

End-to-end deployment of the Dell PowerEdge M710HD, Dell PowerConnect M8024-k and Dell EqualLogic PS6010XV using Switch Independent Partitioning and the Broadcom BCM57712-k

August 2011

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Executive summary

Introduction

Traditional network interfaces resemble a highway system. Each road carries a single type of traffic: one road for passenger traffic, one road for freight and so on. However, converged I/O allows a single connection to carry different types of traffic simultaneously. This guide explains how to converge TCP and iSCSI, with each type of traffic travelling through a dedicated VLAN over a single network interface. You will also learn how to configure a simple network from bare metal, with a server, a SAN (iSCSI) connection and a LAN (TCP/IP) connection.

The components we used in this demonstration, the Dell[™] PowerEdge[™] M710HD blade server and the Dell PowerConnect[™] M8024-k blade switch, can greatly increase the density of your data center – allowing you to accomplish more work in the same space. Converged network adapters (CNAs) allow this density increase in the data center while reducing costs. CNAs contribute to this benefit in three ways: by reducing processor load, reducing complexity and reducing equipment costs.

Because data center networking speeds have increased to 10 Gb, the load that a traditional controller places on the server has increased. CNAs can offload CPU processing of several types of traffic, resulting in more processing resources being available for business-critical tasks. This guide demonstrates the offloading of traffic for a TCP connection and an iSCSI connection.

CNAs reduce complexity by reducing the number of components. Fewer adapter cards, switches, connectors and cables doing the same amount of work as before represents a net increase in efficiency. The Broadcom[®] BCM57712-k that we used can support four 1Gb channels through a single 10Gb interface, potentially reducing the number of components for network connectivity by 75 percent.

The cost savings are even more impressive. For this analysis, we assume that the chassis already has two Dell PowerConnect M8024-k switches in Fabric A. All prices we mention are those in effect at publication time.

As of publication time, the default Fabric A NIC in the Dell PowerEdge M710HD was the Broadcom 5709 1GbE NIC, which gives the server two 1 Gb connections.

Substituting the Broadcom BCM57712-k for Fabric A costs an additional \$499. With Switch Independent Partitioning active, the server has eight 1 Gb connections.

Without Switch Independent Partitioning, you would have to add both NICs and switches to increase the number of ports on the Dell PowerEdge M710HD. Adding a dual-port BCM5709 for Fabric B and Fabric C costs \$798 per blade. Adding four Dell PowerConnect M2024-k switches for Fabrics B and C costs \$31,764.28, or \$1,985.27 per blade, for a total additional cost of \$1,776.48 per blade to get to six ports.

Using Switch Independent Partitioning, you save \$1,277.48 per blade, or \$20,439.68 for a fully populated chassis, while getting more ports.

Fewer components to buy, maintain, repair, or replace, as well as increased processor availability from the same number of processors translates directly to the bottom line. You accomplish more work with less equipment.

The Dell PowerEdge M710HD and Dell PowerConnect M8024-k

The half-height Dell PowerEdge M710HD fits the capabilities of the full-height Dell PowerEdge M710, effectively doubling the capacity of the chassis. The Dell PowerEdge M710HD has two processor sockets, each capable of supporting a 4-core or 6-core processor. It can support up to 192 GB of RAM and up to 1.2 TB of internal storage. The Dell PowerEdge M710HD is one of the first blade servers in the industry to offer the flexibility of a user-selectable Select NIC in place of a fixed LAN on motherboard adapter. That card, when equipped with a Broadcom BCM57712-k controller offers the advantages of convergence in either two 10Gb network interfaces or eight 1GB interfaces.

The Dell PowerConnect M8024-k supports the 10Gbase-KR standard and offers end-to-end 10Gb connectivity on Fabric A. At 480 Gbps of aggregate bandwidth, it has double the switch fabric capacity of the Dell PowerConnect M8024.



This guide discusses several Dell management features, such as the automatic discovery capabilities of the Dell PowerEdge M1000e Modular Blade enclosure and the Dell Unified Server Configurator.

Overview of the procedure

To illustrate the use of Switch Independent Partitioning to consolidate heterogeneous network traffic, this guide will show how to create a small network using the Dell PowerEdge M710HD with the Broadcom BCM57712-k, Dell PowerConnect M8024-k, Dell EqualLogic™ PS6010XV and the Cisco[®] Catalyst[®] 6504-E. Upon completion, the server will be sending and receiving both iSCSI and TCP traffic through a single 10Gb NIC.

Below, we illustrate the goal of our test network. We show that the converged I/O takes two different streams and transmits over one network interface. The grey stream represents TCP/IP traffic, while the orange stream represents iSCSI traffic.



Configure the Cisco Catalyst 6504-E

Using a serial connection and the IOS CLI, configure the Cisco Catalyst 6504-E the following way:

- 1. Enable portfast and Jumbo Frames.
- 2. Create the VLANs.
- 3. Set up trunking and VLAN access.
- 4. As per the *Dell EqualLogic Configuration Guide*, enable flow control and disable unicast storm control on the interface connected to the Dell EqualLogic PS6010XV. Finally, configure it as a layer-2 port and activate it.
- 5. Enable 802.1q tagging for the whole switch, and exit global configuration mode.

Configure the Dell PowerConnect M8024-k

Using the PowerConnect OpenManage GUI, configure the Dell PowerConnect M8024-k the following way:

- 1. Configure frame size per port.
- 2. Create the VLANs.
- 3. Set up trunking and VLAN access.

Configure the Dell EqualLogic PS6010XV

Using the setup utility and a serial connection to the management port, configure the Dell EqualLogic PS6010XV as follows:

- 1. Initialize the array.
- 2. Enter the networking information for the array.
- 3. Create a group.
- 4. Set the administrator (grpadmin) password.

Use the Dell Unified Server Configurator to enable Switch Independent Partitioning on the Broadcom BCM57712-k

- 1. Boot the server, and press F10 to enter the USC.
- 2. Select Hardware Configuration \rightarrow Advanced configuration, and press Enter.
- 3. Select the first of the two BCM57712-k interfaces, and then select Device Configuration Menu.
- 4. Enable Switch Independent Partitioning on the BCM57712-k. Enabling Switch Independent Partitioning affects both of the interfaces on the Broadcom BCM57712-k.

Install Windows Server[®] 2008 R2 and the drivers for the Broadcom BCM57712-k

1. Install a new copy of Windows Server 2008 R2 Enterprise (Full Installation) as the operating system on the Dell PowerEdge M710HD.

At this point, Windows Server 2008 R2 is installed, but it does not recognize the Broadcom BCM57712-k. The driver file we used in this guide is Bcom_LAN_16.2.0_W2K3_8_64_A01.exe, available from http://www.support.dell.com.

- 2. Double-click the executable, and unzip the files.
- 3. Launch the Broadcom installer.
- 4. Install the Control Suite and all its sub features. You will use the Broadcom Advanced Control Suite in configuring the interfaces.
- 5. Now that the system has network connectivity, install Windows updates.

Create the VLAN for iSCSI traffic

1. Launch the Broadcom Advanced Control Suite (BACS).

NOTE: Because there is only one switch in the chassis, half of the interfaces will show as disconnected.

- 2. Select the corresponding network adaptor, and select the Configurations tab.
- 3. Set the Jumbo packet size, and disable the IPv4 Large Send Offload option.

NOTE: According to the *Using Broadcom Advanced Control Suite 3: Broadcom NetXtreme 57XX User Guide,* Jumbo Frames and Large Send Offload (LSO) are mutually exclusive properties.

- 4. Select the iSCSI adaptor, turn off DHCP, and enter the IP address.
- 5. At Team Management, right-click adaptor #42 (the iSCSI adaptor), and select Create a VLAN.
- 6. Enter the name of the team, the name of the VLAN, and the tag value. Click Finish to create the VLAN, and click Yes on the warning pop-up.

Repeat steps 1 through 6 in this section to create the VLAN for TCP/IP traffic, changing the team name, VLAN name, and tag value as appropriate. There is no need to set jumbo frames or disable LSO for the TCP/IP connection.

Create the SAN volume

- 1. Install the EqualLogic Hardware Integration Tools (HIT), using a typical install and answering Yes to all prompts.
- 2. After the Dell PowerEdge M710HD reboots, select Configure this computer to access a PS Series SAN.
- 3. Launch Internet Explorer[®] and enter the IP address for the EqualLogic array.
- 4. Log into the array using the grpadmin account.
- 5. Name the array, and select the RAID policy.
- 6. Choose Volumes in the left pane, and click Create volume.
- 7. Name the volume, choose the size for the volume, and set the snapshot reserve as appropriate.
- 8. Restrict iSCSI access as appropriate. You have successfully created the volume.

Set iSCSI access to the SAN

- 1. Start the iSCSI Initiator.
- 2. Select the Discovery tab.
- 3. Enter the IP address, and select the adaptor to use. The Broadcom interface will appear in the list of local adaptors.
- 4. Select the Targets tab, and connect to the target.
- 5. Close the iSCSI Initiator.
- 6. Start Server Manager, expand Storage, and select Disk Management.
- 7. Right-click the new disk, and select Online. Initialize the drive if necessary.

Detailed deployment steps

Wire the network

This diagram shows how the network components are connected. The blue lines represent 1Gb connections, while the orange lines represent 10Gb connections.



This process assumes a 1GB connection to the core Ethernet network, so the 1Gb switch is outside the scope of this guide. This guide will show how to configure all other components from bare metal.

Connect to the Dell PowerEdge M1000e CMC

The Dell PowerEdge M1000e provides many powerful management features, far more than this guide touches on. The section below illustrates only features needed to implement the procedures in this guide.

1. Enter the IP address of the Dell PowerEdge M1000e. At the warning about the website's security certificate, click Continue to this website (not recommended).



2. Enter the user name and password. The default root password is "calvin".



3. To launch the console for the Dell PowerEdge M710HD, select the server and click Launch Remote Console.

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- 9 SLOT-09	Old Name	1
-10 SLOT-10	Siot Name	M/TOHD
-11 SLOT-11	Present	Yes
-12 SLOT-12	Health	
-13 SLOT-13	Server Model	PowerEdgeM710HD
-15 SLOT-15	Service Tag	HCJ3JM1
-16 SLOT-16	IDDAC Eirmware	3 00 (Build 32)
I/O Module Overview		0.00 (bina 06)
-A1 10 GBE KR	CPLD version	1.0.0
A2 Not Installed	BIOS Version	1.1.10
B1 Not installed	Host Name	M710ESX
-C1 Not installed	Operating System	

4. At the warning about the website's security certificate, click Continue to this website (not recommended).



5. Depending on your browser settings, you may need to give permission for the console to launch.



6. The console is running.



7. To launch the GUI for the Dell PowerEdge M8024-k, select the switch from the chassis overview and scroll down to click Launch I/O Module GUI.

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	Location	A1
- Chassis Controller	Name	M8024-k 10GbE SW
Server Overview	Present	Yes
1 M710HD	Health	
-13 SLOT-03	Power Status	On
	Service Tag	0000000
- 6 SLOT-06	Fabric	10 GDE KR
-17 SLOT-07	MAC Address	00.80.24.12.00.89
- 0 SLOT-08	Role	Master
- 10 SLOT-10		1909AS
-11 SLOT-11	I/O Module Network Settings	Back to top
-12 SLOT-12 -13 SLOT-13	Attribute	Value
-14 SLOT-14	DHCP Enabled	Yes
-15 SLOT-15	IP Address	10.41.2.108
- VO Module Overview	Subnet Mask	255 255 248 0
A1 10 GbE KR	Galeway	10.41.0.1
-A2 Not installed		1.11.11.11.1
- B2 Not installed		
-C1 Not Installed		Launch I/O Module GU

8. Enter the user name and password. The default root password is "calvin".

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- 5 SLOT-05	Service		
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	MAC A		
- 8 SLOT-08	Role	Login: 10.41.2.108 ?	
SLOT-09			
-11 SLOT-11		Type in Username and Password, then click Submit.	
-12 SLOT-12	I/O Mo	Iteration and	 Back to top
-13 SLOT-13	Attribut	Osername: 100t	
-14 SLOT-14	DHCP	Password: ••••••	
-15 SLOT-15	ID Artist	Application: Switch Adminstrator	
III SLOT-16	IP AUG		
A1 10 GbE KR	Subnet	Crusti Chard	
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9. The console is running.

System : Home: Device Information -	Windows Internet Explorer				_ 5 ×
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PowerConnect M8024-k root, r/w	Device Information Stack View				
Home System	Home: Device Information		8	• C 3	
+ Statistics/RMON					
	Unit	1.			
	Déll PowerConnect M8024 k	Cover			
		20 19 18 17			
	Link Up	3101.0 3101.1			
			Internet Protected Mode: Off	Va + 1 12	

Configure the Cisco Catalyst 6504-E

To configure the Cisco Catalyst 6504-E, you will need a serial connection to the management port.

1. To make changes to the switch, enter privileged mode, and then enter global configuration mode.

```
enable
configure terminal
```

2. According to the Dell EqualLogic *Configuration Guide*, the Rapid Spanning Tree protocol or Cisco portfast functionality is required if the SAN infrastructure consists of more than two switches. Although this deployment only uses two switches for the SAN infrastructure, the command to enable portfast is the following:

spanning-tree portfast default

3. The Dell EqualLogic *Configuration Guide* recommends enabling Jumbo frames, though it is not required. Set the maximum transmission unit size to 9,000 using the following command:

system jumbomtu 9000

4. Create the VLANs. VLAN 200 will carry TCP/IP traffic. VLAN 300 will carry the iSCSI traffic from the SAN, so increase its MTU to 9,000.

vlan 200 exit vlan 300

mtu 9000 exit

Interface port-channel 1 will carry the traffic to and from the Dell PowerConnect M8024-k switch. Configuring this interface is the most complicated part of configuring the Cisco switch, so we will present these steps in sections.

5. Specify that you are configuring port-channel 1 with the following command:

```
interface port-channel 1
```

6. The next set of commands configures the interface as a layer 2 port. Specify that the encapsulation on the trunk will follow the IEEE 802.1q standard, and that the port will accept traffic form VLANs 200 and 300. Because the interface supports multiple VLANs, make it a trunk port. Finally, the no shutdown command brings the port up.

```
switchport
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 200,300
switchport mode trunk
no shutdown
```

7. Specify that the 10Gb interface 2/2 will be in the channel-group. Configure it as a layer 2 port, make the group active, and bring up the group.

```
interface TenGigabitEthernet2/2
switchport
channel-group 1 mode active
no shutdown
```

8. Exit configuration mode.

exit

The commands we used to configure the port channel are as follows:

```
Router (config) #
Router (config) #interface port-channel 1
Router (config-if) #switchport
Router (config-if) #switchport trunk encapsulation dot1q
Router (config-if) #switchport trunk allowed vlan 200,300
Router (config-if) #switchport mode trunk
Router (config-if) #no shutdown
Router (config-if) #interface TenGigabitEthernet2/2
Router (config-if) #switchport
Router (config-if) #switchport
Router (config-if) #channel-group 1 mode active
Router (config-if) #no shutdown
Router (config-if) #no shutdown
```

9. Interface 1/3 is a 1GB uplink port, which will carry traffic to the core Ethernet network. Configure it as a layer-2 interface, make the port active, and exit.

```
int GigabitEthernet1/3
switchport
no shut
exit
```

10. Next, configure the 10Gb interface 2/3 to carry the iSCSI traffic from the SAN. According to the *Dell EqualLogic Configuration Guide*, enable flow control and disable unicast storm control. Finally, configure it as a layer-2 port and bring it up.

```
interface TenGigabitEthernet2/3
flowcontrol receive on
flowcontrol send on
no storm-control unicast level
switchport
no shut
exit
```

11. Enable 802.1q tagging for the whole switch, and exit global configuration mode.

```
vlan dotlq tag native end
```

12. Copy this configuration to be the one that loads when the switch boots, and then reboot the switch.

```
copy running-config startup-config
reload
```

Configure the Dell PowerConnect M8024-k

There are two methods of configuring the Dell PowerConnect M8024-k. This guide uses the web GUI, which requires a network connection to the Dell CMC.

1. Enter the IP address of the Dell PowerEdge M1000e. At the warning about the website's security certificate, click Continue to this website (not recommended).

Certificate Error: Navigation Blocked - Windows Internet Explorer		X
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Certificate Error: Navigation Blocked	<u>0</u> • ⊡ • ≡ •	🖷 • Page • Safety • "
There is a problem with this website's security certificate.		~
The security certificate presented by this website was not issued by a trusted certificate authority. The security certificate presented by this website was issued for a different website's address.		
Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.		
We recommend that you close this webpage and do not continue to this website.		
Ø Click here to close this webpage.		
Continue to this website (not recommended).		
More information		
http://10.41.2.96/	Internet Protected Mode: Off	× 120% • /

2. Enter the user name and password. The default root password is "calvin".

172.	16.84.14 PCM8024-k			
	DELL OPENMANAGE TM	Suj	oport About	
	Login: 172.16.84.14 Type in Username and Password, the	n click Submit.	?	
	Username: Password: Application:	root		
		Cancel	mit	
-				

3. In the left pane, expand Switching and Ports, and select Port Configuration.

	ANAGE™ SWITCH ADMINISTRATOR	Support About Log Out
System PowerConnect M8024-k root, r/w	Port Configuration Detail Show All	
root, f/w Floring Switching Network Security Switching Switching Switching Switching Sold Floring Floring Sold Floring Flor	Detail Show All Port Configuration: Detail Port Description Admin Status Current Port Status Current Port Speed Admin Port Speed Admin Duplex Current Duplex Mode Auto Negotiation Current Auto Negotiation	C 2 Unit 1 Port Te1/0/1 Unit 1 Port Te1/0/1 (0 to 64 characters) Enable Link Up 10G Full 1000 T518 (1518 to 9216) Full Puplex Enable Enable
Link Dependency Routing Statistics/RMON Quality of Service	Admin Advertisement	All Supported 10 Full 10 Half 100 Half 100 Full 10000 Full
IPv6 Multicast	LAG	not a lag member
	Transceiver Firmware Part Number	
	Transceiver Firmware Revision	
	Current Flow Control	active
		Арріу

4. Make sure the port selected is Te1/0/1, then in the Maximum Frame Size textbox write 9000 and select Apply.

	NAGE™ SWITCH ADMINISTRATOR	Support About Log Ou
System PowerConnect M8024-k root, r/w	Port Configuration Detail Show All	
Home System Switching Network Security Sola	Port Configuration: Detail	B @ C ?
Ports	Port	Unit 1 Port Te1/0/1 💌
Port Configuratio	Description	(0 to 64 characters)
LAG Configuration Storm Control	Admin Status	Enable -
Traffic Mirroring	Current Port Status	Link Up
GARP	Current Port Speed	10G Full
ULAN	Admin Port Speed	10000 💌
Link Aggregation Multicast Support	Maximum Frame Size	9000 (1518 to 9216)
WVR Configuration LLDP	Admin Duplex	Full
Dynamic ARP Inspection DHCP Snooping	Current Duplex Mode	Full Duplex
DHCP Relay DHCP Relay	Auto Negotiation	Enable
+ PFC	Current Auto Negotiation	Enable
Routing	Admin Advertisement	☐ All Supported ☐ 10 Full ☐ 10 Half
Quality of Service		🗆 100 Half 🖂 100 Full 🖂 1000 Full 🖂 10000 Full
IPv6 Multicast	LAG	not a lag member
	Transceiver Firmware Part Number	
	Transceiver Firmware Revision	
	Current Flow Control	active

5. Select the Te1/0/20 port in the Port dropdown box, then in the Maximum Frame Size textbox write 9000 and select Apply.

	ANAGE™ SWITCH ADMINISTRATOR	Support About Log Out
System PowerConnect M8024-k root, r/w	Port Configuration Detail Show All	
Home System Switching Network Security Slots	Port Configuration: Detail	B & C ?
PortsGlobal ParametersPort ConfiguratioProtected Port ConfigurationLAG Configuration	Port Description Admin Status	Unit 1 Port Te1/0/20 (0 to 64 characters)
	Current Port Status Current Port Speed	Link Up 10G Full
	Admin Port Speed Maximum Frame Size	10000 v 9000 (1518 to 9216)
LLDP Dynamic ARP Inspection DHCP Snooping DHCP Relay	Admin Duplex Current Duplex Mode Auto Negotiation	Full © Full Duplex Disable ■
	Current Auto Negotiation Admin Advertisement	Disable _ All Supported _ 10 Full _ 10 Half _ 100 Half _ 100 Full _ 1000 Full _ 10000 Full
Cuality of Service IPv4 Multicast IPv6 Multicast	LAG Transceiver Firmware Part Number	not a lag member
	Transceiver Firmware Revision Current Flow Control	active
		Apply

6. In the left pane, expand Switching and VLAN, and select VLAN Membership.

	MANAGE" SWITCH ADMINISTRATOR	Supp	on A	bout I	.og Ou
System PowerConnect M8024-k root, r/w	VLAN Membership Detail Add				
 Home System Switching Network Security 	VLAN Membership: Detail			C	?
Slots Ports Address Tables	Show VLAN 1-default				
 Spanning Tree VLAN 	VLAN Name default (0 to 32 characters) Status Default				
VLAN Membershi	VLAN ID-Individual/Range Range[2-4093]				
Bind MAC to VLAN	VLAN Participation All				
GVRP Parameters Protocol Group	Participation All Include v				
Double VLAN Voice VLAN	Tagging All Untagged v				
Link Aggregation Multicast Support	Remove		▲ E	Back to	lop
MVR Configuration	Remove VLAN				
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7. Click the Add tab.

	MANAGE™ SWITCH ADMINISTRAT	DR	Support About Log Out
System PowerConnect M8024-k root, r/w	VLAN Membership Detail Add		
Home System Switching Network Security	VLAN Membership: Detail		
	Show VLAN VLAN Name	1-default (0 to 32 characters)	
Port Settings LAG Settings Bind MAC to VL ⁱ Bind IP Subnet to	VLAN ID-Individual/Range VLAN Participation All	Range[2-4093]	
GVRP Paramete Protocol Group Double VLAN Group Coice VLAN Link Aggregation	Participation All Tagging All Remove	Include v Untagged v	+ Back to top
Multicast Support MVR Configuration LLDP Dynamic ARP Inspect	Remove VLAN		Back to top
+ DHCP Snooping - DHCP Relay - IP Source Guard - PFC - ▼	Unit Port 1 2 3 4 5 6 7 8 9	9 10 11 12 13 14 15 16 17 18 19 20	

8. In the VLAN Membership: Add tab, type 200 in the VLAN ID text box, and internet in the VLAN Name text box, and select Apply.

	IANAGE™ SWITCH ADMINISTRATOR		Support	About Log C	ut
System PowerConnect M8024-k root, r/w	VLAN Membership Detail Add				
Home System Switching Network Security Slots	VLAN Membership: Add			• C ?)
Ports Address Tables GARP Some Spanning Tree VLAN	VLAN ID VLAN Name	200 (2 to 4093) internet (0 to 32 characters)			
VLAN Member VLAN Member VLAN Member VLAS Stillings LAS stillings LAS stillings GVRP Paramete Protocol Group Double VLAN VLAN Unk Aggregation Muticast Support Muticast Support DHCP Snooping DHCP Relay FIC Relay FFC VLAN				Apply	

9. In the VLAN Membership: Add tab, type 300 in the VLAN ID text box, and iscsi in the VLAN Name text box, and select Apply.



- 10. In the left pane, select Port Settings under the VLAN tree.
- 11. Make sure the port selected is Te1/0/1, then in the Port VLAN Mode drop-down box select Trunk and select Apply.

verConnect M8024-k t, r/w	Detail Show All				
Home System Switching	Port Settings: Detail			C	
+ Slots + Ports + Address Tables	Ports	Unit 1 V Port Te1/0/1 V			
GARP	Port VLAN Mode	Trunk			
VLAN	PVID	Access General (1 to 4093)			
Port Settings	Frame Type	Admit All			
Bind MAC to VL/	Ingress Filtering	Enable			
GVRP Paramete	Port Priority	0 (0 to 7)			
Protocol Group Poulos VLAN Voice VLAN Voice VLAN Multicast Support MVR Configuration MUR Configuration DLDP Dynamic ARP Inspect DHCP Rolog DHCP Rolog DHCP Rolay PFC PFC V			A	pply	

12. Select the Te1/0/20 port, in the Port VLAN Mode drop-down box select Trunk, and select Apply.

	IANAGE™ SWITCH ADMINISTRAT	TOR	Support About Log Out
System PowerConnect M8024-k root, f/w Home - Home - System - Switching - Network Security	Port Settings Detail		₽ ● © ?
Sots Sots Address Tables Address Tables Spanning Tree VAN VAN VAN Address Tables Out Settings Bid MAC to VU Bid MAC to VU Bid MAC to VU Gith IP Subnet it GYRP Paramete OYRP Paramete Protocol Group	Ports Port VLAN Mode PVID Frame Type Ingress Filtering Port Priority	Unit 1 • Port Te1/020 • Trunk • Access Generation (1 to 4093) Admit All • Enable • 0 (0 to 7)	
Double VLAN Double VLAN Urik Apgregation Multicast Support Multicast Support DrUCP Socialization DUCP Socialization DUCP Socialization DUCP Socialization DUCP Relay DUCP Relay PFC PFC			Apply

Configure the Dell EqualLogic PS6010XV

There are two methods of initializing the Dell EqualLogic PS6010XV. This guide uses the setup utility, which requires a serial connection to the management port.

- 1. When you boot the array, log in as the group administrator. If the array is set to factory defaults, both the account name and password will be grpadmin.
- 2. The setup utility asks if you want to figure the array. Type y and press Enter to confirm.



- 3. At the prompt "Do you want to proceed (yes | no) [no]:," type y and press Enter.
- 4. The setup utility displays a message that the array is initializing. When the initialization finishes, it prompts you for the array name. Enter the name, and press Enter.

to account grpadmin succeeded. It appears that the storage array has not been configured. Would you like to configure the array now ? (y/n) [n]y
Group Manager Setup Utility
The setup utility establishes the initial network and storage configuration for a storage array and then configures the array as a member of a new or existing group of arrays.
For help, enter a question mark (?) at a prompt.
Do you want to proceed (yes no) [no]: y
Initializing. This may take several minutes to complete.402:219:SP:22-Apr-2011 15:42:03.840220:verify.c:368:INF0:13.2.7:Parity verification completed.
Enter the network configuration for the array.
Member name []: ArrayO1

- 5. Next, the setup utility prompts you for the network interface to use. Accept the default of eth0.
- 6. Enter the IP address of the array.
- 7. Enter the netmask.
- 8. Enter the default gateway.
- 9. The utility displays a message that it is initializing the interface. Then it will prompt for the name of the group. Enter the name of the group.

NOTE: In our example below, the group did not currently exist.



- 10. Enter the IP address for the group
- 11. The utility checks for the existence of the group. If the group does not exist, it will display the prompt "Do you want to proceed (yes | no) [no]:." Type _Y, and press Enter.
- 12. At the prompt "Do you want to use the group setting shown above (yes | no) [no]:," type $_{\rm Y}$ and press Enter.
- 13. Enter the password for managing the group membership, and press Enter. When the utility prompts you to confirm the password, enter it a second time, and press Enter.

14. Enter the password for the grpadmin account, and press Enter. When the utility prompts you to confirm the password, enter it a second time, and press Enter. The array then saves the configuration.

Saving the configuration
Waiting for configuration to become activeDone 1119:13:psgd:22-Apr-2011 15:58:33.570014:psgd_group.cc:15329:INFO:18.2.0:Group m ember Array01 now active in the group.
Group Group01 has been created with one member. Use the Group Manager GUI or CLI to set the RAID policy for the member. You can then create a volume which a host can connect to using an iSCSI initiator.
To access the Group Manager GUI, specify http://group_ip_address in a Web browser window. To access the CLI, use telnet or SSH to connect to the group IP address from a remote terminal, or attach a console terminal directly to a serial port on a group member's active control module. Log in to the default group administration account (grpadmin) using the password you specified when creating this group. See the Group Administration manual for more information.

Use the Dell Unified Server Configurator to configure the Broadcom BCM57712-k

To use the Dell Unified Server Configurator (USC), you must boot into UEFI rather than BIOS. If your system already boots into UEFI, skip to step 5.

NOTE: You do not have to boot into UEFI to use Switch Independent Partitioning. Once you have configured the Broadcom BCM57712-k, boot into BIOS or UEFI as appropriate.

1. Boot the server. When the system prompts you, press F2 to enter system setup.



2. Use the down arrow key to highlight Boot Settings, and press Enter.

10.41.2.123, PowerEdge M710HD, Slot 9, Us Video Keyboard Mouse Options Power Media	er: cmc_root - 1fps a Help		<u>_ ×</u>
Dell Inc.	(www.dell.com) - PowerE BIOS Version 1.1.10	dge M710HD	
Service Tag: HCJ3JM1	Asset Tag:		
System Time System Date		10:31:04 Thu Apr 21, 2011	1
Memory Settings Processor Settings		<enter> <enter></enter></enter>	
Boot Settings		<enter></enter>	
Integrated Devices PCI IRQ Assignment		<enter> <enter></enter></enter>	
Serial Communication		<enter></enter>	
Power Management System Security		<enter> <enter></enter></enter>	
Keyboard NumLock		On	•
Up,Down Arrow to select	SPACE,+,- to change	ESC to exit F1=	Help

3. Set the Boot Mode to UEFI.

II 10.41.2.123, PowerEdge M710HD, Slot 9, User: cmc_root - 0fps Video Keyboard Mouse Options Power Media Help					
Dell Inc. (www.dell.com) - PowerEdge M710HD BIOS Version 1.1.10					
Service Tag: HCJ3JM1 Asset Tag:					
System Time 10:31:52 System Date Thu Apr 21, 2011	A				
Memory Boot Mode UEFI Proces Boot Sequence <enter> Boot S Disabled</enter>					
Integrated Devices					
Serial Communication					
Power Management					
Keyboard NumLock	p				

4. Press Esc twice to exit the BIOS. Press Enter to select Save changes and exit.

10.41.2.123, PowerEdge M710HD, Slot 9, User: cmc_root - 0fps 10/41.2.123, PowerEdge M710HD, Slot 9, User: cmc_root - 0fps 10/41.2.123, PowerEdge M710HD, Slot 9, User: cmc_root - 0fps				
Dell Inc.	. (www.dell.co BIOS Vers:	om) – PowerEdg ion 1.1.10	je M710HD	
Service Tag: HCJ3JM1		Asset Tag:		
System Time System Date			10:33:52 Thu Apr 21,	2011
Memory Settings Processor Settings			<enter> <enter></enter></enter>	
Boot Settings	Save changes Discard chan	s and exit ages and exit	<enter></enter>	
Integrated Devices PCI IRQ Assignment	Return to Se	etup	<enter> <enter></enter></enter>	
Serial Communication			<enter></enter>	
Power Management System Security			<enter> <enter></enter></enter>	
Keyboard NumLock			On	
Up,Down Arrow to select	SPACE,+,-	to change	ESC to exit	F1=Help

5. When the system reboots, press F10 to enter the USC.



6. Select Hardware Configuration, and press Enter. In the right pane, select Advanced configuration, and press Enter.



7. The BCM57712-k presents two interfaces to the USC. Select the first interface, and press Enter.



8. Select Device Configuration Menu, and press Enter.

0.41.2.123, PowerEdge H710HD, Slot 9, User: cmc_root - 0 o Keyboard Mouse Options Power Media Help	бря	
UNIFIED SERVER CONFIGURAT	OR LIFECYCLE CONTROLLER ENABLED	2
Broadcom Main Configuration Page		
Firmware Image Menu		
Device Configuration Menu		
MBA Configuration Menu		
NIC Partitioning Configuration Menu		
Chip Type BCM57712E A1		
PCI Device ID 1663		
Bus:Dev:Func 02:00:00		
Link Status DOWN		
Permanent MAC Address		
00:10:18:81:F4:90		
Virtual MAC Address		
00:10:18:81:F4:90		
iSCSI MAC Address		
00:10:18:81:F4:91		
Configure device specific parameters. device.	These parameters will affect both ports of th	e
EFI v2.1	Default Fin:	ish

9. From the NIC Partition drop down box, select Enabled. This will enable Switch Independent Partitioning on the BCM57712-k.



NOTE: Enabling Switch Independent Partitioning affects both of the interfaces on the BCM57712-k.

The default parameters on the BCM57712-k are suitable for the deployment in this guide. By default, the BCM57712-k configures the first of the NIC partitions as an iSCSI interface. For information about configuring the parameters of the BCM57712-k, see the <u>NIC Partitioning (NPAR) Setup Guide</u>.

Install Windows Server 2008 R2

- 1. Connect a DVD drive with the Windows Server 2008 R2 DVD to one of the USB ports on the front of the PowerEdge M710HD.
- 2. Launch the console and boot the server.
- 3. At the Install Windows screen, click Install now.



4. Select Windows Server 2008 R2 Enterprise (Full Installation) as the operating system to install.



5. Accept the license terms.



6. Set the Language to install, Choose the appropriate Time and currency format and Keyboard of input method. Click Next.



7. Install a new copy of Windows Server 2008 R2.



8. Select the disk partition to install in. Installation will start.

Where do you want to install Windows	2		
Name	Total Size	Free Space Type	
Disk 0 Partition 1: System Reserved	100.0 MB	71.0 MB System	
Disk 0 Partition 2	136.0 GB	135.9 GB Primary	
€n Befresh €n Load Driver		Drive options (advanced	n
			NG.

9. After the installation completes, set the administrator password.



Install the drivers for the Broadcom BCM57712-k

At this point, Windows Server 2008 R2 is installed, but does not recognize the Broadcom BCM57712-k. Use a USB drive to copy the driver to the PowerEdge M710HD. The file used in this guide was Bcom_LAN_16.2.0_W2K3_8_64_A01.exe, available from http://www.support.dell.com.

- 1. Double-click the executable to start the installation.
- 2. When the WinZip Self-Extractor prompts you, click Unzip to unzip the files.



3. Navigate to C:\Bcom\W2K3_8_64\Driver_Management_Apps_Installer, and double-click BcrmSetup.



4. At the InstallShield Wizard splash screen, click Next.



5. Accept the license agreement.



6. Click Control Suite and select This feature, and all subfeatures, will be installed on local hard drive. You will use the Broadcom Advanced Control Suite in configuring the interfaces. Click Next.

10.41.2.123, Powertdge Video Keyboard Mouse Co	N710HD, Slot 9, User: cmc m otons Power Media Help	not - Olps				
Driver_Management_A	pps_lestalles					e ×
() · Boam •	W2K3_8_64 + Driver_Manageme	nt_Apps_Installer +	• 🚮 Search D	river_Manag	pement_Apps_Ins	12
Organize + 🖻 Open	Burn New folder				· •	
* Favorites	Broadcom Drivers and Ha	nagement Application	- InstallShield Warard	×	Size	
Desktop	Custom Setup Select the program features y	rou went installed.		4	100.000	
Consuler	Cick on an icon in the lat below	to change how a feature is segment Applications inter will be installed on loca ture will not be available.	Installed. Feature Description This feature will install the Broadcame Advanced Conter Inard drive. If be restalled on local hard drive		9613 510 21,50310 516 516	
Local Dek (C:)			This feature requires 91536 your hard drive.) on		
Network	and the second					
	Help	< Back	Next > Canc	<u>e</u>		
BramSetup Da Appikation	ste wodfled: 2/11/2011 9:38 AM Size: 96.0 KB	Date created: 2/11	/2011 9:38 AM	• [1	1155P	941 511

7. Click Install. When the install completes, click Finish. The PowerEdge M710HD is now connected to the core Ethernet network.



Install Windows updates

1. Launch Windows Update.



2. Optionally, turn on Automatic Updating.



3. Install the updates.



4. Accept the license agreement.



5. Restart the system.

to Keyboard Mouse Options Pow	er Media Help		
Windows Update			التالم ا
Control Panel + Sys	ten and Security + Windowe Update	👻 📫 🛛 Search Control P	anel !
Control Panel Home	Windows Update		
Check for updates			
Change settings	The undates we	re successfully installed	
View update history			
Restore hidden updates	Restart now to fin updates.	sh installing	Restart new
Updates: frequently asked	Succeeded: 72 up	dates	
questions	Window	s can't update important files and services wi frem. Save any open files, and then restart	hile the system
	-	a lanti a para lang apart mang ana a jarri salah s	
	Most recent check for updates: To	day at 2:05 PM	
	You receive updates: Fo	r Windows only.	
	Get updates for other Microsoft p	roducts. Find out more	
	Wind	ows Update	
	10		101 A. 101 A.
		Restart your computer to hinsk ins	taling important updates
		Windows carr't update important files and	services while the system is
		using them. Make sure to save your files	before restarting.
		Remind me in:	10 minutes
See also			
Installed Updates		Resta	rt now Postpone

Set the iSCSI adaptor and network interface properties

1. Launch the Broadcom Advanced Control Suite (BACS).



NOTE: Because there is only one switch in the chassis, half of the interfaces will show as disconnected.

2. Mouse over the connected iSCSI adaptor and note the number of the associated interface.

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Divisio Paragement	Vital Signs The Vital Signs section of the Information tab has useful information about the network adaptors that an installed in your system, such as the link status of the adapter and general redución correctivity.	
	* E- E (b. 30100	

3. Select the corresponding network adaptor, and select the Configurations tab.

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4. Set the Jumbo packet size. In this case, it is set to 9000.

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5. Disable the IPv4 Large Send Offload option. According to the <u>Using Broadcom Advanced Control</u> <u>Suite 3: Broadcom NetXtreme 57XX User Guide</u>, Jumbo Frames and Large Send Offload (LSO) are mutually exclusive properties.



6. Click Apply, and click Yes to clear the warning.

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		Advanced Advanced	Configuration Status Status	of Context Week
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7. Select the iSCSI adaptor, and select the Configurations tab.

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8. Turn off DHCP, and ether the IP address. Click Apply, and click Yes to clear the warning.

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Rock B1	Providence of centred level of the sector Provide Pro	Configuration Configu	0 Denobe 111-41.5 s21 354.8 s21 154.8 s Denobe Denobe Denobe 0 0	ig' Const Ves
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	and the second		BAL	0

Create the VLANs

1. In the left pane, click Team Management, right-click on the iSCSI adaptor (#42 in our case), and select Create a VLAN.

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Terri Balanaran	1/ Information	· Cagnostica	Br Configurations	Superce	
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- BBI TEATS	MAC Address		00-10-19-01-	P4-90	
E Chatsagned Adapters	Permanent MAC 2	Address	00-10-18-81-	P4-90	3
[1007] Broadcan SCN07712 M	P Address		\$0.41.2.005		2
INVESTIGATION AND ADDRESS OF ADDR	PV6 IP Address		540.bcie#	912-049-6-650%34	
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[1011] Broadcan 80967712 M	PD Duplex		1.4		_
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(B016) Breadcan-BCM5771216	B Oriver Informa	diam.			
THE REAL PROPERTY AND ADDRESS OF	Driver Status		Looked		
AND DOUBLESS STATES	Driver Name		bond80a.sys		
Create a Tear	Driver Version		6.2.9.0		
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and Acces		_	B	91-1	0

2. Click Next to clear the splash screen.



3. Each VLAN is associated with a team. Enter the name of the team, and click Next.



4. Enter the name of the VLAN, and click Next.



5. Select Tagged for the VLAN type, and click Next.

17	The New Task	Sens No		
AN L	Explorer New	I Jaformation S Despatts D Cardorate	ons in Statistics	• 10
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	- 28 (0013) 6 - 28 (0013) 6 - 28 (0013) 6 - 28 (0013) 6 - 29 (0013) 6	Wastinite W.Witpe C Unaged C Tagged		
		U Flagged VLWI is whethed, be sure the worksh supports tagged VLWIs To use VLWI ID Is wheth untagged rade batter rates.		
	el Contact Plant Frank Hand	Dancel Check 7	t Ver netter edepter and Ref >	r
	Tearrithme	Cancel Clack N	eus P1	

6. Enter the tag value, and click Next.



7. Click Finish to create the VLAN, and click Yes to on the warning pop-up.

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cyde Bin	
97	Broadcom Advanced Control State 3 File View Tools Teams Help
LAN_1	Explorer View 🔍 🗘 Information 🔨 Diagnostics 🥵 Configurations 🚳 Statistics 🔹 🧕
	Team Management
	Unassigned A Congratulations! The Teaming Wizard has finished collecting information. How would you like to proceed? BROADCOM. How would you like to proceed?
	The processing and events innovation of contractory in The processing and events innovation of contractory in The processing and events innovation of contractory in
	Applying the changes will temporarily intempt the network connection. The process may take several minutes and the connection will resume alterwards.
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Repeat steps 1 through 7 in this section to create a VLAN for TCP/IP traffic, changing the team name, VLAN name, and tag value as appropriate. For this guide, we used Team TCP, VLAN 200, and 200 as the values for this VLAN. There is no need to set jumbo frames or disable LSO for the TCP/IP connection.

Restrict traffic to the designated VLANs (optional)

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- 1. Open the Network and Sharing Center.

2. Select the first network connection, right-click it, and select Disable.

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3. Select the second network connection, right-click it, and select Disable.

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Now, all network traffic goes through the VLANs.

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	Change your networking settings		
	Set up a new connection or network Set up a wineless, broadband, clai-up, ad hoc, or t	IPN connection; or set up a router or access point.	
	Connect to a network Connect or reconnect to a wireless, wired, dial-up	ar VPN network connection.	
	Troubleshoot problems		
	Diagnose and repair network problems, or get thou	bieshooting information.	
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Install the EqualLogic Hardware Integration Toolkit

- 1. Copy the installer for the EqualLogic Hardware Integration Toolkit (HIT) to the PowerEdge M710HD.
- 2. Double-click the Setup64 icon.
- 3. At the splash screen, click Next.



4. Accept the terms of the license agreement, and click Next.



5. Accept the default of Typical for the installation type.



6. When the installer prompts you to start the iSCSI Initiator service and make a firewall exception, click Yes.



7. When the installer prompts you to start the Microsoft iSCSI service, click Yes.



8. Close the iSCSI Initiator properties dialog. It is configured later in the process.



9. When the installer prompts you to make a firewall exception for ping requests, click Yes.



10. Click Install.



11. Click Yes to install Microsoft Multipath I/O.



12. Click Finish.



13. Accept the default of Yes, I want to restart my computer now and click OK to reboot the computer.



14. After the PowerEdge M710HD reboots, select Configure this computer to access a PS Series SAN, and click Next.



15. Click Finish.



Create the RAID

1. Enter the IP address for the EqualLogic array. You may need to add this address to your list of trusted sites.



2. At the security warning, click Yes.



3. Log into the array using the grpadmin account and the password you entered earlier.

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4. Click the warning about Array01 not being configured, and click Yes.



5. Name the array, and click Next.



6. Select the RAID policy, and click Next.



7. Review the summary, and click Finish.



Create the SAN volume

1. Choose Volumes in the left pane, and click Create volume.



2. Name the volume, and click Next.

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3. Choose the size for the volume, and set the snapshot reserve as appropriate. Click Next.

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4. Restrict iSCSI access as appropriate. The example below shows restricting by subnet.



You have now successfully created the volume.



Set iSCSI access to the SAN

1. Start the iSCSI Initiator.

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2. Select the Discovery tab.

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3. Enter the IP address, click Discover Portal, and click Advanced.

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4. Select the adaptor to use. In this case, 42 is the one that's active.



5. Click OK to close the Advanced Settings dialog.

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6. Click OK to close the Discover Target Portal dialog.

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7. Select the Targets tab, and click Connect.

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8. Verify the Connect to Target settings, and click OK.



9. Close the iSCSI Initiator.

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10. Start Server Manager.



11. Expand Storage, and select Disk Management.

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Conclusion

Converged I/O, enabled by Switch Independent Partitioning, has the potential to generate great savings. Switch Independent Partitioning is very easy to use. Although this guide covers the entire deployment end-to-end, the only steps specific to Switch Independent Partitioning involved using the Dell Lifecycle Controller to enable the feature. Dell provides you with a complete, easy-to-deploy solution, allowing you to get the same amount of work done with fewer components and less maintenance.