



8 Gbps to 16 Gbps Model Conversion Guide

Converting 2499-192 to 2499-416 and 2499-384 to 2499-816

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IBM System Storage



8 Gbps to 16 Gbps Model Conversion Guide

Converting 2499-192 to 2499-416 and 2499-384 to 2499-816

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Read this first

Getting help

For the latest version of your product documentation, visit the web at www.ibm.com/shop/publications/order. Search by form number or title.

For more information about IBM® SAN products, see the following Web site: www.ibm.com/servers/storage/san/

IBM Redbooks® often provide in depth information about product best practices, configurations, and more technical information. For redbooks associated with this product, enter search terms on the following Web site: www.redbooks.ibm.com/.

For support information for this and other IBM products, see the IBM Support Portal, www.ibm.com/supportportal. Search for the product Machine type or product name.

For Fabric OS Release Notes and access to Fabric OS firmware downloads, go to the IBM Support Portal, www.ibm.com/supportportal. Search for the product Machine type or product name, and then follow links for **Downloads**. More detailed instructions are available through the **Accessing firmware updates and OS documentation updates** link on the product documentation CD that is shipped with this product.

You can also contact IBM Service within the United States at 1-800-IBMSERV (1-800-426-7378). For support outside the United States, you can find the service number at: www.ibm.com/planetwide/.

To expedite your call, before contacting IBM Service, please have the following information available:

- Machine type and model
- Product serial number
- License ID (you can use the **licenseIdShow** command to display the license ID)
- World Wide Name (WWN)
- FOS version installed
- Error numbers and messages received
- **supportSave** command output
- Detailed description of the problem and specific questions
- Description of any troubleshooting steps already performed and the results
- Serial console and Telnet session logs
- Syslog message logs

Visit www.ibm.com/contact for the contact information for your country or region.

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- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

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Safety notices

Attention: This section contains the safety notices required for the model conversion. However, if you are completing additional procedures, such as moving a chassis within a rack or relocating a rack, you must refer to the additional safety notices and procedures on those topics included in the *IBM System Storage® SAN768B-2 Installation, Service, and User Guide* or *IBM System Storage SAN384B-2 Installation, Service, and User Guide*.

Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition. The danger and caution notices are listed in numerical order based on their IDs, which are displayed in parentheses, for example (D004), at the end of each notice. Use this ID to locate the translation of these danger and caution notices in the *IBM System Storage SAN b-type Safety Notices* publication, which is shipped with this product.

The following notices and statements are used in IBM documents. They are listed below in order of increasing severity of potential hazards. Follow the links for more detailed descriptions and examples of the danger, caution, and attention notices in the sections that follow.

- **Note:** These notices provide important tips, guidance, or advice.
- **“Attention notices” on page xvi:** These notices indicate potential damage to programs, devices, or data.
- **“Caution notices” on page xiii:** These statements indicate situations that can be potentially hazardous to you.
- **“Danger notices”:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these situations.
- In addition to these notices, “Safety labels” on page xv may be attached to the product to warn of potential hazards.

Danger notices

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people. A lightning bolt symbol accompanies a danger notice to represent a dangerous electrical condition. Read and comply with the following danger notices before installing or servicing this device.



DANGER

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device or the power rating label for electrical specifications. (D002)



DANGER

If the receptacle has a metal shell, do not touch the shell until you have completed the voltage and grounding checks. Improper wiring or grounding could place dangerous voltage on the metal shell. If any of the conditions are not as described, STOP. Ensure the improper voltage or impedance conditions are corrected before proceeding. (D003)



DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)

A general electrical danger notice provides instructions on how to avoid shock hazards when servicing equipment. Unless instructed otherwise, follow the procedures in the following danger notice.



DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described below when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.







To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Caution notices

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition. A caution notice can be accompanied by different symbols, as in the examples below:

If the symbol is...	It means....
	A hazardous electrical condition with less severity than electrical danger.
	A generally hazardous condition not represented by other safety symbols.
 <small>≥55 kg (≥121.2 lbs)</small> <small>svc00169</small> >55kg (121.2 lb)	A specification of product weight that requires safe lifting practices. The weight range of the product is listed below the graphic, and the wording of the caution varies, depending on the weight of the device.
 <small>PIN 18P3550-B</small> <small>S.000752</small>	A potential hazard of pinching the hand or other body parts between parts.
	A hazardous condition due to moving parts nearby.
 Class I	A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U.S. Department of Health and Human Services (for example, Class I, Class II, and so forth).

Read and comply with the following caution notices before installing or servicing this device.



CAUTION:

Energy hazard present. Shorting may result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)



>55kg (121.2 lb)

CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



CAUTION:

The system contains circuit cards, assemblies, or both that may contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)



CAUTION:

This product is equipped with a 3-wire (two conductors and ground) power cable and plug. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C018)



Class I

CAUTION:

This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)



CAUTION:

The power-control button on the device does not turn off the electrical current supplied to the device. The device might also have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals. (C031)



CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

CAUTION:

For CA residents only: IBM recommends installing this product in a room size of 62 cubic meters (2190 cubic feet) or larger at 0.4 ACH ventilation rate to reduce the concentrations of any chemicals emitted by the product.

Safety labels

As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards. These can be either danger or caution notices, depending upon the level of the hazard.

The actual product safety labels may differ from these sample safety labels:



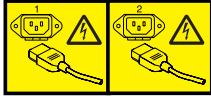
DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)



DANGER

Rack-mounted devices are not to be used as a shelf or work space. (L002)



DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



DANGER

Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION:

Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in splattered metal, burns, or both. (L005)



CAUTION:

Hazardous moving parts nearby (L008)



CAUTION:

Pinch hazard. (L012)

Attention notices

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. A sample attention notice follows:

Attention: Do not bend a fibre cable to a radius less than 5 cm (2 in.); you can damage the cable. Tie wraps are not recommended for optical cables because they can be easily overtightened, causing damage to the cable.

Product recycling and disposal

Refer to the *IBM Systems Environmental Notices and User Guide (Z125-5823)* on the CD shipped with the product for translated environmental statements and information regarding product recycling and disposal. This document may be provided either in printed version or on a CD-ROM.

About this document

This document describes how to convert an 8 Gbps 2499 Machine Type to a 16 Gbps 2499 Machine Type. It covers converting a SAN384B (2499-192) to a SAN384B-2 (2499-416) and a SAN768B (2499-384) to a SAN 768B-2 (2499-816). The instructions for both model conversions are similar, with the major differences due to the different size and orientation of the two chassis types. The 2499-192 and 2499-416 chassis have 8 slots, with the blades and slots oriented horizontally. The larger 2499-384 and 2499-816 chassis have 12 slots, with the blades and slots oriented vertically. Throughout this document, whenever necessary, the product are referred to by their machine type model (MTM). Whenever instructions apply to all models, the terms *system*, *device*, or *chassis*, are used.

Attention: A minimum Fabric OS version 7.0.1 and later is required for this model conversion and is also required for both of the 8 Gbps Enhanced port blades. FOS v7.0.1 will automatically update Vital Product Data (VPD) during the upgrade process so that the upgraded chassis reflects the new MTM.

The sections that follow provide information about:

- “Who should read this document”
- “Product documents”
- “Brocade documents” on page 2

Who should read this document

This document is intended for trained service representatives who are responsible for installing and servicing the 2499 fiber backbone models. It describes how to upgrade a 2499-192 (8 Gbps) to a 2499-416 (16 Gbps) and a 2499-384 (8 Gbps) to a 2499-816 (16 Gbps) fabric backbone, which is an MES model conversion procedure.

Product documents

Once this model conversion has been completed, documentation for the 16 Gbps 2499 models (416 and 816) will apply to the converted model. Manuals for the 8 Gbps models will no longer apply to the converted models, and should be replaced. The latest versions of these product documents are available on the web through the IBM Support Portal www.ibm.com/supportportal. Enter the product name or machine type, select the product from the displayed list, and then click the **Documentation** tab. Click the appropriate link to download the document.

Publications are also available from the IBM Publications Center www.ibm.com/shop/publications/order. Search by form number or title.

- *IBM System Storage SAN384B-2 Installation, Service, and User Guide, GA32-0894*
- *IBM System Storage SAN768B-2 Installation, Service, and User Guide, GA32-0893*
- *IBM System Storage SAN b-type Safety Notices*
- *IBM Systems Environmental Notices and User Guide, Z125-5823*

Brocade documents

Two Brocade Fabric Operating System (FOS) publications are referenced in these instructions. IBM switches and directors use software licensed from Brocade Communications Systems, Inc. You can find information related to the software that supports the 2499 Machine Type models in the following Brocade FOS documents. There are additional FOS documents available at the same site, but only the two below are referenced in these instructions.

IBM has consolidated all IBM product support into a single IBM Support Portal. This includes links to Brocade FOS documentation, firmware updates, and release notes. Read the release notes prior to committing to any firmware update.

To access Fabric OS Release Notes, firmware, and publication updates:

1. Go to the IBM Support Portal, www.ibm.com/supportportal
2. In the **Choose your products** section, enter your product machine type or name in the search field, then click the button.
3. This will add the product to your customized product list. You can have up to 10 products listed.
4. In the Choose your task section, select **Downloads**.
5. The **Downloads** page will display results, which will include links to release notes and firmware versions for the selected products. Reading the release notes is strongly recommended prior to installing any firmware updates. Click the appropriate release notes link.
6. On the **Downloads** page, click the firmware version link, then click **Continue** to be redirected Brocade's IBM Assist site, with the page title, **Brocade Downloads for IBM End Users**.
7. Select the operating system for your product, and continue by following the instructions on the Brocade site to download firmware to which you are entitled.
8. The Brocade page also has a documentation tab, which will allow you to search for and download documentation associated with each Fabric OS version.

Brocade Fabric OS publications

- *Fabric OS Administrator's Guide*
- *Fabric OS Command Reference Manual*

IBM and Brocade product equivalents

When you use any of the Brocade documents, such as Fabric Operating System (FOS) publications, you will notice that the model numbers reflect the corresponding Brocade products. Table 1 provides the equivalent Brocade product names for the IBM products covered by these model conversion instructions.

Table 1. Brocade and IBM product and model number equivalents

IBM product name	IBM machine type and model number	Brocade product name
SAN384B	2499 Model 192	Brocade DCX-4S
SAN768B	2499 Model 384	Brocade DCX
SAN384B-2	2499 Model 416	Brocade DCX 8510-4
SAN768B-2	2499 Model 816	Brocade DCX 8510-8

Overview and preparation

This section provides an overview of the steps required to complete the model conversion from 8 Gbps to 16 Gbps.

Attention: For complete information on the 8 Gbps to 16 Gbps model conversion feature codes (FC 3016 for the 2499-192, and FC 3017 for the 2499-384), refer to the Announcement Letter or the 2499-192 or 2499-384 Sales Manuals. This information includes the definitive list of blades, transceivers, and other features that must be removed from the 2499-192 and 2499-384 models for conversion to 2499-416 and 2499-816 models. The 2499-416/2499-816 Sales Manual provides additional information on the inter-chassis link (ICL) and power requirements.

Time and items required

This upgrade procedure can take one to two hours or more, depending on how many of the upgrade tasks have already been completed, and how many blades, SFPs and cables need to be removed and installed.

The Fabric OS upgrade from v6.4.x to v7.0.1 requires about 30 minutes if the new version is on a IBM Data Center Fabric Manager (DCFM) or IBM Network Advisor server or a USB device (IBM PN 45W2425).

Attention: All references to "USB device" are for IBM part number 45W2425 only, which is a specific USB flash memory device configured for the b-type SAN products. Use of any other USB device is not supported, and will not function correctly.

Attention: Ensure that the customer is aware that IBM DCFM will not be able to handle post-upgrade management of the chassis. The IBM DCFM installation must be upgraded to IBM Network Advisor *before upgrading the hardware to ensure post-upgrade manageability of Fabric OS v7.0.1 hardware.*

The chassis must be powered off when replacing the core blades. The power on process takes 20 to 30 minutes. Additional considerations for time can include the following:

- Installing additional power supplies
- Removing unsupported blades and installing supported blades
- Cabling new blades or relocating existing cables.

The following items are required for the procedure:

- Electrostatic discharge (ESD) grounding strap
- #2 Phillips screwdriver
- Workstation computer
- Serial cable or crossover Ethernet cable or management network access to the chassis (recommended for monitoring)
- IP address of an FTP server for backing up the backbone configuration
- IP address of an FTP server from which to download new versions of the Fabric OS firmware or the USB device (IBM PN 45W2425) from which to download a

new version of the Fabric OS firmware. Multiple USB devices may be needed if upgrading more than one level of Fabric OS.

- New core blades compatible with Fabric OS v7.0.1 or later
 - CR16-8 for the 2499-384 (upgrading to 2499-816)
 - CR16-4 for the 2499-192 (upgrading to 2499-416)
- Additional power supplies, if needed to meet power requirements
- QSFP transceivers and cables for new inter-chassis link (ICL) connections
- Port blades compatible with Fabric OS v7.0.1
 - FC8-64
 - FC16-32
 - FC16-48
 - FC8-32E
 - FC8-48E
- 16 Gbps SFP+ transceivers compatible with new blades
- Filler panels if any slots will be left open

ESD precautions

The chassis contain ESD-sensitive field-replaceable units (FRUs). When working with any FRU, use correct ESD procedures.

- Wear a wrist grounding strap connected to a chassis ground or a bench ground
- Store ESD-sensitive components in antistatic packaging

Steps for upgrading the chassis from 8 Gbps to 16 Gbps

IBM recommends the following sequence of steps to complete the model conversion from an 8 Gbps system to a 16 Gbps system. Because upgrading to Fabric OS v7.0.1 can be performed non-disruptively, you have the option of performing the FOS upgrade before quiescing traffic on the chassis.

Attention: The customer should perform the first three steps prior to the chassis upgrade procedure. These are not SSR responsibilities. These steps are provided here as a convenience for the customer to minimize the need to refer to the installation, service, and user guides. It is also highly recommended that the customer have all cables labeled, with a mapping of the ports and cables completed. Note that the mapping may change if the new port blades have a different number of ports than the port blades being replaced.

Attention: Ensure that the customer is aware that IBM DCFM will not be able to handle post-upgrade management of the chassis. The IBM DCFM installation must be upgraded to IBM Network Advisor *before upgrading the hardware to ensure post-upgrade manageability of Fabric OS v7.0.1 hardware.*

1. "Saving configuration information" on page 6
2. "Quiescing traffic on the chassis" on page 6
3. "Upgrading the CP blades to Fabric OS v7.0.1" on page 7
4. "Powering down the chassis" on page 11
5. "Replacing the core switch blades" on page 12
6. "Installing additional power supplies" on page 16
7. "Removing unsupported port and application blades" on page 18
8. "Attaching new model labels" on page 21
9. "Installing supported port, application, and encryption blades" on page 29
10. "Installing transceivers into port, application, and encryption blades" on page 32
11. "Powering up the chassis" on page 32
12. "Upgrading additional chassis" on page 33
13. "Installing QSFP transceivers and cables for the ICLs" on page 33
14. "Checking the chassis functionality" on page 34
15. "Failback traffic" on page 34
16. "Disposition of removed components" on page 34

Refer to the following topics for further information, as needed.

- "Power supply requirements for the 2499-816 chassis" on page 35
- "Qualified transceivers for use with 16 Gbps chassis" on page 36
- "Backing out of the migration" on page 36
- "Index numbering scheme for the 2499-384 and 2499-816 chassis" on page 40
- "Index, slot, port, and cable routing table" on page 43

Saving configuration information

Attention: This procedure is a customer responsibility, which should be completed prior to the upgrade process.

It is important to record the configuration of your chassis before you begin the upgrade process in case the upgrade fails. Refer to the *Fabric OS Command Reference* for details on the commands shown. Complete the following steps:

1. Use one of the following procedures to upload the configuration. Refer to the “Configuration file backup” section of the *Fabric OS Administrator’s Guide* for more information on backing up the configuration.

Attention: This configuration information is critical if emergency recovery must be performed.

 - a. Enter the **fosConfig --show** command to determine if Virtual Fabrics are enabled. If so, enter the **configUpload -vf** command followed by the **configUpload -all** command. This command uploads the backbone virtual fabric data. Manually record the IP addresses assigned to any logical switches.
 - b. If virtual fabrics are not enabled, enter the **configUpload -all** command. This command uploads the backbone configuration.
2. Record your cabling information so you can recreate it after replacing unsupported blades. You can use copies of Table 12 on page 44 to record this information.
3. Enter the **slotShow** command to display which blades are installed in the chassis. Refer to Table 2 on page 31 for blade IDs of the blades supported in the 2499-416 and 2499-816 chassis. Unsupported blades will need to be removed and replaced during the upgrade. Make a note of blades that must be removed and replaced by either supported blades or filler panels.
4. Enter the **switchShow** command to display slot, port, and index information for the chassis. You can use copies of the table in the “Index, slot, port, and cable routing table” on page 43 section to record your slot, port, index, and cable information. You can also use this form to plan your post-migration setup.
5. Enter the **prtcfgShow** command to display port configurations. You can record these settings so that you can reconfigure ports after the upgrade. This information will be helpful in recreating your Virtual Fabrics setup if you have that feature enabled.

Quiescing traffic on the chassis

Attention: This step is a customer responsibility, which should be completed prior to the chassis upgrade procedure.

All traffic on the chassis to be upgraded must be ended or rerouted. You should perform controlled failovers to alternate servers or paths in advance of the upgrade. You should also prepare for failover paths to be ready when attempting to execute the upgrade procedure. This is similar to planning for a switch outage in the core.

Specific actions will be unique to most systems, depending on how high availability has been implemented. Be sure to disable any existing logical switches and to review any logical port assignments made to any blades that will be removed as part of the upgrade process.

Upgrading the CP blades to Fabric OS v7.0.1

Attention: This procedure is a customer responsibility, which should be completed prior to the upgrade process.

Before you replace any blades in your chassis, your control processor (CP) blades must be upgraded to Fabric OS v7.0.1. The CP8 blades do not have to be replaced.

Recording critical backbone information

Back up the backbone configuration before you upgrade a CP blade. Refer to the *Fabric OS Administrator's Guide* for backup information.

Attention: The following instructions reference specific slot numbers for the CP blades. For the 2499-816 and 2499-384 chassis, slots 6 and 7 contain the CP blades. For the 2499-416 and 2499-192 chassis, slots 4 and 5 contain the CP blades. The following examples are from a 2499-384 chassis.

1. Connect to the chassis and log in to the active CP blade as **admin**. For more information about the following commands, refer to the *Fabric OS Command Reference*.
2. Enter **haShow** to determine which CP blade is active.
3. Enter **firmwareShow** to note the firmware version of the active CP blade. The following example shows the results of the **firmwareShow** command when the firmware versions on the two CP blades are the same.

```
2499_384:admin> hashow
Local CP (Slot 7, CP1) : Active
Remote CP (Slot 6, CP0) : Standby, Healthy
HA Enabled, Heartbeat Up, HA State Synchronized
```

```
2499_384:admin> firmwareshow
Slot Name  Appl  Primary/Secondary Versions  Status
-----
6 CP0     FOS   v6.4.0                ACTIVE
           v6.4.0
7 CP1     FOS   v6.4.0                STANDBY *
           v6.4.0
* Local CP
```

4. Enter the **licenseIdShow** and the **licenseShow** commands to show the license key and all the licenses installed on the chassis. The upgrade should not affect the licenses, but it is good practice to record the licenses installed. The key allows you to add back the licensed features if needed.

Attention: The 2499-192 and 2499-384 base configurations did **not** include Server Application Optimization (SAO). It was offered as an optional licensed feature (FC 7920 for the 2499-192 and FC 7910 for the 2499-384), but is included as part of the base configuration for the 2499-416 and 2499-816. If the chassis to be upgraded does not have this feature installed, SAO must be purchased and installed prior to installing the 16 Gbps core blades.

```
2499_384:admin> licenseidshow
10:00:00:05:33:13:94:1a
```

```
2499_384:admin> licenseshow
dydc9yS99ezedA1:
  Extended Fabric license
RzRSRRzbcyU0STSC:
  Fabric Watch license
RzRSRRzbcyW0STSE:
```

```
Performance Monitor license
RzRSRRzbcya0STSI:
Trunking license
(further output truncated>
```

5. Use one of the following procedures to upload the configuration if you have not already done so in “Saving configuration information” on page 6.
Attention: This configuration information is critical if emergency recovery must be performed.
 - a. Enter the **fosConfig --show** command to determine if virtual fabrics are enabled. If so, enter the **configUpload -vf** command followed by the **configUpload -all** command. This command uploads the backbone virtual fabric data. Manually record the IP addresses assigned to any logical switches.
 - b. If virtual fabrics are not enabled, enter the **configUpload -all** command. This command uploads the backbone configuration.

Preparing for the upgrade

The firmware level must be brought up to Fabric OS v7.0.1 or higher before making the final upgrade to 16 Gbps performance. If your backbone chassis is using a version earlier than v6.4.0, you may have to run through the upgrade process multiple times to reach version Fabric OS v7.0.1, depending on the Fabric OS version you have installed.

You can download the firmware from either an FTP server, a Network Advisor server, or a USB device (IBM PN 45W2425). If upgrading through multiple versions, you need the multiple versions loaded on the USB device. You can check your error logs before beginning the upgrade process to see if there are any indications of problems.

Upgrading the chassis to 16 Gbps performance

Upgrading a 2499-192 or 2499-384 to Fabric OS v7.0.1 does not automatically provide 16 Gbps performance to the chassis or support the Enhanced 8 Gbps port blades. Additional steps must be taken to convert the chassis to a 2499-416 or 2499-816 with 16 Gbps performance.

Complete the following steps to upgrade to 16 Gbps performance.

1. Enter the **firmwareDownload** command to upgrade from Fabric OS v6.4.x to v7.0.1. If you have a version of Fabric OS earlier than v6.4.x, you should upgrade to v6.4.x and then to v7.0.1.
Refer to either “Downloading firmware from an FTP server” or “Downloading firmware from a USB device” on page 10, depending on where the firmware upgrade files are located. If the firmware files have not yet been downloaded to an ftp server or USB device ((IBM PN 45W2425)), follow the steps within the instructions to download the files through the IBM site.
2. After downloading and installing the firmware, finish the upgrade process in “Completing the FOS upgrade” on page 11.

Downloading firmware from an FTP server

Complete the following steps do download the firmware from an FTP server.

1. If the firmware is not yet on an FTP server, download firmware through the IBM site, following these steps, then continue with step 2.
 - a. Go to the IBM Support Portal, www.ibm.com/supportportal
 - b. Search for your product machine type (2499) or product name

- c. On the displayed page click **Download** in the **Task** section
- d. From the displayed page, select the appropriate release notes link and read the release notes prior to downloading and installing the firmware update
- e. From the **Release notes** page, click the **Release Firmware** link and follow the online prompts to navigate to the **Brocade Downloads for IBM End Users** page.
- f. Follow the instructions on the Brocade pages. Enter all requested information (use default values).

2. Log in to the chassis as **admin**. You should remain logged in to the active CP blade to monitor it.
3. If you need to know the IP address of the blade, enter **ipAddrShow**.
4. Use the **firmwareDownload** command as shown below to download the firmware. Enter all requested information (use default values). The **firmwareDownload** command automatically downloads the new firmware to both CP blades in rollover mode. The following example shows the results of running **firmwareDownload** for Fabric OS v7.0.1 on a 2499-384 chassis that has application blades installed in slots 2 and 10.

```
2499_384:admin> firmwaredownload 10.20.10.100,,/pub/v7.0.1
Server IP: 10.20.10.100, Protocol IPv4
Checking system settings for firmwaredownload...
System settings check passed.
The following AP blades are installed in the system.
Slot Name Versions Traffic Disrupted
-----
2 FS8-18 v7.0.0 Encrypted Traffic
10 FX8-24 v7.0.0 GigE
This command will upgrade the firmware on both CPs and all AP blades above.
If you want to upgrade firmware on a single CP only, please use -s option.
You may run firmwaredownloadstatus to get the status of this
command.
This command will cause a warm/non-disruptive boot on the active CP,
but will require that existing telnet, secure telnet or SSH sessions
be restarted.

Do you want to continue (Y/N) [Y]:Y

Firmware is being downloaded to the switch. This step may take up to 30 minutes.
Preparing for firmwaredownload...
2012/02/24-10:59:39, [SULB-1001], 7258, SLOT 7 | CHASSIS, WARNING, 2499_384,
Firmwaredownload command has started.
2012/02/24-10:59:39, [SULB-1036], 7259, SLOT 7 | CHASSIS, INFO, 2499_384,
The current Version: Fabric OS v7.0.0
Start to install packages...
dir #####
ldconfig #####
<further output truncated>
```

5. When the download process finishes, run **firmwareDownloadStatus** to verify that the firmware has been updated. The command displays a running account of the progress of the **firmwareDownload** command until the command has completed. The final message is similar to the following and will appear with a date and time stamp:


```
Slot 6 (CP0, active): Firmwaredownload command has completed successfully.
Use firmwareshow to verify the firmware versions.
```
6. Proceed to “Completing the FOS upgrade” on page 11

Downloading firmware from a USB device

This section assumes that the new firmware has already been copied onto the USB device (IBM PN 45W2425). The folder structure on the USB device must be as follows in order to allow the device to be enabled:

```
brocade>
config
firmware
firmwareKey
support
```

The unzipped firmware has already been copied under the firmware folder. The firmware folder contains the folder for one or more release versions you are installing.

1. If the firmware is not yet on the USB device (IBM PN 45W2425), download firmware through the IBM site to the USB device, following these steps, then continue with step 2.
 - a. Go to the IBM Support Portal, www.ibm.com/supportportal
 - b. Search for your product machine type (2499) or product name
 - c. On the displayed page click **Download** in the **Task** section
 - d. From the displayed page, select the appropriate release notes link and read the release notes prior to downloading and installing the firmware update
 - e. From the **Release notes** page, click the **Release Firmware** link and follow the online prompts to navigate to the **Brocade Downloads for IBM End Users** page.
 - f. Follow the instructions on the Brocade pages. Enter all requested information (use default values).
2. Insert the USB drive into the USB port of the active CP blade.
3. Attach a serial cable from the PC to the active CP blade.
4. Log in to the active CP blade as **admin** if you are not still logged in and enter **usbStorage -e** to enable the USB device.

```
2499_384:admin> usbstorage -e
```

5. Enter **firmwareDownload -U vX.X.X** (where X.X.X is the firmware version you are downloading) to download the firmware. Enter all requested information (use default values). The **firmwareDownload** command automatically downloads the new firmware to both CP blades in automatic failover mode. The following example shows the results of running **firmwaredownload** for Fabric OS v7.0.1.

```
2499_384:admin> firmwaredownload -U v7.0.1
Server IP: 10.31.2.25, Protocol IPv4
Checking system settings for firmwaredownload...
System settings check passed.
```

```
Firmware is being downloaded to the switch.
This step may take up to 30 minutes.
Preparing for firmwaredownload...
2012/02/24-10:59:39, [SULB-1001], 7258, SLOT 7 | CHASSIS,
WARNING, 2499_384, Firmwaredownload command has started.
2012/02/24-10:59:39, [SULB-1036], 7259, SLOT 7 | CHASSIS,
INFO, 2499_384, The current Version: Fabric OS v7.0.0
```

```
Start to install packages...
dir #####
ldconfig #####
```

<further output truncated>

- When the download process finishes, enter **firmwareDownloadStatus** to verify that the firmware has been updated. The command displays a running account of the progress of the **firmwareDownload** command until the command has completed. The final message is similar to the following and will appear with a date and time stamp:


```
Slot 6 (CP0, active): Firmwaredownload command has
completed successfully. Use firmwareshow to verify the
firmware versions.
```
- Proceed to “Completing the FOS upgrade”

Completing the FOS upgrade

Complete the following steps to finish the Fabric OS upgrade procedure.

- Enter **haShow** and verify that the command output includes “HA Enabled, Heartbeat Up”. If it is not yet enabled, re-enter the command until you have verified that redundancy is achieved. The example shown is from a 2499-816. The 2499-416 is similar, but with different slot numbers.

```
2499_816:admin> hashow
Local CP (Slot 7, CP1) : Active
Remote CP (Slot 6, CP0) : Standby, Healthy
HA Enabled, Heartbeat Up, HA State Synchronized
```

- If you have purchased any new licenses, install them now. Refer to the *Fabric OS Administrator’s Guide* for details.
- Enter **licenseShow** to confirm that all the licenses originally installed on the chassis are still valid. Compare the results to the results of the **licenseShow** command you ran before the upgrade.

```
2499_816:admin> licenseshow
```

- Enter **firmwareShow** to verify that the firmware version has been updated and that the versions are the same on the two CP blades and any application blades in the chassis. The example shown is from a 2499-816. The 2499-416 is similar, but with different slot numbers. Not all slot numbers are shown.

```
2499_816:admin> firmwareshow
Slot   Name   Appl Primary/Secondary Versions  Status
-----
2      FS8-18 FOS   v7.0.1 v7.0.1
6      CP0    FOS   v7.0.1 v7.0.1  STANDBY
7      CP1    FOS   v7.0.1 v7.0.1  ACTIVE *
10     FX8-24 FOS   v7.0.1 v7.0.1
```

If you have one or more application or encryption blades in the chassis, the Fabric OS automatically detects mismatches between the active CP firmware and the blades’ firmware and triggers the auto-leveling process. This auto-leveling process automatically updates the blades’ firmware to match the active CP. At the end of the auto-leveling process, the active CP and the application and encryption blades will run the same version of the firmware.

Powering down the chassis

Once the Fabric OS upgrade is complete, you must power down the chassis in order to replace blades and reinstall cables.

- Shut down the chassis using the **sysShutdown** command.

```
switch::admin> sysshutdown
This command will shutdown the operating systems on your switch.
You are required to power-cycle the switch in order to restore operation.
Are you sure you want to shutdown the switch [y/n]?y
HA is disabled
Stopping blade 1
```

```
Shutting down the blade....
Stopping blade 2
Shutting down the blade....
Stopping blade 8
Shutting down the blade....
```

Broadcast message from root (pts/1) Fri Feb 24 14:23:06 2012...

The system is going down for system halt NOW !!

2. Power off the chassis by turning the AC power switches on the power supplies to **O** (LEDs on the power supplies should turn off). To maintain the ground connections, leave the power cords connected to the power supplies and to the electrical outlets.

Replacing the core switch blades

The core switch blades used with the 2499-192 and 2499-384 chassis (CR-8 and CR4S-8 respectively) are not compatible with 16 Gbps or 8 Gbps Enhanced performance and the new ICL implementation. They must be replaced with the CR16-4 and CR16-8 core switch blades.

If you purchased inter-chassis link (ICL) licensing for your 2499-192 or 2499-384 chassis, the licensing is preserved during the upgrade; however, during the model conversion process IBM will assign new features codes. If you have an 8-link license on your 2499-192 or 2499-384, you will have a 1st Ports on Demand (1st POD) license on your 2499-416 or 2499-816 after the upgrade. If you had a 16-link license on your 2499-384 chassis, then you will have both 1st and 2nd POD licenses on your 2499-816. New QSFP transceivers and cables will have to be ordered for the converted 2499-416 or 2499-816 models.

Attention: Follow electrostatic discharge (ESD) precautions while replacing any blade. See "ESD precautions" on page 4.

Removing a CR8 or CR4S-8 core switch blade

For this procedure, refer to Figure 1 on page 13 for removing the CR8 core switch blade from the 2499-384, and Figure 2 on page 13 for removing the CR4S-8 core switch blade from the 2499-192. Note that because of different chassis orientation, references to "top" for the 2499-384 correlate to "left" for the 2499-192.

1. Remove the chassis door, using both hands, by pulling straight out. Set the door aside to reinstall later.
2. Move the slider switch in the top ejector down to the off position.
3. If they are present, disconnect any ICL cables from the core switch blade.
4. Unscrew the thumbscrews from both ejectors using the Phillips screwdriver.
5. Open both ejectors simultaneously to approximately 45 degrees and pull the core switch blade out of the chassis.
6. Set the blades aside for return to the customer at the end of the model conversion procedure.

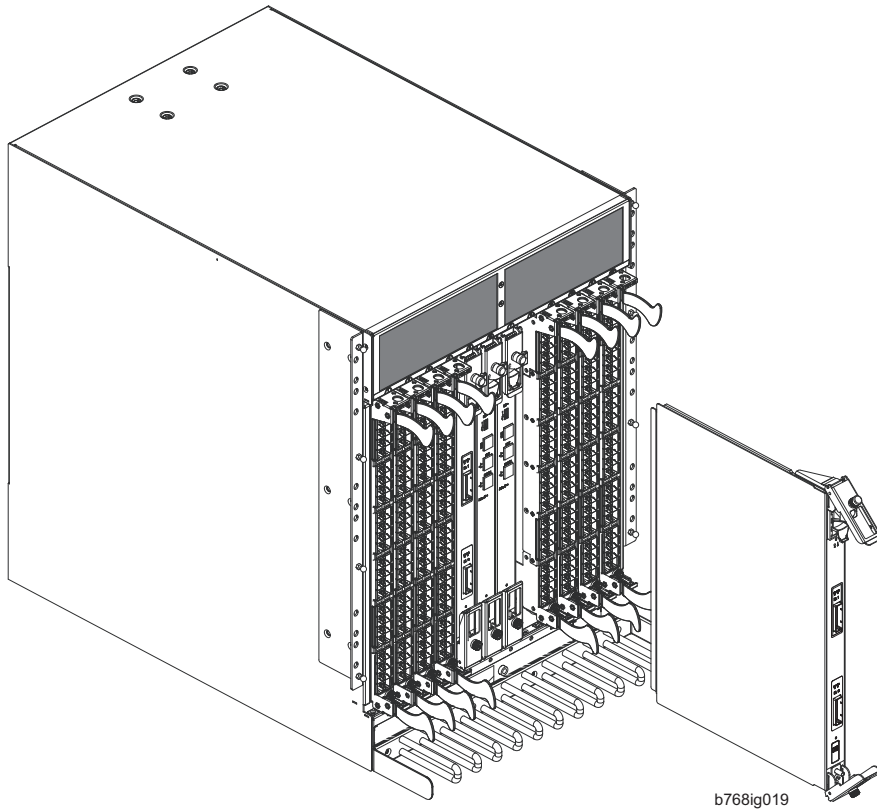


Figure 1. Removal of the Core Switch Blade (CR8) from a 2499-384 chassis

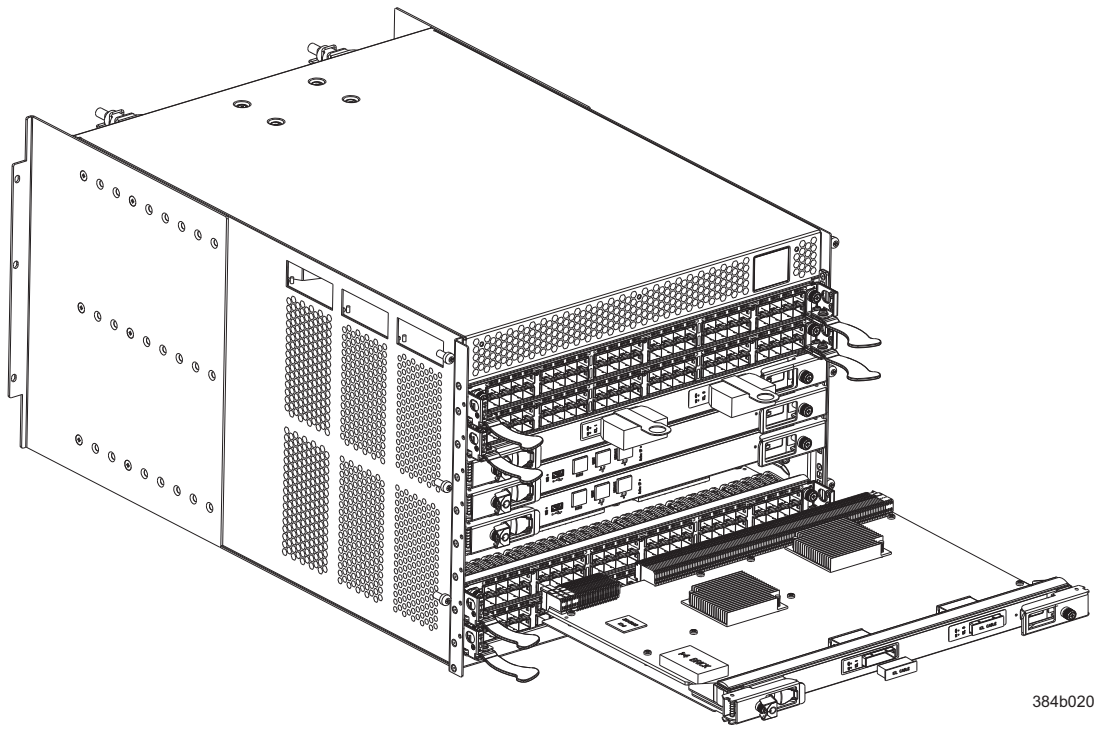


Figure 2. Removal of the Core Switch Blade (CR4S-8) from a 2499-192 chassis

Installing a CR16-8 or CR16-4 core switch blade

For this procedure, refer to Figure 3 on page 15 for installing the CR16-8 core switch blade and Figure 4 on page 16 for installing the CR16-4 core switch blade. Note that because of different chassis orientation, references to "top" for the 2499-384 and 2499-816 correlate to "left" for the 2499-192 and 2499-416.

Note: For simplicity from this point forward in the instructions, only the 16 Gbps chassis models MTMs will be used, 2499-816 for the larger chassis with vertical blades, and 2499-416 for the smaller chassis with horizontal blades.

1. Open the ejectors by rotating them toward the center of the blade face. Orient the CR16 blade so that the handles are toward you.
2. Choose one of the following instructions depending on whether you have a 2499-816 or a 2499-416:
 - For the 2499-816, align the flat side of the CR16-8 blade inside the top and bottom rail guides in the slot with the components facing to the right, and slide the blade into the slot until it is firmly seated.
 - For the 2499-416, align the flat side of the CR16-4 blade inside the left and right rail guides in the slot with the components facing upwards, and slide the blade into the slot until it is firmly seated.
3. Close the ejectors by rotating them away from the center of the blade. The lever action of the ejectors seats the blade in the slot.
4. Tighten the thumbscrews.

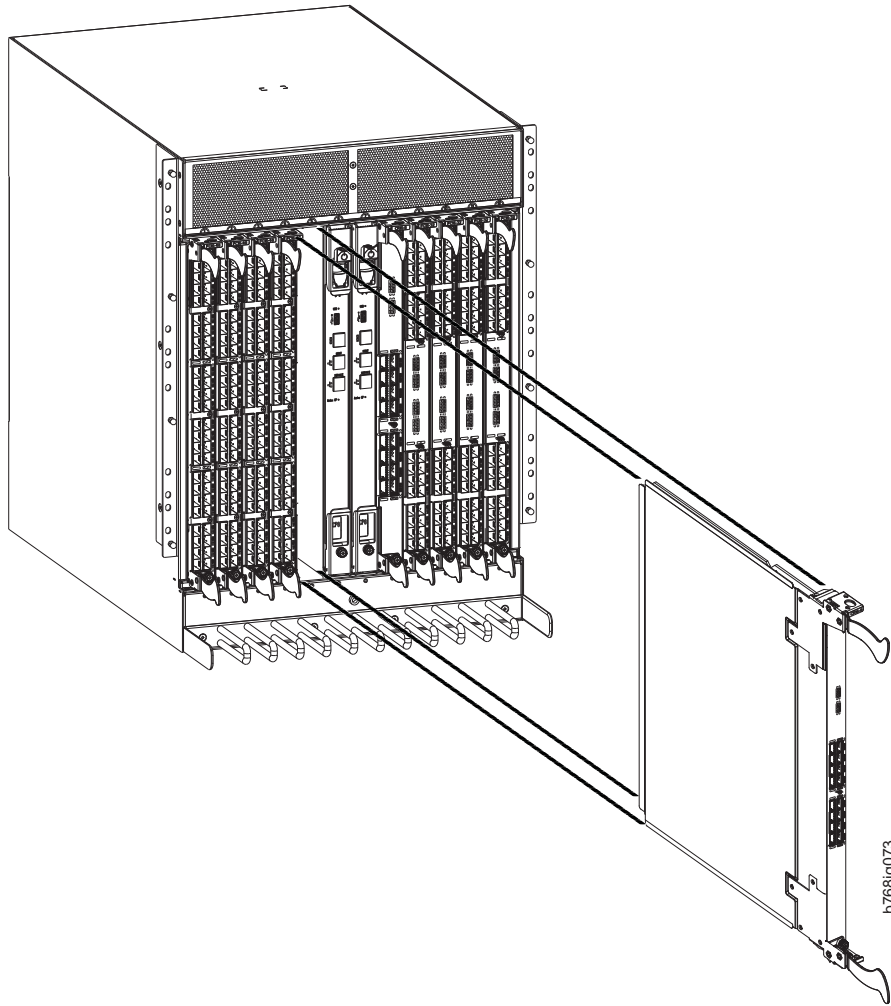


Figure 3. Installing the core switch blade (CR16-8) - typical (one of two shown) in a 2499-816 chassis

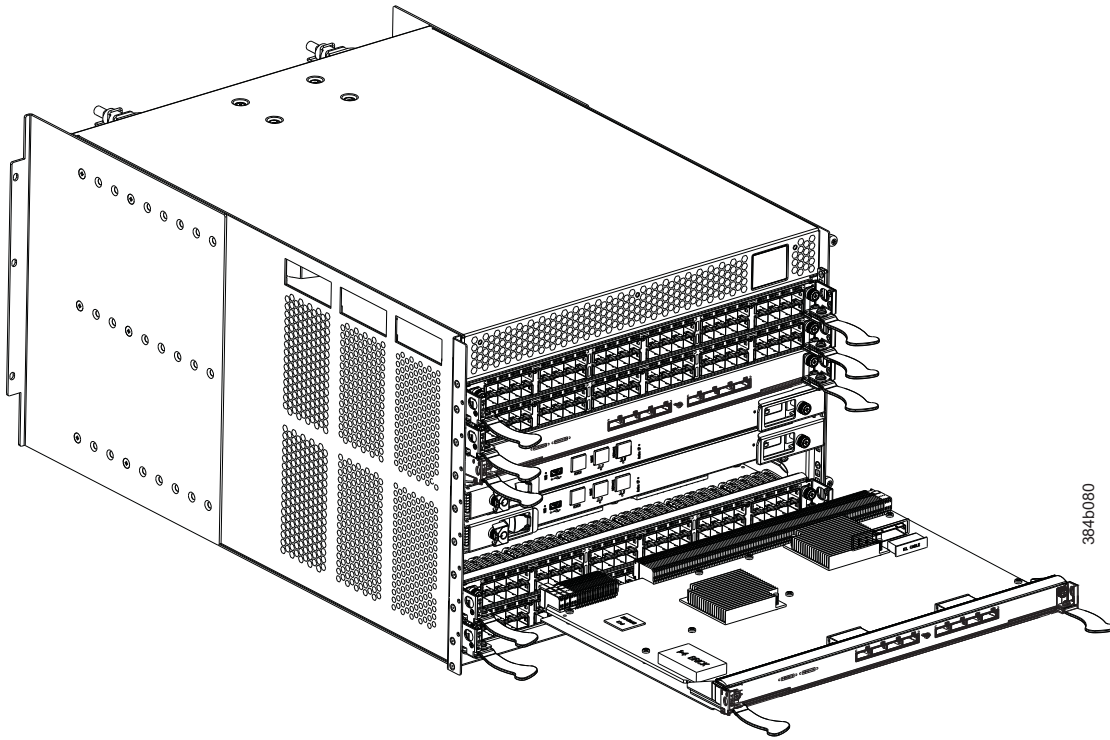


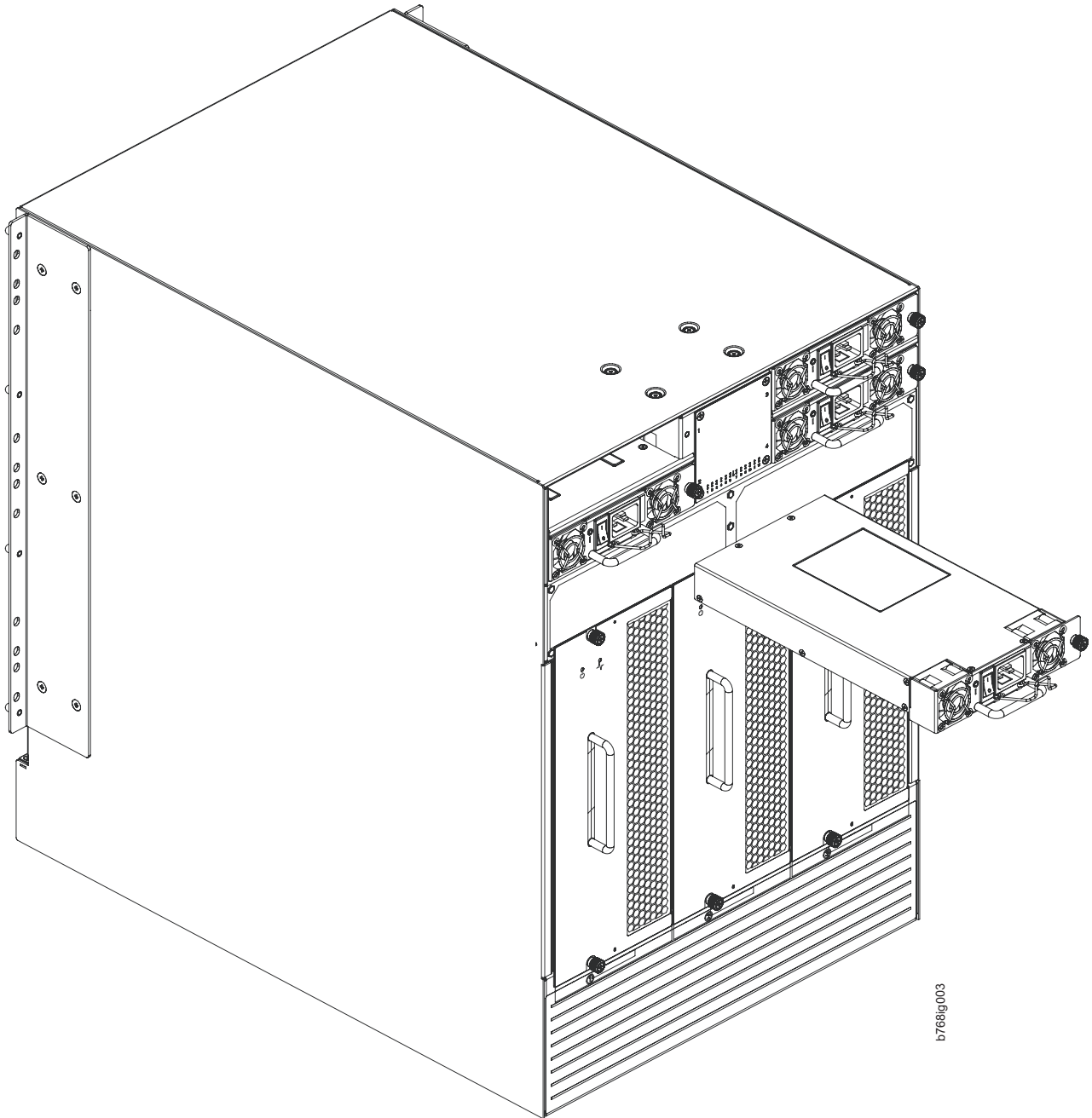
Figure 4. Installing the core switch blade (CR16-4) - typical (one of two shown) in a 2499-416 chassis

Installing additional power supplies

In order to meet the power requirements of the chassis after you have made your changes, you may need additional power supplies. The 2499-816 can have a maximum of 4 power supplies, and the 2499-416 can have a maximum of 2 power supplies. Refer to Figure 5 on page 17, showing the addition of a fourth power supply to the 2499-816 chassis. The power supplies are identical for both models. Refer to “Power supply requirements for the 2499-816 chassis” on page 35 to calculate your power requirements.

Note: Since the standard 2499-192 and 2499-416 products sold by IBM already have the maximum two power supplies, this section does not apply to the conversion of the 2499-192 to a 2499-416.

Note: IBM highly recommends reviewing the power requirements for a post-migration chassis. Fabric OS behavior has changed with v7.0.1 and this has changed power requirements. Additionally, it is important to have the right power setup in order to maintain high availability. A symptom of being under-powered may be the failure of some blades to power up, particularly with single power unit setups.



b768ig003

Figure 5. Adding a power supply in a 2499-816 chassis

To add a power supply, complete the following steps. Repeat the steps if you need to add more than one new power supply.

1. Remove the filler panel over the power supply bay.
2. Insert the power supply into the bay. Verify that the power supply is seated by gently pulling on the handle.
3. Tighten the thumbscrew.
4. Attach the power cord.
5. If you are installing two new power supplies in a 2499-816 chassis to bring the total of power supplies up to four, you should change the switchstatus policy settings for power supplies to the following in order to enable the call home feature if one power supply goes down. Use the **switchStatusPolicyShow**

command to view the policy settings and the **switchStatusPolicySet** command to change them. You should change the value for Bad PowerSupplies contributing to DOWN status to 1 and the value for Bad PowerSupplies contributing to MARGINAL status to 0 if they are not already set to these values. Refer to the following examples for more information.

```
switch:admin> switchstatuspolicyshow
```

The current overall switch status policy parameters:

	Down	Marginal
PowerSupplies	0	0
Temperatures	0	0
Fans	1	0
WWN	0	0
CP	0	0
Blade	0	0
CoreBlade	0	0
Flash	0	0
MarginalPorts	0.00%[0]	0.00%[0]
FaultyPorts	0.00%[0]	0.00%[0]
MissingSFPs	0.00%[0]	0.00%[0]
ErrorPorts	0.00%[0]	0.00%[0]

Number of ports: 344

```
switch:admin> switchstatuspolicyset
```

To change the overall switch status policy parameters

The current overall switch status policy parameters:

	Down	Marginal
PowerSupplies	0	0
Temperatures	0	0
Fans	1	0
WWN	0	0
CP	0	0
Blade	0	0
CoreBlade	0	0
Flash	0	0
MarginalPorts	0.00%[0]	0.00%[0]
FaultyPorts	0.00%[0]	0.00%[0]
MissingSFPs	0.00%[0]	0.00%[0]
ErrorPorts	0.00%[0]	0.00%[0]

Number of ports: 344

<some output removed>

The minimum number of Bad PowerSupplies contributing to DOWN status: (0..4) [0]

Bad PowerSupplies contributing to MARGINAL status: (0..4) [0]

<some output removed>

Policy parameter set has been changed

For more details on executing the **switchStatusPolicyShow** and **switchStatusPolicySet** commands, refer to the *Fabric OS Command Reference Manual*.

Removing unsupported port and application blades

You must remove all port and application blades that are **not** compatible with Fabric OS v7.0.1. For a definitive listing of incompatible blades, refer to the Announcement Letter or the Sales Manual specific to your model.

Attention: Follow electrostatic discharge (ESD) precautions while replacing any blade. See “ESD precautions” on page 4.

Removing a blade

Complete the following steps to remove a blade from the chassis. For this procedure, refer to Figure 6 and Figure 7 on page 20.

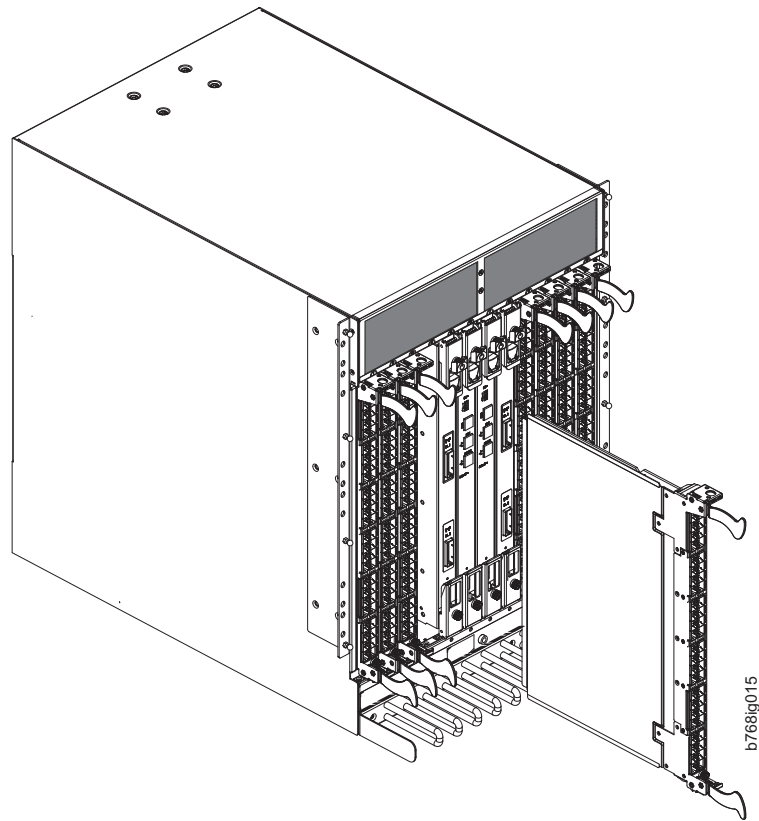


Figure 6. Removing a blade from a 2499-816 chassis (FC8-48 port blade shown)

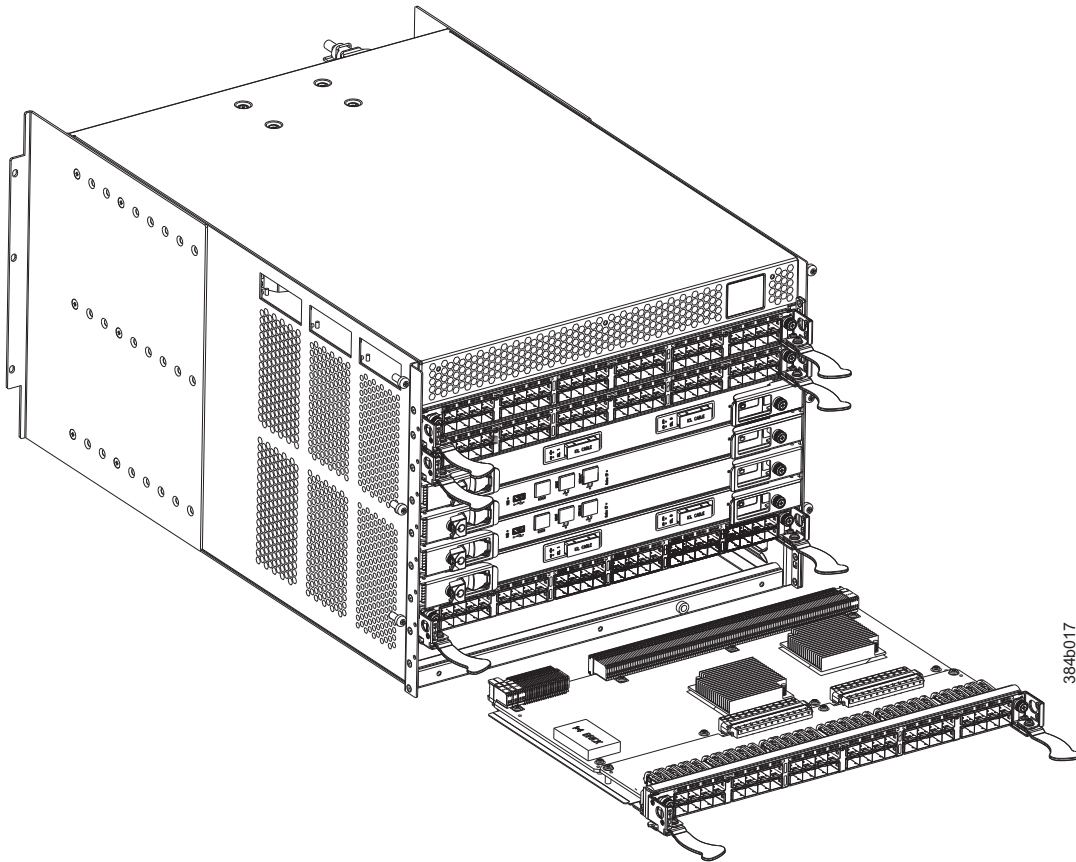


Figure 7. Removing a blade from a 2499-416 chassis (FC8-48 port blade shown)

Attention: If any cables and transceivers are going to be retained for the compatible 8 Gbps port blades, be sure to label those cables and keep a map of their connections. You can use a copy of the table in “Index, slot, port, and cable routing table” on page 43 to record this information.

1. Disconnect all cables and the SFP, SFP+, or XFP transceivers from the blade.
You can use the extraction tool Figure 8 to remove the transceivers if necessary.

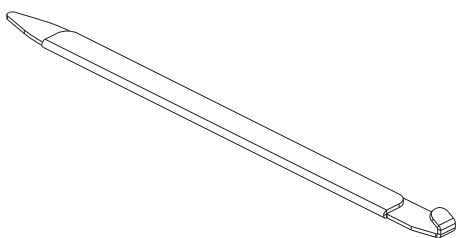


Figure 8. Optical transceiver (SFP, SFP+, and XFP) extraction tool

2. Perform the appropriate following action based on the type of blade:
 - For the FC8-16, FC8-32, FC8-48 port blades and the FCOE10-24 application blade: Unscrew the two thumbscrews next to the top and bottom or left and

- right (depending on the chassis orientation) ejectors on the blade using the Phillips screwdriver. Unscrew the top or left thumbscrew until it pops out.
- For the FC10-6 port blade, and the FA4-18 and FR4-18i application blades: Move the slider switch in the top or left ejector to the off position.
3. Perform the appropriate following action based on the type of blade:
 - For the FC8-16, FC8-32, FC8-48 port blades and the FCOE10-24 application blade: Open the ejectors by rotating them toward the center of the blade face. Pull the blade out of the chassis using the ejectors (Figure 6 on page 19 or Figure 7 on page 20)
 - For the FC10-6 port blade, and the FA4-18 and FR4-18i application blades: Unscrew the two thumbscrews from the top and bottom or left and right (depending on the chassis orientation) ejectors on the blade using the Phillips screwdriver. Pull both ejectors simultaneously away from the blade face to approximately 45 degrees to open them and pull the blade out of the chassis.
 4. Set the removed blades aside for return to the customer when the conversion process is complete.

Attaching new model labels

FOS v7.0.1 will automatically update the VPD to reflect the 16 Gbps chassis MTM. However, for future service purposes, chassis labels must be applied to reflect the new MTM.

Since the left side cable management fingers must be removed from the 2499-416 to provide access to the location for one of the new model labels, this step needs to be completed *before* installing new blades, SFPs, and cables. For the 2499-816, the cable management comb does not need to be removed, so this step can be completed at this point or as the final step in the model conversion process.

Attaching new model labels to the 2499-416 chassis

Two new model labels are to be applied to the 2499-416 chassis. The model labels come on a single sheet, PN 98Y2293, as shown in Figure 9 on page 22. One label, with the rounded end, is applied on the port side directly on top of an existing model label, which is covered by the cable management finger assembly. That assembly must be removed first. The other label is applied to the nonport side of the chassis next to the certification label.

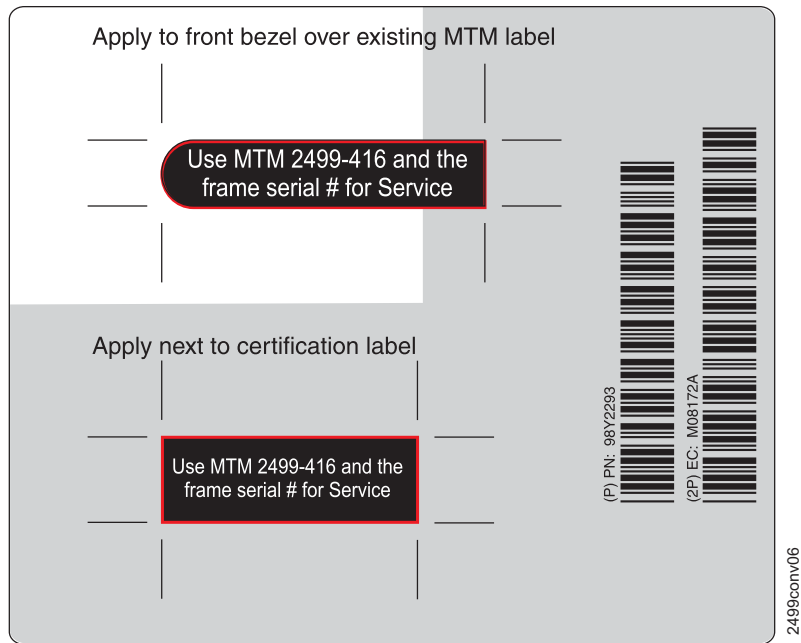


Figure 9. 2499-416 model conversion labels

Remove the left cable management finger assembly (2499-416 only)

The cable management finger assembly mounted on the left side of the chassis and cabinet rails covers the location of one the 2499-192 model labels (see Figure 10 on page 23). This assembly must be removed to provide access for applying the new model label on top of the existing label. The cable management finger assembly on the right side of the chassis can remain in place.



Figure 10. Label location under left cable management finger assembly

Follow these steps to remove the left cable management finger assembly.

1. Ensure that all cables are labeled and that a cable and port mapping is completed.
2. Remove the cables from the cable management finger assembly and rearrange the cables around the assembly. Bundle groups of cables together, as appropriate.
3. While supporting the assembly to prevent it from falling, unscrew and save the two screws used to attach the left cable management assembly to the rack upright (see Figure 11 on page 24).

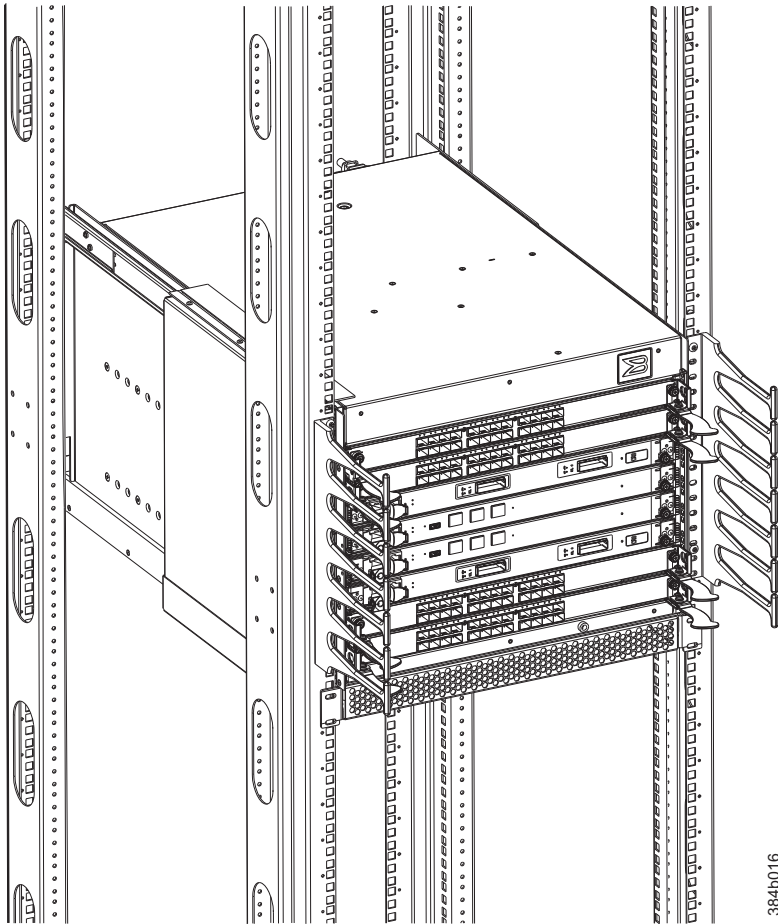


Figure 11. 2499-416 cable finger assembly location

4. Remove the cable management finger assembly, and set aside.

Apply the port side new model label to the 2499-416 chassis

1. Clean the surface of the existing label.
2. Apply the new model label on top of the existing model label. See **1** in Figure 12 on page 25 for the approximate location on the 2499-416 chassis flange (shown without the cable management finger assemblies or the cabinet rails).

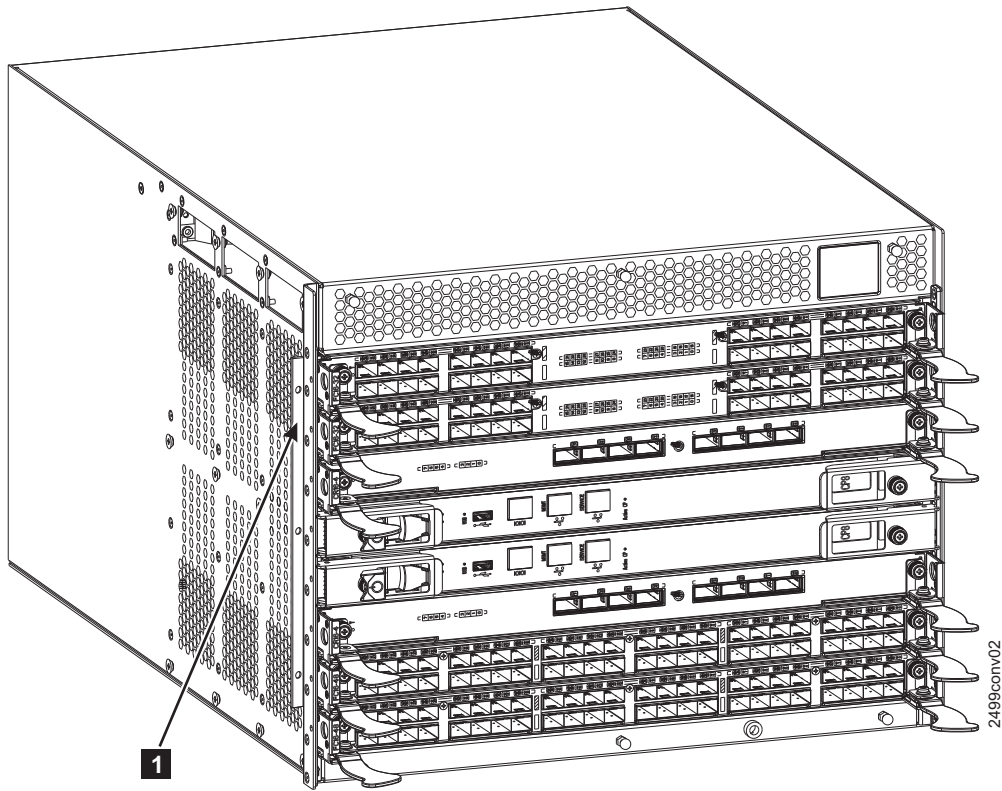


Figure 12. 2499-416 port side new model label location

3. Install the left side cable management finger assembly, using the two screws that were saved when the assembly was removed.

Apply the nonport side new model label to the 2499-416 chassis

The other 2499-416 model label is applied to the nonport (blower) side of the chassis between the caution label and the serial number label (see **1** in Figure 13 on page 26)



Figure 13. 2499-416 nonport side model label location

1. Clean the surface where the label will be applied.
2. Apply the label.

Attaching new model labels to the 2499-816 chassis

This step can be completed for the 2499-816 at this point, or as the last step in the conversion process.

Two new model labels are to be applied to the 2499-816 chassis. The model labels come on a single sheet, PN 98Y2295, as shown in Figure 14 on page 27. One label, with both ends squared, is applied on the port side of the chassis. The other label with the rounded end is applied to the nonport side of the chassis directly on top of the existing model label.

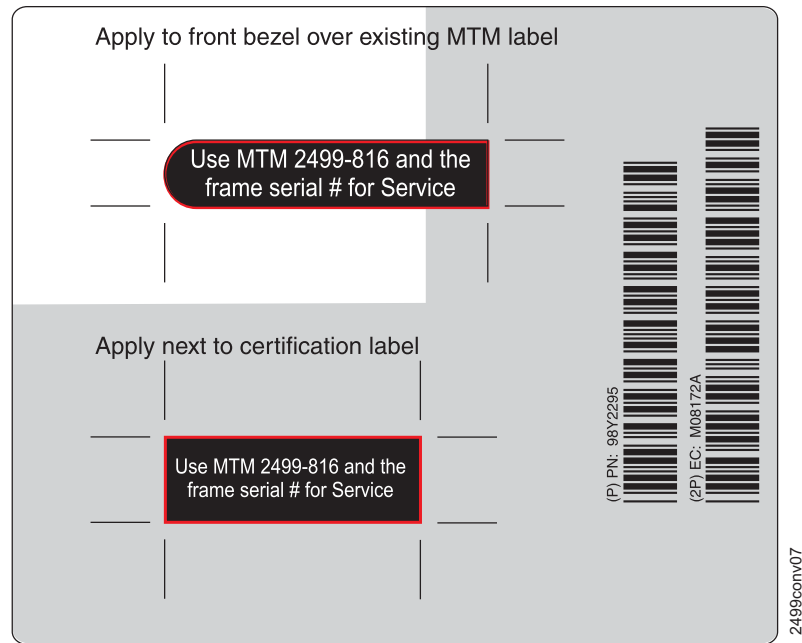


Figure 14. 2499-816 model conversion labels

Apply the port side new model label to the 2499-816 chassis

The new model label (which is square on both ends) for the port side of the 2499 is applied below the blades, directly above the cable management comb in the blank space to the left of the existing certification label.

1. If necessary, move cables off to the side.
2. Clean the surface where the label will be applied.
3. Apply the new model label in the blank space **1** shown in Figure 15 on page 28 on the 2499-816 chassis.



2499comv04

1

Figure 15. 2499-816 port side new model label location

Apply the nonport side new model label to the 2499-816 chassis

The other 2499-816 model label (with the rounded end) is applied to the nonport (blower) side of the chassis below the left blower assembly, directly on top of the existing model label (see **1** in Figure 16 on page 29)



1

Figure 16. 2499-816 nonport side model label location

1. Clean the surface of the existing label.
2. Apply the new model label on top of the existing model label.

Installing supported port, application, and encryption blades

The following port, application, and encryption blades are compatible with Fabric OS v7.0.1 and can be used in a 2499-416 or 2499-816 chassis. For a definitive listing of compatible blades, refer to the Announcement Letter or the latest 2499-416/2499-816 Sales Manual.

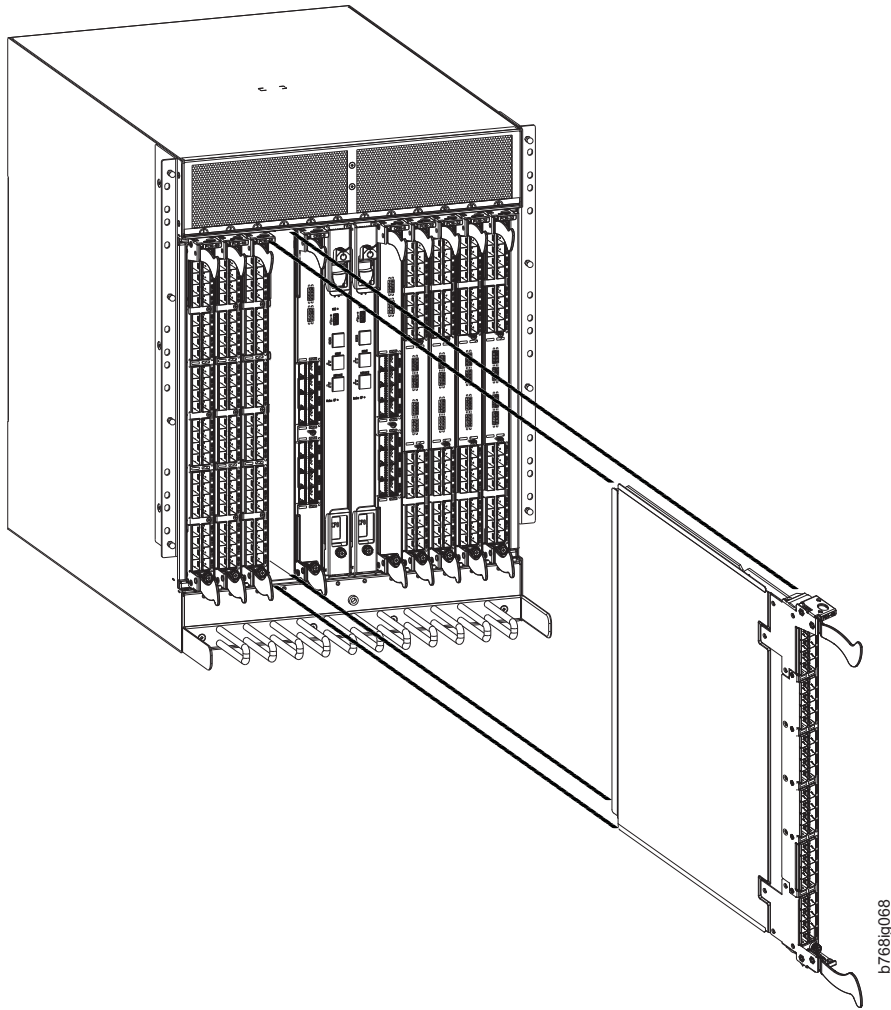
- FC8-64
- FC16-32
- FC16-48
- FX8-24
- FS8-18
- FC8-32E
- FC8-48E

Installing a blade

Complete the following steps to insert a blade. For this procedure, refer to Figure 17 on page 30 or Figure 18 on page 31.

Attention: Any open slots that will not have replacement blades inserted must be filled with filler panels in order to maintain proper cooling of the chassis.

1. Orient the blade so that the ports are at the front of the chassis.



b768ig068

Figure 17. Installing port, application, or encryption blades in a 2499-816 chassis (FC16-48 port blade shown)

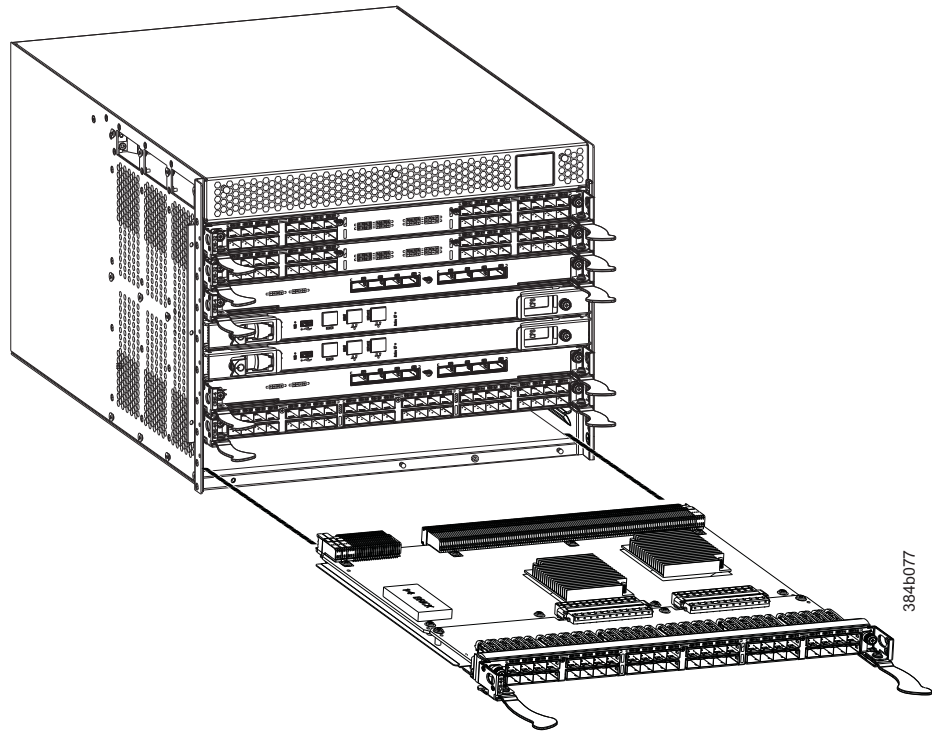


Figure 18. Installing port, application, or encryption blades in a 2499-416 chassis (FC16-48 port blade shown)

2. Open the ejectors by rotating them toward the center of the blade face, align the flat side of the blade inside the left and right or top and bottom rail guides (depending on chassis orientation) in the slot, and slide the blade into the slot until it is firmly seated.
3. Close the ejectors by rotating them away from the center of the blade. The lever action of the ejectors seats the blade in the slot.
4. Tighten the thumbscrews using the Phillips screwdriver.
5. After inserting any new blades, run the **slotShow** command to confirm that the blades are properly seated and identified. Refer to Table 2 for the correct blade IDs.

Table 2. Supported blades for the 2499-816 and 2499-416 chassis

Blade name	ID
CP8	50
CR16-4 (2499-416 only)	99
CR16-8 (2499-816 only)	98
FC8-64	77
FC16-32	97
FC16-48	96
FC16-32E	125
FC16-48E	126
FX8-24	75
FS8-18	43

Installing transceivers into port, application, and encryption blades

Attention: Do not reuse unsupported transceivers. Transceivers removed from unsupported blades should *not* be reused in any blades without carefully checking to ensure that they are supported in the particular blade and chassis. Consult the Sales Manual or the interoperability matrix for a definitive listing of supported transceivers.

Replacement blades will ship with new transceivers. Do not intermix these transceivers with the ones removed from the unsupported blades. Once all of the supported blades have been installed in the chassis, you can install the transceivers and cables. Only Brocade-branded optics are supported. For a listing of transceivers compatible with this product:

- Go to the IBM SAN web page www.ibm.com/systems/storage/san
- Select the **IBM System Storage SAN768B-2 and SAN384B-2** product link
- On the displayed product page, click the **Interoperability Matrix** link in the **Learn more** section.
- In the Interoperability matrix, click the **Transceivers** link.

Attention: Do not insert the QSFP cables for the ICLs yet. All chassis that will be connected using ICLs must be fully upgraded first.

Installing an mSFP or SFP+ transceiver

1. Position the optical transceiver so that the key is oriented correctly to the port.
2. Insert the transceiver into the port until it is firmly seated and the latching mechanism clicks. Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.
3. Insert all the required transceivers before inserting the cables. Once all the transceivers are inserted, proceed to step 2.

Attention: If you are inserting mSFP transceivers into an FC8-64 port blade, IBM recommends that you insert the cables into the transceivers before inserting the transceivers into the blade. The smaller size of the mSFP transceivers makes it difficult to insert cables after inserting all the transceivers into the blade. Be sure you have the correct cables to insert into the mSFP transceivers.

4. Position a cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver.
5. Insert the cable into the transceiver until the latching mechanism clicks. Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented.

Powering up the chassis

Once the core blades have been replaced and any new power supplies have been added, you can power up the chassis. Complete the following steps to power up a chassis.

1. Turn the AC power switches on the power supplies to I. The AC power switches display green when switched on and power is supplied. The backbone performs a power-on self-test (POST) when it is powered on. POST takes approximately 15 to 20 minutes and is complete when the indicator light activity displays the operational state. A faulty POST may be caused by blades not being properly seated. Check all blades to be sure they are seated correctly.

2. Confirm the following:
 - The chassis is online
 - All devices are online
 - All ISLs are online

Upgrading additional chassis

If you have two or more chassis that will be connected with inter-chassis link (ICL) cables, they must all be upgraded to Fabric OS v7.0.1. Repeat the previous steps, beginning with “Quiescing traffic on the chassis” on page 6 for each chassis until all chassis have been upgraded.

Installing QSFP transceivers and cables for the ICLs

Once all chassis that will be connected have been upgraded to Fabric OS v7.0.1, you can begin cabling them together with ICL cables.

Attention: If any QSFP ports are not used, make sure the rubber gaskets (dust covers) are inserted in the ports.

Figure 19 shows a QSFP cable and transceiver. The QSFP connectors on the core blades are labeled by trunk group (trunking is licensable) for ease of installation.

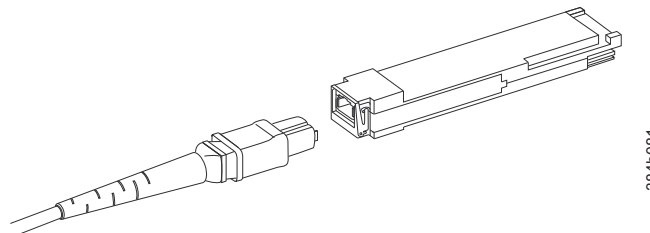


Figure 19. QSFP cable and transceiver

Follow these steps to install the QSFP transceivers and cables in the 16 Gbps core blades. These transceivers and cables are used to form the ICLs with neighboring 2499-816 and 2499-416 chassis.

Note: The transceivers should be installed in the blades before connecting the cables.

Because each QSFP transceiver contains four 16 Gbps ports, be aware that any problems with one port could affect all four ports if the QSFP transceiver must be replaced.

1. Position one of the QSFP transceivers so that the key is oriented correctly to the port.
2. Insert the transceiver into the port until it is firmly seated. Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.
3. Remove the protective cap from the special QSFP cable and insert it into the transceiver until it is firmly seated. The cables are also keyed to fit into the transceivers correctly.
4. Repeat steps 1 through 3 for the remaining ICLs.

5. Once all the cables are attached and all the chassis to be connected are powered up, refer to the *Inter-chassis links* section of the **Routing Traffic** chapter in the *Fabric OS Administrator's Guide* for information concerning possible topologies for ICLs and the configuration procedure.

Checking the chassis functionality

You can run the **slotShow** and **switchShow** commands to see information about the chassis functionality after all the previous procedures have been done. When you run the **slotShow** command, check to see that all blades are enabled. When you run the **switchShow** command, check to see that all the port indexes, link addresses, and world-wide names (WWN) are as expected. If Virtual Fabrics have been enabled, check to see that all port have been assigned to the correct logical switches and that all port configuration parameters are in place.

Failback traffic

This process will be unique to each installation, depending on the mix of blades in each chassis and the number and configuration of the chassis in the fabric. You may also have to consult with your host and storage vendors to provide multipathing procedures for your environment. Through the software applications, you can watch for devices to log on to the correct port, check for error messages and monitor traffic on the backbone.

Disposition of removed components

Unless informed otherwise, all components removed during this model conversion process should be given to the customer.

Attention: Ensure that customers are aware that many of the removed components *cannot* be used in the upgraded machine. The definitive list of blades, transceivers, and other features that must be removed from the 2499-192 and 2499-384 models for conversion to 2499-416 and 2499-816 models is provided in the Announcement Letter and the appropriate Sales Manual.

Appendix.

- “Power supply requirements for the 2499-816 chassis”
- “Qualified transceivers for use with 16 Gbps chassis” on page 36
- “Backing out of the migration” on page 36
- “Index numbering scheme for the 2499-384 and 2499-816 chassis” on page 40
- “Index, slot, port, and cable routing table” on page 43

Power supply requirements for the 2499-816 chassis

Use Table 3 to determine the power requirements for your configuration of the 2499-816 chassis. Values for the 2499-416 chassis are not provided, since the only configurations sold by IBM for the 2499-192 and 2499-416 chassis include the maximum two power supplies.

The base unit 2499-816 comes with two power supplies, and the 2499-384 model being converted may have a different number of power supplies, depending on the configuration. The power requirements for a given configuration depend on which blades have been installed in the chassis. Table 3 shows the power draw for the blades that can be used in the 2499-816 chassis along with the power draw for the cooling fans. All numbers for the blades assume that the blade is fully populated with optical transceivers, including QSFPs for the core blades. All ports are Fibre Channel except where noted. You can calculate your power requirements by combining the power draws for the various blades and fan units in your configuration. While you may use fewer ports in a given blade, it is always safer to use the power requirement of a fully populated blade.

Table 3. Power demands per component in a 2499-816 chassis

Blade or fan units	Maximum power draw (Watts)	Type of blade	Ports per blade	Number of blades permitted in chassis	Total ports per chassis
CP8	40	Control blade	NA	2	NA
CR16-8	240	Core blade	16 64 Gbps QSFP ports	2	32 quad ports (128 ports)
FC8-32E (8Gb)	140	Port blade	32 8 Gbps SFP+	up to 8	256
FC8-48E (8Gb)	160.4	Port blade	48 8 Gbps SFP+	up to 8	384
FC16-32 (16Gb)	140	Port blade	32 16 Gbps SFP+ (can use 8 Gbps SFP+)	up to 8	256
FC16-48 (16Gb)	160.4	Port blade	48 16 Gbps SFP+ (can use 8 Gbps SFP+)	up to 8	384
FC8-64 (8Gb)	126.4	Port blade	64 8Gbps SFP+	up to 8	512
FS8-18	235	Encryption blade	16 8 Gbps SFP+	up to 4	64

Table 3. Power demands per component in a 2499-816 chassis (continued)

Blade or fan units	Maximum power draw (Watts)	Type of blade	Ports per blade	Number of blades permitted in chassis	Total ports per chassis
FX8-24	250	Extension blade	12 8 Gbps SFP+ 10 1 Gbps Ethernet 2 10 Gbps Ethernet	up to 4	48 8 Gbps 40 1 Gbps Ethernet 8 10 Gbps Ethernet
Fan unit	90	NA	NA	3 fans per chassis	NA

For a more specific calculation of power draw of a 2499-416 with different blade combinations, refer to the *Power specifications* section in Appendix A of the *SAN384B-2 Installation, Service, and User Guide*

Qualified transceivers for use with 16 Gbps chassis

Attention: Do *not* reuse unsupported transceivers. Transceivers removed from unsupported blades should *not* be reused in any blades without carefully checking to ensure that they are supported in the particular blade and chassis.

The replacement blades will ship with new transceivers. Do *not* intermix these transceivers with the ones removed from the unsupported blades. Once all of the supported blades have been installed in the chassis, you can install the transceivers and cables. Only Brocade-branded optics are supported.

For a listing of transceivers compatible with this product:

- Go to the IBM SAN web page www.ibm.com/systems/storage/san
- Select the **IBM System Storage SAN768B-2 and SAN384B-2** product link
- On the displayed product page, click the **Interoperability Matrix** link in the **Learn more** section.
- In the Interoperability matrix, click the **Transceivers** link.

Backing out of the migration

If, at some point in the migration process, you need to reverse it and restore your system to its original configuration, complete the following steps:

1. Reverse any hardware changes you have made.
2. Run the **firmwareDownload** command to downgrade the Fabric OS to your original version.
3. Run the **configDownload -all** command to reapply the original configuration that you uploaded before beginning the migration process. If the Virtual Fabrics feature was enabled, use the **configDownload -vf** command followed by **configDownload -all**. The commands must run in that order for proper behavior of the system and logical switches.

Index numbering scheme for the 2499-192 and 2499-416 chassis

Refer to Table 4, Table 5, Table 6 on page 38, and Table 7 on page 39 to determine the index number of any port on a 2499-192 or 2499-416 chassis, with different port blades. Use the indexes in your planning for the upgrade to reduce the need to reconfigure features such as Virtual Fabrics, zoning, and FICON®.

The tables are oriented horizontally, with the slot number in the right column to match the horizontal layout of the port blades on the 2499-192 and 2499-384 chassis. The last two tables are rotated 90 degrees to accommodate the larger number of ports in the higher density blades.

Table 4. Index numbering for a 16-port blade in a 2499-192 or 2499-384 chassis

2499-192 or 2499-416																
207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192	Slot 8
143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	Slot 7
79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	Slot 2
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Slot 1

Table 5. Index numbering for a 32-port blade in a 2499-192 or 2499-384 chassis

2499-192 or 2499-416																
223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208	Slot 8
207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192	
159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144	Slot 7
143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	
95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	Slot 2
79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	Slot 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Table 6. Index numbering for a 48-port blade in a 2499-192 or 2499-416 chassis

2499-192 or 2499-416																								
239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224	223	222	221	220	219	218	217	216	Slot 8
215	214	213	212	211	210	209	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192	Slot 8
175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	Slot 7
151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	Slot 7
111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	Slot 2
87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	Slot 2
47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	Slot 1
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Slot 1

Table 7. Index numbering for a 64-port blade in a 2499-192 or 2499-416 chassis

2499-192 or 2499-416																																																															
255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224	Slot 8																															
223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192																																
191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160	Slot 7																															
159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128																																
127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96	Slot 2																															
95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64																																
63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	Slot 1																															
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																																

Index numbering scheme for the 2499-384 and 2499-816 chassis

Refer to Table 8, Table 9 on page 41, Table 10 on page 42, and Table 11 on page 43 to determine the index number of any port on a 2499-384 or 2499-816 chassis, with different port blades. Use the indexes in your planning for the upgrade to reduce the need to reconfigure features such as Virtual Fabrics, zoning, and FICON.

Table 8. Index numbering for a 16-port blade in a 2499-384 or 2499-816 chassis

2499-384 or 2499-816							
Slot 1	Slot 2	Slot 3	Slot 4	Slot 9	Slot 10	Slot 11	Slot 12
15	31	47	63	79	95	111	127
14	30	46	62	78	94	110	126
13	29	45	61	77	93	109	125
12	28	44	60	76	92	108	124
11	27	43	59	75	91	107	123
10	26	42	58	74	90	106	122
9	25	41	57	73	89	105	121
8	24	40	56	72	88	104	120
7	23	39	55	71	87	103	119
6	22	38	54	70	86	102	118
5	21	37	53	69	85	101	117
4	20	36	52	68	84	100	116
3	19	35	51	67	83	99	115
2	18	34	50	66	82	98	114
1	17	33	49	65	81	97	113
0	16	32	48	64	80	96	112

Table 9. Index numbering for a 32-port blade in a 2499-384 or 2499-816 chassis

2499-384 or 2499-816															
Slot 1		Slot 2		Slot 3		Slot 4		Slot 9		Slot 10		Slot 11		Slot 12	
15	143	31	159	47	175	63	191	79	207	95	223	111	239	127	255
14	142	30	158	46	174	62	190	78	206	94	222	110	238	126	254
13	141	29	157	45	173	61	189	77	205	93	221	109	237	125	253
12	140	28	156	44	172	60	188	76	204	92	220	108	236	124	252
11	139	27	155	43	171	59	187	75	203	91	219	107	235	123	251
10	138	26	154	42	170	58	186	74	202	90	218	106	234	122	250
9	137	25	153	41	169	57	185	73	201	89	217	105	233	121	249
8	136	24	152	40	168	56	184	72	200	88	216	104	232	120	248
7	135	23	151	39	167	55	183	71	199	87	215	103	231	119	247
6	134	22	150	38	166	54	182	70	198	86	214	102	230	118	246
5	133	21	149	37	165	53	181	69	197	85	213	101	229	117	245
4	132	20	148	36	164	52	180	68	196	84	212	100	228	116	244
3	131	19	147	35	163	51	179	67	195	83	211	99	227	115	243
2	130	18	146	34	162	50	178	66	194	82	210	98	226	114	242
1	129	17	145	33	161	49	177	65	193	81	209	97	225	113	241
0	128	16	144	32	160	48	176	64	192	80	208	96	224	112	240

Table 10. Index numbering for a 48-port blade in a 2499-384 or 2499-816 chassis

2499-384 or 2499-816															
Slot 1		Slot 2		Slot 3		Slot 4		Slot 9		Slot 10		Slot 11		Slot 12	
135	271	151	287	167	303	183	319	199	335	215	351	231	367	247	383
134	270	150	286	166	302	182	318	198	334	214	350	230	366	246	382
133	269	149	285	165	301	181	317	197	333	213	349	229	365	245	381
132	268	148	284	164	300	180	316	196	332	212	348	228	364	244	380
131	267	147	283	163	299	179	315	195	331	211	347	227	363	243	379
130	266	146	282	162	298	178	314	194	330	210	346	226	362	242	378
129	265	145	281	161	297	177	313	193	329	209	345	225	361	241	377
128	264	144	280	160	296	176	312	192	328	208	344	224	360	240	376
15	263	31	279	47	295	63	311	79	327	95	343	111	359	127	375
14	262	30	278	46	294	62	310	78	326	94	342	110	358	126	374
13	261	29	277	45	293	61	309	77	325	93	341	109	357	125	373
12	260	28	276	44	292	60	308	76	324	92	340	108	356	124	372
11	259	27	275	43	291	59	307	75	323	91	339	107	355	123	371
10	258	26	274	42	290	58	306	74	322	90	338	106	354	122	370
9	257	25	273	41	289	57	305	73	321	89	337	105	353	121	369
8	256	24	272	40	288	56	304	72	320	88	336	104	352	120	368
7	143	23	159	39	175	55	191	71	207	87	223	103	239	119	255
6	142	22	158	38	174	54	190	70	206	86	222	102	238	118	254
5	141	21	157	37	173	53	189	69	205	85	221	101	237	117	253
4	140	20	156	36	172	52	188	68	204	84	220	100	236	116	252
3	139	19	155	35	171	51	187	67	203	83	219	99	235	115	251
2	138	18	154	34	170	50	186	66	202	82	218	98	234	114	250
1	137	17	153	33	169	49	185	65	201	81	217	97	233	113	249
0	136	16	152	32	168	48	184	64	200	80	216	96	232	112	248

Table 11. Index numbering for a 64-port blade in a 2499-384 or 2499-816 chassis

2499-384 or 2499-816															
Slot 1		Slot 2		Slot 3		Slot 4		Slot 9		Slot 10		Slot 11		Slot 12	
143	783	159	799	175	815	191	831	207	847	223	863	239	879	255	895
142	782	158	798	174	814	190	830	206	846	222	862	238	878	254	894
141	781	157	797	173	813	189	829	205	845	221	861	237	877	253	893
140	780	156	796	172	812	188	828	204	844	220	860	236	876	252	892
139	779	155	795	171	811	187	827	203	843	219	859	235	875	251	891
138	778	154	794	170	810	186	826	202	842	218	858	234	874	250	890
137	777	153	793	169	809	185	825	201	841	217	857	233	873	249	889
136	776	152	792	168	808	184	824	200	840	216	856	232	872	248	888
135	775	151	791	167	807	183	823	199	839	215	855	231	871	247	887
134	774	150	790	166	806	182	822	198	838	214	854	230	870	246	886
133	773	149	789	165	805	181	821	197	837	213	853	229	869	245	885
132	772	148	788	164	804	180	820	196	836	212	852	228	868	244	884
131	771	147	787	163	803	179	819	195	835	211	851	227	867	243	883
130	770	146	786	162	802	178	818	194	834	210	850	226	866	242	882
129	769	145	785	161	801	177	817	193	833	209	849	225	865	241	881
128	768	144	784	160	800	176	816	192	832	208	848	224	864	240	880
15	271	31	287	47	303	63	319	79	335	95	351	111	367	127	383
14	270	30	286	46	302	62	318	78	334	94	350	110	366	126	382
13	269	29	285	45	301	61	317	77	333	93	349	109	365	125	381
12	268	28	284	44	300	60	316	76	332	92	348	108	364	124	380
11	267	27	283	43	299	59	315	75	331	91	347	107	363	123	379
10	266	26	282	42	298	58	314	74	330	90	346	106	362	122	378
9	265	25	281	41	297	57	313	73	329	89	345	105	361	121	377
8	264	24	280	40	296	56	312	72	328	88	344	104	360	120	376
7	263	23	279	39	295	55	311	71	327	87	343	103	359	119	375
6	262	22	278	38	294	54	310	70	326	86	342	102	358	118	374
5	261	21	277	37	293	53	309	69	325	85	341	101	357	117	373
4	260	20	276	36	292	52	308	68	324	84	340	100	356	116	372
3	259	19	275	35	291	51	307	67	323	83	339	99	355	115	371
2	258	18	274	34	290	50	306	66	322	82	338	98	354	114	370
1	257	17	273	33	289	49	305	65	321	81	337	97	353	113	369
0	256	16	272	32	288	48	304	64	320	80	336	96	352	112	368

Index, slot, port, and cable routing table

You can use copies of Table 12 on page 44 to help you track your ports, indexes, and cabling during the conversion. In addition, you can use this form to plan your post-migration setup. You can make copies of the table for each blade in the chassis to cover the total number of ports in the chassis.

Table 12. Index, slot, port, and cable routing table (64 ports shown)

Current values				Cable labels			Connected device	WWN of device	Slot/port of device	Planning values					
Index	Slot	Port	Link address	Switch end	Device end	Index				Slot	Port	Link address			
		0											0		
		1												1	
		2												2	
		3												3	
		4												4	
		5												5	
		6												6	
		7												7	
		8												8	
		9												9	
		10												10	
		11												11	
		12												12	
		13												13	
		14												14	
		15												15	
		16												16	
		17												17	
		18												18	
		19												19	
		20												20	
		21												21	
		22												22	
		23												23	
		24												24	

Table 12. Index, slot, port, and cable routing table (64 ports shown) (continued)

Current values				Cable labels			Connected device	WWN of device	Slot/port of device	Planning values			
Index	Slot	Port	Link address	Switch end	Device end				Index	Slot	Port	Link address	
		25									25		
		26									26		
		27									27		
		28									28		
		29									29		
		30									30		
		31									31		
		32									32		
		33									33		
		34									34		
		35									35		
		36									36		
		37									37		
		38									38		
		39									39		
		40									40		
		41									41		
		42									42		
		43									43		
		44									44		
		45									45		
		46									46		
		47									47		
		48									48		
		49									49		

Table 12. Index, slot, port, and cable routing table (64 ports shown) (continued)

Current values				Cable labels			Connected device	WWN of device	Slot/port of device	Planning values			
Index	Slot	Port	Link address	Switch end	Device end				Index	Slot	Port	Link address	
		50									50		
		51									51		
		52									52		
		53									53		
		54									54		
		55									55		
		56									56		
		57									57		
		58									58		
		59									59		
		60									60		
		61									61		
		62									62		
		63									63		



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