 6.2 – Network Interfaces



Step 3: In the Settings Screen, select the '**Change adapter options**' in the '**Related settings**' section (Figure 6.3.1).

Figure 6.3 –Change Adapter Options

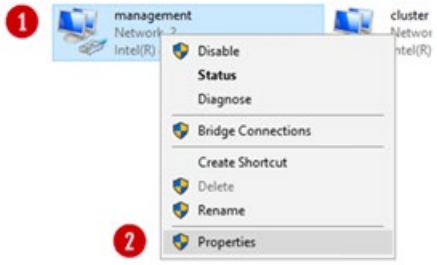


Step 4: In the **Network Connections** screen, verify the names of the interfaces in Windows (Figure 6.4). If using a Physical machine, change the names of the interfaces to match the names in Figure 6.4.

Figure 6.4 – View Interfaces

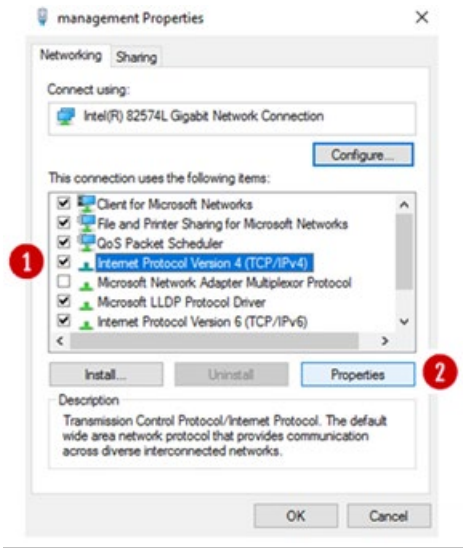
Step 5: Now we will set or verify the **IP Address** and **DNS** information for each interface. Right click on an interface (Figure 6.5.1). Then select '**Properties**' from the menu (Figure 6.5.2).

Figure 6.5 – Interfaces after Name changes



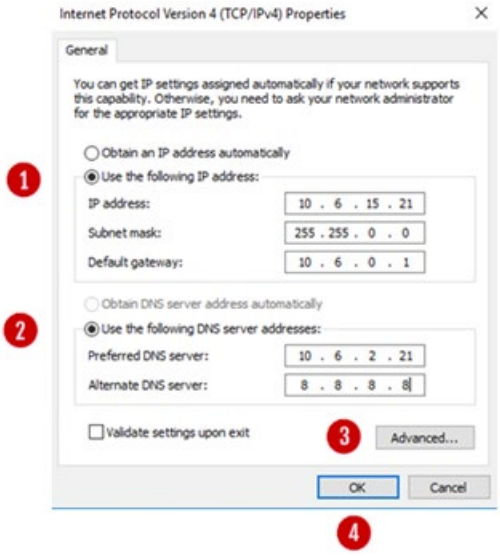
Step 6: In the interface **Properties** window, select the '**Internet Protocol Version 4 (TCP/IPv4)**' option (Figure 6.6.1) and then click on the '**Properties**' button (Figure 6.6.2).

Figure 6.6 – IPV4



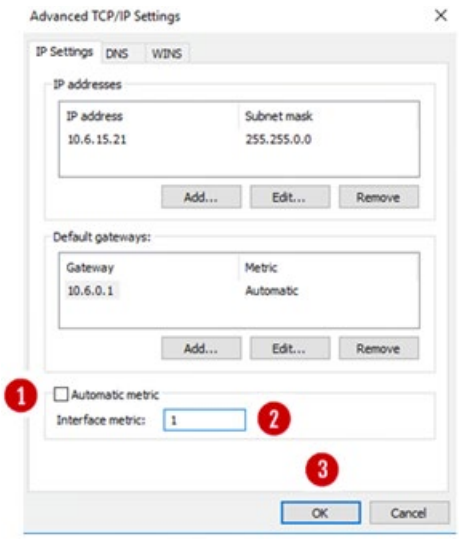
Step 7: In the '**Internet Protocol Version 4 (TCP/IPv4)**' window, verify or fill in the **IP Address** and **DNS** information to match the information from **Chapters 3 & 4** for the interface (Figures 6.7.1 and 6.7.2). In some cases it may be required to manually set the metric where the management would be '1', the cluster '2', the private '3' and the storage '4'. The metric is accessed by clicking the 'Advanced...' button (Figure 6.7.3).

Figure 6.7 – Update IPV4



Step 8: To manually set the metric, click the '**Automatic metric**' to be unchecked (Figure 6.8.1), then enter a number in the interface metric box (Figure 6.8.2). Note a lower number has a higher priority. Then click the '**OK**' button in the '**Advanced TCP/IP Settings**' window (Figure 6.8.3), then click the '**OK**' button in the '**Internet Protocol Version (TCP/IPv4) Properties**' window (Figure 6.7.4).

Figure 6.8 – Update Metric



Step 9: Repeat Steps 5 through 8 for each interface on both node 1 and node 2.

Step 10: Reboot both node 1 and node 2.

Step 11: Test the interfaces of each node. Open a DOS Command Prompt on each node and then use the ping command to check connectivity. Use the IP address for each interface, for this example 10.6.15.21, 10.6.15.22, 10.6.11.21 and 10.6.11.22, 192.168.44.21, 192.168.44.22, 10.6.20.21 and 10.6.20.22.

Resolve any issues, do not continue if the interfaces cannot be seen from each node.

On Node 1 Ping the management interfaces

C:> **ping 10.6.15.21**

C:> **ping 10.6.15.22**

On Node 1 Ping the cluster interface

C:> **ping 10.6.11.21**

C:> **ping 10.6.11.22**

On Node 1 Ping the private interface

C:> **ping 192.168.44.21**

C:> **ping 192.168.44.22**

On Node 1 Ping the storage interface

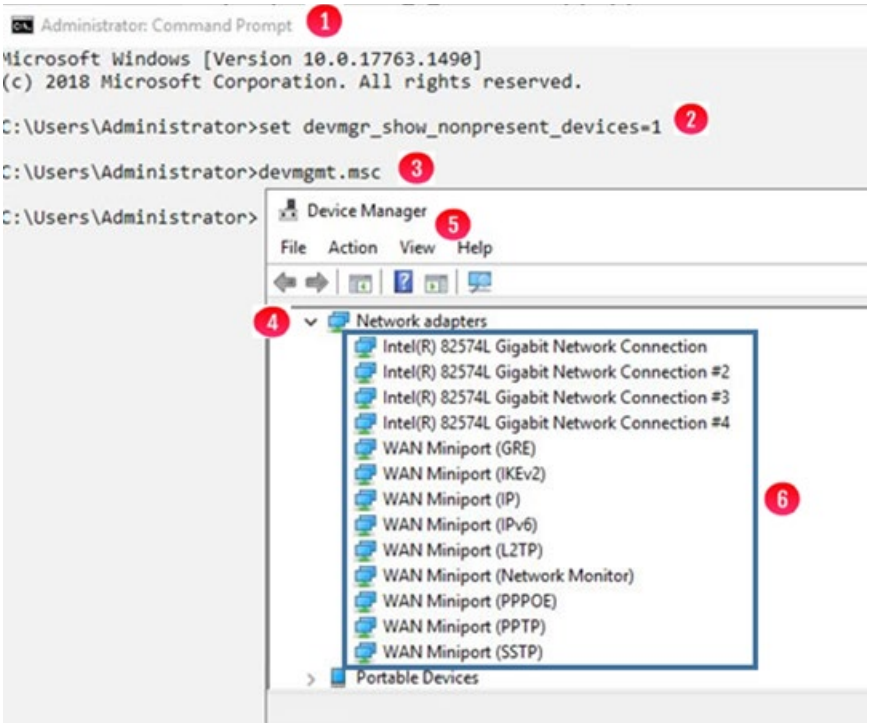
C:> **ping 10.6.20.21**

C:> **ping 10.6.20.22**

Repeat the process for Node 2. Also repeat the process using the FQDN of each IP address on both nodes.

Step 12: On both nodes, click on the Windows Start button and open a **DOS Command prompt** as **Administrator** (Figure 6.9.1). Issue the command **set devmgr_show_nonpresent_devices=1** (Figure 6.9.2). Open the Windows Device Manager by issuing the command **devmgmt.msc** (Figure 6.9.3). In Device Manager, scroll down and open the **Network adapters** selection (Figure 6.9.4). In Device Manager, click the **View** menu (Figure 6.9.5) and select **Show Hidden Devices**. If there are any network adapters greyed out, right-click on the greyed out network adapter and select **Uninstall device**. Repeat this step until there are no more greyed out network adapters (Figure 6.9.6).

Figure 6.9 – Ghost Network Adapters



Chapter 7 Shared Disk Setup

If you are using a pair of physical machines, refer to **Chapter 17 Shared Disk Setup with SAN Storage** for the detailed instructions.

If you are using GAD storage, refer to **Chapter 18 Shared Disk Setup with GAD Storage** for the detailed instructions.

Before the shared disks can be installed a SCSI controller needs to be added to both of the VMs first.

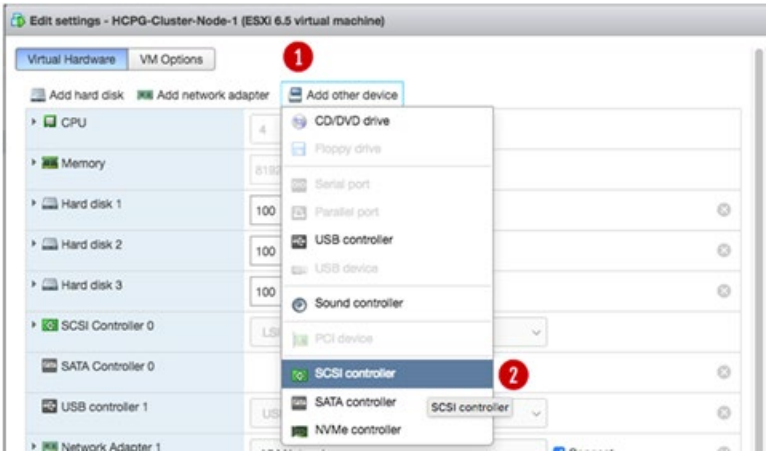
A. Adding SCSI Controller

Step 1: Make sure you have shut down the node 1 VM properly with the Shutdown option in the Windows Start menu. For Node 1 on the ESXi console, click '**Edit**' to edit the node settings. In the '**Edit settings**' window, if '**SCSI Controller 1**' does not already exist, click the '**Add other device**' button (Figure 7.1.1), scroll down and select '**SCSI Controller**' (Figure 7.1.2). If '**SCSI Controller 1**' already exists, then ensure that the '**SCSI Controller 1**' is set to '**VMWare Paravirtual**' and the '**SCSI Bus Sharing**' to '**Physical**' (Figure 7.3) and skip to step 4.

NOTE:

When installing both of the cluster nodes on the same ESXi host, set the 'SCSI Bus Sharing' to 'Virtual'

Figure 7.1 – Add SCSI Controller



Step 2: The Edit settings window is updated with a '**New SCSI Controller**' entry. Expand the settings of the '**New SCSI Controller**' by clicking on the **arrow** (Figure 7.2.1) just to the left of the label.

Figure 7.2 – Add SCSI Controller

Step 3: In the Expanded settings, change the '**New SCSI Controller**' to '**VMWare Paravirtual**' (Figure 7.3.1) and the '**SCSI Bus Sharing**' to '**Physical**' (Figure 7.3.2). Then click on the '**Save**' button (Figure 7.3.3) to exit this settings window.

NOTE:

When installing both of the cluster nodes on the same ESXi host, set the 'SCSI Bus Sharing' to 'Virtual'

Figure 7.3 – Virtual SCSI Controller

Step 4: Repeat this process for node 2.

B. Adding Shared Cluster Disks to Node 1

Two disks will be added as Shared Cluster Disks, one will be the Cluster Witness Disk and the second will be the HCP Gateway Cache disk.

Step 1: On the ESXi Console, for Node 1, click the '**Edit**' button. In the '**Edit settings**' window, click the '**Add hard disk**' button located at the top of the window (Figure 7.4.1). This will be the **Witness** disk.

Figure 7.4 – Virtual SCSI Controller

Step 2: Select '**New standard hard disk**' from the menu (Figure 7.5.1).

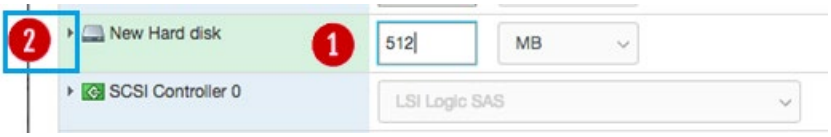
Figure 7.5 – Add Disk

Step 3: A '**New Hard disk**' entry will appear in the Edit settings window. Change the unit from '**GB**' to '**MB**' for the '**New Hard disk**' (Figure 7.6.1).

Figure 7.6 – Change Disk Size

Step 4: Next change the size from the default from **40** to **512** (Figure 7.7.1). Then click on the right arrow (Figure 7.7.2) to open a window to see all of the settings.

Figure 7.7 – Change Disk Size



Step 5: Notice the Location of the folder where the VM files for Node 1 are stored (Figure 7.8.1).

Figure 7.8 – Witness Disk Location

Step 6: Change the Disk Provisioning to '**Thick provisioned, eagerly zeroed**' (Figure 7.9.1).

Figure 7.9 – Change Disk Provisioning

Step 7: Change the '**Controller location**' by clicking on the **down arrow**, then select '**SCSI controller 1**' from the list (Figure 7.10.1). Notice that the disk location is now '**SCSI (1:0)**'.

Figure 7.10 – Change SCSI Controller

Step 8: Change the '**Disk mode**' by clicking on the **down arrow**, then select '**Independent - persistent**' (Figure 7.11).

Figure 7.11 – Change Disk Mode

Step 9: Change the 'Sharing' by clicking on the **down arrow**, then select '**Multi-writer sharing**' (Figure 7.12).

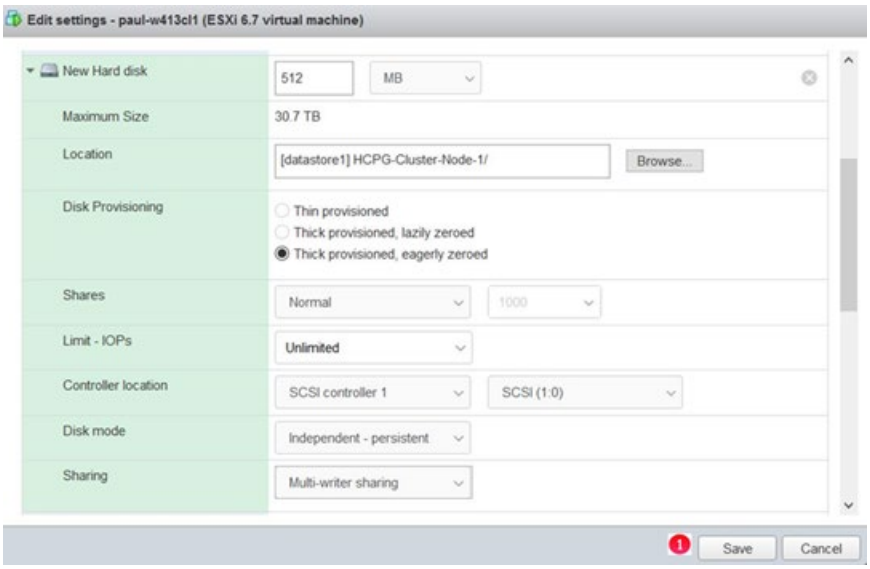
NOTE:

If the VMs used in this cluster are on separate VMWare ESXi hosts, known as cluster-across-boxes, then leave the 'Sharing' setting at the default 'None'. If the VMWare ESXi host is running ESXi version 7.0, then leave the 'Sharing' setting at the default 'None'.

Figure 7.12 – Change Sharing

Step 10: The screen should now look like Figure 7.13. Click '**Save**' (Figure 7.13.1).

Figure 7.13 – Save Changes



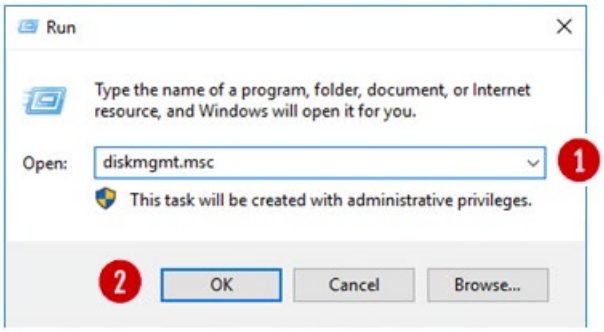
Step 11: Now a shared cache disk needs to be created. Repeat steps 1, 2, 4-10. Step 3 is skipped as the desired unit by default is GBs for the shared cache disk. On step 4, use whatever value meets the customer requirements, for this example 100GB, for the HCP Gateway shared cache disk. The Controller location for this shared cache disk will be **SCSI(1:1)**.

Step 12: Power on the Node 1 VM.

NOTE:

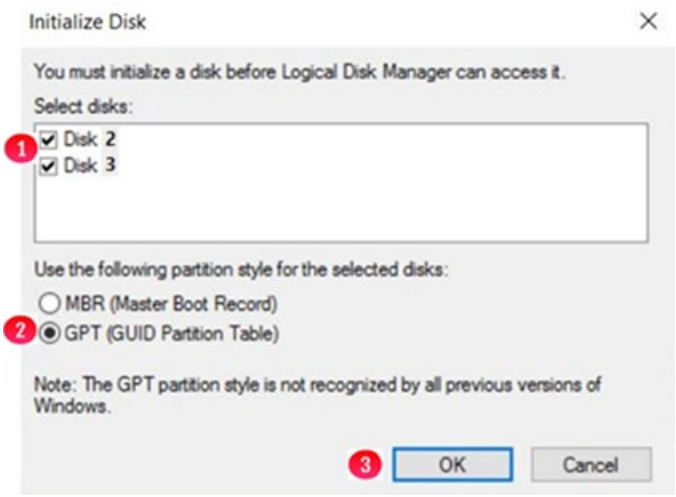
Depending on the size of the shared cache disk, it may take a few minutes or longer for the ESXi host to eagerly zero the disk before the VM will power on. Logon on to the desktop as the local Administrator on Node 1. Right-click on the Windows Start Menu located at the bottom left of the screen and select the command 'Run'. In the 'Open' text entry space enter 'diskmgmt.msc' (Figure 7.14.1), then click 'OK' to open the Disk Management window.

Figure 7.14 – Run Disk Management



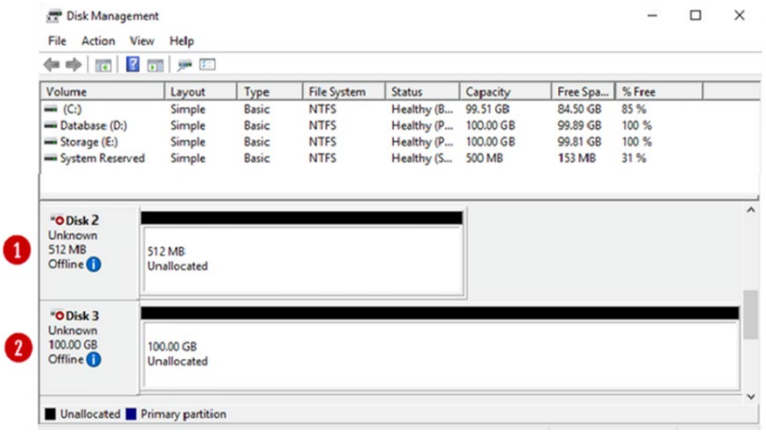
Step 12: In the Disk Management window, if the "**Initialize Disk**" window is displayed, make sure both "**Disk 2**" and "**Disk 3**" are selected (Figure 7.15.1). Select the "**GPT (GUID Partition Table)**" button (Figure 7.15.2) and click the "**OK**" button (Figure 7.15.3) to continue. If you did not see the "**Initialize Disk**" screen, go to Step 13. Otherwise, skip to Step 17.

Figure 7.15 – Select New Disks



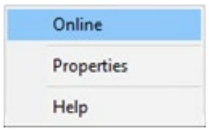
Step 13: In the Disk Management window, if you did not see the "**Initialize Disk**" screen in Step 12 for both "**Disk 2**" and "**Disk 3**", scroll down to view the two hard disks (Figures 7.16.1 and 7.16.2) with size 512MB and the size of the shared cache disk, for this example 100GB, that were added in the ESXi console. Note the disks are offline and unallocated.

Figure 7.16 – New Disk Status



Step 14: Right click on **Disk 2**, then select '**Online**' from the pulldown menu (Figure 7.17).

Figure 7.17 – Set Disk Online



Step 15: The **Disk 2** status will change from **Offline** to **Not Initialized** (Figure 7.18). The next step is to initialize the disk by right clicking again on **Disk 2** and selecting "**Initialize Disk**" (Figure 7.19.1).

Figure 7.18 – Updated Disk Status

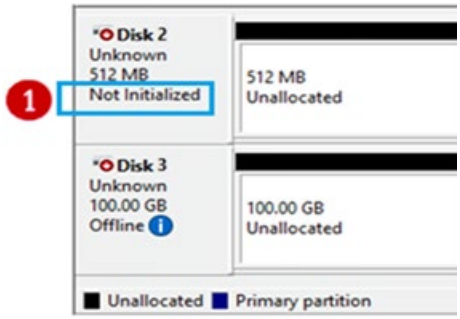
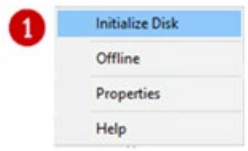
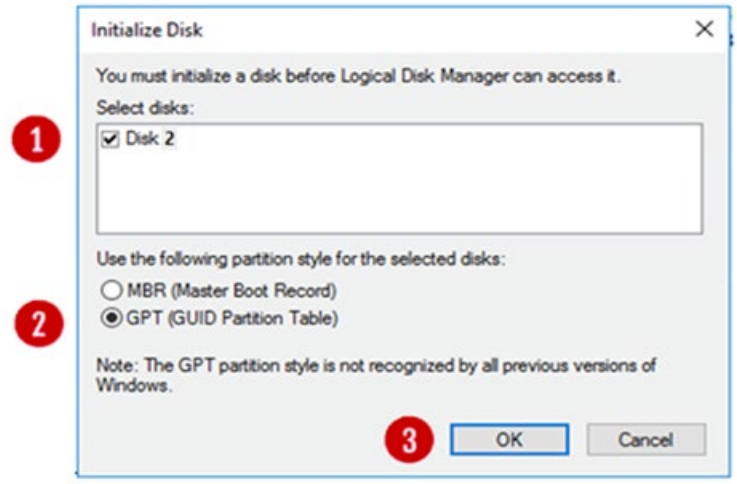


Figure 7.19 – Initialize Disk



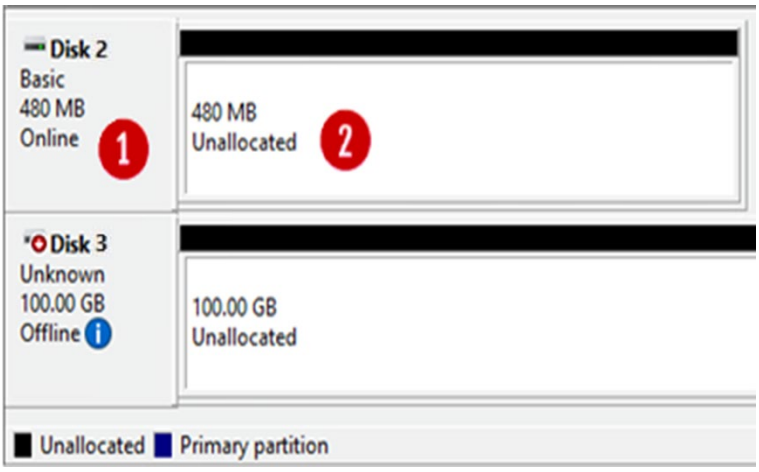
Step 16: From the **Initialize Disk** menu select the drive (Figure 7.20.1). Use **GPT** partition style (Figure 7.20.2). Then click the '**OK**' button to start the initialize process.

Figure 7.20 – Initialize Disk Configuration



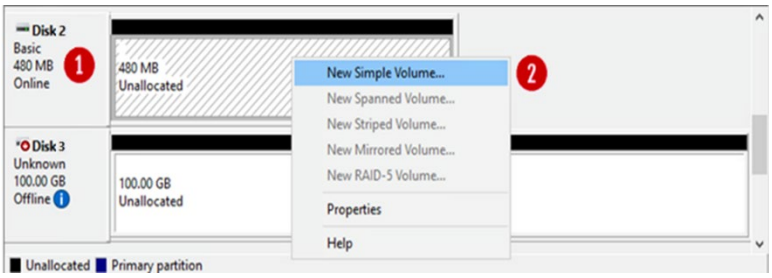
Once the initialization process is complete, the menu will revert back to the Disk Management main menu. Now **Disk 2** will show status as **Online** (Figure 7.21.1). Note the Unallocated disk space is now around 480MB (Figure 7.21.2), versus the original 512 MB allocation on the ESXi console. Repeat Steps 13-16 for **Disk 3**. Note that the Unallocated disk space is now 99.98GB, versus the original 100GB allocated on the ESXi console.

Figure 7.21 – Disk Online



Step 17: The next step is to right click in the box that surrounds the '**480 MB Unallocated**' text for **Disk 2** (Figure 7.22.1) and then select **New Simple Volume** (Figure 7.22.2) from the menu list.

Figure 7.22 – Create Simple Volume

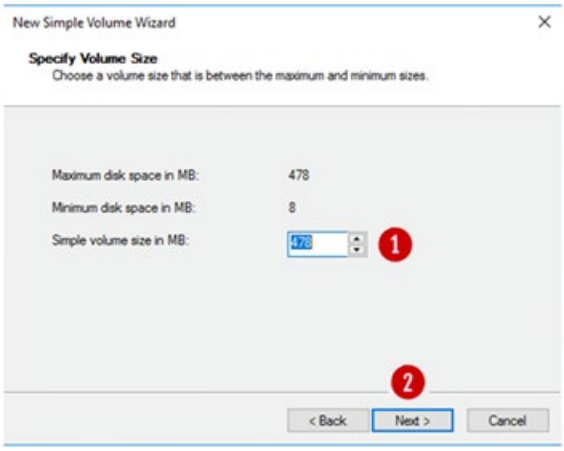


Step 18: This will open the New Simple Volume Wizard (Figure 7.23), click the '**Next**' button (Figure 7.23.1) to continue.

Figure 7.23 – New Volume Wizard

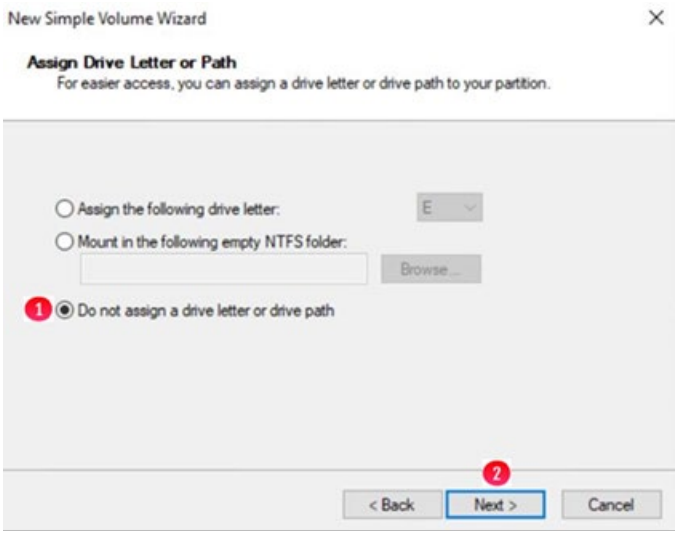
Step 19: Take the default Simple Volume size (Figure 7.24.1) which is the maximum value. Then click the '**Next**' button (Figure 7.24.2) to continue.

Figure 7.24 – Set Volume Size



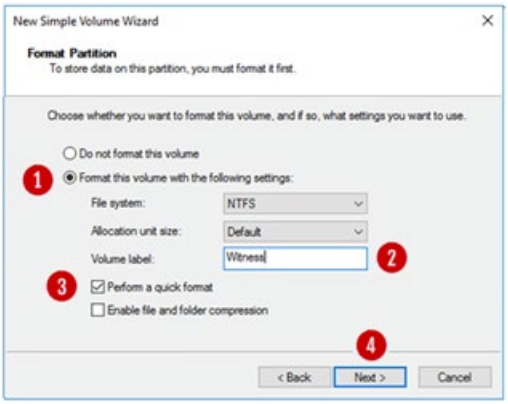
Step 20: Select "**Do not assign a drive letter or path**" (Figure 7.25.1). Then click the '**Next**' button (Figure 7.25.2) to continue.

Figure 7.25 – Set Drive Letter



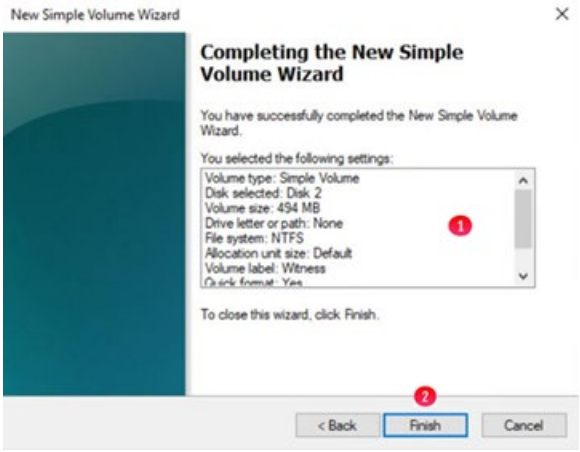
Step 21: Click the option '**Format the volume with the following settings**' (Figure 7.26.1) radio button. Select '**File System**' as '**NTFS**' and '**Allocation Unit size**' as '**Default**' options. Then type '**Witness**' into the Volume label (Figure 7.26.2) data entry box. Then select the box for '**Perform a quick format**' (Figure 7.26.3). Then click the '**Next**' button (Figure 7.26.4) to continue.

Figure 7.26 – Format Partition



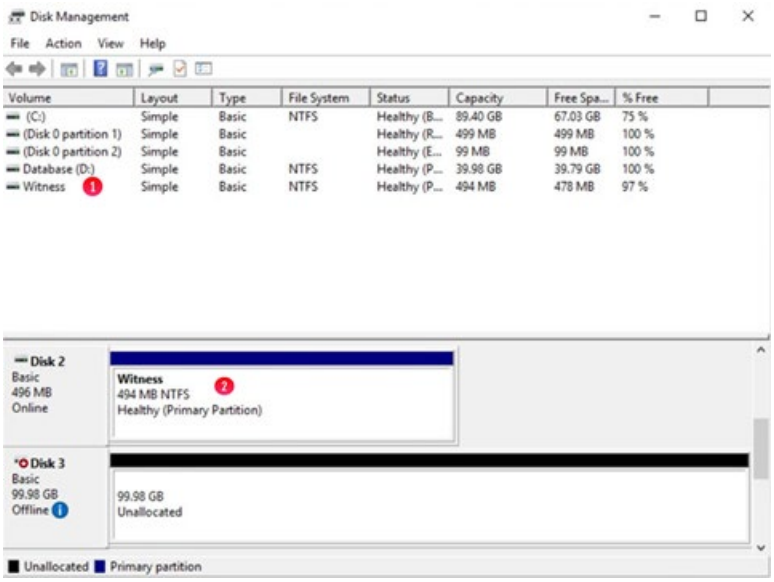
Step 22: Review the selected settings in the dialogue box (Figure 7.27.1). If they are correct then click the '**Finish**' button (Figure 7.27.2). If the settings are not correct, click the **Back** button and go back to the setting that needs to be corrected.

Figure 7.27 – Finish



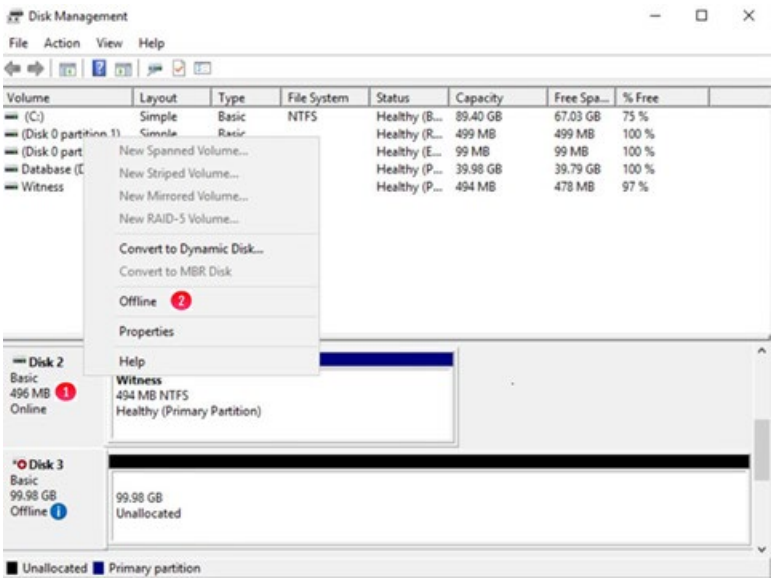
Step 23: Review updates in the Disk Management console. Notice that the **Witness Disk** (Figure 7.28.1), is online and has a Healthy status (Figure 7.28.2).

Figure 7.28 – Results



Step 24: Take the Witness disk offline by right-clicking in the "**Disk 2**" box (Figure 7.29.1) and select "**Offline**" (Figure 7.29.2).

Figure 7.29 – Take Disk 2 Offline

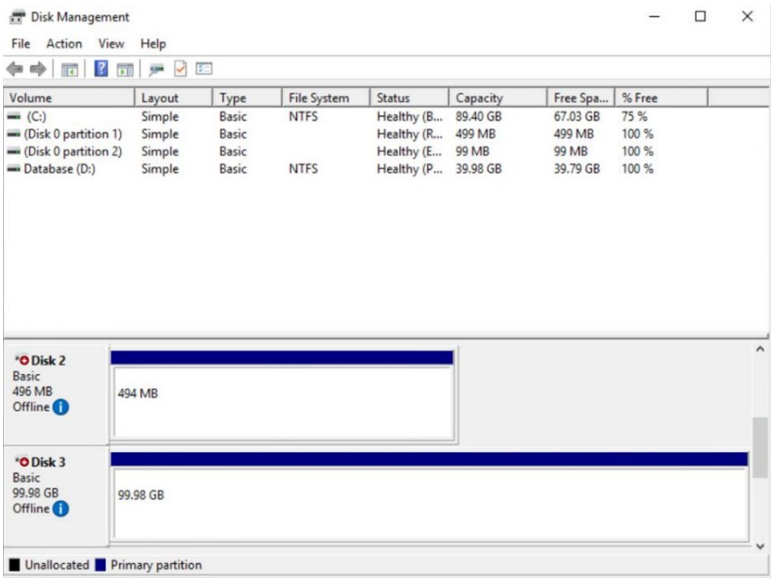


Step 25: Repeat steps 13-24 for **Disk 3**, in Step 16, for this example, the disk size of 100GB in ESXi will likely show as 99.98GB, assign G for the drive letter in Step 20 and **Shared Cache** for the Volume Label in Step 21. Review the Disk Management window to make sure both drives are **Offline** (Figure 7.30)

NOTE

If using a large disk for the cache, you may need to adjust the Allocation Unit size of the disk. Please contact your system administrator for more information.

Figure 7.30 – Results 2



Step 26: If necessary, expand the size of the database disk, drive **D**:. Refer to the **VM Deployment Guide Chapter 2** for the details.

C. Adding Shared Cluster Disks to Node 2

The Witness and Shared Cache disks have now been added to Node 1 in the ESXi console and to Windows Disk Management for node 1. Now the Witness and Shared Cache disks need to be added to Node 2 in ESXi console and to Disk Manager on Node 2. This section will cover those steps.

Step 1: Make sure you have shut down the node 2 VM properly with the Shutdown option in the Windows Start menu. For Node 2 on the ESXi console, click '**Edit**' to edit the node settings. In the '**Edit settings**' window, if '**SCSI Controller 1**' does not already exist, click the '**Add other device**' button (Figure 7.30.1). If '**SCSI Controller 1**' already exists, then ensure that the '**SCSI Controller 1**' is set to '**VMWare Paravirtual**' and the '**SCSI Bus Sharing**' to '**Physical**' (Figure 7.32) and skip to step 4.

NOTE:

When installing both of the cluster nodes on the same ESXi host, set the 'SCSI Bus Sharing' to 'Virtual'

Figure 7.31 – Add Other Device

Step 2: In the menu selection scroll down and select '**SCSI controller**' (Figure 7.31.1)

Figure 7.31 – SCSI Controller

Step 3: The Edit settings window is updated with a '**New SCSI Controller**' entry. Expand the settings of the 'New SCSI Controller' by clicking on the **arrow** (Figure 7.32.1) just to the left of the label. In the Expanded settings, change the '**New SCSI Controller**' to '**VMWare Paravirtual**' (Figure 7.32.1) and the '**SCSI Bus Sharing**' to '**Physical**' (Figure 7.32.2). Then click Save (Figure 7.32.3).

NOTE:

When installing both of the cluster nodes on the same ESXi host, set the 'SCSI Bus Sharing' to 'Virtual'

Figure 7.32 – Configure New SCSI Controller

Step 4: Next, click the '**Edit**' button for node 2 in the ESXi console and click the '**Add hard disk**' icon at the top of the window (Figure 7.33.1). From the menu select '**Existing hard disk**' (Figure 7.33.2)

Figure 7.33 – Add existing Disk

Step 5: The '**Datastore browser**' will appear, select the directory for the Node 1 VM, for this example, **HCPG-Cluster-Node-1** and the disk "**HCPG-Cluster-Node-1_2.vmdk**" (Figure 7.34.1) created earlier on Node

1. Ensure that the disk you selected is the 512MB disk. Click the '**Select**' button to continue.

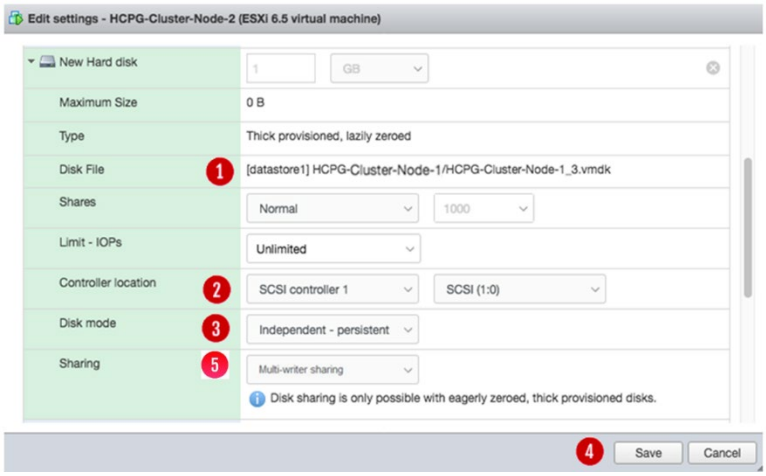
Figure 7.34 –Datastore Browser

Step 6: Node 2 will now contain the location (Figure 7.35.1) of the first shared disk (**Witness** Disk). Open the '**New Hard Disk**' section and change the **Controller location** from '**SCSI Controller 0**' to '**SCSI Controller 1**' (Figure 7.35.2) in the pull down menu, the disk location will change to '**SCSI (1:0)**'. Change the Disk Mode setting from '**Dependent**' to '**Independent - persistent**' (Figure 7.35.3). Then click the '**Save**' button (Figure 7.35.4) to exit the Windows settings. Then click '**Edit**' on the node again, click the right-arrow on '**Hard Disk 3**' and change the '**Sharing'** to **'Multi-writer sharing**' (Figure 7.35.5) then click the '**Save**' button (Figure 7.35.4) to exit the Windows settings. Repeat Steps 4-6 for the second shared disk (Shared Cache Disk) selecting the disk named "**HCPG-Cluster-Node-1_3.vmdk**" in Step 5. Ensure the size of the disk is the correct size, for this example 100GB and the **Controller location** is '**SCSI controller 1**' and the disk location is '**SCSI (1:1)**'. This disk will be **Hard Disk 4** in the ESXi settings.

NOTE:

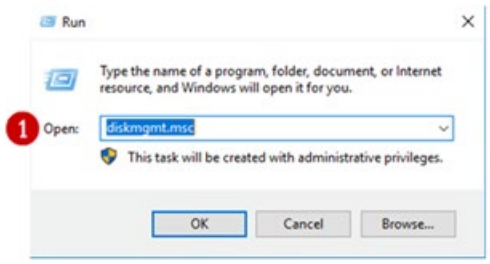
If the VMs used in this cluster are on separate VMWare ESXi hosts, known as cluster-across-boxes, or if the VMWare ESXi host is running ESXi version 7.0, then leave the 'Sharing' setting at the default 'None'.

Figure 7.35 – Update Witness Disk Settings



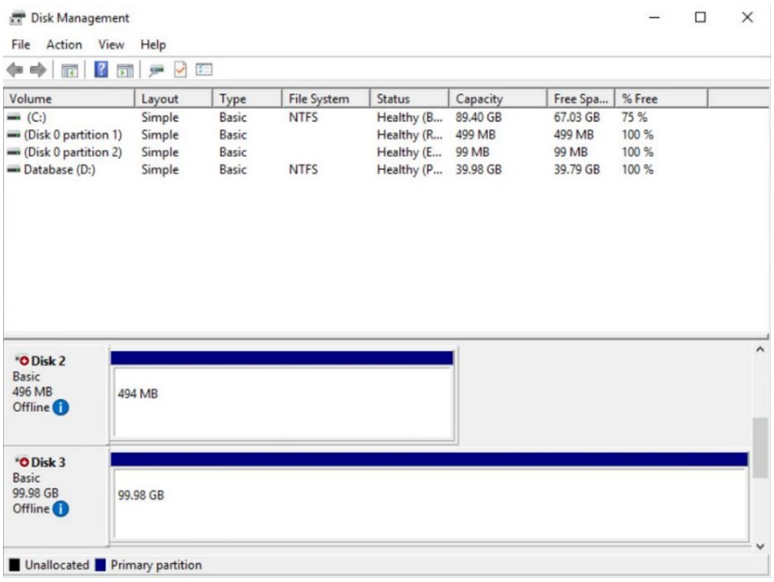
Step 7: Now that the disks have been added to Node 2, power on the VM. Then login into the Windows disk management on Node 2 to verify that the disks are visible. **First**, login to the Windows Desktop as the local Administrator on Node 2. Right-click on the Windows Start Menu located at the bottom left of the screen and select '**Run**'. In the dialogue box following the '**Open**:' tag (Figure 7.36.1), enter '**diskmgmt.msc**' then click '**OK**' to access the Disk Manager.

Figure 7.36 – Windows Disk Management



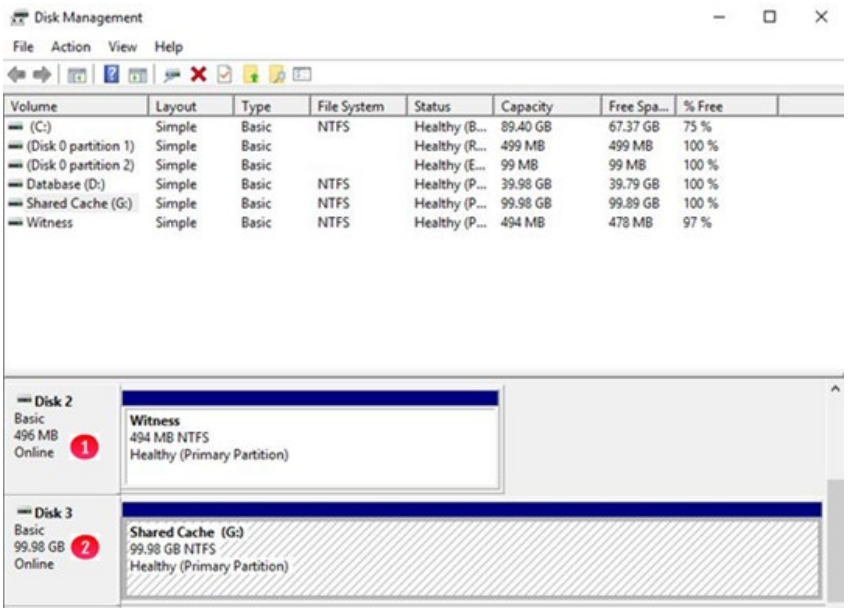
Step 8: In the Disk Management window, scroll down to view that the two hard disks added in the ESXi console appear (Figures 7.37.1 and 7.37.2). Note these disks are offline as they are controlled by Node 1.

Figure 7.37 – New Drives Added



Step 9: In the Disk Management window, right-click on **Disk 2** and change the disk to '**Online**' (Figure 7.38.1). The disk name will change to '**Witness**'. Right-click on **Disk 3** and change the disk to 'Online'. The disk name will change to '**Shared Cache (E:)**'. Right-click again on Disk 3 in the **Shared Cache E**: drive box and change the drive letter to '**G:**' (Figure 7.38.2).

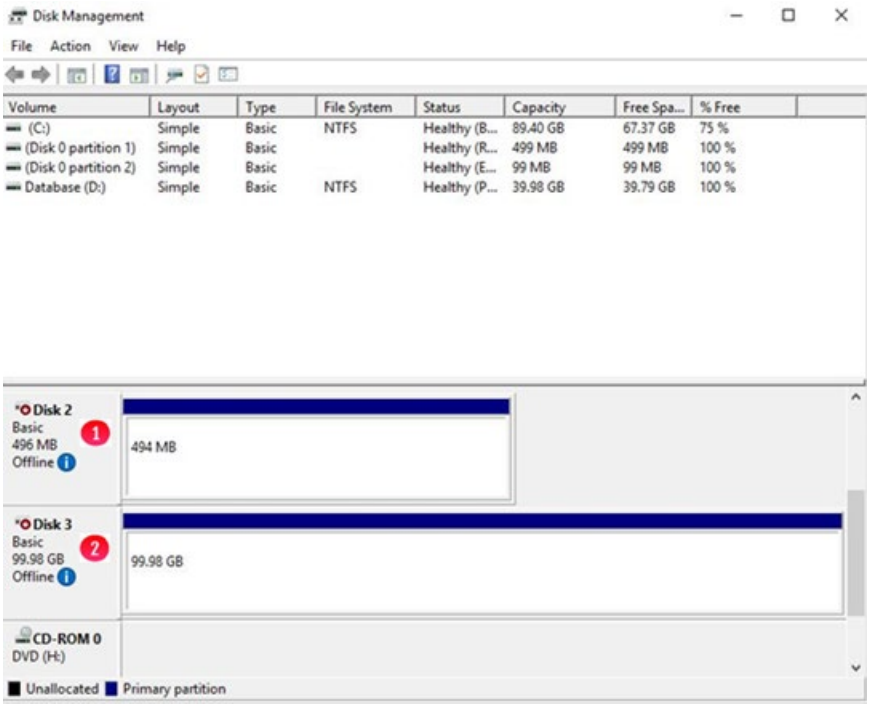
Figure 7.38 – Node 2 drives online



Step 10: In the Disk Management window, right-click on **Disk 2** and change the disk to '**Offline**' (Figure 7.39.1). The disk name '**Witness**' and status will no longer be visible. Right-click on **Disk 3** and change the disk

to '**Offline**'. The disk name '**Shared Cache (G:)**' and status will no longer be visible (Figure 7.39.2).

Figure 7.39 – Node 2 drives offline



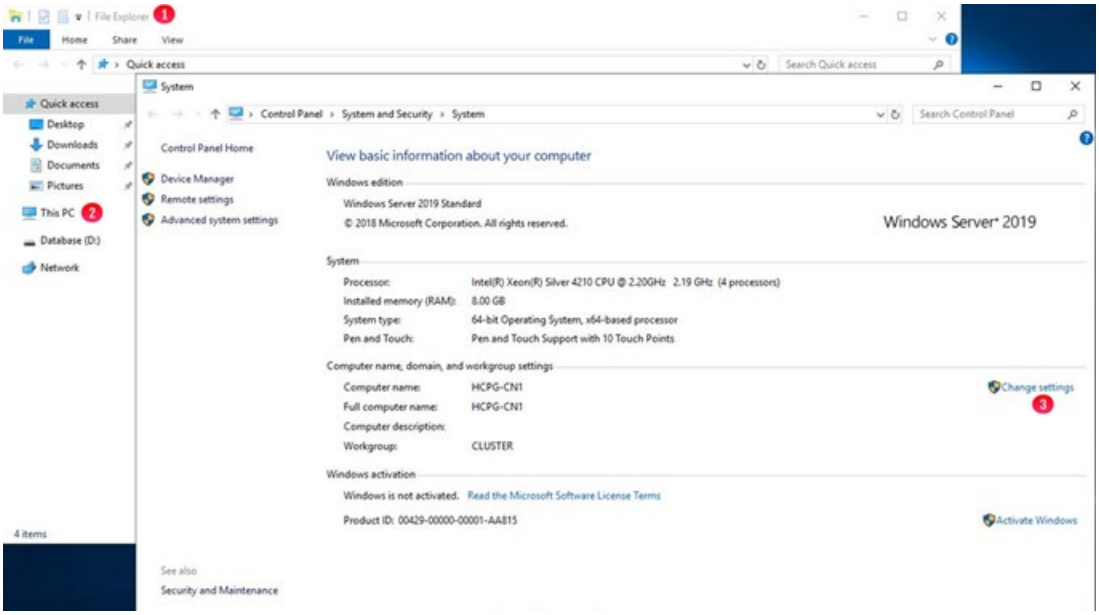
Step 11: If necessary, expand the size of the database disk, drive **D**:. Refer to the **VM Deployment Guide Chapter 2** for the details.

Chapter 8 Active Directory

For Windows Fail-over Clustering to work properly both Node 1 and Node 2 to have to be in an Active Directory domain. If you have previously added the Nodes into an Active Directory domain, then this chapter can be skipped.

Step 1: To join a domain, login to the Desktop on Node 1, left-click on the Windows File Explorer (Figure 8.1.1) in the taskbar. In Windows File Explorer, right-click on '**This PC**' (Figure 8.1.2) and select '**Properties**' to bring up the **Control Panel**. Click on '**Change Settings**' (Figure 8.1.3).

Figure 8.1 – Windows Settings



Step 2: In the '**System Properties**' screen, click '**Computer Name**' (Figure 8.2.1) and click '**Change**…' (Figure 8.2.2). If you need to change the name of the computer before joining the domain, enter the new **name** (Figure 8.2.3), then click '**OK**' (Figure 8.2.4). Note that you may need to enter the credentials to change the name of the server then click 'OK' in the '**Computer Name/Domain Changes**' popup window (Figure 8.2.7). Then click '**Close**' in the '**System Properties**' screen, then in the '**Microsoft Windows**' popup window select '**Restart Now**' (Figure 8.3.1) to reboot the server. Then after the server comes back up, return to this screen and click the '**Domain**:' button (Figure 8.2.5) and enter the **domain name** (Figure 8.2.6) then click '**OK**' (Figure 8.2.4). Note that you may need to enter the credentials to join the domain then click '**OK**' in the '**Computer Name/Domain Changes**' popup window welcoming you to the domain. Then click 'OK' in the 'Computer Name/Domain Changes' popup window informing you to restart your computer (Figure 8.2.7). Then click '**Close**' in the '**System Properties**' screen, then in the '**Microsoft Windows**' popup window select '**Restart Now**' (Figure 8.3.1) to reboot the server.

Figure 8.2 – Computer Name/Domain Name

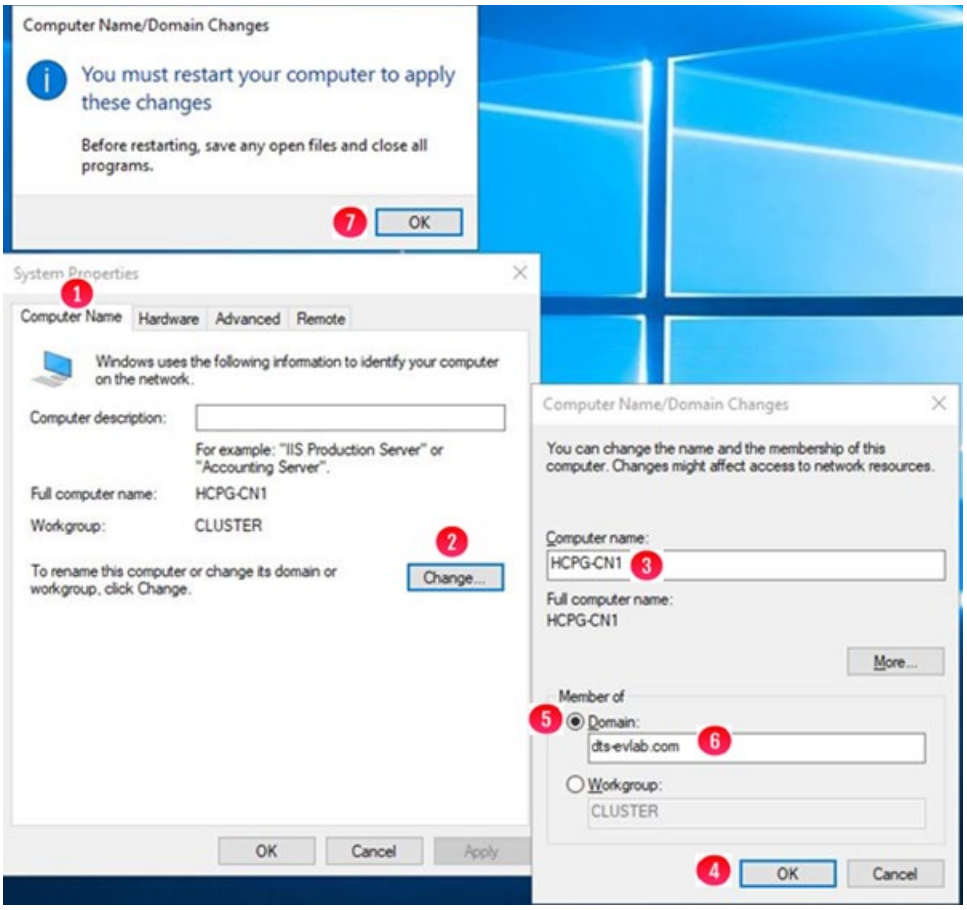
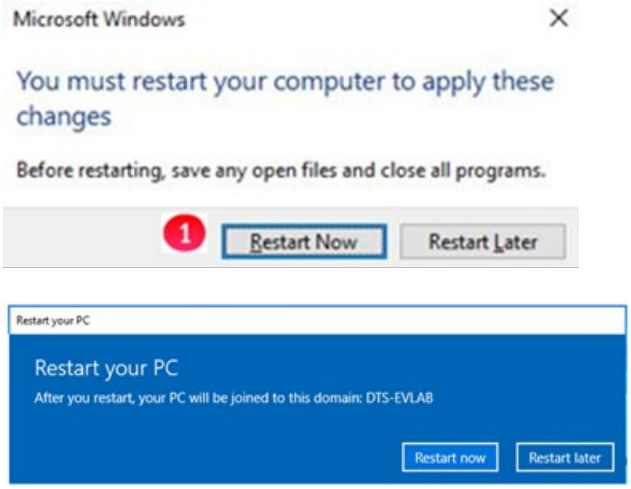


Figure 8.3 – Join a Domain



Step 4: Repeat the 'Join a Domain' process for Node 2.

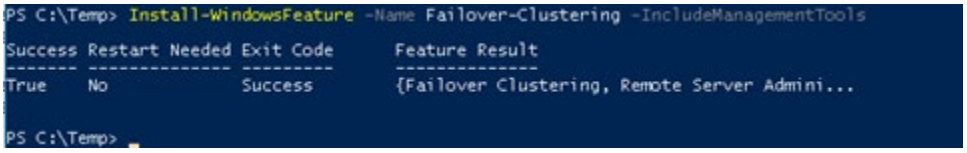
Chapter 9 Adding Failover Cluster Software

If you deployed the pair of HCP Gateway Cluster VMs, you can skip this chapter, as the Failover Cluster Software is already installed on the VMs. This chapter provides instructions for adding the Microsoft Failover Cluster software to an HCP Gateway Single VM or server. The HCP Gateway cluster requires a minimum of 2 VMs or servers configured with the Microsoft Failover Cluster software. There are 2 methods to install the software, a PowerShell command that can be run or a GUI method using Server Manager.

PowerShell Method

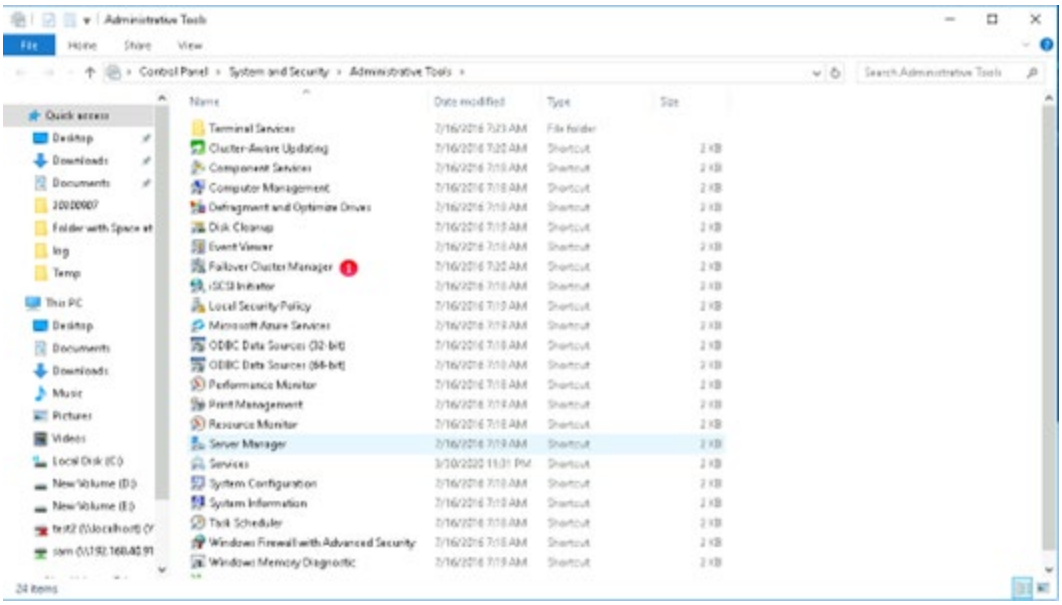
Step 1: Open Windows Powershell as an Administrator. Enter the command **Install-WindowsFeature –Name Failover-Clustering –IncludeManagementTools** (Figure 9.1). If prompted to reboot, reboot the server and then log back in as a Domain User, this user must have Administrator Privileges.

Figure 9.1 – PowerShell script



Step 2: Open Windows **Control Panel**, navigate to **System and Security -> Administrative Tools** to verify that the feature was installed (Figure 9.2.1).

Figure 9.2 – Windows Control Panel



Step 3: Repeat the '**Adding the Failover Cluster Software Powershell Method**' steps 1-2 for Node 2

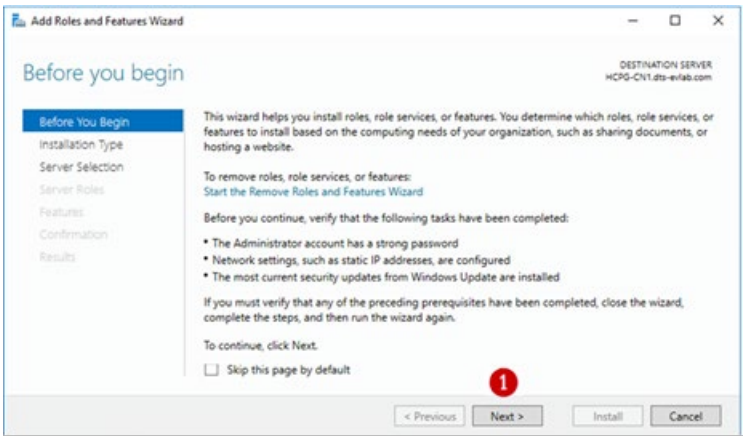
Server Manager Method

Step 1: Login to Node 1 as a Domain User, this user must have Administrator Privileges on both nodes. By default after login, Windows Server Manager will start. From the top menu of the Server Manager Window, select '**Manage**' (Figure 9.3.1) and then '**Add Roles and Features**' (Figure 9.3.2).

Figure 9.3 – Add Roles

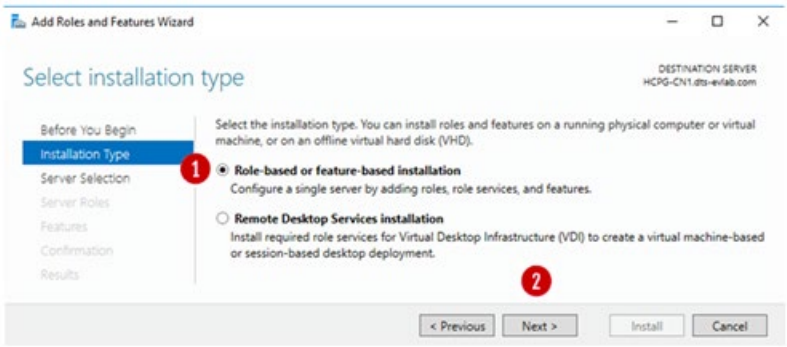
Step 2: Press '**Next**' (Figure 9.4.1) on the '**Before you begin**' window

Figure 9.4 – Next



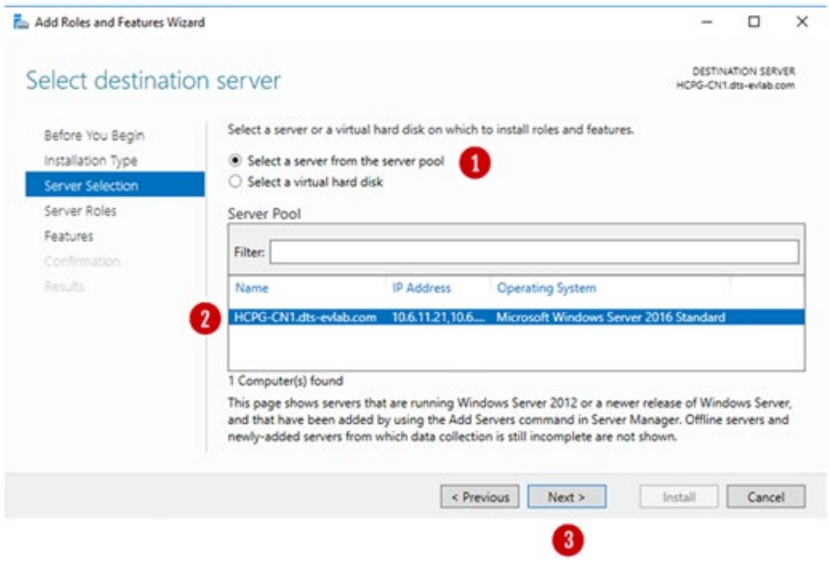
Step 3: In the '**Select installation type**' window, accept the default '**Role-based or feature-based installation**' (Figure 9.5.1). Press the '**Next**' button (Figure 9.5.2).

Figure 9.5 – Next



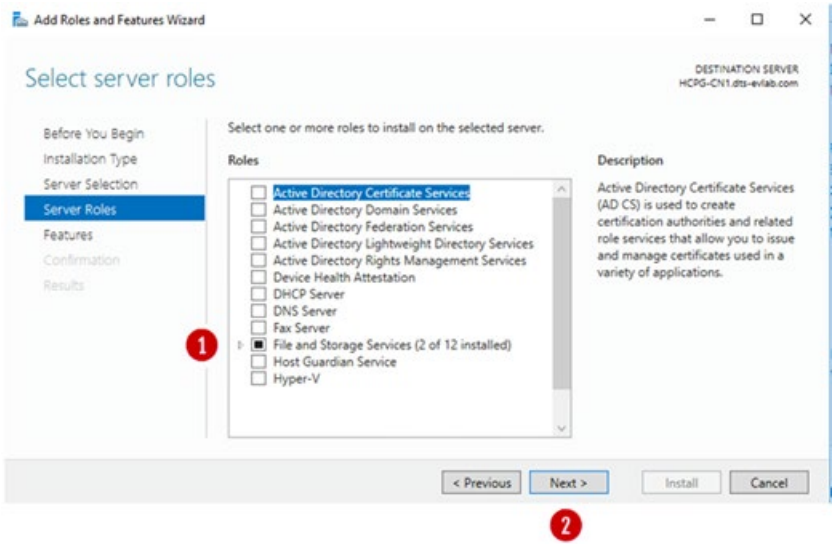
Step 4: In the '**Select destination server**' window, the default setting is '**Select a server from the server pool**' (Figure 9.6.1) and a default server (Figure 9.6.2) is listed. Then click the '**Next**' button (Figure 9.6.3).

Figure 9.6 – Select Destination Server



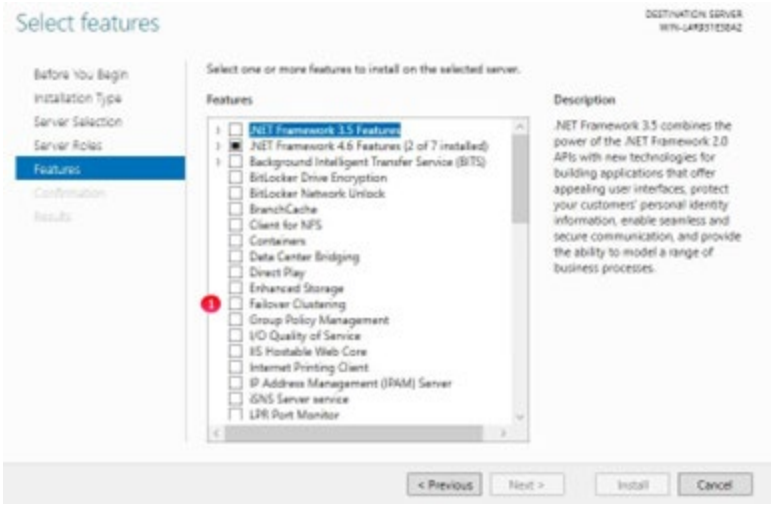
Step 5: In the '**Select server roles**' window, accept the default of "**File and Storage Services**" (Figure 9.7.1) and click the '**Next**' button (Figure 9.7.2) to continue.

Figure 9.7 – File and Storage Services



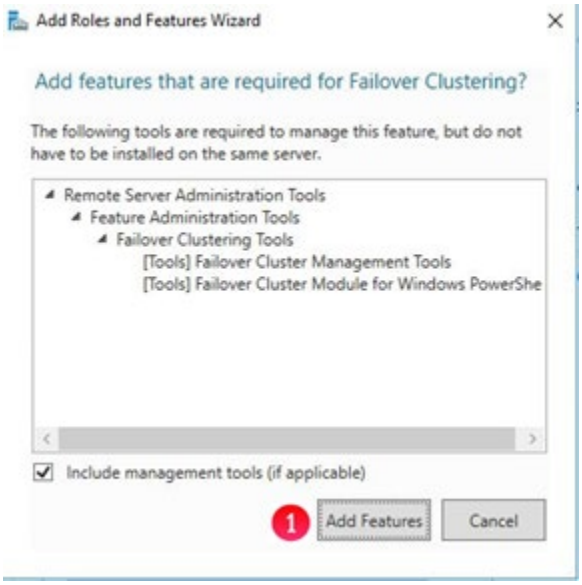
Step 6: In the '**Select features**' window, click the "**Failover Clustering**" box (Figure 9.8.1).

Figure 9.8 – Select Features



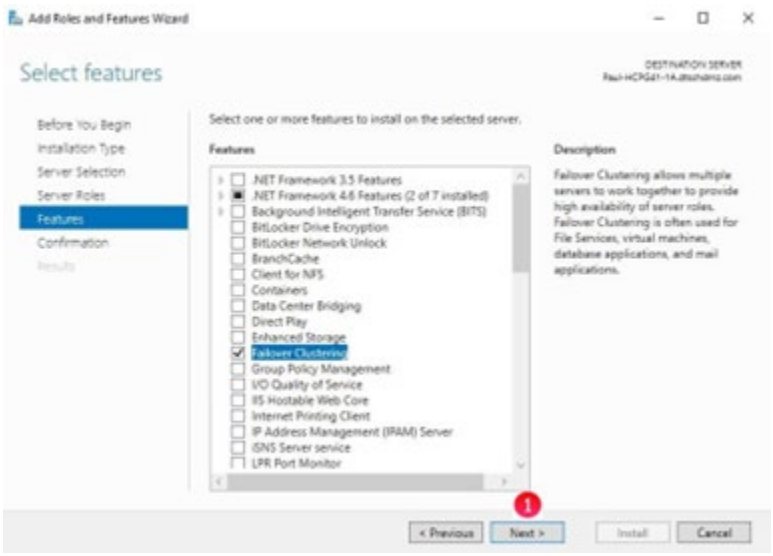
Step 7: In the '**Add Roles and Features Wizard**' window, accept the defaults and click the "**Add Features**" button (Figure 9.9.1)

Figure 9.9 – Add Roles and Features Wizard



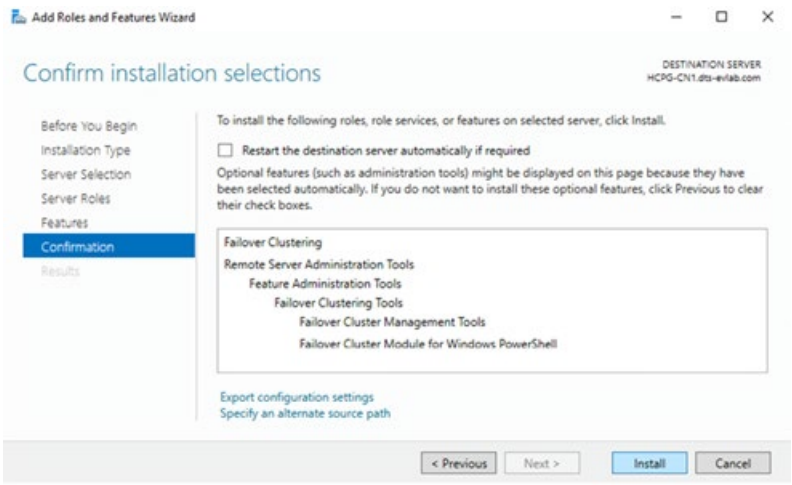
Step 8: In the '**Select Features**' window, notice that "Failover Clustering" is now selected, accept the defaults and click the "**Next**" button (Figure 9.10.1)

Figure 9.10 – Select Features



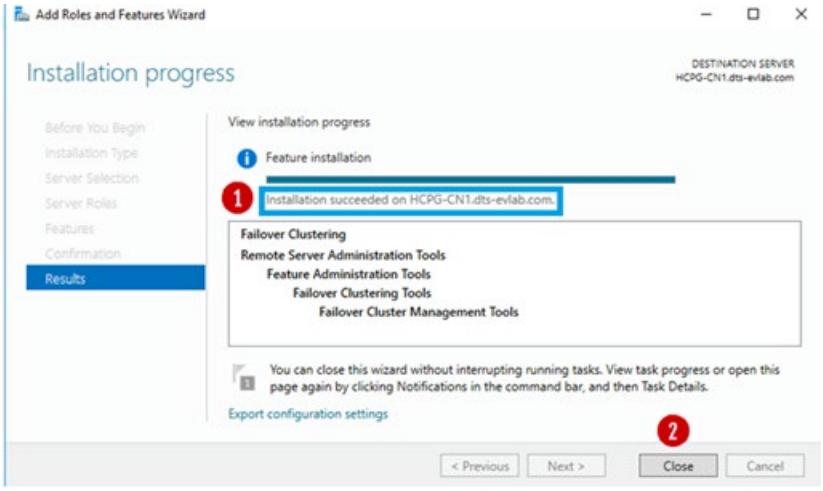
Step 9: In the '**Confirm installation selections**', accept the defaults. Then click the '**Install**' button (Figure 9.11).

Figure 9.11 – Confirm Selections



Step 10: The '**Installation progress**' window will appear. Wait until the installation has completed. The installation should finish and indicate that it was successful (Figure 9.12.1). Then click the '**Close**' button (9.12.2).

Figure 9.12 – Installation a Success



Step 11: Repeat the '**Adding the Failover Cluster Software Server Manager Method**' steps 1-10 for Node 2.

Chapter 10 Validating the Nodes are Cluster Ready

Step 1: Login to Node 1.

If you deployed the pair of HCP Gateway Clustered VMs, left-click on the '**Failover Cluster Manager**' icon (Figure 10.1V.1) and then go to Step 3.

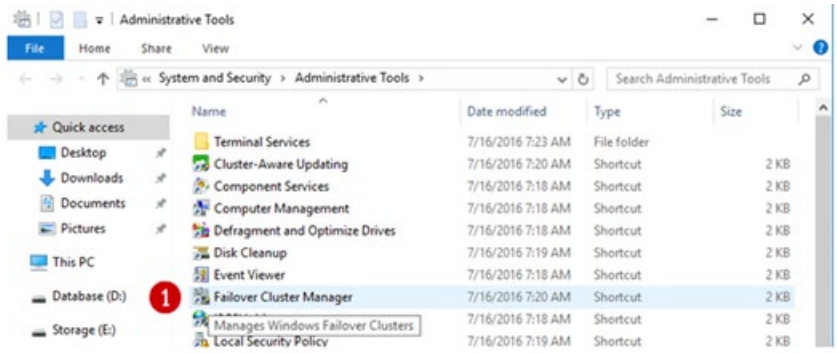
Figure 10.1V – VM – Open Failover Cluster Manager

If you just completed installing the **Failover Cluster Software** in the '**Adding Failover Cluster Software**' chapter, then left-click on the Windows icon, locate and select the '**Windows Administrative Tools**' icon (Figure 10.1S.1).

Figure 10.1S – Windows Administrative Tools

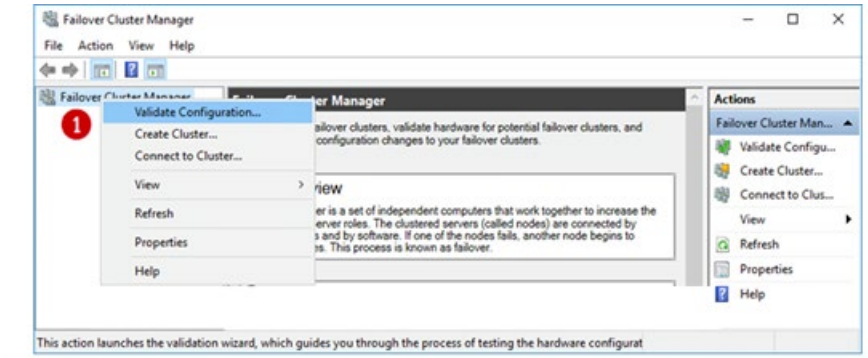
Step 2: In the '**Administrative Tools**' window, locate and double-click on '**Failover Cluster Manager**' (Figure 10.2.1).

Figure 10.2 – Failover Cluster Manager



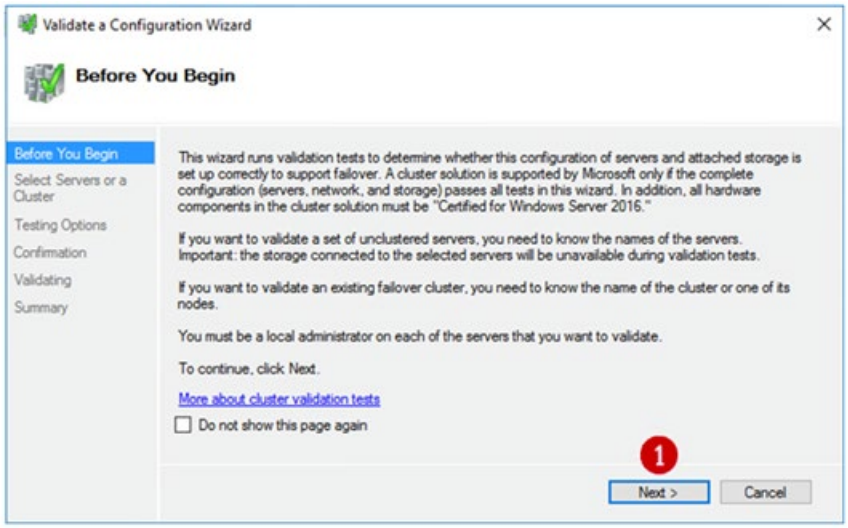
Step 3: In the '**Failover Cluster Manager**' window, right-click on the '**Failover Cluster Manager**' and then select '**Validate Configuration**' (Figure 10.3.1).

Figure 10.3 –Validate Configuration



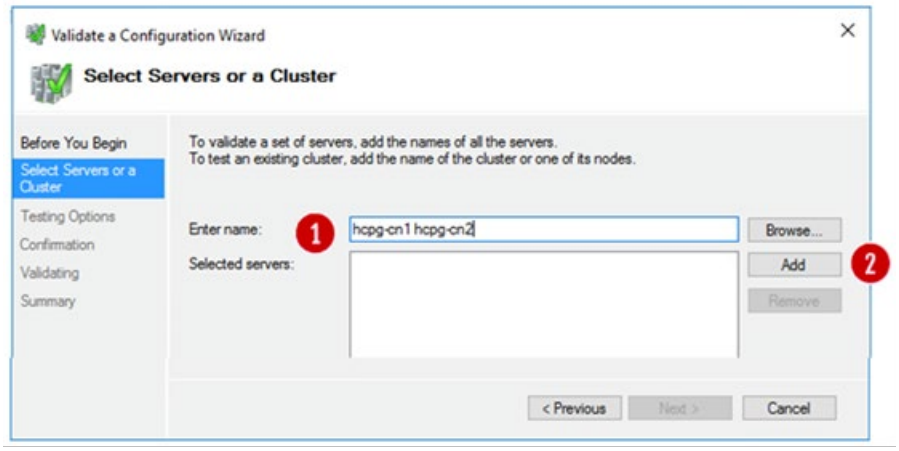
Step 4: If you just completed installing the **Failover Cluster Software** in the '**Adding Failover Cluster Software**' chapter, then in the '**Before you begin**' window, read the text and then click the '**Next**'' button (Figure 10.4.1).

Figure 10.4 –Read Before You Begin



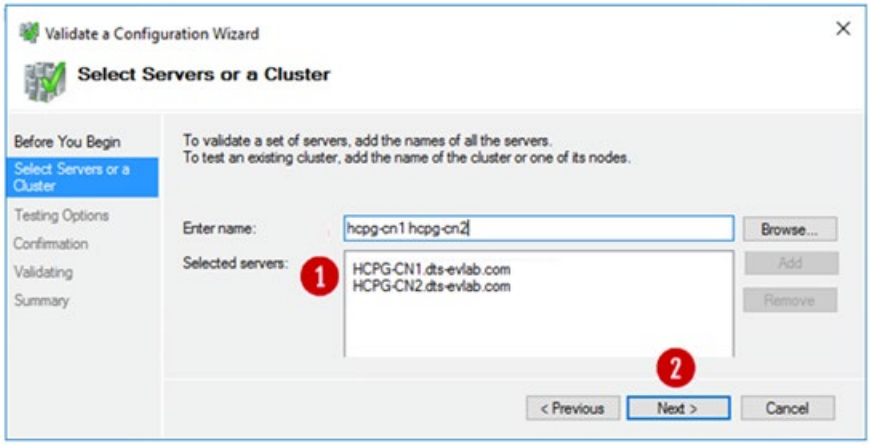
Step 5: In the '**Select Servers or a Cluster**' window, enter the names of both Node 1 and Node 2 (Figure 10.5.1). The names are not case-sensitive and must be separated by a space. Click the '**Add**' button (Figure 10.5.2).

Figure 10.5 – Select Servers



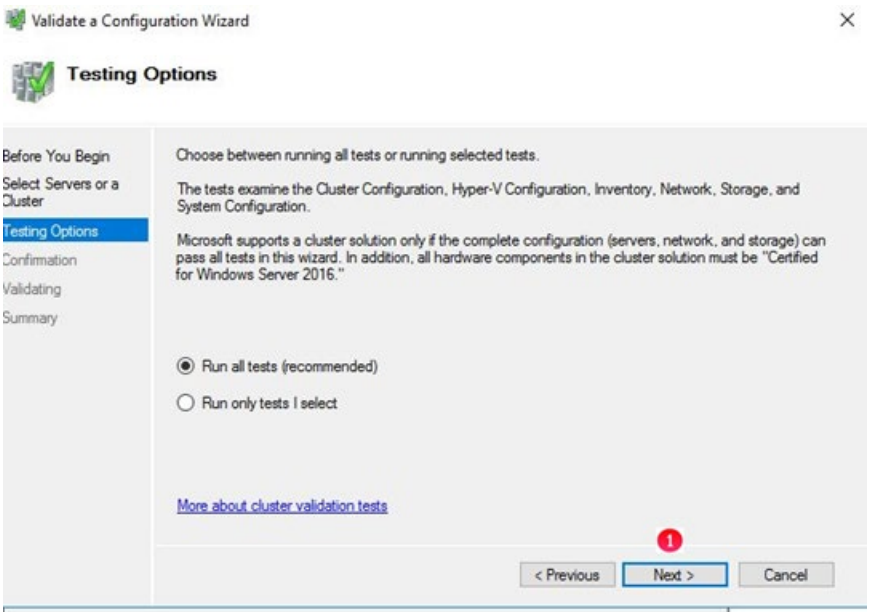
Step 6: After pressing '**Add**' the Cluster wizard will validate that the selected servers have valid DNS entries (Figure 10.6.1) and display them in the dialog box. Press the '**Next**' button (Figure 10.6.2).

Figure 10.6 – Select Servers



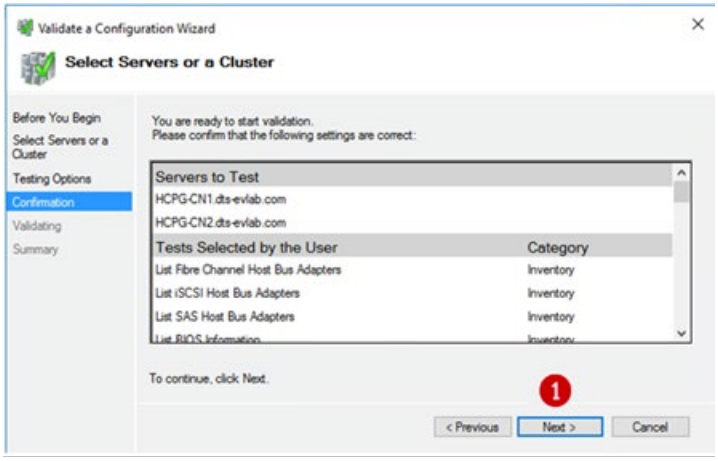
Step 7: In the '**Testing Options**' window, accept the default to run all tests. Press '**Next**' (Figure 10.7.1).

Figure 10.7 – Run All tests



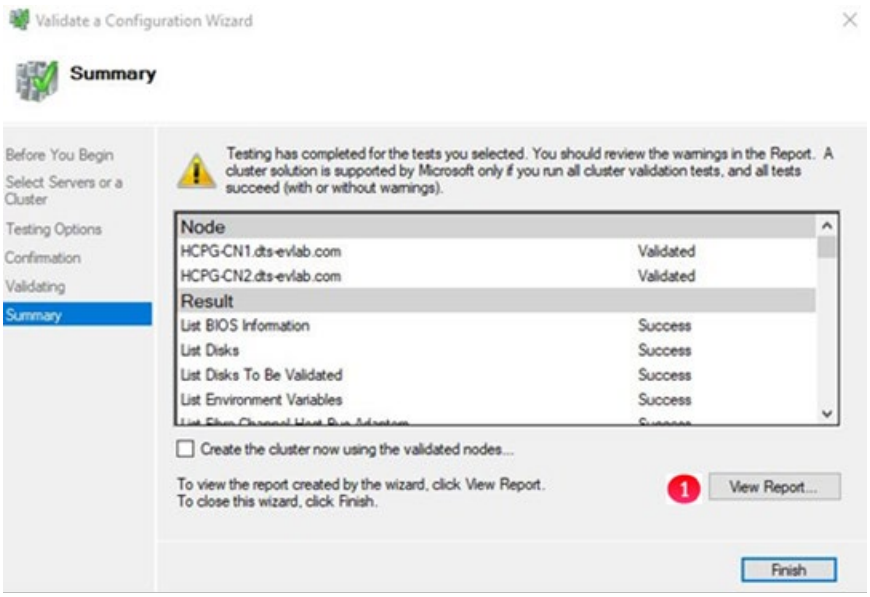
Step 8: In the '**Confirmation**' windows, press the '**Next**' button (Figure 10.8.1), the wizard will start the validation testing.

Figure 10.8 – Start Tests



Step 9: The '**Validating**' page will display the progress of the testing. After the tests have completed, a '**Summary**' window is displayed containing the testing details. Click the '**View Report**' button (Figure 10.9.1) to open the report in Internet Explorer, if prompted to change the settings in Internet Explorer, select '**Ask me later**'. In the next pop-up, click '**Allowed Blocked Content**'.

Figure 10.9 – View Report



When installing a cluster and not using Microsoft Storage Spaces, the following errors (Figure 10.10) are acceptable. For Networking, the '**Validate Cluster Network Configuration**' must show '**Success**'. If it shows a '**Warning**' or '**Error**' click on the link to view the message(s). The warnings in Figure 10.10 are acceptable, for all other warnings/errors you need to determine what corrective action must be taken. Usually, it's a DHCP enabled interface which should be changed to a static IP address. For System Configuration, the result should show '**Success**', however it may show a '**Warning**' if the '**Validate Software Update Levels**' are not the same. To correct, run Windows Update on both nodes.

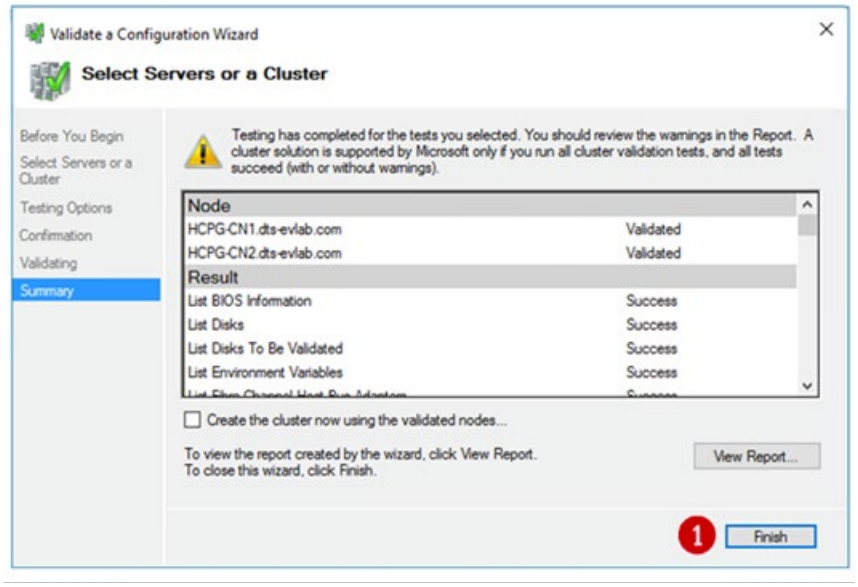
Any other errors must be corrected and the validation test in Steps 3-8 must be re-run until no more unacceptable errors are reported.

Figure 10.10 – Acceptable Errors in Validate Storage Spaces Persistent Reservation section

Step 10: If there are any errors or warnings, click the '**Finish**' button (Figure 10.11.1) to continue. To correct any errors or warnings, minimize the 'Failover Cluster Manager' window. Correct any issues, then return to the '**Failover Cluster Manager**' window in Step 3 and run Steps 3 – 9 to

re-run the '**Validate Configuration**'. If there is a warning about disks ensure that the shared disks are online.

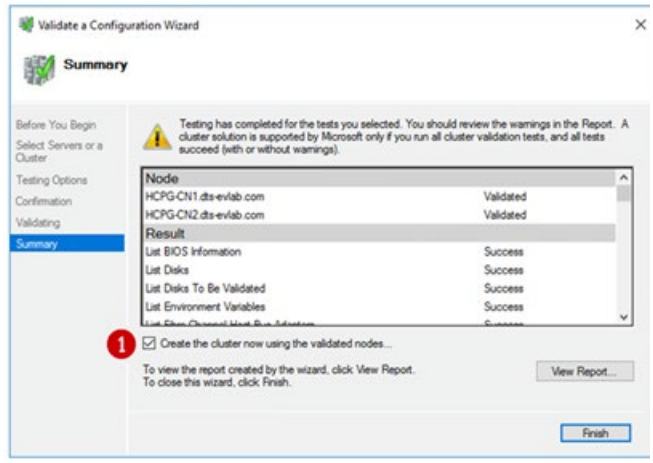
Figure 10.11 – Test Results

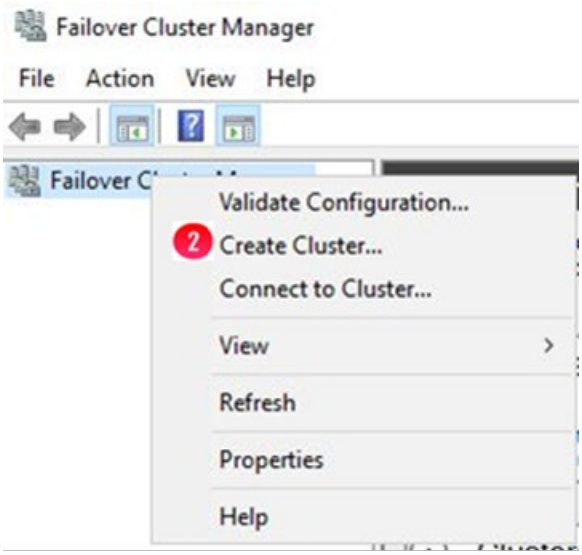


Chapter 11 Creating the Failover Cluster

Step 1: After any errors have been addressed, and warnings inspected, re-run the validation tool in Chapter 10, Steps 3-8. If the validation test is successful, then, on the Summary window, select the checkbox '**Create the cluster now using the validated nodes**' (Figure 11.1) then click the '**Finish**' button to create the cluster. If the "Validate a Configuration Wizard" window was closed, then right-click on "**Failover Cluster Manager**" and select "**Create Cluster**…" (Figure 11.1.2).

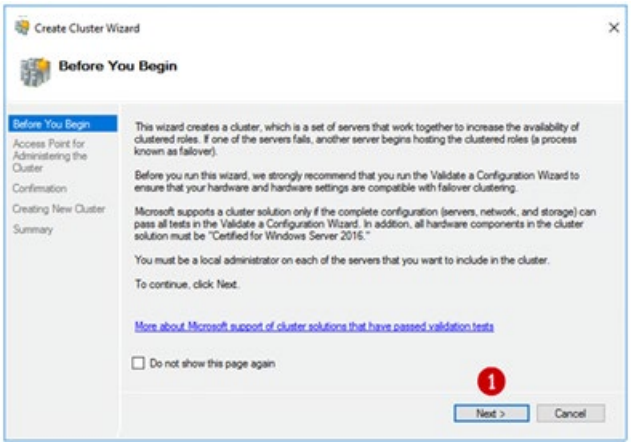
Figure 11.1 – Create Cluster





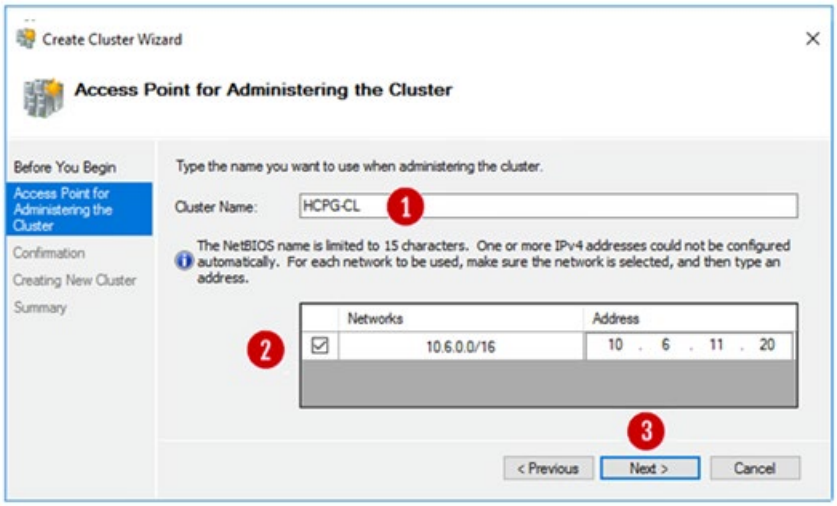
Step 2: The Create Cluster Wizard will start on the '**Before You Begin**' window, click the '**Next**' button (Figure 11.2.1).

Figure 11.2 – Start



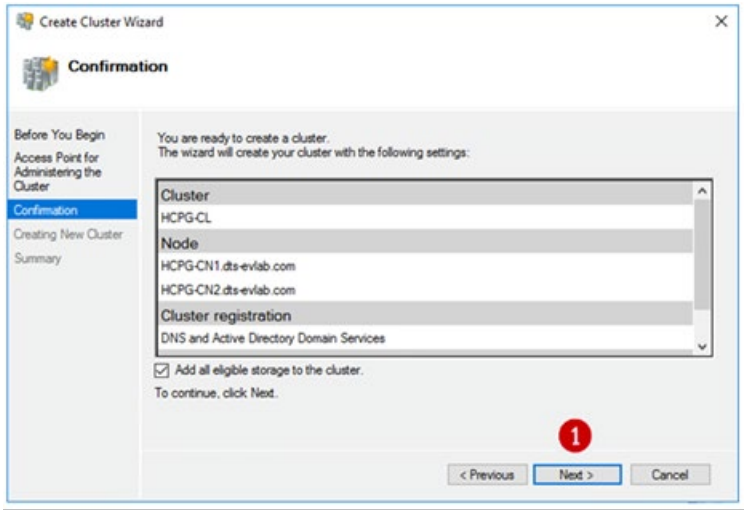
Step 3: If you had to click the "**Create Cluster**…" button in Step 2, then enter the names of the cluster servers (Figure 10.5.1) in the Select Servers window and click '**Add**' (Figure 10.5.2) then click '**Next**' (Figure 10.6.2). In the '**Access Point for Administering the Cluster**' enter the **cluster services network name** (Figure 11.3.1) (the Cluster Services name from the Interface Assignments section in Chapter 3 Host IP Address Assignments). This is the name you will use when managing the cluster. This name will always be the active node. Then enter the **IP address** for the **Cluster Services** (Figure 11.3.2). The name and the IP address were assigned at the beginning, for this example the name is '**HCPG-CL**' and the IP address is '**10.6.11.20**'. After verifying the name and IP address, press the '**Next**' button (Figure 11.3.3).

Figure 11.3 – Enter Access Points



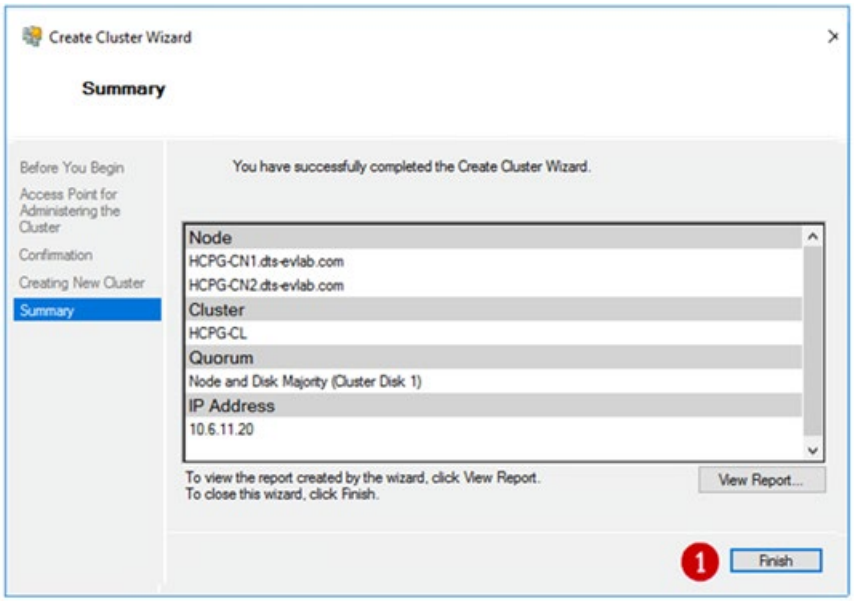
Step 4: Verify that the information is correct in the '**Confirmation**' window. If it is correct, then press the '**Next**' button (Figure 11.4.1) and the cluster will be created.

Figure 11.4 – Confirm Info



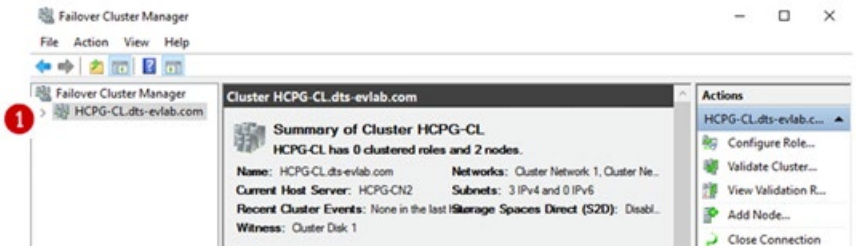
Step 5: The '**Summary**' window presents the new cluster information. Click the '**Finish**' button (Figure 11.5.1) to exit.

Figure 11.5 – Finish Cluster Creation



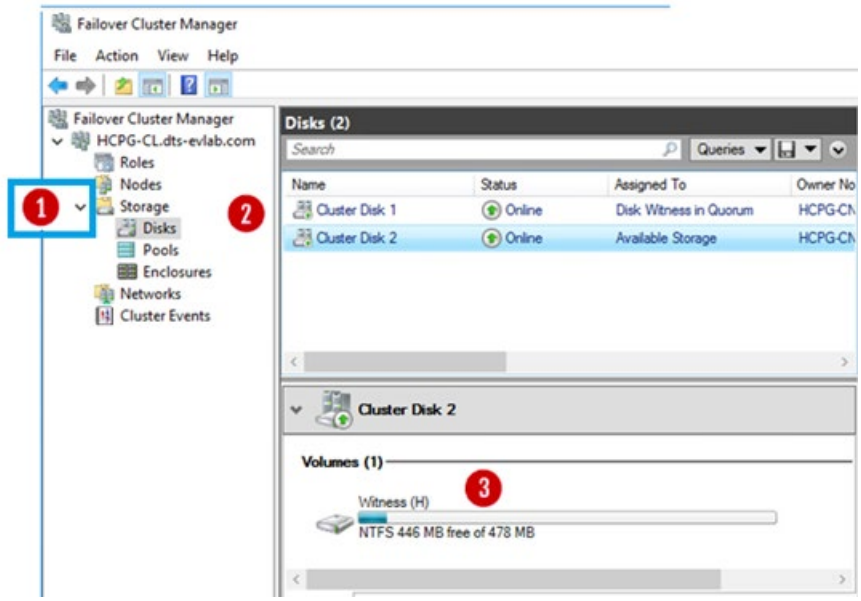
Step 6: The '**Cluster Wizard**' may not assign the '**Witness**' disk to the intended target and may need to be moved. Open the '**Failover Cluster Manager**', click on the arrow just to the left side of the Cluster name that is located on the left panel, to expand the cluster details (Figure 11.6.1).

Figure 11.6 – Expand Cluster Details



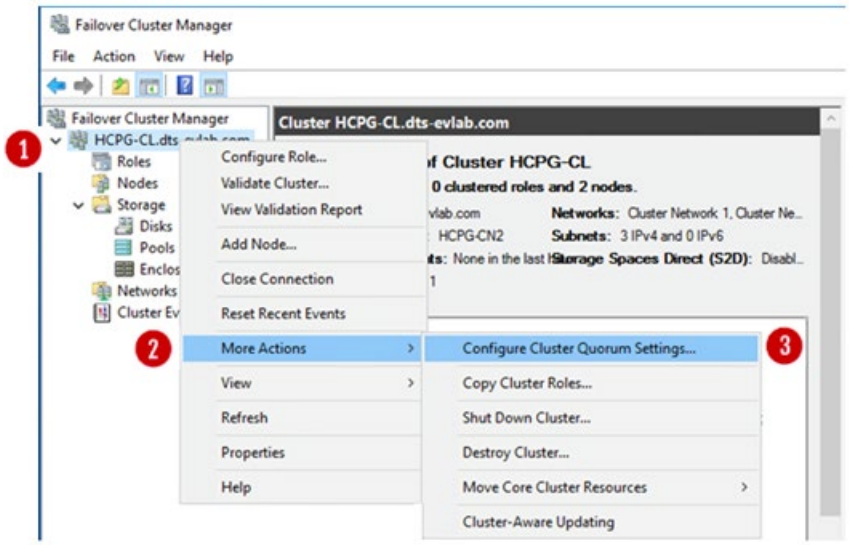
Step 7: In the expanded details, click on the **arrow** yo the left of the '**Storage**' (Figure 11.7.1) to view the storage information, then click on "**Disks**". Click on each '**Cluster Disk** ' (Figure 11.7.2) to verify that it is the correct size. In the example below, 'Cluster Disk 2' is assigned as **Available Storage**. It is actually the Witness disk but was assigned to Available Storage because it was expected to be 100 GB and it's shown as 478 MB (Figure 11.7.3). This means that the Cluster Wizard selected the **Shared Cache** disk as the **Witness** disk. The **Witness** disk needs to be assigned to **Disk Witness in Quorum**. If the disk configuration is correct, skip to Step 14.

Figure 11.7 – Check Disk Sizes



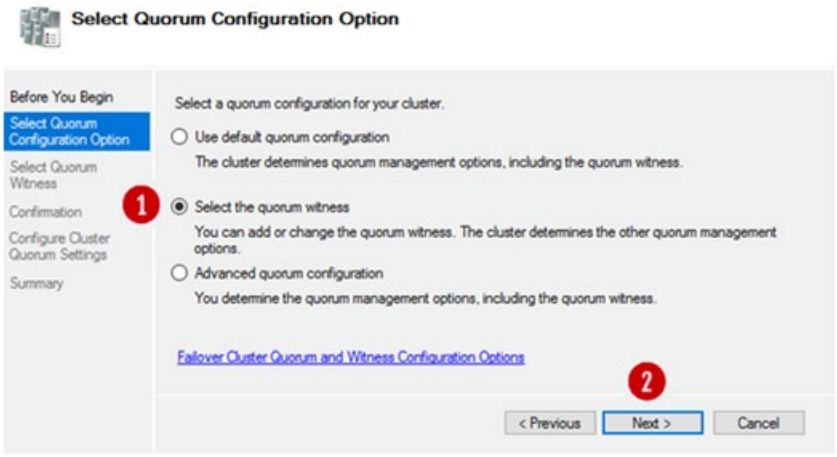
Step 8: In the main '**Failover Cluster Manager**' window, right-click on the **Cluster Name** (Figure 11.8.1) then a menu will be presented. Select '**More Actions >**' (Figure 11.8.2) from the menu, then select '**Configure Cluster Quorum Settings**' (Figure 11.8.3). If a '**Before You Begin**' window appears, click the '**Next**' button to continue.

Figure 11.8 – Configure Quorum Settings



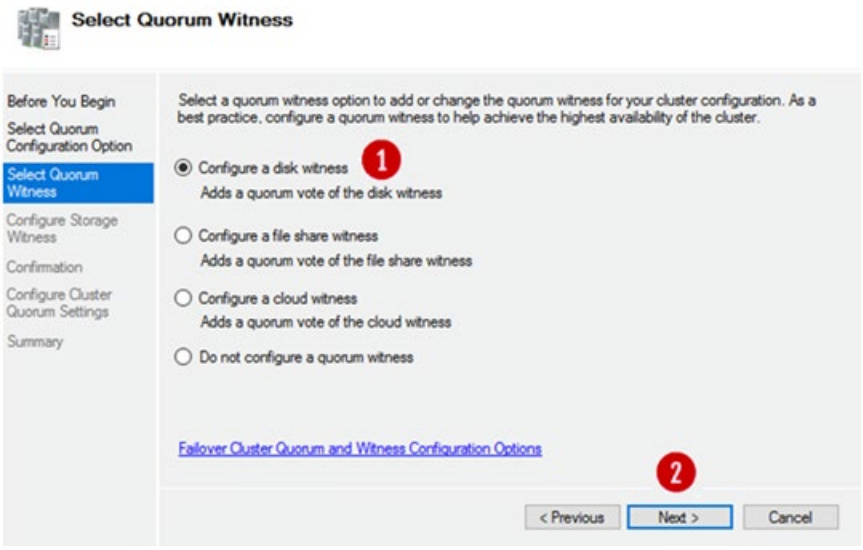
Step 9: The '**Select Quorum Configuration Option**' window will appear. Choose the option '**Select the quorum witness**' (Figure 11.9.1) and then press the '**Next**' button (Figure 11.9.2).

Figure 11.9 – Select Quorum Witness



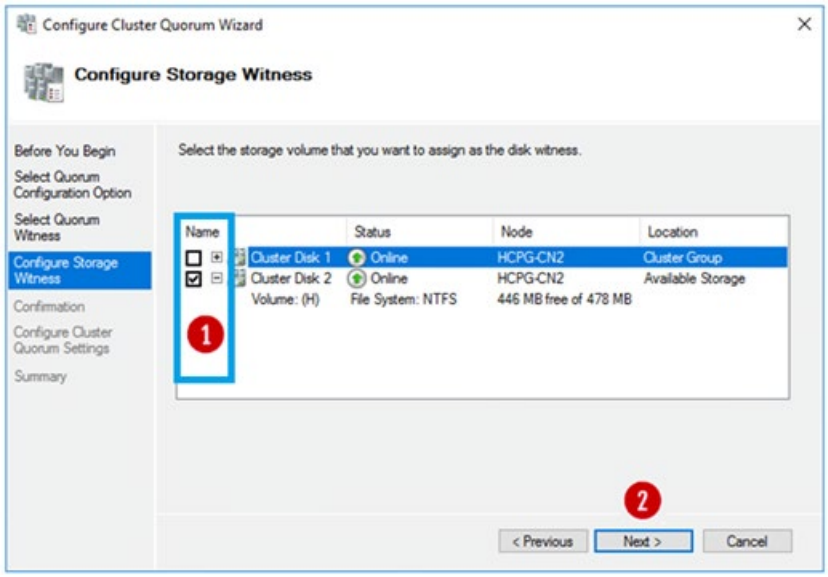
Step 10: In the '**Select Quorum Witness**' window, select the first option '**Configure a disk witness**' (Figure 11.10.1) and press the '**Next**' button (Figure 11.10.2).

Figure 11.10 – Configure Disk Witness



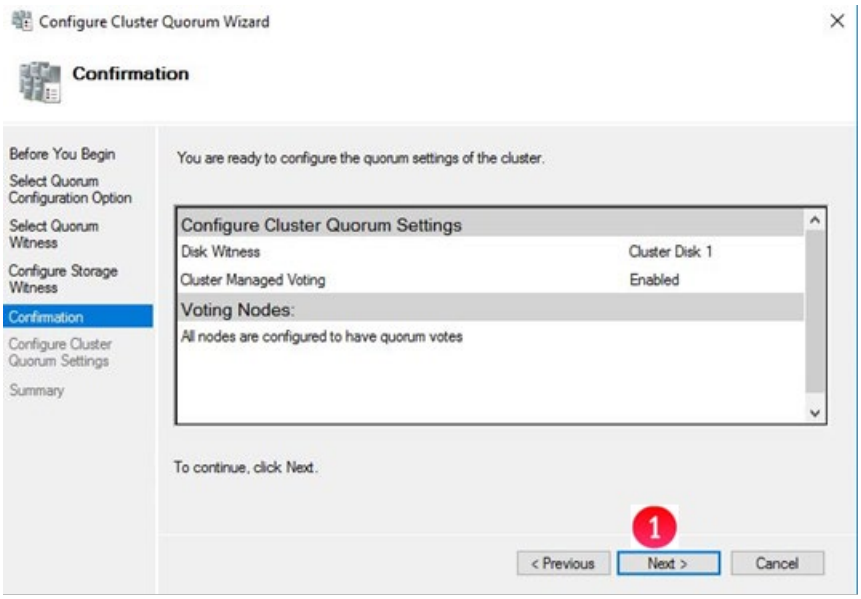
Step 11: In the '**Configure Storage Witness**' window, **select the correct disk** to be used as the '**Witness**' disk. Clicking on the '+' to the right of the check box will display the disk information (Figure 11.11.1). For this example the intended disk is the small 478 MB disk. After selecting the intended disk, click the '**Next**' button (Figure 11.11.2).

Figure 11.11 – Configure Disk Witness



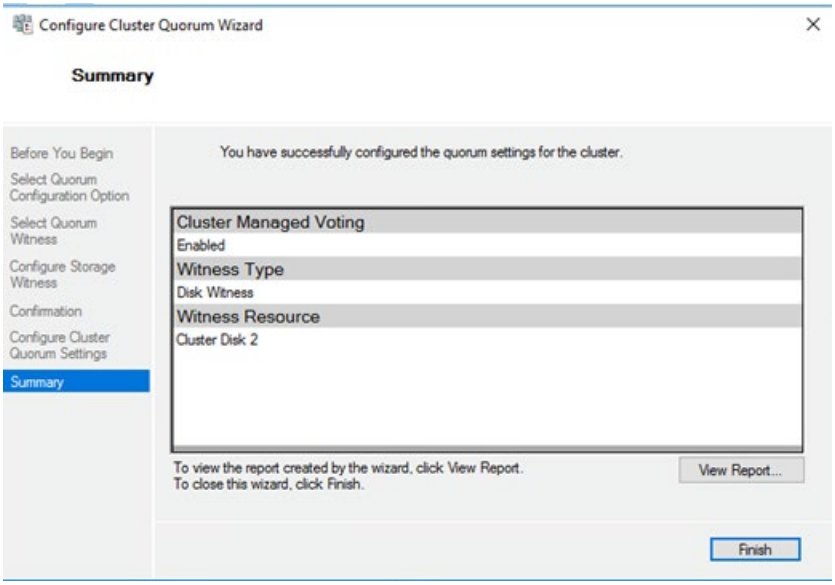
Step 12: The '**Confirmation**' window allows the review of the selection. If this is correct, click the '**Next'** button (Figure 11.12.1).

Figure 11.12 – Confirmation



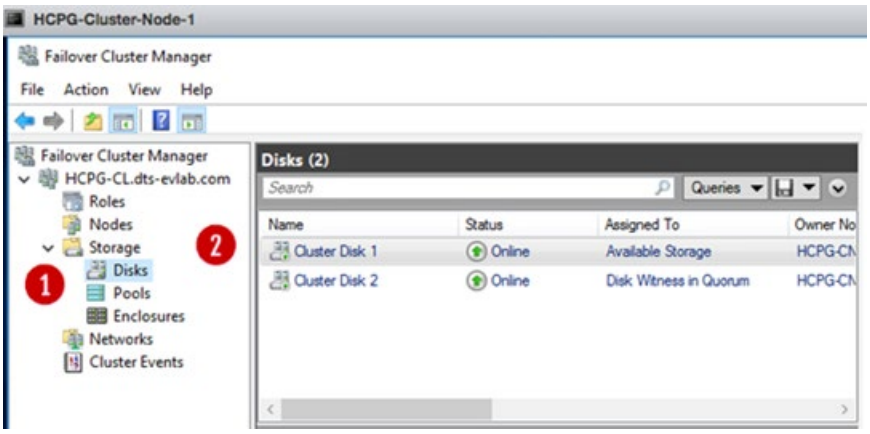
Step 13: In the “Summary” window, click the ‘**Finish**’ button (Figure 11.13) to continue.

Figure 11.13 – Summary



Step 14: In the '**Failover Cluster Manager**' the '**Disks**' (Figure 11.14.1) show that the '**Disk Witness in Quorum**' has been moved to the intended disk (figure 11.14.2), which in this example is Cluster Disk 2.

Figure 11.14 – Verification



Step 15: Verify if Database Replication is configured.

IMPORTANT NOTE:

In the Windows Services on both nodes, locate the MariaDB service, if necessary, change the Startup type from 'Manual' to 'Automatic', then start the service.

If you haven't already done so, now you need to setup the Database Replication. Follow the instructions in the HCP GatewayDatabase Replication Setup Windows Guide

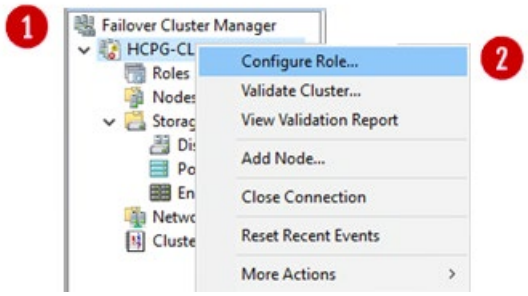
- Chapter 1 for modifications to Gateway and database configuration files and
- Chapter 3 when configuring only a 2 node cluster or Chapter 6 when configuring a 4 node cluster.

If you already followed the instructions in the HCP Gateway Database Replication Setup Windows Guide, then re-run all the Steps in Chapter 2 Change HCP Gateway Configuration above to verify that you have the correct database and application settings for cluster replication.

Chapter 12 Setting Up a Service Role

Step 1: On Node 1, in the '**Failover Cluster Manager**' right-click on the Cluster name (Figure 12.1.1), select '**Configure Role**' (Figure 12.1.2).

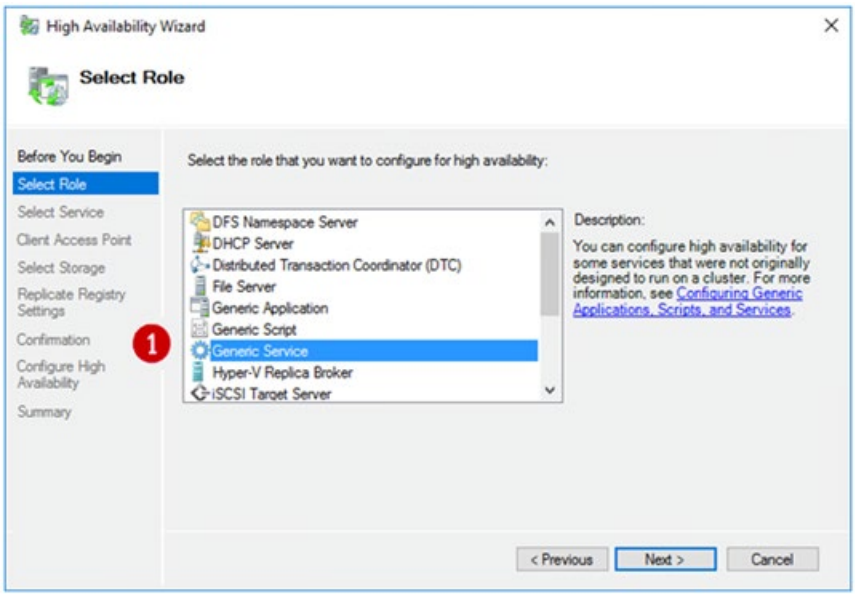
Figure 12.1 – Configure Role



Step 2: In **'Before You Begin**' screen, click the '**Next**' button.

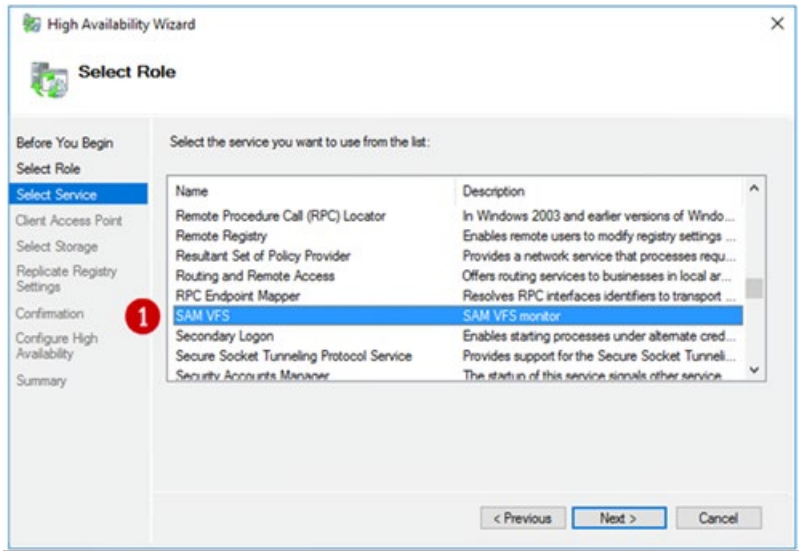
Step 3: In the '**Select Role**' screen, choose the '**Generic Service**' (Figure 12.2.1) and then click the '**Next**' button.

Figure 12.2 – Generic Service



Step 4: In the '**Select Service**' screen (some versions of Windows may show this window name as 'Select Role', scroll to locate the '**SAM VFS**' service (Figure 12.3.1) and select it. Then press the '**Next**' button.

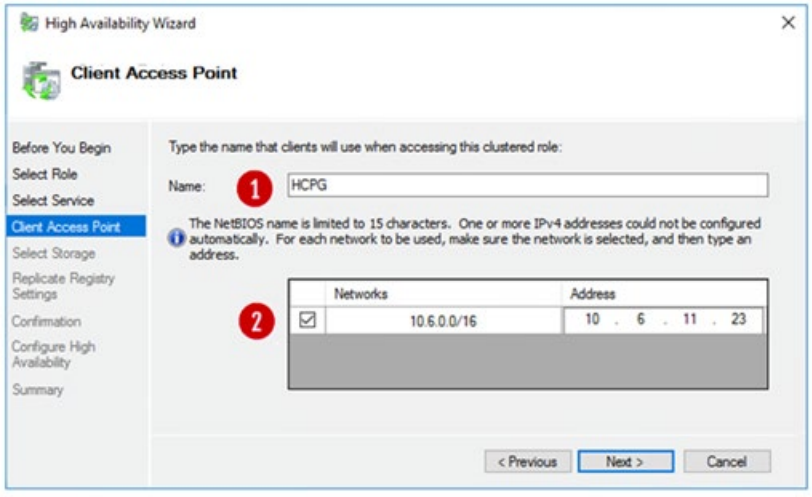
Figure 12.3 – Select VFS



Step 5: In the '**Client Access Point**' screen, enter the **name** (Figure 12.4.1) that clients will use to access the clustered HCP Gateway shares (the Cluster Role defined in Chapter 3 the Interface Assignments section, for this example it is '**HCPG**'. Then in the '**Address**' enter the cluster IP address for '**HCPG**' (Figure 12.4.2), this is the cluster IP address that all the HCP Gateways will be accessed with. This is also referred to as the Cluster Virtual IP Address. Clients will be mapping to the HCP Gateway Shares using this IP address and DNS name. Click the '**Next**' button to continue.

Example: \\10.6.11.23\<share name>

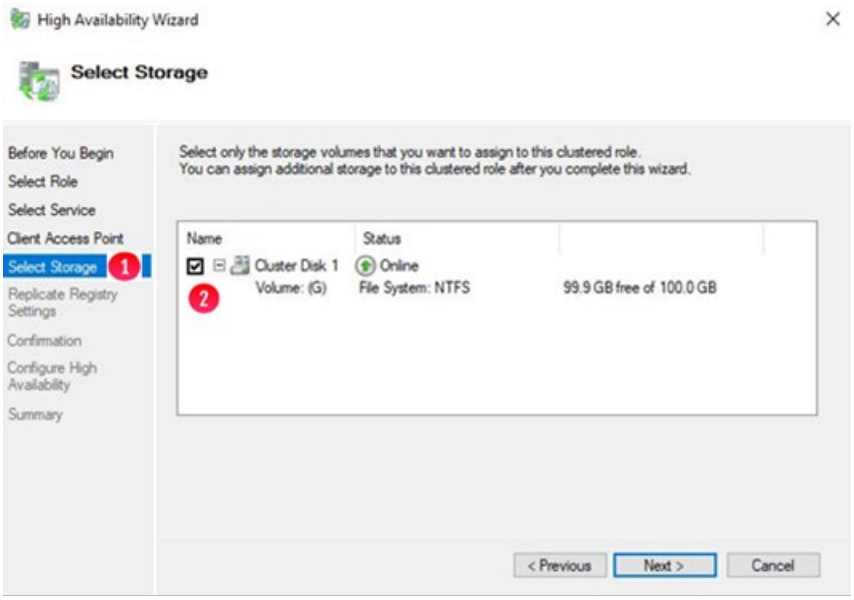
Figure 12.4 – Client Access Point



Step 6: In the '**Select Storage**' screen (Figure 12.5.1), select the Shared Cluster Disk and click the '+' icon to verify the size of the disk, in this

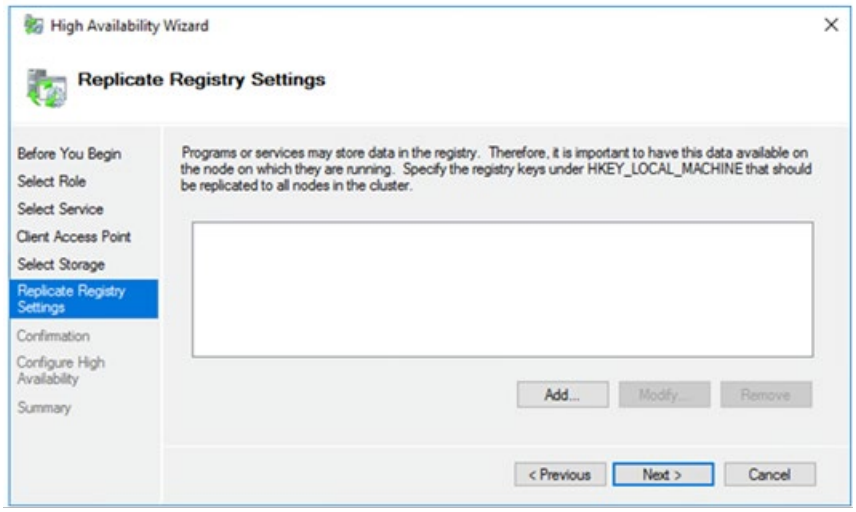
example, '**Cluster Disk 1' with size 100GB** (Figure 12.5.2), then click the '**Next'** button.

Figure 12.5 – Client Access Point



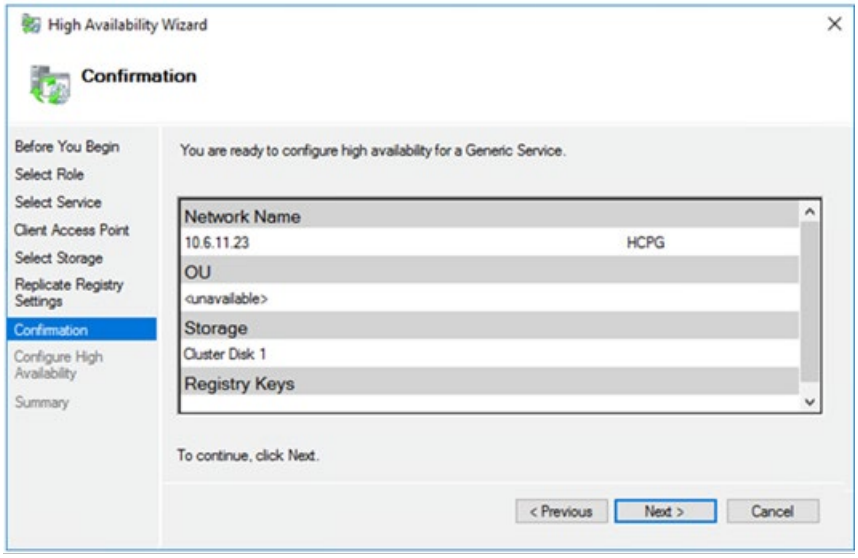
Step 7: On the '**Replicate Registry Settings**' screen, press the '**Next**' button (Figure 12.6).

Figure 12.6 – Replicate Registry Settings



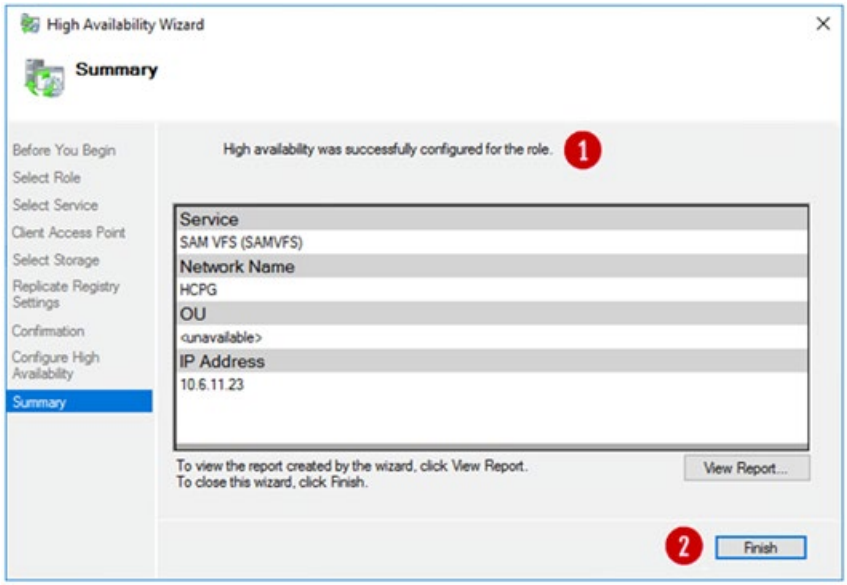
Step 8: The '**Confirmation**' screen will appear, verify the information then click the '**Next**' button (Figure 12.7).

Figure 12.7 – Replicate Registry Confirmation



Step 9: On the '**Summary**' screen notice the message indicating that "**High availability was successfully configured for the role**" (Figure 12.8.1). Click the '**Finish**' button (Figure 12.8.2) to exit.

Figure 12.8 – Summary

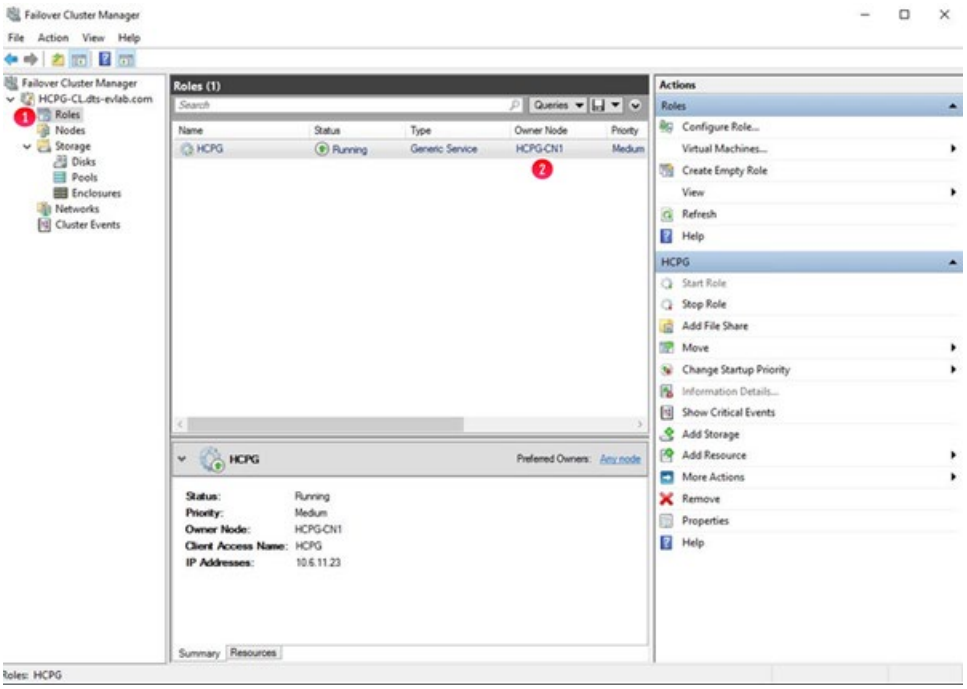


Step 10: Verify that the role is running on Node 1, by clicking on **Roles** (Figure 12.9.1) and verify the Node 1, for this example HCPG-CN1 is the **Owner Node** (Figure 12.9.2) for the role.

Note:

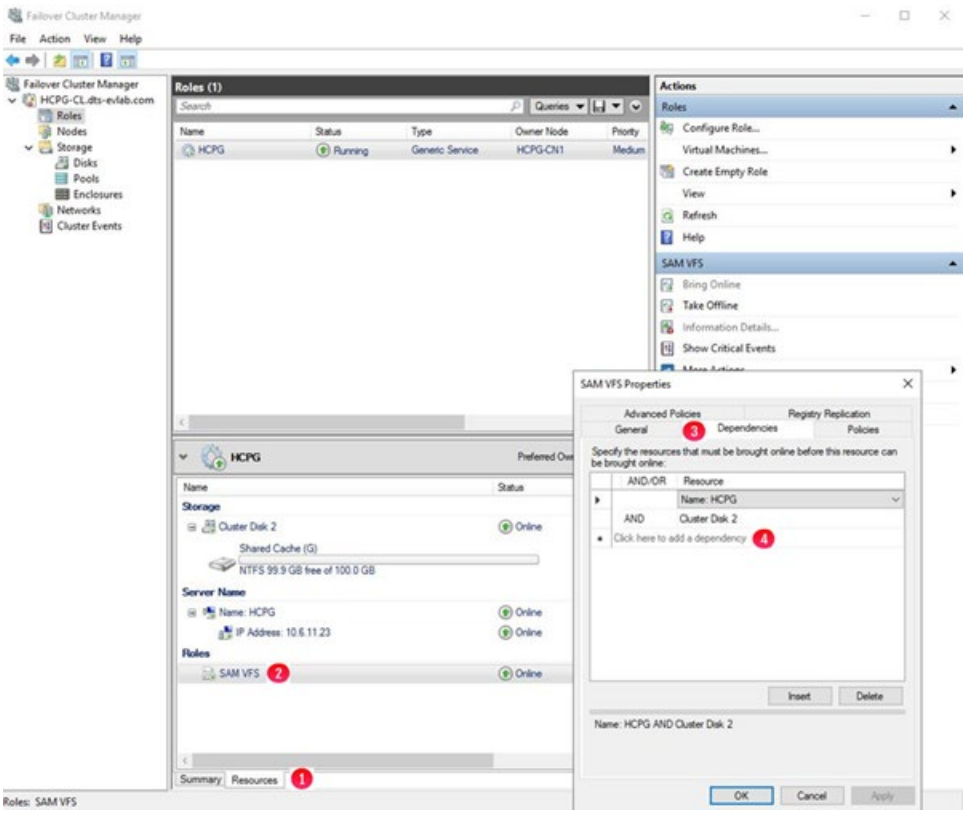
The cluster may try to start the role on Node 2, for this example HCPG-CN2. If this occurs, the role will generate an error event, so right-click the role in the middle-pane, then select ‘Move', then select ‘Select Node’, then select ‘HCPG-CN1’ and finally click 'OK'. In some cases, it may be necessary to reboot Node 2 to force the cluster role to Node 1.

Figure 12.9 – Verify Role Owner



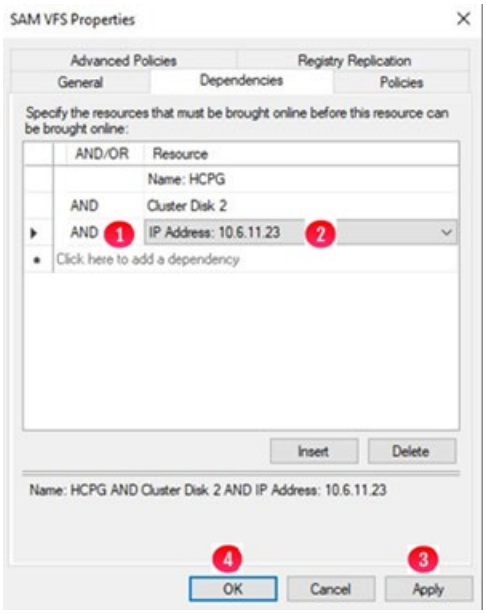
Step 11: Scroll down and click the **Resources** tab (Figure 12.10.1). Right-click on the **SAM VFS** entry (Figure 12.10.2) and select **Properties**. In the **SAM VFS Properties** window select the **Dependencies** tab (Figure 12.10.3). Click on the line **Click here to add a dependency** (Figure 12.10.4).

Figure 12.10 – Add Dependency to Role



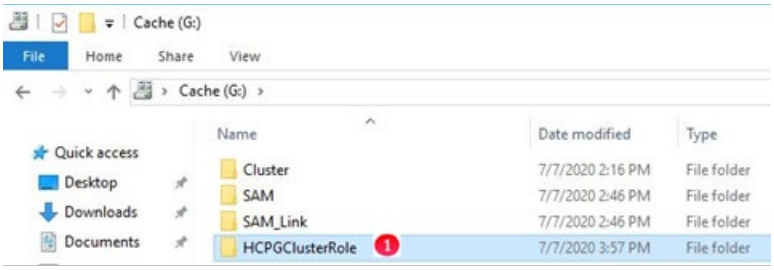
Step 12: Click the **AND** box (Figure 12.11.1). Then in the **Resource** column on that line, click the down-arrow to open the drop-down menu and select **IP Address: 10.6.11.23** (Figure 12.11.2). Then click **Apply** (Figure 12.11.3) and then click **OK** (Figure 12.11.4).

Figure 12.11 – Add IP Address Dependency



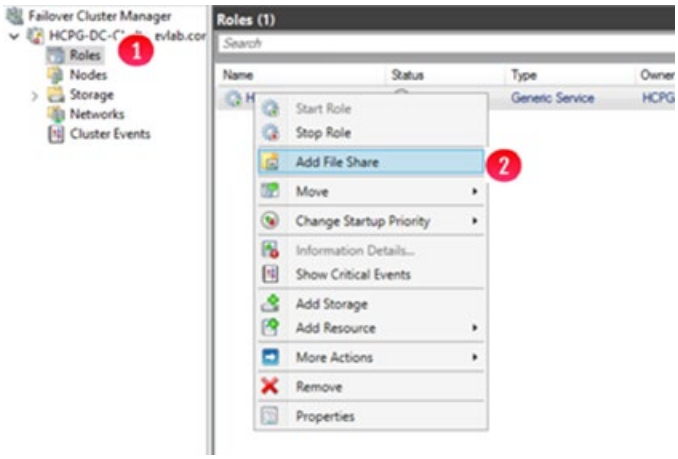
Step 13: Now you need to add a file share to the role to enable the "**SAM VFS**" service and **Shared Cache G**: drive to be able to move together during a cluster failover event. Open a Windows File Explorer and create a folder named "**HCPGClusterRole**" on the **G**: drive (Figure 12.12.1).

Figure 12.12 – Windows File Explorer



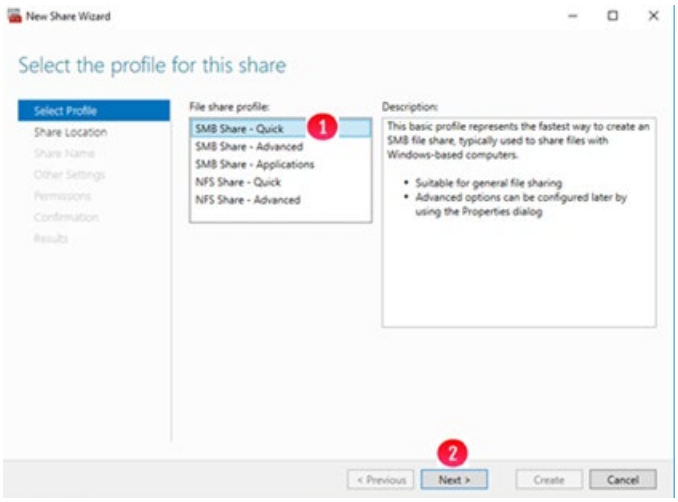
Step 14: In the "**Failover Cluster Manager**", click on **Roles** (Figure 12.13.1) then right-click on the service role that you just configured, for this example **HCPG**, and select "**Add File Share**" (Figure 12.13.2).

Figure 12.13 – Add File Share to Role



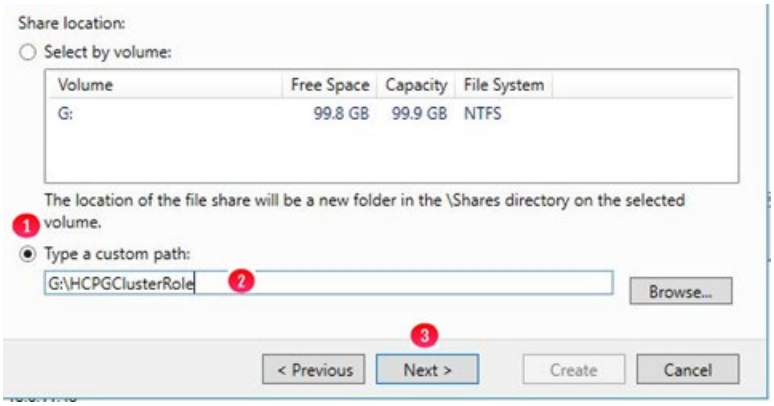
Step 15: Select "**SMB Share – Quick**" (Figure 12.14.1). Click the "**Next**" button (Figure 12.14.2) to continue.

Figure 12.14 – New Share Wizard



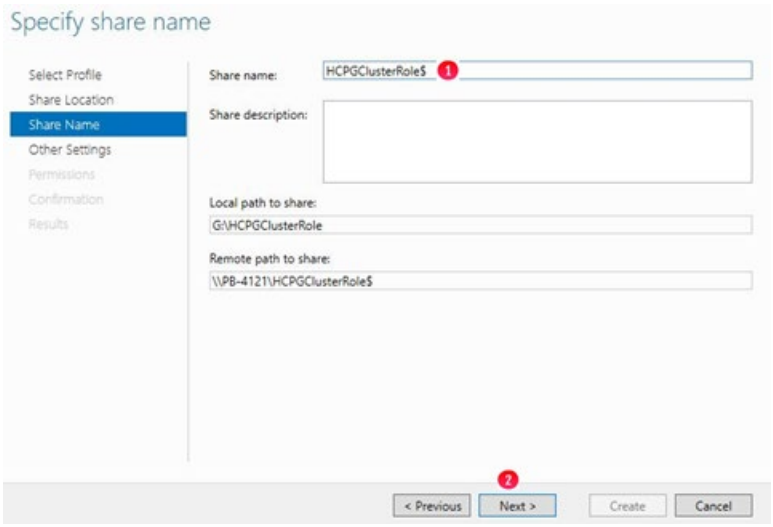
Step 16: Select the "**Type a custom path**" radio button (Figure 12.15.1). Enter or browse to the folder "**G:\HCPGClusterRole**" (Figure 12.15.2). Click the "**Next**" button (Figure 12.15.3) to continue.

Figure 12.15 – New Share Wizard



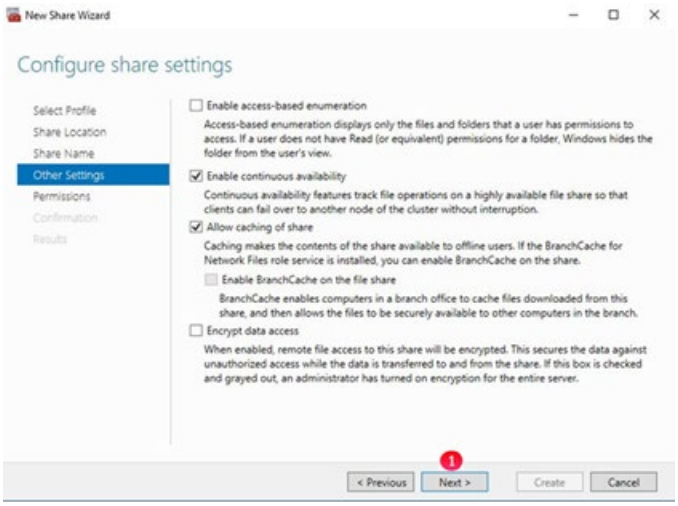
Step 17: Add a "**$**" to the end of the "**Share name**" (Figure 12.16.1) to make this a hidden share. Click the "**Next**" button (Figure 12.16.2) to continue.

Figure 12.16 – Specify Share Name



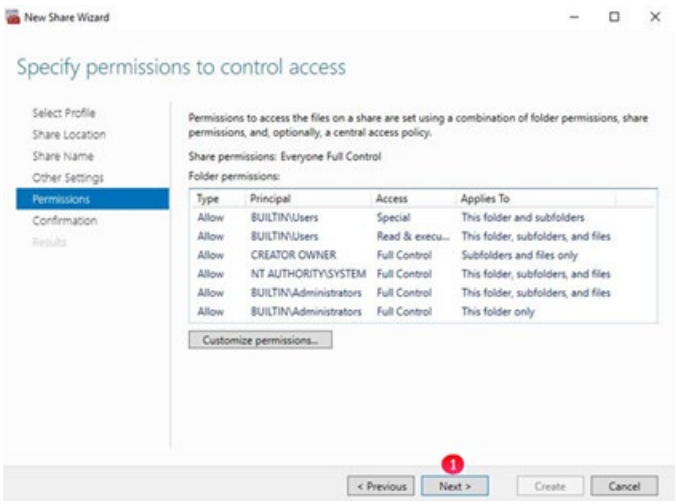
Step 18: In the '**Configure Share Settings**' window, accept the defaults and click the "**Next**" button (Figure 12.17.1) to continue.

Figure 12.17 – Other Settings



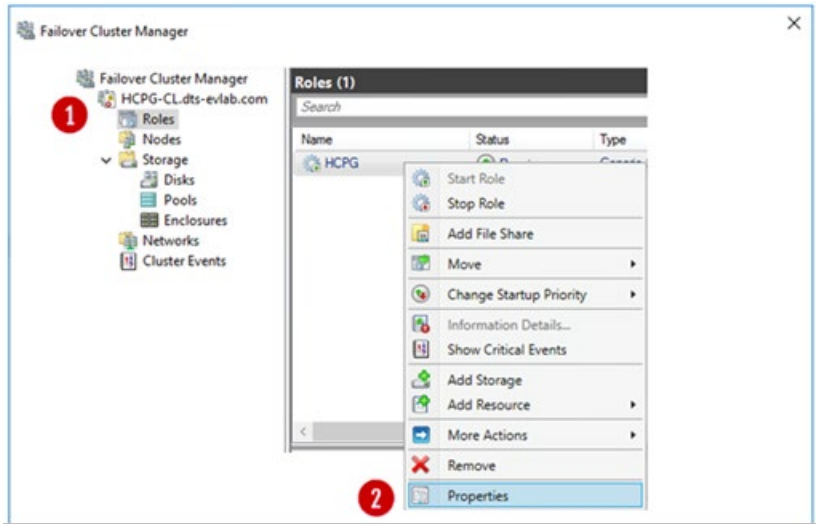
Step 19: In the '**Permissions**' window, accept the defaults (or select '**Customize permissions**" to customize the share access and NTFS file permissions) and click the "**Next**" button (Figure 12.18.1) to continue. In the "**Confirm selections**" window, review the selections and click the "**Create**" button. When you receive the share was successfully created message, click the "**Close**" button.

Figure 12.18 – Permissions



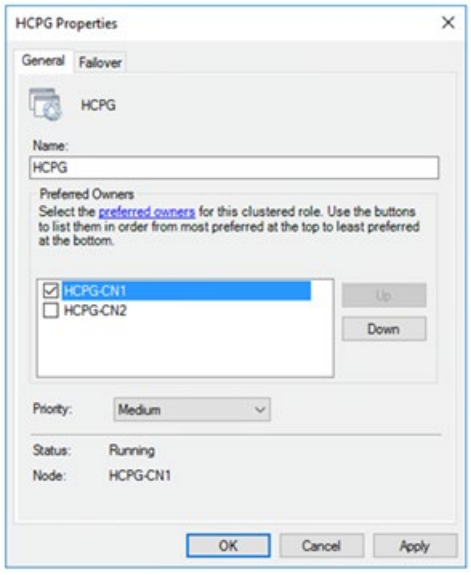
Step 20: Set the preferred Node for the Cluster Resources. Left-click on "**Roles**" (Figure 12.19.1). In the '**Roles**' window, right-click on the cluster role name and in the drop down menu select '**Properties**' (Figure 12.19.2).

Figure 12.19 – Registry Finish



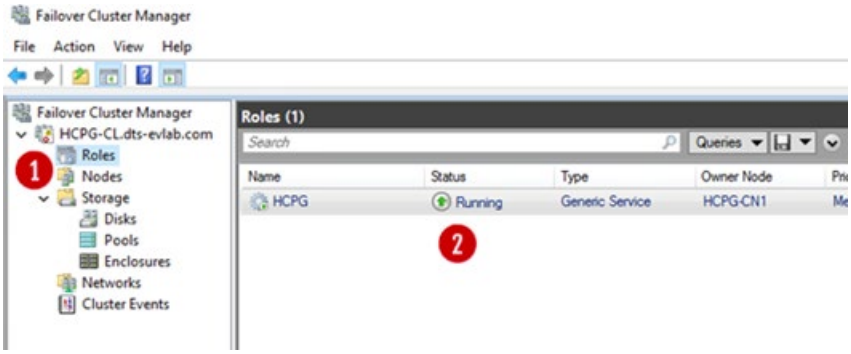
Step 21: In the '**General**' tab choose **Node 1** as the preferred owner. Click the '**OK**' button (Figure 12.20).

Figure 12.20 – Choose Owner



Step 22: In the '**Roles**' window (Figure 12.21.1), notice that the service is running on the preferred node (Figure 12.21.2).

Figure 12.21 – Verify



Chapter 13 Test the Cluster Configuration

Now that the cluster is built, test the cluster configuration.

IMPORTANT NOTE:

Every time a share is created on the HCP Gateway the ACLs of the share will need to be updated. Refer to the HCP Gateway Administration Guide, Chapter 10 Section 2 Add/Configure a Share for the details.

IMPORTANT NOTE:

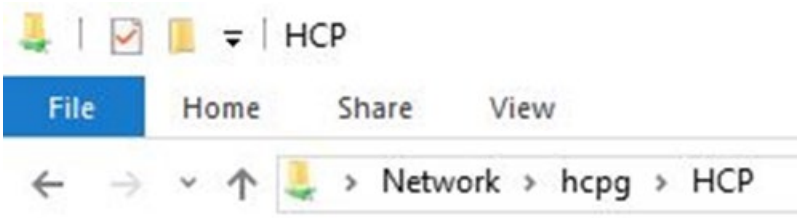
Every time a share is created on the HCP Gateway, please refer to the HCP Gateway Windows Database Replication Guide, Chapter 1 Warning about checking for errors on the non-active node in the cluster.

Step 1: Use the HCP Gateway Management UI to create the Storage, Policies and Shares. For our example the Share will be called “HCP”. Configure the Share Access permissions when you create the Shares. The process of creating a Share is covered in the **HCP Gateway Administration Guide, Chapter 10 Section 2 Add/Configure a Share** and will not be covered here.

Step 2: The next step is to test that the shared cache on the G: Drive is working correctly. Map a client to the share using the cluster IP address. For this example the cluster role is using **10.6.11.23** (Figure 13.1). You can also access the share using the DNS name for the cluster role, for this example the UNC path, **\\HCPG\hcp** (Figure 13.2).

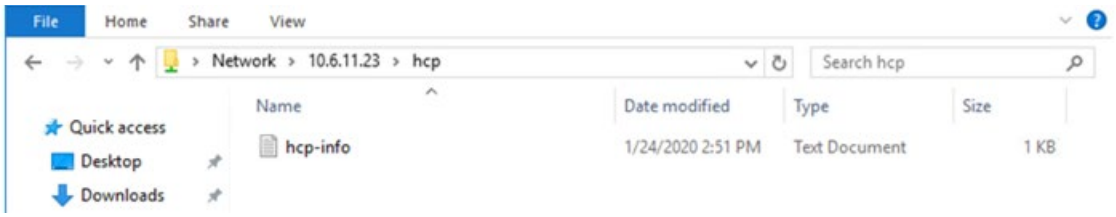
Figure 13.1 – Map Client to Share using IP address

Figure 13.2 – Map Client to Share using UNC path



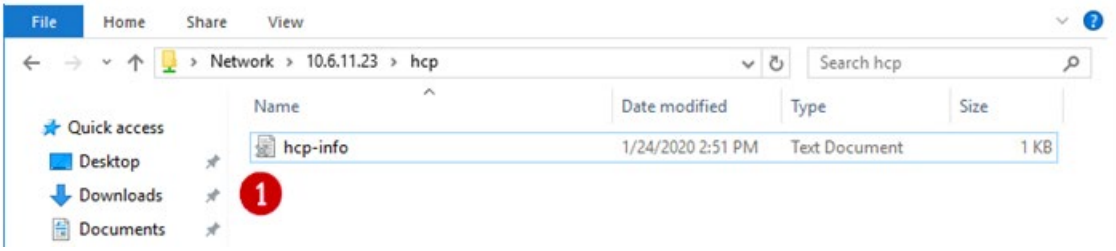
Step 3: The share will be empty, copy a text file into the share (Figure 13.3).

Figure 13.3 – Copy a file



Step 4: Wait for the file to be copied to the HCP, there will be about a 3 minute delay. If you are not using a Server Mode Copy Policy, the file icon (X) (Figure 13.4.1) means the file is offline, which will occur when the file has been copied to the HCP and completely processed by the HCP Gateway.

Figure 13.4 – Wait for File to go offline



Step 5: Right-click on the file and copy it back to the desktop (Figure 13.5).

Figure 13.5 – Copy File to Desktop

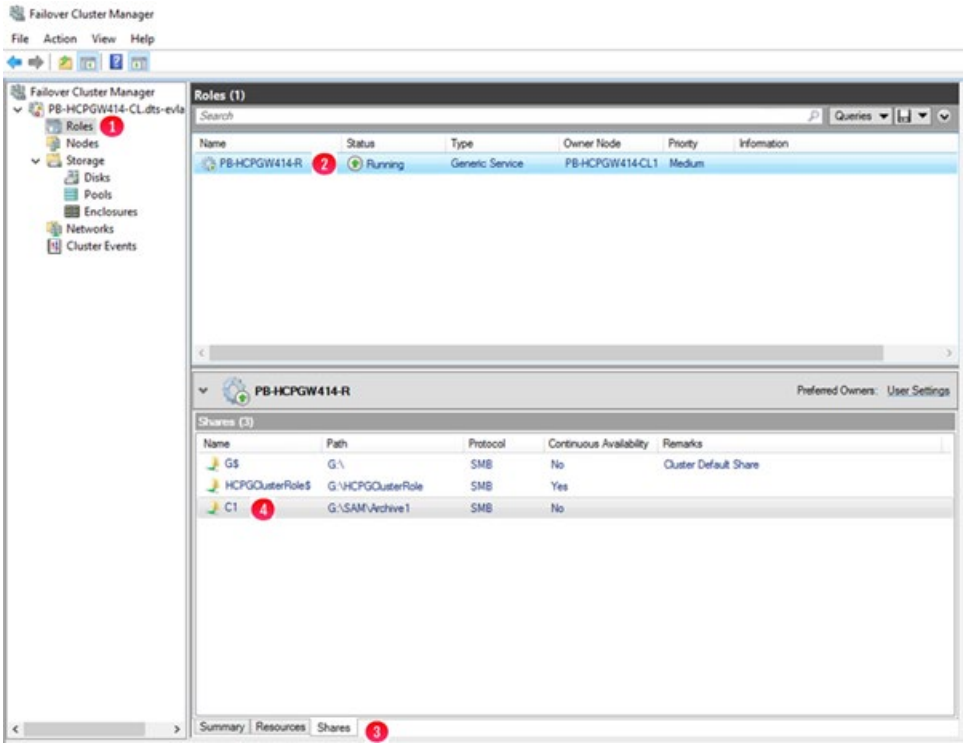
Step 6: Verify the file is the same as the one that was copied. Optionally, follow the steps in the next chapter to fail the cluster to the Passive node then run the test in this chapter again.

Chapter 14 Modify Gateway Cluster Share and NTFS Permissions

After the HCP Gateway Management UI was used to create a share(s), customize the default Share and NTFS Permissions.

Step 1: On Node 1, in the '**Failover Cluster Manager**', select '**Roles**' (Figure 14.1.1), then select the cluster role (Figure 14.1.2), then select '**Shares**' (Figure 14.1.3), then select the share (Figure 14.1.4) to customize the share and/or NTFS permissions.

Figure 14.1 – Cluster Role Shares

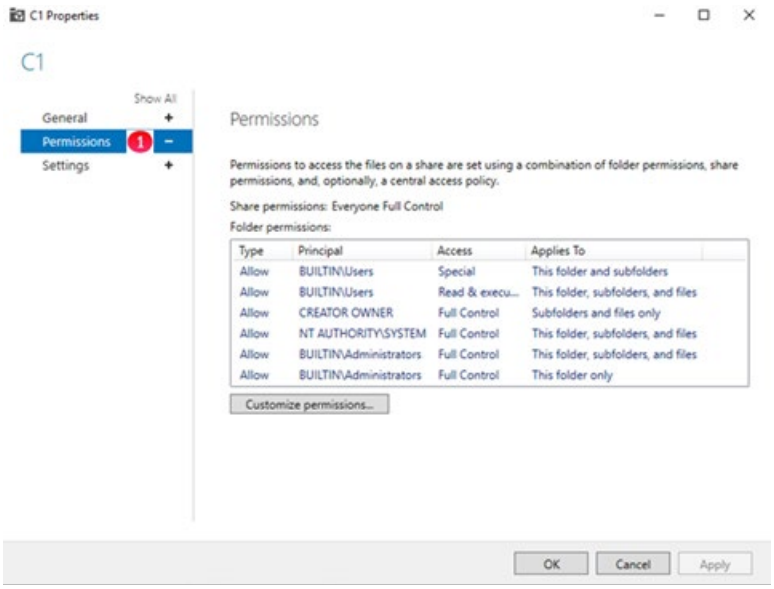


Step 2: Right-click on the share (Figure 14.1.4) to customize the share and/or NTFS permissions and select '**Properties**' (Figure 14.2.1).

Figure 14.2 – Cluster Role Share Select Properties

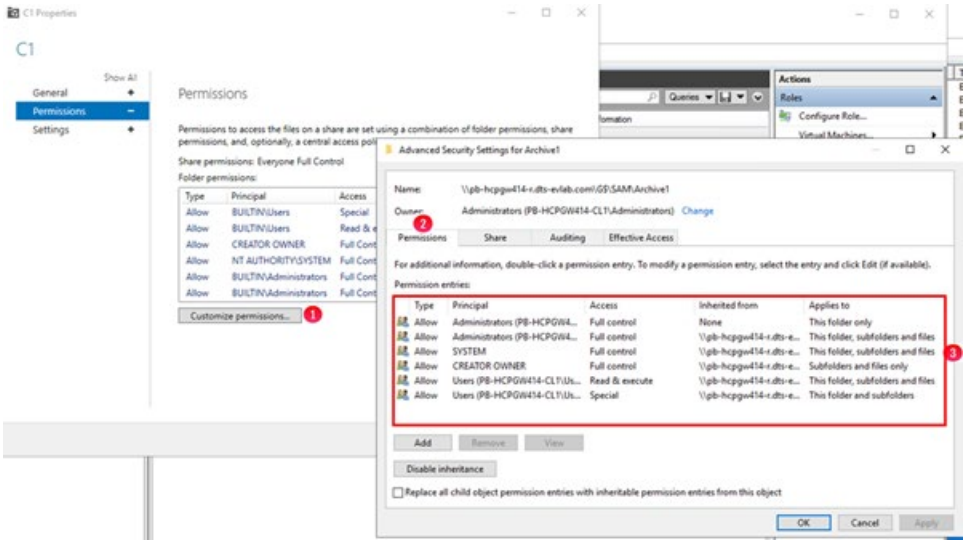
Step 3: Select '**Permissions**' (Figure 14.3.1). Do not change any settings in the **General** and **Settings** screens.

Figure 14.3 – Cluster Role Share Select Permissions



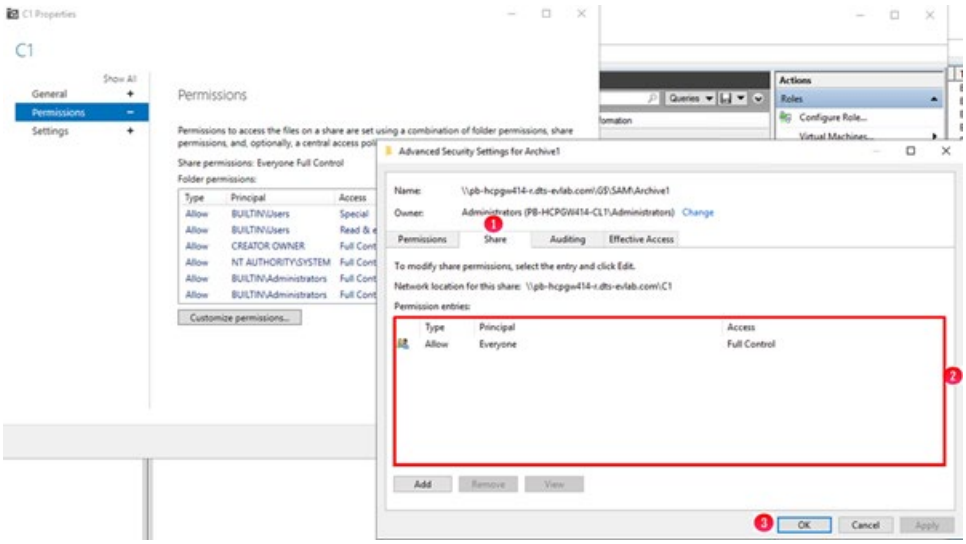
Step 4: Select '**Customize permissions**' (Figure 14.4.1). Select the '**Permissions**' tab (Figure 14.4.2). Modify the NTFS permissions (Figure 14.4.3). Please refer to **the HCP Gateway Administration Guide Chapter 18 Step 20** for details on the **sam.account** parameter and the SAM VFS Windows Service Log On setting to ensure that the HCP Gateway SAM VFS service will have Full Control access to all the folders and files.

Figure 14.4 – Cluster Role Share Modify NTFS permissions



Step 5: Select '**Share**' (Figure 14.5.1). Modify the Share access permissions (Figure 14.5.2). Select '**OK**' (Figure 14.5.3) to save the changes.

Figure 14.5 – Cluster Role Share Modify Share permissions



Chapter 15 Cluster Subshares

Prerequisites:

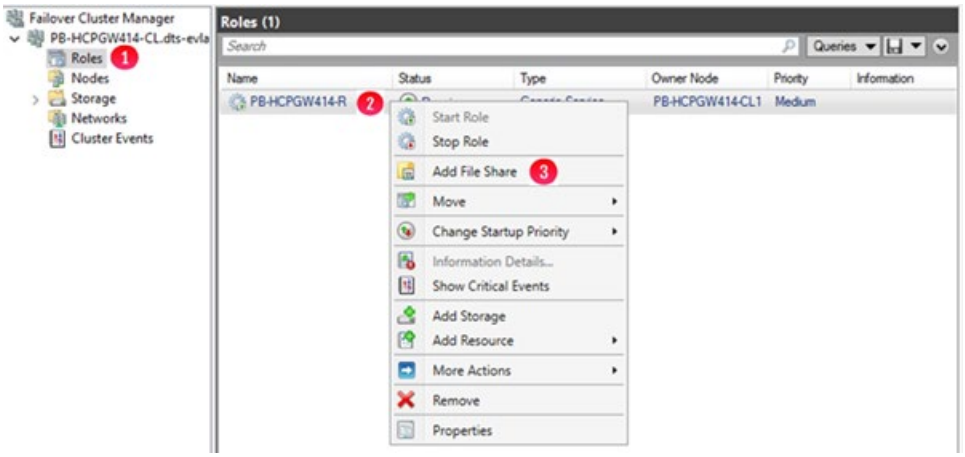
Make sure these settings are set in **C:\SAM\etc\sam\sam.properties** on HCP Gateways in the cluster.

- registry.shares=1 (or registry.shares=yes)
- cluster=1 (or cluster=yes)
- **cluster.access.ip=<clusterIPAddress>** (where <**clusterIPAddress**> is the IP address of the Cluster Role that contains the SAM VFS service)

Add subshare on Cluster

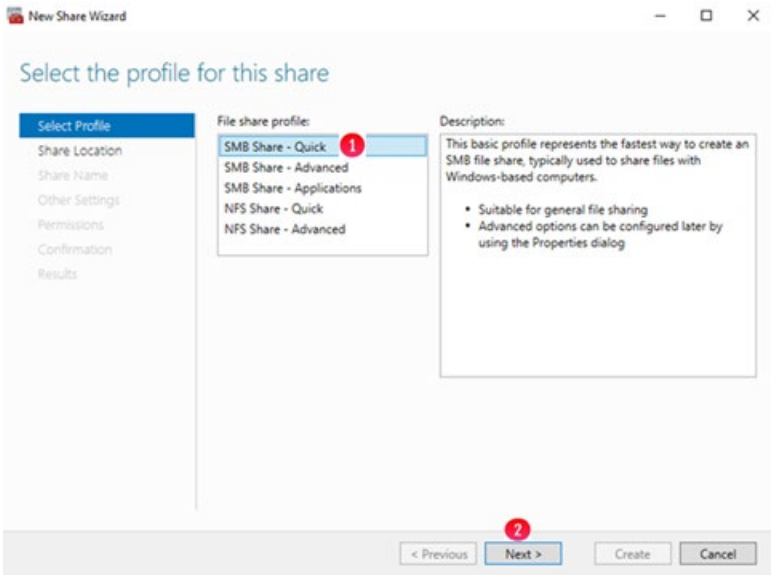
Step 1: On Node 1, in the '**Failover Cluster Manager**', select '**Roles**' (Figure 14.6.1), then right-click on the cluster role (Figure 14.6.2) and select '**Add File Share**' (Figure 14.6.3).

Figure 14.6 – Add Subshare



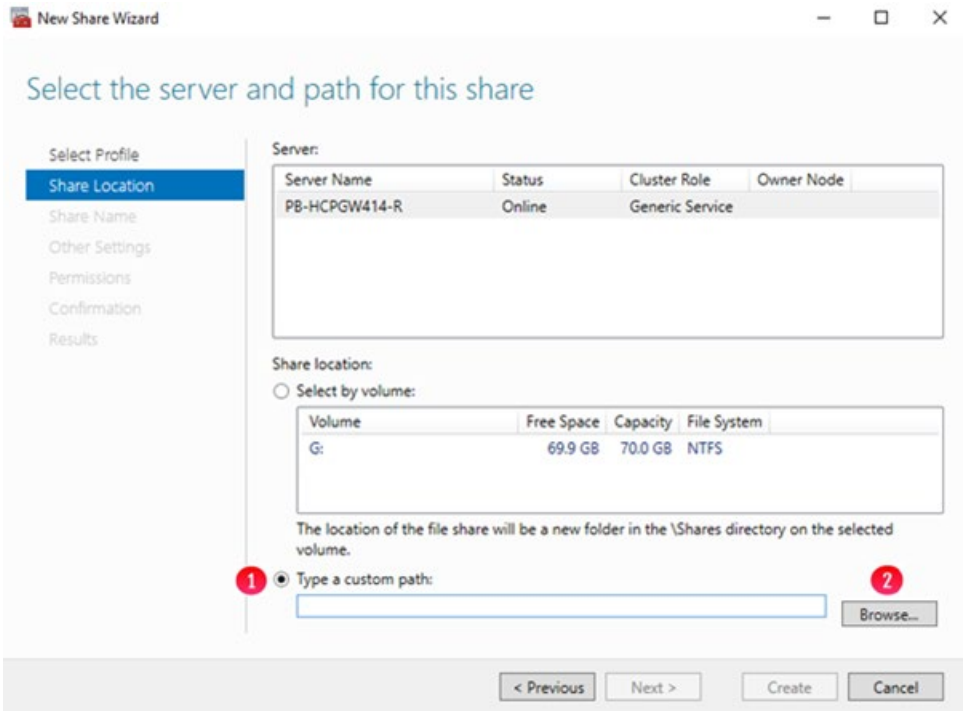
Step 2: In the New Share Wizard, select '**SMB Share - Quick**' (Figure 14.7.1), then select '**Next**' (Figure 14.7.2).

Figure 14.7 – New Share Wizard



Step 3: Select '**Type a custom path**' (Figure 14.8.1) and select '**Browse**' (Figure 14.8.2).

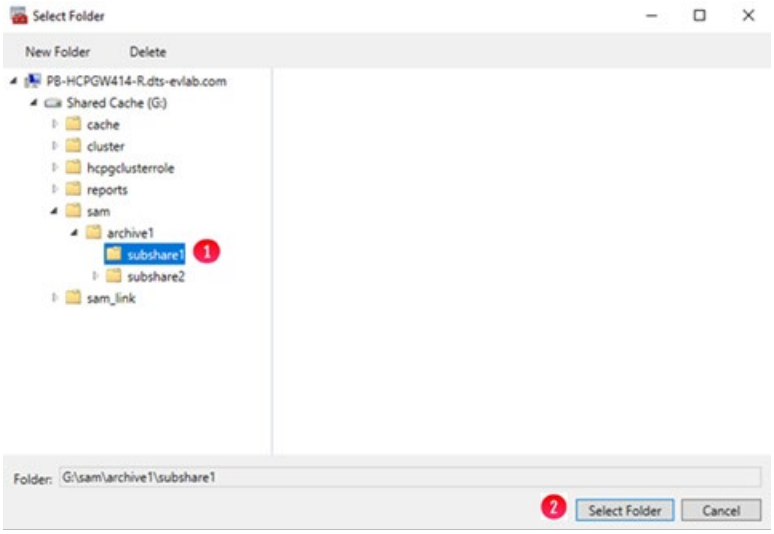
Figure 14.8 – New Share Wizard 2



Step 4: Navigate to **G:\sam** and select the **archive#** folder for the share that you want to add a subshare to, select the Subshare (Figure 14.9.1) and select '**Select Folder**' (Figure 14.9.2). Note that if there is more than 1 share on the HCP Gateway, the next step will discuss how to determine

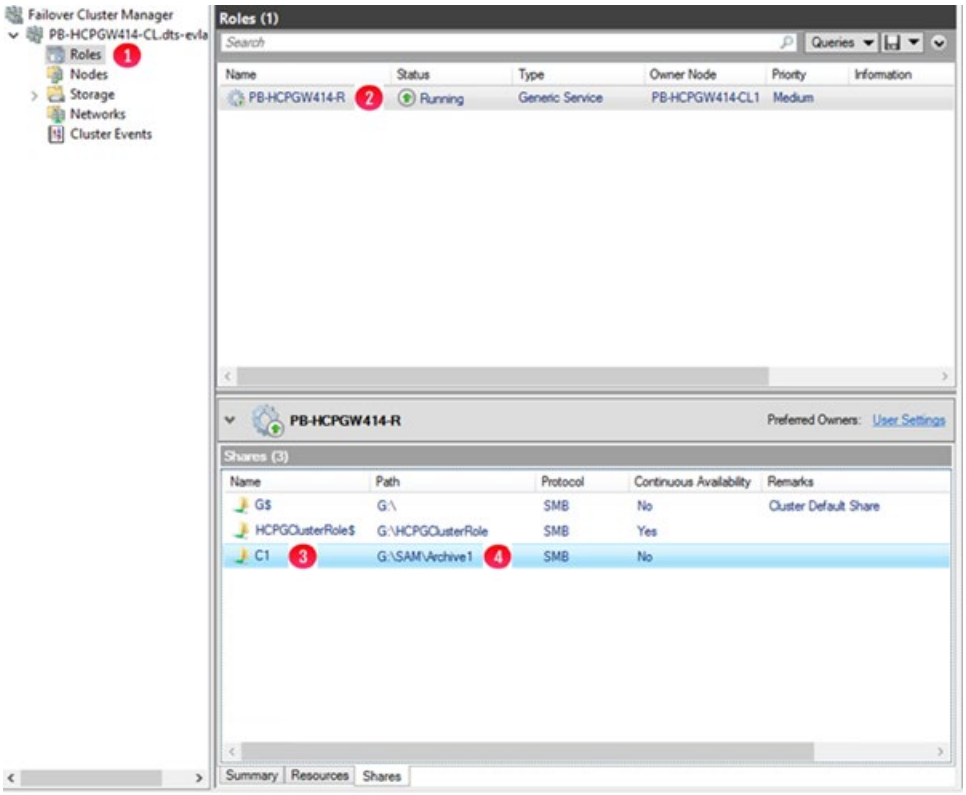
the archive number in the path **G:\sam\archive#**. If there is only 1 share, then skip to Step 6.

Figure 14.9 – New Share Wizard 2



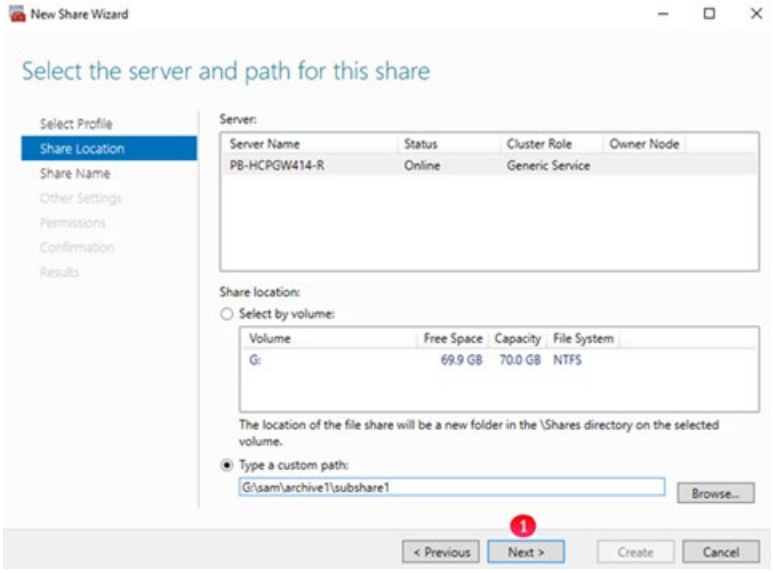
Step 5: In the '**Failover Cluster Manager**', select '**Roles**' (Figure 14.10.1), select the cluster role (Figure 14.10.2), select '**Shares**' (Figure 14.10.3). Note the last character in the Path name for the share, for this example '**1**'.

Figure 14.10 – Share Archive Number



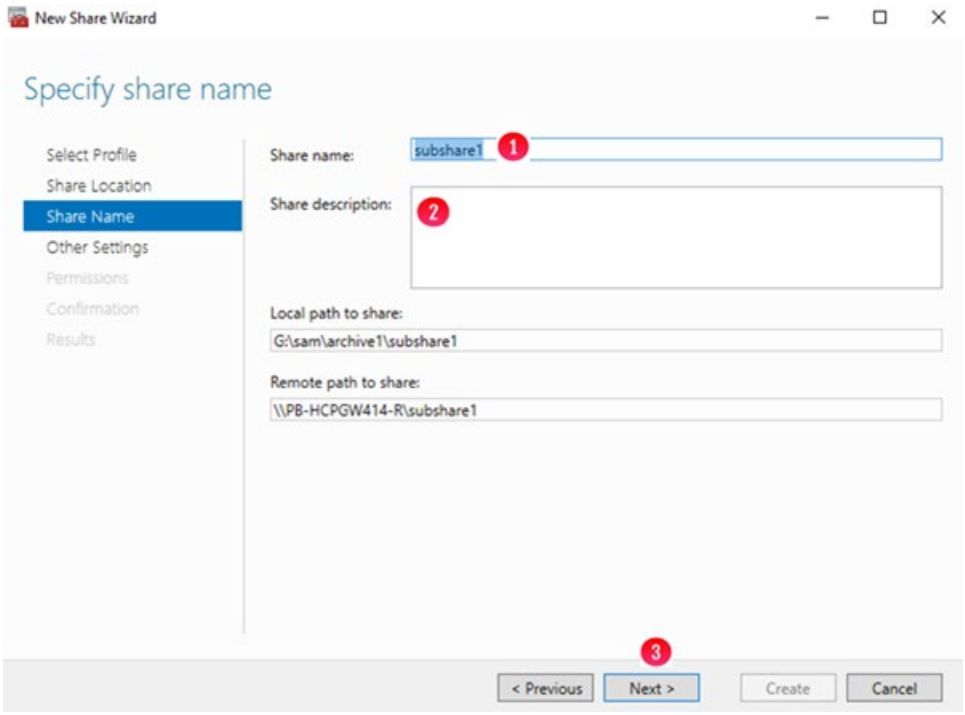
Step 6: Select '**Next**' (Figure 14.11.1).

Figure 14.11 – New Share Wizard 3



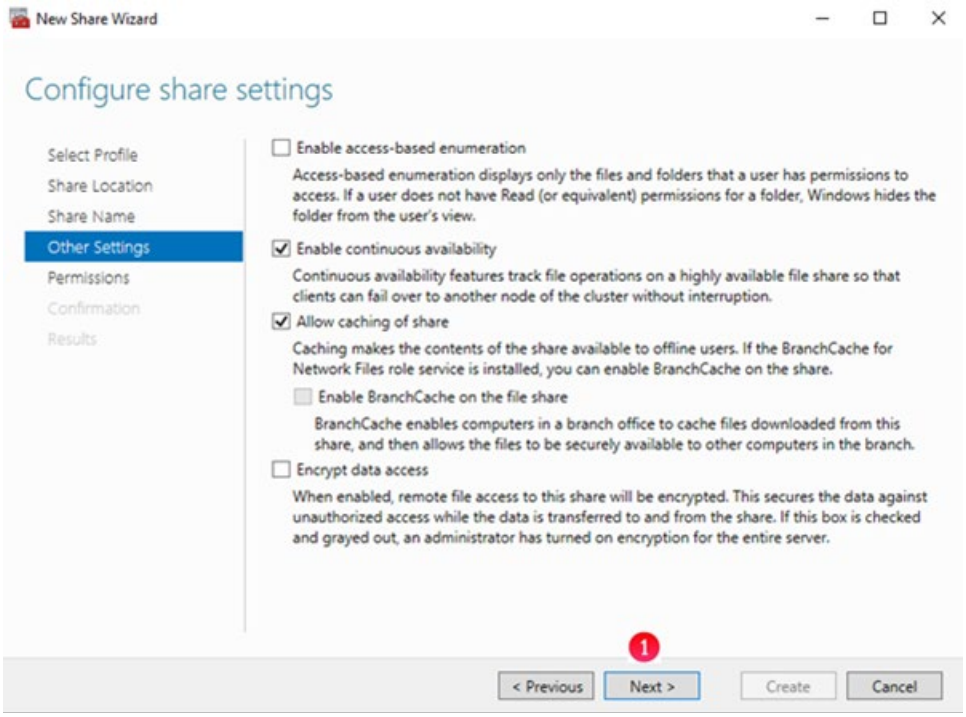
Step 7: If necessary, change the share name (Figure 14.12.1), DO NOT change the Share description (Figure 14.12.2) and select '**Next**' (Figure 14.12.3).

Figure 14.12 – New Share Wizard 4



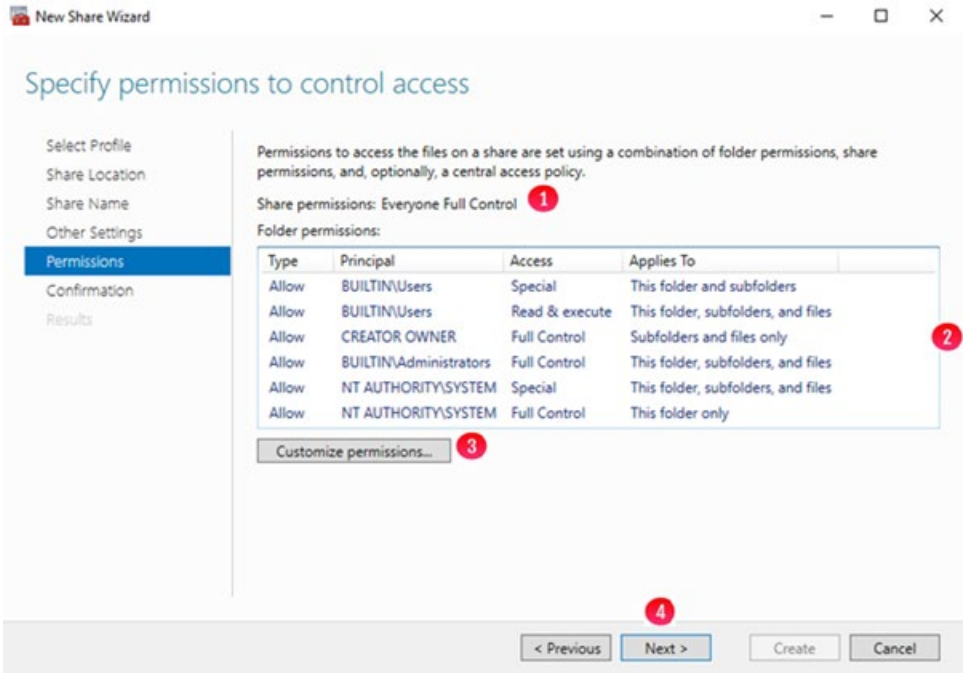
Step 8: Keep all the default settings and select '**Next**' (Figure 14.13.1).

Figure 14.13 – New Share Wizard 5



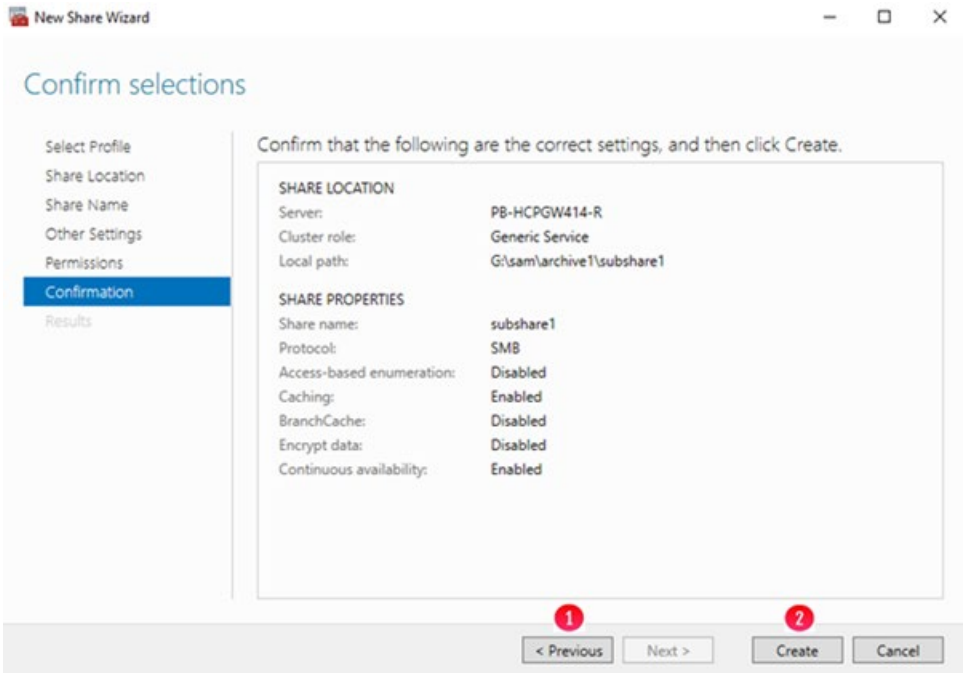
Step 9: The default share permission is **Everyone – Full Control** (Figure 14.14.1). The default folder permissions are shown (Figure 14.14.2). Please refer to t**he HCP Gateway Administration Guide Chapter 18 Step 20** for details on the **sam.account** parameter and the SAM VFS Windows Service Log On setting to ensure that the HCP Gateway SAM VFS service will have Full Control access to all the folders and files. Select '**Customize permissions**' (Figure 14.14.3) to configure the share and folder permissions. Select '**Next**' (Figure 14.14.4).

Figure 14.14 – New Share Wizard 6



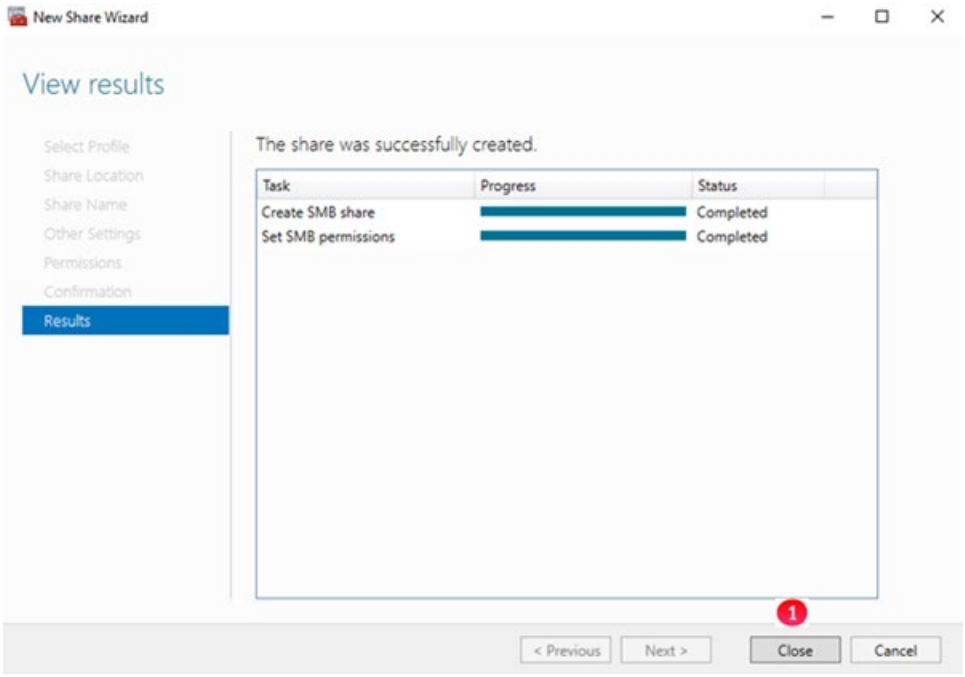
Step 10: Confirm the settings, select '**Previous**' to go back and change something (Figure 14.15.1), select '**Create**' (Figure 14.15.2) to create the Subshare.

Figure 14.15 – New Share Wizard 7



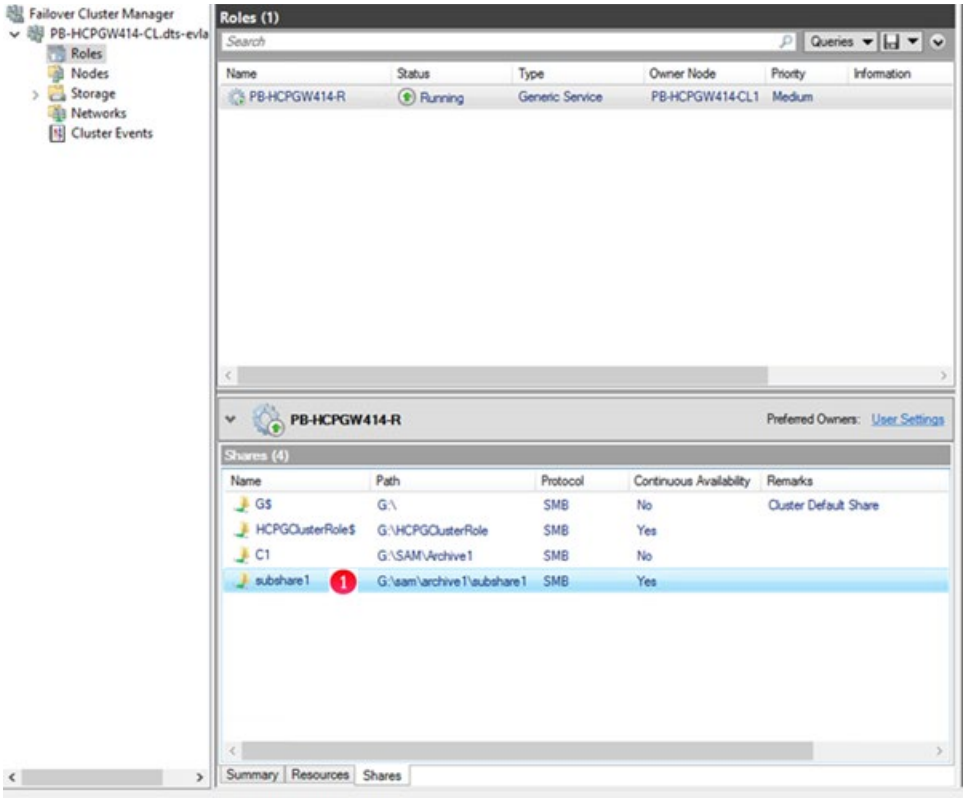
Step 11: The Subshare was successfully created, select '**Close**' (Figure 14.16.1).

Figure 14.16 – Close New Share Wizard



Step 12: The Subshare is visible (Figure 14.17.1) in the Failover Cluster Manager role.

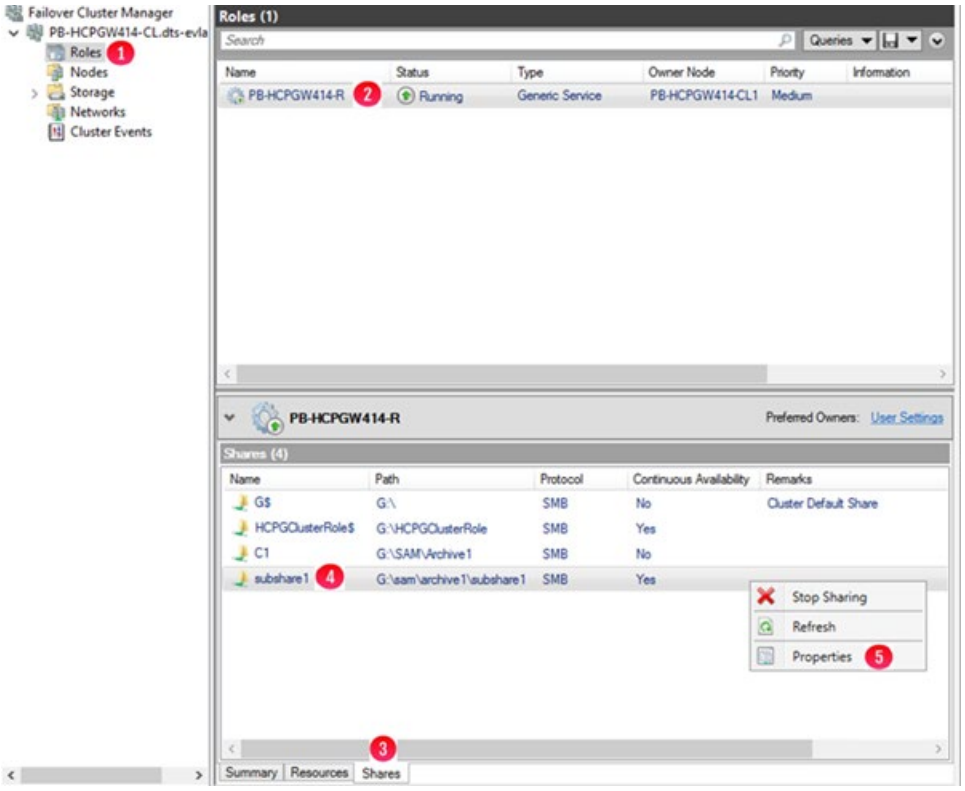
Figure 14.17 – Failover Cluster Manager Role



Edit subshare on Cluster

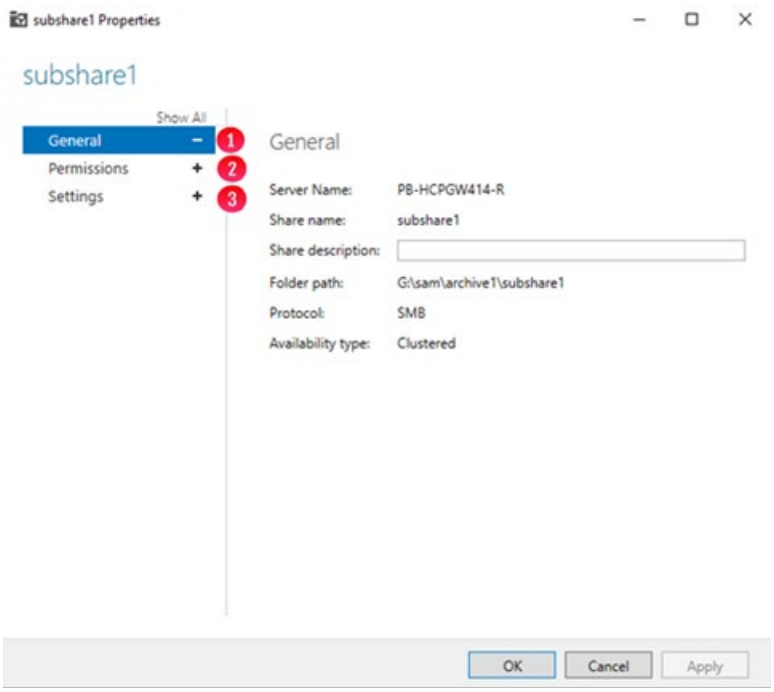
Step 1: On Node 1, in the '**Failover Cluster Manager**', select '**Roles**' (Figure 14.18.1), select the cluster role (Figure 14.18.2), select '**Shares**' (Figure 14.18.3), right-click the Subshare (Figure 14.18.4) and select '**Properties**' (Figure 14.18.5).

Figure 14.18 – Edit Subshare



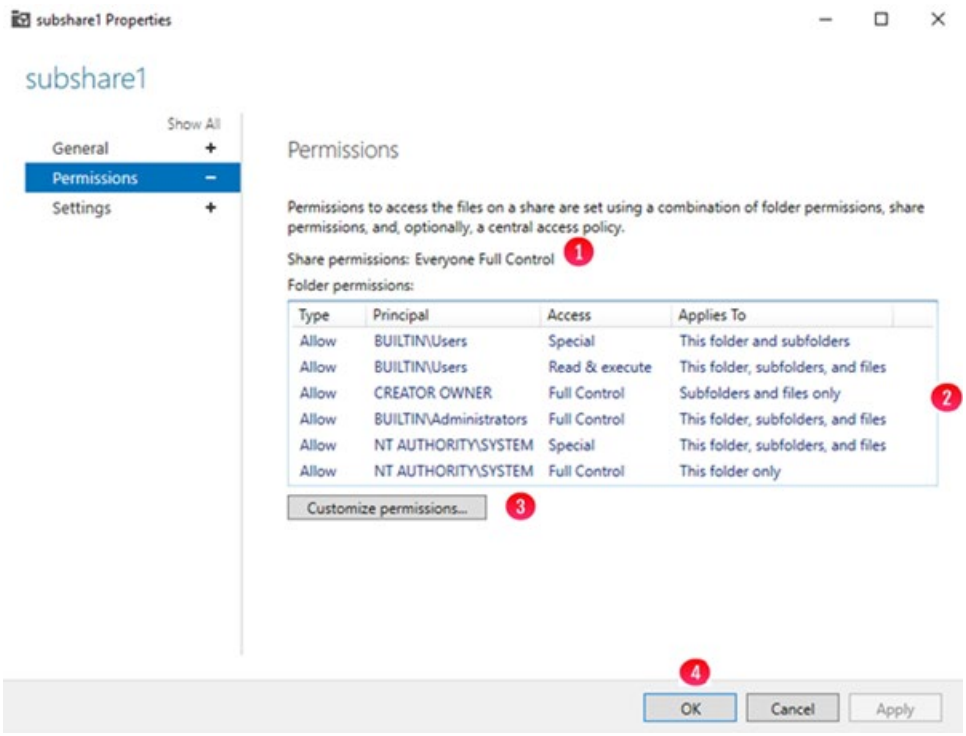
Step 2: Do not change any settings in '**General**' (Figure 14.19.1) or '**Settings**' (Figure 14.19.3). Select '**Permissions**' (Figure 14.19.2) to modify the share and folder permissions.

Figure 14.19 – Subshare Properties



Step 3: The default share permission is **Everyone – Full Control** (Figure 14.20.1). The default folder permissions are shown (Figure 14.20.2). Please refer to **the HCP Gateway Administration Guide Chapter 18 Step 20** for details on the **sam.account** parameter and the SAM VFS Windows Service Log On setting to ensure that the HCP Gateway SAM VFS service will have Full Control access to all the folders and files. Select '**Customize permissions**' (Figure 14.20.3) to configure the share and folder permissions. Select '**OK**' (Figure 14.20.4) to save the settings.

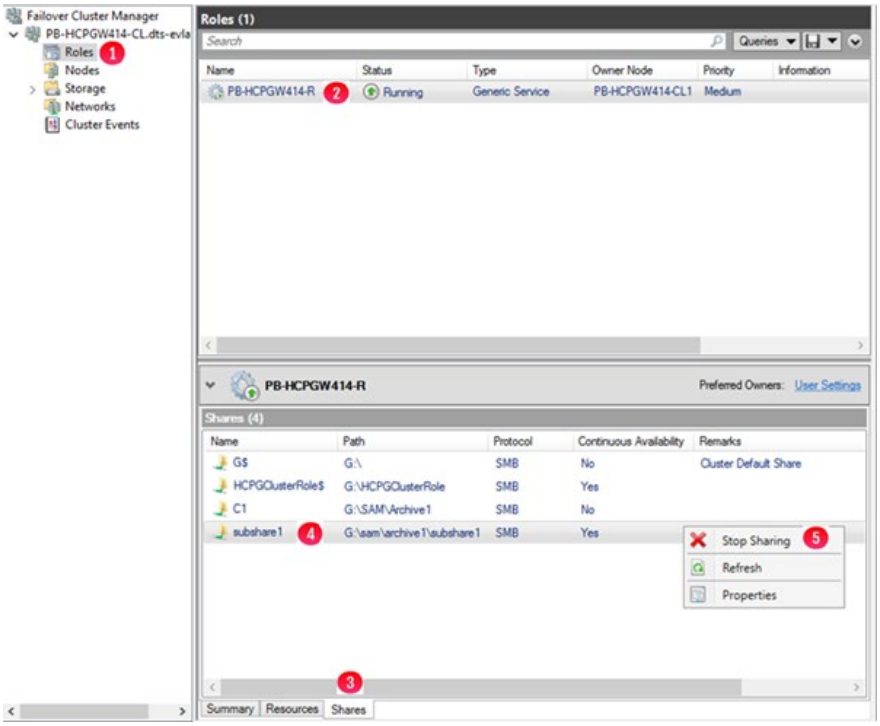
Figure 14.20 – Subshare Permissions



Delete subshare on Cluster

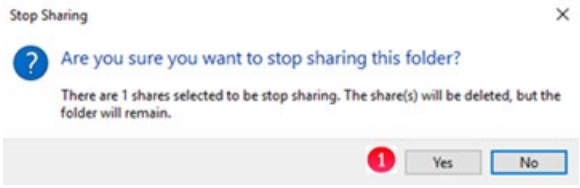
Step 1: On Node 1, in the '**Failover Cluster Manager**', select '**Roles**' (Figure 14.21.1), select the cluster role (Figure 14.21.2), select '**Shares**' (Figure 14.21.3), right-click the Subshare (Figure 14.21.4) and select '**Stop Sharing**' (Figure 14.21.5).

Figure 14.21 – Delete Subshare



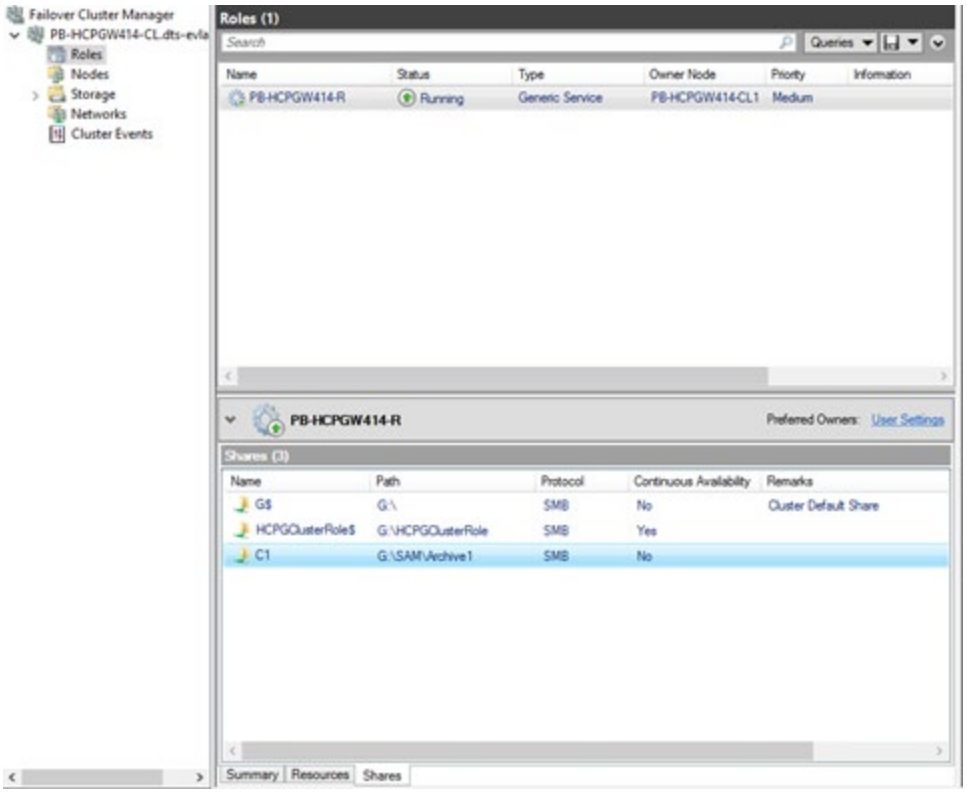
Step 2: Select '**Yes**' (Figure 14.22.1).

Figure 14.22 – Confirm Delete Subshare



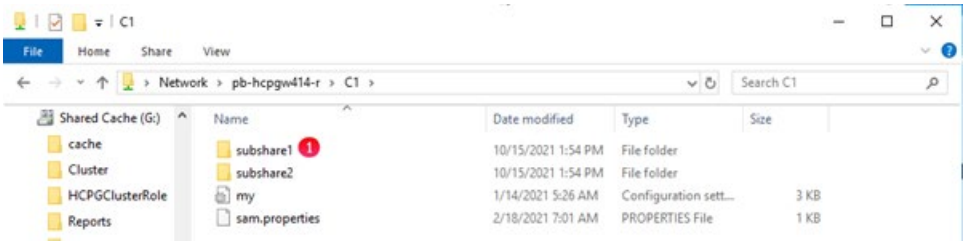
Step 3: The Subshare **subshare1** is deleted (Figure 14.23).

Figure 14.23 Subshare Deleted



Step 4: In Windows File Explorer, navigate to the cluster share C1 and see that the **subshare1** folder was not deleted (Figure 14.24.1).

Figure 14.24 subshare1 folder not deleted



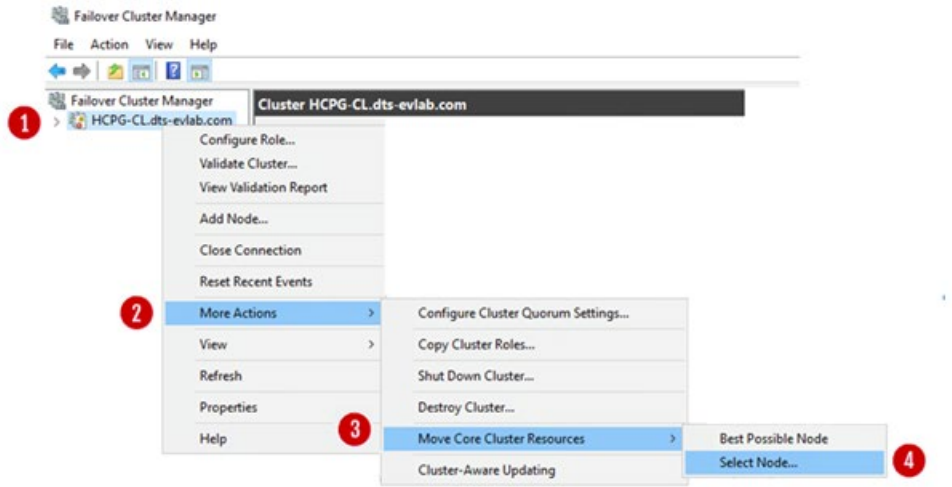
Chapter 16 How to Switch Cluster Services to Passive Node

This chapter is optional and explains how to move the Cluster Services from the Active node to the Passive node. You can perform this action by either using the Windows UI or the PowerShell command. The Windows UI requires some additional steps.

Using Windows UI:

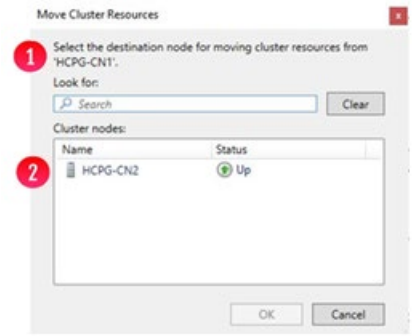
Step 1: On the active node of the cluster, for this example, Node 1, open the Failover Cluster Manager. Then Right-click on the **Cluster name** (Figure 16.1.1), in this example it's 'HCPG-CL.dts-evlab.com'. Click on '**More Actions**' (Figure 16.1.2), then '**Move Core Cluster Resources**' (Figure 16.1.3) then '**Select Node**' (Figure 16.1.4).

Figure 16.1 – Select Node



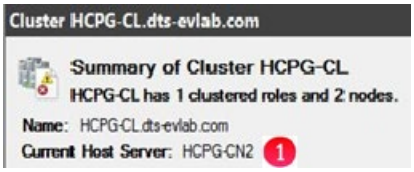
Step 2: In the select node, choose the other node. In this example, the cluster is currently running on Node 1 (Figure 16.2.1), it will be switched to Node 2 (Figure 16.2.2). Then click '**OK**.'

Figure 16.2 – Move Cluster Resource



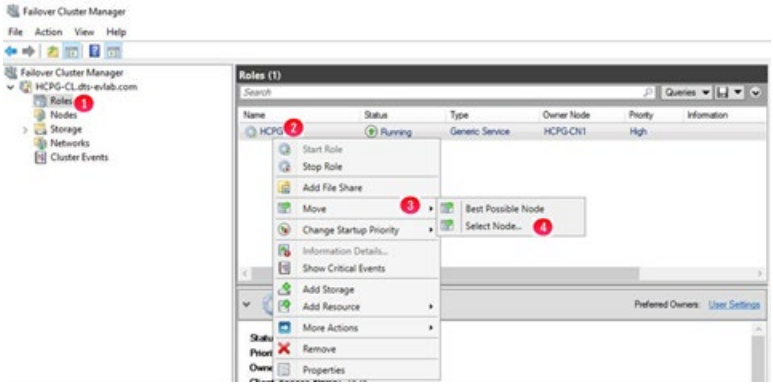
Step 3: Notice in the Cluster Summary that Node 2 is now listed as the "**Current Host Server**" (Figure 16.3.1).

Figure 16.3 – Cluster Summary



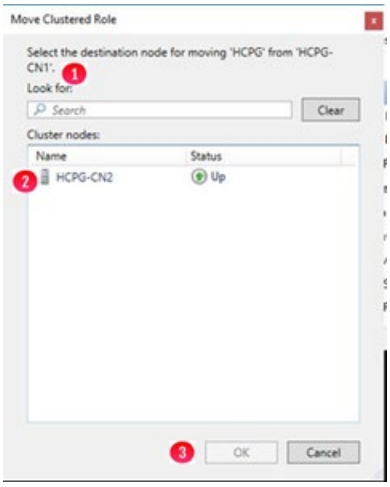
Step 4: In the Failover Cluster Manager window, click '**Roles**' (Figure 16.4.1), then right-click on the Cluster Role Name, in this example '**HCPG**' (Figure 16.4.2), then click on '**Move**' (Figure 16.4.3), then click on '**Select Node**' (Figure 16.4.4).

Figure 16.4 – Move Cluster Role



Step 5: In the Move Clustered Role window, choose the other node. In this example, the cluster is currently running on Node 1 (Figure 16.5.1), it will be switched to Node 2 (Figure 16.5.2). Then click '**OK**' (Figure 16.5.3).

Figure 16.5 – Move Clustered Role Select Node



Step 6: Notice in the Roles window that Node 2 is now listed as the "Owner Node" (Figure 16.6) and the "Status" is "Running".

Figure 16.6 – Move Clustered Role Summary

Step 7: In the client, verify that the text file can be copied to the desktop, as it was previously (Figure 13.6). Optionally, choose to make another copy or over-write the existing file on the desktop and copy the updated file back to the share. Validate that the file copied is identical to the updated file.

Using PowerShell Commands:

Step 1: This PowerShell command will show the status of the Witness disk (HCPG-CL) and G: drive and SAM VFS service (Cluster Group). On the active node for the cluster, for this example, Node 1, open a Windows PowerShell window as Administrator and issue the command **get-clustergroup** (Figure 16.7) and note that the Cluster Role is on the active node HCPG-CN1.

Figure 16.7 – Get Cluster Status

Step 2: Next, failover the Witness disk (HCPG-CL) and G: drive and SAM VFS service (Cluster Group) to the other node. On the active node for the cluster, to failover the Cluster Role to the other node in the cluster, in the Windows PowerShell window, issue the commands **get-clusternode HCPG-CN1 | Get-Clustergroup | move-clustergroup -Node HCPG-CN2** (Figure 16.8). Note that the Cluster failed over to the other node HCPG-CN2.

Figure 16.8 – Failover Cluster Role

```
PS C:\Windows\system32> get-clusternode HCPG-CN1 | Get-
Clustergroup | move-clustergroup -Node HCPG-CN2

Name              OwnerNode      State
----              ---------      -----
Available Storage HCPG-CN2       Offline
Cluster Group     HCPG-CN2       Online
HCPG-CL           HCPG-CN2       Online
```

Step 3: Check the status of the Witness disk (HCPG-CL) and G: drive and SAM VFS service (Cluster Group). On the active node for the cluster, in the Windows PowerShell window, issue the command **get-clustergroup** (Figure 16.9) and note that the Cluster failed over to the other node HCPG-CN2.

Figure 16.9 – Check Failover Status

```
PS C:\Windows\system32> get-clustergroup

Name              OwnerNode      State
----              ---------      -----
Available Storage HCPG-CN2       Offline
Cluster Group     HCPG-CN2       Online
HCPG-CL           HCPG-CN2       Online
```

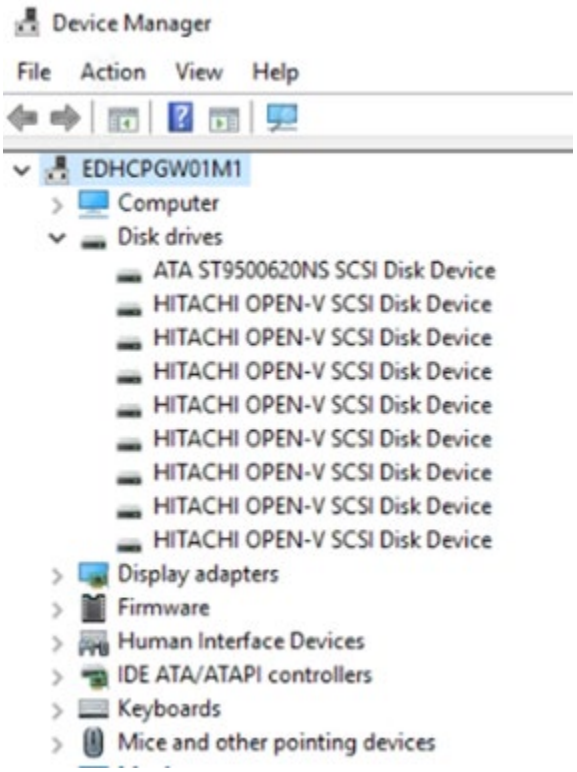
Step 4: In the client, verify that the text file can be copied to the desktop, as it was previously (Figure 13.6). Optionally, choose to make another copy or over-write the existing file on the desktop and copy the updated file back to the share. Validate that the file copied is identical to the updated file.

This completes the installation of the Windows Cluster.

Chapter 17 Shared Disk Setup with SAN Storage

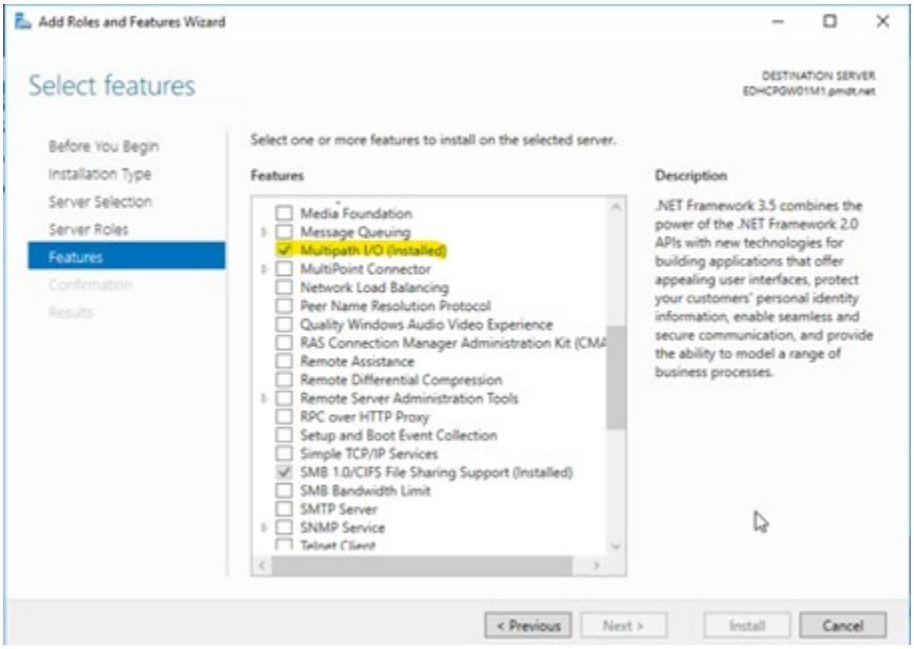
Step 1: Configure the SAN storage so that the disks are presented to the 2 Windows cluster servers. In Device Manager you will see the SAN disks presented (Figure 17.1). Here they are listed as Hitachi Open-V SCSI Disk Devices. Note the name of the disk for when MPIO is configured. HITACHI OPEN-V in this example.

Figure 17.1 – SAN disks



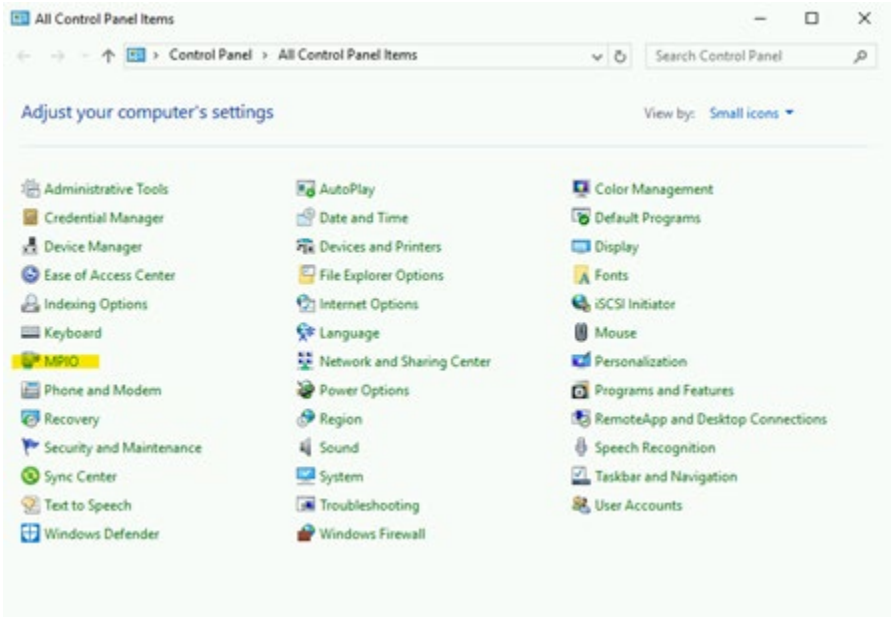
Step 2: Install Multipath I/O. In Windows Add Roles and Features Wizard, install the Feature - Multipath I/O (Figure 17.2).

Figure 17.2 – Multipath I/O

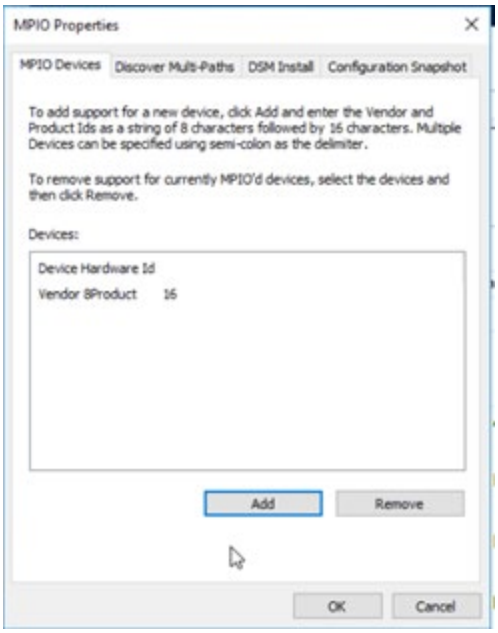


Step 3: Open MPIO in the Control Panel (Figure 17.3).

Figure 17.3 – MPIO in Control Panel

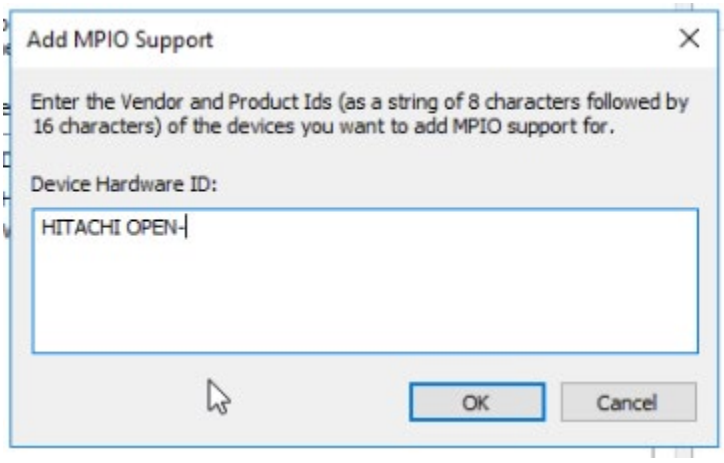


Step 4. Click Add (Figure 17.4).



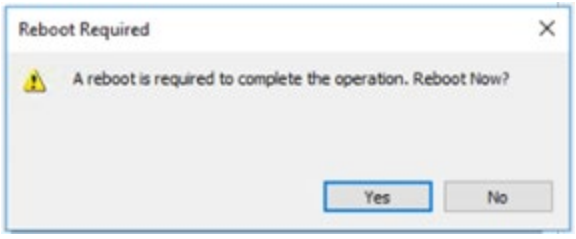
Step 5: Enter in the name of the disks **Hitachi OPEN-** click OK (Figure 17.5).

Figure 17.5 – Enter HITCAHI OPEN-



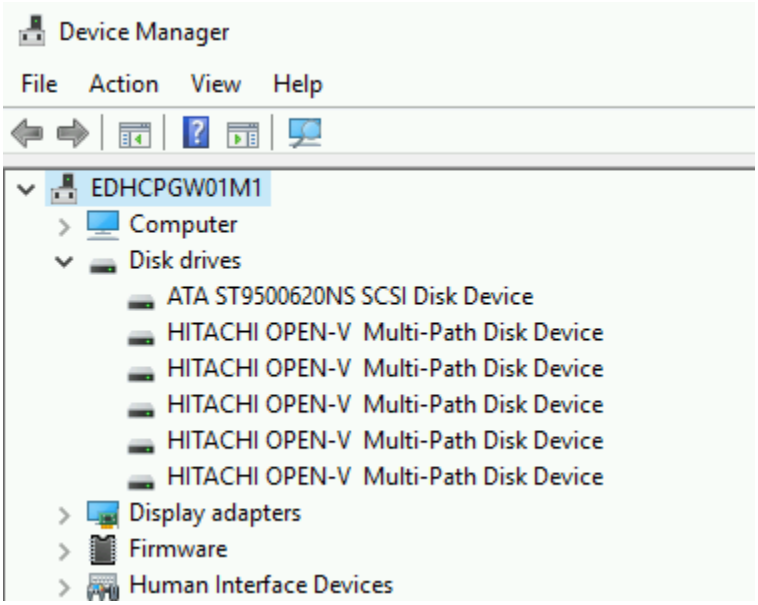
Step 6: You will get prompted to reboot. Click Yes (Figure 17.6).

Figure 17.6 Reboot required



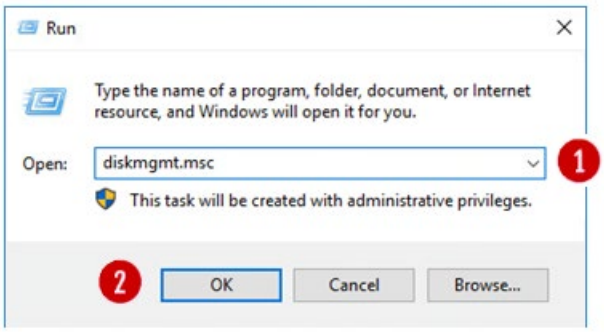
After the reboot, open Device Manager and expand the Disk drives. You will see the disks as Multi-Path disks (Figure 17.7).

Figure 17.7 - SAN disks as MPIO disks



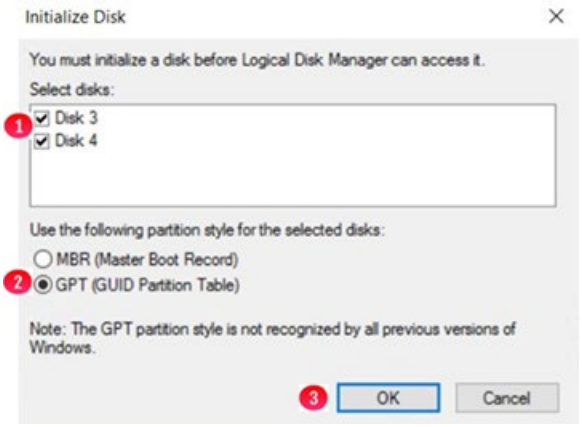
Step 7: Logon on to the desktop on Node 1. Right-click on the Windows Start Menu located at the bottom left of the screen and enter the command 'Run'. Click the Run option under Apps. In the 'Open' text entry space enter '**diskmgmt.msc**' (Figure 17.8.1), then click '**OK**' (Figure 17.8.2) to open the Disk Management window.

Figure 17.8 – Run Disk Management



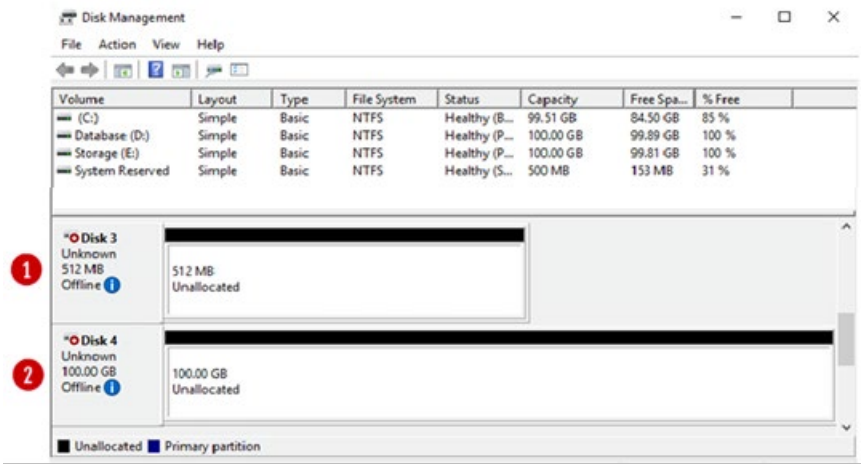
Step 8: In the Disk Management window, make sure both “Disk 3” and “Disk 4” are selected (Figure 17.9.1), select the “GPT (GUID Partition Table)” button (Figure 17.9.2) and click the “OK” button (Figure 17.9.3) to continue. If you did not see the “Initialize Disk” screen, go to Step 9. Otherwise, skip to Step 13.

Figure 17.9 – Select New Disks



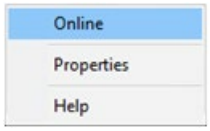
Step 9: In the Disk Management window, if you did not see the “**Initialize Disk**” screen in Step 8 for both “**Disk 3**” and “**Disk 4**”, scroll down to view that the two hard disks (Figures 17.10.1 and 17.10.2) with size 512MB and the size of the shared cache disk, for this example 100GB. Note the disks are offline and unallocated.

Figure 17.10 – New Disk Status



Step 10: Right click on **Disk 3**, then select '**Online**' from the pulldown menu (Figure 17.11).

Figure 17.11 – Set Disk Online



Step 11: The **Disk 3** status will change from **Offline** to **Not Initialized** (Figure 17.12.1). The next step is to initialize the disk by right clicking again on Disk 3 and selecting "**Initialize Disk**" (Figure 17.13.1).

Figure 17.12 – Updated Disk Status

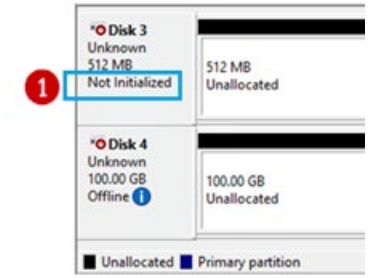
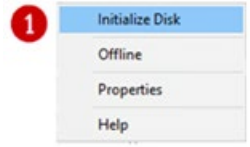
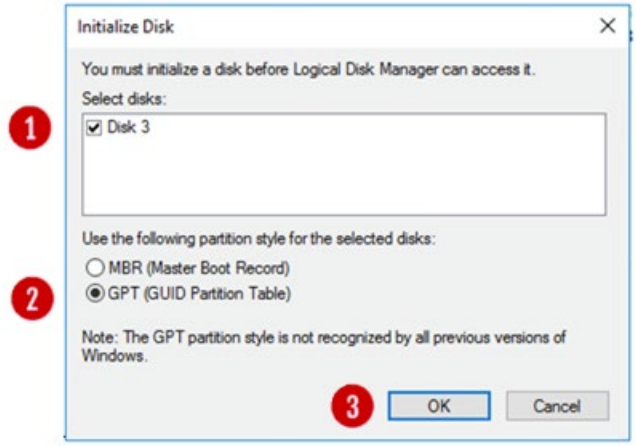


Figure 17.13 – Initialize Disk



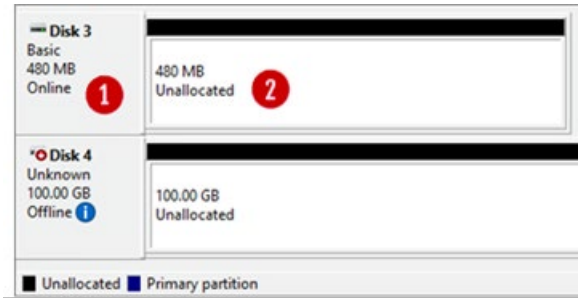
Step 12: From the **Initialize Disk** menu select the drive (Figure 17.14.1). Use **GPT** partition style (Figure 17.14.2). Then click the '**OK**' button (Figure 17.14.3) to start the initialize process.

Figure 17.14 – Initialize Disk Configuration



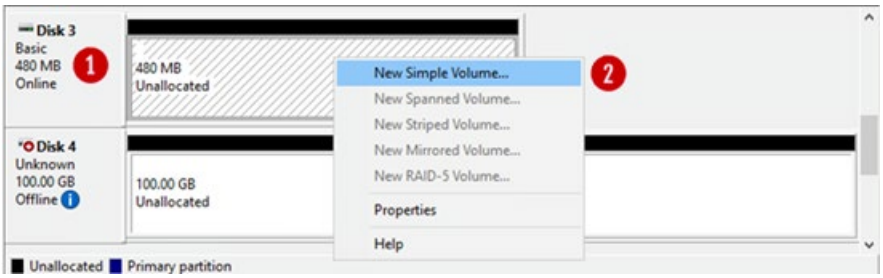
Once the initialization process is complete, the menu will revert back to the Disk Management main menu. Now the Disk 3 will show status as Online (Figure 17.15.1). Note the Unallocated disk space is now around 480MB (Figure 17.15.2), versus the original 512 MB capacity. Repeat Steps 9-12 for Disk 4, noting that the Unallocated disk space is now around 99.98GB, versus the original 100GB capacity.

Figure 17.15 – Disk Online



Step 13: The next step is to right click in the box that surrounds the '**480 MB Unallocated**' text for **Disk 3** (Figure 17.16.1) and then select **New Simple Volume** (Figure 17.16.2) from the menu list.

Figure 17.16 – Create Simple Volume

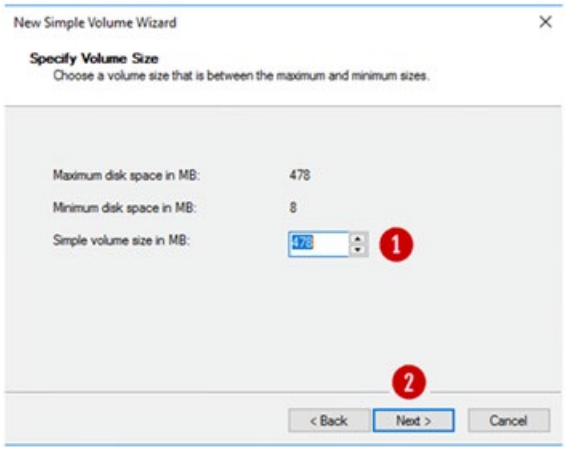


Step 14: This will open the New Simple Volume Wizard (Figure 17.17), click the '**Next**' button (Figure 17.17.1) to continue.

Figure 17.17 – New Volume Wizard

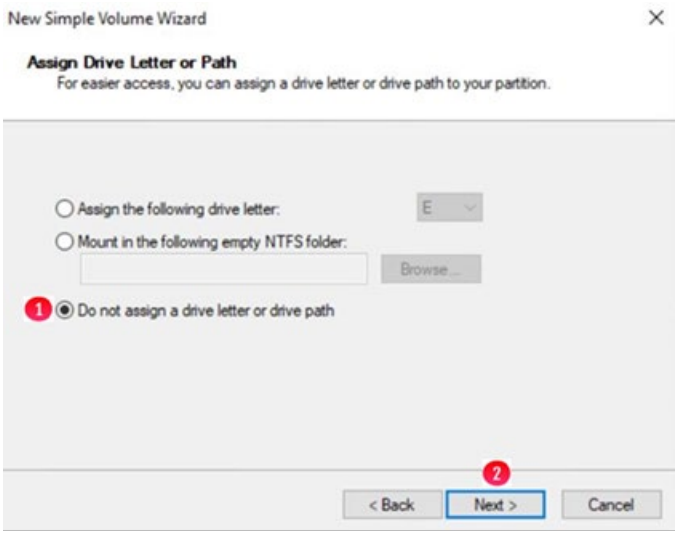
Step 15: Take the default Simple Volume size (Figure 17.18.1) which is the maximum value. Then click the '**Next**' button (Figure 17.18.2) to continue.

Figure 17.18 – Set Volume Size



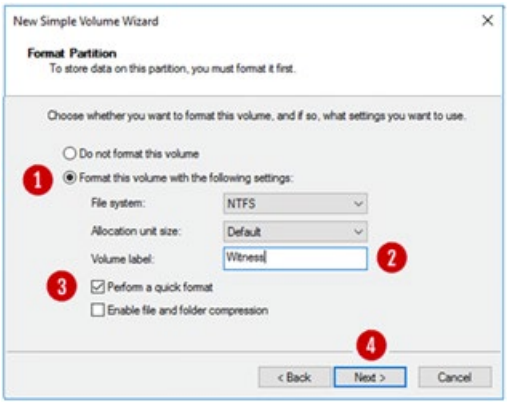
Step 16: Select "**Do not assign a drive letter or path**" (Figure 17.19.1). Then click the '**Next**' button (Figure 17.19.2) to continue.

Figure 17.19 – Set Drive Letter



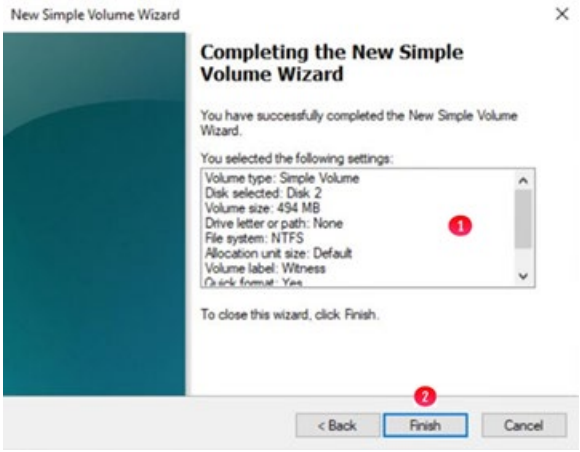
Step 17: Click the option '**Format the volume with the following settings**' (Figure 17.20.1) radio button. Select '**File System**' as '**NTFS**' and '**Allocation Unit size**' as '**Default**' options. Then type '**Witness**' into the Volume label (Figure 17.20.2) data entry box. Then select the box for '**Perform a quick format**' (Figure 17.20.3). Then click the '**Next**' button (Figure 17.20.4) to continue.

Figure 17.20 – Format Partition



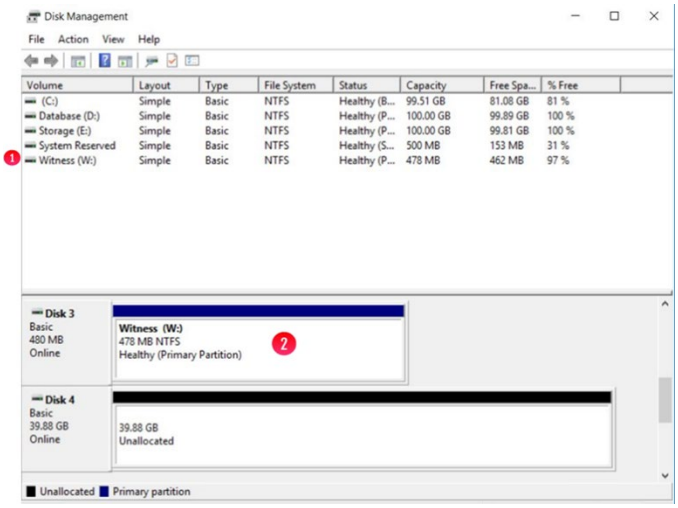
Step 18: Review the selected settings in the dialogue box (Figure 17.21.1). If they are correct then click the '**Finish**' button (Figure 17.21.2). If the settings are not correct, click the Back button and go back to the setting that needs to be corrected.

Figure 17.21 – Finish



Step 19: Review updates in the Disk Management console. Notice that the **Witness Disk** (Figure 17.22.1) is online and has a Healthy (Figure 17.22.2) status.

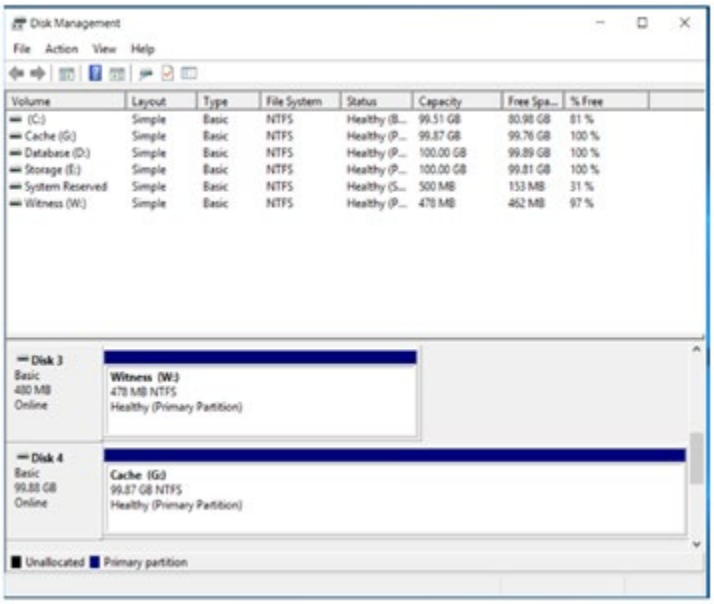
Figure 17.22 – Results



Step 20: Take the Witness disk offline by right-clicking in the "**Disk 3**" box and select "**Offline**".

Step 21: Repeat steps 9-20 for **Disk 4**, in Step 13, the disk size of a 100GB in ESXi will likely show as 98.88GB, using G for the drive letter in Step 16 and **Shared Cache** for the Volume Label in Step 17. Review the Disk Management window to make sure both drives are online and Healthy (Figure 17.23)

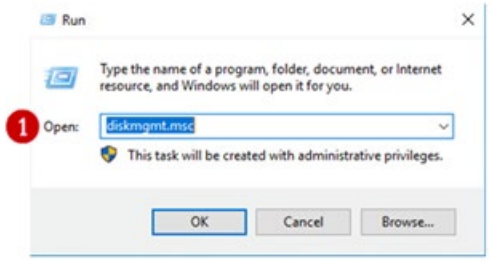
Figure 17.23 – Results



Step 22:

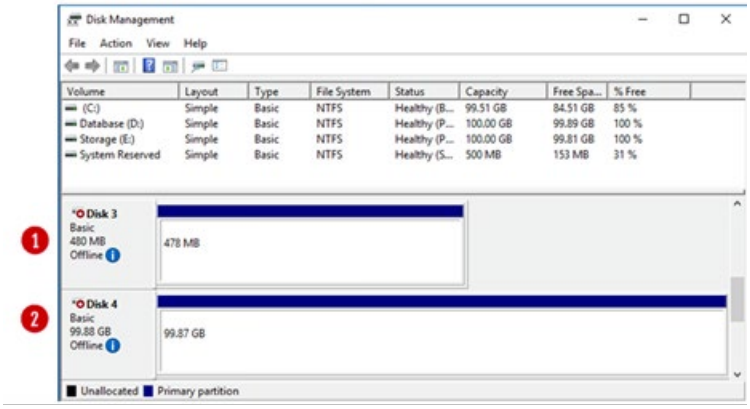
Now that the disks have been added on Node 1, we can login into the Windows disk management on Node 2 and verify the disks are visible. **First**, login to the Windows Desktop on Node 2. Right-click on the Windows Start Menu located at the bottom left of the screen and enter '**Run**'. Click on the '**Run**' option under **Apps**. In the dialogue box following the '**Open**:' tag (Figure 17.24.1), enter '**diskmgmt.msc**' to access the Disk Manager.

Figure 17.24 – Windows Disk Management



Step 23: In the Disk Management window, scroll down to view that the two hard disks are visible (Figures 17.25.1 and 17.25.2). Note these disks are offline as they are controlled by Node 1.

Figure 17.25 – New Drives Added



Step 24: In the Disk Management window, right-click on **Disk 3** and change the disk to '**Online**'. The disk name will change to '**Witness**'. Right-click on **Disk 4** and change the disk to '**Online**'. The disk name will change to '**Shared Cache (E:)**'. Right-click again on **Disk 3** and change the drive letter to '**G:**'

Step 25: In the Disk Management window, right-click on **Disk 3** and change the disk to '**Offline**'. The disk name '**Witness**' and status will no longer be visible. Right-click on **Disk 3** and change the disk to '**Offline**'. The disk name '**Shared Cache (G:)**' and status will no longer be visible.

Step 26: If necessary, expand the size of the database disk, drive **D**:. Refer to **the VM Deployment Guide Chapter 2** for the details.

Chapter 18 Shared Disk Setup with GAD Storage

Step 1: Configure the GAD storage so that the disks are presented to the 2 Windows cluster servers.

For this example, the cache drive (G:\) will be provided by a 100GB GAD lun from 2x VSP E590 arrays spread across 2 datacenters. GAD is an active/active solution, where the virtualized LUN is read and writable from both sites.

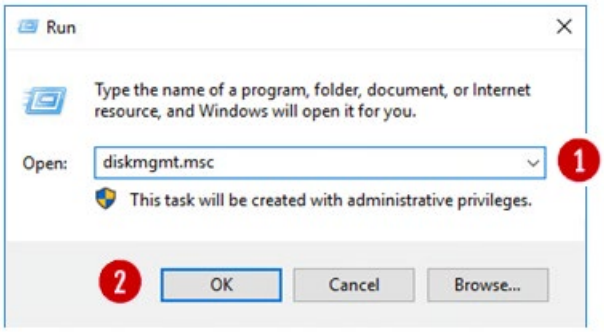
Since GAD is an active/active solution, for this example, a 512MB quorum device is needed for cluster arbitration purposes. This lun should reside preferably on an independent 3rd site or in the cloud.

GAD relies on Hitachi's replication technology; therefore, FC replication will be established between both sites. Minimum 2 FC links (1 link per fabric) are needed, recommended is 4 links (2 links per fabric).

On windows OS level, an NTFS cluster size of 32KB can be used in order to support a maximum volume of 128TB.

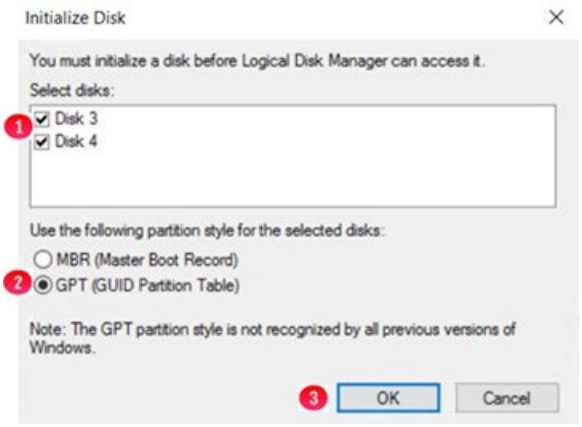
Step 2: Logon on to the desktop on Node 1. Right-click on the Windows Start Menu located at the bottom left of the screen and enter the command **'Run'**. Click the Run option under Apps. In the 'Open' text entry space enter **'diskmgmt.msc'** (Figure 18.1.1), then click '**OK**' (Figure 18.1.2) to open the Disk Management window.

Figure 18.1 – Run Disk Management



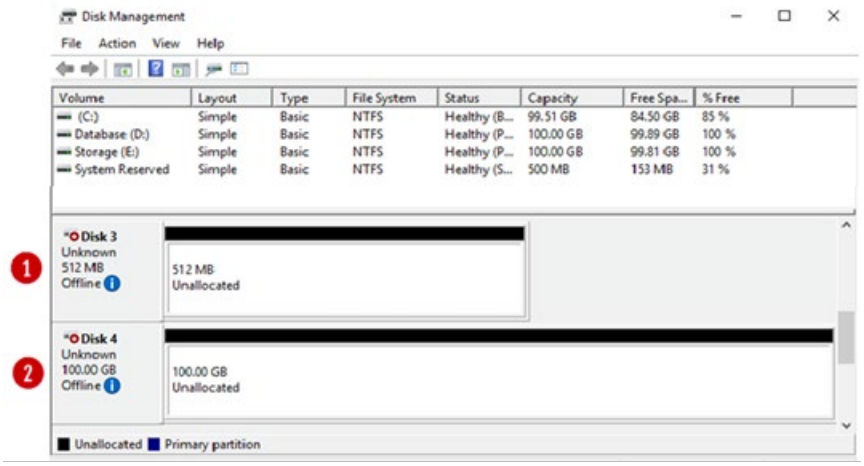
Step 3: In the Disk Management window, make sure both "**Disk 3**" and "**Disk 4**" are selected (Figure 18.2.1), select the "**GPT (GUID Partition Table)**" button (Figure 18.2.2) and click the "**OK**" button (Figure 18.2.3) to continue. If you did not see the "**Initialize Disk**" screen, go to Step 4. Otherwise, skip to Step 8.

Figure 18.2 – Select New Disks



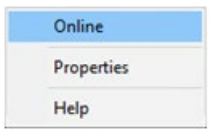
Step 4: In the Disk Management window, if you did not see the "**Initialize Disk**" screen in Step 3 for both "**Disk 3**" and "**Disk 4**", scroll down to view that the two hard disks (Figures 18.3.1 and 18.3.2) with size 512MB and the size of the shared cache disk, for this example 100GB. Note the disks are offline and unallocated.

Figure 18.3 – New Disk Status



Step 5: Right click on **Disk 3**, then select '**Online**' from the pulldown menu (Figure 18.4).

Figure 18.4 – Set Disk Online



Step 6: The **Disk 3** status will change from **Offline** to **Not Initialized** (Figure 18.5.1). The next step is to initialize the disk by right clicking again on **Disk 3** and selecting "**Initialize Disk**" (Figure 18.6.1).

Figure 18.5 – Updated Disk Status

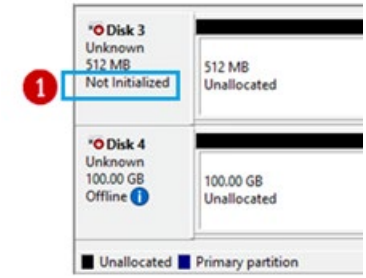
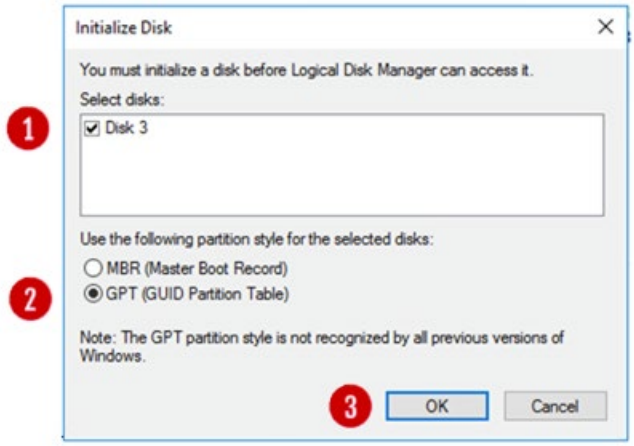


Figure 18.6 – Initialize Disk

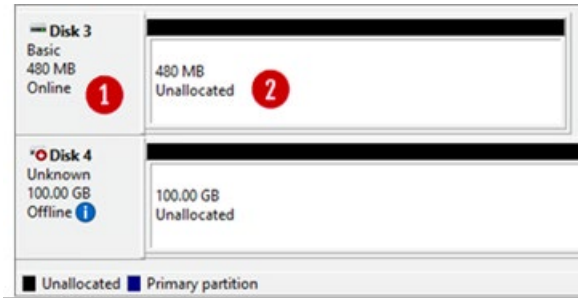
Step 7: From the **Initialize Disk** menu select the drive (Figure 18.7.1). Use **GPT** partition style (Figure 18.7.2). Then click the '**OK**' button (Figure 18.7.3) to start the initialize process.

Figure 18.7 – Initialize Disk Configuration



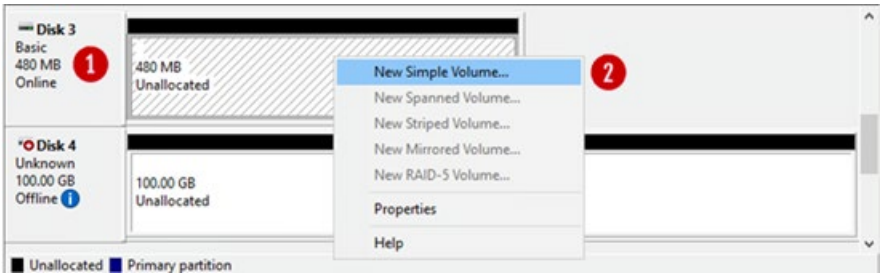
Once the initialization process is complete, the menu will revert back to the Disk Management main menu. Now the **Disk 3** will show status as **Online** (Figure 18.8.1). Note the Unallocated disk space is now around 480MB (Figure 18.8.2), versus the original 512 MB capacity. Repeat Steps 4-7 for **Disk 4**, noting that the Unallocated disk space is now around 99.98GB, versus the original 100GB capacity.

Figure 18.8 – Disk Online



Step 8: The next step is to right click in the box that surrounds the '**480 MB Unallocated**' text for **Disk 3** (Figure 18.9.1) and then select **New Simple Volume** (Figure 18.9.2) from the menu list.

Figure 18.9 – Create Simple Volume

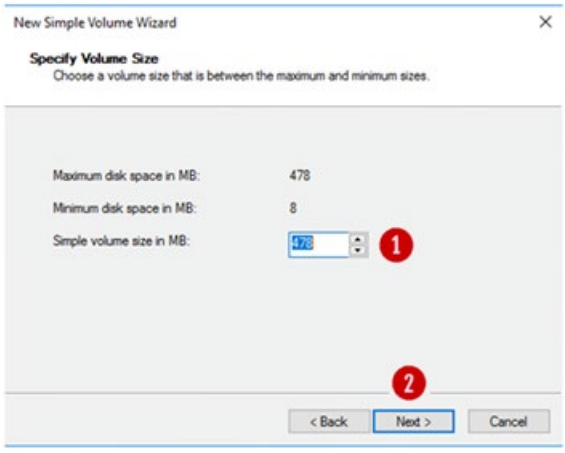


Step 9: This will open the New Simple Volume Wizard (Figure 18.10), click the '**Next**' button (Figure 18.10.1) to continue.

Figure 18.10 – New Volume Wizard

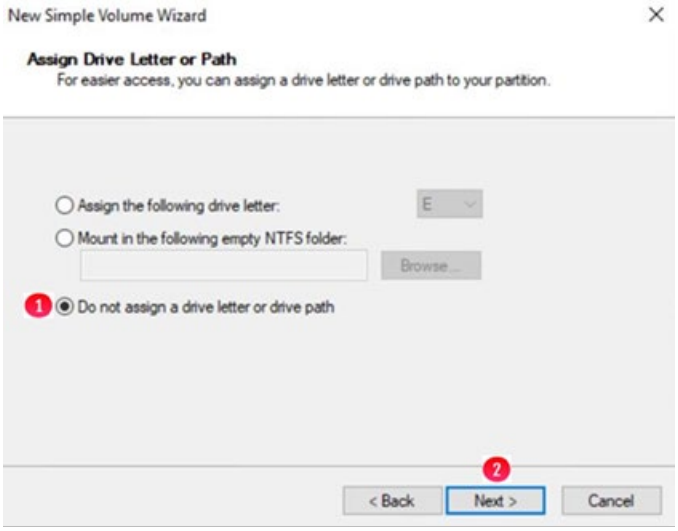
Step 10: Take the default Simple Volume size (Figure 18.11.1) which is the maximum value. Then click the '**Next**' button (Figure 18.11.2) to continue.

Figure 18.11 – Set Volume Size



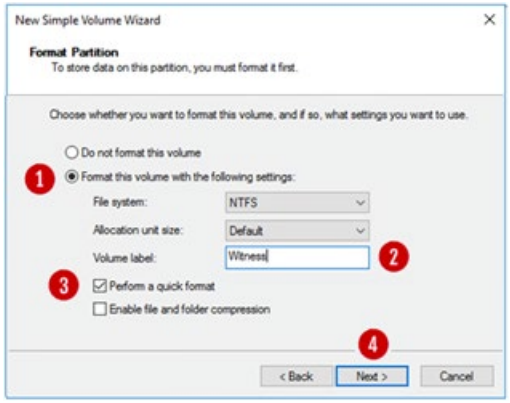
Step 11: Select "**Do not assign a drive letter or path**" (Figure 18.12.1). Then click the '**Next**' button (Figure 18.12.2) to continue.

Figure 18.12 – Set Drive Letter



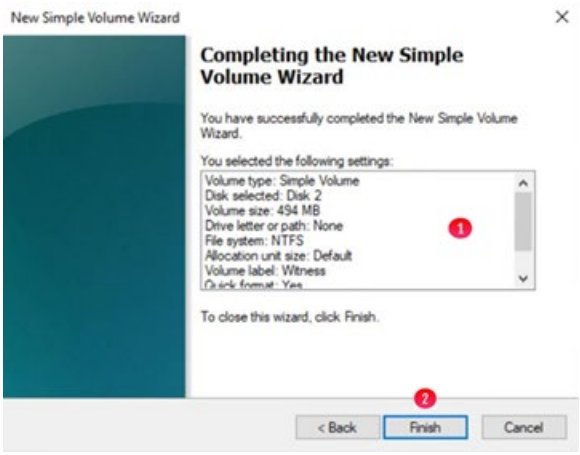
Step 12: Click the option '**Format the volume with the following settings**' (Figure 18.13.1) radio button. Select '**File System**' as '**NTFS**' and '**Allocation Unit size**' as '**Default**' options. Then type '**Witness**' into the Volume label (Figure 18.13.2) data entry box. Then select the box for '**Perform a quick format**' (Figure 18.13.3). Then click the '**Next**' button (Figure 18.13.4) to continue.

Figure 18.13 – Format Partition



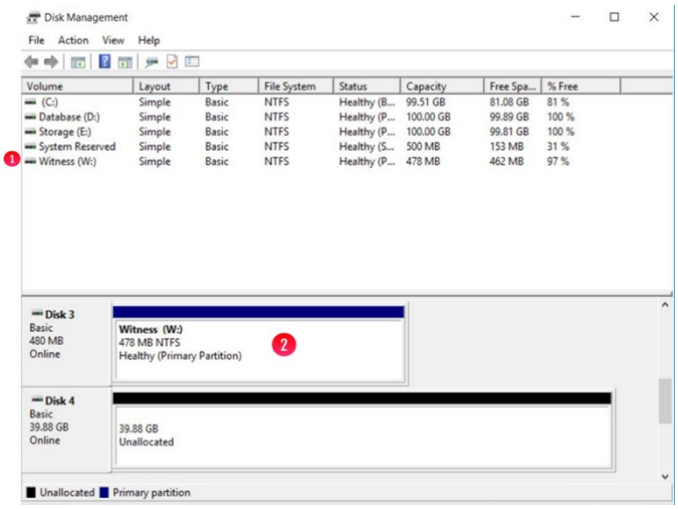
Step 13: Review the selected settings in the dialogue box (Figure 18.14.1). If they are correct then click the '**Finish**' button (Figure 18.14.2). If the settings are not correct, click the Back button and go back to the setting that needs to be corrected.

Figure 18.14 – Finish



Step 14: Review updates in the Disk Management console. Notice that the **Witness Disk** (Figure 18.15.1) is online and has a Healthy (Figure 18.15.2) status.

Figure 18.15 – Results



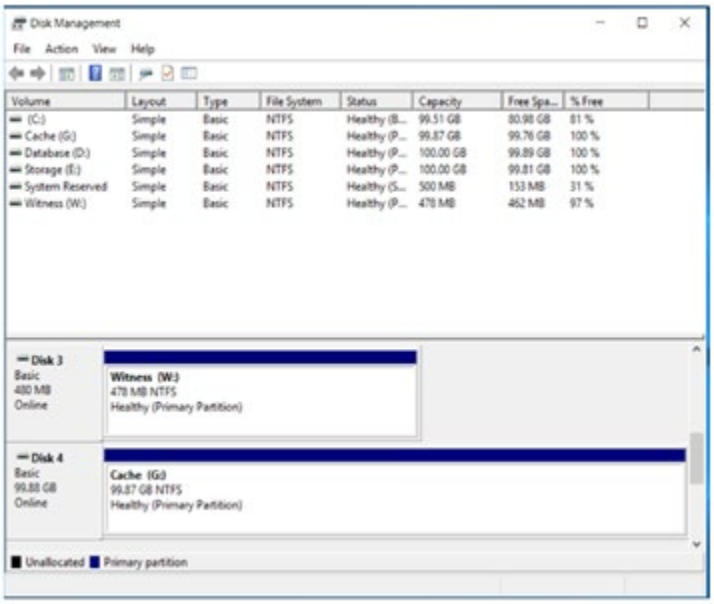
Step 15: Take the Witness disk offline by right-clicking in the "**Disk 3**" box and select "**Offline**".

Step 16: Repeat steps 4-15 for **Disk 4**, in Step 7, the disk size of a 100GB in ESXi will likely show as 98.88GB, using **G** for the drive letter in Step 11 and **Shared Cache** for the Volume Label in Step 12. Review the Disk Management window to make sure both drives are online and Healthy (Figure 18.16).

NOTE:

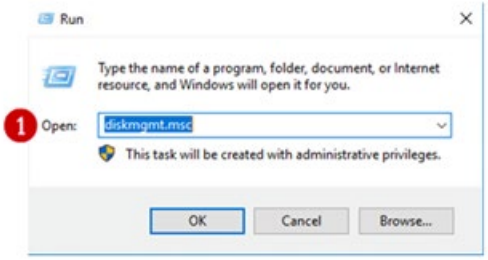
An NTFS Allocation Unit size of 32KB can be used in Step 12 in order to support a maximum volume size of 128TB for the cache drive.

Figure 18.16 – Results

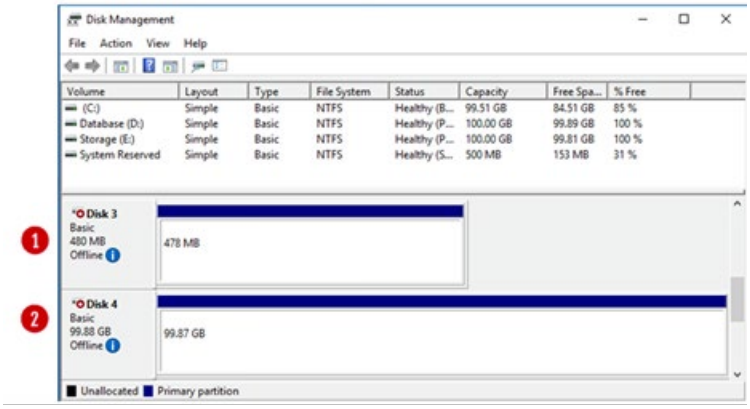


Step 17: Now that the disks have been added on Node 1, we can login into the Windows disk management on Node 2 and verify the disks are visible. **First**, login to the Windows Desktop on Node 2. Right-click on the Windows Start Menu located at the bottom left of the screen and enter '**Run**'. Click on the '**Run**' option under **Apps**. In the dialogue box following the '**Open:**' tag (Figure 18.17.1), enter '**diskmgmt.msc**' to access the Disk Manager.

Figure 18.17 – Windows Disk Management



Step 18: In the Disk Management window, scroll down to view that the two hard disks are visible (Figures 18.18.1 and 18.18.2). Note these disks are offline as they are controlled by Node 1.



Step 19: In the Disk Management window, right-click on **Disk 3** and change the disk to '**Online**'. The disk name will change to '**Witness**'. Right-click on **Disk 4** and change the disk to '**Online**'. The disk name will change to '**Shared Cache (E:)**'. Right-click again on **Disk 3** and change the drive letter to '**G:**'.

Step 20: In the Disk Management window, right-click on **Disk 3** and change the disk to '**Offline**'. The disk name '**Witness**' and status will no longer be visible. Right-click on **Disk 3** and change the disk to '**Offline**'. The disk name '**Shared Cache (G:)**' and status will no longer be visible.

Step 21: If necessary, expand the size of the database disk, drive **D:** Refer to **the VM Deployment Guide Chapter 2** for the details.

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