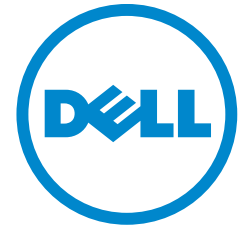


53-1002111-01  
02 November 2010



# PowerConnect B-MLXe

---

## Hardware Installation Guide

**Information in this document is subject to change without notice.**

**© 2010 Dell Inc. All rights reserved.**

Reproduction of these materials in any manner whatsoever without the written permission of Dell Inc. is strictly forbidden. Trademarks used in this text: Dell, the DELL logo, Inspiron, Dell Precision, Dimension, OptiPlex, Latitude, PowerEdge, PowerVault, PowerApp, Dell OpenManage and the YOURS IS HERE logo are trademarks of Dell Inc.; Intel, Pentium, and Celeron are registered trademarks of Intel Corporation in the U.S. and other countries; Microsoft, Windows, Windows Server, MS-DOS and Windows Vista are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.

Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products.

Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

Regulatory Model Codes: Brocade MLXe-4, Brocade MLXe-8, Brocade MLXe-16

# Contents

---

## About This Document

Audience . . . . .	ix
How this document is organized . . . . .	ix
Supported hardware . . . . .	x
What's new in this document . . . . .	x
Document conventions . . . . .	x
Text formatting . . . . .	x
Command syntax conventions . . . . .	x
Command examples . . . . .	xi
Notes, cautions, and danger notices . . . . .	xi
Notice to the reader . . . . .	xi
Getting technical help or reporting errors . . . . .	xii
Contacting Dell . . . . .	xii

## Chapter 1

### Product Overview

Dell router overview . . . . .	1
Router applications . . . . .	1
Hardware features . . . . .	1
PowerConnect B-MLXe routers . . . . .	1
Router modules . . . . .	6
Management modules . . . . .	6
Interface modules . . . . .	8
Switch fabric modules . . . . .	15
High-speed switch fabric modules . . . . .	17
Power supplies . . . . .	17
Rack mounting brackets . . . . .	18
Cooling system for PowerConnect B-MLXe routers . . . . .	18
NIBI-16-FAN-EXH-A high-speed fan assemblies . . . . .	20
Rack mount kit . . . . .	21
Supported software features . . . . .	21

## Chapter 2

### Installing a PowerConnect B-MLXe Core Router

Installation precautions . . . . .	23
General precautions . . . . .	23
Power precautions . . . . .	24

Installing a PowerConnect B-MLXe-4 router . . . . .	25
Preparing the installation site . . . . .	26
Unpacking a PowerConnect B-MLXe-4 router . . . . .	26
Installing a PowerConnect B-MLXe-4 router in a rack or cabinet	26
Installing PowerConnect B-MLXe-4 modules . . . . .	34
Installing power supplies in a PowerConnect B-MLXe-4 router.	38
Connecting AC power . . . . .	39
Final steps . . . . .	40
Installing a PowerConnect B-MLXe-8 router . . . . .	40
Preparing the installation site . . . . .	40
Unpacking a PowerConnect B-MLXe-8 router . . . . .	40
Installing a PowerConnect B-MLXe-8 router in a rack . . . . .	41
Mounting your device in a cabinet . . . . .	43
Installing PowerConnect B-MLXe-8 modules . . . . .	48
Installing power supplies in the PowerConnect B-MLXe-8 router	51
Connecting AC power . . . . .	52
Final steps . . . . .	53
Installing a PowerConnect B-MLXe-16 router . . . . .	53
Preparing the installation site . . . . .	53
Unpacking a PowerConnect B-MLXe-16 router . . . . .	54
Installing a PowerConnect B-MLXe-16 router in a rack . . . . .	54
Installing modules in a PowerConnect B-MLXe 16-slot router .	62
Installing power supplies in a PowerConnect B-MLXe-16 router	66
Final steps . . . . .	68
Attaching a management station . . . . .	68
Attaching a PC or terminal to the console port or Ethernet port . . . . .	68
Activating the power source . . . . .	69
Verifying proper operation . . . . .	70
Observing the LEDs . . . . .	70
Displaying the module status . . . . .	72

### **Chapter 3**

#### **Using the Dell Structured Cabling Components**

Cable cinch overview . . . . .	75
MRJ21 procedures . . . . .	76
Cable cinch with two mRJ21 cables . . . . .	76
Cable cinch with three mRJ21 cables . . . . .	77
Cable cinch with four mRJ21 cables . . . . .	78
Cable cinch with five mRJ21 cables . . . . .	79
Cable cinch with six mRJ21 cables . . . . .	80
Cable cinch with seven mRJ21 cables . . . . .	81
Cable cinch with eight mRJ21 cables . . . . .	82



RJ45 procedures . . . . .	83
Cable cinch with one group of RJ45 cables . . . . .	83
Cable cinch with two groups of RJ45 cables . . . . .	84
Cable cinch with three groups of RJ45 cables . . . . .	85
Cable cinch with four groups of RJ45 cables . . . . .	86
Cable cinch with five groups of RJ45 cables . . . . .	87
Cable cinch with six groups of RJ45 cables . . . . .	88
Cable cinch with seven groups of RJ45 cables . . . . .	89
Cable cinch with eight groups of RJ45 cables . . . . .	90

**Chapter 4      Connecting a Router to a Network Device**

Assigning permanent passwords . . . . .	91
Configuring IP addresses . . . . .	92
Support of subnet masks . . . . .	92
Assigning an IP address to a management interface . . . . .	93
Assigning IP addresses to an interface, virtual interface, or loopback interface . . . . .	94
Enabling and disabling the interfaces . . . . .	95
Understanding management port functions . . . . .	95
Connecting the router to a network device . . . . .	95
Installing a fiber-optic transceiver . . . . .	96
Cabling a fiber-optic transceiver . . . . .	96
Cleaning fiber-optic ports and connectors . . . . .	96
Troubleshooting network connections . . . . .	97
Testing network connectivity . . . . .	97
Pinging an IP address . . . . .	97
Tracing a route . . . . .	98

**Chapter 5      Managing Routers and Modules**

Managing the device . . . . .	99
Disabling and re-enabling power to interface modules . . . . .	99
Monitoring I2C failures on management modules . . . . .	100
Displaying device status and temperature readings . . . . .	102
Displaying the Syslog configuration and static and dynamic buffers . . . . .	104
Managing switch fabric modules . . . . .	106
Forcing HSF modules to operate in normal mode . . . . .	106
Managing the cooling system . . . . .	107
Configuring the cooling system . . . . .	107
Manually setting the fan speed . . . . .	111
Monitoring the cooling system . . . . .	111
Temperature log reduction . . . . .	112
Managing interface modules . . . . .	113
Configuring interface module boot parameters . . . . .	113
Changing priority of slots for interface modules . . . . .	118
Disabling and re-enabling power to interface modules . . . . .	119

Enabling and disabling management module	
CPU usage calculations	120
Displaying CPU usage	120
Displaying management module CPU usage	122
Removing MAC address entries	123

## Chapter 6

### Upgrading Software Images and Configuration Files

Upgrading Software Images and Configuration Files	125
Important software upgrade considerations	126
General upgrade considerations	127
Special upgrade information for PowerConnect B-MLXe routers	127
Interface module software upgrade considerations	127
Important memory requirement information	128
CLI upgrade commands for R05.1.00	130
Software upgrade procedures	130
Determining current software image versions	131
Upgrading the combined IronWare Application Image on management modules	131
Upgrading the monitor image on a management module	131
Upgrading the boot image on a management module	132
Upgrading the boot and monitor images on interface modules	132
Upgrading interface modules using the combined FPGA image	133
Additional upgrade steps	134
Upgrading MBRIDGE images on management modules	134
Upgrading individual FPGA images on interface modules	135
Rebooting the management module	136
Performing a Hitless OS upgrade	137
Performing an image coherence check	137
Performing a coherence check without a reload	138
Displaying image versions	138
Using the show flash command	138
Configurations conditions specific to NI-MLX-1Gx48-T modules	145
Loading and saving configuration files	146
Configuring file size for startup and running configuration	146
Configuration buffers	147
Replacing the startup configuration with the running configuration	148
Replacing the startup configuration with the running configuration	148
Retaining the current startup configuration	148
Copying a configuration file to or from a TFTP server	149
Making local copies of the startup configuration file	149
Hitless OS upgrade	150

Dynamic configuration loading . . . . .	152
Loading configuration information into the running-config file . . . . .	154
Using SNMP to save and load configuration information . . . . .	154
Erasing image and configuration files . . . . .	155
File synchronization . . . . .	155
File synchronization between active and standby management modules . . . . .	155
File synchronization between management and interface modules . . . . .	156
Scheduling a system reload . . . . .	157
Reloading at a specific time . . . . .	158
Reloading after a specific amount of time . . . . .	158
Displaying the amount of time before a scheduled reload . . . . .	158
Canceling a scheduled reload . . . . .	158
Diagnostic error codes and remedies for TFTP transfers . . . . .	158

## **Chapter 7**

### **Router Maintenance**

Hardware maintenance schedule . . . . .	161
Replacing a management module . . . . .	161
Replacing an interface module . . . . .	161
Removing and replacing an interface module . . . . .	162
Replacing a switch fabric module . . . . .	162
Replacing a fiber-optic transceiver . . . . .	162
Cabling a fiber-optic transceiver . . . . .	163
Replacing a power supply . . . . .	163
Determining which power supply failed . . . . .	163
Setting the threshold for power supply monitoring . . . . .	164
Clearing power supply failure timestamps . . . . .	164
Displaying power supply monitoring timestamps . . . . .	165
Enabling a power supply shutdown . . . . .	165
Powering on the power supply through the CLI . . . . .	165
Replacing a power supply . . . . .	166
Replacing fan assemblies . . . . .	167
Replacing fan assemblies in a 16-slot router . . . . .	167
Replacing the fan tray assembly in 4-slot and 8-slot routers . . . . .	170
Replacing the air filters . . . . .	172

<b>Chapter 8</b>	<b>Hardware Specifications</b>	
	Hardware specifications for PowerConnect B-MLXe routers . . . . .	175
	Power specifications . . . . .	175
	Physical dimensions for PowerConnect B-MLXe routers . . . . .	177
	Operating environment specifications for PowerConnect B-MLXe routers . . . . .	177
	Storage environment specifications for PowerConnect B-MLXe routers . . . . .	177
	Safety agency approvals . . . . .	177
	Electromagnetic approvals . . . . .	177
	Port specifications for all router models . . . . .	178
	Console port pin assignments . . . . .	178
	Management port pin assignments . . . . .	179
	Power cords . . . . .	179
<b>Appendix A</b>	<b>Regulatory Statements</b>	
	U.S.A. . . . .	183
	Industry Canada statement . . . . .	183
	Europe and Australia . . . . .	183
	Germany . . . . .	183
	Japan . . . . .	184
	Power cords (Japan Denan) . . . . .	184
	China . . . . .	185
	Korea . . . . .	185
	Russia . . . . .	185
<b>Appendix B</b>	<b>Caution and Danger Notices</b>	
	Cautions . . . . .	187
	Dangers . . . . .	194

# About This Document

---

## Audience

This document is designed for system administrators with a working knowledge of Layer 2 and Layer 3 switching and routing.

If you are using a Dell device, you should be familiar with the following protocols if applicable to your network – IP, RIP, OSPF, BGP, ISIS, IGMP, PIM, MPLS, and VRRP.

## How this document is organized

This document is organized to help you find the information that you want as quickly and easily as possible.

The document contains the following components:

- Chapter 1, “Product Overview” - Provides an overview of PowerConnect B-MLXe.
- Chapter 2, “Installing a PowerConnect B-MLXe Core Router” - Provides installation instructions for PowerConnect B-MLXe routers.
- Chapter 3, “Using the Dell Structured Cabling Components” - Provides information on how to use the cabling components with PowerConnect B-MLXe routers.
- Chapter 4, “Connecting a Router to a Network Device” - Describes how to connect PowerConnect B-MLXe routers to network devices.
- Chapter 5, “Managing Routers and Modules” - Provides information on management tasks for PowerConnect B-MLXe routers.
- Chapter 6, “Upgrading Software Images and Configuration Files” - Provides instructions on how to upgrade software for PowerConnect B-MLXe routers.
- Chapter 7, “Router Maintenance” - Describes maintenance procedures for PowerConnect B-MLXe routers.
- Chapter 8, “Hardware Specifications” - Provides hardware specifications for PowerConnect B-MLXe routers.
- Appendix A, “Regulatory Statements” - Contains regulatory information for PowerConnect B-MLXe routers.
- Appendix B, “Caution and Danger Notices” - Contains Caution and Danger notices in four languages for PowerConnect B-MLXe routers.

## Supported hardware

In instances in which procedures or parts of procedures documented here apply to some devices but not to others, this guide identifies exactly which devices are supported and which are not.

Although many different hardware configurations are tested and supported by Dell, documenting all possible configurations and scenarios is beyond the scope of this document.

The following hardware platforms are described in this document:

- PowerConnect B-MLXe-4 router
- PowerConnect B-MLXe-8 router
- PowerConnect B-MLXe-16 router

## What's new in this document

The following information has been added to this hardware installation guide for this release:

- PowerConnect B-MLXe-4 router information
- PowerConnect B-MLXe-8 router information
- PowerConnect B-MLXe-16 router information

## Document conventions

This section describes text formatting conventions and important notice formats used in this document.

### Text formatting

The narrative-text formatting conventions that are used are as follows:

<b>bold text</b>	Identifies command names
	Identifies the names of user-manipulated GUI elements
	Identifies keywords
	Identifies text to enter at the GUI or CLI
<i>italic text</i>	Provides emphasis
	Identifies variables
	Identifies document titles
<code>code text</code>	Identifies CLI output

### Command syntax conventions

Command syntax in this manual follows these conventions:

<b>command and parameters</b>	Commands and parameters are printed in bold.
[ ]	Optional parameter.
< <i>variable</i> >	Variables are printed in italics enclosed in angled brackets < >.
...	Repeat the previous element, for example “member [;member...]”
	Choose from one of the parameters.

## Command examples

This document describes how to perform simple upgrade and configuration tasks using the command line interface (CLI), but does not describe the commands in detail. For complete descriptions of commands for PowerConnect B-MLXe routers, see the *Brocade NetIron Configuration Guide*.

## Notes, cautions, and danger notices

The following notices and danger statements are used in this manual. They are listed below in order of increasing severity of potential hazards.

---

### NOTE

A note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

---



### CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

---



### DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

---

## Notice to the reader

This document may contain references to the trademarks of the following corporations. These trademarks are the properties of their respective companies and corporations.

These references are made for informational purposes only.

Corporation	Referenced trademarks and products
Phillips Screw Company, Inc.	Phillips

## Getting technical help or reporting errors

Dell Technical Support is committed to ensuring that your investment in our products remains cost-effective. If you need assistance or find errors in the manuals, contact Dell Technical Support. When contacting Dell technical Support have the device configuration file and an output capture of **show tech-support** command available.

### Contacting Dell

For customers in the United States, call 800-WWW.DELL (800.999.3355).

---

#### NOTE

If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

---

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit <http://www.support.dell.com>.
2. Click your country or region at the bottom of the page. For a full listing of countries and regions, click **All**.
3. In the **Support** menu, click **All Support**.
4. Choose the method of contacting Dell that is convenient for you.



# Product Overview

---

## Dell router overview

Dell routers provide high-performance routing to service providers, metro topologies, and Internet Exchange Points, offering the following benefits:

- 10 Gbps Ethernet ports that process both inbound and outbound user packets
- IPv4 routing with a very large hardware-based forwarding table and powerful hardware-based Access Control List (ACL) and rate limiting functions
- IPv6 routing including hardware-based forwarding and dual-stack support
- High availability (redundancy) of the following hot-swappable critical router components:
  - Management modules
  - Fans
  - Power supplies
  - Switch fabric modules
- A management (10BaseT or 100BaseTX or 1000BaseTX Ethernet) port for connectivity to your existing management network
- Increased Ternary Content Addressable Memory (TCAM) on the interface modules to process routing protocols
- Increased processor Random Access Memory (RAM) on management and interface modules supports larger default Media Access Control (MAC) address tables and the IP route tables

## Router applications

Dell routers are commonly deployed in the following situations:

- Layer 2 metro networks
- Multiprotocol Label Switching (MPLS) Layer 3 Virtual Private Network (VPN) service provider networks supporting multi-VRFs and RFC 2547bis
- MPLS Layer 2 VPN service provider networks supporting both Virtual Private LAN Service (VPLS) and Virtual Leased Line (VLL)

## Hardware features

This section describes the major hardware components of Dell routers.

### PowerConnect B-MLXe routers

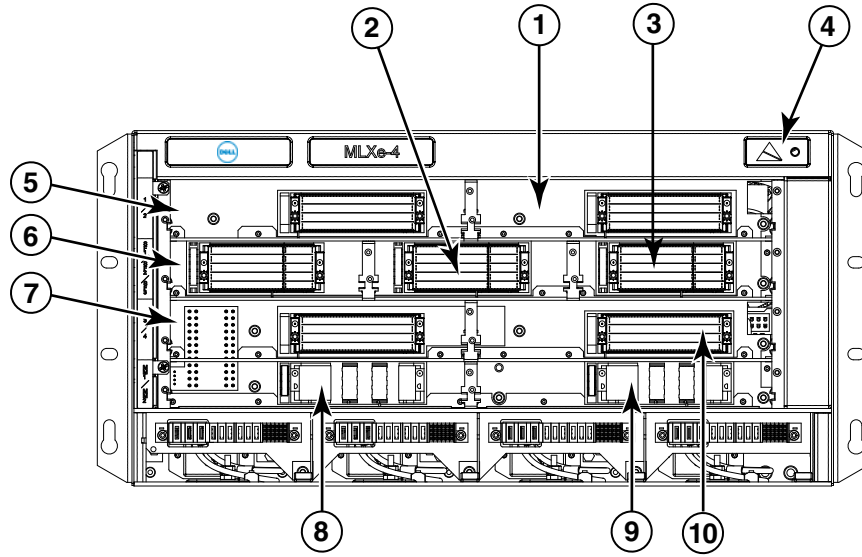
PowerConnect B-MLXe routers are available in the following models:

# 1 Hardware features

- PowerConnect B-MLXe-4: 4 interface slots
- PowerConnect B-MLXe-8: 8 interface slots
- PowerConnect B-MLXe-16: 16 interface slots

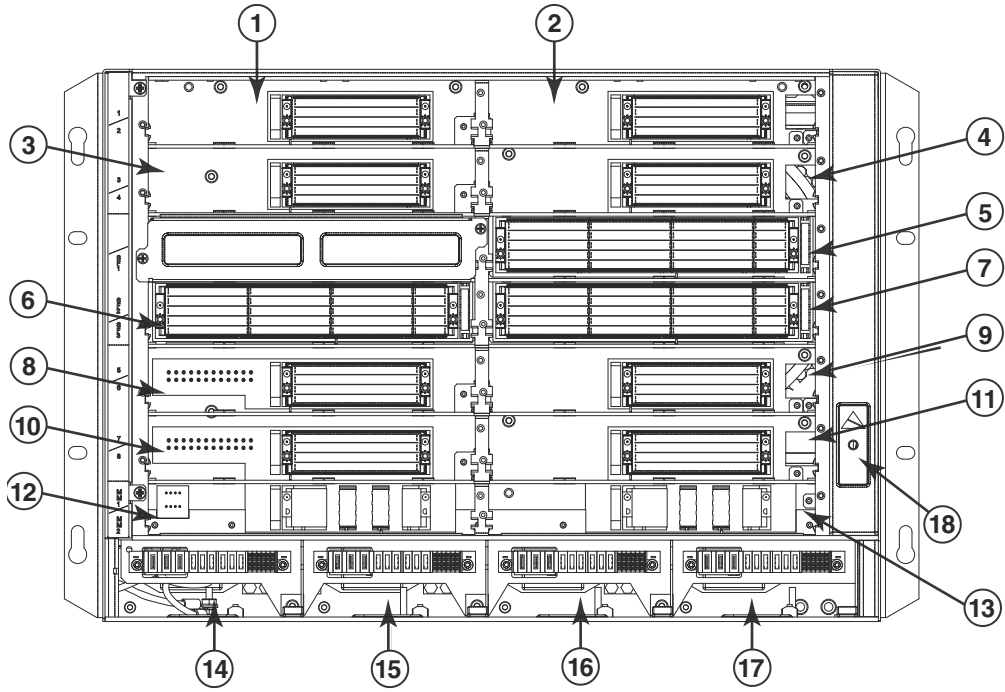
Figure 1, Figure 2, and Figure 3 illustrate these models.

FIGURE 1 PowerConnect B-MLXe-4 router



- |                        |                        |                     |                     |
|------------------------|------------------------|---------------------|---------------------|
| 1 Interface slot 2     | 4 ESD connector        | 7 Interface slot 3  | 10 Interface slot 4 |
| 2 Switch fabric slot 2 | 5 Interface slot 1     | 8 Management slot 1 |                     |
| 3 Switch fabric slot 3 | 6 Switch fabric slot 1 | 9 Management slot 2 |                     |

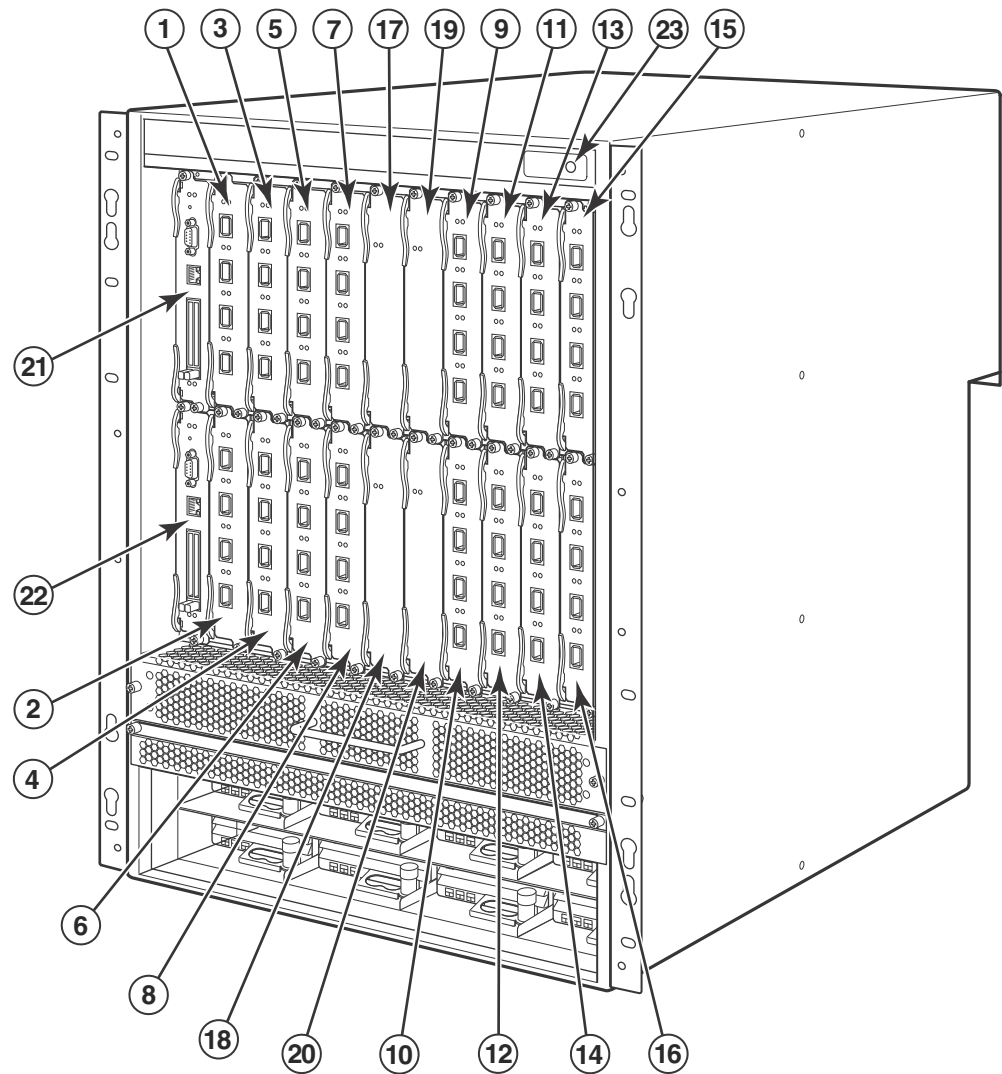
FIGURE 2 PowerConnect B-MLXe-8 router



- |                        |                        |                        |                        |
|------------------------|------------------------|------------------------|------------------------|
| 1 Interface slot 1     | 6 Switch fabric slot 2 | 11 Interface slot 8    | 16 Power supply slot 3 |
| 2 interface slot 2     | 7 Switch fabric slot 3 | 12 Management slot 1   | 17 Power supply slot 4 |
| 3 Interface slot 3     | 8 Interface slot 5     | 13 Management slot 2   | 18 ESD connector       |
| 4 Interface slot 4     | 9 Interface slot 6     | 14 Power supply slot 1 |                        |
| 5 Switch fabric slot 1 | 10 Interface slot 7    | 15 Power supply slot 2 |                        |

# 1 Hardware features

FIGURE 3 PowerConnect B-MLXe-16 router



- |      |                      |    |                      |
|------|----------------------|----|----------------------|
| 1-16 | Interface slots 1-16 | 20 | Switch fabric slot 4 |
| 17   | Switch fabric slot 1 | 21 | Management slot 1    |
| 18   | Switch fabric slot 2 | 22 | Management slot 2    |
| 19   | Switch fabric slot 3 | 23 | ESD connector        |

## ***PowerConnect B-MLXe-4 router components***

The following components are factory-installed in the PowerConnect B-MLXe-4 routers:

- Two high-speed switch fabric modules.
- A slot blank in each empty module slot. The slot blank covers a slot that does not currently have a module installed in it, ensuring proper airflow.

- A fan tray assembly, which is located in the front right side of the router. For more information about fans, refer to [“Cooling system for PowerConnect B-MLXe routers”](#) on page 18.
- One power supply.

You can install the following components in the router slots:

- Up to two management modules (one active and one redundant).
- Up to three switch fabric modules.
- Up to four interface modules.
- Up to three power supplies (AC).

### ***PowerConnect B-MLXe-8 router components***

The following components are factory-installed in the PowerConnect B-MLXe-8 routers:

- Two high-speed switch fabric modules.
- A slot blank in each empty module slot. The slot blank covers a slot that does not currently have a module installed in it, ensuring proper airflow.
- A fan tray assembly, which is located in the front right side of the router. For more information about fans, refer to [“Cooling system for PowerConnect B-MLXe routers”](#) on page 18.
- Two power supplies.

You can install the following components in the router slots:

- Up to two management modules (one active and one redundant).
- Up to three switch fabric modules.
- Up to eight interface modules.
- Up to four power supplies (AC).

### ***PowerConnect B-MLXe-16 router components***

The following components are factory-installed in PowerConnect B-MLXe-16 routers:

- Three high-speed switch fabric modules.
- A slot blank in each empty module slot. The slot blank covers a slot that does not currently have a module installed in it, ensuring proper airflow.
- A fan tray assembly located in the front right side of the router, and two fan assemblies located at the rear of the router. For more information about fans, refer to [“Cooling system for PowerConnect B-MLXe routers”](#) on page 18.
- Four power supplies.

You can install the following components in the router slots:

- Up to two management modules (one active and one redundant).
- Up to four switch fabric modules.
- Up to 16 interface modules.
- Up to eight power supplies (AC).

# Router modules

The following sections describe management modules, interface modules, and switch fabric modules.

The figures in the previous sections show the router slots where you install modules and power supplies. For installation instructions for these components, refer to the appropriate installation chapter in this guide for your model.

## Management modules

Table 1 lists the management modules that are available for PowerConnect B-MLXe routers.

**TABLE 1 Management modules**

Part number	Description
NI-MLX-MR	PowerConnect B-MLXe management module, 1 GB SDRAM, dual PCMCIA slots, EIA or TIA-232 and 10/100/1000 Ethernet ports for out-of-band management.

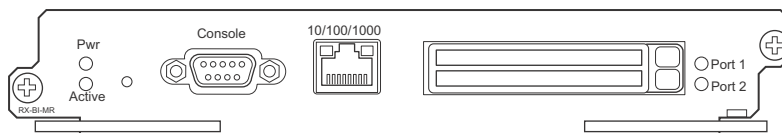
The management module controls the hardware components, runs the networking protocols, and provides the Real Time Operating System (RTOS).

Each router requires one management module, and can accommodate a second module for redundancy. A redundant management module works in conjunction with the active management module. If the active module becomes unavailable, the redundant management module automatically takes over the system operation, minimizing system downtime. For information about the redundancy feature, refer to the “Using a Redundant Management Module” chapter in the *PowerConnect B-MLXe Configuration Guide*.

Management modules are installed in dedicated slots marked M1 and M2. By default, the module installed in slot M1 is the active management module.

Management modules are hot-swappable, which means you can remove and replace them without powering down the system. Figure 4 shows the management module front panel.

**FIGURE 4 Management module front panel**



The front panel contains the following control features:

- Two PCMCIA slots
- A console port
- A 10/100/1000 Ethernet port
- Six LEDs

### ***PCMCIA slots***

PCMCIA slots support flash PC cards. A flash PC card provides storage space in addition to system flash memory. You can store boot images, startup configuration files, running configuration files, and other system files on the flash PC card. This allows you to perform system management tasks, such as copying files between flash PC cards, or copying files between a flash PC card and flash memory.

### ***Console port***

The console port is a standard DB-9 serial connector through which you can attach a PC or terminal to configure the router using the CLI.

---

**NOTE**

The console port interfaces the control plane only. It does not interface the data plane.

---

### ***10/100/1000 Ethernet port***

The management module also contains a 10BaseT, 100BaseTX, or 1000BaseTX auto-sensing, auto-negotiating Ethernet port. This port has an RJ45 unshielded twisted pair (UTP) connector.

Typical uses of this port include but are not limited to the following:

- Connecting a PC to configure, monitor, and manage the system through a Telnet or SSHv2 connection.
- Connecting to the 10BaseT, 100BaseTX, or 1000BaseTX port for connectivity to your existing management network. You can then access the router and configure, monitor, and manage the system from a management station.

---

**NOTE**

The existing management network into which you can connect the 10/100/1000 Ethernet port must be separate and isolated from the network over which user packets are switched and routed. For information about the functionality of the management port, refer to [“Understanding management port functions”](#) on page 95.

---

For information about connecting a PC to the 10/100/1000 Ethernet port, refer to [“Attaching a management station”](#) on page 205.

Unlike the 10 Gbps Ethernet ports, the out-of-band port does not interface the LAN. Instead, the out-of-band port can interface with a separate system management network, and allows you to do the following tasks:

- Access the router through Telnet, the Web management interface, or the SNMP Network Manager software.
- Access a TFTP server to perform system upgrade tasks.
- Access SNMP messages or protocol data units (PDUs).
- Send Syslog packets.
- Access the system through RADIUS AAA.

### ***Management module LEDs***

[Table 2](#) describes the LEDs on the management module.

# 1 Router modules

**TABLE 2** Management module LEDs

LED	Position	State	Meaning
Port 1 and Port 2	Each adjacent to the PCMCIA slot that it represents	On or blinking	The software is currently accessing the PCMCIA flash card.
		Off	The software is not currently accessing a PCMCIA flash card, although there is one inserted in the slot.
Active	Lower Left	On	The module is functioning as the active management module.
		Off	The module is functioning as the redundant management module.
Pwr	Upper Left	On	The module is receiving power.
		Off	The module is not receiving power.
10/100/1000 Ethernet Port	Above and right of RJ45 connector	On (Green)	A link is established with the remote port.
		Off	No link is established with the remote port.
10/100/1000 Ethernet Port	Above and left of RJ45 connector	On or blinking (Yellow)	The port is transmitting and receiving packets.
		Off for an extended period	The port is not transmitting or receiving packets.

## Interface modules

Table 3 lists the interface modules that are available for PowerConnect B-MLXe routers.

**TABLE 3** Interface modules

Part Number	Description
DL-MLX-10Gx4-X-ML	4-port 10 Gbps Ethernet module with IPv4, IPv6, and MPLS hardware support—requires XFP optics
DL-MLX-1GFx24-X-ML	24-port FE or GE (100/1000) module with IPv4, IPv6, and MPLS hardware support—requires SFP optics
DL-MLX-1GCx24-X-ML	24-port 10/100/1000 copper modules with IPv4, IPv6, and MPLS hardware support
DL-NI-MLX-10Gx8-M	
DL-NI-MLX-10Gx8-D	

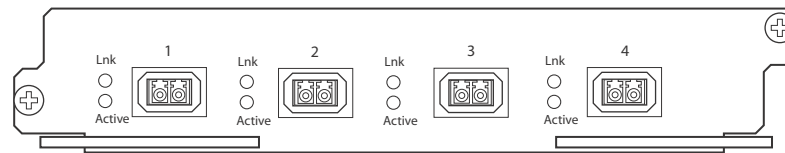
Depending on your router model, you can install up to 16 interface modules.

Interface modules are hot-swappable, which means you can remove and replace them without powering down the system.

### *10 Gbps Ethernet interface modules (4-port)*

Figure 5 shows 4-port 10 Gbps Ethernet interface module front panels.



**FIGURE 5** 4-port 10 Gbps Ethernet module front panels

The front panel of the 4-port module includes the following features:

- Four LEDs per port
- Four 10 Gbps Ethernet XFP optics ports

### 10 Gbps Ethernet interface module LEDs

All 4-port interface modules have LEDs that indicate the status of each port, as described in [Table 4](#).

**TABLE 4** 10 Gbps Ethernet module LEDs

LED	Location	State	Meaning
Link	Left of each Ethernet port	On	A link is established with the remote port.
		Off	A link is not established with the remote port.
Active	Left of each Ethernet port	On	The port is transmitting and receiving packets.
		Off	The port is not transmitting or receiving packets.

### 10 Gbps Ethernet ports

The 10 Gbps Ethernet module has four physical ports that allow you to connect your router to other network routers at a speed of 10 Gbps.

You must insert XFP-compliant fiber-optic transceivers (provided by Dell) in each port you intend to use. XFP-compliant transceivers provide an optical or physical medium-dependent (PMD) interface for single- or multi-mode fiber that can be used with the LAN physical layer (PHY).

[Table 5](#) lists the 10 Gbps XFP-compliant fiber-optic transceivers that are available from Dell.

**TABLE 5** XFP-compliant transceivers for 10 Gbps Ethernet interface modules

Part number	Description
10G-XFP-SR	850 nm serial pluggable XFP optic (LC), target range 300m over multi-mode fiber.
10G-XFP-LR	1310 nm serial pluggable XFP optic (LC) for up to 10km over single-mode fiber.
10G-XFP-ER	1550 nm serial pluggable XFP optic (LC) for up to 40km over single-mode fiber.
10G-XFP-CX4	10-Base-CX4, XFP transceiver, 5 km, CX connector.

For more information about fiber-optic transceivers and associated cabling, refer to [“Installing a fiber-optic transceiver”](#) on page 96.

### 8-port 10 Gbps interface modules

For PowerConnect B-MLXe routers, the 8-port, 10 Gbps interface modules (NI-MLX-10Gx8-M and NI-MLX-10Gx8-D) provide eight 10 Gbps ports that support SFP+ optics. These modules contain an internal flash memory of 16 MB for local storage of CPU images, and 32 MB for local storage of FPGA images. Each 8-port 10 Gbps Ethernet interface module can support a buffer of 256 MB.

When installing NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules, you must first upgrade the software on all interface modules and management modules to Multi-Service IronWare software 5.1 or later. For more information on upgrading the software, refer to [Chapter 6, “Upgrading Software Images and Configuration Files”](#).

**NOTE**

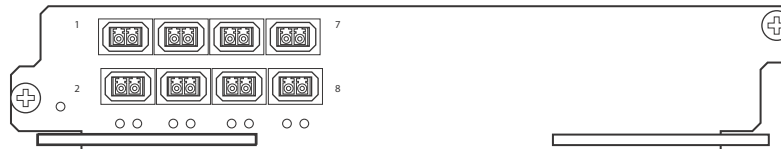
NI-MLX-10Gx8-D interface modules do not support MPLS.

Routers that are loaded with one or more NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules must also have high-speed switch fabric modules installed in order to operate. You can replace switch fabric modules while the system is powered on and running.

For PowerConnect B-MLXe routers, NI-MLX-10Gx8-M and NI-MLX-10Gx8-D modules require the installation of high-speed switch fabric modules and high-speed fans. For more information about high-speed switch fabric modules, see [“High-speed switch fabric modules”](#) on page 17. For information about the high-speed fans, see [“NIBI-16-FAN-EXH-A high-speed fan assemblies”](#) on page 20.

[Figure 6](#) illustrates the faceplate of the NI-MLX-10Gx8-M and NI-MLX-10Gx8-D modules.

**FIGURE 6** NI-MLX-10Gx8-M and NI-MLX-10Gx8-D module faceplate



**NOTE**

NI-MLX-10Gx8-M and NI-MLX-10Gx8-D modules are designed for use with PowerConnect B-MLXe routers only.

NI-MLX-10Gx8-M and NI-MLX-10Gx8-D modules support the SFP+ optics listed in [Table 6](#). These modules do not support SFP optics.

**TABLE 6** SFP+ optic transceivers for NI-MLX-10Gx8-M and NI-MLX-10Gx8-D Ethernet interface modules

Part number	Description
10G-SFPP-SR	10GBASE-SR serial pluggable SFP+ optic (LC), target range 300 m over multi-mode fiber
10G-SFPP-LR	10GBASE-LR serial pluggable SFP+ optic (LC) for up to 10 km over single-mode fiber

#### NI-MLX-10Gx8-M and NI-MLX-10Gx8-D interface module LEDs

The NI-MLX-10Gx8-M and NI-MLX-10Gx8-D Ethernet interface module LEDs indicate module and port status, as described in [Table 7](#).

**TABLE 7** NI-MLX-10Gx8-M and NI-MLX-10Gx8-D Ethernet module LEDs

LED	Location	State	Meaning
Power	Lower left corner of module	Green	Module is receiving power
		Off	Module is not receiving power
Link/Activity	Underneath the ports. Top port LED on left, bottom port LED on right.	Green blinking	Port enabled and link is up.
		Off	Port is disabled.

### Power supply requirements for NI-MLX-10Gx8-M and NI-MLX-10Gx8-D modules

When installing NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules, consider the following power supply requirements for each type of router:

- **4-slot routers**

You can install up to three NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules using a single 1200W power supply. You can achieve a 1+1 power redundancy by installing four additional power supplies.

If four NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules are installed, you will need a minimum of two power supplies. You can achieve 2+2 power redundancy by installing two additional power supplies.

- **8-slot routers**

In MLXe-8 routers, you can install up to six NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules using two 1200W power supplies. You can achieve a 2+2 power redundancy by installing two additional power supplies.

For MLXe-8 routers, if you install seven or more NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules, you will need a minimum of three power supplies. You can achieve 3+1 power redundancy by installing one additional power supply.

For MLX 8-slot routers, you can install up to eight NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules using two 1200W power supplies. You can achieve 2+2 power redundancy by installing two additional power supplies

- **16-slot routers**

You can install up to 16 NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules using four 1200W power supplies. You can achieve a 4+4 power redundancy by installing four additional power supplies.

If you install thirteen or more NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules, you will need a minimum of five power supplies. You can achieve 5+3 power redundancy by installing three additional power supplies.

When installing NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules, you must upgrade the software on all interface modules and management modules to the appropriate software release. For more information on the appropriate software release refer to the Release Notes. For more information about upgrading the software, refer to [Chapter 6, “Upgrading Software Images and Configuration Files”](#).

---

**NOTE**

NI-MLX-10Gx8-D modules do not support Multiprotocol Label Switching (MPLS).

---

# 1 Router modules

If you try to configure MPLS on device that has NI MLX 8x10G -D modules installed, you will see the following error message.

```
PowerConnect MLX-8 Router(config)# router mpls
The command can't be used when system contains -d class modules.
```

If you install an NI-MLX-10Gx8-D module in a device that is running MPLS, the NI-MLX-10Gx8-D module will boot in INTERACTIVE mode, and the following error message is displayed.

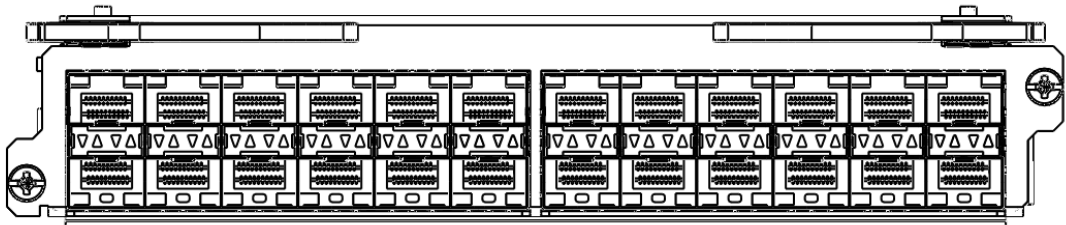
```
R2-MLX#
Module is inserted into slot 7
SYSLOG: May 28 16:22:35:<13>May 28 16:22:35 System: Module was inserted to
slot 7
Module 7 is -d class, it can't work when router mpls is enabled.
Reset slot 7

SYSLOG: May 28 16:22:48 :<13>May 28 16:22:48 Module 7 is reset by mgmt
(reason: boot to interactive mode)
```

## 24-port 100/1000 Ethernet interface module

Figure 7 shows the front panel of the 24-port 100/1000 Gbps Ethernet SFP interface module.

FIGURE 7 24-port 100/1000 Ethernet module front panel



The front panel includes the following features:

- LEDs to the left support the top ports, LEDs to the right support the bottom ports
- 24 100/1000 Ethernet SFP ports

Table 8 describes the LEDs for the 24-port 100/1000 Ethernet module

TABLE 8 24-port 100/1000 Ethernet module LEDs

Position	State	Meaning
Below each Ethernet port. (Left-side LED supports port in top row. Right-side LED supports port in bottom row.)	On or blinking	The port is transmitting and receiving packets.
	Off for an extended period	The port is not transmitting or receiving packets.

### 100/1000 Ethernet ports

The 100/1000 Ethernet interface module contains 24 physical ports, through which you can connect your router to other network routers at a speed of 100 Mbps or 1 Gbps.

You must insert an SFP-compliant fiber-optic transceiver (provided by Dell) into a physical port. SFP-compliant fiber-optic transceivers provide a physical medium-dependent (PMD) fiber interface that can be used with either the LAN physical layer (PHY) or WAN physical layer (WAN PHY).

Table 9 lists SFP-compliant transceivers available from Dell.

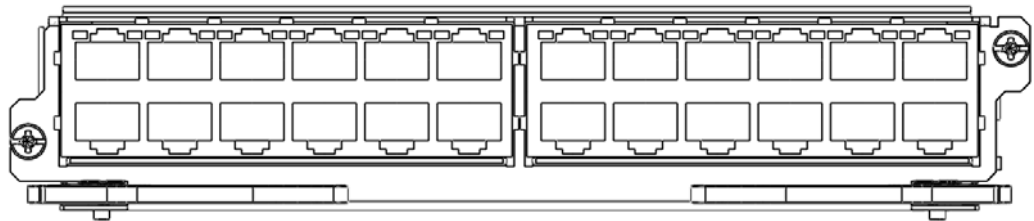
**TABLE 9 SFP-compliant transceivers available from Dell**

Part number	Description
E1MG-TX	SFP Copper, RJ45 connector (supported at 1000 Mbps speeds only).
E1MG-SX-OM	1000Base-SX SFP optic with Digital Optical Monitoring.
E1MG-LX	1000Base-LX SFP optic, single-mode fiber, LC connector.
E1MG-LX-OM	1000Base-LX SFP optic with Digital Optical Monitoring.
E1MG-LHA-OM	1000Base-LHA SFP optic, single-mode fiber, LC connector. For ranges up to 80 km.
E1MG-100FX-OM	100Base-FX SFP optic multi-mode fiber, LC connector.

### ***24-port 10/100/1000 Ethernet interface module***

Figure 8 shows the front panel of the 24-port 10/100/1000 Ethernet RJ45 module.

**FIGURE 8 24-port 10/100/1000 copper Ethernet module front panel**



The front panel includes the following features:

- LEDs
- Twenty 10/100/1000 copper Ethernet ports.

Table 10 describes the 24-port 10/100/1000 Ethernet module LEDs.

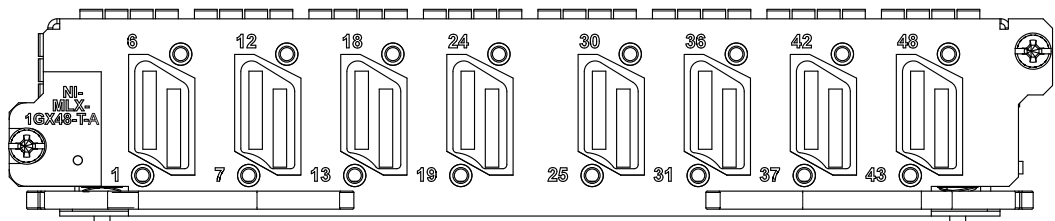
**TABLE 10 24-port 10/100/1000 Ethernet module LEDs**

LED	Position	State	Meaning
Link or Active	Underneath the ports. The top port LED is on the left side, the bottom port LED is on the right side.	On (solid)	A link is established with the remote port (with no traffic).
		Blinking	The port is transmitting and receiving packets.
		Off	A link is not established with the remote port and no traffic is being passed.

### ***NI-MLX-1Gx48-T-A interface module***

Figure 9 shows the front panel of the NI-MLX-1Gx48-T-A interface module.

**FIGURE 9 NI-MLX-1Gx48-T-A module front panel**



The front panel includes the following features:

- A power LED located below the part number
- Eight mini-RJ21 connectors, each supporting six 10/100/1000 Mbps Ethernet ports

The eight mini-RJ21 connectors support six 1 Gbps Ethernet ports each. You can connect a patch panel with a mini-RJ21 connector to a mini-RJ21 connector on the interface module. The patch panel provides RJ45 connectors. You can also use a cable with a mini-RJ21 connector on one end that connects to the mini-RJ21 connector on the interface module. The other end of the cable splits into six cables with RJ45 connectors on each cable.

The NI-MLX-1Gx48-T-A module ships with two cable cinches. Each cable cinch consists of a plastic part and a velcro strap. For instructions on using the cable cinches, see [Chapter 3, “Using the Dell Structured Cabling Components”](#).

Contact your Dell Sales Representative for more information about cables and patch panels that support this module.

### Power supply requirements for NI-MLX-1Gx48-T-A modules

When installing NI-MLX-1Gx48-T-A modules, consider the following power supply requirements for each type of router:

- **4-slot routers**

You can install up to three NI-MLX-1Gx48-T-A modules, and populate the remaining slots with other modules using a single 1200W power supply. You can achieve a 1+2 power redundancy by installing two additional power supplies.

If four NI-MLX-1Gx48-T-A modules are installed, you will need a minimum of two power supplies. You can achieve 2+1 power redundancy by installing one additional power supply.

- **8-slot routers**

You can install up to seven NI-MLX-1Gx48-T-A modules, and populate the remaining slots with other modules using two 1200W power supplies. You can achieve a 2+2 power redundancy by installing two additional power supplies.

If eight NI-MLX-1Gx48-T-A modules are installed, you will need a minimum of three power supplies. You can achieve 3+1 power redundancy by installing one additional power supply.

- **16-slot routers**

You can install up to twelve NI-MLX-1Gx48-T-A modules, and populate the remaining slots with other modules using four 1200W power supplies. You can achieve a 4+4 power redundancy by installing four additional power supplies.

If you install thirteen or more NI-MLX-1Gx48-T-A modules, you will need a minimum of five power supplies. You can achieve 5+3 power redundancy by installing three additional power supplies.

When installing NI-MLX-1Gx48-T-A modules, you must upgrade the software on all interface modules and management modules to the appropriate software release. For more information on the appropriate software release, refer to the Release Notes. For more information about upgrading the software, refer to [Chapter 6, “Upgrading Software Images and Configuration Files”](#).

To display information about NIBI-16-FAN-EXH-A modules installed in a 16-slot router, enter the **show chassis** command.

```
PowerConnect# show chassis
*** MLX-16 chassis ***
Power 1 (H1250CFN - AC 1200W): Installed (OK)
Power 2: Installed (Failed or Disconnected)
Power 3: not present
Power 4: Installed (Failed or Disconnected)
Power 5 (H1250CFN - AC 1200W): Installed (OK)
Power 6 (30351200 - AC 1200W): Installed (OK)
Power 7: Installed (Failed or Disconnected)
Power 8 (30351200 - AC 1200W): Installed (OK)
Total power budget for chassis = 4800 W
Total power used by system core = 762 W
Total power used by LPs = 1040 W
Total power available = 2998 W
Slot Power-On Priority and Power Usage:
Slot10 pri=1 module type=NI-MLX-1Gx48-T-A 48-port 10/100/1000Base-T MRJ21
Module power usage=260W
Slot11 pri=1 module type=NI-MLX-1Gx48-T-A 48-port 10/100/1000Base-T MRJ21
Module power usage=260W
Slot13 pri=1 module type=NI-MLX-1Gx48-T-A 48-port 10/100/1000Base-T MRJ21
Module power usage=260W
Slot16 pri=1 module type=NI-MLX-1Gx48-T-A 48-port 10/100/1000Base-T MRJ21
Module power usage=260W
--- FANS ---
Bottom fan tray (fan 1): Status = OK, Speed = LOW (50%)
Bottom fan tray (fan 2): Status = OK, Speed = LOW (50%)
Bottom fan tray (fan 3): Status = OK, Speed = LOW (50%)
Bottom fan tray (fan 4): Status = OK, Speed = LOW (50%)
Bottom fan tray (fan 5): Status = OK, Speed = LOW (50%)
Bottom fan tray (fan 6): Status = OK, Speed = LOW (50%)
```

---

#### NOTE

To physically confirm the high speed fans look for the four captive screws on the fans at the rear of the chassis.

---

## Switch fabric modules

[Table 11](#) lists the switch fabric modules that are available for PowerConnect B-MLXe routers.

# 1 Router modules

**TABLE 11** Switch fabric modules

Part number	Description
NI-X-4-HSF	High speed switch fabric module for 4-slot routers
NI-X-16-8-HSF	High speed switch fabric module for 8- and 16-slot routers

Switch fabric modules switch packets from one interface module to another. PowerConnect B-MLXe routers can be configured with multiple switch fabric modules as described here:

- **4-slot router:** Accommodates three switch fabric modules (two required and one redundant) for a fully-loaded system. Ships with two switch fabric modules. You must purchase an additional switch fabric module to equip your router for redundancy.
- **8-slot router:** Accommodates three switch fabric modules (two required and one redundant) for a fully-loaded system. Ships with two switch fabric modules. You must purchase an additional switch fabric module to equip your router for redundancy.
- **16-slot router:** Accommodates four switch fabric modules (three required and one redundant) for a fully-loaded system. Ships with three switch fabric modules. You must purchase an additional switch fabric module to equip your router for redundancy.

**NOTE**

PowerConnect B-MLXe router switch fabric modules are dedicated, which means that they function properly in PowerConnect B-MLXe routers only. If you attempt to install a PowerConnect B-MLXe router switch fabric module in another Dell device or a switch fabric module intended for another Dell device in a PowerConnect B-MLXe router, the router and switch fabric module will not function properly.

Figure 10 shows the front panel of a switch fabric module.

**FIGURE 10** Switch fabric module front panel



The front panel contains two LEDs, as described in Table 12.

**TABLE 12** Switch fabric module LEDs

LED	Position	State	Meaning
Pwr	Above Active LED	On	The module is receiving power.
		Off	The module is not receiving power.
Active	Below Pwr LED	On	The switch fabric is active and ready to switch user packets.
		Off for an extended period	The switch fabric is not active and cannot switch user packets.



## High-speed switch fabric modules

Generation 2 (G2) high-speed fabric (HSF) modules support wire-speed forwarding for all packet sizes, including jumbo frames.

HSF modules are supported on PowerConnect B-MLXe routers and are interoperable with all existing interface modules.

HSF modules are hot-swappable, which allows you to install or replace them while the system is powered up and running.

## Power supplies

PowerConnect B-MLXe routers support the following power supply options:

- **4-slot router:** Ships with one power supply, but can accommodate three AC power supplies (one required and two redundant). To equip your router for redundancy, you must purchase one or two additional power supplies.
- **8-slot router:** Accommodates four AC power supplies (two required and two redundant). Because power is supplied over a common power bus, any power supply installed in addition to the two required will provide backup for any supply that fails. For full redundancy for both of the required power supplies, you must add two additional power supplies.
- **16-slot router:** Accommodates eight AC power supplies (four required and four redundant). Because power is supplied over a common power bus, any power supply installed in addition to the four required will provide backup for any power supply that fails. For full redundancy for all of the required power supplies, you must add four additional power supplies.

For power supply specifications, refer to “[Power specifications](#)” on page 175.

Power supplies provide power to all router components, share the workload equally, and report status to the management module. If the management module detects that a power supply has failed or overheated, the management module redistributes the workload of the failed power supply to the remaining power supplies.

Power supplies have three LEDs on the faceplate. These LEDs provide status for input power, output power, and notification of alarms that have been sent. If the input power and output power LEDs are on (a steady green), the power supply is providing power to the router components. For more information about the power supply LEDs, refer to the AC power supply sections in [Table 27](#) on page 207.

---

### NOTE

After a power supply is removed from a router, the software determines if there is enough power to operate all of the interface modules. If it determines that there is not enough power, some interface modules will be powered off.

---



### DANGER

*Power supplies are hot-swappable, which means they can be removed and replaced while the router is powered on and running. However, Dell recommends that you disconnect a power supply from its power source before removing and replacing the supply. The 4-, 8-, and 16-slot*

*router can be running while a power supply is being removed and replaced, but the power supply itself should not be connected to a power source. Otherwise, you could be injured, or the power supply or other parts of the router could be damaged.*

## Rack mounting brackets

All routers ship with pre-installed mounting brackets that allow you to front-mount the router in a standard 19-inch (EIA310-D) rack. For instructions about how to mount the router in a rack, refer to the installation chapter that is appropriate for your router model.

You can also mid-mount your 4-, 8- or 16-slot router using two L-shaped mounting brackets that come in a mid-mount kit (ordered separately). The mid-mount kit comes with instructions for installing the mounting brackets and mounting the router in a rack. Contact Dell for more information about the mid-mount bracket kit.

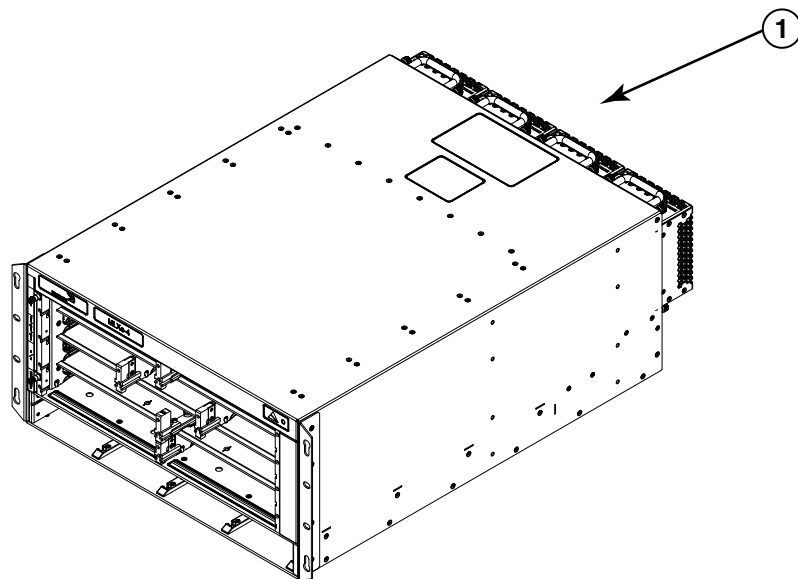
## Cooling system for PowerConnect B-MLXe routers

The cooling systems for PowerConnect B-MLXe routers contain the following components:

- **4-slot router:** Equipped with a fan assembly that contains two 4-speed fans and two fan controllers to support redundancy.
- **8-slot router:** Equipped with a fan assembly containing four 4-speed fans and four fan controllers to support redundancy.
- **16-slot router:** Equipped with two high-speed fan assemblies. Each fan assembly contains two 4-speed fans with 16 fan controllers to support redundancy.

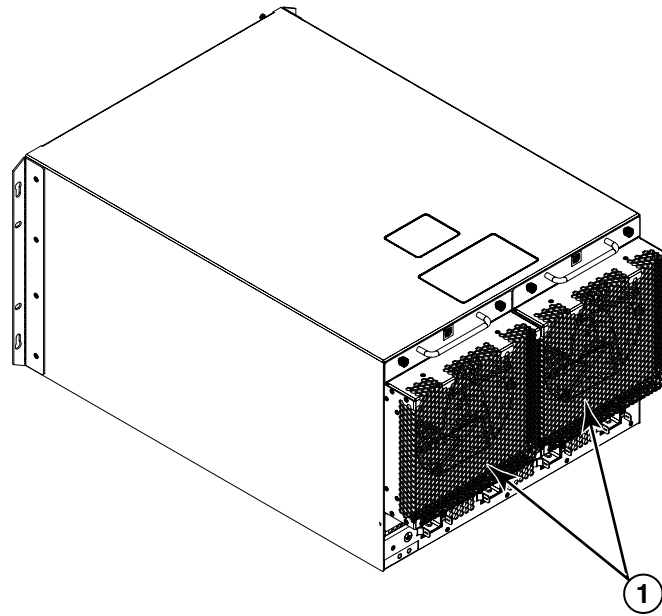
Figure 11 and Figure 12 show the fan locations for 4-slot and 8-slot routers. Figure 13 and Figure 14 show the fan locations for 16-slot routers.

**FIGURE 11** Fan locations for PowerConnect B-MLXe-4 routers



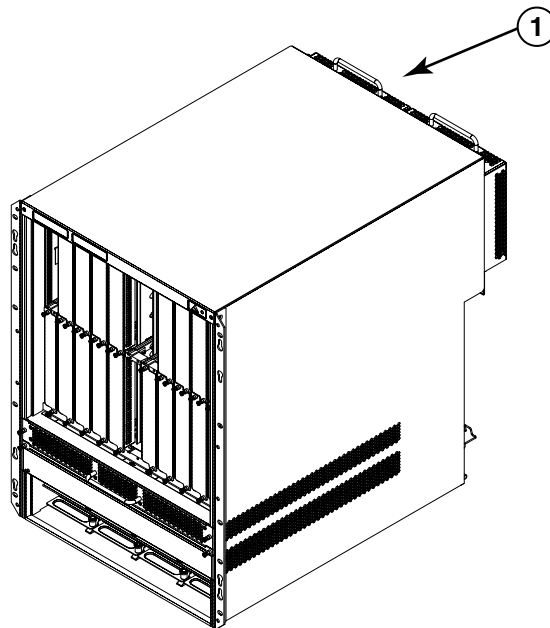
1 Fans in rear of chassis

**FIGURE 12** Fan locations for PowerConnect B-MLXe-8-routers



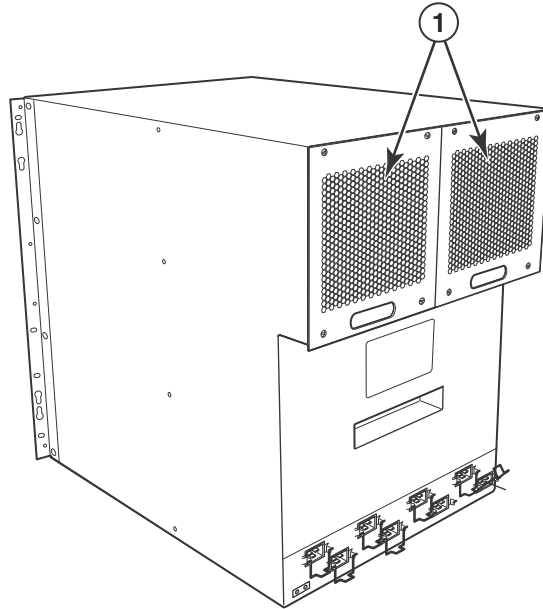
1 Fan module

**FIGURE 13** Fan location for PowerConnect B-MLXe-16 routers



1 Fan assembly

**FIGURE 14** Rear fan location for PowerConnect B-MLXe-16 routers



## 1 Rear fan assemblies

At startup, the fans operate at high speed. After a period of time, the management module changes the fan speed to low.

By default, the router polls the temperature sensor on each module every 60 seconds for a temperature reading. Depending on the results, the router will:

- Leave the fan speed as is
- Increase the fan speed
- Decrease the fan speed
- Shut down a module to prevent damage

If the temperature of a module exceeds specified high temperature thresholds, the system generates a Syslog message and SNMP trap. The system can also shut down the module if the temperature exceeds the highest threshold.

You can change default low and high temperature thresholds for modules and fan speeds. Refer to [“Changing temperature thresholds for modules and fan speeds”](#) on page 107.

The fan control modules include a bi-color LED, which indicates the status of the fans. The router ships with fan assemblies fully installed. Fan assemblies are hot-swappable, which means you can remove and replace them without powering down the system.

## NIBI-16-FAN-EXH-A high-speed fan assemblies

NIBI-16-FAN-EXH-A high-speed fan assemblies are required for PowerConnect B-MLXe routers when you install NI-MLX-10Gx8-M, NI-MLX-10Gx8-D, or NI-MLX-1Gx48-T-A modules. PowerConnect B-MLXe-16 routers ship with high-speed fan assemblies factory installed. Refer to [“Installing NIBI-16-FAN-EXH-A fan assemblies”](#) on page 167 for high-speed fan installation instructions.

## Rack mount kit

PowerConnect B-MLXe routers can be mounted in a standard 19-inch (EIA310-D) rack, and ship with pre-installed mounting brackets.

You can install the following number of routers in a rack depending on the model:

- 4-slot router – Up to ten routers per rack
- 8-slot router – Up to six routers per rack
- 16-slot router – Up to three routers per rack

For instructions on how to install routers in a rack, refer to [Chapter 2, “Installing a PowerConnect B-MLXe Core Router”](#).

## Supported software features

For a complete list of software features supported on PowerConnect B-MLXe routers, refer to the software release notes.

# 1 Supported software features

# Installing a PowerConnect B-MLXe Core Router

---

## Installation precautions

Read the following cautions and danger notices before installing PowerConnect B-MLXe routers.

### General precautions

**DANGER**

*The procedures in this manual are for qualified service personnel.*

**DANGER**

*All fiber-optic interfaces use Class 1 Lasers.*

**CAUTION**

Do not install the router in an environment where the operating ambient temperature might exceed 40°C (104°F).

**CAUTION**

Make sure the air flow around the front, sides, and back of the router is not restricted.

**CAUTION**

If you do not install a module in a slot, you must keep the slot blank in place. If you operate the router with an uncovered slot, the system may overheat.

**CAUTION**

Never leave tools inside the router.

## Power precautions



**CAUTION**

---

Use a separate branch circuit for each AC power cord for redundancy in case one of the circuits fails.

---



**DANGER**

---

*Make sure to choose the appropriate circuit device, depending on the number of AC power supplies installed in the router.*

---



**DANGER**

---

*Disconnect the power cord from all power sources to completely remove power from the router.*

---



**DANGER**

---

*Make sure that the power source circuits are properly grounded, then use the power cord supplied with the router to connect it to the power source.*

---



**DANGER**

---

*If the installation requires a different power cord than the one supplied with the router, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the router.*

---



**DANGER**

---

*Make sure the rack or cabinet housing the router is adequately secured to prevent it from becoming unstable or falling over.*

---



**DANGER**

---

*Mount the routers you install in a rack or cabinet as low as possible. Place the heaviest router at the bottom and progressively place lighter routers above.*

---



**CAUTION**

Ensure that the router does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the router. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the routers near the input power connectors.

**CAUTION**

PowerConnect B-MLXe routers with AC power sources are intended for installation in restricted access areas only. A restricted access area is a location where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security.

**CAUTION**

For the DC input circuit to the system of PowerConnect B-MLXe-4, PowerConnect B-MLXe-8, and PowerConnect B-MLXe-16 routers (1800W supply), make sure there is a UL-Listed 60 amp circuit breaker, minimum -48VDC, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be copper wire, 6 AWG, marked VW-1, and rated minimum 90°C.

**CAUTION**

For the DC input circuit to the system of PowerConnect B-MLXe-4, PowerConnect B-MLXe-8, and PowerConnect B-MLXe-16 routers (1200W supply), make sure there is a UL-Listed 30 amp circuit breaker, minimum -48VDC, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be copper wire, 6 AWG, marked VW-1, and rated minimum 90°C.

**CAUTION**

For the NEBS-compliant installation of PowerConnect B-MLXe-4, PowerConnect B-MLXe-8, and PowerConnect B-MLXe-16 routers with AC systems, use a ground wire of at least 6 American Wire Gauge (AWG). The ground wire should have an agency-approved crimped connector (provided with the device) attached to one end, with the other end attached to building ground. The connector must be crimped with the proper tool, allowing it to be connected to both ground screws on the enclosure. Before crimping the ground wire into the provided ground lug, ensure the bare copper wire has been cleaned and antioxidant is applied to the bare wire.

## Installing a PowerConnect B-MLXe-4 router

This section describes how to install a PowerConnect B-MLXe-4 router.

---

**NOTE**

Illustrations in this chapter may differ slightly from the actual equipment.

---

### Preparing the installation site

Before installing the router, plan the location and orientation relative to other devices and equipment. For cooling purposes, allow a minimum of six inches of space between the sides, front, and the back of the router and walls or other obstructions. If a router is installed in a perforated enclosure, the perforations must cover at least 60 percent of the surface.

---

**NOTE**

This equipment is suitable for installation in a Network Telecommunication facility and where NEC requirements apply. Additionally, it may be installed in either a Common Bonding Network (CBN) or Isolated Bonding Network (IBN). It is not intended for Outside Plant (OSP) installations.

---

Ensure that the proper cabling is installed at the site.

For information on cabling, refer to [“Installing power supplies in a PowerConnect B-MLXe-4 router”](#) on page 38, [“Attaching a management station”](#) on page 68, and [“Connecting the router to a network device”](#) on page 95.

### Unpacking a PowerConnect B-MLXe-4 router

The PowerConnect B-MLXe-4 router ships with the following items:

- Router chassis with switch fabric modules installed in slots marked SF, slot blanks installed in all empty module slots, and mounting brackets attached for front-mount.
- Insertion or extraction tool for use with RJ45 and fiber-optic connectors.

---

**NOTE**

If any items are missing, contact the place of purchase.

---

#### Unpacking steps

Follow these steps to unpack your PowerConnect B-MLXe-4 router.

1. Remove the router from the shipping carton.
2. Save the shipping carton and packing materials in case you need to move or ship the router at a later time.

### Installing a PowerConnect B-MLXe-4 router in a rack or cabinet

Your PowerConnect B-MLXe-4 router ships from the factory with mounting brackets attached. You can mount your router in the following ways:

- Front-mount in a standard two-post rack using the factory-installed brackets.
- Mid-mount in a standard two-post rack by moving the factory-installed brackets to the center of the device
- Mount the device in a four-post rack or cabinet using the Cabinet Mount Kit. Refer to [“Mounting in a 4-post rack or cabinet”](#) on page 29.

---

**NOTE**

Because of the weight of a fully loaded PowerConnect B-MLXe-4 router, Dell recommends mounting it in a rack before installing the modules and AC power supplies.

---

You can install up to eight PowerConnect B-MLXe-4 routers in a standard 19-inch (EIA310-D) two-post rack using the factory-installed mounting brackets for either front- or mid-mounts.

If you use the air duct rack mount method, you can install up to six PowerConnect B-MLXe-4 routers in a cabinet or four-post rack using the cabinet mounting kit.

**Mounting your device in a standard rack**

The factory-installed mounting brackets allow you to front-mount or mid-mount your device in the rack. For a mid-mount, you must remove the factory installed brackets from the front edge of the device and install them using the holes in the center-sides of the device. Refer to [Figure 16](#).

You will need to provide four standard #12-24 pan-head screws (per router) to secure routers in the rack. You will also need a #2 Phillips screwdriver. Complete the following steps.

---

**NOTE**

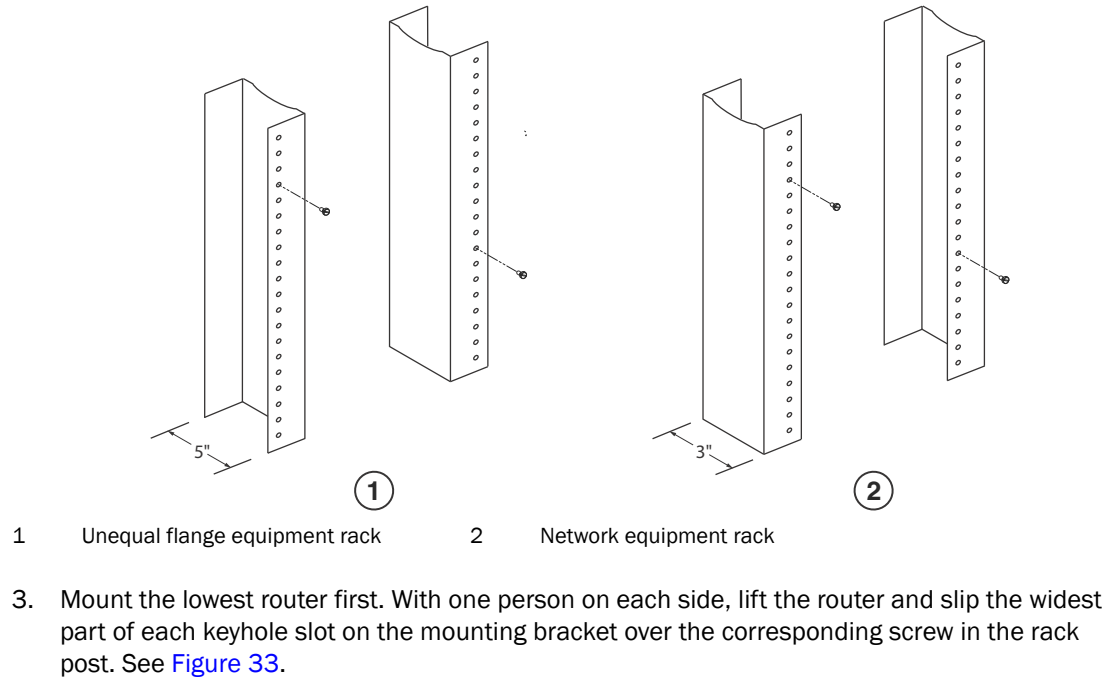
When connecting the device to the rack frame, use thread-forming screws and paint-piercing washers.

---

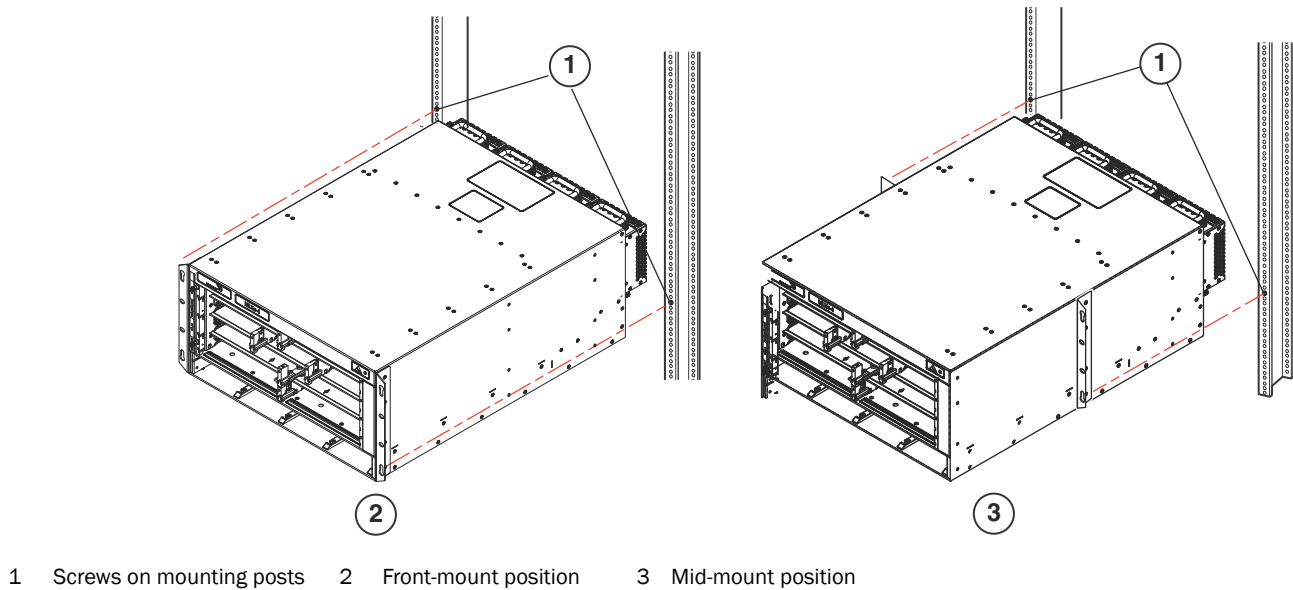
1. Determine the position of each router in the rack according to the weight of the router. For example, mount the router with the fewest modules near the top of the rack, a router with more modules near the middle of the rack, and fully populated routers near the bottom of the rack.
2. Using the keyhole slots in the router mounting brackets as a guide, align one screw per rack post, as shown in [Figure 33](#). On one side of the rack, the screw should align with the top hole in the mounting bracket. On the other side of the rack, the screw should align with the bottom hole of the mounting bracket. When tightening these screws, leave approximately 1/4 inch of clearance between the back of the screw head and the rack post.

## 2 Installing a PowerConnect B-MLXe-4 router

**FIGURE 15** Positioning the mounting screws in rack posts



**FIGURE 16** Mounting the router in a rack



4. Slide the router down so that the mounting screw heads are in the narrowest part of the keyhole slots.
5. Tighten the screws to secure the router in place. For extra support, use additional screws.

---

**NOTE**

For better grounding of the router to the rack, attach the router using nuts. You should also use star washers with any single-hole grounding lugs to keep the lugs from rotating.

---

6. Repeat step 2 through step 5 to mount each router in the rack, moving from lowest to highest.

### ***Mounting in a 4-post rack or cabinet***

You can also install your device in a 4-post rack or cabinet, using a Cabinet Rack Mount Kit, which must be ordered separately (part number F899W). This kit includes the following hardware:

- Cabinet Mount Kit contents:
  - Front mounting brackets (2)
  - Side mounting plates (2)
  - Rear brackets (4)
  - Telescoping rack mount shelf
  - Side duct assembly
  - Top rails - 2 for use in 29-31" rack and 2 for use in 27-29" rack
  - 18 6-32 flat head screws
  - 12 10-32 screws
  - 12 10-32 Slip and Caged Nuts.

To order the Cabinet Rack Mount Kit, contact Dell.

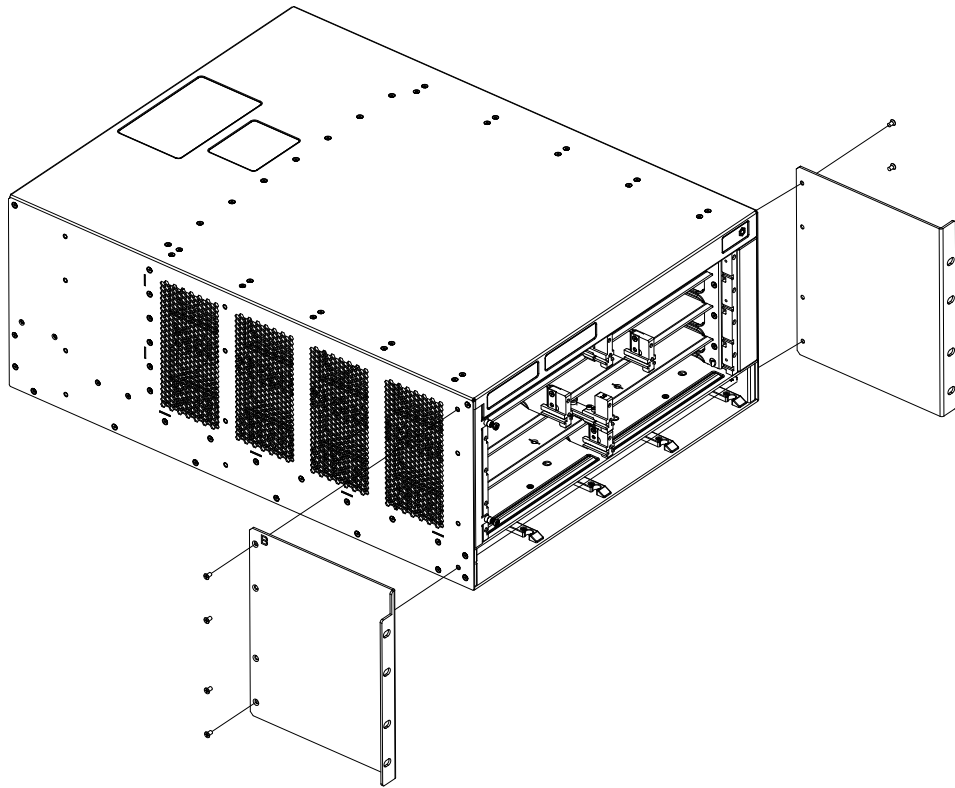
### **Cabinet rack mounting steps**

Follow these steps to mount each PowerConnect B-MLXe-4 router in a rack using the cabinet mounting kit, starting with the lowest device first.

1. Determine the position of each router in the rack according to the weight of the router. For example, mount the router with the fewest modules near the top of the rack, the router with more modules near the middle of the rack, and a fully populated router near the bottom of the rack.
2. Remove the factory-installed mounting brackets from the chassis.
3. Attach the front mounting brackets to the chassis using 8 6-32 flat head screws. Refer to [Figure 17](#).

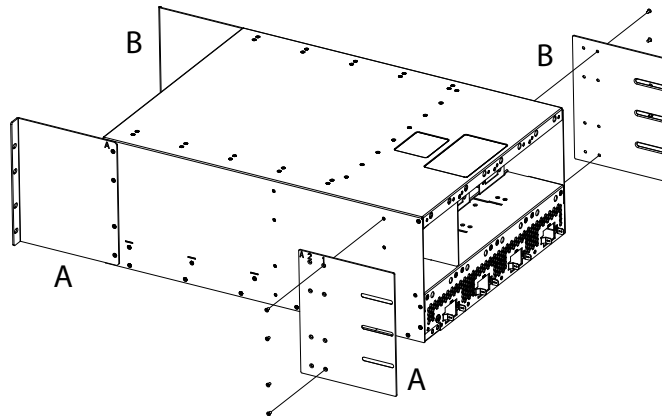
## 2 Installing a PowerConnect B-MLXe-4 router

**FIGURE 17** Attach front mounting brackets to the chassis

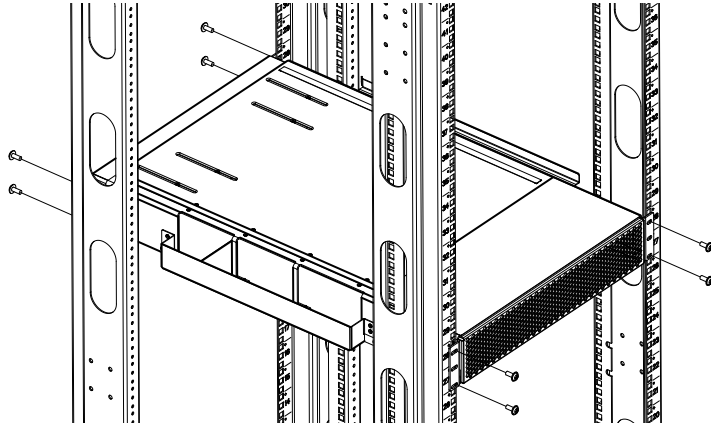


4. Attach the side plates to the rear of the chassis. Refer to [Figure 18](#).

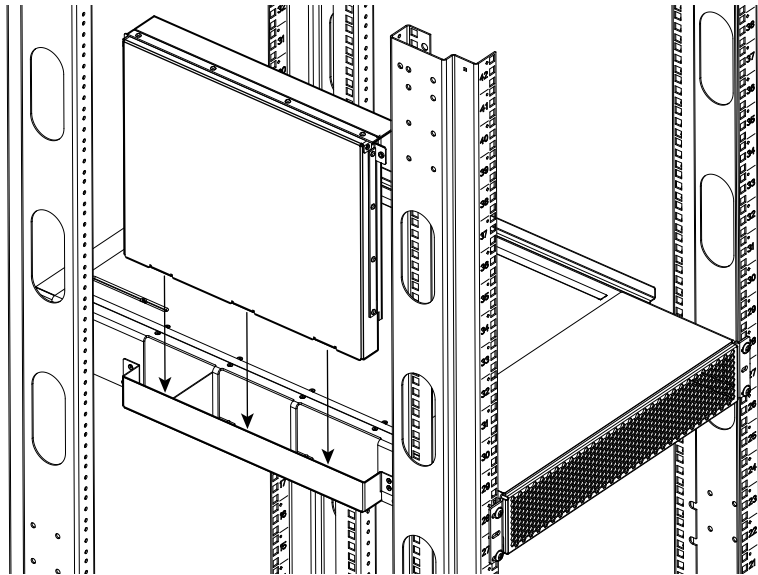
**FIGURE 18** Attach the side plates to the rear of the chassis



5. Install the mounting shelf to the rack rails. Refer to [Figure 19](#).

**FIGURE 19** Install the mounting shelf in the rack

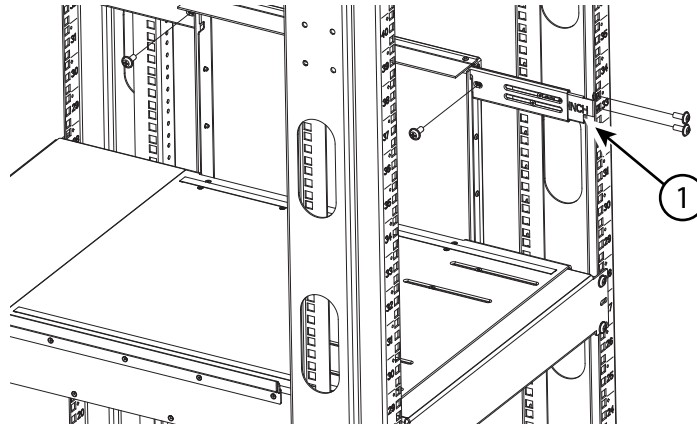
6. Install the side ducts to the mounting shelf. Refer to [Figure 20](#). Facing the port side of the router, the side ducts will be on one left side of router.

**FIGURE 20** Install side air ducts to the mounting shelf

7. Install the top rails to the rack. Refer to [Figure 21](#).

## 2 Installing a PowerConnect B-MLXe-4 router

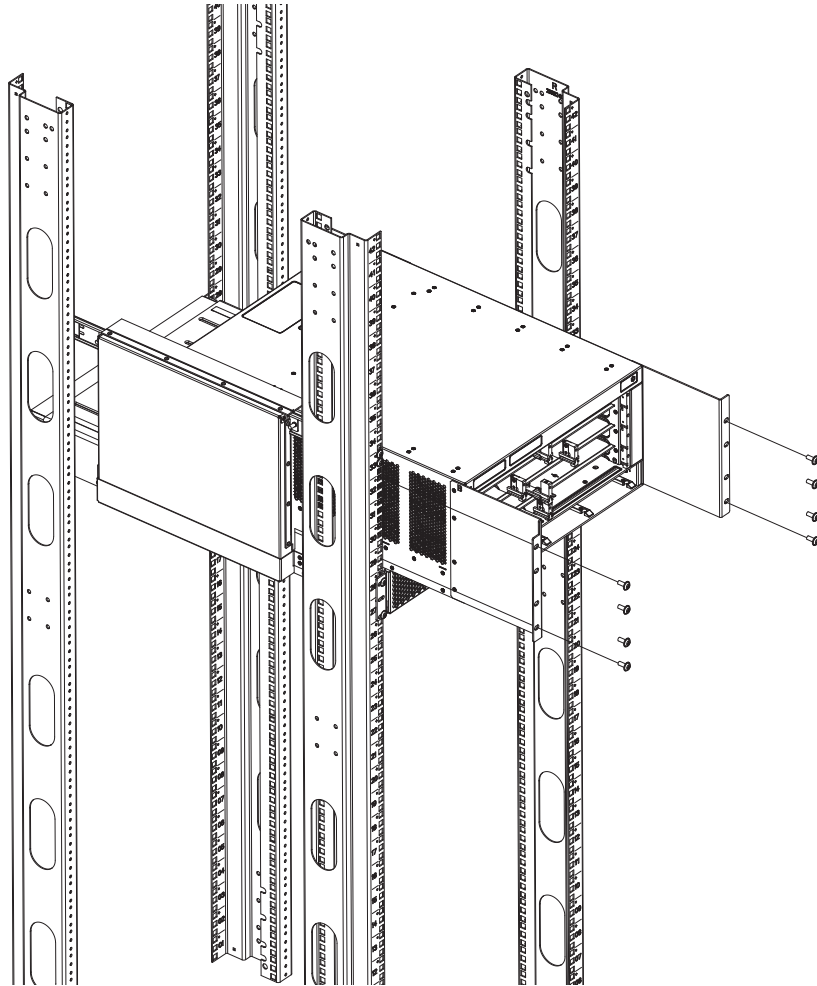
**FIGURE 21** Install top rails to the rack



8. Install the device in the rack. The device slides into the rack on top of the mounting shelf. Secure the device to the rack rails using 10-32 screws. Refer to [Figure 22](#).



FIGURE 22 Mounting the router in a rack



9. Install the rear brackets to the rack and to the chassis side plates. Refer to [Figure 23](#).

---

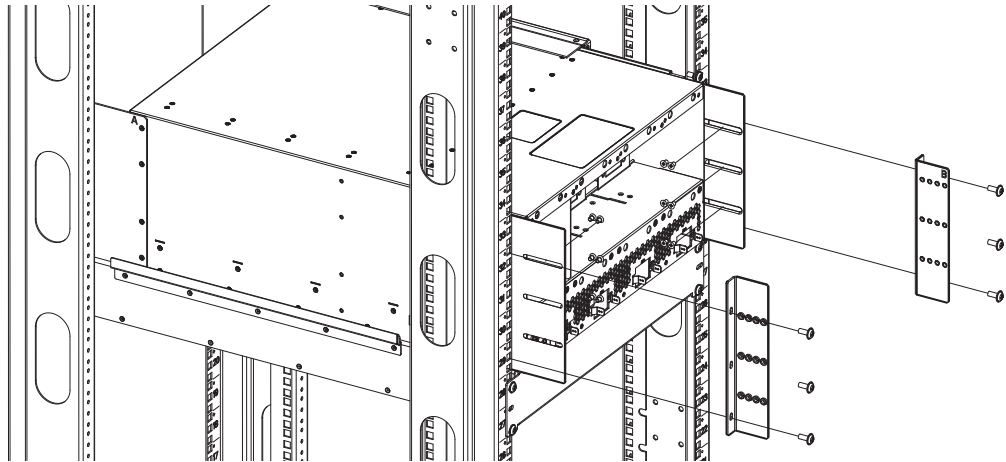
**NOTE**

Rear brackets are required for NEBS-compliant installations.

---

## 2 Installing a PowerConnect B-MLXe-4 router

**FIGURE 23** Install the rear brackets to the rack and chassis side plates



Repeat steps 2 through 8 to install each router in the rack, moving from lowest to highest.

### Installing PowerConnect B-MLXe-4 modules

The sequence for installing multiple modules is important to ensure proper fit. The recommended sequence for the PowerConnect B-MLXe-4 router is to install right-to-left, beginning with the lowest row and moving up.

---

#### NOTE

Installation procedures are identical for interface, management and switch fabric modules.

---



#### DANGER

*The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment or subassembly MUST NOT be metalically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.*

---

#### NOTE

PowerConnect B-MLXe modules are dedicated, which means that you must install them in PowerConnect B-MLXe routers only. If you install a PowerConnect B-MLXe module in a non-PowerConnect B-MLXe router, or install a module intended for a non-PowerConnect B-MLXe router in a PowerConnect B-MLXe router, the router and module will not function properly.

---

For information about how to disable and re-enable power to interface modules, see [“Disabling and re-enabling power to interface modules”](#) on page 99

[Table 13](#) identifies the router slot numbers where the modules must be installed. An identifying label can be seen at the base of each slot.

**NOTE**

The PowerConnect B-MLXe-4 router ships with the required switch fabric modules installed.

**TABLE 13 PowerConnect B-MLXe-4 module installation**

module	slot number
Management modules	Active module – M1 (left). Redundant module – M2 (right).
Interface modules	1 – 4
Switch fabric modules	SF1 – SF3

**CAUTION**

If you do not install a module in a slot, you must leave the slot blank installed in the slot. If you run the router with an uncovered slot, the system may overheat.

**NOTE**

If you are installing a redundant management module, see the chapter titled “Using a Redundant Management Module” in the *Brocade NetIron Configuration Guide* for information about how the redundant module works, optional software configurations, and how to manage redundancy.

Before installing modules, have the following items available:

- A large flat-blade screwdriver.
- An ESD wrist strap with a plug for connection to the ESD connector on the router chassis.

**DANGER**

*For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.*

**NOTE**

Installation instructions are identical for interface, management, and switch fabric modules.

You can install modules while the router is powered on and running.

Before installing a new interface module, you will need to remove the slot blank from the module slot. You should also have the following items available:

- A 1/4 inch #8 flat-blade screwdriver, or a #2 Phillips screwdriver
- A new interface module, which you can order from Dell
- An ESD wrist strap with a plug for connection to the ESD connector on the PowerConnect B-MLXe router.

**DANGER**

*For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.*

## 2 Installing a PowerConnect B-MLXe-4 router

The PowerConnect B-MLXe-4 router ships with slot blanks installed in all empty module slots. The slot blanks help ensure proper airflow inside the router. You must remove the slot blank to install a module into a slot.



### CAUTION

**If you do not install a module in a slot, you must keep the slot blank in place. If you operate the router with an uncovered slot, the system may overheat. Tighten the screws that secure the slot blanks so that they remain in place when removing adjacent panels or modules.**

Although the slot blanks differ in size, the procedure for removing them is identical. You will need a flat-blade screwdriver to remove slot blanks.

### Slot blank removal steps

Follow these steps to remove a slot blank.

1. Loosen the screws on either end of the slot blank by hand or with a flat-blade screwdriver.
2. Pull the slot blank out of the router, and store it in a safe place for future use.



### CAUTION

**If you are hot-swapping a module, allow a minimum of two seconds after a module (or power supply or fan tray) has been removed before inserting a module in the same slot.**

### Module installation steps

Follow these steps to install a module.

1. If you are installing a module in a slot which may have been configured for a different module type, remove the old configuration information by following these steps.

- a. Use the **show running-config** command in config mode to determine the current configuration of the slot.

```
PowerConnect(config)# show running-config
Current configuration:
!
ver V5.1.0aT163
module 1 ni-mlx-24-port-1g-copper
!
```

This example shows that slot 1 has already been configured for a 24-port 1 Gbps copper interface module.

- b. Enter the **no module <slot-number> <module-type>** command to remove the configuration from slot 1, using the information shown as a result of the **show running-config** command.

```
PowerConnect(config)# no module 1 ni-mlx-24-port-1g-copper
```

This example removes the existing configuration from slot 1, leaving it ready for a new module.

2. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector on the front of the chassis.
3. Remove the module from the packaging.

4. Insert the module into the router slot, and slide the card along the card guide until the ejectors on either side of the module move close to the module front panel. Refer to [Figure 24](#).

---

**NOTE**

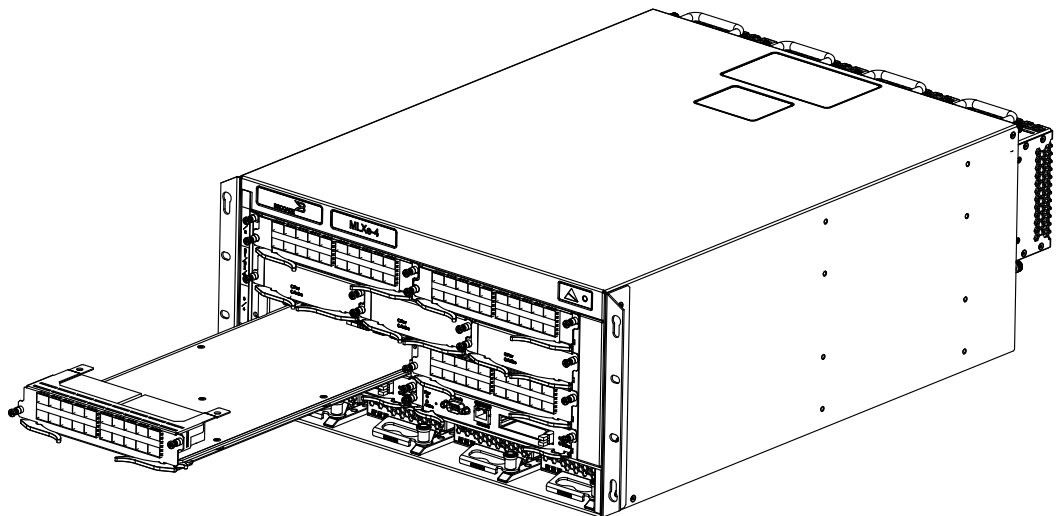
When inserting the module into the router, be sure that the faceplate does not overlap the faceplate of an adjacent module.

---

5. Rotate the ejectors until they are flush with the module front panel. This action will fully seat the module in the backplane.
6. Tighten the screws at each end of the module faceplate by pushing them in and turning them clockwise. Complete the tightening process using the flat-blade screwdriver.
7. Enter the **write memory** command to ensure that the slot will be correctly configured for the new module after a reboot.

```
PowerConnect(config)# write memory
Write startup-config done.
```

**FIGURE 24** Installing a module



### ***NI-MLX-1Gx48-T-A interface module power supply requirements***

A single 1200W power supply will support up to three NI-MLX-1Gx48-T-A modules, with other modules filling the remaining slots. You can equip your router for 1+2 power redundancy by installing up to two additional power supplies.

If you install four NI-MLX-1Gx48-T-A modules in your router, you will need a minimum of two power supplies. You can equip your router for 2+1 power redundancy by installing one additional power supply.

### ***NI-MLX-8x10-M interface module power supply, switch fabric, and fan requirements***

A single 1200W power supply will support up to three NI-MLX-8x10-M modules, with other modules filling the remaining slots. You can equip your router for 1+2 power redundancy by installing up to two additional power supplies.

If you install four NI-MLX-8x10-M modules in your router, you will need a minimum of two power supplies. You can equip your router for 2+1 power redundancy by installing one additional power supply.

### **Installing power supplies in a PowerConnect B-MLXe-4 router**

The PowerConnect B-MLXe-4 router ships with one power supply, but can accommodate up to three AC power supplies (one required and two redundant). To equip your router for redundancy, you will need to purchase one or two additional power supplies.

#### **Power supply installation steps**

Follow these steps to install a power supply.

1. Remove the power supply slot blank and store it for future use.
2. Remove the power supply from the packaging.
3. Insert the power supply into the slot and slide it along the guides on each side of the slot. Refer to [Figure 25](#).

---

#### **NOTE**

Empty power supply slots must be covered with slot blanks.

---

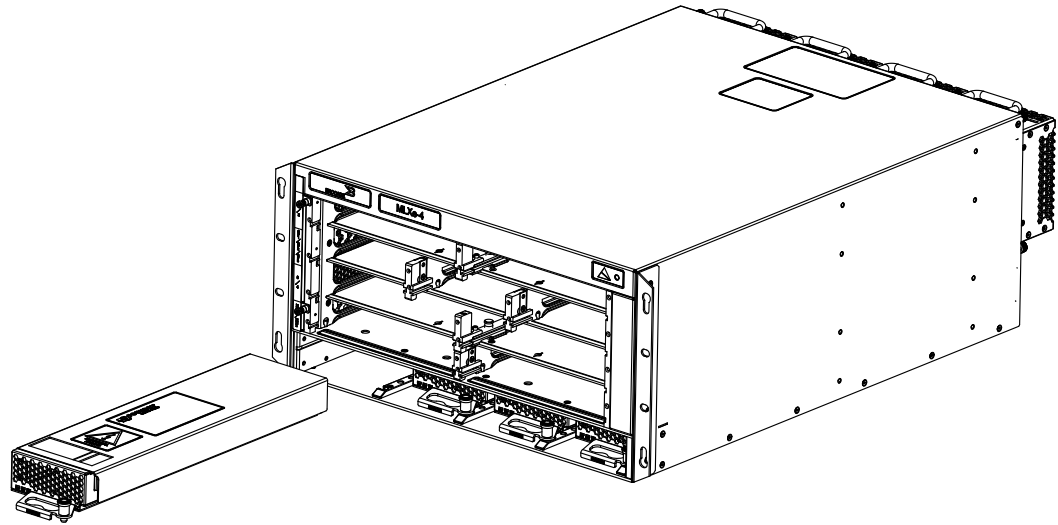


#### **CAUTION**

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

---

FIGURE 25 Installing a power supply



4. Push the power supply front panel into the router until it engages the backplane connector.
5. Ensure captive pin is engaged.

For information about connecting power to the router, refer to [“Connecting AC power”](#) on page 39.

## Connecting AC power

AC power is supplied through a power cord connected to the AC power supply installed in the router.

---

### NOTE

For the NEBS-compliant installation, AC power connections must use a surge protection device (SPD) to protect the AC power supplies from damage due to excessive power line surges.

---

### AC power connection steps

Follow these steps to connect the AC power cord.

1. Locate the power receptacle on the rear side of the chassis.
2. Lift the cord retainer and connect an AC power cord to the power supply.
3. Snap the cord retainer over the power plug to hold it in place.



### DANGER

*If the installation requires a different power cord than the one supplied with the router, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the router.*

---

For information about powering on the system, refer to [“Activating the power source”](#) on page 69.

### Final steps

Complete these steps in the order listed:

- [“Attaching a management station”](#)
- [“Activating the power source”](#)
- [“Verifying proper operation”](#)

## Installing a PowerConnect B-MLXe-8 router

This section describes how to install a PowerConnect B-MLXe-8 router.

---

### NOTE

Illustrations in this chapter may differ slightly from the actual equipment.

---

### Preparing the installation site

Before installing the router, plan the location and orientation relative to other devices and equipment. For cooling purposes, allow a minimum of six inches of space between the sides, front, and the back of the router and walls or other obstructions. If a router is installed in a perforated enclosure, the perforations must cover at least 60 percent of the surface.

---

### NOTE

This equipment is suitable for installation in a Network Telecommunication facility and where NEC requirements apply. Additionally, it may be installed in either a Common Bonding Network (CBN) or Isolated Bonding Network (IBN). It is not intended for Outside Plant (OSP) installations.

---

Ensure that the proper cabling is installed at the site.

For information on cabling, refer to [“Installing power supplies in the PowerConnect B-MLXe-8 router”](#) on page 51, [“Attaching a management station”](#) on page 68, and [“Connecting the router to a network device”](#) on page 95.

### Unpacking a PowerConnect B-MLXe-8 router

The PowerConnect B-MLXe-8 router ships with the following items:

- Switch fabric modules installed in slots marked SF, and slot blanks installed in all empty module slots.
- Two AC power supplies
- Insertion or extraction tool for use with RJ45 and fiber-optic connectors.

Save the shipping carton and packing materials in case you need to move or ship the router at a later time.

### *Lifting guidelines for PowerConnect B-MLXe-8 routers*

Follow these guidelines for lifting and moving PowerConnect B-MLXe-8 routers:

- Before lifting or moving the router, disconnect all external cables.



- Do not attempt to lift a fully configured router by yourself.
- It is recommended that you install router components after you have installed the router in a rack.

## Installing a PowerConnect B-MLXe-8 router in a rack

Because of the weight of a fully loaded PowerConnect B-MLXe-8 router, Dell recommends mounting it in a rack before installing the modules and AC power supplies.

You can install up to six PowerConnect B-MLXe-8 routers in a standard 19-inch (EIA310-D) rack using the standard rack installation method. If you use the cabinet mounting kit, you can install up to 4 PowerConnect B-MLXe-8 routers in a standard 19-inch rack.

### *Front- or mid-mount your device in a standard rack*

Your PowerConnect B-MLXe-8 router ships from the factory with mounting brackets attached for front-mount installation in a standard rack. You can also use these brackets for a mid-mount installation by simply removing the brackets from the front edges of the device and re-attaching them in the center sides of the device using the pre-drilled holes. Refer to [Figure 27](#).

You will need to provide four standard #12-24 pan-head screws (per router) and a #2 Phillips screwdriver to secure routers in the rack.

---

#### **NOTE**

When connecting the device to the rack frame, use thread-forming screws and paint-piercing washers.

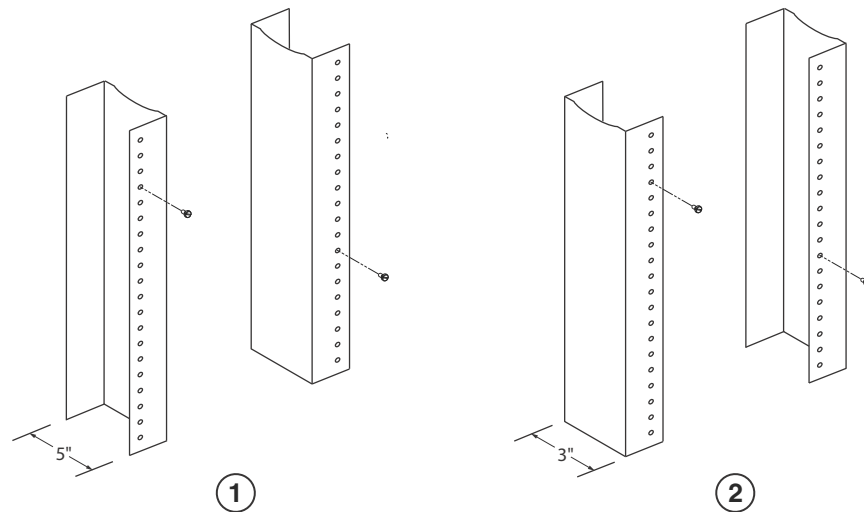
---

Follow these steps to mount your device in a standard rack in either a front- or mid-mount configuration.

1. Determine the position of each router in the rack according to weight. For example, mount the router with the fewest modules near the top of the rack, the router with more modules near the middle of the rack, and a fully populated router near the bottom of the rack.
2. Using the keyhole slots in the router mounting brackets as a guide, align one screw per rack post, as shown in [Figure 26](#). On one side of the rack, the screw should align with the top hole in the mounting bracket. On the other side of the rack, the screw should align with the bottom hole of the mounting bracket. When tightening these screws, leave approximately 1/4 inch of clearance between the back of the screw head and the rack post.

## 2 Installing a PowerConnect B-MLXe-8 router

**FIGURE 26** Positioning the mounting screws in rack posts

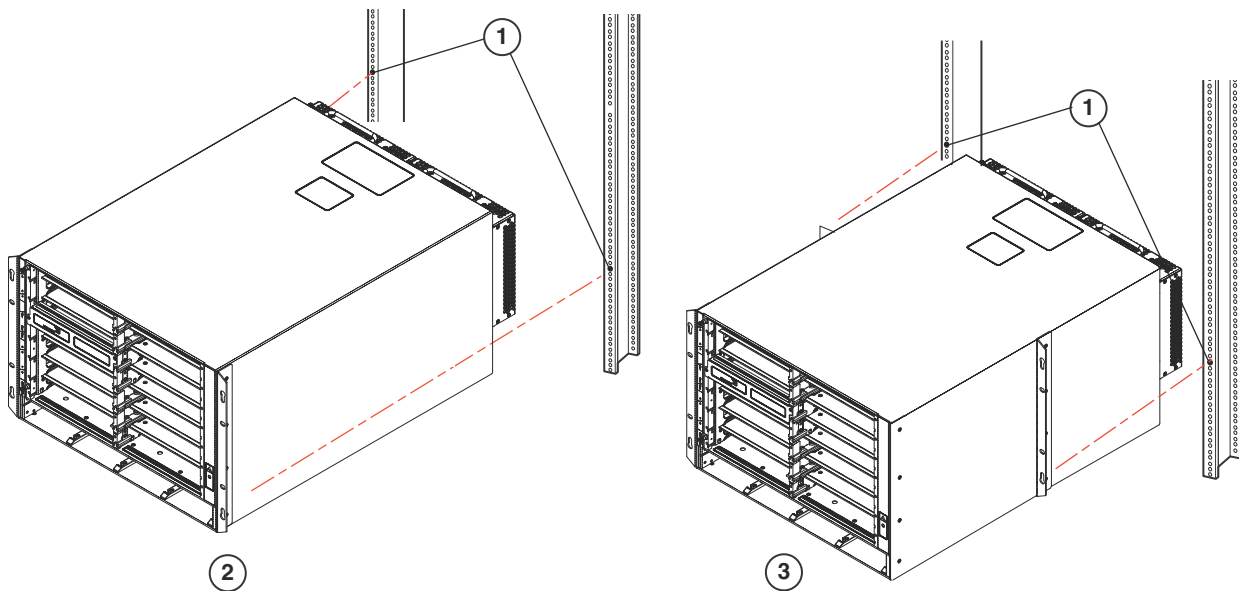


1 Unequal flange equipment rack

2 Network equipment rack

3. Mount the lowest router first. With one person on each side, lift the router and slip the widest part of each keyhole slot on the mounting bracket over the corresponding screw in the rack post. See [Figure 27](#).

**FIGURE 27** Mounting the router in a rack



1 Screws in mounting posts

2 Front-mount position installation

3 Mid-mount installation

4. Slide the router down so that the mounting screw heads are in the narrowest part of the keyhole slots.
5. Tighten the screws to secure the router in place. For extra support, use additional screws.

---

**NOTE**

For better grounding of the router to the rack, attach the router using star washers. You should also use star washers with any single-hole grounding lugs to keep the lugs from rotating.

---

Repeat step 2 through step 5 to mount each router in the rack, moving from lowest to highest.

## Mounting your device in a cabinet

You can also install your device in a 4-post rack or cabinet, using a Cabinet Rack Mount Kit, which must be ordered separately (part number VW8MK). This kit includes the following hardware:

- Cabinet Mount Kit contents:
  - Front mounting brackets (2)
  - Side mounting plates (2)
  - Rear brackets (4)
  - Telescoping rack mount shelf
  - Side duct assembly
  - Top rails - 2 for use in 29-31" rack and 2 for use in 27-29" rack
  - 18 6-32 flat head screws
  - 12 10-32 screws
  - 12 10-32 slip and caged nuts

To order the Cabinet Rack Mount Kit, contact Dell.

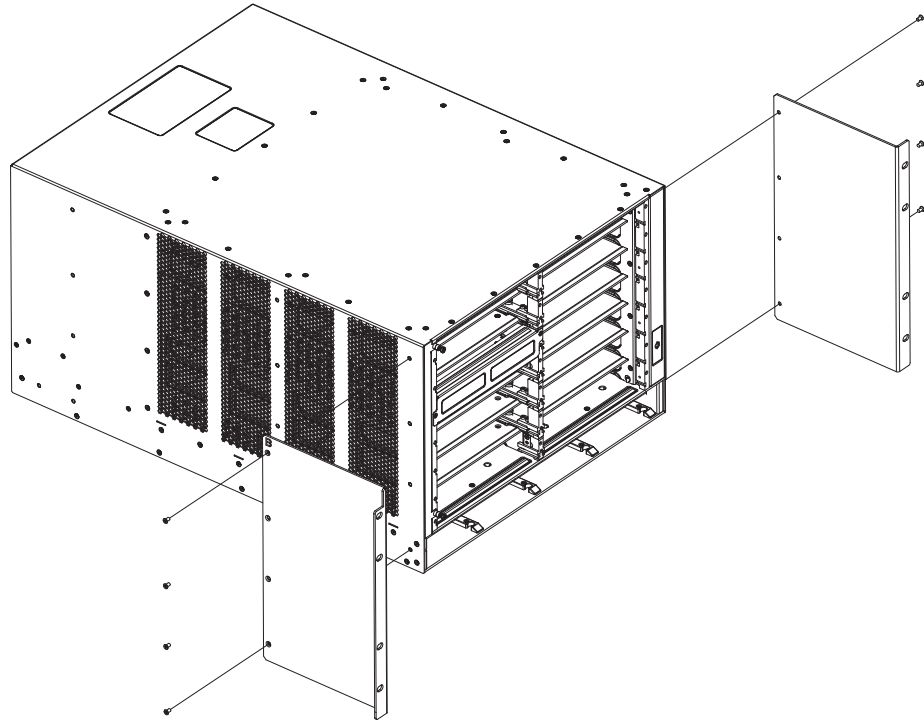
### Cabinet rack mounting steps

Follow these steps to mount each PowerConnect B-MLXe-8 router in a rack using the Cabinet Rack Mount Kit, starting with the lowest device first.

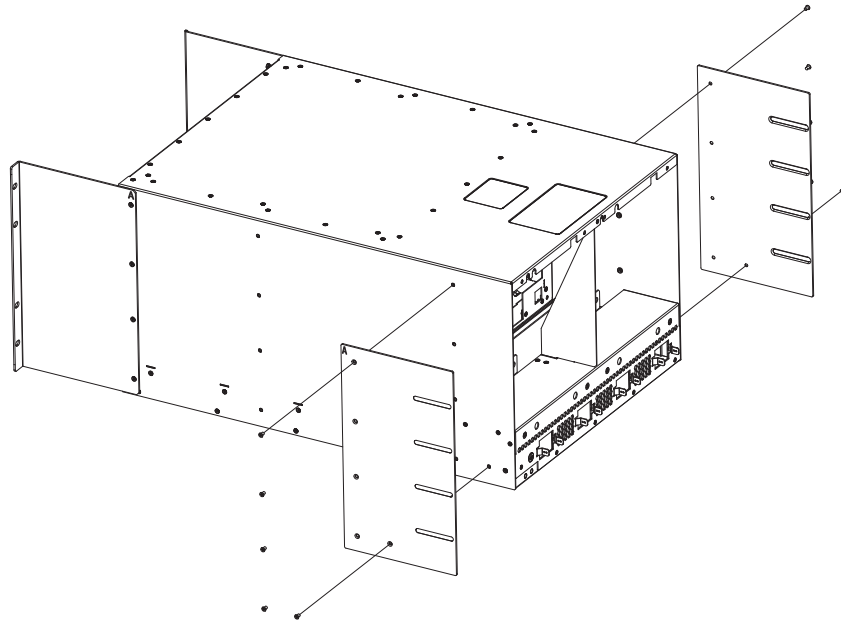
1. Determine the position of each router in the rack according to the weight of the router. For example, mount the router with the fewest modules near the top of the rack, the router with more modules near the middle of the rack, and a fully populated router near the bottom of the rack.
2. Remove the factory-installed mounting brackets from the chassis.
3. Attach the kit front mounting brackets to the chassis using 8 6-32 flat head screws. Refer to [Figure 17](#).

## 2 Installing a PowerConnect B-MLXe-8 router

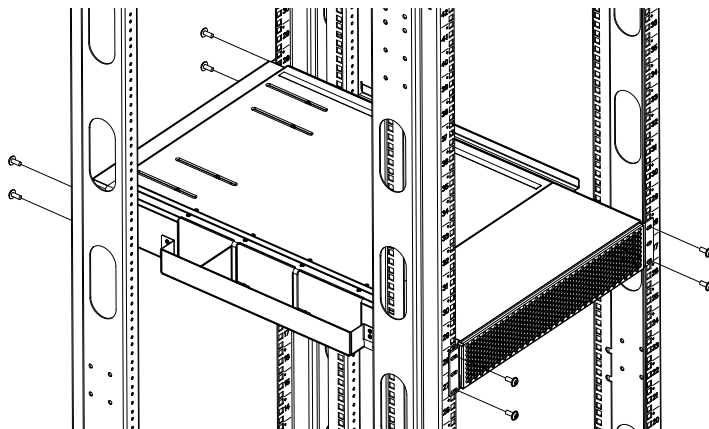
**FIGURE 28** Attach front mounting brackets to the chassis



4. Attach the side plates to the rear of the chassis. Refer to [Figure 29](#).

**FIGURE 29** Attach the side plates to the rear of the chassis

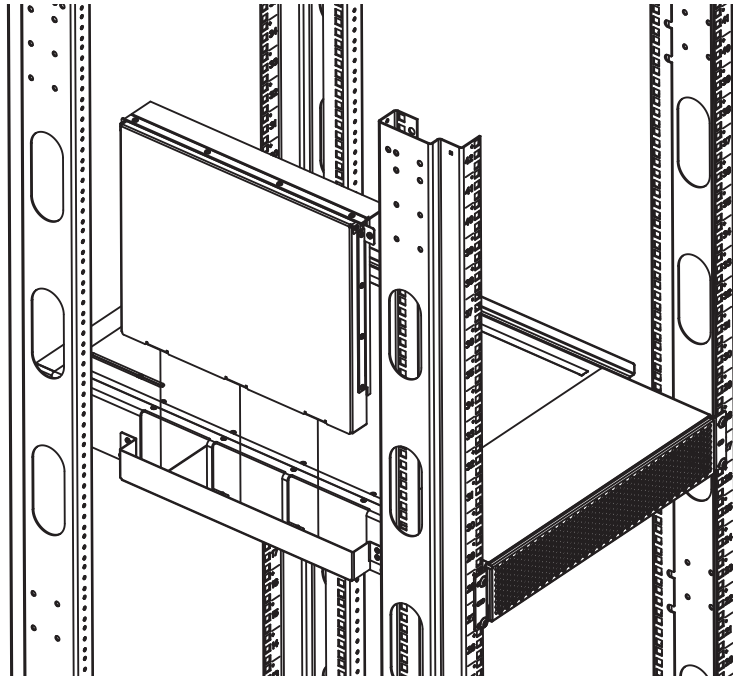
5. Install the mounting shelf to the rack rails. Refer to [Figure 30](#).

**FIGURE 30** Install the mounting shelf in the rack

6. Install the side ducts to the mounting shelf. Refer to [Figure 31](#). Facing the port side of the router, the side ducts will be on the left side of the router.

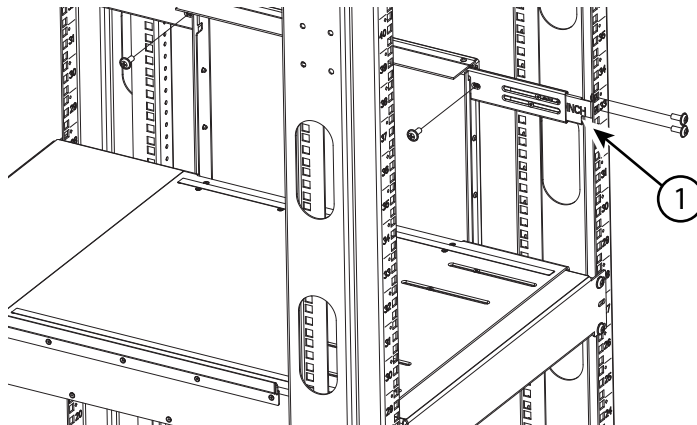
## 2 Installing a PowerConnect B-MLXe-8 router

**FIGURE 31** Install side air ducts to the mounting shelf

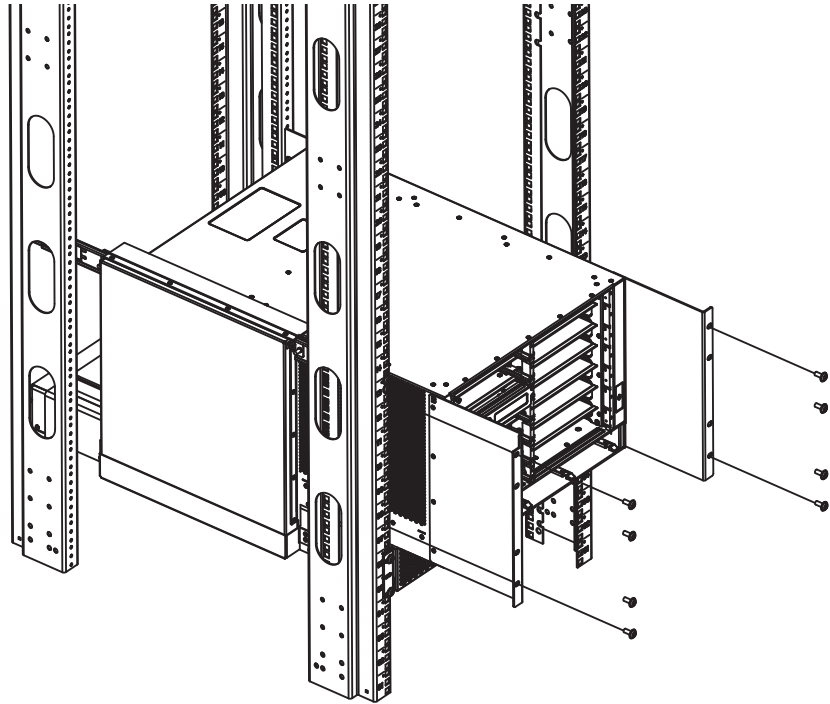


7. Install the top rails to the rack. Refer to [Figure 32](#).

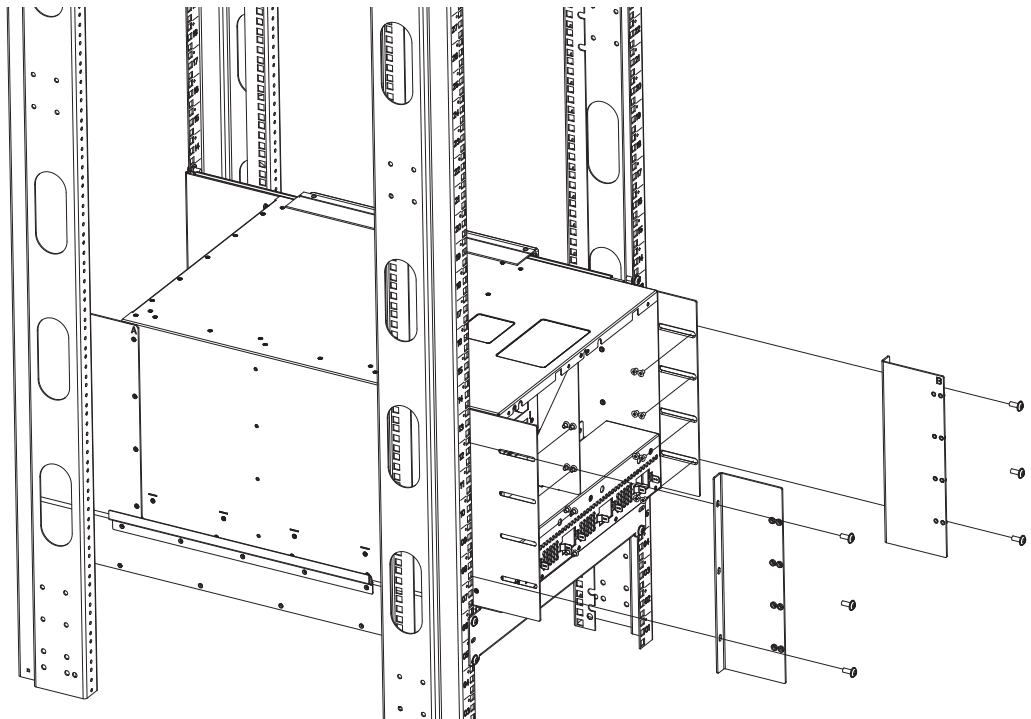
**FIGURE 32** Install top rails to the rack



8. Install the device in the rack. The device slides into the rack on top of the mounting shelf. Secure the device to the rack rails using 10-32 screws. Refer to [Figure 33](#).

**FIGURE 33** Mounting the router in the cabinet

9. Install the rear brackets to the rack and to the chassis side plates. Refer to [Figure 34](#)

**FIGURE 34** Install the rear brackets to the rack and chassis side plates

Repeat steps 2 through 8 to install each router in the rack, moving from lowest to highest.

## Installing PowerConnect B-MLXe-8 modules

The sequence for installing multiple modules is important to ensure proper fit. The recommended sequence for the PowerConnect B-MLXe-8 router is to install right-to-left, beginning with the lowest row and moving up.

---

### NOTE

installation instructions are identical for interface, management, and switch fabric modules.

---



### DANGER

*The intra-building ports of the equipment or subassembly are suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.*

---

### NOTE

PowerConnect B-MLXe modules are dedicated, which means that you must install them in the PowerConnect B-MLXe router only. If you try to install a PowerConnect B-MLXe module in a non-PowerConnect B-MLXe router, or install a module intended for a non-PowerConnect B-MLXe router in a PowerConnect B-MLXe router, the router and module will not function properly.

---

[Table 14](#) identifies the router slot numbers where the modules must be installed. An identifying label can be seen at the base of each slot.

For information about how to disable and re-enable power to interface modules, see [“Disabling and re-enabling power to interface modules”](#) on page 99

---

### NOTE

The PowerConnect B-MLXe-8 router ships with the required switch fabric modules installed.

---

**TABLE 14** PowerConnect B-MLXe-8 module slot designations

Module	Slot number
Management modules	Active module – M1 (left). Redundant module – M2 (right).
Interface modules	1 – 8
Switch fabric modules	SF1 – SF3



### CAUTION

If you do not install a module in a slot, you must leave the slot blank installed in the slot. If you run the router with an uncovered slot, the system may overheat.

---



---

**NOTE**

If you are installing a redundant management module, refer to the chapter titled “Using a Redundant Management Module” in the *PowerConnect B-MLXe Configuration Guide* for information about how the redundant module works, optional software configurations, and how to manage redundancy.

---

Before installing a module in the PowerConnect B-MLXe-8 router, have the following items available:

- A large flat-blade screwdriver.
- An ESD wrist strap with a plug for connection to the ESD connector on the router.

**DANGER**

*For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.*

---

You can install modules while the router is powered on and running.

The router ships with slot blanks installed in all empty module slots. The slot blanks help ensure proper airflow inside the router. You must remove the slot blank to install a module.

**CAUTION**

**If you do not install a module in a slot, you must keep the slot blank in place. If you run the router with an uncovered slot, the system may overheat. Tighten the screws that secure the slot blanks so that they remain in place when removing adjacent panels or modules.**

---

Although the slot blanks differ in size, the procedure for removing them is identical. You will need a flat-blade screwdriver to perform this task.

**Slot blank removal steps**

Follow these steps to remove a slot blank.

1. Loosen the screws on either end of the slot blank by hand or with a flat-blade screwdriver.
2. Pull the slot blank out of the router, and store it in a safe place for future use.

**CAUTION**

**If you are hot-swapping a module, allow a minimum of two seconds after a module (or power supply or fan tray) has been removed before inserting a module in the same slot.**

---

**Module installation steps**

Follow this procedure to install a module in the router.

1. If you are installing a module in a slot which may have been configured for a different module type, remove the old configuration information by following these steps.
  - a. Use the **show running-config** command in config mode to determine the current configuration of the slot.

```
PowerConnect(config)# show running-config
Current configuration:
```

## 2 Installing a PowerConnect B-MLXe-8 router

```
!  
ver V5.1.0aT163  
module 1 ni-mlx-24-port-1g-copper  
!
```

This example shows that slot 1 has already been configured for a 24-port 1 Gbps copper interface module.

Enter the **no module** *<slot-number>* *<module-type>* command to remove the configuration from slot 1. Use the slot number and module type shown in the output from the **show running-config** command.

```
PowerConnect(config)# no module 1 ni-mlx-24-port-1g-copper
```

This example removes the configuration from slot 1, leaving it ready for a new module.

2. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector on the chassis.
3. Remove the module from the packaging.
4. Insert the module into the router slot, and slide the card along the card guide until the ejectors on either side of the module move close to the module front panel. Refer to [Figure 35](#).

---

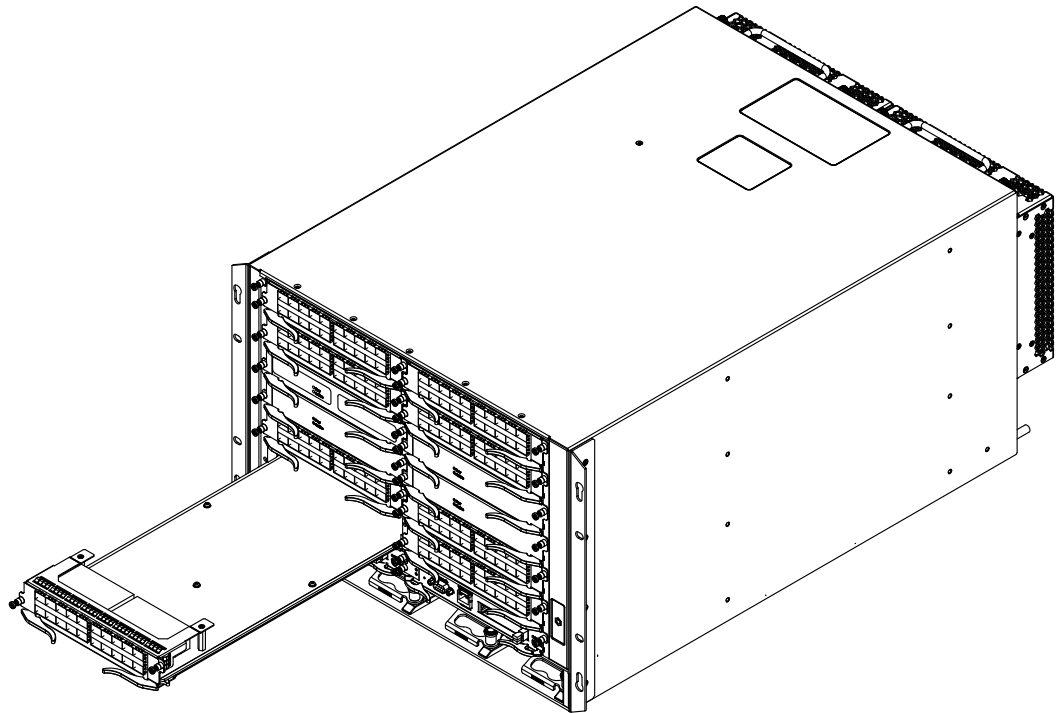
### NOTE

When inserting the module into the router, be sure that the faceplate does not overlap the faceplate of an adjacent module.

---

5. Rotate the ejectors until they are flush with the module faceplate. This action will fully seat the module in the backplane.
6. Tighten the screws at each end of the module faceplate by pushing them in and turning them clockwise. Complete the tightening process using the flat-blade screwdriver.
7. Enter the **write memory** command to ensure that the slot will be correctly configured for the new module after a reboot.

```
PowerConnect(config)# write memory  
Write startup-config done.
```

**FIGURE 35** Installing a module in a 8-slot router

8. Rotate the ejectors flush with the module faceplate to fully seat the module in the backplane. Modules have a snug fit for maximum EMI protection.
9. Tighten the two screws on each side of the module faceplate by pushing them in and turning them clockwise. Complete the tightening process using a flat-blade screwdriver.

### ***Power supply, switch fabric, and fan requirements for NI-MLX-8x10-M and NI-MLX-1Gx48-T-A interface modules***

A single 1200W power supply will support up to three NI-MLX-1Gx48-T-A or NI-MLX-8x10 interface modules, with other modules filling the remaining slots. You can equip your router for 1+2 power redundancy by installing up to two additional power supplies.

If you install four NI-MLX-1Gx48-T-A or NI-MLX-8x10-M modules in your router, you will need a minimum of two power supplies. You can equip your router for 2+1 power redundancy by installing one additional power supply.

## **Installing power supplies in the PowerConnect B-MLXe-8 router**

The PowerConnect B-MLXe-8 router ships with one power supply, but it can accommodate up to three AC power supplies (one required and two redundant). To equip your router for redundancy, you will need to purchase one or two additional power supplies.

### **Power supply installation steps**

Follow these steps to install a power supply in the PowerConnect B-MLXe-8 router.

## 2 Installing a PowerConnect B-MLXe-8 router

1. Remove the power supply slot blank.
2. Remove the power supply from the packaging.
3. Insert the power supply into the slot and slide it along the guides on each side of the slot. Refer to [Figure 36](#).

---

### NOTE

Empty power supply slots must be covered with slot blanks.

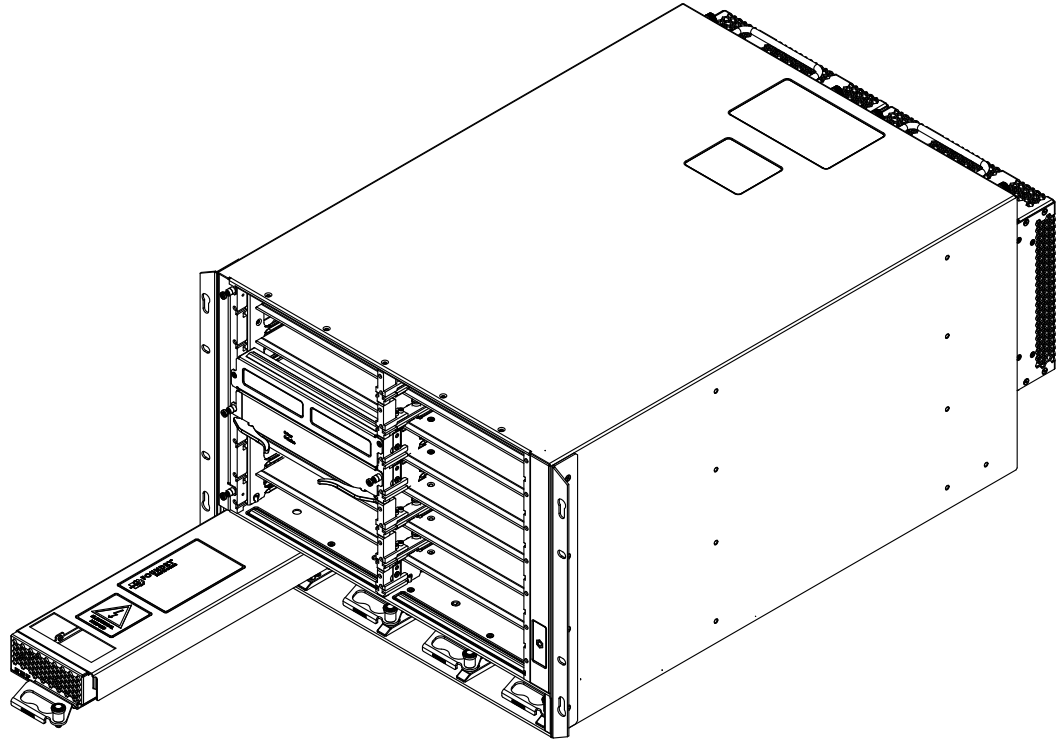
---



### CAUTION

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

FIGURE 36 Installing a power supply in a PowerConnect B-MLXe-8 router



4. Push the power supply front panel into the router until it engages the backplane connector.
5. Ensure the captive pin is engaged.

For information about connecting power to the router, refer to [“Connecting AC power”](#) on page 52.

## Connecting AC power

AC power is supplied through the power cord that is connected to the AC power supply in the router.

---

**NOTE**

For the NEBS-compliant installation, AC power connections must use a surge protection device (SPD) to protect the AC power supplies from damage due to excessive power line surges.

---

**AC power connection steps**

Follow these steps to connect the AC power cord.

1. Locate the power receptacle on the rear of the chassis.
2. Lift the cord-retainer and connect an AC power cord to the power supply.
3. Snap the cord-retainer over the power plug to hold it in place.

**DANGER**

*If the installation requires a different power cord than the one supplied with the router, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the router.*

---

For information about powering on the system, refer to [“Activating the power source”](#) on page 69.

**Final steps**

Complete these final steps in the order listed:

- [“Attaching a management station”](#)
- [“Activating the power source”](#)
- [“Verifying proper operation”](#)

## Installing a PowerConnect B-MLXe-16 router

The following sections describe how to install a PowerConnect B-MLXe-16 router.

---

**NOTE**

Illustrations in this chapter may differ slightly from the actual equipment.

---

**Preparing the installation site**

Before installing the router, plan the location and orientation relative to other devices and equipment. For cooling purposes, allow a minimum of six inches of space between the sides, front, and the back of the router and walls or other obstructions. If you are installing the router in a perforated enclosure, the perforations must cover at least 60 percent of the surface.

Ensure that the proper power and network cabling is installed at the site. For information about cabling, refer to [“Installing power supplies in a PowerConnect B-MLXe-16 router”](#) on page 66, and [“Attaching a management station”](#) on page 68.

### Unpacking a PowerConnect B-MLXe-16 router

The PowerConnect B-MLXe-16 router ships with the following items:

- Router chassis with switch fabric modules installed in the slots marked SF, and slot blanks installed in all empty module slots.
- Four AC power supplies
- Insertion or extraction tool for use with RJ45 and fiber-optic connectors.

If any of these items are missing, contact the place of purchase.

Remove your PowerConnect B-MLXe-16 router from the shipping carton. Save the shipping carton and packing materials in case you need to move or ship the router at a later time.

### *Lifting guidelines for PowerConnect B-MLXe-16 routers*



#### **DANGER**

***An unpopulated PowerConnect B-MLXe-16 router is heavy. MINIMUM OF TWO PEOPLE ARE REQUIRED WHEN LIFTING, HANDLING, OR MOUNTING THESE DEVICES.***

Follow these guidelines for lifting and moving your PowerConnect B-MLXe-16 router:

- Before lifting or moving the router, disconnect all external cables.
- Do not attempt to lift a fully configured router by yourself. Use two people to lift the router.
- It is recommended that you remove all router components before installing the router in a rack.

### Installing a PowerConnect B-MLXe-16 router in a rack



#### **DANGER**

***Make sure the rack or cabinet housing the router is adequately secured to prevent it from becoming unstable or falling over.***



#### **DANGER**

***Mount the routers you install in a rack or cabinet as low as possible. Place the heaviest router at the bottom and progressively place lighter routers above.***

You can install your router in a standard rack in either a front- or mid-mount position using the factory-installed mounting brackets. For a mid-mount configuration, simply remove the mounting brackets from the front edges of the device and re-attach them using the pre-drilled holes in the center sides of the device.

You can install up to three PowerConnect B-MLXe-16 routers in a standard 19-inch (EIA310-D) rack. It is recommended that you install your router in a rack before you install any router components. For standard rack mount steps, refer to [“Front- or mid-mount in a standard rack”](#) on page 55.

### Front- or mid-mount in a standard rack

Follow these steps to mount a PowerConnect B-MLXe-16 router in a rack.

You will need to provide standard #12-24 pan-head screws to mount each router in a rack. You will need a Phillips screwdriver to perform this task.

---

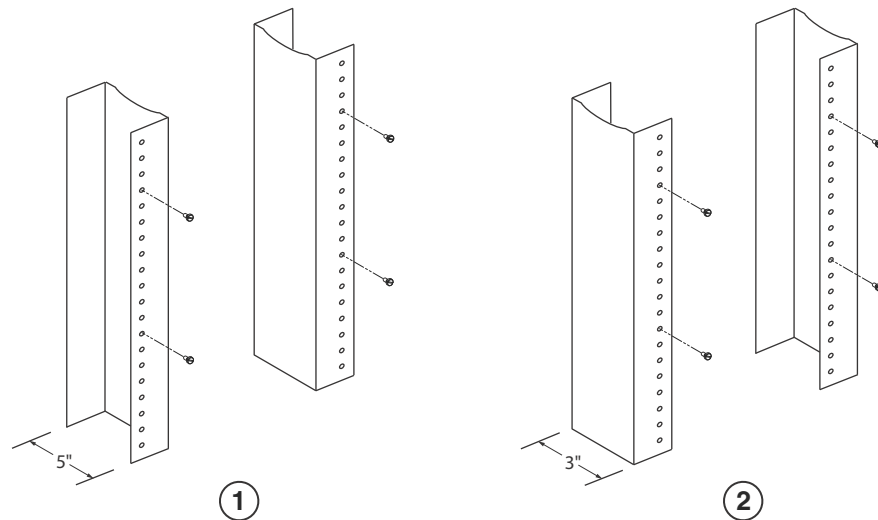
#### NOTE

When connecting the device to the rack frame, use thread-forming screws and paint-piercing washers.

---

1. Determine the position of each router in the rack. For example, place routers with the fewest modules near the top of the rack, routers with more modules near the middle of the rack, and fully populated routers near the bottom of the rack.
2. Position four mounting screws for each router using the spacing of the keyhole slots (the ones with the narrow portion pointing up) on the mounting brackets as a guide, as shown in [Figure 37](#). When tightening the mounting screws, leave approximately 1/4 inch of clearance between the back of the screw head and the rack posts.

**FIGURE 37** Positioning the mounting screws in the rack posts



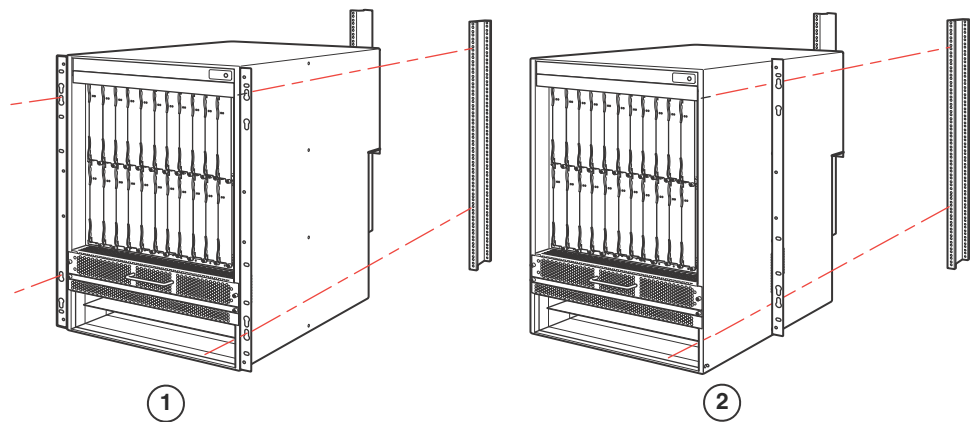
1 Unequal flange equipment rack

2 Network equipment rack

3. Starting with the router that will be in the lowest position in the rack, mount the router in the rack as shown in [Figure 38](#). With two or more people lifting the router, slip the wide portion of each keyhole slot over the corresponding mounting screw in the rack post.

## 2 Installing a PowerConnect B-MLXe-16 router

**FIGURE 38** Mounting the PowerConnect B-MLXe-16 router in a rack



1 Front-mount configuration

2 Mid-mount configuration

4. Slide the router down so that the mounting screw heads are in the narrow portion of the keyhole slots.
5. Tighten the screws to secure the router in place. For extra support, use additional screws.

---

### NOTE

For better grounding of the router to the rack, attach the router using star washers. You should also use star washers with any single-hole grounding lugs to keep the lugs from rotating.

---

### NOTE

When making the primary ground connection, use a star washer to prevent lug rotation.

---

Repeat step 2 through step 5 to mount each router in the rack.

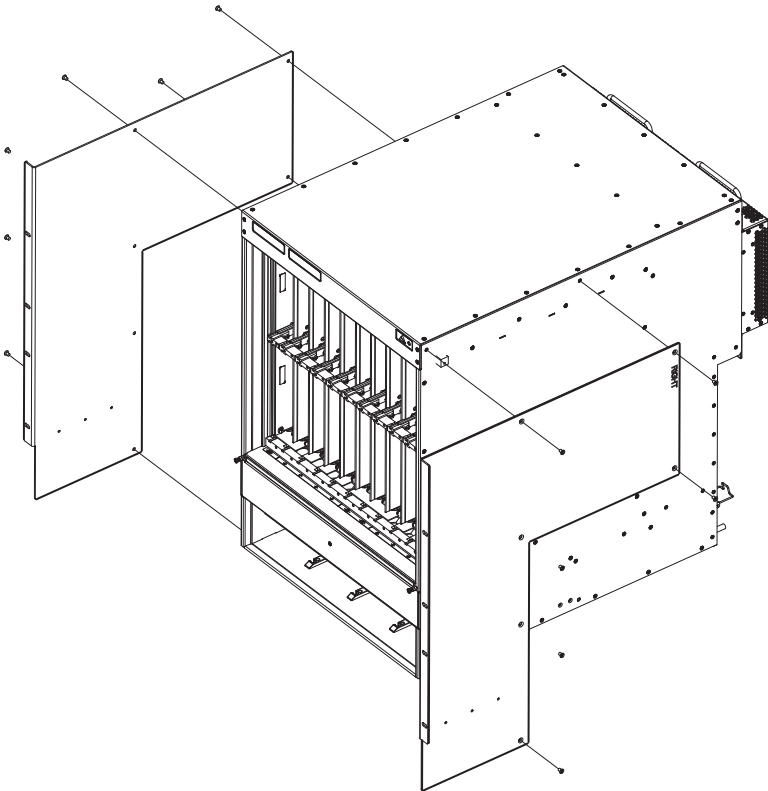
### Cabinet installation steps

You can also install your device in a 4-post rack or cabinet, using a Cabinet Rack Mount Kit, which must be ordered separately (part number 326TY). To install your router in a closed cabinet, follow these steps.

1. Remove the sides of the cabinet to allow access to the cabinet mounting posts.
2. Remove the factory-installed mounting brackets.
3. Attach the cabinet rack mounting brackets to the front of the device. Refer to [Figure 39](#).



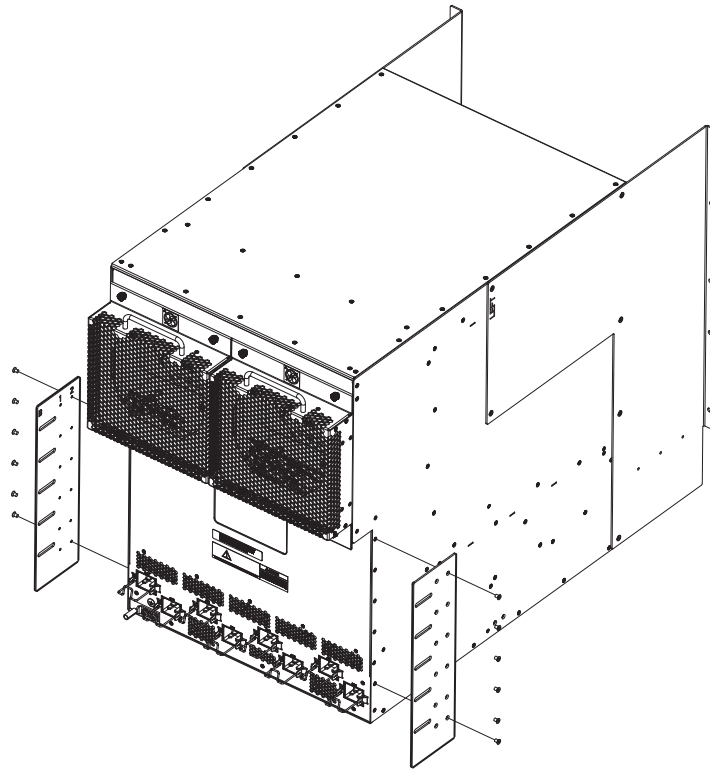
**FIGURE 39** Attach the mounting brackets to the front of the device



- 4. Attach the side plates to the device. Refer to [Figure 40](#).

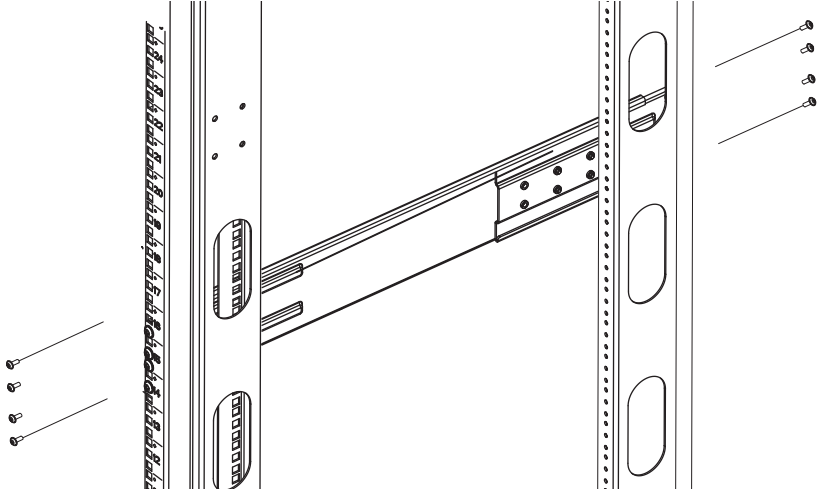
## 2 Installing a PowerConnect B-MLXe-16 router

**FIGURE 40** Attach the side plates to the device



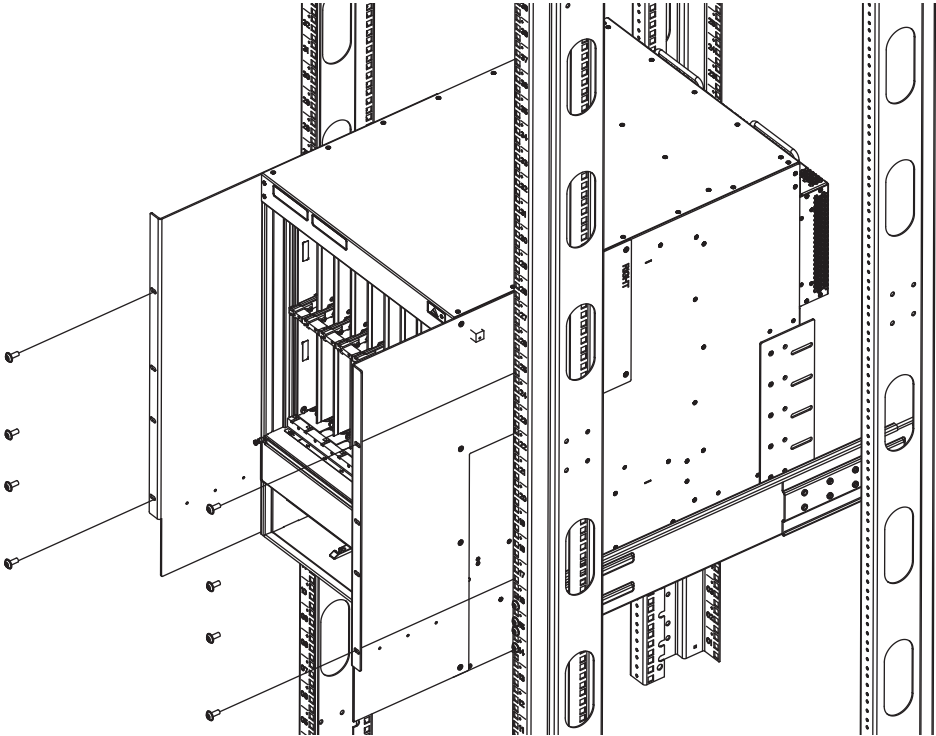
5. Attach the telescoping rails to the cabinet mounting posts. Refer to [Figure 41](#),

FIGURE 41 Attach rails to cabinet posts



6. Install the device in the cabinet. Refer to [Figure 42](#).

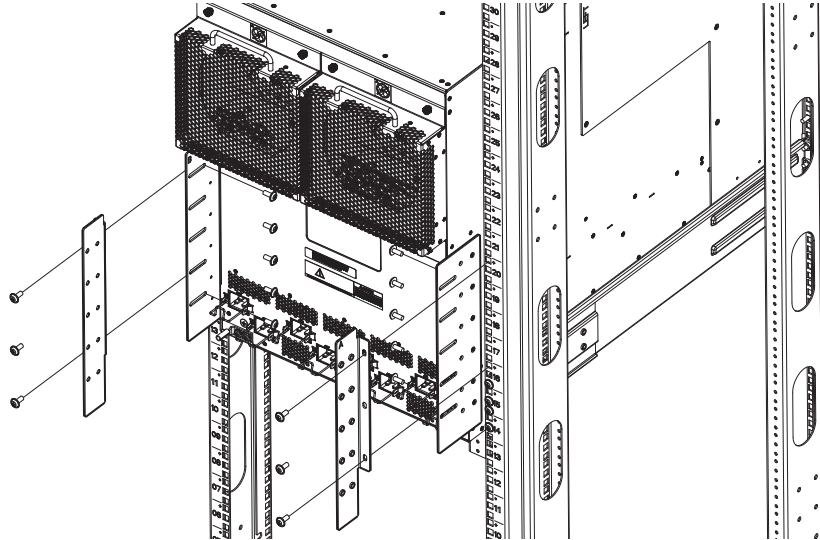
FIGURE 42 Install the device in the cabinet



## 2 Installing a PowerConnect B-MLXe-16 router

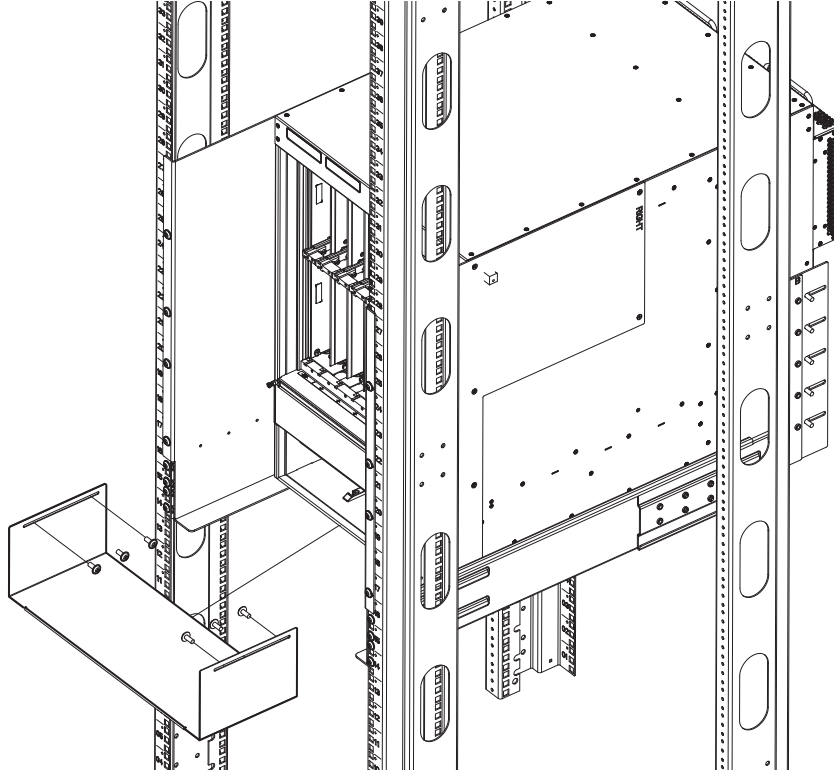
7. Secure the rear brackets to the rear of the device and to the cabinet mounting posts. Refer to [Figure 43](#).

**FIGURE 43** Secure rear brackets to the device and cabinet mounting posts



8. Install the air block bracket to the front of the cabinet. Refer to [Figure 44](#).

**FIGURE 44** Install the air block bracket



## 2 Installing a PowerConnect B-MLXe-16 router

9. Attach the cable management comb. Refer to [Figure 45](#).

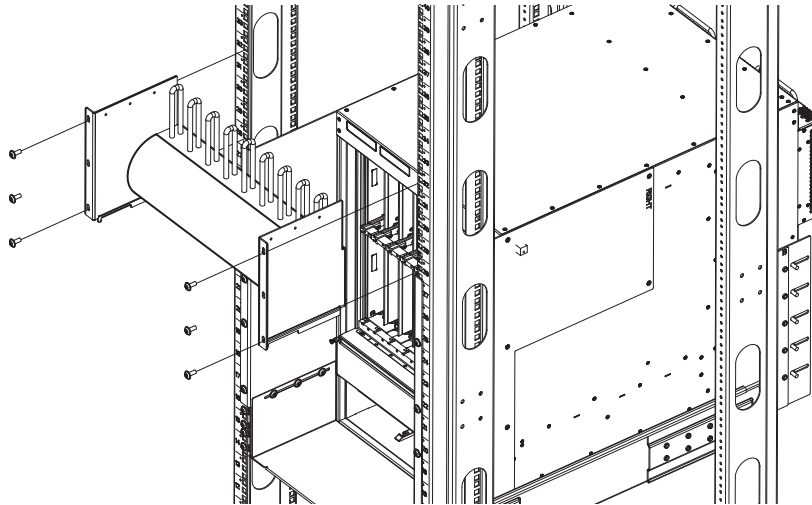
---

### NOTE

The cable management comb is sold separately.

---

**FIGURE 45** Attach the cable management comb



10. Route cables through the cable management comb.

Repeat steps 1 through 9 for each router you install in the cabinet.

## Installing modules in a PowerConnect B-MLXe 16-slot router

The installation sequence for multiple modules is important to ensure proper fit. Always fill the bottom slots in the PowerConnect B-MLXe-16 router first. Begin by filling the slots from the left side of the router, and work towards the right side. Refer to [Figure 3](#) on page 4 for slot locations.

---

### NOTE

Installation instructions are identical for interface, management, and switch fabric modules. However, there are specific switch fabric and fan requirements for NI-MLX-10x8G and NI-MLX-1Gx48-T-A modules in the 16-slot router. Refer to [“Installing modules in a PowerConnect B-MLXe 16-slot router”](#) on page 62.

---



### DANGER

*The intra-building ports of the equipment or subassembly are suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These ports are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.*

---

Table 15 provides the router slot numbers into which you must install the modules. Markings for the router slots appear at the base of the slots.

For information about how to disable and re-enable power to interface modules, see “Disabling and re-enabling power to interface modules” on page 99

---

**NOTE**

The PowerConnect B-MLXe-16 router ships with the required switch fabric modules installed.

---

**TABLE 15** PowerConnect B-MLXe-16 module slot designations

Module	Slot number
Management modules	Active module – M1 (upper). Redundant module – M2 (lower).
Interface modules	1 – 16
Switch Fabric modules	SF1 – SF4

---

**NOTE**

If you are installing a redundant management module, refer to the chapter titled “Using a Redundant Management Module” in the *Brocade NetIron Configuration Guide* for information about how the redundant module works, optional software configurations that you can perform, and how to manage the redundancy feature.

---

**NOTE**

PowerConnect B-MLXe modules are dedicated, which means that you must install them in PowerConnect B-MLXe routers only. If you install a PowerConnect B-MLXe module in another Dell router or install a module intended for another Dell router in a PowerConnect B-MLXe router, the router and module may not function properly.

---

Before installing modules in the PowerConnect B-MLXe-16 router, have the following items available:

- A large flat-blade screwdriver.
- A new or replacement interface module, which you can order from Dell
- An ESD wrist strap with a plug to attach to the ESD connector on the router chassis.


**DANGER**

*For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.*

---


**CAUTION**

*Use of a power screwdriver may twist the heads from the screws and is not recommended.*

---



### CAUTION

If you do not install a module in a slot, you must keep the slot blank in place. If you operate the router with an uncovered slot, the system may overheat. Tighten the screws that secure the slot blanks so that they remain in place when removing adjacent panels or modules.

### Reset fan speed to auto

For PowerConnect B-MLXe 16-slot routers, if you insert a module into a slot where the fan speed for a previous module was manually configured, you will need to change the fan speed back to auto. For example, if the fan speed was manually configured to “slow”, and you are installing a module that requires more cooling power, the “slow” setting will cause the module to overheat. To configure the fan speed to auto, enter the following command:

```
NetIron# set-fan-speed auto
```

The PowerConnect B-MLXe-16 router ships with slot blanks installed in all empty module slots. The slot blanks help ensure proper airflow inside the router. You must remove the slot blank to install a module in a slot.

Although the slot blanks differ in size, the procedure for removing them is identical. You will need a flat-blade screwdriver to perform this task.

### Slot blank removal steps

Follow these steps to remove a slot blank.

1. Loosen the screws on either end of the slot blank by hand or with a flat-blade screwdriver.
2. Pull the slot blank out of the router and store it in a safe place for future use.



### CAUTION

If you are hot-swapping a module, allow a minimum of two seconds after a module (or power supply or fan tray) has been removed before inserting a module in the same slot.

### Module installation steps

Follow this procedure to install modules in the router.

1. If you are installing a module in a slot which may have been previously configured for a different module type, remove the old configuration information using this procedure:
  - a. Use the **show running-config** command in config mode to determine the current configuration of the slot.

```
MLXe-16(config)# show running-config
Current configuration:
!
ver V5.1.0aT163
module 1 ni-mlx-24-port-1g-copper
!
```

This example shows that slot 1 is currently configured for a 24-port 1 Gbps copper interface module.



- b. With the module designation from **show running-config** command output, use the **no module <slot-number> <module-type>** command to remove the configuration from slot 1.

```
MLXe-16(config)# no module 1 ni-mlx-24-port-1g-copper
```

This command removes the configuration from slot 1, leaving it ready for a new module.

2. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector on the chassis.
3. Remove the module from the packaging.
4. Insert the module into the slot, and slide the module along the card guide until the ejectors on either side of the module rotate towards the module front panel.

---

**NOTE**

When inserting a module in the router, make sure that the module faceplate does not overlap the faceplate of an adjacent module.

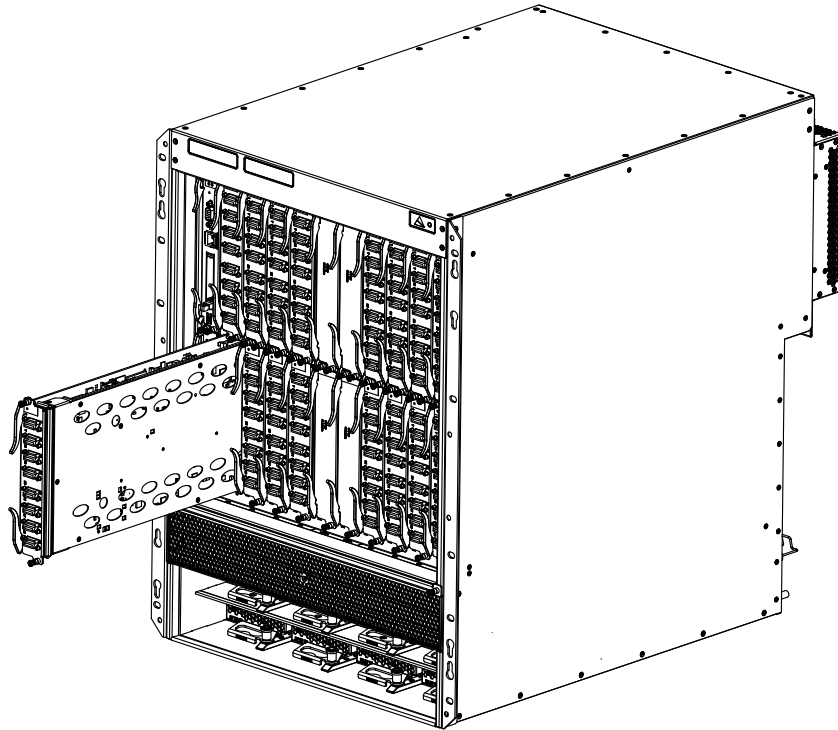
---

5. Rotate the ejectors flush with the module faceplate. This action will fully seat the module in the backplane.
6. Tighten the two screws on the module faceplate by pushing them in and turning them clockwise. Complete the tightening process using the flat-blade screwdriver.
7. Enter the **write memory** command to ensure that the slot will be correctly configured for the new module after a reboot.

```
MLXe-16(config)# write memory  
Write startup-config done.
```

## 2 Installing a PowerConnect B-MLXe-16 router

FIGURE 46 Installing a module in a PowerConnect B-MLXe-16 router



### Installing power supplies in a PowerConnect B-MLXe-16 router



#### **DANGER**

*High Touch Current. Earth connection is essential before connecting supply.*

#### **Power supply installation steps**

Follow these steps to install a power supply in a PowerConnect B-MLXe-16 router.

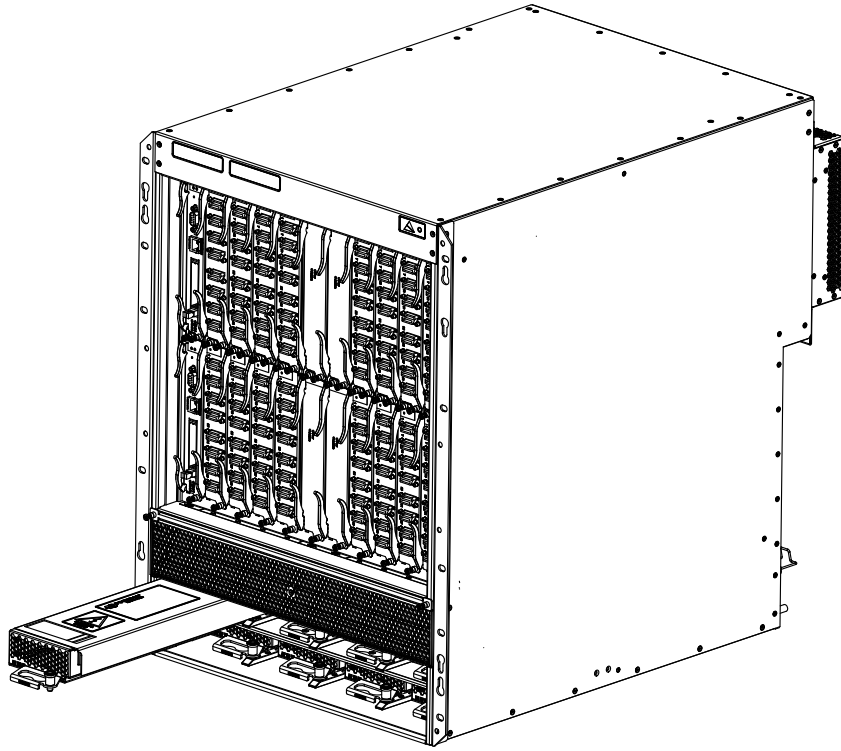
1. Remove the power supply slot blank.



#### **CAUTION**

**Empty power supply slots must be covered with slot blanks.**

2. Remove the power supply from the packaging.
3. Insert the power supply into the slot, using the guides on either side of the slot. Refer to [Figure 47](#).

**FIGURE 47** Installing a power supply in a PowerConnect B-MLXe-16 router**CAUTION**

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

4. Push the power supply front panel toward the back of the router. This action causes the power supply connector to engage the backplane connector.
5. For information about connecting power to the router, refer to [“Connecting AC power”](#).
6. For information about powering on the system, refer to [“Activating the power source”](#) on page 69.

***Connecting AC power***

AC power is supplied through a power cord connected to the power supply in the PowerConnect B-MLXe-16 router. Follow these steps to connect AC power.

**AC power connection steps**

1. Locate the power supplies in the bottom of the front panel of the PowerConnect B-MLXe-16 router.
2. Lift the cord retainer and connect an AC power cord to each power supply.

## 2 Attaching a management station

3. Snap the cord retainer over the power plug to hold it in place.



### **DANGER**

*If the installation requires a different power cord than the one supplied with the router, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the router.*

4. For information about powering on the system, refer to [“Activating the power source”](#) on page 69.

## Final steps

Complete these steps in the order listed:

- [“Attaching a management station”](#)
- [“Activating the power source”](#)
- [“Verifying proper operation”](#)

## Attaching a management station

You can manage your router in the following ways:

- Connect a PC or terminal to the console port on the management module. From this port, you can assign an IP address to the management module and establish connections through Telnet or SSH.
- Connect the router to your existing management network and manage the router and other network devices from a management station.

---

### **NOTE**

The management network that you connect to through the 10/100 Ethernet port must be separate and isolated from the network over which user packets are switched and routed. For information about functionality on the management port, Refer to [“Understanding management port functions”](#) on page 95.

---

## Attaching a PC or terminal to the console port or Ethernet port

You can attach a PC or terminal to either the console port (which has a male DB-9 serial connector), or the 10/100/1000 or 1000Base TX Ethernet port (which has an RJ45 UTP connector) on the management module. From the console port, you can access the router CLI directly from the PC or terminal or through a Telnet connection. From the Ethernet port, you can access the router CLI or Web management interface directly from the PC or terminal or through a Telnet connection.

Before performing this task, have the following items available:

- PC running a terminal emulation application or a terminal.

- For console port connections, a straight-through EIA or TIA DB-9 serial cable with one end terminated in a female DB-9 connector and the other end terminated in a male or female DB-9 or DB-25 connector, depending on the specifications of your PC or terminal. You can order this cable from Dell or build your own cable. If you build your own cable, refer to the pinout information in [“Console port pin assignments”](#) on page 178.
- For Ethernet port connections, a Category 5 UTP crossover cable, which you must supply. For information about the management port pin assignments, refer to [“Management port pin assignments”](#) on page 179.

#### PC or terminal to console or Ethernet port connection steps

Follow these steps to attach a PC or terminal to the console port or Ethernet port.

1. Connect a PC or terminal to the console port or Ethernet port using the appropriate cable.
2. Open the terminal emulation program, and set the session parameters as follows:
  - **Baud:** 9600 bps
  - **Data bits:** 8
  - **Parity:** None
  - **Stop bits:** 1
  - **Flow control:** None

## Activating the power source

When you complete the hardware installation, you are ready to activate the power source.

#### Power source activation steps

1. Verify that all modules and power supplies are properly installed and all empty slots are covered by slot blanks.



#### CAUTION

**If you do not install a module in a slot, you must keep the slot blank in place. If you run the router with an uncovered slot, the system may overheat.**

2. If you are supplying AC power to your router, attach one end of an AC power cord to each installed AC power supply as described in the appropriate section:
  - [“Connecting AC power”](#) on page 67

Insert the other end of each cable into a 115V/120V wall outlet.



#### DANGER

***If the installation requires a different power cord than the one supplied with the router, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the router.***

## 2 Verifying proper operation

---

**NOTE**

Because the router is designed to provide uninterrupted service even when you insert or remove management modules and interface modules, there is no on/off power switch. To turn the system off, simply unplug the power cords.

---

---

**NOTE**

Wall outlets should be installed near the equipment and should be easily accessible.

---

3. Verify that the router has initialized successfully. Refer to “[Verifying proper operation](#)” on page 70.

## Verifying proper operation

To verify that your router is operating properly, observe the LEDs, or display the status of the modules using the CLI.

### Observing the LEDs

When power is supplied to the router, you can observe the LEDs to verify that the router initialized successfully. [Table 16](#) describes the LEDs, the desired state of each LED, possible abnormal states of each LED, and what to do if an LED indicates an abnormal state.

**TABLE 16 Router LED states and actions**

LED label	Desired state	Meaning	Abnormal state	Meaning or action
<b>Management module</b>				
Active	The Active LED on one of the installed management modules should be on.	The module is functioning as the active management module.	Off	Neither of the management modules is managing the switch fabric and interface modules. A problem may have occurred during initialization. Check your attached PC or terminal for possible error messages.
Pwr	On	The module is receiving power.	Off	The module is not receiving power. Check the following: <ul style="list-style-type: none"><li>• Make certain that the module is installed properly. For more information, refer to the module installation section in this chapter that applies to your router model.</li><li>• If you are using AC power supplies, refer to the AC power supply LED information in this table for more information.</li></ul>
10/100/1000 Ethernet Port	On (green)	A link is established with the remote port.	Off	A link is not established with the remote port. Check the following: <ul style="list-style-type: none"><li>• Verify that the connection to the other router has been properly made. Also, make certain that the other router is powered on and operating correctly.</li><li>• Try using a different cable.</li></ul>

TABLE 16 Router LED states and actions (Continued)

LED label	Desired state	Meaning	Abnormal state	Meaning or action
10/100/1000 Ethernet Port	On or blinking (yellow)	The port is transmitting and receiving packets.	Off for an extended period	The port is not transmitting or receiving packets. Check the following: <ul style="list-style-type: none"> <li>Look at the LED for the other 10/100/1000 Ethernet port to see if a link has been established with the remote port.</li> <li>Verify that the connection to the other router has been properly made. Also, make certain that the other router is powered on and operating correctly.</li> <li>Try using a different cable.</li> </ul>
<b>Interface module</b>				
Pwr	On	The module is receiving power.	Off	The module is not receiving power. Check the following: <ul style="list-style-type: none"> <li>Make certain that the module is installed properly. For more information, refer to the module installation section in this chapter that applies to your router model.</li> <li>The module may not be receiving enough power. Dell recommends installing power supplies in a fully redundant configuration as described for each router model in this chapter.</li> <li>Check the Pwr LED on the management module. If it is on, the management module may be preventing power from getting to the interface module.</li> <li>Enter the <b>show chassis</b> command at any level of the CLI to determine if the management module recognizes the presence of all power sources.</li> <li>If you are using AC power supplies, see the entry for the AC power supply LED in this table for more information.</li> </ul>
Mgmt Act	During initialization: steady blinking. After initialization: occasional blinking.	The active management module processor and the interface module processor are communicating.	Off for an extended period.	The interface module may be in interactive mode. Check the status of the module by entering the <b>show module</b> command at any level of the CLI.
Link	On	A link is established with the remote port.	Off	This LED will remain off until you have cabled the interface module ports. After cabling the ports, if this LED is still off, a link is not established with the remote port. For more information, refer to <a href="#">Table 18</a> on page 97.
Active	On or blinking	The port is transmitting and receiving user packets.	Off for an extended period.	This LED will remain off until you have cabled the interface module ports. After cabling the ports, if this LED is still off, the port is not transmitting or receiving user packets. For more information, refer to <a href="#">Table 18</a> on page 97.
<b>Switch Fabric module</b>				
Pwr	On	The module is receiving power.	Off	The module is not receiving power. Check the following: <ul style="list-style-type: none"> <li>Make certain that the module is installed properly. For more information, refer to the module installation section in this chapter that applies to your router model.</li> <li>If you are using AC power supplies, refer to the AC power supply LED information in this table for more information.</li> </ul>

## 2 Verifying proper operation

**TABLE 16 Router LED states and actions (Continued)**

LED label	Desired state	Meaning	Abnormal state	Meaning or action
Active	On	The switch fabric module is active and ready to switch user packets.	Off for an extended period.	The switch fabric module is not active and user packets are not being switched from one interface module to another. You must replace the switch fabric module. Refer to <a href="#">“Replacing a switch fabric module”</a> on page 162.
<b>AC power supplies</b>				
AC	Green (steady)	The power supply is receiving power from the AC power source.	Off	The power supply is not receiving power from an AC power source. You can do the following: <ul style="list-style-type: none"><li>• Make sure that the power cord is connected securely to the wall outlet and the power supply.</li><li>• Make sure that the wall outlet is rated for 115/120V and 20A. If it is not, obtain a cable that is rated for the outlet.</li><li>• Make sure that the wall outlet has power.</li></ul>
AC OK	Green (steady)	The power supply is providing AC power to the router.	Off	The power supply is not supplying power to the router. If the AC LED is green, there is a problem with the power supply and it must be replaced.
ALM	Off	The power supply is in normal operating condition.	Amber	The power supply is malfunctioning.
<b>Fan control module (two LEDs on rear panel of router)</b>				
Unlabeled	Green (steady)	The fans are working and responding to controls from the fan control module.	Off or amber	The fans are not receiving power (off), or the fans are not working and not responding to controls from the fan control module (amber). Check the following: <ul style="list-style-type: none"><li>• If the LED is off, check the power LED on the other modules to make sure they are receiving power.</li><li>• If you are using AC power supplies, take the actions described in the Meaning or Action column for the AC power supply LED. If these actions do not resolve the problem, check the LED on each power supply or enter the <b>show chassis</b> command at any CLI prompt to determine if a power supply has failed. If a power supply has failed, you must replace it.</li><li>• If the LED is amber, you must replace the fan module.</li></ul>

If a problem persists after taking the actions described in this table, contact technical support.

### Displaying the module status

After you have attached a PC or terminal to the console port or Ethernet port on the management module and the router has initialized successfully, press **Enter** to display the CLI prompt in the terminal emulation window. This example is a prompt for a 16-slot router.

```
MLXe-16>
```

If you do not see this prompt, check the following items.



1. Make sure the cable is securely connected to your PC or terminal and the console port or Ethernet port.
2. Check the settings in your terminal emulation program. In addition to the session settings listed in [“Attaching a PC or terminal to the console port or Ethernet port”](#) on page 68, make sure the terminal emulation session is running on the same serial port you attached to the console port.

When you see this prompt (MLXe-16#), you are connected to the system and can display module status using the CLI. Enter the **show module** command at any CLI level.

```
MLXe-16# show module
      Module                               Status      Ports Starting MAC
M1 (upper): NetIron Mgmt Module           Active
M2 (lower):
F0: NetIron Switch Fabric Module         Active
S1:
S2:
S3:
S4: NetIron 4-Port 10Gig Module           CARD_STATE_UP  4  000c.db80.0000
S5: NetIron 4-Port 10Gig Module           CARD_STATE_UP  4  000c.db80.0000
S6: NetIron 4-Port 10Gig Module           CARD_STATE_UP  4  000c.db80.0000
S7:
S8:
```

#### Syntax: show module

The Status column shows the module status. The management module status can be one of the following:

- **ACTIVE** – The module is currently the active management module.
- **STANDBY** – The module is currently the standby management module.
- **COMING UP** – The module is coming up as the standby module. This status occurs if the standby management module becomes the active module during a switchover.

The switch fabric module status can be one of the following:

- **ACTIVE** – The module is up and running.
- **BAD** – The management module cannot initialize the switch fabric module.

An interface module status can be one of the following:

- **CARD\_STATE\_INIT** – The system detects the module but the module is not up and running yet.
- **CARD\_STATE\_BOOT** – The module is booting.
- **CARD\_STATE\_INTERACTIVE** – The module is booting from interactive mode.
- **CARD\_STATE\_LP\_SYNC** – The software images are synchronized between the management module and interface module.
- **CARD\_STATE\_SYNC** – The system is currently synchronizing the software image between the management module and interface module.
- **CARD\_STATE\_SOFTWARE\_LOADED** – The module has loaded the software image.
- **CARD\_STATE\_POWER\_OFF** – The module does not have power.
- **CARD\_STATE\_UP** – The module is operating normally.

## 2 Verifying proper operation

- **CARD\_STATE\_FAILED** – The management module was unable to bring up an interface module. If you see this status, make certain that the interface module is installed properly. For more information, refer to [“Installing modules in a PowerConnect B-MLXe 16-slot router”](#) on page 62.
- **CARD\_DOWN\_REASON\_<explanation>** – The module is in a nonfunctional state. This status appears with an explanation for why the module is down. For example, "CARD\_DOWN\_REASON\_BOOT\_FAILED." If the explanation does not help you resolve the problem, contact technical support and provide the explanation included with this status.

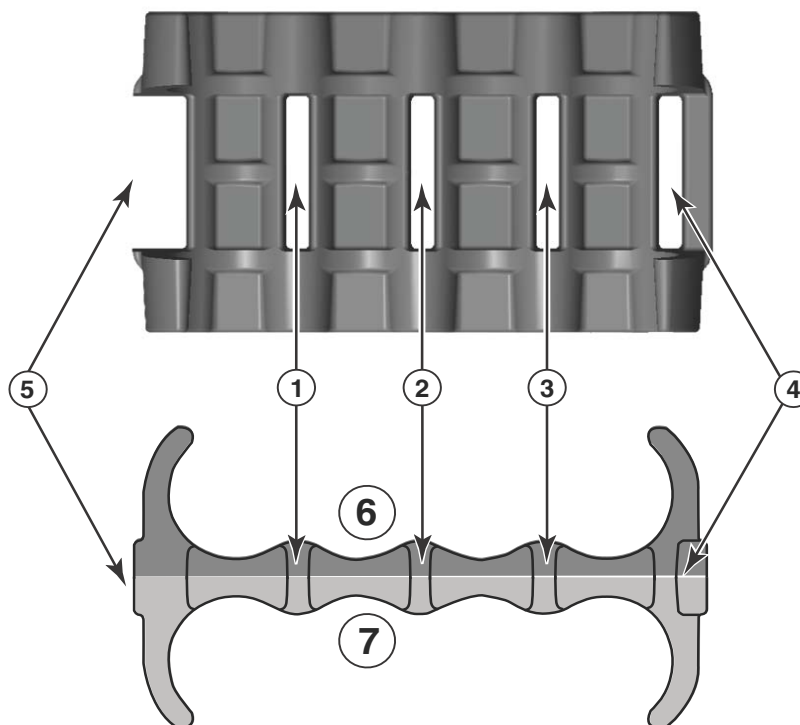
# Using the Dell Structured Cabling Components

---

## Cable cinch overview

Position the cable cinch with the open end to the left (no slot) as shown in [Figure 48](#).

**FIGURE 48** Cable cinch overview



- |   |        |   |          |
|---|--------|---|----------|
| 1 | Slot 1 | 5 | Open end |
| 2 | Slot 2 | 6 | Rear     |
| 3 | Slot 3 | 7 | Front    |
| 4 | Slot 4 |   |          |

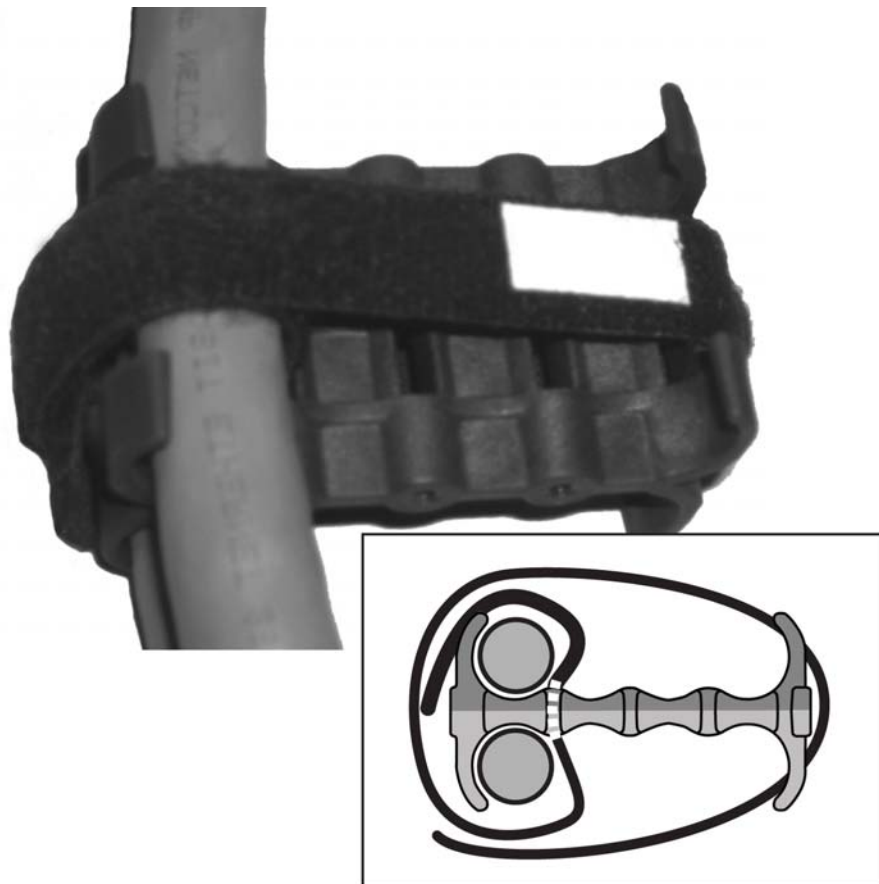
## MRJ21 procedures

The following procedure demonstrates securing up to eight mRJ21 cables into the cable cinch. When securing fewer than the maximum cables, follow the procedure to secure the desired number of cables and simply wrap the remaining Velcro strap around the cable cinch. Use the additional slots in the clip to secure groups of cables as required.

### Cable cinch with two mRJ21 cables

To secure two mRJ21 cables, place the Velcro strap through slot one and use the front and rear left recesses as shown in [Figure 49](#).

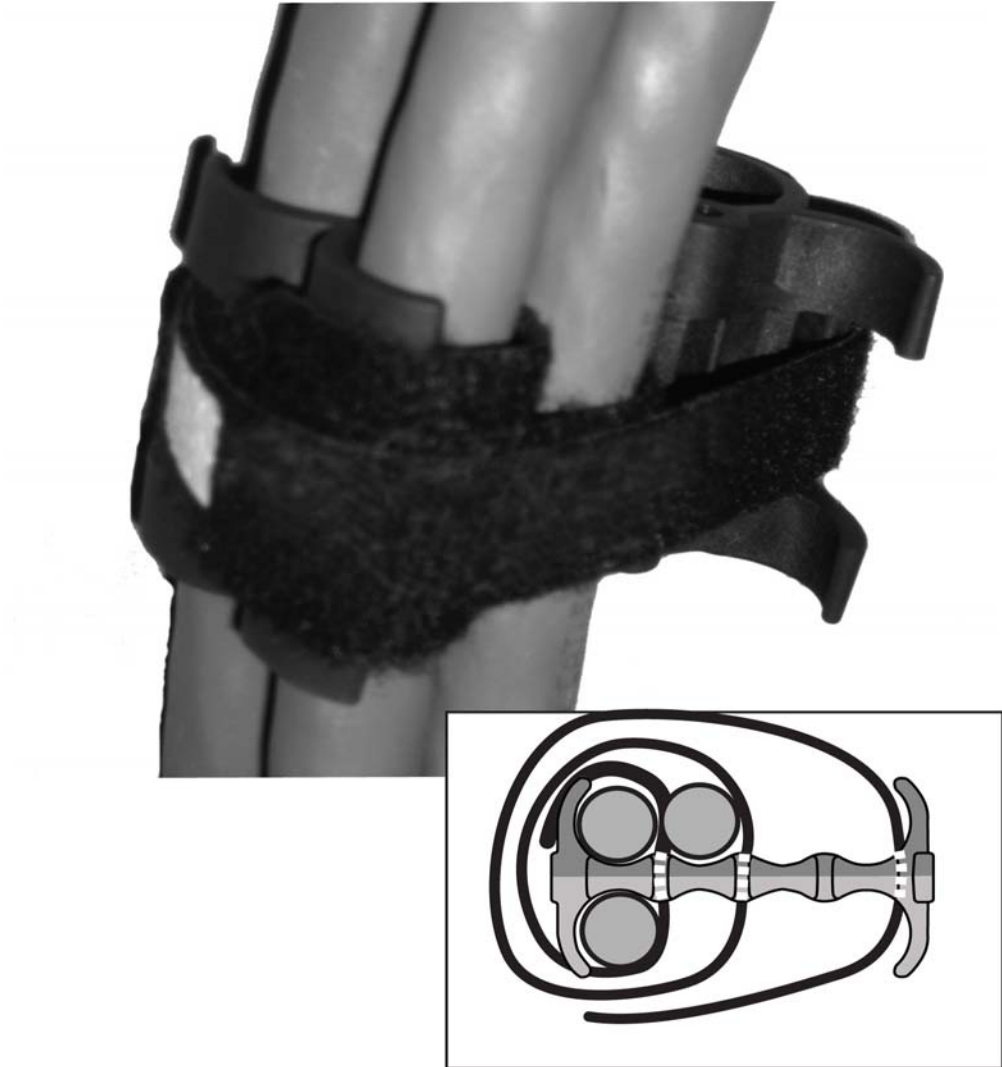
**FIGURE 49** Two mRJ21 cables



## Cable cinch with three mRJ21 cables

Three mRJ21 cables may be secured as shown in [Figure 50](#).

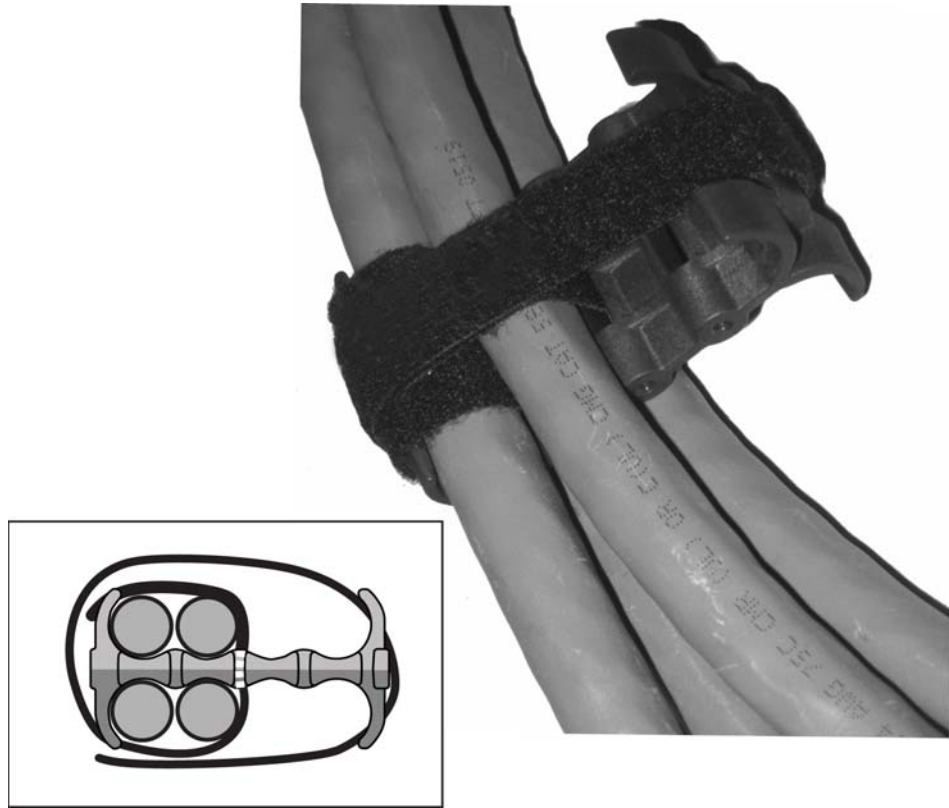
**FIGURE 50** Three mRJ21 cables



### Cable cinch with four mRJ21 cables

Four mRJ21 cables may be secured as shown in [Figure 51](#).

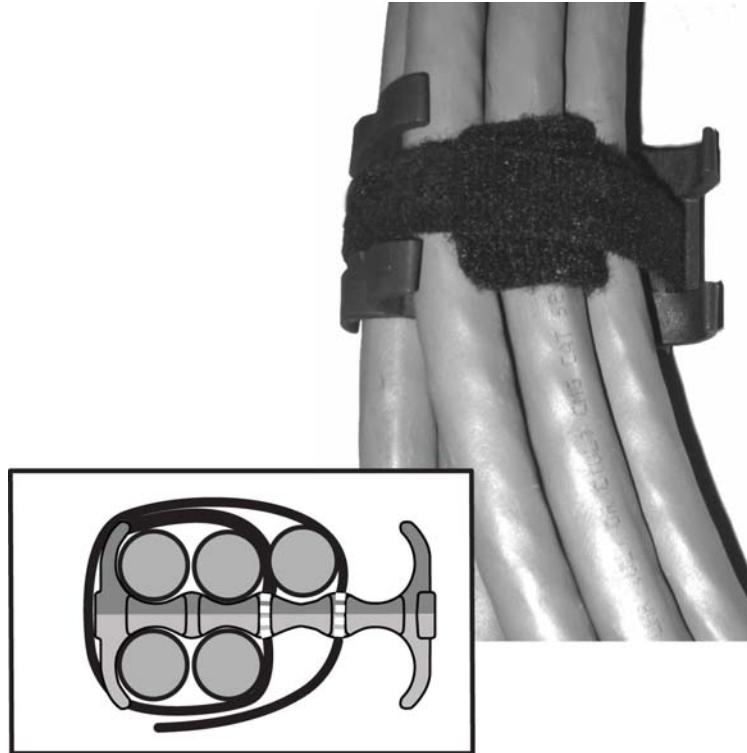
**FIGURE 51** Four mRJ21 cables



## Cable cinch with five mRJ21 cables

Five mRJ21 cables may be secured as shown in [Figure 52](#).

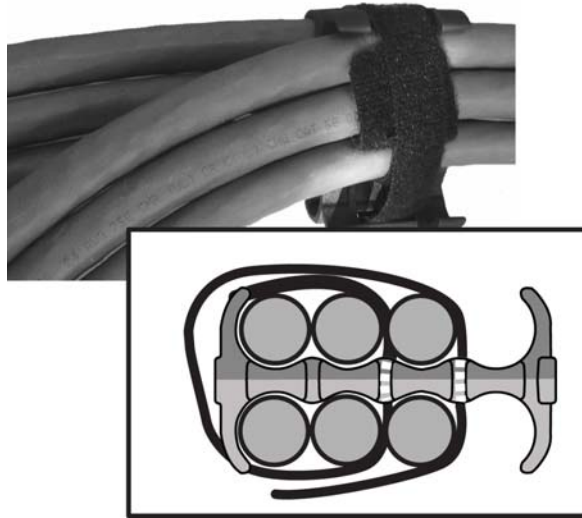
**FIGURE 52** Five mRJ21 cables



### Cable cinch with six mRJ21 cables

Six mRJ21 cables may be secured as shown in [Figure 53](#).

**FIGURE 53** Six mRJ21 cables

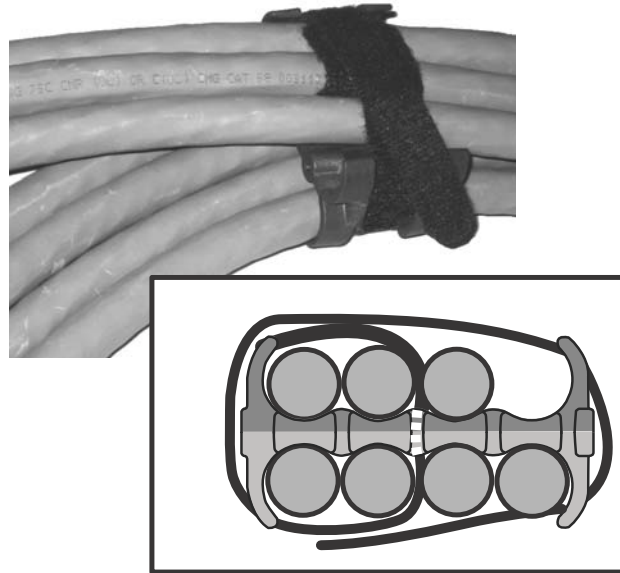




## Cable cinch with seven mRJ21 cables

Seven mRJ21 cables may be secured as shown in [Figure 54](#).

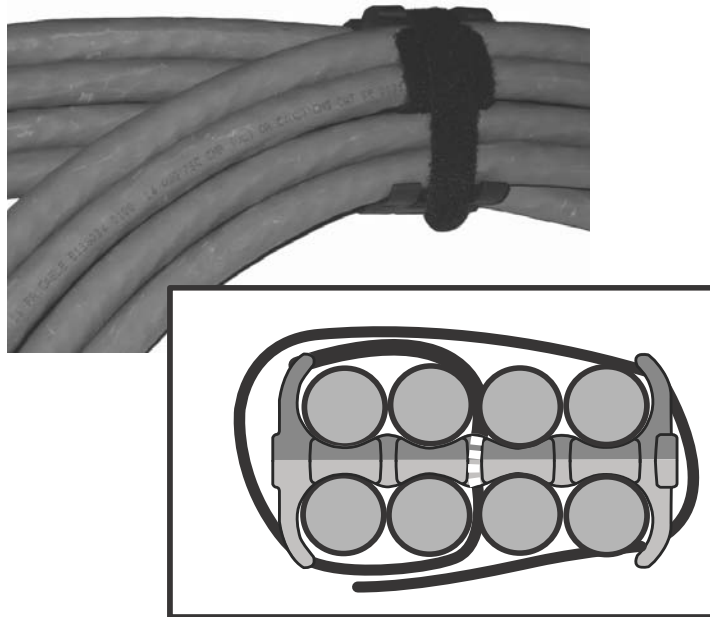
**FIGURE 54** Seven mRJ21 cables



### Cable cinch with eight mRJ21 cables

Eight mRJ21 cables may be secured as shown in [Figure 55](#).

**FIGURE 55** Eight mRJ21 cables



## RJ45 procedures

Use the following guidelines when using the cable cinch clips with RJ45 cables.

### Cable cinch with one group of RJ45 cables

RJ45 cables may be secured in groups of six. To secure up to six RJ45 cables in one group, place the Velcro strap through slot one and use the front left recesses as shown in [Figure 56](#).

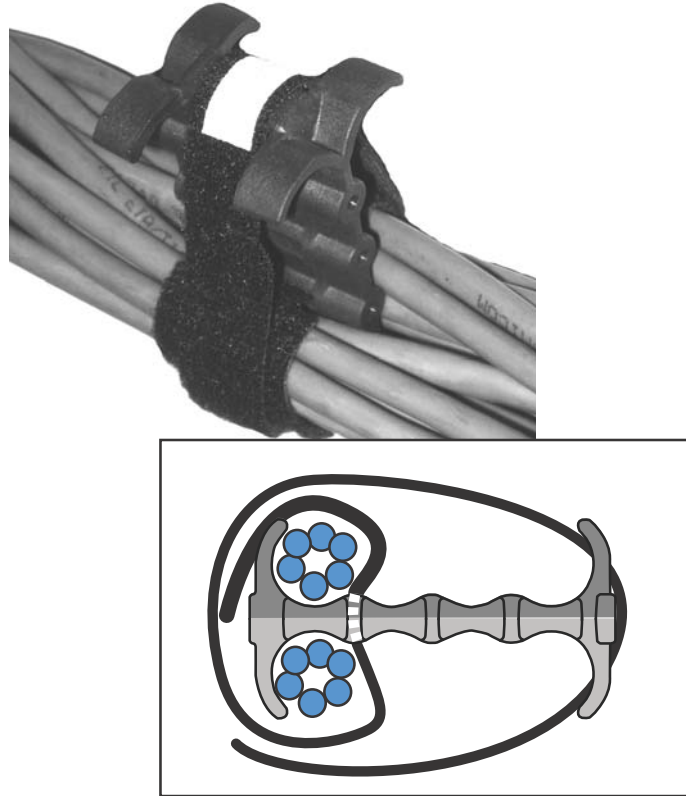
**FIGURE 56** One group of RJ45 cables



### Cable cinch with two groups of RJ45 cables

12 RJ45 cables, in two groups, may be secured as shown in [Figure 57](#).

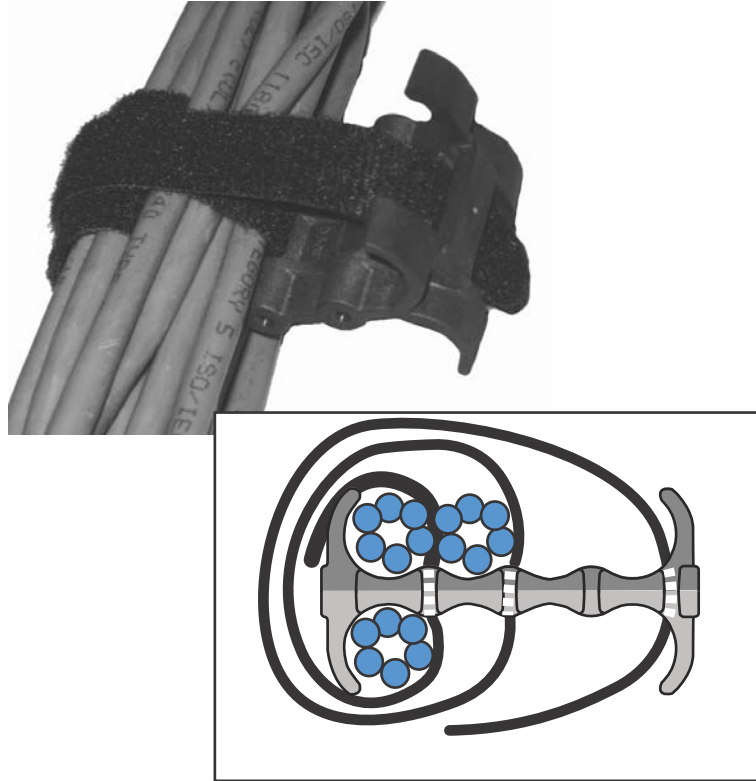
**FIGURE 57** 12 RJ45 cables in two groups



## Cable cinch with three groups of RJ45 cables

18 RJ45 cables, in three groups, may be secured as shown in [Figure 58](#).

**FIGURE 58** 18 RJ45 cables in three groups



### Cable cinch with four groups of RJ45 cables

24 RJ45 cables, in four groups, may be secured as shown in [Figure 59](#).

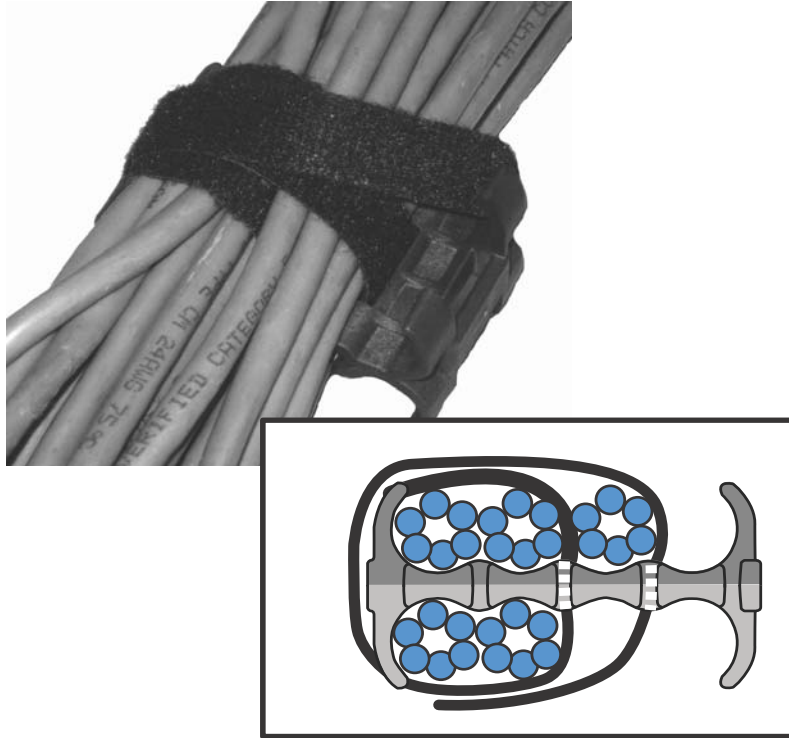
**FIGURE 59** 24 RJ45 cables in four groups



## Cable cinch with five groups of RJ45 cables

30 RJ45 cables, in five groups, may be secured as shown in [Figure 60](#).

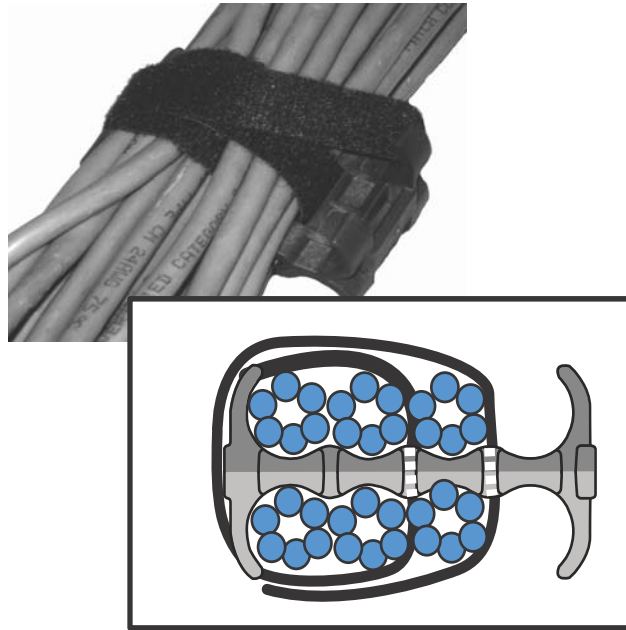
**FIGURE 60** 30 RJ45 cables in five groups



### Cable cinch with six groups of RJ45 cables

36 RJ45 cables, in six groups, may be secured as shown in [Figure 61](#).

**FIGURE 61** 36 RJ45 cables in six groups

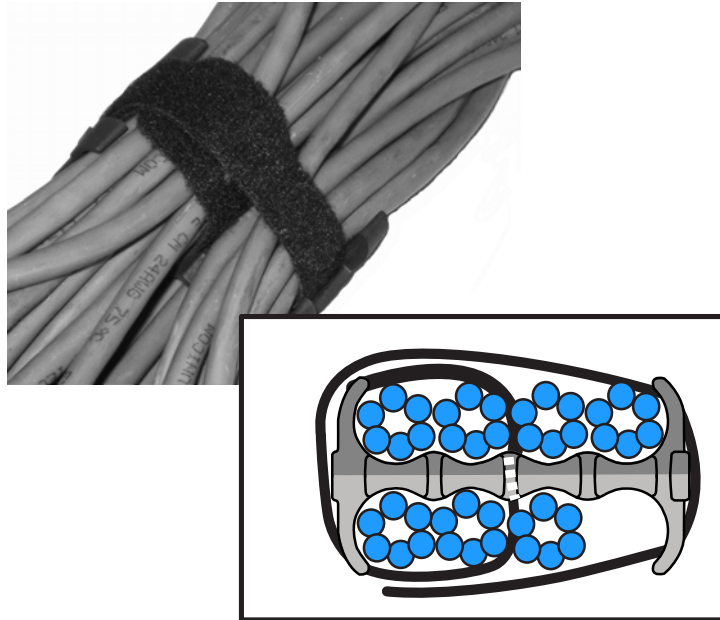




## Cable cinch with seven groups of RJ45 cables

42 RJ45 cables, in seven groups, may be secured as shown in [Figure 62](#).

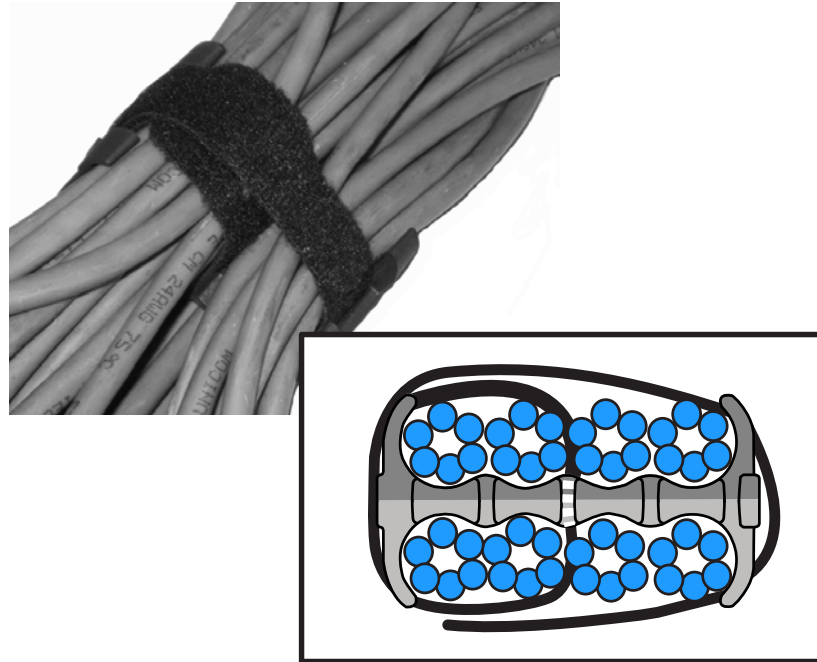
**FIGURE 62** 42 RJ45 cables in seven groups



### Cable cinch with eight groups of RJ45 cables

48 RJ45 cables, in eight groups, may be secured as shown in [Figure 63](#).

**FIGURE 63** 48 RJ45 cables in eight groups



# Connecting a Router to a Network Device

---

## Assigning permanent passwords



### **DANGER**

*The procedures in this manual are for qualified service personnel.*

By default, the CLI is not protected by passwords. To secure CLI access, it is strongly recommended that you assign passwords.

The CLI contains the following access levels:

- **Privileged EXEC** – This level is also called the Enable level and can be secured by a password. From this level you can manage files on the management module flash memory or a PCMCIA flash card in the management module slots 1 or 2, save the system configuration to flash memory, and clear caches.
- **CONFIG** – The configuration level. From this level you can configure a system IP address and configure routing features. To access the CONFIG mode, you must already be logged into the Privileged level of the EXEC mode.

---

### **NOTE**

You cannot assign a password using the Web management interface. You can assign passwords using the SNMP Network Manager software if an Enable password for a super user is already configured on the device.

You can set the following levels of Enable passwords:

- **Super user** – Allows complete read-and-write access to the system. This is generally for system administrators and is the only password level that allows you to configure passwords.

---

### **NOTE**

You must set a super-user password before you can set other types of passwords.

- **Port configuration** – Allows read-and-write access for specific ports but not for global (system-wide) parameters.
- **Read only** – Allows access to the Privileged EXEC mode and CONFIG mode but only with read access.

To set passwords, perform the following steps.

1. At the opening CLI prompt, enter **enable** to change to the Privileged level of the EXEC mode.

```
NetIron> enable
NetIron#
```

2. Access the CONFIG level of the CLI by entering the **configure terminal** command.

## 4 Configuring IP addresses

```
NetIron# configure terminal
NetIron(config)#
```

**Syntax:** `configure terminal`

3. Enter the **enable super-user-password** command to set the super-user password.

```
NetIron(config)# enable super-user-password mustang
```

**Syntax:** `enable super-user password <text>`

---

**NOTE**

You must set the super-user password before you can set other types of passwords.

---

4. Enter the following commands to set the port configuration and read-only passwords.

```
NetIron(config)# enable port-config-password mustang
NetIron(config)# enable read-only-password mustang
```

---

**NOTE**

If you forget your super-user password, see the *Multi-Service IronWare Software Release 5.1.0 Notes*.

---

**Syntax:** `enable | super-user-password | read-only-password | port-config-password <text>`

The text for the **read-only-password** and the **port-config password** should be different from the text for the **super-user** password. Passwords can be up to 48 characters long.

## Configuring IP addresses

Dell routers implement separate data and control planes. This architecture affects how you assign IP addresses. [Table 17](#) outlines the interfaces to which you can assign IP addresses.

In this table, “In band” refers to an interface over which user packets are routed, while “Out of band” refers to an interface over which control packets related to system management are forwarded.

**TABLE 17** Interfaces that can be given IP addresses

Interface	Associated physical port	Out of band or In band
Management interface	Ethernet 10/100/1000 port on active or redundant management module	Out of band
Any interface over which user packets are routed	Any interface module port	In band
Any virtual interface over which user packets are routed	Any interface port	In band
Loopback interface	-	In band

## Support of subnet masks

Dell routers support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

- Enter a classical network mask in IP address format. For example, enter “209.157.22.99 255.255.255.0” for an IP address with a Class-C subnet mask.

- To enter a prefix number for a network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter “209.157.22.99/24” for an IP address that has a network mask with 24 significant (“mask”) bits.

## Assigning an IP address to a management interface

Instead of assigning a global IP address to the router for system management purposes, you must assign an IP address to the active management module. If the active management module becomes unavailable and the redundant module becomes the active module, the IP address is automatically assigned to the new active management module.

For example, to assign the IP address 10.0.1.1 to the management module, use these steps.

1. At the opening CLI prompt, enter **enable**.

```
NetIron> enable
```

2. Enter the **erase startup-config** command at the Privileged EXEC level prompt (for example, NetIron#), then press **Enter**. This command erases the factory test configuration if it is still present.

```
NetIron# erase startup-config
```

**Syntax:** `erase startup-config`

After you enter this command, you will need to perform a reload on the system.



### CAUTION

Use the `erase startup-config` command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.

3. Access the configuration level of the CLI by entering the **configure terminal** command.

```
NetIron# configure terminal
NetIron(config)#
```

4. Configure the IP address and mask for the management interface by entering these commands.

```
NetIron(config)# interface management 1
NetIron(config-if-mgmt-1)# ip address 10.0.1.1 255.255.255.0
```

**Syntax:** `enable [<password>]`

**Syntax:** `configure terminal`

**Syntax:** `interface management <num>`

**Syntax:** `[no] ip address <ip-addr> <ip-mask>`

or

**Syntax:** `[no] ip address <ip-addr>/<mask-bits>`

### Assigning IP addresses to an interface, virtual interface, or loopback interface

You must assign an IP address to each interface and virtual interface over which user packets are routed. You can also assign an IP address to a loopback interface, which is generally used for testing and diagnostic purposes.

You must use the serial connection to assign the first IP address. For subsequent addresses, you can also use the CLI through Telnet or the Web management interface. Use IronView Network Manager to assign IP addresses to virtual routing interfaces only.

By default, you can configure up to 24 IP addresses on each interface, virtual interface, and loopback interface.

For example, to assign the IP address 192.22.3.44 and subnet mask 255.255.255.0 to Ethernet interface 1/1, do the following.

1. At the opening CLI prompt, enter **enable**.

```
NetIron> enable
```

2. Enter the following command at the Privileged EXEC level prompt, then press **Enter**. This command erases the factory test configuration if it is still present.

```
NetIron# erase startup-config
```

After you enter this command, you will need to restart the system.



#### **CAUTION**

Use the `erase startup-config` command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.

3. Access the configuration level of the CLI by entering the following command.

```
NetIron# configure terminal
NetIron(config)#
```

4. Configure the IP address and subnet mask for Ethernet interface 1/1 by entering the following commands.

```
NetIron(config)# interface ethernet 1/1
NetIron(config-if-e10000-1/1)# ip address 192.22.3.44 255.255.255.0
```

**Syntax:** `enable` [`<password>`]

**Syntax:** `configure terminal`

**Syntax:** `[no] ip address` `<ip-addr>` `<ip-mask>` [`secondary`]

or

**Syntax:** `[no] ip address` `<ip-addr>/<mask-bits>` [`secondary`]

Use the **secondary** parameter if you have already configured an IP address within the same sub-net on the interface.

## Enabling and disabling the interfaces

By default, all router interfaces are disabled. To enable an interface, enter the **enable** command at the appropriate interface configuration level of the CLI. For example, to enable the management interface, enter the **enable** command at the management interface configuration level of the CLI.

```
NetIron(config-if-mgmt-1)# enable
```

**Syntax: enable**

You can disable each of these interfaces using the **disable** command at the appropriate interface configuration level of the CLI. For example, to disable the management port, enter the **disable** command at the management interface configuration level of the CLI.

```
NetIron(config-if-mgmt-1)# disable
```

**Syntax: disable**

## Understanding management port functions

The management port performs specific functions and is subject to some limitations, as described:

- Because the management port allows you to configure, monitor, and manage routers only, this port has the same limited functionality as an IP host port.
- You cannot enable and run routing protocols on the management port.
- You cannot configure routes from the management interface.
- The management port uses static IP routes from the interface routing tables.
- If you configure the redistribution of static or directly connected routes for a particular routing protocol, the protocol redistributes routes associated with the interface module ports, but not the routes associated with the management port.

To display configuration information and statistics about the management port, enter the **show interface management 1** command at any CLI level.

## Connecting the router to a network device

You can connect a router to another Ethernet network device. PowerConnect B-MLXe routers support connections to other vendors' devices as well as Dell network devices.

The Ethernet interface modules available with PowerConnect B-MLXe routers are described in [“Interface modules”](#) on page 8. These include XFP fiber, SFP and SFP+ fiber, and RJ45 copper interfaces. Details regarding the SFP, SFP+, and XFP fiber-optic transceivers supported for these interface modules are also described.

To connect a router to another network device, you must do the following:

- Install the fiber-optic modules if required.
- Cable the modules with either copper cable or fiber-optic cable as required.

The following sections provide information about module installation and cabling, as well as how to clean fiber-optic connectors and troubleshoot network connections.

### Installing a fiber-optic transceiver

To connect a router to another network device using a fiber port, install a fiber-optic transceiver (SFP, SFP+, or XFP, as required by your interface module).



#### **DANGER**

***All fiber-optic interfaces use Class 1 Lasers.***

---

#### **NOTE**

Refer to [“Installation precautions”](#) on page 137 for other hardware installation precautions.

Before installing a fiber-optic transceiver, have on hand an ESD wrist strap with a plug for connection to the ESD connector on the router chassis.



#### **DANGER**

***For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.***

Follow these steps to install a fiber-optic transceiver.

1. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector on the router chassis.
2. Remove the transceiver from the protective packaging.
3. Remove the metal cover from the port on the interface module.
4. Gently insert the fiber-optic transceiver into the port until the transceiver clicks into place. Transceivers are keyed to prevent incorrect insertion.

### Cabling a fiber-optic transceiver

Follow these steps to cable a fiber-optic transceiver.

1. Remove the protective covering from the fiber-optic port connectors and store the covering for future use.
2. Before cabling a fiber-optic transceiver, it is strongly recommended that you clean the cable connectors and the port connectors. For more information, refer to [“Cleaning fiber-optic ports and connectors”](#).
3. Gently insert the two cable connectors (a tab on each connector should face upward) into the ports until the tabs lock into place.

### Cleaning fiber-optic ports and connectors

To avoid problems with connections between fiber-optic ports and fiber cable connectors, it is strongly recommended that you clean ports and connectors each time you make a connection. Dust can accumulate inside the port and connector and cause problems as serious as reducing the optic launch power.

When you are not using a fiber-optic transceiver port, always replace the protective cover.



## Troubleshooting network connections

Observe connection LEDs to determine if network connections are functioning properly. [Table 18](#) lists the LEDs related to the network connections, the desired state of each LED, possible abnormal states of each LED, and what to do if an LED indicates an abnormal state.

**TABLE 18** Network connection-related LED states

LED	Desired state	Meaning	Abnormal state	Meaning or action
<b>Interface module</b>				
Link	On	A link is established with the remote port.	Off	A link is not established with the remote port. Try the following: <ul style="list-style-type: none"> <li>• Verify that the connection to the other network device has been properly made, and that the other network device is powered on and operating correctly.</li> <li>• Verify that the transmit port on a router is connected to the receive port on the other network device, and that the receive port on the router is connected to the transmit port on the other network device. If you are not certain, remove the two cable connectors and reinsert them in the port connector, reversing their order.</li> <li>• Dust may have accumulated in the cable connector or port connector. For information about cleaning the connectors, refer to <a href="#">“Cleaning fiber-optic ports and connectors”</a> on page 96.</li> <li>• If these actions do not resolve the problem, try using a different port or a different cable.</li> </ul>
Active	On or blinking	The port is transmitting and receiving user packets.	Off for an extended period.	The port is not transmitting or receiving user packets. Try the following: <ul style="list-style-type: none"> <li>• Check the Link LED to make sure the link is still established with the remote port. If not, take the actions described in the Meaning or Action column for the Link LED.</li> <li>• Verify that the port has not been disabled through a configuration change. You can use the CLI. If you have configured an IP address on the device, you also can use the Web management interface or IronView Network Manager.</li> </ul>

If a problem persists after taking these actions, contact Dell Technical Support.

## Testing network connectivity

After you cable the fiber-optic transceivers, you can test connectivity to other network devices by pinging those devices. You also can perform traceroutes.

### Pinging an IP address

To verify that the router can reach another device through the network, enter a command such as the following at any level of the CLI.

```
NetIron> ping 192.33.4.7
```

## 4 Testing network connectivity

**Syntax:** ping <ip addr> | <hostname> [source <ip addr>] [count <num>] [timeout <msec>] [ttl <num>] [size <byte>] [quiet] [numeric] [no-fragment] [verify] [data <1-to-4 byte hex>] [brief]

The maximum allowable size is 9170 bytes.

---

### NOTE

If you send the ping to the IP broadcast address, the device lists the first four responses to the ping.

---

## Tracing a route

To determine the path through which the router can reach another network device, enter a command such as the following at any level of the CLI.

```
NetIron> traceroute 192.33.4.7
```

**Syntax:** traceroute <host-ip-addr> [maxttl <value>] [minttl <value>] [numeric] [timeout <value>] [source-ip <ip addr>]

The CLI displays traceroute information for each hop on the route as soon as the information is received. Traceroute requests display all responses to a given TTL. If there are multiple equal-cost routes to the destination, the router displays up to three responses by default.

# Managing Routers and Modules

---

## Managing the device

You can perform these management tasks for the router:

- Display status and temperatures of all hardware components.
- Display the Syslog configuration and static and dynamic buffers.
- Disable and re-enable power to interface modules

### Disabling and re-enabling power to interface modules

You can disable power and re-enable power to all interface modules. or to a specified interface module using the **power-off** command in the CLI, as shown in this example.

```
PowerConnect# power-off lp all
```

**Syntax:** **power-off lp** [**all** | <slot-number>]

- **all** - disables power to all interface modules
- <slot number> - disables power to the interface module in the specified slot. You can specify 1-4 for 4-slot routers, 1-8 for 8-slot routers, and 1-16 for 16-slot routers.

---

#### NOTE

It is recommended that you do not disable power to interface modules during a software upgrade. If you try to disable power during a software upgrade, the following message will be displayed:

---

```
Warning: There is an outstanding software download.  
Do you want to continue ? (enter "Y" or "n")
```

Type "n" and wait until the upgrade is complete.

To re-enable power to all interfaces. or to a specific interface, enter the **power-on ip** command, as shown in this example:

```
PowerConnect# power-on ip
```

**Syntax:** **power-on lp** [**all** | <slot-number>]

- **all** - enables power to all interface modules
- <slot number> disables power to the interface module in the specified slot. You can specify 1-4 for 4-slot routers, 1-8 for 8-slot routers and 1-16 for 16-slot routers.

## Monitoring I2C failures on management modules

The management module accesses temperature sensors, fan controllers, power supplies, serial PROMs, and other devices are all accessed through the I2C serial bus. When I2C devices are inaccessible, generic (and uninformative) error messages are displayed on the management module console interface. If you do not keep a record of the console messages before the management module resets or reloads, these error messages will be lost.

At the first occurrence of an I2C failure, the Global I2C Error Indicator (GIEI) flag severity is set to major. The GIEI flag is cleared only when the management module is able to access the same physical device successfully. The GIEI severity flag is set to minor only if other I2C devices are accessible. A set of static and dynamic Syslog messages are generated when any or all of the following events occur:

- When an I2C failure is first detected
- When the GIEI severity is changed from major to minor
- When the GIEI flag is cleared

These Syslog messages are generated in both the static and dynamic sections of the **show logging** command output. A Syslog message is also sent to the SNMP log server.

When the GIEI is set to major, the first Syslog message displayed is an Alert. The following example shows an Alert Syslog message where the GIEI is set to major:

```
PowerConnect# show logging
Sysloglogging: enabled (0 messages dropped, 0 flushes, 1 overruns)
Buffer logging: level ACDMEINW, 50 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning

Static Log Buffer:
Apr 16 18:21:25:A:System: Power Supply 2 , middle, Not Installed (FAILED)
Apr 16 18:21:25:A:System: Power Supply 3 , top, Not Installed (FAILED)
Apr 16 18:21:25:A:System: bad i2c access (GIEI = set), Severity Major, Mux
index 0, Mux tap 4, ID 0x4, Addr0x5, (FANTRAY4)
Apr 16 18:21:25:I:System: last good i2c access, Muxindex 0, Mux tap 1, ID
0x9, Addr0x1, (SNM1TEMP)

Dynamic Log Buffer (50 lines):
Apr 16 18:21:25:A:System: bad i2c access (GIEI = set), Severity Major, Mux
index 0, Mux tap 4, ID 0x4, Addr 0x5, (FANTRAY4)
Apr 16 18:21:25:I:System: last good i2c access, Mux tap 1, ID
0x9, Addr 0x1, (SNM1TEMP)
Mar 28 12:36:47:A:System: Set fan speed to MED (75%)
Mar 25 21:40:47:A:System: Set fan speed to MED-HI (90%)
```

The Syslog message shows the last successful I2C access by the management module and also contains the following information about the failed device:

- Current state of the GIEI flag
- Severity of the failure: major or minor
- MUX index number:
  - The MUX index is always zero in 4-, 8-, and 16-slot MLX devices

- MUX tap number:
  - 0-7 - there are total of 8 MUX taps connected to a MUX device.
  - 15 - MUX tap is non applicable
- Device ID
- Device address
- Description of the load

If the GIEI severity changes from the time the GIEI is set to major, the first Syslog message in the static section of the log is updated to reflect this change. A copy of this updated message is generated in the dynamic section of the log and a copy is sent to SNMP log server.

When an I2C failure is first detected, a second Syslog message is generated containing information about the last successful I2C access before the GIEI error flag was set. The last successful access information remains unchanged until the GIEI is cleared. A copy of the second Syslog message is also sent to the SNMP log server.

The second Syslog message is always displayed as an informational Syslog. The following example shows an informational Syslog message:

```
PowerConnect# show logging
Syslog logging: enabled (0 messages dropped, 0 flushes, 1 overruns)
Buffer logging: level ACDMEINW, 50 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning
Static Log Buffer:
Apr 16 18:21:25:A:System: Power Supply 2 , middle, Not Installed
(FAILED)
Apr 16 18:21:25:A:System: Power Supply 3 , top, Not Installed (FAILED)
Apr 16 18:22:12:I:System: i2c recovered (GIEI = clear), Severity Minor,
Mux index 0, Mux tap 4, ID 0x4, Addr 0x5, (FANTRAY4)

Dynamic Log Buffer (50 lines):
Apr 16 18:22:12:I:System: i2c recovered (GIEI = clear), Severity Minor,
Mux index 0, Mux tap 4, ID 0x4, Addr 0x5, (FANTRAY4)
Apr 16 18:21:27:I:System: bad i2c access (GIEI = set), Severity Minor,
Mux index 0, Mux tap 4, ID 0x4, Addr 0x5, (FANTRAY4)
Apr 16 18:21:25:A:System: bad i2c access (GIEI = set), Severity Major,
Mux index 0, Mux tap 4, ID 0x4, Addr 0x5, (FANTRAY4)
Apr 16 18:21:24:I:System: last good i2c access, Mux index 0, Mux tap 1,
ID 0x9, Addr 0x1, (SNM1TEMP)
```

When the GIEI flag is cleared, the first Syslog message in the static section of the log is updated to show that the GIEI is set to clear. The second Syslog message in the static section is removed. A copy of the updated first Syslog message is also generated in the dynamic section of the log and in SNMP log server.

When a problematic device is removed from the system, the GIEI is cleared and all Syslog messages are updated to show that the GIEI is set to clear.

If an I2C failure has not occurred, there will be no I2C messages in the static log, dynamic log, or SNMP log server. The following example shows output from the **show logging** command when there is no I2C failure.

## 5 Managing the device

```
PowerConnect# show logging
Syslog logging: enabled (0 messages dropped, 0 flushes, 1 overruns)
Buffer logging: level ACDMEINW, 50 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning
Static Log Buffer:
Apr 16 18:21:25:A:System: Power Supply 2 , middle, Not Installed (FAILED)
Apr 16 18:21:25:A:System: Power Supply 3 , top, Not Installed (FAILED)
Dynamic Log Buffer (50 lines):
Mar 28 12:36:47:A:System: Set fan speed to MED (75%)
Mar 25 21:40:47:A:System: Set fan speed to MED-HI (90%)
Mar 25 16:30:47:A:System: Set fan speed to MED (75%)
Mar 23 23:12:07:A:System: Set fan speed to MED-HI (90%)
```

If the system detects a major I2C failure, the system prevents the management module from accessing devices through the I2C serial bus. The output from the **show temperature** command reflect this action, as shown in these examples.

The following output is from the **show temperature** command with the GIEI set to major severity.

```
PowerConnect# show temperature
*** Note: ***
*** Global I2C Error Indicator is set (severity: Major). ***
*** All I2C access are skipped. ***
SLOT #: CARD TYPE: SENSOR # TEMPERATURE (C):
2 LP 1 34.0C
2 LP 2 44.250C
4 LP 1 36.0C
. . .
```

### Displaying device status and temperature readings

You can display the following information about the router:

- Power-on priority of the device slots
- Status of the fans
- Temperature readings of the management, switch fabric, interface, and fan control modules and the interval at which the system reads the temperature of these modules
- MAC address of the device

To display this information, enter the **show chassis** command at any level of the CLI.

```
PowerConnect# show chassis
*** MLXe-4 chassis ***
---POWERS ---
Power 1 (32011000 - AC 1200W): Installed (OK)
Power 2: not present
Power 3: not present
Total power budget for device = 1200 W
Total power used by system core = 183 W
Total power used by LPs = 386 W
Total power available = 631 W
Slot Power-On Priority and Power Usage:
Slot1 pri=1 module type=NI-MLX-1Gx20-GC 24-port 10/100/1000 Copper Module power
usage=156W
Slot4 pri=1 module type=NI-X-OC48x8 8-port OC48/12 STM16/STM4 Module power
usage=230W
--- FANS ---
```

```

right fan tray (fan 1): Status = OK, Speed = MED-HI (90%)
right fan tray (fan 2): Status = OK, Speed = MED-HI (90%)
--- TEMPERATURE READINGS ---
Active Mgmt Module: 36.500C 49.625C
Standby Mgmt Module: 36.250C 51.0C
SNM1: 37.0C
SNM2: 38.0C
SNM3: not present
LP1 Sensor1: 41.5C
LP1 Sensor2: 50.625C
LP4 Sensor1: 39.0C
LP4 Sensor2: 49.250C
LP4 Sensor3: UNUSED
LP4 Sensor4: 38.5C
LP4 Sensor5: 47.750C
LP4 Sensor6: UNUSED
Fans are in auto mode. Temperature Monitoring Poll Period is 60 seconds

```

The output displays the following information.

**TABLE 19** show chassis command output

This field...	Displays...
<b>Powers</b>	
Power <num>, <part num>	The Power <num> is the power supply number as positioned in the device. The number of power supplies are as follows: 4-slot devices: 1 – 3 8-slot devices: 1 – 4 16-slot devices: 1 – 8 The <part num> is the part number of the power supply purchased. This applies to AC power supplies.
Power <status>	Indicates whether an AC power supply is installed in the specified power supply slot and the status of the power supply, which can be one of the following: <ul style="list-style-type: none"> <li>• <b>Installed (Shutdown)</b>-The power supply has shut down. A power supply will shut down due to flapping, or if a shut down is enabled manually using the <b>power-off power-supply</b> command. Refer to “<a href="#">Enabling a power supply shutdown</a>” on page 165.</li> <li>• <b>Installed (OK)</b> – The power supply is functioning properly and supplying power to the device and installed modules.</li> <li>• <b>Failed</b> – The power supply is not functioning and is not supplying power to the device and installed modules.</li> <li>• <b>not present</b> – There is no power supply installed in the slot.</li> <li>• <b>Installed (Failed or Disconnected)</b> - The power supply is not functioning, or the power supply is not connected to the device and installed modules.</li> </ul>
Total power budget for device	The sum of all power (in watts), used by all power supplies currently functioning in the device.
Total power used by system core	The total power used by the management modules, switch fabric modules, and fans. Each component consumes different amounts of power.
Total power used by LPs	The total power used by the interface modules. Each module type consumes different amounts of power.
Total power available	The total power budget for the device minus the total power used by the system core and the installed interface modules.
Slot Power-On Priority	The configured power-on priority of each interface module.

**TABLE 19** show chassis command output (Continued)

This field...	Displays...
Slot <num> Slot1 – Slot16 4-slot device: Slot1 – Slot4 8-slot device: Slot1 – Slot8 16-slot device: Slot1 – Slot16	The slot <num> is the device slot number. The priority of each device slot as configured by the <b>lp-slot-priority</b> command. The priority can be 1 (low, default) – 8 (high). If the amount of power supplied to the device falls below a minimum threshold, the device slots with the lowest priority will likely lose power. For information about using the <b>lp-slot-priority</b> command, refer to “ <a href="#">Changing priority of slots for interface modules</a> ” on page 118.
<b>Fans</b>	
Fan <number>	Information about fans in the device.
Status	The fan status of a fan can be OK or Failed: <ul style="list-style-type: none"> <li>• <b>OK</b> – The fan is functioning properly and is keeping the temperature of each module within an acceptable range.</li> <li>• <b>Failed</b> – The fan is not working or the fan control module cannot control the fan.</li> </ul>
Speed	Fan speed can be one of four settings: <ul style="list-style-type: none"> <li>• <b>Low</b> – The fan is functioning at 50 percent of capacity.</li> <li>• <b>Medium</b> – The fan is functioning at 75 percent of capacity.</li> <li>• <b>Medium-high</b> – The fan is functioning at 90 percent of capacity.</li> <li>• <b>High</b> – The fan is functioning at 100 percent of capacity.</li> </ul>
<b>Temperature readings</b>	
Active and Standby Mgmt Module	The temperature of the active and standby management modules.
Fan <number>	The temperature of fan0 and fan1.
SNM<number>	The temperature of the switch fabric module.
LP<number>	The temperature of the interface module.
Temperature Monitoring Poll Period	The interval at which the system reads the temperature sensor on the management, switch fabric, interface, and fan control modules.
<b>MAC address</b>	
Backplane EEPROM MAC Address	The MAC address of the device.

## Displaying the Syslog configuration and static and dynamic buffers

To display the Syslog parameters currently in effect on a NetIron device, enter the **show logging** command from any level of the CLI.

```
PowerConnect> show logging
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
  Buffer logging: level ACDMEINW, 7 messages logged
  level code: A=alert C=critical D=debugging M=emergency E=error
               I=informational N=notification W=warning
  ...
```

### Syntax: show logging

The Syslog output displays the buffer configuration information, in the rows above the log entries.



**TABLE 20** Syslog buffer configuration

This field...	Displays...
Syslog logging	The state (enabled or disabled) of the Syslog buffer.
messages dropped	The number of Syslog messages dropped due to user-configured filters. By default, the software logs messages for all Syslog levels. You can disable individual Syslog levels, in which case the software filters out messages at those levels. Each time the software filters out a Syslog message, this counter is incremented.
flushes	The number of times the Syslog buffer has been cleared by the <b>clear logging</b> command. For information about clearing the Syslog buffer, refer to <a href="#">“Static and dynamic buffers”</a> on page 105.
overruns	The number of times the dynamic log buffer has filled up and been cleared to hold new entries. For example, if the buffer is set for 100 entries, the 101st entry causes an overrun. After that, the 201st entry causes a second overrun.
level	The message levels that are enabled. Each letter represents a message type and is identified by the key (level code) below the value. If you disable logging of a message level, the code for that level is not listed.
messages logged	The total number of messages that have been logged since the software was loaded.
level code	The message levels represented by the one-letter codes.

### *Static and dynamic buffers*

The software provides a static buffer and a dynamic buffer:

- **Static** – logs power supply failures, fan failures, and temperature warning or shutdown messages
- **Dynamic** – logs all other message types. The power supply messages are displayed in both static and dynamic logs.

In the static log, new messages replace older ones, so only the most recent message is displayed. For example, only the most recent temperature warning message will be present in the log. If multiple temperature warning messages are sent to the log, the latest one replaces the previous one. The static buffer is not configurable.

The message types that appear in the static buffer do not appear in the dynamic buffer. The dynamic buffer contains up to the maximum number of messages configured for the buffer (50 by default), then begins removing the oldest messages (at the bottom of the log) to make room for new ones.

The static and dynamic buffers are both displayed when you enter the **show logging** command.

```
PowerConnect(config)# show logging
...
Static Log Buffer:
Aug 27 12:42:42:A:Power Supply 6, 1st right, failed

Dynamic Log Buffer (50 lines):
Aug 27 12:19:04:I:Interface ethernet3/4, state up
Aug 27 12:19:04:I:Interface ethernet6/3, state up
Aug 27 12:19:04:I:Interface ethernet3/2, state up
```

```
Aug 27 12:19:04:I:Interface ethernet6/1, state up
Aug 27 12:19:00:N:Module up in slot 6
Aug 27 12:19:00:N:Module up in slot 3
Aug 27 12:18:43:I:Warm start
```

When you clear log entries, you can selectively clear the either buffer, or you can clear both. For example, to clear only the dynamic buffer, enter the **clear logging** command at the Privileged EXEC level.

```
PowerConnect# clear logging dynamic-buffer
```

**Syntax:** **clear logging** [**dynamic-buffer** | **static-buffer**]

Specify the **dynamic-buffer** keyword to clear the dynamic buffer, or the **static-buffer** keyword to clear the static buffer. If you do not specify a buffer, both buffers are cleared.

## Managing switch fabric modules

This section provides information about how to manage high speed switch fabric modules.

---

### NOTE

In CLI output, high-speed modules are referred to as generation 2 (G2) modules.

---

High speed switch fabric (HSF) modules can operate in normal mode (3.125 Gbps) or turbo mode (6.25 Gbps). HSF modules will boot in turbo mode only if all active interface modules are either NI-MLX-10Gx8-M modules or NI-MLX-48-T-A modules.

The system selects the operating mode for switch fabric modules at startup, or when the first switch fabric or interface module is installed. The system uses this mode for all modules that are subsequently installed.

---

### NOTE

Changes to the switch fabric operating mode do not take effect until after a system reload.

---

Standard and high-speed switch fabric modules are interoperable, with the following restrictions:

- The system blocks discovery of any standard switch fabric module if you have issued the **system-init block-g1-sfm** command. Refer to [“Blocking discovery of G1 switch fabric modules”](#) on page 109.
- If the system is operating in turbo mode, standard switch fabric modules and standard interface modules are automatically blocked.
- If there are any active G1 switch fabric modules, G2 interface modules are blocked.
- If there are any active G2 interface modules, G1 switch fabric modules are blocked.

## Forcing HSF modules to operate in normal mode

If necessary, you can configure HSF modules to operate in normal mode using the **system-init fabric-data-mode force normal** command.

```
PowerConnect(config)# system-init fabric-data-mode force-normal
```

**Syntax:** [**no**] **system-init fabric-date-mode force-normal**

If you remove the forced normal condition using the **no** version of this command, you must enter the **write-memory** command and restart the router.

## Managing the cooling system

This section provides configuration, management, and monitoring information about router cooling systems.

### Configuring the cooling system

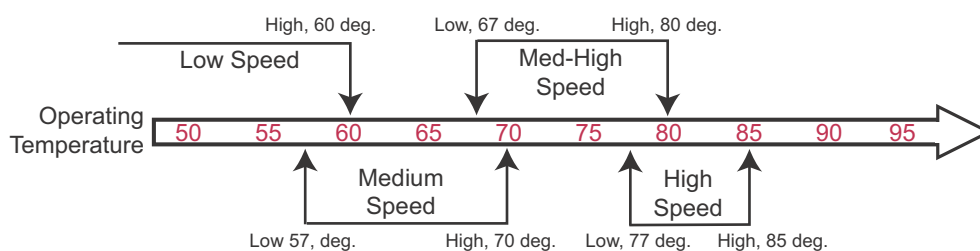
Your router is pre-configured with default settings for all cooling system parameters. Although no initial configuration of the cooling system is necessary, you can change the settings of the following cooling system parameters:

- Low and high temperature thresholds for modules and fan speeds
- Interval at which the system polls the temperature sensors on the module for a reading

#### *Changing temperature thresholds for modules and fan speeds*

The cooling system includes fans that operate at four speeds: low, medium, medium-high, and high. In general, each fan speed, (except for low), has a low and high temperature threshold associated with it, as shown in [Figure 64](#). The low fan speed has a high temperature threshold only.

**FIGURE 64** Fan speeds and temperature thresholds



The low and high temperature thresholds allow the router to determine the speed at which the fans should operate. In general, the fans operate according to these guidelines:

- If the temperature of all modules falls between the low and high thresholds for a fan speed, the fan continues to operate at that speed.
- If the temperature of a management module, switch fabric module, or two interface modules exceeds the high threshold specified for a fan speed, the fan changes to the next higher speed. If the temperature of any of the modules exceeds the high threshold for the high speed, the router shuts down the modules to prevent damage. The router also sends a warning message to the system log and an SNMP trap. For information about viewing the warning messages, refer to [“Displaying temperature warnings”](#) on page 112.
- The frequency with which the temperature is checked is determined by the setting of the **temp-poll-period** command. For information about **temp-poll-period** command, refer to [“Changing the temperature polling interval”](#) on page 110.
- If the temperature of a management module, switch fabric module, and interface modules falls below the low threshold for a fan speed, the fan changes to the next lower speed. If the temperature of all modules falls below the high threshold for the low speed, the fan operates at the low speed.

Table 21 describes the default temperature thresholds for PowerConnect B-MLXe devices.

**TABLE 21** Default temperature thresholds for modules and fan speeds for PowerConnect B-MLXe devices

Fan speed	Low temperature threshold	High temperature threshold
<b>Management modules</b>		
High	77° C	85° C
Medium-high	67° C	80° C
Medium	57° C	70° C
Low	-1°	60° C
<b>Interface modules</b>		
High	56° C	85° C
Medium-high	51° C	60° C
Medium	46° C	55° C
Low	-1°	50° C
<b>Switch fabric module</b>		
High	72° C	85° C
Medium-high	67° C	80° C
Medium	57° C	70° C
Low	-1°	60° C

For information about checking the current low and high temperature threshold settings for modules and fan speeds, refer to “Displaying temperature thresholds for modules and fan speeds” on page 109.

You can change the default low and high temperature thresholds for a particular module and fan speed. For example, to change the low and high thresholds of the medium fan speed for the management modules to 56° C and 72 °s C, respectively, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# fan-threshold mp med 56 72
```

**Syntax:** fan-threshold <module> [**low** <high-threshold>] [**med** <low-threshold> <high-threshold>] [**med-hi** <low-threshold> <high-threshold>] [**high** <low-threshold> <high-threshold>]

For the <module> parameter, you can specify the following:

- **lp** – Changes low and high temperature thresholds for interface modules
- **mp** – Changes low and high temperature thresholds for management modules
- **mp-cpu** – Changes low and high temperature thresholds for the management module CPU
- **switch fabric** – Changes low and high temperature thresholds for switch fabric modules

For the <low-threshold> and <high-threshold> parameters, you can specify any temperature in Centigrade. However, when changing low and high temperature thresholds for module fan speeds, remember that the low temperature threshold of a *higher* fan speed must be lower than the *high* temperature threshold of the lower fan speed. Dell has established this guideline to ensure fan speed stability.

For example, if you are changing the temperature thresholds for a management module high and medium-high fan speeds, the system will accept the following values because the low temperature threshold for the high speed (79° C) is lower than the high temperature threshold (82° C) for the medium-high speed.

Fan speed	Low temperature threshold	High temperature threshold
High	79° C	87° C
Medium-high	69° C	82° C

The device will **not** accept the following values because the low temperature threshold for the high speed (83° C) is higher than the high temperature threshold (82° C) for the medium-high speed.

Fan speed	Low temperature threshold	High temperature threshold
High	83° C	87° C
Medium-high	69° C	82° C

### Displaying temperature thresholds for modules and fan speeds

To check the current settings of the low and high temperature thresholds for modules and fan speeds, you can enter the **show fan-threshold** command at any level of the CLI.

```
PowerConnect# show fan-threshold
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_MP) ===
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 85
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_SNM) ===
Fan Speed Low: -1 - 30
Fan Speed Med: 27 - 40
Fan Speed Med-Hi: 37 - 50
Fan Speed Hi: 47 - 75
state = 2 (FAN_STATE_MED_HI)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_LP) ===
Fan Speed Low: -1 - 50
Fan Speed Med: 46 - 55
Fan Speed Med-Hi: 51 - 60
Fan Speed Hi: 56 - 95
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_LP_XPP) ===
Fan Speed Low: -1 - 50
Fan Speed Med: 45 - 65
Fan Speed Med-Hi: 60 - 75
Fan Speed Hi: 70 - 113
state = 1 (FAN_STATE_MED)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_STANDBY_MP) ===
Fan Speed Low: -1 - 60
```

## 5 Managing the cooling system

```

Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 85
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_MP_CPU) ===
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 95
state = 1 (FAN_STATE_MED)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
=== Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_STANDBY_MP_CPU) ===
Fan Speed Low: -1 - 60
Fan Speed Med: 57 - 70
Fan Speed Med-Hi: 67 - 80
Fan Speed Hi: 77 - 95
state = 0 (FAN_STATE_LOW)
max_ts_shut_off_count = 1
shut_off_count = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

### Syntax: show fan-threshold

The output displays the following information.

**TABLE 22** Temperature threshold information for modules and fan speeds

This field...	Displays...
Thermal Sensor Control Block (THERMAL_SENSOR_TEST_RULE_<module>)	The temperature threshold information for the various modules. The <module> parameter indicates the following: <ul style="list-style-type: none"> <li>• MP - The active management module</li> <li>• STANDBY_MP - The standby management module</li> <li>• SNM - The switch fabric module</li> <li>• LP - An interface module</li> </ul>
Fan Speed Low or Med or Med-Hi or Hi	The current setting of the low and high temperature thresholds for the low, medium, medium-high, and high fan speeds. <p><b>NOTE:</b> The low fan speed for each module does not have a default low temperature threshold value, nor can you configure this value. The "-1" value that appears in the Fan Speed Low field for each module is a Dell internal value only.</p>
State = 0 (FAN_STATE_LOW)	For Dell internal use only.
max_ts_shut_off_count	For Dell internal use only.
shut_off_count = 0 0 0 0 0 0 0	For Dell internal use only.

### *Changing the temperature polling interval*

By default, the router reads the temperature sensor on each module every 60 seconds. To change the polling interval, enter the **temp-poll-period** command at the global CONFIG level of the CLI.

```
PowerConnect(config)# temp-poll-period 120
```

### Syntax: temp-poll-period <seconds>

For the <seconds> parameter, you can specify a value from 30 - 120. You can also specify 0, which disables the system from polling the temperature sensor on each module.

## Manually setting the fan speed

Typically, the management module, in conjunction with default settings of low and high temperature thresholds, determines the speed of the two four-speed fans. (For information about changing the low and high temperature thresholds, refer to [“Changing temperature thresholds for modules and fan speeds”](#) on page 107.) You can manually set the fan speed using the **set-fan-speed** command in the Global CONFIG level of the CLI.

For example, to set the speed of fan 0 to medium-high, enter the following command.

```
PowerConnect# set-fan-speed med-high
```

**Syntax:** **set-fan-speed** <fan-speed>

For the <fan-speed> parameter, you can specify the following:

- **auto** – The system is adjusted by the monitoring system.
- **high** – The system sets the fan speed to high.
- **low** – The system sets the fan speed to low.
- **med** – The system sets the fan speed to medium.
- **med-high** – The system sets the fan speed to medium-high.

## Monitoring the cooling system

You can monitor the following aspects of the router cooling system:

- The temperature of the fan control modules
- The status and speed of the fans
- The temperature warnings sent to the system log and that generate an SNMP trap

### *Displaying fan tray status and speed*

To display the status and speed of the 4-speed fans in the router, enter the **show chassis** command at any level of the CLI.

```
PowerConnect# show chassis
...
--- FANS ---
Right Fan Tray: Fan 5: Status = OK, Speed = LOW (50%)
Right Fan Tray: Fan 6: Status = OK, Speed = LOW (50%)...
```

**TABLE 23** Fan status and speed fields

This Field...	Displays...
Status	The status can be one of the following: <ul style="list-style-type: none"> <li>• <b>OK</b> – The fan is functioning properly and is keeping the temperature of each module within an acceptable temperature range.</li> <li>• <b>Failed</b> – The fan is not functioning properly or the fan control module cannot control the fan.</li> </ul>
Speed	The speed can be one of the following: <ul style="list-style-type: none"> <li>• <b>LOW</b> – The fan is functioning at 50 percent of capacity.</li> <li>• <b>MEDIUM</b> – The fan is functioning at 75 percent of capacity.</li> <li>• <b>MEDIUM-HIGH</b> – The fan is functioning at 90 percent of capacity.</li> <li>• <b>HIGH</b> – The fan is functioning at 100 percent of capacity.</li> </ul>

### *Displaying temperature warnings*

If the temperature of a module exceeds the high temperature threshold for any of the fan speeds, the system sends a warning message to the system log and an SNMP trap. (For more information about the low and high temperature thresholds, refer to [“Changing temperature thresholds for modules and fan speeds”](#) on page 107.) This section describes how to view the system log. If you have configured your router to use a Syslog server or SNMP trap receiver, refer to the documentation for the server or receiver.

To display the system log, enter the show log command at any CLI level.

```
NetIron# show log
```

**Syntax:** show log

### Temperature log reduction

Depending on settings and temperature readings, fan speeds are changed dynamically within the following ranges: low, med, med-hi, and high. Fan speed changes are determined by temperature thresholds set for sensors on the management modules, interface modules and switch fabric modules. When a temperature threshold is passed upward on any module, the fan speed changes to the assigned fan speed. This occurs even if the temperature is within the threshold for the slower fan speed on other modules. In previous versions of the software, a log message is sent whenever a temperature threshold is crossed on any module whether the fan speed is actually increased or not. This can result in excessive log messages.

The default behavior is a for log message to be sent only when the fan speed is actually changed, which reduces the number of messages. A CLI option allows you to log all messages or have a single log message sent when any temperature threshold is crossed.

Details about how to set temperature thresholds and default threshold values are described in the [“Configuring the cooling system”](#) on page 107

### *Configuring temperature logging*

The **temp log-threshold** command sets the temperature logging threshold to send a single message whenever any of the thresholds are crossed.

```
PowerConnect(config) temp-log-threshold low
```

**Syntax:** temp-log-threshold [verbose | high | low | med | med-high]



- The **verbose** option generates logs whenever a temperature threshold is crossed. This is the operational mode of previous versions of Multi-Service IronWare software and provides backward compatibility.
- The **high** option generates logs only when the high threshold is crossed.
- The **low** option generates logs whenever any threshold (low, medium, medium-high or high) is crossed.
- The **med** option generates logs only when the medium, medium-high, and high thresholds are crossed.
- The **med-high** option generates logs only when the medium-high and high thresholds are crossed. This is the default setting.

This output displays two instances of a module temperature exceeding the warning threshold.

## Managing interface modules

### Configuring interface module boot parameters

Ethernet interface modules contain independent copies of system software and boot after the management module boots. By default, the following boot-related events occur:

- The router synchronizes, or prompts you to synchronize, the software image on the interface modules with the software on the management module.
- Interface modules boot from a source specified by the management module (the default source is a primary image in the flash memory on the interface module.)

You can make these changes:

- Disable the synchronization of images between the management module and all interface modules. You can also initiate an immediate synchronization.
- Change the boot source of one or all interface modules.

### *Synchronizing the software image between management modules and interface modules*

An interface module can have primary and secondary images that reside in the flash memory.

If you copy the primary or secondary image to all interface modules using the **copy** command with the **all** keyword, the management module makes a copy of the file and stores it in code flash under the names *lp-primary-0* or *lp-secondary-0*. The images are stored in this location only and are not run by the management module or the interface modules. If you copy the primary or secondary image to a specified device slot using the **copy** command with the *<device-slot-number>* parameter, the management module does not make a copy of the file.

If the management module has a copy of the primary or secondary image in code flash, by default, the router synchronizes, or prompts you to synchronize, images between the management module and the interface modules during the boot process. When the router synchronizes the images, the management module copies the images from flash memory to the flash memory on the interface module (the default boot source for the interface modules).

You can manage synchronization of the software images between management and interface modules in the following situations:

- You are prompted to synchronize the software images during the boot process.
- You want to initiate an immediate synchronization; for example, you want an immediate update of the software images on one or all interface modules.
- You want to disable synchronization; for example, you have upgraded the image of one interface module but want to continue running the older image on all other interface modules.

The following sections discuss how to manage software image synchronization in these situations.

### Synchronizing the software image on interface modules during the boot process

By default, the router checks the software images in the flash memory on interface modules during the boot process to see if they are the same as the images in the flash memory on the management module. If an interface module does not have a software image, the system automatically downloads the image from the management module to the interface module.

If an interface module has an image that is different from that on the management module, the system prompts you to take one of the following steps:

- To update the primary and secondary images on the interface module with the images on the management module, enter the **lp cont-boot sync** <slot-number> command at the Privileged EXEC prompt.
- To retain the software images on the interface module, enter the **lp cont-boot no-sync** <slot-number> command at the Privileged EXEC prompt.

**Syntax:** **lp cont-boot sync** <slot-number>

**Syntax:** **lp cont-boot no-sync** <slot-number>

### Specifying an immediate synchronization

To immediately synchronize software images between the management module and one or all interface modules, enter the following command at the Privileged EXEC level.

```
PowerConnect# lp sync all
```

**Syntax:** **lp sync** [**all** | <slot-number>]

- The **all** keyword indicates that the immediate synchronization applies to all interface modules in the router.
- The <slot-number> parameter specifies the slot number that contains the interface module to which the immediate synchronization applies. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Specifying an immediate shutdown

The management module takes approximately 16-20 seconds to shutdown all interface modules in a device after a reload is issued. During this time, the interface module continues sending packets. Enter the **lp fast-powerdown** command to immediately shut down all interface modules in a device after a reload is issued.

```
PowerConnect(config)# lp fast-powerdown
```

**Syntax:** [**no**] **lp fast-powerdown**

If you do not enter this command, by default, the interface module continues to forward packets for an extended time after the router is reloaded.

---

**NOTE**

You do not need to change the state of the interface module, or synchronize this shutdown with the standby management module.

---

### *Changing the boot source*

By default, the interface modules boot from the primary image located in flash memory. You can change the boot source of one or all interface modules to one of the following sources:

- Management module
  - PCMCIA flash card in slot 1 or 2
  - Primary or secondary image in the management module flash memory
- Interface module
  - Secondary image in interface module flash memory
- TFTP server

You can also specify an interactive boot, which allows you to enter a separate command after the interface module comes up. The command specifies the source from which one or all interface modules should boot.

When changing the boot source for one or all interface modules, you can specify one of the following:

- An immediate boot for one interface module from a specified source
- An automatic boot for one or all interface modules from a specified source starting with the next software reload or system reset and each reload or reset after that

The CLI command for specifying an immediate boot for one interface module is the same as that for specifying an automatic boot for one or all modules. The only difference is the CLI level from which you execute the command. You must specify the command for an immediate boot in the Privileged EXEC level and the command for an automatic boot in the global CONFIG level.

The following sections explain how to specify an immediate boot and an automatic boot.

#### **Specifying an immediate boot**

You can specify an immediate boot for one interface module from a specified source by entering the **lp boot system** command in the Privileged EXEC level. The entered command will override the default or configured boot source one time only.

#### **Specifying an immediate boot from the PCMCIA slots on the management module**

To specify an immediate boot for the interface module installed in slot 1 from the PCMCIA slot on the management module, enter the **lp boot system** command at the Privileged EXEC level of the CLI.

```
PowerConnect# lp boot system slot1 primary 1
```

**Syntax:** **lp boot system slot1 | slot2 <filename> <slot-number>**

- The **slot1** and **slot2** keywords indicate the PCMCIA slot on the management module from which to boot the interface module.
- The **<filename>** parameter specifies the name of the image from which to boot the interface module.

- The *<slot-number>* parameter specifies the device slot number that contains the interface module that will undergo an immediate boot. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Specifying an immediate boot from management module flash memory

To specify an immediate boot from the primary image on the management module for the interface module installed in slot 1, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# lp boot system mp primary 1
```

**Syntax:** `lp boot system mp primary | secondary <slot-number>`

- The **primary** and **secondary** keywords specify the primary or secondary software image in flash memory on the management module.
- The *<slot-number>* parameter specifies the device slot number that contains the interface module that will undergo an immediate boot. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Specifying an immediate boot from flash memory on the interface module

To specify an immediate boot from the primary image in flash memory on the interface module installed in slot 1, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# lp boot system flash primary 1
```

**Syntax:** `lp boot system flash [primary | secondary] <slot-number>`

- The **primary** and **secondary** keywords specify the primary or secondary image in the interface module flash memory.
- The *<slot-number>* parameter specifies the slot number that contains the interface module that will undergo an immediate boot. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Specifying an immediate boot from a TFTP server

To specify an immediate boot for the interface module installed in slot 1 from a TFTP server, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# lp boot system tftp 123.123.123.123 primary 1
```

**Syntax:** `lp boot system tftp <ip-address> <filename> <slot-number>`

- The *<ip-address>* parameter specifies the IP address of the TFTP server from which the interface module will be booted.
- The *<filename>* parameter specifies the name of the image from which to boot the interface module.
- The *<slot-number>* parameter specifies the slot number that contains the interface module that will undergo an immediate boot. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Specifying an immediate interactive boot

To specify an immediate interactive boot for the interface module installed in slot 1, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# lp boot system interactive 1
```

**Syntax:** `lp boot system interactive <slot-number>`

- The `<slot-number>` parameter specifies the slot number that contains the interface module that will undergo an immediate boot. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

After you enter this command, the system enters monitor mode on the interface module. To boot from the primary image in flash memory on the interface module, enter the following command at the monitor prompt.

```
LP MONITOR> boot system flash primary
```

**Syntax:** `boot system flash primary`

### Configuring an automatic boot

To configure an automatic boot for one or all interface modules from a specified source, enter the **lp boot system** command in the global CONFIG level. If you save this configuration by entering the **write memory** command, the system implements the automatic boot starting with the next software reload or system reset and each reload or reset after that.

### Configuring an automatic boot from the PCMCIA slot on the management module

To configure an automatic boot for all interface modules from PCMCIA slot1 on the management module, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# lp boot system slot1 primary all
```

**Syntax:** `lp boot system [slot1 | slot2] <filename> [all | <slot-number>]`

- The **slot1** and **slot2** keywords indicate the PCMCIA slot on the management module from which to boot the interface modules.
- The `<filename>` parameter specifies the name of the image from which to boot the interface modules.
- The **all | <slot-number>** parameter specifies that the automatic boot applies to all interface modules in the device or to an interface module in the specified device slot number only. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Configuring an automatic boot from flash memory on the management module

To configure an automatic boot from the primary image in flash memory on the management module for all interface modules, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# lp boot system mp primary all
```

**Syntax:** `lp boot system mp [primary | secondary] [all | <slot-number>]`

- The **primary** and **secondary** keywords specify the primary or secondary image in flash memory on the management module.
- The **all | <slot-number>** parameter specifies that the automatic boot applies to all interface modules in the device, or to an interface module in the specified device slot number only. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Configuring an automatic boot from flash memory on the interface module

To configure an automatic boot from the primary image in flash memory on the interface module for all interface modules, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# lp boot system flash primary all
```

**Syntax:** `lp boot system flash [primary | secondary] [all | <slot-number>]`

- The **primary** and **secondary** keywords specify the primary or secondary image in the interface module flash memory.
- The **all | <slot-number>** parameter specifies that the automatic boot applies to all interface modules in the device or to an interface module in the specified slot number only. You can specify 1 – 4 for 4-slot devices, 1 – 8 for 8-slot devices, or 1 – 16 for 16-slot devices.

### Configuring an automatic boot from a TFTP server

To configure an automatic boot for all interface modules from a TFTP server, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# lp boot system tftp 123.123.123.123 primary all
```

**Syntax:** `lp boot system tftp <ip-address> <filename> [all | <slot-number>]`

- The *<ip-address>* parameter specifies the IP address of the TFTP server from which the interface modules will be booted.
- The *<filename>* parameter specifies the name of the image from which to boot the interface modules.
- The **all | <slot-number>** parameter specifies that the automatic boot applies to all interface modules in the router or to an interface module in the specified router slot number. You can specify 1 – 4 for 4-slot routers, 1 – 8 for 8-slot routers, or 1 – 16 for 16-slot devices.

### Configuring an automatic interactive boot

To configure an automatic interactive boot for all interface modules, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# lp boot system interactive all
```

**Syntax:** `lp boot system interactive [all | <slot-number>]`

The **all | <slot-number>** parameter specifies that the automatic boot applies to all interface modules in the router, or to an interface module in the specified slot number. You can specify 1 – 4 for 4-slot routers, 1 – 8 for 8-slot routers, or 1 – 16 for 16-slot devices.

After you enter this command, the system enters monitor mode on the interface module. To boot from the primary image in flash memory on the interface module, enter the following command at the monitor prompt.

```
LP MONITOR> boot system flash primary
```

**Syntax:** `boot system flash primary`

## Changing priority of slots for interface modules

You can prioritize the slots in which the interface modules are installed. The priority range is 1 (low) – 8 (high). You can set one, some, or all slots to the same priority or each slot to a different priority. If you assign the same priority to all slots, the lowest-number slot has the highest priority, while the highest-numbered slot has the lowest priority.

By default, the priority of all slots is 1, which is the lowest priority. If the supply of power to the router falls below a minimum threshold, the slots will likely lose power because of their low priority. In this scenario for an 8-slot router, slot 8 will lose power first, then slot 7, slot 6, and so on until slot 1 loses power.

To set the priority of slot 1 to the highest priority (8), enter the following command.

```
PowerConnect(config)# lp-slot-priority 1 8
```

**Syntax:** `lp-slot-priority <slot-number> <priority>`

- The `<slot-number>` parameter indicates that the slot number for which you are changing the priority. You can specify 1 – 4 for 4-slot routers, 1 – 8 for 8-slot routers, or 1 – 16 for 16-slot devices.
- The `<priority>` parameter indicates the priority of the slot if the router loses power. You can specify a value of 1 – 8, where 1 is the lowest priority and 8 is the highest priority. You can set one, some, or all slots to the same priority or each slot to a different priority.

## Disabling and re-enabling power to interface modules

You can disable and re-enable power to a specified interface module, or to all interface modules. For example, to disable power to the interface module in slot 1, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# power-off lp 1
```

To disable power on all interface modules, enter the following command:

```
PowerConnect# power-off lp all
```

In this output example, there is one interface module in slot 2, which is powered off.

```
PowerConnect# power-off lp all
Slot 2 is powered off.
rw_power_off_lp: write 00030000 to RW_MBRIDGE_CARD_POWER_OFF_REG
```

**Syntax:** `power-off lp <slot-number> all`

- The `<slot-number>` parameter indicates the slot number for which you are disabling the power. You can specify 1 – 4 for 4-slot routers, 1 – 8 for 8-slot routers, or 1 – 16 for 16-slot devices.
- The `all` parameter allows you to power off all interface modules.

To re-enable power to the interface module in slot 1, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# power-on lp 1
```

To re-enable power on all interface modules, enter the following command.

```
PowerConnect# power-on lp all
```

In this output example, there is one interface module in slot 3 and slot 3 is powered on.

```
PowerConnect# power-on lp all
Slot 3 is powering on.
rw_power_on_lp: write 00070004 to RW_MBRIDGE_CARD_POWER_OFF_REG
```

**Syntax:** `power-on lp [<slot-number> | all]`

- The `<slot-number>` parameter indicates the slot number for which you are re-enabling the power. You can specify 1 – 4 for 4-slot routers, 1 – 8 for 8-slot routers, or 1 – 16 for 16-slot devices.
- The `all` parameter allows you to power on all interface modules.

## Enabling and disabling management module CPU usage calculations

You can enable the router to perform usage averaging calculations on tasks handled by CPU on the management module. You can then display usage averages for all tasks performed by the CPU on the management module for an interval of up to one hour. You can display these statistics using the **show cpu** command.

---

### NOTE

Typically, these statistics are used for debugging purposes.

---

By default, the performance of the calculations is disabled. When disabled, you can use the **show cpu** command without optional parameters to display usage averages for all tasks performed by CPU on the management module.

---

### NOTE

The **cpu-usage** command must be configured in order to poll the MP CPU utilization.

---

To enable the usage averaging calculations, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# cpu-usage on
```

#### Syntax: **cpu-usage on**

To disable the usage averaging calculations, enter the following command at the global CONFIG level of the CLI.

```
PowerConnect(config)# cpu-usage off
```

#### Syntax: **cpu-usage off**

---

### NOTE

When you are finished gathering statistics for debugging purposes, it is recommended that you disable the usage averaging calculations, which are CPU-intensive and can affect the performance of the management module.

---

## Displaying CPU usage

Use the **show cpu** command to display usage averages for all tasks performed by the management module as shown in this example.

```
PowerConnect# show cpu
... Usage average for all tasks in the last 1 seconds ...
=====
Name                us/sec          %
idle                755423          100
monitor             13              0
wd                  46              0
flash               0               0
dbg                 6               0
boot                92              0
main                0               0
itc                 0               0
tmr                 588             0
```



ip_rx	211	0
scp	36	0
console	54	0
vlan	0	0
mac_mgr	38	0
mrp	0	0
vsrp	0	0
snms	71	0
rtm	640	0
rtm6	40	0
ip_tx	2478	0
rip	0	0
mpls	119	0
nht	0	0
mpls_glue	13	0
bgp	0	0
bgp_io	0	0
ospf	737	0
ospf_r_calc	0	0
isis	38	0
isis_spf	0	0
mcast	18	0
msdp	134	0
vrrp	0	0
ripng	0	0
ospf6	66	0
ospf6_rt	0	0
mcast6	7	0
bfd	0	0
l4	98	0
stp	0	0
gvrp_mgr	0	0
snmp	0	0
rmon	13	0
web	86	0
lacp	0	0
dot1x	0	0
dot1ag	7	0
hw_access	1049	0
ospf_msg_task	0	0
telnet_0	0	0
telnet_1	44	0

**Syntax:** show cpu

## Displaying management module CPU usage

You can display the tasks handled by the management module and the amount of the management module CPU used by each task by entering the **show tasks** command at any level of the CLI.

```
PowerConnect# show tasks
```

Task Name	Pri	State	PC	Stack	Size	CPU Usage(%)	task id	task vid
idle	0	run	00001904	040560a0	256	66	0	0
monitor	20	susp	0000c658	0404bd80	8192	0	0	0
int	16	susp	0000c658	04051f90	16384	0	0	0
timer	15	susp	0000c658	04055f90	16384	0	0	0
dbg	30	susp	0000c658	0404df10	8192	0	0	0
flash	17	susp	0000c658	0409cf98	8192	0	0	0
wd	31	susp	0000c658	0409af80	8192	0	0	0
boot	17	susp	0000c658	041dbe30	65536	0	0	0
main	3	susp	0000c658	2060cf38	65536	0	0	1
itc	6	susp	0000c658	20610af0	16384	0	0	1
tmr	5	susp	0000c658	206a7638	16384	0	0	1
ip_rx	5	susp	0000c658	206aef48	16384	0	0	1
scp	5	susp	0000c658	206b3638	16384	0	0	1
console	5	susp	0000c658	206bf628	32768	0	0	1
vlan	5	susp	0000c658	206c6628	16384	0	0	1
mac_mgr	5	susp	0000c658	206d5638	16384	0	0	1
mrp_mgr	5	susp	0000c658	206db638	16384	0	0	1
vsrp	5	susp	0000c658	206e1630	16384	0	0	1
snms	5	susp	0000c658	206e5638	16384	0	0	1
rtm	5	susp	0000c658	20756638	16384	0	0	1
ip_tx	5	run	0000c658	20763638	16384	0	0	1
mcast	5	susp	0000c658	20767638	16384	0	0	1
l4	5	susp	0000c658	2076b630	16384	0	0	1
stp	5	susp	0000c658	20970628	16384	0	0	1
gvrp_mgr	5	susp	0000c658	20979638	16384	0	0	1
snmp	5	susp	0000c658	20982638	32768	0	0	1
web	5	susp	0000c658	2098d638	32768	0	0	1
lacp	5	susp	0000c658	20991638	16384	0	0	1
hw_access	5	susp	0000c658	20996638	16384	0	0	1
telnet_0	5	run	0000c658	209db638	32768	0	0	1

**Syntax: show tasks**

Examine the CPU Usage (%) field to determine the percentage of management module CPU used by each task.

**NOTE**

The total CPU usage may not add up to 100 percent. The total may not include resources used by the management processes.

A problem could exist if the CPU usage is distributed unevenly to one task, other than the idle task, for a prolonged period. If this situation occurs, contact Dell Technical Support for assistance.

## Removing MAC address entries

You can remove the following learned MAC address entries from the system MAC address table:

- All MAC address entries
- All MAC address entries for a specified interface module
- All MAC address entries for a specified Ethernet port
- All MAC address entries for a specified VLAN
- A specified MAC address entry in all VLANs

For example, to remove entries for the MAC address 000d.cb80.00d in all VLANs, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# clear mac-address 000d.cb80.00d0
```

**Syntax:** `clear mac-address <mac-address> [ethernet <slot-num>/<port-num>] | [module <slot-num>] | vlan <number>`

- If you enter the **clear mac-address** command without any parameters, the software removes all MAC entries.
- Use the `<mac-address>` parameter to remove a specified MAC address from all VLANs. Specify the MAC address in the following format: HHHH.HHHH.HHHH.
- Use the **ethernet <slot-num>/<port-num>** parameter to remove all MAC addresses for a specified Ethernet port. For the `<slot>` parameter, enter the number of the device slot in which the Ethernet interface module is installed. For the `<port>` parameter, enter the Ethernet port for which to remove all MAC addresses.
- Use the **module <slot-num>** parameter to remove all MAC addresses for an interface module in a specified device slot.
- Use the **vlan <number>** parameter to remove all MAC addresses for a specified VLAN.

## 5 Removing MAC address entries

# Upgrading Software Images and Configuration Files

## Upgrading Software Images and Configuration Files

---

### NOTE

The software described in this section applies only to the PowerConnect B-MLXe series routers. You cannot use this software on other Dell devices.

---

[Table 24](#) shows you where to find upgrade instructions specific to your upgrade needs.

**TABLE 24** Where to find the upgrade instructions for your router and configuration

If you are upgrading:	Go to these sections (in the order listed)
All devices	<a href="#">“Important software upgrade considerations”</a> on page 126.
<b>PowerConnect B-MLXe routers</b>	
Determine current image version	<a href="#">“Determining current software image versions”</a> on page 131.
Basic upgrade steps	<a href="#">“Software upgrade procedures”</a> on page 130
Routers with 10Gx8 modules	<a href="#">“Considerations for NI-MLX-10Gx8 interface modules that require high-speed switch fabric modules”</a> on page 128.
Routers where you are installing high-speed switch fabric modules	<a href="#">“Considerations for NI-MLX-10Gx8 interface modules that require high-speed switch fabric modules”</a> on page 128.
Post-upgrade tasks	<a href="#">“Rebooting the management module”</a> on page 136, <a href="#">“Performing an image coherence check”</a> on page 137.

---

For non-standard upgrades, and special software upgrade considerations, refer to [“Important software upgrade considerations”](#) on page 126.

The following steps are required to perform a basic software upgrade.

**Step 1** - Determine the software versions currently running on your router. If your router is running image versions that are not compatible with R05.1.00, you will need to upgrade those images. Refer to [Table 25](#) for the required image versions. If your system is not running incompatible versions, proceed to step 2.

**TABLE 25** Required images for R05.1.00 upgrade

Required image	Image name
Combined application image for management modules	xm5100
Monitor image for management modules	xmb05100
Monitor image for interface modules	xmlb05100
Boot image for management modules	xmprm05100
Boot image for interface modules	xmlprm05100
Combined FPGA image for interface modules	lpfpga05100

---

## 6 Important software upgrade considerations

**Step 2** – Upgrade the combined application image on all management modules. Refer to “[Software upgrade procedures](#)” on page 130.

**Step 3** – Upgrade the monitor image for management modules and interface modules. Refer to “[Upgrading the monitor image on a management module](#)” on page 131.

**Step 4** - Upgrade the boot images for management modules and interface modules. Refer to <<<

**Step 5** - Upgrade the combined FPGA image on interface modules. Refer to “[Upgrading interface modules using the combined FPGA image](#)” on page 133.

**Step 6** - Perform an image coherency check. Refer to “[Performing an image coherence check](#)” on page 137

**Step 7** – Reboot the management module. Refer to “[Rebooting the management module](#)” on page 136.

[Table 26](#) lists the individual images for R05.1.00.

**TABLE 26** Software images for R05.1.00

Hardware	Image type	Image name	R05.1.00 compatible version	
Management modules	Boot	xmprm05100	n/a	
	Monitor	xmb05100	n/a	
	Application	xmr05100	n/a	
	Combined Application	xm05100	n/a	
	MBRIDGE	mbridge_05100.xsvf	32	
Interface modules	Boot	xmlprm05100	n/a	
	Monitor	xmlb05100	n/a	
	Application	xmlp05100	n/a	
	Combined FPGA	lpfpga05100	n/a	
	Individual FPGA images	pbifsp2.bin (all Ethernet modules except Mini-RJ)		3.22
		xppsp2.bin (all Ethernet modules except Mini-RJ)		6.04
		pbifmrj.bin (NI-MLX-1Gx48T-A modules only)		2.06
		xppmrj.bin (NI-MLX-1Gx48T-A modules only)		3.24
		statsmrj.bin (NI-MLX-1Gx48T-A modules only)		6.03
		pbif8x10.bin (NI-MLX-10Gx8 modules only)		0.08
xpp8x10.bin (NI-MLX-10Gx8 modules only)			0.28	
Switch fabric modules	SBRIDGE	sbridge_05100.mcs	6	
High speed switch fabric modules	HSBRIDGE	hsbridge_05100.mcs	16	

## Important software upgrade considerations

Read the following information carefully before you begin your software upgrade.

## General upgrade considerations

- The combined interface module FPGA image can exceed 32 MB, which is greater than the file size limit in older versions of TFTP server applications. Before using TFTP to transfer image files, be sure that you are using an updated TFTP server capable of handling larger file sizes.
- In most cases boot and monitor images do not need to be upgraded, regardless of whether you are using the combined IronWare image, or are copying images to the management module and interface modules individually. Do not upgrade boot or monitor images unless you are explicitly instructed to do so in the upgrade instructions for the version you are using.
- Hitless OS upgrades are only supported for upgrades within the same major software release. Hitless OS upgrades are not supported for upgrades from one major release to another major release. For more information about hitless upgrades, refer to “Hitless IS Upgrades”.

## Special upgrade information for PowerConnect B-MLXe routers

- PowerConnect B-MLXe routers require a minimum software release of R05.1.0.
- In rare circumstances, you may receive management modules that are running Pre 5.1.0 code. In this instance, follow the instructions below to upgrade the management module and the MLXe router to R05.1.00.

## Interface module software upgrade considerations

The following sections contain important upgrade information for interface modules.

### Interface module FPGA image upgrade considerations

---

**NOTE**

You must use FPGA images that are specified for PowerConnect B-MLXe series routers. Use of FPGA images intended for other products will render your chassis inoperable.

---

The following rules apply when upgrading FPGA images on interface modules:

- FPGA images on interface modules must be compatible with the software version running on the router.
- You can upgrade FPGA images
  - individually, or upgrade all FPGA images using the combined FPGA image.
  - When you copy the
    - combined FPGA image from to the management module, the management module selects the FPGA images to be downloaded based on the types of interface modules installed and checks for duplicates before downloading the images.
- The FPGA upgrade utility compares the FPGA image version currently installed to new images being downloaded. If the versions are identical, the download is aborted and a warning message is displayed. You can use the **force-overwrite** option with the FPGA upgrade command to override this feature.
- The bundled FPGA image is more than 32 MB in size. If you are using a TFTP server, be sure that it is capable of handling larger file sizes.

### *Considerations for NI-MLX-10Gx8 interface modules that require high-speed switch fabric modules*

Some interface modules require high-speed switch fabric modules to operate, (for example, NI-MLX-10Gx8-M and NI-MLX-10Gx8-D. If you are installing any of the following modules in your router, you must install high-speed switch fabric modules (if not already installed).

If you install NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules in your router, you must upgrade the entire system to software R05.1.00, and replace existing switch fabric modules with high-speed switch fabric modules. Be sure to remove all standard switch fabric modules **BEFORE** you install NI-MLX-10Gx8-M or NI-MLX-10Gx8-D modules in your router.

If you do not replace the switch fabric modules with high-speed switch fabric modules, the NI-MLX-10Gx8 modules will not work. For 16-slot routers, you must also install high-speed fans.

---

**NOTE**

Do not attempt to downgrade NI-MLX-10Gx8 modules or high-speed switch fabric modules to software releases older than 5.1.0.0. These modules will not operate with older software.

---

To upgrade software and install high-speed switch fabric modules and NI-MLX-10Gx8 modules at the same time, first make sure your router is running R05.0.xx or later, then perform the following steps.

---

**NOTE**

Traffic may be briefly interrupted during an inline upgrade procedure.

---

1. Upgrade your router to R05.1.00. This upgrade must include all application, boot, and monitor files, and all management, interface, and switch fabric module FPGAs.
2. Restart your router.
3. Enter the **show version** command to confirm that the upgrade was successful.
4. Remove a standard switch fabric module (SFM).
5. Install a high-speed switch fabric module (hSFM) in the empty switch fabric slot.
6. To confirm that the new module is operating properly, enter the **show module** command.  
  
Repeat steps 4 through 6 to replace the remaining switch fabric modules with high-speed switch fabric modules.
7. Install an NI-MLX-10Gx8 module into an empty interface module slot.
8. To confirm that the module is operating properly, enter the **show module** command.  
  
Repeat steps 7 and 8 to install all remaining NI NI-MLX-10Gx8 modules.

### **Important memory requirement information**

Before you begin your upgrade, verify that you have enough available bytes free in flash memory by entering the **dir** command.

```
PowerConnect# dir <<<<<
Directory of /flash/

08/31/1908 13:26:14                3  $$snmp_boots
```





## CLI upgrade commands for R05.1.00

The following table lists the commands used to upgrade from Pre5.1.0 to R05.1.00.

### NOTE

If you are upgrading using the combined images, you will only need to use a few of these commands.

**TABLE 27** CLI upgrade commands for R05.1.00

Command	Description
Combined application command	
<b>copy tftp image</b> <tftp_srvr> xm05100	Combined management module and interface module application image.
Management module image commands	
<b>copy tftp flash</b> <tftp_srvr> xmr05100.bin pri	Non-combined management module application.
<b>copy tftp flash</b> <tftp_srvr> xmb05100.bin mon	Management module monitor image.
<b>copy tftp flash</b> <tftp_srvr> xmprm05100.bin mon	Management module boot image.
Interface module image commands	
<b>copy tftp lp</b> <tftp_srvr> xmlp05100.bin pri	Non-combined interface module application.
<b>copy tftp lp</b> <tftp_srvr> xmlb05100.bin mon all	Interface module monitor image.
<b>copy tftp lp</b> <tftp_srvr> xmlprm05100.bin boot all	Interface module boot image.
Management module MBRIDGE command	
<b>copy tftp mbridge</b> <tftp_srvr> mbridge_05100.xsvf	Management module MBRIDGEimage.
Interface module FPGA commands	
<b>copy tftp lp</b> <tftp_srvr> lpfpga05100.bin fpga-all all	Combined FPGA image.
<b>copy tftp lp</b> <tftp_srvr> pbifsp2_05100.bin fpga-pbif all	4x10 and 24x1 interface modules.
<b>copy tftp lp</b> <tftp_srvr> xppsp2_05100.bin fpga-xpp all	4x10 and 24x1 interface modules.
<b>copy tftp lp</b> <tftp_srvr> xgmacsp2_05100.bin fpga-xgmac all	4x10 interface modules only.
<b>copy tftp lp</b> <tftp_srvr> statsoc_05100.bin fpga-stats all	All interface modules.
<b>copy tftp lp</b> <tftp_srvr> pbifmrj_05100.bin fpga-pbif all	48T interface modules only.
<b>copy tftp lp</b> <tftp_srvr> xppmrj_05100.bin fpga-xpp all	48T interface modules only.
<b>copy tftp lp</b> <tftp_srvr> statsmrj_05100.bin fpga-stats all	48T interface modules only.
<b>copy tftp lp</b> <tftp_srvr> pbif8x10_05100.bin fpga-pbif all	8x10 interface modules only.
<b>copy tftp lp</b> <tftp_srvr> xpp8x10_05100.bin fpga-xpp all	8x10 interface modules only.

## Software upgrade procedures

The following sections contain specific procedures for upgrading your PowerConnect B-MLXe router Multi-Service IronWare.

## Determining current software image versions

Before you upgrade your software, you should check the image versions currently installed to determine which ones need to be upgraded. If there are images on your system that are not compatible with R05.1.00 images, you will need to upgrade those images in addition to the basic required images.

To display image version information, enter the **show flash** or **show version** command. Compare the image versions to the compatible image version numbers in the table “Software images for R05.1.00.”

To see output examples of the **show flash** and **show version** commands, refer to “Displaying flash information and “Displaying version information.”

You should also check the installed images immediately after an upgrade to confirm that the upgrade was successful.

You should also verify that you have enough available flash memory to complete your upgrade. Refer to “Important upgrade memory requirements information.”

## Upgrading the combined IronWare Application Image on management modules

1. Place the new software images on an accessible TFTP server, or on a flash card inserted in slot 1 or 2 on the active management module.
2. Copy the new image from the TFTP server or the flash card to the flash memory on the management module by entering one of the following commands at the Privileged EXEC level of the CLI:

```
copy tftp image <tftp_srvr> xm05100.bin primary | secondary
```

```
copy slot1 | slot2 flash <ip-addr> xm05100.bin primary | secondary
```

The primary option copies the files to the primary image on the management module. The secondary option copies the files to the secondary image on the management module.

3. Verify that the new image has been successfully copied to the specified destination by entering one of the following commands at the Privileged EXEC level of the CLI:

```
show flash (if the destination was code flash)
```

```
dir /<path-name>/ (if the destination was slot 1 or 2)
```

Check for the primary or secondary image and the date and time that it was placed in the directory.

To upgrade other software images, refer to the appropriate upgrade section. When you have completed your upgrade, you must reboot the management module. Refer to “Rebooting the Management Module.”

## Upgrading the monitor image on a management module

To upgrade the monitor image on a management module, perform the following steps:

## 6 Software upgrade procedures

1. Place the new monitor image on an accessible TFTP server, or on a flash card inserted in slot 1 or 2 in the management module.
2. Copy the new monitor image to the router by entering one of the following commands.

**copy tftp flash <tftp\_srvr> xmb05100.bin monitor** - copies the new monitor image from the TFTP server to flash memory on the management module.

**copy slot1 | slot2 flash xmb05100.bin monitor** – copies the new monitor image from a flash card in slot 1 or slot 2 to flash memory on the management module.

3. Verify that the new monitor image has been successfully copied by entering one of the following commands at the Privileged EXEC level of the CLI:

show flash

**dir /<path-name>/** (if the destination is slot 1 or 2)

Check the monitor image version (xmb05100) and the date and time when the new image was built.

To upgrade other software images, refer to the appropriate upgrade section. When you have completed your upgrade, you must reboot the management module. Refer to “Rebooting the Management Module.”

### Upgrading the boot image on a management module

To upgrade the boot image on a management module, perform the following steps:

1. Place the new boot image on an accessible TFTP server, or on a flash card inserted in slot 1 or 2 in the management module.
2. Copy the new boot image to the router by entering one of the following commands.

**copy tftp flash <tftp\_srvr > xmprpm05100.bin boot** – copies the new boot image from the TFTP server to flash memory on the management module.

**copy slot1 | slot2 flash xmprpm05100.bin boot** – copies the new boot image from a flash card to flash memory on the management module.

3. Verify that the new boot image has been successfully copied by entering one of the following commands.

show flash

**dir /<path-name>/** (if the destination is slot 1 or 2)

Check the boot and monitor image versions, and the date and time when the new images were built.

To upgrade other software images, refer to the appropriate upgrade section. When you have completed your upgrade, you must reboot the management module. Refer to “Rebooting the Management Module.”

### Upgrading the boot and monitor images on interface modules

It is recommended that you perform this upgrade from a PC or terminal that is directly connected to the Console port on the management module. You can also perform this procedure through a Telnet or SSHv2 session.

To upgrade monitor and boot images for all interface modules or a specified interface module perform the following steps.

1. Place the new monitor and boot images on a TFTP server that the router can access, or on a flash card inserted in slot 1 or 2 of the management module.
2. Copy the new monitor and boot images to all interface modules, or to a specified interface module by entering one of the following commands.

**copy tftp lp <tftp\_srvr> xmlb05100.bin monitor all | <slot-number>** - copies the latest monitor image from the TFTP server to all interface modules or to a specified interface module.

**copy tftp lp <tftp\_srvr > xmlprm05100.bin boot all | <slot-number>** - copies the latest boot image from the TFTP server to all interface modules, or to a specified interface module.

**copy slot1 | slot2 lp <ip-address> xmlb05100.bin monitor all | <slot-number>** - copies the latest monitor image from the flash card to all interface modules or to a specified interface module.

**copy slot1 | slot2 lp <ip-address> xmlprm05100.bin boot all | <slot-number>** - copies the latest boot image from the flash card to all interface modules, or to a specified interface module.

3. Verify that the new images were successfully copied by entering the **show flash** command.

Check the monitor and boot image versions, and the date and time when the new images were built.

To upgrade other software images, refer to the appropriate upgrade section. When you have completed your upgrade, you must reboot the management module. Refer to “Rebooting the Management Module.”

## Upgrading interface modules using the combined FPGA image

To upgrade FPGA images on interface modules using the combined FPGA image, perform the following steps:

1. Place the combined FPGA image on an accessible TFTP server, or on a flash card inserted in management module slot 1 or 2.
2. Copy the bundled image from the TFTP server or flash card to all interface modules, or to a specific interface module by entering one of the following commands.

**copy tftp lp <tftp\_srvr> lpfpga05100.bin fpga-all [<slot-num> | all] [force -overwrite | <module-type>]**

This command copies the combined FPGA image from a TFTP server

**copy [slot1 | slot2] lp lpfpga05100.bin fpga-all [<slot-num> | all] [force -overwrite | <module-type>]**

This command copies the images from a flash card in slot 1 or slot 2 of the management module

The *<file-name>* variable specifies the file name of the bundled image for a specific software release.

The *<slot-num>* variable specifies the slot number.

The *<module-type>* variable specifies the interface module where the FPGA is to be upgraded.

The management module compares the copied FPGA versions to the images currently installed on all interface modules (the **all** option), or on a specified interface module (<slot-num>). If the FPGA images are identical, the download is aborted and a message is displayed:

```
Message: Copying 2nd image (PBIF - POS) to slot 1 skipped, same version exists. Use "force-overwrite" if required.
```

The download will continue for interface modules that do not have matching FPGA images.

The **force-overwrite** option allows you to copy the FPGA image identical to the image currently installed. A warning message is not sent. The **force-overwrite** option can also be used for a specific module type.

## Additional upgrade steps

The following sections describe additional upgrade steps that may be required for non-standard upgrades, or upgrades where you are not using the combined software images.

### Upgrading MBRIDGE images on management modules

---

#### NOTE

This procedure is generally not required for a major software upgrade. To determine whether you need to upgrade these images, refer to the table “Software images for R05.1.00 for PowerConnect B-MLXe routers.” If your router is running image versions that are not listed in the table, you will need to upgrade them.

---

To upgrade the MBRIDGE image on your management module, perform the following steps:

1. Place the new MBRIDGE image on an accessible TFTP server, or on a flash card inserted in slot 1 or 2 in the management module.
2. Copy the new MBRIDGE image to the router by entering one of the following commands.

**copy tftp mbridge <tftp\_srvr> mbridge\_05100.xsvf** - copies the new image from the TFTP server to flash memory on the management module.

**copy slot1 | slot2 mbridge mbridge\_05100.xsvf** - copies the new image from a flash card to flash memory on the management module.

3. Verify that the new image has been successfully copied by entering one of the following commands at the Privileged EXEC level of the CLI:

```
show flash
```

```
dir /<path-name>/ (if the destination is slot 1 or 2)
```

Check the mbridge image version and the date and time when the new image was built.

To upgrade other software images, refer to the appropriate upgrade section. When you have completed your upgrade, you must reboot the management module. Refer to “Rebooting the Management Module.”

## Upgrading individual FPGA images on interface modules

You can upgrade FPGA images individually on interface modules. To see which FPGA images are available, refer to Table 2.

---

### NOTE

For a simplified FPGA image upgrade process, use the combined FPGA image for interface modules.

---

To upgrade FPGA images individually, perform the following steps.

1. Copy each FPGA image from the TFTP server or a flash card to all interface modules, or to a specified interface module by entering one of the following commands:

```
copy tftp lp <tftp_srvr> <image-name> <image-type> all [<module-type>] [force-overwrite]
```

```
copy tftp lp <tftp_srvr> <image-name> <image-type> <chassis-slot-number> [force-overwrite]
```

```
copy slot1 | slot2 lp <image-name> <image-type> [<module-type>] [force-overwrite]
```

```
copy slot1 | slot2 lp <image-name> <image-type> <chassis-slot-number> [force-overwrite]
```

Specify the <image-name> of the fpga file you are copying, for example, **pbifsp2.bin**, **xppsp2.bin**, **statsoc.bin**, etc.

For a complete list of individual fpga file names, refer to [Table 26](#).

If you specify the <module-type> (e.g., 4x10g), the router copies the images for that module only. If you specify **all** without a module-type, the system copies the appropriate images to the corresponding modules.

The system compares FPGA versions being copied to those currently on the interface modules. If the images are identical, the download is aborted and the following warning message is displayed:

```
Warning: same version of FPGA already exists on LP, no need to download FPGA again, use force-overwrite option to force download.
```

If you use the **all** option, the system checks each interface module, and sends warning messages for interface modules that have matching FPGA images. For interface modules that do not have matching FPGA images, the software proceeds with the download.

If you use the **force-overwrite** option, an identical image is downloaded and the warning message is not sent.

2. The new FPGA images take effect when the management module is rebooted. You can also force the FPGA image to take effect on an interface module without rebooting the management module by “power cycling” the interface module using either of the following methods:
  - Turn the power off and on for the interface module using the **power-off lp <slot>** command followed by the **power-on lp <slot>** command.
  - Pull out and then reinsert the interface module.

When the interface module boots, the FPGA Version Check utility confirms that compatible versions of the FPGA images are installed. At restart, or when the **show version** command is entered, the following information is displayed (this is an example only, versions may not be accurate).

```
Valid PBIF Version = 3.21, Build Time = 11/11/2009 14:44:00
Valid XPP Version = 6.02, Build Time = 1/31/2010 10:52:00
Valid STATS Version = 0.07, Build Time = 12/11/2008 13:33:00
```

## 6 Rebooting the management module

If there is a problem with your FPGA upgrade, one of the following warnings will be displayed.

```
WARN: Invalid FPGA version = 1.2, Build Time = 9/13/2005 13:20:0 <<<---
```

This message indicates an FPGA version mismatch, or that one of the versions is not current.

```
ERROR: failed to read FPGA versions from flash <<<---
```

This message indicates that you have not completed a mandatory FPGA upgrade.

## Rebooting the management module

When you complete your upgrade process, you must reboot the management module, which then reboots the interface modules.

To reboot the management module, enter one of the following commands:

**reload** (this command boots from the default boot source, which is the primary code flash)

**boot system flash primary | secondary**

During the management module reboot, the following synchronization events occur:

- The system compares the monitor, primary, and secondary images on a standby management module (if installed) to those on the active management module. If you have updated these images on the active module, the system automatically synchronizes the images on the standby module to match those on the active management module.
- If you copied the primary and secondary IronWare image to all interface modules using the **copy** command with the **all** keyword, the management module copied the image and stored it in flash memory under the names **lp-primary-0** or **lp-secondary-0**. By default, the system compares the IronWare images on the interface modules to the images on the management module to confirm that they are identical. (These IronWare images are stored on the management module only and are not run by the management or interface modules.) If the IronWare images are not identical, the system gives you the following options:
  - Replace the IronWare images in interface module flash memory with the images in the management module flash memory by entering the **lp cont-boot sync <slot-number>** command at the Privileged EXEC prompt.
  - To retain the IronWare images in the interface module flash memory, enter the
  - **lp cont-boot no-sync <slot-number>** command at the Privileged EXEC prompt.

When the management module has finished booting, perform the following steps:

1. Enter the **show module** command, and verify that the status of all interface modules is **CARD\_STATE\_UP**.
2. Enter the **show version** command, and verify that all management and interface modules are running the new software image version.

---

### NOTE

If an interface module is in a waiting state or is running an older software image, you may have forgotten to enter the **lp cont-boot sync <slot-number>** command at the Privileged EXEC prompt.

---



## Performing a Hitless OS upgrade

---

**NOTE**

**Note:** Hitless upgrades are supported for upgrades **within** a major release (for example, 05.1.00 to 05.1.00a) but are **not supported** for upgrades from one major release to another (for example 5.1.0 to 5.2.0.)

---

Some features and protocols are not supported for hitless upgrade. Before you perform a hitless upgrade, refer to “Hitless OS Upgrade” for more information.

A Hitless OS Upgrade loads from the primary and secondary images on the management modules.

To do a Hitless OS Upgrade, perform the following steps:

1. Copy the Multi-Service IronWare software images to the primary and secondary flash on the active and standby management modules and on interface modules.
2. Set up a console connection to both the active and standby management modules. These connections can be serial console sessions or sessions established through Telnet or SSH.
3. Enter the **hitless-reload** command at the console of the active management module.

**hitless-reload mp [primary | secondary] | lp [primary | secondary]**

The **mp** parameter specifies that the image will be copied to the *management module*.

The **lp** parameter specifies that the image will be reloaded to the *interface module*.

## Performing an image coherence check

When you enter the **reload-check** command, Multi-Service IronWare software performs a coherence check to ensure that compatible versions of the software are installed on management and interface modules, and that all interface module FPGAs are compatible with the current software version. If incompatible images are discovered, a warning message is sent.

The image coherence check is performed in the following sequence:

1. Check management module and interface module application images for compatibility
  - Checks for compatibility of interface module application images on management and interface modules.
  - Checks for compatibility of interface module monitor images on management and interface modules.
2. Checks the interface module monitor image on the management module and all interface modules
3. Checks the management module monitor image for compatibility with the management module application image.
4. Checks the interface module monitor image for compatibility the management and interface module application images.
5. Checks all interface module FPGAs for compatibility with the application image. FPGAs include CPP, PBIF, XGMAC, STATS, XPP-OC, PBIF-OC, STATS-OC.

If step 1 does not succeed, verification is stopped and a warning is issued. If step 1 succeeds, the rest of the checks are conducted in parallel.

## Performing a coherence check without a reload

Enter the **reload-check** command to perform a coherence check *without* performing a reload, as shown in the following example:

```
PowerConnect# reload-check
Checking for coherence...

Warning: The new LP PBIF-8X10 FPGA will not be compatible with the new LP 3
application.

Warning: The new LP XPP-8X10 FPGA will not be compatible with the new LP 3
application.
Done.
PowerConnect#
```

If interface modules are in interactive mode, or the system is unable to communicate with the interface modules, the system sends the following warning message.

```
Can't check LP for coherence.
```

### *Error messages generated by the coherence check*

The following error messages are generated if a coherence check fails:

```
Warning: Image coherence check skipped due to insufficient info: Invalid active LP
# flash images in Primary/Secondary.
```

```
Warning: Image coherence check skipped due to insufficient info: Invalid active MP
flash images in Primary/Secondary.
```

```
Warning: Image coherence ckeck skipped due to insufficient info: MP/LP not booting
from flash.
```

```
Warning: Image coherence check skipped due to failure to communiante with LP.
```

If interface modules are in interactive mode, or the system is unable to communicate with the interface modules, the system sends the following warning message.

```
Can't check LP for coherence.
```

## Displaying image versions

The following sections describe how to display software image version information for PowerConnect B-MLXe routers, using the **show flash** or **show version** commands.

### Using the show flash command

You can display the images stored in flash memory using the **show flash** command.

---

**NOTE**

This example is for illustration only and may not reflect current image version information.

---

Output from the **show flash** command resembles this example.

```
PowerConnect# show flash
~~~~~
```

Active Management Module (Left Slot)

Code Flash - Type MT28F128J3, Size 32 MB

- o IronWare Image (Primary)
  - Version 5.1.0T163, Size 6986803 bytes, Check Sum 74d5
  - Compiled on Sep 16 2010 at 17:49:56 labeled as xmr05100
- o IronWare Image (Secondary)
  - Version 5.1.0T163, Size 6984593 bytes, Check Sum d570
  - Compiled on Aug 17 2010 at 16:13:36 labeled as xmr05100b1
- o LP Kernel Image (Monitor for LP Image Type 0)
  - Version 5.1.0T175, Size 493244 bytes, Check Sum fd4a
  - Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
- o LP IronWare Image (Primary for LP Image Type 0)
  - Version 5.1.0T177, Size 4950936 bytes, Check Sum d368
  - Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
- o LP IronWare Image (Secondary for LP Image Type 0)
  - Version 5.1.0T177, Size 4947628 bytes, Check Sum 3f13
  - Compiled on Aug 18 2010 at 17:39:16 labeled as xmlp05100b1
- o Monitor Image
  - Version 5.1.0T165, Size 524053 bytes, Check Sum 70b1
  - Compiled on Aug 11 2010 at 14:06:30 labeled as xmb05100
- o Startup Configuration
  - Size 12652 bytes, Check Sum dd86
  - Modified on 21:57:42 Pacific Thu Sep 16 2010

Boot Flash - Type AM29LV040B, Size 512 KB

- o Boot Image
  - Version 5.1.0T165, Size 524038 bytes, Check Sum 59a3
  - Compiled on Aug 11 2010 at 14:06:58 labeled as xmpr05100

~~~~~

Standby Management Module (Right Slot)

Code Flash: Type MT28F128J3, Size 32 MB

- o IronWare Image (Primary)
  - Version 5.1.0T163, Size 6986803 bytes, Check Sum 74d5
  - Compiled on Sep 16 2010 at 17:49:56 labeled as xmr05100
- o IronWare Image (Secondary)
  - Version 5.1.0T163, Size 6984593 bytes, Check Sum d570
  - Compiled on Aug 17 2010 at 16:13:36 labeled as xmr05100b1
- o LP Kernel Image (Monitor for LP Image Type 0)
  - Version 5.1.0T175, Size 493244 bytes, Check Sum fd4a
  - Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
- o LP IronWare Image (Primary for LP Image Type 0)
  - Version 5.1.0T177, Size 4950936 bytes, Check Sum d368
  - Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
- o LP IronWare Image (Secondary for LP Image Type 0)
  - Version 5.1.0T177, Size 4947628 bytes, Check Sum 3f13
  - Compiled on Aug 18 2010 at 17:39:16 labeled as xmlp05100b1
- o Monitor Image
  - Version 5.1.0T165, Size 524053 bytes, Check Sum 70b1
  - Compiled on Aug 11 2010 at 14:06:30 labeled as xmb05100
- o Startup Configuration
  - Size 12652 bytes, Check Sum dd86
  - Modified on 14:15:27 Pacific Fri Sep 17 2010

Boot Flash: Type AM29LV040B, Size 512 KB

- o Boot Image
    - Version 5.1.0T165, Size 524038 bytes, Check Sum 59a3
    - Compiled on Aug 11 2010 at 14:06:58 labeled as xmpr05100
- ~~~~~

## 6 Displaying image versions

```

Line Card Slot 4
Code Flash: Type MT28F640J3, Size 16 MB
  o IronWare Image (Primary)
    Version 5.1.0T177, Size 4950936 bytes, Check Sum d368
    Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
  o IronWare Image (Secondary)
    Version 5.1.0T177, Size 4947628 bytes, Check Sum 3f13
    Compiled on Aug 18 2010 at 17:39:16 labeled as xmlp05100b1
  o Monitor Image
    Version 5.1.0T175, Size 493244 bytes, Check Sum fd4a
    Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
Boot Flash: Type AM29LV040B, Size 512 KB
  o Boot Image
    Version 5.1.0T175, Size 492544 bytes, Check Sum 6c2b
    Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
FPGA Version (Stored In Flash):
  PBIF Version = 3.24, Build Time = 8/4/2010 14:57:00

  XPP Version = 6.03, Build Time = 2/18/2010 16:38:00

  STATS Version = 0.08, Build Time = 2/18/2010 16:30:00

~~~~~
Line Card Slot 6
Code Flash: Type MT28F640J3, Size 16 MB
  o IronWare Image (Primary)
    Version 5.1.0T177, Size 4950936 bytes, Check Sum d368
    Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
  o IronWare Image (Secondary)
    Version 5.1.0T177, Size 4947628 bytes, Check Sum 3f13
    Compiled on Aug 18 2010 at 17:39:16 labeled as xmlp05100b1
  o Monitor Image
    Version 5.1.0T175, Size 493244 bytes, Check Sum fd4a
    Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
Boot Flash: Type AM29LV040B, Size 512 KB
  o Boot Image
    Version 5.1.0T175, Size 492544 bytes, Check Sum 6c2b
    Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
FPGA Version (Stored In Flash):
  PBIF Version = 3.22, Build Time = 2/5/2010 14:43:00

  XPP Version = 6.04, Build Time = 2/3/2010 14:39:00

  XGMAC Version = 0.13, Build Time = 2/3/2010 14:42:00

~~~~~
All show flash done

```

**TABLE 28** Description of the **show flash** command output

| Field                                    | Definition                                                                                                                                                                                                                                                                |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management Modules                       |                                                                                                                                                                                                                                                                           |
| <type> Management Module<br>(<location>) | The management module for which flash information is displayed. <ul style="list-style-type: none"> <li>• &lt;type&gt; indicates an active or standby management module.</li> <li>• &lt;location&gt; indicates the top or bottom slot (M1 or M2, respectively).</li> </ul> |

**TABLE 28** Description of the **show flash** command output (Continued)

| Field                                                          | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Code Flash                                                     | The model number and size of the management module flash memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| IronWare Image (Primary or Secondary)                          | <p>Indicates the IronWare image installed in the primary or secondary location in the management module flash memory. The image must be <b>xmr</b>&lt;xxxx&gt;. The actual image name depends on the version of software you have running on your router.</p> <p>The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                                                                                                       |
| Line Processor (LP) Kernel Image (Monitor for LP Image Type 0) | <p>Indicates the interface module monitor image stored in the management module flash memory. The image must be <b>xmlb</b> &lt;xxxx&gt;. The management module stores these images only; it does not run the images. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                                                                                                                                                  |
| LP IronWare Image (Primary or Secondary for LP Image Type 0)   | <p>Indicates the interface module primary and secondary IronWare image stored in the management module flash memory if you copied the primary and secondary IronWare image to all interface modules using the <b>copy</b> command with the <b>all</b> keyword. The management module stores these images only; it does not run the images. The image must be <b>xmlp</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul> |
| Monitor Image                                                  | <p>Indicates the monitor image installed in the management module flash memory. The image must be <b>xmb</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                                                                                                                                                                                                                                             |

**TABLE 28** Description of the **show flash** command output (Continued)

| Field                                 | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Startup Configuration                 | <p>The output displays the following information about the startup configuration, which is saved in the management module flash memory:</p> <ul style="list-style-type: none"> <li>• Size – Size, in bytes, of the startup configuration.</li> <li>• Check sum – A unique ID for the file. If the contents of the file change, the check sum changes also.</li> <li>• Modification date and time – Date and time that the startup configuration was last saved.</li> </ul>                                                                                                                                                                                                           |
| Boot Flash                            | The model number and size of the management module boot flash.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Boot Image                            | <p>Indicates the boot image installed in the management module boot flash. The image must be <b>xmpm</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                           |
| Interface modules                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Line Card Slot <number>               | <p>The interface module for which flash information is displayed.</p> <p>The &lt;number&gt; parameter indicates the number of the chassis slot, 1 – 16, in which the interface module is installed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Code Flash                            | The model number and size of the interface module flash memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| IronWare Image (Primary or Secondary) | <p>Indicates the IronWare image installed in the primary or secondary location in the interface module flash memory. The image must be <b>xmlp</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul> |
| Monitor Image                         | <p>Indicates the monitor image installed in the interface module flash memory. The image must be <b>xmlb</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                       |
| Boot Flash                            | The model number and size of the interface module boot flash.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**TABLE 28** Description of the **show flash** command output (Continued)

| Field                    | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Boot Image               | <p>Indicates the boot image installed in the interface module boot flash. The image must be <b>xmiprm</b> &lt;xxxx&gt;. The output displays the following information about the image:</p> <ul style="list-style-type: none"> <li>• Version – “<b>5.1.0Txy</b>” indicates the image version number. “xx” indicates the hardware type; “y” indicates the image type.</li> <li>• Size – The size, in bytes, of the image.</li> <li>• Check sum – A unique ID for the image. If the contents of the image change, the check sum changes also.</li> <li>• Compilation date and time – The date and time that the image was compiled.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FPGA Version Information | <p>The output displays the following information about the field-programmable gate array (FPGA) images that is stored in Flash for installation on the interface modules:</p> <ul style="list-style-type: none"> <li>• <b>PBIF</b> image information – The version number of the PBIF image. This image is installed on Ethernet interface modules but from different image files. The versions installed on Ethernet interface modules can differ and should reflect the correct image for your release.</li> <li>• <b>XPP</b> image information – The version number of the XPP image. This image is installed on Ethernet interface modules but from different image files. The versions installed on Ethernet interface modules can differ and should reflect the correct image for your release.</li> <li>• <b>XGMAC</b> image information – The version number of the XGMAC image. This image is only installed on the 10 Gbps interface module.</li> </ul> <p><b>NOTE:</b> The FPGA version installed on your module should be the correct one for the version of Multi-Service IronWare you are running.</p> <p>The following Images are only displayed from the <b>show version</b> command:</p> <ul style="list-style-type: none"> <li>• <b>MBRIDGE</b> Revision – The version number of the MBRIDGE FPGA installed on the management module.</li> <li>• <b>SBRIDGE</b> Revision – The version number of the SBRIDGE FPGA installed on the PowerConnect B-MLXe Switch Fabric modules.</li> </ul> |

*Using the show version command*

Enter the **show version** command to display version information for your router.

**NOTE**

This example is for illustration only and may not reflect current image version information.

## 6 Displaying image versions

```
PowerConnect# show version
System Mode: MLX
Chassis: NetIron 8-slot (Serial #:      GOLD, Part #: 35549-000C)
NI-X-SF Switch Fabric Module 1 (Serial #: PR23050271, Part #: 31523-100A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
NI-X-SF Switch Fabric Module 2 (Serial #: SA21091164, Part #: 35523-302A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
NI-X-SF Switch Fabric Module 3 (Serial #: SA21091204, Part #: 35523-302A)
FE 1: Type fe200, Version 2
FE 3: Type fe200, Version 2
=====
SL M2: NI-MLX-MR Management Module Active (Serial #: SA21091472, Part #:
35524-103C):
Boot: Version 5.1.0T165 Copyright(c)1996-2009 Brocade Communications Systems,Inc.
Compiled on Aug 11 2010 at 14:06:58 labeled as xmpr05100
(524038 bytes) from boot flash
Monitor: Version 5.1.0T165 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Aug 11 2010 at 14:06:30 labeled as xmb05100
(524053 bytes) from code flash
IronWare: Version 5.1.0T163 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Sep 16 2010 at 17:49:56 labeled as xmr05100
(6986803 bytes) from Primary
Board ID : 00 MBRIDGE Revision : 32
916 MHz Power PC processor 7447A (version 8003/0101) 166 MHz bus
512 KB Boot Flash (AM29LV040B), 32 MB Code Flash (MT28F128J3)
1024 MB DRAM
Active Management uptime is 1 minutes 28 seconds
=====
SL 4:NI-MLX-1Gx48-T 48-port 10/100/1000Base-T MRJ21 Module(Serial#:
SA05091472,Part#: 35663-20EA)
Boot: Version 5.1.0T175 Copyright(c) 1996-2009 Brocade Communications Systems,
Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlpr05100
(492544 bytes) from boot flash
Monitor: Version 5.1.0T175 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
(493244 bytes) from code flash
IronWare: Version 5.1.0T177 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
(4950936 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.24, Build Time = 8/4/2010 14:57:00

Valid XPP Version = 6.03, Build Time = 2/18/2010 16:38:00

Valid STATS Version = 0.08, Build Time = 2/18/2010 16:30:00

BCM56502GMAC 0
BCM56502GMAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
1024 MB DRAM, 8 KB SRAM, 0 Bytes BRAM
PPCR0: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
PPCR1: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
```



```

LP Slot 4 uptime is 58 seconds
=====
SL 6: NI-MLX-10Gx4 4-port 10GbE Module (Serial #: SA12090950, Part #: 35600-202D)
Boot: Version 5.1.0T175 Copyright (c) 1996-2009 Brocade Communications Systems,
Inc.
Compiled on Aug 11 2010 at 14:07:20 labeled as xmlprm05100
(492544 bytes) from boot flash
Monitor: Version 5.1.0T175 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Aug 11 2010 at 14:07:42 labeled as xmlb05100
(493244 bytes) from code flash
IronWare: Version 5.1.0T177 Copyright(c)1996-2009 Brocade Communications Systems,
Inc.
Compiled on Sep 16 2010 at 17:55:24 labeled as xmlp05100
(4950936 bytes) from Primary
FPGA versions:
Valid PBIF Version = 3.22, Build Time = 2/5/2010 14:43:00

Valid XPP Version = 6.04, Build Time = 2/3/2010 14:39:00

Valid XGMAC Version = 0.13, Build Time = 2/3/2010 14:42:00

X10G2MAC 0
X10G2MAC 1
666 MHz MPC 8541 (version 8020/0020) 333 MHz bus
512 KB Boot Flash (AM29LV040B), 16 MB Code Flash (MT28F640J3)
512 MB DRAM, 8 KB SRAM, 286331153 Bytes BRAM
PPCR0: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
PPCR1: 768K entries CAM, 8192K PRAM, 2048K AGE RAM
LP Slot 6 uptime is 59 seconds
=====
All show version done

```

## Configurations conditions specific to NI-MLX-1Gx48-T modules

### ifIndex allocation

The SNMP Management Information Base (MIB) uses the Interface Index (ifIndex) to assign a unique value to each port on a module or slot.

- If you will be installing the NI-MLX-1Gx48-T module on your device, you must configure the maximum ifIndex per module to 64. **You must change the ifIndex allocation before installing the NI-MLX-1Gx48-T module;** otherwise, the module remains in the Offline state.
- If you have a new device (no previous software installed), and you will be installing an NI-MLX-1Gx48-T module, you **must** configure the maximum ifIndex per module to 64; otherwise, the module remains in the Offline state.
- If you have a new device (no previous software installed), and will not be installing an NI-MLX-1Gx48-T module, it is recommended that you configure the maximum ifIndex per module to 64 to avoid future ifIndex problems if you decide to install an NI-MLX-1Gx48-T module in the future.

### Port MAC address change

The MAC address assigned to each port may change to accommodate a greater number of ports per module. The MAC address ports allocated for each module has increased from 20 to 48.

### QoS priorities for NI-MLX-1Gx48-T modules

You can configure more ports in the system by changing the QoS per-port priorities from 8 to 4. This enables the device to support 2016 ports using 4 priorities per port.

## Loading and saving configuration files

For easy configuration management, the router supports both the download and upload of configuration files between the router and a TFTP server on the network. You can also copy the startup configuration file locally between the management module's code flash and a PCMCIA flash card inserted in management module slot 1 or 2.

You can upload either the startup configuration file or the running configuration to the TFTP server, code flash, or a flash card for backup and use in booting the system.

- **Startup configuration file** – This file (startup-config) contains the configuration information that is currently saved. To display this file, enter the show configuration command at any CLI prompt.
- **Running configuration** – This active configuration is in the system RAM but not yet saved to code flash. These changes could represent a short-term requirement or general configuration change. To display this configuration, enter the show running-config or write terminal command at any CLI prompt.

Each device can have one startup configuration file and one running configuration. The startup configuration file is shared by both flash modules. The running configuration resides in DRAM.

## Configuring file size for startup and running configuration

The system allocates 8 MB of contiguous memory per session (console, TELNET, SSH) for processing different configuration commands, such as **show run**, **config terminal**, and **copy tftp run**. In a low memory state, memory is generally fragmented resulting in a failure to allocate contiguous memory to support the session. We now pre-allocate one configuration buffer so that at least one CLI session will remain operational even in low memory condition.

---

### NOTE

The low memory condition is not a normal operating condition, and may indicate scaling the network beyond system max limits. However, this feature ensures that one CLI session remains operational so that the user can take suitable actions to recover from the condition.

---

To specify a configuration file size for both startup and running configuration, enter the following command:

```
PowerConnect(config)# system-max
```

**Syntax:** [no] **system-max** [**config-file-size** <decimal>]

By default, **no system-max parameter** is configured.

The **config-file-size** option specifies the configuration file size for processing various commands.

The **decimal** parameter specifies the range supported for configuring file size. The minimum configuration is 2 MB, and the maximum is 16 MB. If the file size is not configured, the default size of 8 MB is used.

---

**NOTE**

It is strongly recommended that you use the default size (8 MB) when configuring file size.

---

When you enter the **system-max** command, with the `config-file-size` parameter included, the following additional information is displayed:

```
PowerConnect(config)# system-max config-file-size 2097152
Reload required. Please write memory and then reload or power cycle.
Failure to reload could cause system instability on failover.
Newly configured system-max will not take effect during hitless-reload.
Replacing the Startup Configuration with the Running Configuration
```

---

**NOTE**

You must enter the **write memory** command and restart the system for this command to take effect.

---

## Configuration buffers

The system allocates a segment of contiguous memory as a buffer for each session (console, TELNET, SSH) to process configuration commands, such as **show run**, **config terminal** and **copy tftp run**. In a low memory state, memory is often fragmented. As a result, sufficient contiguous memory to support the session may not be available. To ensure that at least one CLI session remains operational even in low memory conditions, at startup the router *pre-allocates* one configuration buffer.

---

**NOTE**

Low memory is not a normal operating condition, and may indicate that the network has been scaled beyond appropriate system limits. The pre-allocated buffer ensures that one CLI session remains operational, making it possible to gain access to the device and recover from the low memory condition.

---

The default size for the session buffer is 8 MB, which is sufficient for most system configurations, and it is recommended that you leave the buffer at the default size. However, if your system has unusually large configuration files, it may be necessary to increase the buffer size to accommodate them. If your system has small configuration files but needs to support a large number of simultaneous connections, it may be appropriate to decrease the buffer size.

### *Determining the config buffer size*

If the demands of your system require an unusual connection buffer size, you can configure it using a command such as the following.

```
PowerConnect(config)# system-max config-file-size 4000000
```

This command reduces the connection buffer size from 8 MB to 4 MB (the value is the size in bytes, and is rounded up to a supported configuration size).

**Syntax:** `[no] system-max config-file-size <decimal>`

By default, the buffer size is set to 8388608 (8 MB).

The **config-file-size** configures the contiguous buffer size allocated to each connection session.

The **decimal** parameter specifies the buffer size. Supported configurations are 2, 4, 8, and 16 MB. If the file size is not configured, the default size of 8 MB is used.

---

**NOTE**

It is strongly recommended that you leave the buffer at the default size (8 MB).

---

After you issue the **system-max** command with the **config-file-size** parameter included, additional information is displayed:

```
PowerConnect(config)# system-max config-file-size 2097152
Reload required. Please write memory and then reload or power cycle.
Failure to reload could cause system instability on failover.
Newly configured system-max will not take effect during hitless-reload.
```

---

**NOTE**

You must issue the **write memory** command *and restart the system* for the new buffer size to take effect.

---

### Replacing the startup configuration with the running configuration

After you make configuration changes to the active system, you can save the changes by writing them to flash memory. When you write configuration changes to flash memory, you replace the startup configuration with the running configuration.

To replace the startup configuration with the running configuration, enter the **write memory** command.

### Replacing the startup configuration with the running configuration

After you make configuration changes to the active system, you can save the changes to flash memory, which replaces the existing startup configuration with the new running configuration.

To replace the startup configuration with the new running configuration, enter the **write memory** command.

### Retaining the current startup configuration

After making configuration changes to the active system, if you have not executed a **write memory** command and you decide you don't want to save the changes, enter the **reload** command to return to the current startup configuration.

```
PowerConnect# reload
```

If the system detects differences between the running and startup configurations, it prompts you as follows:

```
Are you sure? (enter 'y' or 'n'):
```

Enter **y**, and press the **Enter** key.

## Copying a configuration file to or from a TFTP server

To copy the startup-config or running-config file to or from a TFTP server, use one of the following methods.

---

### NOTE

You can name the configuration file when you copy it to a TFTP server. However, when you copy a configuration file from the server to a device, the file is always copied as “startup-config” or “running-config”, depending on which type of file you saved to the server.

---

To copy configuration files to or from a TFTP server, enter one of the following commands:

**copy startup-config tftp** *<ip-address>* *<filename>* – Use this command to upload a copy of startup-config from the device to a TFTP server.

**copy running-config tftp** *<ip-address>* *<filename>* – Use this command to upload a copy of the running configuration from the device to a TFTP server.

**copy tftp startup-config** *<ip-address>* *<filename>* – Use this command to download a copy of the startup-config from a TFTP server to the device.

**copy tftp running-config** *<ip-address>* *<filename>* [**overwrite**] – Use this command to download the running configuration from the system runtime memory to a TFTP server. The running configuration is then appended to the current configuration of the device.

## Making local copies of the startup configuration file

You can copy the startup-config file in flash memory to a TFTP server or to a PCMCIA flash card inserted in management module slot 1 or 2.

For example, to make a backup copy of the startup-config file and save the backup file to a TFTP server, enter a command such as the following at the Privileged EXEC level in the CLI:

```
PowerConnect# copy startup-config tftp 10.28.40.21 startup-config.bak
```

**Syntax:** **Syntax: copy startup-config tftp** *<ip-address>* *<dest-file-name>*

The *<ip-address>* variable specifies the IP address of the TFTP server that you want to save the startup configuration to.

The *<dest-file-name>* specifies the name of the file you copied to a new destination.

For example, to make a backup copy of the startup-config file and save the backup file on a flash card in slot 2, enter a command such as the following at the Privileged EXEC level in the CLI:

```
PowerConnect# copy startup-config slot2 /backups/startup-config.bak
```

**Syntax:** **Syntax: copy startup-config** [**slot1** | **slot2**] [*<dest-dir-path>*]/*<dest-file-name>*

Specify the *<dest-dir-path>* parameter to copy the source file to a file system that does not have current management focus.

The *<dest-file-name>* specifies the name of the file you copied to a new destination.

## Hitless OS upgrade

You can upgrade Multi-Service IronWare software using the Hitless OS upgrade feature with no loss of service or disruption in the most functions and protocols. During the Hitless OS upgrade process, all ports and links remain operational. The following table lists supported and unsupported protocols for Hitless OS upgrade.

**TABLE 29** Features supported and not supported for Hitless OS Upgrade

| Supported                                                                 | Not supported                     |
|---------------------------------------------------------------------------|-----------------------------------|
| TOS-based QoS                                                             | 802.1s                            |
| Layer 2 switching                                                         | All MPLS features                 |
| Layer 2 protocols:                                                        | IPv4 and IPv6 multicast snooping  |
| MRP                                                                       | IPv4 and IPv6 multicast routing   |
| STP                                                                       | VLAN translation                  |
| RSTP                                                                      | Policy-based routing              |
| VSRP                                                                      | FPGA upgrades                     |
| IGMP                                                                      | POS                               |
| PIM                                                                       | Unicast                           |
| OSPF                                                                      | VRRP and VRRP-E                   |
| BGP                                                                       | All VPN features                  |
| Static IP routes                                                          | Network management to the device: |
| Layer-3 forwarding                                                        | SSH                               |
| GRE tunnels                                                               | Telnet                            |
| ACLs (the following ACLS continue to function but ACL counters are reset) | SNTP                              |
| Layer 2 ACLs                                                              | HTTP/HTTPS                        |
| IPv4 ACLs                                                                 | sFlow (interface modules only)    |
| IPv6 ACLs                                                                 | Ping                              |
| IP Receive ACLs                                                           | Traceroute                        |
| IPv4 and Layer-2                                                          | Syslog messages are cleared       |
| ACL-based traffic policing                                                | SNMP and SNMP trap                |
| Traffic policing                                                          | DNS                               |
| UDLD                                                                      | DHCP                              |
| LACP                                                                      | AAA                               |
| BFD                                                                       |                                   |

### NOTE

Services not supported for Hitless OS Upgrade may encounter disruptions when the management and interface modules are restarted, but will resume normal operation once the modules are again operational.

### *Considerations when using Hitless OS upgrade*

Consider the following information when using this feature:

- Both active and standby management modules must be installed to use this feature.
- To avoid disruptions of Layer-3 traffic to OSPF or BGP routes, OSPF Non-stop routing or OSPF Graceful Restart and BGP Graceful Restart features must be configured on the router. In addition, OSPF neighbors of the router must have OSPF Graceful Restart Helper enabled if OSPF Graceful Restart is enabled.

- To avoid disruptions of IPv4 Layer 3 multicast traffic, the unicast routing protocol for multicast RPF routes must be either Non-Stop routing- or Graceful Restart-capable and enabled .
- The time required for the hitless upgrade process ranges from 1 to 10 minutes, depending on the size of the MAC table and the routing table, and the number of OSPF and BGP neighbors. Router configuration is unavailable during the entire hitless upgrade process. The message “
- **—SW Upgrade In Progress - Please Wait—**” is displayed at the console if configuration is attempted. Operational command of the router is allowed during the upgrade process.
- Because the active management module becomes the standby management module during the hitless upgrade process, you will need a connection to the console interface on both management modules.
- When they are reset, management and interface modules are unable to send and receive packets. Once the management and interface modules are again operational, modules can send and receive packets, even before the hitless upgrade process is complete.
- Router configuration cannot be changed during the hitless upgrade process.
- System-max parameter changes (or other configuration changes that require a system reload, such as “cam-mode” and cam-profile” changes), do not take effect after a hitless upgrade.
- FPGA images cannot be upgraded using the hitless upgrade process.
- Hitless upgrade cannot be used to downgrade an image to a version older than the version currently running on the device.
- If there are protocol dependencies between neighboring nodes, it is recommended that you upgrade nodes one at a time.
- After hitless upgrade, the running configuration on the router will be the same as it was before the upgrade. A configuration that is not saved before a hitless upgrade is not removed and the existing startup configuration does not take effect. This behavior is similar to the management module switchover feature.

### *The Hitless OS upgrade process*

A hitless upgrade of Multi-Service IronWare software is performed in the following sequence:

1. Multi-Service IronWare software is installed in flash memory to the primary and secondary image on active and standby management modules and interface modules.
2. Enter the **hitless-reload** command on the active management module.
3. The hitless upgrade process starts on the active management module, which initiates the upgrade process on the standby management module.
4. The standby management module is reset.
5. The active management module is reset and the standby management module becomes the active module.
6. Active console control is lost to the previously active management module as it becomes the standby management module.
7. The active management module initiates the upgrade process on all interface modules.
8. The router is now running the new Multi-Service IronWare software. The management module that was initially configured as the standby management module is now the active management module and the management module that was initially configured as the active management module is now the standby management module. If you want the original management module to be active, you must manually fail-over control to it.

## Dynamic configuration loading

You can load dynamic configuration commands (these commands do not require a reload to take effect) from a file on a TFTP server into the running configuration file on the router. You can also make configuration changes off-line, then load the changes directly into the running configuration file on the router, without reloading the software.

Consider the following factors when using this feature:

- Use this feature only to load configuration information that does not require a software reload to take effect. For example, you cannot use this feature to change statically-configured memory (the **system-max** command).
- Do not load port configuration information for secondary ports in a trunk group. Since all ports in a trunk group use the port configuration settings of the primary port in the group, the software cannot implement the changes to the secondary port.

### *Preparing the configuration file*

Create a copy of the startup configuration file that follows the same syntax rules as the startup configuration file created by the router. When preparing this duplicate startup configuration file consider the following:

- The startup configuration file is a script containing CLI configuration commands. The CLI reacts to each command entered from the file in the same way it reacts to the command if you enter it. For example, if the command results in an error message or a change to the CLI configuration level, the software responds by displaying the message, or changing the CLI level.
- The software retains the running configuration file currently on the router, and changes this file only by adding new commands from the startup configuration file. If the running configuration already contains a command that is also in the startup configuration file you are loading, the CLI rejects the new command as a duplicate and displays an error message. For example, if the running configuration file already contains a command that configures ACL 1, the software rejects ACL 1 in the startup configuration file, and displays a message that ACL 1 is already configured.
- The duplicate startup configuration file can contain global CONFIG commands or configuration commands for interfaces, routing protocols, and so on. You cannot enter User EXEC or Privileged EXEC commands.
- Since the default CLI configuration level in a startup configuration file is the global CONFIG level, the first command in the file must be a global CONFIG command or "!". The ! (exclamation point) character means "return to the global CONFIG level".

---

#### **NOTE**

You can enter text following "!" as a comment. However, the "!" is not a comment marker. It returns the CLI to the global configuration level.

---

#### **NOTE**

The CLI switches to the global CONFIG level if you load the configuration as a startup configuration instead of the running configuration (using the **copy tftp startup-config <ip-addr> <filename>** command or **ncopy tftp <ip-addr> <from-name> startup-config** command).

---



**NOTE**

If you copy and paste a configuration into a management session, the CLI ignores the “!” instead of changing the CLI to the global CONFIG level. You may get unexpected results if you copy and paste a configuration instead of loading the configuration using TFTP.

- Make sure you enter each command at the correct CLI level. Since some commands have identical forms at both the global CONFIG level and individual configuration levels, if the CLI response to the configuration file results in the CLI entering a configuration level you did not intend, you can get unexpected results.

For example, if a trunk group is active on the device, and the configuration file contains a command to disable STP on one of the secondary ports in the trunk group, the CLI rejects the commands to enter the interface configuration level for the port and moves on to the next command in the file you are loading. If the next command is a spanning-tree command with syntax valid at the global CONFIG level as well as the interface configuration level, the software applies the command globally. For example:

If the configuration file contains these commands.

```
interface ethernet 4/2
no spanning-tree
```

the CLI responds:

```
PowerConnect(config)# interface ethernet 4/2
Error - cannot configure secondary ports of a trunk
PowerConnect(config)# no spanning-tree
PowerConnect(config)#
```

- If the file contains commands that must be entered in a specific order, the commands must appear in the file in the required order. For example, if you want to use the file to replace an IP address on an interface, you must first remove the old address using **no** in front of the **ip address** command, then add the new address. Otherwise, the CLI displays an error message and does not implement the command. For example:

The configuration file contains these commands.

```
interface ethernet 3/1
ip address 10.10.10.1/24
```

The running-config file already has a command to add an address to 3/1, so the CLI responds like this.

```
PowerConnect(config)# interface ethernet 3/1
PowerConnect(config-if-e1000-3/1)# ip add 10.10.10.69/24
Error: can only assign one primary ip address per subnet
PowerConnect(config-if-e1000-3/1)#
```

To successfully replace the address, enter commands into the file as follows.

```
interface ethernet 3/1
no ip address 10.10.10.1/24
ip address 10.10.10.69/24
```

This time, the CLI accepts the command, and no error message is displayed.

```
PowerConnect(config)# interface ethernet 3/1
PowerConnect(config-if-e1000-3/1)# no ip add 10.10.10.1/24
PowerConnect(config-if-e1000-3/1)# ip add 10.10.10.69/24
PowerConnect-if-e1000-3/1)
```

- Always use the **end** command at the end of the file. The **end** command must appear on the last line of the file, by itself.

### Loading configuration information into the running-config file

You can load configuration information from a TFTP server using either of the following commands:

- **copy tftp running-config file** *<ip-addr>* *<filename>* [**overwrite**]
- **ncopy tftp** *<ip-addr>* *<filename>* **running-config file**

## Using SNMP to save and load configuration information

---

### NOTE

If you are using SNMP to manage your router and you have installed NI-MLX-1Gx48-T-A interface modules, information about the number of indexes available per module can be found in the “Configuring SNMP ifIndex” section of the “Configuring Basic Parameters” chapter in the *PowerConnect B-MLXe Configuration Guide*.

---

You can use a third-party SNMP management application to save and load a configuration to your router using this procedure.

1. Enable the SNMP agent on the router by entering the **snmp-server** command from the global CONFIG level of the CLI.
2. On the router, enter the **no snmp-server pw-check** command from the global CONFIG level of the CLI.

This command disables password checking for SNMP set requests. If a third-party SNMP management application does not add a password to the password field when it sends SNMP set requests to a router, by default the router rejects the request.

3. From a management station, send the following SNMP PDU to the agent.

```
SnmpSet(1.3.6.1.4.1.1191.1.1.2.1.5.0 = <tftp-ip-address>  
1.3.6.1.4.1.1991.1.1.2.1.8.0 = <config-file-name>  
1.3.6.1.4.1.1991.1.1.2.1.9.0 = <command-integer>
```

- *<tftp-ip-addr>* is the IP address of the TFTP server.
- *<config-file-name>* is the name of the configuration file.
- *<command-integer>* is one of the following:
  - **20** – Upload the startup-config file from the router flash memory to the TFTP server.
  - **21** – Download a startup-config file from a TFTP server to the router flash memory.
  - **22** – Upload the running-config file from the router flash memory to the TFTP server.
  - **23** – Download a configuration file from a TFTP server into the router running-config file.
  - **30** – Download the config to DRAM from a TFTP server, clear the running-config file, and overwrite with the new configuration.

---

**NOTE**

Option **23** adds configuration information to the running-config file on the device, and does not replace commands. To replace configuration information on the device, use **no** forms of the configuration commands to remove the configuration information, then use configuration commands to create the configuration information you want. Option **30** erases the entire running-config file and replaces it with the new configuration file.

---

## Erasing image and configuration files

To erase software images or configuration files, enter one of the following commands at the Privileged EXEC level of the CLI:

- **erase flash primary** - Erases the image stored in primary flash memory.
- **erase flash secondary** - Erases the image stored in secondary flash memory.
- **erase startup-config** - Erases the configuration stored in the startup configuration file. The running configuration remains intact until the system is restarted.

## File synchronization

### File synchronization between active and standby management modules

Files can be synchronized between active and standby management modules. These files include:

- **flash memory** – The flash memory can include the following files:
  - monitor, which contains the management module Real Time Operating System (RTOS).
  - primary, which contains the management module primary IronWare image.
  - secondary, which contains the management module secondary IronWare image.

---

**NOTE**

A Multi-Service IronWare image contains the layer 1 – 3 software that runs on the management module.

---

During startup or switchover, the standby module flash memory version is compared to the version on the active module. If the versions are different, the standby module flash memory is synchronized to match the active module version. If you update the flash memory on the active module, the standby module code is automatically synchronized (without comparison) to match the active module version.

- **System-config file** – The flash memory also includes the system-config file. During startup or switchover, the system-config file on the standby module is compared to the file on the active module. If the system-config file on the standby module does not match that of the active module, the standby module system-config file is synchronized to match the active module system-config file. When you save changes to the system-config file on the active module, the system-config file on the standby module is automatically synchronized (without comparison) to match the system-config on the active module.

- **Running-config file** – The running-config file resides in system memory.

You can perform the following tasks related to file synchronization:

- Compare files on the active module with files on the standby module and immediately synchronize any files that are different.
- Immediately synchronize all files between the active and standby modules.

The following sections explain how to perform these tasks.

### *Comparing and synchronizing files*

You can initiate a comparison of the flash memory, system-config file, and running-config file on the active management module with the files on the standby module, and synchronize the files immediately if differences exist. When you synchronize the files, the active module replaces files on the standby module.

To *compare* and synchronize files between active and standby modules, enter the **sync-standby** command at the Privileged EXEC level of the CLI.

**Syntax:** `sync-standby`

### *Synchronizing files without comparison*

You can synchronize the flash memory, system-config file, and running-config file immediately without comparison. When you synchronize the files, the active module replaces the files on the standby module.

To immediately synchronize the files between the active and standby modules, enter the **force-sync-standby** command at the Privileged EXEC level of the CLI.

**Syntax:** `force-sync-standby`

## File synchronization between management and interface modules

An interface module can have two IronWare images: primary and secondary. These images contain layer 1 – 3 software, and reside in flash memory. Either the primary or secondary image is run by the interface module from this location.

If you copy the primary or secondary image to all interface modules using the **copy all** command, the management module makes a copy of the file and stores it in flash memory under the names *lp-primary-0* or *lp-secondary-0*. The images are stored in the flash memory only and are not run by the management module or the interface modules. If you copy the primary or secondary IronWare image to a specified device slot using the **copy** command with the *<slot-number>* variable, the management module does not make a copy of the file.

If the management module has a copy of the primary or secondary image in flash memory, by default, the router synchronizes, or prompts you to synchronize, interface module images between the management module and the interface modules during the boot process. When the router synchronizes the images, the image is copied from management module flash memory to the interface module flash memory (the interface module default boot source).

You to manage synchronization of images between management and interface modules in the following situations:

- When you are prompted to synchronize the images during the boot process.
- When you want to initiate an immediate synchronization. For example, if you want an immediate update of the images on one or all interface modules.
- When you want to disable synchronization. For example, you have upgraded the image of one interface module but want to continue running an older image on all other interface modules.

The following sections discuss how to manage the image synchronization in these situations.

### *Synchronizing interface module images during the boot process*

By default, the router checks the images in the interface module flash memory during the boot process to ensure they are the same as the images in the management module flash memory. If an interface module does not have an image, the system automatically downloads the image from the management module flash memory to the flash memory on the interface module.

If an interface module has different primary and secondary images than those of the management module, the system prompts you to:

- Replace the primary and secondary images in the interface module flash memory with the images in the management module flash memory by entering the **ip cont-boot sync** *<slot-num>* command at the Privileged EXEC prompt.
- Retain the images in the interface module flash memory, by entering the **ip cont-boot no-sync** *<slot-num>* command at the Privileged EXEC prompt.

### *Specifying an immediate synchronization*

To immediately synchronize images between the management module and one or all interface modules, enter the **ip sync all** command at the Privileged EXEC level.

**Syntax:** **ip sync all** | *<slot-number>*

- The **all** keyword indicates that the immediate synchronization applies to all interface modules in the router.
- The *<slot-number>* parameter specifies the device slot number that contains the interface module to which the immediate synchronization applies. You can specify 1 – 32, depending on your router model.

## Scheduling a system reload

In addition to reloading the router manually, you can configure the system to automatically reload at a specific time, or after a specific amount of time has passed.

---

### **NOTE**

The scheduled reload feature requires the system clock. You can use a Simple Network Time Protocol (SNTP) server to set the clock or you can set the clock manually.

---

### Reloading at a specific time

For example, to schedule a system reload from the primary flash memory module for 6:00:00 AM, January 19, 2011, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# reload at 06:00:00 01-19-2011
```

**Syntax:** `reload at <hh:mm:ss> <mm-dd-yy> [primary | secondary]`

- `<hh:mm:ss>` is the hours, minutes, and seconds.
- `<mm-dd-yy>` is the month, day, and year.
- **primary | secondary** specifies whether the reload is to occur from the primary flash memory module or the secondary flash memory module. The default is **primary**.

### Reloading after a specific amount of time

For example, to schedule a system reload from the secondary flash memory one day and 12 hours from the current time, enter the following command at the Privileged EXEC level of the CLI.

```
PowerConnect# reload after 01:12:00 secondary
```

**Syntax:** `reload after <dd:hh:mm> [primary | secondary]`

- `<dd:hh:mm>` is the number of days, hours, and minutes.
- **primary | secondary** specifies whether the reload is to occur from the primary flash memory module or the secondary flash memory module.

### Displaying the amount of time before a scheduled reload

To display how much time is left before a scheduled reload, enter the **show reload** command from any level of the CLI.

**Syntax:** `show reload`

### Canceling a scheduled reload

To cancel a scheduled reload, enter the **reload cancel** command at the Privileged EXEC level of the CLI.

**Syntax:** `reload cancel`

## Diagnostic error codes and remedies for TFTP transfers

If an error occurs during a TFTP transfer to or from a router, one of the following error codes is displayed.

| Error code | Message                                         | Explanation and action                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | Flash read preparation failed.                  | A flash error occurred during the download.                                                                                                                                                                                                                                                                                                                                                                                             |
| 2          | Flash read failed.                              | Retry the download. If it fails again, contact customer support                                                                                                                                                                                                                                                                                                                                                                         |
| 3          | Flash write preparation failed.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4          | Flash write failed.                             |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5          | TFTP session timeout.                           | TFTP failed because of a time out.<br>Check IP connectivity and make sure the TFTP server is running.                                                                                                                                                                                                                                                                                                                                   |
| 6          | TFTP out of buffer space.                       | The file is larger than the amount of space on the device or TFTP server.<br><br>If you are copying an image file to flash, first copy the other image to your TFTP server, then delete it from flash. (Use the <b>erase flash...</b> CLI command at the Privileged EXEC level to erase the image in the flash.)<br><br>If you are copying a configuration file to flash, edit the file to remove unneeded information, then try again. |
| 7          | TFTP busy, only one TFTP session can be active. | Another TFTP transfer is active on another CLI session, SNMP, or Web management session. Retry the transfer after a period of time.                                                                                                                                                                                                                                                                                                     |
| 8          | File type check failed.                         | You accidentally attempted to copy the incorrect image code into the system. Retry the transfer using the correct image.                                                                                                                                                                                                                                                                                                                |
| 16         | TFTP remote - general error.                    | There is an error in the TFTP configuration. The error message describes the error. Correct the error, then retry the transfer.                                                                                                                                                                                                                                                                                                         |
| 17         | TFTP remote - no such file.                     |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 18         | TFTP remote - access violation.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 19         | TFTP remote - disk full.                        |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 20         | TFTP remote - illegal operation.                |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 21         | TFTP remote - unknown transfer ID.              |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 22         | TFTP remote - file already exists.              |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 23         | TFTP remote - no such user.                     |                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 6 Diagnostic error codes and remedies for TFTP transfers



## Hardware maintenance schedule



### **DANGER**

*The procedures in this manual are for qualified service personnel.*

Dell routers require minimal maintenance for hardware components. It is recommended that you perform the following regular maintenance tasks:

- Clean the fiber-optic connectors on a fiber-optic transceiver port and the connected fiber cable each time you disconnect the cable.
- Replace the air filters quarterly.

You can also replace the following hardware components, as needed:

- All modules (management, interface, and switch fabric).
- Fiber-optic transceivers.
- AC power supplies.
- Fan assemblies.

### **NOTE**

The management, interface, and switch fabric modules are dedicated, which means that you must install them in Dell routers only. If you install these modules in another Dell device or you install a module intended for another Dell device in a Dell router, the device and modules will not function properly.

## Replacing a management module

For instructions on how to install or replace modules, refer to the module installation section in the installation chapter for your router model.

## Replacing an interface module

You can remove or replace interface modules while the router is powered on and running. For more information on module slot locations, refer to [Chapter 1, “Product Overview”](#). For information about how to install a new or replacement module, refer to the installation chapter for your router model.



### CAUTION

If you are hot-swapping a component, allow a minimum of two seconds after a component has been removed before inserting a replacement component in the same slot.

## Removing and replacing an interface module

To remove or replace an interface module, see the module instructions in the installation chapter that is appropriate for your router model.

For 16-slot routers, if you insert a module into a slot where the fan speed for a previous module was manually configured, you will need to change the fan speed back to auto. For example, if the fan speed was manually configured to “slow”, and you are installing a module that requires more cooling power, the “slow” setting will cause the module to overheat. To configure the fan speed to auto, enter the following command:

```
PowerConnect# set-fan-speed auto
```

**Syntax:** set-fan-speed auto

## Replacing a switch fabric module

You can replace a switch fabric module while the router is powered on and running. For more information on switch fabric slot locations, refer to [Chapter 1, “Product Overview”](#). For installation instructions for switch fabric modules, see the installation chapter that is appropriate for your router model.



### CAUTION

If you are hot-swapping a component, please allow a minimum of two seconds after the old component has been removed before inserting a replacement component in the same slot.

For a graceful shutdown of the links, it is recommended that you disable the switch fabric module before removing it from the device. It is also recommended that you remove or replace switch fabric modules one at a time. If you need to remove all of the switch fabric modules at the same time, you must shut down the router and remove the power source.

## Replacing a fiber-optic transceiver

You can replace a fiber-optic transceiver in a 10 Gigabit Ethernet port while the device is powered on and running.

Before removing a fiber-optic transceiver, have the following items available:

- The protective covering that you removed from the fiber-optic transceiver port when you initially installed the module

- An ESD wrist strap with a plug for connection to the ESD connector on the router chassis.

**DANGER**

***For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.***

Follow these steps to replace a fiber-optic transceiver in a 10 Gbps Ethernet port.

1. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector located on the front of the router.
2. Disconnect the two fiber cable connectors from the port connectors.
3. Replace the protective cover on the port connectors.
4. Pull down the latch on the front of the transceiver.
5. Pull the transceiver out of the port and place it in an anti-static bag for storage.
6. Remove the new transceiver from the protective packaging.
7. Insert the fiber-optic transceiver into the port until it clicks into place. Fiber-optic transceivers are keyed to prevent incorrect insertion.

## Cabling a fiber-optic transceiver

To cable a fiber-optic transceiver, perform the following steps.

### Fiber-optic cabling steps

1. Before cabling a fiber-optic transceiver, it is strongly recommended that you clean the cable connectors and the port connectors. For more information, refer to [“Replacing a management module”](#) on page 161.
2. Gently insert the two cable connectors (a tab on each connector should face upward) into the port connectors until the tabs lock into place.

## Replacing a power supply

You can replace a power supply while the device is powered on and running. For the location of the power supplies refer to [Chapter 1, “Product Overview”](#).

**CAUTION**

**If you are hot-swapping a module, power supply, or fan tray, allow a minimum of two seconds after a module (or power supply or fan tray) has been removed before inserting a module in the same slot.**

## Determining which power supply failed

To determine which power supply has failed, enter the **show chassis** command at any CLI command prompt.

```
PowerConnect# show chassis
```

This command displays status information for the fans and power supplies, and temperature readings for various components in the device. The power supplies are numbered in the display. Refer to “[Displaying device status and temperature readings](#)” on page 102 for more information.

If a power supply has failed, the display indicates “Installed (Failed)” and identifies the slot in which the failed power supply is installed.

### Setting the threshold for power supply monitoring

The **power-supply monitoring threshold** command monitors the power supply state, and indicates when a power supply will shut down due to failure.

To set a threshold value for power supply monitoring, enter the following command.

```
PowerConnect(config)#power-supply monitoring threshold 3
A Power Supply will be Shutdown if it fails 3 times within an Hour
```

The power supply will flap three times within an hour, after which the power supply will automatically shut down.

**Syntax:** [no] power-supply monitoring [threshold <decimal>]

The <decimal> variable specifies the number of flaps within an hour after which a power supply will automatically shutdown. The threshold range is from 0 through 32. The default value is 5. A value of 0 disables the power supply auto-shutdown on flapping.

---

#### NOTE

A threshold value of 0 will not automatically shutdown a power supply due to failures.

---

For Syslog messages, please refer to *Appendix A, Using Syslog in the Brocade NetIron Configuration Guide*.

### Clearing power supply failure timestamps

The **power-supply monitoring clear** command is used to clear all collected failure timestamps for a given power supply, or for all available power supplies.

To clear all collected failure timestamps for a power supply, enter the following command.

```
PowerConnect(config)# power-supply monitoring clear 1
This will clear all collected failure timestamps for the Power Supply # 1
Are you sure? (enter 'y' or 'n'): y
```

To clear all collected failure timestamps for all available power supplies, enter the following command.

```
PowerConnect(config)# power-supply monitoring clear all
This will clear all collected failure timestamps for all available Power Supplies
Are you sure? (enter 'y' or 'n'): y
```

You are asked to verify this command by entering “yes” or “no.”

**Syntax:** power-supply monitoring clear <decimal | all>]

By default, no power-supply monitoring is configured.

The *<decimal>* variable specifies a power supply number, The **all** keyword clears all available power supplies.

## Displaying power supply monitoring timestamps

To display timestamps for failures on any power supply, enter the following command.

```
PowerConnect# show power-supply-monitoring
   PS-1      PS-2      PS-3      PS-4      PS-5      PS-6      PS-7      PS-8
1 ) 0         0         0         0         0         0         0         0
2 ) 0         0         0         0         0         0         0         0
3 ) 0         0         0         0         0         0         0         0
4 ) 0         0         0         0         0         0         0         0
5 ) 0         0         0         0         0         0         0         0
6 ) 0         0         0         0         0         0         0         0
7 ) 0         0         0         0         0         0         0         0
8 ) 0         0         0         0         0         0         0         0
9 ) 0         0         0         0         0         0         0         0
```

The **show power-supply-monitoring** command displays the last 32 recorded failure timestamps for a power supply. The current configured power supply monitoring threshold value is also displayed at the end of the output.

**Syntax:** **show power-supply-monitoring**

## Enabling a power supply shutdown

The **power-off power-supply** command allows you to shut down a power supply manually.

To shut down a power supply, enter the following command.

```
PowerConnect# power-off power-supply 3
This will Shutdown The Power Supply # 3
Are you sure? (enter 'y' or 'n'): y
ERROR: Power Supply # 3 is the Last Available in the system and will not be
shutdown.
To force the shutdown, please use keyword "forced"
```

**Syntax:** **power-off power-supply [forced] <decimal>**

The **power-supply** keyword allows you to shut down a power supply.

The *<decimal>* variable specifies a power supply index number.

The forced option forces the last power supply available in the system to shut down. The CLI will not shut down the last power supply unless the **forced** option is used.

## Powering on the power supply through the CLI

The **power-on power-supply** command allows you turn on a power supply that has been shut down.

A power supply will shut down due to flapping, or if a shutdown is enabled manually using the **power-off power-supply** command. Refer to [“Enabling a power supply shutdown”](#) on page 165.

## 7 Replacing a power supply

To turn on a power supply that has shut down, enter the following command.

```
PowerConnect#power-on power-supply 1  
AC Power Supply 1 is OK
```

The output example displays the status for power supply 1 as OK.

---

### NOTE

If a power supply has shut down, power to the interface module will be lost. There will not be enough power remaining in the system.

---

**Syntax:** `power-on [power-supply <decimal>]`

The <decimal> variable specifies a power supply index number.

## Replacing a power supply

To replace a power supply, have the following items available:

- A new power supply which you can order from Dell
- A small flat-blade or Phillips screwdriver (NetIron MLX-4 only)



### DANGER

*The power supplies are hot swappable, which means they can be removed and replaced while the device is powered on and running. However, Dell recommends that you disconnect the power supply from its power source before removing and replacing the supply. The device can be running while a power supply is being removed and replaced, but the power supply itself should not be connected to a power source. Otherwise, you could be injured or the power supply or other parts of the device could be damaged.*

---



### DANGER

*The front panel of a power supply includes a handle that locks the power supply in the device. This handle is a locking mechanism only and should not be used to lift and carry the power supply. You may sustain physical injury or harm if you attempt to lift and carry a power supply using the locking handle.*

---

1. Disconnect the power supply from the power source.
2. Disconnect the power cables from the power supply.
3. For a 4-slot device, use the screwdriver to loosen the two screws on both sides of the power supply faceplate. Then pull the ejectors forward until the power supply disconnects from the backplane.
4. For an 8-slot or 16-slot device, pull up on the plunger on the faceplate and pull the handle toward you until the power supply is released.
5. Pull the power supply out of the device.
6. Insert the new power supply into the empty power supply slot, using the guides provided on either side of the slot.

**CAUTION**

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

7. After you insert the power supply, push gently on the power supply faceplate until the power supply is fully seated.
8. Pull up on the handle on the power supply faceplate to lock the power supply in place.
9. For a 4-slot device, use the screwdriver to secure the two screws on either side of the power supply faceplate.
10. Connect the AC power cord to the power supply faceplate.
11. Connect the power to the AC source.

LEDs on the power supply faceplate show the status of the power supply with the following colors:

- For an AC supply, the AC OK and DC OK LEDs should be green, indicating the power supply is providing power to the device components.
- If the ALM LED is lit (amber), the power supply has failed.

For information about troubleshooting this problem, refer to [Table 27](#) on page 207.

## Replacing fan assemblies

You can replace a fan or a fan control module while the router is powered on and running. The fans and fan control modules are located on the rear panel of the router.

**NOTE**

Fan trays are hot swappable. However, a hot-swap procedure should be completed within five minutes so the device will continue to function correctly without any fans. It is recommended that you disconnect the power supply from AC power before installing or removing the fan tray.

### Replacing fan assemblies in a 16-slot router

A 16-slot router has one fan assembly accessible from the front of the router and two assemblies that are accessible from the rear. The front assembly pushes air into the router and the rear fans pull air out.

You can remove and replace a fan assembly while a 16-slot router is powered on and running.

**CAUTION**

To avoid overheating of the 16-slot router, remove one fan assembly at a time, and replace it promptly. Do not remove all fans from the device at once.

To replace a fan assembly, you need the following:

- A new fan assembly, which you can order from Dell.
- A small flat-blade screwdriver.

## 7 Replacing fan assemblies

- An ESD wrist strap with a plug for connection to the ESD connector on the router.



### **DANGER**

*For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.*

### ***Replacing the rear fan assemblies in the 16-slot router***

Perform these steps to replace a rear fan assembly.

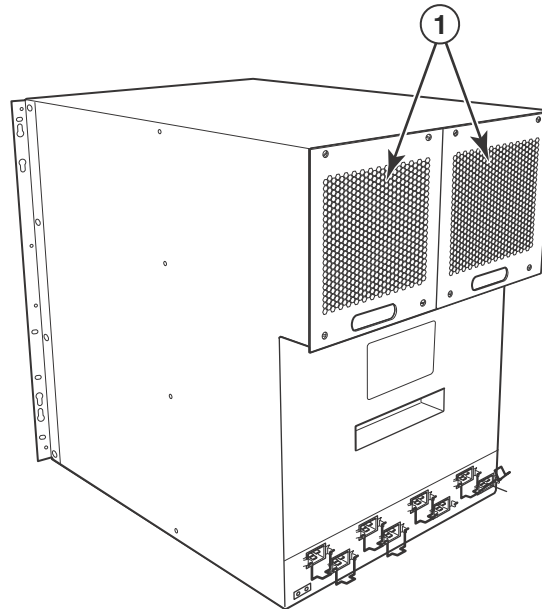
1. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector on the front of the router.
2. Using the flat-blade screwdriver, loosen the four captive screws that secure the fan assembly to the router.
3. Remove the fan by inserting your fingers underneath the fan assembly and pulling the assembly toward you as shown in [Figure 65](#). Pulling the fan assembly unseats the fan connector from the router connector.



### **DANGER**

*Be careful not to insert your fingers into the fan while removing it. The fan may still be spinning at a high speed.*

**FIGURE 65** Removing a rear fan assembly from a 16-slot router



- 1 Fan assembly



4. Insert the new fan assembly into the slot and push the assembly in until the faceplate is flush with the device. Pushing the assembly in seats the fan connector with the device connector.
5. Secure the fan assembly to the device by tightening the four captive screws.
6. Access the CLI, and enter the **show chassis** command to verify that both fans are operating normally.

#### Front fan assembly replacement steps

Perform the following steps to replace a fan assembly.

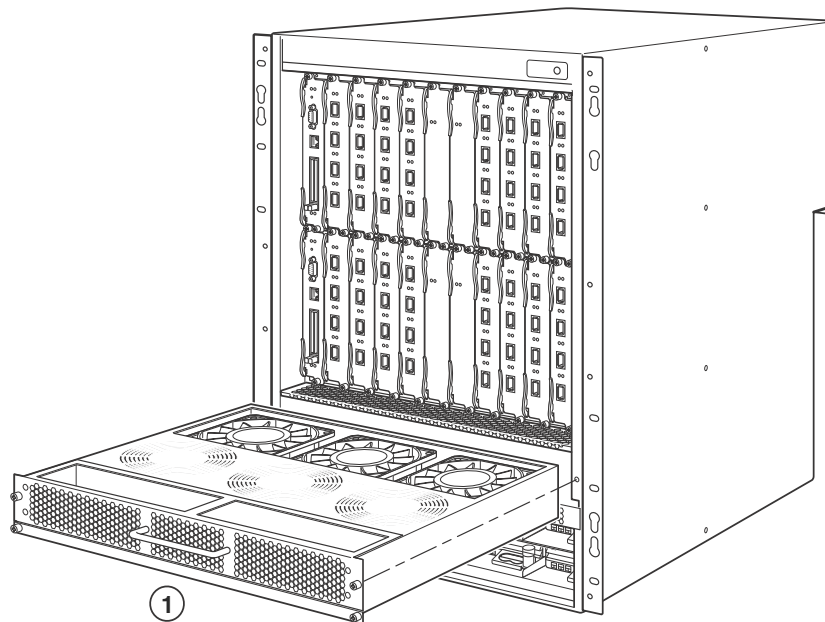
1. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector located on the front of the router.
2. Using the flat-blade screwdriver, loosen the four captive screws that secure the fan assembly to the front of the router.
3. Grasp the handle on the fan assembly and pull it toward you as shown in [Figure 66](#). Pulling the fan assembly unseats the assembly connector from the router connector.



#### **DANGER**

***Be careful not to accidentally insert your fingers into the fan while removing it. The fan may still be spinning at a high speed.***

**FIGURE 66** Removing a front fan assembly from a 16-slot router



1. Fan tray assembly
4. Insert the new fan assembly into the slot and push the assembly in until the faceplate is flush with the device. Pushing the assembly in seats the fan connector with the device connector.
5. Tighten the four captive screws to secure the fan to the device.

6. Access the CLI, and enter the **show chassis** command to verify that the fans are operating normally.

### Replacing the fan tray assembly in 4-slot and 8-slot routers

4-slot and 8-slot routers have a fan tray assembly that is accessible from the front of the device. The fan tray assembly pulls air out of the device.

You can remove and replace a fan tray assembly while the router is powered on and running.

To replace a fan tray assembly, have these items available:

- A new fan tray assembly, which you can order from Dell.
- An ESD wrist strap with a plug for connection to the ESD connector on the router.



#### **DANGER**

***For safety reasons, the ESD wrist strap should contain a 1 megohm series resistor.***

Follow these steps to replace a fan tray assembly in 4-slot and 8-slot routers.

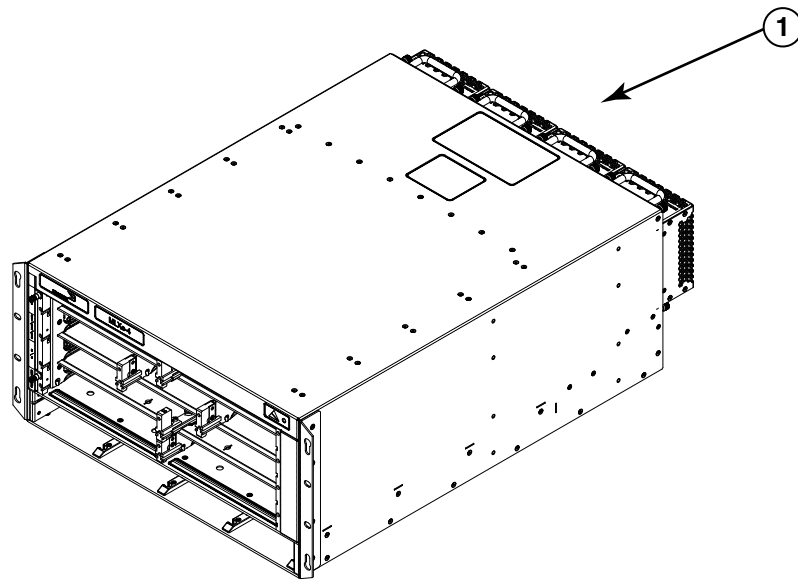
1. Put on the ESD wrist strap and ground yourself by inserting the plug into the ESD connector located on the front of the router.
2. To remove the fan tray assembly from the router, grasp the handle and pull it toward you as shown in [Figure 67](#) and [Figure 68](#). Pulling the assembly unseats the fan tray assembly connector from a router connector.



#### **DANGER**

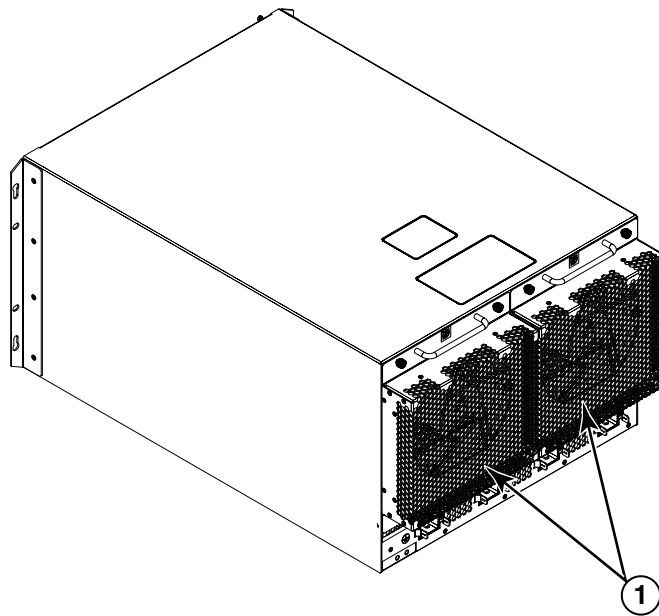
***Be careful not to insert your fingers into the fan while removing it. The fan may still be spinning at a high speed.***

**FIGURE 67** Removing a fan tray assembly from a 4-slot router.



- 1 Fan tray assembly

**FIGURE 68** Removing a fan tray assembly from an 8-slot router.



- 1 Fan tray assembly
3. Insert the new fan assembly into the fan slot and push the enclosure in until the faceplate is flush with the router. Pushing the enclosure in seats the fan connector with the router connector.
4. Tighten the four captive screws to secure the fan to the router.
5. Access the CLI, and enter the **show chassis** command to verify that the fans are operating normally.

## Replacing the air filters

It is strongly recommended that routers be installed in environments that have minimal dust and airborne contaminants. If routers are installed in environments where dust or other airborne contaminants may be present, air filters should be inspected and replaced as needed. Maintaining clean air filters ensures optimal airflow through the devices.

You can replace the air filters while a router is powered on and running. Before performing this task, have these items available:

- A 7/64 inch hex head screwdriver
- Replacement air filters, which you can order from Dell

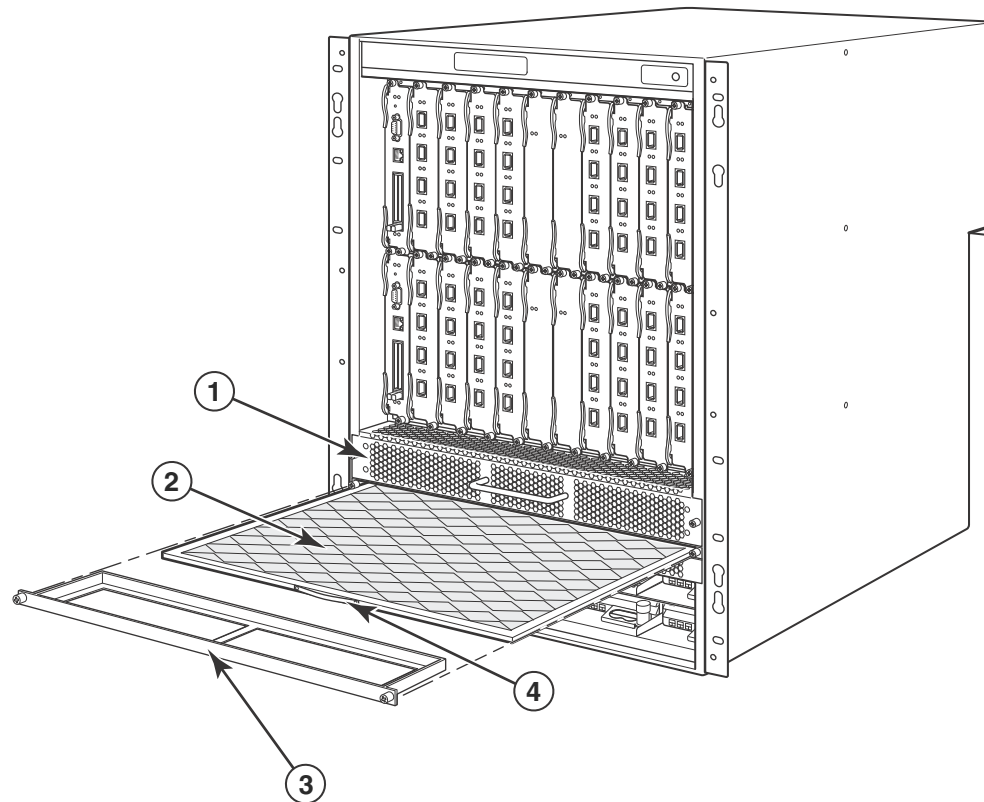
### *Replacing the air filter in 16-slot routers*

Follow these steps to replace the air filter in a 16-slot router.

1. Loosen the two screws in the front of the filter retainer.
2. Pull the filter retainer away from the router as shown in [Figure 69](#).

There is a hook on the back of the retainer that is attached to the grab-strap. As you pull the retainer out, the filter is pulled along with it.

**FIGURE 69** Air filter removal and replacement for 16-slot routers



- |            |                     |                     |
|------------|---------------------|---------------------|
| 1 Fan tray | 3 Filter retainer   | 5 Airflow direction |
| 2 Filter   | 4 Filter grab-strap |                     |

3. Unhook the filter retainer from the air filter and discard the used filter.
4. Partially insert the replacement air filter by sliding it along the metal guides.

The filter is marked with an arrow that indicates how the filter should be installed in relation to the direction of airflow in the router. Because air is pulled through the device, the arrow must point up towards the fan tray.

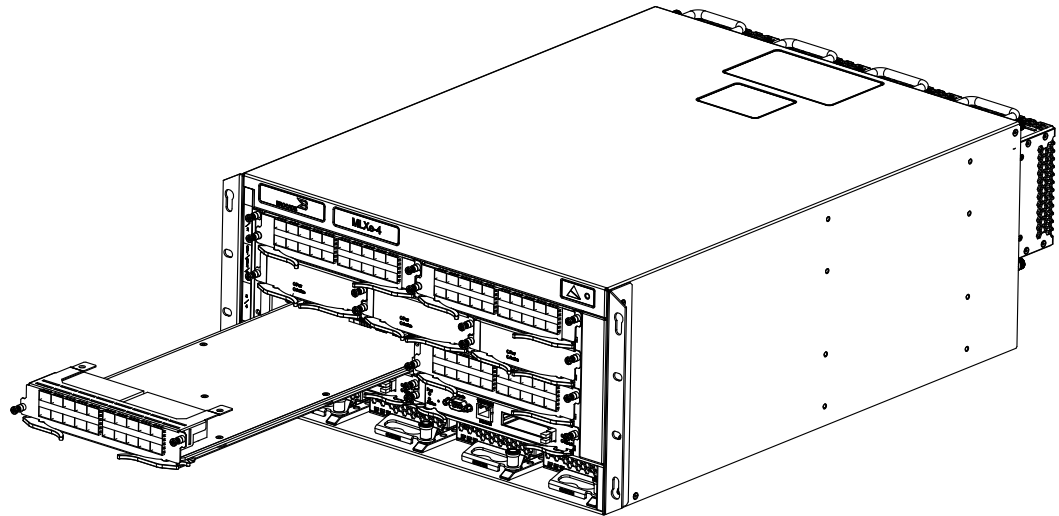
5. Attach the hook on the back of the filter retainer to the filter grab-strap.
6. Push the filter retainer into the router and tighten the two screws.

### ***Replacing the air filter in 4-slot and 8-slot routers***

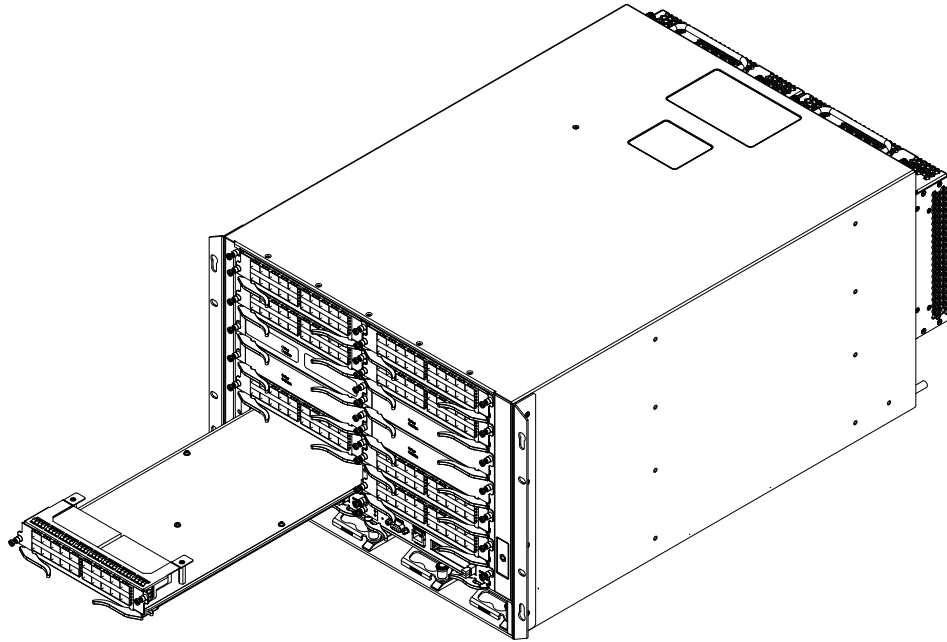
Follow these steps to replace the air filter in 4-slot and 8-slot routers.

1. Loosen the two screws in the front of the filter retainer.
2. Pull the filter retainer away from the router as shown in [Figure 70](#) or [Figure 71](#).

**FIGURE 70** Air filter removal and replacement for a 4-slot router.



**FIGURE 71** Air filter removal and replacement for the 8-slot router.



3. Pull the old air filter out of the router and discard it.
4. Insert the replacement air filter by sliding it along the metal guides.

The filter is marked with an arrow that indicates how the filter should be installed for proper airflow in the device. Since air is pulled through the router, the arrow must point right towards the fan tray.

5. Push the filter retainer into the router and tighten the two screws.

# Hardware Specifications

This chapter describes hardware specifications for PowerConnect B-MLXe routers.

## Hardware specifications for PowerConnect B-MLXe routers

The following sections describe hardware specifications for PowerConnect B-MLXe routers.

### Power specifications

This section contains the power specifications for PowerConnect B-MLXe routers

The following power supply frequency requirements apply to PowerConnect B-MLXe-4, PowerConnect B-MLXe-8, and PowerConnect B-MLXe-16 routers:

- AC Input Rating: 100 to 240V, 50/60 Hz, 16.0 A maximum per power supply
- AC Operating Voltage Range: 90 to 264V, 50/60 Hz
- DC Input Rating: -48V, 30.0 A maximum per power supply
- DC Operating Range: -40 to -60V
- DC Input Rating: -48V, 45.0 A maximum per power supply
- DC Operating Range: -40 to -60V

### *Power consumption for PowerConnect B-MLXe routers and components*

[Table 30](#) lists power consumption, in watts, for PowerConnect B-MLXe router components. [Table 31](#) lists power consumption information for multiple configurations of PowerConnect B-MLXe routers.

**TABLE 30** Wattage consumed by individual components in PowerConnect B-MLXe routers

| Component                                                          | Maximum power consumption, in watts |
|--------------------------------------------------------------------|-------------------------------------|
| <b>Management modules</b>                                          |                                     |
| Management modules (MLXe-4, 8, and 16 routers)                     | 30W                                 |
| <b>Switch fabric modules</b>                                       |                                     |
| NI-X-SF3                                                           | 53W                                 |
| NI-X-SF1                                                           | 19W                                 |
| <b>High speed switch fabric modules</b>                            |                                     |
| NI-X-4-HSF (PowerConnect B-MLXe-4 routers)                         | 19W                                 |
| NI-X-16-8-HSF switch fabric module (MLXe-8 and MLXe-16 routers)    | 53W                                 |
| <b>Interface modules</b>                                           |                                     |
| 4-port 10 Gigabit Ethernet interface with fiber-optic transceivers | 225W                                |

**TABLE 30** Wattage consumed by individual components in PowerConnect B-MLXe routers (Continued)

| Component                                      | Maximum power consumption, in watts |
|------------------------------------------------|-------------------------------------|
| 48-port Gigabit Ethernet with MRJ-21 interface | 260W                                |
| NI-MLX-10x8G-M interface module                | 246W                                |
| NI-MLX-10x8G-D interface modules               | 246W                                |
| <b>Line cards</b>                              |                                     |
| 4x10G                                          | 255W                                |
| 24x1GC                                         | 170W                                |
| 24x1GF                                         | 170W                                |
| <b>Fan assemblies</b>                          |                                     |
| PowerConnect B-MLXe-16 front fan tray          | 202W                                |
| NIBI-16-FAN-EXH-A-16 rear fan modules          | 288W                                |

Table 31 lists power consumption information for PowerConnect B-MLXe routers with all base components installed, and with only the specified interface modules installed.

**TABLE 31** PowerConnect B-MLXe router power consumption values

| Model                                                      | @100 VAC |       |        | @200 VAC |       |        | @-48VDC |       |        |
|------------------------------------------------------------|----------|-------|--------|----------|-------|--------|---------|-------|--------|
|                                                            | Amps     | Watts | BTU/hr | Amps     | Watts | BTU/hr | Amps    | Watts | BTU/hr |
| <b>MLXe routers with 8x10G interface modules only</b>      |          |       |        |          |       |        |         |       |        |
| MLXe-4                                                     | 17       | 1706  | 5824   | 9        | 1706  | 5824   | 36      | 1706  | 5824   |
| MLXe-8                                                     | 33       | 3332  | 11372  | 17       | 3332  | 11372  | 69      | 3332  | 11372  |
| MLXe-16                                                    | 57       | 5674  | 19365  | 28       | 5674  | 19365  | 118     | 5674  | 19365  |
| <b>MLXe routers with 48-T-A interface modules only</b>     |          |       |        |          |       |        |         |       |        |
| MLXe-4                                                     | 18       | 1773  | 6052   | 9        | 1773  | 6052   | 37      | 1773  | 6052   |
| MLXe-8                                                     | 35       | 3465  | 11827  | 17       | 3465  | 11827  | 72      | 3465  | 11827  |
| MLXe-16                                                    | 59       | 5940  | 20275  | 30       | 5940  | 20275  | 124     | 5940  | 20275  |
| <b>MLXe routers with legacy MLX interface modules only</b> |          |       |        |          |       |        |         |       |        |
| MLXe-4                                                     | 16       | 1630  | 5564   | 8        | 1630  | 5564   | 34      | 1630  | 5564   |
| MLXe-8                                                     | 32       | 5180  | 10852  | 16       | 3180  | 10852  | 66      | 3180  | 10852  |
| MLXe-16                                                    | 54       | 5369  | 18325  | 27       | 5369  | 18325  | 112     | 5369  | 18325  |



## Physical dimensions for PowerConnect B-MLXe routers

Table 32 provides the physical dimensions for PowerConnect B-MLXe routers

**TABLE 32** PowerConnect B-MLXe physical dimensions

| Router model | Height                  | Width                   | Depth                   | Depth with Fan FRU      | Weight (empty)           | Weight (fully loaded)     |
|--------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|---------------------------|
| MLXe-4       | 22.13 cm<br>(8.714 in.) | 43.69 cm<br>(17.20 in.) | 58.42 cm<br>(23.0 in.)  | 63.5 cm<br>(25.0 in.)   | 27.40 kg<br>(60.4 lbs)   | 52.84 kg<br>(116.5 lbs.)  |
| MLXe-8       | 31.01 cm<br>(12.21 in.) | 43.69 cm<br>(17.20 in.) | 60.96 cm<br>(24.0 in.)  | 66.04 cm<br>(26.0 in.)  | 35.47 kg<br>(78.2 lbs.)  | 77.72 kg<br>(171.35 lbs.) |
| MLXe-16      | 62.15 cm<br>(24.47 in.) | 44.32 cm<br>(17.45 in.) | 64.77 cm<br>(24.18 in.) | 66.50 cm<br>(26.18 in.) | 41.66 kg<br>(91.95 lbs.) | 159.39 kg<br>(351.4 lbs)  |

## Operating environment specifications for PowerConnect B-MLXe routers

Table 33 provides the operating environment specifications for PowerConnect B-MLXe routers.

**TABLE 33** PowerConnect B-MLXe router operating environment

| Operating temperature   | Relative humidity                         | Operating altitude            |
|-------------------------|-------------------------------------------|-------------------------------|
| (0° - 40°C) 32° - 104°F | 5 to 90%, at (40°C) 104°F, non-condensing | (0 - 2012 meters) 0 - 6600 ft |

## Storage environment specifications for PowerConnect B-MLXe routers

Table 34 provides the storage environment specifications for the PowerConnect B-MLXe routers.

**TABLE 34** PowerConnect B-MLXe router storage environment

| Storage temperature        | Storage humidity                              | Storage altitude                |
|----------------------------|-----------------------------------------------|---------------------------------|
| (-25° - 70°C) -13° - 158°F | 95% maximum relative humidity, non-condensing | (0 - 4500 meters) 0 - 15,000 ft |

## Safety agency approvals

- CAN/CSA-C22.2 No. 60950-1-03/UL60950-1 – First Edition, Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products – Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products – Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1:2001\IEC 60950-1 Safety of Information Technology Equipment

## Electromagnetic approvals

- FCC Part 15, Subpart B (Class A)

- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

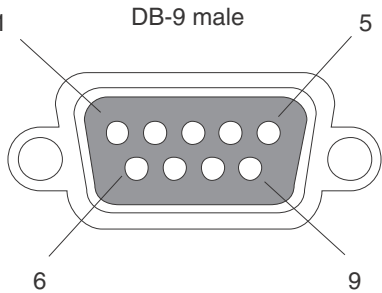
## Port specifications for all router models

This section describes port specifications for all router models.

### Console port pin assignments

The console port is a standard male DB-9 connector, as shown in [Figure 72](#). For information about how you can use this port, refer to [“Console port”](#) on page 7.

**FIGURE 72** Console port pin and signalling details

| Pin Assignment                                                                                       | Pin Number | Switch Signal |
|------------------------------------------------------------------------------------------------------|------------|---------------|
|  <p>DB-9 male</p> | 1          | Reserved      |
|                                                                                                      | 2          | TXD (output)  |
|                                                                                                      | 3          | RXD (input)   |
|                                                                                                      | 4          | Reserved      |
|                                                                                                      | 5          | GND           |
|                                                                                                      | 6          | Reserved      |
|                                                                                                      | 7          | CTS (input)   |
|                                                                                                      | 8          | RTS (output)  |
|                                                                                                      | 9          | Reserved      |

Most PC serial ports require a cable with a female DB-9 connector. Terminal connections will vary, requiring a cable with either a DB-9 or DB-25 connector, male or female

Serial cable options between the router and a PC or terminal are shown in [Figure 73](#).

**NOTE**

As shown in [Figure 72](#) and [Figure 73](#), some wires should not be connected. If you connect wires that are labeled “Reserved”, you may experience unexpected results with some terminals.

**FIGURE 73** Console port pin assignments with connection options to a terminal or PC

| DB-9 to DB-9<br>Female Switch |          |   | Terminal or PC | DB-9 to DB-25<br>Female Switch |          |   | Terminal or PC |
|-------------------------------|----------|---|----------------|--------------------------------|----------|---|----------------|
| 1                             | Reserved |   | 1              | 1                              | Reserved |   | 8              |
| 2                             |          | → | 2              | 2                              |          | → | 3              |
| 3                             |          | ← | 3              | 3                              |          | ← | 2              |
| 4                             | Reserved |   | 4              | 4                              | Reserved |   | 20             |
| 5                             |          | — | 5              | 5                              |          | — | 7              |
| 6                             | Reserved |   | 6              | 6                              | Reserved |   | 6              |
| 7                             |          | ← | 7              | 7                              |          | ← | 4              |
| 8                             |          | → | 8              | 8                              |          | → | 5              |
| 9                             | Reserved |   | 9              | 9                              | Reserved |   | 22             |

## Management port pin assignments

The management port is an RJ45 UTP connector. [Table 35](#) describes the pin assignments for this connector. For information about how you can use this port, refer to [“10/100/1000 Ethernet port”](#) on page 7.

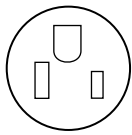
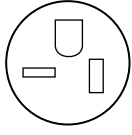
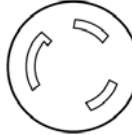
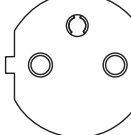
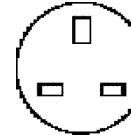


**TABLE 35** Management port pin assignments

| Pin number | MDI-X ports                           |
|------------|---------------------------------------|
| 1          | TD+                                   |
| 2          | TD-                                   |
| 3          | RD+                                   |
| 4          | Not used (10BaseT)<br>CMT (100BaseTX) |
| 5          | Not used (10BaseT)<br>CMT (100BaseTX) |
| 6          | RD-                                   |
| 7          | Not used (10BaseT)<br>CMT (100BaseTX) |
| 8          | Not used (10BaseT)<br>CMT (100BaseTX) |

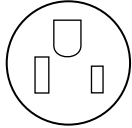
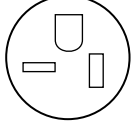

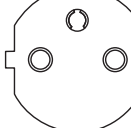
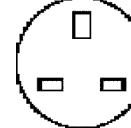


## Power cords

The types of power cords provided with routers are specific to the country where they are installed. To order a power cord, contact your Dell supplier. [Table 36](#) describes power cord types.

**TABLE 36** Power cord types (international)

| Country              | Plug style                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | NEMA 5-15P<br>125V only<br>USA, Canada,<br>Japan, other<br>locations              | NEMA 5-20P<br>125V only<br>USA, Canada,<br>Mexico, other<br>locations             | NEMA L6-20<br>USA, Canada,<br>Mexico, other<br>locations                          | CEE-7/7<br>“Schuko”<br>Continental<br>Europe                                      | BS-1363A<br>various<br>locations                                                   | AS 3112<br>Australia/New<br>Zealand                                                 | IEC-60309<br>32A-6h, 230V~                                                          |
|                      |  |  |  |  |  |  |  |
| Argentina            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Australia            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | X                                                                                   |                                                                                     |
| Austria              |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Bahrain              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Belgium              |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Brazil               | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Chile                |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| China, People's Rep. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | X                                                                                   |                                                                                     |
| Czech, Rep. of       |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Denmark              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Egypt                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| England              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Finland              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| France               |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Germany              |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Greece               |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Hong Kong            |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Hungary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| India                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Indonesia            |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Ireland, North       |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Ireland, South       |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Israel               |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Italy                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Japan                | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Korea, South         |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Malaysia             |                                                                                   |                                                                                   |                                                                                   | Alternate                                                                         |                                                                                    |                                                                                     | Recommended                                                                         |

**TABLE 36** Power cord types (international) (Continued)

| Country                | Plug style                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                        | NEMA 5-15P<br>125V only<br>USA, Canada,<br>Japan, other<br>locations              | NEMA 5-20P<br>125V only<br>USA, Canada,<br>Mexico, other<br>locations             | NEMA L6-20<br>USA, Canada,<br>Mexico, other<br>locations                          | CEE-7/7<br>“Schuko”<br>Continental<br>Europe                                      | BS-1363A<br>various<br>locations                                                   | AS 3112<br>Australia/New<br>Zealand                                                 | IEC-60309<br>32A-6h, 230V~                                                          |
|                        |  |  |  |  |  |  |  |
| Mexico                 | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Monaco                 |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Netherlands            |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| New Zealand            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | X                                                                                   |                                                                                     |
| Norway                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Poland                 |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Portugal               |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Puerto Rico            | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Russia                 |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Saudi Arabia           |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Scotland               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Singapore              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| South Africa           |                                                                                   |                                                                                   |                                                                                   |                                                                                   | X                                                                                  |                                                                                     |                                                                                     |
| Spain                  |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| Sweden                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Switzerland            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| Taiwan                 | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Turkey                 |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| United Arab<br>Emirate |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| United Kingdom         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | X                                                                                   |
| United States          | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Venezuela              | X                                                                                 | X                                                                                 | X                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Yugoslavia             |                                                                                   |                                                                                   |                                                                                   | X                                                                                 |                                                                                    |                                                                                     |                                                                                     |

## 8 Power cords

# Regulatory Statements

---

## U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



### **CAUTION**

**Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

## Industry Canada statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## Europe and Australia

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## Germany

### **For PowerConnect B-MLXe-16 routers:**

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 89 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 89 dB(A) gemäss EN ISO 7779.

### **For PowerConnect B-MLXe-8 routers:**

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 87.4 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 87.4 dB(A) gemäss EN ISO 7779.

**For PowerConnect B-MLXe-4 routers:**

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 86 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 86 dB(A) gemäss EN ISO 7779.

## Japan

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

**English translation of above statement**

This is Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

## Power cords (Japan Denan)



---

**注意** - 添付の電源コードを他の装置や用途に使用しない

添付の電源コードは本装置に接続し、使用することを目的として設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないでください。火災や感電の原因となる恐れがあります。

---

**English translation of above statement**

**ATTENTION:** Never use the power cord packed with your equipment for other products.



## China

The following statement applies to PowerConnect B-MLXe and NetIron devices.

---

### 声 明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

---

#### English translation of above statement

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures

## Korea

이 기기는 A급 기기로서, 업무용으로 전자파 적합 등록을 한 기기이오니 판매자 또는 사용자는 이 점을 유의하시기 바라며, 만약 잘못 판매 또는 구입하였을 경우에는 가정용으로 교환하시기 바랍니다.

#### English translation of above statement

This apparatus has radio wave acceptability registration as a Class A device, so sellers or users should be aware of this. If it is sold or purchased incorrectly, it should be exchanged with a home apparatus (Class B).

## Russia

Сертификат Соответствия в "Системе сертификации в области связи" № ОС-2-СПД-0561, срок действия: с 29 октября 2009 г. до 29 октября 2012 г.

#### English Translation of above statement

Certificate of Conformity in "Certification System in the field of telecommunications" # ??-2-???-0561, validity from the 29 of October 2009 to the 29 of October 2012.

**A** Russia

# Caution and Danger Notices

---

## Cautions

The cautions and dangers that appear in this manual are listed below in English, German, French, and Spanish.

A caution calls your attention to a possible hazard that can damage equipment.

"Vorsicht" weist auf eine mögliche Beschädigung des Geräts hin. Sie finden die folgenden Vorsichtshinweise in diesem Handbuch.

Une mise en garde attire votre attention sur un risque possible d'endommagement de l'équipement. Ci-dessous, vous trouverez les mises en garde utilisées dans ce manuel.

Un mensaje de precaución le advierte sobre un posible peligro que pueda dañar el equipo. Las siguientes son precauciones utilizadas en este manual.

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | All devices with DC power supplies (PowerConnect B-MLXe-16) are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.                                                                                |
| <b>VORSICHT</b>      | Alle Geräte mit Direktstromquellen (PowerConnect B-MLXe-16) sind nur zur Installation in Sperrbereichen bestimmt. Ein Sperrbereich ist ein Ort, zu dem nur Wartungspersonal mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer anderen Schutzvorrichtung Zugang hat. Er unterliegt außerdem der Kontrolle durch die für den Standort verantwortliche Stelle.                                                                    |
| <b>MISE EN GARDE</b> | Tous les équipements dotés d'un bloc d'alimentation en courant continu (PowerConnect B-MLXe-16) sont conçus pour l'installation dans des zones à accès réglementé uniquement. Une zone à accès réglementé est un local qui n'est accessible que par le personnel d'entretien à l'aide d'un outil, verrou ou clé conçus à cet effet, ou de tout autre accessoire de sécurité, et qui est contrôlé par l'autorité responsable de ce local. |
| <b>PRECAUCIÓN</b>    | Todos aquellos dispositivos con fuentes de alimentación de CC (PowerConnect B-MLXe-16) están diseñados para su instalación en zonas de acceso restringido solamente. Una zona de acceso restringido es un lugar al que sólo puede acceder personal de mantenimiento haciendo uso de una herramienta especial, una llave y un candado, o algún otro medio de seguridad, y que está controlado por la autoridad responsable.               |

## B Cautions

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | For a DC system (PowerConnect B-MLXe-16), use a grounding wire of at least 6 American Wire Gauge (AWG). The 6 AWG wire should be attached to an agency-approved crimp connector (provided on the chassis), and crimped with the proper tool. The crimp connector should allow for securement to both ground screws on the enclosure. For the ground lug use a UL-listed Panduit crimp connector, P/N LCD6-10A, and two 10-32, PPH, 1/2 screws to secure crimp connector to chassis. The grounding position is located on the side of the chassis adjacent to the ground symbol.                                                                                                                                                                                                                                                                                                                       |
| <b>VORSICHT</b>      | Für ein Gleichstromsystem (PowerConnect B-MLXe-16) ist ein Erdleiter von mindestens 6 AWG (amerikanische Norm für Drahtquerschnitte) zu verwenden. Der 6-AWG-Leiter sollte an einem geprüften gecrimpten Anschluss (am NetIron MLX-16 und PowerConnect B-MLXe-16 Chassis bereitgestellt) angebracht und mit dem vorschriftsmäßigen Werkzeug gecrimpt werden. Der gecrimpte Anschluss sollte eine Sicherung an beiden Erdungsschrauben am Gehäuse ermöglichen. Für NetIron MLX-8 und NetIron MLX-4 ist ein Erdleiter von mindestens 6 AWG (American Wire Gauge) zu verwenden. Für den Erdungskabelschuh ist ein UL-geprüfter Panduit-Crimp-Anschluss (Best.-Nr. LCD6-10A) und zwei 10-32, PPH, 1/2-Schrauben zur Sicherung des Crimp-Anschlusses am Chassis zu verwenden. Die Erdungsposition befindet sich seitlich am Chassis neben dem Erdungssymbol.                                               |
| <b>MISE EN GARDE</b> | Pour un système à alimentation continue (PowerConnect B-MLXe-16), utiliser un câble de mise à la terre de calibre AWG 6 (13 mm <sup>2</sup> ) au minimum. Le conducteur de 13 mm <sup>2</sup> doit être fixé à un raccord à sertir agréé (directement présent sur le châssis du NetIron MLX-16 et PowerConnect B-MLXe-16) à l'aide de la pince à sertir appropriée. Le raccord à sertir doit pouvoir être raccordé aux deux vis de mise à la terre du châssis. Pour les NetIron MLX-8 et NetIron MLX-4, utiliser un câble de mise à la terre de calibre AWG 6 (13 mm <sup>2</sup> ) au minimum. Pour la borne de mise à la terre, utiliser un raccord à sertir Panduit agréé (réf. LCD6-10A). Pour fixer ce raccord au châssis, utiliser deux 1/2 vis 10-32 PPH. L'emplacement prévu pour la mise à la terre, identifié par le symbole international correspondant, se trouve sur le côté du châssis. |
| <b>PRECAUCIÓN</b>    | Para un sistema de CC (PowerConnect B-MLXe-16), utilice un conductor de tierra de al menos 6 CAE (Calibre de Alambre Estadounidense, American Wire Gauge o AWG en sus siglas en inglés). El conductor de 6 CAE debe estar acoplado a un conector rizado homologado (suministrado con el chasis NetIron MLX-16 y PowerConnect B-MLXe-16), que haya sido rizado con la herramienta apropiada. El conector rizado debe permitir el acoplamiento a los dos tornillos de tierra del recinto. Para los sistemas NetIron MLX-8 y NetIron MLX-4, utilice un conductor de tierra de al menos 6 CAE. Para el terminal de tierra, utilice un conector rizado Panduit homologado por UL, P/N LCD6-10A, y dos tornillos 1/2, PPH, 10-32 para fijar el conector rizado al chasis. La posición de conexión a tierra está situada en el lateral del chasis junto al símbolo de tierra.                                |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | For the DC input circuit to the system of a PowerConnect B-MLXe-16, MLXe-8 and MLXe-4 (1800W supply) make sure there is a UL-Listed 60 amp circuit breaker, minimum -48Vdc, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be Listed copper wire, 8 AWG, marked VW-1, and rated minimum 90o C.                                                                                                        |
| <b>VORSICHT</b>      | Bei der Gleichstromeingangsschaltung zum System eines PowerConnect B-MLXe-16, MLXe-8 und MLXe-4 (1800W supply), muss sichergestellt werden, dass an den Eingangskabelschuhen zur Stromversorgung ein zweipoliger Schalter mit UL-Zulassung, 60 Ampere und mindestens -48 V Gleichstrom vorhanden ist. Die Eingangsleitung zum Anschluss an das Produkt sollte als Kupferdraht, 8 AWG, angegeben, als VW-1 gekennzeichnet und für mindestens 90 °C bemessen sein. |
| <b>MISE EN GARDE</b> | Pour le circuit d'alimentation en courant continu du système PowerConnect B-MLXe-16, MLXe-8 et MLXe-4 (1800W supply), vérifier la présence d'un disjoncteur bipolaire homologué de 60 A, minimum -48 Vcc, sur l'entrée de l'alimentation. Les câbles d'alimentation du produit doivent être des fils de cuivre homologués de section 10 mm <sup>2</sup> (8 AWG), marqués VW-1 et testés à 90° C.                                                                 |
| <b>PRECAUCIÓN</b>    | Para el circuito de entrada de CC al sistema de un PowerConnect B-MLXe-16, MLXe-8 y MLXe-4 (1800W supply), verifique que existe un disyuntor catalogado por UL de 60 amperios, -48VCC como mínimo, bipolar, en las orejetas de entrada a la fuente de alimentación. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 8 AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90 °C.                       |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | For the DC input circuit to the system of a PowerConnect B-MLXe-16, MLXe-8 and MLXe-4 (1200W supply), make sure there is a UL-Listed 30 amp circuit breaker, minimum -48Vdc, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be Listed copper wire, 8 AWG, marked VW-1, and rated minimum 90o C.                                                                                                      |
| <b>VORSICHT</b>      | Bei der Gleichstromeingangsschaltung zum System eines PowerConnect B-MLXe-16, MLXe-8 and MLXe-4 (1200W supply) muss sichergestellt werden, dass an den Eingangskabelschuhen zur Stromversorgung ein zweipoliger Schalter mit UL-Zulassung, 30 Ampere und mindestens -48 V Gleichstrom vorhanden ist. Die Eingangsleitung zum Anschluss an das Produkt sollte als Kupferdraht, 8 AWG, angegeben, als VW-1 gekennzeichnet und für mindestens 90 °C bemessen sein. |
| <b>MISE EN GARDE</b> | Pour le circuit d'alimentation en courant continu du système PowerConnect B-MLXe-16, MLXe-8 and MLXe-4 (1200W supply), vérifier la présence d'un disjoncteur bipolaire homologué de 30 A, minimum -48 Vcc, sur l'entrée de l'alimentation. Les câbles d'alimentation du produit doivent être des fils de cuivre homologués de section 10 mm <sup>2</sup> (8 AWG), marqués VW-1 et testés à 90° C.                                                               |
| <b>PRECAUCIÓN</b>    | Para el circuito de entrada de CC al sistema de un PowerConnect B-MLXe-16, MLXe-8 and MLXe-4 (1200W supply), verifique que existe un disyuntor catalogado por UL de 30 amperios, -48VCC como mínimo, bipolar, en las orejetas de entrada a la fuente de alimentación. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 8 AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90 °C.                    |

## B Cautions

|                      |                                                                                                                                                                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.                                                     |
| <b>VORSICHT</b>      | Beachten Sie mechanischen Führungen an jeder Seite des Netzteils, das ordnungsgemäß in die Führungen gesteckt werden muss. Das Netzteil darf niemals umgedreht eingesteckt werden.                                                             |
| <b>MISE EN GARDE</b> | Suivez attentivement les repères mécaniques de chaque côté du slot du bloc d'alimentation et assurez-vous que le bloc d'alimentation est bien inséré dans les repères. N'insérez jamais le bloc d'alimentation à l'envers.                     |
| <b>PRECAUCIÓN</b>    | Siga cuidadosamente las guías mecánicas de cada lado de la ranura del suministro de energía y verifique que el suministro de energía está insertado correctamente en las guías. No inserte nunca el suministro de energía de manera invertida. |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Do not add or remove a flash card while a file operation involving the flash card slot is in progress. Doing so can result in corruption of the flash card. If this occurs, you may need to reformat the flash card to make it usable again. Reformatting the card erases all data stored on the card.                                                                                                                         |
| <b>VORSICHT</b>      | Eine Flash-Karte darf nur dann eingesteckt oder herausgenommen werden, wenn keine Dateifunktion läuft, die der Flash-Karte bedarf. Wenn dies nicht beachtet wird, kann dies zur Korruption der Flash-Karte führen. Die Karte kann dann erst nach Neuformatierung wieder benutzt werden. Bei Neuformatierung gehen alle auf der Karte gespeicherten Daten verloren.                                                             |
| <b>MISE EN GARDE</b> | N'ajoutez pas ou ne supprimez pas une carte mémoire au cours d'une opération de fichier dans laquelle le slot de carte mémoire est impliqué. Vous risquez sinon de corrompre la carte mémoire. Si cela se produit, vous devrez peut-être reformater la carte mémoire pour qu'elle soit à nouveau utilisable. Le reformatage de la carte efface toutes les données qui y sont stockées.                                         |
| <b>PRECAUCIÓN</b>    | No añada ni quite una tarjeta flash mientras una operación de archivo que conlleve el uso de una ranura de tarjeta flash se encuentre en uso. De hacerlo así se podría dar lugar a la corrupción de la tarjeta flash. Si esto ocurriera, podría ser necesario que vuelva a formatear la tarjeta flash para hacer que vuelva sea utilizable. Cuando se formatea la tarjeta se borran todos los datos almacenados en la tarjeta. |

|                      |                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Do not install the device in an environment where the operating ambient temperature might exceed 40° C (104° F).                 |
| <b>VORSICHT</b>      | Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 40° C (104° F) installiert werden.         |
| <b>MISE EN GARDE</b> | N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 40° C (104° F). |
| <b>PRECAUCIÓN</b>    | No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 40° C (104° F).         |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the device. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the devices near the input power connectors.                                                                                                                            |
| <b>VORSICHT</b>      | Stromkreise, Verdrahtung und Überlastschutz dürfen nicht durch das Gerät überbelastet werden. Addieren Sie die Nennstromleistung (in Ampere) aller Geräte, die am selben Stromkreis wie das Gerät installiert sind. Somit können Sie feststellen, ob die Gefahr einer Überbelastung der Versorgungsstromkreise vorliegt. Vergleichen Sie diese Summe mit der Nennstromgrenze des Stromkreises. Die Höchstnennströme (in Ampere) stehen normalerweise auf der Geräterückseite neben den Eingangsstromanschlüssen.                                |
| <b>MISE EN GARDE</b> | Assurez-vous que le dispositif ne risque pas de surcharger les circuits d'alimentation, le câblage et la protection de surintensité. Pour déterminer le risque de surcharge des circuits d'alimentation, additionnez l'intensité nominale (ampères) de tous les dispositifs installés sur le même circuit que le dispositif en question. Comparez alors ce total avec la limite de charge du circuit. L'intensité nominale maximum en ampères est généralement imprimée sur chaque dispositif près des connecteurs d'entrée d'alimentation.     |
| <b>PRECAUCIÓN</b>    | Verifique que el instrumento no sobrecargue los circuitos de corriente, el cableado y la protección para sobrecargas. Para determinar la posibilidad de sobrecarga en los circuitos de suministros, añada las capacidades nominales de corriente (amp) de todos los instrumentos instalados en el mismo circuito que el instrumento. Compare esta suma con el límite nominal para el circuito. Las capacidades nominales de corriente máximas están generalmente impresas en los instrumentos, cerca de los conectores de corriente de entrada. |

|                      |                                                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Make sure the air flow around the front, sides, and back of the device is not restricted.                                                 |
| <b>VORSICHT</b>      | Stellen Sie sicher, dass an der Vorderseite, den Seiten und an der Rückseite der Luftstrom nicht behindert wird.                          |
| <b>MISE EN GARDE</b> | Vérifiez que rien ne restreint la circulation d'air devant, derrière et sur les côtés du dispositif et qu'elle peut se faire librement.   |
| <b>PRECAUCIÓN</b>    | Asegúrese de que el flujo de aire en las inmediaciones de las partes anterior, laterales y posterior del instrumento no esté restringido. |

|                      |                                                                                                                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Make sure the flash card is empty or does not contain files you want to keep. Formatting a flash card completely erases all files on the card.                                                 |
| <b>VORSICHT</b>      | Stellen Sie sicher, dass die Flash-Karte leer ist oder keine Dateien auf ihr gespeichert sind, die Sie behalten möchten. Die Formatierung einer Flash-Karte löscht alle Dateien auf der Karte. |
| <b>MISE EN GARDE</b> | Vérifiez que la carte mémoire est vide ou ne contient pas de fichiers que vous voulez conserver. Le reformatage de la carte mémoire efface tous les fichiers qui s'y trouvent.                 |
| <b>PRECAUCIÓN</b>    | Verifique que la tarjeta flash esté vacía o que no contenga archivos que desee conservar. Al formatear una tarjeta flash todos los archivos de ésta se borran.                                 |

|                      |                                                       |
|----------------------|-------------------------------------------------------|
| <b>CAUTION</b>       | Never leave tools inside the chassis.                 |
| <b>VORSICHT</b>      | Lassen Sie keine Werkzeuge im Chassis zurück.         |
| <b>MISE EN GARDE</b> | Ne laissez jamais d'outils à l'intérieur du châssis.  |
| <b>PRECAUCIÓN</b>    | No deje nunca herramientas en el interior del chasis. |

## B Cautions

|                      |                                                                                                                                                                                                                                                                                                                       |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Once you start the formatting process, you cannot stop it. Even if you enter CTRL-C to stop the CLI output and a new prompt appears, the formatting continues. Make sure you want to format the card before you enter the command.                                                                                    |
| <b>VORSICHT</b>      | Wenn Sie mit dem Formattieren beginnen, können Sie diesen Prozess nicht anhalten. Selbst wenn zum Anhalten der CLI-Ausgabe Strg-C drücken und eine neue Aufforderung gezeigt wird, wird mit dem Formattieren fortgefahren. Stellen Sie sicher, dass Sie die Karte formattieren wollen, bevor Sie den Befehl eingeben. |
| <b>MISE EN GARDE</b> | Une fois le processus de formatage commencé, vous ne pouvez pas l'interrompre. Même si vous appuyez sur CTRL-C pour arrêter la sortie CLI et si une nouvelle invite apparaît, le formatage continue. Soyez bien sûr de vouloir formater la carte avant d'entrer la commande.                                          |
| <b>PRECAUCIÓN</b>    | Una vez que empiece con el proceso de formateado, no se puede detener. Incluso si pulsa CTRL-C para detener la salida de CLI y aparece un nuevo indicador, el formateado continuará. Esté seguro que desea formatear la tarjeta antes de introducir el comando.                                                       |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Use the erase startup-config command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.                                                                                                |
| <b>VORSICHT</b>      | Verwenden Sie den Befehl "Erase startup-config" (Löschen Startup-Konfig) nur für neue Systeme. Wenn Sie diesen Befehl in ein bereits konfiguriertes System eingeben, löscht der Befehl die Konfiguration. Falls Sie aus Versehen die Konfiguration eines bereits konfigurierten Systems löschen, geben Sie den Befehl "Write Memory" (Speicher schreiben) ein, um die laufende Konfiguration in der Startup-Konfig-Datei zu speichern. |
| <b>MISE EN GARDE</b> | N'utilisez la commande erase startup-config que pour les nouveaux systèmes. Si vous entrez cette commande sur un système que vous avez déjà configuré, elle efface la configuration. Si vous effacez la configuration par accident sur un système configuré, entrez la commande write memory pour enregistrer la configuration actuelle dans le fichier startup-config.                                                                |
| <b>PRECAUCIÓN</b>    | Use el comando erase startup-config (borrar configuración de inicio) para sistemas nuevos solamente. Si usted introduce este comando en un sistema que ya ha configurado, el comando borrará la configuración. Si usted borra accidentalmente la configuración en un sistema ya configurado, introduzca el comando write memory (escribir memoria) para guardar la configuración en ejecución en el archivo startup-config.            |

|                      |                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Use a separate branch circuit for each AC power cord, which provides redundancy in case one of the circuits fails.                                              |
| <b>VORSICHT</b>      | Es empfiehlt sich die Installation eines separaten Stromkreiszweiges für jede Wechselstrom-Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises. |
| <b>MISE EN GARDE</b> | Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation C.A. Ainsi, il y aura un circuit redondant en cas de panne d'un des circuits.     |
| <b>PRECAUCIÓN</b>    | Use un circuito derivado separado para cada cordón de alimentación de CA, con lo que se proporcionará redundancia en caso de que uno de los circuitos falle.    |



|                      |                                                                                                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | If you do not install a module in a slot, you must keep the slot panel in place. If you run the chassis with an uncovered slot, the system may overheat.                                      |
| <b>VORSICHT</b>      | Falls kein Modul im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.                                 |
| <b>MISE EN GARDE</b> | Si vous n'installez pas de module dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.        |
| <b>PRECAUCIÓN</b>    | Si no instala un módulo en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento. |

|                      |                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | If you do not install a module in a slot, you must keep the slot blank in place. If you run the chassis with an uncovered slot, the system may overheat. Tighten the screws that secure the slot blanks so that they remain in place when removing adjacent panels or modules.                                                                                   |
| <b>VORSICHT</b>      | Wenn in einem Steckplatz kein Modul installiert wird, muss die Steckplatz-Leerblende immer angebracht sein. Wird das Chassis mit einem leeren Steckplatz ohne Leerblende betrieben, kann dies zu Überhitzung führen. Die Befestigungsschrauben der Leerblenden festziehen, damit sie sich beim Herausnehmen benachbarter Blenden oder Module nicht lösen können. |
| <b>MISE EN GARDE</b> | Si aucun module n'est installé dans un emplacement, laisser le cache de cet emplacement en place. Le système peut chauffer si le châssis est mis en service avec un emplacement ouvert. Serrer les vis de fixation des caches des emplacements vides de façon à les laisser en place lors de la dépose des panneaux ou des modules adjacents.                    |
| <b>PRECAUCIÓN</b>    | En caso de no instalar un módulo en una ranura, deberá taparla con la cubierta al efecto. Si llegara a poner en funcionamiento el chasis con una ranura descubierta el sistema podría sobrecalentarse. Apriete los tornillos que fijan las cubiertas de las ranuras para impedir que se muevan al desmontar los paneles o módulos adyacentes.                    |

|                      |                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION:</b>      | All devices with AC power sources are intended for installation in restricted access areas only. A restricted access area is a location where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security.                                                                     |
| <b>VORSICHT</b>      | Alle Geräte mit Wechselstromquellen sind nur zur Installation in Sperrbereichen bestimmt. Ein Sperrbereich ist ein Ort, zu dem nur Wartungspersonal mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer anderen Schutzvorrichtung Zugang hat.                                                                                         |
| <b>MISE EN GARDE</b> | Tous les équipements dotés de sources d'alimentation électrique secteur sont destinés à être installés uniquement dans des zones à accès réglementé. Une zone à accès réglementé est une zone dont l'accès n'est possible qu'au personnel de service utilisant un verrou, une clé ou un outil spécial, ou d'autres moyens de sécurité.        |
| <b>PRECAUCIÓN</b>    | Todos aquellos dispositivos con fuentes de alimentación de CA están diseñados para su instalación en zonas de acceso restringido solamente. Una zona de acceso restringido es un lugar al que sólo puede acceder personal de mantenimiento haciendo uso de una herramienta especial, una llave y un candado, o algún otro medio de seguridad. |

## B Dangers

|                      |                                                                                                                                                                                                   |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | Be sure not to exceed the minimum recommended bend radius for the cables: 2" for MRJ-21 cables, and 1.5" for Category 5 (RJ45) and fiber-optic cables.                                            |
| <b>VORSICHT</b>      | Der empfohlene Mindestbiegeradius für die Kabel darf nicht überschritten werden: 2 Zoll (5,08 cm) bei MRJ-21-Kabeln und 1,5 Zoll (3,81 cm) bei Kabeln der Kategorie 5 (RJ45) und Glasfaserkabeln. |
| <b>MISE EN GARDE</b> | Respecter le rayon de courbure minimal recommandé pour les câbles (5,08 cm pour les câbles MRJ-21 et 3,81 cm pour les câbles Ethernet de catégorie 5 (RJ45) et les fibres optiques).              |
| <b>PRECAUCIÓN</b>    | Asegúrese de no exceder el radio de curvatura recomendado para los cables: 2" para los cables MRJ-21 y 1,5" para cables de Categoría 5 (RJ45) y de fibra óptica.                                  |

|                      |                                                                                                                                                                                                                                                                          |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b>       | If hot removing or inserting a module, please allow a minimum of two seconds after a module (or power supply or fan tray) has been removed before inserting a module in the same slot.                                                                                   |
| <b>VORSICHT:</b>     | Beim Herausnehmen oder Einschoben eines Moduls bei laufendem Betrieb sollte nach dem Herausnehmen des Moduls (oder einer Stromversorgung oder eines Lüftereinsatzes) mindestens zwei Minuten gewartet werden, bevor ein Modul in denselben Steckplatz eingeschoben wird. |
| <b>MISE EN GARDE</b> | En cas de dépose et d'insertion à chaud d'un module, attendre au moins 2 secondes entre la dépose du module d'origine (y compris les modules de ventilation et d'alimentation) et l'insertion du nouveau module dans le même emplacement.                                |
| <b>PRECAUCIÓN</b>    | En caso de desmontar o insertar un módulo mientras el chasis está en funcionamiento, espere un mínimo de dos segundos después de haber desmontado el módulo (o la fuente de alimentación o la bandeja del ventilador) antes de introducir un módulo en la misma ranura.  |

## Dangers

A danger calls your attention to a possible hazard that can cause injury or death. The following are the dangers used in this manual.

"Gefahr" weist auf eine mögliche Gefährdung hin, die zu Verletzungen oder Tod führen können. Sie finden die folgenden Warnhinweise in diesem Handbuch.

Un danger attire votre attention sur un risque possible de blessure ou de décès. Ci-dessous, vous trouverez les dangers utilisés dans ce manuel.

Una advertencia le llama la atención sobre cualquier posible peligro que pueda ocasionar daños personales o la muerte. A continuación se dan las advertencias utilizadas en este manual.

|                |                                                                                                       |
|----------------|-------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Installation and removal of the unit must be carried out by qualified personnel only.                 |
| <b>GEFAHR</b>  | Die Installation und Entfernung der Einheit dürfen nur von qualifiziertem Personal ausgeführt werden. |
| <b>DANGER</b>  | L'installation et la dépose de l'unité doivent être confiées uniquement à du personnel qualifié.      |
| <b>PELIGRO</b> | La instalación y desinstalación de la unidad debe llevarse a cabo solamente por personal cualificado. |

|                |                                                                                                                                      |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Before beginning the installation, refer to the precautions in the Power precautions section.                                        |
| <b>GEFAHR</b>  | Vor der Installation siehe Vorsichtsmaßnahmen unter "Power Precautions" (Vorsichtsmaßnahmen in Bezug auf elektrische Ablagen).       |
| <b>DANGER</b>  | Avant de commencer l'installation, consultez les précautions décrites dans "Power Precautions" (Précautions quant à l'alimentation). |
| <b>PELIGRO</b> | Antes de comenzar la instalación, consulte las precauciones en la sección "Power Precautions" (Precauciones sobre corriente).        |

|                |                                                                                                                                   |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Disconnect the power cord from all power sources to completely remove power from the device.                                      |
| <b>GEFAHR</b>  | Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird.                   |
| <b>DANGER</b>  | Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif.   |
| <b>PELIGRO</b> | Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente. |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.                                                                                                         |
| <b>GEFAHR</b>  | Falls für die Installation ein anderes Stromkabel erforderlich ist (wenn das mit dem Gerät gelieferte Kabel nicht passt), müssen Sie sicherstellen, dass Sie ein Stromkabel mit dem Siegel einer Sicherheitsbehörde verwenden, die für die Zertifizierung von Stromkabeln in Ihrem Land zuständig ist. Das Siegel ist Ihre Garantie, dass das Stromkabel sicher mit Ihrem Gerät verwendet werden kann.                      |
| <b>DANGER</b>  | Si l'installation nécessite un cordon d'alimentation autre que celui fourni avec le dispositif, assurez-vous d'utiliser un cordon d'alimentation portant la marque de l'organisation responsable de la sécurité qui définit les normes et réglementations pour les cordons d'alimentation dans votre pays. Cette marque vous assure que vous pouvez utiliser le cordon d'alimentation avec le dispositif en toute sécurité. |
| <b>PELIGRO</b> | Si la instalación requiere un cordón de corriente distinto al que se ha suministrado con el instrumento, verifique que usa un cordón de corriente que venga con la marca de la agencia de seguridad que defina las regulaciones para cordones de corriente en su país. Esta marca será su garantía de que el cordón de corriente puede ser utilizado con seguridad con el instrumento.                                      |

|                |                                                                                                                                                                                                      |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.                                                  |
| <b>GEFAHR</b>  | Stellen Sie sicher, dass die Stromkreise ordnungsgemäß geerdet sind. Benutzen Sie dann das mit dem Gerät gelieferte Stromkabel, um es an die Stromquelle anzuschließen.                              |
| <b>DANGER</b>  | Vérifiez que les circuits de sources d'alimentation sont bien mis à la terre, puis utilisez le cordon d'alimentation fourni avec le dispositif pour le connecter à la source d'alimentation.         |
| <b>PELIGRO</b> | Verifique que circuitos de la fuente de corriente están conectados a tierra correctamente; luego use el cordón de potencia suministrado con el instrumento para conectarlo a la fuente de corriente. |

## B Dangers

|                |                                                                                                                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Make sure the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable or falling over.                                                                       |
| <b>GEFAHR</b>  | Stellen Sie sicher, dass das Gestell oder der Schrank für die Unterbringung des Geräts auf angemessene Weise gesichert ist, so dass das Gestell oder der Schrank nicht wackeln oder umfallen kann. |
| <b>DANGER</b>  | Vérifiez que le bâti ou le support abritant le dispositif est bien fixé afin qu'il ne devienne pas instable ou qu'il ne risque pas de tomber.                                                      |
| <b>PELIGRO</b> | Verifique que el bastidor o armario que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga.                                                   |

|                |                                                                                                                                                                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Mount the devices you install in a rack or cabinet as low as possible. Place the heaviest device at the bottom and progressively place lighter devices above.                                                                                             |
| <b>GEFAHR</b>  | Montieren Sie die Geräte im Gestell oder Schrank so tief wie möglich. Platzieren Sie das schwerste Gerät ganz unten, während leichtere Geräte je nach Gewicht (je schwerer desto tiefer) darüber untergebracht werden.                                    |
| <b>DANGER</b>  | Montez les dispositifs que vous installez dans un bâti ou support aussi bas que possible. Placez le dispositif le plus lourd en bas et le plus léger en haut, en plaçant tous les dispositifs progressivement de bas en haut du plus lourd au plus léger. |
| <b>PELIGRO</b> | Monte los instrumentos que instale en un bastidor o armario lo más bajos posible. Ponga el instrumento más pesado en la parte inferior y los instrumentos progresivamente más livianos más arriba.                                                        |

|                |                                                                                                                                                              |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.                                                                          |
| <b>GEFAHR</b>  | Aus Sicherheitsgründen sollte ein EGB-Armband zum Schutz von elektronischen gefährdeten Bauelementen mit einem 1 Megaohm-Reihenwiderstand ausgestattet sein. |
| <b>DANGER</b>  | Pour des raisons de sécurité, la dragonne ESD doit contenir une résistance de série 1 méga ohm.                                                              |
| <b>PELIGRO</b> | Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio.                                                      |

|                    |                                                                            |
|--------------------|----------------------------------------------------------------------------|
| <b>DANGER</b>      | All fiber-optic interfaces use Class 1 Lasers.                             |
| <b>GEFAHR</b>      | Alle Glasfaser-Schnittstellen verwenden Laser der Klasse 1.                |
| <b>DANGER</b>      | Toutes les interfaces en fibres optiques utilisent des lasers de classe 1. |
| <b>ADVERTENCIA</b> | Todas las interfaces de fibra óptica utilizan láser de clase 1.            |

|                |                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | The front panel of an AC power supply includes a handle that locks the power supply in the chassis. This handle is a locking mechanism only and should not be used to lift and carry the power supply. You may sustain physical injury or harm if you attempt to lift and carry a power supply using the locking handle.                                                                                  |
| <b>GEFAHR</b>  | Die Vorderabdeckung eines Wechselstrom-Netzteils verfügt über einen Griff, mit dem das Netzteil im Gehäuse verriegelt werden kann. Dieser Griff dient nur der Verriegelung. Mit ihm sollte das Netzteil weder angehoben noch getragen werden. Anheben und Tragen eines Netzteils mit dem Verriegelungsgriff kann zu Verletzungen führen.                                                                  |
| <b>DANGER</b>  | Le panneau avant d'un bloc d'alimentation C.A. comprend une poignée qui permet de verrouiller le bloc d'alimentation dans le châssis. Cette poignée est un mécanisme de verrouillage uniquement, elle ne doit pas être utilisée pour soulever et transporter le châssis. Vous risquez d'être blessé si vous essayez de soulever et de transporter un bloc d'alimentation avec la poignée de verrouillage. |
| <b>PELIGRO</b> | El panel delantero de un suministro de corriente alterna incluye un mango que bloquea el suministro de corriente al chasis. El mango es un mecanismo de bloqueo solamente y no deberá usarse para alzar ni transportar el suministro de corriente. De hacerlo así, podría sufrir daños personales.                                                                                                        |

|                |                                                                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | A fully-populated PowerConnect B-MLXe-16 chassis is heavy. TWO OR MORE PEOPLE ARE REQUIRED WHEN LIFTING, HANDLING, OR MOUNTING THESE DEVICES.                               |
| <b>GEFAHR</b>  | Ein voll bestücktes PowerConnect B-MLXe-16 Gehäuse ist schwer. ZUM ANHEBEN, HANDHABEN ODER MONTIEREN DIESER GERÄTE SIND MINDESTENS ZWEI PERSONEN ERFORDERLICH.              |
| <b>DANGER</b>  | Un châssis PowerConnect B-MLXe-16 entièrement équipé est extrêmement lourd. POUR SOULEVER, MANIPULER OU MONTER CES ÉQUIPEMENTS, DEUX PERSONNES AU MINIMUM SONT NÉCESSAIRES. |
| <b>PELIGRO</b> | Un chasis PowerConnect B-MLXe-16 muy concurrido es muy pesado. SE REQUIEREN DOS O MÁS PERSONAS CUANDO SE VAYA A ALZAR, MANEJAR O MONTAR ESTE DISPOSITIVO.                   |

|                |                                                                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Make sure to choose the appropriate circuit device depending on the number of AC power supplies installed in the chassis.                        |
| <b>GEFAHR</b>  | Je nach Anzahl der Wechselstrom-Netzteile im Gehäuse muss das passende Stromgerät ausgewählt werden.                                             |
| <b>DANGER</b>  | Assurez-vous de choisir le dispositif de circuit approprié selon le nombre de blocs d'alimentation C.A. installés dans le châssis.               |
| <b>PELIGRO</b> | Asegúrese de que elige el dispositivo de circuitos apropiado dependiendo del número de suministros de corriente alterna instalados en el chasis. |

|                |                                                                                                                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | Be careful not to accidentally insert your fingers into the fan tray while removing it from the chassis. The fan may still be spinning at a high speed.                                                |
| <b>GEFAHR</b>  | Die Finger dürfen nicht versehentlich in das Ventilatorblech gesteckt werden, wenn dieses vom Gehäuse abgenommen wird. Der Ventilator kann sich unter Umständen noch mit hoher Geschwindigkeit drehen. |
| <b>DANGER</b>  | Faites attention de ne pas accidentellement insérer vos doigts dans le boîtier du ventilateur lorsque vous l'enlevez du châssis. Il est possible que le ventilateur tourne encore à grande vitesse.    |
| <b>PELIGRO</b> | Procure no insertar los dedos accidentalmente en la bandeja del ventilador cuando esté desmontando el chasis. El ventilador podría estar girando a gran velocidad.                                     |

## B Dangers

|                |                                                                                                                                                                                                                                                       |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | To prevent damage to the chassis and components, never attempt to lift the chassis using the fan or power supply handles. These handles were not designed to support the weight of the chassis.                                                       |
| <b>GEFAHR</b>  | Alle Geräte mit Wechselstromquellen sind nur zur Installation in Sperrbereichen bestimmt. Ein Sperrbereich ist ein Ort, zu dem nur Wartungspersonal mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer anderen Schutzvorrichtung Zugang hat. |
| <b>DANGER</b>  | Pour éviter d'endommager le châssis et les composants, ne jamais tenter de soulever le châssis par les poignées du ventilateur ou de l'alimentation. Ces poignées n'ont pas été conçues pour supporter le poids du châssis.                           |
| <b>PELIGRO</b> | Para prevenir daños al chasis y a los componentes, nunca intente levantar el chasis usando las asas de la fuente de alimentación o del ventilador. Tales asas no han sido diseñadas para soportar el peso del chasis.                                 |

|                |                                                                                                                                                                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | The ports labeled BITS1, BITS2 are safety extra low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. All interconnected equipment should be located in the same building as the unit.                                                                  |
| <b>GEFAHR</b>  | Die Anschlüsse BITS1, BITS2 sind SELV (Safety Extra Low Voltage)- Stromkreise. SELV-Stromkreise sollten nur an andere SELV-Stromkreise angeschlossen werden. Alle mit einander verbundenen Geräte sollten sich im gleichen Gebäude wie die Einheit befinden.                                  |
| <b>DANGER</b>  | Les ports marqués BITS1, BITS2 sont des circuits de sécurité à très basse tension (SELV). Ces circuits doivent uniquement être connectés à d'autres circuits SELV. Tous les équipements interconnectés via ces ports doivent se trouver dans le même bâtiment que l'unité.                    |
| <b>PELIGRO</b> | Los puertos que llevan las marcas BITS1, BITS2 son circuitos de bajo voltaje de seguridad extra (SELV, por sus siglas en inglés). Los circuitos SELV sólo deben conectarse a otros circuitos SELV. Todos los equipos interconectados deben estar situados en el mismo edificio que la unidad. |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DANGER</b>  | The intra-building port or ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port or ports of the equipment or subassembly <b>MUST NOT</b> be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.                                                                                                                                                                                                                            |
| <b>GEFAHR</b>  | Die gebäudeinternen Anschlüsse des Geräts bzw. der Unterbaugruppe sind nur zur Verbindung mit gebäudeinternen bzw. nicht freiliegenden Drähten und Kabeln geeignet. Die gebäudeinternen Anschlüsse des Geräts bzw. der Baugruppe <b>DÜRFEN NICHT</b> metallisch mit Schnittstellen verbunden werden, die an Außenbereiche (OSP) oder deren Verdrahtung angeschlossen sind. Diese Schnittstellen sind ausschließlich zur Verwendung als gebäudeinterne Schnittstellen ausgelegt (Anschlüsse des Typs 2 oder 4 gemäß GR-1089-CORE, Ausgabe 4) und müssen von den freiliegenden OSP-Kabeln isoliert werden. Eine hinzugefügte Primärschutzeinrichtung ist kein ausreichender Schutz gegen den metallischen Anschluss dieser Schnittstellen an die OSP-Verdrahtung                                                                                                                            |
| <b>DANGER</b>  | Le ou les ports réservés à l'utilisation de l'appareil à l'intérieur d'un bâtiment (intra-building) sont uniquement destinés à une connexion en intérieur ou avec du câblage non exposé aux intempéries. Il est rigoureusement interdit d'établir un contact métallique entre le ou les ports réservés à l'utilisation de l'équipement à l'intérieur d'un bâtiment et des interfaces connectées à des installations extérieures(OSP) ou à leur câblage. Ces interfaces sont en effet destinées uniquement à un usage en intérieur (les ports de type 2 ou 4 sont décrits dans le document GR-1089-CORE, volume 4) ; elles doivent être isolées de tout câblage exposé à l'extérieur. L'ajout de dispositifs de protection primaire n'offre pas une protection suffisante pour permettre de raccorder par contact métallique ces interfaces à un câblage ou une installation en extérieur. |
| <b>PELIGRO</b> | Los puertos del equipo o del sistema secundario situados en el interior de un edificio únicamente podrán conectarse a instalaciones eléctricas o cableados que se encuentren dentro del edificio o que no estén expuestos. Los puertos del equipo o del sistema secundario situados en el interior del edificio <b>NO DEBEN</b> conectarse metálicamente a interfaces que se encuentren conectadas a la planta exterior (OSP por sus siglas en inglés) o a su sistema eléctrico. Dichas interfaces han sido diseñadas para uso exclusivo en el interior de un edificio (puertos Tipo 2 o Tipo 4, según lo descrito en GR-1089-CORE, Número 4) y deben aislarse del cableado de la OSP expuesto. La incorporación de Protectores Primarios no proporciona protección suficiente para conectar dichas interfaces metálicamente al sistema eléctrico de la OSP.                              |

## **B** Dangers