

Hitachi Content Platform Gateway Windows Cluster Setup with SAN Storage

V4.3.8

Windows Failover Clustering for Virtual and Physical Servers

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

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Chapter 1 Introduction

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

WARNING: The account being used to install the Cluster **must** have the ability to create a **cluster named object (CNO)**. Refer to the Microsoft Website <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.

Figure 1 - Windows Server Failover Cluster



NOTE:

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

Chapter 2 HCP and HCP Gateway Configuration

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

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

Figure 2.1 - Windows Start Menu



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

Figure 2.2 - Administrative Tools

File Home	Share	View Manage					~ 0	Open	
- → - ↑ 墙	< Syst	em and Security > Adm	inistrative Tools >	~ 0	Search Adm	ninistrative Tools	P	Open file location	
Quick access Desktop Downloads Documents Pictures System32 This PC	* * * *	Name Terminal Services Cluster-Aware Upd Component Service Computer Manage Defragment and Op Disk Cleanup Exect Viewer Failover Cluster Ma	n ting tis ment timize Drives	Date modified 7/16/2016 7:23 AM 7/16/2016 7:20 AM 7/16/2016 7:18 AM 7/16/2016 7:18 AM 7/16/2016 7:18 AM 7/16/2016 7:19 AM 7/16/2016 7:19 AM	Type File folder Shortcut Shortcut Shortcut Shortcut Shortcut Shortcut	Size 2 K 2 K 2 K 2 K 2 K 2 K 2 K	 A B B	Author ♥ Run as administrator Pin to Start 7-Zip CRC SHA ₩ Edit with Notepad++ ♥ Scan with Windows Defender Open with Pin to taskar ♥	
Database (D:)		Local Security Polic	у	7/16/2016 7:19 AM	Shortcut	2 K	B	Restore previous versions	
Storage (E:)		DDBC Data Sources	(32-bit)	7/16/2016 7:19 AM	Shortcut	2 K	8	Send to	3
Network		ODBC Data Sources Performance Monit	(64-bit) for	7/16/2016 7:18 AM 7/16/2016 7:18 AM	Shortcut	2 K 2 K	B	Cut <u>C</u> opy	
	_	Resource Monitor		7/16/2016 7:19 AM 7/16/2016 7:18 AM 7/16/2016 7:19 AM	Shortcut Shortcut	2 K 2 K	8 8	Create <u>s</u> hortcut <u>D</u> elete	
	1	Services	s, and configures Wind	7/16/2016 7:18 AM	Shortcut	2.16	8	Rename	
		System Information	1	7/16/2016 7:19 AM	Shortcut	2 K	B	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					
🗢 🔿 🔯 🔯	à 🗟 🛛 🖬 🕨 🖛 🖬 🕩					
Services (Local)	Services (Local)					
	SAM VFS	Name	Description	Status	Startup Type	Log ^
		Remote Desktop Services	Allows user	Running	Manual	Net
	Stop the service	Remote Desktop Services U	Allows the r	Running	Manual	Loc
	Increase one pervice	Remote Procedure Call (RPC)	The RPCSS	Running	Automatic	Net
	and a state of the	Remote Procedure Call (RP	In Windows		Manual	Net
	Description:	Remote Registry	Enables rem		Automatic (T	Loc
	SAM VFS monitor	Resultant Set of Policy Provi	Provides a n		Manual	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.

Figure 2.5 - Stop SAM VFS Service



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

Figure 2.6 - Find properties file



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

Figure 2.7 - Edit with Notepad++

Open with	
7-Zip	>
CRC SHA	>
Edit with Notepad++	
Scan with Windows Defender	

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

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

Figure 2.8 - Edit sam.properties Files

🗳 •C:	\SAM\etc\sam\sam.properties - Notepad++ [Administrator]
File E	dit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
sam.	
1	#Sun Aug 23 22:23:55 MDT 2020
2	backup.days=10
3	backup.dir=\\10.6.11.61\operation\$
1	backup.enabled=1
0	Dackup.password
7	backup.schedultu-v
8	backup.user=
9	binlog.folder="D:\MariaDB\binlog"
10	binlog.name=hcpg-l-bin 6
11	cluster=1
12	data.folder="D:\MariaDB\data"
13	database.binlog="C:\Program Files\MariaDB 10.4\bin\mysqlbinlog.exe"
14	database.dump="C:\Program Files\MariaDB 10.4\bin\mysqldump.exe"
15	database.ip=localhost
16	database.name=SAM
10	database.password=ug13vyJNMk+IH0FCwnydLg==
10	database port=3300
20	database.root.nasword=0gi3vuJNRe1H8FCNbudEg==
21	database.username=sam
22	letter=E:\
23	report.dir=E:\Reports
24	server.id=1 (2)
25	server.ignore=1 3
26	zip.program="C:\Program Files\7-Zip\7z.exe"
CA CA	SAM(etc)cam)cam properties - Notenade + (Administrator)
	anniec annihisteries - receber. Fraumanacol
File E	dit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
0	🗄 🐚 🐚 🎧 🔏 🔏 👘 🍈 ⊅ 🗲 📾 🖕 🍕 🍕 🕼 💁 1 🚺 🎩 🎯 🖉 🖉 💷 🗶 💷 🖉 🗎
🖂 sam.	properties 🖂
1	#Sun Aug 23 22:23:55 MDT 2020
2	backup.days=10
3	backup.dir=\\10.6.11.61\operation\$
4	backup.enabled=1
5	backup.password=
6	backup.scneaulea=u
1	backup.cype=network

6 backup.schedule=0
7 backup.user=
9 binlog.folder="D:\MariaDB\binlog"
10 binlog.folder="D:\MariaDB\binlog"
11 cluster=1
12 data.folder="D:\MariaDB\data"
13 database.binlog="C:\Program Files\MariaDB 10.4\bin\mysqlbinlog.exe"
14 database.dump="C:\Program Files\MariaDB 10.4\bin\mysqlbinlog.exe"
15 database.ip=localhost
16 database.pars=SAM
17 database.port=3366
19 database.port=3366
19 database.port=3306
10 database.port=3406
10 data

Step 9: Leave the SAM service not running.

26 zip.program="C:\Program Files\7-Zip\7z.exe"

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

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

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

Figure 2.9 – Select Guest OS

	CP I BUILIDI OTT III			
Microsoft Windows Server 2 ESXI 6.0 virtual machine Yes 4 8 GB	Power Guest OS Snapshots Console			
	Autostart Upgrade VIII Compatibility Compat			
d, but a newer version is available on t	Contestings Contesting Contestin			
Consumed host CPU Re Consumed host memory	C Defete Help Open in a new window			

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

Figure 2.10 – VMWare Tools Status



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

Chapter 3 Host IP Address Assignments

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

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

Figure 3.1 - Active/Passive Two Node Cluster Networks



Active/Passive Two Node Cluster

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

Interface Assignments

A. Management Interface Assignments

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

C. Private Interface Assignments

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

D. Storage Interface Assignments

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

Completed Network Diagram with IP Addresses

Figure 3.3 – Completed Network Diagram



Chapter 4 DNS Setup

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

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

Figure 4 – DNS

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.

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

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

SCSI Controller 0	LSI Logic SAS	~		0
SCSI Controller 1	VMware Paravirtual	Ŷ		0
SATA Controller 0				0
USB controller 1		~		0
Retwork Adapter 1	VM Network	~	Connect	0
Network Adapter 2	HCP Private Network	~	Connect	0
Network Adapter 3	VM Network	~	Connect	0
Network Adapter 4	HCP Private Network	~	Connect	0
GD/DVD Drive 1	Host device	~	Connect	0
Video Card	Default settings	~		

Figure 5.1 – View Network Adapters

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

Figure 5.2 – Configure Network Adapters on Node 1

Network Adapter 1	VM Network	() ~	Connect	0
Mill Network Adapter 2	HCP Private Network	2 ~	Connect	0
INN Network Adapter 3	VM Network	3 ~	Connect	0
INN Network Adapter 4	HCP Private Network	4 ~	Connect	0
S CD/DVD Drive 1	Host device	~	Connect	0
Video Card		~		

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

Mill Network Adapter 1	VM Network	1 ~	Connect	0
Retwork Adapter 2	HCP Private Network	2 ~	Connect	0
INI Network Adapter 3	VM Network	3~	Connect	٢
Matwork Adapter 4	HCP Private Network	4 ~	Connect	0
GD/DVD Drive 1	Host device	~	Connect	٥
Video Card		~		

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

Figure 5.4 – Configure Network Adapter Type

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

Step 6: Get MAC Addresses to update the Windows Networks

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

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

Figure 5.5 – Get Node 1 MAC Address

C:\Users\Adm MACAddress	ninistr	ator>wmic nic get Name,MACAddress,netconnection Name	ID NetConnectionID
	1	Microsoft Kernel Debug Network Adapter	
00:0C:29:65	68:0B	Intel(R) 82574L Gigabit Network Connection	Management
00:0C:29:65	68:1F	Intel(R) 82574L Gigabit Network Connection #3	Cluster
00:0C:29:65	68:15	Intel(R) 82574L Gigabit Network Connection #2 WAN Miniport (SSTP)	Private
		WAN Miniport (IKEv2)	
		WAN Miniport (L2TP)	
		WAN Miniport (PPTP)	
		WAN Miniport (PPPOE)	
		WAN Miniport (GRE)	
F6:72:20:52	41:53	WAN Miniport (IP)	
F8:DC:20:52	41:53	WAN Miniport (IPv6)	
FC:3E:20:52	41:53	WAN Miniport (Network Monitor)	
02:E6:17:5A	6C:2C	Microsoft Failover Cluster Virtual Adapter	
00:0C:29:65	68:29	Intel(R) 82574L Gigabit Network Connection #4	Storage
	0		0
	9		•

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

Figure 5.6 – ESXi MAC Addresses

▼ ■■ Network Adapter 1	VM Network ~
Status	Connect at power on
Adapter Type	E1000e 🗸
MAC Address	Automatic 🗸 00.0c:29.65.68.0b 1
▼ ■ 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)
• Mill Network Adapter 3	HCP Private Network
Status	Connect at power on
Adapter Type	E1000e 🗸
MAC Address	Automatic 🗸 00.0c.29.65.68.11 (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

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

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

Chapter 6 Set IP Addresses

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

Figure 6.1 – Network Interfaces



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

Figure 6.2 – Network Interfaces



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

Figure 6.3 – Change Adapter Options



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

Figure 6.4 – View Interfaces



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

Figure 6.5 – Interfaces after Name changes



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

Figure 6.6 – IPV4

Connect usin	ig:			
💭 Intel(R	() 82574L Giga	abit Network Corr	nection	
This connect	tion uses the f	ollowing items:	Config	ure
Cle	nt for Microsof and Printer SP Packet Sche met Protocol rosoft Network rosoft LLDP P met Protocol	ft Networks haring for Microso eduler Version 4 (TCP/II k Adapter Multiple rotocol Driver Version 6 (TCP/II	ft Networks (v4) (xor Protocol	<
<				>
Instal	_	Uninstall	Proper	ties

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

Figure 6.7 – Update IPV4

You	can	get IP bility.	settir Othe	ngs as rwise,	signed a you ne	ed to a	atical ask y	ly ou	if yo	our th	nel	ad	ork i min	sup	po
tor	the a	pprop	sate .	P set	ongs.										
C) 06	tain an	IP at	idress	automa	atically									
	Use	the fo	Non	ng IP a	oddress	1									
1	Pade	iress:				[10		6		15		21		
	ubne	t masi	C.			[255		255		0		0		
1	Defau	it gate	way:			[10		6	,	0		1		
	Ob	tain DN	S ser	ver ac	ódress a	sutoma	tical	v							
	Use	the fo	Novi	ng DNa	S server	addre	esses								
1	refe	red Dr	iS se	rver:		[10		6		2		21	٦	
	Vtern	ate Dr	IS se	ver:		ĺ	8	•	8	,	8		8]	
(]Va	idate :	settin	gs upo	on exit				6)	1	1	ldv	and	ced
								Г	0	0	e .		1		~

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

Figure 6.8 – Update Metric

acturys	DNS	WINS		
IP address	ies			
IP addr	ess		Subnet mask	
10.6.15	.21		255.255.0.0	
_		Add	Edit	Remove
Default ga	teways:			
Gatewa	y		Metric	-
10.6.0.	1		Automatic	
		Add	Edit	Remove
Autom	atic metr	ic		
Interface	metric:	1	2	

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

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

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

Figure 6.9 – Ghost Network Adapters



Chapter 7 Shared Disk Setup

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

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

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

A. Adding SCSI Controller

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

NOTE:

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

Figure 7.1 – Add SCSI Controller

Artual Hardware VM Options		0		
📃 Add hard disk 🛛 🛤 Add netw	ork adapter	Add other device		
CPU	4	CD/DVD drive		
Memory	8193	Serial port		
Hard disk 1	100	Parallel port		0
Hard disk 2	100	USB controller		0
Hard disk 3	100	Sound controller		0
SCSI Controller 0		Di PCI device	~	
SATA Controller 0		SCSI controller	2	0
USB controller 1		SATA controller SCSI control	ier 🗸	0
IN Network Adapter 1	1925			

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

Virtual Hardware VM Options]		
Add hard disk 🗰 Add netwo	ork adapter 🗧	dd other device	
III CPU	4	0	
Memory		MB v	
Hard disk 1	100	G8 ~	c
Hard disk 2	100	G8 ~	c
• 🛄 Hard disk 3	100	G8 ~	c
SCSI Controller 0	LSt Logi	sas v	
New SCSI Controller	ISLANK	848	

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

NOTE:

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

Figure 7.3 – Virtual SCSI Controller

New SCSI Controller	VMware Paravirtual	~	0			
SCSI Bus Sharing	Physical	~	2			
				8	Save	Cance

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	RE Add network a	dapter 🚍 /	Add other device	
+ CPU Add a h	ard disk to virtual ma	ichine 🗸	0	

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	KE Add network a	idapter 🚍 Add	d other device	
💻 New standard h	and disk		0	
Existing hard di	sk New standard	hard disk		

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

Figure 7.6 – Change Disk Size

Hard disk 3	100	GB	~		0
Rew Hard disk	40	✓ GB TB	0		٥
				Save	Cance

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

> 🛄 New Hard disk	512	MB ~	
SCSI Controller 0	LSI Logic	SAS	~

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

Figure 7.8 – Witness Disk Location

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 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).

NOTE:

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

Figure 7.12 – Change Sharing

Sharing Multi-writer sharing ~

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

Figure 7.13 – Save Changes

 Mew Hard disk 	512 MB V	2		0	
Maximum Size	30.7 TB				
Location	[datastore1] HCPG-Cluster-Node	-1/	Browse		1
Disk Provisioning	Thin provisioned Thick provisioned, lazily zeroec Thick provisioned, eagerly zero	f ied			
Shares	Normal ~	1000 🗸			
Limit - IOPs	Unlimited ~				
Controller location	SCSI controller 1 ~	SCSI (1:0)	~		
Disk mode	Independent - persistent				
Sharing	Multi-writer sharing ~				

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

Step 12: Power on the Node 1 VM.

NOTE:

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

Figure 7.14 – Run Disk Management

Type the name of a program, folder, document, or Internet resource, and Windows will open it for you. Open: diskmgmt.msc It is task will be created with administrative privileges.	Run		
Open: diskmgmt.msc Ø This task will be created with administrative privileges.	Ø	Type the name of a program, folder, do resource, and Windows will open it for	ocument, or Internet you.
This task will be created with administrative privileges.	Open:	diskmgmt.msc	~
		This task will be created with admi	nistrative privileges.

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.





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

Figure 7.16 – New Disk Status

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 %	
Omine	Unallocated							
					-			
*O Disk 3								

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

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

Figure 7.19 – Initialize Disk

1	Initialize Disk	
- I	Offline	
	Properties	
	Help	

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

Figure 7.20 – Initialize Disk Configuration



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

Figure 7.21 – Disk Online

Disk 2 Basic 480 MB Online	480 MB Unallocated
*O Disk 3 Unknown 100.00 GB Offline	100.00 GB Unallocated
Unallocated	Primary partition

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	¥/////////////////////////////////////		
480 MB	(480 MB	New Simple Volume 2	
Unline	Unallocated	New Spanned Volume	
		New Striped Volume	
ODisk 3	(New Mirrored Volume	
100.00 GB	100.00 GB	New RAID-5 Volume	
Offline 🚺	Unallocated	Properties	
		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.

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

Figure 7.24 – Set Volume Size

lew Simple Volume Wizard	×
Specify Volume Size	on the environment and minimum stress
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 💽 🚹
	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.

Figure 7.25 – Set Drive Letter

Assign the following drive letter:	E ~	
O Mount in the following empty NTFS folder:	Browse_	
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.

Figure 7.26 – Format Partition

New Simple Volu	me Wizard			×
Format Partiti	ion			
To store da	ta on this partition, yo	u must format it first.		
Choose wh	ether you want to for	nat this volume, and if	so, what settings you wa	nt to use.
ODon	ot format this volume			
1 ® Form	at this volume with th	e following settings:		
FI	e system:	NTFS	~	
A	ocation unit size:	Default	~	
W	ume label:	Wtness	2	
3 🛛	Perform a quick form	at		
	Enable file and folde	r compression		
			•	
		< Baci	k Next >	Cancel

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

Figure 7.27 – Finish

Completing the New Simple Volume Wizard	e
You have successfully completed the New Sin Wizard.	nple 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	D
Allocation unit size: Default Volume label: Witness Desch format: Yes	~
To close this wizard, click Finish.	
0	

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

(n. mp.) ((2)) 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 partitio)	on 1) Simple	Basic		Healthy (R_	499 MB	499 MB	100 %	
 (Disk 0 partitio 	on 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 %	
= Disk 2					(
Disk 2 Basic 496 MB Online	Witness 494 MB NTFS Healthy (Prima	2 ny Partition)			1			
- Disk 2 Basic 496 MB Online	Witness 494 MB NTF5 Healthy (Prima	79 ry Partition)						
Disk 2 Basic 496 MB Online Obisk 3 Paris	Witness 494 MB NTFS Healthy (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).

Figure 7.29 – Take Disk 2 Offline

Volume	Lavout	Type	File System	Status	Capacity	Free Spa	% Free		
 (C:) (Disk 0 partition (Disk 0 part (Disk 0 part Database (I Witness 	Simple 3) Simple New Spanned New Striped W New Mirrored New RAID-5 W Convert to Dyn Convert to MB Offline	Basic Rasic Volume Volume Volume Nume R Disk	NTFS	Healthy (B Healthy (R Healthy (F Healthy (P Healthy (P	89.40 GB 499 MB 99 MB 39.98 GB 494 MB	67.03 GB 499 MB 99 MB 39.79 GB 478 MB	75 % 100 % 100 % 100 % 97 %		
m Dick 2	Help				1				
Basic 496 MB 1 Online	Witness 494 MB NTFS Healthy (Prima	ry Partition)							4
*O Disk 3 Basic 99,98 GB Offline	99.98 GB Unallocated							-	

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

NOTE

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

Figure 7.30 – Results 2

(olume	Lavout	Type	File System	Chatur	Canacity	Free Sna	% Free	
(C:)	Simple	Basic	NTES	Healthy (B	89.40 GB	67.03 GB	75 %	
(Disk 0 partitio	on 1) Simple	Basic		Healthy (B.	499 MB	499 MB	100 %	
 (Disk 0 partitio 	on 2) Simple	Basic		Healthy (F.,	99 MB	99 MB	100 %	
Database (D:)	Simple	Basic	NTES	Healthy (P	39.98 GB	39.79 GB	100 %	
in Disk 3	-				1			
Olisk 2 Basic 196 MB Offline	494 MB							

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

Edit settings - HCPG-Cluster-Node	-2 ESXi 6.5 virtu	al machine)	
Virtual Hardware VM Options			
🔜 Add hard disk 🛛 🛤 Add network	adapter 😑 Ad	id other device	
CPU	4 - •	Add other hardware to this virtual machine	
Memory	8192	M8 v	
Hard disk 1	100	GB v	0

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

Figure 7.31 – SCSI Controller

OD/DVD drive	
Floppy drive	
USB controller	
USB device	
Sound controller	
PCI device	
SCSI controller	1
SATA controller	

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

NOTE:

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

Figure 7.32 – Configure New SCSI Controller

 New SCSI Controller 	VMware Paravirtual	~	0				
SCSI Bus Sharing	Physical	~	0				~
				3	Save	Canc	el

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

VM Options				
Add hard disk RB Add network	adapter 🗧 Ad	d other devic	e	
New standard hard disk	4	0		
Existing hard disk		-		
Existing hard disk	8192	MB	~	
New raw disk	100	GB	~	c

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

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

Figure 7.34 – Datastore Browser



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

NOTE:

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

Figure 7.35 – Update Witness Disk Settings

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.

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

Figure 7.36 – Windows Disk Management

0	Type the name of a program, folder, document, or Inter resource, and Windows will open it for you.
Open:	diskmgmt.msc
	This task will be created with administrative privile

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

Figure 7.37 – New Drives Added

	1		1	1		1		
lolume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
(C:)	Simple	Basic	NTES	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	NITTO	Healthy (E	99 MB	99 MB	100 %	
Database (D:)	Simple	Dasic	NIFS	Healthy (P	59.90 GB	59.79 GB	100 %	
*O Disk 2 Basic 496 MB Offline	94 MB							

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).

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 (G:)	Simple	Basic	NTFS	Healthy (P	99.98 GB	99.89 GB	100 %	
- Witness	Simple	Basic	NTFS	Healthy (P	494 MB	478 MB	97 %	
= Disk 2 Basic 496 MB	Witness 494 MB NTFS				1			
- Disk 2 Basic 496 MB Online	Witness 494 MB NTFS Healthy (Prima	ry Partition)						
Disk 2 Basic 496 MB Online Disk 3 Ratic	Witness 494 MB NTFS Healthy (Prima	ry Partition)						
Disk 2 Basic 496 MB Online Disk 3 Basic 99.98 GB 2	Witness 494 MB NTFS Healthy (Primar Shared Cache 99.98 GB NTFS	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).

A Party series as	Innet	Tune	Ele Sustem	Chathur	Canacity	Eres Con	% Eres	-	_
(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 %		
*ODisk 2 Basic 496 MB Offline	494 MB								
									_

Figure 7.39 – Node 2 drives offline

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

Chapter 8 Active Directory

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

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

Figure 8.1 – Windows Settings

+ + >	Quick access		~ ð	Search Quick access	p	
	System				- 0	×
Quick access Desktop	💉 🖶 🗉 🛧 🔜 > Contro	I Panel > System and Security > Sy	stem	~ 0	Search Control Panel	P
Downloads Documents	Control Panel Home	View basic information	about your computer			
Fictures	* Device Manager	Windows edition				
This PC 🔞	 Remote settings Advanced system settings 	Windows Server 2019 Stan	dard	14/5	adour Sequert 2010	
- Database (D)		to 2016 Microsoft Corpora	tion, valinghts reserved.		100WS Server 2015	
Network		System				
- Multica		Processor: Installed memory (RAM):	Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz 2.19 GHz (4 processor 8.00 GR	s)		
		System type:	64-bit Operating System, x64-based processor			
		Pen and Touch:	Pen and Touch Support with 10 Touch Points			
		Computer name, domain, and	d workgroup settings			
		Computer name:	HCPG-CN1		Schange s	ettings
		Full computer name: Computer description:	HCPG-CN1)
		Workgroup:	CLUSTER			
		Windows activation				
		Windows is not activated.	Read the Microsoft Software License Terms			
items		Product ID: 00429-00000-0	00001-AA815		SActivate W	lindows
i items		Product ID: 00429-00000-0	00001-AA815		S Activate W	lindov
	See also					
	Security and Maintenance					

Step 2: In the 'System Properties' screen, click 'Computer Name'

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

Figure 8.2 – Computer Name/Domain Name

Computer Name/Dom	nain Changes		
You must r these chan Before restarti programs.	restart your computer to apply iges ing, save any open files and close all		
System Properties	7 OK	×	
Windows use on the networ	is the following information to identify your computer rk.	Computer Name/Domain Changes	×
Computer description:	For example: "IIS Production Server" or "Accounting Server".	You can change the name and the members computer. Changes might affect access to n	hip of this etwork resources.
Full computer name: Workgroup:	HCPG-CN1 CLUSTER 2	Computer name:	
To rename this compute workgroup, click Chang	r or change its domain or Change e.	HCPG-CN1 3 Full computer name: HCPG-CN1	More
		Member of Domain: dts-evlab.com O Workgroup:	
	OK Cancel Apply	CLUSTER	Cancel

Figure 8.3 – Join a Domain



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

Chapter 9 Adding Failover Cluster Software

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

PowerShell Method

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

Figure 9.1 – PowerShell script



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

Figure 9.2 – Windows Control Panel

and a second sec	View						
- + 🗟 + Control	Panel + System and Security + Administrative	Toels +			~ 6	Search Administrative Tools	p
^	Name	Oute modified	7504	Sue			
Quick access	Terminal factors	2016/02/14 2012 AM	Ets bridge				
Desitop 💉	Charles feeta likebies	NUMBER OF ALL	The result	1.0			
🕹 Downlowds 💉	Company Section	TURNEY AND AND AND	Source #	1.10			
Documents #	Comparing Manager	NUMBER OF STREET	Destort	210			
1000007	Definition and Ontering Oncore	NUMBER OF STREET	Second .	110			
faith and farment	Did Chaun	5/16/16/16 TO B A&A	Second Second	1.0			
FRIDE WED SPACE IF	E Cont Viene	Disercent Tolk And	Danta A	110			
log	S Exhan Contra Manadar	NAMES AND ADDRESS OF ADDRESS ADDRESS OF ADDRESS OF ADDR	Sec. 1	2.08			
Temp	SC Statester	Scheroline Sciences	Down d	2.48			
This PC	A Lord Security Palicy	2/16/2014 2/10 044	Sector 4	119			
Baritan	A Minnest Anna Sanara	NUMBER OF A DAMAGE AND A DAMA	Contrast.	2.00			
27 Cramp	CORC Data Sources (22, NR	2/16/22/16 2/18 244	Sec.4	1.0			
Documents	CERC Data Source: (M. M.	NUMBER OF A DAMAGE	Sugar, 4	2.00			
Downioads	Order Det alder (or org)	WHEN THE THE ALL	Sector 4	1.00			
Music	Se Good Management	Transforme White Aste	Share d	2.48			
Pictures	() Records Marches	NUCCESSION THE DAY	Contra d	110			
Widees	Samer Manager	NUMBER OF STREET	Sector 4	110			
Local Dark (C.)	C familia	3/50/2005 41-01 (04	Destored.	140			
New Schlarer (D.S.	Suter Configuration	2/16/2016 212 284	Dane.	2.40			
- new systeme (b.)	Solar binnetics	WHEN PARTY AND AND	Contra A	1.0			
 New volume (E) 	O Tod Scheduler	NUMBER OF ANY	Sugar, a	210			
Test2 (//localhost) (/	Window Errenit with Advanced Security	2/16/02/16 2/18 244	Course of	119			
🛫 sam (1\192.168.42.91	P whowin news with Advanced security	TO DESCRIPTION OF THE ABOR	Sector 4	112			
	Ser wandows wearded cysilliouse	C REPORT OF SHARE	and the second	2.10			

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

Server Manager Method

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

Figure 9.3 – Add Roles



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

Figure 9.4 – Next



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

Figure 9.5 - Next



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

Figure 9.6 – Select Destination Server

Select destinati	on server			DESTING HCPG-CN1	ATION SER	COM
Before You Begin	Select a server or a virtual h	ard disk on which	to install roles and features.			
Installation Type	Select a server from the	server pool				
Server Selection	 Select a virtual hard disk 	k 🐂				
Server Roles	Server Pool					
Features						
	Filter:					_
	Name	IP Address	Operating System			
	HCPG-CN1.dts-evlab.com	10.6.11.21,10.6.	Microsoft Windows Server	r 2016 Standard		
	1 Computer(s) found					_
	This page shows servers the and that have been added newly-added servers from v	at are running Win by using the Add S which data collecti	dows Server 2012 or a newer Servers command in Server M on is still incomplete are not	release of Wind lanager. Offline s shown.	lows Serv servers ar	nd
		< Pre	vious Next >	Install	Cance	el

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

Select server ro	les	DESTINATION SERVER HCPG-CN1.dts-eviab.com
Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Image: Select one or more roles to install on the selected server. Roles Image: Server Services Active Directory Relation Services Active Directory Lightweights Directory Services Active Directory Lightweights Directory Services Device Health Attestation DHCP Server DNS Server File and Storage Services (2 of 12 installed) Host Guardian Service Hyper-V	Description Active Directory Certificate Services (AD CS) is used to create 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).

Figure 9.8 – Select Features

Before You Begin	Select one or more features to install on the selected server.	
Installation Type Server Selection Server Roles	Features Image: Image and the second secon	Description NET Framework 3.5 combines the power of the NET Framework 2.0
Features Conferencies Results	Eacligiound Intelligent Transfer Service (BTS) Efficience Transfer Encryption Bitlocker Network Unlock Exerciticative Cleast for NPS Constainers Data Centre Bridging Divest Play Enhanced Darage Falouer Clastening Coup Policy Management 10 Quality of Service ES Hostable Wileb Core Es Host	building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provid the ability to model a range of business processes.

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

Figure 9.9 – Add Roles and Features Wizard

	oles and reatures wizard	
Add 1	features that are required for Failover Clustering?	
The follower to	lowing tools are required to manage this feature, but do not o be installed on the same server.	
4 Re	mote Server Administration Tools	٦
1	Feature Administration tools A Failover Clustering Tools	
	- I dilater enastering loans	
	[Tools] Failover Cluster Management Tools	
	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
4	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh	e
< 3	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh clude management tools (if applicable)	e
< V In	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh clude management tools (if applicable)	e
< V In	[Tools] Failover Cluster Management Tools [Tools] Failover Cluster Module for Windows PowerSh clude management tools (if applicable) Add Features Cancel	e

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

Figure 9.10 – Select Features

OESTINATION SERVER Rec1+4CR541-14.attuchang.com
Description
Falover Clustering allows multiple servers to work together to provide high availability of server roles. Falower Clustering is often used for File Services, virtual machines, distabase applications, and mail applications.

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

Figure 9.11 – Confirm Selections



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

Figure 9.12 – Installation a Success

Add Roles and Features Wit	ard	-		×
Installation prog	gress	DESTIN- HCPG-CN1	ATION SER	VER
	View installation progress Feature installation Installation succeeded on HCPG-CN1.dts-eviab.com.			
Features Confirmation Results	Failover Clustering Remote Server Administration Tools Feature Administration Tools Failover Clustering Tools Failover Cluster Management Tools			
	You can close this wizard without interrupting running tasks. View task page again by clicking Notifications in the command bar, and then Task Export configuration settings	progress or Details.	open this	5
	< Previous Next >	Close	Cance	el

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

Chapter 10 Validating the Nodes are Cluster Ready

Step 1: Login to Node 1.

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

Figure 10.1V – VM – Open Failover Cluster Manager



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

Figure 10.1S – Windows Administrative Tools



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

Figure 10.2 – Failover Cluster Manager

墙 🖸 📕 🖬 Adr	ninistr	ative Tools			- 0	×
File Home	Share	View				× 🕐
← → - ↑ 葡	er Sys	tem and Security > Administrative Tools >	~ 0	Search Adm	inistrative Tools	Q
		Name	Date modified	Туре	Size	^
Quick access		Terminal Services	7/16/2016 7:23 AM	File folder		
Desktop	1	👧 Cluster-Aware Updating	7/16/2016 7:20 AM	Shortcut	2 K8	8
Downloads	1	A Component Services	7/16/2016 7:18 AM	Shortcut	2 KE	8
Documents	*	S Computer Management	7/16/2016 7:18 AM	Shortcut	2 Ki	8
Fictures	1	Defragment and Optimize Drives	7/16/2016 7:18 AM	Shortcut	2 KB	в
-		Jisk Cleanup	7/16/2016 7:19 AM	Shortcut	2 KE	8
This PC		3 Event Viewer	7/16/2016 7:18 AM	Shortcut	2 Ki	8
_ Database (D:)	ิก	Failover Cluster Manager	7/16/2016 7:20 AM	Shortcut	2 KE	В
6	-	Manages Windows Failover Clusters	7/16/2016 7:18 AM	Shortcut	2 Ki	в
Storage (E:)		Local Security Policy	7/16/2016 7:19 AM	Shortcut	2 KB	8

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

Figure 10.3 – Validate Configuration

Failover	Thurter Manager	er Manager	^	Actions
0	Create Cluster Connect to Cluster	allover clusters, validate hardware for potential failover clusters, and configuration changes to your failover clusters.		Failover Cluster Man
View Refresh Properties Help	 riew er is a set of independent computers that work together to increase the erver roles. The clustered servers (called nodes) are connected by and by software. If one of the nodes fails, another node begins to 		Connect to Clus View	
	is. This process is known as failover.		Properties	

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

Figure 10.4 – Read Before You Begin



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

Figure 10.5 – Select Servers

Before You Begin	To validate a set of se	rvers, add the names of all the servers.	
Select Servers or a Ouster	To test an existing clu	ster, add the name of the cluster or one of its nod	es.
Testing Options	Enter name:	hopg-on1 hopg-on2	Browse
/alidating	Selected servers:		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).

Figure 10.6 – Select Servers

Before You Begin To validate a set of servers, add the names of all the servers. To test an existing cluster, add the name of the cluster or one of its nodes. Cluster Testing Options Confirmation Enter name: hcpg-cn1 hcpg-cn2	
Testing Options Enter name: hcpg-cn1 hcpg-cn2	
Validation Selected servers: A HCPG-CN1.dts-eviab.com	Browse
HCPG-CN2.dts-eviab.com	Remove
2	

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

Uration Wizard	×
Choose between running all tests or running selected tests. The tests examine the Cluster Configuration, Hyper-V Configuration, Inventory, Network, Storage, and System Configuration. Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2016."	
Run all tests (recommended) Run only tests I select More about cluster validation tests	
	uration Wizard Options Choose between running all tests or running selected tests. The tests examine the Cluster Configuration, Hyper-V Configuration, Inventory, Network, Storage, and System Configuration. Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wirard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2016." Run all tests (recommended) Run only tests I select More about cluster validation tests (Previous) Next > Cancel

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

Figure 10.8 – Start Tests

Before You Begin	You are ready to start validation.		
Select Servers or a Duster	Please confirm that the following settings are correct:		
Testing Options	Servers to Test		>
Confirmation	HCPG-CN1.dts-eviab.com		- 10
Validating	HCPG-CN2.dts-eviab.com		
Summary	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 RIOS Information	loweston	~
		1.122.00	
	To continue, click Next.	•	

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

Figure 10.9 – View Report

Summar	Y .		
fore You Begin lect Servers or a ister	Testing has completed for the tests you selected. You show cluster solution is supported by Microsoft only if you run all succeed (with or without warnings).	ild review the warnings in the cluster validation tests, and a	e Report. A all tests
sting Options	Node		^
nfirmation	HCPG-CN1.dts-evlab.com	Validated	
dation	HCPG-CN2.dts-evlab.com	Validated	
outrig	Result		
nmary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	
	List Ehm Channel Hart Due Adapter	C.usassas	v
	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

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 the Storage Spaces subsystem. Some storage devices require specific firmware versions commands needed by clustered storage pools that use the Storage Spaces subsystem. 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 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. Contact your storage administrator or storage vendor for help with configuring the storage 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. 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: If there are any errors or warnings, click the '**Finish**' button (Figure 10.11.1) to continue. To correct any errors or warnings, minimize the 'Failover Cluster Manager' window. Correct any issues, then return to the '**Failover Cluster Manager**' window in Step 3 and run Steps 3 – 9 to

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

Figure 10.11 – Test Results

Select S	Servers or a Cluster		
fore You Begin lect Servers or a uster	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).	Id review the warnings in the cluster validation tests, and	e Report. A all tests
sting Options	Node		^
nfirmation	HCPG-CN1.dts-eviab.com	Validated	
Edation	HCPG-CN2.dts-evlab.com	Validated	
Roderny	Result		
Summary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	1.00
	List Elver Channel Heat Due Adapters	Currenter	~
	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

Chapter 11 Creating the Failover Cluster

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

Figure 11.1 – Create Cluster

Summar	y		
efore You Begin elect Servers or a luster	Testing has completed for the tests you selected. You show cluster solution is supported by Microsoft only if you run all succeed (with or without warnings).	id review the warnings in t cluster validation tests, and	he Report. /
esting Options	Node	100.00	
onfimation	HCPG-CN1.dts-ev/ab.com	Validated	
alidation	HCPG-CN2.dts-ev/ab.com	Validated	
maariy	Result		
mmary	List BIOS Information	Success	
	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	
	List Ehm Occurred Heat Day Advetors	C	
	Create the cluster now using the validated nodes		
	To view the report created by the wizard, click View Report. To close this wizard, click Rnish.	Vie	w Report

Kailover Cluster Manager

File Action	View Help
de 🔿 🛛 🔂 🕯	2 💼
🖓 Failover C	Validate Configuration Create Cluster
	View >
	Refresh
	Properties
	U.V.A. (Nuctor

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

Figure 11.2 – Start



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

Before You Begin	Type the name yo	want to	use when admi	nistering the c	luster.					
Access Point for Administering the	Cluster Name:	HCPG	icl 🚺					_	_	
Cluster										
Cluster Confirmation	The NetBIOS	name is lim	nited to 15 char network to be	acters. One	or more IPv4 are the netw	address ork is se	es coul lected.	and th	e co	nfigured
Cluster Confirmation Creating New Cluster	The NetBIOS automatically. address.	name is lim For each	nited to 15 char n network to be	acters. One used, make s	or more IPv4 sure the netw	address ork is se	es coul lected,	d not b and th	ne co	nfigured /pe an
Cluster Confirmation Creating New Cluster Summary	The NetBIOS automatically. address.	name is lin For each	nited to 15 char n network to be Networks	acters. One used, make s	or more IPv4 sure the netw	address ork is se Addres	es coul lected,	d not b and th	hen t	nfigured /pe an

Figure 11.3 – Enter Access Points

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

Figure 11.4 – Confirm Info

Confirma	tion	
efore You Begin ccess Point for dministering the	You are ready to create a cluster. The wizard will create your cluster with the following settings:	
luster	Cluster	^
onfirmation	HCPG-CL	
Creating New Cluster Summary	Node	
	HCPG-CN1.dts-evlab.com	
	HCPG-CN2.dts-evlab.com	
	Cluster registration	
	DNS and Active Directory Domain Services	~
	Add all eligible storage to the cluster.	
	To continue, click Next.	

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		
Before You Begin Access Point for Administering the	You have successfully completed the Create Cluster Wizard.	
Cluster	Node	/
Confirmation	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. To close this wizard, click Finish.	View Report
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View Report

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

Figure 11.6 – Expand Cluster Details



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

Figure 11.7 – Check Disk Sizes

Failover Cluster Manager Weight HCPG-CL.dts-evlab.com Roles Nodes	Disks (2)					
HCPG-CL.dts-evlab.com	Search		P Queries ▼	. • •		
Nodes	Name	Status	Assigned To	Owner N		
v 📇 Storage 🛛 🙎	Custer Disk 1	() Online	Disk Witness in Quorum	HCPG-CI		
Disks	Cluster Disk 2	() Online	Available Storage	HCPG-CI		
	<			>		
	👻 🦉 Cluster Disk	¢ 2				
	V.1					

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

Figure 11.8 – Configure Quorum Settings



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

Figure 11.9 – Select Quorum Witness

lefore You Begin	Select a quorum configuration for your cluster.
elect Quorum onfiguration Option	O Use default quorum configuration
elect Quorum	The cluster determines quorum management options, including the quorum witness.
onfirmation 1	Select the quorum witness
onfigure Cluster uorum Settinas	You can add or change the quorum witness. The cluster determines the other quorum management options.
mmany	Advanced quorum configuration
uning j	You determine the quorum management options, including the quorum witness.
	Failover Ouster Quorum and Witness Configuration Options

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

Figure 11.10 – Configure Disk Witness



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

Figure 11.11 – Configure Disk Witness

Refore You Begin Relect Quorum Configuration Option	Select the r	torage volume th	nat you want to assign a	s the disk witness.	
Select Quorum Vitness	Name		Status	Node	Location
Configure Storage Witness Confirmation		Ouster Disk 1 Cluster Disk 2 Volume: (H)	Online Online File System: NTFS	HCPG-CN2 HCPG-CN2 446 MB free of 478 MB	Ouster Group Available Storage
onfigure Cluster luorum Settings	0				
ummary					

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

Figure 11.12 – Confirmation

lefore You Begin	You are ready to configure the quorum settings of the clus	ter.	
elect Quorum onfiguration Option			
elect Quorum	Configure Cluster Quorum Settings		^
reness	Disk Witness	Cluster Disk 1	
onfigure Storage Itness	Cluster Managed Voting	Enabled	
onfirmation	Voting Nodes:		
onfigure Cluster uorum Settings	All nodes are configured to have quorum votes		
Summary			~
	To continue, click Next.		

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	Ouster Disk 2	
Summary		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View Report
		Datab
		Pinish

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

Figure 11.14 – Verification

Failover Cluster Manager File Action View Help				
🗢 🏟 🖄 📷 📓 📷				
Bailover Cluster Manager	Disks (2)			
 HCPG-CL.dts-evlab.com Roles Nodes Storage 	Search		₽ Queries ▼	
	Name	Status	Assigned To	Owner No
	2 Ouster Disk 1	() Online	Available Storage	HCPG-C
Disks Pools Enclosures Networks Cluster Events	3 Guster Disk 2	Online	Disk Witness in Quorum	HCPG-CI
	<	_		1

Step 15: Verify if Database Replication is configured.

IMPORTANT NOTE:

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

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

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

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

Chapter 12 Setting Up a Service Role

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

Figure 12.1 – Configure Role

Roles	Configure Role
Node:	Validate Cluster
🗸 📇 Storag	View Validation Report
E Po	Add Node
En En	Close Connection
R Cluste	Reset Recent Events
-	More Actions

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

Select Service Client Access Point Select Storage Replicate Registry Settings Confirmation DFS Namespace Server DFS Namespace Ser	Before You Begin Select Role	Select the role that you want to configure for high av-	alabilty:		
	Select Service Client Access Point Select Storage Replicate Registry Settings Confirmation	DFS Namespace Server DHCP Server Distributed Transaction Coordinator (DTC) File Server Generic Application Generic Script	Î	Description: You can configure high availability for some services that were not originally designed to run on a cluster. For more information, see <u>Configuring Generic</u> <u>Applications</u> , <u>Scripts</u> , and <u>Services</u> .	
Configure High Availability S⊂ISCSI Target Server	Configure High Availability Summary	Hyper-V Replica Broker CriSCSI Target Server	~		

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

Figure 12.3 – Select VFS



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

Example: \\10.6.11.23 \< share name>

Figure 12.4 – Client Access Point

y Wizard	nt				2
Type the Name:	name that	t clients will t	use when accessing this clustered r	ole:	
1 The N autom addre	etBIOS natically.	ame is limiter For each ne	d to 15 characters. One or more If twork to be used, make sure the n	Pv4 addresses could not be configured etwork is selected, and then type an	6
		N	etworks	Address	1
	2		10.6.0.0/16	10 . 6 . 11 . 23	1
	-				
			< Previo	ous Next > Cancel	1
	y Wizard Cocess Point Type the Name: Name: The N auton addre	y Wizard CCCESS Point Type the name that Name: 1 The NetBIOS n automatically. address. 2	y Wizard CCESS Point Type the name that clients will on Name:	y Wizard CCESS Point Type the name that clients will use when accessing this clustered in Name: 1 HCPG The NetBIOS name is limited to 15 characters. One or more II automatically. For each network to be used, make sure the n address. 2 Networks 2 10.6.0.0/16	y Wizard CCESS Point Type the name that clients will use when accessing this clustered role: Name: 1 HCPG The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address. 2 Networks Address 2 Networks Address 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



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

Figure 12.6 – Replicate Registry Settings

Replicat	te Registry Settings	
Before You Begin Select Role Select Service Client Access Point Select Storage Replicate Registry	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.	
Confirmation		
Configure High Availability	14	
Summary	Add Modely Elemove	
	d Brandown Manaka Concerd	

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

Figure 12.7 – Replicate Registry Confirmation

Before You Begin	You are ready to configure high availa	ability for a Generic Service.	
Select Service	Network Name		^
Jent Access Point	10.6.11.23	HCPG	
elect Storage	OU		
ettings	<unavailable></unavailable>		
onfirmation	Storage		
onfigure High	Cluster Disk 1		
wailability	Registry Keys		100
iummary			*

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

Figure 12.8 – Summary

High Availability	Wizard	×
Before You Begin Select Role	High availability was successfully configured for the role.	
Select Service	Service	
Client Access Point	SAM VFS (SAMVFS)	
Select Storage	Network Name	
Replicate Registry	HCPG	
Settings	OU	
Confirmation	<ur><unavailable></unavailable></ur>	
Configure High	IP Address	
Summary	10.6.11.23	
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	Vew Report
		2 Finish

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

Failover Cluster Manager	Roles (1)					Actions	
V C HCPG-CL.dts-evlab.com	Search			P Queries -		Roles	
Nodes	Name	Status	Туре	Owner Node	Priority	R Configure Role	
V 🛃 Storage	() HCPG	Running	Generic Service	HCPG-CN1	Medum	Virtual Machines	•
Pools	-			2		1 Create Empty Role	
Enclosures						View	
Networks						G Refresh	
E Cluster Events						P Help	
						HCPG	
						G Start Role	
						C Stop Role	
						Add File Share	
						Move	
						S Change Startup Priority	
						M Information Details	
						Show Critical Events	
	8					Add Storage	
	Y CAHCPG			Preferred Owners:	Any node	Add Resource	,
	NO					More Actions	
	Status:	Running				× Remove	
	Priority:	Medum				Properties	
	Client Access Name:	HOPG				Help	
	IP Addresses:	10.6.11.23				-	

Step 11: Scroll down and click the **Resources** tab (Figure 12.10.1). Rightclick 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

ver Cluster Manager	Roles (1)					Actions		
CPG-CL.dts-evlab.com	Search			P Queries	• • •	Roles		
Nodes	Name	Status	Type	Owner Node	Priority	89 Configure Role.	10	
Storage	() HCPG	Running	Generic Service	HCPG-CN1	Medum	Virtual Machine	L.	
Pools						Create Empty Ro	sle	
Enclosures						View		
Networks Cluster Events						Refresh		
g control creats						Help		
						SAM VFS		
						Bring Online		
						Take Offline		
						R Information Det	ails	
						Show Critical Ev	ents	
	1			1		Plans Artises		
	8		_		SAM VFS Prope	rties	Registry R	plication Policies
	× 🛞 HCPG			Preferred Own	SAM VFS Prope Advan General Specify the res be brought only	rties ced Policies 3 Depender sources that must be broug ine:	Registry R noies ght online before th	plication Policies is resource can
	 HCPG Name 			Preferred Own	SAM VFS Prope Advan General Specify the res be brought onl AND/	ord Policies Ceel Po	Registry R ncies ght online before th	plication Policies is resource can
	 ✓ Contract HCPG Nane Skorage 			Preferred Out Status	SAM VFS Prope Advan General Specify the res be brought oni AND/	ced Policies ced Policies Depende ources that must be broug ne: OR Resource Name: HCPG	Registry R ncies ght online before th	plication Policies is resource can
	 C V Control Control	2	_	Preferred Over Status () Online	SAM VFS Prope Advan General Specify the res be brought on AND AND	Contemporary Conte	Registry R ncies (ht online before th	> Polces is resource can
	✓ V HCPG Name Sorage G. Custer Data Shared	2 Cashe (G)	_	Preferred Our Status () Online	SAM VFS Prope Advan General Specify the ren be brought onl AND/ AND Click her	Advance Anticeservices Contemporation Contemporation Contemporation Contemporation Contemporation Contemporation Contemporation Contemporation	Registry R ncies jht online before th	plication Policies is resource can
	 ✓ Work HCPG Name Storage ⇒ E Custer Dek 2 Shared ✓ hTFS 9 	2 Cache (G) 9.9 G8 free of 100.0 GB		Preferred Own Status (*) Online	SAM VFS Prope Advan General Specify the res be brought of AND AND Click her	Context Contex	Registry R ncies jet online before th	plication Policies is resource can
	 ✓ Or HCPG Name Storage ⇒ E Outer Dak 3 Shared Shared Server Name 	2 Cache (G) 5 5 GB free of 100 0 GB		Preferred Out Status (*) Online	SAM VFS Prope Advan General Specify the res be brought on AND AND Click her	Control of the second s	Registry R noies git online before th	plication Policies Is resource can
	C V Control HCPG Name Storage ⇒ Bouter Deks Started NHTFS 9 Server Name S ∰ Name: HCPG	2 Cache (G) 9 5 GB free of 100 0 GB		Preferred Out Status (*) Online (*) Online	SAM VFS Prope Advan General Specify the res be brought on AND AND Click her	Construction of the second sec	Registry R noies git online before th	plication Policies Is resource can
	Kores HCPG Name Sorage ≣ @ Ounter Dak 0 Sarad Sa	2 Cache (G) 9.9 GB free of 100.0 GB 6 10. 10.6.11.23		Preferred Own Status (*) Online (*) Online (*) Online	SAM VFS Prope Advan General Specify the ren be brought of AND AND Click her	Content of the second s	Registry R noise dt online before th	plication Policies is resource can
	 Comparison (Comparison) Control (Comparison)<td>2 Cache (G) 55 GB feee of 100 0 GB 5 5 10 6.11 23 2</td><td>_</td><td>Preferred Our Status (e) Online (f) Online (f) Online (f) Online (f) Online (f) Online</td><td>SAM VFS Prope Advan General Specify the ret be brought of AND • Click her</td><td>Construction Co</td><td>Registry R jet online before S</td><td>> Policies is resource can</td>	2 Cache (G) 55 GB feee of 100 0 GB 5 5 10 6.11 23 2	_	Preferred Our Status (e) Online (f) Online (f) Online (f) Online (f) Online (f) Online	SAM VFS Prope Advan General Specify the ret be brought of AND • Click her	Construction Co	Registry R jet online before S	> Policies is resource can
	C V Conter Data 2 Storage Storage Shared	2 Cache (G) 9 5 GB feee of 100 0 GB i is: 10.6.11.23 2		Professed Own Status Orline Orline Orline Orline Orline	SAM VFS Prope Advan General Secoly the re be brought on the be brought on the be brought on the AND • Clock here	Conter Dak 2 Conter Dak 2 Conter Dak 2 Conter Dak 2	Registry R notes pht online before the a	Delete
	Korage ■ ﷺ Custer Dak J Storage ■ ﷺ Custer Dak J Striver Name ■ ﷺ Name: HCPG ■ Moder Poder Roles SAM VSS	2 Cache (G) 9.9 GB fees of 100 0 GB 1 10.6.11 23 2		Preferred Our Status (*) Online (*) Online (*) Online (*) Online	SAM VFS Prope Advan Spectry the re- be brought on a AND • AND • Click here	AND Outer Det 2	Registry R pit ordine before S	Delete

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

Figure 12.11 – Add IP Address Dependency



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

Figure 12.12 – Windows File Explorer

Image: State File Home Share	View		
← → * ↑ ☐ > Cad	Name	Date modified	Туре
Quick access Desktop Pownloads Pocuments	Cluster SAM SAM_Link	7/7/2020 2:16 PM 7/7/2020 2:46 PM 7/7/2020 2:46 PM	File folder 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

Failover Cluster Manager	Roles (1)				
Roles	Search				
Nodes	Name	Status		Туре	Owne
) 👸 Storage 🦓 Networks 🔁 Cluster Events	0 H 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Start Role Stop Role Add File Share Move Change Startup Priority Information Details	•	Generic Service	HCP
	3	Show Critical Events Add Storage Add Resource			
		More Actions	•		
	×	Remove			
	5	Properties			

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

Select Profile	File share profile:	Description
orare Location Drare Settings Permissions Confermation Issuids	SMB Share - Advanced SMB Share - Applications NFS Share - Quick NFS Share - Advanced	SMB file share, typically used to share files with Windows-based computers. • Suitable for general file sharing • Advanced options and be configured later by using the Properties dialog

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

Figure 12.15 – New Share Wizard

			the system	
G:	99.8 GB	99.9 GB	NTFS	
plume. /pe a custom path:				_
HCPGClusterRole				Browse

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

Figure 12.16 – Specify Share Name

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

Figure 12.17 – Other Settings

folder from the user's view.
Senable continuous availability
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. Ø Allow caching of share Caching makes the contents of the share available to offline users. If the BranchCache for Network Files role senice 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. Encypt data access When enabled, remote file access to this share will be encrypted. This secures the data against unauthorized access while the data is transferred to and from the share. If this box is checked

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

Figure 12.18 – Permissions
Select Profile Share Location	Permission	s to access the files on a sha is, and, optionally, a central a	re are set using a access policy.	combination of folder permissions, sh	are
Share Name Other Settings	Share per Folder per	nissions: Everyone Full Cont missions:	lo		
Permissions	Type	Principal	Access	Applies To	
Confirmation	Allow	BUILTIN/Users	Special	This folder and subfolders	
	Allow	8UILTIN/Users	Read & execu	This folder, subfolders, and files	
	Allow	CREATOR OWNER	Full Control	Subfolders and files only	
	Allow	NT AUTHOR/TY/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	
	Custom	ize permissions			

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

Figure 12.19 – Registry Finish

Failover Cluster Manager	Roles (1)			
HCPG-CL.dts-evlab.com	Search			
Nodes	Name		Status	Туре
V 🔀 Storage B Disks Pools	C HCPG	00	Start Role Stop Role	Canada
Enclosures Networks			Add File Share	
Cluster Events		1	Move	
		۲	Change Startup Priority	
		1	Information Details Show Critical Events	
		2	Add Storage Add Resource	
	<		More Actions	
		×	Remove	

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

Figure 12.20 – Choose Owner

Inneral	P.4.				
er rer a	Fallover				
	HCPG				
Name:					
HCPG					
Prefer	red Owners				
	ICPG-CN1 ICPG-CN2			•	Up
	ICPG-CN1 ICPG-CN2				Up Down
Priority	ICPG-CN1 ICPG-CN2		~		Up Down
Priority:	ICPG-CN1 ICPG-CN2 Medium Running	1	~		Up Down
Priority Status: Node:	ICPG-CN1 ICPG-CN2 Medum Running HCPG-CN	1	~		Up Down
Priority Status: Node:	ICPG-CN1 ICPG-CN2 Medum Running HCPG-CN	1	~		Up Down

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

Figure 12.21 – Verify



Chapter 13 Test the Cluster Configuration

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

IMPORTANT NOTE:

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

IMPORTANT NOTE:

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

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

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

Figure 13.1 – Map Client to Share using IP address



Figure 13.2 – Map Client to Share using UNC path



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

Figure 13.3 – Copy a file



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

Figure 13.4 – Wait for File to go offline



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

Figure 13.5 – Copy File to Desktop



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

Chapter 14 Modify Gateway Cluster Share and NTFS Permissions

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

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

Figure 14.1 – Cluster Role Shares

Nodes Name Status Type Owner Node Proty Homaton Storage Disks PB-BCRGW414R PB-BCRGW414R PB-BCRGW414-R PB-BCRGW414-R PB-BCRGW414-R PB-BCRGW414-R Path Protocol Continuous Availability Remarks PB-BCRGW414-R Path Protocol Continuous Availability Remarks PCFGOLaterRole SMB No Cuter Default Share C1 G:SAM-Wethine1 SMB No C1 G:SAM-Wethine1 SMB No SMB No SMB No SMB No SMB No SMB No SMB SMB	Roles 1	Search	10.000				P Queries	- 6
Click Control Con	Nodes Storage	Name	Status	Туре	Owner Node	Priority Informati	ion	
Image: Control of Control o	Disks Dools Pools Enclosures Networks Cluster Events		Charles					
Name Path Protocol Continuous Availability Remarks 2 G3 G-1 SME No Ouster Default Share 2 HCRGOLsterRoles G-VECPGOLsterRole SME Yes 2 C1 G-SAM-Archive1 SME No		<	414-R				Preferred Owners	User. ⁴
GS G1 SMB No Quiter Default Share HCPGQuiterRoles G1HCPGQuiterRole SMB Yes C1 G1SAM/Archive1 SMB No		beatimarkatedu, pa. 20	Path	Protocol	Continuous Availability	Remarks		
HCFGCusterRole SMB Yes C1 G:SAMVActive1 SMB No		Name		SMR	No	Ouster Default Share		
C1 C1 G^SAM/Archive1 SMB No		Name J G\$	G:\	Contraction of the second seco				
		Name GS HCPGOusterRoleS	G:\ G:\HCPGOusterRole	SMB	Yes			
		Name J GS J HCPGOusterRoleS J C1	G:\ G:\HCPGOusterRole G:\SAM\Archive1	SMB SMB	Yes No			

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
J G\$		G:\	SMB	No	Ouster Default Share
J HCP	GClusterRole\$	G:\HCPGClusterRole	SMB	Yes	
🤳 C1	¥ 64	CARAM Ambient	SMB	No	
		Ab automita			
	C Re	fresh			
	Pro Pro	operties 1			

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

Figure	14.3 – Cluster Role Share Select Permissions	S	
	C1 Properties	_	×

eneral	+	Permis	sions		
ermissions	1 -				
ettings	+	Permission	ns to access the files on a sha ns, and, optionally, a central	are are set using a access policy.	combination of folder permissions, share
		Share per	missions: Everyone Full Cont	lor	
		Folder per	missions:		
		Type	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		

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

General Permissions Settings	Show All	Permissions Permissions to access the files on a sh permissions, and, optionally, a central	are are set u	sing a combination	on of folder permissions, share	P Que		tions Hes Configure Role Virtual Machines
		Share permissions: Everyone Full Cont Folder permissions: Type Principal	Access	Name	\pb-hcpgud14-r.dts-evlab.co	mi/G\$/SAMI.Archive1		- 0
		Allow BULTINUSers Allow BULTINUSERS Allow CREATOR OWNER Allow NT AUTHORITY/SYSTEM Allow BULTIN/Administrators Allow BULTIN/Administrators	Special Read & e Full Cont Full Cont Full Cont	Permissions For additional Permission en	Administrators (PB-HCPSW41 Share Auditing information, double-click a perm bries:	E-CL1-Administrators) C Effective Access vission entry. To modify a	hange permission entry, select t	he entry and click Edit (if available)
		Customize permissions.		Type 建 Allow 建 Allow 建 Allow 建 Allow 建 Allow 建 Allow	Principal Administrators (PB-HCPGW4 Administrators (PB-HCPGW4 SYSTEM CREATOR OWNER Users (PB-HCPGW414-CL1/Us Users (PB-HCPGW434-CL1/Us	Access Full control Full control Full control Full control Read & execute Special	Inherited from None Vigib-hcpgw414-r.dts- Vigib-hcpgw414-r.dts- Vigib-hcpgw414-r.dts- Vigib-hcpgw414-r.dts- Vigib-hcpgw414-r.dts-	Applies to This folder only e This folder, subfolders and file e This folder, subfolders and file subfolders and files only e This folder, subfolders and file This folder and subfolders
			_	Add Disable inh	Ramove View entance child object permission entries wi	th inheritable permission	entries from this object	

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			- ¤ ×	- ¤ ×
C1 General Permissions Settings	Stor Al + -	Permissions Permissions to access the files on a chare are permissions, and optionally, a central access i Share permissions: bergone Full Control Folder permissions:	Contraction of folder permissions, share Advanced Security Settings for Archive1	Actions Roles Rife Configure Role Virtual Machines
		Allow BULTIN/Jers Speci Allow BULTIN/Jers Speci Allow CREATOR (WNER Full C Allow CREATOR (WNER Full C Allow BULTIN/Administrators Full C Allow BULTIN/Administrators Full C	Owner: Administrators (PB-HCPG/WEI4-CLT)Administrators) Owner Permissions Sure Audding Effective Access To modify share permissions, select the entry and click Edit. Network location for this share: \phi-hcpgsel14+.dbi-endit.com/C1 Permission entries:	
		Customize permissions.	Type Principal Access B Allow Everyone Full Conto	8
			Add Remove Vew	OK Cancel Apply

Figure 14.5 – Cluster Role Share Modify Share permissions

Chapter 15 Cluster Subshares

Prerequisites:

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

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

Add subshare on Cluster

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

Figure 14.6 – Add Subshare

📲 Failover Cluster Manager	Roles (1)							
PB-HCPGW414-CL.dts-ev/a	Search	_			_		PQue	ries 🔻 🔛 👻 🔍
Nodes	Name	Statu	IS	Туре		Owner Node	Priority	Information
> 2월 Storage @ Networks 태 Cluster Events	PB-HCPGW414-R 🥑	000	Start Role Stop Role	Canada Candon		PB-HCPGW414-CL1	Medium	
			Add File Share	3	_			
			Move					
		۲	Change Startup	Priority				
		•	Information De Show Critical En	tails vents				
		2	Add Storage Add Resource					
			More Actions					
		×	Remove					
			Properties					

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

Share Location SMB Share - Quick This basic profile represents the fastest way to creat SMB Share - Advanced Share Name SMB Share - Advanced Other Settings NFS Share - Applications NFS Share - Quick Suitable for general file sharing Permissions Confirmation Results Results	Select Profile	File share profile:	Description:
	Share Location Share Name Other Settings Permissions Confirmation Results	SMB Share - Advanced SMB Share - Advanced SMB Share - Applications NFS Share - Quick NFS Share - Advanced	SNB file sher, 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

	Derver.				
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 Sy	stem	
	G:	69.9 GB	70.0 GB NTFS		
	The location of the fi	le share will be a new fold	der in the \Shares of	sirectory on the se	lected
	volume				
	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-evlab.com Shared Cache (G:) Cache Cluster Cluster Chrogodusterrole Forgodusterrole Sam Sam Substhare Substhare Substhare2 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**'.

Figure 14.10 – Share Archive Number

PB-HCPGW414-CL.dts-evla	Search				
📆 Roles 🚺	search				P Gueries • [Ed
Nodes 1	Name	Status	Туре	Owner Node	Priority Information
Storage Networks Uster Events	C PB-HCPGW414-R	2 (*) Running	Generic Service	PB-HCPGW414CL1	Medium
	PB-HCPGW4	114-R			Preferred Owners: User S
	PB-HCPGW4	114-R			Preferred Owners: User S
	PB-HCPGW4 Phores (3) Name	114-R Path	Protocol	Continuous Availability	Preferred Owners: <u>User S</u> Remarks
	PB-HCPGW4 Phares (3) Name J GS	Path G:\	Protocol SMB	Continuous Availability No	Preferred Owners: User S Remarks Ourster Default Share
	PB-HCPGW4 Phares (3) Name P GS Phares For the former of th	Path G:\ G:\HCPGCusterRole	Protocol SMB SMB	Continuous Availability No Yes	Preferred Owners: <u>User S</u> Remarks Ouster Default Share
	PB-HCPGW4 Phares (6) Name GS HCPGOLuterRoles C1 3	Path G-\ G-\HCPGCusterRole G-\SAM-Vechive1	Protocol SMB SMB SMB	Continuous Availability No Yes No	Preferred Owners: User S Remarks Ouster Default Share
	PB-HCPGW4 Phares (3) Name Gs HCPGOLaterRoles C1	Path G.\ G.\HCPGCusterRole G.\SAMVvchwe1	Protocol SMB SMB SMB	Continuous Availability No Yes No	Preferred Owners: User S Remarks Ouster Default Share

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

Figure 14.11 – New Share Wizard 3

Select Profile	Server:				
Share Location	Server Name	Status	Cluster Role	Owner Node	
Share Name	PB-HCPGW414-R	Online	Generic Service		
	Share location:				
	O Select by volume:				
	Volume	Free Space	Capacity File Syst	tem	
	G:	69.9 GB	70.0 G8 NTFS		
	The location of the file volume.	e share will be a new fol	der in the \Shares di	rectory on the s	elected
	Type a custom path:				

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).

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Figure 14.12 - New Share Wizard	4
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Step 8: Keep all the default settings and select 'Next' (Figure 14.13.1).

Figure 14.13 - New Share Wizard 5



Step 9: The default share permission is **Everyone – Full Control** (Figure 14.14.1). The default folder permissions are shown (Figure 14.14.2). Please refer to 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).

Helect Profile Thare Location Thare Name	Permission permission Share permission	is to access the files on a sha is, and, optionally, a central missions: Everyone Full Cont	are are set using a access policy.	combination of folder permissions,	share
Other Settings	Folder per	missions:			
ernissions Confirmation Lesults	Type Allow Allow Allow Allow Allow	Principal BUILTIN/Users BUILTIN/Users CREATOR OWNER BUILTIN/Administrators NT AUTHORITY/SYSTEM NT AUTHORITY/SYSTEM	Access Special Read & execute Full Control Full Control Special Full Control	Applies To 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	
	Custor	nize permissions 3			

Figure 14.14 – New Share Wizard 6

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

Figure 14.15 – New Share Wizard 7

SHARE LOCATION Server: Cluster role: Local path:	PB-HCPGW414-R Generic Service G\sam\archive1\subshare1		
Server: Cluster role: Local path:	PB-HCPGW414-R Generic Service G:\sam\archive1\subshare1		
Cluster role: Local path:	Generic Service G:\sam\archive1\subshare1		
Local path:	G:\sam\archive1\subshare1		
SHARE PROPERTIES			
Share name:	subshare1		
Protocol:	SMB		
Access-based enumeration:	Disabled		
Caching:	Enabled		
BranchCache:	Disabled		
Encrypt data:	Disabled		
Continuous availability:	Enabled		
	Protocol: Access-based enumeration: Caching: BranchCache: Encrypt data: Continuous availability:	Protocol: SMB Access-based enumeration: Disabled Caching: Enabled BranchCache: Disabled Encrypt data: Disabled Continuous availability: Enabled	Protocol: SMB Access-based enumeration: Disabled Caching: Enabled BranchCache: Disabled Encrypt data: Disabled Continuous availability: Enabled

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

New Share Wizard				-		×
View results						
	The share was success	fully created.				
	Task	Progress	Status			
	Create SMB share		Completed			
	Set SMB permissions		Completed			
Confirmation						
Results						
			(1		
		< Previous	Next > C	lose	Cance	el

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

Name	Status	ype	Owner Node	Priority Info
PB-HCPGW414-R	Running	Generic Service	PB-HCPGW414-CL1	Medium
ts				
(c				
× 🛞 рв-нсреу	/414-R			Preferred Owners: 1
	1414-R			Preferred Owners:
PB-HCPGV Shares (4) Name	V414-R Path	Protocol	Continuous Availability	Preferred Owners: 1
< <tr> V PB-HCPGV Shares (4) Name J GS GS</tr>	4414-R Path G.\	Protocol	Continuous Availability No	Preferred Owners: Remarks Ouster Default Shan
Shares (4) Shares (4) Same GS HCPGOusterRoles	Path G.\ G.\HCPGCusterRole	Protocol SMB SMB	Continuous Availability No Yes	Preferred Owners: 1 Remarks Ouster Default Share
<	Path G:\ G:\HCPGCusterRole G:\SAMVerbive1	Protocol SMB SMB SMB	Continuous Availability No Yes No	Preferred Owners: 1 Remarks Ouster Default Share

Figure 14.17 – Failover Cluster Manager Role

Edit subshare on Cluster

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

Figure 14.18 – Edit Subshare



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

Figure 14.19 – Subshare Properties

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

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

Figure 14.20 – Subshare Permissions

General	+	Permiss	sions		
Settings	•	Permission permission Share perr Folder per	is to access the files on a shi is, and, optionally, a central missions: Everyone Full Cont missions:	are are set using a c access policy. rol	ombination of folder permissions, sha
		Type Allow Allow Allow Allow Allow	Principal BUILTIN/Users BUILTIN/Users CREATOR OWNER BUILTIN/Administrators NT AUTHORITY/SYSTEM NT AUTHORITY/SYSTEM	Access Special Read & execute Full Control Full Control Special Full Control	Applies To 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 3		

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

PB-HCPGW414-CL.dts-evia	Search				P Queries V La
Roles 1	No.			0	
I Nodes	Name	Status	ype	Owner Node	Phonty Informatio
Networks Cluster Events	in remaining	2 Chunng C	enenc Jervice	PENLIGHT	i meduliti
	<				
	PB-HCPGW4 Shares (4)	414-R			Preferred Owners: User 5
	<	414-R Path	Protocol	Continuous Availability	Preferred Owners: User S Remarks
	PB-HCPGW/ Shores (4) Name GS	414-R Path G:\	Protocol	Continuous Availability No	Preferred Owners: User S Remarks Custer Default Share
	PB-HCPGW/ Shares (4) Name GS HCPGCusterRoleS	Path G.\ G.\HCPGQuaterRole	Protocol SMB SMB	Continuous Availability No Yes	Preferred Owners: User S Remarks Ouster Default Share
	Shares (4) Shares (4) Shares (5) GS HCPGOusterRoles C1	Path G:\ G:\FCPGCusterRole G:\SAM\/vrchwe1	Protocol SMB SMB SMB	Continuous Availability No Yes No	Preferred Owners: User S Remarks Ouster Default Share
	Shares (4) Shares (4) Shares (5) GS HCPGCusterRoles C1 subshare1 (4)	414-R Path G.\ G.\ G.\HCPGClusterRole G.\SAM\vchive1 G.\sam\archive1\subshare1	Protocol SMB SMB SMB SMB	Continuous Availability No No Yes	Prefered Owners: User S Penarks Ouster Default Share
	Shares (4) Shares (4) Name GS HCPGCusterRoleS C1 subshare1 4	Path G.\ G.\CPGCusterRole G.\SAM\vchive1 G.\sam\archive1\subshare1	Protocol SMB SMB SMB SMB	Continuous Availability No Yes No Yes	Preferred Owners: User S Pernarks Ouster Default Share
	Shares (4) Shares (4) Name GS GS HCPGOusterRoleS C1 subshare1 4	414-R Path G.\ G.\FCPGOusterRole G.\SAM/Archive1 G.\sam\archive1\subshare1	Protocol SMB SMB SMB SMB	Continuous Availability No Yes No Yes	Preferred Owners: User S Pernarks Outer Default Share Stop Sharing S Refresh Pernarking
	PB-HCPGW/ Shares (4) Shares (4) Name GS HCPGCusterRoles C1 subshare1	A14-R Path G.\ G.\HCPGOusterRole G.\SAM\Archive1 G.\sam\archive1\aubshare1	Protocol SMB SMB SMB SMB	Continuous Availability No Yes No Yes	Preferred Owners: User S Pernarks Ouster Default Share Stop Sharing Refresh Properties
	PB-HCPGW/ Shares (4) Name GS HCPGOusterRoleS C1 subshare1 4	Path G:\ G:\HCPGClusterRole G:\SAM.Archive1 G:\sam\archive1\subshare1	Protocol SMB SMB SMB SMB SMB	Continuous Availability No Yes No Yes	Preferred Owners: User S Penados Custer Default Share Stop Sharing Refresh Properties

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

Figure 14.22 – Confirm Delete Subshare

?	Are you sure you want to stop sharing this folder?
	There are 1 shares selected to be stop sharing. The share(s) will be deleted, but the folder will remain.

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

Figure 14.23 Subshare Deleted

Roles					O Queries w L 1
Storage					
spanote in the second second	Name	Status	Type	Owner Node	Phoney Information
Networks	C3 renormalien	() huming	Generic Service	PERCENTAIRCET	Medum
	v 🛞 РВ-НСРДЖ	414-R			Preferred Owners: User Se
	Shares (3)				
	Name	Path	Protocol	Continuous Availability	Remarks
	J GS	G:\	SMB	No	Ouster Default Share
	HCPGOusterRoleS	G:\HCPGOusterRole	SMB	Yes	
	1.01	CACLAR Amburn 1		1222.0	

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

Figure 14.24 subshare1 folder not deleted

💂 🔄 📒 🖛 C1		2-220		-	
File Home Share	View				~ ()
← → ~ ↑ 👤 > Netwo	ork > pb-hcpgw414-r > C1 >		~ Ö	Search C1	Q
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 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).

Figure 16.1 – Select Node

P 🗣 📶 🔃			
Failover Cluster	Manager s-evlab.com	dts-evlab.com	
	Configure Role		
	Validate Cluster		
	Add Node		
	Close Connection		
	Reset Recent Events		
2	More Actions	Configure Cluster Quorum Settings	
	View	> Copy Cluster Roles	
	Refresh	Shut Down Cluster	
	Properties	Destroy Cluster	
			Post Possible Made
	Help	Move Core Cluster Resources	 Best Possible Ivode

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

elect the destination no HCPG-CN1'.	ode for moving cluster reso	urces from
ook for:		
P Search		Clea
luster 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

No.

	10							
Search	_			_			2	Jueries 🕶 🛄 💌 🐨
Name	-	Statu	6	T)	pe	Owner Node	Priority	Information
Q HO	PG 2) () (Running	6	eneric Service	HCPG-CN1	High	
	8 8 0 0	Start Role Stop Role Add File Share Move	0	12	Best Possible N	ode		
		Change Startup Price	vity +	12	Select Node	0		
-	16	Information Details. Show Critical Events		L				
- 8	3	Add Storage Add Resource					Prefored	Owners: User Setting
-		More Actions						
Priori	×	Remove						
Own	1	Properties						
	Colest Search Name Q HC	Kare (I) Search Name C COO Search Search Search Search Search Search Search Search Search Search	Kora U Sauch Name Sauch Name Sauch Sa	Kora U Search Name Satus Concellent Stop Role Stop Role Stop Role Concellent Concellent Stop Role Concellent Stop Role Concellent Stop Role Stop Role Concellent Stop Role Stop	Kots (U) Search Search Search Name Search Image: Search More Actions Image: Search Image: Search Image: Search Image: Search Image: Search Image: Search Image: Search Image: Search	Kollis UU Sasta Type Name Sasta Type Name Sasta Type Interverge Stata Genetic Service Image: Stata Role Image: Sasta Genetic Service Image: Stata Role Image: Sasta Image: Sasta Image: Stata Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role Image: Sasta Role	Kolis U Salua Type Owner Node Name Salua Type Owner Node Image: Start Role Image: Salua Image: Salua Image: Salua Image: Salua Image: Salua Image: Salua	Kolis U Place Search Place Name Bala Type Owner Holde Place Bala Place Bala Type Owner Holde Place Bala Stop Role Owner Holde Place Best Possible Node Orange Startsp Priority Placet Node. Orange Startsp Priority Placet Node. Stat Add Storage Perfered More Actions Placet Node. Stat Properties

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

Figure 16.5 – Move Clustered Role Select Node

P Search		Clear
luster nodes:		
Name	Status	

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

Figure 16.6 – Move Clustered Role Summary



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

Using PowerShell Commands:

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



			P	Queries 🔻 🔚 👻 🗸
Status	Туре	Owner Node	Priority	Information
() Running	Generic Service	HCPG-CN2	High	
	Status Running	Status Type	Status Type Owner Node Plunning Generic Service HCPG-CN2	Status Type Owner Node Phonty P Running Genetic Service HCPG_CN2 High

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

Figure 16.8 – Failover Cluster Role

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

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

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

Figure 16.9 – Check Failover Status

PS C:\Windows\system32> get-clustergroup

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

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

This completes the installation of the Windows Cluster.

Chapter 17 Shared Disk Setup with SAN Storage

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

Figure 17.1 – SAN disks

De De	evice Manager
file	Action View Help
(= =)) 📰 🗾 💷 💯
¥ 📇	EDHCPGW01M1
>	Computer
~	Disk drives
	ATA ST9500620NS SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
	HITACHI OPEN-V SCSI Disk Device
>	Display adapters
>	Firmware
>	Human Interface Devices
>	IDE ATA/ATAPI controllers
>	Keyboards
>	Mice and other pointing devices

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

Figure 17.2 – Multipath I/O



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

Figure 17.3 – MPIO in Control Panel



Step 4. Click Add (Figure 17.4).

IPIO Properti	es		×
#P10 Devices	Discover Multi-Paths	DSM Install	Configuration Snapshot
To add suppo Product Ids a Devices can b	rt for a new device, di s a string of 8 characte e specified using semi-	ck Add and en ers followed by colon as the d	ter the Vendor and y 16 characters. Multiple Jelmiter.
To remove su then dick Ren	pport for currently MPI nove.	10'd devices, i	select the devices and
Devices:			
Device Hard	Iware Id		
Vendor 8Pro	oduct 16		
ni		Add	Remove
	L,	}	

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 a 16 characters) of t	nd Product Ids (as a string on the devices you want to add	of 8 characters followed b MPIO support for.
Device Hardware I	D:	
HITACHI OPEN-		
	N	

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

Figure 17.6 Reboot required



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

Figure 17.7 - SAN disks as MPIO disks



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

Figure 17.8 – Run Disk Management



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

Figure 17.9 – Select New Disks



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

Figure 17.10 - New Disk Status

(= =) 🔃 🖬								
Volume	Layout	Type	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 %	
Offline ()	Unallocated							
*O Disk 4 Unknown 100.00 GB	100.00 GB							

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

Figure 17.11 – Set Disk Online



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

Figure 17.12 – Updated Disk Status



Figure 17.13 – Initialize Disk

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



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

Figure 17.15 – Disk Online

Basic 480 MB Online	480 MB Unallocated
Olisk 4 Unknown 100.00 GB Offline	100.00 GB Unallocated

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

Figure 17.16 – Create Simple Volume

		^
480 MB	New Simple Volume	
Unallocated	New Spanned Volume	
	New Striped Volume	
	New Mirrored Volume	
100.00 GB	New RAID-5 Volume	
Unallocated	Properties	
<u></u>	Help	
	480 MB Unallocated	480 MB Unallocated New Simple Volume New Spanned Volume New Striped Volume New Mirrored Volume New RAID-5 Volume Properties Help

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

ple	Welcome to the New Sim Volume Wizard	
ne on a disk. sk.	This wizard helps you create a simple volum A simple volume can only be on a single dis To continue, click Next.	
sk.	A simple volume can only be on a single dis To continue, click Next.	

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

ew Simple Volume Wizard	2
Specify Volume Size	
Choose a volume size that is betwee	en the maximum and minimum sizes.
Martine del anno 1980	170
Maximum disk space in MB:	4/6
Minimum disk space in MB:	8
Simple volume size in MB:	🚥 🕀 1
	0
	< Back Next > Cancel

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

Figure 17.19 – Set Drive Letter

roi easier access, you can assign a unve ieue	for 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		

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

Figure 17.20 – Format Partition

New Simple Volu	me Wizard			×
Format Partiti	ion			
To store da	ta on this partition, yo	u must format it first.		
Choose wh	ether you want to for	nat this volume, and if	so, what settings you wa	nt to use.
ODon	ot format this volume			
1 ® Form	at this volume with th	e following settings:		
FI	e system:	NTFS	~	
A	ocation unit size:	Default	~	
W	ume label:	Wtness	2	
3 🛛	Perform a quick form	at		
	Enable file and folde	r compression		
			•	
		< Baci	k Next >	Cancel

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

Completing the New Simple Volume Wizard	e
You have successfully completed the New Sin Wizard.	ple Volume
You selected the following settings:	
Volume type: Simple Volume Disk selected: Disk 2 Volume size: 434 MB Drive letter or path: None File system: NTFS Allocation unit size: Default Volume Inde: Winnere	D
Churck format: Yes	×
To close this wizard, click Finish.	

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

Figure 17.22 – Results

/olume	Lavout	Type	File System	Status	Canacity	Free Sna	% Free	
(C)	Simple	Rasic	NTES	Healthy (B	99.51 GB	81.08 GB	81 %	
Database (D:)	Simple	Basic	NTES	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 %	
Witness (W:)	Simple	Basic	NTFS	Healthy (P	478 MB	462 MB	97 %	
Disk 3 Basic V 480 MB 4 Online H	Vitness (W:) 78 MB NTFS Healthy (Primar	ry Partition)	2					

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

File Action View	Help							
(* *) 🗊 🖬 (al 🗩 🖻 🛙							
Volume	Layout	Type	File System	Status	Capacity	Free Spa	% free	
= (C:)	Simple	Basic	NTES	Healthy (8	99.51 GB	80.98 68	81 %	
Cache (G)	Simple	Basic	NTES	Healthy (P_	99.87 GB	99.76 GB	100 %	
Database (D.)	Simple	Basic	NTFS	Healthy (P_	100.00 68	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 %	
Witness (W:)	Simple	Basic	NTFS	Healthy (P_	478 MB	452 MB	97 %	
- Disk 3 Besic 40 MB	Witness (W3) 78 MB NTFS				•			
■ Disk 3 Basic 400 MB Conline	Witness (WJ) 78 M8 NTFS Healthy (Prima	ry Patilion)						

Step 22:

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

Figure 17.24 – Windows Disk Management



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

Figure 17.25 – New Drives Added

44 1 9771	2 🛅 🗩 🖾							
Volume	Layout	Type	File System	Status	Capacity	Free Spa	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (B	99.51 G8	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 Reser 	ved Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
	478 M8							
480 MB Offline								

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

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

Step 26: If necessary, expand the size of the database disk, drive **D**:. Refer to **the VM Deployment Guide Chapter 2** for the details.
Chapter 18 Shared Disk Setup with GAD Storage

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

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

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

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

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

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

Figure 18.1 – Run Disk Management



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

Figure 18.2 – Select New Disks



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

Figure 18.3 – New Disk Status

Volume	Lawout	Tune	File System	Status	Canacity	Free Sna	% Free	1
- (C:)	Simple	Basic	NTES	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 Reserve	ed Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
Offine ()	Unallocated							
"O Disk 4 Unknown								

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

Figure 18.4 – Set Disk Online



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

Figure 18.5 – Updated Disk Status

0	*O Disk 3 Unknown 512 MB Not Initialized	512 MB Unallocated
	*O Disk 4 Unknown 100.00 GB Offline	100.00 GB Unallocated
	Unallocated	Primary partition

Figure 18.6 – Initialize Disk

0	Initialize Disk	
-	Offline	
	Properties	
	Help	

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

You must initia	lize a disk before Logic	al Disk Manager can ac	cess it.
Select disks:			
Disk 3			
Use the follow	ing partition style for the	e selected disks:	
O MBR (Mas	ster Boot Record)		
GPT (GUI	D Partition Table)		
	T partition style is not re	cognized by all previous	versions o

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.

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Figure 18.8 – Disk Online

Basic 480 MB Online	480 MB Unallocated
O Disk 4 Unknown 100.00 GB Offline	100.00 GB Unallocated

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	25/////////////////////////////////////		^
480 MB Online	480 MB Unallocated	New Simple Volume New Spanned Volume	
ODisk 4 Unknown 100.00 GB	100.00 GB	New Striped Volume New Mirrored Volume New RAID-5 Volume	
Offline 🚺	Unallocated	Properties	
	J.	Help	~

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

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.

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

ew Simple Volume Wizard	2
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:	🚥 🗄 1
	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.

Figure 18.12 – Set Drive Letter

Assign the following drive letter:	E. ~	
O Mount in the following empty NTFS folder:	Browse	
O not assign a drive letter or drive path		

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

Figure 18.13 – Format Partition

To stor	e data on this partition, yo	u must format it first.		
Choose	whether you want to fom	nat this volume, and if	so, what settings you w	ant to use.
0	Do not format this volume			
1 .	format this volume with the	e following settings:		
-	File system:	NTFS	~	
	Allocation unit size:	Default	~	
	Volume label:	Wtness	2	
3	Perform a quick form	at		
-	Enable file and folde	r compression		
			_	

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

Figure 18.14 – Finish

Completing the New Simple Volume Wizard
You have successfully completed the New Simple Volume Wizard.
Volume type: Simple Volume Dak selected: Dak (2 Volume type: 494 MB Drive letter or path: None File system: NTFS Allocation untsize: Default Volume label: Witness Chatek format: Yea
To close this wizard, click Finish.

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

Figure 18.15 – Results

P 🗣 🔃 🖬 🖬		H						
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	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 %	
Witness (W:)	Simple	Basic	NTFS	Healthy (P	478 MB	462 MB	97 %	
Disk 3 Basic W 480 MB 47 Online H	Fitness (W-) 18 MB NTFS ealthy (Primar	y Partition)	2		1			

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

File Action Vie	e Help								
(+ +) 🖬 🔛	mi 🖛 🖻 🛙								
Volume	Layout	Type	File System	Status	Capacity	Free Spa	%.Free		
= (C:)	Simple	Basic	NTES	Healthy (8	99.51 GB	80.98 68	\$1.%		
Cache (G)	Simple	Basic	NTES	Healthy (P_	99.87 GB	99.76 GB	100 %		
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 %		
Witness (W:)	Simple	Basic	NTFS	Healthy (P_	478 MB	452 MB	97 %		
					-			_	
- Diak 3 Basic 400 MB Online	Witness (W-3 478 MB NTFS Healthy (Prima	ry Partition)			•				

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

Figure 18.17 – Windows Disk Management

0	Type the nar resource, an	me of a progr d Windows w	am, folder, docun ill open it for you	nent, or Internet
Open:	diskmgmt.	msc		,
	💎 This tas	k will be creat	ted with administ	rative privileges.

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.

(* *) (II)								
Volume	Layout	Type	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 Reser	ved Simple	Basic	NTFS	Healthy (S	500 MB	153 MB	31 %	
	478 MB							
450 MB Offline								

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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