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

QLogic® QME8242-k
Converged Network Adapter

Dell™ PowerEdge™ M710 blade server

Principled Technologies®

QLOGIC®
The **Ultimate** in Performance
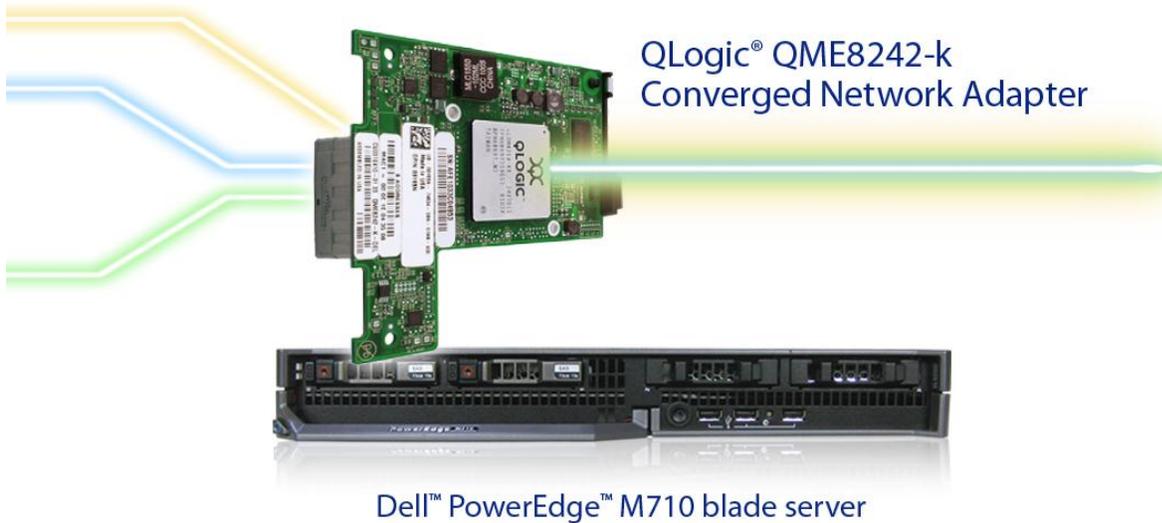
A Principled Technologies deployment guide commissioned by QLogic Corporation

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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.
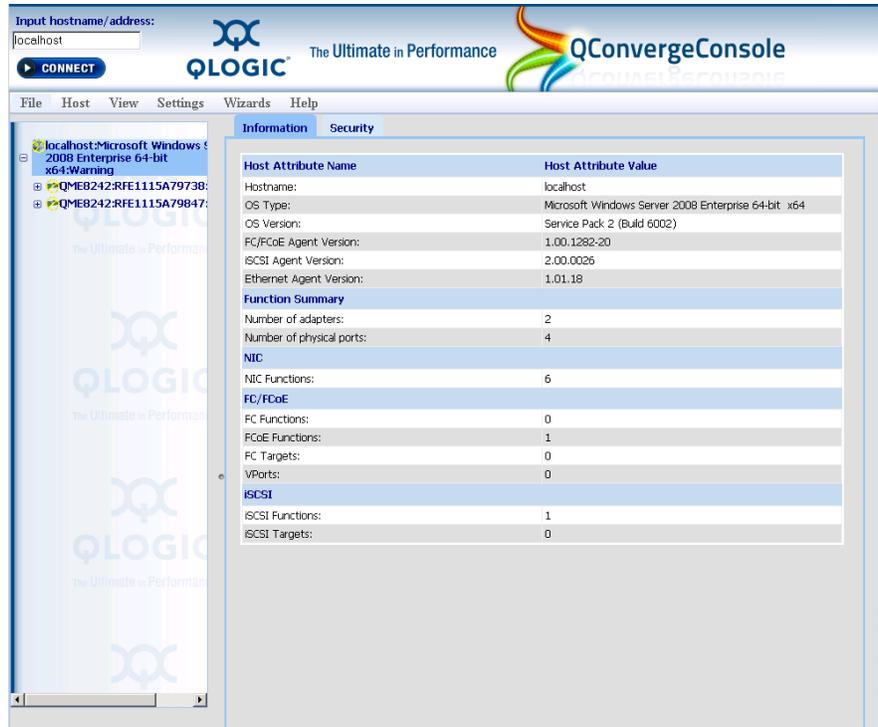
Our report does not provide complete details about the QLogic QConvergeConsole™ suite of software, though we do include instructions on how to modify the adapter and its partitions with the QConverge Console command line interface. For more information on the QConvergeConsole CLI and GUI, see the QLogic 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 OS-agnostic 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 [Cabling the network](#) and [Connecting to the Dell PowerEdge M1000e CMC](#) 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 [Configuring the Dell PowerConnect M8428-k switch](#) 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 [Installing Windows Server 2008 R2](#), [Installing the drivers for the QLogic QME8428-k](#), and Installing Windows [updates](#) sections below.

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

NOTE

Enabling NPAR on the QLogic QME8242-k

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 Appendix 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 Setting access to the SAN 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 M710 Blade Server

Dell PowerConnect M8428-k 10Gb Converged Network Switch

QLogic QME8242-k 10GbE Converged Network Adapter

TCP/IP

FCoE

TCP/IP

FC

Core Ethernet network

SAN Infrastructure

Dell PowerEdge M1000e Modular Blade Enclosure
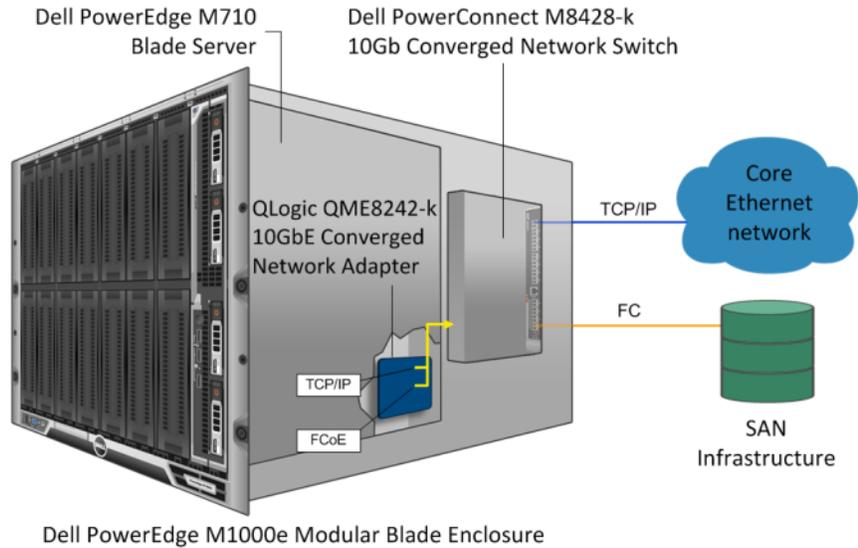
This guide assumes a connection to the core Ethernet network, in our case, via a Cisco® Nexus® 5010 switch. Likewise, we connected to an existing SAN infrastructure via a Brocade® 200E switch. Configuring these switches is outside the scope of this guide. This guide shows how to configure all other components 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).
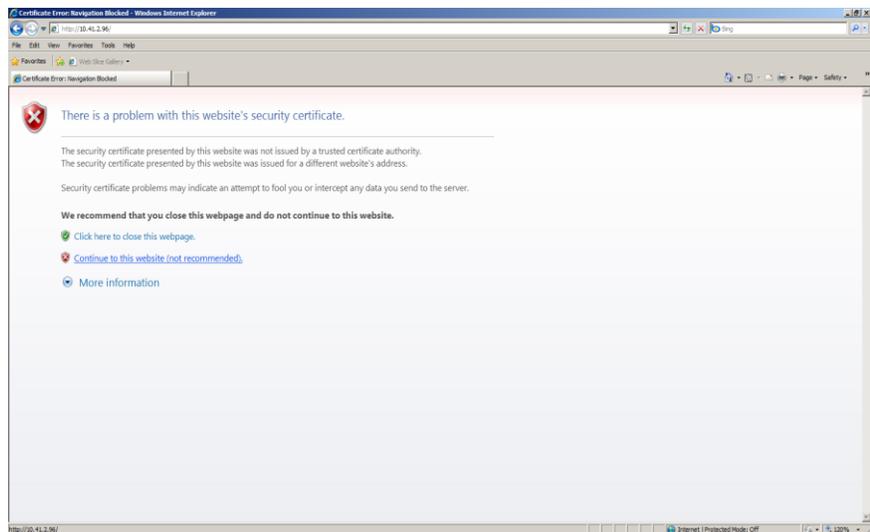
2. Enter the user name and password. The default root password is
`calvin`.
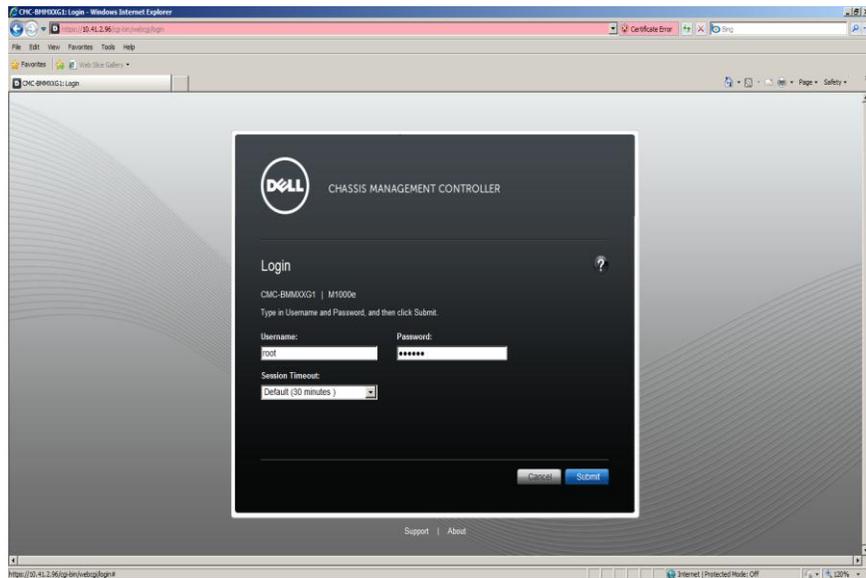
3. To launch the console for the Dell PowerEdge M710, select the
server, and click Launch Remote Console.
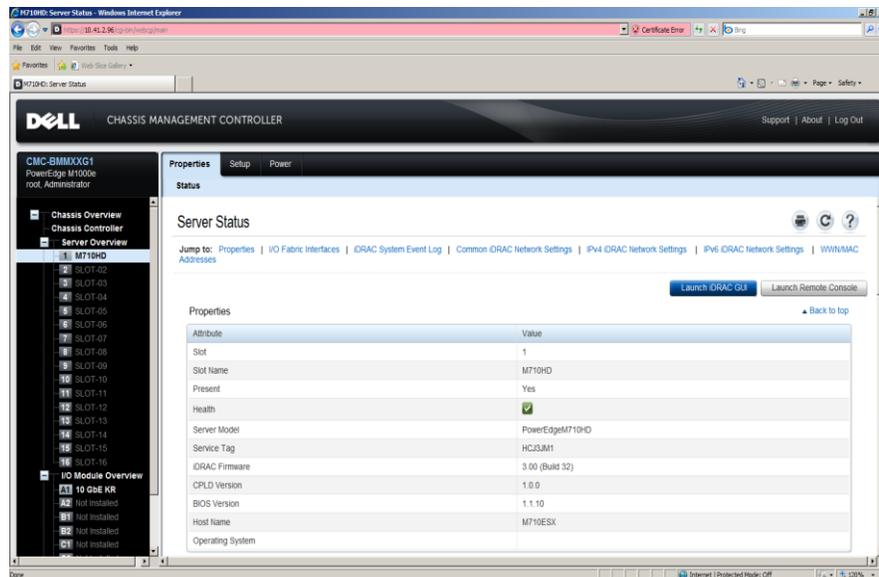
4. At the warning about the Web site's security certificate, click Continue to this website (not recommended).
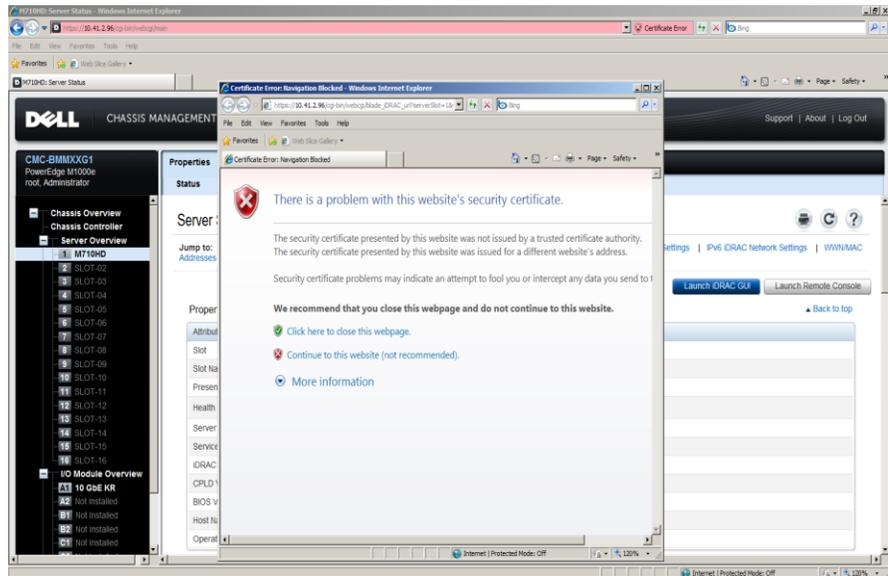
5. Depending on your browser settings, you may need to give permission for the console to launch.
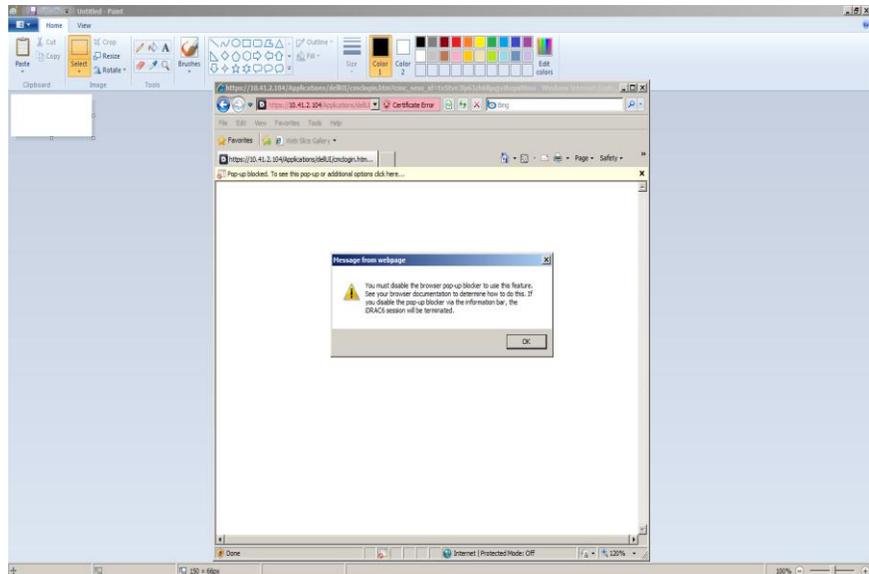
6. The console is running.
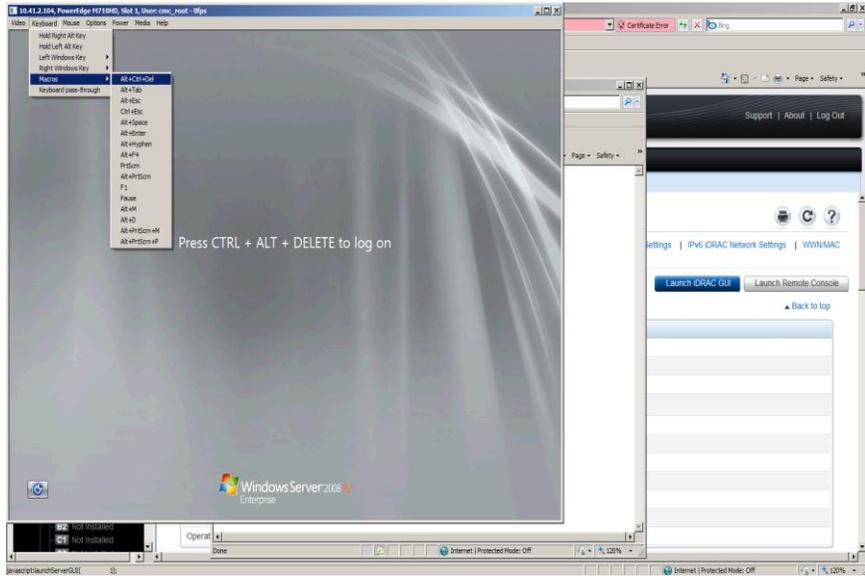
7. To launch the GUI for the Dell PowerConnect M8428-k, select the switch from Chassis Overview, and scroll down to click Launch I/O Module GUI.
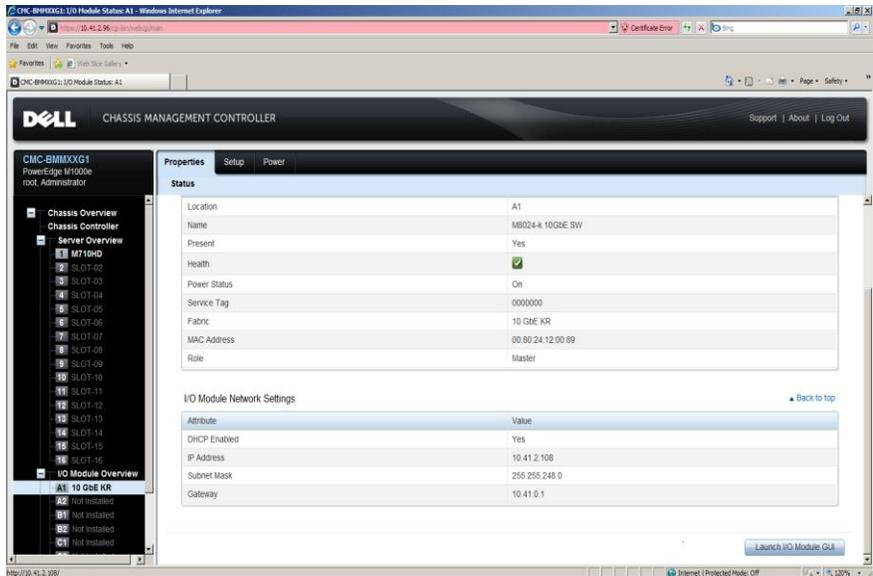
8. Enter the user name and password. The default root password is
`calvin`.
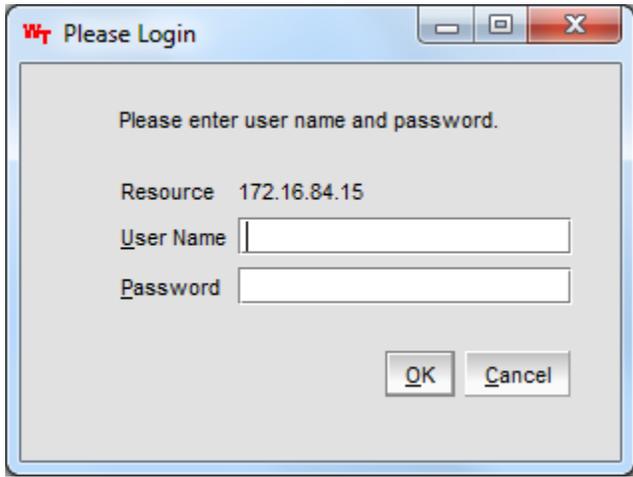
9. The console is running.
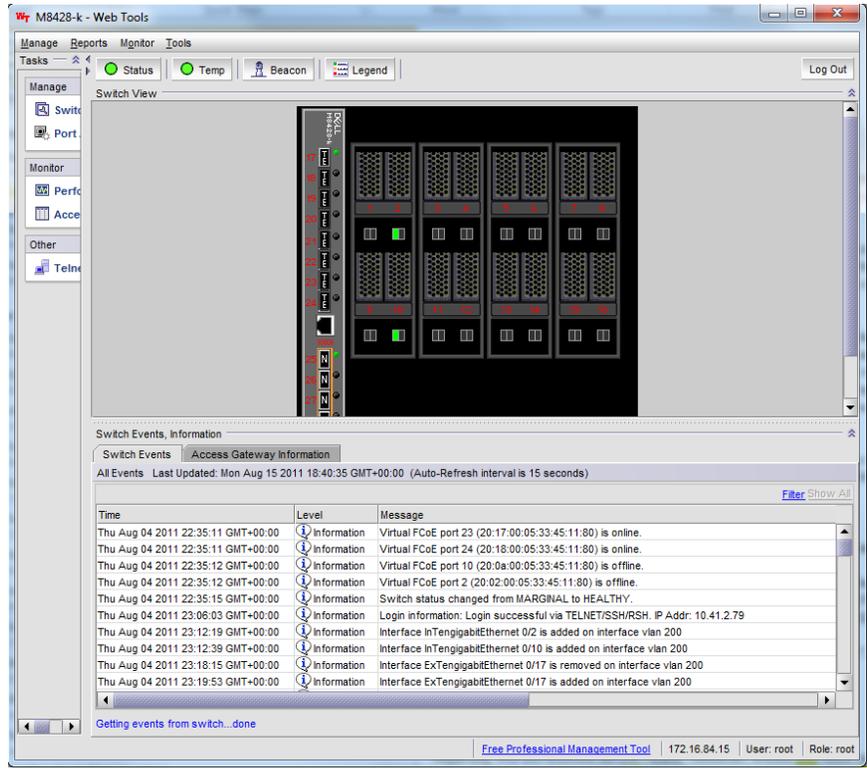
Configuring the Dell PowerConnect M8428-k

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.
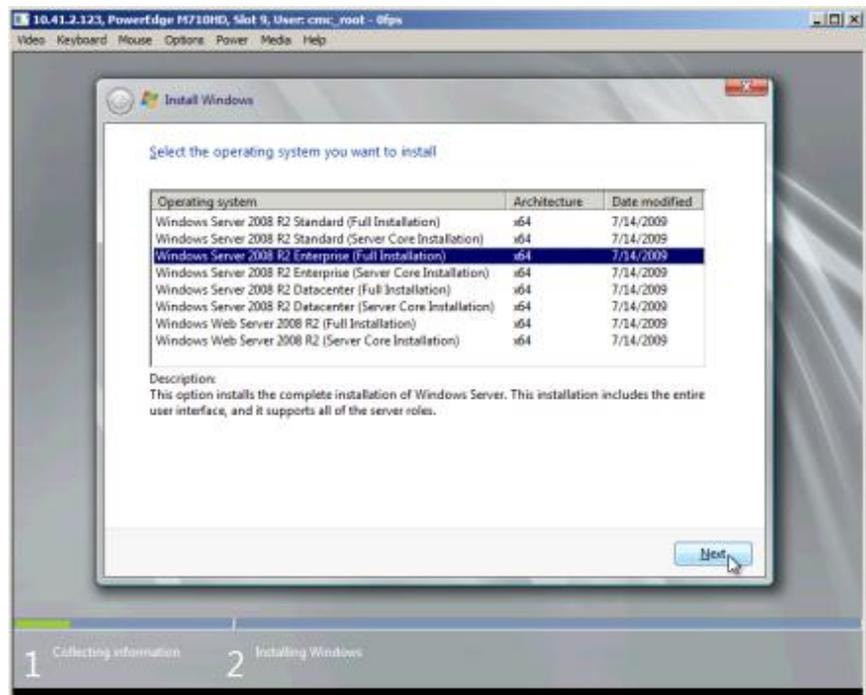
5. To accept the license terms, click the I accept the license terms checkbox, and click Next.
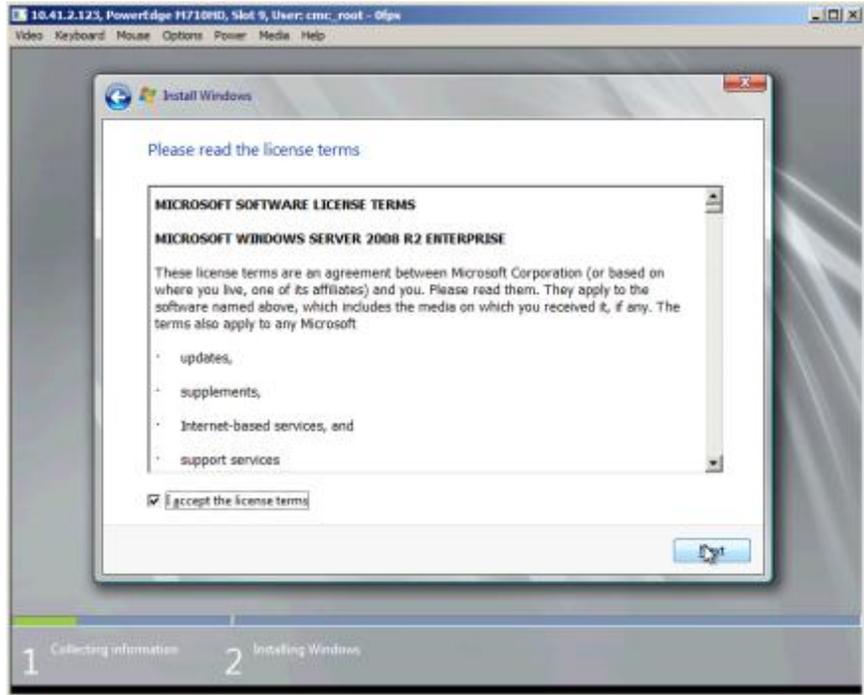
6. Set the Language to install, choose the appropriate Time and currency format and Keyboard of input method, and click Next.
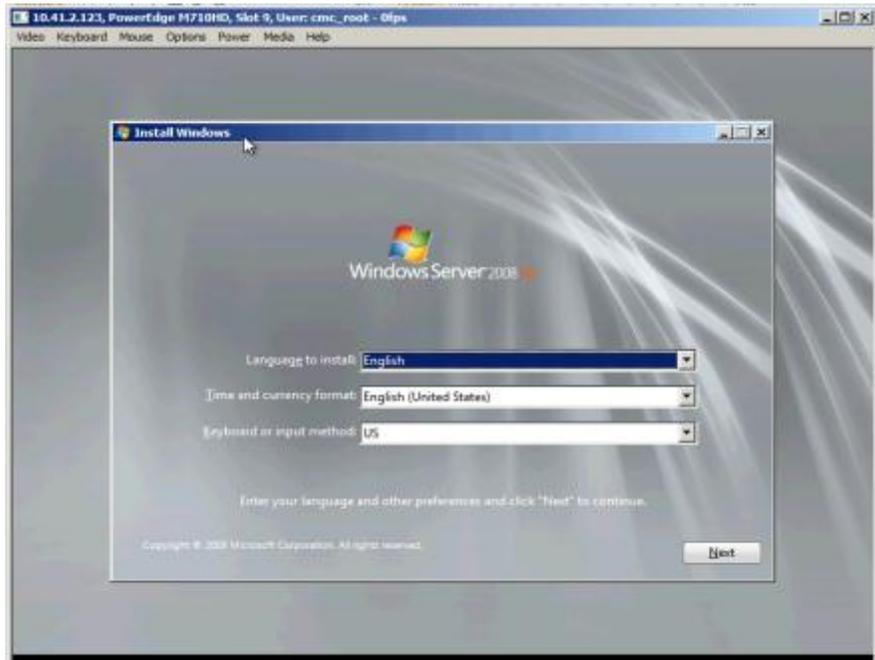
7. Install a new copy of Windows Server 2008 R2. Select Custom (advanced).
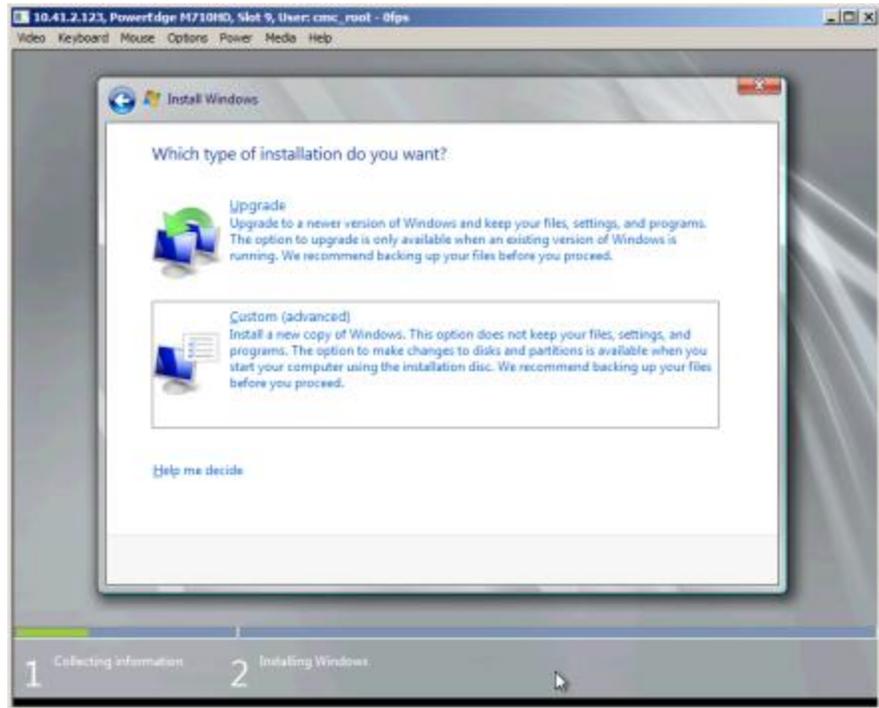
8. Select the disk partition to install in, and click Next to begin the installation.
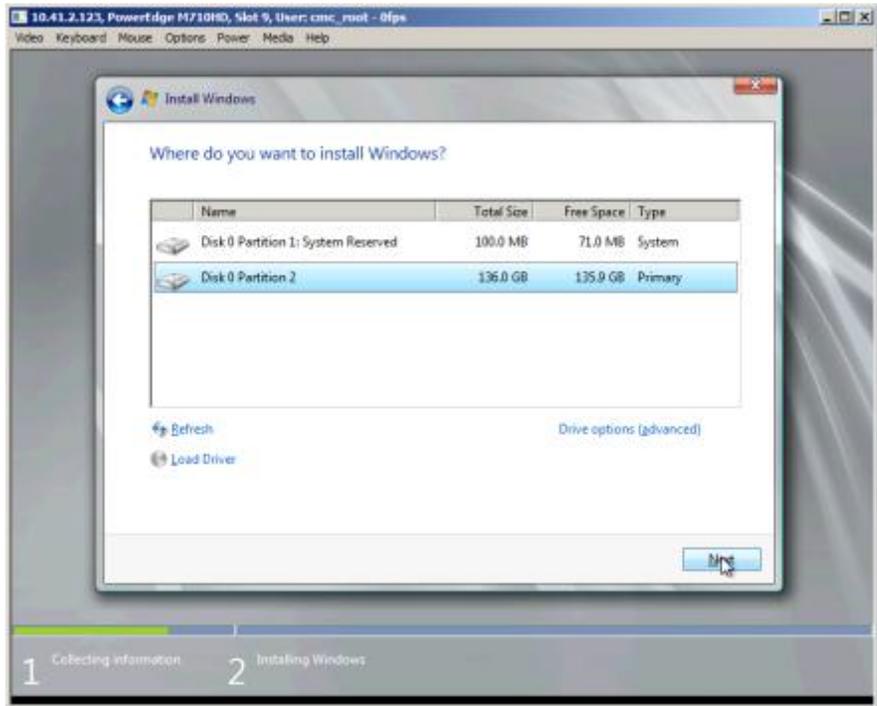
9. After the installation completes, set the administrator password.

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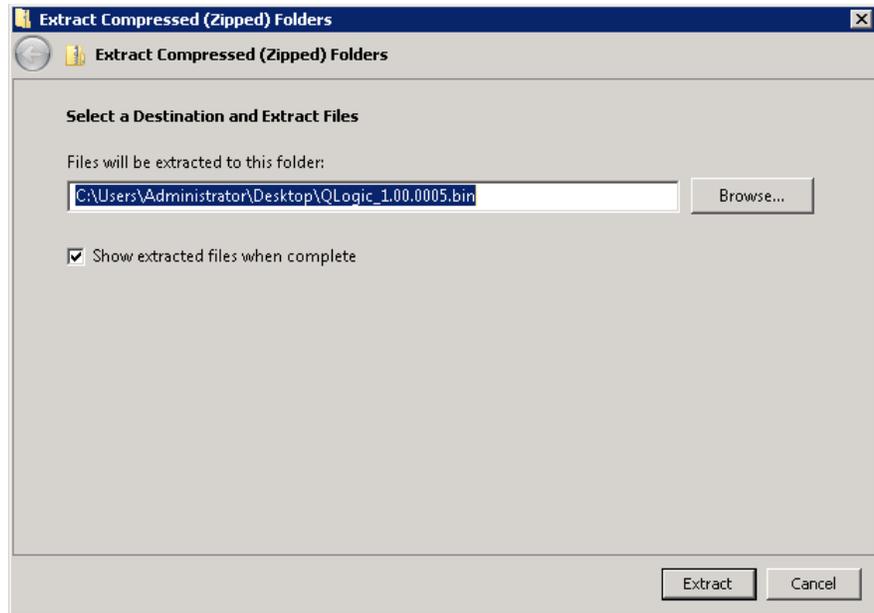
3. Navigate to the unzipped folder, and double-click on Setup.exe to start the installation.

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

5. Read the License Agreement, and click Agree to continue.
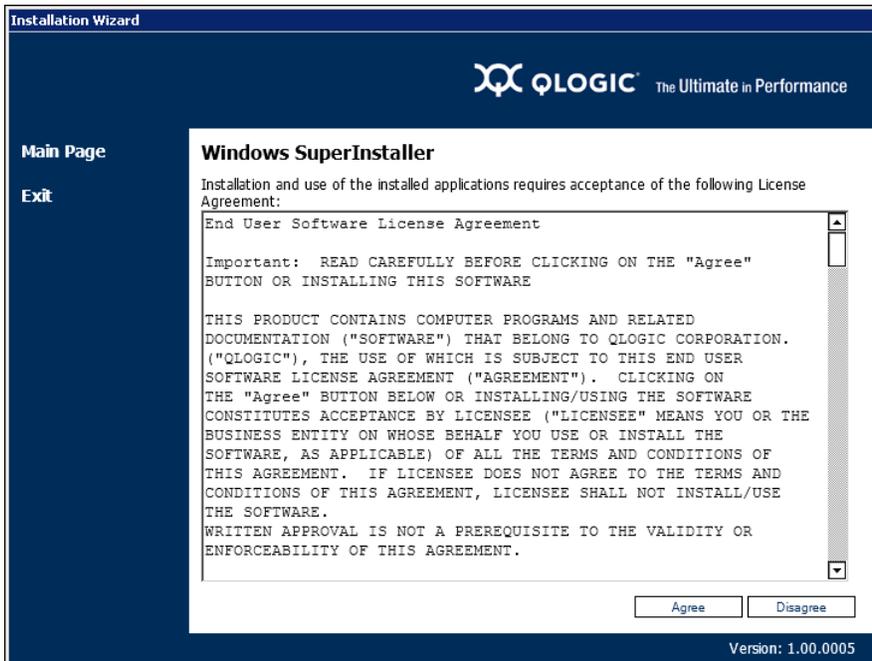
6. Select the default installation (Install Drivers and Applications), check the VLAN / Teaming Driver checkbox, and click Install.
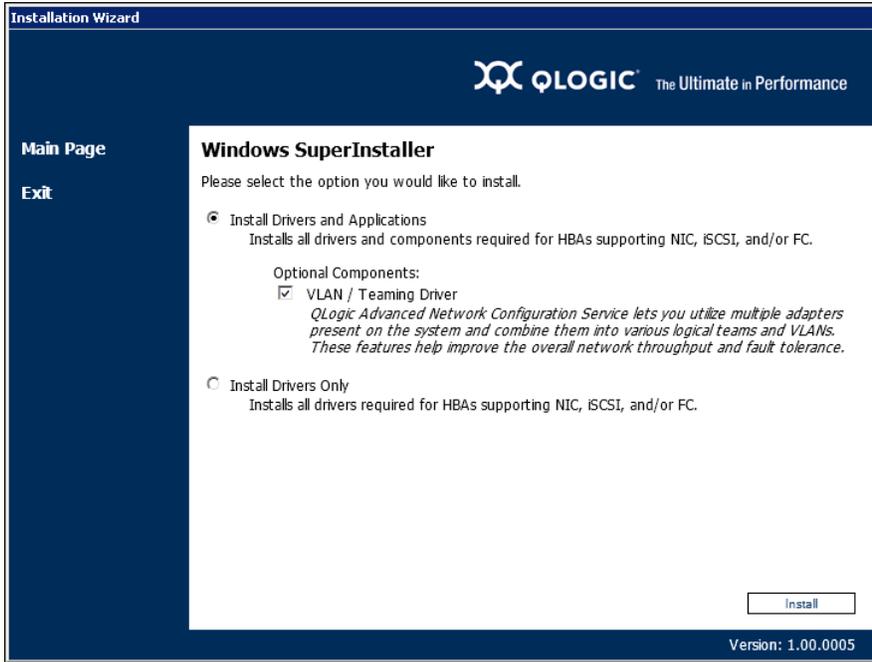
7. When the installation completes, click Finish. The server is now connected to the core Ethernet network.
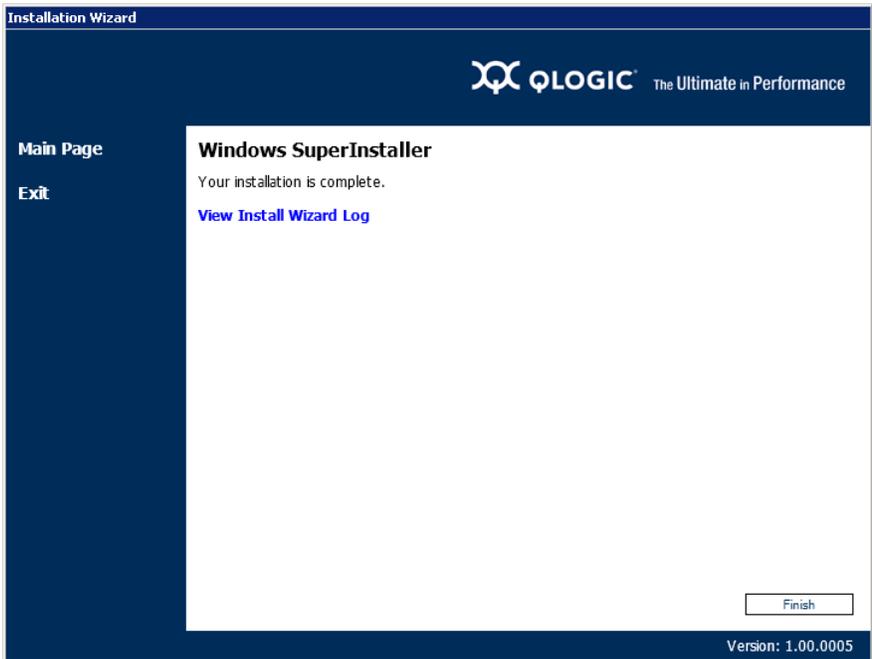
Enabling NPAR on the QLogic QME8242-k

1. Start the QConvergeConsole CLI.
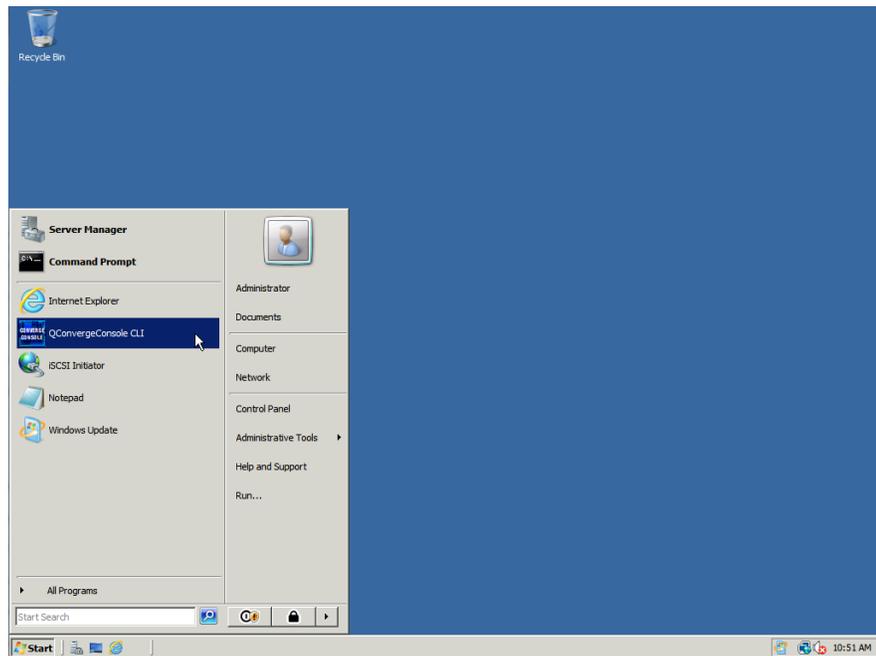
2. Once the QConvergeConsole CLI finishes discovering devices, select 7 (NIC Partitioning Configuration), and press Enter.
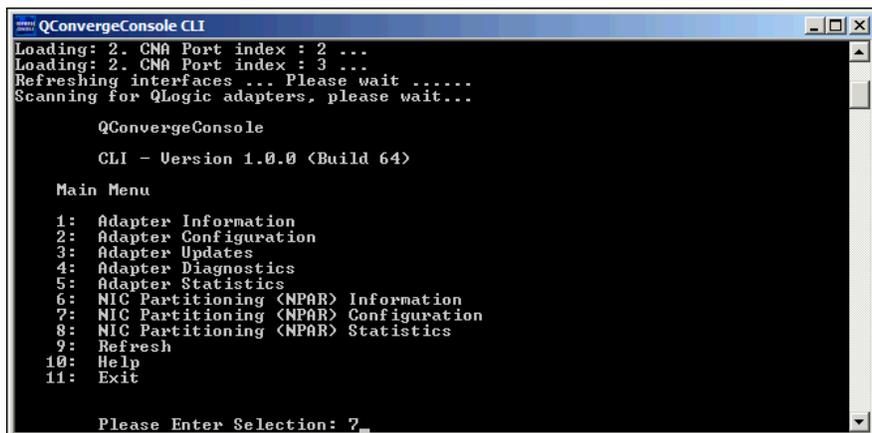
3. In the NIC Partitioning (NPAR) Configuration Selection menu, select 1 (NPAR Configuration), and press Enter.

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

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.

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

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.
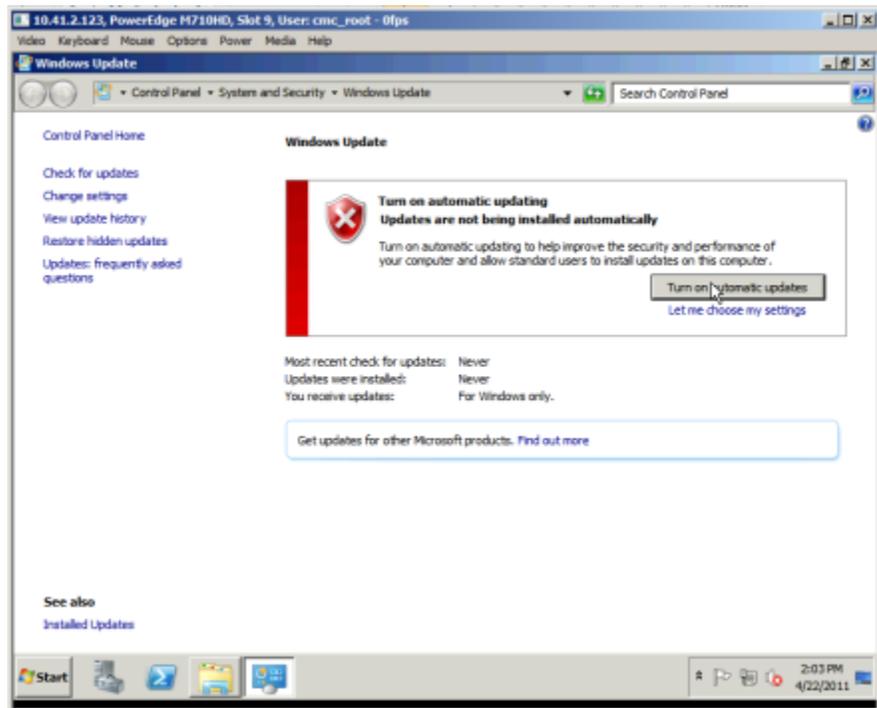
Installing Windows updates

NOTE

We configured our network with DHCP. If you do not use DHCP in your network, be sure to configure your IP address before attempting these steps.
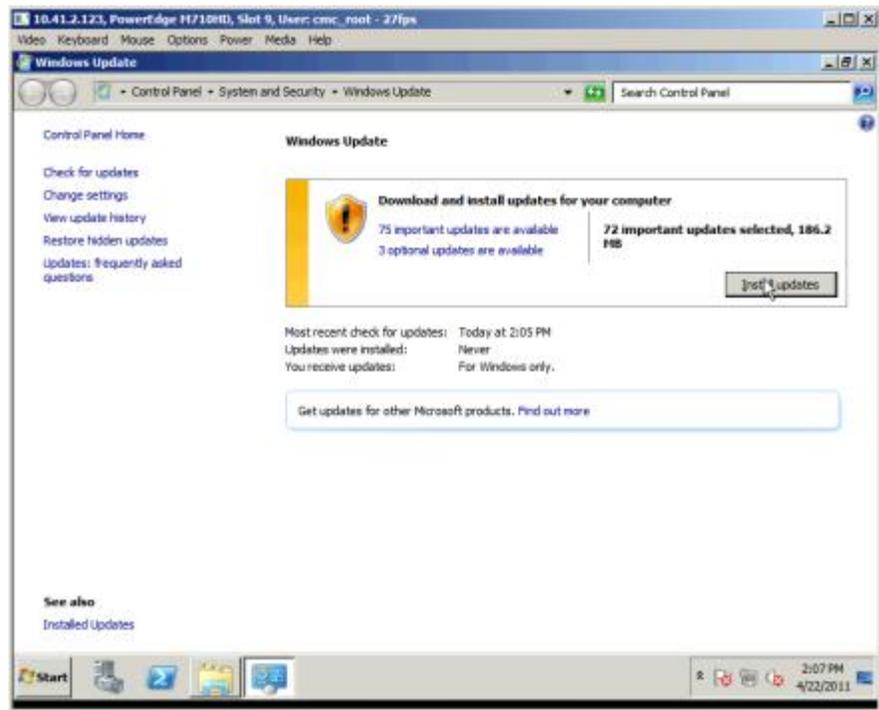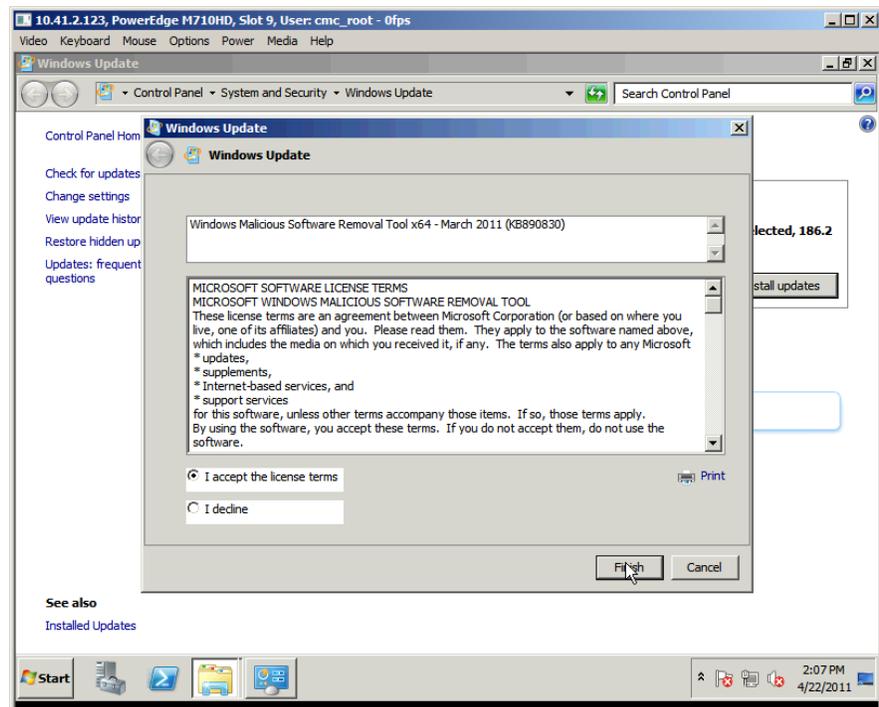
1. Launch Windows Update.
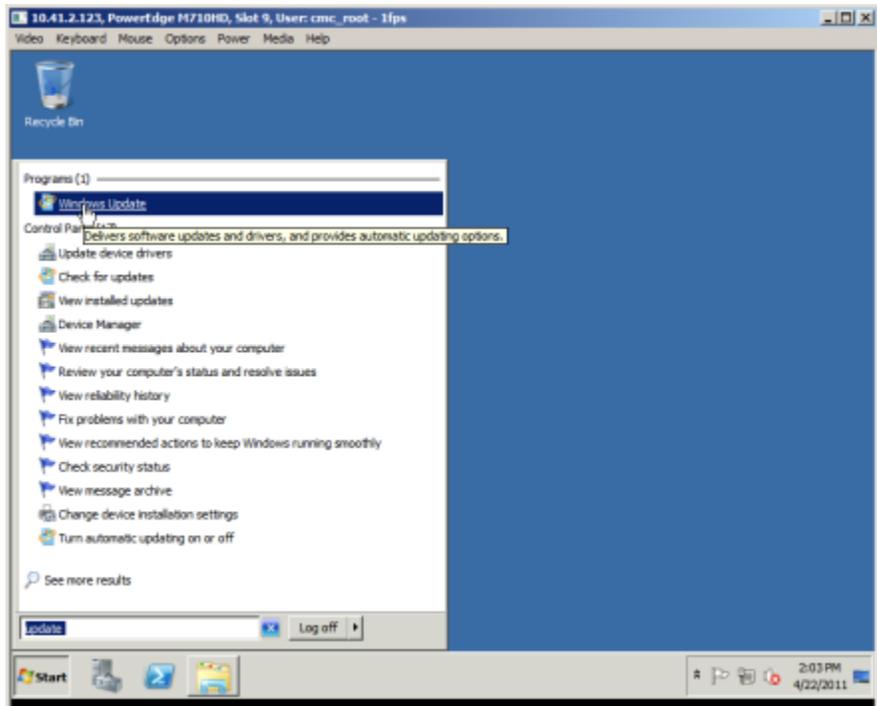
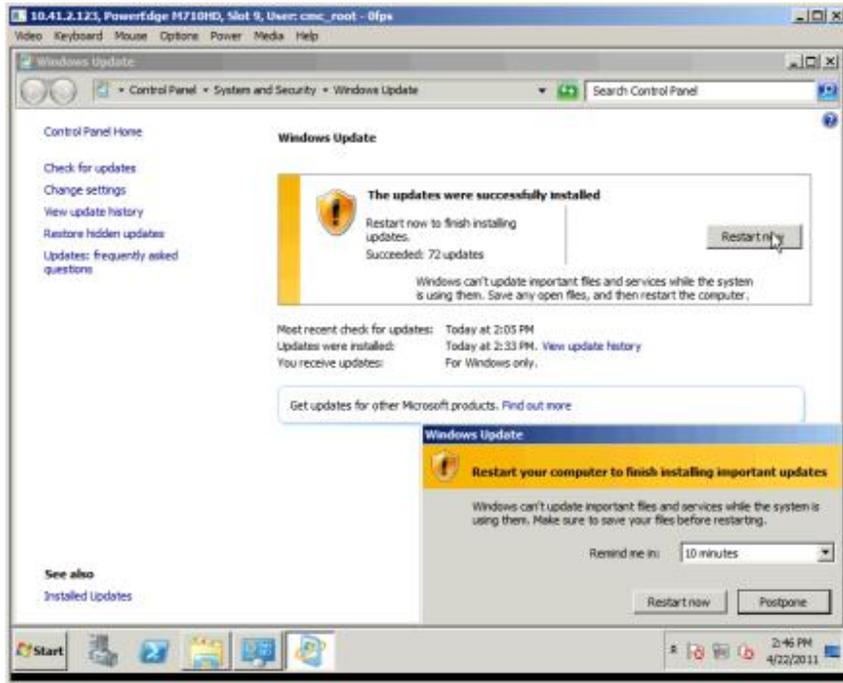2. Optionally, turn on Automatic Updating.

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.
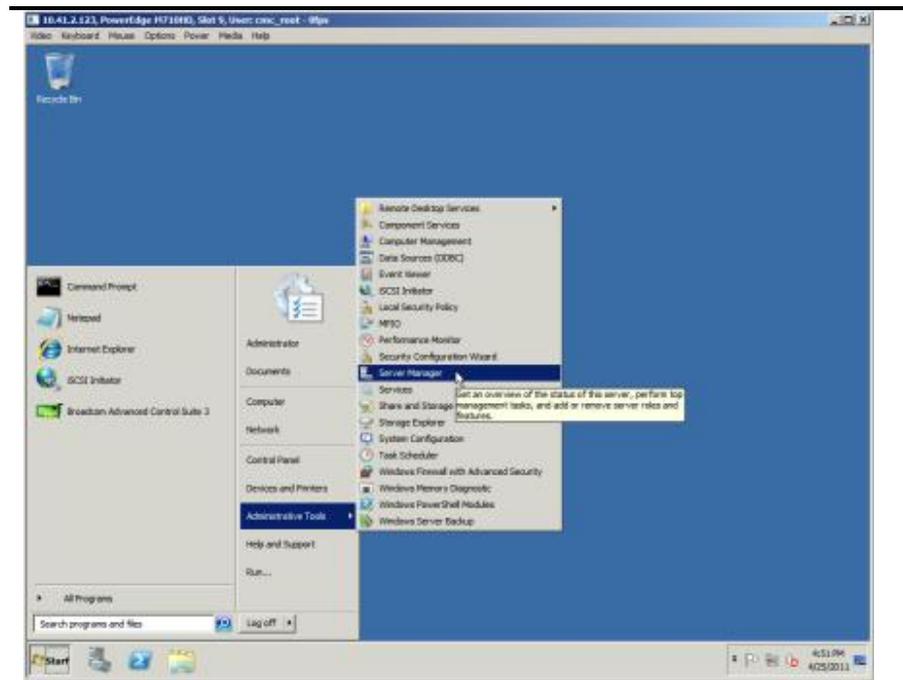
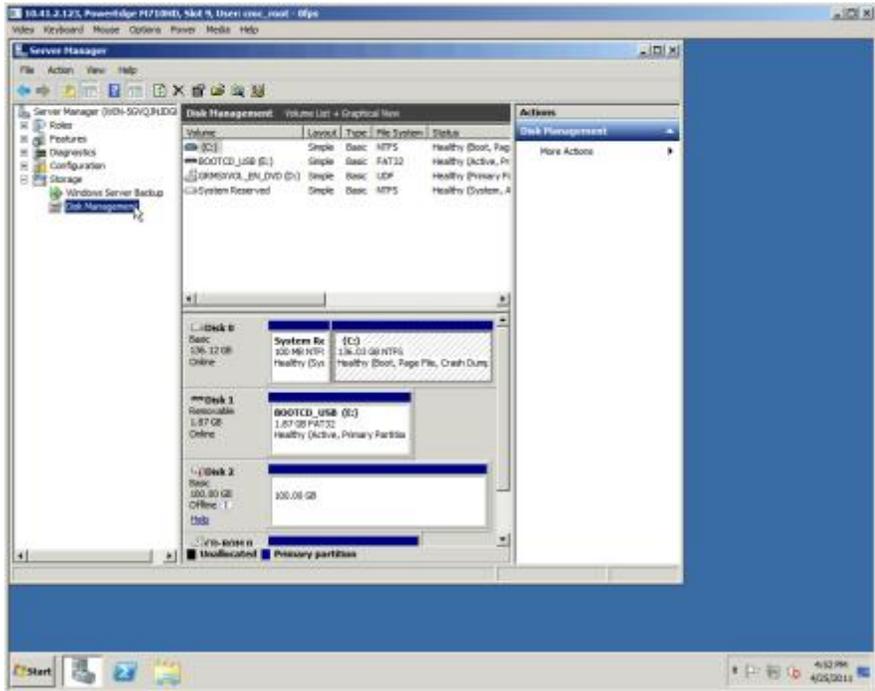5. To restart the system, click Restart now.

Setting access to the SAN

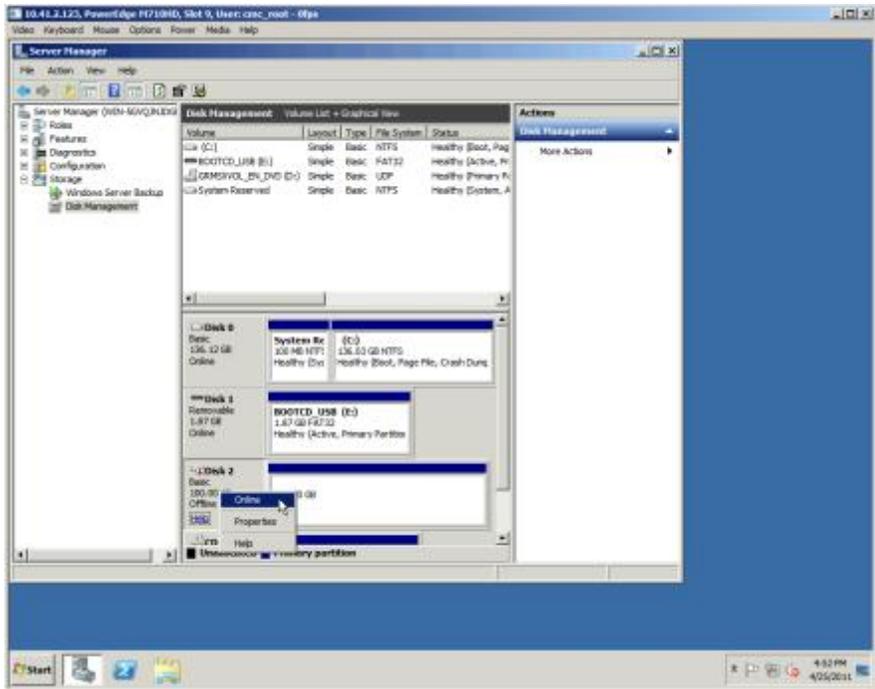The following steps assume that you are connecting to a pre-configured
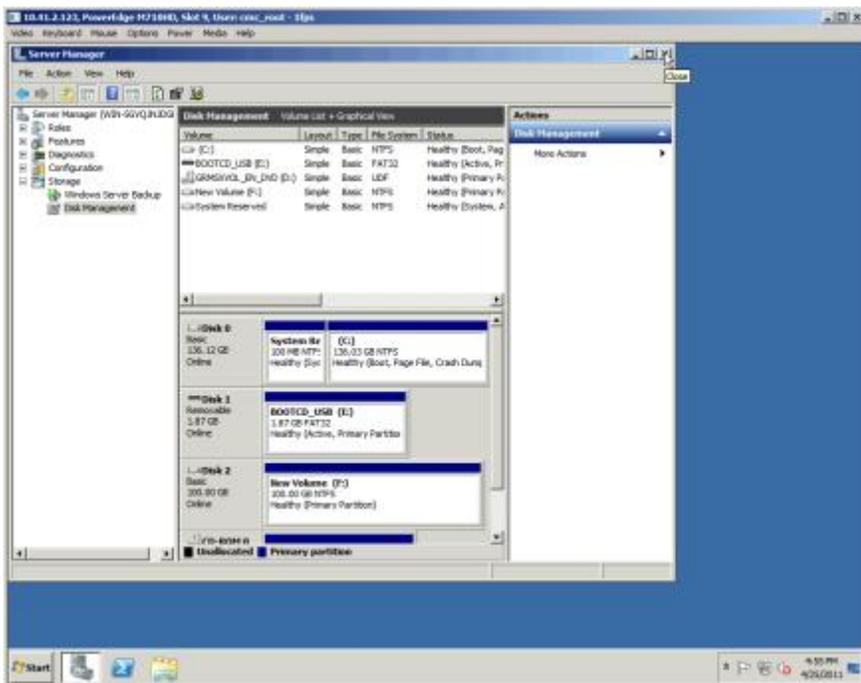LUN.

1. Start Server Manager.

2. Expand Storage, and select Disk Management.

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

4. Close Server Manager.

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.

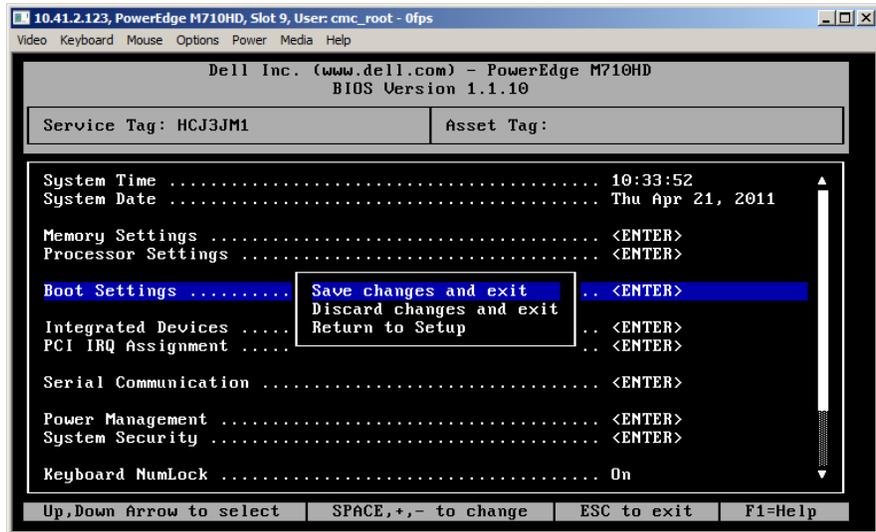1. Boot the server. When the system prompts you, press F2 to enter system setup.

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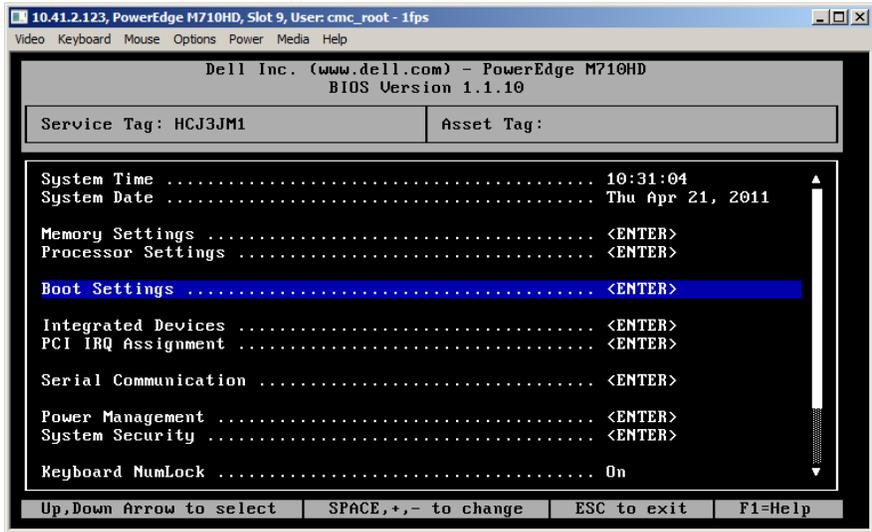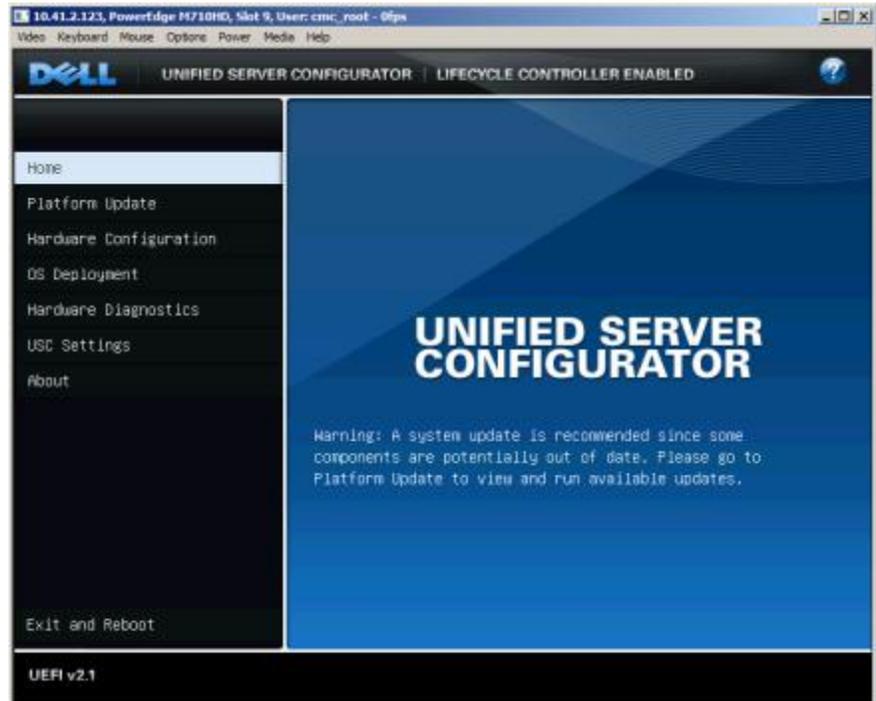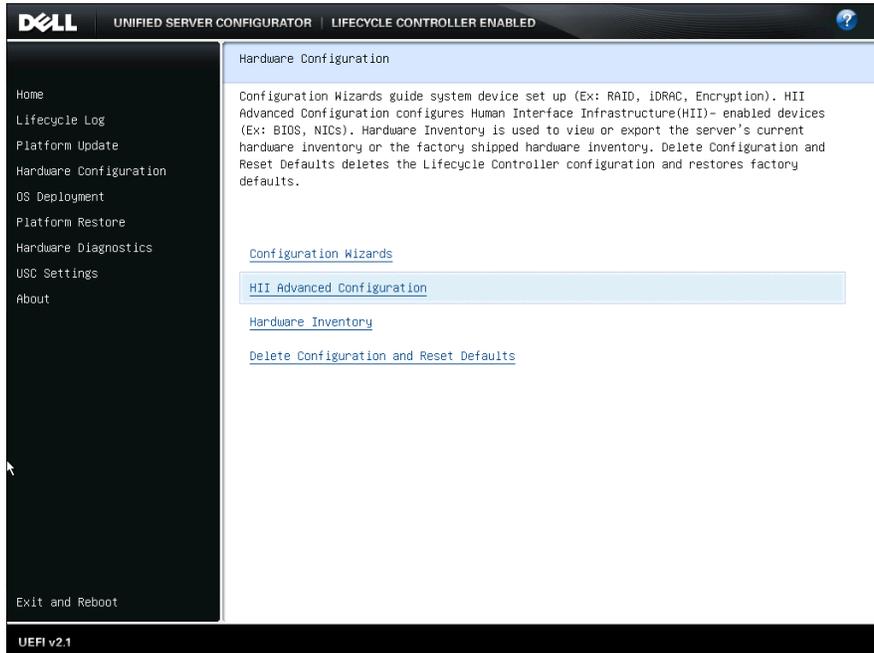

3. Set the Boot Mode to UEFI.
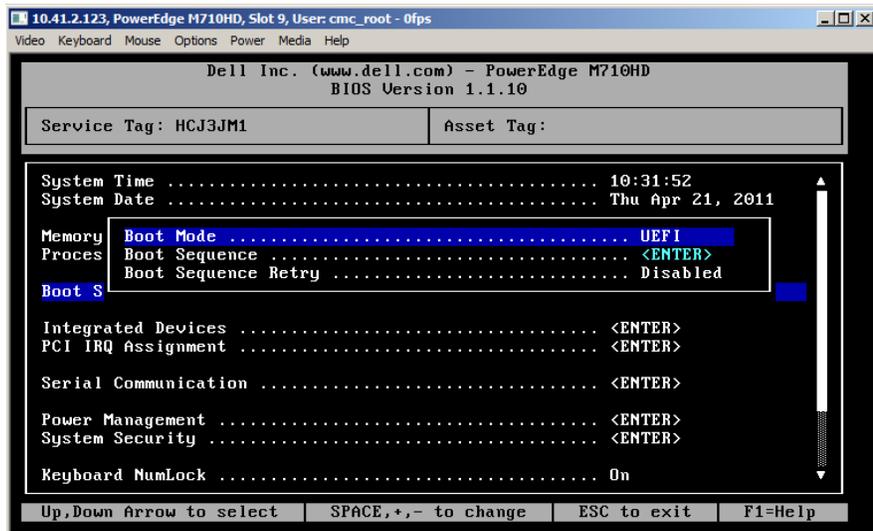
4. Press Esc twice to exit the BIOS. Press Enter to select Save changes and exit.
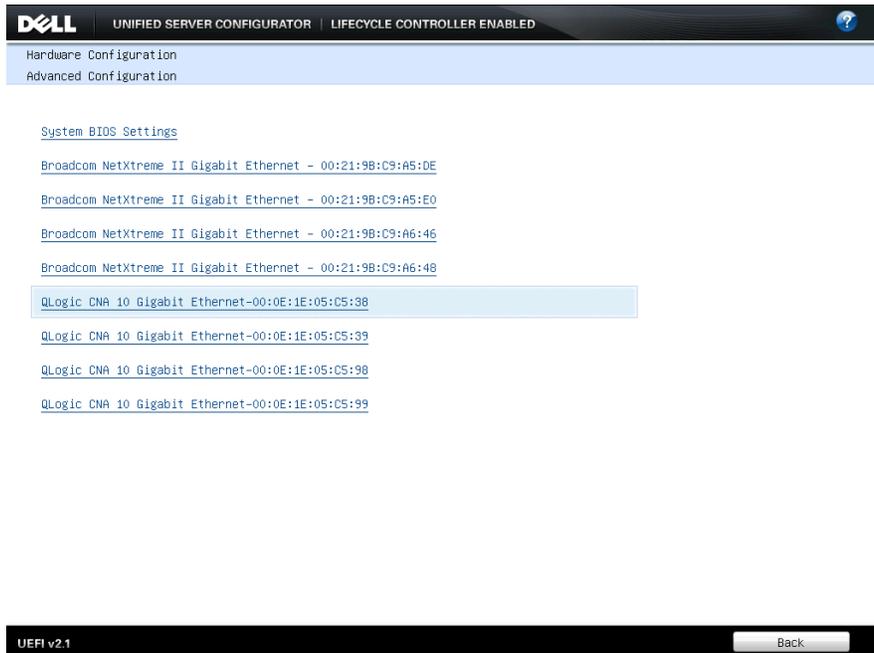

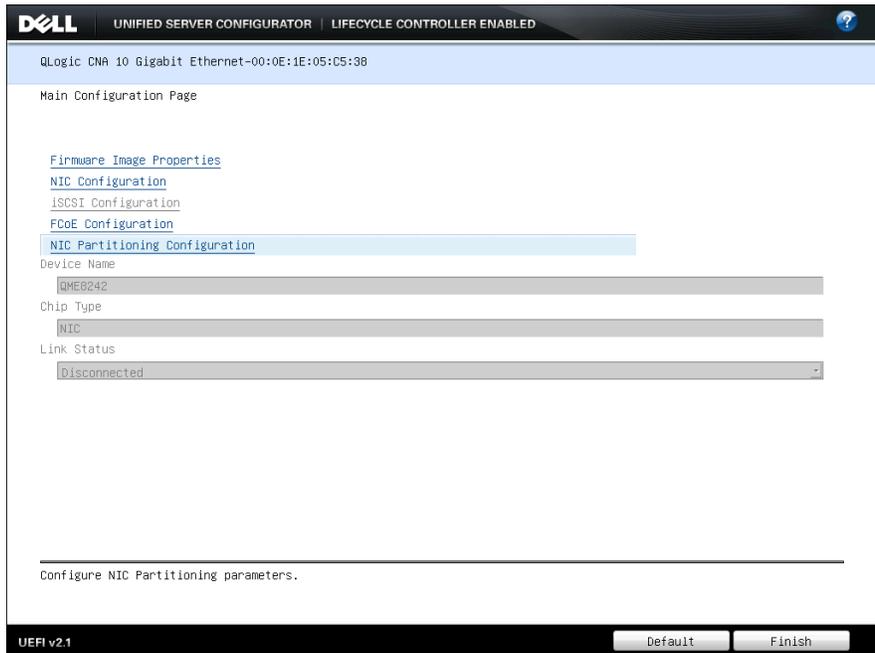5. When the system reboots, press F10 to enter the USC.

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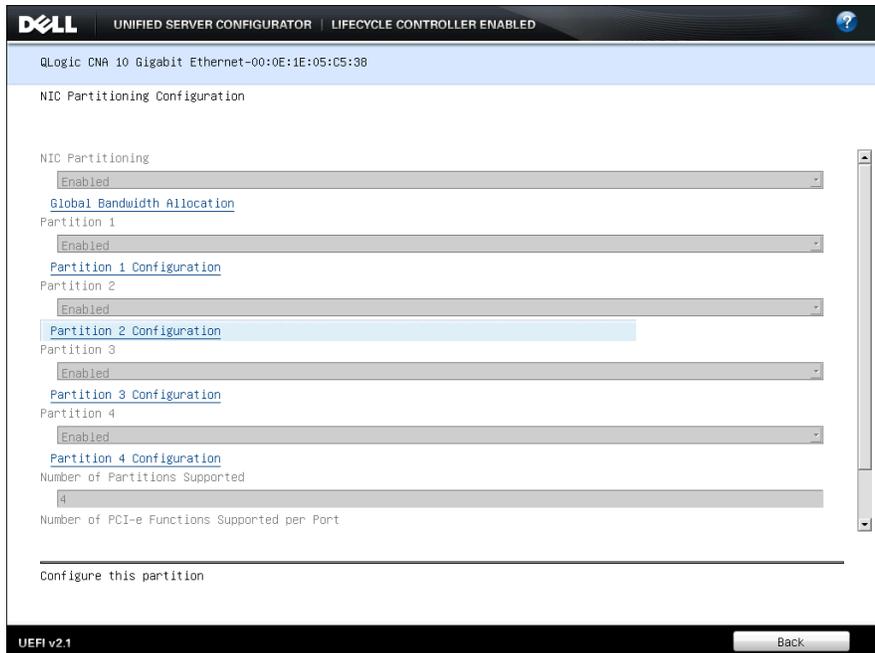

7. The QLogic QME8242-k presents four interfaces to the USC. Select the first interface, and press Enter.

Deploying the QLogic QME8242-k Converged Network
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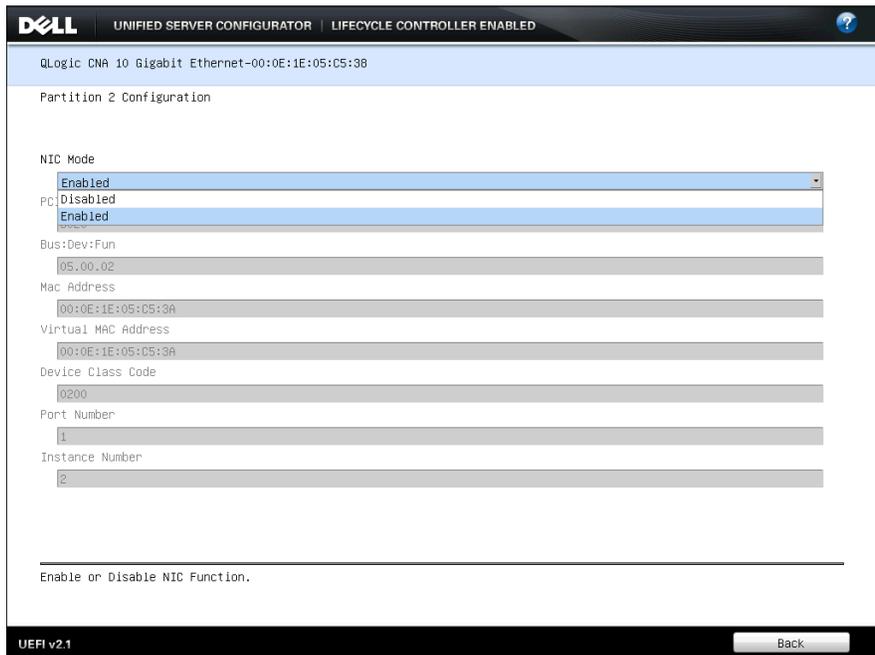A Principled Technologies deployment guide 32

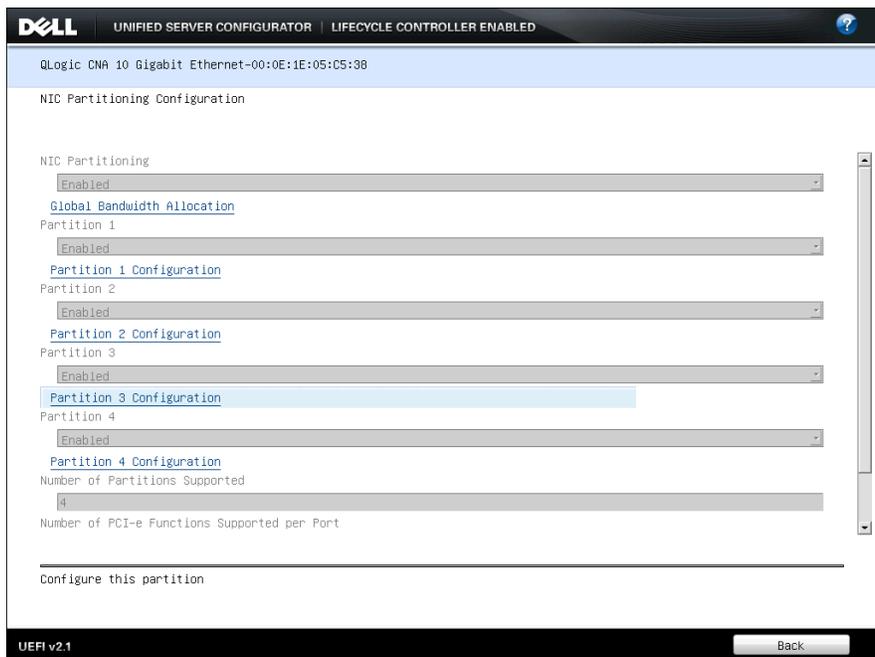8. Select NIC Partitioning Configuration, and press Enter.

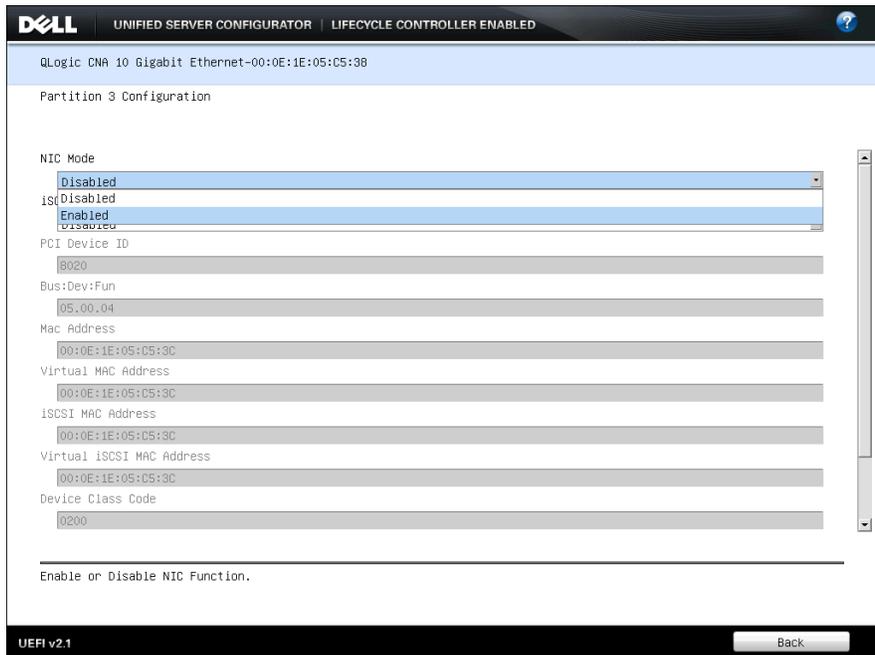9. Select Partition 2 Configuration, and press Enter.

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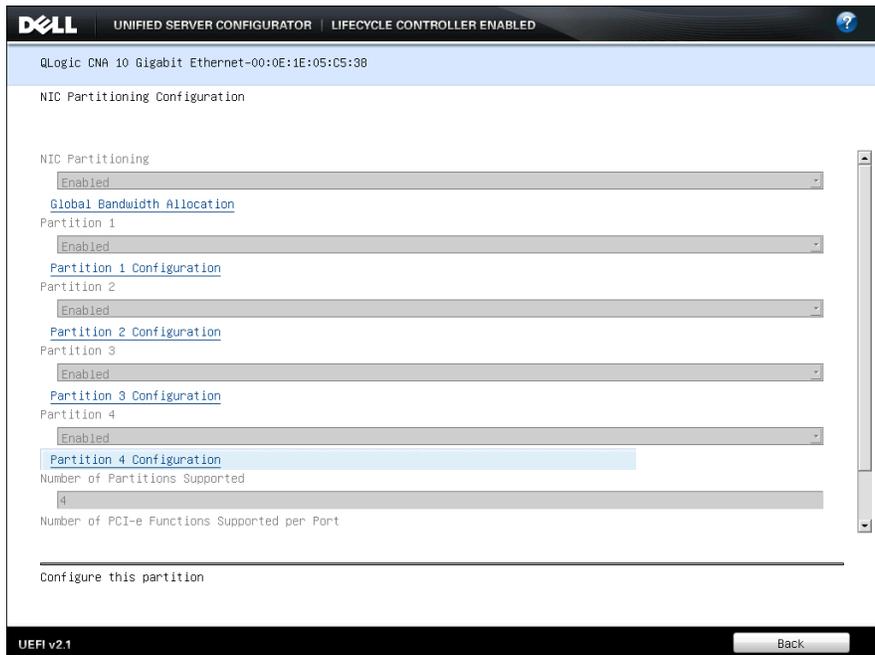

11. Highlight Back, press Enter, select Partition 3 Configuration, and press Enter.

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


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

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14. From the FCoE Offload Mode drop-down box, select Enabled. This will enable FCoE on the fourth partition on the QLogic QME8242-k.
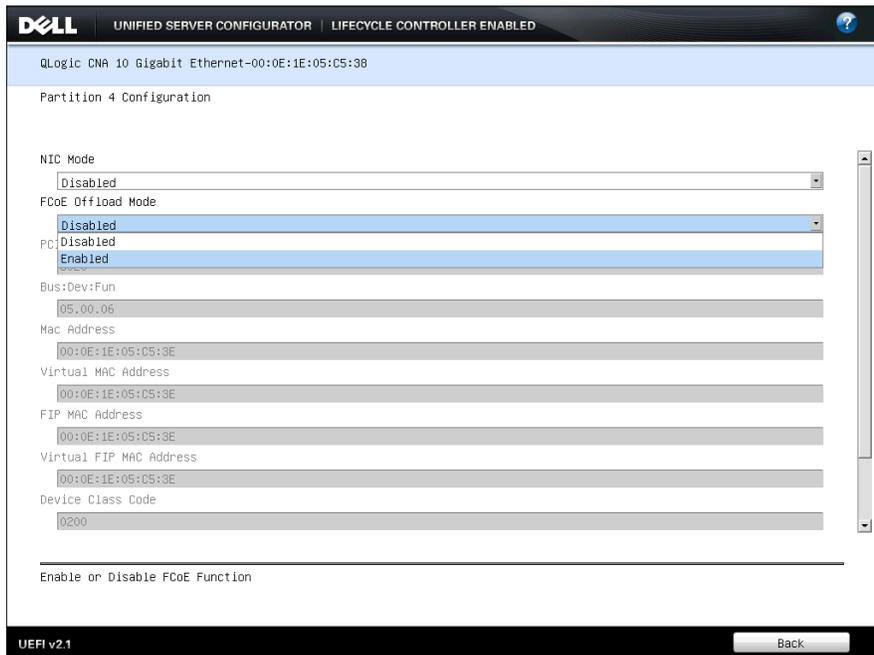
15. Highlight Back and press Enter twice, highlight Finish, and press Enter. When a window appears asking if you want to save changes, highlight Yes, and press Enter.
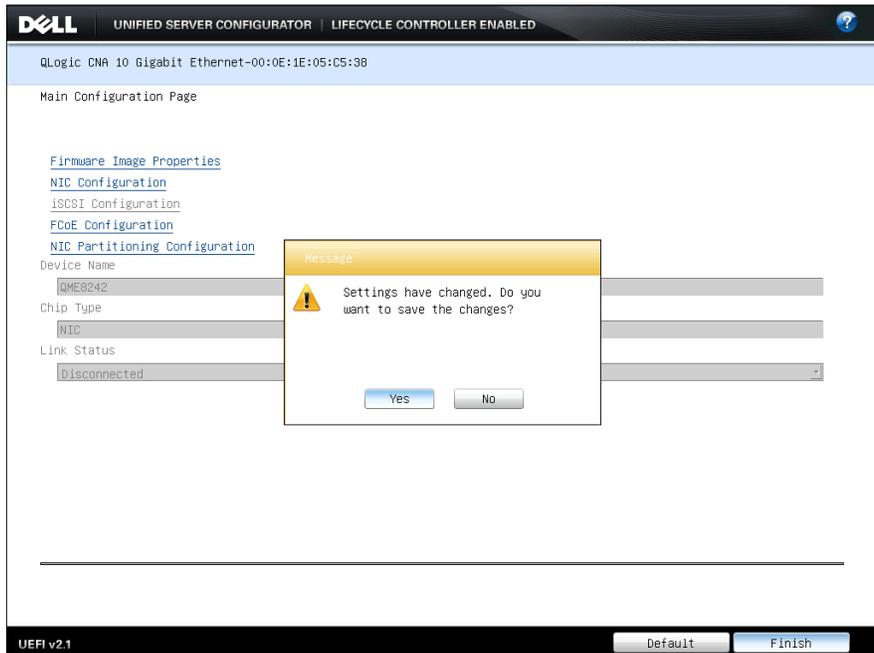
16. Repeat steps 7 through 15 for the additional 3 NICs in the USC.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies, Inc.
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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.

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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.