

Hitachi Content Platform Gateway Windows Cluster Setup with SAN Storage

v4.2.0

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

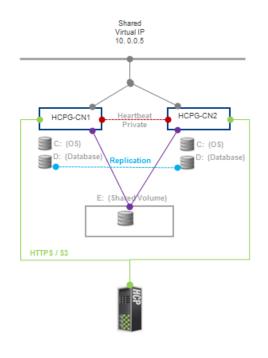
This document provides installation instruction on adding Windows Failover Clustering to two existing Hitachi Content Platform Gateway (HCP Gateway) instances that are identical. The document covers the installation of two HCP Gateway Virtual or Physical Machines using shared disks. Ensure that you have 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.

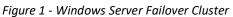
WARNING: The account being used to install the Cluster **must** have the ability to create a **cluster named object (CNO)**. Refer to the Microsoft Website <u>Configuring cluster accounts in Active Directory</u>, and follow the section titled: 'Steps for configuring the account for the person who installs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





Chapter 2 HCP and HCP Gateway Configuration

The first step is to 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.

→ - ↑ 論	« Svs	tem and Security > Administrative Tools >	~ 0	Search Adm	oinistrative Tools	Ø	Open file location
Ouick access		Name	Date modified	Туре	Size	^	Author
Desktop		Terminal Services	7/16/2016 7:23 AM	File folder			💎 Run as <u>a</u> dministrator
		n Cluster-Aware Updating	7/16/2016 7:20 AM	Shortcut	2 KB		Pin to Start
Downloads	A	Component Services	7/16/2016 7:18 AM	Shortcut	2 KB		7-Zip
Documents	*	Normal Computer Management	7/16/2016 7:18 AM	Shortcut	2 KB		CRC SHA
E Pictures	*	Defragment and Optimize Drives	7/16/2016 7:18 AM	Shortcut	2 KB		Edit with Notepad++
System32		Disk Cleanup	7/16/2016 7:19 AM	Shortcut	2 KB		Scan with Windows Defender
		Event Viewer	7/16/2016 7:18 AM	Shortcut	2 KB		Open with
This PC		Failover Cluster Manager	7/16/2016 7:20 AM	Shortcut	2 KB		
Cache (G:)		Sk iSCSI Initiator	7/16/2016 7:18 AM	Shortcut	2 KB		Pin to taskbar
		Local Security Policy	7/16/2016 7:19 AM	Shortcut	2 KB		Restore previous versions
Database (D:)		A Microsoft Azure Services	7/16/2016 7:19 AM	Shortcut	2 KB		
Storage (E:)		DDBC Data Sources (32-bit)	7/16/2016 7:18 AM	Shortcut	2 KB		Se <u>n</u> d to
		DDBC Data Sources (64-bit)	7/16/2016 7:18 AM	Shortcut	2 KB		Cut
Network		Performance Monitor	7/16/2016 7:18 AM	Shortcut	2 KB		Copy
		Print Management	7/16/2016 7:19 AM	Shortcut	2 KB		
		Sesource Monitor	7/16/2016 7:18 AM	Shortcut	2 KB		Create shortcut
		Server Manager	7/16/2016 7:19 AM	Shortcut	2 KB		Delete
	6	Services	7/16/2016 7:18 AM	Shortcut	2 KB		Rename
	•	System Starts, stops, and configures Wine	dows services. 7:18 AM	Shortcut	2 KB		
		2 System Information	7/16/2016 7:19 AM	Shortcut	2 KB		Properties

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

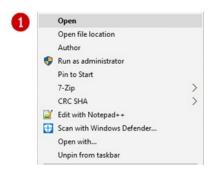


Figure 2.3 - Open Services

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

Figure 2.4 - Windows Services

🔍 Services					- 0	×
File Action View	Help					
♦ ♦ □ □ 0) 🕞 🛛 📷 🕨 🔲 II 🕩					
Services (Local)	Services (Local)					
	SAM VFS	Name	Description	Status	Startup Type	Log '
	Stop the service	Remote Desktop Services	Allows user Allows the r	Running Running	Manual Manual	Net Loc
	Restart the service	Remote Procedure Call (RPC)	The RPCSS In Windows	Running	Automatic Manual	Net Net
	Description: SAM VFS monitor	Remote Registry Resultant Set of Policy Provi	Enables rem		Automatic (T Manual	Loc Loc
		Routing and Remote Access	Offers routi		Disabled	Loc
		RPC Endpoint Mapper	Resolves RP	Running	Automatic	Net
		🖏 SAM VFS	SAM VFS m	Running	Manual	Loc

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.



Resume Restart

Figure 2.5 - Stop SAM VFS Service

Step 6: Change the HCP Gateway Configuration File. Open a Windows File Explorer, browse to the 'C:\SAM\etc\sam' (Figure 2.6.1) folder.

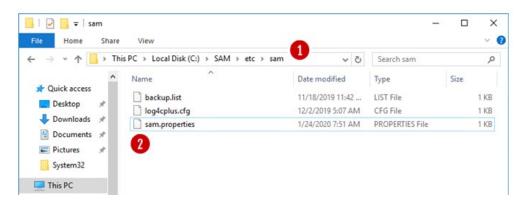


Figure 2.6 - Find properties file

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

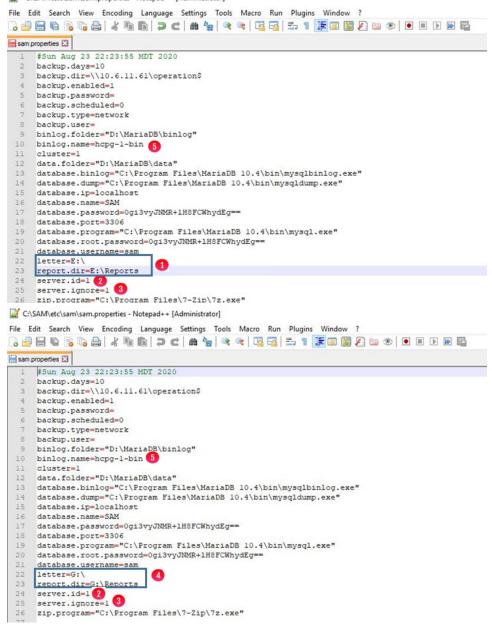
Figure 2.7 - Edit with Notepad++



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.properties file and exit Notepad++.

Figure 2.8 - Edit sam.properties Files

*C:\SAM\etc\sam\sam.properties - Notepad++ [Administrator]

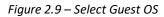


Step 9: Leave the SAM service not running.

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.

Microsoft Windows Server 2 ESXi 6.0 virtual machine Yes	Power Guest OS
4 8 GB	i Snapshotsi € Console
	👸 Autostart 🕠
	📇 Upgrade VM Compatibility
	🙀 Export
	😝 Export With Images
	👸 Edit settings
	& Permissions
out a newer version is available on t	ig Edit notes
	🔊 Rename
	Answer question
	🖧 Delete
Consumed host CPU ORE Consumed host memory	Help
	🛅 Open in a new window



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



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.

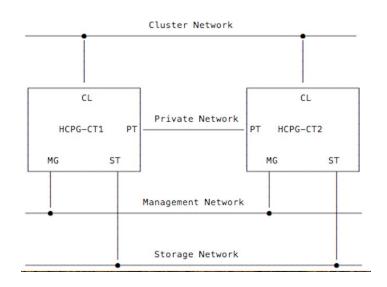
Step 13: A backup namespace must be created that the HCPG will use to store backups of the HCP Gateway configuration and database. No user data will be stored on this namespace. The share name for the backup namespace is required to be 'operation\$', which is a hidden share. Refer to the HCP

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.





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

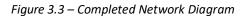
A. Management Interface Assignments

	IP Address	<u>Netmask</u>	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

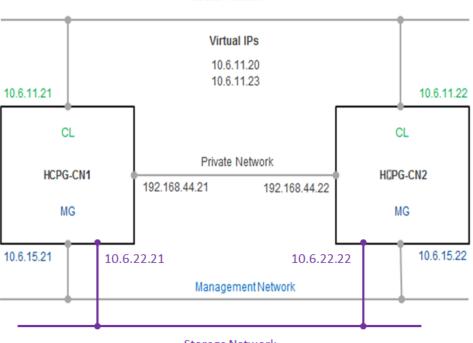
B. Cluster Interface Assignments

		IP Address	<u>Netmask</u>	<u>Gateway</u>
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
	erface Assignments	IP Address	<u>Netmask</u>	<u>Gateway</u>
hcpg-p1	Node 1 Private	192.168.44.21	255.255.240.0	N/A
hcpg-p2	Node 2 Private	100 100 44 00	255 255 240 0	NI / A
	Node 21 mate	192.168.44.22	255.255.240.0	N/A
D. Storage In	terface Assignments			
C	terface Assignments	<u>IP Address</u> 10.6.22.21	<u>Netmask</u> 255.255.255.0	Gateway 10.6.0.1
D. Storage In hcpg-s1 hcpg-s2		IP Address	<u>Netmask</u>	Gateway

Completed Network Diagram with IP Addresses



Cluster Network



Storage Network

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	
HCPG-CN1 Host (A) 10	.6.15.21
HCPG-CL1 Host (A) 10	.6.11.21
HCPG-CN2 Host (A) 10	.6.15.22
HCPG-CL2 Host (A) 10	.6.11.22
HCPG-CL Host (A) 10	.6.11.20

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.

Figure 5.1 – View Network Adapters

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.

SCSI Controller 0	LSI Logic SAS	~	8
SCSI Controller 1	VMware Paravirtual	~	0
SATA Controller 0			0
USB controller 1		~	0
Network Adapter 1	VM Network	Connect	0
Network Adapter 2	HCP Private Network	✓ ✓ Connect	0
Network Adapter 3	VM Network	V Connect	1
Network Adapter 4	HCP Private Network	V Connect	0
S CD/DVD Drive 1	Host device	→ Connect	0
Video Card	Default settings	~	

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

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

12

Network Adapter 1	VM Network	1 v Connect	0
Metwork Adapter 2	HCP Private Network	2 V Connect	0
Network Adapter 3	VM Network	3 🗸 🗹 Connect	0
Network Adapter 4	HCP Private Network	4 V Connect	0
S CD/DVD Drive 1	Host device	✓ □ Connect	0
Video Card	Default settings	~	

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
--------------	-----------	---------	----------	-----------

	VM Network	1 ~	Connect	0
Network Adapter 2	HCP Private Network	2 ~	Connect	0
Network Adapter 3	VM Network	3 ~	Connect	0
Network Adapter 4	HCP Private Network	4~	Connect	0
S CD/DVD Drive 1	Host device	~	Connect	0
Video Card	Default settings	~		

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.

 Metwork Adapter 1 	VM Network	~	0
Status	Connect at power on		
Adapter Type	E1000e	~ 2	
MAC Address	E1000e		
	SR-IOV passthrough		
	VMXNET 3 3		4

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).

ACAddress		Name	NetConnectionI
	_	Microsoft Kernel Debug Network Adapter	
0:0C:29:65			Management
0:0C:29:65	68:1F	Intel(R) 82574L Gigabit Network Connection #3	Cluster
0:0C:29:65	68:15	Intel(R) 82574L Gigabit Network Connection #2	Private
	1000	WAN Miniport (SSTP)	
		WAN Miniport (IKEv2)	
		WAN Miniport (L2TP)	
		WAN Miniport (PPTP)	
		WAN Miniport (PPPOE)	
		WAN Miniport (GRE)	
6:72:20:52	41.53	WAN Miniport (IP)	
8:DC:20:52	and the second se	WAN Miniport (IPv6)	
C:3E:20:52		WAN Miniport (Network Monitor)	
2:E6:17:5A			
		Microsoft Failover Cluster Virtual Adapter	C
0:0C:29:65	68:29	Intel(R) 82574L Gigabit Network Connection #4	Storage
	2	• · · · · · · · · · · · · · · · · · · ·	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.

Network Adapter 1	VM Network V
Status	Connect at power on
Adapter Type	E1000e ~
MAC Address	Automatic 🗸 00:0c:29:65:68:0b 1
Mill Network Adapter 2	HCP S1 Private Network
Status	Connect at power on
Adapter Type	E1000e ~
MAC Address	Automatic ~ 00:0c:29:65:68:15 (2)
Network Adapter 3	HCP Private Network
Status	Connect at power on
Adapter Type	E1000e 🗸
MAC Address	Automatic 🗸 00.0c:29.65.68.1f 3
Network Adapter 4	HCP S2 Private Network ~
Status	Connect at power on
Adapter Type	E1000e ~
MAC Address	Automatic ~ 00.0c 29.65.68.29

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

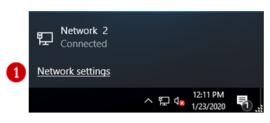
Step 1: From the Node 1 desktop, access the Windows network interfaces by clicking the icon with the image of a plug (Figure 6.1) in the windows taskbar.

Figure 6.1 – Network Interfaces

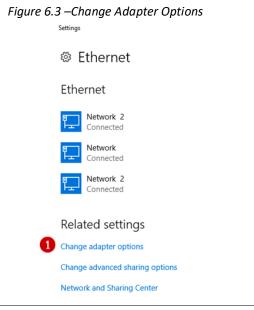


Step 2: In the pop-up menu, select '*Network Settings*' (Figure 6.2.1). Note for Windows 2019, the option to select is '*Network & Internet Settings*'.

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).



HCP Gateway Windows Cluster Setup with SAN Storage



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).

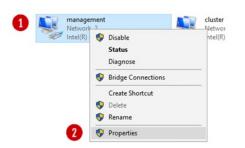


Figure 6.5 – Interfaces after Name changes

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

	sing:			
Intel		aigabit Network Con	nection	
-				
			Cont	figure
This conne	ection uses th	e following items:		
🗹 🏪 O	lient for Micro	soft Networks		^
🗹 🏆 Fi	le and Printer	r Sharing for Microso	ft Networks	
🗹 🖳 Q	oS Packet Se	cheduler		
	ternet Protoc	ol Version 4 (TCP/II	Pv4)	
🗆 🔔 N	icrosoft Netw	vork Adapter Multiple	the second se	
		and the second	the second se	
🗹 🔟 N	licrosoft LLDF	vork Adapter Multiple	exor Protocol	~
🗹 🔟 N	licrosoft LLDF	vork Adapter Multiple P Protocol Driver	exor Protocol	>
	licrosoft LLDF ternet Protoc	vork Adapter Multiple P Protocol Driver	exor Protocol Pv6)	> erties
⊻ _ N ⊻ _ In <	licrosoft LLDF ternet Protoc	vork Adapter Multiple P Protocol Driver col Version 6 (TCP/II	exor Protocol Pv6)	
✓ M ✓ Inst Descripti	licrosoft LLDF itemet Protoc all	vork Adapter Multiple P Protocol Driver col Version 6 (TCP/II	exor Protocol Pv6) Prop	erties
Inst Descripti Transmi wide are	licrosoft LLDF itemet Protoc all on ssion Control sa network pr	vork Adapter Multiple P Protocol Driver col Version 6 (TCP/II Uninstall	exor Protocol Pv6) Prop prop	erties lefault

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).

	Internet Protocol Version 4 (TCP/IPv4	4) Properties	×
	General		
	You can get IP settings assigned auto this capability. Otherwise, you need t for the appropriate IP settings.		
	Obtain an IP address automatica	ally	
1	• Use the following IP address:		
-	IP address:	10 . 6 . 15 . 21	
	Subnet mask:	255.255.0.0	
	Default gateway:	10 . 6 . 0 . 1	
	Obtain DNS server address auto	matically	
2	• Use the following DNS server ad	dresses:	
-	Preferred DNS server:	10 . 6 . 2 . 21	
	Alternate DNS server:	8.8.8.8	
	Validate settings upon exit	3 Advanced	
		OK Cancel	
		4	

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).

IP addresse	NS V			
IP addres 10.6.15.			Subnet mask 255.255.0.0	
		Add	Edit	Remove
Default gat	eways:			
Gateway			Metric	
10.6.0.1			Automatic	
		Add	Edit	Remove
Automat		1	2	
and idue in	inclusion.	L*		

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).

Administrator: Command Pro		
Microsoft Windows [Versi	oration. All rights reserved.	
• •		
C:\Users\Administrator>s	et devmgr_show_nonpresent_devices=1 🕐	
C:\Users\Administrator>c		
c. (osers (Administrator)	-	
C:\Users\Administrator>	d Device Manager	
	File Action View Help	
	4 ✓	1
	Intel(R) 82574L Gigabit Network Connection	
	Intel(R) 82574L Gigabit Network Connection #2	
	Intel(R) 82574L Gigabit Network Connection #3	
	Intel(R) 82574L Gigabit Network Connection #4 WAN Miniport (GRE)	
	WAN Miniport (IKEv2)	
	WAN Miniport (IP)	6
	WAN Miniport (IPv6)	•
	WAN Miniport (L2TP)	
	WAN Miniport (Network Monitor)	
	WAN Miniport (PPPOE)	
	WAN Miniport (PPTP)	
	WAN Miniport (SSTP)	I
	> Portable Devices	

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'

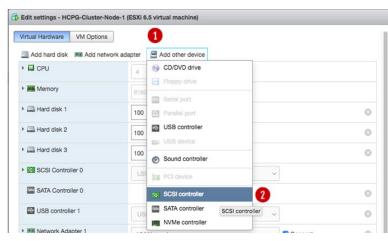


Figure 7.1 – Add SCSI Controller

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

VM Options			
Add hard disk 🛤 Add netwo	rk adapter 🛛 🔚 /	Add other device	
CPU	4 ~	0	
Memory	8192	MB ~	
Hard disk 1	100	GB ~	0
Hard disk 2	100	GB ~	0
Hard disk 3	100	GB ~	8
SCSI Controller 0	LSI Logic	sas ~	
New SCSI Controller	LSI Logic	SAS	

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.

Sharing' to 'Virtu	ıal'		
	Figure 7.3 – Virtual SCS	I Controller	
New SCSI Controller	VMware Paravirtual	~ 1	
SCSI Bus Sharing	Physical	~ 2	~

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

Virtual Hardware	VM Options		
Add hard disk	M Add network ad	apter 🗧 Add other device	
+ CPU Add a h	ard disk to virtual mac	hine 🧹 🍈	

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

Figure 7.5 – Add Disk

Virtual Hardware VM Options		
Add hard disk 🛤 Add network	adapter 🚍 Add other device	
New standard hard disk	4	
Existing hard disk New standa		
New persistent memory disk	8192 MB V	

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

And And And And And And And And And	Hard disk 3	100	GB v	0
40			MB	
	New Hard disk	40		0
			ТВ	

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).

Location	[datastore1] HCPG-Cluster-Node-1/	Browse 1

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

Figure 7.9 – Change Disk Provisioning

Disk Provisioning	 Thin provisioned Thick provisioned, lazily zeroed
	1 O Thick provisioned, eagerly zeroed

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

Controller location	SCSI controller 1	~	SCSI (1:0)	~

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

Independent - persistent V

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

Figure 7.12 – Change Sharing

Sharing	Multi-writer sharing	~
	Multi-Writer Sharing	- ¥ -

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

Rew Hard disk	512 MB ~	0
Maximum Size	30.7 TB	
Location	[datastore1] HCPG-Cluster-Node-1/ Browse	
Disk Provisioning	 Thin provisioned Thick provisioned, lazily zeroed Thick provisioned, eagerly zeroed 	
Shares	Normal V 1000 V	
Limit - IOPs	Unlimited ~	
Controller location	SCSI controller 1 V SCSI (1:0) V	
Disk mode	Independent - persistent	
Sharing	Multi-writer sharing ~	

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 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.

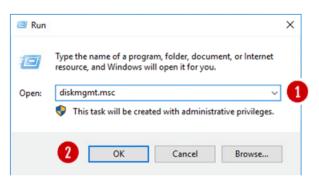


Figure 7.14 – Run Disk Management

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.

You must initialize a disk before Logical Disk Mar	nager can access it.
Select disks:	
✓ Disk 2 ✓ Disk 3	
Use the following partition style for the selected of	disks:
MBR (Master Boot Record)	
GPT (GUID Partition Table)	
Note: The GPT partition style is not recognized b Windows	y all previous versions of

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.



Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	99.51 GB	84.50 GB	85 %	
 Database (D:) 	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.89 GB	100 %	
- Storage (E:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.81 GB	100 %	
- System Reserved	Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
*O Disk 2 Unknown 512 MB	512 MB							
Unknown	512 MB Unallocated							

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

Figure 7.17 – Set Disk Online
Online
Properties
Help

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

*O Disk 2 Unknown 512 MB Not Initialized	512 MB Unallocated
ODisk 3 Unknown 100.00 GB Offline	100.00 GB Unallocated
Unallocate	d Primary partition

Figure 7.19 – Initialize Disk

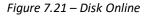


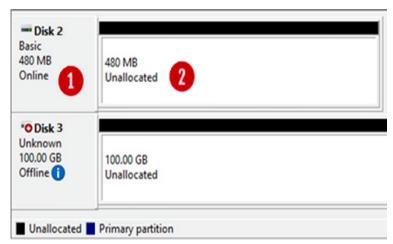
Step 16: From the **Initialize Disk** menu select the drive (Figure 7.20.1). Use **GPT** partition style (Figure 7.20.2). Then click the '*OK'* button to start the initialize process.

Figure 7.20 – Initialize Disk Configuration

You must initialize a disk before Lo	gical Disk Manager can access	it.
Select disks:		
Disk 2		
Use the following partition style for	the selected disks:	
O MBR (Master Boot Record)		
GPT (GUID Partition Table)		
Note: The GPT partition style is no Windows.	t recognized by all previous ver	sions of

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.





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

- Disk 2 Basic	24/////////////////////////////////////		Â
480 MB 1	480 MB Unallocated	New Simple Volume 2	
Onnie	Unallocated	New Spanned Volume	
		New Striped Volume	
*O Disk 3 Unknown		New Mirrored Volume	
100.00 GB	100.00 GB	New RAID-5 Volume	
Offline 🚺	Unallocated	Properties	
	<u></u>	Help	

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

Welcome to the New Simple Volume Wizard
This wizard helps you create a simple volume on a disk. A simple volume can only be on a single disk. To continue, click Next.
< Back Next > Cancel

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 1	7.24 –	Set Vo	lume	Size
----------	--------	--------	------	------

ew Simple Volume Wizard	>
Specify Volume Size Choose a volume size that is betwee	en the maximum and minimum sizes.
Maximum disk space in MB:	478
Minimum disk space in MB:	8
Simple volume size in MB:	578 🔁 1
	2
	< Back Next > Cancel

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.

0	Assign the following d	rive letter:	E	\checkmark	
0	Mount in the following	empty NTFS folder:	Browse		
1 01	Do not assign a drive	letter or drive path			

- 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.

Format Partitie To store dat		u must format it first.		
Choose whe	ther you want to for	nat this volume, and if	so, what settings you	want to use.
O Do no	t format this volume			
1 Forma	at this volume with th	e following settings:		
File	system:	NTFS	\sim	
Alk	cation unit size:	Default	\sim	
Vol	ume label:	Witness	2	
3	Perform a quick form	at		
	Enable file and folde	r compression		
			4	

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.



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

Þ 🔿 🕅 🖬 🖬	1 🗩 🖌 🛛	<u> </u>						
/olume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	89.40 GB	67.03 GB	75 %	
(Disk 0 partition 1)	Simple	Basic		Healthy (R	499 MB	499 MB	100 %	
(Disk 0 partition 2)	Simple	Basic		Healthy (E	99 MB	99 MB	100 %	
Database (D:)	Simple	Basic	NTFS	Healthy (P	39.98 GB	39.79 GB	100 %	
Witness 🚺	Simple	Basic	NTFS	Healthy (P	494 MB	478 MB	97 %	
496 MB 49	itness 4 MB NTFS ealthy (Prima	2 ry Partition)						

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).

Volume	Layout	Type	File System	Status	Capacity	Free Spa	% Free	1	
(C:) (Disk 0 partitio	Simple	Basic Rasic	NTFS	Healthy (B Healthy (R	89.40 GB 499 MB	67.03 GB 499 MB	75 % 100 %		
 (Disk 0 part Database (E Witness 	New Spanned New Striped Vo New Mirrored New RAID-5 Vo	olume Volume		Healthy (E Healthy (P Healthy (P	39.98 GB	99 MB 39.79 GB 478 MB	100 % 100 % 97 %		
	Convert to Dyn Convert to MB								
	Offline 2								
	Properties								_
- Disk 2	Help								
Basic 496 MB 1 Online	Witness 494 MB NTFS Healthy (Prima	ry Partition)			•				
ODisk 3 Basic 99.98 GB Offline	99.98 GB Unallocated								-

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)

🕨 🔿 🕅 🕅	🛅 🏓 🗹 🛙	52						
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
(C:) (Disk 0 partition		Basic Basic	NTFS	Healthy (B Healthy (R		67.03 GB 499 MB	75 % 100 %	
 Disk 0 partition Database (D:) 	2) Simple Simple	Basic Basic	NTFS	Healthy (E Healthy (P		99 MB 39.79 GB	100 % 100 %	
*O Disk 2 Basic 496 MB Offline	494 MB							

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

rtual Hardware VM Options		
Add hard disk 🛤 Add netw	ork adapter 🗧 Add other device 🚺	
CPU	4 \checkmark (i) Add other hardware to this virtual ma	achine
Memory	8192 MB ~	

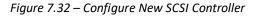
Step 2: In the menu selection scroll down and select 'SCSI controller' (Figure 7.31.1)

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'



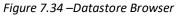
New SCSI Controller	VMware Paravirtual	~]	
SCSI Bus Sharing	Physical	√] 2	~
		3 Sav	e Cancel

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

Virtual Hardware	VM Options				
Add hard disk	Add network	adapter 🔚 A	dd other devid	e	
New standard	d hard disk	4 ~	0		
Existing hard	disk				
A New persist	xisting hard disk	8192	MB	~	
New raw disk	(100	GB	~	

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.





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

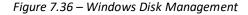
HCP Gateway Windows Cluster Setup with SAN Storage 36

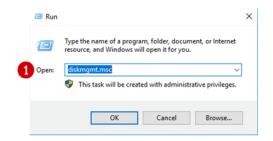
location will change to 'SCSI (1:0)'. Change the Disk Mode setting from 'Dependent' to 'Independent - persistent' (Figure 7.35.3). Then click the 'Save' button (Figure 7.35.4) to exit the Windows settings. Then click 'Edit' on the node again, click the right-arrow on 'Hard Disk 3' and change the 'Sharing' 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 (1:1)'. This disk will be Hard Disk 4 in the ESXi settings.

New Hard disk	1 GB ~
Maximum Size	0 B
Туре	Thick provisioned, lazily zeroed
Disk File	1 [datastore1] HCPG-Cluster-Node-1/HCPG-Cluster-Node-1_3.vmdk
Shares	Normal ~ 1000 ~
Limit - IOPs	Unlimited ~
Controller location	2 SCSI controller 1 ~ SCSI (1:0) ~
Disk mode	3 Independent - persistent ~
Sharing	5 Multi-writer sharing ~
	() Disk sharing is only possible with eagerly zeroed, thick provisioned disks.

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 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.





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.

🕨 🔿 🕅 🕅 🕅								
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	89.40 GB	67.03 GB	75 %	
 (Disk 0 partition 		Basic		Healthy (R		499 MB	100 %	
 (Disk 0 partition) 		Basic		Healthy (E		99 MB	100 %	
 Database (D:) 	Simple	Basic	NTFS	Healthy (P	39.98 GB	39.79 GB	100 %	
*O Disk 2 Basic 496 MB Offline	494 MB							

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).

de ed 📰 😰	🗊 🗩 🗙	2 🔒 👂 🛛	5::					
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	89.40 GB	67.37 GB	75 %	
 (Disk 0 partition 	1) Simple	Basic		Healthy (R	499 MB	499 MB	100 %	
 (Disk 0 partition 	2) Simple	Basic		Healthy (E	99 MB	99 MB	100 %	
- Database (D:)	Simple	Basic	NTFS	Healthy (P	39.98 GB	39.79 GB	100 %	
- Shared Cache (0	G:) Simple	Basic	NTFS	Healthy (P	99.98 GB	99.89 GB	100 %	
- Witness	Simple	Basic	NTFS	Healthy (P	494 MB	478 MB	97 %	
	1				4		_	
= Disk 2 Basic 496 MB Online	Witness 494 MB NTFS Healthy (Prima	ry Partition)						,

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

 ■ 	🗊 🗩 🗹 I	2						
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	89.40 GB	67.37 GB	75 %	
(Disk 0 partition)		Basic		Healthy (R		499 MB	100 %	
(Disk 0 partition)		Basic		Healthy (E		99 MB	100 %	
 Database (D:) 	Simple	Basic	NTFS	Healthy (P	39.98 GB	39.79 GB	100 %	
*ODisk 2 Basic 496 MB	494 MB							

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

Unallocated Primary partition

40

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).

-> · · · 🛪	> Qu	iick access		- C	Search Quick access	Q		
		🔜 System						;
🖈 Quick access		T	anel > System and Security > Sy	stem	ڻ ~	Search Control Pan	el	
Desktop	*		ine i system in second i sy					
Downloads Documents	*	Control Panel Home	View basic information	about your computer				
Pictures	*	Device Manager	Windows edition					
This PC		Remote settings	Windows Server 2019 Stan					
-		Advanced system settings	© 2018 Microsoft Corporat	tion. All rights reserved.	Wi	ndows Server* 2	2019	
Database (D:)								
Network			System					
			Processor:	Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz 2.19 GHz (4 process	ors)			
			Installed memory (RAM):	8.00 GB				
			System type:	64-bit Operating System, x64-based processor				
			Pen and Touch:	Pen and Touch Support with 10 Touch Points				
			Computer name, domain, and	workgroup settings				
			Computer name:	HCPG-CN1			hange sett	in
			Full computer name:	HCPG-CN1			3	ſ
			Computer description:					
			Workgroup:	CLUSTER				
			Windows activation					
			Windows is not activated.	Read the Microsoft Software License Terms				
			Product ID: 00429-00000-0	0001-04815		(DAC	tivate Win	de

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 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 welcoming 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.

Computer Name/Dom	ain Changes		
You must r these chan	estart your computer to apply ges		
Before restarti programs.	ng, save any open files and close all		
	ОК		
System Properties	1	K Charles Char	
Computer Name Hardw	are Advanced Remote		
naide			
Windows use	s the following information to identify your computer		
	n.	Computer Name/Domain Changes	X
Computer description:			
	For example: "IIS Production Server" or "Accounting Server".	You can change the name and the membership of computer. Changes might affect access to network	
Full computer name:	HCPG-CN1	comparer. Changes might area access to network	resources.
Workgroup:	CLUSTER		
Workgroup.	(2)	Computer name:	
	r or change its domain or Change	HCPG-CN1 3	
workgroup, click Chang	e.	Full computer name:	
		HCPG-CN1	
			More
		Member of	
		5 Domain:	
		dts-evlab.com 6	
		O Workgroup:	
		CLUSTER	
	OK Creat		
	OK Cancel Apply	4 ок	Cancel

Figure 8.2 – Computer Name/Domain Name



×
ter to apply these
nd close all programs.
Restart Later
TS-EVLAB

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).

🖸 📕 ╤ Administrativ Ie Home Share	e Tools View					- 0	×
	I Panel > System and Security > Administrative	Tools >			√ Ū	Search Administrative Tools	Q
^	Name	Date modified	Туре	Size			
🖈 Quick access	Terminal Services	7/16/2016 7:23 AM	File folder				
🔜 Desktop 🛛 🖈	Cluster-Aware Updating	7/16/2016 7:20 AM	Shortcut	2 KB			
🕹 Downloads 🛛 🖈	Component Services	7/16/2016 7:18 AM	Shortcut	2 KB			
🔮 Documents 🛛 🖈	👷 Computer Management	7/16/2016 7:18 AM	Shortcut	2 KB			
20200907	befragment and Optimize Drives	7/16/2016 7:18 AM	Shortcut	2 KB			
Folder with Space at	🔚 Disk Cleanup	7/16/2016 7:19 AM	Shortcut	2 KB			
log	🛃 Event Viewer	7/16/2016 7:18 AM	Shortcut	2 KB			
Temp	腸 Failover Cluster Manager 👔	7/16/2016 7:20 AM	Shortcut	2 KB			
- remp	👧 iSCSI Initiator	7/16/2016 7:18 AM	Shortcut	2 KB			
This PC	🚠 Local Security Policy	7/16/2016 7:19 AM	Shortcut	2 KB			
Desktop	🌮 Microsoft Azure Services	7/16/2016 7:19 AM	Shortcut	2 KB			
Documents	📷 ODBC Data Sources (32-bit)	7/16/2016 7:18 AM	Shortcut	2 KB			
Downloads	📷 ODBC Data Sources (64-bit)	7/16/2016 7:18 AM	Shortcut	2 KB			
Music	🔊 Performance Monitor	7/16/2016 7:18 AM	Shortcut	2 KB			
Pictures	🔚 Print Management	7/16/2016 7:19 AM	Shortcut	2 KB			
	🔊 Resource Monitor	7/16/2016 7:18 AM	Shortcut	2 KB			
📕 Videos	🏊 Server Manager	7/16/2016 7:19 AM	Shortcut	2 KB			
🏪 Local Disk (C:)	🙈 Services	3/30/2020 11:31 PM	Shortcut	2 KB			
👝 New Volume (D:)	🔛 System Configuration	7/16/2016 7:18 AM	Shortcut	2 KB			
👝 New Volume (E:)	🥺 System Information	7/16/2016 7:19 AM	Shortcut	2 KB			
素 test2 (\\localhost) (Y	😥 Task Scheduler	7/16/2016 7:18 AM	Shortcut	2 KB			
🛖 sam (\\192.168.40.91	🔗 Windows Firewall with Advanced Security	7/16/2016 7:18 AM	Shortcut	2 KB			
items	🗊 Windows Memory Diagnostic	7/16/2016 7:19 AM	Shortcut	2 KB			BEE

Figure 9.2 – Windows Control Panel

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

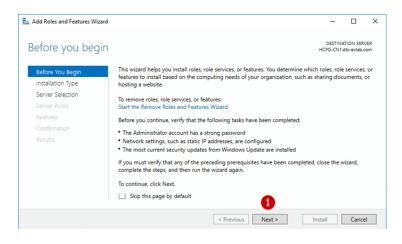
Server Manager Method

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).



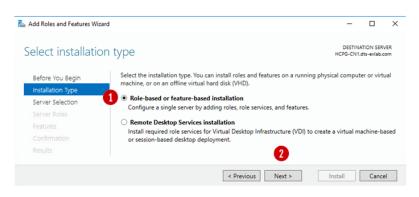
Step 2: Press 'Next' (Figure 9.4.1) on the 'Before you begin' window

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).

Select destination	on convor				ATION SER	
Select destination	UT SEI VEI			HCPG-CN1	.dts-evlab.	com
Before You Begin	Select a server or a vi	irtual hard disk on which	n to install roles and features.			
Installation Type	Select a server from the se	om the server pool				
Server Selection	O Select a virtual ha	ird disk				
Server Roles	Server Pool					
Features						
	Filter:					_
	Name	IP Address	Operating System			
	2 HCPG-CN1.dts-evial	b.com 10.6.11.21,10.6	Microsoft Windows Serve	er 2016 Standard		
	1 Computer(s) found					_
	This page shows serv and that have been a	ers that are running Wi dded by using the Add	ndows Server 2012 or a newe Servers command in Server M tion is still incomplete are not	Aanager. Offline		
			evious Next >	Install	Canc	

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

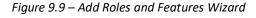
elect server ro	oles	DESTINATION SERVER HCPG-CN1.dts-evlab.com
Before You Begin Installation Type	Select one or more roles to install on the selected server. Roles	Description
Server Selection	Active Directory Certificate Services	Active Directory Certificate Services (AD CS) is used to create
Features Confirmation Results	Active Directory Federation Services Active Directory Lightweight Directory Services Active Directory Rights Management Services Device Health Attestation DHCP Server DNS Server Fax Server Fax Server File and Storage Services (2 of 12 installed) Host Guardian Service Hyper-V	certification authorities and related role services that allow you to issue and manage certificates used in a variety of applications.
	< Previous Next	> Install Cancel

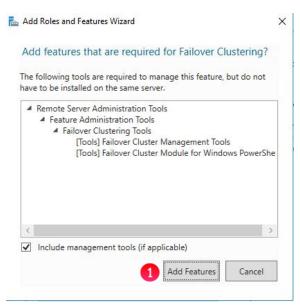
Step 6: In the 'Select features' window, click the "Failover Clustering" box (Figure 9.8.1).

DESTINATION SERVER Select features Select one or more features to install on the selected server Before You Begin Installation Type Features Description Server Selection .NET Framework 3.5 combines the power of the .NET Framework 2.0 INET Framework 3.5 Features INET Framework 4.6 Features (2 of 7 installed) Background Intelligent Transfer Service (BITS) Server Roles APIs with new technologies for building applications that offer appealing user interfaces, protect BitLocker Drive Encryption BitLocker Network Unlock BranchCache Client for NFS your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of Containers Data Center Bridging Direct Play Enhanced Storage business processes. Failover Clustering Group Policy Management I/O Quality of Service IIS Hostable Web Core Internet Printing Client IP Address Management (IPAM) Server ISNS Server service < Previous Next > Install Cancel

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)





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)

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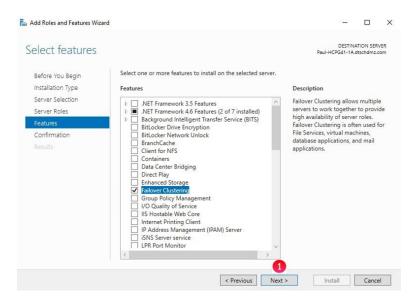


Figure 9.10 – Select Features

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

Figure 9.11 – Confirm Selections

Add Roles and Features Wiz				
Confirm installa	tion selections	DESTIN HCPG-CN1	ATION SER	
Before You Begin	To install the following roles, role services, or features on selected server	, click Install.		
Installation Type	Restart the destination server automatically if required			
Server Selection	Optional features (such as administration tools) might be displayed on t			
Server Roles	been selected automatically. If you do not want to install these optional their check boxes.	features, click Prev	vious to c	lea
Features				
Confirmation	Failover Clustering			
Results	Remote Server Administration Tools			
	Feature Administration Tools			
	Failover Clustering Tools Failover Cluster Management Tools			
	Failover Cluster Module for Windows PowerShell			
	Export configuration settings			
	Specify an alternate source path			
	< Previous Next >	Install	Canc	-1

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).

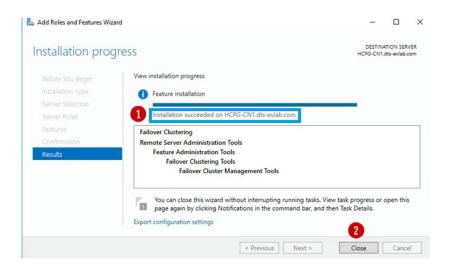


Figure 9.12 – Installation a Success

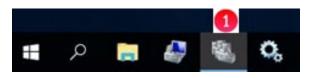
Step 11: Repeat the 'Adding the Failover Cluster Software Server Manager Method' steps 1-10 for Node 2.

Chapter 10 Validating the Nodes are Cluster Ready

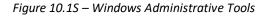
Step 1: Login to Node 1.

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).





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

File Home	Share	View				×
- → ~ ↑ 🗟	« Sys	tem and Security > Administrative Tools >	~	ර් Search Adm	inistrative Tools	P
		Name	Date modified	Туре	Size	
A Quick access		Terminal Services	7/16/2016 7:23 AM	File folder		
Desktop	A	🔂 Cluster-Aware Updating	7/16/2016 7:20 AM	Shortcut	2 KB	
Downloads	*	Se Component Services	7/16/2016 7:18 AM	Shortcut	2 KB	
Documents	*	Computer Management	7/16/2016 7:18 AM	Shortcut	2 KB	
E Pictures	*	Defragment and Optimize Drives	7/16/2016 7:18 AM	Shortcut	2 KB	
This PC		🔚 Disk Cleanup	7/16/2016 7:19 AM	Shortcut	2 KB	
Inis PC		🛃 Event Viewer	7/16/2016 7:18 AM	Shortcut	2 KB	
👝 Database (D:)	1	Failover Cluster Manager	7/16/2016 7:20 AM	Shortcut	2 KB	
Channes (E.)	-	Manages Windows Failover Clusters	7/16/2016 7:18 AM	Shortcut	2 KB	
Storage (E:)		Local Security Policy	7/16/2016 7:19 AM	Shortcut	2 KB	

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).

= => 🔃	?		
E Failover	Validate Configuration	er Manager	Actions
1	Create Cluster	ailover clusters, validate hardware for potential failover clusters, and	Failover Cluster Man
-	Connect to Cluster	configuration changes to your failover clusters.	Validate Configu
	View	iGW er is a set of independent computers that work together to increase the enver roles. The clustered servers (called nodes) are connected by and by software. If one of the nodes fails, another node begins to is. This process is known as failover.	Create Cluster
			Connect to Clus
	Refresh		View
	Properties		Refresh
	Help		Properties
			Help

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

💐 Validate a Confi	guration Wizard	×
Before Y	You Begin	
Before You Begin Select Servers or a Cluster Testing Options Confirmation Validating Summary	This wizard runs validation tests to determine whether this configuration of servers and attached storage is set up correctly to support failover. A cluster solution is supported by Microsoft only if the complete configuration (servers, network, and storage) passes all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2016." If you want to validate a set of unclustered servers, you need to know the names of the servers. Important: the storage connected to the selected servers will be unavailable during validation tests. If you want to validate an existing failover cluster, you need to know the name of the cluster or one of its nodes.	
	You must be a local administrator on each of the servers that you want to validate. To continue, click Next. More about cluster validation tests Do not show this page again Next > Cancel]

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

Select S	Servers or a Cluste	er	
Before You Begin Select Servers or a Cluster		ervers, add the names of all the servers. Ister, add the name of the cluster or one of its node:	5.
Testing Options Confirmation Validating	Enter name: Selected servers:	hcpg-cn1 hcpg-cn2	Browse Add
Summary			Remove

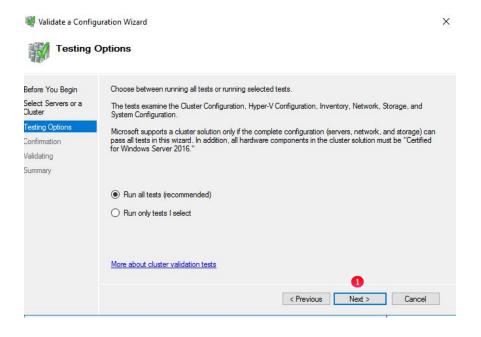
Step 6: After pressing 'Add' the Cluster wizard will validate that the selected servers have valid DNS entries (Figure 10.6.1) and display them in the dialog box. Press the '*Next*' button (Figure 10.6.2).

Validate a Config	guration Wizard	er	×
Before You Begin Select Servers or a Cluster		rvers, add the names of all the servers. ster, add the name of the cluster or one of its nodes.	
Testing Options Confirmation Validating Summary	Enter name: Selected servers:	hcpg-cn1 hcpg-cn2 HCPG-CN1.dts-evlab.com HCPG-CN2.dts-evlab.com	Browse Add Remove
			2 ext > Cancel

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
--------	-------	---------	-------



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

Select S	Servers or a Cluster		
Before You Begin Select Servers or a Sluster	You are ready to start validation. Please confirm that the following settings are correct:		
Testing Options	Servers to Test		^
Confirmation	HCPG-CN1.dts-evlab.com		
/alidating	HCPG-CN2.dts-evlab.com		
ummary	Tests Selected by the User	Category	
	List Fibre Channel Host Bus Adapters	Inventory	
	List iSCSI Host Bus Adapters	Inventory	
	List SAS Host Bus Adapters	Inventory	
	List BIOS Information	Inventory	~
	To continue, click Next.	0	

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'.

Validate a Conf	iguration Wizard		0
Summa	ry		
fore You Begin lect Servers or a	Testing has completed for the tests you selected. You shou cluster solution is supported by Microsoft only if you run all of		. A
iect Servers or a ister	succeed (with or without warnings).		_
sting Options	Node		^
nfirmation	HCPG-CN1.dts-evlab.com	Validated	
idating	HCPG-CN2.dts-evlab.com	Validated	
mmary	Result		
mmary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	
	List Ether Channel Hest Due Adapton	Sussaa	~
	Create the cluster now using the validated nodes		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	1 View Report.	

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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

Failure issuing call to Persistent Reservation REGISTER. RESERVATION KEY 0x10000000a SERVICE ACTION RESERVATION KEY 0x10000000b for Test Disk 1 from node HCPG-CN1.dts-evlab.com: Incorrect function.

Failure issuing call to Persistent Reservation REGISTER. RESERVATION KEY 0xa SERVICE ACTION RESERVATION KEY 0xb for Test Disk 0 from node HCPG-CN1.dts-evlab.com: Incorrect function.

Test Disk 0 does not support SCSI-3 Persistent Reservations commands needed by clustered storage pools that use the Storage Spaces subsystem. Some storage devices require specific firmware versions or settings to function properly with failover clusters. Contact your storage administrator or storage vendor for help with configuring the storage to function properly with failover clusters that use Storage Spaces.

Test Disk 1 does not support SCSI-3 Persistent Reservations commands needed by clustered storage pools that use the Storage Spaces subsystem. Some storage devices require specific firmware versions or settings to function properly with failover clusters. Contact your storage administrator or storage vendor for help with configuring the storage to function properly with failover clusters that use Storage Spaces.

Step 10: 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

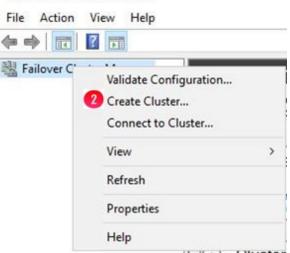
Validate a Config	guration Wizard ervers or a Cluster		2
Before You Begin Select Servers or a Cluster	Testing has completed for the tests you selected. You sh cluster solution is supported by Microsoft only if you run al succeed (with or without warnings).		
Testing Options	Node		^
onfimation	HCPG-CN1.dts-eviab.com	Validated	
alidating	HCPG-CN2.dts-evlab.com	Validated	
	Result		
ummary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	
	List Ellers Channel Hest Dus Adapton	Sussess	~
	Create the cluster now using the validated nodes		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View F	Report
		0	Finish

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).

Validate a Configu	ration Wizard		;
Before You Begin Select Servers or a Cluster	Testing has completed for the tests you selected. You sho cluster solution is supported by Microsoft only if you run all succeed (with or without warnings).	uld review the warnings in the cluster validation tests, and al	Report. A I tests
Testing Options	Node		^
Confirmation	HCPG-CN1.dts-evlab.com	Validated	
/alidating	HCPG-CN2.dts-evlab.com	Validated	
	Result		
bummary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	
_	List Elvis Channel Hest Rus Adapters	Cusasa	~
(1	Create the cluster now using the validated nodes		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View	Report
			Finish

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).

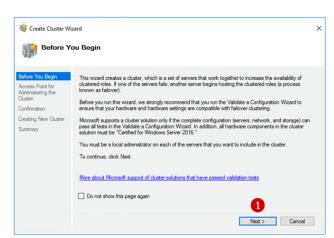


Figure 11.2 – Start

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 checking the name and IP address, press the 'Next' button (Figure 11.3.3).

Create Cluster Wi		ering the Cluster	×
Before You Begin Access Point for Administering the Cluster Confirmation Creating New Cluster	Cluster Name: [ant to use when administering the cluster. HCPG-CL the is limited to 15 characters. One or more IPv4 addresses could not be configured or each network to be used, make sure the network is selected, and then type an	
Summary	0	Networks Address ☑ 10.6.0.0/16 10 6 . 11 . 20 Image: Concent of the second secon	

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.

Create Cluster W	
Before You Begin Access Point for Administering the	You are ready to create a cluster. The wizard will create your cluster with the following settings:
Cluster	Cluster ^
Confirmation	HCPG-CL
Creating New Cluster	Node
Summary	HCPG-CN1.dts-eviab.com
	HCPG-CN2.dts-eviab.com
	Cluster registration
	DNS and Active Directory Domain Services
	Add all eligible storage to the cluster.
	To continue, click Next.
	0
	< Previous Next > Cancel

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

Summary		
efore You Begin ccess Point for dministering the	You have successfully completed the Create Cluster Wizard.	
luster	Node	^
onfimation	HCPG-CN1.dts-evlab.com	
reating New Cluster	HCPG-CN2.dts-evlab.com	
ummary	Cluster	
	HCPG-CL	
	Quorum	
	Node and Disk Majority (Cluster Disk 1)	
	IP Address	
	10.6.11.20	
		×
	To view the report created by the wizard, click View Report. View Report. To close this wizard, click Finish.	port

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 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* next to 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 1' is not assigned as Available Storage, it is the Witness disk and was assigned to Available Storage and 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.

Failover Cluster Manager	Disks (2)			
HCPG-CL.dts-evlab.com Roles	Search		P Queries ▼	
Nodes	Name	Status	Assigned To	Owner No
V 📇 Storage 🛛 🙎	📇 Cluster Disk 1	() Online	Disk Witness in Quorum	HCPG-CN
Disks	📇 Cluster Disk 2	() Online	Available Storage	HCPG-CN
	<			>
	👻 🧾 Cluster Disk	2		
	Volumes (1)			

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.

🗢 🔿 🖄 📷 🛛	Help	ts-evlab.com
✓ WHCPG-CL.dts ~ 4 Tencles Storage Storage Disks Pools Enclos Wetworks ECluster Ev Cluster Ev Storage Storage	Configure Role Validate Cluster View Validation Report Add Node Close Connection Reset Recent Events	of Cluster HCPG-CL 0 clustered roles and 2 nodes. vlab.com Networks: Cluster Network 1, Cluster Ne HCPG-CN2 Subnets: 3 IPv4 and 0 IPv6 ts: None in the last Hatorage Spaces Direct (S2D): Disabl 1
2	More Actions >	Configure Cluster Quorum Settings
	View >	
	Refresh	Shut Down Cluster
	Properties	Destroy Cluster
	Help	Move Core Cluster Resources >
		Cluster-Aware Updating

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

Select Q	uorum Configuration Option
Before You Begin Select Quorum Configuration Option Select Quorum Witness Configure Quater Quorum Settings Summary	Select a quorum configuration for your cluster. Use default quorum configuration The cluster determines quorum management options, including the quorum witness. Select the quorum witness You can add or change the quorum witness. The cluster determines the other quorum management options. Advanced quorum configuration You determine the quorum management options, including the quorum witness. Failover Cluster Quorum and Witness Configuration Options Q Next >

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
----------	---------	-----------	------	---------

Before You Begin Select Quorum Configuration Option	Select a quorum witness option to add or change the quorum witness for your cluster configuration. As a best practice, configure a quorum witness to help achieve the highest availability of the cluster.
Select Quorum Witness	Configure a disk witness Adds a quorum vote of the disk witness
Configure Storage Witness	O Configure a file share witness
Confirmation	Adds a quorum vote of the file share witness
Configure Cluster Quorum Settings Summary	Configure a cloud witness Adds a quorum vote of the cloud witness Do not configure a quorum witness
	Failover Cluster Quorum and Witness Configuration Options 2

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, press the 'Next' button (Figure 11.11.2).

Figure 11.11 – Configure Disk Witness

Configure	e Storage Wi	tness			
Before You Begin Select Quorum Configuration Option Select Quorum	Select the store	age volume ti	nat you want to assign a	s the disk witness.	
Witness	Name		Status	Node	Location
Configure Storage Witness Confirmation	🗹 🗉 🗒 G	uster Disk 1 uster Disk 2 olume: (H)	Online Online File System: NTFS	HCPG-CN2 HCPG-CN2 446 MB free of 478 MB	Cluster Group Available Storage
Configure Cluster Quorum Settings	1				
Summary	-				
					2
				< Previous Ne	ext > Cancel

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

Before You Begin Select Quorum Configuration Option	You are ready to configure the quorum settings of the clus	ter.	
Select Quorum Witness	Configure Cluster Quorum Settings		^
Configure Storage Witness	Disk Witness Cluster Managed Voting	Cluster Disk 1 Enabled	
Confirmation	Voting Nodes:		
Configure Cluster Quorum Settings	All nodes are configured to have quorum votes		
Summary			~
	To continue, click Next.		*

Figure 11.12 – Confirmation

Step 13: In the "Summary" window, click the '*Finish*' button (Figure 11.13) to continue.

Figure 11.13 – Summary

Configure Cluste	r Quorum Wizard	×
Summar	×	
Before You Begin	You have successfully configured the quorum settings for the cluster.	
Select Quorum Configuration Option		
Select Quorum Witness	Cluster Managed Voting Enabled	
Configure Storage Witness	Witness Type Disk Witness	
Confirmation	Witness Resource	
Configure Cluster Quorum Settings Summary	Cluster Disk 2	
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View Report
		Finish

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.

 Hailover Cluster Manager File Action View Help 					
Failover Cluster Manager Were Cluster Manager HCPG-CL.dts-evlab.com Roles Nodes Nodes Storage Disks Disks Dools Enclosures Networks Storage Lister Events	Disks (2) Search P Queries V				
	Name	Status	Assigned To	Owner No	
	근 Cluster Disk 1 2월 Cluster Disk 2	OnlineOnline	Available Storage Disk Witness in Quorum	HCPG-CN HCPG-CN	

Figure 11.14 – Verification

IMPORTANT NOTE: In the Windows Services on both nodes, locate the **MariaDB** service, 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 Gateway Administration Guide, Chapter 19 except use the settings for the D:\MariaDB\data\my.ini and C:\SAM\etc\sam\sam.properties files specified in Chapter 2 of this document titled HCP and HCP Gateway Configuration. Skip Steps 8-10 that empties the folders on the E: drive and configures the database my.ini and sam.properties files. Also in Step 11, do not start the SAM VFS service on the either node. In this cluster, the database service is called MariaDB, so substitute MariaDB for MySQL when starting and stopping the service. Stop after Step 16 where you run the show slave status\G. If you already followed the instructions in HCP Gateway Configuration above to make sure 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).

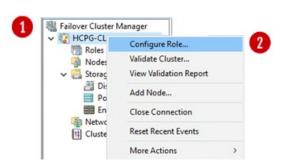


Figure 12.1 – Configure Role

- 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.

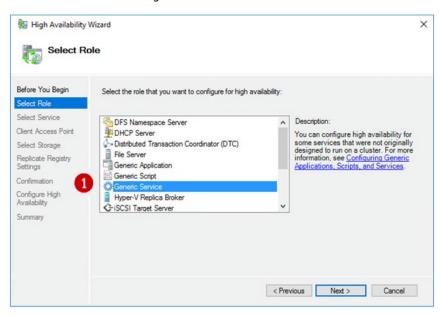


Figure 12.2 – Generic Service

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.

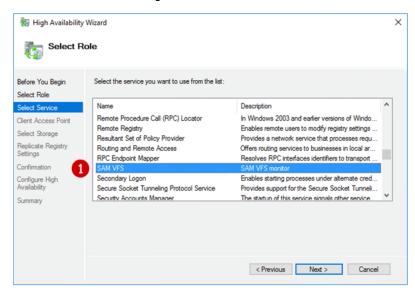


Figure 12.3 – Select VFS

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>

High Availability	y Wizard	×
Before You Begin Select Role Select Service Client Access Point	Type the name that clients will use when accessing this clustered role: Name: HCPG The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured	
Select Storage Replicate Registry Settings	automatically. For each network to be used, make sure the network is selected, and then type an address. Networks Address	
Confirmation Configure High Availability	2 10.6.0.0/16 10 . 6 . 11 . 23	
Summary	< Previous Next > Cancel	

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
--------	--------	---------------	-------

Before You Begin Select Role	Select only the storage volu You can assign additional st		to this clustered role. fter you complete this wizard.	
Select Service Client Access Point Select Storage Replicate Registry Settings Confirmation	Name Image: Weight of the second s	Status (*) Online File System: NTFS	99.9 GB free of 100.0 GB	
Configure High Availability Summary				

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

igh Availabilit	y Wizard	×
Replicat	e Registry Settings	
Before You Begin Select Role Select Service Client Access Point Select Storage	Programs or services may store data in the registry. Therefore, it is important to have this data available on the node on which they are running. Specify the registry keys under HKEY_LOCAL_MACHINE that should be replicated to all nodes in the cluster.	
Replicate Registry Settings Confirmation		
Configure High Availability Summary	Add Modify Remove	
	< Previous Next > Cancel	

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

igh Availability 🏭	Wizard		×
Confirma	tion		
Before You Begin Select Role	You are ready to configure high availability for a C	ieneric Service.	
Select Service	Network Name		^
Client Access Point	10.6.11.23	HCPG	
Select Storage	OU		
Replicate Registry Settings	<unavailable></unavailable>		
Confirmation	Storage		
Configure High	Cluster Disk 1		
Availability	Registry Keys		
Summary			~
	To continue, click Next.		
		< Previous Next > Cance	al l

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.

Summar	у	
fore You Begin lect Role	High availability was successfully configured for the role.	
elect Service	Service	
ent Access Point	SAM VFS (SAMVFS)	11
ect Storage	Network Name	11
eplicate Registry	HCPG	ъ
sttings	OU	11
onfirmation	<unavailable></unavailable>	
nfigure High	IP Address	
vailability	10.6.11.23	
ummary		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	

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.

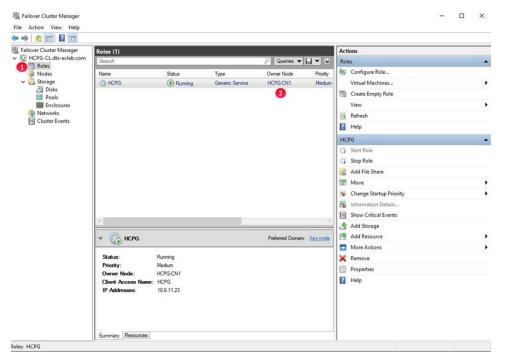


Figure 12.9 – Verify Role Owner

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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).

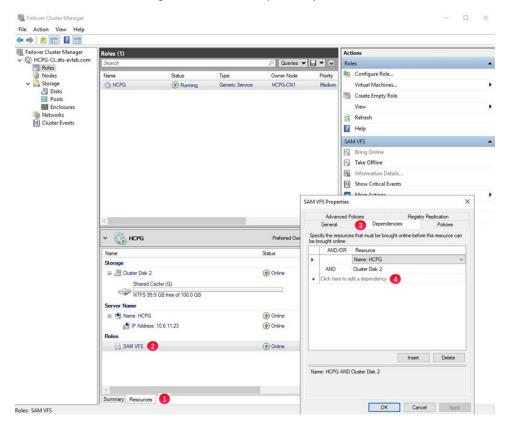


Figure 12.10 – Add Dependency to Role



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).

	Advanced F			ry Replication
	General	Deper	ndencies	Policies
	cify the resource rought online:	es that must be b	rought online befo	ore this resource car
	AND/OR	Resource		
		Name: HCPG		
	AND	Cluster Disk 2		
•	AND 1	IP Address: 10	.6.11.23 🛛 🔁	`
	PT 1.1			
	Llick here to a	dd a dependenc	y	
	Llick here to a	dd a dependenc	Insert	Delete
				1

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

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	-		
- → • ↑ 💾 > Ca	iche (G:) >	Date modified	Туре
Quick access Control	Cluster	7/7/2020 2:16 PM 7/7/2020 2:46 PM	File folder File folder
Downloads * Documents *	SAM_Link	7/7/2020 2:46 PM 7/7/2020 3:57 PM	File folder File folder

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).

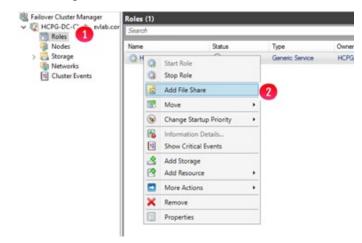
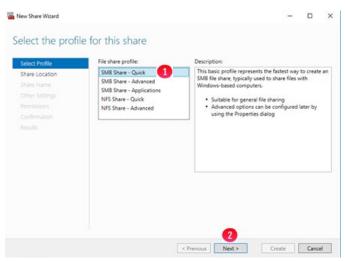


Figure 12.13 – Add File Share to Role

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.

Volume	Free Space	Capacity	File System		
G:	99.8 GB	99.9 GB	NTFS		
	e share will be a new fold	der in the \	Shares directo	ry <mark>on the</mark>	selected
he location of the file olume. ype a custom path: G:\HCPGClusterRole	e share will be a new fold	der in the \	Shares directo	ry on the	selected Browse

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

Select Profile	Share name:	HCPGClusterRole\$ 1
Share Location	Bay of State	
Share Name	Share description:	
Other Settings		
	Local path to share	
	G:\HCPGClusterRo	le
	Remote path to sha	are:
	\\PB-4121\HCPGC	lusterRole\$

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

Select Profile Share Location Share Name	Enable access-based enumeration Access-based enumeration displays only the files and folders that a user has permissions to access. If a user does not have flead (or equivalent) permissions for a folder. Windows hides the folder from the user's view.
Other Settings	Enable continuous availability
Permissions	Continuous availability features track file operations on a highly available file share so that clients can fail over to another node of the cluster without interruption.
	Allow caching of share Caching makes the contents of the share available to offline users. If the BranchCache for Network Files role service is installed, you can enable BranchCache on the share.
	Enable BranchCache on the file share BranchCache enables computers in a branch office to cache files downloaded from this
	share, and then allows the files to be securely available to other computers in the branch. Encrypt data access
	When enabled, remote file access to this share will be encrypted. This secures the data agains unauthorized access while the data is transferred to and from the share. If this how is checked and grayed out, an administrator has turned on encryption for the entire server.

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.

elect Profile hare Location hare Name ther Settings	permission	ns, and, optionally, a central missions: Everyone Full Cont	access policy.	combination of folder permissions, s
ermissions	Туре	Principal	Access	Applies To
onfirmation	Allow Allow Allow Allow Allow	BUILTIN/Users BUILTIN/Users CREATOR OWNER NT AUTHORITY/SYSTEM BUILTIN/Administrators BUILTIN/Administrators	Special Read & execu Full Control Full Control Full Control Full Control	This folder and subfolders This folder, subfolders, and files Subfolders and files only This folder, subfolders, and files This folder, subfolders, and files This folder only
	Custom	ize permissions		

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).

Image: Search Search Image: Status Type	/pe
Nodes Name Status Type Storage Disks Pools Start Role Start Role Enclosures Image: Add File Share Image: Add File Share Image: Add File Share It Cluster Events Image: Add File Share Image: Add File Share	
Ibisks Image: Start Role Pools Image: Start Role Image: Role Image: Start Role Image: Role Image: Role Image:	
Pools Enclosures Networks Cluster Events Pools Cluster Events Pools Cluster Events Pools Cluster Events Cluster Events Cluster Events Pools Cluster Events Cluster Events Clust	
Enclosures Networks Cluster Events Add File Share Add File Share Change Startup Priority	•
Il Cluster Events Il Cluster	•
Change Startup Priority	
	•
Show Critical Events	
Add Storage	
More Actions	
X Remove	

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).

e. Use the buttons to least preferred
Up
Up
ancel Apply
CON.

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.

- 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).

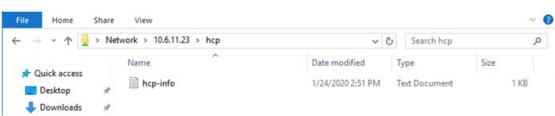
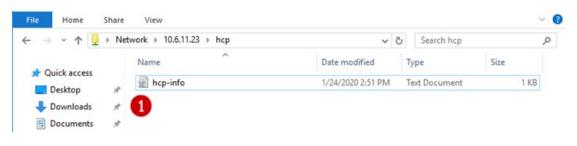


Figure 13.3 – Copy a file

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.

Disks Pools		Status	Туре						
Disks	PB-HCPGW414-R			Owner Node	Priority	Information			
■■ Enclosures ④ Networks 比 Cluster Events		2 • Running	Generic Service	PB-HCPGW414-CL1	Medum				
<	/22								
	PB-HCPGW4 ares (3)						Preferred	Owners:	User S
Sha Na	ares (3) ame	Path	Protocol		Remarks	_	Preferred	Owners:	User S
Shu Na	ares (3) ame GS	Path G:\	SMB	No	Remarks Oluster Default :	Share	Preferred	Owners:	User S
Sha Na	arres (3) arree GS HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes		Share	Preferred	Owners:	User S
Sha Na	ares (3) ame GS	Path G:\	SMB	No		Share	Preferred	Owners:	User S

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

Name		Path	Protocol	Continuous Availability	Remarks	
🐊 GS		G:\	SMB	No	Cluster Default Share	
HCPGClusterRole\$		G:\HCPGClusterRole	SMB	Yes		
J C1	GACAMA Anabian 1		SMB	No		
	× Sto	p Sharing				
	G Ref	resh				
	Pro	perties 1				

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

	Show All				
General	+	Permiss	sions		
Permissions	1 -				
Settings	+	permission	ns, and, optionally, a central missions: Everyone Full Cont	access policy.	combination of folder permissions, sh
		Туре	Principal	Access	Applies To
		Allow	BUILTIN\Users	Special	This folder and subfolders
		Allow	BUILTIN\Users	Read & execu	This folder, subfolders, and files
		Allow	CREATOR OWNER	Full Control	Subfolders and files only
		Allow	NT AUTHORITY\SYSTEM	Full Control	This folder, subfolders, and files
		Allow	BUILTIN\Administrators	Full Control	This folder, subfolders, and files
		Allow	BUILTIN\Administrators	Full Control	This folder only
		Custon	nize permissions		

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.

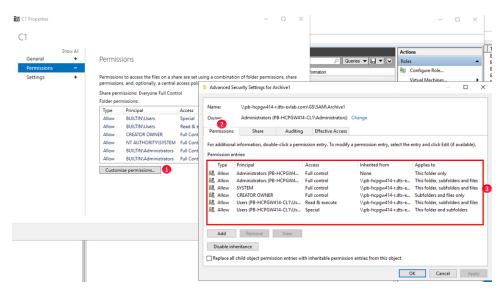
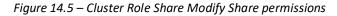


Figure 14.4 – Cluster Role Share Modify NTFS permissions

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.



C1 Properties						075	o ×			-		
Show General Permissions Settings	+ Pé - Pe pe Sh	ermissions missions to access the files on a sh missions, and, optionally, a central are permissions: Everyone Full Con Ider permissions:	access poli	-		urity Settings for A	rchive1	formation	ieries V 📊 V V	Actions Roles Configure Role Virtual Machines		
	Folder permissi Type provide Altow BU Altow BU Altow ID Altow N Altow BU	Allow BUILTIN\Users Allow BUILTIN\Users Allow CREATOR OWNER Allow NT AUTHORITY\SYSTEM Allow BUILTIN\Administrators	BUILTIN/Users Special BUILTIN/Users Read & e CREATOR OWNER Full Cont NT AUTHORITY/SYSTEM Full Cont BUILTIN/Administrators Full Cont	Owner: Permiss To modi Network								
		Customize permissions			ype Illow	Principal Everyone			Access Full Contro	I	2	
				Ado	I	Remove	View		3	OK Cancel	Apply	

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)

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

Select Profile	File share profile:	Description:
Share Location Share Name Other Settings Permissions Confirmation Results	SMB Share - Quick 1 SMB Share - Advanced SMB Share - Applications NFS Share - Quick NFS Share - Advanced	This basic profile represents the fastest way to create a SMB file share, typically used to share files with Windows-based computers. Suitable for general file sharing Advanced options can be configured later by using the Properties dialog

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

elect Profile	Server:					
hare Location	Server Name	Status	Cluster	Role	Owner Node	
hare Name	PB-HCPGW414-R	Online	Generic	Service		
	Share location:					
	Select by volume:					
	Volume	Free Space	Capacity	File Syster	m	
	G:	69.9 GB	70.0 GB	NTFS		
	The location of the fil	le share will be a new fol	der in the \	Shares dire	ctory on the se	lected
	volume.					

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.

Select Folder	-		×
New Folder Delete			
 PB-HCPGW414-R.dts-eviab.com Shared Cache (G:) Cache Cluster Cluster Chrogolusterrole Carports Sam Subsharel Subsharel Subsharel Sam_link 			
Folder: G:\sam\archive1\subshare1			
	2 Select Folder	Can	cel

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'.

Failover Cluster Manager	Roles (1)					
PB-HCPGW414-CL.dts-evia Roles	Search				P Queries	
Nodes	Name	Status	Туре	Owner Node	Priority	Information
> 🛃 Storage	PB-HCPGW414-R	2 💿 Running	Generic Service	PB-HCPGW414-CL1	Medium	
Cluster Events						
	<				_	>
	V 🛞 PB-HCPGW4	414-R			Preferred Owner	s: <u>User Settings</u>
	Shares (3)					
	Name	Path	Protocol	Continuous Availability	Remarks	
	🌙 GS	G:\	SMB	No	Cluster Default S	Share
	J HCPGClusterRole\$	G:\HCPGClusterRole	SMB	Yes		
) C1 (3	G:\SAM\Archive1 4	SMB	No		
	<					>
< >	Summary Resources	Shares				

Figure 14.10 – Share Archive Number

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

share Location Server Name PB-HCPGW414-R Other Settings Server Name Confirmation	Status Online	Cluster Role Generic Servi	Owner Node
share Name PB-HCPGW414-R Other Settings Permissions	Online	Generic Servi	ice
Other Settings Permissions			
Permissions			
lesuits			
Share location:			
 Select by volume: 			
Volume	Free Spac	e Capacity File S	System
G:	69.9 G	8 70.0 GB NTFS	s
The local sector of the file	hare will be a new fi	older in the \Shares	s directory on the selected
The localize of the film	hare will he a new f	Ider in the \Shares	s directory on the selecte

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

elect Profile	Share name: subshare1	
hare Location	Share description:	
Other Settings		
	Local path to share:	
	G:\sam\archive1\subshare1	
	Remote path to share:	
	\\PB-HCPGW414-R\subshare1	

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

Select Profile	Enable access-based enumeration
Share Location Share Name	Access-based enumeration displays only the files and folders that a user has permissions to access. If a user does not have Read (or equivalent) permissions for a folder, Windows hides t folder from the user's view.
Other Settings	Enable continuous availability
Permissions Confirmation	Continuous availability features track file operations on a highly available file share so that clients can fail over to another node of the cluster without interruption.
	Allow caching of share
	Caching makes the contents of the share available to offline users. If the BranchCache for Network Files role service is installed, you can enable BranchCache on the share.
	Enable BranchCache on the file share
	BranchCache enables computers in a branch office to cache files downloaded from this share, and then allows the files to be securely available to other computers in the branch.
	Encrypt data access
	When enabled, remote file access to this share will be encrypted. This secures the data again unauthorized access while the data is transferred to and from the share. If this box is checked and grayed out, an administrator has turned on encryption for the entire server.

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 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 14.14.3) to configure the share and folder permissions. Select '*Next*' (Figure 14.14.4).

Figure 14.14 – New Share Wizard 6

Select Profile Share Location Share Name Other Settings	permissions	; and, optionally, a central issions: Everyone Full Cont	access policy.	combination of folder permissions, s	share
Permissions	Туре	Principal	Access	Applies To	
Confirmation	Allow	BUILTIN\Users	Special	This folder and subfolders	
	Allow	BUILTIN\Users	Read & execute	This folder, subfolders, and files	
	Allow	CREATOR OWNER	Full Control	Subfolders and files only	
	Allow	BUILTIN\Administrators	Full Control	This folder, subfolders, and files	
	Allow	NT AUTHORITY\SYSTEM	Special	This folder, subfolders, and files	
	Allow	NT AUTHORITY\SYSTEM	Full Control	This folder only	
	Customia	ze permissions 3			

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

Select Profile	Confirm that the following	are the correct settings, and ther	n click Create.	
Share Location Share Name	SHARE LOCATION Server:	PB-HCPGW414-R		
Other Settings	Cluster role:	Generic Service		
Permissions	Local path:	G:\sam\archive1\subshare1		
Confirmation	SHARE PROPERTIES			
	Share name: Protocol: Access-based enumeration:	subshare1 SMB Disabled		
	Caching:	Enabled		
	BranchCache:	Disabled		
	Encrypt data:	Disabled		
	Continuous availability:	Enabled		

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

	The share was success	fully created.		
	Task	Progress	Status	
	Create SMB share		Completed	
	Set SMB permissions		Completed	
Confirmation				
Results				

Figure 14.16 – Close New Share Wizard

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

B-HCPGW414-CL.dts-evia	Roles (1)					
Toles	Search				Quen	es 🕶 🔛 🕶
Nodes	Name	Status T	ype	Owner Node	Priority	Information
Storage	PB-HCPGW414-R	🛞 Running 🛛 G	ieneric Service	PB-HCPGW414-CL1	Medium	
Networks Cluster Events						
Conter creats						
	<					
	Y 💦 PB-HCPGW4	114-R			Preferred Own	ers: User Sett
	Shares (4)					
	Name	Path	Protocol	Continuous Availability	Remarks	
	J GS	G:\	SMB	No	Cluster Default	t Share
	J HCPGClusterRole\$	G:\HCPGClusterRole	SMB	Yes		
	J C1	G:\SAM\Archive1	SMB	No		
	J C1	G:\SAM\Archive1 G:\sam\archive1\subshare1		No Yes		

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).

Search				🔎 Queries 🔻
Name	Status	ype	Owner Node	Priority Info
A PB-HCPGW414-R	🕐 Running 🛛 🤇	Seneric Service	PB-HCPGW414-CL1	Medium
< PB-HCPGW4 Storms (4)	114-R			Preferred Owners:
PB-HCPGW4 Shares (4)		Protocol	Continuous Availability	
V 🏀 PB-HCPGW4	Path G:\	Protocol	Continuous Availability	Preferred Owners: Remarks Cluster Default Shar
PB-HCPGW4 Strares (4) Name	Path			Remarks
✓ ✓	Path G:\	SMB	No	Remarks
PB-HCPGW4 Sturres (4) Name GS HCPGClusterRoleS	Path G:\ G:\HCPGClusterRole	SMB SMB SMB	No Yes No Yes	Remarks Cluster Default Shar
PB-HCPGW4 Shares (4) Name GS GS C1 C1	Path G:\ G:\HCPGClusterRole G:\SAM\Archive1	SMB SMB SMB	No Yes No Yes	Remarks
PB-HCPGW4 Shares (4) Name GS GS C1 C1	Path G:\ G:\HCPGClusterRole G:\SAM\Archive1	SMB SMB SMB	No Yes No Yes	Remarks Cluster Default Shar

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.

subshare1					
General Permissions Settings	Show All - 1 + 2 + 3	General Server Name: Share name: Share description: Folder path: Protocol: Availability type:	PB-HCPGW414-R subshare1 G:\sam\archive1\subshare1 SMB Clustered	 	

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.

General	Show All	Permis	sions		
Permissions Settings	+		ns to access the files on a sha ns, and, optionally, a central		combination of folder permissions, s
		Share per Folder per	missions: Everyone Full Cont missions:	rol 1	
		Туре	Principal	Access	Applies To
		Allow	BUILTIN\Users	Special	This folder and subfolders
		Allow	BUILTIN\Users	Read & execute	This folder, subfolders, and files
		Allow	CREATOR OWNER	Full Control	Subfolders and files only
		Allow	BUILTIN\Administrators	Full Control	This folder, subfolders, and files
		Allow	NT AUTHORITY\SYSTEM NT AUTHORITY\SYSTEM		This folder, subfolders, and files This folder only
		Custon	nize permissions 3		

Figure 14.20 – Subshare Permissions

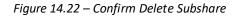
Delete subshare on Cluster

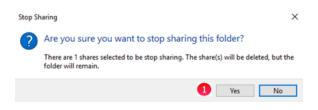
Step 1: On Node 1, in the 'Failover Cluster Manager', select '*Roles*' (Figure 14.21.1), select the cluster role (Figure 14.21.2), select '*Shares'* (Figure 14.21.3), right-click the Subshare (Figure 14.21.4) and select '*Stop Sharing*' (Figure 14.21.5).

Figure 14.21 – Delete Subshare

Roles 1	Search				ρ (Queries 🔻 🔛 🤻
Nodes	Name	Status T	ype	Owner Node	Priority	Information
> 🧾 Storage 🍓 Networks 🗄 Cluster Events	A PB-HCPGW414-R	2 💽 Running G	ieneric Service	PB-HCPGW414-CL	1 Medium	
	<	414-R			Preferred	Owners: User Se
	Shares (4)					
	Shares (4) Name	Path	Protocol	Continuous Availability	Remarks	
	Shares (4) Name J GS	Path G:\	SMB	No	Remarks	
	Shares (4) Name J GS J HCPGClusterRoleS	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks	
	Shares (4) Name J. GS J. HCPGClusterRoles J. C1	Path G:\ G:\HCPGClusterRole G:\SAM\Archive1	SMB SMB SMB	No Yes No	Remarks Cluster D	lefault Share
	Shares (4) Name J GS J HCPGClusterRoleS	Path G:\ G:\HCPGClusterRole	SMB SMB SMB	No Yes	Remarks Cluster D	
	Shares (4) Name J. GS J. HCPGClusterRoles J. C1	Path G:\ G:\HCPGClusterRole G:\SAM\Archive1	SMB SMB SMB	No Yes No	Remarks Cluster D	efault Share
	Shares (4) Name J. GS J. HCPGClusterRoles J. C1	Path G:\ G:\HCPGClusterRole G:\SAM\Archive1	SMB SMB SMB	No Yes No	Remarks Cluster D Stop	efault Share

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





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

🔛 Failover Cluster Manager	Roles (1)				
PB-HCPGW414-CL.dts-evla	Search				🔎 Queries 🔻 🛃 💌 😪
Roles	Name	Status	Туре	Owner Node	Priority Information
> 🛃 Storage	PB-HCPGW414-R	Running	Generic Service	PB-HCPGW414-CL1	-
i Networks	Mail Brick GW4141	Running	Generic Service	T BHICLUW414-CET	Medidin
Cluster Events					
	<				>
	Als.				
	Y 🎧 PB-HCPGW4	114-K			Preferred Owners: User Settings
	PB-HCPGW4	¥14-K			Preferred Owners: User Settings
		Path	Protocol	Continuous Availability	Preferred Owners: <u>User Settings</u> Remarks
	Shares (3)		Protocol SMB	Continuous Availability No	
	Shares (3) Name	Path			Remarks
	Shares (3) Name G\$	Path G:\	SMB	No	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks
	Shares (3) Name G\$ HCPGClusterRole\$	Path G:\ G:\HCPGClusterRole	SMB SMB	No Yes	Remarks

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).

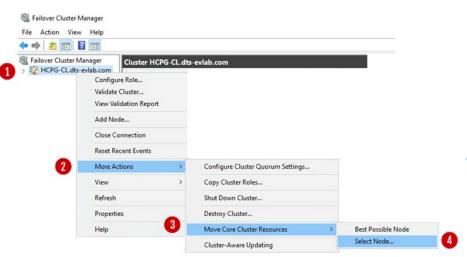
👱 📝 📙 🖛 C1				-	
File Home Share	View				~
← → × ↑ 🗜 > Networ	k > pb-hcpgw414-r > C1 →		~ Ū	Search C1	J
Shared Cache (G:) ^	Name	Date modified	Туре	Size	
cache	subshare1 🚺	10/15/2021 1:54 PM	File folder		
Cluster	subshare2	10/15/2021 1:54 PM	File folder		
HCPGClusterRole	🔊 my	1/14/2021 5:26 AM	Configuration sett	3 KB	
Reports	sam.properties	2/18/2021 7:01 AM	PROPERTIES File	1 KB	

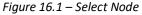
Chapter 16 How to Switch Cluster Services to Passive Node

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).





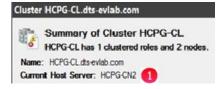
Step 2: In the select node, choose the other node. In this example, the cluster is currently running on Node 1 (Figure 16.2.1), it will be switched to Node 2 (Figure 16.2.2). Then click 'OK.'

Figure 16.2 – Move Cluster Resource

HCPG-CN1'.	ode for moving cluster reso	arces mon
Look for:		
P Search		Clea
Cluster nodes:		18
Name	Status	
HCPG-CN2	() Up	

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).

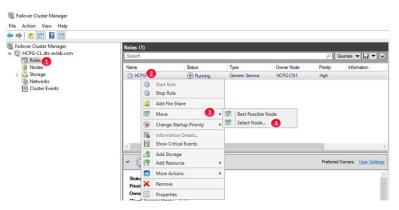


Figure 16.4 – Move Cluster Role

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).

₽ Search		Clear
luster nodes:		
Name	Status	

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

Roles (1)					
Search P					lueries 🔻 🔚 🔻 😪
Name	Status	Туре	Owner Node	Priority	Information
C HCPG	Running	Generic Service	HCPG-CN2	High	

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.

Figu	re 16.7 – Get Cluster Sta	tus
PS C:\Windows\syst	cem32> get-clus	tergroup
Name	OwnerNode	State
Available Storage	HCPG-CN1	Offline
Cluster Group	HCPG-CN1	Online
HCPG-CL	HCPG-CN1	Online

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

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.



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

Add Roles and Features Wizard		- 🗆 X
Select features		DESTINATION SERVER EDHCPGW01M1.pmdt.net
Before You Begin Installation Type	Select one or more features to install on the selected server.	Description
Server Selection Server Roles Features Confirmation Results	Media Foundation Message Queuing Multipath I/O (Installed) Multipath I/O (Installed) MultiPoint Connector Network Load Balancing Peer Name Resolution Protocol Quality Windows Audio Video Experience RAS Connection Manager Administration Kit (CMA Remote Assistance Remote Server Administration Tools RPC over HTTP Proxy Setup and Boot Event Collection Simple TCP/IP Services	NET Framework 3.5 combines the power of the .NET Framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.
	SMB 1.0/CIFS File Sharing Support (Installed) SMB Bandwidth Limit SMTP Server SMTP Service Telnet Client	C ₂

Figure 17.2 – Multipath I/O

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

	I → All Control Panel Items	✓ O Search Control Panel
Adjust your computer's settings View by: Small icons 🔻		
🚰 Administrative Tools	📑 AutoPlay	💶 Color Management
Credential Manager	🐣 Date and Time	Co Default Programs
🗄 Device Manager	Devices and Printers	🛄 Display
Ease of Access Center	File Explorer Options	A Fonts
🔒 Indexing Options	🔁 Internet Options	🔩 iSCSI Initiator
🔤 Keyboard	😪 Language	🕚 Mouse
MPIO	💱 Network and Sharing Center	🚅 Personalization
Phone and Modem	Power Options	Programs and Features
🐼 Recovery	🔊 Region	🐻 RemoteApp and Desktop Connections
陀 Security and Maintenance	🖬 Sound	Speech Recognition
🔇 Sync Center	🗾 System	Taskbar and Navigation
🔁 Text to Speech	Troubleshooting	🎎 User Accounts
🖶 Windows Defender	🔗 Windows Firewall	

Figure 17.3 – MPIO in Control Panel

Step 4. Click Add (Figure 17.4).

IPIO Propertie	5		×
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration Snapshot
Product Ids as Devices can b	e specified using semi- pport for currently MPI	ers followed by colon as the d	/ 16 characters. Multiple elimiter.
Devices:			
Device Hard	ware Id		
Vendor 8Pro	duct 16		
		Add	Remove
	L ₃	\$	
			OK Cancel

Figure 17.4 – Click Add

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

Figure 17.5 – Enter HITCAHI OPEN-

Enter the Vendor and Product Ids (as a str 16 characters) of the devices you want to	
Device Hardware ID:	
HITACHI OPEN-	
Ν	OK Cancel

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

Figure 17.6 Reboot required

Kebo	ot Required		
1	A reboot is required	d to complete the operation. Reb	oot Now?

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

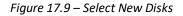
📇 Device Manager
File Action View Help
V 🗄 EDHCPGW01M1
> 💻 Computer
🗸 👝 Disk drives
ATA ST9500620NS SCSI Disk Device
HITACHI OPEN-V Multi-Path Disk Device
HITACHI OPEN-V Multi-Path Disk Device
HITACHI OPEN-V Multi-Path Disk Device
HITACHI OPEN-V Multi-Path Disk Device
HITACHI OPEN-V Multi-Path Disk Device
> 🔙 Display adapters
> 📕 Firmware
> 🐺 Human Interface Devices

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.

🖾 Run		×
0	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.	
Open:	diskmgmt.msc ~	
	This task will be created with administrative privileges.	
	2 OK Cancel Browse	1

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.





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.

📅 Disk Management _ File Action View Help 🗢 🔶 📷 🔀 📷 🗩 🖾 File System Status Free Spa... % Free Volume Layout Туре Capacity - (C:) Database (D:) NTFS NTFS Healthy (B... 99.51 GB Healthy (P... 100.00 GB 84.50 GB 99.89 GB 85 % 100 % Basic Simple Simple Basic Storage (E:) System Reserved Simple Basic NTFS Healthy (P... 100.00 G Healthy (S... 500 MB 100.00 GB 99.81 GB 100 % Simple Basic NTFS 153 MB 31 % ODisk 3 Unknown 512 MB Offline 512 MB Unallocated "O Disk 4 100.00 GB Offline 100.00 GB Unallocated Unallocated Primary partition

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).

1	*O Disk 3 Unknown 512 MB Not Initialized	512 MB Unallocated
	O Disk 4 Unknown 100.00 GB Offline	100.00 GB Unallocated

Figure 17.12 – Updated Disk Status

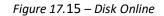
Figure 1	7.13 – Initialize Disk
0	Initialize Disk
-	Offline
	Properties
	Help

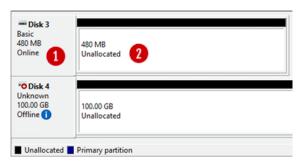
Step 12: From the Initialize Disk menu select the drive (Figure 17.14.1). Use GPT partition style (Figure 17.14.2). Then click the 'OK' button (Figure 17.14.3) to start the initialize process.

Figure 17.14 – Initialize Disk Configuration

	Initialize Disk	×
	You must initialize a disk before Logical Disk Manager can access it.	
	Select disks:	
1	☑ Disk 3	
	Use the following partition style for the selected disks:	
	O MBR (Master Boot Record)	
2	GPT (GUID Partition Table)	
	Note: The GPT partition style is not recognized by all previous versions of Windows.	
	3 OK Cancel	

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.





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.

- Disk 3 Basic	**/////////////////////////////////////		^
480 MB 1	480 MB	New Simple Volume 2	
OTIMITE	Unallocated	New Spanned Volume	
		New Striped Volume	
*O Disk 4 Unknown		New Mirrored Volume	
100.00 GB	100.00 GB	New RAID-5 Volume	
Offline 🚺	Unallocated	Properties	
		Help	·

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

New Simple Volume Wizard	×
	Welcome to the New Simple Volume Wizard
	This wizard helps you create a simple volume on a disk.
	A simple volume can only be on a single disk.
	To continue, click Next.
	0
	< Back Next > Cancel

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

lew Simple Volume Wizard	>			
Specify Volume Size Choose a volume size that is between the maximum and minimum sizes.				
Maximum disk space in MB:	478			
Minimum disk space in MB:	8			
Simple volume size in MB:	478 ÷ 1			
	•			
	<pre></pre>			

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.

rive path to	your partition.	
E	~	
Browse		
	E	E v

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

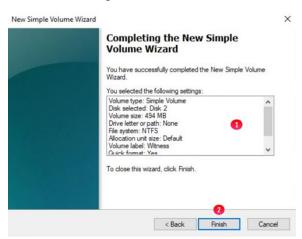
'**Perform a quick format**' (Figure 17.20.3). Then click the '*Next*' button (Figure 17.20.4) to continue.

Format I	Partition ore data on this partition, yo	u must format it first		
10 30	ore data or this paration, yo	o most format it mat.		
Choo	se whether you want to form	nat this volume, and if	so, what settings you want	to use.
C) Do not format this volume			
1) Format this volume with the	e following settings:		
	File system:	NTFS	~	
	Allocation unit size:	Default	\sim	
	Volume label:	Witness	2	
3	Perform a quick form	at	-	
	Enable file and folde	r compression		
			4	
			U	

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.

📅 Disk Management × File Action View Help 💠 🔶 📰 🖥 🖬 🗩 🖻 🗉
 Status
 Capacity

 Healthy (B...
 99.51 GB

 Healthy (P...
 100.00 GB

 Healthy (P...
 100.00 GB

 Healthy (S...
 500 MB

 Healthy (P...
 478 MB

 File System
 Status

 NTFS
 Healthy

 NTFS
 Healthy
 Volume Layout Туре Free Spa... % Free 81.08 GB 81 % Basic Basic Basic Basic Basic 81 % 100 % 100 % 31 % 97 % - (C:) 99.89 GB 99.81 GB 153 MB 462 MB Simple Simple Simple Simple - Database (D:) Storage (E:) System Rese Witness (W:) Disk 3 Basic 480 MB Online Witness (W:) 478 MB NTFS Healthy (Primary Partition) 2 Disk 4 Basic 39.88 GB Online 39.88 GB Unallocated Unallocated Primary partition

Figure 17.22 – Results

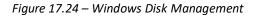
Step 20: Take the Witness disk offline by right-clicking in the "Disk 3" box and select "Offline".

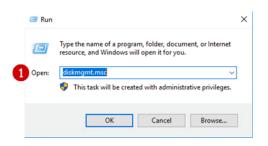
Step 21: Repeat steps 9-20 for Disk 4, in Step 13, the disk size of a 100GB in ESXi will likely show as 98.88GB, using G for the drive letter in Step 16 and Shared Cache for the Volume Label in Step 17. Review the Disk Management window to make sure both drives are online and Healthy (Figure 17.23)

Figure 17.23 – Results

Volume	1		[[]]]	Status	C	Free Spa	% Free	-	
(C:)	Layout Simple	Type Basic	File System NTFS	Healthy (B	Capacity 00.51 CP	80.98 GB	81 %		
Cache (G:)	Simple	Basic	NTES	Healthy (P		99.76 GB	100 %		
Database (D:)	Simple	Basic	NTES	Healthy (P		99.89 GB	100 %		
Storage (E:)	Simple	Basic	NTES	Healthy (P		99.81 GB	100 %		
System Reserved	Simple	Basic	NTES	Healthy (S		153 MB	31 %		
Witness (W:)	Simple	Basic	NTFS	Healthy (P		462 MB	97 %		
- Disk 3									
Basic W 480 MB 4	Fitness (W:) 78 MB NTFS ealthy (Prima	ry Partition)							

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.





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

📅 Disk Managemer	nt						-	
File Action View	v Help							
(n 🔿 👘 👘	TT 🗩 🗉							
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
= (C:)	Simple	Basic	NTFS	Healthy (B	99.51 GB	84.51 GB	85 %	
- Database (D:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.89 GB	100 %	
- Storage (E:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.81 GB	100 %	
System Reserved	Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
*O Disk 3 Basic								
Basic	478 MB				•			
Basic 480 MB Offline () *O Disk 4 Basic								
Basic 480 MB Offline () *O Disk 4 Basic	478 MB 99.87 GB							

- 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 DeploymentGuide 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.

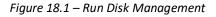
Since GAD is an active/active solution, for this example, a 512MB quorum device is needed for cluster arbitration purposes. This lun should reside preferably on an independent 3rd site or in the cloud.

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).

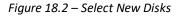
On windows OS level, an NTFS cluster size of 32KB can be used in order to support a maximum volume of 128TB.

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.

🖅 Run		×
0	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.	
Open:	diskmgmt.msc 🗸	
	This task will be created with administrative privileges.	
	2 OK Cancel Browse	ľ



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.



You must initializ	ze a disk before Lo	gical Disk Manager can	access it.
Select disks:			
✓ Disk 3 ✓ Disk 4			
		the selected disks:	
-	er Boot Record) Partition Table)		
Note: The GPT Windows.	partition style is no	t recognized by all previo	us versions of

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.

	1 🗩 🖾							
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	99.51 GB	84.50 GB	85 %	
- Database (D:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.89 GB	100 %	
- Storage (E:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.81 GB	100 %	
- System Reserved	Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
	12 MB							
Unknown 512 MB 5	12 MB Inallocated							

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

Online	
Properties	
Help	

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).

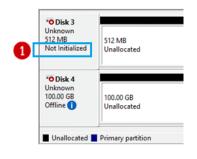


Figure 18.5 – Updated Disk Status

Figure 18.6 – Initialize Disk

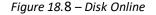


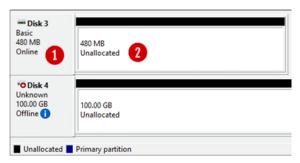
Step 7: From the Initialize Disk menu select the drive (Figure 18.7.1). Use GPT partition style (Figure 18.7.2). Then click the 'OK' button (Figure 18.7.3) to start the initialize process.

Figure 18.7 – Initialize Disk Configuration

	Initialize Disk	×
0	You must initialize a disk before Logical Disk Manager can access it. Select disks: Ø Disk 3	
2	Use the following partition style for the selected disks: O MBR (Master Boot Record) @ GPT (GUID Partition Table) Note: The GPT partition style is not recognized by all previous versions of Windows. 3 OK Cancel	

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.





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

- Disk 3 Basic	2//////////////////////////////////////		î
480 MB	480 MB Unallocated	New Simple Volume 2	
OTIMIC	Unallocated	New Spanned Volume	
		New Striped Volume	
Olisk 4 Unknown		New Mirrored Volume	
100.00 GB	100.00 GB	New RAID-5 Volume	
Offline 🚺	Unallocated	Properties	
		Help	v

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
--------	-------	-------	-------------

New Simple Volume Wizard	:
Specify Volume Size Choose a volume size that is betwe	en the maximum and minimum sizes.
Maximum disk space in MB:	478
Minimum disk space in MB:	8
Simple volume size in MB:	±120 -
	2
	< Back Next > Cancel

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.

issign Drive Letter or Path For easier access, you can assign a drive lette	r or drive path	to your partition	
• Assign the following drive letter:	E	~	
O Mount in the following empty NTFS folder:	Browse		
Do not assign a drive letter or drive path			

Figure 18.12 – Set Drive Letter

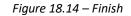
Step 12: Click the option 'Format the volume with the following settings' (Figure 18.13.1) radio button.
Select 'File System' as 'NTFS' and 'Allocation Unit size' as 'Default' options. Then type 'Witness' into the Volume label (Figure 18.13.2) data entry box. Then select the box for

'**Perform a quick format**' (Figure 18.13.3). Then click the '*Next*' button (Figure 18.13.4) to continue.

New Simple	e Volume Wizard		×				
Format Partition To store data on this partition, you must format it first.							
Choo	se whether you want to form	at this volume, and if so, what settings you want to use.					
С) Do not format this volume						
1 🤨) Format this volume with the	e following settings:					
-	File system:	NTFS ~					
	Allocation unit size:	Default ~					
	Volume label:	Witness 2					
3	Perform a quick form	at					
	Enable file and folde	r compression					
		4					
		< Back Next > Cancel					

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.



Completing the New Sim Volume Wizard	ple
You have successfully completed the New Wizard.	Simple Volume
You selected the following settings: Volume type: Simple Volume Disk selected: Disk 2 Volume size: 494 MB Drive letter or path: None File system: NTFS Allocation unit size: Default Volume label: Witness	1
Childe format: Yes	~
0	

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.

🔶 🏟 🔤 🖬 🖬	1 🗩 🖌 🛛	E						
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	99.51 GB	81.08 GB	81 %	
- Database (D:)	Simple	Basic	NTFS	Healthy (P		99.89 GB	100 %	
- Storage (E:)	Simple	Basic	NTFS	Healthy (P		99.81 GB	100 %	
System Reserved	Simple	Basic	NTFS	Healthy (S		153 MB	31 %	
- Witness (W:)	Simple	Basic	NTFS	Healthy (P	478 MB	462 MB	97 %	
480 MB 4	Vitness (W:) 78 MB NTFS lealthy (Primar	y Partition)	2					

Figure 18.15 – Results

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

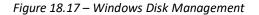
Step 16: Repeat steps 4-15 for Disk 4, in Step 7, the disk size of a 100GB in ESXi will likely show as 98.88GB, using G for the drive letter in Step 11 and Shared Cache for the Volume Label in Step 12. Review the Disk Management window to make sure both drives are online and Healthy (Figure 18.16).

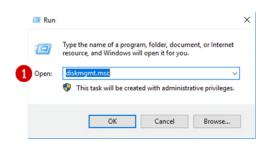
NOTE: An NTFS Allocation Unit size of 32KB can be used in Step 12 in order to support a maximum volume size of 128TB for the cache drive.

Figure 18.16 – Results

♦ ♦ 1 1 2 1	-		1	1		-		
Volume	Layout	Туре	File System	Status	Capacity	Free Spa		
- (C:)	Simple	Basic	NTFS	Healthy (B		80.98 GB	81 %	
Cache (G:)	Simple	Basic	NTFS	Healthy (P		99.76 GB	100 %	
Database (D:)	Simple	Basic	NTES	Healthy (P		99.89 GB		
Storage (E:)	Simple	Basic Basic	NTES	Healthy (P		99.81 GB 153 MB	100 %	
 System Reserved Witness (W:) 	Simple	Basic	NTES	Healthy (S Healthy (P		462 MB		
= Disk 3		buik	NIT3	reality (r	4/0 MID	402 MB	5/ 70	
Disk 3 Basic 480 MB 4	fitness (W:) 78 MB NTFS ealthy (Prima			reating (r	+/0 MD	402 MD	of 16	

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.





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.

Figure 18.18 – New Drives Added

📅 Disk Managemer	nt						-	
File Action View	v Help							
(n 🔿 👘 👘	TT 🗩 🗉							
Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
= (C:)	Simple	Basic	NTFS	Healthy (B	99.51 GB	84.51 GB	85 %	
💳 Database (D:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.89 GB	100 %	
- Storage (E:)	Simple	Basic	NTFS	Healthy (P	100.00 GB	99.81 GB	100 %	
System Reserved	Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
*O Disk 3 Basic					•			
Basic	478 MB							
Basic 480 MB Offline () *O Disk 4 Basic								
Basic 480 MB Offline () *O Disk 4 Basic	478 MB 99.87 GB							

- 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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