Multiple I/O streams. One adapter. Converged I/O.



Dell[™] PowerEdge[™] M710 blade server





A Principled Technologies deployment guide commissioned by QLogic Corporation

Table of contents

| Executive summary |
|---|
| Introduction2 |
| QLogic QConvergeConsole |
| Overview of the procedure |
| Initial setup5 |
| Setting up the Dell PowerConnect M8428-k switch5 |
| Installing Windows Server [®] 2008 R2 and drivers for the QLogic QME8242-k5 |
| Enabling NPAR on the QLogic QME8242-k6 |
| Setting fiber access to the SAN6 |
| Detailed deployment steps6 |
| Cabling the network |
| Connecting to the Dell PowerEdge M1000e CMC7 |
| Configuring the Dell PowerConnect M8428-k12 |
| Installing Windows Server 2008 R212 |
| Installing the drivers for the QLogic QME8242-k17 |
| Enabling NPAR on the QLogic QME8242-k20 |
| Installing Windows updates23 |
| Setting access to the SAN26 |
| Conclusion |
| Appendix: Using the Dell Unified Server Configurator to enable NPAR on the QLogic QME8242-k29 |
| About Principled Technologies |

EXECUTIVE SUMMARY

Introduction

Traditional networking, where each connection uses one or more cables, is evolving into a more streamlined system – converged networking. Where you previously needed a separate cable for each connection type, you can now combine multiple types of connections onto just one cable. This guide explains how to converge Ethernet and Fibre Channel (FC) networks for data center deployment with both network types flowing through the same physical connection. We will describe a simple network configuration containing a LAN connection and a SAN connection to preconfigured storage.

With Ethernet speeds increasing to 10 Gb/second, more traffic can go through a single cable without compromising performance. Converged network adapters take the benefits of 10Gb Ethernet one step further by allowing you to combine multiple types of traffic, such as TCP, iSCSI, and FCoE, on a single physical port.

NIC partitioning (NPAR), implemented with QLogic VMflex[™] technology, provides a seamless migration path for replacing many 1Gb Ethernet ports with fewer 10GbE ports, without compromising the performance, bandwidth provisioning flexibility, and isolation that physical server environments require.

The QLogic QME8242-k Converged Network Adapter can support up to four independent I/O partitions in one port, allowing you to reduce the number of components used for networking. The partitions are flexible, allowing you to change their function from iSCSI or FCoE to pure Ethernet with just a few steps. The QLogic QME8242-k uses a PCIe[®] Gen2 x8 bus to interface with the host server. The greater bus speed allows data to move more quickly between the processor and the converged adapter.

The QLogic QME8242-k uses QLogic FlexOffload[™] to reduce server CPU cycles required for TCP, FCoE, and iSCSI operations. This increases available CPU resources or CPU efficiency, which can improve performance for all applications and increase levels of consolidation in virtualized servers.



The benefits the QLogic QME8242-k Converged Network Adapter delivers are clear: fewer server CPU cycles, fewer cables, fewer switches, and greater efficiency—all of which yields you a greater return on your investment by allowing you to accomplish more work with less equipment.

QLogic QConvergeConsole

QLogic offers easy to use management tools to help manage its adapter, allowing you to change the functionality of your adapter's partitions from your operating system, along with a host of other features. It is available in both a command line interface (CLI) and a graphical user interface (GUI). Each provides similar functionality, but offers different ways of interacting with the adapter.

| put hostname/address: | a | |
|---------------------------------------|---------------------------|---|
| | The Ultimate in Perform | |
| ïle Host View Settings | Wizards Help | |
| Iocalhost:Microsoft Windows \$ | Information Security | |
| 2008 Enterprise 64-bit x64:Warning | Host Attribute Name | Host Attribute Value |
| ⊕ QME8242:RFE1115A79738 □ | Hostname: | localhost |
| ⊕ 🕫 QME8242:RFE1115A79847: | OS Type: | Microsoft Windows Server 2008 Enterprise 64-bit x64 |
| | OS Version: | Service Pack 2 (Build 6002) |
| | FC/FCoE Agent Version: | 1.00.1282-20 |
| | iSCSI Agent Version: | 2.00.0026 |
| | Ethernet Agent Version: | 1.01.18 |
| | Function Summary | |
| | Number of adapters: | 2 |
| | Number of physical ports: | 4 |
| | NIC | |
| | NIC Functions: | 6 |
| | FC/FCoE | |
| | FC Functions: | 0 |
| | FCoE Functions: | 1 |
| | FC Targets: | 0 |
| e | VPorts: | 0 |
| | ISCSI | |
| | ISCSI Functions: | 1 |
| | iSCSI Targets: | 0 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Our report does not provide complete details about the QLogic QConvergeConsole[™] suite of software, though we do include instructions on how to modify the adapter and its partitions with the QConverge Console command line interface. For more information on the QConvergeConsole CLI and GUI, see the QLogic user guides at http://support.dell.com.

OVERVIEW OF THE PROCEDURE

This guide shows you how to use NIC partitioning to consolidate heterogeneous network traffic using the QLogic QME8242-k Converged Network Adapter, a Dell PowerEdge M710 server, and a Dell PowerConnect™ M8428-k switch. As a physical Ethernet switch and OSagnostic layer 2 technology, NPAR gives you a lot of freedom in how you configure your servers. For this guide, we chose Microsoft® Windows Server® 2008 R2 as the server OS, and show every step needed to connect a bare-metal blade to an existing Ethernet network and Fibre Channel-based SAN infrastructure. When the installation is complete, the server will send and receive both FCoE and Ethernet traffic through a single port on the 10Gb adapter.

Initial setup

For details, see the <u>Cabling the network</u> and <u>Connecting to the Dell</u> <u>PowerEdge M1000e CMC</u> sections below.

- 1. Connect the Dell PowerConnect M8428-k switch to the core Internet network and to the SAN infrastructure.
- 2. Use your browser to connect to the Dell PowerEdge M1000e CMC and launch the iDRAC GUI for the Dell PowerConnect M8428-k.

Setting up the Dell PowerConnect M8428-k switch

For details, see the <u>Configuring the Dell PowerConnect M8428-k switch</u> section below.

- 1. Create the VLANs to access the core network and the SAN infrastructure.
- 2. Configure the VLAN access.

Installing Windows Server[®] 2008 R2 and drivers for the QLogic QME8242-k

For details, see the <u>Installing Windows Server 2008 R2</u>, <u>Installing the</u> <u>drivers for the QLogic QME8428-k</u>, and Installing Windows <u>updates</u> sections below.

 Install a new copy of Windows Server 2008 R2 Enterprise (Full Installation) as the operating system on the Dell PowerEdge M710.
 If you have not already done so, download the drivers for the QLogic QME8242-k from <u>http://support.dell.com</u>.

3. Log in as administrator.

4. Install the QLogic Windows SuperInstaller and all its relevant components.

5. Now that the system has network connectivity, install Windows updates.

Enabling NPAR on the QLogic QME8242-k

NOTE

There are several ways to enable NPAR on the QLogic QME8242-k. In the body of this guide, we provide details on doing so with the QLogic QConvergeConsole CLI. You can also use the Dell Unified Server Configurator (USC) (see the <u>Appendix</u> of this guide).

The basic steps for enabling NPAR on the QLogic QME8242-k are as follows:

1. Start the QConvergeConsole CLI.

2. Through the NIC Partitioning menu, enable the additional ports, making sure to assign the fourth port for FCoE.

3. Reboot the server.

For details, see the Enabling NPAR on the QLogic QME8242-k section below.

Setting fiber access to the SAN

For details, see the <u>Setting access to the SAN</u> section below.

1. Start the Windows Server Manager, expand Storage, and select Disk Management.

2. Right-click the new disk, and select Online. In this guide, we are connecting to a preconfigured LUN. However, you would have the opportunity to initialize the drive at this point, if necessary.

DETAILED DEPLOYMENT STEPS

Cabling the network

This diagram shows how the network components are connected. The blue line represents the Network/IP connection, while the orange line represents the Storage/FC connection.



Dell PowerEdge M1000e Modular Blade Enclosure

This guide assumes a connection to the core Ethernet network, in our case, via a Cisco[®] Nexus[®] 5010 switch. Likewise, we connected to an existing SAN infrastructure via a Brocade[®] 200E switch. Configuring these switches is outside the scope of this guide. This guide shows how to configure all other components from bare metal.

Connecting to the Dell PowerEdge M1000e CMC

1. Enter the IP address of the Dell PowerEdge M1000e. At the warning about the Web site'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 M710, select the server, and click Launch Remote Console.

| H710HD: Server Status - Windows Interne | t Explorer | |
|---|--|---|
| 🕒 🕤 🗢 🖸 https://10.41.2.96/cgi-bin/webcj | ¢/main | 🕐 🖓 Centificate Error 🐈 🗶 🕞 Bing 🥖 |
| File Edit View Pavorites Tools Help | | |
| 🚖 Favorites 🛛 🎄 🙋 Web Sice Galery 🔹 | | |
| M710HD: Server Status | | 💁 • 🔂 - 🖂 👼 • Page • Safety • |
| | | |
| CHASSIS | MANAGEMENT CONTROLLER | Support About Log Out |
| CMC-BMMXXG1 | Properties Setup Power | |
| root, Administrator | Status | |
| Chassis Overview | | |
| - Chassis Controller | Server Status | e c 2 |
| Server Overview | Jump for Broperties 1, 1/O Eabric Interfaces, 1, 100 | AC Surfam Event Los I. Common (DDAC Notwork Refines: L. Dut (DDAC Notwork Refines: L. Duc (DDAC Notwork Refines: L. WARRAND |
| 1 M710HD | Addresses | |
| - 2 SLOT-02 | | |
| - 4 SLOT-04 | | Launch DRAC GUI Launch Remote Console |
| - 5 SLOT-05 | Properties | Back to top |
| - 6 SLOT-06 | Attribute | Value |
| - 7 SLOT-07 | Stat | 4 |
| - 9 SLOT-09 | | |
| -10 SLOT-10 | Slot Name | MPTOHD |
| -11 SLOT-11 | Present | Yes |
| -12 SLOT-12 | Health | |
| -13 SLOT-13 | Server Model | PowerEdgeM710HD |
| -14 SLOT-14 | Service Tan | HCISIM |
| -16 SLOT-16 | ODAC Eirmune | 9.00 (Duild 99) |
| I/O Module Overview | ibroic rinnware | 5.00 (build 32) |
| A1 10 GEE KR | CPLD Version | 1.0.0 |
| A2 Not installed | BIOS Version | 1.1.10 |
| | | M740EQV |
| - Bi Not installed | Host Name | MFIDEAX |
| B1 Not installed B2 Not installed And installed | Host Name Operating System | W/ ICEA |

4. At the warning about the Web site'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 PowerConnect M8428-k, select the switch from Chassis Overview, and scroll down to click Launch I/O Module GUI.

| 🕤 🗢 🖸 https://10.41.2.96.cg-tan/webcg/hean | | 👱 🤪 Certificate Error 🛛 🕂 🗙 🔽 | Brg |
|---|-----------------------------|-------------------------------|-------------------------------|
| Edit View Pavorites Tools Help | | | |
| Favorites 🙀 🙋 Web Silce Gallery • | | | |
| CNC-EMMONG1: 1/O Module Status: A1 | | | 🏠 • 🔂 · 🖸 🖮 • Page • Safety • |
| | GEMENT CONTROLLER | | Support About Log Out |
| CMC-BMMXXG1 Pr PowerEdge M1000e root. Administrator | operties Setup Power | | |
| - | Location | A1 | |
| Chassis Overview Chassis Controller | Name | M8024-k 10GbE SW | |
| Server Overview | Present | Yes | |
| 1 M710HD | Health | | |
| - 3 SLOT-02 | Priver Status | <u> </u> | |
| - 3 SLOT-04 | Service Tan | 000000 | |
| 5 SLOT-05 | Fabor | 10 GhE KR | |
| - 7 SLOT-07 | MAC Address | 00.80 24 12:00.89 | |
| SLOT-08 | Rile | Master | |
| - 9 SLOT-09 | | | |
| -11 SLOT-11 | I/O Module Network Settings | | Back to top |
| -13 SLOT-13 | Attribute | Value | |
| - 14 SLOT-14 | DHCP Enabled | Yes | |
| -15 SLOT-15 | IP Address | 10.41.2.108 | |
| - I/O Module Overview | Subnet Mask | 255 255 248 0 | |
| A1 10 GEE KR | Gateway | 10.41.0.1 | |
| - A2 Not installed | | | |
| - B2 Not installed | | | |
| And Not Installed | | | Laurath IIO Madala OIR |

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

| Wr Please Login |
|--------------------------------------|
| Please enter user name and password. |
| Resource 172.16.84.15 |
| User Name |
| Password |
| <u>O</u> K <u>C</u> ancel |

9. The console is running.

| eke — 🏠 🤉 | | | | | | | | |
|-----------|--|--|--|---|---|--|--|-------------|
| 31.3 2 | Status | 🔾 Temp 📗 🥂 Bea | icon 🔡 Leg | end | | | | Log O |
| lanage | Switch View | | | | | | | |
| 🖪 Swite | | | 20 | | | | | |
| Port | | | | | | | | |
| | | | ž. | | | | | |
| Ionitor | | | 17 1 | | | | | |
| I Dorfe | | | 18 | | | | | |
| | | | 19 T 🔍 🛁 | | | | | |
| | | | 20 🛛 ° | | | | | |
| Other | | | 21 🛛 ° | | | | | |
| | | | 22 🗍 ° | SI 683 683 683 | E83 E83 | B88 B88 | | |
| Telne | | | 23 I O | | | | | |
| | | | . † | | | | | |
| | | | 24. | 3 10 11 12 | 13 14 | 15 16 | | |
| | | | | n m m m | m m | lm ml | | |
| | | | I ALAN AL | | | | | |
| | | | | | | | | |
| | | | 25 | | | | | |
| | | | 25 N 26 N | | | | | |
| | | | 25 N * 26 N * 27 N * | | | | | |
| | Switch Events In | formation | 25 N ° 26 N ° 27 N ° | | | | | |
| | Switch Events, In | formation | | | | | | |
| | Switch Events, In Switch Events | formation Access Gateway Inf | 25 0 1 26 0 27 0 2 27 0 2 formation | -00:00 (Auto-Defresh | nterval is 15 se | eronds) | | |
| | Switch Events, In Switch Events All Events Last U | formation Access Gateway Inf Jpdated: Mon Aug 15 20 | 25 1 26 1 26 1 27 26 1 26 1 26 1 26 1 26 1 | r+00:00 (Auto-Refresh i | nterval is 15 se | econds) | | Filer Show |
| | Switch Events, In Switch Events All Events Last L | formation Access Gateway Inf Jpdated: Mon Aug 15 20 | 22 N 1 22 | F-00:00 (Auto-Refresh i | nterval is 15 se | econds) | | Filer Show |
| | Switch Events, In Switch Events All Events Last L Time Thu Aug 04 2011 | formation Access Gateway Inf Jpdated: Mon Aug 15 20 22:35:11 GMT+00:00 | formation 011 18:40:35 GMT | F=00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 | nterval is 15 se | econds) | 16. | Filter Show |
| | Switch Events, In Switch Events All Events Last U Time Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway Inf Jpdated: Mon Aug 15 20 22:35:11 GMT+00:00 22:35:11 GMT+00:00 | formation Characteristics Control of Contro | r+00:00 (Auto-Refresh I Message Virtual FCc port 23 (2 Virtual FCc port 24 (2 | nterval is 15 se 20:17:00:05:33: 20:18:00:05:33 | econds) 45:11:80) is onlin 45:11:80) is onlin | 1e. | Filer Show |
| | Switch Events, In Switch Events All Events Last L Time Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway Int pdated: Mon Aug 15 20 22:35:11 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 | formation 011 18:40:35 GMT Level Q Information Q Information | F+00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2) Virtual FCoE port 12 (2) | nterval is 15 se 20:17:00:05:33: 20:18:00:05:33: 20:0a:00:05:33: | 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is offi | ne. ne. | Filer Show |
| | Switch Events, In Switch Events All Events Last L Time Thu Aug 04 2011 Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway In1 pdated: Mon Aug 15 20 22:35:11 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 | formation 011 18:40:35 GMT Level Q Information Q Information Q Information | -00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 2 (2 Virtual FCoE port 2 (2 | nterval is 15 se 20:17:00:05:33: 20:0a:00:05:33: 0:02:00:05:33:4 | 45:11:80) is onlin 45:11:80) is offin 45:11:80 is offin 5:11:80 is offin | ne. e. | Filter Show |
| | Switch Events, In Switch Events All Events Last U Time Thu Aug 04 2011 | formation Access Gateway Int Jpdated: Mon Aug 15 20 22:35:11 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 | formation 011 18:40:35 GMT Level Q Information Q Information Q Information Q Information | -00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 2 (2 Virtual FCoE port 2 (2) | nterval is 15 se 20:17:00:05:33: 20:0a:00:05:33 20:0a:00:05:33: d from MARGIN | 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is onlin vAL to HEALTHY | те. те. те. е. | Filter Show |
| | Switch Events, in Switch Events All Events Last I Time Thu Aug 04 2011 Thu Aug 04 2011 Thu Aug 04 2011 Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway int 22:35:11 GMT-00:00 22:35:12 GMT-00:00 22:35:12 GMT-00:00 22:35:15 GMT-00:00 22:35:15 GMT-00:00 | formation 011 18:40:35 GMT Level 0 Information 0 Information 0 Information 0 Information 0 Information 0 Information 0 Information 0 Information | F+00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 10 (2 Virtual FCoE port 10 (2 Switch status change Login information: Log | nterval is 15 se 20.17.00.05.33 20.18.00.05.33 20.00.005.33.4 drom MARGM in successful v | 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is offit 5:11:80) is offit 5:11:80) is offit 4:5:11:80) is offit 4:5:11:80 is offit | 16. 16. 16. 16. 16. 17. 18. 19. 10. 11. 10. 11. 12. 10. 11. 12. 10. 11. 12. 12. 12. 12. 12. 12. 12. 12. 12 | Filter Show |
| | Switch Events, In Switch Events All Events Last U Time Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway Int Jpdated Mon Aug 15 20 22:35:11 GMT-00:00 22:35:12 GMT-00:00 22:35:12 GMT-00:00 23:06:03 GMT-00:00 23:06:03 GMT-00:00 23:12:19 GMT-00:00 | formation D11 18:40:35 GMT | -00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 10 (2 Virtual FCoE port 2 (2 Switch status change Login information: Log Interface InTengigabit | nterval is 15 se 20.17.00.05.33 20.18.00.05.33 20.00.05.35 20.00.0 | 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is offlin 5:11:80) is offlin 14L to HEALTNSH/ added on interfac | ne. ne. ne. | Filter Show |
| | Switch Events, In Switch Events All Events Last U Time Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway Int Jpdated. Mon Aug 15 20 22:35:11 GMT-00:00 22:35:12 GMT-00:00 22:35:12 GMT-00:00 23:06:30 GMT-00:00 23:12:19 GMT-00:00 23:12:39 GMT-00:00 23:12:39 GMT-00:00 | formation 011 18:40:35 GMT Level Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation Dinformation | +00:00 (Auto-Refresh I Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 24 (2 Virtual FCoE port 2 (2 Virtual FCoE port 2 (2 Virtual FCoE port 2 (2) Interface Information: Log Interface InTengigabiti | nterval is 15 sec 20.17.00.05.33 20.18.00.05.33 20.20.005.33 20.20.005.33 4 from MARGII in successful in successful iterrent 0/10 is | 45:11:80) is onlin 45:11:80) is onlin 45:11:80 is onlin 45:11:80 is offli 45:11:80 is online 45:11:80 is online 45: | ne. ne. e. RSH. IP Addr: 10.41.2: RSH. IP Addr: 10.41.2: ce vian 200 ce vian 200 | Filter Show |
| | Switch Evenis, in Switch Evenis All Events Last U Time Thu Aug 04 2011 Thu Aug 04 2011 | Tormation Access Gateway Int pdated: Mon Aug 15 20 22:35:11 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 22:35:12 GMT+00:00 23:12:12 GMT+00:00 23:12:12:36 GMT+00:00 23:12:12:36 GMT+00:00 23:16:15 GMT+00:00 | Level Chromation D11 18:40:35 GMT Level Chromation | F+00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 10 (2 Virtual FCoE port 10 (2 Switch status change Login information: Log Interface InTengigabti Interface ExTengigabti | enterval is 15 se 20:17:00:05:33 20:08:00:05:33 20:08:00:05:33 20:09:00:05:33 20:09:00:05:33 20:00:00:05:33 20:00:00:05:33 20:00:00:05:33 20:00:00:05:33 20:00:00:05:33 20:00:00:05:33 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:00:00:05:35 20:000 | 45:11:80) is onlin 45:11:80) is onlin 45:11:80) is orlin 45:11:80 is offin 45:11:80 is offin 45:11:80 is offin 41.10 HEALTY a TELNET/SSH/ added on interfa 5 removed on int | ie. e. e. RSH. IP Addr: 10.41.2. RSH. 200 sce vian 200 erface vian 200 erface vian 200 | Filter Show |
| | Switch Events, In Switch Events All Events Last U Time Thu Aug 04 2011 Thu Aug 04 2011 | formation Access Gateway Int Access Gateway Int 22:35:11 GMT-00:00 22:35:12 GMT-00:00 22:35:12 GMT-00:00 23:12:19 GMT-00:00 23:12:19 GMT-00:00 23:12:19 GMT-00:00 23:19:53 GMT-00:00 | tormation 11 11 8:40:35 GMT Photomation P | -00:00 (Auto-Refresh i Message Virtual FCoE port 23 (2 Virtual FCoE port 24 (2 Virtual FCoE port 2 (2 Virtual FCoE port 2 (2 Switch status change Login information: Log Interface Intengigabit Interface ExTengigabit Interface ExTengigabit | et al 20 et al | 45:11:80) is onlin 45:11:80 is onlin 45:11:80 is onlin 45:11:80 is offin 14:L to HAC.THY is TELNET/SH/I added on interfa added on interfa | ne. ne. e. RH. IP Addr: 10.41.2. re vian 200 re vian 200 face vian 200 face vian 200 | Filter Show |

Configuring the Dell PowerConnect M8428-k

To configure the Dell PowerConnect M8428-k, you will need to use SSH to connect to the IP address of the switch and use the command-line interface.

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

```
config t
```

2. Internal interface 0/1 will be carrying the combined traffic to the Dell PowerEdge M710. Make it an FCoE port, change the switchport mode to converged traffic, and enable the port.

```
interface internalTenGigabitEthernet 0/1
fcoeport
switchport mode converged
no shutdown
exit
```

3. External interface 0/17 will be carrying the Ethernet traffic to the Cisco Nexus 5010. Change the port to use VLAN 200, and enable the port.

interface externalTenGigabitEthernet 0/17
switchport mode access
switchport access vlan 200
no shutdown
exit

Installing 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 M710.

- 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, and click Next.

| 🔾 🚰 Install Windows | | | |
|---|---------------------|---------------------|----|
| Select the operating system you want to install | | | |
| Operating system | Architecture | Date modified | I |
| Windows Server 2008 R2 Standard (Full Installation) | x64 | 7/14/2009 | |
| Windows Server 2008 R2 Standard (Server Core Installation) | x64 | 7/14/2009 | 18 |
| Windows Server 2008 R2 Enterprise (Full Installation) | 164 | 7/14/2009 | |
| Windows Server 2008 R2 Enterprise (Server Core Installation) | :64 | 7/14/2009 | |
| Windows Server 2008 R2 Datacenter (Full Installation) | 164 | 7/14/2009 | |
| Windows Server 2008 R2 Datacenter (Server Core Installation) | x64 | 7/14/2009 | |
| Windows Web Server 2008 R2 (Full Installation) | x64 | 7/14/2009 | |
| Windows Web Server 2008 R2 (Server Core Installation) | x64 | 7/14/2009 | |
| Description: This option installs the complete installation of Windows Serve user interface, and it supports all of the server roles. | . This installation | includes the entire | |
| | _ | Mest | |

5. To accept the license terms, click the I accept the license terms checkbox, and click Next.

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

7. Install a new copy of Windows Server 2008 R2. Select Custom (advanced).

8. Select the disk partition to install in, and click Next to begin the installation.

| 1 Install Windows | | 1000 |
|-------------------------------------|------------|--------------------------|
| Where do you want to install Window | N5? | |
| 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 |
| €s Betresh ⊕ Load Driver | | Drive options (advanced) |
| | | _N |

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

Installing the drivers for the QLogic QME8242-k

At this point, Windows Server 2008 R2 is installed, but does not recognize the QLogic QME8242-k. Use a USB drive to copy the driver to the PowerEdge M710. The file we used was QLogic_1.00.0005.bin.zip, which is available for download at http://support.dell.com.

- 1. Right-click the file, and select Extract All.
- 2. Accept the default extraction location, and click Extract.

| Extract Compressed (Zipped) Folders | X |
|---|----------------|
| Extract Compressed (Zipped) Folders | |
| Select a Destination and Extract Files | |
| Files will be extracted to this folder: | |
| C:\Users\Administrator\Desktop\QLogic_1.00.0005.bin | Browse |
| ✓ Show extracted files when complete | |
| | |
| | |
| | |
| | |
| | |
| | |
| | Extract Cancel |

3. Navigate to the unzipped folder, and double-click on Setup.exe to start the installation.

4. At the Windows SuperInstaller welcome screen, click Next.

5. Read the License Agreement, and click Agree to continue.

| Installation Wizard | CALOGIC [*] The Ultimate in Performance |
|---------------------|---|
| Main Page | Windows SuperInstaller |
| Exit | Installation and use of the installed applications requires acceptance of the following License Agreement: |
| | End User Software License Agreement Important: READ CAREFULLY BEFORE CLICKING ON THE "Agree" BUTTON OR INSTALLING THIS SOFTWARE THIS PRODUCT CONTAINS COMPUTER PROGRAMS AND RELATED DOCUMENTATION ("SOFTWARE") THAT BELONG TO QLOGIC CORPORATION. ("QLOGIC"), THE USE OF WHICH IS SUBJECT TO THIS END USER SOFTWARE LICENSE AGREEMENT ("AGREEMENT"). CLICKING ON THE "Agree" BUTTON BELOW OR INSTALLING/USING THE SOFTWARE CONSTITUTES ACCEPTANCE BY LICENSEE ("LICENSEE" MEANS YOU OR THE BUSINESS ENTITY ON WHOSE BEHALF YOU USE OR INSTALL THE SOFTWARE, AS APPLICABLE) OF ALL THE TERMS AND CONDITIONS OF THIS AGREEMENT. IF LICENSEE DOES NOT AGREE TO THE TERMS AND CONDITIONS OF THIS AGREEMENT, LICENSEE SHALL NOT INSTALL/USE THE SOFTWARE. WRITTEN APPROVAL IS NOT A PREREQUISITE TO THE VALIDITY OR ENFORCEABILITY OF THIS AGREEMENT. |
| | Version: 1.00.0005 |

6. Select the default installation (Install Drivers and Applications), check the VLAN / Teaming Driver checkbox, and click Install.

7. When the installation completes, click Finish. The server is now connected to the core Ethernet network.

Enabling NPAR on the QLogic QME8242-k

1. Start the QConvergeConsole CLI.

2. Once the QConvergeConsole CLI finishes discovering devices, select 7 (NIC Partitioning Configuration), and press Enter.

3. In the NIC Partitioning (NPAR) Configuration Selection menu, select 1 (NPAR Configuration), and press Enter.

4. In the NIC Partitioning (NPAR) Configuration menu, select 2 (Change PCI Function Personality), and press Enter.

| ſ | 📰 QConve | ergeConsole CLI | |
|---|----------|--|---|
| | | QConvergeConsole | |
| | | CLI - Version 1.0.0 (Build 64) | |
| | NIC | Partitioning (NPAR) Configuration Selection | |
| | 1: | NPAR Configuration | |
| | | (p or Ø: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 1 | |
| | | QConvergeConsole | |
| | | CLI - Version 1.0.0 (Build 64) | |
| | NIC | Partitioning (NPAR) Configuration | |
| | 1: 2: | Bandwidth Configuration Change PCI Function Personality | |
| | | (p or Ø: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 2 | - |

5. In the NIC Partitioning (NPAR) Port Configuration Selection menu, select the adapter you wish to modify (we chose port 1 of the first CNA, or option 2), and press Enter.

| 📰 QConvergeConsole CLI | _ 🗆 × |
|--|----------|
| (p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 2 | _ |
| QConvergeConsole | |
| CLI - Version 1.0.0 (Build 64) | |
| NIC Partitioning (NPAR) Port Configuration Selection | |
| CNA Model QME8242 SN: RFE1115A79738 | |
| Function 1 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:39] 2. Port 1 | |
| Function Ø [Type: NIC] [MAC Address: 00:0E:1E:05:C5:38] Function 2 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:3A] CNA Model QME8242 SN: RFE1115A72847 | |
| 3. Port 2 Function 1 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:99] | |
| FORT 1 Function Event 1 Event 1 | |
| (p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 2 | _ |

6. In the NIC Partitioning (NPAR) PCI Function Configuration Selection menu, select 3 (Function: 6), and press Enter.

| 🚟 QConvergeConsole CLI | |
|---|---|
| Function 2 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:3A] CNA Model QME8242 SN: RFE1115A79847 | - |
| 3. Port 2 Function 1 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:99] 4. Port 1 | |
| Function 0 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:98] Function 2 [Type: NIC] [MAC Address: 00:0E:1E:05:C5:9A] | |
| (p or Ø: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 2 | |
| QConvergeConsole | |
| CLI - Version 1.0.0 (Build 64) | |
| NIC Partitioning (NPAR) PCI Function Configuration Selection | |
| 1: Function: 2 MAC: 00:0E:1E:05:C5:3A Type: NIC 2: Function: 4 MAC: 00:0E:1E:05:C5:3C Type: Disabled 3: Function: 6 MAC: 00:0E:1E:05:C5:3E Type: Disabled | |
| (p or Ø: Previous Menu; m or 98: Main Menu; ex or 99: Quit) Please Enter Selection: 3_ | • |

7. When asked for the personality you wish to change the partition to, select 3 (FCoE), and press Enter.

8. The console will warn you that you need to reboot the system for changes to take effect. Press Enter to continue.

9. Type 99 and press Enter to quit.

10. Reboot your server. The fourth partition will be configured as an FCoE physical function type upon rebooting.

Installing Windows updates

1. Launch Windows Update.

NOTE

2. Optionally, turn on Automatic Updating.

3. Click Install updates. We installed all important updates, including SP1.

4. To accept the license agreement, click the I accept the license terms radio button, and click Finish.

A Principled Technologies deployment guide 25

5. To restart the system, click Restart now.

Setting access to the SAN

The following steps assume that you are connecting to a pre-configured LUN.

1. Start Server Manager.

2. Expand Storage, and select Disk Management.

| ctory Verv Help | | |
|--|---|-------------------|
| 2 m 🖬 m 🗈) | 《明明》是 | |
| r Managar (HDH-SGVQJHEDG | Disk Hanagement Volume List + Graphical New | Actions |
| olen naturni | Volume Lovout Type Pile System Stetus | Disk Perseparat + |
| Negresiks onfgunsten brage Windows Server Backup Windows Server Backup | Bing (SL) Single Date: MTS Healthy Boot, Rep ECOTOL (SL) Single Date: FATS Healthy (Reve, P J) (SMMSYRA, (R, UNY) (D)) Brack Base: UDF Healthy (Privacy PL CaSystem Reserved Drude Date: MTS Healthy (Svitem, A Single Date: MTS | Hore Actions |
| | 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | |
| | moekii Elezonalii Lezon January Autor Order Hatty (Lezon, Penary Partile | |
| | - José 2 boso da Office 1 bita | |
| | Little Roll of Printery partition | |
| | | |

3. Right-click the new disk, and select Online.

| Server Hanager | the second s | |
|--|---|----------------|
| le Action Vew relp | | |
| 🗢 🐮 🔟 🖬 🔞 🖬 | F 10 | |
| Server Marager (NDN-50VQ/NEX0 | Disk Hanagement Volume List + Graphical Yese | Actions |
| Roles | Volume Layout Type Pile System Status | Ded Hasagement |
| Degration Configuration Manage Withdows Server Backup Withdows Server Backup | Lia (C.) Single Back OTFS weathy Boot, Ag ##6001C0,UKB (E) Single Back F4112 Healthy Gate, Ag (GMSSYOC, BK, IVO (D) Single Back (MTFS Healthy System, A CLASystem Reserved Single Back (MTFS Healthy System, A | Hore Actions |
| | Collect 0 Section 2 | |
| | Times a BOOTCD Use (F:) LAF 02 F-522 LAF 02 F-522 Dillion Healthy (Active, Primary Partition | |
| | Text Concernent of the Concerne of the Concernent of the Concernent of the Concerne | |
| | | |

4. Close Server Manager.

| Server Humager | the local distance of | | |
|--|---|----------------------------------|--|
| Pile Action Vew Help | | - Court | |
| 🗢 🔶 🔊 🖬 🖬 🕅 🕅 | ff 18 | | |
| E Server Manager (W3N-SGVQ.3N3D) E P Roles | Disk Hanageneest Volume Lat + Graphical Vers | Actures Tak Hatasserert and a | |
| N GE Protures B Disputsion Configuration Configu | Link (C) Series (Link (C)) Series (Link (C | More Acture | |
| | <u>د</u> | | |
| | Rever 10, 12 (C) | | |
| | Managarita Resolution 18708 I 18708 Far12 Office Inadity (Active, Reserv Partito | | |
| | L-Opsk 2 Basic 200.070 (B Cakke Peulity Pinary Partice) | | |
| • | Linn-tote a Prevary partition | | |
| | | | |
| | | | |

Conclusion

The deployment is complete. You can now access both the core Ethernet network and your SAN through a single interface.

As you have seen, using NPAR with the QLogic QME8242-k is simple. Once you have enabled NPAR using the steps described in the Configuring the QLogic QME8242-k section, all other setup is the same as for an installation without NPAR.

The QLogic QME8242-k, with QLogic VMflex and QLogic FlexOffload technologies, lets you get more done with less. It provides a seamless migration path for replacing many 1Gb Ethernet ports with fewer 10GbE ports, makes better use or precious processor resources, and simplifies the data center.

APPENDIX: USING THE DELL UNIFIED SERVER CONFIGURATOR TO ENABLE NPAR ON THE QLOGIC QME8242-K

NOTE

The USC will let you configure the QLogic QME8242-k even before you have installed the operating system.

If you choose to use the USC, you must boot into UEFI rather than into BIOS. If your system already boots into UEFI, skip to Step 5.

You do not have to boot into UEFI to use NIC partitioning. Once you have configured the QLogic QME8242-k, boot into BIOS or UEFI as appropriate. It is also possible to configure the NIC partitioning in Windows, as detailed in Enabling NPAR on the QLogic QME8242-k.

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.

| Under Keyboard Mouse Options Power Media Help | - 1fps |
|---|---|
| Dell Inc. (www.del BIOS Ve | l.com) - PowerEdge M710HD ersion 1.1.10 |
| Service Tag: HCJ3JM1 | Asset Tag: |
| System Time System Date | 10:31:04 ▲ Thu Apr 21, 2011 |
| Memory Settings Processor Settings | <pre> <enter> <enter></enter></enter></pre> |
| Boot Settings | <enter></enter> |
| Integrated Devices PCI IRQ Assignment | <pre> <enter> <enter></enter></enter></pre> |
| Serial Communication | <enter></enter> |
| Power Management System Security | <pre> <enter> <enter></enter></enter></pre> |
| Keyboard NumLock | On 🔻 |
| Up,Down Arrow to select SPACE, | +,- to change ESC to exit F1=Help |

3. Set the Boot Mode to UEFI.

| 10.41.2.123, PowerEdge M710HD, Slot 9, User: cmc_root - Ofp: Video Keyboard Mouse Options Power Media Help | |
|---|--------------------------------------|
| Dell Inc. (www.dell.c BIOS Vers | om) – PowerEdge M710HD ion 1.1.10 |
| Service Tag: HCJ3JM1 | Asset Tag: |
| System Time System Date | 10:31:52 ▲ Thu Apr 21, 2011 |
| Memory Boot Mode Proces Boot Sequence Boot S Sequence Retry | UEFI <pre></pre> |
| Integrated Devices PCI IRQ Assignment | <enter> <enter></enter></enter> |
| Serial Communication | <enter></enter> |
| Power Management System Security | |
| Keyboard NumLock | On 🔻 |
| Up,Down Arrow to select SPACE,+,- | to change ESC to exit F1=Help |

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 - 0fp Video Keyboard Mouse Options Power Media Help | os | . <u> </u> |
|--|--|------------|
| Dell Inc. (www.dell.c BIOS Vers | com) – PowerEdge M710HD sion 1.1.10 | |
| Service Tag: HCJ3JM1 | Asset Tag: | |
| System Time System Date | 10:33:52 Thu Apr 21, 2011 | |
| Memory Settings Processor Settings | | |
| Boot Settings Save change Discard cha | es and exit (ENTER) | |
| PCI IRQ Assignment | (ENTER) | |
| Serial Communication Power Management | <enter> <enter></enter></enter> | |
| System Security Keyboard NumLock | <enter></enter> | |
| 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 HII Advanced Configuration, and press Enter.

| | CONFIGURATOR LIFECYCLE CONTROLLER ENABLED |
|---|---|
| | Hardware Configuration |
| Home Lifecycle Log Platform Update Hardware Configuration OS Deployment Platform Restore | Configuration Wizards guide system device set up (Ex: RAID, iDRAC, Encryption). HII Advanced Configuration configures Human Interface Infrastructure(HII)– enabled devices (Ex: BIDS, NICS). Hardware Inventory is used to view or export the server's current hardware inventory or the factory shipped hardware inventory. Delete Configuration and Reset Defaults deletes the Lifecycle Controller configuration and restores factory defaults. |
| Hardware Diagnostics USC Settings | Configuration Wizards |
| About | HII Advanced Configuration Hardware Inventory Delete Configuration and Reset Defaults |
| Exit and Reboot | |
| UEFI v2.1 | |

7. The QLogic QME8242-k presents four interfaces to the USC. Select the first interface, and press Enter.

8. Select NIC Partitioning Configuration, and press Enter.

| 200010 0000 10 01200010 2000100 | 00.02.12.0 | 5.05.00 | | | |
|-----------------------------------|-------------|---------|--|--|---|
| Main Configuration Page | | | | | |
| | | | | | |
| Firmware Image Properties | | | | | |
| NIC Configuration | | | | | |
| iSCSI Configuration | | | | | |
| FCoE Configuration | | | | | |
| NIC Partitioning Configurati | on | | | | |
| Device Name | _ | | | | |
| QME8242 | | | | | |
| Chip Type | | | | | |
| NIC | | | | | |
| Link Status | | | | | |
| Disconnected | | | | | - |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Configure NIC Partitioning par | ameters | | | | |
| contradic Mic Full (if(ioning pul | unic (c) 3. | | | | |

9. Select Partition 2 Configuration, and press Enter.

| DØLL | UNIFIED SERVER CONFIGURATOR | LIFECYCLE CONTROLLER ENABLED | | ? |
|------------|----------------------------------|------------------------------|----------|---|
| QLogic CNA | 10 Gigabit Ethernet-00:0E:1E:05 | :C5:38 | | |
| NIC Partit | ioning Configuration | | | |
| | | | | |
| NIC Partit | ioning | | | - |
| Enabled | ł | | v | |
| Global B | andwidth Allocation | | | |
| Partition | 1 | | | |
| Enabled | ł. | | <u>~</u> | |
| Partitio | n 1 Configuration | | | |
| Partition | 2 | | | |
| Enabled | l | | <u> </u> | |
| Partition | 3 | | | |
| Enabler | - | | - | |
| Partitio | n 3 Configuration | | | |
| Partition | 4 | | | |
| Enabled | k | | ~ | |
| Partitio | n 4 Configuration | | | |
| Number of | Partitions Supported | | | |
| 4 | | | | |
| Number of | PCI-e Functions Supported per Po | nt | | - |
| | | | | _ |
| Configure | this partition | | | - |
| | | | | |
| | | | | |
| UEFI v2.1 | | | Back | |

10. From the NIC Mode drop-down box, select Enabled. This will enable the second partition on the QLogic QME8242-k.

| WEDRIC CNF | TO BIGBDIT Ethernet-00.0E.IE.05.05.30 | |
|------------|---------------------------------------|---|
| Partition | 2 Configuration | |
| | | |
| NIC Mode | | |
| Enabled | | • |
| PC Disable | d | |
| Enabled | | |
| Bus:Dev:Fu | in | |
| 05.00.0 | 2 | |
| Mac Addres | 'S | |
| 00:0E:1 | E:05:05:3A | |
| Virtual MA | iC Address | |
| 00:0E:1 | E:05:05:3A | |
| Device Cla | iss Code | |
| 0200 | | |
| Port Numbe | ۳ | |
| 1 | | |
| Instance N | umber | |
| 2 | | |
| | | |
| | | |
| | | |
| Enable or | Disable NIC Function | |
| Endbie of | | |

11. Highlight Back, press Enter, select Partition 3 Configuration, and press Enter.

| QLogic CNA 10 Gigabit Ethern | et-00:0E:1E:05:C5:38 | |
|---------------------------------------|----------------------|----------|
| NIC Partitioning Configuration | DN | |
| | | |
| NIC Partitioning | | |
| Enabled | | |
| Global Bandwidth Allocation | | |
| Partition 1 | | |
| Enabled | | - |
| Partition 1 Configuration | | |
| Partition 2 | | |
| Enabled | | <u>*</u> |
| Partition 2 Configuration | | |
| Partition 3 | | |
| Enabled | | Ψ |
| Partition 3 Configuration | | |
| Partition 4 | | |
| Enabled | | |
| Partition 4 Configuration | | |
| Number of Partitions Support | 30 | |
| 4 Number of DOT a Supervisions Out | exerted and Dest | |
| Number of FCI-e Functions Su | pponted per Pont | |
| | | |
| Configure this partition | | |
| | | |

12. From the NIC Mode drop-down box, select Enabled. This will enable the third partition on the QLogic QME8242-k.

| VIC Mode | onu 1994 ortau |
|-------------|----------------|
| NIC Mode | |
| NIC Mode | |
| | |
| Disable | 1 |
| is(Disabled | 1 |
| Enabled | |
| °CI Device | ID |
| 8020 | |
| Bus:Dev:Fur | |
| 05.00.04 | |
| lac Address | , |
| 00:0E:1E | :05:05:30 |
| /irtual MAG | ; Address |
| 00:0E:1E | :05:05:30 |
| ISCSI MAC A | ıddress |
| 00:0E:1E | :05:05:30 |
| /irtual iSC | SI MAC Address |
| 00:0E:1E | :05:C5:30 |
| Device Clas | is Code |
| 0200 | |
| | |

13. Highlight Back, press Enter, select Partition 4 Configuration, and press Enter.

| NIC Partit | ioning Configuration | |
|------------|------------------------------------|----------|
| | | |
| NIC Partit | ioning | |
| Enabled | | * |
| Global B | indwidth Allocation | |
| Partition | 1 | |
| Enabled | | - |
| Partitio | 1 Configuration | |
| Partition | 2 | |
| Enabled | | |
| Partitio | (2 Configuration | |
| Partition | 3 | |
| Enabled | - O Carfiguration | <u> </u> |
| Partition | 4 | |
| Enabler | | Ŧ |
| Partitio | 4 Configuration | |
| Number of | Partitions Supported | |
| 4 | | |
| Number of | PCI-e Functions Supported per Port | |
| | | |
| Configuno | this partition | |
| com igure | this partition | |

14. From the FCoE Offload Mode drop-down box, select Enabled. This will enable FCoE on the fourth partition on the QLogic QME8242-k.

| WEDGIE ENH ID BIGBDIE EUNERNEE | -00.00.10.03.03.30 | |
|---------------------------------|--------------------|---|
| Partition 4 Configuration | | |
| | | |
| NTC Mode | | |
| Disabled | | 1 |
| FCOE Offload Mode | | 9 |
| Disabled | • | |
| PC:Disabled | | 1 |
| Enabled | | |
| Bus:Dev:Fun | | |
| 05.00.06 | | Ľ |
| Mac Address | | |
| 00:0E:1E:05:C5:3E | | 1 |
| Virtual MAC Address | | |
| 00:0E:1E:05:C5:3E | | 1 |
| FIP MAC Address | | |
| 00:0E:1E:05:C5:3E | | |
| Virtual FIP MAC Address | | |
| 00:0E:1E:05:C5:3E | | |
| Device Class Code | | |
| 0200 | | |
| | | |
| Enchie on Dischie FRaf Supetio | | |
| Enable of Disable FLOE Function | | |

15. Highlight Back and press Enter twice, highlight Finish, and press Enter. When a window appears asking if you want to save changes, highlight Yes, and press Enter.

| Main Configuration Page | | |
|---|---|----------|
| Firmware Image Properties | | |
| ISCSI Configuration FCoE Configuration NIC Partitioning Configuration | | |
| Device Name [OME8242 Chip Type NIC | Hessage Settings have changed. Do you want to save the changes? | |
| Link Status Disconnected | Yes No | <u> </u> |
| | | |
| | | |
| | | |

16. Repeat steps 7 through 15 for the additional 3 NICs in the USC.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies, Inc. 1007 Slater Road, Suite 300 Durham, NC, 27703 www.principledtechnologies.com We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

Principled Technologies is a registered trademark of Principled Technologies, Inc. All other product names are the trademarks of their respective owners.

Disclaimer of Warranties; Limitation of Liability:

PRINCIPLED TECHNOLOGIES, INC. HAS MADE REASONABLE EFFORTS TO ENSURE THE ACCURACY AND VALIDITY OF ITS TESTING, HOWEVER, PRINCIPLED TECHNOLOGIES, INC. SPECIFICALLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, RELATING TO THE TEST RESULTS AND ANALYSIS, THEIR ACCURACY, COMPLETENESS OR QUALITY, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE. ALL PERSONS OR ENTITIES RELYING ON THE RESULTS OF ANY TESTING DO SO AT THEIR OWN RISK, AND AGREE THAT PRINCIPLED TECHNOLOGIES, INC., ITS EMPLOYEES AND ITS SUBCONTRACTORS SHALL HAVE NO LIABILITY WHATSOEVER FROM ANY CLAIM OF LOSS OR DAMAGE ON ACCOUNT OF ANY ALLEGED ERROR OR DEFECT IN ANY TESTING PROCEDURE OR RESULT.

IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC. BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH ITS TESTING, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC.'S LIABILITY, INCLUDING FOR DIRECT DAMAGES, EXCEED THE AMOUNTS PAID IN CONNECTION WITH PRINCIPLED TECHNOLOGIES, INC.'S TESTING. CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES ARE AS SET FORTH HEREIN.