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Fabric OS

Troubleshooting and Diagnostics Guide

Supporting Fabric OS v6.4.0

BROCADE

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Fabric OS Troubleshooting and Diagnostics Guide	53-1001187-01	Added support for Virtual Fabrics, fcPing, pathInfo, and additional troubleshooting tips.	November 2008
Fabric OS Troubleshooting and Diagnostics Guide	53-1001340-01	Added support for checking physical connections, updated commands, removed obsolete information, and moved the FCIP and FICON chapters into their respective books.	July 2009
Fabric OS Troubleshooting and Diagnostics Guide	53-1001769-01	Added support for the Rolling Reboot Detection feature and the Superping tool; added enhancements for supportSave and spinFab; updated commands; transferred the iSCSI chapter into its respective book.	March 2010

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How this document is organized

The document contains the following chapters:

- Chapter 1, "Introduction to Troubleshooting," gives a brief overview of troubleshooting the Fabric OS, and provides procedures for gathering basic information from your switch and fabric to aid in troubleshooting.
- Chapter 2, "General Issues," provides information on licensing, hardware, and syslog issues.
- Chapter 3, "Connectivity Issues," provides information and procedures on troubleshooting various link issues.
- Chapter 4, "Configuration Issues," provides troubleshooting information and procedures for configuration file issues.
- Chapter 5, "FirmwareDownload Errors," provides procedures for troubleshooting firmware download issues.
- Chapter 6, "Security Issues," provides procedures for user account and security issues.
- Chapter 7, "Virtual Fabrics", provides procedures to troubleshooting Virtual Fabrics.
- Chapter 8, "ISL Trunking Issues," provides procedures for resolving trunking issues.
- Chapter 9, "Zone Issues," provides preparations and procedures for performing firmware downloads, as well troubleshooting information.
- Chapter 10, "Working With Diagnostic Features," provides procedures for the use of the diagnostics commands for the chassis, ports, and other chassis equipment. Provides information on the system messages.
- The appendices provide special information to guide you in understanding switch output.

Supported hardware and software

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

Although many different software and hardware configurations are tested and supported by Brocade Communications Systems, Inc. for 6.4.0, documenting all possible configurations and scenarios is beyond the scope of this document.

The following hardware platforms are supported by this release of Fabric OS:

- Brocade 300 switch
- Brocade 4100 switch
- Brocade 4900 switch
- Brocade 5000 switch
- Brocade 5100 switch
- Brocade 5300 switch
- Brocade 5410 embedded switch
- Brocade 5424 embedded switch
- Brocade 5460 embedded switch
- Brocade 5470 embedded switch
- Brocade 5480 embedded switch
- Brocade 7500 extension switch
- Brocade 7500E extension switch
- Brocade 7600 application appliance
- Brocade 7800 extension switch
- Brocade 8000 application appliance
- Brocade 48000 director
- Brocade DCX Backbone data center backbone
- Brocade DCX-4S Backbone data center backbone
- Brocade Encryption Switch
- Brocade VA-40FC

What’s new in this document

- Information that was added:
  - supportSave enhancements
  - Rolling Reboot Detection feature
  - Superping tool
  - spinFab enhancements

- Information that was changed:
    - All commands have been updated.
- Information that was deleted:
    - All obsolete information. This information was obsoleted because it was no longer supported in the current version of firmware.
    - The iSCSI chapter has been removed and put in the *iSCSI Administrator's Guide.*

For further information about documentation updates for this release, refer to the release notes.

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:

bold text	Identifies command names Identifies the names of user-manipulated GUI elements Identifies keywords and operands Identifies text to enter at the GUI or CLI
italic text	Provides emphasis Identifies variables Identifies paths and Internet addresses Identifies document titles
`code` text	Identifies CLI output Identifies command syntax examples

Command syntax conventions

For readability, command names in the narrative portions of this guide are presented in mixed lettercase: for example, switchShow. In actual examples, command lettercase is often all lowercase. Otherwise, this manual specifically notes those cases in which a command is case sensitive. Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
`--`**option, option**	Command options are printed in bold.
`-`**argument,** arg	Arguments.
[ ]	Optional element.
variable	Variables are printed in italics. In the help pages, values are underlined or enclosed in angled brackets < >.

...	Repeat the previous element, for example “member[;member...]”
value	Fixed values following arguments are printed in plain font. For example, **--show** WWN
|	Boolean. Elements are exclusive. Example: **--show -mode** egress | ingress

Command examples

This book describes how to perform configuration tasks using the Fabric OS command line interface, but does not describe the commands in detail. For complete descriptions of all Fabric OS commands, including syntax, operand description, and sample output, see the *Fabric OS Command Reference*.

Notes, cautions, and warnings

The following notices and 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.

ATTENTION

An Attention statement indicates potential damage to hardware or data.

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.

Key terms

For definitions specific to Brocade and Fibre Channel, see the *Brocade Glossary*.

For definitions of SAN-specific terms, visit the Storage Networking Industry Association online dictionary at:

http://www.snia.org/education/dictionary

Additional information

This section lists additional Brocade and industry-specific documentation that you might find helpful.

Brocade resources

To get up-to-the-minute information, go to http://my.brocade.com and register at no cost for a user ID and password.

For practical discussions about SAN design, implementation, and maintenance, you can obtain *Building SANs with Brocade Fabric Switches* through:

http://www.amazon.com

White papers, online demos, and data sheets are available through the Brocade Web site at:

http://www.brocade.com/products-solutions/products/index.page

For additional Brocade documentation, visit the Brocade Web site:

http://www.brocade.com

Release notes are available on the Brocade Connect Web site and are also bundled with the Fabric OS firmware.

Other industry resources

For additional resource information, visit the Technical Committee T11 Web site. This Web site provides interface standards for high-performance and mass storage applications for Fibre Channel, storage management, and other applications:

http://www.t11.org

For information about the Fibre Channel industry, visit the Fibre Channel Industry Association Web site:

http://www.fibrechannel.org

Getting technical help

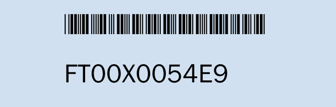
Contact your switch support supplier for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information available:

1. General Information
   - Switch model
   - Switch operating system version
   - Error numbers and messages received
   - supportSave command output
   - Detailed description of the problem, including the switch or fabric behavior immediately following the problem, and specific questions

   - Description of any troubleshooting steps already performed and the results
   - Serial console and Telnet session logs
   - syslog message logs

2. Switch Serial Number

   The switch serial number and corresponding bar code are provided on the serial number label, as illustrated below.:



   The serial number label is located as follows:

   The serial number label is located as follows:

   - *Brocade 300, 4100, 4900, 5100, 5300, 7500, 7800, 8000, VA-40FC, and Brocade Encrypytion Switch*—On the switch ID pull-out tab located inside the chassis on the port side on the left
   - *Brocade 5000*—On the switch ID pull-out tab located on the bottom of the port side of the switch
   - *Brocade 7600*—On the bottom of the chassis
   - *Brocade 48000*—Inside the chassis next to the power supply bays
   - *Brocade DCX*—On the bottom right on the port side of the chassis
   - *Brocade DCX-4S*—On the bottom right on the port side of the chassis, directly above the cable management comb

3. World Wide Name (WWN)

   Use the **licenseIdShow** command to display the chassis' WWN.

   If you cannot use the **licenseIdShow** command because the switch is inoperable, you can get the WWN from the same place as the serial number, except for the Brocade DCX. For the Brocade DCX, access the numbers on the WWN cards by removing the Brocade logo plate at the top of the nonport side of the chassis.

Document feedback

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. Forward your feedback to:

> documentation@brocade.com

Provide the title and version number of the document and as much detail as possible about your comment, including the topic heading and page number and your suggestions for improvement.

Chapter

Introduction to Troubleshooting

1

In this chapter

- Troubleshooting overview 1
- Most common problem areas. 2
- Questions for common symptoms 2
- Gathering information for your switch support provider 5
- Building a case for your switch support provider 7

Troubleshooting overview

This book is a companion guide to be used in conjunction with the *Fabric OS Administrator's Guide*. Although it provides a lot of common troubleshooting tips and techniques it does not teach troubleshooting methodology.

Troubleshooting should begin at the center of the SAN — the fabric. Because switches are located between the hosts and storage devices and have visibility into both sides of the storage network, starting with them can help narrow the search path. After eliminating the possibility of a fault within the fabric, see if the problem is on the storage side or the host side, and continue a more detailed diagnosis from there. Using this approach can quickly pinpoint and isolate problems.

For example, if a host cannot detect a storage device, run the **switchShow** command, to determine if the storage device is logically connected to the switch. If not, focus first on the switch directly connecting to storage. Use your vendor-supplied storage diagnostic tools to better understand why it is not visible to the switch. If the storage can be detected by the switch, and the host still cannot detect the storage device, then there is still a problem between the host and switch.

Network time protocol

One of the most frustrating parts of troubleshooting is trying to synchronize switch's message logs and portlogs with other switches in the fabric. If you do not have NTP set up on your switches, then trying to synchronize log files to track a problem is more difficult.

Most common problem areas

Table 1 identifies the most common problem areas that arise within SANs and identifies tools to use to resolve them.

TABLE 1 Common troubleshooting problems and tools

Problem area	Investigate	Tools
Fabric	• Missing devices • Marginal links (unstable connections) • Incorrect zoning configurations • Incorrect switch configurations	• Switch LEDs • Switch commands (for example, switchShow or nsAllShow) for diagnostics • Web or GUI-based monitoring and management software tools
Storage Devices	• Physical issues between switch and devices • Incorrect storage software configurations	• Device LEDs • Storage diagnostic tools • Switch commands (for example, switchShow or nsAllShow) for diagnostics
Hosts	• Physical issues between switch and devices • Downgrade HBA firmware • Incorrect device driver installation • Incorrect device driver configuration	• Device LEDs • Host operating system diagnostic tools • Device driver diagnostic tools • Switch commands (for example, switchShow or nsAllShow) for diagnostics Also, make sure you use the latest HBA firmware recommended by the switch supplier or on the HBA supplier's web site
Storage Management Applications	• Incorrect installation and configuration of the storage devices that the software references. For example, if using a volume-management application, check for: • Incorrect volume installation • Incorrect volume configuration	• Application-specific tools and resources

Questions for common symptoms

You first need to determine what the problem is. Some symptoms are obvious, such as the switch rebooted without any user intervention, or more obscure, such as your storage is having intermittent connectivity to a particular host. Whatever the symptom is, you will need to gather information from the devices that are directly involved in the symptom.

Table 2 lists common symptoms and possible areas to check. You may notice that an intermittent connectivity problem has lots of variables to look into, such as the type of connection between the two devices, how the connection is behaving, and the port type involved.

TABLE 2 Common symptoms

Symptom	Areas to check	Chapter or Document
Blade is faulty	Firmware or application download Hardware connections	Chapter 2, "General Issues" Chapter 5, "FirmwareDownload Errors" Chapter 7, "Virtual Fabrics"
Blade is stuck in the "LOADING" state	Firmware or application download	Chapter 5, "FirmwareDownload Errors"
Configupload or download fails	FTP or SCP server or USB availability	Chapter 4, "Configuration Issues"
E_Port failed to come online	Correct licensing Fabric parameters Zoning	Chapter 2, "General Issues" Chapter 3, "Connectivity Issues" Chapter 7, "Virtual Fabrics" Chapter 9, "Zone Issues"
EX_Port does not form	Links	Chapter 3, "Connectivity Issues" Chapter 7, "Virtual Fabrics"
Fabric merge fails	Fabric segmentation	Chapter 2, "General Issues" Chapter 3, "Connectivity Issues" Chapter 7, "Virtual Fabrics" Chapter 9, "Zone Issues"
Fabric segments	Licensing Zoning Virtual Fabrics Fabric parameters	Chapter 2, "General Issues" Chapter 3, "Connectivity Issues" Chapter 7, "Virtual Fabrics" Chapter 9, "Zone Issues"
FCIP tunnel bounces	FCIP tunnel, including the network between FCIP tunnel endpoints.	*Fibre Channel over IP Administrator's Guide*
FCIP tunnel does not come online	FCIP tunnel, including the network between FCIP tunnel endpoints.	*Fibre Channel over IP Administrator's Guide*
FCIP tunnel does not form	Licensing Fabric parameters	Chapter 2, "General Issues" *Fibre Channel over IP Administrator's Guide*
FCIP tunnel is sluggish	FCIP tunnel, including the network between FCIP tunnel endpoints.	*Fibre Channel over IP Administrator's Guide*
Feature is not working	Licensing	Chapter 2, "General Issues"
FCR is slowing down	FCR LSAN tags	Chapter 2, "General Issues"
FICON switch does not talk to hosts	FICON settings	*FICON Administrator's Guide*
FirmwareDownload fails	FTP or SCP server or USB availability Firmware version compatibility Unsupported features enabled Firmware versions on switch	Chapter 5, "FirmwareDownload Errors" Chapter 7, "Virtual Fabrics"
Host application times out	FCR LSAN tags Marginal links	Chapter 2, "General Issues" Chapter 3, "Connectivity Issues"
Intermittent connectivity	Links Trunking Buffer credits FCIP tunnel	Chapter 3, "Connectivity Issues" Chapter 8, "ISL Trunking Issues" *Fibre Channel over IP Administrator's Guide*
LEDs are flashing	Links	Chapter 3, "Connectivity Issues"

TABLE 2 Common symptoms (Continued)

Symptom	Areas to check	Chapter or Document
LEDs are steady	Links	Chapter 3, “Connectivity Issues”
License issues	Licensing	Chapter 2, “General Issues”
LSAN is slow or times-out	LSAN tagging	Chapter 2, “General Issues”
Marginal link	Links	Chapter 3, “Connectivity Issues”
No connectivity between host and storage	Cables SCSI timeout errors SCSI retry errors Zoning	Chapter 3, “Connectivity Issues” Chapter 8, “ISL Trunking Issues” Chapter 9, “Zone Issues” *Fibre Channel over IP Administrator’s Guide*
No connectivity between switches	Licensing Fabric parameters Segmentation Virtual Fabrics Zoning, if applicable	Chapter 2, “General Issues” Chapter 3, “Connectivity Issues” Chapter 7, “Virtual Fabrics” Chapter 9, “Zone Issues”
No light on LEDs	Links	Chapter 3, “Connectivity Issues”
Performance problems	Links FCR LSAN tags FCIP tunnels	Chapter 3, “Connectivity Issues” Chapter 2, “General Issues” *Fibre Channel over IP Administrator’s Guide*
Port cannot be moved	Virtual Fabrics	Chapter 7, “Virtual Fabrics”
SCSI retry errors	Buffer credits FCIP tunnel bandwidth	*Fibre Channel over IP Administrator’s Guide*
SCSI timeout errors	Links HBA Buffer credits FCIP tunnel bandwidth	Chapter 3, “Connectivity Issues” Chapter 8, “ISL Trunking Issues” *Fibre Channel over IP Administrator’s Guide*
Switch constantly reboots	Rolling reboot detection FIPS	Chapter 6, “Security Issues”
Switch is unable to join fabric	Security policies Zoning Fabric parameters	Chapter 3, “Connectivity Issues” Chapter 7, “Virtual Fabrics” Chapter 9, “Zone Issues”
Switch reboots during configup/download	Configuration file discrepancy	Chapter 4, “Configuration Issues”
Syslog messages	Hardware SNMP management station	Chapter 2, “General Issues” Chapter 6, “Security Issues”
Trunk bounces	Cables are on same port group SFPs Trunked ports	Chapter 8, “ISL Trunking Issues”
Trunk failed to form	Licensing Cables are on same port group SFPs Trunked ports Zoning E_Port QOS configuration mismatch	Chapter 2, “General Issues” Chapter 3, “Connectivity Issues” Chapter 8, “ISL Trunking Issues” Chapter 9, “Zone Issues”
User forgot password	Password recovery	Chapter 6, “Security Issues”

TABLE 2 Common symptoms (Continued)

Symptom	Areas to check	Chapter or Document
User is unable to change switch settings	RBAC settings Account settings	Chapter 6, “Security Issues”
Virtual Fabric does not form	FIDs	Chapter 7, “Virtual Fabrics”
Zone configuration mismatch	Effective configuration	Chapter 9, “Zone Issues”
Zone content mismatch	Effective configuration	Chapter 9, “Zone Issues”
Zone type mismatch	Effective configuration	Chapter 9, “Zone Issues”

Gathering information for your switch support provider

If you are troubleshooting a production system, you must gather data quickly. As soon as a problem is observed, perform the following tasks. For more information about these commands and their operands, refer to the *Fabric OS Command Reference*.

1. Enter the **supportSave** command to save RASLOG, TRACE, supportShow, core file, FFDC data, and other support information from the switch, chassis, blades, and logical switches.
2. Gather console output and logs.

NOTE
To execute the **supportSave** command on the chassis, you will need to log in to the switch on an account with the admin role that has the chassis role permission.

Setting up your switch for FTP

1. Connect to the switch and log in using an account assigned to the admin role.
2. Type the **supportFtp** command and respond to the prompts.

Example of supportFTP command

```
switch:admin> supportftp -s
Host IP Addr[1080::8:800:200C:417A]:
User Name[njoe]: userFoo
Password[********]: <hidden>
Remote Dir[support]:
supportftp: parameters changed
```

Capturing a supportSave

The **supportSave** command uses the default switch name to replace the chassis name regardless if the chassis name has been changed to a non-factory setting. If Virtual Fabrics is enabled, the **supportSave** command uses the default switch name for each logical fabric.

1. Connect to the switch and log in using an account assigned to the admin role.

2. Type the appropriate **supportSave** command based on your needs:
   - If you are saving to an FTP or SCP server, use the following syntax:

     supportSave

     When invoked without operands, this command goes into interactive mode. The following operands are optional:

     -n Does not prompt for confirmation. This operand is optional; if omitted, you are prompted for confirmation.

     -c Uses the FTP parameters saved by the supportFtp command. This operand is optional; if omitted, specify the FTP parameters through command line options or interactively. To display the current FTP parameters, run supportFtp (on a dual-CP system, run supportFtp on the active CP).
   - On platforms that support USB devices, you can use your Brocade USB device to save the support files. To use your USB device, use the following syntax:

     supportsave [**-U -d** *remote_dir*]

     -d Specifies the remote directory to which the file is to be transferred. When saving to a USB device, the predefined `/support` directory must be used.
   - While running the **supportSave** command you may encounter a timeout. A timeout occurs if the system is in busy state due to CPU or I/O bound from a lot of port traffic or file access. If this occurs an SS-1004 is generated to both the console and the RASlog to report the error. You need to rerun the **supportSave** command with the **-t** option.

     Example of SS-1004 message:

     SS-1004: “One or more modules timed out during supportsave. Please retry supportsave with -t option to collect all logs.”

Changing the supportSave timeout value

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **supportSave** command with the **-t** operand, and specify a value between 1 through 5.

The following example increases the **supportSave** modules timeout to 2 times of original timeout setting.

```
switch:admin> supportSave –t 2
```

Capturing output from a console

Some information, such as boot information is only outputted directly to the console. In order to capture this information you have to connect directly to the switch through its management interface, either a serial cable or an RJ-45 connection.

1. Connect directly to the switch using hyperterminal.
2. Log in to the switch using an account assigned to the admin role.

3. Set the utility to capture output from the screen.

   Some utilities require this step to be performed prior to opening up a session. Check with your utility vendor for instructions.

4. Type the command or start the process to capture the required data on the console.

Capturing command output

1. Connect to the switch through a Telnet or SSH utility.
2. Log in using an account assigned to the admin role.
3. Set the Telnet or SSH utility to capture output from the screen.

   Some Telnet or SSH utilities require this step to be performed prior to opening up a session. Check with your Telnet or SSH utility vendor for instructions.

4. Type the command or start the process to capture the required data on the console.

Building a case for your switch support provider

The following form should be filled out in its entirety and presented to your switch support provider when you are ready to contact them. Having this information immediately available will expedite the information gathering process that is necessary to begin determining the problem and finding a solution.

Basic information

1. What is the switch's current Fabric OS level?

   To determine the switch's Fabric OS level, type the **firmwareShow** command and write the information.

2. What is the switch model?

   To determine the switch model, type the switchshow command and write down the value in the *switchType* field. Cross-reference this value with the chart located in Appendix A, "Switch Type and Blade ID".

3. Is the switch operational? Yes or No
4. Impact assessment and urgency:
   - Is the switch down? Yes or no.
   - Is it a standalone switch? Yes or no.
   - Are there VE, VEX or EX ports connected to the chassis? Yes or no.

     Use the **switchShow** command to determine the answer.

   - How large is the fabric?

     Use the **nsAllShow** command to determine the answer.

   - Do you have encryption blades or switches installed in the fabric? Yes or no.
   - Do you have Virtual Fabrics enabled in the fabric? Yes or no.

     Use the **switchShow** command to determine the answer.

- Do you have IPsec installed on the switch's Ethernet interface? Yes or no.

  Use the **ipsecConfig --show** command to determine the answer.
- Do you have Inband Management installed on the switches GigE ports? Yes or no.

  User the **portShow iproute geX** command to determine the answer.
- Are you using NPIV? Yes or no.

  Use the **switchShow** command to determine the answer.
- Are there security policies turned on in the fabric? If so, what are they? (Gather the output from the following commands:
  - □ secPolicyShow
  - □ fddCfg --showall
  - □ ipFilter --show
  - □ authUtil --show
  - □ secAuthSecret --show
  - □ fipsCfg --showall
- Is the fabric redundant? If yes, what is the MPIO software? (List vendor and version.)

5. If you have a redundant fabric, did a failover occur?
6. Was POST enabled on the switch?
7. Which CP blade was active? (Only applicable to the Brocade 48000 director, and the Brocade DCX and DCX-4S enterprise-class platforms.)

Detailed problem information

Obtain as much of the following informational items as possible prior to contacting the SAN technical support vendor.

Document the sequence of events by answering the following questions:

- When did problem occur?
- Is this a new installation?
- How long has the problem been occurring?
- Are specific devices affected?
  - □ If so, what are their World Wide Node Names?
- What happened prior to the problem?
- Is the problem reproducible?
  - □ If so, what are the steps to produce the problem?
- What configuration was in place when the problem occurred?
- A description of the problem with the switch or the fault with the fabric.
- The last actions or changes made to the system environment:
  - □ settings
  - □ **supportShow** output

- Host information:
    - □ OS version and patch level
    - □ HBA type
    - □ HBA firmware version
    - □ HBA driver version
    - □ Configuration settings
- Storage information:
    - □ Disk/tape type
    - □ Disk/tape firmware level
    - □ Controller type
    - □ Controller firmware level
    - □ Configuration settings
    - □ Storage software (such as EMC Control Center, Veritas SPC, etc.)

8. If this is a Brocade 48000, Brocade DCX or DCX-4S enterprise-class platform, are the CPs in-sync? Yes or no.

   Use the **haShow** command to determine the answer.

9. List out when and what were the last actions or changes made to the switch, the fabric, and the SAN or metaSAN?

TABLE 3 Environmental changes

Type of Change	Date when change occurred

Gathering additional information

Below are features that require you to gather additional information. The additional information is necessary in order for your switch support provider to effectively and efficiently troubleshoot your issue. Refer to the chapter or document specified for the commands whose data you need to capture:

- Configurations, see Chapter 3, “Connectivity Issues”.
- Firmwaredownload, see Chapter 5, “FirmwareDownload Errors”.
- Trunking, see Chapter 8, “ISL Trunking Issues”.
- Zoning, see Chapter 9, “Zone Issues”.
- FCIP tunnels, see the *Fibre Channel over IP Administrator’s Guide*.
- FICON, see the *FICON Administrator’s Guide*.

Chapter

General Issues 2

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- Time issues 11
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- Switch boot issues. 13
- FC-FC routing connectivity. 15

Licensing issues

Some features need licenses in order to work properly. To view a list of features and their associated licenses, refer to the *Fabric OS Administrator's Guide*. Licenses are created using a switch's License Identifier so you cannot apply one license to different switches. Before calling your switch support provider, verify that you have the correct licenses installed by using the **licenseShow** command.

Symptom *A feature is not working.*

Probable cause and recommended action

Refer to the *Fabric OS Administrator's Guide* to determine if the appropriate licenses are installed on the local switch and any connecting switches.

Determining installed licenses

1. Connect to the switch and log in using an account assigned to the admin role.
2. Type the **licenseShow** command.

   A list of the currently installed licenses on the switch will be displayed.

Time issues

Symptom *Time is not in-sync.*

Probable cause and recommended action

NTP is not set up on the switches in your fabric. Set up NTP on your switches in all fabrics in your SAN and metaSAN.

For more information on setting up NTP, refer to the *Fabric OS Administrator's Guide*.

Switch message logs

Switch message logs (RAS logs) contain information on events that happen on the switch or in the fabric. This is an effective tool in understanding what is going on in your fabric or on your switch. Weekly review of the RAS logs is necessary to prevent minor problems from becoming larger issues, or in catching problems at an early stage.

Below are some common problems that can occur with or in your system message log.

Symptom *Inaccurate information in the system message log*

Probable cause and recommended action

In rare instances, events gathered by the *track change* feature can report inaccurate information to the system message log.

For example, a user enters a correct user name and password, but the login was rejected because the maximum number of users had been reached. However, when looking at the system message log, the login was reported as successful.

If the maximum number of switch users has been reached, the switch will still perform correctly in that it will reject the login of additional users, even if they enter the correct user name and password information.

However, in this limited example, the Track Change feature will report this event inaccurately to the system message log; it will appear that the login was successful. This scenario only occurs when the maximum number of users has been reached; otherwise, the login information displayed in the system message log should reflect reality.

See the *Fabric OS Administrator's Guide* for information regarding enabling and disabling track changes (TC).

Symptom *MQ errors are appearing in the switch log.*

Probable cause and recommended action

An MQ error is a message queue error. Identify an MQ error message by looking for the two letters *MQ* followed by a number in the error message:

```
2004/08/24-10:04:42, [MQ-1004], 218,, ERROR, ras007, mqRead, queue =
raslog-test- string0123456-raslog, queue I
D = 1, type = 2
```

MQ errors can result in devices dropping from the switch's Name Server or can prevent a switch from joining the fabric. MQ errors are rare and difficult to troubleshoot; resolve them by working with the switch supplier. When encountering an MQ error, issue the **supportSave** command to capture debug information about the switch; then, forward the **supportSave** data to the switch supplier for further investigation.

Symptom *I2C bus errors are appearing in the switch log.*

Probable cause and recommended action

I^{2}C bus errors generally indicate defective hardware or poorly seated devices or blades; the specific item is listed in the error message. See the *Fabric OS Message Reference* for information specific to the error that was received. Some Chip-Port (CPT) and Environmental Monitor (EM) messages contain I^{2}C-related information.

If the I^{2}C message does not indicate the specific hardware that may be failing, begin debugging the hardware, as this is the most likely cause. The next sections provide procedures for debugging the hardware.

Symptom *Core file or FFDC warning messages appear on the serial console or in the system log.*

Probable cause and recommended action

Issue the supportSave command. The messages can be dismissed by issuing the supportSave -R command after all data is confirmed to be collected properly.

Error example:

```
*** CORE FILES WARNING (10/22/08 - 05:00:01 ) ***
3416 KBytes in 1 file(s)
use "supportsave" command to upload
```

Switch boot issues

Symptom *The enterprise-class platform model rebooted again after an initial bootup.*

Probable cause and recommended action

This issue can occur during an enterprise-class platform boot up with two CPs. If any failure occurs on active CP, before the standby CP is fully functional and has obtained HA sync, the Standby CP may not be able to take on the active role to perform failover successfully.

In this case, both CPs will reboot to recover from the failure.

Rolling Reboot Detection

A rolling reboot occurs when a switch or enterprise-class platform has continuously experienced unexpected reboots. This behavior is continuous until the rolling reboot is detected by the system. Once the Rolling Reboot Detection (RRD) occurs, the switch is put into a stable state so that a minimal **supportSave** can be collected and sent to your service support provider for analysis. Not every reboot activates the Rolling Reboot Detection feature.

ATTENTION
If a rolling reboot is caused by a panic inside Linux kernel, then the RRD feature will not be activated.

Reboot classification

There are two types of reboots that occur on a switch and enterprise-class platform, expected and unexpected. Expected reboots occur when the reboots are initialized by commands, these types of reboots are ignored by the RRD feature. They include the following:

- reboot
- haFailover
- fastBoot
- firmwareDownload

The RRD feature is activated and halts rebooting when an unexpected reboot reason is shown continuously in the reboot history within a certain period of time. The period of time is switch dependent. The following are considered unexpected reboots:

- Reset

  A reset reboot may be caused by one of the following:

  - Power-cycle of the switch or CP.
  - Linux reboot command.
  - Hardware watchdog timeout.
  - Heartbeat loss related reboot.
- Software Fault:Kernel Panic
  - If the system upon detecting an internal fatal error from which it cannot safely recover, generally it will output an error message to the console, dump a stack trace for debugging and then performs an automatic reboot.
  - After a kernel panic, the system may not have enough time to write the reboot reason causing the reboot reason to be empty. This is treated as an Unknown/reset case.
- Software fault
  - Software Fault:Software Watchdog
  - Software Fault:ASSERT.
- Software recovery failure

  This is an HA bootup related issue and happens when switch is unable to recover to a stable state. HASM log contains more detail and specific information on this type of failure, such as one of the following:

  - Failover recovery failed: This occurs when failover recovery failed and has to reboot the CP.
  - Failover when standby CP unready: Occurs when the active CP has to failover, but the standby CP is not ready to takeover mastership.
  - Failover when LS trans incomplete: Takes place when a logical switch transaction is incomplete.
- Software bootup failure

  This is an HA bootup related issue and happens when a switch is unable to load the firmware to a usable state. HASM log contains more detail and specific information on this type of failure, such as one of the following:

  - System bring up timed out: The CP failed to come up within the time allotted.
  - LS configuration timed out and failed: Logical switch configuration failed and timed out.

After RRD is activated, admin level permission is required to login enter the **supportShow** or **supportSave** command to collect a limited amount of data to resolve the issue.

ATTENTION

The limited **supportSave** used with the RRD feature does not support USB.

Restrictions

The following restrictions are applicable on the RRD feature:

- The RRD works only on CFOS based systems and is not available on AP blades.
- If FIPS mode is enabled, then the RRD feature works in *record-only* mode.
- Rolling Reboot Detection relies on the bootprom and Linux kernel working properly.
- Rolling Reboot Detection feature would only work during system boot-up time period and would not work for an unexpected reboot after a period of time of 30 minutes after boot up. If your system reboots after being up and working properly in 30 or more minute intervals, the RRD feature will not be activated.

Collecting a limited supportSave on the Rolling Reboot Detection

1. Log into the switch on the admin account.

   A user account with admin privileges will not be able to collect a limited **supportSave**.
2. After you see the message in the example below, press **Enter**.
3. Enter the **supportSave** command to go into interactive mode.
4. Respond to the prompts.
5. Once the **supportSave** is completed, contact you service support provider to provide them with the data.

Below is an example of the screen on a Brocade DCX.

```
Fabos Version 6.4.0_main_bld23
sw0 login: admin
Password: <hidden text>
**************************************************************
* *
* Fabric OS has detected frequent switch reboot condition. *
* Following actions can be taken to recover the switch: *
* - take off or replace the bad blades. *
* - use supportsave to collect supportsave data. *
*
* *
**************************************************************

Please change passwords for switch default accounts now.
Use Control-C to exit or press 'Enter' key to proceed.
```

FC-FC routing connectivity

This section describes tools you can use to troubleshoot Fibre Channel routing connectivity and performance.

Generate and route an ECHO

The FC-FC Routing Service enables you to route the ECHO generated when an **fcPing** command is issued on a switch, providing **fcPing** capability between two devices in different fabrics across the FC router.

The **fcPing** command sends a Fibre Channel ELS ECHO request to a pair of ports. It performs a zone check between the source and destination. In addition, two Fibre Channel Extended Link Service (ELS) requests will be generated. The first ELS request is from the domain controller to the source port identifier. The second ELS request is from the domain controller to the destination port identifiers. The ELS ECHO request will elicit an ELS ECHO response from a port identifier in the fabric and validates link connectivity.

Use the **fcPing** command to validate link connectivity to a single device or between a pair of devices.

ATTENTION

There are some devices that do not support the ELS ECHO request. In these cases, the device will either not respond to the request or send an ELS reject. When a device does not respond to the ELS request, further debugging is required; however, do not assume that the device is not connected.

On the edge Fabric OS switch, make sure that the source and destination devices are properly configured in the LSAN zone before entering the **fcPing** command. This command performs the following functions:

- Checks the zoning configuration for the two ports specified.
- Generates an ELS (extended link service) ECHO request to the source port specified and validates the response.
- Generates an ELS ECHO request to the destination port specified and validates the response.

```
switch:admin> fcping 0x060f00 0x05f001
Source:         0x60f00
Destination:    0x5f001
Zone Check:     Zoned

Pinging 0x60f00 with 12 bytes of data:
received reply from 0x60f00: 12 bytes time:501 usec
received reply from 0x60f00: 12 bytes time:437 usec
received reply from 0x60f00: 12 bytes time:506 usec
received reply from 0x60f00: 12 bytes time:430 usec
received reply from 0x60f00: 12 bytes time:462 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 430/467/506 usec

Pinging 0x5f001 with 12 bytes of data:
received reply from 0x5f001: 12 bytes time:2803 usec
received reply from 0x5f001: 12 bytes time:2701 usec
received reply from 0x5f001: 12 bytes time:3193 usec
received reply from 0x5f001: 12 bytes time:2738 usec
received reply from 0x5f001: 12 bytes time:2746 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 2701/2836/3193 usec
```

Regardless of the device’s zoning configuration, the **fcPing** command sends the ELS frame to the destination port. A destination device can take any one of the following actions:

- Send an ELS Accept to the ELS request.
- Send an ELS Reject to the ELS request.
- Ignore the ELS request.

For details about the **fcPing** command, see the *Fabric OS Command Reference*.

Example of one device that accepts the request and another device that rejects the request:

```
switch:admin> fcping 10:00:00:00:c9:29:0e:c4 21:00:00:20:37:25:ad:05
Source: 10:00:00:00:c9:29:0e:c4
Destination: 21:00:00:20:37:25:ad:05
Zone Check: Not Zoned
Pinging 10:00:00:00:c9:29:0e:c4 [0x20800] with 12 bytes of data:
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1162 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1013 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1442 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1052 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1012 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 1012/1136/1442 usec
Pinging 21:00:00:20:37:25:ad:05 [0x211e8] with 12 bytes of data:
Request rejected
Request rejected
Request rejected
Request rejected
Request rejected
5 frames sent, 0 frames received, 5 frames rejected, 0 frames timeout
Round-trip min/avg/max = 0/0/0 usec
```

Example To use fcPing with a single destination (in this example, the destination is a device node WWN):

```
switch:admin> fcping 20:00:00:00:c9:3f:7c:b8
Destination: 20:00:00:00:c9:3f:7c:b8
Pinging 20:00:00:00:c9:3f:7c:b8 [0x370501] with 12 bytes of data:
received reply from 20:00:00:00:c9:3f:7c:b8: 12 bytes time:825 usec
received reply from 20:00:00:00:c9:3f:7c:b8: 12 bytes time:713 usec
received reply from 20:00:00:00:c9:3f:7c:b8: 12 bytes time:714 usec
received reply from 20:00:00:00:c9:3f:7c:b8: 12 bytes time:741 usec
received reply from 20:00:00:00:c9:3f:7c:b8: 12 bytes time:880 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 713/774/880 usec
```

Superping

Superping refers to the **fcPing --allpaths** command which is a diagnostic tool used to test all least cost ISLs between a source and destination switch. When you run the command you are provided with a list of all available least cost paths from a source domain to a destination device. Superping isolates links with potential failures so that you can investigate these ISLs to determine the exact links.

ATTENTION
There are some devices that do not support the ELS ECHO request. In these cases, the device will either not respond to the request or send an ELS reject. When a device does not respond to the ELS request, further debugging is required; however, do not assume that the device is not connected.

It works by sending ECHO frames to a destination device and outputs the status of each ISL it traverses whether or not the response from the destination device is received. Each ECHO frame may choose any path from multiple available paths in the fabric to reach the destination device. This utility allows you to do the following:

- Run a sanity test that exercises all the ISLs and internal links in different paths that route to the destination device.
- Determines the least cost path to aid in designing fabric redundancy.

- Determines the specific ISLs and internal links with failures.
- Exercises all ISL links in the base fabric for a logical fabric configuration.

The number of actual paths covered when using the superping tool depends on two other parameters that you can optionally specify. When you issue the **fcPing --allpaths** command without any other options, superping covers all ISLs in the routes between source to destination.

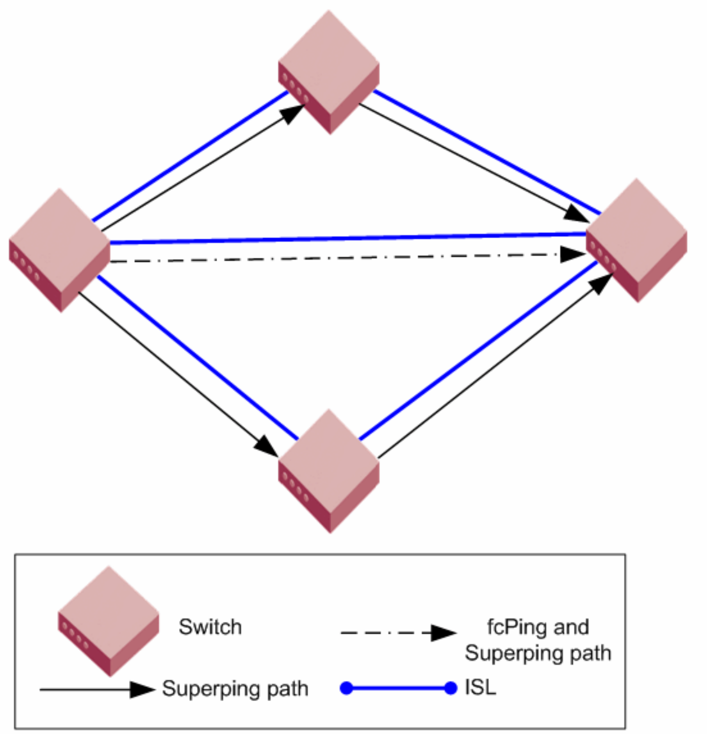

FIGURE 1 **Superping and fcPing paths**

In the example below, superping is invoked using the **fcPing –allpaths** command to destination domain 165. The example below displays each hop as (Domain1/Index1-> Domain2/Index2) format. To reach destination domain 165 from source domain 3 there are 2 unique end-to-end paths. In the first path, the frame traverses from egress port index 205 on source domain 3 to ingress port index 25 on domain 207. On domain 207 the frame traverses from egress port index 42 to ingress port index 3 in domain 101. On domain 101 the frame goes from egress port index 16 to ingress port index 99 on domain 165.

```
ECP80:FID128:admin> fcping -allpaths 165
Pinging(size:12 bytes) destination domain 165 through all paths

PATH SWITCH1-->           SWITCH2-->           SWITCH3           SWITCH4             STATUS
-----------------------------------------------------------------------------------
1.   (3/EMB, 3/205)[128] (207/25,207/42)[128] (101/3,101/16)[128] (165/99,165/0)[128]  SUCCESS
2.   (3/EMB, 3/204)[128] (207/27,207/42)[128] (101/3,101/16)[128] (165/99,165/0)[128]  SUCCESS
```

Superping can isolate links with failures so that you can further investigate these ISLs to determine the exact links giving the errors.

NOTE
Superping provides an indication if all ISLs are covered. If all the ISLs are not covered, you can increase the coverage count and maximum retries to transmit, so that complete coverage of all ISLs is achieved.

Consider the example below in which a few errors are recorded on ISLs `3/205-->2/25`, `3/204-->2/27`, `2/42-->101/3`, and `2/1-->101/8`. But a maximum of 100 percentage errors are recorded on internal port 0/284 on domain 2, which is the potential faulty link.

```
ISL COVERAGE
-------------

SNO             ISL                     STATUS
-----------------------------------------------------------------------------
 1      3/123[128]--> 165/96[128]   SUCCESS(5/5)
 2      3/205[128]--> 2/25[128]     FAILURE(7/50)
 3      3/204[128--> 2/27[128]      FAILURE(11/50)
 4      165/99[128]--> 101/16[128]  SUCCESS(5/5)
 6      2/42[128]--> 101/3[128]     FAILURE(10/67)
 7      2/1[128]--> 101/8[128]      FAILURE(8/33)


INTERNAL PORT COVERAGE
-----------------------

SNO     DOMAIN  INTRNL_PORT     STATUS
-----------------------------------------------------------------------------
 1        2[128]  0/272     SUCCESS(40/40)
 2        2[128]  0/276     SUCCESS(44/44)
 3        2[128]  0/280     SUCCESS(30/30)
 4        2[128]  0/284     FAILURE(20/20) <== 100% failure
```

When an echo frame is dropped, all the ISLs in the path are marked as failed. It is not possible to determine the exact ISL link that dropped the frame. Due to this, all the ISLs in the path will record some failures. But the ISL with the actual error, has the maximum percentage of failures, as this ISL when selected in any possible path causes the echo frame to be dropped and accumulates a higher failure percentage.

Restrictions

- Fabric reconfiguration cannot occur while using the superping tool. It is assumed that the fabric is stable before the **fcPing –allpaths** command is executed.
- The control path for interswitch communication should be available, even if the data path for device to device communication may have resource starvation.
- When executed in a fabric with trunk ports, only the trunk master index is output to the user i.e. individual coverage statistics of each trunk-member is not available.
- All switches must have Fabric OS v6.3.0 or later.
- Superping requires that the FC Echo ELS frame is supported by end-devices.
- In TI Zones, when failover is disabled and superping is executed to destination device included in the TI Zone then superping displays failures on all ISLs that are not part of the TI Zone. Also, when superping is executed to a device that is not present in a TI Zone, failures are shown on all ISLs that are part of any TI Zone.
- This feature is not supported in interopMode 2 or 3.

- In frame redirection configurations, where there is a physical host, physical target, virtual initiator and virtual target; superping only identifies the path from the physical host to the physical target regardless if the data path consists of the path from physical target to virtual target through the virtual initiator.

Route and statistical information

The **pathInfo** command displays routing and statistical information from a source port index on the local switch to a destination port index on another switch. This routing information describes the full path that a data stream travels between these ports, including all intermediate switches.

ATTENTION
Using the **pathInfo** command when exchange-based routing is turned on can provide different paths with each attempt.

The routing and statistics information are provided by every switch along the path, based on the current routing-table information and statistics calculated continuously in real time. Each switch represents one hop.

Use the **pathInfo** command to display routing information from a source port on the local switch to a destination port on another switch. The command output describes the exact data path between these ports, including all intermediate switches.

When using this command in Fabric OS v6.3.0 across fabrics connected through an FC router, the command represents backbone information as a single hop. The command captures details about the FC router to which ingress and egress EX_Ports are connected, but it hides the details about the path the frame traverses from the ingress EX_Ports to the egress EX_Ports in the backbone.

To use pathInfo across remote fabrics, you must specify both the fabric ID (FID) and the domain ID of the remote switch. You cannot use the command to obtain source port information across remote FCR fabrics. When obtaining path info across remote fabrics, the destination switch must be identified by its domain ID. Identifying the switch by name or WWN is not accepted.

Use the **pathInfo** command to display basic path information to a specific domain in command line mode:

```
switch:admin> pathinfo 91
Target port is Embedded
Hop In Port Domain ID (Name) Out Port BW Cost
---------------------------------------------------------
0      E      9      (web226)   2      1G 1000
1      3      10     (web229)   8      1G 1000
2      8      8      (web228)   9      1G 1000
3      6      91     (web225)   E      -  -
```

To display basic and extended statistics in interactive mode:

```
switch:admin> pathinfo
Max hops: (1..127) [25]
Fabric Id: (1..128) [-1]
Domain|Wwn|Name: [] 8
Source port: (0..15) [-1]
Destination port: (0..255) [-1]
Basic stats (yes, y, no, n): [no] y
Extended stats (yes, y, no, n): [no] y
Trace reverse path (yes, y, no, n): [no]
Source route (yes, y, no, n): [no]
```

```
Timeout: (1..30) [5]
Target port is Embedded
Hop In Port Domain ID (Name) Out Port BW Cost
---------------------------------------------------------
0      E      9      (web226)   2      1G 1000

Port          E                    2
              Tx         Rx            Tx                Rx
              -----------------------------------------------
B/s (1s)      -          -             0                 0
B/s (64s)     -          -             1                 1
Txcrdz (1s)   -          -             0                 -
Txcrdz (64s)  -          -             0                 -
F/s (1s)      -          -             0                 0
F/s (64s)     -          -             2743              0
Words         -          -             2752748           2822763
Frames        -          -             219849            50881
Errors        -          -             -                 0
Hop In Port Domain ID (Name) Out Port BW Cost
---------------------------------------------------------
1 3 10 (web229) 12 1G 1000


Port                 3                 12
              Tx         Rx            Tx                Rx
              -----------------------------------------------
B/s (1s)      36         76            0                 0
B/s (64s)     5          5             5                 5
Txcrdz (1s)   0          -             0                 -
Txcrdz (64s)  0          -             0                 -
F/s (1s)      1          1             0                 0
F/s (64s)     0          0             0                 0
Words         240434036  2294316       2119951           2121767
Frames        20025929   54999         162338            56710
Errors        -          4             -                 0
Hop In Port Domain ID (Name) Out Port BW Cost
---------------------------------------------------------
2      14     8      (web228)      E   -   -
(output truncated)
```

For details about the **pathInfo** command, see the *Fabric OS Command Reference*.

Performance issues

Symptom *General slow-down in FCR performance and scalability.*

Probable cause and recommended action

As LSAN zone databases get bigger, it takes more switch resources to process them. Use the *enforce tag* feature to prevent a backbone switch from accepting unwanted LSAN zone databases into its local database.

Symptom *Host application times out.*

Probable cause and recommended action

The FCR tends to take a long time, more than 5 seconds, to present and setup paths for the proxy devices. Certain hosts are able to do discovery much faster as a result they end up timing out. Use the *speed tag* feature to always present target proxy to the host and import them faster. This helps sensitive hosts to do a quick discovery without timing out or cause an application failure.

Chapter

Connectivity Issues 3

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Port initialization and FCP auto discovery process

The steps in the port initialization process represent a protocol used to discover the type of connected device and establish the port type and port speed. The possible port types are as follows:

- U_Port—Universal FC port. The base Fibre Channel port type and all unidentified, or uninitiated ports are listed as U_Ports.
- L_/FL_Port—Fabric Loop port. Connects public loop devices.
- G_Port—Generic port. Acts as a transition port for non-loop fabric-capable devices.
- E_Port—Expansion port. Assigned to ISL links.
- F_Port—Fabric port. Assigned to fabric-capable devices.
- EX_Port—A type of E_Port. It connects a Fibre Channel router to an edge fabric. From the point of view of a switch in an edge fabric, an EX_Port appears as a normal E_Port. It follows applicable Fibre Channel standards as other E_Ports. However, the router terminates EX_Ports rather than allowing different fabrics to merge as would happen on a switch with regular E_Ports.
- M_Port—A mirror port. A mirror port lets you configure a switch port to connect to a port to mirror a specific source port and destination port traffic passing though any switch port. This is only supported between F_Ports.
- VE_Port—A virtual E_Port. A Gigabit Ethernet switch port configured for an FCIP tunnel is called a VE port (virtual E-port). However, with a VEX_Port at the other end it does not propagate fabric services or routing topology information from one edge fabric to another.

- VEX_Port—A virtual EX_Port. It connects a Fibre Channel router to an edge fabric. From the point of view of a switch in an edge fabric, a VEX_Port appears as a normal VE_Port. It follows the same Fibre Channel protocol as other VE_Ports. However, the router terminates VEX_Ports rather than allowing different fabrics to merge as would happen on a switch with regular VE_Ports.

Figure 2 shows the process behind port initialization. Understanding this process can help you determine where a problem resides. For example, if your switch cannot form an E_Port, you understand that the process never got to that point or does not recognize the switch as an E_Port. Possible solutions would be to look at licensing and port configuration. Verify that the correct licensing is installed or that the port is not configured as a loop port, a G_Port, or the port speed is not set.

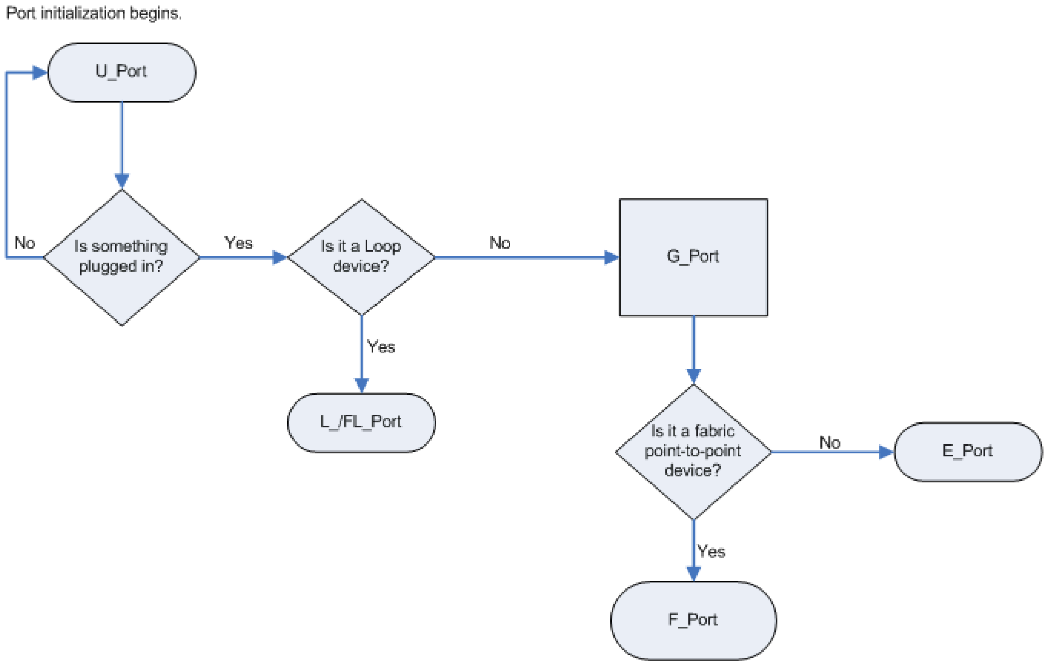

FIGURE 2 **Simple port initialization process**

The FCP auto discovery process enables private storage devices that accept the process login (PRLI) to communicate in a fabric.

If device probing is enabled, the embedded port logs in (PLOGI) and attempts a PRLI into the device to retrieve information to enter into the name server. This enables private devices that do not perform a fabric login (FLOGI), but accept PRLI, to be entered in the name server and receive full fabric citizenship.

A fabric-capable device will register information with the Name Server during a FLOGI. These devices will typically register information with the name server before querying for a device list. The embedded port will still PLOGI and attempt PRLI with these devices.

To display the contents of a switch’s Name Server, use the nsShow or nsAllShow command. For more information about these name server commands, refer to *Fabric OS Command Reference*.

Link issues

Symptom *Port LEDs are flashing.*

Probable cause and recommended action

Depending on the rate of the flash and the color of the port LED this could mean several things. To determine what is happening on either your port status LED or power status LED, refer to that switch's model hardware reference manual. There is a table that describes the LEDs purpose and explains the current behavior as well as provides suggested resolutions.

Symptom *Port LEDs are steady.*

Probable cause and recommended action

The color of the port LED is important in this instance. To determine what is happening on either your port status LED or power status LED, refer to that switch's model hardware reference manual. There is a table that describes the LEDs purpose and explains the current behavior as well as provides suggested resolutions.

Symptom *No light from the port LEDs.*

Probable cause and recommended action

If there is no light coming from the port LED, then no signal is being detected. Check your cable and SFP to determine the physical fault.

Connection problems

Determine if the problem is the target or the host, then continue to divide the suspected problem-path in half until you can pinpoint the problem. One of the most common solutions is zoning. Verify that the host and target are in the same zone. For more information on zoning, refer to Chapter 9, "Zone Issues".

Checking the physical connection

- Check the cables running to and from the host and storage to the switch.

  This path includes the patch panel. Verify that none of the cables are damaged, including indentations or bent cable.

- Check the SFP on the HBAs and switches.

  Verify that they are known to be in good working condition. You can do this by swapping the current SFP with a known good working SFP.

- Clean the optics.

  There are many kits on the market for cleaning fiber optics. You want to find a product that does not leave residue either from a lint-free wipe or from the solvent.

Checking the logical connection

1. Enter the **switchShow** command.
2. Review the output from the command and determine if the device successfully logged into the switch.
    - A device that *is* logically connected to the switch is registered as an F_, L_, E_, EX_, VE_, VEX_, or N_Port.
    - A device that is *not* logically connected to the switch will be registered as a G_ or U_Port, if NPIV is not on the switch.
3. Enter the **slotShow -m** command to verify that all blades are ENABLED and not faulty, disabled or in some other non-available state.
4. Perform the appropriate actions based on how your missing device is connected:
    - If the missing device *is* logically connected, proceed to the next troubleshooting procedure ("Checking the Name Server (NS)" on page 26).
    - If the missing device is *not* logically connected, check the device and everything on that side of the data path. Also see "Link failures" on page 28 for additional information.

      Checking the path includes verifying the following for the Host:

        - The Host OS is configured correctly.
        - The third-party vendor multi-pathing input/output (MPIO) software if it is being used, is configured correctly.
        - The HBA and storage device and the driver and firmware are compatible with switch based on the compatibility matrix.
        - The driver settings and binaries are up-to-date.
        - The device Basic Input Output System (BIOS) settings are correct.
        - The HBA configuration is correct according to manufacturer's specifications.
        - The SFPs in the HBA are compatible with the Host's HBA.
        - The SFP on the switch is compatible with the switch.
        - The switch settings related to the Host are configured correctly.

      Checking the path includes the following for the Target:

        - The driver settings and binaries are up-to-date.
        - The device Basic Input Output System (BIOS) settings are correct.
        - The HBA configuration is correct according to the manufacturer's specifications.
        - The SFPs in the HBA are compatible with the Target HBA.
        - The switch settings related to the Target are configured correctly.

      See "Checking for a loop initialization failure" on page 29 as the next potential trouble spot.

Checking the Name Server (NS)

1. Enter the **nsShow** command on the switch to determine if the device is attached:

```
switch:admin> nsshow
The Local Name Server has 9 entries {
 Type Pid     COS    PortName             NodeName            TTL(sec)

*N   021a00;   2,3;20:00:00:e0:69:f0:07:c6;10:00:00:e0:69:f0:07:c6; 895
    Fabric Port Name: 20:0a:00:60:69:10:8d:fd
NL   051edc;    3;21:00:00:20:37:d9:77:96;20:00:00:20:37:d9:77:96; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051ee0;    3;21:00:00:20:37:d9:73:0f;20:00:00:20:37:d9:73:0f; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051ee1;    3;21:00:00:20:37:d9:76:b3;20:00:00:20:37:d9:76:b3; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051ee2;     3;21:00:00:20:37:d9:77:5a;20:00:00:20:37:d9:77:5a; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051ee4;    3;21:00:00:20:37:d9:74:d7;20:00:00:20:37:d9:74:d7; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051ee8;    3;21:00:00:20:37:d9:6f:eb;20:00:00:20:37:d9:6f:eb; na
    FC4s: FCP [SEAGATE ST318304FC      0005]
Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 NL   051eef;    3;21:00:00:20:37:d9:77:45;20:00:00:20:37:d9:77:45; na
    FC4s: FCP [SEAGATE ST318304FC      0005]

    Fabric Port Name: 20:0e:00:60:69:10:9b:5b
 N    051f00;   2,3;50:06:04:82:bc:01:9a:0c;50:06:04:82:bc:01:9a:0c; na
    FC4s: FCP [EMC     SYMMETRIX       5267]

    Fabric Port Name: 20:0f:00:60:69:10:9b:5b
```

2. Look for the device in the NS list, which lists the nodes connected to that switch. This allows you to determine if a particular node is accessible on the network.

   - If the device is *not* present in the NS list, the problem is between the device and the switch. There may be a time-out communication problem between edge devices and the name server, or there may be a login issue. First check the edge device documentation to determine if there is a time-out setting or parameter that can be reconfigured. Also, check the port log for NS registration information and FCP probing failures (using the **fcpProbeShow** command). If these queries do not help solve the problem, contact the support organization for the product that appears to be inaccessible.
   - If the device *is* listed in the NS, the problem is between the storage device and the host. There may be a zoning mismatch or a host/storage issue. Proceed to Chapter 9, “Zone Issues”.

3. Enter the **portLoginShow** command to check the port login status.

4. Enter the **fcpProbeShow** command to display the FCP probing information for the devices attached to the specified F_Port or L_Port. This information includes the number of successful logins and SCSI INQUIRY commands sent over this port and a list of the attached devices.

5. Check the port log to determine whether or not the device sent the FLOGI frame to the switch, and the switch probed the device.

Link failures

A link failure occurs when a server, storage, or switch device is connected to a switch, but the link between the devices does not come up. This prevents the devices from communicating to or through the switch.

If the **switchShow** command or LEDs indicate that the link has not come up properly, use one or more of the following procedures.

The port negotiates the link speed with the opposite side. The negotiation usually completes in one or two seconds; however, sometimes the speed negotiation fails.

Determining a successful speed negotiation

NOTE
Skip this procedure if the port speed is set to a static speed through the **portCfgSpeed** command.

1. Enter the **portCfgShow** command to display the port speed settings of all the ports.
2. Enter the **switchShow** command to determine if the port has module light.
3. Enter the **portCfgSpeed** command to change the port speed to 1, 2, 4 or 8 Gbps, depending on what speed can be used by both devices. This should correct the negotiation by setting to one speed.
4. Enter the **portLogShow** or **portLogDump** command.
5. Check the events area of the output:

```
time          task      event  port      cmd    args
-----------------------------------------------------------------
14:38:51.976  SPEE      sn     <Port#>   NC     00000001,00000000,00000001
14:39:39.227  SPEE      sn     <Port#>   NC     00000002,00000000,00000001
```

   - In the `event` column *sn* indicates a speed negotiation.
   - In the `cmd` column *NC* indicates the negotiation has completed.

   If these fields do not appear, proceed to the step 6.

6. Correct the negotiation by entering the **portCfgSpeed** [*slotnumber/*]*portnumber*, *speed_level* command if the fields in step 5 do not appear.

```
switch:admin> portcfgspeed
Usage: portCfgSpeed PortNumber  Speed_Level
Speed_Level:    0  - Auto Negotiate
                1  - 1Gbps
                2  - 2Gbps
                4  - 4Gbps
                8  - 8Gbps
                ax - Auto Negotiate + enhanced retries
```

Checking for a loop initialization failure

1. Verify the port is an L_Port.

   a. Enter the **switchShow** command.

   b. Check the last field of the output to verify that the switch port indicates an L_Port. If a loop device is connected to the switch, the switch port must be initialized as an L_Port.

   c. Check to ensure that the state is online; otherwise, check for link failures.

   Example of an online L_Port

```
Area Port Media Speed State     Proto
=====================================
(output truncated)
66   66   --    N8   No_Module
67   67   id    AN   No_Sync
68   68   id    N2   Online          L-Port  13 public
```

2. Verify that loop initialization occurred *if* the port to which the loop device is attached does not negotiate as an L_Port.

   a. Enter the **portLogShow** or **portLogDump** command to display the port log for all ports on the switch; or if you are looking for a specific port, enter the **portLogDumpPort** command.

   b. Check argument number four for the loop initialization soft assigned (*LISA) frame* 0x11050100.

```
switch:admin> portlogdumpport 4
time          task   event  port   cmd    args
-----------------------------------------------------------------
11:40:02.078  PORT   Rx3    23     20     22000000,00000000,ffffffff,11050100
Received LISA frame
```

   The *LISA frame* indicates that the loop initialization is complete.

3. Skip point-to-point initialization by using the **portCfgLport** Command.

   The switch changes to point-to-point initialization after the LISA phase of the loop initialization. This behavior sometimes causes trouble with old HBAs.

Checking for a point-to-point initialization failure

1. Enter the **switchShow** command to confirm that the port is active and has a module that is synchronized.

   If a fabric device or another switch is connected to the switch, the switch port must be online.

2. Enter the **portLogShow** or **portLogDump** commands.

3. Verify the event area for the port state entry is *pstate*. The command entry *AC* indicates that the port has completed point-to-point initialization.

```
switch:admin> portlogdumpport 4
time          task       event  port cmd  args
-------------------------------------------------
11:38:21.726  INTR       pstate   4   AC
```

4. Skip over the loop initialization phase.

After becoming an active port, the port becomes an F_Port or an E_Port depending on the device on the opposite side. If the opposite device is a host or target device, the port becomes an F_Port. If the opposite device is another switch, the port becomes an E_Port.

If there is a problem with the host or target device, enter the **portCfgGPort** to force the port to try to come up as point-to-point only.

Correcting a port that has come up in the wrong mode

1. Enter the **switchShow** command.
2. Check the output from the **switchShow** command and follow the suggested actions in Table 4.

TABLE 4 SwitchShow output and suggested action

Output	Suggested action
Disabled	If the port is disabled because persistent disable or security reasons, attempt to resolve the issue and then enter the **portEnable** or, if persistently disabled, **portCfgPersistentEnable** command.
Bypassed	The port may be testing.
Loopback	The port may be testing.
E_Port	If the opposite side is not another switch, the link has come up in a wrong mode. Check the output from the **portLogShow** or **PortLogDump** commands and identify the link initialization stage where the initialization procedure went wrong.
F_Port	If the opposite side of the link is a private loop device or a switch, the link has come up in a wrong mode. Check the output from **portLogShow** or **PortLogDump** commands.
G_Port	The port has not come up as an E_Port or F_Port. Check the output from **portLogShow** or **PortLogDump** commands and identify the link initialization stage where the initialization procedure went wrong.
L_Port	If the opposite side is *not* a loop device, the link has come up in a wrong mode. Check the output from **portLogShow** or **PortLogDump** commands and identify the link initialization stage where the initialization procedure went wrong.

NOTE
If you are unable to read a portlog dump, contact your switch support provider for assistance.

Marginal links

A marginal link involves the connection between the switch and the edge device. Isolating the exact cause of a marginal link involves analyzing and testing many of the components that make up the link (including the switch port, switch SFP, cable, edge device, and edge device SFP). Troubleshooting a marginal link can involve inspecting the error counters describe in "Troubleshooting a marginal link," or running diagnostics on a link, a port, or an end-to-end path.

The **portLoopbackTest** command is used to verify the functional operation of a path on a switch. This test sends frames from a given port's transmitter and loops them back into the same port's receiver. The loopback is done at the parallel loopback path. The path traversed in this test does not include the media or the fiber cable.

Only one frame is transmitted and received at any given time. An external cable is not required to run this test. The port LEDs flicker green rapidly while the test is running.

Table 5 shows the different loopback modes you can use when using the **portLoopbackTest** to test a marginal link.

TABLE 5 Loopback modes

Loopback mode	Description
1	Port Loopback (loopback plugs)
2	External Serializer/Deserializer (SerDes) loopback
5	Internal (parallel) loopback (indicates no external equipment)
7	Back-end bypass and port loopback
8	Back-end bypass and SerDes loopback
9	Back-end bypass and internal loopback

Troubleshooting a marginal link

1. Enter the **portErrShow** command.
2. Determine whether there is a relatively high number of errors (such as CRC errors or ENC_OUT errors), or if there are a steadily increasing number of errors to confirm a marginal link. Sample the data every 5 minutes until you see the counters increment.
    - The *frames tx* and *rx* are the number of frames being transmitted and received.
    - The *crc_err* counter are frames with CRC errors. If this counter goes up then the physical path should be inspected. Check the cables to and from the switch, patch panel, and other devices. Check the SFP by swapping it with a known good working SFP.

      If you see this issue on an 8 Gbps blade, use the **portCfgFillWord** command to reduce EMI.
    - The *crc_g_eof* counter are frames with CRC errors and a good EOF. The first port detecting a CRC error marks the frame with a bad EOF and passes the frame on to its destination. Subsequent ports in the path will also detect the CRC error and the crc_err counter will increment on these ports. However, since the first port marked the frame with a bad EOF, the good EOF counter on the subsequent ports will not increment. The marginal link associated with the port with an increasing good EOF counter is the marginal link and the source of the errors.
    - The *enc_out* are errors that occur outside the frame and usually indicating a bad primitive. To determine if you are having a cable problem, take snapshots of the port errors by using the **portErrShow** command in increments of 5 to 10 minutes. If you notice the crc_err counter go up, you have a bad or damaged cable, or a bad or damaged device in the path.

      NOTE
      ICLs see enc_out errors when ports on one side of the link are disabled.
    - The *disc_c3* errors are discarded class 3 errors, which means that the switch is holding onto the frame longer than the hold time allows. One problem this could be related to is ISL oversubscription.

```
switch:admin> porterrshow

        frames  enc  crc  crc   too  too  bad  enc disc link loss loss frjt fbsy
       tx   rx  in   err g_eof shrt long eof  out c3   fail sync sig

     ============================================================================

  0:  665k 7.0k   0    0    0    0    0    0    6    0    0    1    2    0    0
  1:    0    0    0    0    0    0    0    0    0    0    0    0    2    0    0
  2:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  3:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  4:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  5:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  6:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  7:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
  8:   78   60    0    0    0    0    0    0    7    0    0    3    6    0    0
  9:   12    4    0    0    0    0    0    0    3    0    0    1    2    0    0
 10:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 11:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 12:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 13:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 14:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 15:    0    0    0    0    0    0    0    0    0    0    0    0    1    0    0
 16:  665k 7.4k   0    0    0    0    0    0    6    0    0    1    2    0    0

(output truncated)
```

3. If you suspect a marginal link, isolate the areas by moving the suspected marginal port cable to a different port on the switch. Reseating of SFPs may also cure marginal port problems.

   If the problem stops or goes away, the switch port or the SFP is marginal (proceed to step 6)

   If the problem does *not* stop or go away, see step 7.

4. Run the **portLoopbackTest** on the marginal port. You will need an adapter to run the loopback test for the SFP. Otherwise, run the test on the marginal port using the loopback mode *lb=5*. Use the different modes shown in Table 5 to test the port. See the *Fabric OS Command Reference* for additional information on this command.

5. Check the results of the loopback test and proceed as follows:

   - If the loopback test failed, the port is bad. Replace the port blade or switch.
   - If the loopback test did not fail, the SFP was bad.

6. Replace the SFP on the marginal port.

7. Perform the following steps to rule out cabling issues:

   a. Insert a new cable in the suspected marginal port.

   b. Enter the **portErrShow** command to determine if a problem still exists.

      - If the **portErrShow** output displays a normal number of generated errors, the issue is solved.
      - If the **portErrShow** output still displays a high number of generated errors, follow the troubleshooting procedures for the Host or Storage device in the following section, "Device login issues".

Device login issues

A correct login is when the port type matches the device type that is plugged in. In the example below, it shows that the device connected to Port 1 is a fabric point-to-point device and it is correctly logged in an F_Port.

```
switch:admin> switchshow
switchName:brcd5300
switchType:64.3
switchState:Online
switchMode:Native
switchRole:Subordinate
switchDomain:1
switchId:fffc01
switchWwn:10:00:00:05:1e:40:ff:c4
zoning:OFF
switchBeacon:OFF
FC Router:OFF
FC Router BB Fabric ID:1

Area Port Media Speed State     Proto
=====================================
  0   0   --    N8   No_Module
  1   1   --    N4   Online      FC  F-Port  10:00:00:05:1e:8f:c1:31
  2   2   --    N8   No_Module
  3   3   --    N8   No_Module
(output truncated)
 61  61   --    N8   No_Module
 62  62   --    N8   No_Module
 63  63   --    N8   No_Module
 64  64   id    N2   Online          E-Port  10:00:00:05:1e:34:d0:05 "1_d1"
(Trunk master)
 65  65   --    N8   No_Module
 66  66   --    N8   No_Module
 67  67   id    AN   No_Sync
 68  68   id    N2   Online          L-Port  13 public
 69  69   --    N8   No_Module
 70  70   --    N8   No_Module
 71  71   id    N2   Online          L-Port  13 public
 72  72   --    N8   No_Module
 73  73   --    N8   No_Module
 74  74   --    N8   No_Module
 75  75   --    N8   No_Module
 76  76   id     N2   Online           E-Port  10:00:00:05:1e:34:d0:05 "1_d1"
(upstream)(Trunk master)
 77  77   id    N4   Online          F-Port  10:00:00:06:2b:0f:6c:1f
 78  78   --    N8   No_Module
 79  79   id     N2   Online           E-Port  10:00:00:05:1e:34:d0:05 "1_d1"
(Trunk master)
```

Pinpointing problems with device logins

1. Log in to the switch as admin.
2. Enter the **switchShow** command; then, check for state logins.
3. Enter the **portCfgShow** command to see if the port is configured correctly.

In some cases, you may find that the port has been locked as an L_Port and the device attached is a fabric point-to-point device such as a host or switch. This would be an incorrect configuration for the device and therefore the device cannot log into the switch.

To correct this type of problem, remove the Lock L_Port configuration using the **portCfgDefault** command.

```
switch:admin> portcfgshow
Ports of Slot 0    0  1  2  3     4  5  6  7     8  9 10 11    12 13 14 15
-----------------+--+--+--+--+----+--+--+--+----+--+--+--+----+--+--+--
Speed             AN AN AN AN    AN AN AN AN    AN AN AN AN    AN AN AN AN
Trunk Port        ON ON ON ON    ON ON ON ON    ON ON ON ON    ON ON ON ON
Long Distance     .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
VC Link Init      .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
Locked L_Port     .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
Locked G_Port     .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
Disabled E_Port   .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
ISL R_RDY Mode    .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
RSCN Suppressed   .. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
Persistent Disable.. .. .. ..    .. .. .. ..    .. .. .. ..    .. .. .. ..
NPIV capability   ON ON ON ON    ON ON ON ON    ON ON ON ON    ON ON ON ON

                  where AN:AutoNegotiate, ..:OFF, ??:INVALID,
                  SN:Software controlled AutoNegotiation.
```

4. Enter the **portErrShow** command; then, check for errors that can cause login problems. A steadily increasing number of errors can indicate a problem. Track errors by sampling the port errors every five or ten minutes until you see the problem occur again.

NOTE

When two shared ports on an FC4-48 blade are receiving traffic and the primary port goes offline, all the frames that are out for delivery for the primary port are dropped, but the counters show them as dropped on the secondary port that shares the same area. Error counters increment unexpectedly for the secondary port, but the secondary port is operating properly.

If this occurs, clear the counters using the **portStatsClear** or **statsClear** command on the secondary port after the primary port goes offline.

---

5. Enter the **portFlagsShow** command; then, check to see how a port has logged in and where a login failed (if a failure occurred):

```
switch:admin> portflagsshow
Port SNMP      Physical   Flags
-------------------------------
    0 Offline   In_Sync    PRESENT U_PORT LED
    1 Online    In_Sync    PRESENT ACTIVE F_PORT G_PORT U_PORT LOGICAL_ONLINE
LOGIN NOELP LED ACCEPT
    2 Offline   No_Light   PRESENT U_PORT LED
    3 Offline   No_Module  PRESENT U_PORT LED
    4 Offline   No_Module  PRESENT U_PORT LED
    5 Offline   No_Light   PRESENT U_PORT LED
    6 Offline   No_Module  PRESENT U_PORT LED
    7 Offline   No_Module  PRESENT U_PORT LED
    8 Offline   No_Light   PRESENT U_PORT LED
    9 Offline   No_Light   PRESENT U_PORT LED
   10 Offline   No_Module  PRESENT U_PORT LED
   11 Offline   No_Module  PRESENT U_PORT LED
   12 Offline   No_Module  PRESENT U_PORT LED
   13 Offline   No_Module  PRESENT U_PORT LED
   14 Online    In_Sync    PRESENT ACTIVE F_PORT G_PORT U_PORT LOGICAL_ONLINE
LOGIN NOELP LED ACCEPT
   15 Online    In_Sync    PRESENT ACTIVE E_PORT G_PORT U_PORT SEGMENTED LOGIN
LED
```

6. Enter the **portLogDumpPort** *portid* command where the port ID is the port number; then, view the device-to-switch communication.

```
switch:admin> portlogdumpport 8 | more
time         task       event   port cmd  args
-------------------------------------------------
Thu Nov  6 16:52:39 2008
16:52:39.066 PORT       scn       8    1  00010004,4302000f,02000000
16:52:39.066 PORT       scn       8    2  ce3dfab0,d9672800,00000002
16:52:39.066 PORT       scn       8    2  ce3dfab0,d9672800,00000080
16:52:39.066 PORT       scn       8    5  00000000,00000000,00000002
16:52:39.066 PORT       scn       8    1  00010004,4302000f,00000002
16:52:39.066 PORT       scn       8    1  00010004,4302000f,02000000
16:52:39.071 PORT       ioctl     88010004  1,0 * 4
16:52:42.311 SPEE       sn        8   WS  00000000,00000000,00000000
16:52:42.558 SPEE       sn        8   NM  00000000,00000000,00000000
16:52:42.558 SPEE       sn        8   NF  00000000,00000000,00000000
16:52:42.558 SPEE       sn        8   NC  00000001,00000000,00000000
16:52:42.559 LOOP       loopscn   8  LIP  8002
16:52:42.559 LOOP       loopscn   8  LIP  f7f7
16:52:42.572 LOOP       loopscn   8  LIM  0
16:52:42.572 PORT       Tx3       8   12  22000000,00000000,ffffffff,11010000
16:52:42.572 PORT       Rx3       8   12  22000000,00000000,ffffffff,11010000
16:52:42.572 PORT       Tx3       8   20  22000000,00000000,ffffffff,11020000
16:52:42.572 PORT       Rx3       8   20  22000000,00000000,ffffffff,11020000
16:52:42.572 PORT       Tx3       8   20  22000000,00000000,ffffffff,11030000
16:52:42.572 PORT       Rx3       8   20  22000000,00000000,ffffffff,11030000
```

NOTE
See "Port log" on page 100 for overview information about **portLogDump**.

Media-related issues

This section provides procedures that help pinpoint any media-related issues, such as bad cables and SFPs, in the fabric. The tests listed in Table 6 are a combination of *structural* and *functional* tests that can be used to provide an overview of the hardware components and help identify media-related issues.

- *Structural* tests perform basic testing of the switch circuit. If a structural test fails, replace the main board or port blade.
- *Functional* tests verify the intended operational behavior of the switch by running frames through ports or bypass circuitry.

TABLE 6 Component test descriptions

Test name	Operands	Checks
portTest	[-**ports** *itemlist*] [-**iteration** *count*] [-**userdelay** *time*] [-**timeout** *time*] [-**pattern** *pattern*] [-**patsize** *size*] [-**seed** *seed*] [-**listtype** *porttype*]	Used to isolate problems to a single replaceable element and isolate problems to near-end terminal equipment, far-end terminal equipment, or transmission line. Diagnostics can be executed every day or on demand.
spinFab	[-**nmegs** *count*] [-**ports** *itemlist*] [-**setfail** *mode*]	Tests switch-to-switch ISL cabling and trunk group operations.

The following procedures are for checking switch-specific components.

Testing a port's external transmit and receive path

1. Connect to the switch and log in as admin.
2. Connect the port you want to test to any other switch port with the cable you want to test.
3. Enter the **portLoopbackTest -lb_mode 2** command.

Testing a switch's internal components

1. Connect to the switch and log in as admin.
2. Connect the port you want to test to any other switch port with the cable you want to test.
3. Enter the **portLoopbackTest -lb_mode 5** command where *5* is the operand that causes the test to run on the internal switch components (this is a partial list—refer to the *Fabric OS Command Reference* for additional command information):

   [-**nframes** *count*]—Specify the number of frames to send.

   [-**lb_mode** *mode*]—Select the loopback point for the test.

   [-**spd_mode** *mode*]—Select the speed mode for the test.

   [-**ports** *itemlist*]—Specify a list of user ports to test.

Testing components to and from the HBA

1. Connect to the switch and log in as admin.
2. Enter the **portTest** command (see the *Fabric OS Command Reference* for information on the command options).

See Table 7 on page 37 for a list of additional tests that can be used to determine the switch components that are not functioning properly. See the *Fabric OS Command Reference* for additional command information.

The HBA's **bcu fcDiag --linkbeacon** command can be used to beacon a target port on the switch. For more information on using this command, refer to the *Brocade Adapters Administrator's Guide*.

TABLE 7 Switch component tests

Test	Function
portBeacon	Sets port beaconing mode.
portLoopbackTest	Performs a functional test of port N to N path. Verifies the functional components of the switch.
turboRamTest	Verifies that the on chip SRAM located in the 4 and 8 Gbps ASIC is using the Turbo-Ram BIST circuitry. This allows the BIST controller to perform the SRAM write and read operations at a much faster rate.

Segmented fabrics

Fabric segmentation is generally caused by one of the following conditions:

- Incompatible fabric parameters (see "Reconciling fabric parameters individually" on page 38).
- Incompatible zoning configuration (see Chapter 9, "Zone Issues").
- Domain ID conflict (see "Reconciling fabric parameters individually" on page 38).
- Fabric ID conflict (see Chapter 7, "Virtual Fabrics").
- Incompatible security policies.
- Incorrect fabric mode.
- Incorrect policy distribution.
- Incompatible software features.

There are a number of settings that control the overall behavior and operation of the fabric. Some of these values, such as the domain ID, are assigned automatically by the fabric and can differ from one switch to another in the fabric. Other parameters, such as the BB credit, can be changed for specific applications or operating environments, but must be the same among all switches to allow the formation of a fabric.

The following fabric parameters must be identical on each switch for a fabric to merge:

- R_A_TOV
- E_D_TOV
- Data field size
- Sequence level switching
- Disable device probing
- Suppress class F traffic
- Per-frame route priority
- Long distance fabric (not necessary on Condor, GoldenEye, Condor2, or GoldenEye2 fabrics. For more information regarding these ASIC types, refer to Appendix A, "Switch Type and Blade ID".)
- BB credit
- PID format

Reconciling fabric parameters individually

1. Log in to one of the segmented switches as admin.
2. Enter the **configShow -pattern "fabric.ops"** command.
3. Log in to another switch in the same fabric as admin.
4. Enter the **configShow -pattern "fabric.ops"** command.
5. Compare the two switch configurations line by line and look for differences. Do this by comparing the two Telnet windows or by printing the **configShow -pattern "fabric.ops"** output. Also, verify that the fabric parameter settings (see the above list) are the same for *both* switches.
6. Connect to the segmented switch after the discrepancy is identified.
7. Disable the switch by entering the **switchDisable** command.
8. Enter the **configure** command to edit the appropriate fabric parameters for the segmented switch.
9. Enable the switch by entering the **switchEnable** command.

Alternatively, you can reconcile fabric parameters by entering the **configUpload** command for each switch and upload a known-good configuration file. If you do this option, the two switches will need to be the same model.

Downloading a correct configuration

You can restore a segmented fabric by downloading a previously saved correct backup configuration to the switch. Downloading in this manner reconciles any discrepancy in the fabric parameters and allows the segmented switch to rejoin the main fabric. For details on uploading and downloading configurations, see the *Fabric OS Administrator's Guide*.

Reconciling a domain ID conflict

If a domain ID conflict appears, the conflict is only reported at the point where the two fabrics are physically connected. However, there may be several conflicting domain IDs, which appear as soon as the initial conflict is resolved.

Typically, the fabric automatically resolves domain conflicts during fabric merges or builds unless Insistent Domain ID (IDID) is configured. If IDID is enabled, switches that cannot be programmed with a unique domain ID are segmented out. Check each switch that has IDID configured and make sure their domain IDs are unique within the configuration.

Repeat the following procedure until all domain ID conflicts are resolved.

1. Enter the **fabricShow** command on a switch from one of the fabrics.
2. In a separate Telnet window, enter the **fabricShow** command on a switch from the second fabric.
3. Compare the **fabricShow** output from the two fabrics. Note the number of domain ID conflicts; there may be several duplicate domain IDs that must be changed. Determine which switches have domain overlap and change the domain IDs for each of those switches.

4. Choose the fabric on which to change the duplicate domain ID; connect to the conflicting switch in that fabric.
5. Enter the **switchDisable** command.
6. Enter the **configure** command.
7. When the **Fabric Parameters** prompt displays, type **y**.
8. When the **Domain** prompt displays, type in the new number.
9. Press enter on all prompts to accept their default settings.
10. Enter the **switchEnable** command.

    This will enable the joining switch to obtain a new domain ID as part of the process of coming online. The fabric principal switch will allocate the next available domain ID to the new switch during this process.

11. Repeat step 4 through step 10 if additional switches have conflicting domain IDs.

Example of setting the domain ID

```
switch_89:FID89:admin> switchdisable
switch_89:FID89:admin> configure

Configure...

  Fabric parameters (yes, y, no, n): [no] y

    Domain: (1..239) [1] 89
    WWN Based persistent PID (yes, y, no, n): [no]
    Allow XISL Use (yes, y, no, n): [yes]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    WAN_TOV: (0..30000) [0]
    MAX_HOPS: (7..19) [7]
    Data field size: (256..2112) [2112]
    Sequence Level Switching: (0..1) [0]
    Disable Device Probing: (0..1) [0]
    Suppress Class F Traffic: (0..1) [0]
    Per-frame Route Priority: (0..1) [0]
    Long Distance Fabric: (0..1) [0]
    BB credit: (1..27) [16]
    Disable FID Check (yes, y, no, n): [no]
    Insistent Domain ID Mode (yes, y, no, n): [no]
  Virtual Channel parameters (yes, y, no, n): [no]
  F-Port login parameters (yes, y, no, n): [no]
  Zoning Operation parameters (yes, y, no, n): [no]
  RSCN Transmission Mode (yes, y, no, n): [no]
  Arbitrated Loop parameters (yes, y, no, n): [no]
  System services (yes, y, no, n): [no]
  Portlog events enable (yes, y, no, n): [no]
  ssl attributes (yes, y, no, n): [no]
  rpcd attributes (yes, y, no, n): [no]
  webtools attributes (yes, y, no, n): [no]
```

```
WARNING: The domain ID will be changed. The port level zoning may be affected
```

Reconciling incompatible software features

Earlier releases of software may not be supported in new versions of Fabric OS code. This may be due to a software feature changing or new services being supported. If you suspect that you are trying to introduce a switch into a fabric that has an older version of code, check the release notes to verify that any features on that switch are supported in the fabric with the newer code.

When the Management Server (MS) Platform services are enabled on a switch running Fabric OS v6.4.0 and you try to merge this switch into a fabric that does not have this feature enabled, the switch will not merge and a segmentation occurs. To resolve this, either turn the MS Platform services off or enable them on every switch in the fabric.

In Fabric OS v6.4.0 an ESC frame is used to exchange fabric parameters to detect Enhance TI Zones, interoperability mode, and Virtual Fabric FID conflicts. If at any point during the ESC frame exchange, a link with incompatible parameters is detected, the switch running Fabric OS v6.4.0 does not join into the existing fabric. To fix this issue, refer to the *Fabric OS Administrator's Guide* for more information on that specific software feature.

Port mirroring

With port mirroring, you can configure a switch port to mirror the traffic between a specific source and destination port. This is only supported between F_Ports. This is a useful way to troubleshoot a problem port without bringing down the host and destination links to insert an inline analyzer.

Port mirroring captures traffic between two devices. It mirrors only the frames containing the SID/DID to the mirror port. Because of the way it handles mirroring, a single mirror port can mirror multiple mirror connections. This also means that the port cannot exceed the maximum bandwidth of the mirror port. Attempts to mirror more traffic than what available bandwidth allows will result in the port mirror throttling the SID/DID traffic so that traffic does not exceed the maximum available bandwidth.

The bandwidth of the mirror port is unidirectional. In general, a host (SID) will talk to multiple storage devices (DIDs). Thus, a host will generally not send full line rate to a single target. A mirror port configured at 4 Gbps can only support up to 4 Gbps of traffic. A normal 4 Gbps F_Port is bi-directional and can support up to 8 Gbps (4 Gbps transmit and 4 Gbps receive) of traffic. If the mirror port bandwidth is exceeded, no credits will be returned to the receiver port and thus those devices involved in mirror connection see a degraded level of performance.

Use port mirroring to detect missing frames, which may occur with zoning issues or hold timeouts, capture protocol errors, and capture ULP traffic (SCSI/FICON). This feature cannot be used on embedded switch traffic.

In-Order Delivery

If IOD is enabled, adding or deleting a port mirror connection causes a frame drop. Port mirroring basically reroutes a given connection to the mirror port. The mirror traffic takes an extra route to the mirror port. When the extra route is removed, the frames between the two ports go directly to the destination port. The frames at the mirror port could be queued at the destination port behind those frames that went directly to the destination port. To prevent this IOD issue, port mirroring will drop those frames from the mirror port when a connection is disabled. If IOD has been disabled, port mirroring will not drop any frames, but will have an IOD error.

Port mirroring considerations

Before creating port mirror connections, consider the following limitations:

- A mirror port can be any port on the same switch as the source identifier port.
- Only one domain can be mirrored. After a domain is defined, only mirror ports on the defined domain can be used. The first connection defines the restriction on the domain, which can be either the local domain or a remote domain.
- A switch that is capable of port mirroring can support a minimum of one and a maximum of three mirror connections.Refer to Table 9 on page 42 to determine the number of mirror connections your switch or blade can support.
- Mirror port bandwidth limits mirror connections.
- Deleting a port mirroring connection with In Order Deliver (IOD) enabled causes frame drop between two endpoints.
- Using the firmware download procedure to downgrade to previous Fabric OS releases that do not support port mirroring requires that you remove all the port mirroring connections. If you downgrade to a previous versions of Fabric OS, you cannot proceed until the mirroring connections are removed.
- Port Mirroring is supported with Virtual Fabrics with the limitation that you cannot have FCR enabled within the same 8-port group.
- If you have NPIV or 10-bit address mode enabled on a Brocade 300, 5300, 5410, 5450, 5460, 5470, 5480, 7800, and the M5424 platforms, all devices from the same NPIV port or 10-bit addressing mode will hit the same mirror connection regardless of different AL_PAs since the validation is done only for the first 16-bits of the SID/DID.
- Port mirroring is not supported for the shared area ports of 48-port blades in the default switch. However, when the ports are assigned to a 10-bit address logical switch, port mirroring is supported.

The Brocade 4100, 4900, 7500, 7500E, and 7600 switches, the Brocade 48000 director, and the FA4-18, FC10-6, FC4-16IP, FC4-48, and FR4-18i blades have the following considerations:

- If you define multiple mirror connections for the same F_PORT (SID or DID), all the connections must share the same mirror port.

Supported platforms

Port Mirroring is supported only in FC ports. In general, a platform or blade supporting port mirroring supports both the mirror ports and the mirror connections. Exemptions are listed in Table 8.

TABLE 8 Port Mirroring platform supportability

Brocade Model	Fabric OS v6.2.0	Fabric OS v6.1.1_enc	Fabric OS v6.34.0	Fabric OS v6.4.0
Brocade Encryptiop Switch	Port mirroring is not supported, but mirror connections are supported through the FC ports			
FS8-18	Port mirroring is not supported, but mirror connections are supported through the FC ports			
DCX-4S	Supported.			
Brocade 8000		Port mirroring is not supported on either FC or FCoE ports.		
FCOE10-24			Port Mirroring is not supported on Europa.	Port mirroring is supported on Europa.
FX8-24			Port Mirroring is supported only on the FC ports. It is not supported over GbE ports/FCIP VE tunnels	Port mirroring is supported over GbE ports/FCIP VE tunnels
Brocade 7800			Port Mirroring is supported only on the FC ports. It is not supported over GbE ports/FCIP VE tunnels	Port mirroring is supported over GbE ports/FCIP VE tunnels

Maximum mirror connections

Table 9 shows the maximum number of mirror connections you can add to a mirror port.

TABLE 9 Maximum number of mirror connections

Model	Maximum Number of Mirror Connections (chassis-wide)
Brocade 300	1
Brocade 4100	3
Brocade 48000	1
Brocade 4900	3

TABLE 9 Maximum number of mirror connections

Model	Maximum Number of Mirror Connections (chassis-wide)
Brocade 5000	3
Brocade 5100	3
Brocade 5300	1
Brocade 5410	1
Brocade 5450	1
Brocade 5460	1
Brocade 5470	1
Brocade 5480	1
Brocade 7500	3
Brocade 7500E	3
Brocade 7600	3
Brocade 7800	1
Brocade DCX	3
Brocade DCX-4S	3
Brocade Encryption Switch	3
Brocade M5424	1
Brocade VA-40FC	3
FA4-18	3
FC10-6	3
FC4-16IP	3
FC4-48	3
FC8-16/32/48/64	3
FR4-18i	3
FS8-18	3
FX8-24	3

Configuring a port to be a mirror port

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **portCfg mirrorport** *[slot number/]<port number>* --**enable** command.

NOTE
The **enable** command enables the port as a mirror port. The **disable** command disables the mirror port configuration.

Adding a port mirror connection

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **portMirror --add** *slotnumber/portnumber SourceID DestID* command.

The configuration database keeps information about the number of port mirror connections configured on a switch, the number of chunks of port mirroring data that are stored, and the chunk number. When removing a mirror connection, always use this method to ensure that the data is cleared. Deleting a connection removes the information from the database.

Deleting a port mirror connection

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **portMirror --del** *SourceID DestID* command.

   For example, to delete the port mirror connection on mirror port 2, you might type:

   ```
   switch:admin> portMirror --del 0x011400 0x240400
   ```

Displaying port mirror connections

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **portMirror --show** command.

   You should see output similar to the following:

```
switch:admin> portmirror --show

Number of mirror connection(s) configured: 4

Mirror_Port  SID       DID       State
----------------------------------------
18           0x070400  0x0718e2  Enabled
18           0x070400  0x0718e3  Enabled
18           0x070400  0x0718ef  Enabled
18           0x070400  0x0718e0  Enabled
```

Chapter

Configuration Issues 4

In this chapter

- Configupload and download issues 47
- Brocade configuration form 51

Configupload and download issues

It is important to maintain consistent configuration settings on all switches in the same fabric because inconsistent parameters (such as inconsistent PID formats) can cause fabric segmentation. As part of standard configuration maintenance procedures, it is recommended that you back up all important configuration data for every switch on a host computer server for emergency reference.

NOTE
For information about AD-enabled switches using Fabric OS v5.2.0 or later, see the *Fabric OS Administrator's Guide*.

For information about Virtual Fabrics using Fabric OS v6.2.0 or later, see the *Fabric OS Administrator's Guide*.

Symptom *The configuration upload fails.*

Probable cause and recommended action

If the configuration upload fails, It may be because of one or more of the following reasons:

- The FTP or SCP server's host name is not known to the switch.

  Verify with your network administrator that the switch has access to the FTP server.

- The USB path is not correct.

  If your platform supports a USB memory device, verify that it is connected and running. Verify that the path name is correct by using the **usbStorage -l** command.

  Example of usbStorage -l command

```
switch:admin> usbstorage -l
firmwarekey\ 0B 2007 Aug 15 15:13
support\ 106MB 2007 Aug 24 05:36
   support1034\ 105MB 2007 Aug 23 06:11
config\ 0B 2007 Aug 15 15:13
firmware\ 380MB 2007 Aug 15 15:13
   FW_v6.0.0\ 380MB 2007 Aug 15 15:13
Available space on usbstorage 74%
```

- The FTP or SCP server's IP address cannot be contacted.

  Verify that you can connect to the FTP server. Use your local PC to connect to the FTP server or ping the FTP server.

  Example of a successful ping

  ```
  C:\> ping 192.163.163.50
  Pinging 192.163.163.50 with 32 bytes of data:
  Reply from 192.163.163.50: bytes=32 time=5ms TTL=61
  Ping statistics for 192.163.163.50:
  Packets: Sent = 4, Received = 4, Lost = 0 (0%loss),
  Approximate round trip times in milli-seconds:
  Minimum = 4ms, Maximum = 5ms, Average = 4ms
  ```

  If your ping is successful from your computer, but you cannot reach it from inside your data center, there could be a block on the firewall to not allow FTP connections from inside the data center. Contact your network administrator to determine if this is the cause and to resolve it by opening the port up on both inbound and outbound UDP and TCP traffic.

  Example of a failed ping

  ```
  C:\> ping 192.163.163.50
  Pinging 192.163.163.50 with 32 bytes of data:
  Request timed out.
  Request timed out.
  Request timed out.
  Request timed out.
  Ping statistics for 192.163.163.50:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
  ```

  If your ping has failed then you should verify the following:

  - The ports are open on the firewall.
  - The FTP server is up and running.

- You do not have configuration upload permission on the switch.

  There may be some restrictions if you are using Admin Domains or Role-Based Access Control. For more information on these types of restrictions, refer to the *Fabric OS Administrator's Guide*.

- You do not have permission to write to directory on the FTP or SCP server.

  Example of a failed login to the FTP server

  The output should be similar to the following on an unsuccessful login:

  ```
  C:\> ftp 192.163.163.50
  Connected to 192.163.163.50
  220 Welcome to Services FTP service.
  User (10.255.252.50:(none)): userFoo
  331 Please specify the password.
  Password: <hidden>
  530 Login incorrect.
  Login failed.
  ```

  If your login to the FTP or SCP server has failed, verify the username and password are correct.

- On a Virtual Fabric-enabled switch, you do not have the chassis role permission set on your user account.

Implement one change at a time, then issue the command again. By implementing one change at a time, you will be able to determine what works and what does not work. Knowing which change corrected the problems will help you to avoid this problem in future endeavors.

Symptom *The configuration download fails.*

Probable cause and recommended action

If the configuration download fails, It may be because of one or more of the following reasons:

- The FTP or SCP server's host name is not known to the switch.

  Verify with your network administrator that the switch has access to the FTP server.

- The USB path is incorrect.

  If your platform supports a USB memory device, verify that it is connected and running. Verify that the path name is correct. It should be the relative path from */usb/usbstorage/brocade/configdownload or use absolute path.*

- The FTP or SCP server's IP address cannot be contacted.

  Verify that you can connect to the FTP server. Use your local PC to connect to the FTP server or ping the FTP server.

- There was a reason to disable the switch.

  Note, however, that you must disable the switch for some configuration downloads. For more information on how to perform a configuration download without disabling a switch, refer to the *Fabric OS Administrator's Guide*.

- You do not have permission on the host to perform configuration download.

  There may be some restrictions if you are using Admin Domains or Role-Based Access Control. For more information on these types of restrictions, refer to the *Fabric OS Administrator's Guide*.

- The configuration file you are trying to download does not exist on the host.
- The configuration file you are trying to download is not a switch configuration file.
- If you selected the (default) FTP protocol, the FTP server is not running on the host.
- The configuration file that you are trying to download uses incorrect syntax.
- The username and password are incorrect.

Symptom *The switch reboots during the configuration download.*

Probable cause and recommended action

If you are issuing the command with the **-vf** option, the rebooting is normal. You can continue with the instructions. Otherwise issue the command again as follows:

1. Enter the **configDownload -vf** command to download Virtual Fabric related data. This causes both CPs to reboot.
2. Enter the **configDownload** command, without the **-vf** operand, to download the regular configuration data. This step does not cause a reboot.

Symptom *Configuration did not seem to change after the configuration download process finished.*

Probable cause and recommended action

Verify that the switch was rebooted by checking the system log. If you are doing this on a enterprise-class platform, verify that both CPs rebooted by checking the system log.

If any error occurs during the download, such as an error about a particular key, it is important to issue the **configDefault** command and attempt to repeat the **configDownload** command.

Gathering additional information

Be sure to capture the output from the commands you are issuing both from the switch and from your computer when you are analyzing the problem.

Send this and all logs to your switch support provider.

Messages captured in the logs

Configuration download generates both RASLog and Audit log messages resulting from execution of the **configDownload** command.

The following messages are written to the logs:

- configDownload completed successfully ... (RASLog and Audit log)
- configUpload completed successfully ... (RASLog)
- configDownload not permitted ... (Audit log)
- configUpload not permitted ... (RASLog)
- (Warning) Downloading configuration without disabling the switch was unsuccessful. (Audit log)

Brocade configuration form

Use this form as a hard copy reference for your configuration information.

In the hardware reference manuals for the Brocade 48000, DCX, and DCX-4S modular switches there is a guide for FC port setting tables. The tables can be used to record configuration information for the various blades.

TABLE 10 Brocade configuration and connection

Brocade configuration settings
IP address
Gateway address
Chassis configuration option
Management connections
Serial cable tag
Ethernet cable tag
Configuration information
Domain ID
Switch name
Ethernet IP address
Ethernet subnet mask
Total number of local devices (**nsShow**)
Total number of devices in fabric (**nsAllShow**)
Total number of switches in the fabric (**fabricShow**)

Chapter

FirmwareDownload Errors 5

In this chapter

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- Firmware download issues 54
- Troubleshooting firmwareDownload. 57
- USB error handling 57
- Considerations for downgrading firmware. 58

Blade troubleshooting tips

This chapter refers to the following specific types of blades inserted into either the Brocade 48000 director or Brocade DCX or DCX-4S enterprise-class platform:

- FC blades or port blades contain only Fibre Channel ports: Brocade FC4-16/32/48, FC10-6, and FC8-16/32/48/64.
- AP blades contain extra processors and some have specialized ports: Brocade FR4-18i, FC4-16IP, FA4-18, FCOE10-24, and FX8-24.
- CP blades have a control processor (CP) used to control the entire switch; they can be inserted only into slots 5 and 6 on the Brocade 48000, slots 6 and 7 on the Brocade DCX, and slots 4 and 5 on the Brocade DCX-4S.
- CORE8 and CR4S-8 core blades provide ICL functionality between two Brocade DCX Backbones. CORE8 blades can be inserted only into slots 5 and 8 on the Brocade DCX. CR4S-8 blades can be inserted only into slots 3 and 6 on the Brocade DCX-4S.

Typically, issues detected during firmware download to AP blades do not require recovery actions on your part.

If you experience frequent failovers between CPs that have different versions of firmware, then you may notice multiple blade firmware downloads and a longer startup time.

ATTENTION
Brocade DCX Director with FC8-16/32/48 blades: If you are running Fabric v6.1.0, then you cannot downgrade to pre-Fabric OS v6.0.0 versions as they are not supported on this director.

Symptom *Relocation of internal image times out on CP8 core blade.*

Probable cause and recommended action

This can be caused by issues in the co-CPU. If this happens, the firmware download process synchronizes the partitions in the main-CPU and co-CPU by starting a firmware commit operation. Wait at least 15 minutes for the commit operation to complete, issue the **firmwareShow** command to verify the partitions are synchronized, and reissue the **firmwareDownload** command. If the problem persists, you will need to contact the switch service provider.

Symptom *The blade is faulty (issue slotShow to confirm).*

Probable cause and recommended action

If the port or application blade is faulty, enter the **slotPowerOff** and **slotPowerOn** commands for the port or application blade. If the port or application blade still appears to be faulty, remove it and re-insert it into the chassis.

Symptom *The AP blade is stuck in the "LOADING" state (issue slotShow to confirm).*

Probable cause and recommended action

If the blade remains in the loading state for a significant period of time, the firmware download will time out. Remove the blade and re-insert it. When it boots up, autoleveling will be triggered and the firmware download will be attempted again.

Firmware download issues

CAUTION

After you start the firmware download process, do not enter any disruptive commands (such as reboot) that will interrupt the process. The entire firmware download and commit process takes approximately 17 minutes.

If there is a problem, wait for the time-out (30 minutes for network problems) before issuing the firmwareDownload command again. Disrupting the process can render the switch inoperable and require you to seek help from your switch service provider.

Do not disconnect the switch from power during the process because the switch could become inoperable when rebooted.

The following symptoms describe common firmware download issues and their recommended actions.

Symptom *The firmwareDownload command and subsequent POST failure may occur on the Brocade AP blades FR4-18i, FA4-18, FC4-16IP, and the Brocade 7500 and 7600 switches when the firmwareCommit operation coincides with the execution of POST.*

Probable cause and recommended action

The BP is too busy during the **firmwareDownload** and **firmwareCommit** operations which happens at the same time when POST is executed.

The recommended work around is to disable POST using the **diagDisablePost** command before you initiate the **firmwareDownload** command and re-enable POST using the **diagEnablePost** command after the **firmwareCommit** is complete.

Symptom *Firmwaredownload times out.*

Probable cause and recommended action

This can be caused by an excessively slow network. If it takes more than 30 minutes to download firmware on a switch, or on each CP in a director, the firmware download process times out. If a timeout occurs on a switch, the firmware download process synchronizes the two partitions on the switch by starting a firmware commit operation. If a timeout occurs in a director, the firmware download process synchronizes the firmware on the two partitions on the CP blades by starting a firmware commit operation on each CP.

Wait at least 15 minutes for the commit operation to complete then use the **firmwareShow** command to verify the partitions are synchronized. In some older versions of firmware, the firmware commit operation may not be started automatically on the switch (or on the standby CP in director). In this case, you can enter the **firmwareCommit** command manually on the switch (or on the standby CP in director) to synchronize the partitions. After the firmware commit operation completes, reissue the **firmwareDownload** command to upgrade the system.

Symptom *Cannot upgrade directly to v6.3.0. Upgrade your switch to v6.2.0 first before upgrading to the requested version.*

Probable cause and recommended action

If the switch is running Fabric OS v6.1.0 or earlier, you will not be allowed to upgrade directly to v6.3.0 because of the “one-version” rule. Upgrade your switch to Fabric OS version v6.2.0 before upgrading to v6.3.0. The “one-version” rule also applies to downgrading.

Symptom *Server is inaccessible or firmware path is invalid.*

Probable cause and recommended action

- The FTP or SCP server’s host name is not known to the switch.

  Verify with your network administrator that the switch has access to the FTP server.

  Verify the path to the FTP or SCP server is accessible from the switch. For more information on checking your FTP or SCP server, see Chapter 4, “Configuration Issues”.

- The USB path is not correct.

  If your platform supports a USB memory device, verify that it is connected and running. Verify that the path name is correct by using the **usbStorage -l** command.

Example of usbStorage -l command

```
switch:admin> usbstorage -l
firmwarekey\ 0B 2010 Mar 15 15:13
support\ 106MB 2007 Mar 24 05:36
   support1034\ 105MB 2010 Mar 23 06:11
config\ 0B 2010 Mar 15 15:13
firmware\ 380MB 2010 Mar 15 15:13
   FW_v6.4.0\ 380MB 2010 Mar 15 15:13
Available space on usbstorage 74%
```

Example of error message

```
switch:admin> firmwaredownload
Server Name or IP Address: 192.126.168.115
User Name: userFoo
File Name: /users/home/userFoo/firmware/v6.4.0
Network Protocol(1-auto-select, 2-FTP, 3-SCP) [1]: 2
```

```
Password: <hidden>
Server IP: 192.126.168.115, Protocol IPv4
Checking system settings for firmwaredownload...
Firmware access timeout.
The server is inaccessible or firmware path is invalid. Please make sure the
server name or IP address, the user/password and the firmware path are valid.
```

Symptom *Cannot download the requested firmware.*

Probable cause and recommended action

The firmware you are trying to download on the switch is incompatible. Check the firmware version against the switch type. If the firmware is incompatible, retrieve the correct firmware version and try again.

Example of error message

```
SW3900:admin> firmwaredownload
Server Name or IP Address: 192.168.126.115
User Name: userFoo
File Name: /users/home/userFoo/firmware/v6.4.0
Network Protocol(1-auto-select, 2-FTP, 3-SCP) [1]: 2
Password: <hidden>
Server IP: 192.126.168.115, Protocol IPv4
Checking system settings for firmwaredownload...
Cannot download the requested firmware because the firmware doesn't support this
platform. Please enter another firmware path.
```

Symptom *Cannot download on a switch with Interop mode turned on.*

Probable cause and recommended action

On single CP, Interop fabric does not support Coordinated HotCode Load.

Perform a **firmwareDownload -o** command. The operand bypasses the checking of Coordinated HotCode Load (HCL). On single CP systems in interop fabrics, the HCL protocol is used to ensure data traffic is not disrupted during firmware upgrades. This option will allow a firmware download to continue even if HCL is not supported in the fabric or the protocol fails. Using this option may cause traffic disruption for some switches in the fabric.

Symptom *You receive a firmwaredownload is already in progress message.*

Probable cause and recommended action

The firmware download process has already been started and it is in progress. Wait till it completes. You can use the **firmwareDownloadStatus** and **firmwareShow** commands to monitor its progress. If the problem persists, contact your switch support provider.

Example of a firmwaredownload already in progress

```
switch:admin> firmwaredownload

Server Name or IP Address: 192.126.168.115
User Name: userFoo
File Name: /users/home/userFoo/firmware/v6.4.0
Network Protocol(1-auto-select, 2-FTP, 3-SCP) [1]: 2
Password: <hidden>
Server IP: 192.126.168.115, Protocol IPv4
Checking system settings for firmwaredownload...
Sanity check failed because firmwaredownload is already in progress.
```

Troubleshooting firmwareDownload

A network diagnostic script and preinstallation check is a part of the **firmwareDownload** procedure. The script and preinstallation check performs troubleshooting and automatically checks for any blocking conditions. If the firmware download fails, see the *Fabric OS Message Reference* for details about error messages. Also see, "Considerations for downgrading firmware" on page 58.

If a firmware download fails in a director, the **firmwareDownload** command synchronizes the firmware on the two partitions of each CP by starting a firmware commit operation. Wait *at least* 15 minutes for this commit operation to complete before attempting another firmware download.

If the firmware download fails in a director or enterprise-class platform, the CPs may end up with different versions of firmware and are unable to achieve HA synchronization. In such cases, issue the **firmwareDownload -s** command on the standby CP; the single mode (**-s**) option allows you to upgrade the firmware on the standby CP to match the firmware version running on the active CP. Then re-issue the **firmwareDownload** command to download the desired firmware version to both CPs. For example, if CP0 is running v6.3.0 on the primary and secondary partitions, and CP1 is running v6.4.0 on the primary and secondary partitions, then synchronize them by issuing the **firmwareDownload** command.

NOTE
Some of the messages include error codes (as shown in the example below). These error codes are for internal use only and you can disregard them.

Example: Port configuration with EX ports enabled along with trunking for port(s) 63, use the **portCfgEXPort**, **portCfgVEXPort**, and **portCfgTrunkPort** commands to remedy this. Verify blade is ENABLED. (error 3)

Gathering additional information

You should follow these best practices for firmware download before you start the procedure:

- Keep all session logs.
- Enter the **supportSave** or the **supportShow** command *before and after* entering the **firmwareDownload** command.
- If a problem persists, package together all of the information (the Telnet session logs and serial console logs, output from the **supportSave** command) for your switch support provider. Make sure you identify what information was gathered before and after issuing the **firmwareDownload** command.

USB error handling

The following table outlines how the USB device handles errors under specific scenarios and details what actions you should take after the error occurs.

TABLE 11 USB error handling

Scenario under which download fails	Error handling	Action
An access error occurs during firmwaredownload because the removal of the USB device, or USB device hardware failure, etc.	Firmwaredownload will timeout and commit will be started to repair the partitions of the CPUs that are affected. See previous table for details.	None.
USB device is not enabled.	Firmwaredownload will fail with an error message	Enable the USB device using the **usbStorage -e** command and retry firmwaredownload.

Considerations for downgrading firmware

The pre-installation check of the **firmwareDownload** command detects all of the blocking conditions that can prevent a successful downgrade, and warns you about all these conditions. The error messages displayed by the **firmwareDownload** command states the blocking conditions and the corresponding commands to correct them. You must address all of these blocking conditions before proceeding. Refer to the *Fabric OS Administrator's Guide* for more information regarding individual features and commands.

To avoid failure of a firmware downgrade, verify the firmware you are downgrading to supports all the blades in the chassis, and that the switch, blades, or chassis supports all the features you are currently using. If not, you will need to disable or remove those features that are not supported.

Preinstallation messages

The messages in this section are displayed if an exception case is encountered during firmware download. The following example shows feature-related messages that you may see if you were upgrading from v6.3.0 to v6.4.0:

```
Cannot upgrade directly to 6.4. Please upgrade to 6.3 first and then upgrade
to 6.4.

Upgrade is not allowed because one of the Zones or configs defined on this
switch is using a reserved naming prefix "msfr_zn" or "msfr_cfg" please rename
them before upgrading.

Upgrade is not allowed because Secondary RKM KV is registered. Please use
"cryptocfg --dereg -keyvault <label> " to deregister the secondary KV and then
try again.

Upgrade is not allowed because in one or more of the 10-bit area supported
partitions, some of the areas in range 0x7000 - 0x8F00 are taken. Please
release these areas using "portaddress --unbind" or "wwnaddress--unbind"
accordingly.
```

This example shows hardware-related messages for the same downgrade example:

```
ecp:admin> firmwaredownload
Type of Firmware (FOS, SAS, or any application) [FOS]:
Server Name or IP Address: 10.1.2.3
User Name: userfoo
```

```
File Name: /home/userfoo/v6.3.0
Network Protocol (1-auto-select, 2-FTP, 3-SCP) [1]:
Password: <hidden>

Checking System Settings...
Version compatibility check passed.

Checking version compatibility...
Version compatibility check passed..

The following items need to be addressed before downloading the specified
firmware:

Downgrade is not allowed because there are more than 2 FX8-24 blades plugged
in to the chassis. The limit after downgrade is 2. Please plug out the extra
blades and rerun the command

Firmwaredownload command failed.
```

The messages in this section are displayed if an exception case is encountered during firmware downgrade. The following example shows feature-related messages that you may see if you were downgrading from v6.4.0 to v6.3.0:

```
Downgrade is not allowed because there are ports configured on FX8-24 as VEX.
Please use "portcfgvexport CLI" to remove the VEX configuration.

Downgrade is not allowed because a range of ports not supported by the target
firmware are assigned to Logical Switches instead of Default Switch. Please
use "lscfg --restore_to_default FID" to move all vacant ports to the default.

Downgrade is not allowed because there are ports configued in CSCTL mode.
Please use "portcfgqos CLI" to disable the CSCTL mode

Downgrade is not allowed because dynamic area mode is enabled on default
switch, Please use "configure" CLI to turn this mode off

Downgrade is not allowed because zoning configuration has overlapping
(enhanced) TI zones in one or more contexts. Please use "zone --delete
zone_name" command to delete overlapping TI Zones before proceeding.

Downgrade is not allowed because either 1) One of the peer switch is
configured to use third party issued certificates, or 2) Certificate files
exist. Please remove or set the configurationto Brocade and delete certificate
files using "seccertutil delete -fcapall" before downgrading.

DSCP Marking for 7800/FC8-24 required firmware version v6.4.0 or higher.
Please remove the DSCP marking using the "portCfg fcipcircuit<ve-port> modify"
command before downgrading.

IPv6 for 7800/FX8-24 requires firmware version v6.4.0 or higher. Please remove
any FCIP circuits using IPv6 addresses using the "portCfg fcipcircuit
<ve-port> delete" command before downgrading firmware.

Advanced compression modes (moderate, aggressive) for FCIP tunnels on FX8-24
requires firmware version v6.4.0 or higher. Please switch to standard
compression using the "portCfg fciptunnel <ve-port> modify" command before
downgrading.
```

```
IPSec on FCIP tunnels requires version v6.3.1 or higher for 7800, and v6.4.0
or higher for FX8-24. Please use "portcfg fciptunnel" to disable IPSec for all
FCIP tunnels and try again.

Downgrade is not allowed because Persistent PID is enabled. Please use "ag
--persistentpidenable 0" to disable the feature before downgrading.

Downgrade is not allowed because one or more ports are locked as E-port.Please
use "portcfgeport" CLI to remove the lock.

Downgrade is not allowed because fillword has been configured as> 1 for one or
more ports which requires firmware version 6.4 or higher. Pleaseuse
"portcfgfillword" CLI to remove fillword configuration before downgrading.

Downgrade is not allowed because Lossless is enabled.  If Virtual Fabric is
enabled, then Lossless is enabled on at least one logical switch. Please use
"dlsset --disable -lossless" (on each logicalswitch, if Virtual Fabric) to
disable the feature before downgrading.
```

The messages in this section are displayed if an exception case is encountered during firmware downgrade. The following example shows blocking messages that you may see if you were downgrading from v6.4.0 to v6.3.0 with any v6.3.1 software features enabled:

```
Downgrade is not allowed because AG is enabled. Please run "ag --modedisable"
command to disable AG mode before proceeding.

IPSec on FCIP tunnels requires version v6.3.1 or higher for 7800, and v6.4.0
or higher for FX8-24. Please use "portcfg fciptunnel" to disable IPSec for all
FCIP tunnels and try again.

VLAN Tagging on FCIP tunnels for 7800/FX8-24 requires version v6.3.1 or
higher. Please use "portcfg fcipcircuit <VE-Port> modify" to disable VLAN
Tagging on all FCIP Circuits.
```

Blade types

This message pertains to any blade in a chassis that may need to be removed or powered off before a firmware download begins.

Message *Cannot downgrade due to presence of blade type 75. Remove or power off these blades before proceeding.*

Probable cause and recommended action

The firmware download operation was attempting to downgrade a system to Fabric OS v6.2.0 or earlier with one or more of the Brocade FX8-24 AP blades (blade ID 75) in the system. Brocade DCX Extension blades are not supported on firmware v6.2.0 or earlier, so the firmware download operation failed.

Power off or remove the blade and try the operation again.

Message *The FS8-18 (type 43) blade is not supported by the target firmware. Please use slotshow to find out which slot it is in and remove it first.*

Probable cause and recommended action

The firmware download operation was attempting to downgrade a system to Fabric OS v6.1.1_enc or earlier with one or more Brocade FC8-18 AP blades (blade ID 43) in the system. Brocade Encryption Blade FC8-18 AP blades are not supported on firmware v6.1.1 or earlier, so the firmware download operation failed.

Use the **slotShow** command to display which slots the Brocade FC8-18 AP blades occupy. Physically remove the blades from the chassis, or use the micro-switch to turn the blade off. Retry the firmware download operation.

Firmware versions

These messages refer to differences between the current firmware and the firmware you are applying to the switch.

Message *Cannot upgrade directly to v6.3.0. Upgrade your switch to v6.2.0 first before upgrading to the requested version.*

Probable cause and recommended action

If the switch is running v6.1.0 or earlier, you are not allowed to upgrade directly to v6.3.0 because of the “two-version” rule.

Upgrade your switch to Fabric OS version v6.2.0 before upgrading to v6.3.0

Message *Non-disruptive firmwaredownload is not supported when downgrading to 6.1. Please use firmwaredownload -s to download the 6.1 firmware.*

Probable cause and recommended action

If the switch is running v6.2.0, you will not be allowed to downgrade directly to v6.1.x without causing disruption to your fabric.

Downgrade using the **firmwareDownload -s** command. For more information on using this command, refer to the *Fabric OS Administrator’s Guide*.

Message *Firmwaredownload of blade application firmware failed. Reissue firmwareDownload to recover.*

Probable cause and recommended action

The firmware download operation was attempting to upgrade the SAS image while the blade was operational.

Retry the firmwaredownload command again.

Platform

These messages are switch features or fabric-wide settings that need to be removed or disabled before downgrading the firmware.

Message *Downgrade is not allowed because VF is enabled. Please run "lscfg --config" and "lscfg --delete" commands to remove the non-default LS first, then run "fosconfig --disable vf" to disable VF before proceeding.*

Probable cause and recommended action

You cannot downgrade because Virtual Fabrics are enabled. Delete the logical switches, delete the base switch, and disable Virtual Fabrics prior to downgrading the firmware.

Routing

This message refers to any route settings that need to be changed prior to downgrading the switch's firmware.

Message *Downgrade is not allowed because IOD Delay value is configured for one or more domains. Please use "ioddelayshow and ioddelayreset" to disable them before downgrading.*

Probable cause and recommended action

If the switch is running v6.2.0 or later, and IOD Delay value is configured for one or more domains, you cannot downgrade the switch to v6.1.0 or earlier.

Use the **iodDelayReset** command to reset the IOD delay to its default value.

Chapter

Security Issues 6

In this chapter

- Password issues 63
- Device authentication issues 64
- Protocol and certificate management issues 65
- SNMP issues 66
- FIPS issues. 66

Password issues

The following section describes various ways to recover forgotten passwords.

Symptom *User forgot password.*

Probable cause and recommended action

If you know the root password, you can use this procedure to recover the password for the default accounts of user, admin, and factory. If you do not know the root password, you need to contact your service support provider to recover admin passwords.

Recovering passwords

1. Open a CLI connection (serial or Telnet) to the switch.
2. Log in as root.
3. Enter the command for the type of password that was lost:

   ```
   passwd user
   passwd admin
   passwd factory
   ```

4. Enter the requested information at the prompts.

Symptom Unable to log in as root password.

Probable cause and recommended action

To recover your root password, contact your switch service provider.

Symptom Unable to log into the boot PROM.

Probable cause and recommended action

To recover a lost boot PROM password, contact your switch service provider. You must have previously set a recovery string to recover the boot PROM password.

This does not work on lost or forgotten passwords in the account database.

Password recovery options

The following table describes the options available when one or more types of passwords are lost.

TABLE 12 Password recovery options

Topic	Solution
If all the passwords are forgotten, what is the password recovery mechanism? Are these procedures non-disruptive recovery procedures?	Contact your switch service provider. A non-disruptive procedure is available.
If a user has only the root password, what is the password recovery mechanism?	Use **passwd** command to set other passwords. Use **passwdDefault** command to set all passwords to default.
How to recover boot PROM password?	Contact your switch service provider and provide the recovery string.
How do I recover a user, admin, or factory password?	Refer to “Password issues” on page 63 for more information on recovering these passwords.

Symptom *User is unable to modify switch settings.*

Probable cause and recommended action

The most common error when managing user accounts is not setting up the default Admin Domain and access control list or role-based access control (RBAC).

Errors such as a user not being able to run a command or modify switch settings are usually related to what role the user has been assigned.

Device authentication issues

Symptom *Switch is unable to authenticate device.*

Probable cause and recommended action

When the device authentication policy is set to ON, the switch expects a FLOGI with the FC-SP bit set. If this bit is not set, the switch rejects the FLOGI with reason LS_LOGICAL_ERROR (0x03), in the switch log with the explanation of “Authentication Required”(0x48), and disables the port. Set the device authentication policy mode on the switch to ON.

Symptom *Switch is unable to form an F_Port.*

Probable cause and recommended action

Regardless of the device authentication policy mode on the switch, the F_Port is disabled if the DH-CHAP protocol fails to authenticate. If the HBA sets the FC-SP bit during FLOGI and the switch sends a FLOGI accept with FC-SP bit set, then the switch expects the HBA to start the AUTH_NEGOTIATE. From this point on until the AUTH_NEGOTIATE is completed, all ELS and CT frames, except the AUTH_NEGOTIATE ELS frame, are blocked by the switch. During this time, the Fibre Channel driver rejects all other ELS frames. The F_Port will not form until the AUTH_NEGOTIATE is completed. It is the HBA's responsibility to send an Authentication Negotiation ELS frame after receiving the FLOGI accept frame with the FC-SP bit set.

Protocol and certificate management issues

This section provides information and procedures for troubleshooting standard Fabric OS security features such as protocol and certificate management.

Symptom *Troubleshooting certificates*

Probable cause and recommended action

If you receive messages in the browser or in a pop-up window when logging in to the target switch using HTTPS, refer to Table 13 for recommended actions you can take to correct the problem.

TABLE 13 SSL messages and actions

Message	Action
The page cannot be displayed	The SSL certificate is not installed correctly or HTTPS is not enabled correctly. Make sure that the certificate has not expired, that HTTPS is enabled, and that certificate file names are configured correctly.
The security certificate was issued by a company you have not chosen to trust.	The certificate is not installed in the browser. Install it as described in the *Fabric OS Administrator's Guide*.
The security certificate has expired or is not yet valid	Either the certificate file is corrupted or it needs to be updated. Click **View Certificate** to verify the certificate content. If it is corrupted or out of date, obtain and install a new certificate.
The name on the security certificate is invalid or does not match the name of the site file	The certificate is not installed correctly in the Java Plug-in. Install it as described in the *Fabric OS Administrator's Guide*.
This page contains both secure and nonsecure items. Do you want to display the nonsecure items?	Click **No** in this pop-up window. The session opens with a closed lock icon on the lower-right corner of the browser, indicating an encrypted connection.

Gathering additional information

For security-related issues, use the following guidelines to gather additional data for your switch support provider.

- Perform a **supportSave -n** command.
- If not sure about the problem area, collect a **supportSave -n** from all switches in the fabric.
- If you think it may be related to E_Port authentication then collect a **supportSave -n** from both switches of the affected E_Port.

- If you think this is a policy-related issue, FCS switch or other security server-related issue then use **supportSave -n** to collect data from the Primary FCS switch and all affected switches.
- If login-related, then also include the following information:
  - Does login problem appear on a Serial, CP IP, or Switch IP address connection?
  - Is it CP0 or CP1?
  - Is the CP in active or standby?
  - Is it the first time login after **firmwareDownload** and reboot?

SNMP issues

This section describes symptoms with associated causes and recommended actions for SNMP-related issues.

Symptom *SNMP management station server is unable to receive traps from fabric.*

Probable cause and recommended action

There are several causes related to this generic issue. You will need to verify the following:

- There are no port filters in the firewalls between the fabric and the SNMP management station.
- If your SNMP management station is a dual-homed server, check that the routing tables are set up correctly for your network.

If you continue to have problems, collect the data in the next section and contact your switch support provider.

Gathering additional information

In addition to **supportSave**, gather the MIB browser snapshot with the problem (like Adventnet screen snapshot) for an MIB variable.

FIPS issues

This section describes symptoms with associated causes and recommended actions for problems related to FIPS.

Symptom *When FIPS is turned on the switch constantly reboots.*

Probable cause and recommended action

When FIPS is turned on the switch runs conditional tests each time it is rebooted. These tests run random number generators and are executed to verify the randomness of the random number generator. The conditional tests are executed each time prior to using the random number provided by the random number generator.

The results of all self-tests, for both power-up and conditional, are recorded in the system log or are output to the local console. This includes logging both passing and failing results. If the tests fail on your switch it will constantly reboot. Because boot PROM access is disabled you will not be able to exit out of the reboot. You will need to send the switch back to your switch service provider for repair.

Chapter

Virtual Fabrics 7

In this chapter

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- Fabric identification issues. 70
- Logical Fabric issues 70
- Base switch issues 71
- Logical switch issues. 72
- Switch configuration blade compatibility. 73

General Virtual Fabric troubleshooting

All of the following constraints apply when the Virtual Fabric feature is enabled:

- The base fabric works only in Brocade native mode, not in an interoperable mode.
- The base switch does not have any devices. The base fabric can have devices in remote layer two switches; traffic between those devices is supported.
- A non-base switch in a Virtual Fabric-capable chassis must not be part of a fabric that serves as a base fabric for some other logical fabric traffic. Although software will not detect or prevent users from deploying such a configuration, such a configuration is not supported.
- ICL ports can only be in the base or default switch. If XISL is turned off, you can connect ICLs to other logical switches.
- A default switch can be configured as a base switch in the Brocade 5100 and 5300 switches, but not in a Brocade DCX or DCX-4S. Fabric IDs of default switches cannot be manually changed.
- The default switch is able to participate in a logical fabric using extended ISLs (XISLs). In the Brocade DCX and DCX-4S, the default switch will not participate in a logical fabric and will be a purely layer two logical switch.
- EX_ and VEX_Ports are supported in the base switch. EX_Ports cannot be part of any other switch other than the base switch.
- EX_ and VEX_Ports cannot connect to a fabric that has a logical switch with the *Allow XISL use* mode on. The port will be disabled with the reason `Conflict: XISL capability domain`.
- Fabric OS v6.2.0 and later support external device sharing only through EX_Ports. Internal device sharing (sharing a device in a logical fabric with other fabrics, without having an EX_Port) is not supported.
- A logical fabric cannot have EX_Ports using extended ISLs and cannot serve as a backbone to any EX_Port traffic. Similarly, the default switch cannot be part of a fabric that serves as a backbone to any EX_Port traffic.

- VE_Ports cannot exist in a logical switch that has XISL use turned on. Although VE_Ports are allowed in a base switch, Fabric OS v6.2.0 and later do not support the use of VE_Ports to carry traffic for logical fabrics using XISLs. They can be used to carry FCR traffic through EX_ and VEX_Ports. You should make sure your configuration does not result in the use of VE_Ports in a base switch for logical fabric traffic.
- Admin Domains are mutually exclusive with Virtual Fabrics. When Virtual Fabrics is enabled, all access control is based on the Virtual Fabric context.
- Traffic Isolation zones with no-failover option are not supported in logical fabrics. TI zones defined in the base fabric for logical fabric traffic must allow failover.

NOTE
A new option “Disable FID check” has been added to configure fabric parameter options. This can be used to disable FID check for FICON logical switches.

Fabric identification issues

Symptom *E_Ports directly connecting two logical switches does not form or is disabled.*

Probable cause and recommended action

The FIDs on each of the logical switches must be the same.

Use the **lsCfg --show** command to view the current FIDs on the chassis and then the **lsCfg --change** *FID* **-newfid** *FID* command to change the FID.

Symptom *Invalid FID.*

Probable cause and recommended action

FIDs for switches may be from 1 through 128 as long as they are not already in use, except EX_Ports which are only assigned FIDs from 1 through 127.

Use the **lsCfg --show** command to verify if the FID is in use. If it is, use another FID.

Symptom *The FID is currently in use.*

Probable cause and recommended action

You may not create two (2) or more logical switches with the same FID.

Use the **lsCfg --show** and **fcrFabricShow** commands to view FIDs in use.

Logical Fabric issues

Symptom *Logical port <port_number> disabled.*

Probable cause and recommended action

This message indicates an LISL was disabled due to some protocol conflict or security or policy violation. This can result in possible traffic issues. You should resolve the cause of the conflict and re-enable the LISL using the **lfCfg --lislenable** command.

Symptom *The switch with domain <domain> with firmware version <fw version> has joined the FID <fid> fabric and may not be compatible with XISL use.*

Probable cause and recommended action

This message indicates the specified switch in the logical fabric using XISLs is running an incompatible firmware version and must be upgraded to Fabric OS v6.2.0.

Base switch issues

All logical switches in a fabric should have the same base switch attribute. If a base switch is connected to a non-base switch, then you must take the appropriate action to resolve the conflict.

Symptom *EX_Port is disabled with reason "Export in non base switch".*

Probable cause and recommended action

An EX_Port has to be in the base switch.

Use the **lsCfg --create** *FID* **-b** *base* command to create a base switch. Then use the **lsCfg –config FID -slot** [*slot* | *slot_range*] **-port** [*port* | *port_range*] [**-force**] command and move the port to the base switch. If the port is not intended to be used as an EX_Port, use the **portCfgDefault** command to reset the port to its default configuration.

Symptom *An EX_ or VEX_Port is disabled with reason Conflict: XISL capability domain.*

Probable cause and recommended action

Use the **configure** command to set the value on the *Allow XISL use* to *OFF* on all logical switches of the connecting edge fabric.

Symptom *E_Ports connecting two logical switches are disabled.*

Probable cause and recommended action

If a base switch is directly connected to a non-base switch, all E_Ports to that logical switch are disabled.

Symptom *Fabric ID and base switch are conflicted.*

Probable cause and recommended action

If there is a Fabric ID conflict and a base switch conflict that exists between two switches, the Fabric ID conflict is detected first.

Use the **lsCfg --change** *FID* **-newfid** *FID* command to change the FID.

Symptom *A base switch already exists on this system.*

Probable cause and recommended action

Only one base switch is allowed on a platform. Use the **lsCfg --delete** *FID* command and then the **lsCfg --create** *FID* **-b** *base* command to remove the current base switch and then create a new one.

Logical switch issues

CAUTION

When a logical switch is created, all configuration for the logical switch is set to factory defaults. When a logical switch is deleted, all configuration for the logical switch is deleted permanently and is not recoverable.

Symptom *The indicated slot is empty.*

Probable cause and recommended action

You used the **lsCfg** command and an empty slot was specified.

Reissue the command with the appropriate slot number.

Symptom *A port or ports cannot be moved to the requested switch.*

Probable cause and recommended action

The port or ports specified may only exist in the default switch. This issue may be seen when attempting to move ports on a Condor-based blade into a non-default switch.

To determine if you have a Condor-based blade, refer to the *Fabric OS Administrator's Guide*.

Symptom *Validation of switch configuration changes is not supported on this platform.*

Probable cause and recommended action

This platform is unknown to the logical switch subsystem.

Symptom *Given slot number is not valid on this platform.*

Probable cause and recommended action

You are specifying a slot number that is not valid on the platform, for example, slot 0 on a Brocade DCX or slot 12 on a Brocade DCX-4S.

Symptom *Slot must be enabled to configure ports.*

Probable cause and recommended action

You may only attempt to configure ports on enabled blades (blades may be faulted).

Symptom *Unable to determine slot type.*

Probable cause and recommended action

The slot type is not known to the logical switch. Verify the slot and try again.

Symptom *There are no ports on this slot.*

Probable cause and recommended action

There are no configurable ports on the slot indicated by the **lsCfg** command. Verify the ports and try again.

Symptom *Unable to remove ports from their current switch.*

Probable cause and recommended action

When moving ports to a switch, they are first removed from the switch in which they reside. This error message is displayed if this step fails.

Symptom *A non-GE blade is within the slot range.*

Probable cause and recommended action

You are attempting to configure a GE port on a slot that does not contain GE ports.

Symptom *A port or ports is already in the current switch.*

Probable cause and recommended action

You may not move a port to the same switch.

Symptom *The maximum number of switches for this platform has been reached.*

Probable cause and recommended action

Each platform that supports Virtual Fabrics has a maximum number of logical switches that may be supported. The platform has reached this limit.

Symptom *Unable to create the switch.*

Probable cause and recommended action

There was an error while creating the switch.

Symptom *A port or ports cannot be moved to the requested switch because it would exceed the 256 area limit for this switch.*

Probable cause and recommended action

The area limit would be exceeded if the **lsCfg** command were allowed.

Symptom *A port or ports cannot be moved to the requested switch because it may only exist in a base or default switch.*

Probable cause and recommended action

You are attempting to move ports on a core blade into a non-default or non-base switch.

Switch configuration blade compatibility

Symptom *A slot in the chassis displays a FAULTY(91) in the output of the slotShow command.*

Probable cause and recommended action

When an enterprise-class platform is coming up or when a blade is inserted, the switch configuration is checked based on the blade type. If the configuration does not match with the blade type, the blade will be faulted. This is displayed as FAULTY(91) in the output of the **slotShow** command. All ports on the FR4-18i, both GE and FC, are automatically moved to the default switch.

Use the **lsCfg –config** command to correct the problem. Once the configuration discrepancy has been fixed, you may use **slotPowerOff** followed by **slotPowerOn** to recover.

Gathering additional information

For Virtual Fabric-related issues, use the following guidelines to gather additional data for your switch support provider:

- Perform the supportSave command.
- If not sure about the problem area, perform the supportSave command on all chassis and logical switches in the fabric.
- If you think it may be related to E_Port authentication, then perform the supportSave -n command on both switches or logical switches of the affected E_Port.

Chapter

ISL Trunking Issues

8

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- Buffer credit issues 76

Link issues

This section describes trunking link issues that can come up and recommended actions to take to correct the problems.

Symptom *A link that is part of an ISL trunk failed.*

Probable cause and recommended action

Use the **trunkDebug** *port1 port2* command to troubleshoot the problem, as shown in the following procedure.

1. Connect to the switch and log in as admin.
2. Enter the **trunkDebug** *port1 port2* command:

   where:

   port1 Specify the area number or index of port 1. Use the **switchShow** command to view the area or index numbers for a port. This operand is required.

   port2 Specify the area number or index of port 2. Use the **switchShow** command to view the area or index numbers for a port. This operand is required.

Example of a unformed E_Port

This example shows that port 3 is not configured as an E_Port:

```
ecp:admin> trunkdebug 126, 127
port 126 is not E/EX port
port 127 is not E/EX port
```

Example of a formed E_Port

```
ecp:admin> trunkdebug 100, 101
port 100 and 101 connect to the switch 10:00:00:05:1e:34:02:45
```

The **trunkDebug** command displays the possible reason that two ports cannot be trunked. Possible reasons are:

- The switch does not support trunking.
- A trunking license is required.
- Trunking is not supported in switch interoperability mode.

- Port trunking is disabled.
- The port is not an E_Port.
- The port is not 2 Gbps, 4 Gbps, or 8 Gbps.
- The port connects to a switch other than the one you want it to.

  To correct this issue, connect additional ISLs to the switch with which you want to communicate.
- The ports are not the same speed or they are not set to an invalid speed.

  Manually set port speeds to a speed supported on both sides of the trunk.
- The ports are not set to the same long distance mode.

  Set the long distance mode to the same setting on all ports on both sides of the trunk.
- Local or remote ports are not in the same port group.

  Move all ISLs to the same port group. The port groups begin at port 0 and are in groups of 4 or 8, depending on the switch model. Until this is done, the ISLs will not trunk.
- The difference in the cable length among trunked links is greater than the allowed difference.

Buffer credit issues

This section describes a trunk going on- and offline or hosts not being able to talk to a storage device.

Symptom *Trunk goes offline and online (bounces).*

Probable cause and recommended action

A port disabled at one end because of buffer underallocation causes all the disabled ports at the other end to become enabled. Some of these enabled ports become disabled because of a lack of buffers, which in turn triggers ports to be enabled once again at the other end.

While the system is stabilizing the buffer allocation, it warns that ports are disabled because of a lack of buffers, but it does not send a message to the console when buffers are enabled. The system requires a few passes to stabilize the buffer allocation. Ultimately, the number of ports for which buffers are available come up and stabilize. You should wait for stabilization, and then proceed with correcting the buffer allocation situation.

Getting out of buffer-limited mode

Occurs on LD_Ports.

1. Change the LD port speed to a lower speed (of non-buffer limited ports).
2. Change the LD port’s estimated distance to a shorter distance (of non-buffer limited ports).
3. Change LD back to L0 (of non-buffer limited ports).
4. If you are in buffer-limited mode on the LD port, then increase the estimated distance.
5. Enable any of these changes on the buffer-limited port or switch by issuing the commands **portDisable** and **portEnable**.

Chapter

Zone Issues

9

In this chapter

- Overview of corrective action 77
- Segmented fabrics 78
- Zone conflicts. 79
- Gathering additional information 84

Overview of corrective action

The following overview provides a basic starting point for you to troubleshoot your zoning problem.

1. Verify that you have a zone problem.
2. Determine the nature of the zone conflict.
3. Take the appropriate steps to correct zone conflict.

To correct a merge conflict without disrupting the fabric, first verify that it was a fabric merge problem, then edit zone configuration members, and then reorder the zone member list if necessary.

The newly changed zone configuration will not be effective until you issue the **cfgEnable** command. This should be done during a maintenance window because this may cause disruption in large fabrics.

Verifying a fabric merge problem

1. Enter the **switchShow** command to validate that the segmentation is because of a zone issue.
2. Review "Segmented fabrics," next, to view the different types of zone discrepancies and determine what might be causing the conflict.

Verifying a TI zone problem

Use the **zone --show** command to display information about TI zones. This command displays the following information for each zone:

- zone name
- E_Port members
- N_Port members
- configured status (the latest status, which may or may not have been activated by **cfgEnable**)
- enabled status (the status that has been activated by **cfgEnable**)

If you enter the **cfgShow** command to display information about all zones, the TI zones appear in the defined zone configuration only and do not appear in the effective zone configuration.

1. Connect to the switch and log in as admin.
2. Enter the **zone --show** command.

   `zone --show` `[`*`name`*`]`

   where:

   name The name of the zone to be displayed. If the name is omitted, the command displays information about all TI zones in the defined configuration.

   To display information about the TI zone purplezone:

```
switch:admin> zone --show purplezone
Defined TI zone configuration:

TI Zone Name:   redzone:
Port List:      1,2; 1,3; 3,3; 4,5

Configured Status: Activated / Failover-Enabled
Enabled Status: Activated / Failover-Enabled
```

   To display information about all TI zones in the defined configuration:

```
switch:admin> zone --show
Defined TI zone configuration:

TI Zone Name:   greenzone:
Port List:      2,2; 3,3; 5,3; 4,11;

Configured Status: Activated / Failover-Enabled
Enabled Status: Activated / Failover-Enabled

TI Zone Name:   purplezone:
Port List:      1,2; 1,3; 3,3; 4,5;

Configured Status: Activated / Failover-Enabled
Enabled Status: Deactivated / Failover-Enabled

TI Zone Name:   bluezone:
Port List:      9,2; 9,3; 8,3; 8,5;

Configured Status: Deactivated / Failover-Disabled
Enabled Status: Activated / Failover-Enabled
```

Segmented fabrics

This section discusses fabric segmentation. Fabric segmentation occurs when two or more switches are joined together by ISLs and do not communicate to each other. Each switch appears as a separate fabric when you use the **fabricShow** command.

Symptom *Zone conflict appears in logs and fabric is segmented.*

Probable cause and recommended action

This issue is usually caused by incompatible zoning configurations. Verify the following are true:

- The effective **cfg** (zone set) on each end of the segmented ISL is identical.
- Any zone object with the same name has the same entries in the same sequence.

Symptom *Fabric segmentation is caused by a "configuration mismatch".*

Probable cause and recommended action

Occurs when zoning is enabled in both fabrics and the zone configurations are different in each fabric.

Symptom *Fabric segmentation is caused by a "type mismatch".*

Probable cause and recommended action

Occurs when the name of a zone object in one fabric is also used for a different type of zone object in the other fabric. A zone object is any device in a zone.

Symptom *Fabric segmentation is caused by a "content mismatch".*

Probable cause and recommended action

Occurs when the definition in one fabric is different from the definition of a zone object with the same name in the other fabric.

Zone conflicts

Zone conflicts can be resolved by saving a configuration file with the **configUpload** command, examining the zoning information in the file, and performing a cut and paste operation so that the configuration information matches in the fabrics being merged.

After examining the configuration file, you can choose to resolve zone conflicts by using the **cfgDisable** command followed by the **cfgClear** command on the incorrectly configured segmented fabric, then enter the **cfgSave** command followed by the **portDisable** and **portEnable** commands on one of the ISL ports that connects the fabrics. This will cause a merge, making the fabric consistent with the correct configuration.

ATTENTION
Be careful using the **cfgClear** command because it deletes the defined configuration.

Table 14 summarizes commands that are useful for debugging zoning issues.

TABLE 14 Commands for debugging zoning

Command	Function
aliCreate	Use to create a zone alias.
aliDelete	Use to delete a zone alias.
cfgCreate	Use to create a zone configuration.
cfgShow	Displays zoning configuration.
cfgDisable	Disables the active (effective) configuration

TABLE 14 Commands for debugging zoning (Continued)

Command	Function
cfgEnable	Use to enable and activate (make effective) the specified configuration.
cfgSave	Use to save changes to the zone configuration database.
cfgTransAbort	Use to abort the current zoning transaction without committing it.
cfgTransShow	Use to display the ID of the current zoning transaction.
defZone	Sets the default zone access mode to *No Access*, initializes a zoning transaction (if one is not already in progress), and creates the reserved zoning objects.
licenseShow	Displays current license keys and associated (licensed) products.
switchShow	Displays currently enabled configuration and any E_Port segmentations resulting from zone conflicts.
zoneAdd	Use to add a member to an existing zone.
zoneCreate	Use to create a zone. Before a zone becomes active, the **cfgSave** and **cfgEnable** commands must be used.
zoneHelp	Displays help information for zone commands.
zoneShow	Displays zone information.

For more information about setting up zoning on your switch, refer to the *Fabric OS Administrator's Guide*.

You can correct zone conflicts by using the **cfgClear** command to clear the zoning database.

ATTENTION
The **cfgClear** command is a disruptive procedure.

Correcting a fabric merge problem quickly

1. Determine which switches have the incorrect zoning configuration; then, log in to the switches as admin.
2. Enter the **switchDisable** command on all problem switches.
3. Enter the **cfgDisable** command on each switch.
4. Enter the **cfgClear** command on each switch.
5. Enter the **cfgSave** command on each switch to commit the change.

   ATTENTION
   The **cfgClear** command clears the zoning database on the switch where the command is run.

6. Enter the **switchEnable** command on each switch once the zoning configuration has been cleared.

   This forces the zones to merge and populates the switches with the correct zoning database. The fabrics will then merge.

Changing the default zone access

A switch is not allowed to merge with another switch that has an active effective configuration if the default zone is set to “no access”. Before the switch can join, the default zone setting has to be set to "all access". When the default zone no access option is enabled and the active configuration is disabled by using the **cfgDisable** command, a special hidden configuration with no members is activated. This configuration will not allow the switch to merge with switches that have an active effective configuration.

1. Connect to the switch and log in using an account assigned to the admin role.
2. Display the current setting with the **defZone –show** command.
3. If your default zone is set to "no access" use the **defZone –allaccess** command to change the default zone.
4. Enter the **cfgSave** command to save the current configuration.

Editing zone configuration members

1. Log in to one of the switches in a segmented fabric as admin.
2. Enter the **cfgShow** command and print the output.
3. Start another Telnet session and connect to the next fabric as an admin.
4. Enter the **cfgShow** command and print the output.
5. Compare the two fabric zone configurations line by line and look for an incompatible configuration.
6. Connect to one of the fabrics.
7. Run zone configure edit commands to edit the fabric zone configuration for the segmented switch (see Table 14 on page 79 for specific commands.

   If the zoneset members between two switches are not listed in the same order in both configurations, the configurations are considered a mismatch; this results in the switches being segmented in the fabric.

   For example:

   `[`*`cfg1 = z1; z2`*`]` is different from `[`*`cfg1 = z2; z1`*`]`, even though the members of the configuration are the same.

   One simple approach to making sure that the zoneset members are in the same order is to keep the members in alphabetical order.

Reordering the zone member list

1. Obtain the output from the **cfgShow** command for both switches.
2. Compare the order in which the zone members are listed. Members must be listed in the same order.
3. Rearrange zone members so the configuration for both switches is the same. Arrange zone members in alphabetical order, if possible.

Checking for Fibre Channel connectivity problems

Enter the fcPing command (refer to the *Fabric OS Command Reference* for more information on this command), which checks the zoning configuration for the two ports specified by:

- Generates an ELS (Extended Link Service frame) ECHO request to the source port specified and validates the response.
- Generates an ELS ECHO request to the destination port specified and validates the response.

Regardless of the device's zoning, the fcPing command sends the ELS frame to the destination port. A device can take any of the following actions:

- Send an ELS Accept to the ELS request.
- Send an ELS Reject to the ELS request.
- Ignore the ELS request.

There are some devices that do not support the ELS ECHO request. In these cases, the device will either not respond to the request or send an ELS reject. When a device does not respond to the ELS request, further debugging is required; however, do not assume that the device is not connected to the Fibre Channel.

Following is sample output from the fcPing command in which one device accepts the request and another device rejects the request:

```
switch:admin> fcping 10:00:00:00:c9:29:0e:c4 21:00:00:20:37:25:ad:05
Source:      10:00:00:00:c9:29:0e:c4
Destination: 21:00:00:20:37:25:ad:05
Zone Check:  Not Zoned

Pinging 10:00:00:00:c9:29:0e:c4 [0x20800] with 12 bytes of date:
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1162 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1013 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1442 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1052 usec
received reply from 10:00:00:00:c9:29:0e:c4: 12 bytes time:1012 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 1012/1136/1442 usec

Pinging 21:00:00:20:37:25:ad:05 [0x211e8] with 12 bytes of data:
Request rejected
Request rejected
Request rejected
Request rejected
Request rejected
5 frames sent, 0 frames received, 5 frames rejected, 0 frames timeout
Round-trip min/avg/max = 0/0/0 usec
switch:admin>
```

Following is sample output from the fcPing command in which one device accepts the request and another device does not respond to the request:

```
switch:admin> fcping 0x020800 22:00:00:04:cf:75:63:85
Source:      0x20800
Destination: 22:00:00:04:cf:75:63:85
Zone Check:  Zoned

Pinging 0x020800 with 12 bytes of data:
received reply from 0x020800: 12 bytes time:1159 usec
received reply from 0x020800: 12 bytes time:1006 usec
received reply from 0x020800: 12 bytes time:1008 usec
received reply from 0x020800: 12 bytes time:1038 usec
received reply from 0x020800: 12 bytes time:1010 usec
5 frames sent, 5 frames received, 0 frames rejected, 0 frames timeout
Round-trip min/avg/max = 1006/1044/1159 usec

Pinging 22:00:00:04:cf:75:63:85 [0x217d9] with 12 bytes of data:
Request timed out
Request timed out
Request timed out
Request timed out
Request timed out
5 frames sent, 0 frames received, 0 frames rejected, 5 frames timeout
Round-trip min/avg/max = 0/0/0 usec
switch:admin>
```

For details about the **fcPing** command, see the *Fabric OS Command Reference*.

Checking for zoning problems

1. Enter the **cfgActvShow** command to determine if zoning is enabled.
   - If zoning is enabled, it is possible that the problem is being caused by zoning enforcement (for example, two devices in different zones cannot detect each other).
   - If zoning is disabled, check the default zone mode by entering the **defZone --show** command. If it is no access, change it to all access. To modify default zone mode from no access to all access, enter the **defZone --all** command, and then the **cfgSave** command.
2. Confirm that the specific edge devices that must communicate with each other are in the same zone.
   - If they are not in the same zone and zoning is enabled, proceed to step 3.
   - If they are in the same zone, perform the following tasks:
     - Enter the **portCamShow** command on the host port to verify that the target is present.
     - Enter the **portCamShow** command on the target.
     - Enter the **nsZoneMember** command with the port ID for the zoned devices on the host and target to determine whether the name server is aware that these devices are zoned together.
3. Resolve zoning conflicts by putting the devices into the same zoning configuration.
4. Verify that no configuration is active by using the **cfgActvShow** command. Enter the **defZone --show** command to display the current state of the zone access mode and the access level. The **defZone** command sets the default zone access mode to No Access.

   ```
   switch:admin> defzone --show
   Default Zone Access Mode
   committed - No Access
   transaction - No Transaction
   ```

   See "Zone conflicts" on page 79 for additional information.

Gathering additional information

Collect the data from a **supportSave -n** command. Then collect the data from the **cfgTransShow** command. For the port having the problem, collect the data from the **filterPortShow** <*port*> command.

Chapter

Working With Diagnostic Features 10

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About Fabric OS diagnostics

The purpose of the diagnostic subsystem is to evaluate the integrity of the system hardware.

Diagnostics are invoked in the one of the following ways:

- Automatically during the power-on self test (POST).
- Automatically on an individual blade whenever it is installed into a director chassis.
- Manually using Fabric OS CLI commands.

The error messages generated during these test activities are sent to the serial console and system message logs, whose output formats may differ slightly.

Use the **diagHelp** command to receive a list of all available diagnostic commands.

See the *Fabric OS Command Reference* for a complete description of each command.

Diagnostic information

On the switch you can enter the **supportShow** command to dump important diagnostic and status information to the session screen, where you can review it or capture its data. If you are using a Telnet client, you may have to set up the client to capture the data prior to opening the session

Most information can be captured using the **supportSave** command and FTP’d off the switch, but when you are collecting information from specialized commands, such as **supportShow**, this information has to be captured using a Telnet client.

To save a set of files that customer support technicians can use to further diagnose the switch condition, enter the **supportSave** command. The command prompts for an FTP server, packages the following files, and sends them to the specified server:

- The output of the **supportShow** command.
- The contents of any trace dump files on the switch.
- System message (RAS) logs.

See also "Automatic trace dump transfers" on page 103.

Power-on self test

By default, when you power on the system, the boot loader automatically performs power-on self tests and loads a Fabric OS kernel image.

The POST tests provide a quick indication of hardware readiness when hardware is powered up. These tests do not require user input to function. They typically operate within several minutes, and support minimal validation because of the restriction on test duration. Their purpose is to give a basic health check before a new switch joins a fabric.

These tests are divided into two groups: POST1 and POST2. POST1 validates the hardware interconnect of the device, and POST2 validates the ability of the device to pass data frames between the ports. The specific set of diagnostic and test commands run during POST depends on the switch model.

You can use the **diagDisablePost** command to disable both POST1 and POST2, and you can reenable it using the **diagEnablePost** command. See the *Fabric OS Command Reference* for additional information about these commands.

The following example shows a typical boot sequence, including POST messages:

```
The system is coming up, please wait...

Read board ID of 0x80 from addr 0x23
Read extended model ID of 0x16 from addr 0x22
Matched board/model ID to platform index 4
PCI Bus scan at bus 0
:   :   :
:   :   :
Checking system RAM - press any key to stop test

Checking memory address: 00100000

System RAM test using Default POST RAM Test succeeded.

Press escape within 4 seconds to enter boot interface.
Booting "Fabric Operating System" image.

Linux/PPC load:
BootROM command line: quiet
Uncompressing Linux...done.
Now booting the kernel
Attempting to find a root file system on hda2...
modprobe: modprobe: Can't open dependencies file /lib/modules/2.4.19/modules.dep
(No such file or directory)
INIT: version 2.78 booting
INIT: Entering runlevel: 3
```

```
eth0: Link status change: Link Up. 100 Mbps Full duplex Auto (autonegotiation
complete).

INITCP: CPLD Vers: 0x95 Image ID: 0x19
uptime: 2008; sysc_qid: 0
Fabric OS (Paulsa45)
Paulsa45 console login: 2005/03/31-20:12:42, [TRCE-5000], 0,, INFO, ?, trace:,
trace_buffer.c, line: 1170

2005/03/31-20:12:42, [LOG-5000], 0,, INFO, SW4100_P45, Previous message repeat 1
time(s), trace_ulib.c, line: 540
2005/03/31-20:12:43, [HAM-1004], 219,, INFO, SW4100_P45, Processor rebooted -
Unknown
SNMP Research SNMP Agent Resident Module Version 15.3.1.4
Copyright 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000,
2001 SNMP Research, Inc.
sysctrld: all services Standby
FSSK 2: chassis0(0): state not synchronized
FSSK 2: Services starting a COLD recovery
2005/03/31-20:12:48, [FSS-5002], 0,, INFO, SW4100_P45, chassis0(0): state not
synchronized, svc.c, line: 318
2005/03/31-20:12:48, [FSS-5002], 0,, INFO, SW4100_P45, Services starting a COLD
recovery, mdev.c, line: 638
2005/03/31-20:12:49, [MFIC-1002], 220,, INFO, Paulsa45, Chassis FRU header not
programmed for switch NID, using defaults (applies only to FICON environments).
sysctrld: all services Active
2005/03/31-20:12:50, [DGD-5001], 0,, INFO, SW4100_P45, Slot 0 has started POST.,
main.c, line: 1189
POST1: Started running Thu Mar 31 20:12:51 GMT 2005
POST1: Test #1 - Running turboramtest
POST1: Test #2 - Running portregtest
POST1: Script PASSED with exit status of 0 Thu Mar 31 20:12:54 GMT 2005 took
(0:0:3)
POST2: Started running Thu Mar 31 20:12:55 GMT 2005
POST2: Test #1 - Running portloopbacktest (SERDES)
POST2: Test #2 - Running minicycle (SERDES)
POST2: Running diagshow
POST2: Script PASSED with exit status of 0 Thu Mar 31 20:13:12 GMT 2005 took
(0:0:17)
2005/03/31-20:13:13, [BL-1000], 221,, INFO, Paulsa45, Initializing Ports...
Enabling switch...
2005/03/31-20:13:13, [BL-1001], 222,, INFO, Paulsa45, Port Initialization
Completed
2005/03/31-20:13:13, [EM-5012], 0,, INFO, SW4100_P45, EM: sent dumpready to ME.,
em.c, line: 2152
2005/03/31-20:13:13, [DGD-5002], 0,, INFO, SW4100_P45, Slot 0 has passed the POST
tests., main.c, line: 936
```

If you choose to bypass POST or after POST completes, various system services are started and the boot process displays additional console status and progress messages.

Disabling POST

A reboot is not required for this command to take effect.

1. Connect to the switch and log in with a user account that has admin privileges with the chassis-role permission.
2. Enter the **diagDisablePost** command.

   This disables POST1 and POST2.

Enabling POST

A reboot is not required for this command to take effect.

1. Connect to the switch and log in with a user account that has admin privileges with the chassis-role permission.
2. Enter the **diagEnablePost** command to enable POST with rebooting the switch.

```
switch:admin> diagenablepost
Config update Succeeded
Diagnostic POST is now enabled.
```

Switch status

Use the **switchStatusShow** command to display the overall status of the switch, including its power supplies, fans, and temperature. If the status of any one of these components is either marginal or down, the overall status of the switch is also displayed as marginal or down. If all components have a healthy status, the switch displays a healthy status.

To modify the rules used to classify the health of each component use the **switchStatusPolicySet** command. To view the rules, use the **switchStatusPolicyShow** command.

Viewing the overall status of the switch

1. Connect to the switch and log in as admin.
2. Enter the **switchStatusShow** command:

```
ecp:admin> switchstatusshow
Switch Health Report                       Report time: 02/20/2008 06:02:51 PM
Switch Name: brcdDCXbb
IP address:192.32.234.63
SwitchState:DOWN
Duration:00:37

Power supplies monitorDOWN
Temperatures monitor  HEALTHY
Fans monitor          DOWN
WWN servers monitor   HEALTHY
Standby CP monitor    HEALTHY
Blades monitor        HEALTHY
Core Blades monitorHEALTHY
Flash monitor         HEALTHY
Marginal ports monitorHEALTHY
```

```
Faulty ports monitor  HEALTHY
Missing SFPs monitor  HEALTHY

All ports are healthy
```

For more information on how the overall switch status is determined, see the **switchStatusPolicySet** command in the *Fabric OS Command Reference*.

Displaying switch information

1. Connect to the switch and log in as admin.
2. Enter the **switchShow** command, which displays the following information for a switch:

   Switch summary information includes the following:

switchName	Switch name
switchType	Switch model and revision numbers
switchState	Switch state: Online, Offline, Testing, or Faulty
switchMode	Switch operation mode: Native, Interop, or Access Gateway
switchRole	Principal, Subordinate, or Disabled
switchDomain	ID: 0-31 or 1-23
switchId	Switch embedded port D_ID
switchWwn	Switch World Wide Name (WWN)
switchBeacon	Switch beaconing state: On or Off
zoning	When Access Gateway mode disabled, the name of the active zone displays in parenthesis.
FC Router	FC Router's state: On or Off
FC Router BB Fabric ID	The backbone fabric ID for FC routing

   The following additional properties are displayed in the switch summary for Virtual Fabrics-enabled switches.

Allow XISL Use	Allows the switch to use extended interswitch links (XISL) in the base fabric to carry traffic to this logical switch. Values are ON or OFF.
LS Attributes	Displays logical switch attributes, including the fabric ID (FID) associated with the logical switch and the switch role (default switch or base switch).

The **switchShow** command also displays the following information for ports on the specified switch:

Index
Index follows Area up to 255. Then it continues to the maximum port of the platform. Index identifies the port number relative to the switch. Index column is only displayed on enterprise-class platforms.

Slot
Slot number; 1-4 and 7-10.

Port
Port number; 0-15, 0-31 or 0-47.

Address
The 24-bit Address Identifier. Address column is only displayed on enterprise-class platforms.

Media
SFP types used.

Speed
The speed of the Port (1G, 2G, 4G, 8G, 10G, N1, N2, N4, N8, AN, UN). The speed can be fixed, negotiated, or auto-negotiated.

State
The port status.

Proto
Protocol support by GbE port.

The details displayed for each switch differ on different switch models. For more information see the **switchShow** command in the *Fabric OS Command Reference*.

Displaying the uptime for a switch

1. Connect to the switch and log in as admin.
2. Enter the **uptime** command:

```
ecp:admin> uptime
 10:50:19 up 11 days,  6:28,  1 user,  load average: 0.49, 0.53, 0.54
```

The **uptime** command displays the length of time the system has been in operation, the total cumulative amount of uptime since the system was first powered on, and the load average over the past one minute (1.29 in the preceding example), five minutes (1.31 in the example), and 15 minutes (1.27 in the example). The reason for the last switch reboot is also recorded in the system message log.

SpinFab and portTest

The **spinFab** command is an online diagnostics command to verify the ISL links between switches at the maximum speed. It is done by setting up the routing functionality in the hardware such that the test frames received by E_Port are retransmitted on the same E_Port. Several frames are then sent to the port attached to each active E_Port specified. These frames are special frames which never occur during normal traffic and the default action for such frames is to route them back to the sender. These frames are circulated between switches until the test stops them.

CAUTION

During the spinFab testing, the switch remains in normal operation. However, some performance degradation will occur due to the ISL links being saturated with the test frames. This test should be run with caution on a live fabric.

Table 15 lists the supported ports for the specified version of Fabric OS when using the **spinFab** command.

TABLE 15 Port type support

Port type	Supported in v6.2.0	Supported in v6.3.0	Supported in v6.4.0
Loopback	Yes	Yes	Yes
E_Ports	Yes	Yes	Yes
Trunk Master ports	Yes	Yes	Yes
Ports beyond index 255	No	Yes	Yes
Ports with swapped areas	No	Yes	Yes
Shared-area ports	No	Yes	Yes
Ports in logical switches	No	Yes	Yes
Ports in base switches	No	Yes	Yes
Trunk slave ports	No	No	Yes
Long distance ports	No	No	Yes
F_Ports connected to Brocade HBAs	No	No	Yes[1]
ICL ports	No	No	No
F_Ports connected to Access Gateway	No	No	No
EX_Ports	No	No	No
Ports in an Access Gateway switch	No	No	No

[1] If you use the **spinFab** command to test F_Ports connected to Brocade HBAs it is required that the firmware version on the HBA is v2.1.1 or later.

Debugging spinFab errors

Link errors and tx/rx errors are seen when the spinFab test fails.

Link Errors

Once the frame is sent out of the port, the **spinFab** command monitors the link errors in the ASIC. If any of the error counters are non-zero, spinFab reports ERROR and the test fails on the port.

```
ERROR: DIAG ERRSTAT spinfab, pass 6,
Pt0/17(7) Ch0/7 CRC_err Error Counter is 109738997 sb 0,


ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 Enc_in Error Counter is 32 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 Enc_out Error Counter is 187725412 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 TruncFrm Error Counter is 32 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 FrmTooLong Error Counter is 32 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 BadOrdSet Error Counter is 32 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 BadEOF Error Counter is 1 sb 0,

ERROR: DIAG ERRSTAT spinfab, pass 1,
Pt0/3(33) Ch0/33 DiscC3 Error Counter is 32 sb 0,
```

If you receive any of the errors listed above, then follow the suggested debugging procedures:

- The spinFab command does not clear any existing error counters before running the test. You should first clear all error counters and re-run the spinFab command.
- Verify that the link comes up by enabling and disabling the local or remote ports.
- Verify that the source of the error is either local port or remote port. This can be done by monitoring the port statistics on both the ends simultaneously. Refer to "Displaying the port statistics" on page 95 for more information on how to display the statistics for a port.
- Verify that the cables and SFPs are inserted properly. Remove and insert them again on both the ends.
- Verify that the failing local port is working fine when connected to another remote port. Similarly, check whether the failing remote port is working fine when connected to another local port.
- Once the fault is isolated on either the local or remote port, replace the cable and SFPs connected to the local and remote ports.
- In-case of loopback ports, change the loopback plug. Refer to "Marginal links" on page 30 for more information on changing the loopback plug.

- Further isolation can be done by running the **portLoopbackTest** command (Offline test) on the failing port in-order to check whether the blade internal ports are having some problems.
  - The -**lb_mode 1** operand verifies that the SFP is working within normal operating parameters. The use of this operand requires that loopback cables are connected.
  - The -**lb_mode 2** verifies that the ASIC port is working within normal operating parameters. The use of this operand does not require any loopback cables.

Tx/Rx Errors

Following errors are seen when the port fails to transmit or receive the frames.

```
ERROR: DIAG PORTSTOPPED spinfab:spinfab, 0 nMegs,
Pt7/2(2) Ch0/2 No Longer Transmitting, FTX Counter Stuck at 116295726,

ERROR: DIAG TIMEOUT spinfab:spinfab, pass 2,
Pt0/17(7) Ch0/7 Receive Error/Timeout
```

The following are debugging procedures:

- Check whether the same port is reporting Link Errors as discussed in "Link Errors" on page 91. If yes, follow the same set of debugging procedures as discussed in "Link Errors" on page 91.
- Check whether the local/remote port is beyond port 255. If yes, try connecting to the lower number of ports. This behavior is found in Fabric OS v6.2.0 and earlier versions only.
- Check whether the local/remote port is part of shared-area region. If yes, try connecting to the non-shared area ports. This behavior is found in Fabric OS v6.2.0 and earlier versions only.
- Check whether the local/remote port is having its area swapped. If yes, try connecting to the normal area ports. This behavior is found in Fabric OS v6.2.0 and earlier versions only.

Clearing the error counters

This procedure clears the port hardware statistics, including ALPA-based CRC monitor, End-to-End monitor, and filter-based performance monitor statistics.

1. Connect to the switch and log in as admin.
2. Enter the **portStatsClear <slot/port>** command.

Enabling a port

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the appropriate command based on the current state of the port and on whether it is necessary to specify a slot number:
    - To enable a port that is disabled, enter the command **portEnable** *portnumber* or **portEnable** *slotnumber/portnumber*.
    - To enable a port that is persistently disabled, enter the command **portCfgPersistentEnable** *portnumber* or **portCfgPersistentEnable** *slotnumber/portnumber.*

    If you change port configurations during a switch failover, the ports may become disabled. To bring the ports online, re-issue the **portEnable** command after the failover is complete.

Disabling a port

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the appropriate command based on the current state of the port and on whether it is necessary to specify a slot number:.
    - To disable a port that is enabled, enter the command **portDisable** *portnumber* or **portDisable** *slotnumber/portnumber.*
    - To disable a port that is persistently enabled, enter the command **portCfgPersistentDisable** *portnumber* or **portCfgPersistentDisable** *slotnumber/portnumber.*

Port information

Use the following instructions to view information about ports and to help diagnose if your switch is experiencing port problems.

Viewing the status of a port

1. Connect to the switch and log in as admin.
2. Enter the **portShow** *[slot/] port* command, specifying the number that corresponds to the port you are troubleshooting. In this example, the status of port 10 is shown:

```
switch:admin> portshow 10
portName:
portHealth: HEALTHY

Authentication: None
portDisableReason: None
portCFlags: 0x1
portFlags: 0x20b03 PRESENT ACTIVE F_PORT G_PORT U_PORT LOGICAL_ONLINE LOGIN
NOELP ACCEPT FLOGI
portType:  18.0
POD Port: Port is licensed
portState: 1Online
portPhys:  6In_Sync
portScn:   32F_Port
port generation number:    14
portId:    020a00
portIfId:    4302000b
portWwn:   20:0a:00:05:1e:41:4a:a5
portWwn of device(s) connected:
21:00:00:e0:8b:05:e0:b1
Distance:  normal
portSpeed: N2Gbps

LE domain: 0
FC Fastwrite: OFF
Interrupts:        0         Link_failure: 0          Frjt:        0
Unknown:           0         Loss_of_sync: 3          Fbsy:        0
Lli:               18         Loss_of_sig:  6
Proc_rqrd:         161        Protocol_err: 0
Timed_out:         0          Invalid_word: 563851
Rx_flushed:        0          Invalid_crc:  0
Tx_unavail:        0          Delim_err:    0
Free_buffer:       0          Address_err:  0
Overrun:           0          Lr_in:        3
Suspended:         0          Lr_out:       0
Parity_err:        0          Ols_in:       0
2_parity_err:      0          Ols_out:      3
CMI_bus_err:       0

Port part of other ADs: No
```

See the *Fabric OS Command Reference* for additional **portShow** command information, such as the syntax for slot or port numbering, displaying IP interfaces on a GbE port, or displaying FCIP tunnel connection or configuration information.

Displaying the port statistics

1. Connect to the switch and log in as admin.
2. At the command line, enter the **portStatsShow** command.

Port statistics include information such as the number of frames received, number of frames sent, number of encoding errors received, and number of class 2 and class 3 frames received.

See the *Fabric OS Command Reference* for additional **portStatsShow** command information, such as the syntax for slot or port numbering.

```
switch:admin> portstatsshow 68
stat_wtx            113535      4-byte words transmitted
stat_wrx            22813       4-byte words received
stat_ftx            9259        Frames transmitted
stat_frx            821         Frames received
stat_c2_frx         0           Class 2 frames received
stat_c3_frx         821         Class 3 frames received
stat_lc_rx          0           Link control frames received
stat_mc_rx          0           Multicast frames received
stat_mc_to          0           Multicast timeouts
stat_mc_tx          0           Multicast frames transmitted
tim_rdy_pri         0           Time R_RDY high priority
tim_txcrd_z         0           Time TX Credit Zero (2.5Us ticks)
time_txcrd_z_vc  0- 3:  0           0           0           0
time_txcrd_z_vc  4- 7:  0           0           0           0
time_txcrd_z_vc  8-11:  0           0           0           0
time_txcrd_z_vc 12-15:  0           0           0           0
er_enc_in           0           Encoding errors inside of frames
er_crc              0           Frames with CRC errors
er_trunc            0           Frames shorter than minimum
er_toolong          0           Frames longer than maximum
er_bad_eof          0           Frames with bad end-of-frame
er_enc_out          0           Encoding error outside of frames
er_bad_os           0           Invalid ordered set
er_c3_timeout       0           Class 3 frames discarded due to timeout
er_c3_dest_unreach  0           Class 3 frames discarded due to destination
unreachable
er_other_discard    0           Other discards
er_type1_miss       0           frames with FTB type 1 miss
er_type2_miss       0           frames with FTB type 2 miss
er_type6_miss       0           frames with FTB type 6 miss
er_zone_miss        0           frames with hard zoning miss
er_lun_zone_miss    0           frames with LUN zoning miss
er_crc_good_eof     0           Crc error with good eof
er_inv_arb          0           Invalid ARB
open                810         loop_open
transfer            0           loop_transfer
opened              409856      FL_Port opened
starve_stop         0           tenancies stopped due to starvation
fl_tenancy          1715        number of times FL has the tenancy
nl_tenancy          331135      number of times NL has the tenancy
zero_tenancy        4           zero tenancy
```

Displaying a summary of port errors for a switch

1. Connect to the switch and log in as admin.
2. Enter the **portErrShow** command. See the *Fabric OS Command Reference* for additional portErrShow command information.

```
switch:admin> porterrshow

        frames  enc  crc  crc   too  too  bad  enc disc link loss loss frjt fbsy
       tx    rx   in  err g_eof shrt long  eof  out   c3 fail sync  sig
     ============================================================================

  0:  665k 7.0k   0    0    0    0    0    0    6    0    0    1    2    0    0
  1:     0    0   0    0    0    0    0    0    0    0    0    0    2    0    0
  2:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  3:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  4:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  5:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  6:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  7:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
  8:    78   60   0    0    0    0    0    0    7    0    0    3    6    0    0
  9:    12    4   0    0    0    0    0    0    3    0    0    1    2    0    0
 10:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 11:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 12:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 13:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 14:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 15:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 16:  665k 7.4k   0    0    0    0    0    0    6    0    0    1    2    0    0
 17:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 18:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 19:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 20:  6.3k 6.6k   0    0    0    0    0    0    7    0    0    1    2    0    0
 21:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 22:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 23:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 24:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 25:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 26:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 27:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 28:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 29:     0    0   0    0    0    0    0    0    0    0    0    0    1    0    0
 30:  664k 6.7k   0    0    0    0    0    0    6    0    0    1    2    0    0
 31:    12    4   0    0    0    0    0    0    3    0    0    1    2    0    0
(output truncated)
```

The **portErrShow** command output provides one output line per port. See Table 16 for a description of the error types.

TABLE 16 Error summary description

Error type	Description
frames tx	Frames transmitted
frames rx	Frames received
enc in	Encoding errors inside frames
crc err	Frames with CRC errors
crc g_eof	CRC errors that occur on frames with good end-of-frame delimiters.

TABLE 16 Error summary description (Continued)

Error type	Description
too shrt	Frames shorter than minimum
too long	Frames longer than maximum
bad eof	Frames with bad end-of-frame delimiters
enc out	Encoding error outside of frames
disc c3	Class 3 frames discarded
link fail	Link failures (LF1 or LF2 states)
loss sync	Loss of synchronization
loss sig	Loss of signal
frjt	Frames rejected with F_RJT
fbsy	Frames busied with F_BSY

Equipment status

You can display status for fans, power supply, and temperature.

NOTE
The number of fans, power supplies, and temperature sensors depends on the switch type. For detailed specifications on these components, refer to the switch hardware reference manual. The specific output from the status commands varies depending on the switch type.

Checking the temperature, fan, and power supply

1. Log in to the switch as user.
2. Enter the **sensorShow** command. See the *Fabric OS Command Reference* for details regarding the sensor numbers.
3. Check the temperature output.

   Look for indications of high or low temperatures.
4. Check the fan speed output.

   If any of the fan speeds display abnormal RPMs, replace the fan FRU.
5. Check the power supply status.

   If any power supplies show a status other than OK, consider replacing the power supply as soon as possible.

Checking the status of the fans

1. Connect to the switch and log in as admin.
2. Enter the **fanShow** command:

```
switch:admin> fanshow
```

```
Fan 1 is Absent
Fan 2 is Ok, speed is 6553 RPM
Fan 3 is Ok, speed is 6367 RPM
```

The possible status values are:

- OK—Fan is functioning correctly.
- Absent—Fan is not present.
- Below minimum—Fan is present but rotating too slowly or stopped.
- Above minimum—Fan is rotating too quickly.
- Unknown—Unknown fan unit installed.
- FAULTY—Fan has exceeded hardware tolerance.

The output from this command varies depending on switch type and number of fans present. Refer to the appropriate hardware reference manual for details regarding the fan status. You may first consider re-seating the fan (unplug it and plug it back in).

Checking the status of a power supply

1. Connect to the switch and log in as admin.
2. Enter the **psShow** command:

```
switch:admin> psshow

Power Supply #1 is OK
V10645,TQ2Z6452916     ,60-0300031-02, B, QCS ,DCJ3001-02P     , A,TQ2Z64529
Power Supply #2 is faulty
V10704,    TQ2J7040124    ,60-0300031-02, B,CHRKE,SP640-Y01A     ,C ,TQ2J7040
```

The possible status values are:

- OK—Power supply functioning correctly.
- Absent—Power supply not present.
- Unknown—Unknown power supply unit installed.
- Predicting failure—Power supply is present but predicting failure.
- FAULTY—Power supply is present but faulty (no power cable, power switch turned off, fuse blown, or other internal error).

If any of the power supplies show a status other than OK, consider replacing the power supply as soon as possible.

For certain switch models, the OEM serial ID data displays after each power supply status line.

Checking temperature status

1. Connect to the switch and log in as admin.
2. Enter the **tempShow** command:

```
switch:admin> tempshow
Sensor  State           Centigrade     Fahrenheit
  ID
=================================================
  1     Ok                  28             82
  2     Ok                  16             60
  3      Ok                        18                64
```

Information displays for each temperature sensor in the switch.

The possible temperature status values are:

- OK—Temperature is within acceptable range.
- FAIL—Temperature is outside of acceptable range. Damage might occur.

Refer to the hardware reference manual for your switch to determine the normal temperature range.

System message log

The system message log, or RASLog, feature enables messages to be saved across power cycles and reboots.

The Brocade 48000 director and the Brocade DCX and DCX-4S enterprise-class platforms maintain the same RASlog for each of the two CP blades. Since all RASlog messages will be routed to the Active CP, the message CPU ID is added as part of the RASlog message attribute. RASlog message attribute *SLOT* is defined to identify the CPU that generated the message.

For example, in the following message the identifier *SLOT 6* means the message was generated from the slot 6 blade main CPU:

```
2001/01/07-04:03:00, [SEC-1203], 2,SLOT 6 | FFDC | CHASSIS, INFO, C08_1, Login
information: Login successful via TELNET/SSH/RSH. IP Addr: 192.168.38.2050
```

and the identifier *SLOT 6/1* means the message was generated from slot 6 blade Co-CPU.

```
2001/01/07-04:03:00, [SEC-1203], 2, SLOT 6/1 , | FFDC | CHASSIS, INFO, C08_1,
Login information: Login successful via TELNET/SSH/RSH. IP Addr:
192.168.38.2050
```

Since RASlog supports Virtual Fabrics and logical switches, the *FID* (Fabric ID) displays on every RASlog message to identify the source of the logical switch that generates the message.

The FID can be a number from 0 to 128, and the identifier *CHASSIS* depends on the instance that generates the message and that it was generated by a chassis instance. The identifier *FID 128* means the message was generated by the default switch instance.

```
2008/08/01-00:19:44, [LOG-1003], 1, SLOT 6 | CHASSIS, INFO, Silkworm12000, The
log has been cleared.
2008/09/08-06:52:50, [FW-1424], 187, SLOT 6 | FID 128, WARNING, Switch10,
Switch status changed from HEALTHY to DOWN.
```

For details on error messages, see the *Fabric OS Message Reference*.

Displaying the system message log, with no page breaks

1. Connect to the switch and log in as admin.
2. Enter the **errDump** command.

Displaying the system message log one message at a time

1. Connect to the switch and log in as admin.
2. Enter the **errShow** command.

Clearing the system message log

1. Connect to the switch and log in as admin.
2. Enter the **errClear** command.

3. Repeat step 2 on the standby CP for a complete erasure of the message log.

   All switch and chassis events are removed from both CPs.

Port log

The Fabric OS maintains an internal log of all port activity. The port log stores entries for each port as a circular buffer. The range of lines is 32768 to 65536 for the Brocade 48000 and the Brocade 7500 switch. For all other switches, the number of lines range from 8192 to 16384. These ranges are for all ports on the switch, not just for one port. When the log is full, the newest log entries overwrite the oldest log entries. The port log is not persistent and is lost over power-cycles and reboots. If the port log is disabled, an error message displays.

NOTE
Port log functionality is completely separate from the system message log. The port log is typically used to troubleshoot device connections.

Viewing the port log

1. Connect to the switch and log in as admin.
2. Enter the **portLogShow** command:

```
switch:admin> portlogshow
time         task       event   port cmd  args
-------------------------------------------------
Fri Feb 22 16:48:45 2008
16:48:45.208 SPEE       sn       67   NM  00000009,00000000,00000000
16:48:46.783 PORT       Rx       64   40  02fffffd,00fffffd,02e2ffff,14000000
16:48:46.783 PORT       Tx       64    0  c0fffffd,00fffffd,02e201bf,00000001
16:48:46.783 FCPH       read     64   40  02fffffd,00fffffd,be000000,00000000,02e201bf
16:48:46.783 FCPH       seq      64   28  22380000,02e201bf,00000c1e,0000001c,00000000
16:48:46.828 SPEE       sn       67   NM  00000009,00000000,00000000
16:48:46.853 PORT       Rx       76   40  02fffffd,00fffffd,02e3ffff,14000000
16:48:46.853 PORT       Tx       76    0  c0fffffd,00fffffd,02e301c1,00000001
16:48:46.853 FCPH       read     76   40  02fffffd,00fffffd,bf000000,00000000,02e301c1
16:48:46.853 FCPH       seq      76   28  22380000,02e301c1,00000c1e,0000001c,00000000
16:48:47.263 PORT       Rx       79   40  02fffffd,00fffffd,02e4ffff,14000000
16:48:47.263 PORT       Tx       79    0  c0fffffd,00fffffd,02e401c2,00000001
16:48:47.263 FCPH       read     79   40  02fffffd,00fffffd,c0000000,00000000,02e401c2
16:48:47.263 FCPH       seq      79   28  22380000,02e401c2,00000c1e,0000001c,00000000
```

```
<output truncated>
```

Use the commands summarized in Table 17 to view and manage port logs. See the *Fabric OS Command Reference* for additional information about these commands.

TABLE 17 Commands for port log management

Command	Description
portLogClear	Clear port logs for all or particular ports.
portLogDisable	Disable port logs for all or particular ports.
portLogDump	Display port logs for all or particular ports, without page breaks.
portLogEnable	Enable port logs for all or particular ports.
portLogShow	Display port logs for all or particular ports, with page breaks.

The **portLogDump** command output (trace) is a powerful tool that is used to troubleshoot fabric issues. The **portLogDump** output provides detailed information about the actions and communications within a fabric. By understanding the processes that are taking place in the fabric, issues can be identified and located.

The **portLogDump** command displays the port log, showing a portion of the Fibre Channel payload and header (FC-PH). The header contains control and addressing information associated with the frame. The payload contains the information being transported by the frame and is determined by the higher-level service or FC_4 upper level protocol. There are many different payload formats based on the protocol.

Because a **portLogDump** output is long, a truncated example is presented:

```
switch:admin> portlogdump
time         task       event   port cmd  args
-------------------------------------------------
Fri Feb 22 20:29:12 2008
20:29:12.638 FCPH       write     3   40  00fffffd,00fffffd,00000000,00000000,00000000
20:29:12.638 FCPH       seq       3   28  00300000,00000000,000005f4,00020182,0000000
20:29:12.638 PORT       Tx        3   40  02fffffd,00fffffd,09a5ffff,14000000
20:29:12.638 FCPH       write     9   40  00fffffd,00fffffd,00000000,00000000,00000000
20:29:12.638 FCPH       seq       9   28  00300000,00000000,000005f4,00020182,00000000
20:29:12.639 PORT       Tx        9   40  02fffffd,00fffffd,09a6ffff,14000000
20:29:12.639 PORT       Rx        3    0  c0fffffd,00fffffd,09a50304,00000001
20:29:12.640 PORT       Rx        9    0  c0fffffd,00fffffd,09a60305,00000001
20:29:20.804 PORT       Rx        9   40  02fffffd,00fffffd,0306ffff,14000000
20:29:20.805 PORT       Tx        9    0  c0fffffd,00fffffd,030609a7,00000001
20:29:20.805 FCPH       read      9   40  02fffffd,00fffffd,d1000000,00000000,030609a7
20:29:20.805 FCPH       seq       9   28  22380000,030609a7,00000608,0000001c,00000000
20:29:20.805 PORT       Rx        3   40  02fffffd,00fffffd,02eeffff,14000000
20:29:20.806 PORT       Tx        3    0  c0fffffd,00fffffd,02ee09a8,00000001
20:29:20.806 FCPH       read      3   40  02fffffd,00fffffd,d2000000,00000000,02ee09a8
20:29:20.806 FCPH       seq       3   28  22380000,02ee09a8,00000608,0000001c,00000000
20:29:32.638 FCPH       write     3   40  00fffffd,00fffffd,00000000,00000000,00000000
20:29:32.638 FCPH       seq       3   28  00300000,00000000,000005f4,00020182,00000000
20:29:32.638 PORT       Tx        3   40  02fffffd,00fffffd,09a9ffff,14000000
20:29:32.638 FCPH       write     9   40 00fffffd,00fffffd,00000000,00000000, 00000000


20:29:32.638 FCPH       seq       9   28  00300000,00000000,000005f4,00020182,00000000
20:29:32.639 PORT       Tx        9   40  02fffffd,00fffffd,09aaffff,14000000
<output truncated>
```

Syslogd configuration

The system logging daemon (syslogd) is an IP-based service for logging system messages made available by default on Unix and Linux operating systems. It is available as a third-party application for Windows operating systems.

Fabric OS can be configured to use a UNIX-style syslogd process to forward system events and error messages to log files on a remote host system. The host system can be running UNIX, Linux, or any other operating system that supports the standard syslogd functionality.

Fabric OS supports UNIX local7 facilities (the default facility level is 7). Configuring for syslogd involves configuring the host, enabling syslogd on the switch, and, optionally, setting the facility level.

Configuring the host

Fabric OS supports a subset of UNIX-style message severities that default to the UNIX local7 facility. To configure the host, edit the */etc/syslog.conf* file to map Fabric OS message severities to UNIX severities, as shown in Table 18.

TABLE 18 Fabric OS to UNIX message severities

Fabric OS message severity	UNIX message severity
Critical (1)	Emergency (0)
Error (2)	Error (3)
Warning (3)	Warning (4)
Info (4)	Info (6)

In this example, Fabric OS messages map to local7 facility level 7 in the */etc/syslog.conf* file:

```
local7.emerg         /var/adm/swcritical
local7.alert         /var/adm/alert7
local7.crit          /var/adm/crit7
local7.err           /var/adm/swerror
local7.warning       /var/adm/swwarning
local7.notice        /var/adm/notice7
local7.info          /var/adm/swinfo
local7.debug         /var/adm/debug7
```

If you prefer to map Fabric OS severities to a different UNIX local7 facility level, see “Setting the facility level” on page 103.

Configuring the switch

Configuring the switch involves specifying syslogd hosts and, optionally, setting the facility level. You can also remove a host from the list of syslogd hosts.

Specifying syslogd hosts

1. Connect to the switch and log in as admin.
2. Enter the **syslogdIpAdd** command and specify an IP address.

3. Verify that the IP address was entered correctly, using the **syslogdIpShow** command.

The **syslogdIpadd** command accepts IPv4 and IPv6 addresses. You can specify up to six host IP addresses for storing syslog messages, as shown in this example:

```
switch:admin> syslogdipadd 1080::8:800:200C:417A
switch:admin> syslogdipadd 1081::8:800:200C:417A
switch:admin> syslogdipadd 1082::8:800:200C:417A
switch:admin> syslogdipadd 10.1.2.4
switch:admin> syslogdipadd 10.1.2.5
switch:admin> syslogdipadd 10.1.2.6

switch:admin> syslogdipshow
syslog.IP.address.1080::8:800:200C:417A
syslog.IP.address.1081::8:800:200C:417A
syslog.IP.address.1082::8:800:200C:417A
syslog.IP.address.4 10.1.2.4
syslog.IP.address.5 10.1.2.5
syslog.IP.address.6 10.1.2.6
```

Setting the facility level

1. Connect to the switch and log in as admin.
2. Enter the following command:

   ```
   switch:admin> syslogdfacility -l n
   ```

   n is a number from 0 through 7, indicating a UNIX local7 facility. The default is 7.

It is necessary to set the facility level only if you specified a facility other than local7 in the host */etc/syslog.conf* file.

Removing a syslogd host from the list

1. Connect to the switch and log in as admin.
2. Enter the **syslogdIpRemove** command:

   ```
   switch:admin> syslogdipremove 10.1.2.1
   ```

3. Verify the IP address was deleted using the **syslogdIpShow** command.

Automatic trace dump transfers

You can set up a switch so that diagnostic information is transferred automatically to a remote server. If a problem occurs, you can then provide your customer support representative with the most detailed information possible. To ensure the best service, you should set up for automatic transfer as part of standard switch configuration, before a problem occurs.

Setting up for automatic transfer of diagnostic files involves the following tasks:

- Specifying a remote server to store the files.
- Enabling the automatic transfer of trace dumps to the server. (Trace dumps overwrite each other by default; sending them to a server preserves information that would otherwise be lost.)

- Setting up a periodic checking of the remote server so that you are alerted if the server becomes unavailable and you can correct the problem.

After the setup is complete, you can run the **supportSave -c** command to save RASLog, TRACE, supportShow, core file, FFDC data and other diagnostic support information to the server without specifying server details.

The following procedures describe the tasks for setting up automatic transfer. For details on the commands, see the *Fabric OS Command Reference*.

Specifying a remote server

1. Verify that the FTP service is running on the remote server.
2. Connect to the switch and log in as admin.
3. Enter the **supportFtp -s** command and respond to the prompts.

Enabling the automatic transfer of trace dumps

1. Connect to the switch and log in as admin.
2. Enter the **supportFtp -e** command.

Setting up periodic checking of the remote server

1. Connect to the switch and log in as admin.
2. Enter the **supportFtp -t** command.

Example of setting the interval in hours

```
switch:admin> supportftp -t 4
supportftp: ftp check period changed
```

The minimum interval is 1 hour. Specify 0 hours to disable the checking feature.

Saving comprehensive diagnostic files to the server

1. Connect to the switch and log in as admin.
2. Enter the **supportSave -c** command and respond to the prompts.

Example of the supportSave -c command

```
switch:admin> supportsave -c
This command will collect RASLOG, TRACE, supportShow, core file, FFDC data
and other support information and then transfer them to a FTP/SCP server
or a USB device. This operation can take several minutes.
NOTE: supportSave will transfer existing trace dump file first, then
automatically generate and transfer latest one. There will be two trace dump
files transfered after this command.
OK to proceed? (yes, y, no, n): [no] y
```

Appendix

Switch Type and Blade ID

A

The *switchType* is a displayed field listed when you run the **switchShow** command. When you are gathering information to give to your switch support provider, you may be asked the switch model. If you do not know the model, you can use this chart to convert the switchType to a B-Series model number.

```
switch:admin> switchshow
switchName:Sprint5100
switchType:66.1 <=== convert this number using Table 19
switchState:Online
switchMode:Native
switchRole:Principal
switchDomain:1
switchId:fffc01
switchWwn:10:00:00:05:1e:82:3c:2a
zoning:OFF
switchBeacon:OFF
FC Router:OFF
FC Router BB Fabric ID:128
```

The number 66 is the switchType and the .1 is the revision of the motherboard of the switch. The revision number is not necessary when converting the number.

TABLE 19 switchType to B-Series model converter

switchType	B-Series switch model	ASIC	Base switch speed
12	3900	BLOOM	2 Gb 32-port switch
16	3200	BLOOM	2 Gb 8-port value line switch
21	24000	BLOOMII	2 Gb 128-port core fabric switch
26	3850	BLOOMII	2 Gb 16-port switch with switch limit
27	3250	BLOOMII	2 Gb 8-port switch with switch limit
29	4012	GoldenEye	2 Gb 12-port embedded switch
32	4100	Condor	4 Gb 32-port switch
34	200E	GoldenEye	2 Gb 16-port switch with switch limit
37	4020	GoldenEye	2 Gb 20-port embedded switch
42	48000	Condor	4 Gb 256-port core fabric switch
43	4024	GoldenEye	2 Gb 24-port embedded switch
44	4900	Condor	4 Gb 64-port
45	4016	GoldenEye	2 Gb 16-port embedded switch
46	7500	Condor	4 Gb 32-port switch and FC Router
51	4018	GoldenEye	2 Gb 16/18-port embedded switch
55	7600	Condor	4 Gb 32-port switch

TABLE 19 switchType to B-Series model converter

switchType	B-Series switch model	ASIC	Base switch speed
58	5000	Condor	4 Gb 32-port switch
61	4424	GoldenEye	2 Gb 24-port embedded switch
62	Brocade DCX	Condor2	8 Gb 798-port core fabric backbone
64	5300	GoldenEye2	8 Gb 64-port switch
66	5100	Condor2	8 Gb 32-port switch
67	Brocade Encryption Switch	Condor2	8 Gb 16-port encryption switch
69	5410	GoldenEye2	8 Gb 12-port embedded switch
71	300	GoldenEye2	8 Gb 16-port switch
72	5480	GoldenEye2	8 Gb 24-port embedded switch
75	M5424	GoldenEye2	8 Gb 24-port embedded switch
76	8000	Condor2	8 Gb 16-FC port, 10 GbE 8-Ethernet port switch
77	Brocade DCX-4S	Condor2	8 Gb 192-port core fabric backbone
83	7800	Condor2	8 Gb 16-FC ports, 6 GbE ports extension switch

You can use Table 20 to find the description of the blade model displayed in the output from the **slotShow** command.

```
switch:admin> slotshow

Slot   Blade Type     ID    Model Name     Status
--------------------------------------------------
  1     SW BLADE     77    FC8-64         ENABLED
  2     AP BLADE     75    FX8-24         ENABLED
  3     AP BLADE     33    FA4-18         ENABLED
  4     SW BLADE     39    FC10-6         ENABLED
  5     CORE BLADE   52    CORE8          ENABLED
  6     CP BLADE     50    CP8            ENABLED
  7     CP BLADE     50    CP8            ENABLED
  8     CORE BLADE   52    CORE8          ENABLED
  9     AP BLADE     43    FS8-18         ENABLED
 10     SW BLADE     37    FC8-16         ENABLED
 11     SW BLADE     55    FC8-32         ENABLED
 12     AP BLADE     75    FX8-24         ENABLED
```

TABLE 20 B-series blade model descriptions

Blade ID	B-series blade model	ASIC	Description
4	FC2-16	n/a	2 Gb 16-FC ports blade
17	FC4-16	n/a	4 Gb 16-FC ports blade
18	FC4-32	n/a	4 Gb 32-FC ports blade
21	FC8-16	n/a	8 Gb 16-FC ports blade
24	FR4-18i	Condor	16 FC-ports with 2 GbE ports router blade
31	FC4-16IP	Condor	8 FC ports and 8 GbE copper RJ-45 ports iSCSI blade

TABLE 20 B-series blade model descriptions (Continued)

Blade ID	B-series blade model	ASIC	Description
33	FA4-18	Condor	4 Gb 16-FC ports with two 10/100/1000 BaseT Ethernet copper interfaces Fibre Channel Application Services blade
36	FC4-48	n/a	4 Gb 48-FC ports blade
39	FC10-6	Condor	10 Gb 6-FC ports blade
51	FC8-48	Condor2	8 Gb 48-FC ports blade
55	FC8-32	n/a	8 Gb 32-FC ports blade
68	FS8-18	Condor2	8 Gb 16-port encryption blade
74	FCOE10-24	Condor2	24-FC ports on an application blade that provides Converged Enhanced Ethernet to bridge a Fibre Channel and Ethernet SAN.
75	FX8-24	Condor2	24-FC port with 10 1-GbE and two 10-GbE ports Fibre Channel routing and FCIP blade
77	FC8-64	Condor2	8 Gb 64-FC ports blade

Appendix

Hexadecimal

B

Hexadecimal, or simply hex, is a numeral system with a base of 16, usually written using unique symbols 0–9 and A–F, or a–f. Its primary purpose is to represent the binary code that computers interpret and represent in a format easier for humans to read. It acts as a form of shorthand, in which one hexadecimal digit stands in place of four binary bits. For example, the decimal numeral 79, whose binary representation is 01001111, is 4F (or 4f) in hexadecimal (4 = 0100, F = 1111). Hexadecimal numbers can have either an *0x* prefix or an *h* suffix. For example, 0xFFFFFA is the same address as FFFFFA*h.* This type of address is called a hex triplet. Fibre Channel uses hexadecimal notation in hex triplets to specify well-known addresses and port IDs.

Example of hexadecimal triplet conversion

Notice the PID in the nsshow output is in hexadecimal.

```
Switch:admin> nsshow
{
 Type Pid    COS     PortName                NodeName                 TTL(sec)
 N    610600;    2,3;10:00:00:00:c9:29:b3:84;20:00:00:00:c9:29:b3:84; na
    FC4s: FCP
    NodeSymb: [36] "Emulex LP9002 FV3.90A7  DV5-5.10A10 "
    Fabric Port Name: 20:08:00:05:1e:01:23:e0
    Permanent Port Name: 10:00:00:00:c9:29:b3:84
    Port Index: 6
    Share Area: No
    Device Shared in Other AD: No
    Redirect: No
The Local Name Server has 1 entry }
```

1. Separate the triplets: 61 06 00
2. Convert each hexadecimal value to a decimal representation:

   61 = Domain ID = 97

   06 = Area (port number) = 06

   00 = Port (AL_PA) = 0 (not used in this instance, but is used in loop, NPIV, and Access Gateway devices)

   Result: hexadecimal triplet 610600 = decimal triplet 97,06,00

TABLE 21 Decimal to Hex conversion table

Decimal	01	02	03	04	05	06	07	08	09	10
Hex	01	02	03	04	05	06	07	08	09	0a
Decimal	11	12	13	14	15	16	17	18	19	20
Hex	0b	0c	0d	0e	0f	10	11	12	13	14
Decimal	21	22	23	24	25	26	27	28	29	30
Hex	15	16	17	18	19	1a	1b	1c	1d	1e
Decimal	31	32	33	34	35	36	37	38	39	40
Hex	1f	20	21	22	23	24	25	26	27	28
Decimal	41	42	43	44	45	46	47	48	49	50
Hex	29	2a	2b	2c	2d	2e	2f	30	31	32
Decimal	51	52	53	54	55	56	57	58	59	60
Hex	33	34	35	36	37	38	39	3a	3b	3c
Decimal	61	62	63	64	65	66	67	68	69	70
Hex	3d	3e	3f	40	41	42	43	44	45	46
Decimal	71	72	73	74	75	76	77	78	79	80
Hex	47	48	49	4a	4b	4c	4d	4e	4f	50
Decimal	81	82	83	84	85	86	87	88	89	90
Hex	51	52	53	54	55	56	57	58	59	5a
Decimal	91	92	93	94	95	96	97	98	99	100
Hex	5b	5c	5d	5e	5f	60	61	62	63	64
Decimal	101	102	103	104	105	106	107	108	109	110
Hex	65	66	67	68	69	6a	6b	6c	6d	6e
Decimal	111	112	113	114	115	116	117	118	119	120
Hex	6f	70	71	72	73	74	75	76	77	78
Decimal	121	122	123	124	125	126	127	128	129	130
Hex	79	7a	7b	7c	7d	7e	7f	80	81	82
Decimal	131	132	133	134	135	136	137	138	139	140
Hex	83	84	85	86	87	88	89	8a	8b	8c
Decimal	141	142	143	144	145	146	147	148	149	150
Hex	8d	8e	8f	90	91	92	93	94	95	96
Decimal	151	152	153	154	155	156	157	158	159	160
Hex	97	98	99	9a	9b	9c	9d	9e	9f	a0
Decimal	161	162	163	164	165	166	167	168	169	170
Hex	a1	a2	a3	a4	a5	a6	a7	a8	a9	aa
Decimal	171	172	173	174	175	176	177	178	179	180
Hex	ab	ac	ad	ae	af	b0	b1	b2	b3	b4

TABLE 21 Decimal to Hex conversion table (Continued)

Decimal	181	182	183	184	185	186	187	188	189	190
Hex	b5	b6	b7	b8	b9	ba	bb	bc	bd	be
Decimal	191	192	193	194	195	196	197	198	199	200
Hex	bf	c0	c1	c2	c3	c4	c5	c6	c7	c8
Decimal	201	202	203	204	205	206	207	208	209	210
Hex	c9	ca	cb	cc	cd	ce	cf	d0	d1	d2
Decimal	211	212	213	214	215	216	217	218	219	220
Hex	d3	d4	d5	d6	d7	d8	d9	da	db	dc
Decimal	221	222	223	224	225	226	227	228	229	230
Hex	dd	de	df	e0	e1	e2	e3	e4	e5	e6
Decimal	231	232	233	234	235	236	237	238	239	240
Hex	e7	e8	e9	ea	eb	ec	ed	ef	ee	f0
Decimal	241	242	243	244	245	246	247	248	249	250
Hex	f1	f2	f3	f4	f5	f6	f7	f8	f9	fa
Decimal	251	252	253	254	255					
Hex	fb	fc	fd	fe	ff					

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