IBM eserver BladeCenter™ Fibre Channel Switch Interoperability Guide

Version 3.0

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Introduction

The *IBM eServer BladeCenter Switch Interoperability Guide* provides the details needed to configure and deploy multi-vendor switched fabrics. Detailed switch configuration data and step-by-step configuration procedures are provided to merge the IBM eServer BladeCenter with Brocade, Cisco, CNT, McDATA, and QLogic Fibre Channel switched fabrics that comply with the second revision of the Fibre Channel switch standard (FC-SW-2).

The FC-SW-2 Standard

FC-SW-2 is an open standard for switch-to-switch communication, allowing end users to choose best-in-class products with the assurance that these products can be deployed in multi-vendor storage area networks (SANs). Fibre Channel switches complying with this standard communicate connectivity and configuration information, path selection, and routing, as well as management and event services using the same language. FC-SW-2 also provides standardized mechanisms for SAN management. These applications can configure, manage, and monitor multi-vendor Fibre Channel SANs from any particular point in the fabric.

The IBM eServer BladeCenter Fibre Channel Switch Module and QLogic 6-port Enterprise Fibre Channel Switch Module (hereinafter referred to as the IBM switch modules), along with switches from Brocade, Cisco, CNT, McDATA, and QLogic, can communicate across three specified FC-SW-2 levels, enabling end-users to deploy products that best suit their needs.

Level 1 addresses switch connectivity and configuration by allowing Fibre Channel switches to interoperate at the link level and by enabling switches to be configured as part of physical and logical configurations (such as Zoning). Fabric Zones allow customers to partition their storage network based on application requirements and to create virtual private SANs within a larger SAN.

Level 2 defines path selection and routing, which create interoperability at the operational level. The fabric shortest path first (FSPF) selection process, which is a key element of FC-SW-2, allows paths to be set up between end devices using multi-switch fabrics. This enables customers to design and implement Fibre Channel configurations based on their individual requirements.

Level 3 specifies management and event services. These services allow Fibre Channel services to be implemented using a distributed model, increasing availability and scalability throughout the entire fabric. The Name Server and Management Server allow the physical and logical SAN topology to be discovered through upper-level SAN management applications, thereby facilitating resource management and capacity planning. Event services create the means for SAN administrators to be notified in case of configuration changes, allowing them to take appropriate action.

IBM TotalStorage Support

This guide is limited to stating vendor switch interoperability with IBM switch modules (IBM eServer BladeCenter Fibre Channel Switch Module and QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter) using the FC-SW-2 open standard for switch-to-switch communication. This guide is not intended to provide interoperability support statements for IBM TotalStorage or other Fibre Channel storage vendor products of SAN configurations.

For interoperability and technical support information for IBM TotalStorage products, please use the support and interoperability URLs for IBM or other vendor products listed below.

Contacting IBM eServer BladeCenter

For more information about merging the IBM eServer BladeCenter with other switched fabrics, please contact IBM customer service. Resources can be found at the following IBM Web sites:

IBM eServer BladeCenter
http://www.ibm.com/servers/eserver/bladecenter/

IBM Technical Support
http://www.ibm.com/support/us/

NOTE: If you are contacting IBM technical support concerning implementing multi-vendor switches, specify *machine type* as **BladeCenter** so that your questions can be routed to the appropriate support representative.

IBM eServer BladeCenter Literature
http://www.pc.ibm.com/us/eserver/bladecenter/literature.html

Other IBM TotalStorage Contacts

For information on specific IBM products, refer to the following resources:

IBM FastT Storage Interoperability Matrix
http://www.storage.ibm.com/disk/fastt/supserver.htm

IBM Enterprise Storage Server (ESS) Interoperability Matrix
http://www.storage.ibm.com/disk/ess/supserver.htm

IBM TotalStorage Technical Support
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/sanfcswitch

IBM TotalStorage SAN Fibre Channel Switch 3534 Model F08
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/3534f08
ftp://service.boulder.ibm.com/storage/san/3534f08/SM3534F08.pdf

IBM TotalStorage SAN Fibre Channel Switch 2109 Model F16
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/2109f16
ftp://service.boulder.ibm.com/storage/san/2109f16/SM2109F16.pdf

IBM TotalStorage SAN Fibre Channel Switch 2109 Model F32
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/2109f32
ftp://service.boulder.ibm.com/storage/san/2109f32/SM2109F32.pdf

IBM TotalStorage SAN Fibre Channel Switch 2109 Model M12
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/2109m12
ftp://service.boulder.ibm.com/storage/san/2109m12/SM2109M12.pdf

Contacting Other Storage Vendors

Cisco MDS 9216 Multilayer Fabric Switch
Cisco MDS 9509 Multilayer Director
http://www.cisco.com/go/ibm/storage

CNT FC/9000 Enterprise Director
http://www.cnt.com/partners/technology/ibm

McDATA ES-3016 & ES-3032 Fabric Switches (IBM Models 2031-16 & 2031-32)
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/es3000
ftp://service.boulder.ibm.com/storage/san/es3032/SMES3032.pdf

McDATA Sphereon 3216 & 3232 Fabric Switches (IBM Models 2031-216 & 2031-232)
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/es3232
ftp://service.boulder.ibm.com/storage/san/es3232/SMES3232.pdf

McDATA 4500 Fabric Switch (IBM Model 2031-224)
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/es4500
ftp://service.boulder.ibm.com/storage/san/es4500/SMES4500.pdf

McDATA Intrepid 6064 Enterprise Fibre Channel Director 1 & 2 Gbit/sec (IBM Model 2032-064)
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/ed6064
ftp://service.boulder.ibm.com/storage/san/ed6064/SMED6064.pdf

McDATA Intrepid 6140 Director 2 Gbit/sec (IBM Model 2032-140)
http://www.ssddom02storage.ibm.com/techsup/webnav.nsf/support/ed6140
ftp://service.boulder.ibm.com/storage/san/ed6140/SMED6140.pdf

QLogic SANbox2 Switches Product Information
http://www.qlogic.com/products/fc_san_switchs.asp

QLogic SANbox2 Switches Product Support
http://www.qlogic.com/support/home_resources.asp?id=37

QLogic SANbox 5200 Switches Product Information
http://www.qlogic.com/products/fc_san_switchs.asp

QLogic SANbox 5000 Switches Product Information and Product Support
http://www.qlogic.com/support/product_resources.asp?id=540

Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard.

IBM Supported Switch and Firmware Versions

Switch Model	Firmware Version
IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above

The IBM switch modules have tested interoperable with the following switches from Brocade, Cisco, CNT, McDATA, and QLogic that comply with the FC-SW-2 standard. See the referenced page for detailed instructions on merging IBM BladeCenter with these fabrics.

Brocade, Cisco, CNT, McDATA, and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Brocade (see page 11)	SilkWorm 3200/ IBM TotalStorage SAN Switch H08	3.0.2g and above
	SilkWorm 3250/ IBM TotalStorage SAN Switch F08	4.2.0c and above
	SilkWorm 3800/ IBM TotalStorage SAN Switch H16	3.0.2g and above
	SilkWorm 3850/ IBM TotalStorage SAN Switch F16	4.2.0c and above
	SilkWorm 3900/ IBM TotalStorage SAN Switch F32	4.0.0e and above
	SilkWorm 12000/ IBM TotalStorage SAN Switch M14	4.0.0e and above
	SilkWorm 24000/ IBM TotalStorage Director M14	*version?*
Cisco (see page 129)	MDS 9216 Switch	1.2(1) and above
	MDS 9509 Director	1.2(1) and above
CNT (see page 173)	FC/9000 Switch	Code set 3.0.3 and above

Brocade, Cisco, CNT, McDATA, and QLogic
Supported Switch and Firmware Versions (Continued)

Manufacturer	Switch Model	Firmware Version
McDATA (see page 213)	ES-3016/IBM 2031-16	5.1 and above
	ES-3032/IBM 2031-32	5.1 and above
	Sphereon 3032/IBM 2031-216	5.1 and above
	Sphereon 3232/IBM 2031-232	5.1 and above
	Sphereon 4300/ *[IBM equivalent?]*	6.02.00 22 and above
	Sphereon 4500/IBM 2031-224	5.1 and above
	Intrepid 6064 Director/IBM 2032-064	5.1 and above
	Intrepid 6140 Director/IBM 2032-140	5.1 and above
QLogic (see page 311)	SANbox 5200	4.0.0.x-x and above
	SANbox2-8	1.5.x and above
	SANbox2-16	1.5.x and above
	SANbox2-64	1.5.x and above

How to Use this Guide

The *IBM eServer BladeCenter Switch Interoperability Guide* provides detailed switch configuration data and step-by-step configuration procedures for merging the IBM eServer BladeCenter with Brocade, Cisco, CNT, McDATA, and QLogic Fibre Channel switched fabrics.

NOTE: Updated versions of this guide can be downloaded from the following IBM Web site: http://www.ibm.com/servers/eserver/bladecenter/.

This section discusses:

- How the guide is organized (see page 7)
- CLI documentation conventions (see page 9)

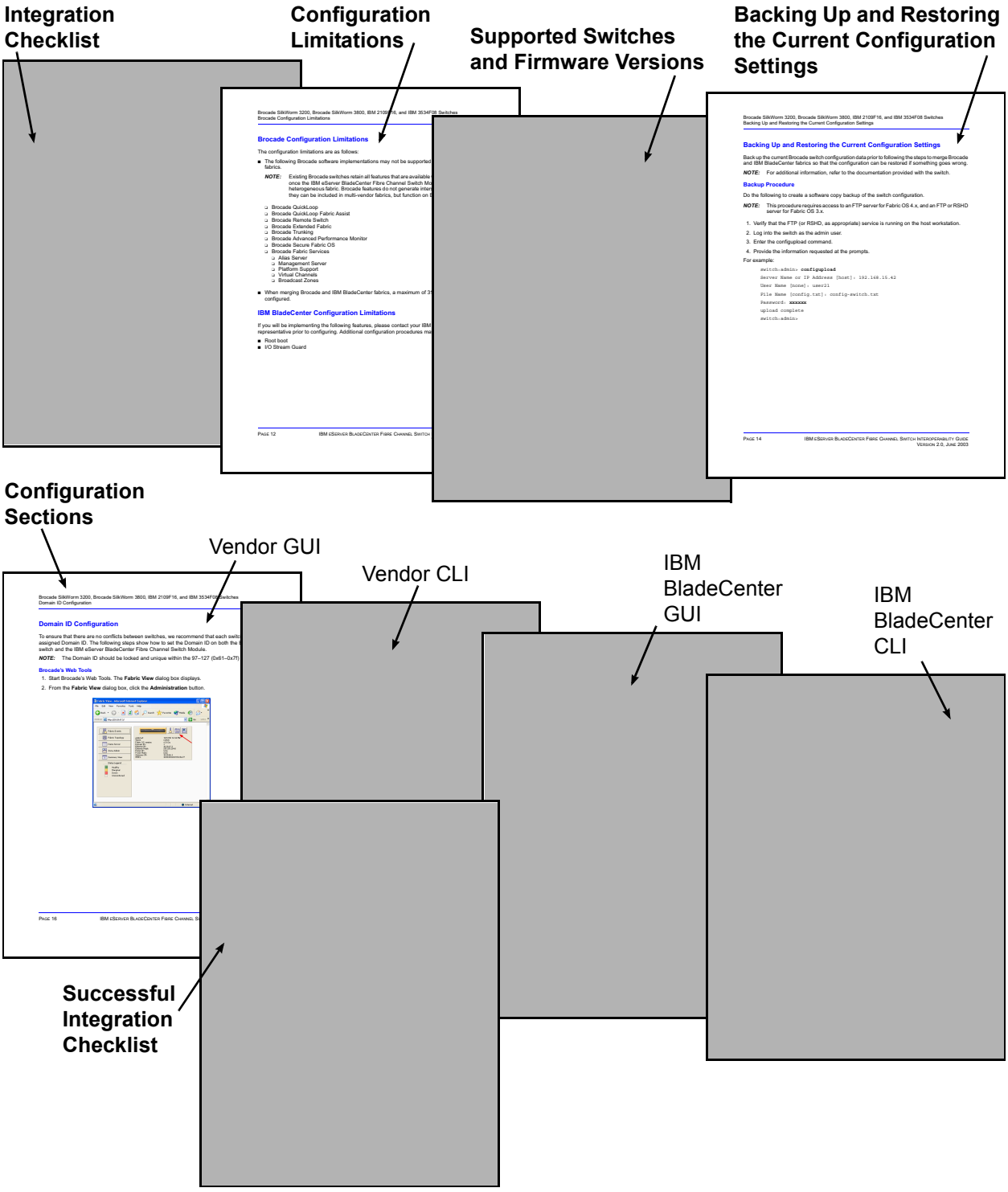
How the Guide Is Organized

All chapters within the *IBM eServer BladeCenter Switch Interoperability Guide* are organized the same way. For a visual representation, see page 8.

- **Integration Checklist.** Lists the steps that must be completed to successfully merge the fabrics.
- **Vendor and IBM BladeCenter Configuration Limitations.** Details the configuration limitations, including features not supported by the vendor switches and IBM switch modules.
- **Supported Switches and Firmware Versions.** The supported switches and firmware versions for which this information applies.
- **Backing Up and Restoring the Current Configuration Settings.** The procedures for backing up and restoring the current switch configuration data.
- For the vendor switch and the IBM switch module, this guide provides graphical user interface (GUI) and command line interface (CLI) information, as appropriate, for the following:
  - **Domain ID Configuration**
  - **Timeout Values**
  - **Principal Switch Configuration**
  - **Zone Configuration**
  - **Operating Mode Configuration**
  - **Vendor and IBM BladeCenter Specific Configuration**
- **Successful Integration Checklist.** Lists the steps to be taken after the E_port connection has been established and the fabric has had time to update.

In addition, refer to the **Glossary** (see page 355) for terms used in this guide and to the **Index** (see page 361) for quick reference to key topics.

Visual Representation of How the Chapters Are Organized



CLI Documentation Conventions

The following is a sample CLI. Note the following:

- Items in brackets (such as [Online]) indicate the default value.
- Items in **bold** (such as **set config switch**) indicate the value to be entered or range of values that can be entered.
- Login. As each line displays, enter the value or accept the default value. Then press **Enter**.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Merging IBM BladeCenter and Brocade Fabrics

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

IBM and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
Brocade	SilkWorm 3200/ IBM TotalStorage SAN Switch H08	3.0.2g and above
	SilkWorm 3250/ IBM TotalStorage SAN Switch F08	4.2.0c and above
	SilkWorm 3800/ IBM TotalStorage SAN Switch H16	3.0.2g and above
	SilkWorm 3850/ IBM TotalStorage SAN Switch F16	4.2.0c and above
	SilkWorm 3900/ IBM TotalStorage SAN Switch F32	4.0.0e and above
	SilkWorm 12000/ IBM TotalStorage SAN Switch M14	4.0.0e and above
	SilkWorm 24000/ IBM TotalStorage Director M14	*version?*

The following chapters provide detailed information about merging Brocade and IBM BladeCenter fabrics:

- **Brocade SilkWorm 3000 Series Switches / IBM TotalStorage SAN Switches (8-Port and 16-Port)** **(see page 13)**
- **Brocade SilkWorm Switches / IBM TotalStorage SAN Switches (14-Port and 32-Port)** **(see page 71)**

Brocade SilkWorm 3000 Series Switches / IBM TotalStorage SAN Switches (8-Port and 16-Port)

Integration Checklist

The following steps must be completed to successfully merge Brocade and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see "Backing Up and Restoring the Current Configuration Settings" on page 17).

✓ Verify that the correct version of switch firmware is installed on each switch (see "Supported Switches and Firmware Versions" on page 16).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see "Domain ID Configuration" on page 19).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 31).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 47).

✓ Ensure that all zone members are specified by WWPN (see "Zone Types" on page 56).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see "Operating Mode Configuration" on page 64).

✓ Ensure that Brocade's Platform Management Server is disabled (see "Brocade Specific Configuration" on page 65).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 66).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

Brocade Configuration Limitations

The configuration limitations are as follows:

- When merging Brocade and IBM BladeCenter fabrics, be sure to enable Interoperability mode on all Brocade switches in the fabric. Brocade switches that are not in Interoperability mode are unable to communicate with IBM BladeCenter FC-SW-2 fabrics and Brocade fabrics in proprietary mode.
- Existing Brocade switches retain the following features that are available once the IBM switch module is merged into a heterogeneous fabric. The features will function on Brocade switches that are in Interoperability mode:
  - **QuickLoop.** Functions as described by Brocade on Brocade switches running in Interoperability mode. In addition, QuickLoop functions when an IBM switch module is between two Brocade QuickLoop partners. Brocade switches and IBM switch modules cannot become QuickLoop partners.
  - **Trunking.** Operates on all Brocade switches configured with this feature. Additionally, traffic submitted to and from a IBM switch module-attached device (initiator/target) can pass through Brocade Trunked ISL ports.
  - **Aliasing.** Operates on all Brocade switches configured with this feature. Can only be managed by the originating switch vendor's management utility or CLI. Aliased names do not propagate between vendors' management utilities, but when an Alias is created and entered into a zone, the WWPNs that were in the Alias propagate correctly.
- To support zoning with an IBM switch module and the Brocade SilkWorm 3200/IBM TotalStorage SAN Switch H08, you must purchase and enable a fabric zoning license from Brocade.
- Brocade proprietary features that may not function in multi-vendor fabrics include:
  - Brocade Fabric Assist
  - Brocade Remote Switch
  - Brocade Extended Fabric
  - Brocade Advanced Performance Monitor
  - Brocade Secure Fabric OS
  - Brocade Fabric Services
    - Management Server
    - Platform Support
    - Virtual Channels
    - Broadcast Zones

- When zoning ports greater than 16, be sure they reside in separate zones. Otherwise, you may not be able to see the target devices in all the ports. When forming an ISL between these larger port Brocade switches and another vendor in the Interoperability mode, Brocade switches no longer have default zones. Therefore, the attached switches—without extended addressing—cannot adequately address the higher Brocade switch ports without Name Server propagation. To enable upper port connectivity, follow these steps:
  1. Establish the ISL between switches with a port lower than 16.
  2. Apply any required zones in ports lower than 16.
  3. After applying zones in the lower numbered ports, the ports greater than 16 should be usable for zoning or establishing an ISL.
- When merging Brocade and IBM BladeCenter fabrics, a maximum of 31 switches can be configured.

NOTE: When making zone changes in a multi-vendor environment using the IBM BladeCenter SAN Utility or IBM BladeCenter SAN Browser ~~QLogic SANbox Manager GUI~~, zone changes propagate to the Brocade switches and display within the Brocade CLI but not in the Web Tools GUI. Zone changes using Brocade's Web Tools will successfully propagate to the IBM BladeCenter SAN Utility and IBM BladeCenter SAN Browser ~~QLogic SANbox Manager GUI~~ and ~~QLogic CLI~~ IBM BladeCenter CLI. *[Does this apply? What should this state?]*

Contacting Brocade

For more information on configuring the Brocade switches, please see the contact information located in the Introduction (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

Supported Switches and Firmware Versions

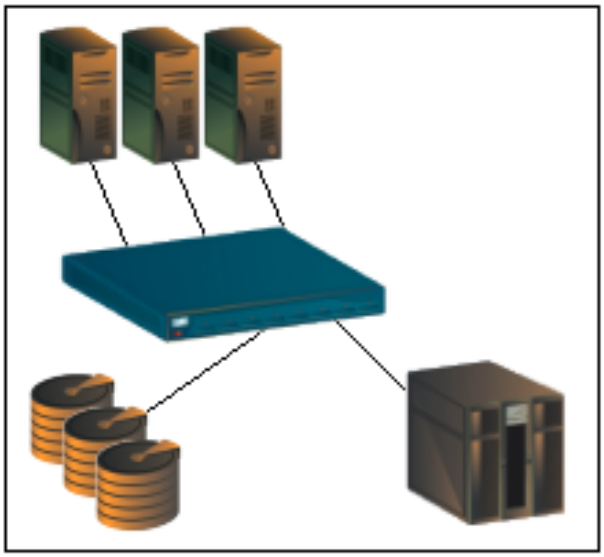
The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

IBM and Brocade Supported Switch and Firmware Versions

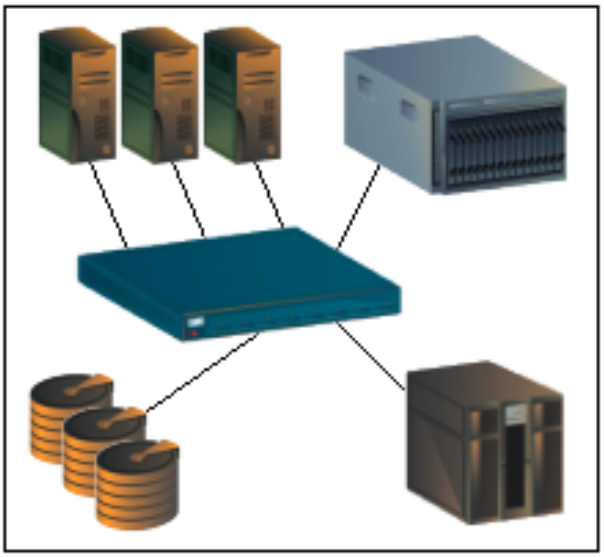
Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
Brocade	SilkWorm 3200 /IBM TotalStorage SAN Switch H08	3.0.2g and above
	SilkWorm 3250/ IBM TotalStorage SAN Switch F08	4.2.0c and above
	SilkWorm 3800 /IBM TotalStorage SAN Switch H16	3.0.2g and above
	SilkWorm 3850/ IBM TotalStorage SAN Switch F16	4.2.0c and above

ATTENTION!! When updating Brocade firmware, the switch may default to a proprietary operating mode. Therefore, after a firmware update, verify that the switch is still set to Interoperability mode (see “Operating Mode Configuration” on page 64).

The following figures illustrate a Brocade Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



Brocade Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



Brocade Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current Brocade switch configuration data prior to following the steps to merge Brocade and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

Backup Procedure

Do the following to create a software copy backup of the switch configuration.

NOTE: This procedure requires access to an FTP server for Fabric OS 4.x, and an FTP or RSHD server for Fabric OS 3.x.

1. Verify that the FTP (or RSHD, as appropriate) service is running on the host workstation.
2. Log into the switch as the admin user.
3. Enter the configupload command.
4. Provide the information requested at the prompts.

For example:

```
switch:admin> configupload
Server Name or IP Address [host]: 192.168.15.42
User Name [none]: user21
File Name [config.txt]: config-switch.txt
Password: xxxxxx
upload complete
switch:admin>
```

Restore Procedure

If you need to restore the Brocade configuration settings that you backed up, do the following:

ATTENTION!! This procedure requires a reboot of the switch.

NOTE: This procedure requires access to an FTP server for Fabric OS 4.x, and an FTP or RSHD server for Fabric OS 3.x.

1. Verify that the FTP (or RSHD, as appropriate) service is running on the host workstation.
2. Log into the switch as the admin user.
3. Shut down the switch by entering the **switchdisable** command.
4. Enter the **configdownload** command.
5. Provide the information requested at the prompts.
6. Reboot the switch by entering the **reboot** command:

For example:

```
switch:admin> configdownload
Server Name or IP Address [host]: 192.168.15.42
User Name [None]: user21
File Name [config.txt]: config-file.txt
Password: xxxxxx
download complete
switch:admin>
switch:admin> reboot
```

Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the Brocade switch and the IBM switch module.

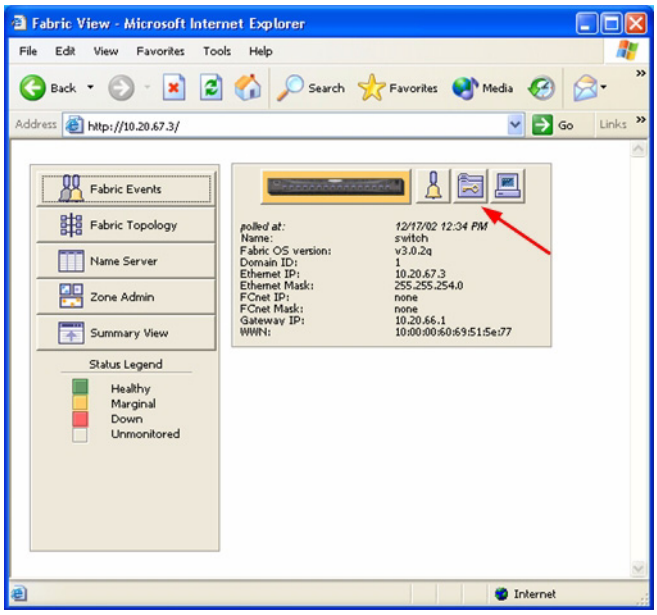
NOTE: The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range.

Brocade's Web Tools

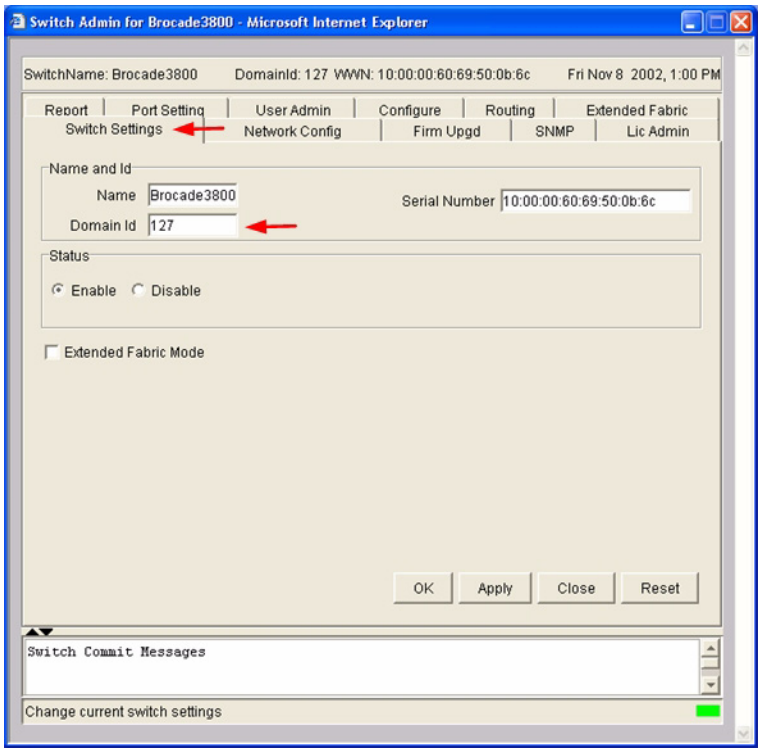
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Administration** button.

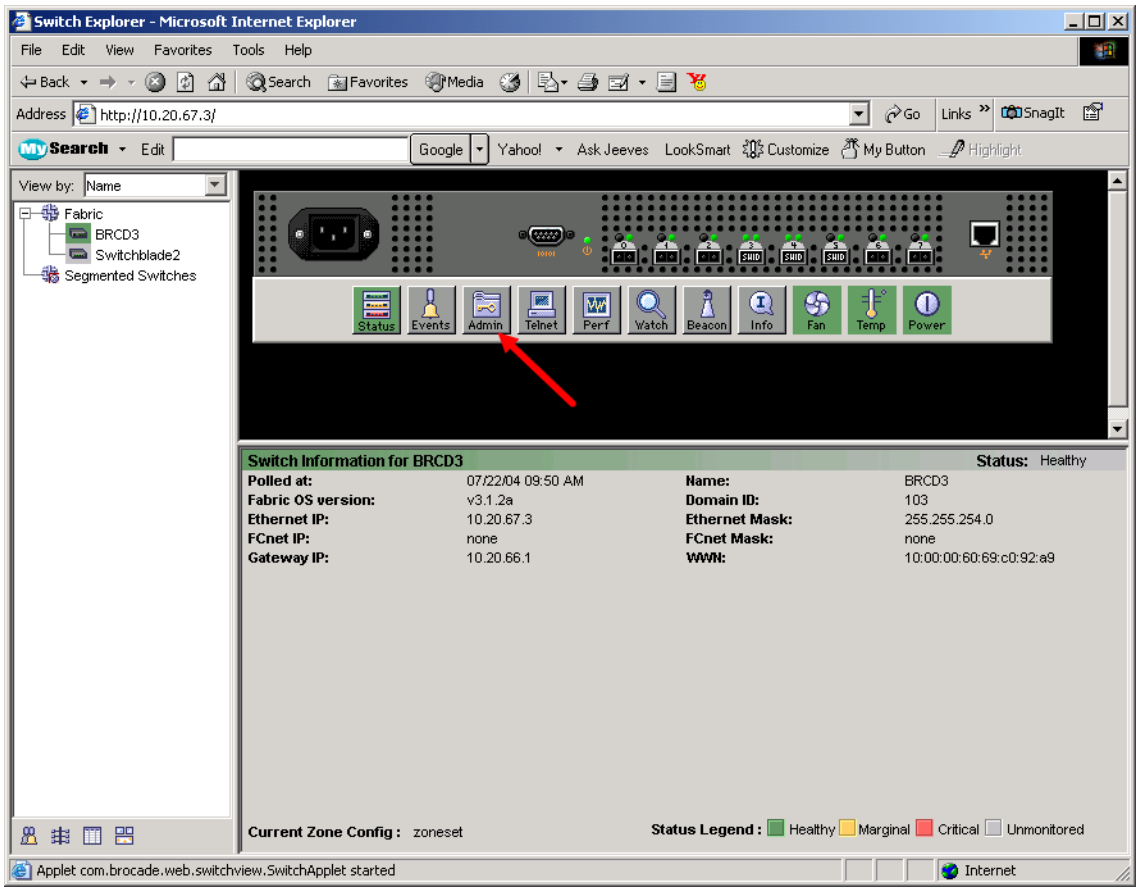


3. From the **Switch Admin for Brocade** dialog box, select the **Switch Settings** tab. Do the following:
   a. In the **Domain ID** field, type or edit the Domain ID as appropriate.
   b. Click **OK**.

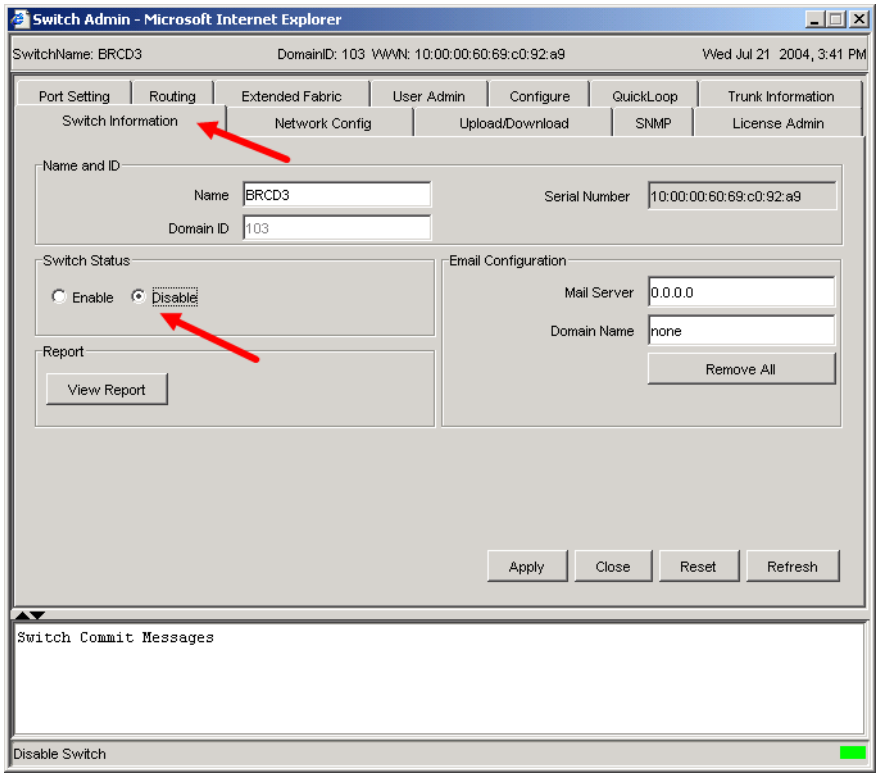


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Admin** button.



3. From the **Switch Admin** dialog box, select the **Switch Information** tab. Do the following:
   a. In the Switch Status section, select the **Disable** radio button. Click **Apply**.
   b. In the Name and ID section **Domain ID** field, type or edit the Domain ID as appropriate. Click **Apply**.
   c. In the Switch Status section, select the **Enable** radio button. Click **Apply**.
   d. Click **Close**.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> switchdisable
Brocade3800:admin> configure
```

The following options display:

```
Fabric parameters (yes, y, no, n): [no] yes
Domain: (1-239) [98] <97-127>
BB credits: 91-27) [16]
R_A_TOV: (4000..120000) [10000]
E_D_TOV: (1000..5000) [2000]
WAN_TOV: (1000..120000) [0]
WAN_RTT_DLY_MAX: (100..5000) [200]
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]
SYNC IO mode: (0..1) [0]
VC Encoded Address Mode: (0..1) [0]
Core Switch PID Format: (0..1) [1]
Per-frame Route Priority: (0..1) [0]
Long Distance Fabric: (0..1) [0]
Virtual Channel parameters (yes, y, no, n): [no]
Zoning Operation parameters (yes, y, no, n): [no]
RSCN Transmission Mode (yes, y, no, n): [no]
NS Operation Parameters (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]
```

```
Brocade:3800:admin> switchenable
```

For Brocade switches with firmware level 3.1.0 and above, do the following:

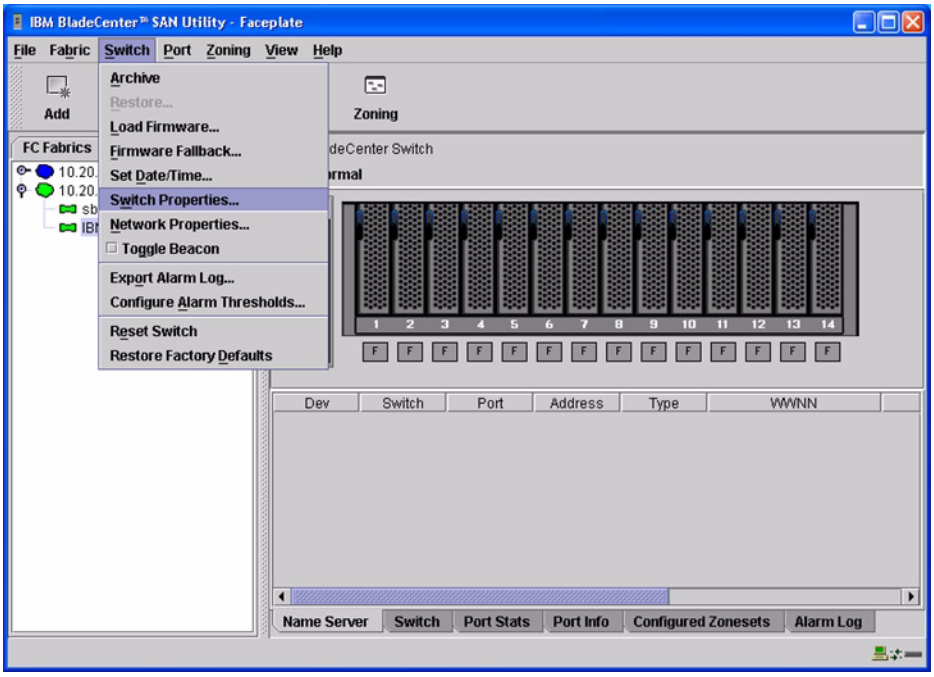
```
Login: admin
Password: xxxxxxxx
BRCD3:admin> switchdisable
BRCD3:admin> configure

Configure...

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

    Domain: (1..239) [1] 103
    BB credit: (1..27) [16]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    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]
    SYNC IO mode: (0..1) [0]
    VC Encoded Address Mode: (0..1) [0]
    Switch PID Format: (0..2) [1]
    Per-frame Route Priority: (0..1) [0]
    Long Distance Fabric: (0..1) [0]

  Virtual Channel 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]

Committing configuration...done.
BRCD3:admin> switchenable
```

IBM BladeCenter GUI

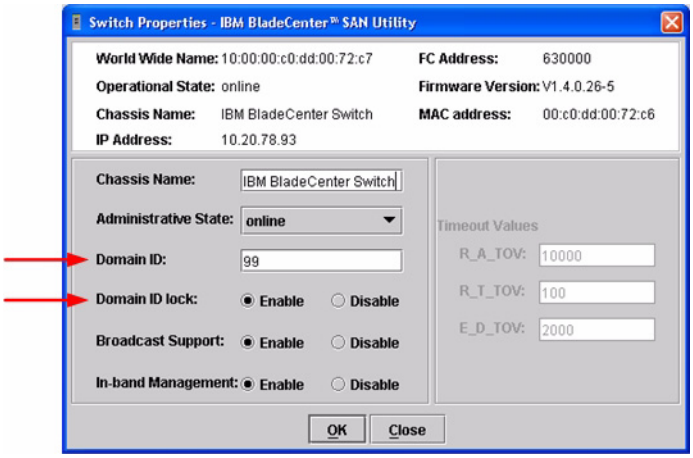
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

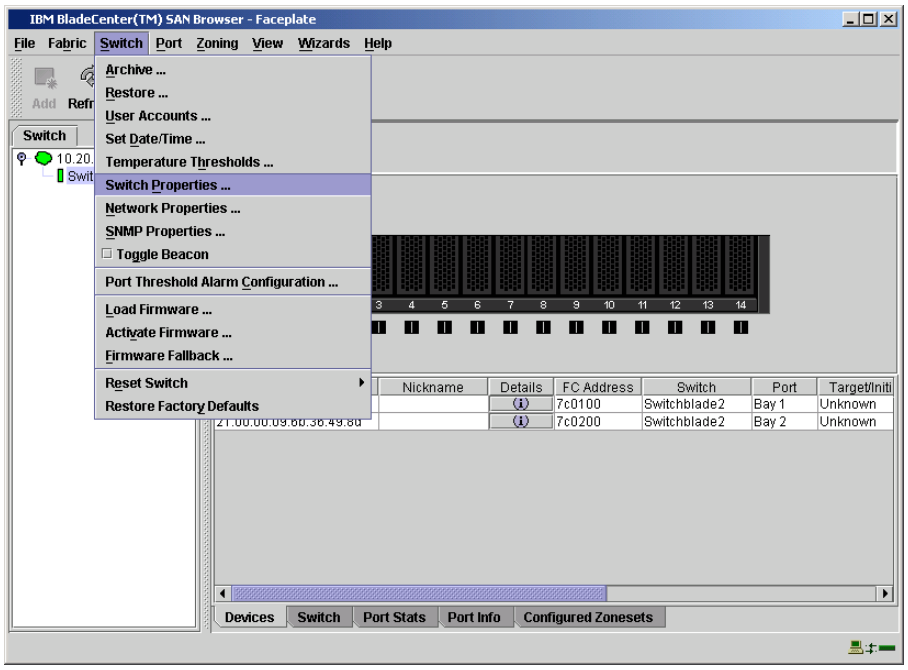


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

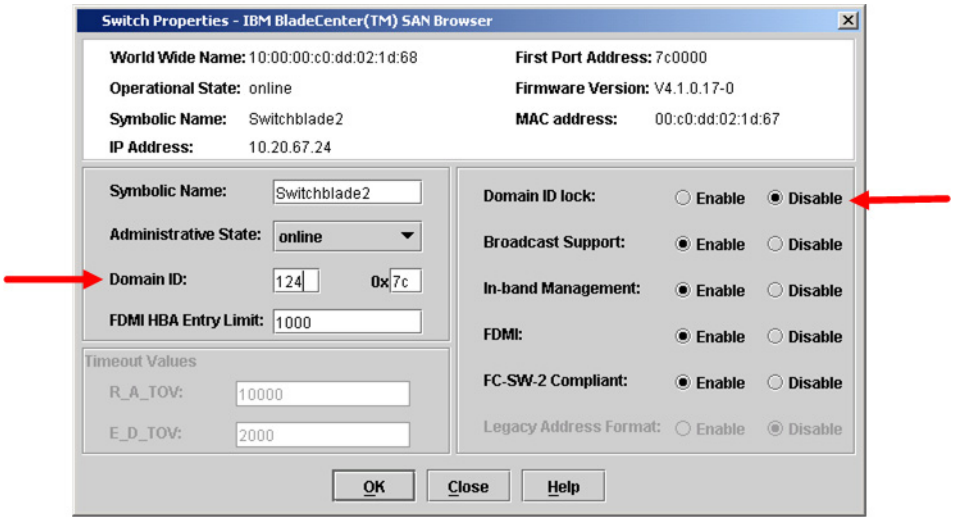


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM switch modules, use the following CLI commands when the IBM BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection.

R_A_TOV = 10 seconds (The setting is **10000**.)
E_D_TOV = 2 seconds (The setting is **2000**.)

NOTE: These are the default values for **R_A_TOV** and **E_D_TOV**. In addition, **BB Credits** will need to be set to **12** (the default is **16**).

This section provides the steps to change these values.

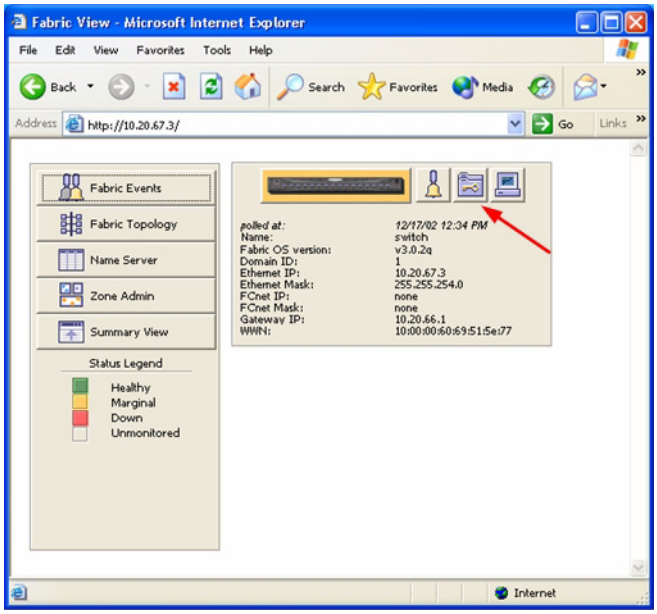
Brocade's Web Tools

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

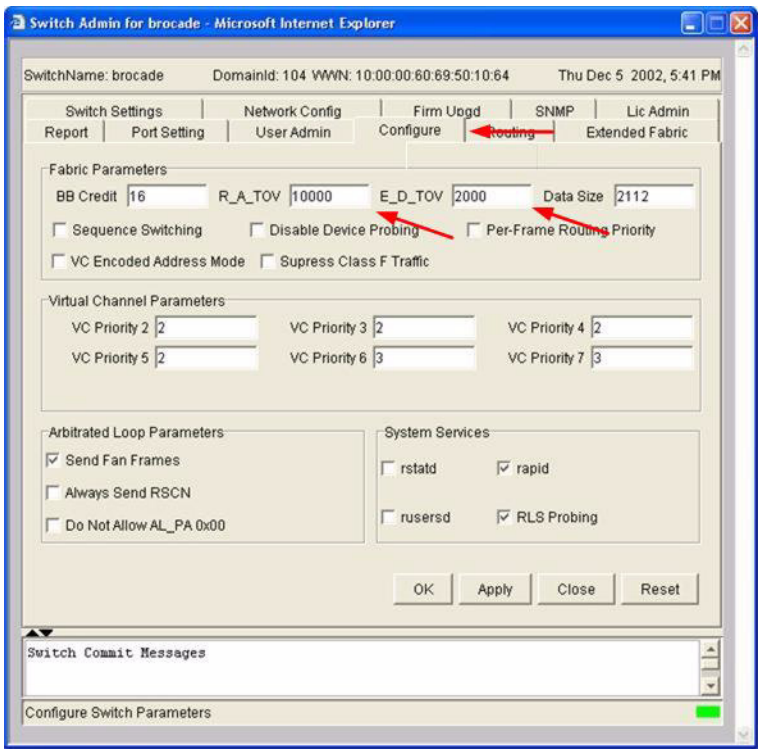
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Administration** button.

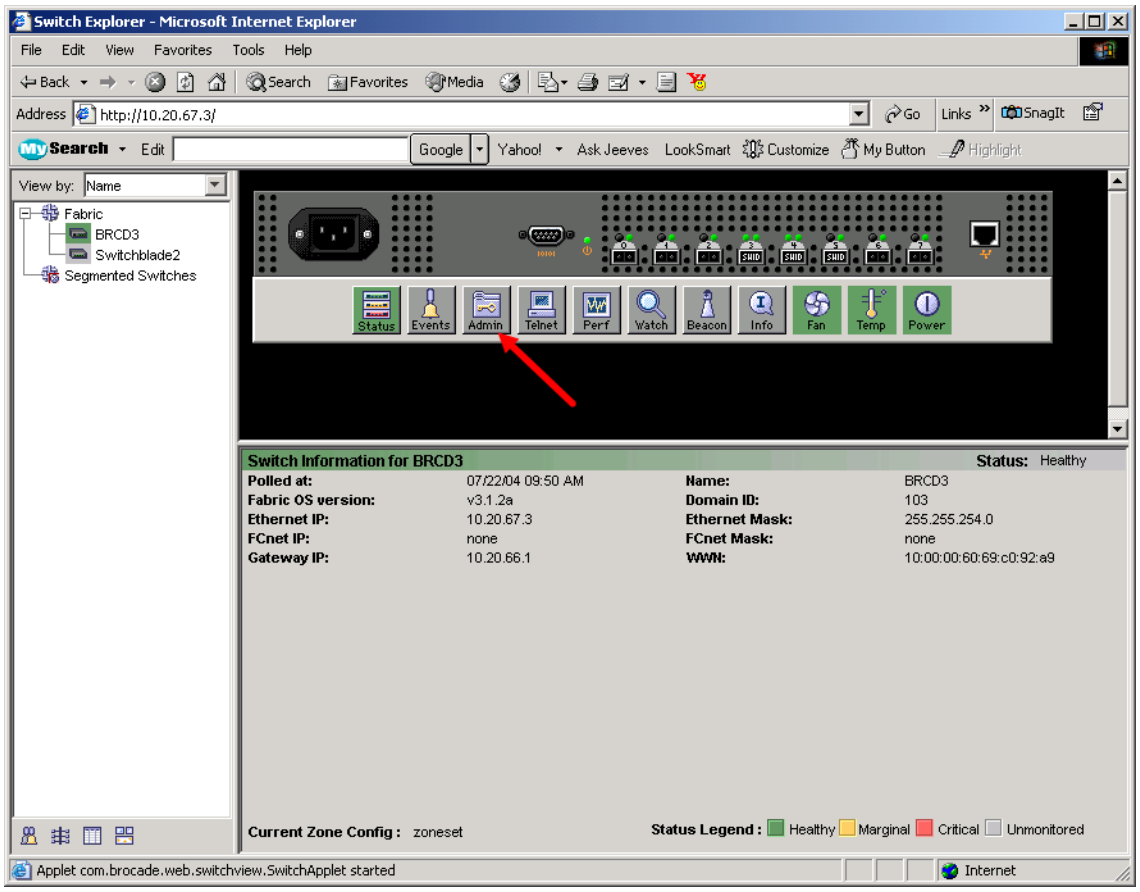


3. From the **Switch Admin for Brocade** dialog box, select the **Configure** tab. Verify that **R_A_TOV** is set to **10000**, **E_D_TOV** is set to **2000**, and **BB Credit** is set to **12**. If the settings are not correct, do the following:
   a. In the **BB Credit** box, change the setting to **12**.
   b. In the **R_A_TOV** box, change the setting to **10000**.
   c. In the **E_D_TOV** box, change the setting to **2000**.
   d. Click **OK**.

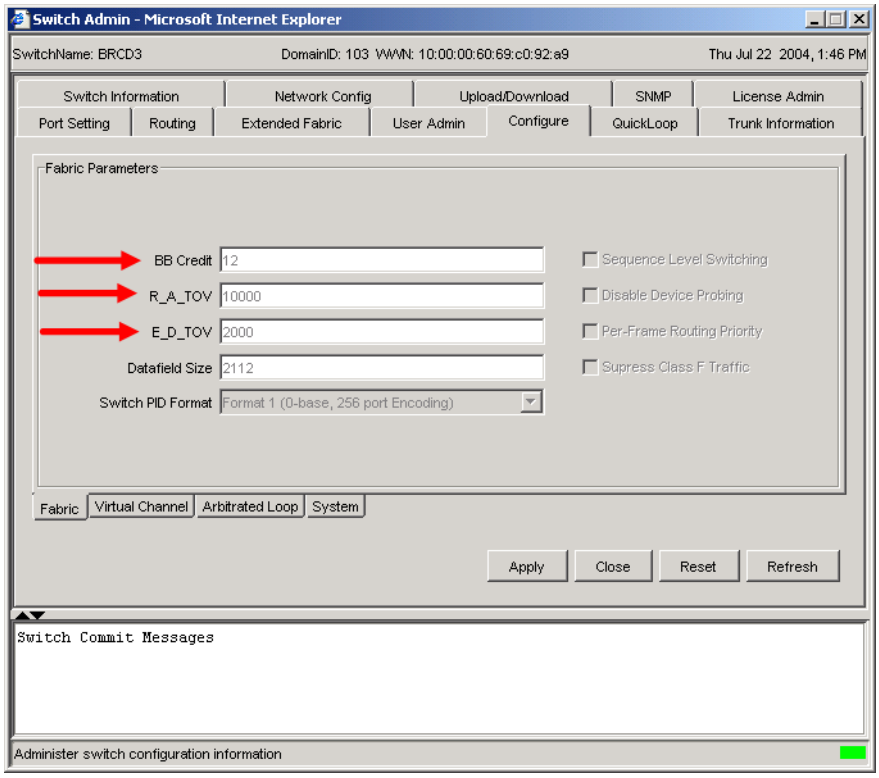


For Brocade switches with firmware level 3.1.0 and above, do the following:

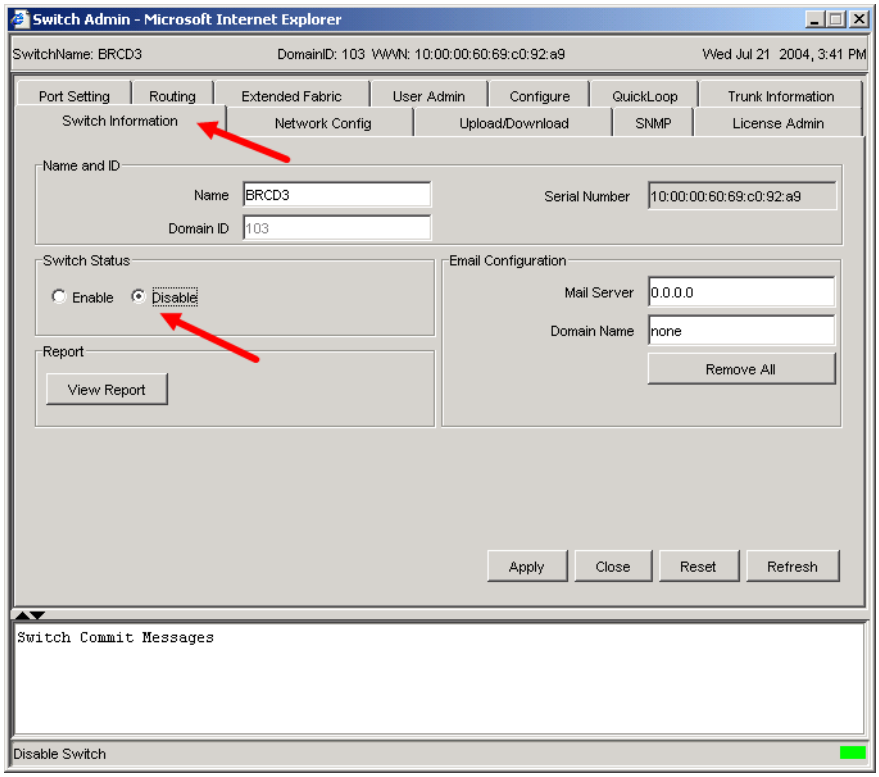
1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Admin** button.



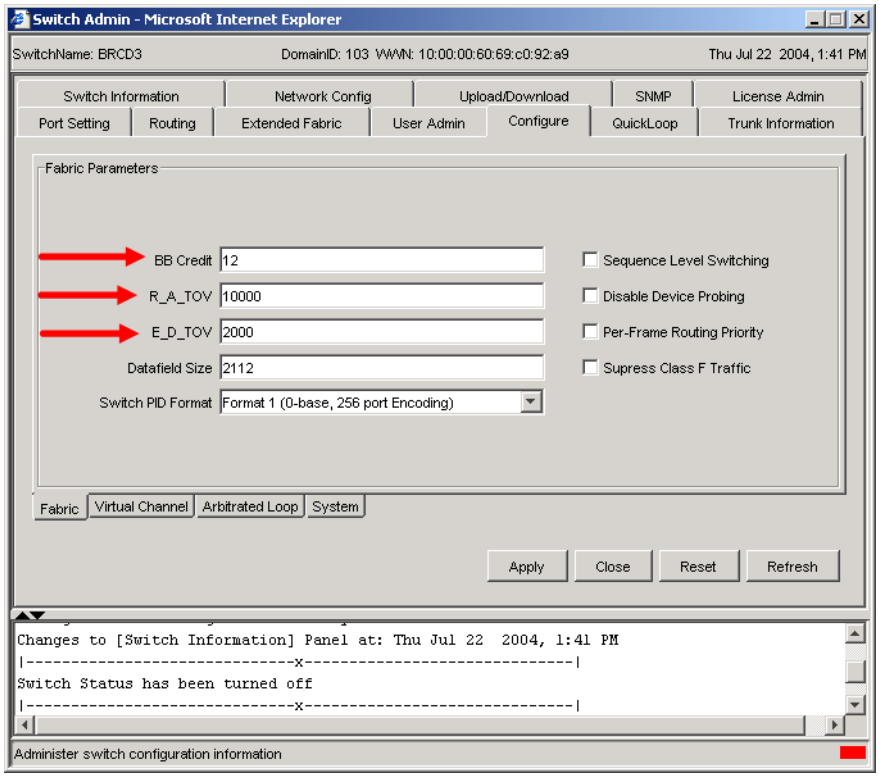
3. From the **Switch Admin** dialog box, select the **Configure** tab. Verify that **R_A_TOV** is set to **10000, E_D_TOV** is set to **2000**, and **BB Credit** is set to **12**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



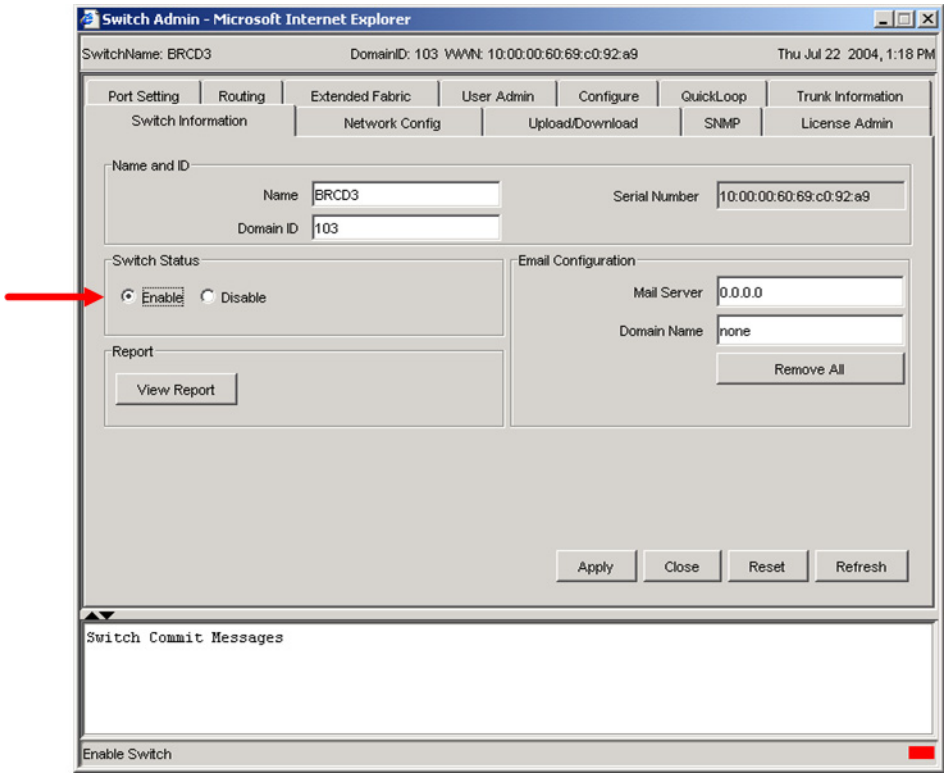
4. Select the **Switch Information** tab. In the Switch Status section, select the **Disable** radio button. Click **Apply**.



5. Select the **Configure** tab, do the following as appropriate:
   a. In the **BB Credit** box, change the setting to **12**.
   b. In the **R_A_TOV** box, change the setting to **10000**.
   c. In the **E_D_TOV** box, change the setting to **2000**.
   d. Click **Apply**.



6. Select the **Switch Information** tab. In the Switch Status section, select the **Enable** radio button to re-enable to switch. Click **Apply**



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
BRCD3:admin> configshow
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
BRCD3:admin> switchdisable
BRCD3:admin> configure

Configure...

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

    Domain: (97..127) [103]
    BB credit: (1..27) [16] 12
    R_A_TOV: (4000..120000) [9000] 10000
    E_D_TOV: (1000..5000) [1500] 2000
    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]
    SYNC IO mode: (0..1) [0]
    Switch PID Format: (0..2) [1]
    Per-frame Route Priority: (0..1) [0]
    Long Distance Fabric: (0..1) [0]

  Virtual Channel 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]

BRCD3:admin> switchenable
```

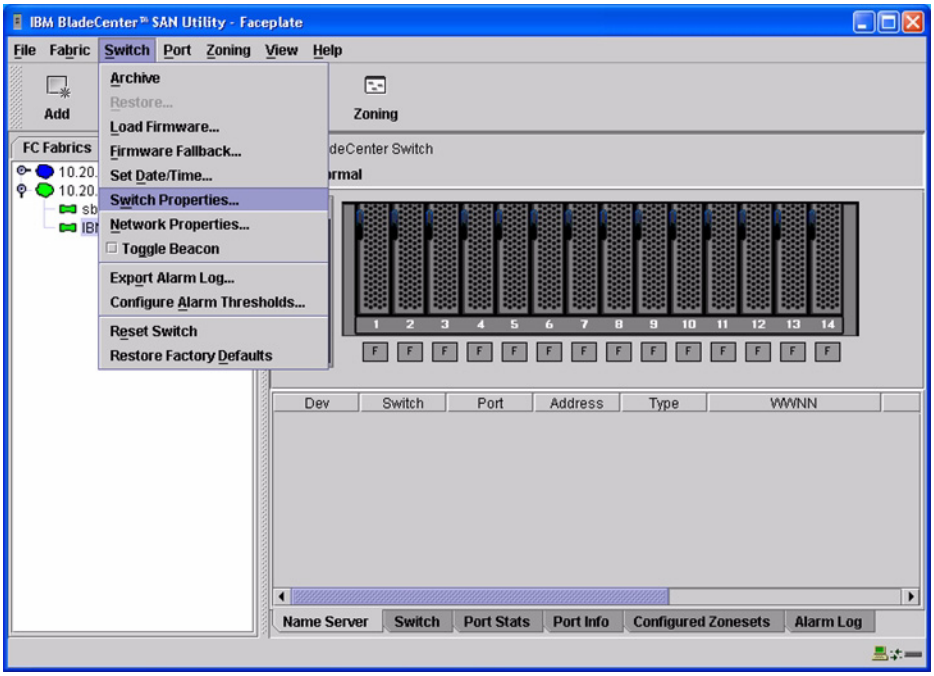
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

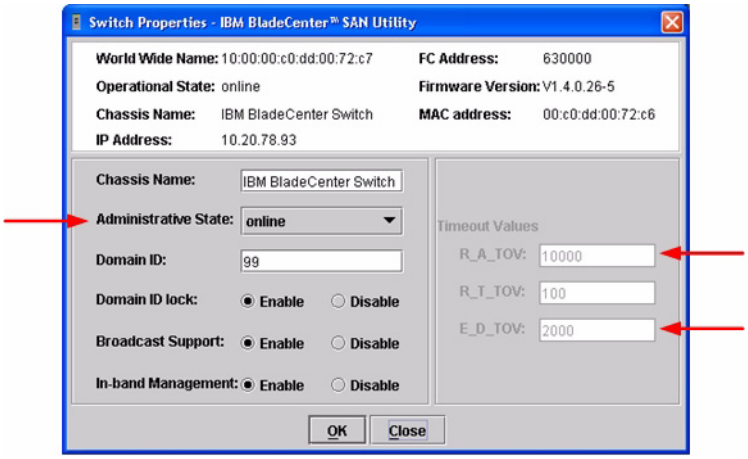
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



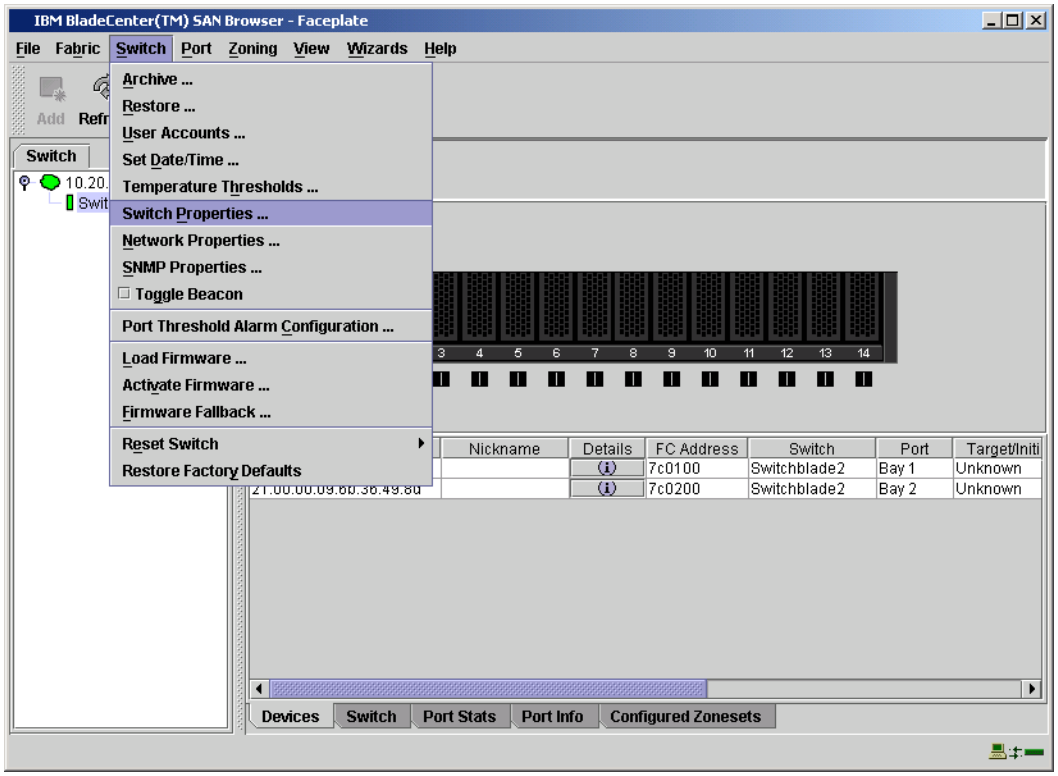
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



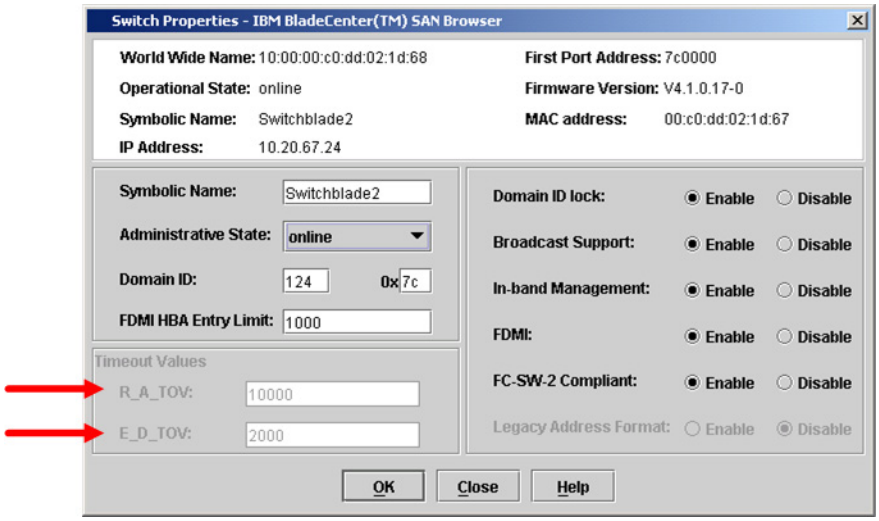
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

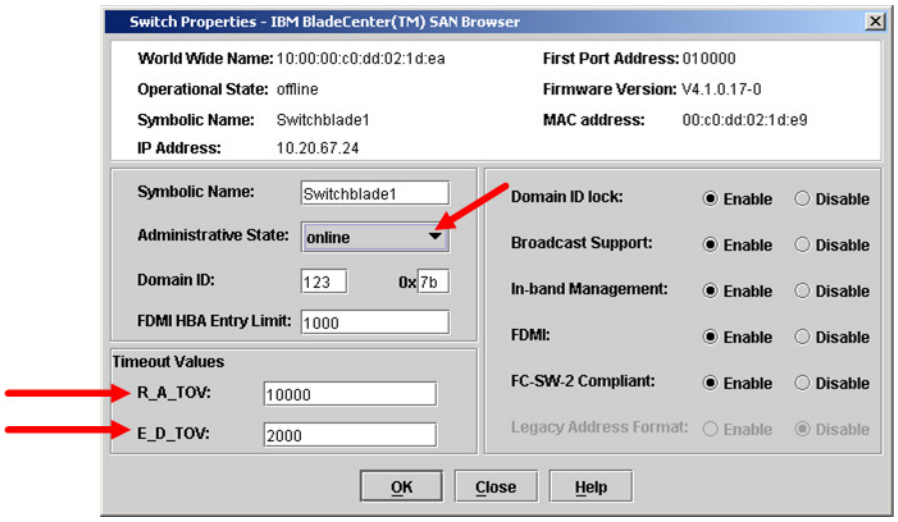
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

Brocade switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

Active Zone Set Names

NOTE: For Brocade, Zone Set is referred to as Zone Configuration.

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

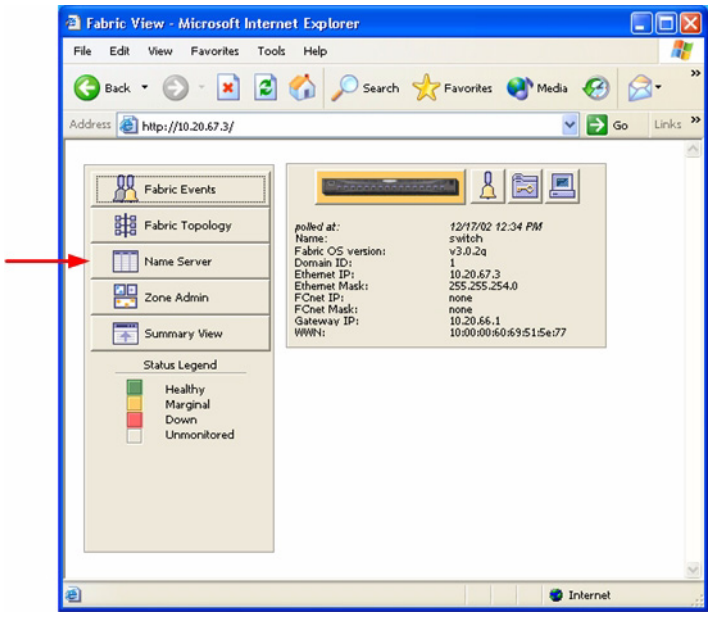
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

Brocade's Web Tools

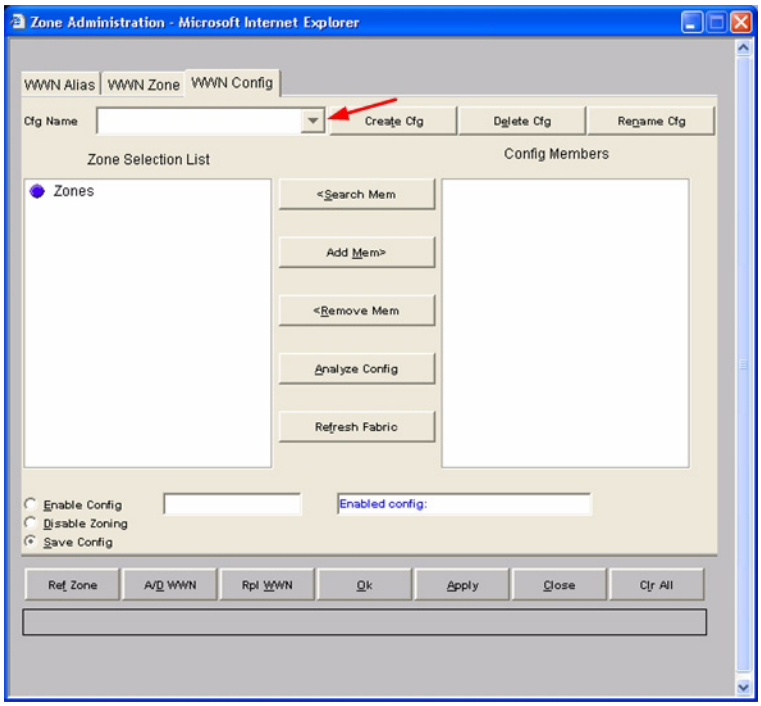
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Zone Admin** button.

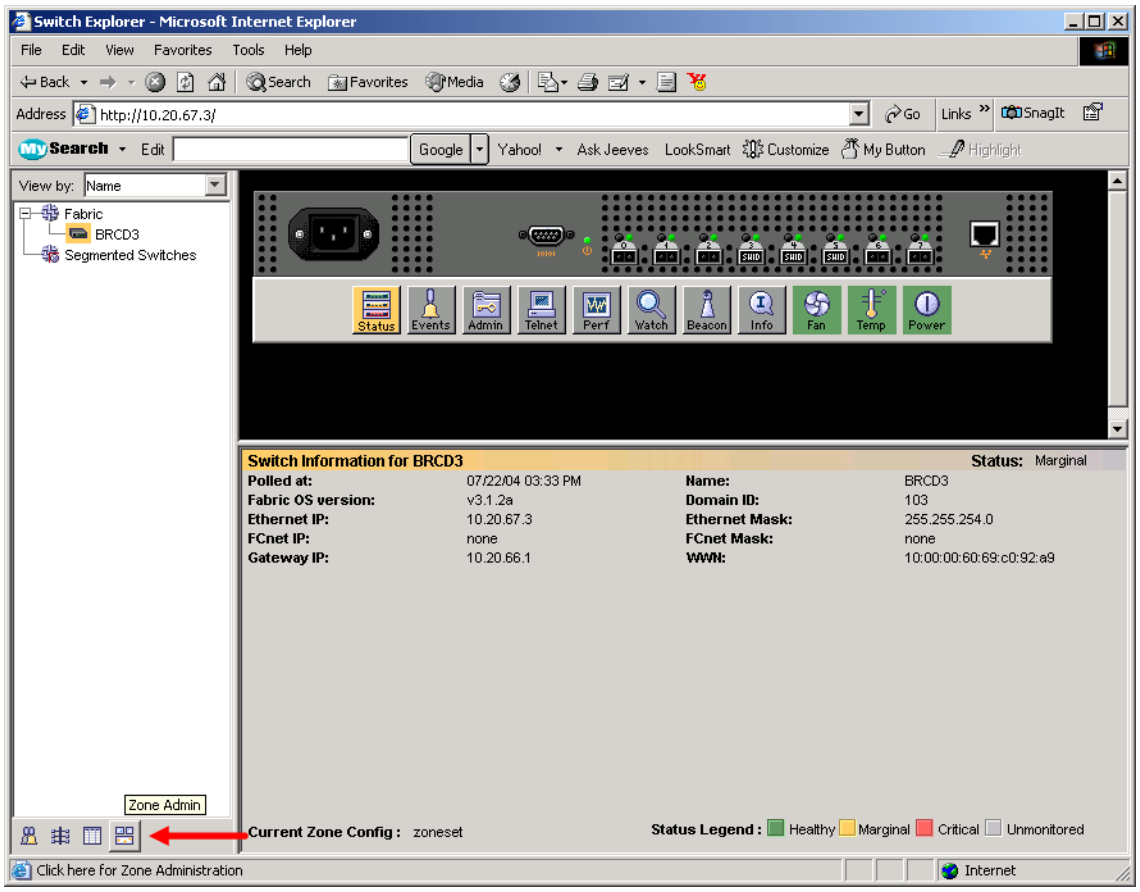


3. From the **Zone Administration** dialog box, select the **WWN Config** tab. Verify that all config names conform to the standards discussed under "Active Zone Set Names" on page 47 and are unique between the switches.

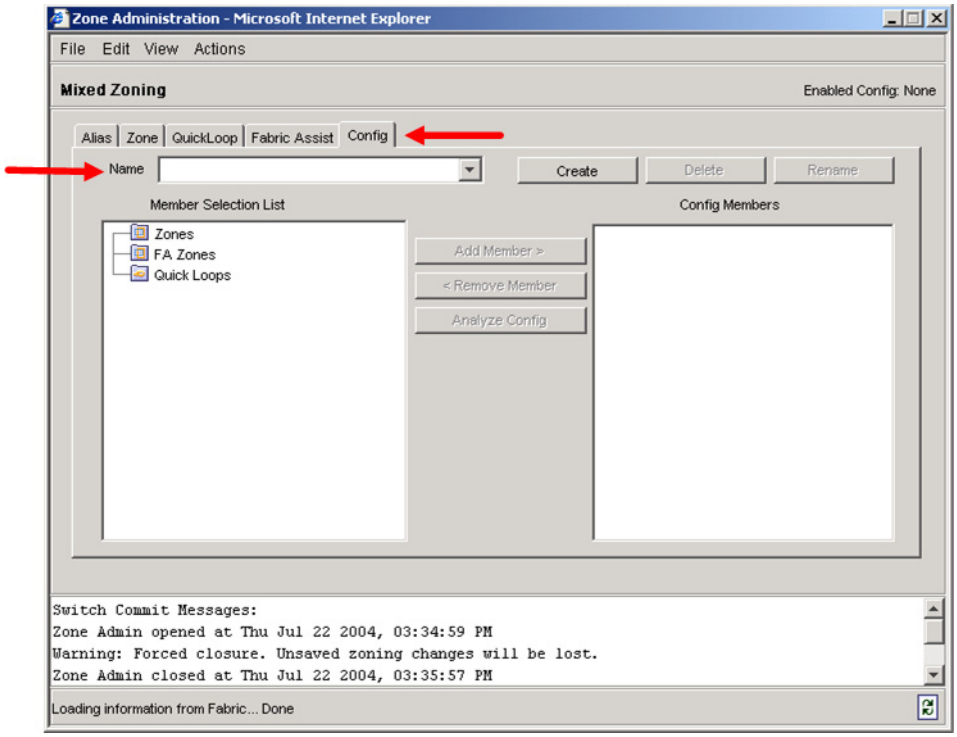


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Zone Admin** button.



3. From the **Zone Administration** dialog box, select the **Config** tab. Click the **Name** drop-down list to verify that all config names conform to the standards discussed under "Active Zone Set Names" on page 47 and are unique between the switches.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

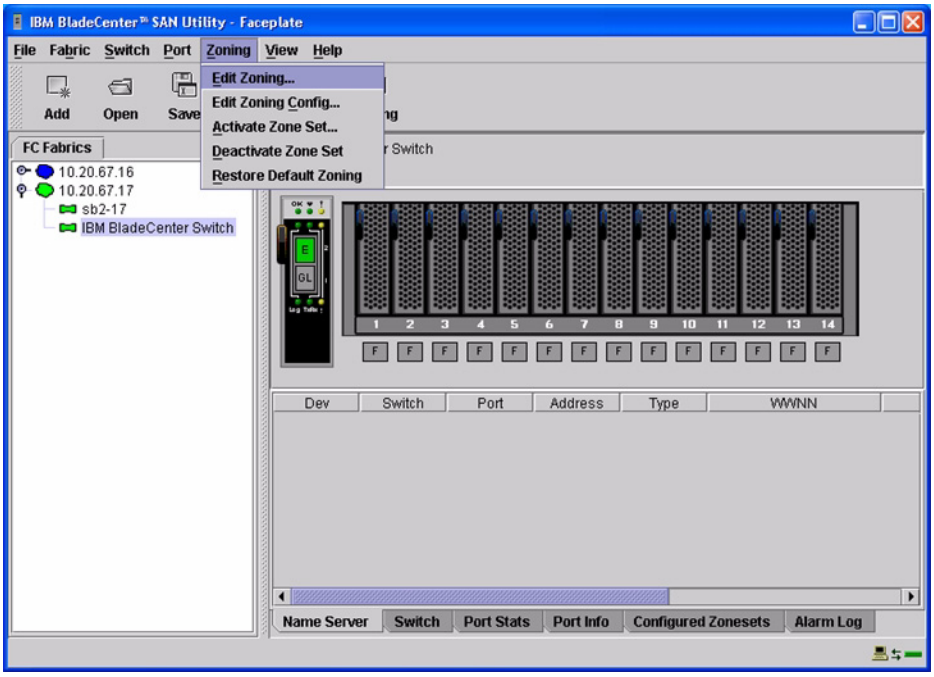
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> cfgshow
```

IBM BladeCenter GUI

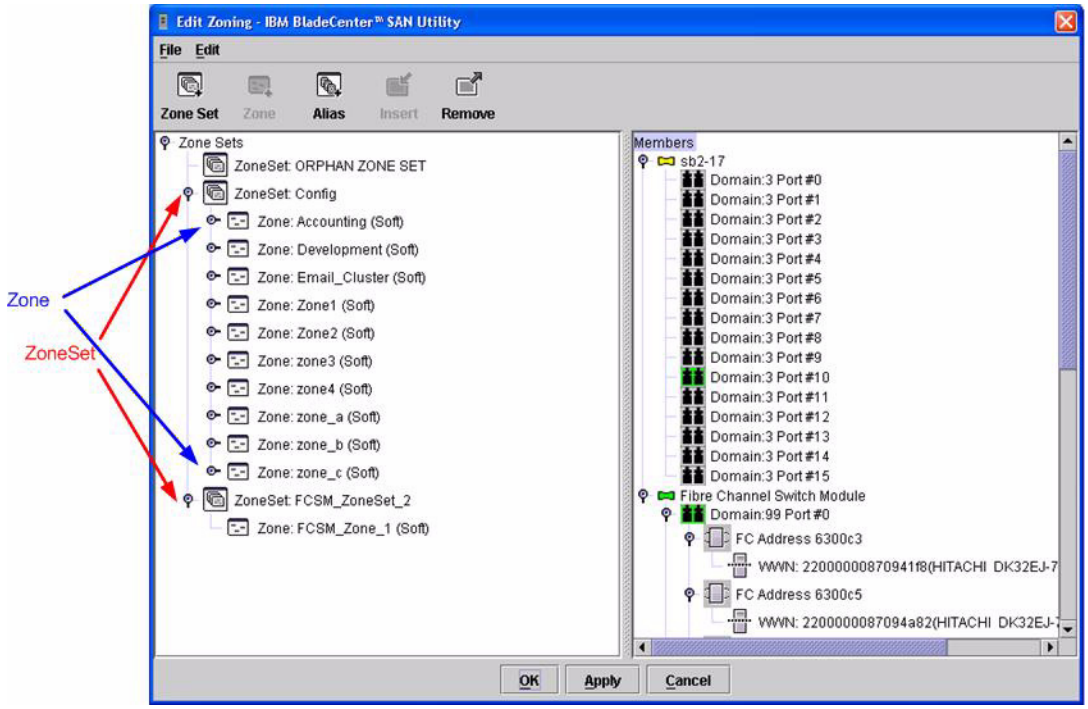
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

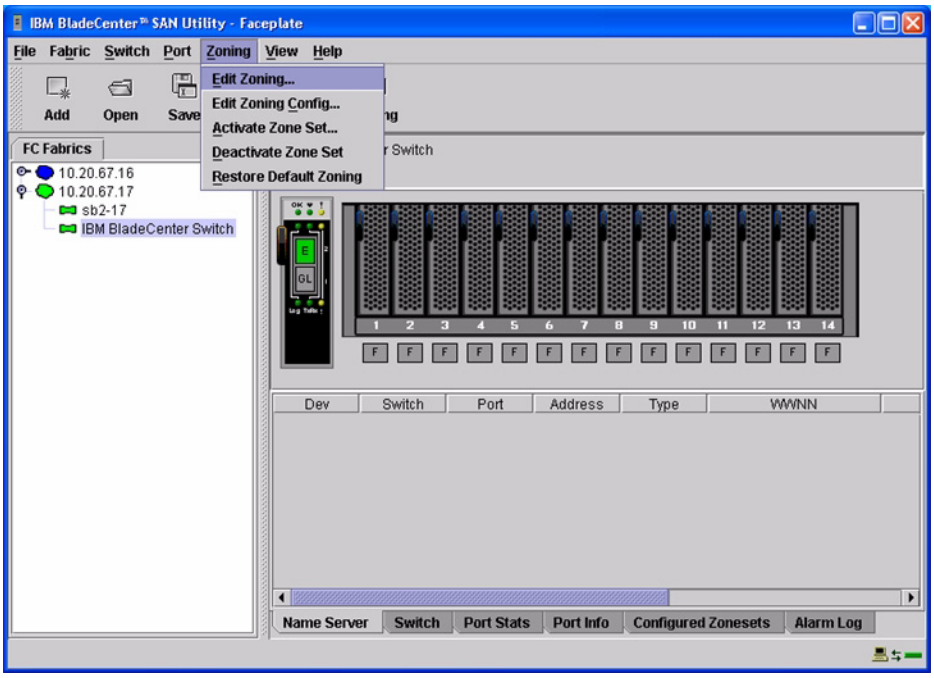


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 47.

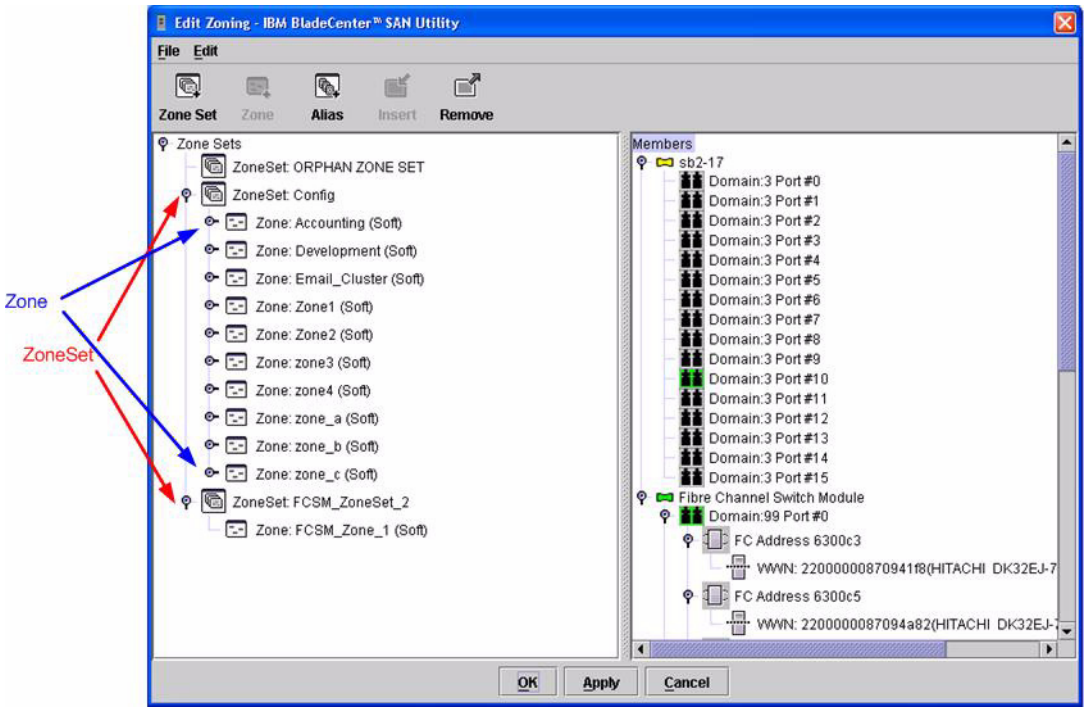


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 47.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

Zone Types

All zones members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

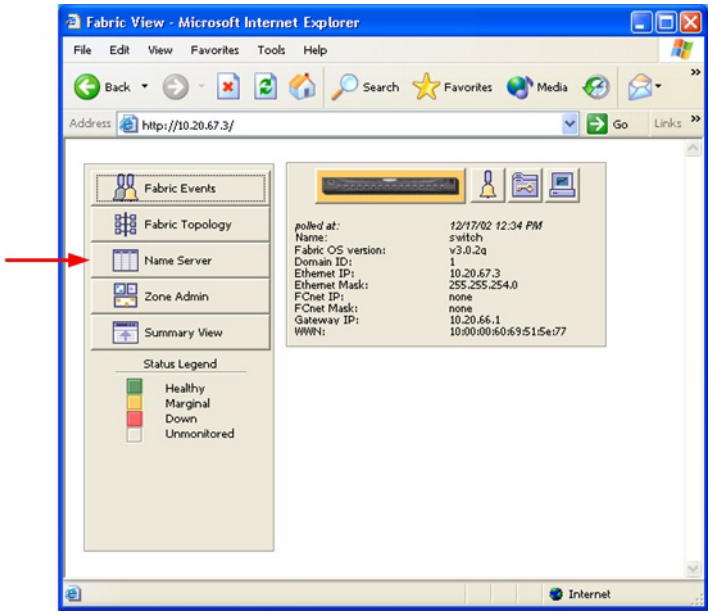
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

Brocade's Web Tools

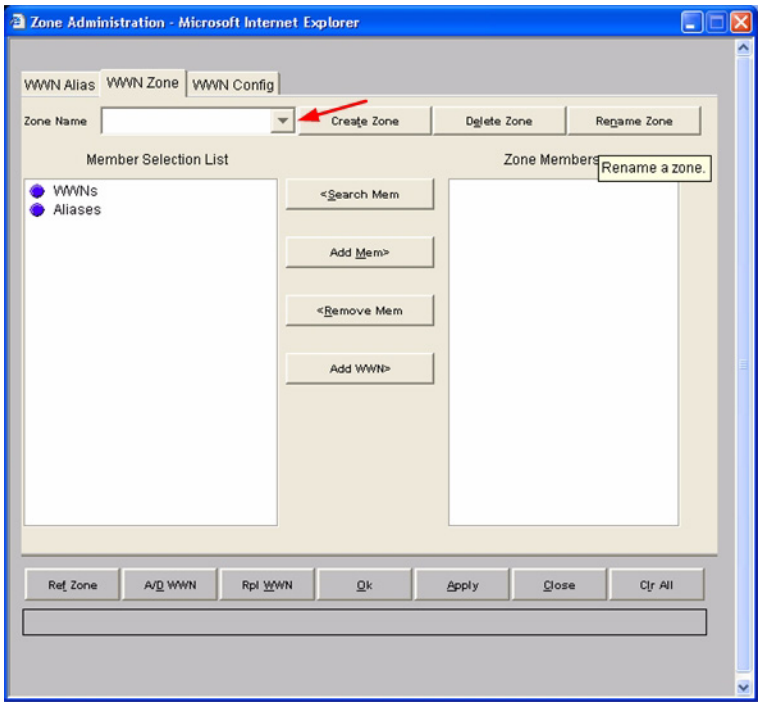
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Zone Admin** button.

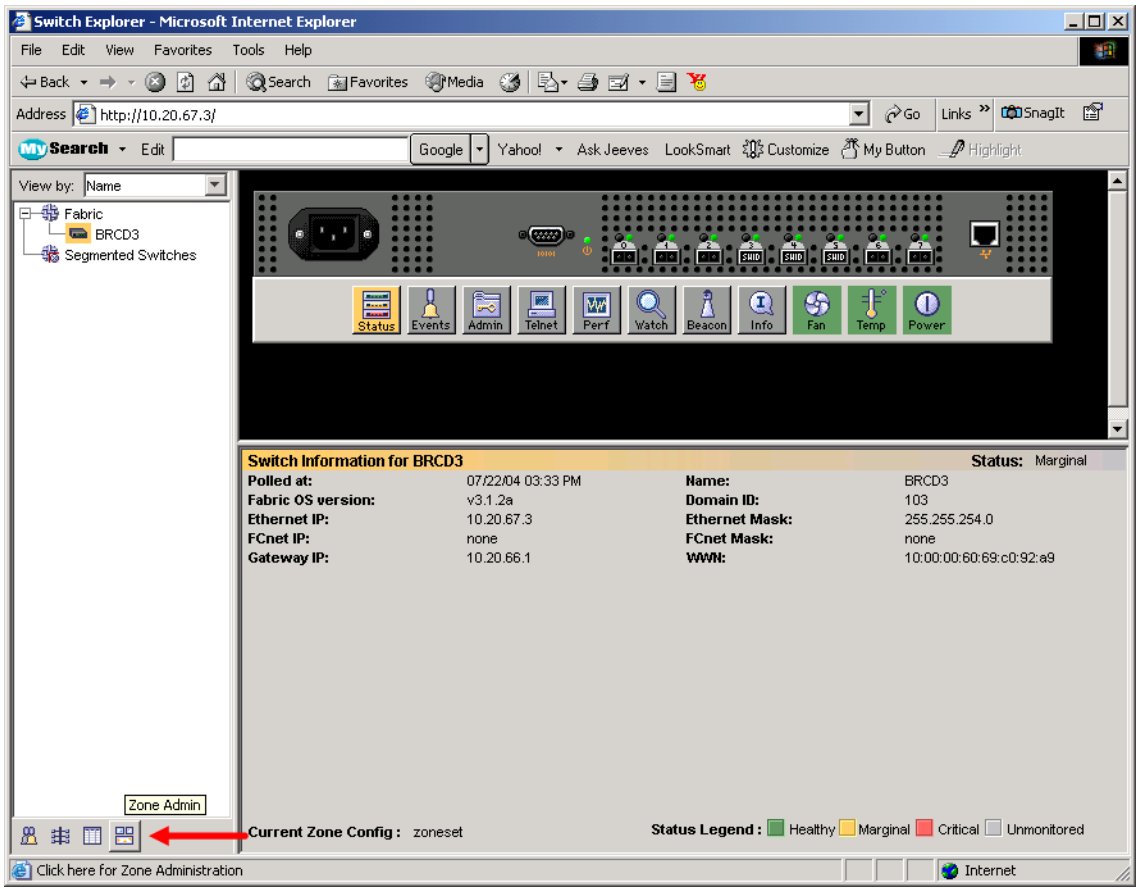


3. From the **Zone Administration** dialog box, select the **WWN Zone** tab. Verify that all zone names conform to the standards discussed under "Active Zone Set Names" on page 47 and are unique between the switches.

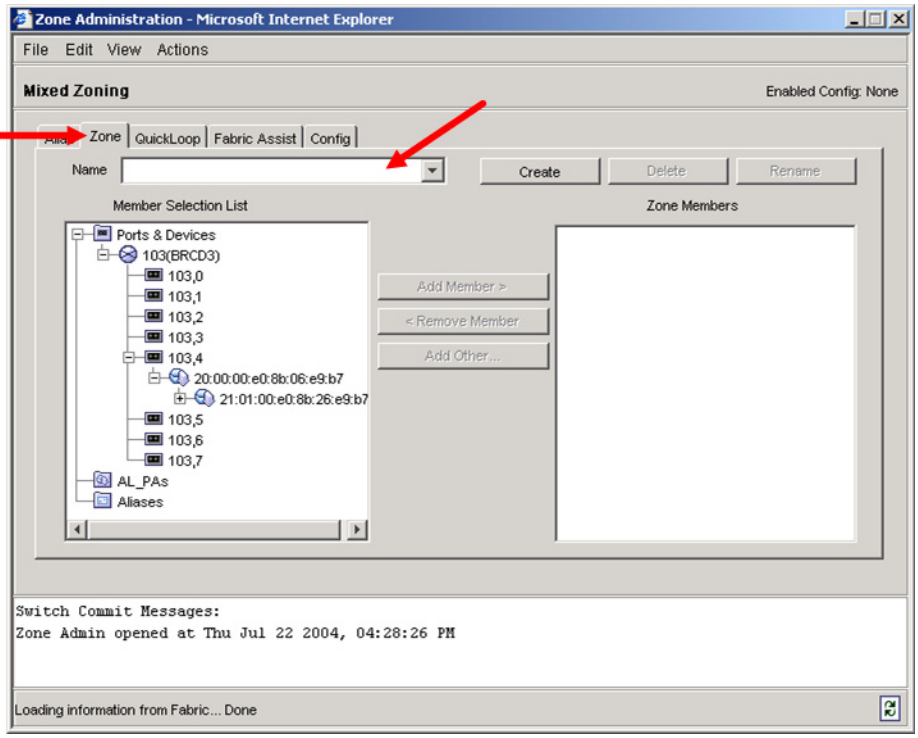


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Zone Admin** button.



3. From the **Zone Administration** dialog box, select the **Zone** tab. Verify that all zone names conform to the standards discussed under "Active Zone Set Names" on page 47 and are unique between the switches. Do the following:
   a. In the **Name** drop-down box, select a zone.
   b. In the Zone Members section, verify the WWNs.
   c. Repeat steps a and b for each zone.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

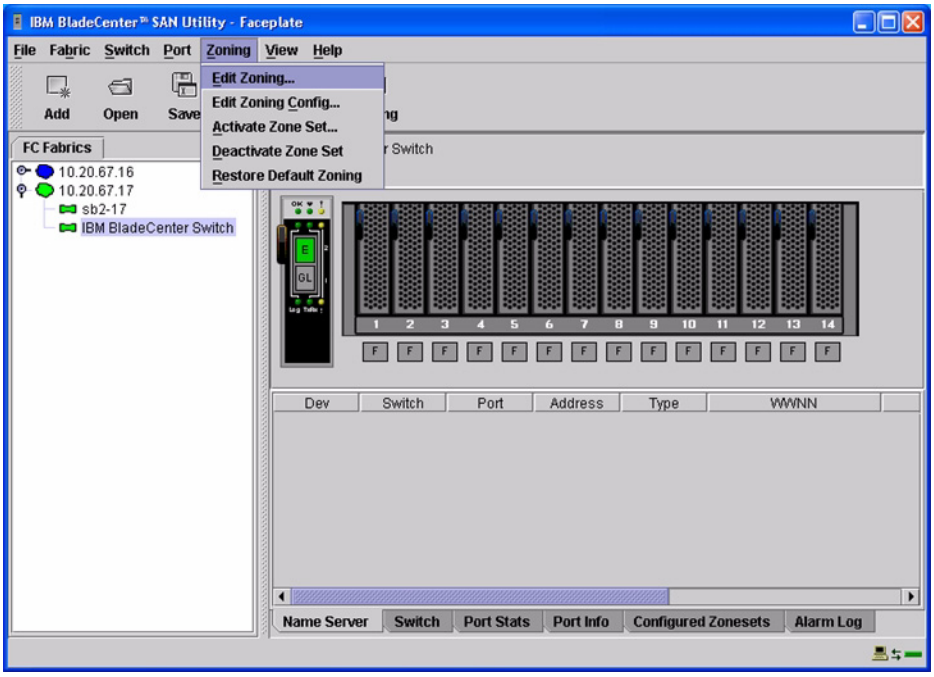
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> zoneshow
```

IBM BladeCenter GUI

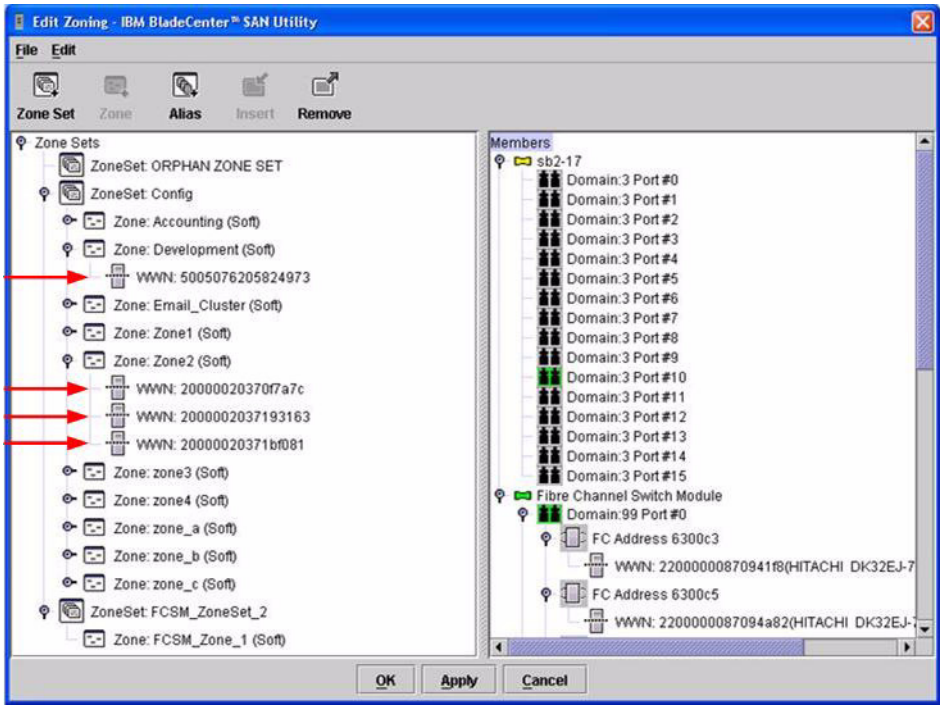
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

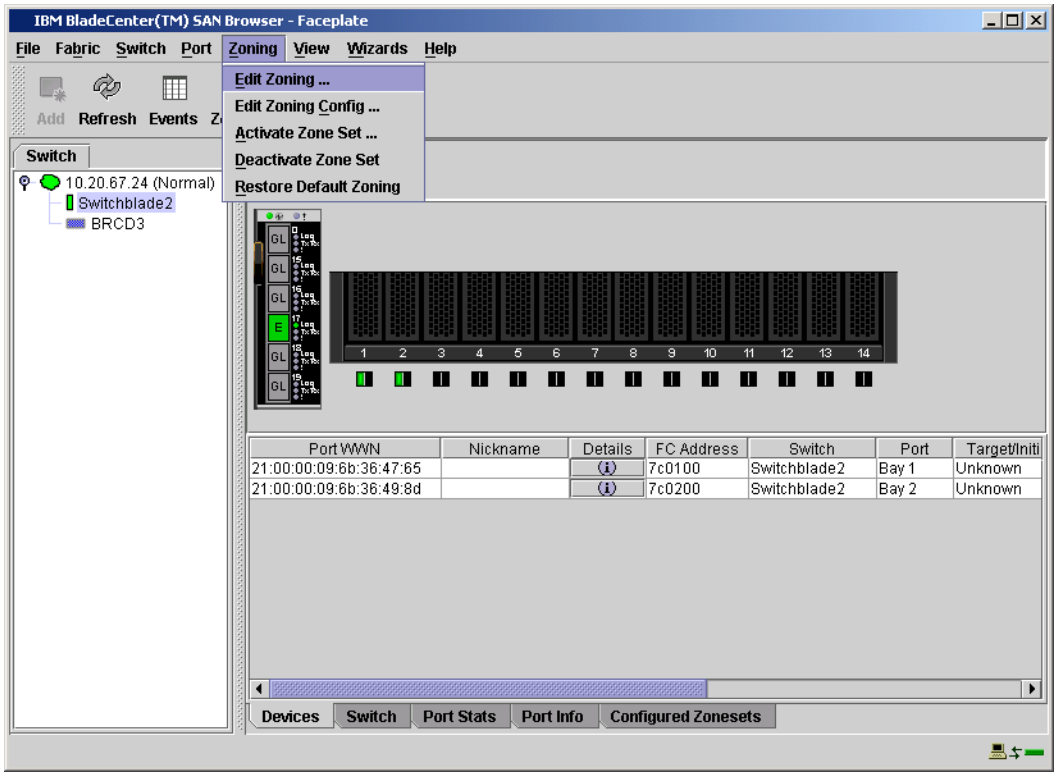


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

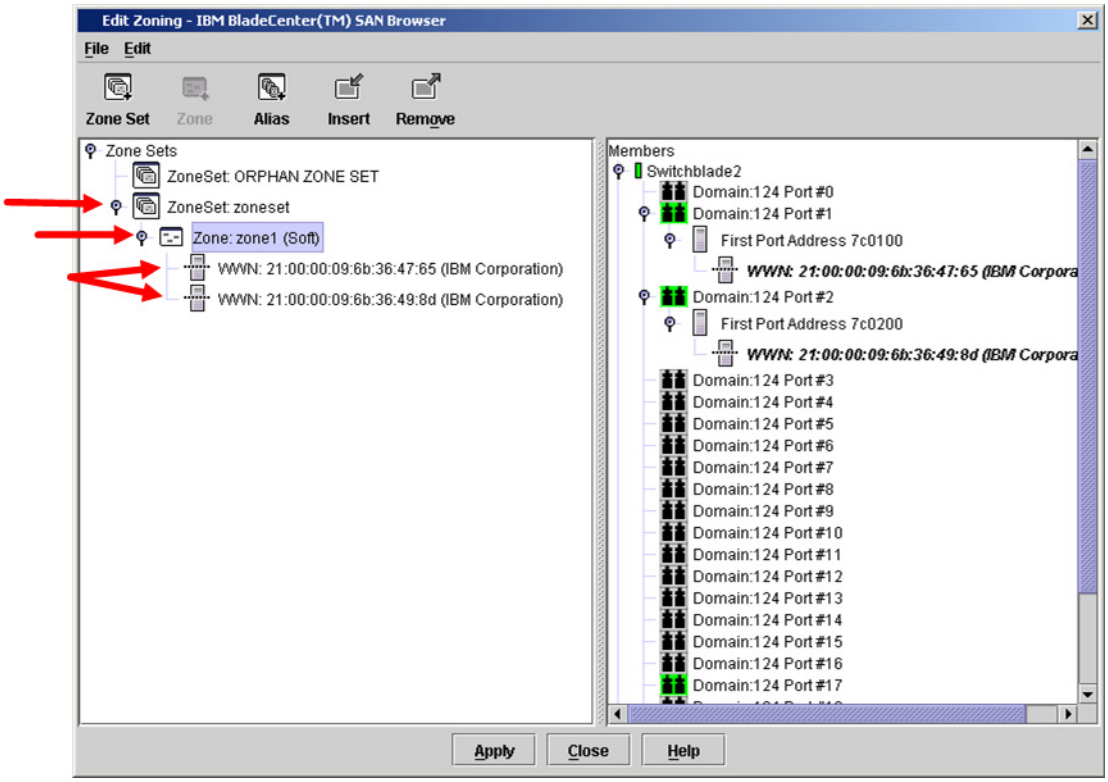


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

Operating Mode Configuration

The Brocade switch must be in Interoperability mode to be FC-SW2 compliant. Therefore, the current operating status must be Interopmode on. Note the following:

- InteropMode = 0 (disabled, which is Brocade proprietary mode)
- InteropMode = 1 (enabled, which is FC-SW-2 compliant mode)

Brocade's Web Tools

Interoperability mode cannot be set using Brocade's Web Tools; use the Brocade CLI.

Brocade CLI

Do the following to set the Brocade switch to Interoperability mode.

ATTENTION!! This procedure requires a reboot of the switch.

Enter the following command to verify that the current operating status is Interopmode:

```
BRCD3:admin> interopmode
InteropMode: Off

Usage: InteropMode 0|1
   0: to turn it off
   1: to turn it on
BRCD3:admin>
```

If Interopmode is disabled, enter the following commands to enable Interopmode:

```
BRCD3:admin> switchdisable
BRCD3:admin> interopmode 1

The switch effective configuration will be lost when the operating mode
is changed; do you want to continue? (yes, y, no, n): [no] yes

Interopmode is enabled
```

Enter the following command to reboot the switch for the new change to take effect:

```
BRCD3:admin> fastboot
```

IBM BladeCenter GUI

Not applicable.

IBM BladeCenter CLI

Not applicable.

Brocade Specific Configuration

The platform manager server must be disabled.

Brocade's Web Tools

This function cannot be done using Brocade's Web Tools; use the Brocade CLI.

Brocade CLI

Enter the following command to verify that Platform Management is disabled:

```
BRCD3:admin> msPlatShow
Platform Management is NOT enabled.
BRCD3:admin>
```

If Platform Management is enabled, enter the following command to disable platform management:

```
BRCD3:admin> msPlMgmtDeactivate
```

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the Brocade and IBM BladeCenter fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

Brocade SilkWorm Switches / IBM TotalStorage SAN Switches (14-Port and 32-Port)

Integration Checklist

The following steps must be completed to successfully merge Brocade and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see “Backing Up and Restoring the Current Configuration Settings” on page 74).

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 73).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 77).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 89).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 106).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 116).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see “Operating Mode Configuration” on page 125).

✓ Ensure that Brocade’s Platform Management Server is disabled (see “Brocade Specific Configuration” on page 126).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 126).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

Brocade Configuration Limitations

The configuration limitations are as follows:

- When merging Brocade and IBM BladeCenter fabrics, be sure to enable Interoperability mode on all Brocade switches in the fabric. Brocade switches that are not in Interoperability mode are unable to communicate with IBM BladeCenter FC-SW-2 fabrics and Brocade fabrics in proprietary mode.
- Existing Brocade switches retain the following features that are available once the IBM switch module is merged into a heterogeneous fabric. The features will function on Brocade switches that are in Interoperability mode:
  - **QuickLoop.** Functions as described by Brocade on Brocade switches running in Interoperability mode. In addition, QuickLoop functions when an IBM switch module is between two Brocade QuickLoop partners. Brocade switches and IBM switch modules cannot become QuickLoop partners.
  - **Trunking.** Operates on all Brocade switches configured with this feature. Additionally, traffic submitted to and from a IBM switch module-attached device (initiator/target) can pass through Brocade Trunked ISL ports.
  - **Aliasing.** Operates on all Brocade switches configured with this feature. Can only be managed by the originating switch vendor's management utility or CLI. Aliased names do not propagate between vendors' management utilities, but when an Alias is created and entered into a zone, the WWPNs that were in the Alias propagate correctly.
- Brocade proprietary features that may not function in multi-vendor fabrics include:
  - Brocade Fabric Assist
  - Brocade Remote Switch
  - Brocade Extended Fabric
  - Brocade Advanced Performance Monitor
  - Brocade Secure Fabric OS
  - Brocade Fabric Services
    - Management Server
    - Platform Support
    - Virtual Channels
    - Broadcast Zones
- When zoning ports greater than 16, be sure they reside in separate zones. Otherwise, you may not be able to see the target devices in all the ports. When forming an ISL between these larger port Brocade switches and another vendor in the Interoperability mode, Brocade switches no longer have default zones. Therefore, the attached switches—without extended

addressing—cannot adequately address the higher Brocade switch ports without Name Server propagation. To enable upper port connectivity, follow these steps:

1. Establish the ISL between switches with a port lower than 16.
2. Apply any required zones in ports lower than 16.
3. After applying zones in the lower numbered ports, the ports greater than 16 should be usable for zoning or establishing an ISL.

- When merging Brocade and QLogic fabrics, a maximum of 31 switches can be configured.

NOTE: When making zone changes in a multi-vendor environment using the IBM BladeCenter SAN Utility or IBM BladeCenter SAN Browser ~~QLogic SANbox Manager GUI~~, zone changes propagate to the Brocade switches and display within the Brocade CLI but not in the Web Tools GUI. Zone changes using Brocade's Web Tools will successfully propagate to the IBM BladeCenter SAN Utility and IBM BladeCenter SAN Browser ~~QLogic SANbox Manager GUI~~ and ~~QLogic CLI~~ IBM BladeCenter CLI. *[Does this apply? What should this state?]*

Contacting Brocade

For more information on configuring the Brocade switches, please see the contact information located in the Introduction (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

IBM and Brocade Supported Switch and Firmware Versions

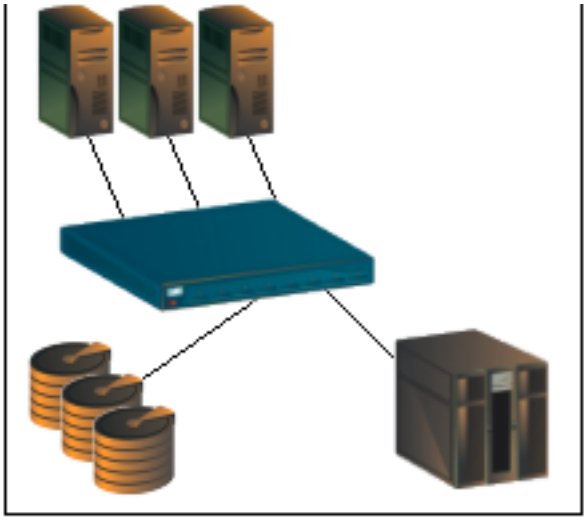
Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
Brocade	SilkWorm 3900/ IBM TotalStorage SAN Switch F32	4.0.0e and above

IBM and Brocade Supported Switch and Firmware Versions

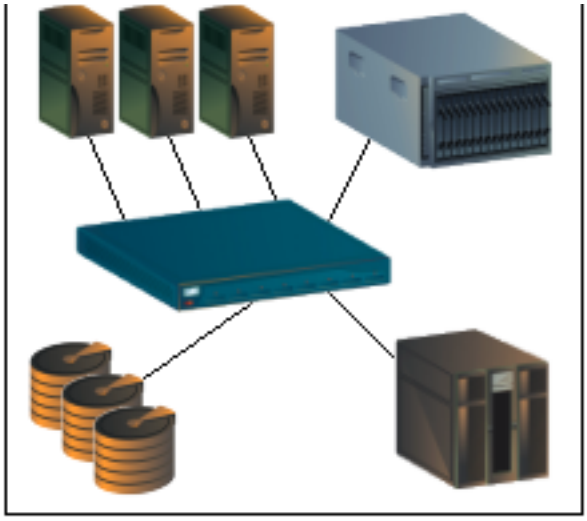
Manufacturer	Switch Model	Firmware Version
	SilkWorm 12000/ IBM TotalStorage SAN Switch M14	4.0.0e and above
	SilkWorm 24000/ IBM TotalStorage Director M14	*version?*

ATTENTION!! When updating Brocade firmware, the switch may default to a proprietary operating mode. Therefore, after a firmware update, verify that the switch is still set to Interoperability mode (see "Operating Mode Configuration" on page 125).

The following figures illustrate a Brocade Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



Brocade Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



Brocade Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current Brocade switch configuration data prior to following the steps to merge Brocade and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

Backup Procedure

Do the following to create a software copy backup of the switch configuration.

NOTE: This procedure requires access to an FTP server for Fabric OS 4.x, and an FTP or RSHD server for Fabric OS 3.x.

1. Verify that the FTP (or RSHD, as appropriate) service is running on the host workstation.
2. Log into the switch as the admin user.
3. Enter the configupload command.
4. Provide the information requested at the prompts.

For example:

```
switch:admin> configupload
Server Name or IP Address [host]: 192.168.15.42
User Name [none]: user21
File Name [config.txt]: config-switch.txt
Password: xxxxxx
upload complete
switch:admin>
```

Restore Procedure

If you need to restore the Brocade configuration settings that you backed up, do the following:

ATTENTION!! This procedure requires a reboot of the switch.

NOTE: This procedure requires access to an FTP server for Fabric OS 4.x, and an FTP or RSHD server for Fabric OS 3.x.

1. Verify that the FTP (or RSHD, as appropriate) service is running on the host workstation.
2. Log into the switch as the admin user.
3. Shut down the switch by entering the **switchdisable** command.
4. Enter the **configdownload** command.
5. Provide the information requested at the prompts.
6. Reboot the switch by entering the **reboot** command:

For example:

```
switch:admin> configdownload
Server Name or IP Address [host]: 192.168.15.42
User Name [None]: user21
File Name [config.txt]: config-file.txt
Password: xxxxxx
download complete
switch:admin>
switch:admin> reboot
```

Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the Brocade switch and IBM switch module.

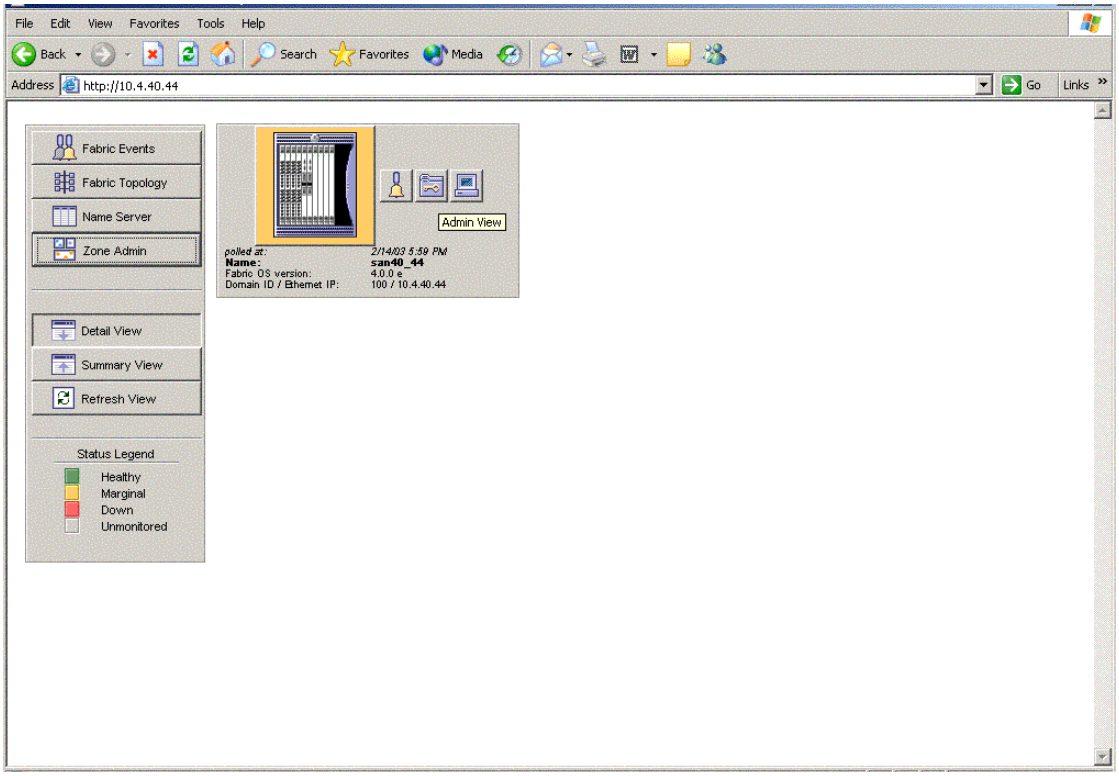
NOTE: The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range.

Brocade's Web Tools

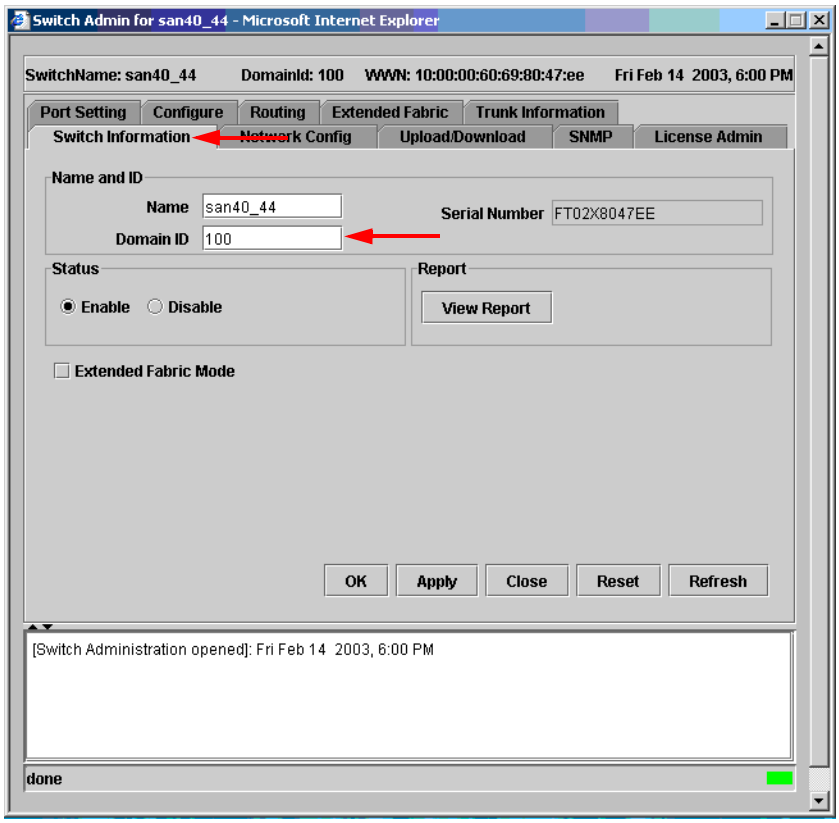
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Administration** button.

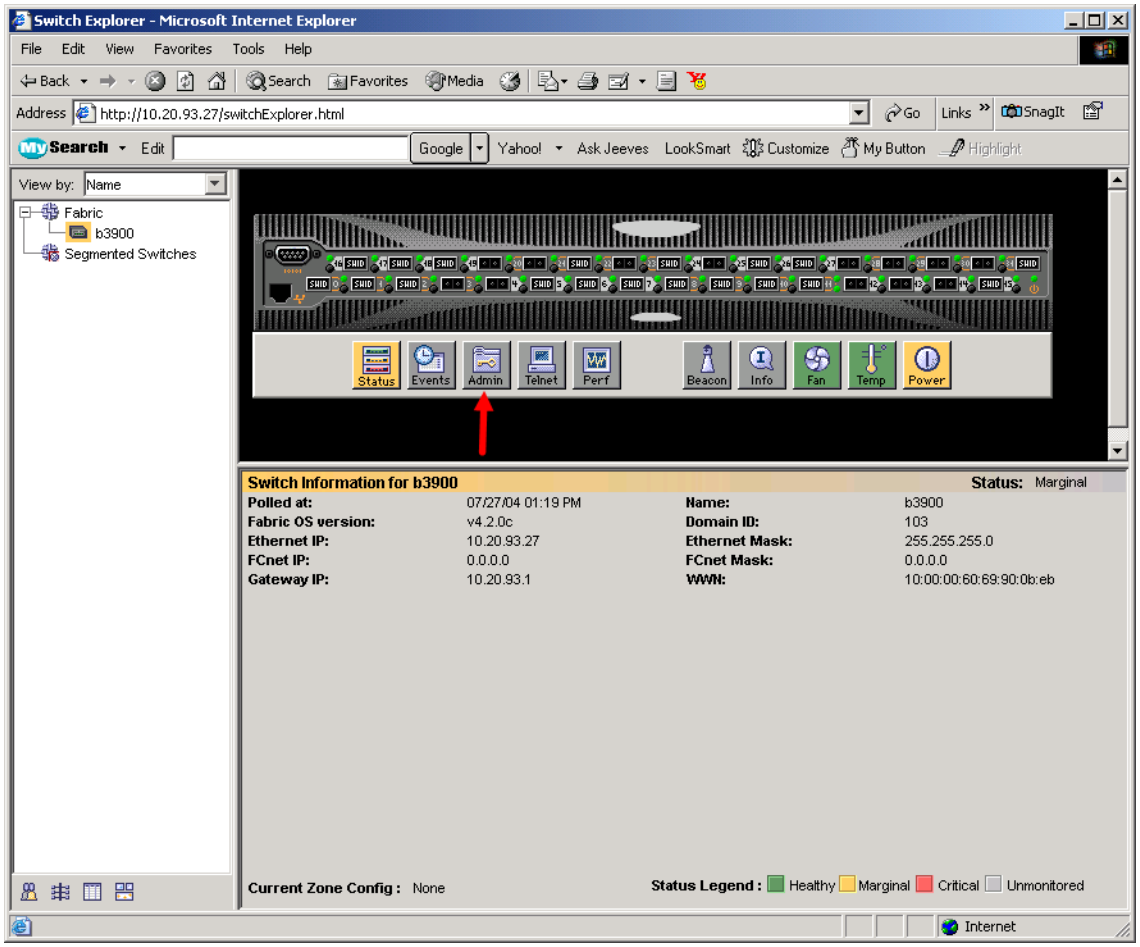


3. From the **Switch Admin for Brocade** dialog box, select the **Switch Settings** tab. Do the following:
   a. In the **Domain ID** field, type or edit the Domain ID as appropriate.
   b. Click **OK**.

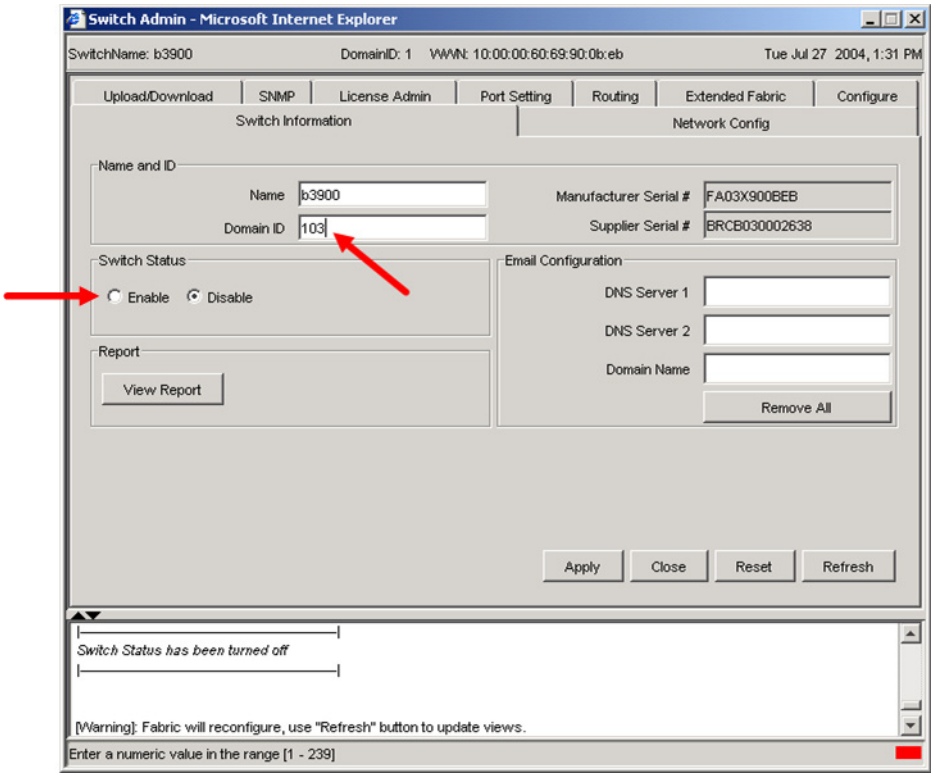


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Admin** button.



3. From the **Switch Admin** dialog box, select the **Switch Information** tab. Do the following:
   a. In the Switch Status section, select the **Disable** radio button. Click **Apply**.
   b. The **Switch Information: Confirm Action** message warns that disabling the switch may reconfigure the fabric. Click **Yes** to continue.
   c. In the Name and ID section **Domain ID** field, type or edit the Domain ID as appropriate. Click **Apply**.
   d. The **Switch Information: Confirm Action** message warns that changing the Domain ID can affect port level zoning. Click **Yes** to continue.
   e. In the Switch Status section, select the **Enable** radio button. Click **Apply**.
   f. Click **Close**.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

```
Fabric OS (cp1)
cp1 login: admin
Password:
Brocade12000:admin> switchdisable
Brocade12000:admin> configure
Configure...
  Fabric parameters (yes, y, no, n): [no] yes
    Domain: (97..127) [100]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    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]
    VC Encoded Address Mode: (0..1) [0]
    Per-frame Route Priority: (0..1) [0]
    BB credit: (1..16) [16]
  Virtual Channel parameters (yes, y, no, n): [no]
  Zoning Operation parameters (yes, y, no, n): [no]
  RSCN Transmission Mode (yes, y, no, n): [no]
  NS Operation Parameters (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]
No changes.
Brocade12000:admin> switchenable
10  Brocade12000:admin> 9  8  7  6  5  4  3  2  1
fabric: Principal switch
fabric: Domain 100
```

For Brocade switches with firmware level 3.1.0 and above, do the following:

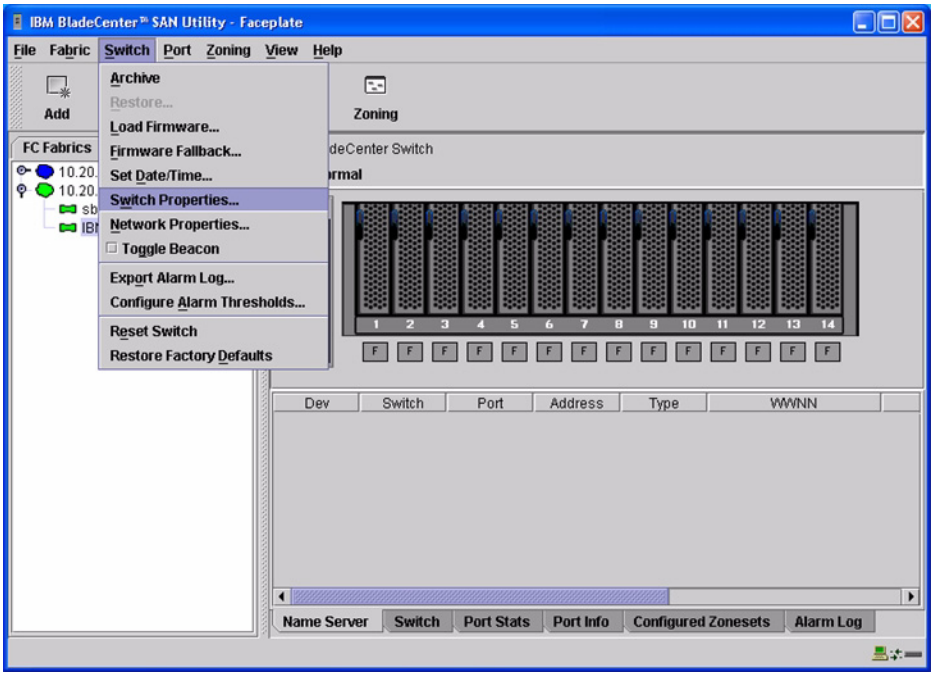
```
Fabric OS (b3900)
b3900 login: admin
Password:
b3900:admin> switchdisable
b3900:admin> configure
Configure...
  Fabric parameters (yes, y, no, n): [no] yes
    Domain: (1..239) [1] 103
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    Data field size: (256..2112) [2112]
    Sequence Level Switching: (0..1) [0]
    Disable Device Probing: (0..1) [0]
    Suppress Class F Traffic: (0..1) [0]
    Switch PID Format: (1..2) [1]
    Per-frame Route Priority: (0..1) [0]
    Long Distance Fabric: (0..1) [0]
    BB credit: (1..27) [16]
  Insistent Domain ID Mode (yes, y, no, n): [no]
  Virtual Channel 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]
WARNING: The domain ID will be changed. The port level zoning may be affected
b3900:admin> switchenable
```

IBM BladeCenter GUI

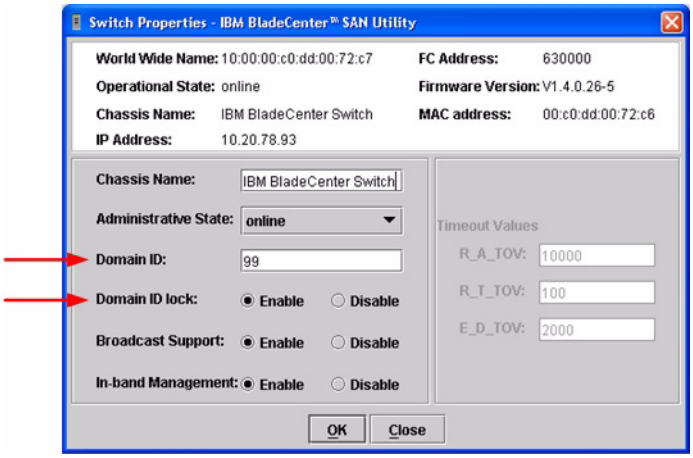
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

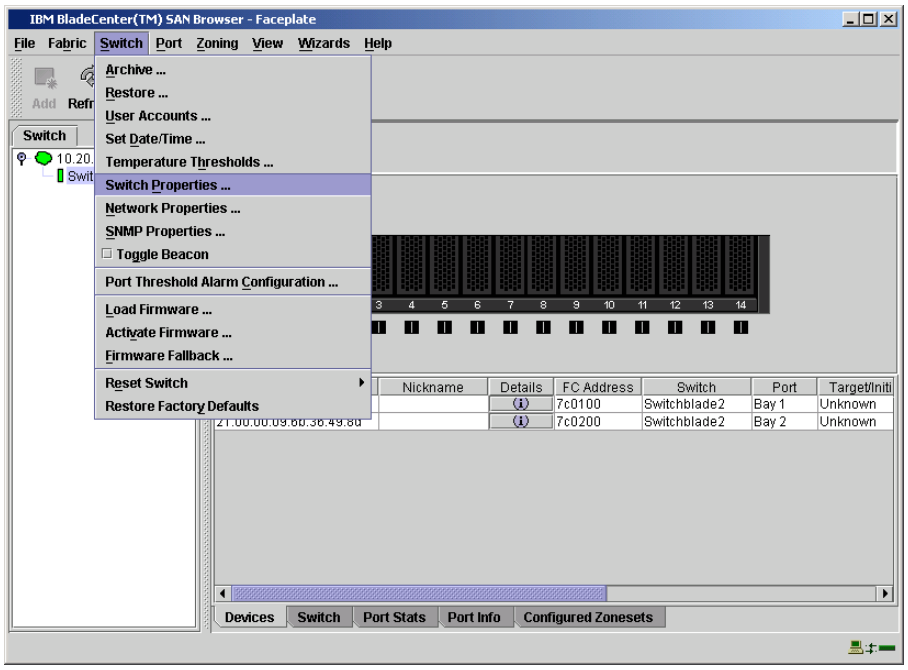


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

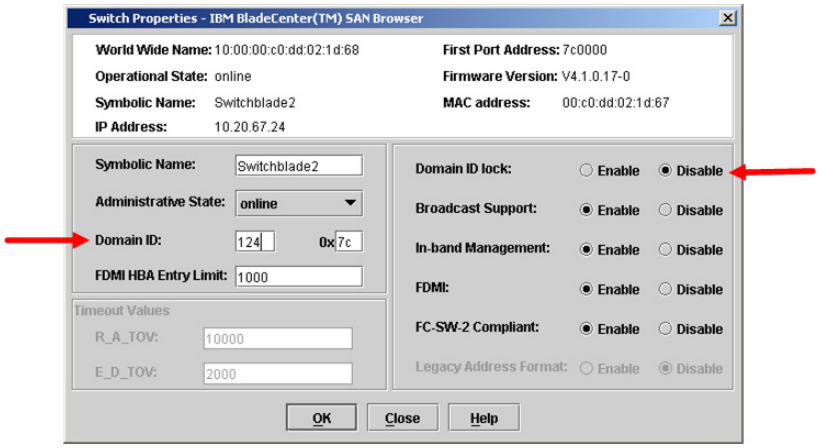


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **10000**.)
E_D_TOV = 2 seconds (The setting is **2000**.)

NOTE: These are the default values for **R_A_TOV** and **E_D_TOV**. In addition, **BB Credits** will need to be set to **12** (the default is **16**).

This section provides the steps to change these values.

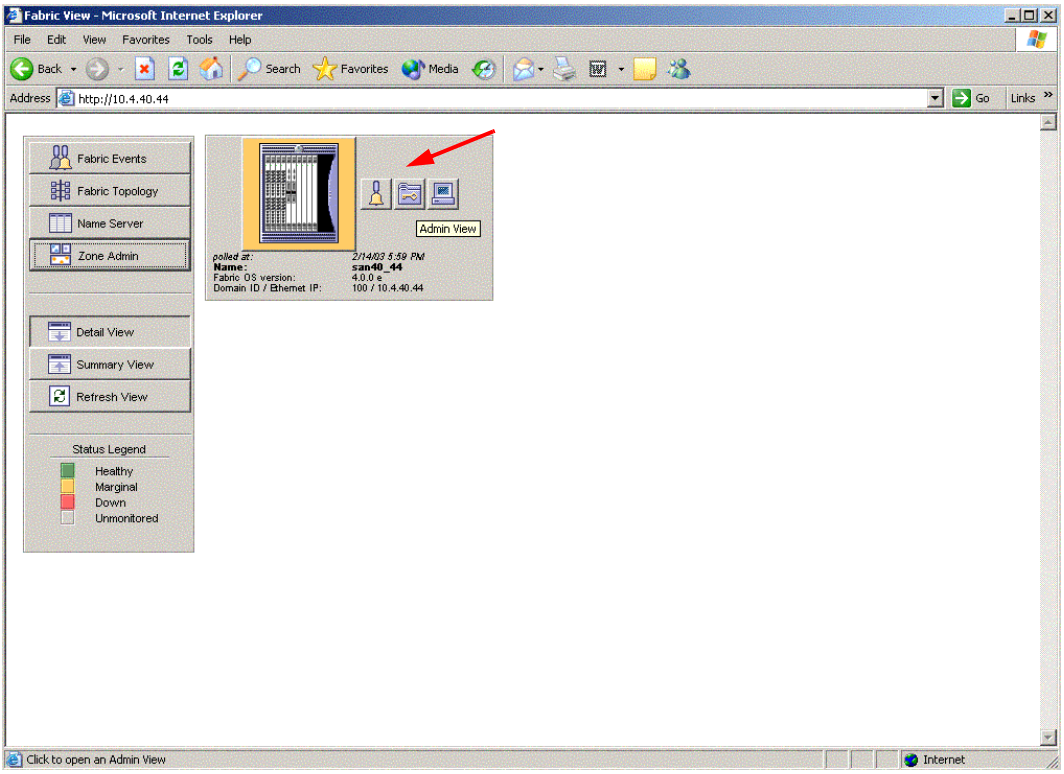
Brocade's Web Tools

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

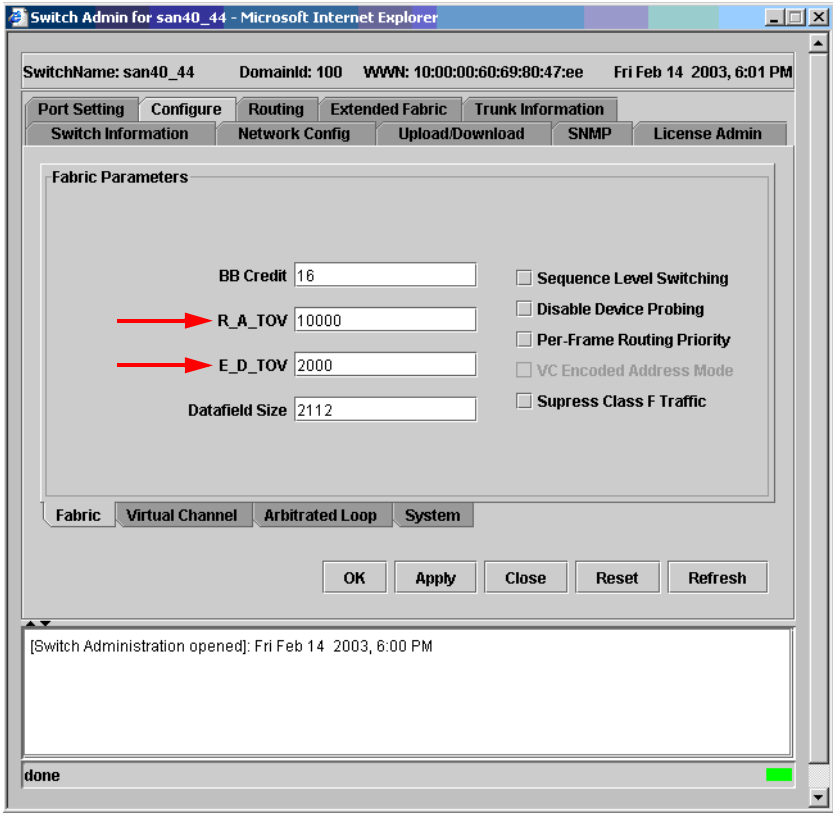
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Administration** button.

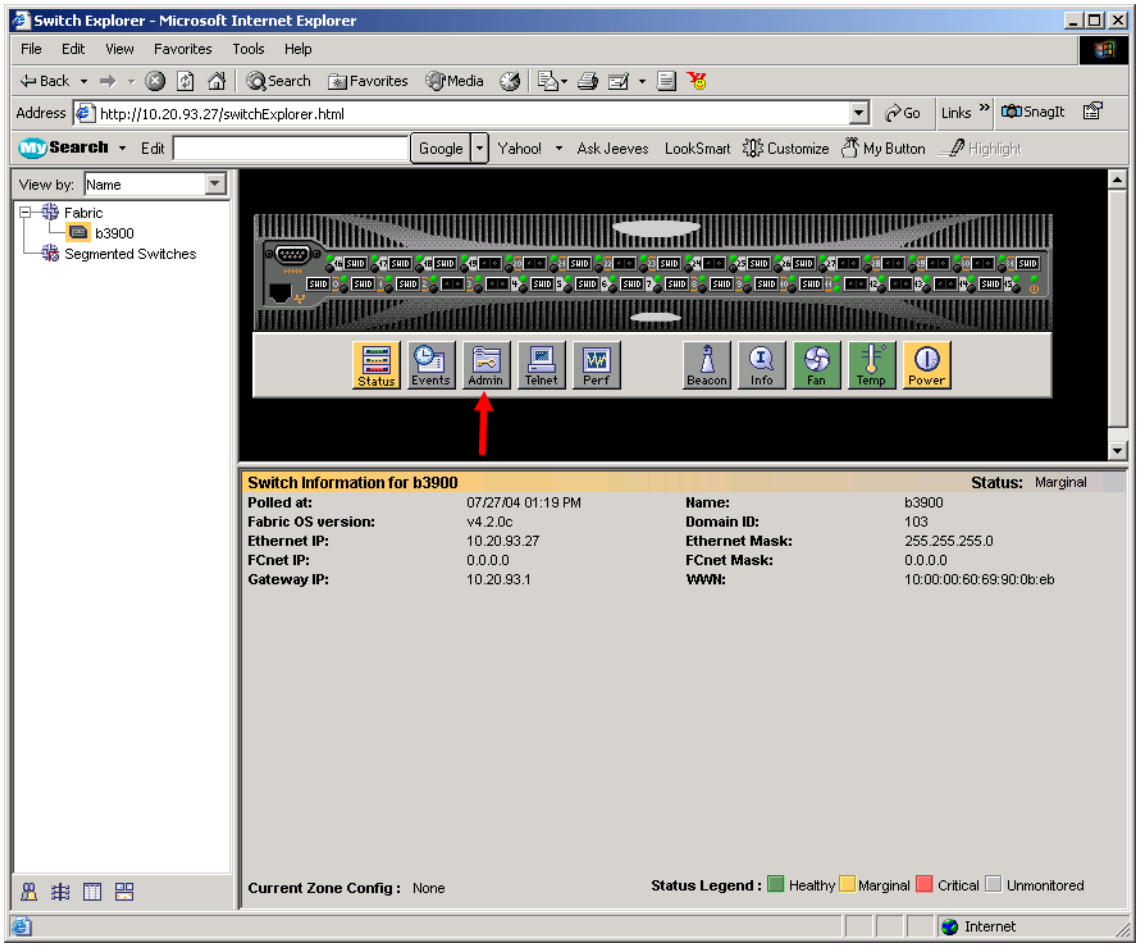


3. From the **Switch Admin for Brocade** dialog box, select the **Configure** tab. Verify that **BB Credit** is set to **12**, **R_A_TOV** is set to **10000, E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **BB Credit** box, change the setting to **12**.
   b. In the **R_A_TOV** box, change the setting to **10000**.
   c. In the **E_D_TOV** box, change the setting to **2000**.
   d. Click **OK**.

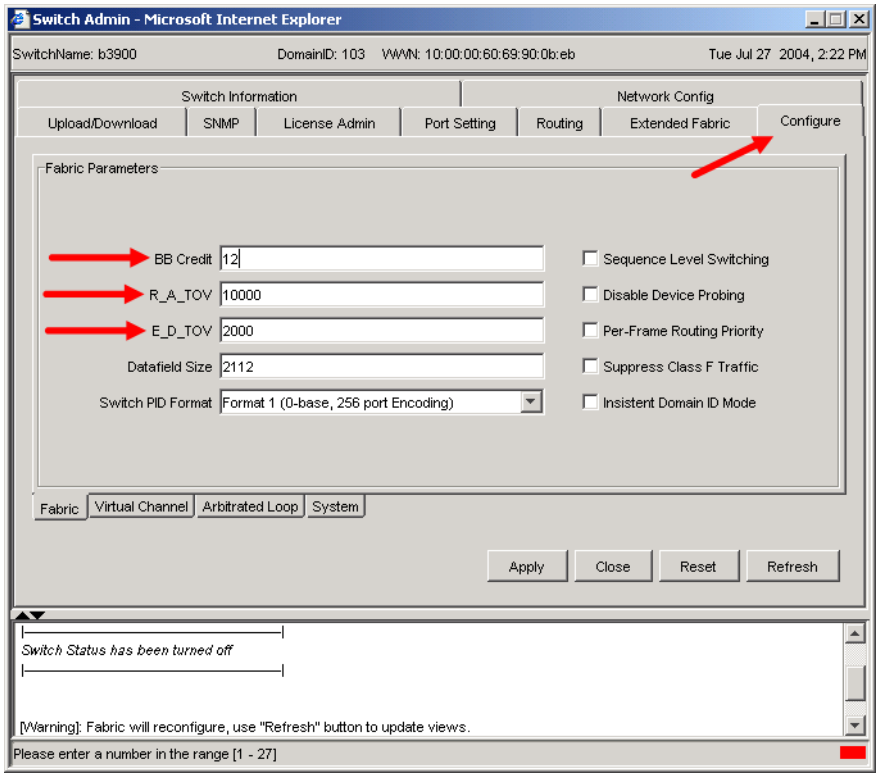


For Brocade switches with firmware level 3.1.0 and above, do the following:

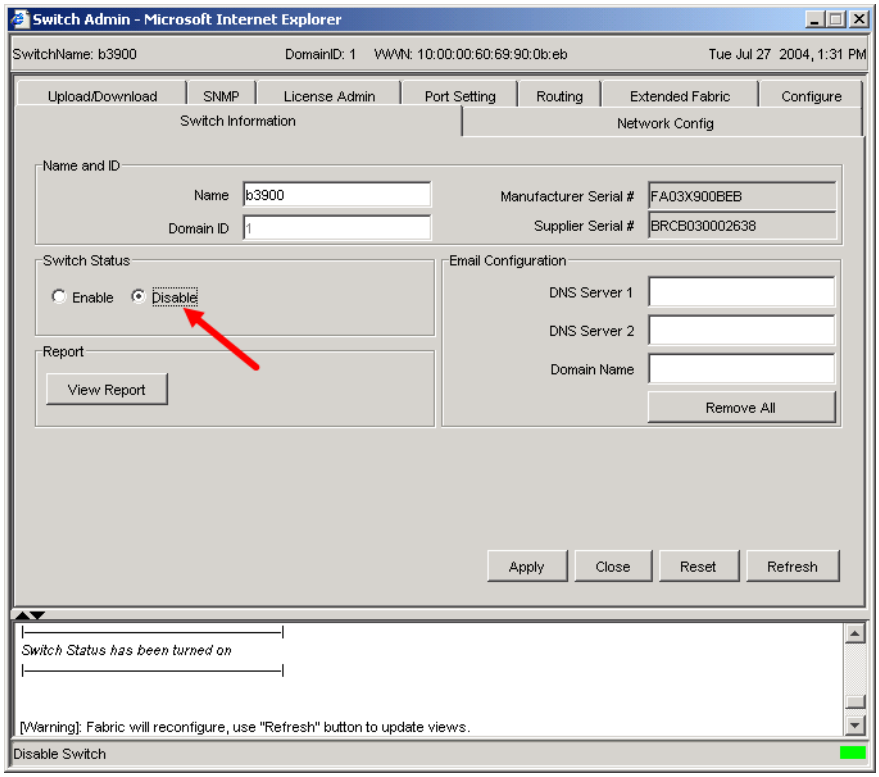
1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Admin** button.



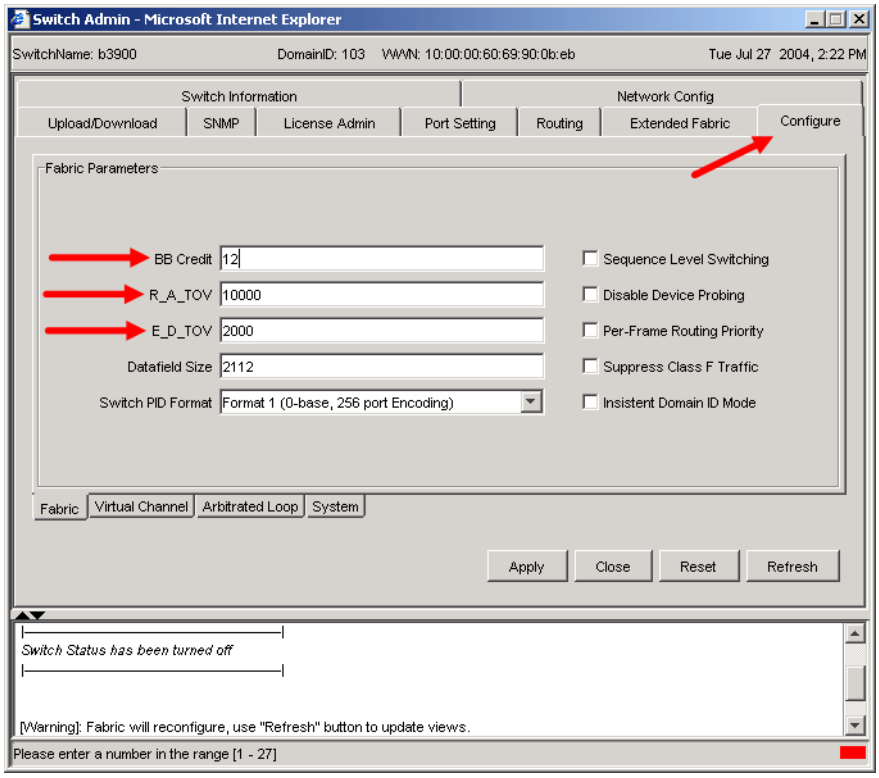
3. From the **Switch Admin** dialog box, select the **Configure** tab. Verify that **BB Credit** is set to **12**, **R_A_TOV** is set to **10000, E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



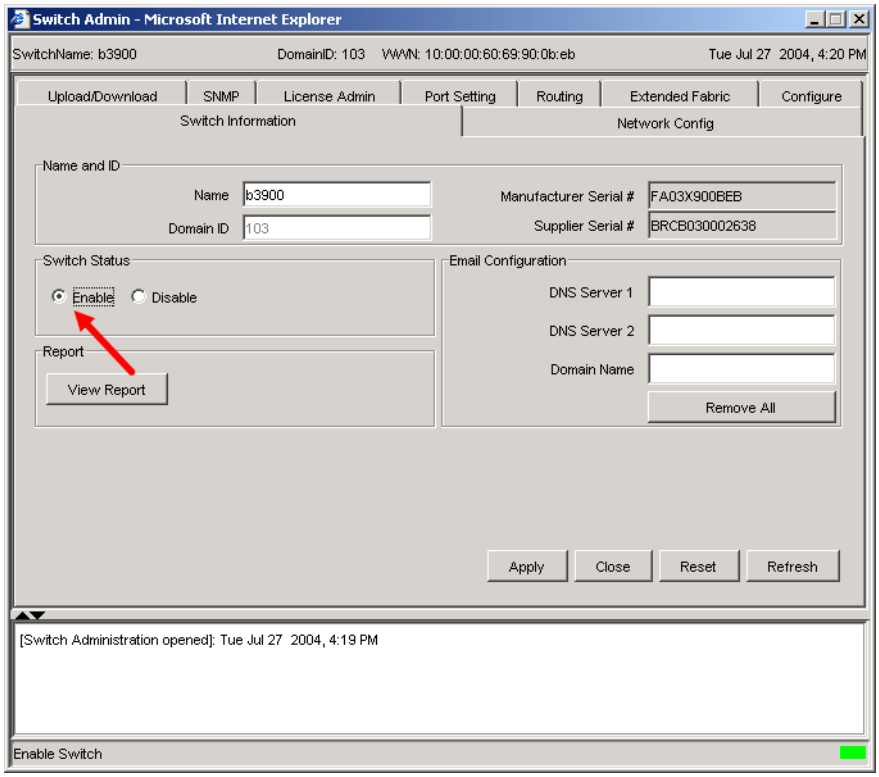
4. Select the **Switch Information** tab. In the Switch Status section, select the **Disable** radio button. Click **Apply**.



5. Select the **Configure** tab, do the following as appropriate:
   a. In the **BB Credit** box, change the setting to **12**.
   b. In the **R_A_TOV** box, change the setting to **10000**.
   c. In the **E_D_TOV** box, change the setting to **2000**.
   d. Click **Apply**.



6. Select the **Switch Information** tab. In the Switch Status section, select the **Enable** radio button to re-enable to switch. Click **Apply**



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

```
Fabric OS (cp1)
cp1 login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000, E_D_TOV is set to 2000, and BB credit is set to 12.

```
Brocade12000:admin> configshow
```

If these timeout and BB credit values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Brocade12000:admin> switchdisable
Brocade12000:admin> configure
Configure...
  Fabric parameters (yes, y, no, n): [no] yes
    Domain: (97..127) [100]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    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]
    VC Encoded Address Mode: (0..1) [0]
    Per-frame Route Priority: (0..1) [0]
    BB credit: (1..16) [12]
  Virtual Channel parameters (yes, y, no, n): [no]
  Zoning Operation parameters (yes, y, no, n): [no]
  RSCN Transmission Mode (yes, y, no, n): [no]
  NS Operation Parameters (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]
```

```
Brocade12000:admin> switchenable
10  Brocade12000:admin> 9  8  7  6  5  4  3  2  1
fabric: Principal switch
fabric: Domain 100
```

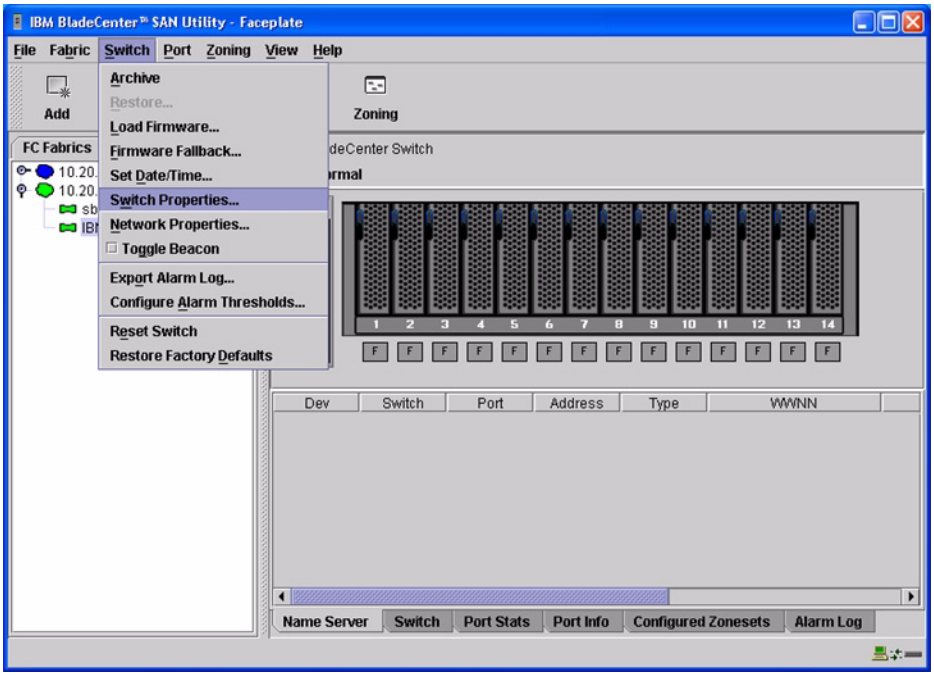
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

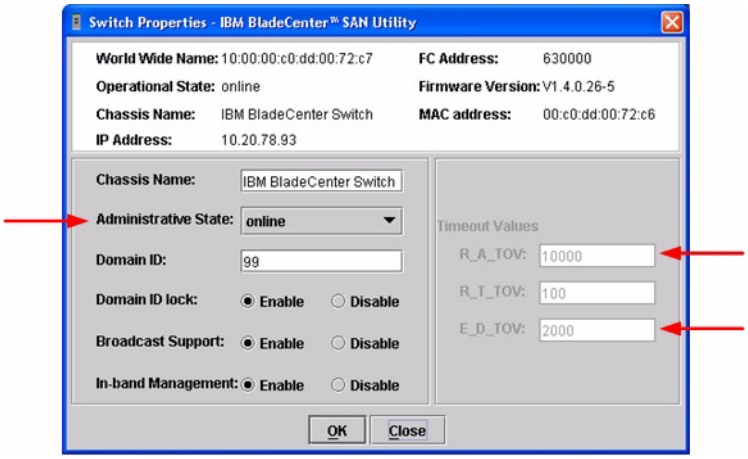
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



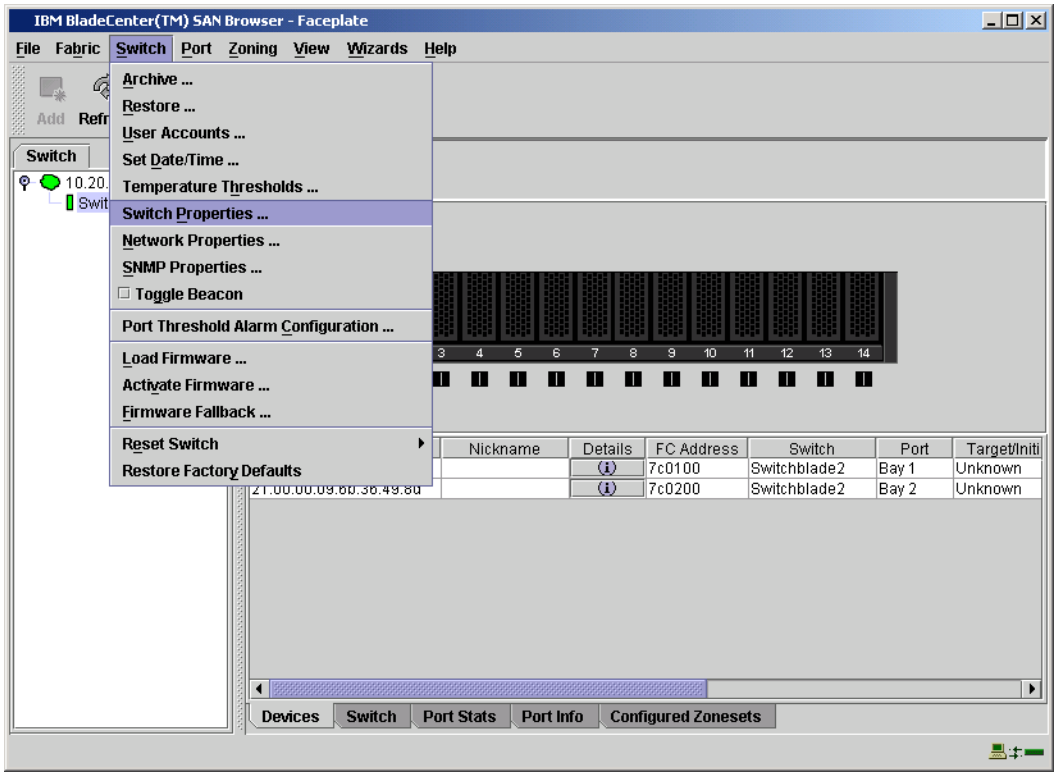
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



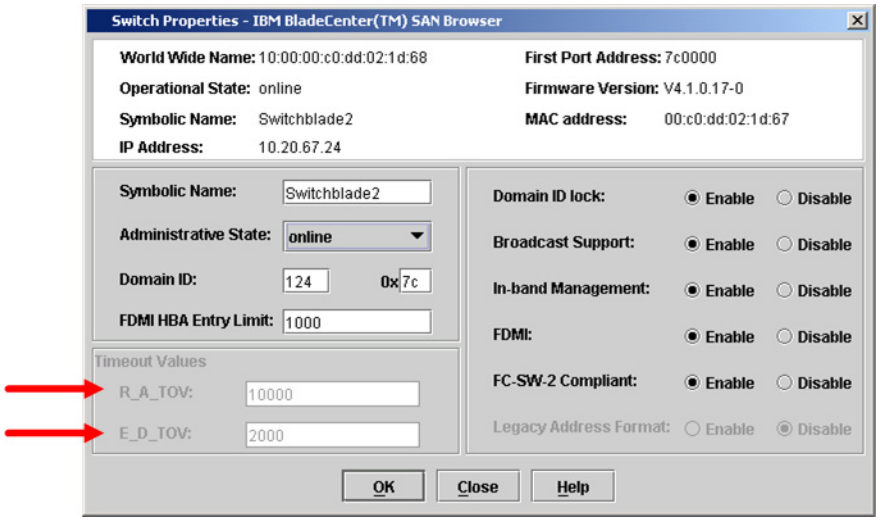
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

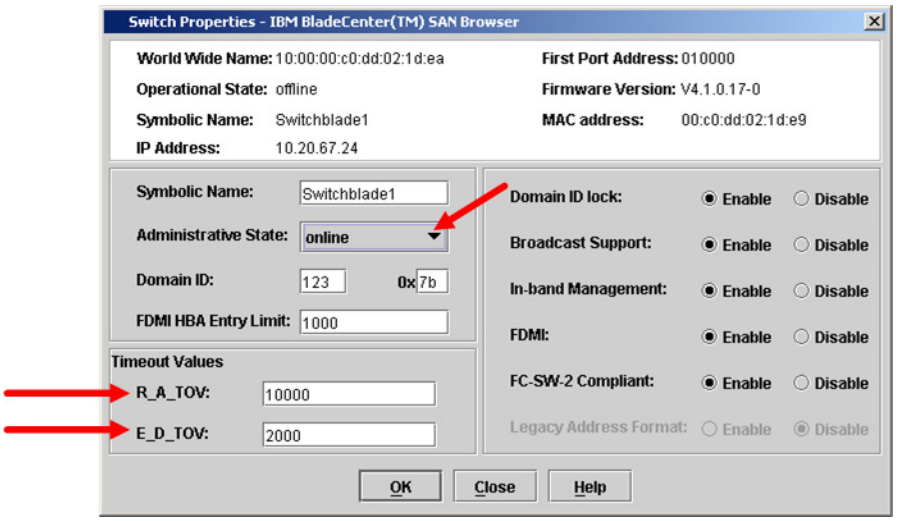
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Login: admin
Password: xxxxxxxx
Switchblade2 #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
    Finished configuring attributes.
    This configuration must be saved (see config save command) and
    activated (see config activate command) before it can take effect.
    To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
    The config named default has been saved.
Switchblade2 (admin): admin> config activate
    The currently active configuration will be activated.
    Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

Brocade switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

Active Zone Set Names

NOTE: For Brocade, Zone Set is referred to as Zone Configuration.

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

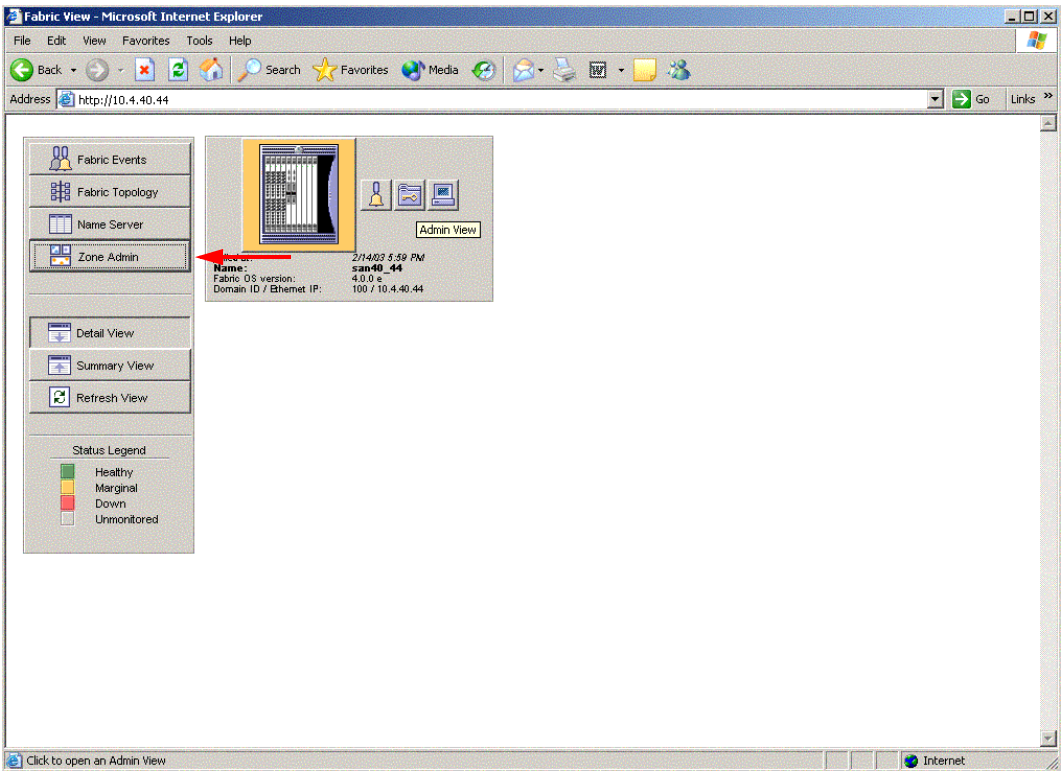
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

Brocade's Web Tools

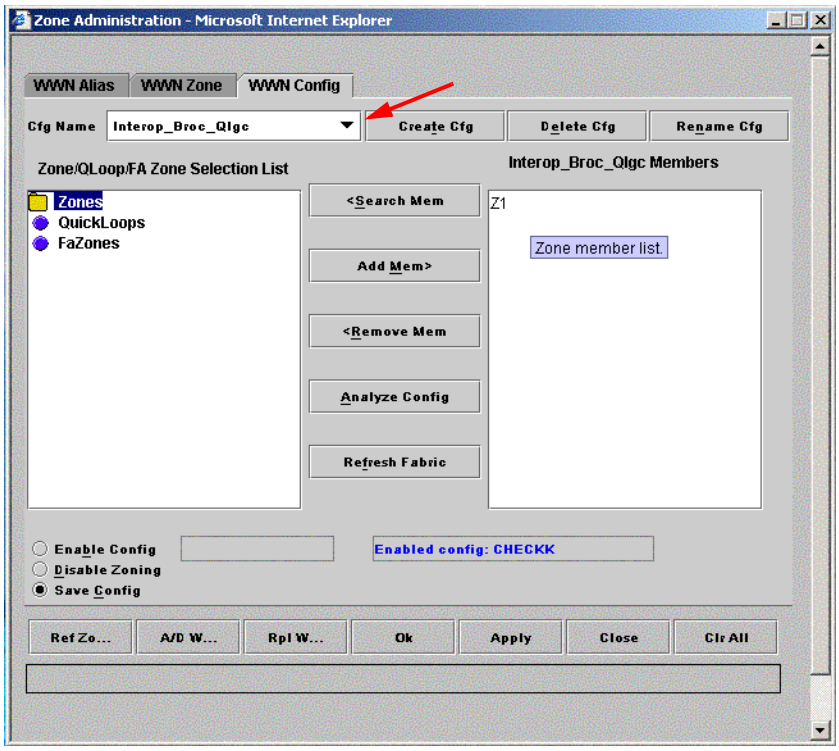
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Zone Admin** button.

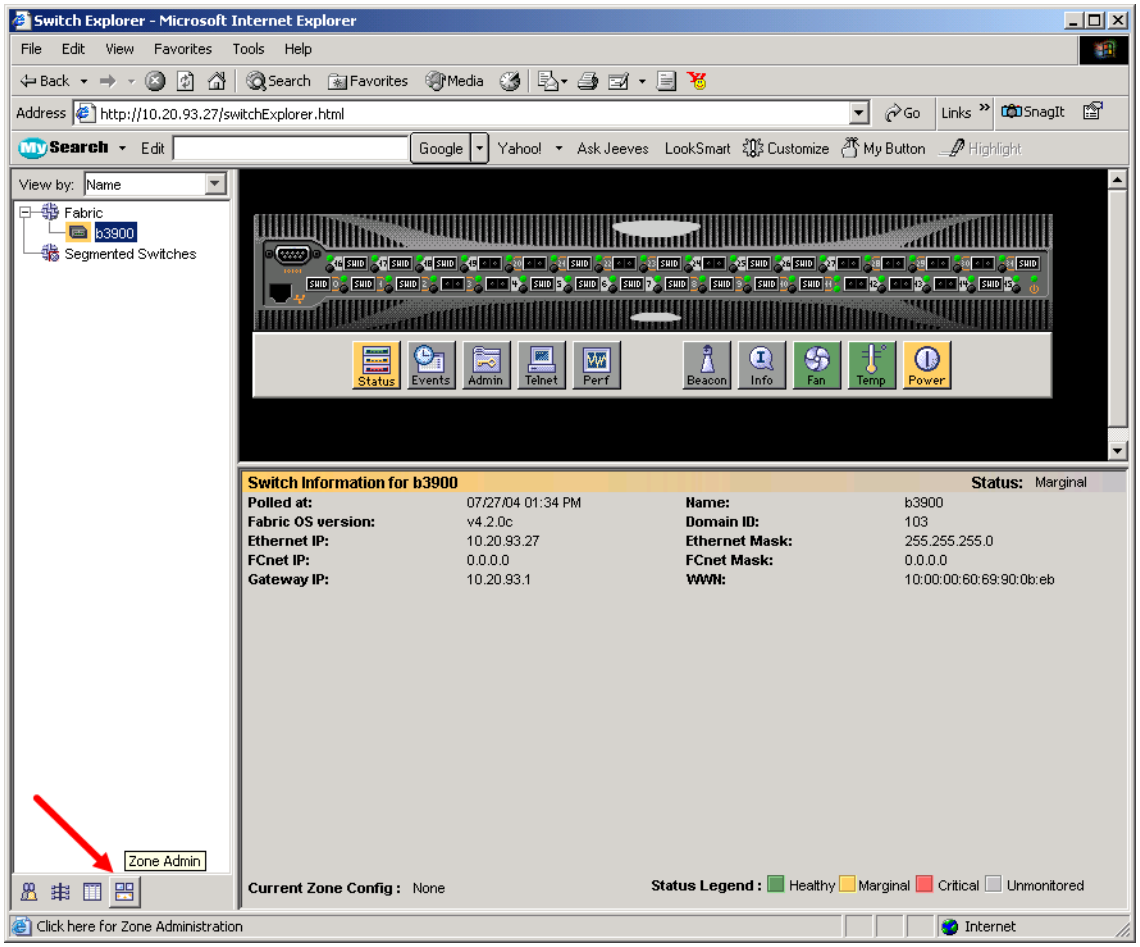


3. From the **Zone Administration** dialog box, select the **WWN Config** tab. Verify that all config names conform to the standards discussed under "Active Zone Set Names" on page 106 and are unique between the switches.

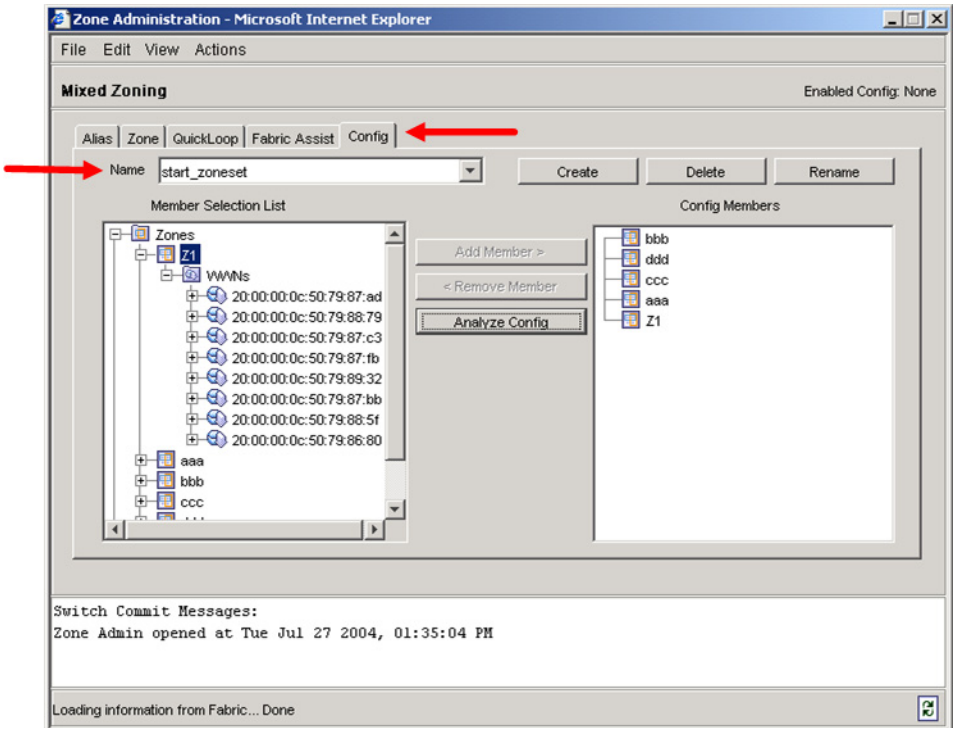


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Zone Admin** button.



3. From the **Zone Administration** dialog box, select the **Config** tab. Click the **Name** drop-down list to verify that all config names conform to the standards discussed under "Active Zone Set Names" on page 106 and are unique between the switches.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

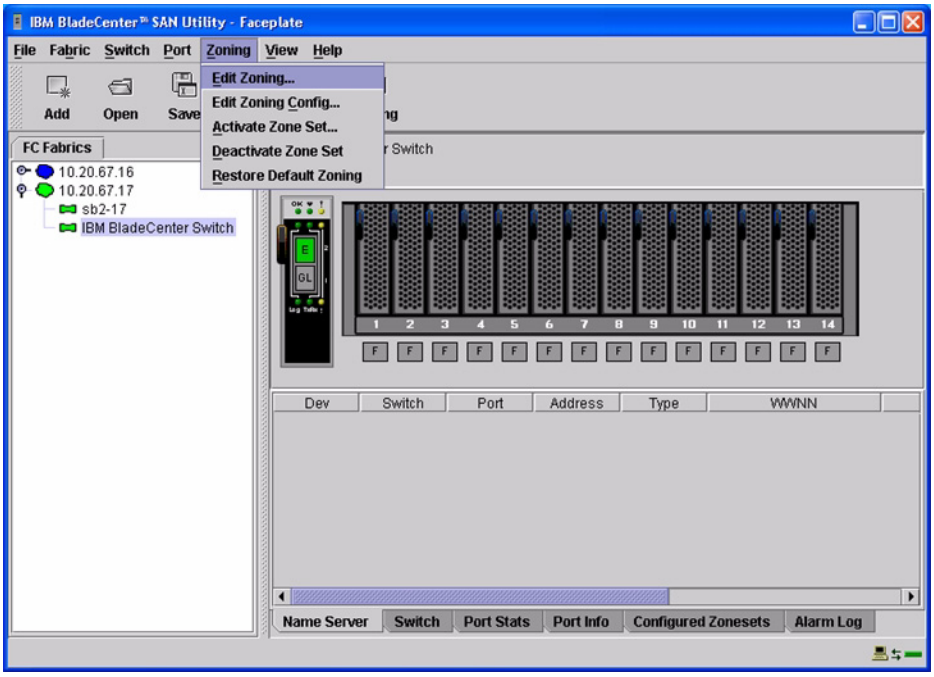
```
Fabric OS (cp1)
cp1 login: admin
Password: xxxxxxxx
Brocade12000:admin> cfgshow
Defined configuration:
  cfg: Interop_Broc_IBM
          Z1
  zone:   Z1    21:00:00:e0:8b:06:01:e6; 21:00:00:e0:8b:06:00:e6;
          21:00:00:e0:8b:06:04:e6; 21:00:00:e0:8b:06:99:67;
          50:02:0f:23:00:00:03:58
Effective configuration:
  cfg: CHECKK
  zone:   Z1    21:00:00:e0:8b:06:01:e6
          21:00:00:e0:8b:06:00:e6
          21:00:00:e0:8b:06:04:e6
          21:00:00:e0:8b:06:99:67
          50:02:0f:23:00:00:03:58
```

IBM BladeCenter GUI

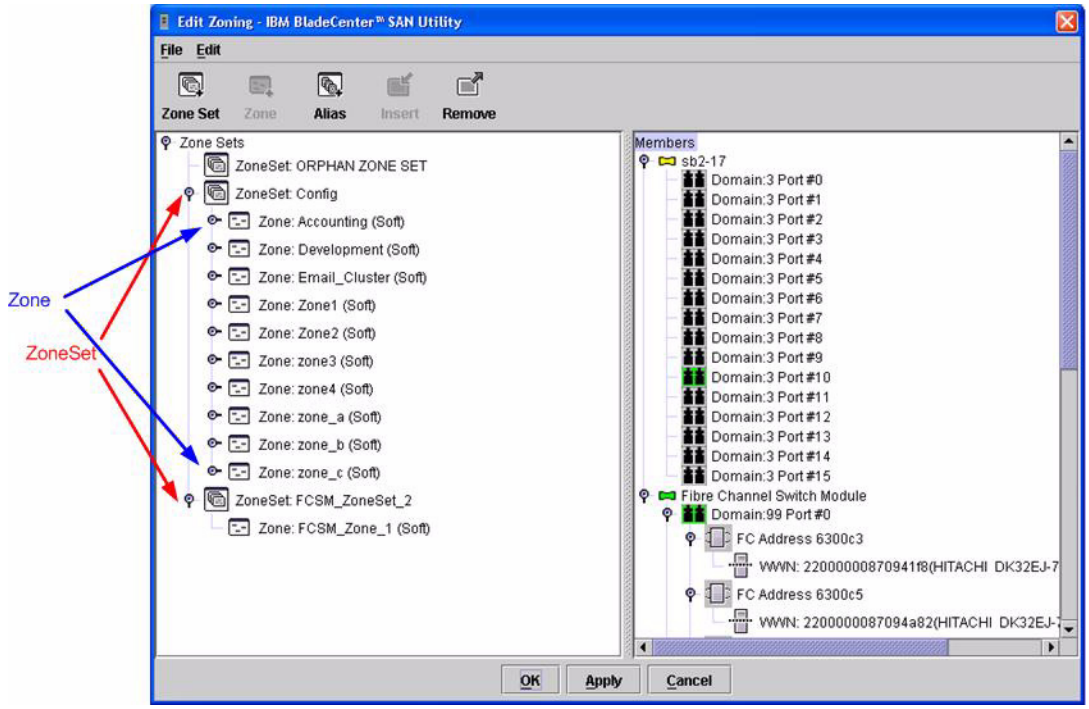
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

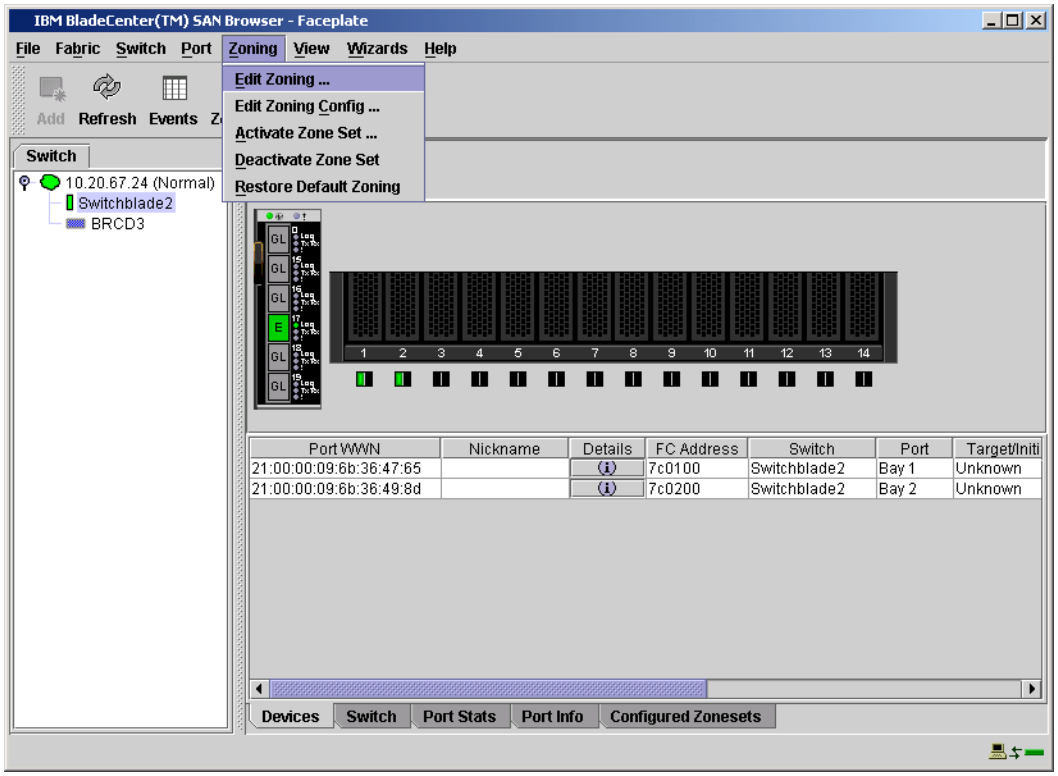


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 106.

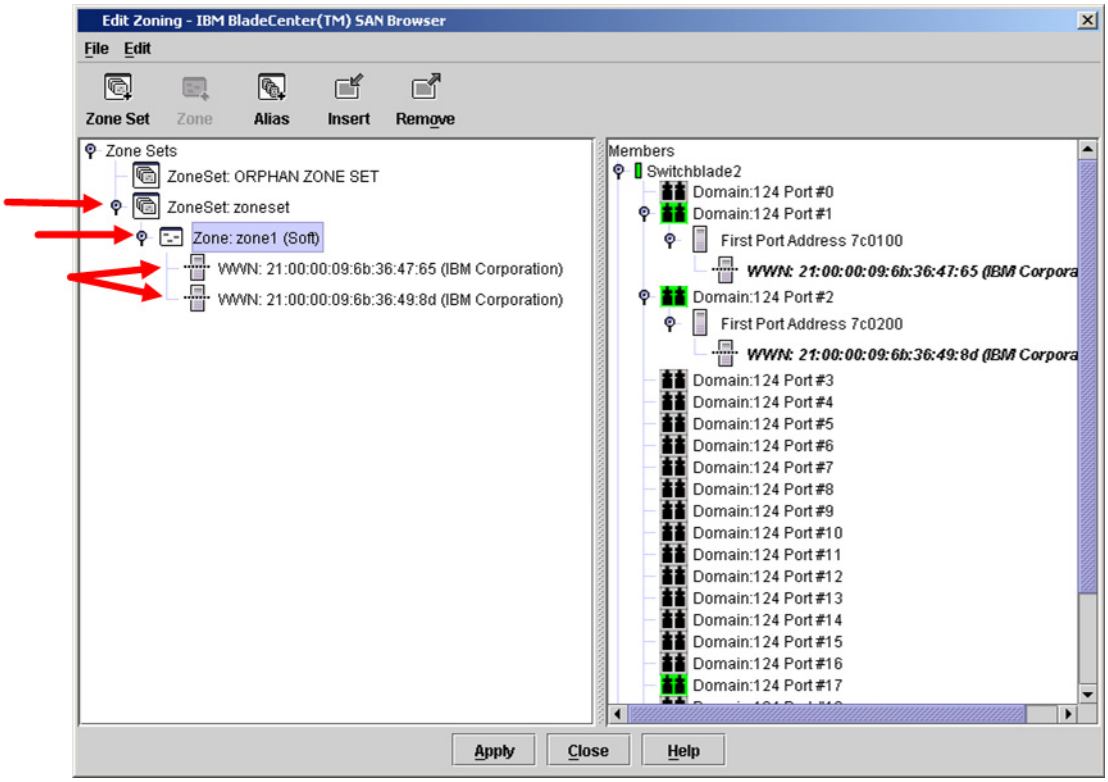


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning— IBM BladeCenter SAN Browser** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 106.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

Zone Types

All zone members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

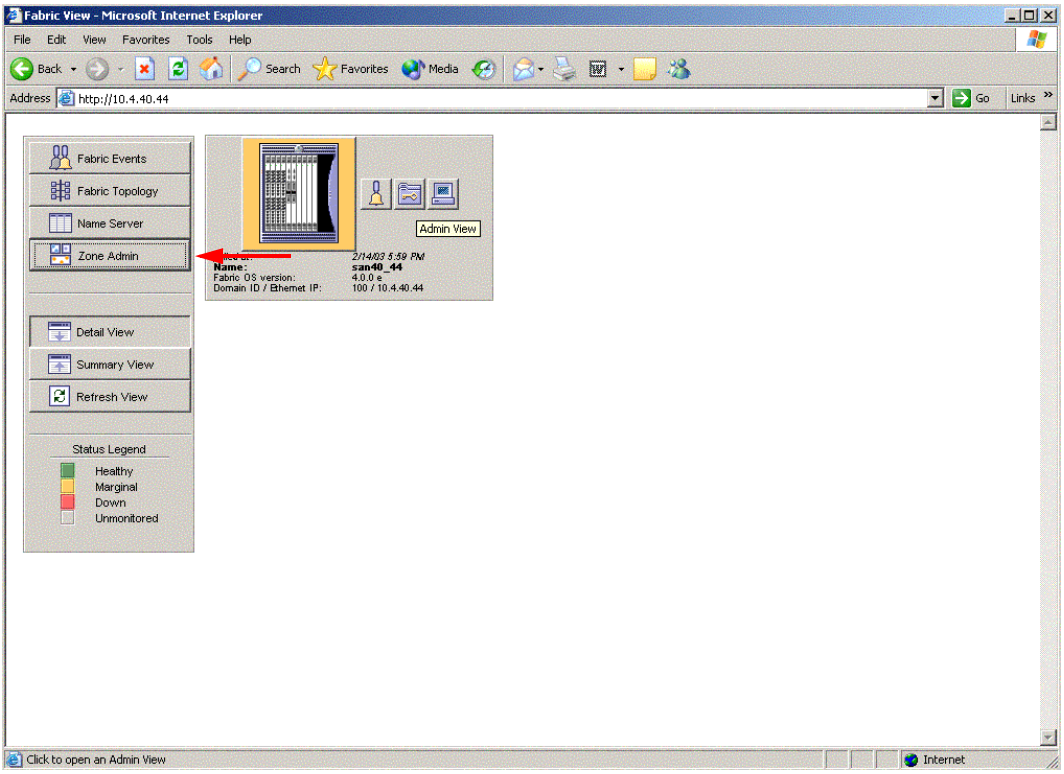
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

Brocade's Web Tools

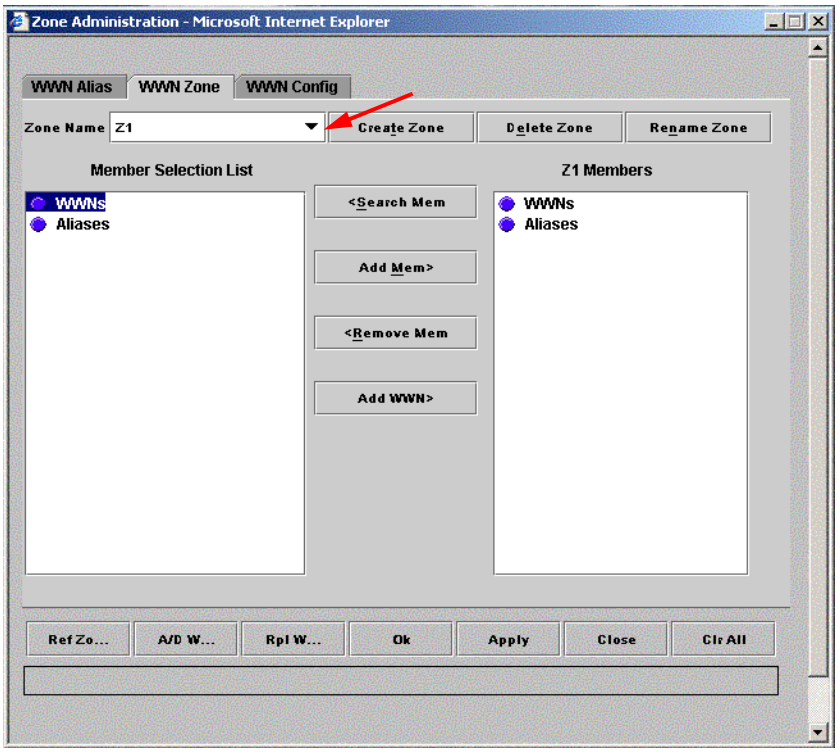
NOTE: The procedures differ based on the Brocade switch firmware level.

For Brocade switches with firmware levels 3.0.2g and above but less than 3.1.0, do the following:

1. Start Brocade's Web Tools. The **Fabric View** dialog box displays.
2. From the **Fabric View** dialog box, click the **Zone Admin** button.

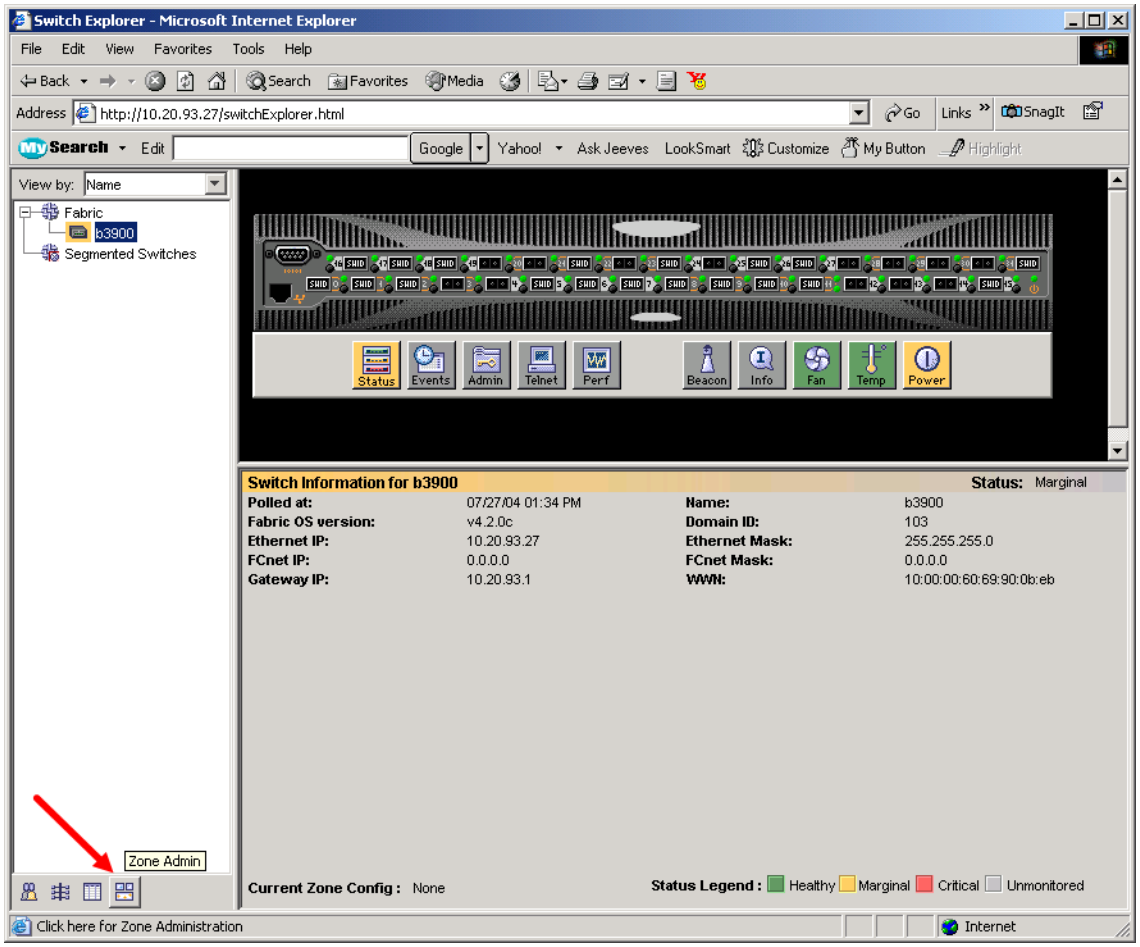


3. From the **Zone Administration** dialog box, select the **WWN Zone** tab. Verify that all zone names conform to the standards discussed under "Active Zone Set Names" on page 106 and are unique between the switches.

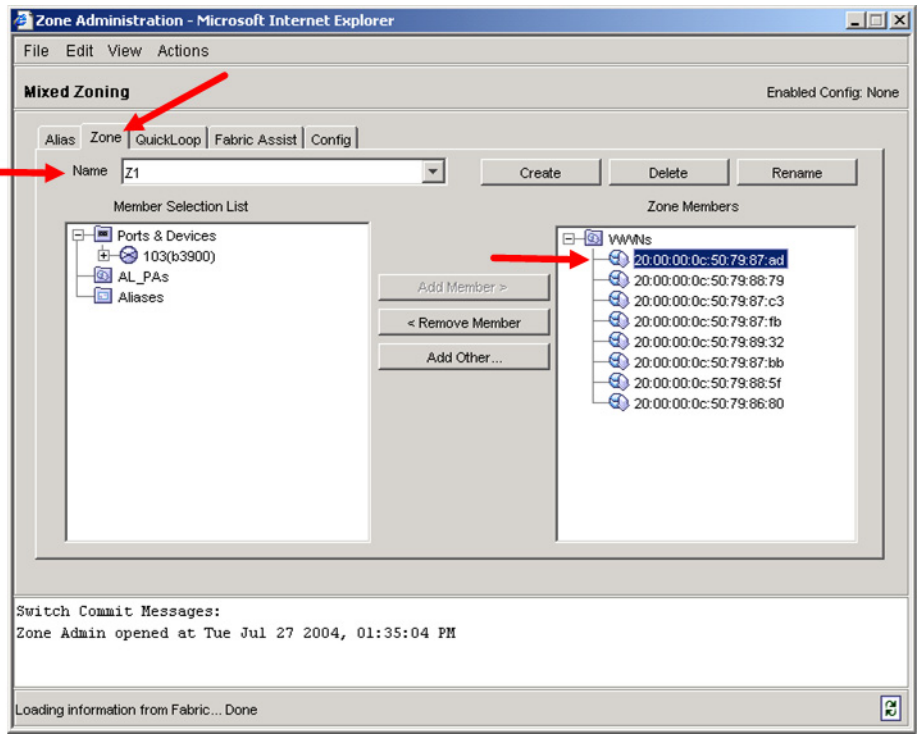


For Brocade switches with firmware level 3.1.0 and above, do the following:

1. Start Brocade's Web Tools. The **Switch Explorer** dialog box displays.
2. From the **Switch Explorer** dialog box, click the **Zone Admin** button.



3. From the **Zone Administration** dialog box, select the **Zone** tab. Verify that all zone names conform to the standards discussed under "Active Zone Set Names" on page 106 and are unique between the switches. Do the following:
   a. In the **Name** drop-down box, select a zone.
   b. In the Zone Members section, verify the WWNs.
   c. Repeat steps a and b for each zone.



Brocade CLI

NOTE: Use the following CLI commands when Brocade's Web tools are not available.

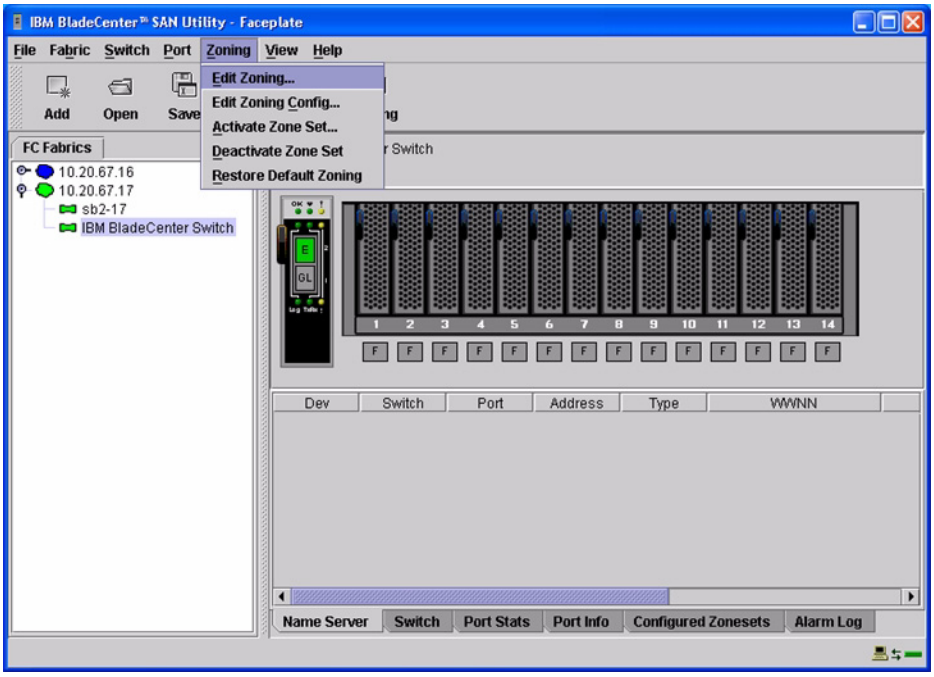
```
Login: admin
Password: xxxxxxxx
Brocade12000:admin> zoneshow
```

IBM BladeCenter GUI

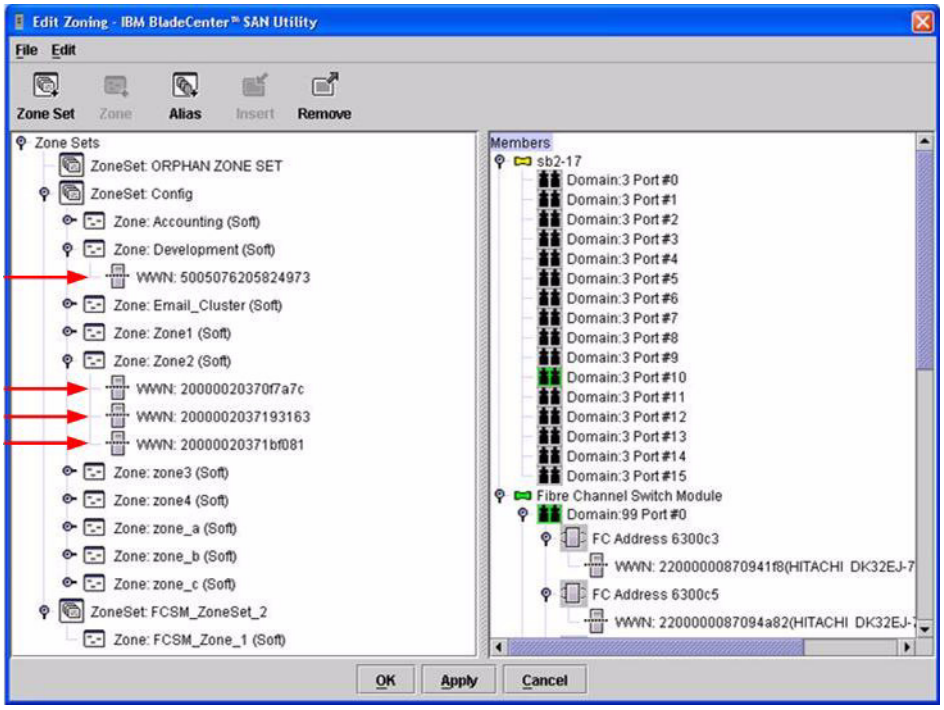
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

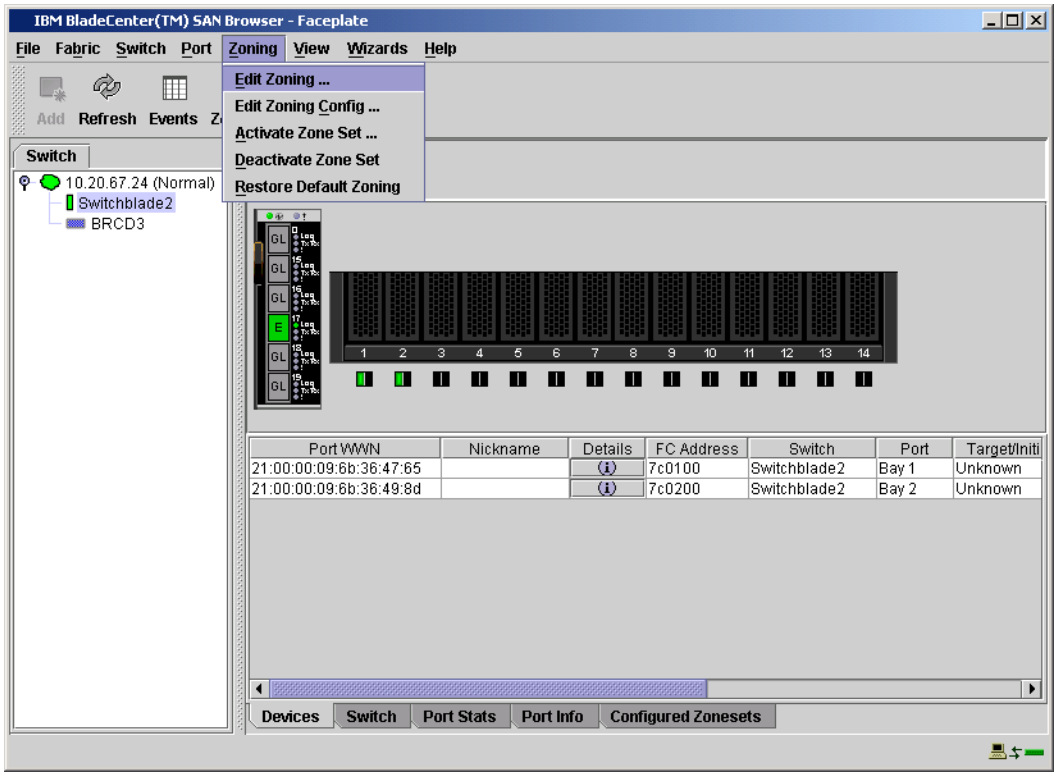


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

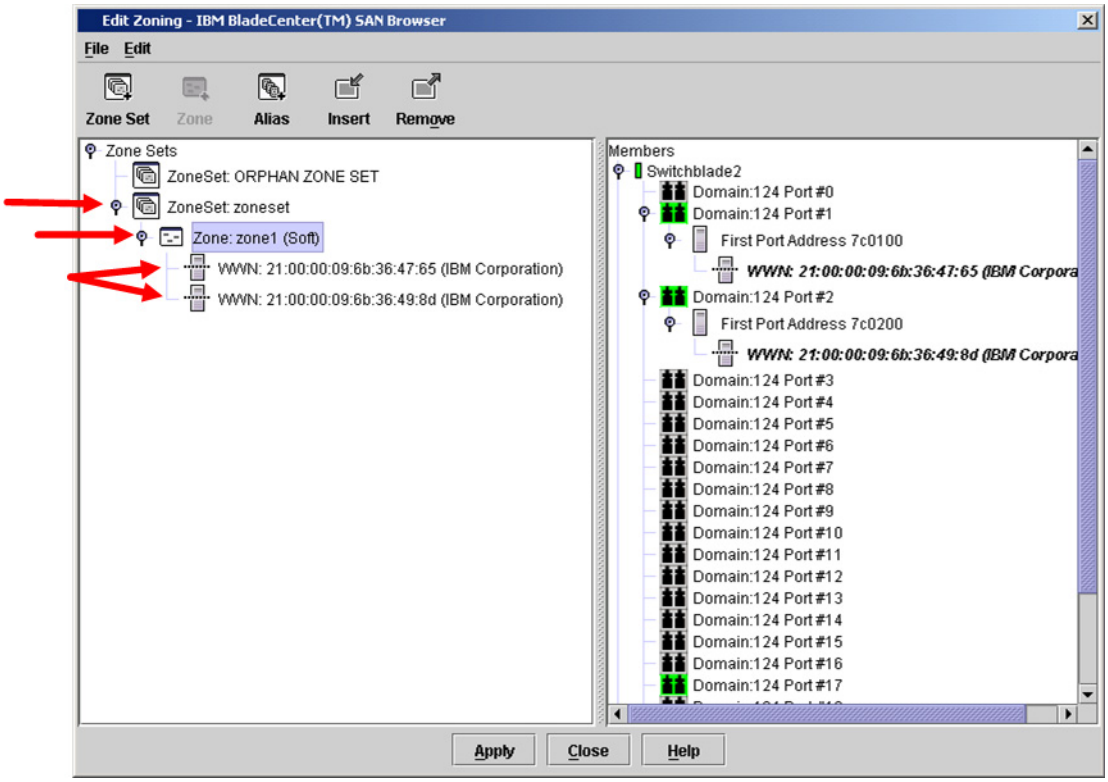


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

Operating Mode Configuration

The Brocade switch must be in Interoperability mode to be FC-SW2 compliant. Therefore, the current operating status must be Interopmode on. Note the following:

- InteropMode = 0 (disabled, which is Brocade proprietary mode)
- InteropMode = 1 (enabled, which is FC-SW-2 compliant mode)

Brocade's Web Tools

Interoperability mode cannot be set using Brocade's Web Tools; use the Brocade CLI.

Brocade CLI

Do the following to set the Brocade switch to Interoperability mode.

ATTENTION!! This procedure requires a reboot of the switch.

Enter the following command to verify that the current operating status is Interopmode:

```
Login: admin
Password: xxxxxxxx
b3900:admin> interopmode
InteropMode: Off

Usage: InteropMode 0|1
   0: to turn it off
   1: to turn it on
b3900:admin>
```

If the Interopmode is disabled, enter the following commands to enable Interopmode:

```
b3900:admin> switchdisable
b3900:admin> interopmode 1

The switch effective configuration will be lost when the operating mode
is changed; do you want to continue? (yes, y, no, n): [no] yes

Interopmode is enabled
```

Enter the following command to reboot the switch for the new change to take effect:

```
b3900:admin> fastboot
```

IBM BladeCenter GUI

Not applicable.

IBM BladeCenter CLI

Not applicable.

Brocade Specific Configuration

The platform manager server must be disabled.

Brocade's Web Tools

These functions cannot be done using Brocade's Web Tools; use the Brocade CLI.

Brocade CLI

Enter the following command to verify that Platform Management is disabled:

```
b3900:admin> msPlatShow
Platform Management is NOT enabled.
b3900:admin>
```

If Platform Management is enabled, enter the following command to disable platform management:

```
b3900:admin> msPlMgmtDeactivate
```

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the Brocade and IBM BladeCenter fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

Merging IBM BladeCenter and Cisco Fabrics

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

IBM and Cisco Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
Cisco	MDS 9216 Switch	1.2(1) and above
	MDS 9509 Director	1.2(1) and above

The following chapter provides detailed information about merging Cisco and IBM BladeCenter fabrics: **Cisco MDS 9000 Series Switches** **(see page 131)**.

Cisco MDS 9000 Series Switches

Integration Checklist

The following steps must be completed to successfully merge Cisco and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see “Backing Up and Restoring the Current Configuration Settings” on page 134).

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 133).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 135).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 144).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 157).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 164).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 170).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

Cisco Configuration Limitations

VSAN functionality is specific to the Cisco switch. Refer to the Cisco manuals for configuration steps.

Contacting Cisco

For more information on configuring the Cisco switches, please see the contact information located in the Introduction (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

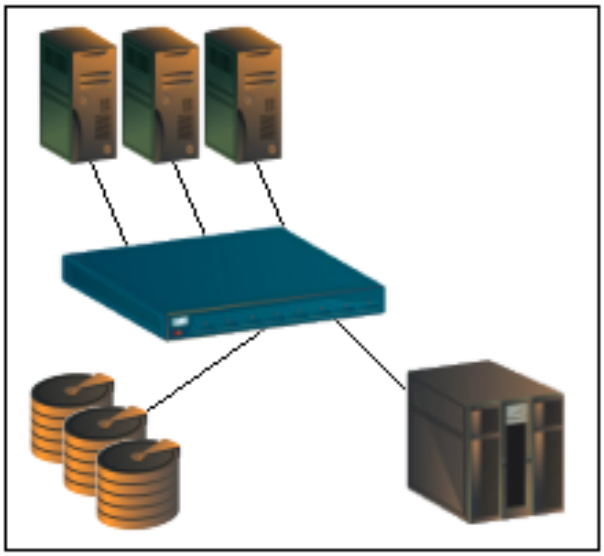
Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

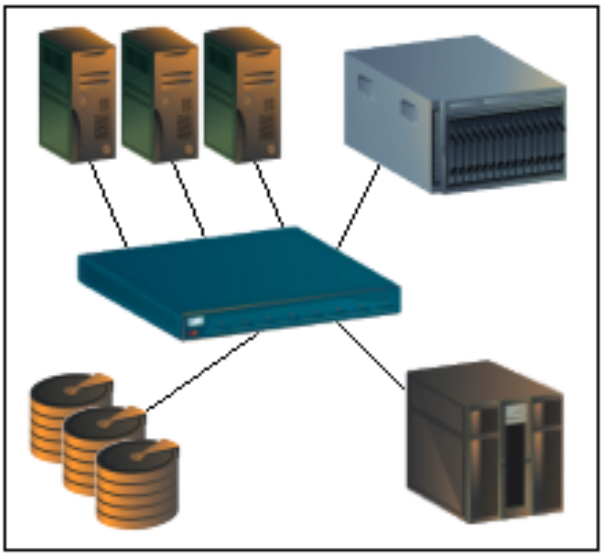
IBM and Cisco Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
Cisco	MDS 9216 Switch	1.2(1) and above
	MDS 9509 Director	1.2(1) and above

The following figures illustrate a Cisco Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



Cisco Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



Cisco Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current Cisco switch configuration data prior to following the steps to merge Cisco and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

Backup Procedure

Do the following to save the Cisco configuration settings:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **Admin** menu, select **Save Configuration**.
3. A dialog prompts whether you want to copy the running configuration to the startup configuration. Click **Yes** to save the configuration.

Restore Procedure

If you need to restore the Cisco configuration settings that you backed up, do the following:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **Admin** menu, select **Copy Configuration**.
3. The **Copy Configuration** dialog box displays. Specify the following:
   - Server address from which you want to copy the file
   - File name of the file you want to copy
   - Protocol you want to use
   - User name and password for the switch from which you want to copy the file (if required)
4. Do one of the following:
   - To copy the configuration, click **Apply**.
   - To close the **Copy Configuration** dialog without downloading, click **Cancel**.

Domain ID Configuration

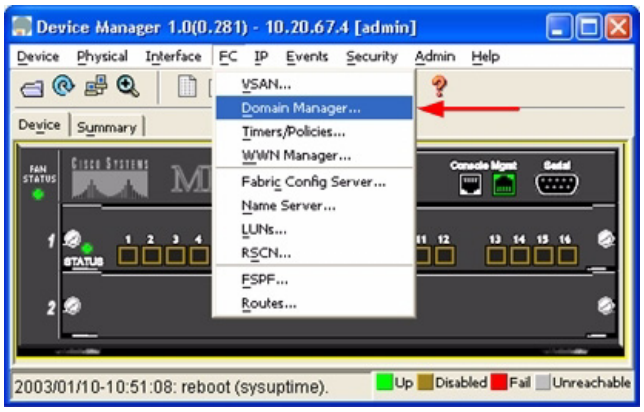
To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the Cisco switch and IBM switch module.

Cisco Device Manager

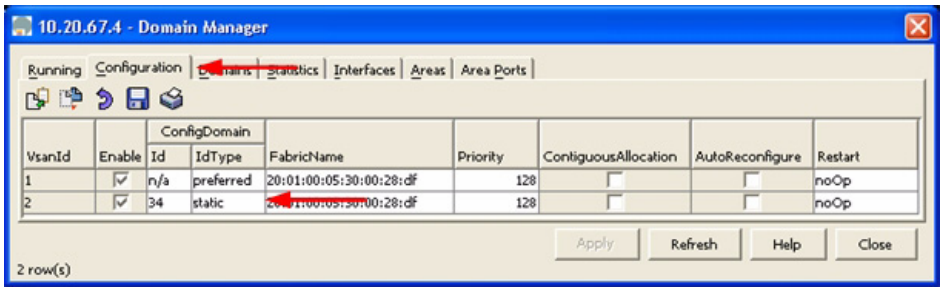
NOTE: The procedures differ based on the Cisco switch firmware level.

For Cisco switches with firmware levels 1.2(1) and above but less than 1.3(4a), do the following:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **FC** menu, select **Domain Manager**.

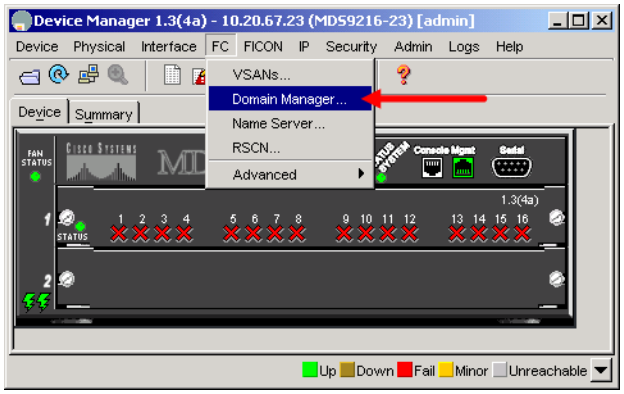


3. From the **Domain Manager** dialog box, select the **Configuration** tab. For the VSAN to which you will connect the E_port, do the following as appropriate:
   a. In the **Domain ID** field, type or edit the Domain ID.
   b. In the **ConfigDomain IdType** field, type **static**.
   c. Click **Apply**.

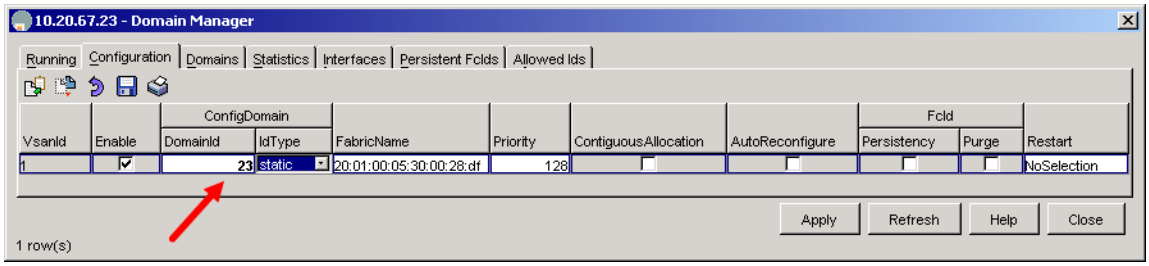


For Cisco switches with firmware levels above 1.3(4a), do the following:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **FC** menu, select **Domain Manager**.



3. From the **Domain Manager** dialog box, select the **Configuration** tab. For the VSAN to which you will connect the E_port, do the following as appropriate:
   a. In the **ConfigDomain DomainId** field, type or edit the domain ID.
   b. In the **ConfigDomain IdType** drop-down box, select **static**.
   c. Click **Apply**.



Cisco CLI

NOTE: Use the following CLI commands when the Cisco Device Manager is not available.

```
login: admin
Password: ********
Cisco_9216# config t
Cisco_9216(config)# fcdomain domain <domain id> static vsan <vsan id>
Cisco_9216(config)# fcdomain restart disruptive vsan <vsan id>
Cisco_9216(config)# end
```

If you want these changes to remain through a switch reset, enter the following command.

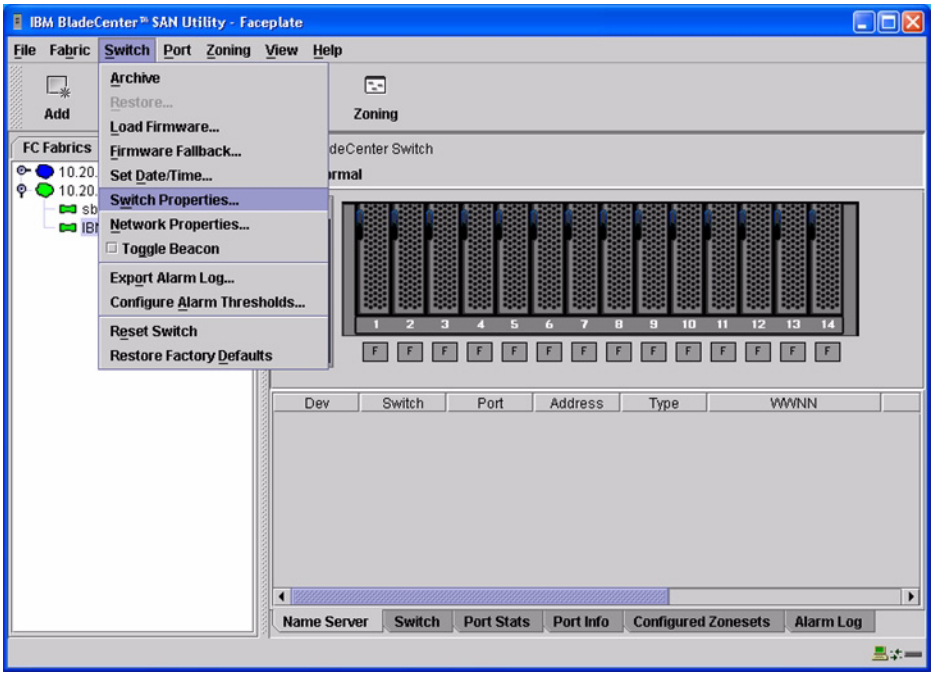
```
Cisco_9216# copy running-config startup-config
```

IBM BladeCenter GUI

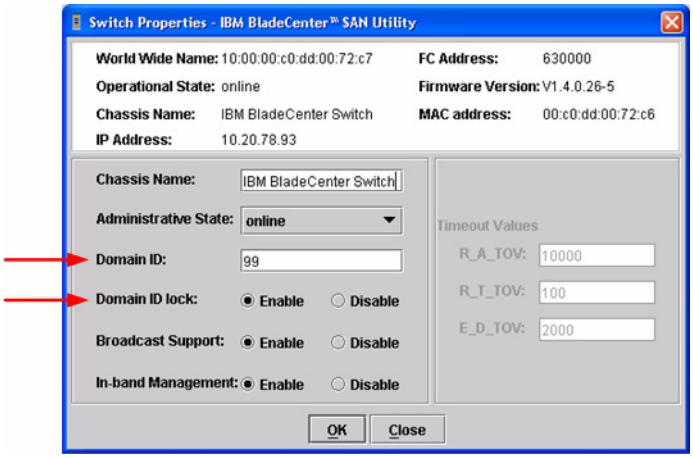
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

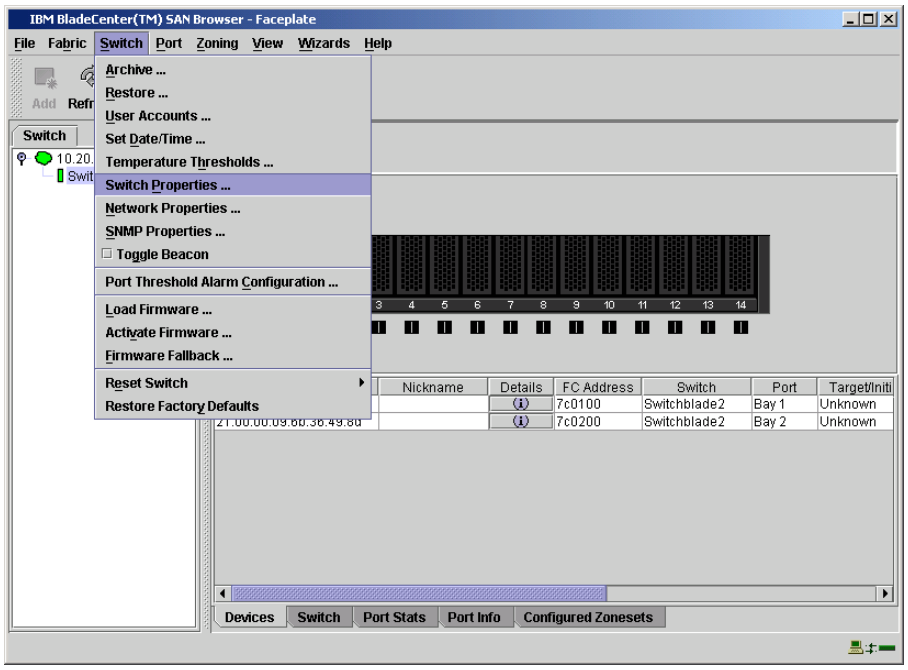


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

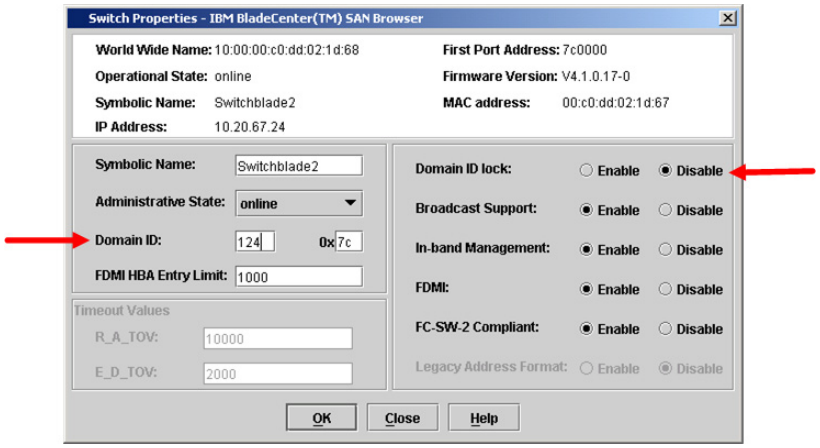


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **10000**.)
E_D_TOV = 2 seconds (The setting is **2000**.)

This section provides the steps to change these values.

Cisco Device Manager

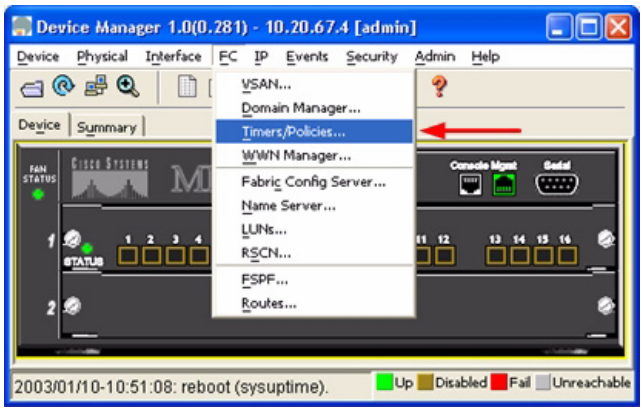
ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

Cisco Device Manager

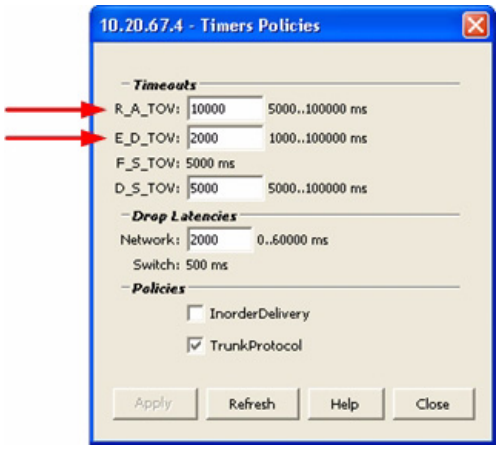
NOTE: The procedures differ based on the Cisco switch firmware level.

For Cisco switches with firmware levels 1.2(1) and above but less than 1.3(4a), do the following:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **FC** menu, select **Timers/Policies**.

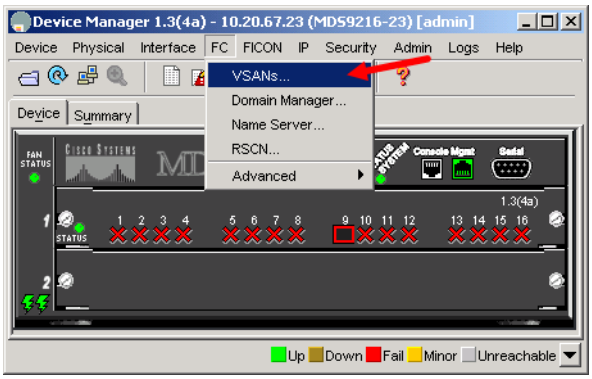


3. From the **Timers Policies** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV** box, change the setting to **2000**.
   c. Click **Apply**.

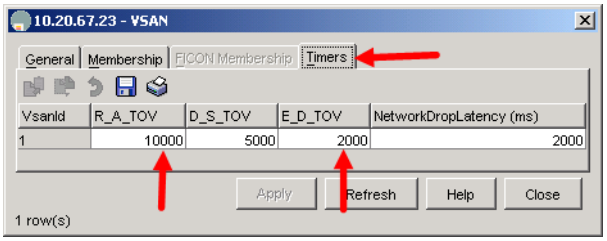


For Cisco switches with firmware levels greater than 1.3(4a), do the following:

1. Start Cisco Device Manager. The **Device Manager** dialog box displays.
2. From the **Device Manager** dialog box **FC** menu, select **VSANs**.



3. From the **VSAN** dialog box, select the **Timers** tab. Verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV** box, change the setting to **2000**.
   c. Click **Apply**.



Cisco CLI

```
login: admin
Password: ********
Cisco_9216# show fctimer
```

Use the above command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000. If these timeout values are not correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Cisco_9216# config t
Cisco_9216(config)# vsan database
Cisco_9216(config-vsan-db)# vsan <vsan id> suspend (do this for all vsan)
Cisco_9216(config-vsan-db)# exit
Cisco_9216(config)# fctimer r_a_tov 10000
Cisco_9216(config)# fctimer e_d_tov 2000
Cisco_9216(config)# vsan database
Cisco_9216(config-vsan-db)# no vsan <vsan id> suspend (do this for all vsan)
Cisco_9216(config-vsan-db)# exit
Cisco_9216(config)# end
```

If you want these changes to remain through a switch reset, enter the following command.

```
Cisco_9216# copy running-config startup-config
```

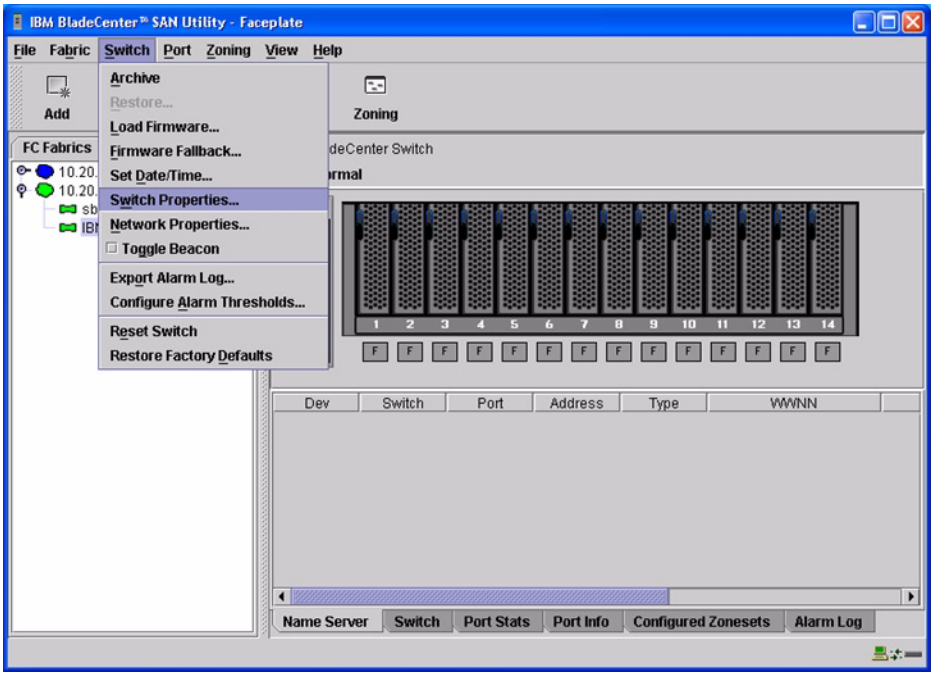
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

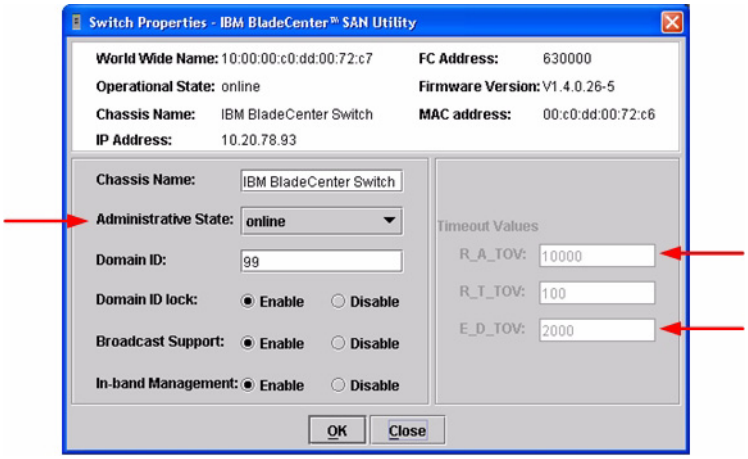
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



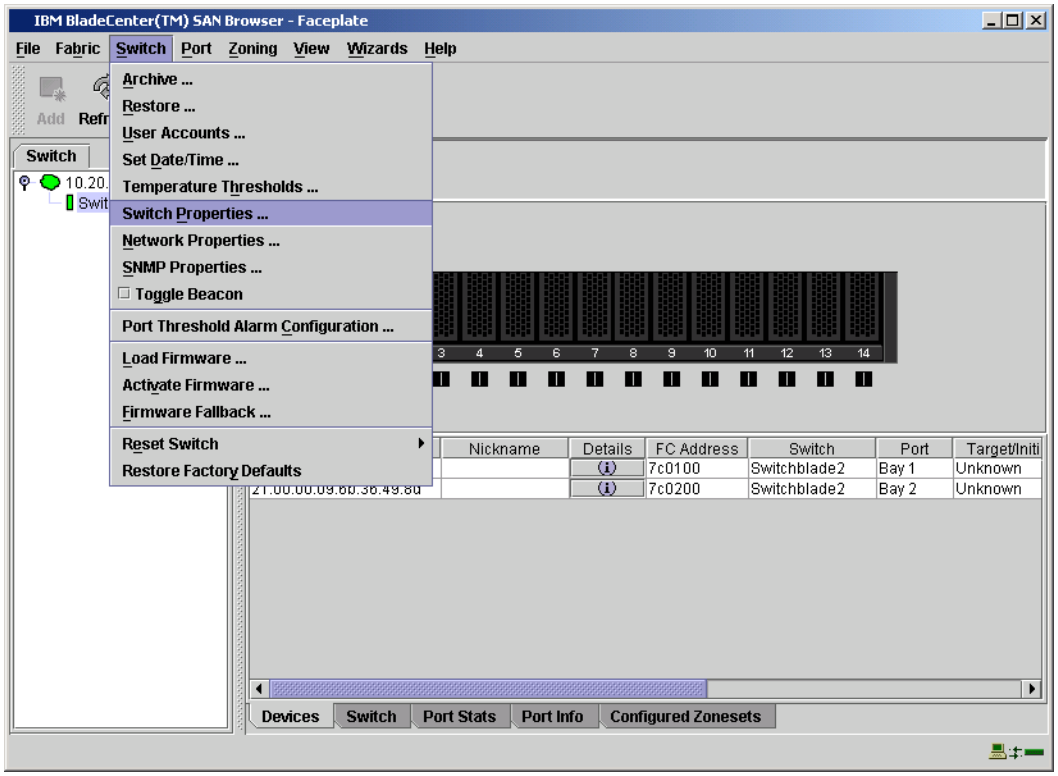
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



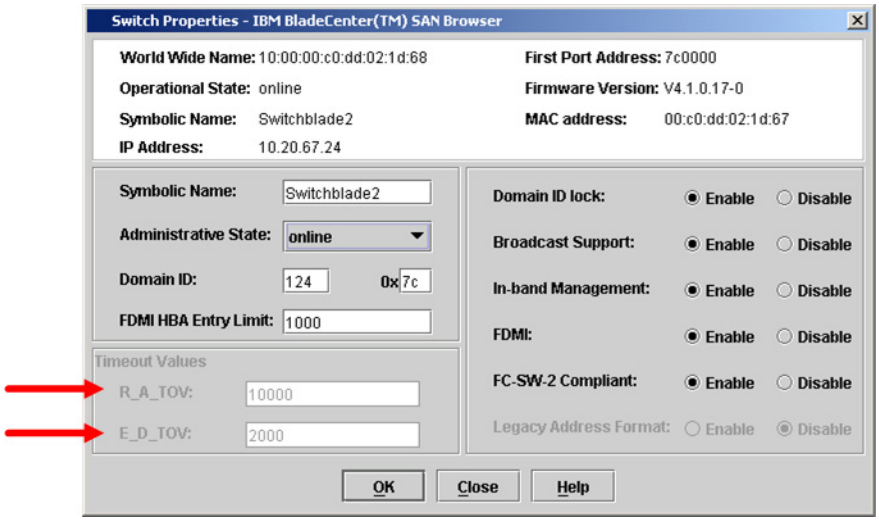
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

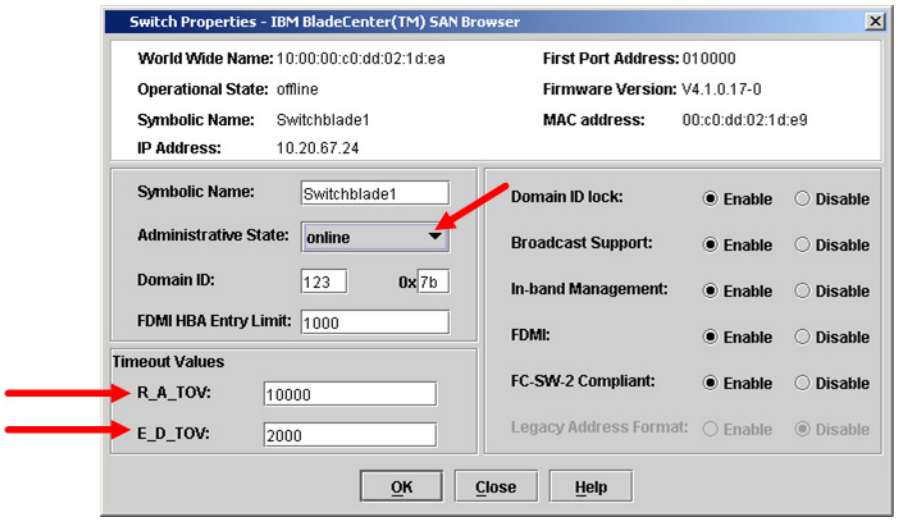
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

Cisco switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

Active Zone Set Names

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

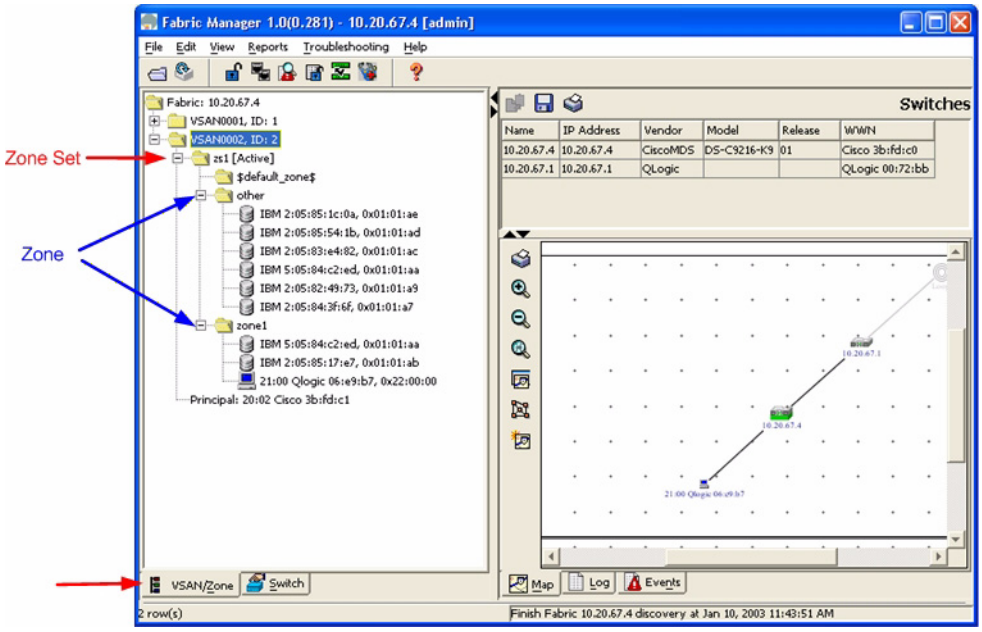
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

Cisco Fabric Manager

NOTE: The procedures differ based on the Cisco switch firmware level.

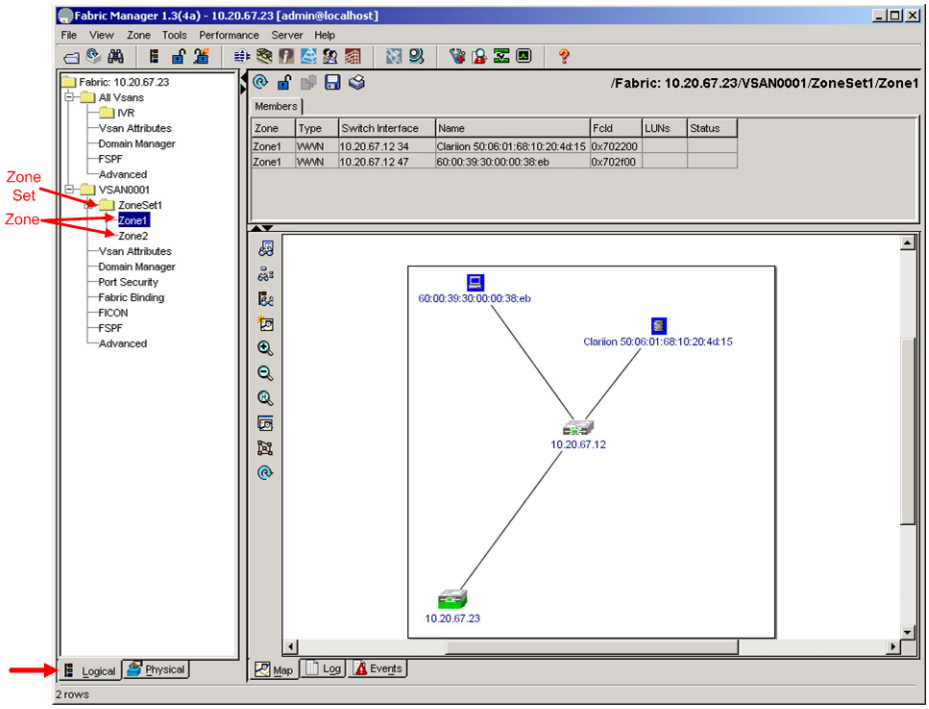
For Cisco switches with firmware levels 1.2(1) and above but less than 1.3(4a), do the following:

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **VSAN/Zone** tab.
   b. Expand the VSAN to which you plan to connect the E_port.
   c. Verify that the Zone Set names and Zone names conform to the standards discussed under "Active Zone Set Names" on page 157 and are unique between the switches.



For Cisco switches with firmware levels above 1.3(4a), do the following:

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **Logical** tab.
   b. Expand the VSAN to which you plan to connect the E_port.
   c. Verify that the Zone Set names and Zone names conform to the standards discussed under "Active Zone Set Names" on page 157 and are unique between the switches.



Cisco CLI

NOTE: Use the following CLI commands when the Cisco Fabric Manager is not available.

```
login: admin
Password: ********
Cisco_9216# show zoneset vsan <vsan id>
```

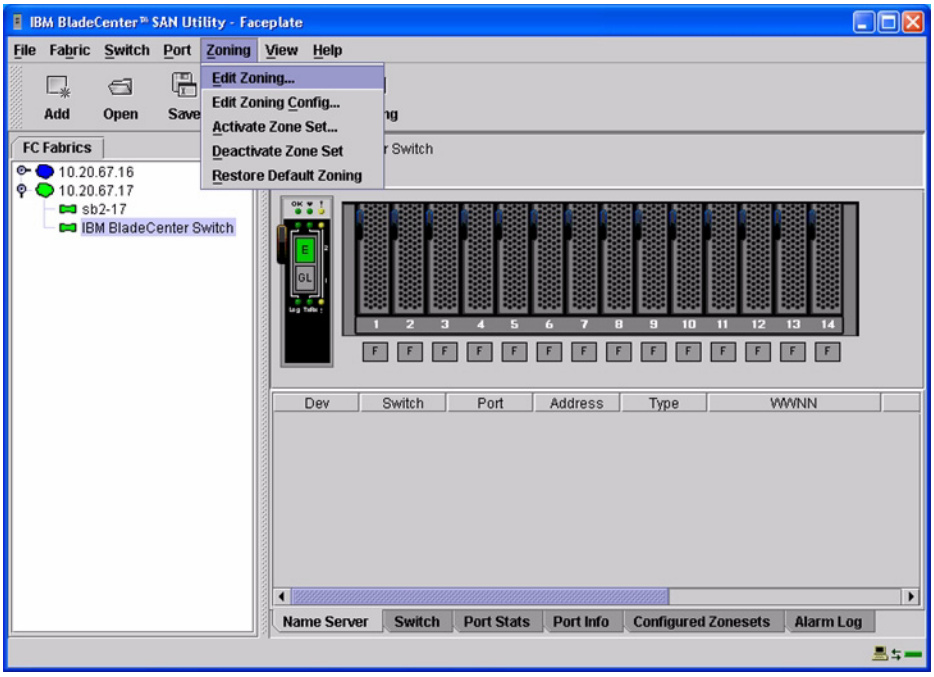
Use the above command to verify that all Zone and Zone Set names in the VSAN conform to FC standards.

IBM BladeCenter GUI

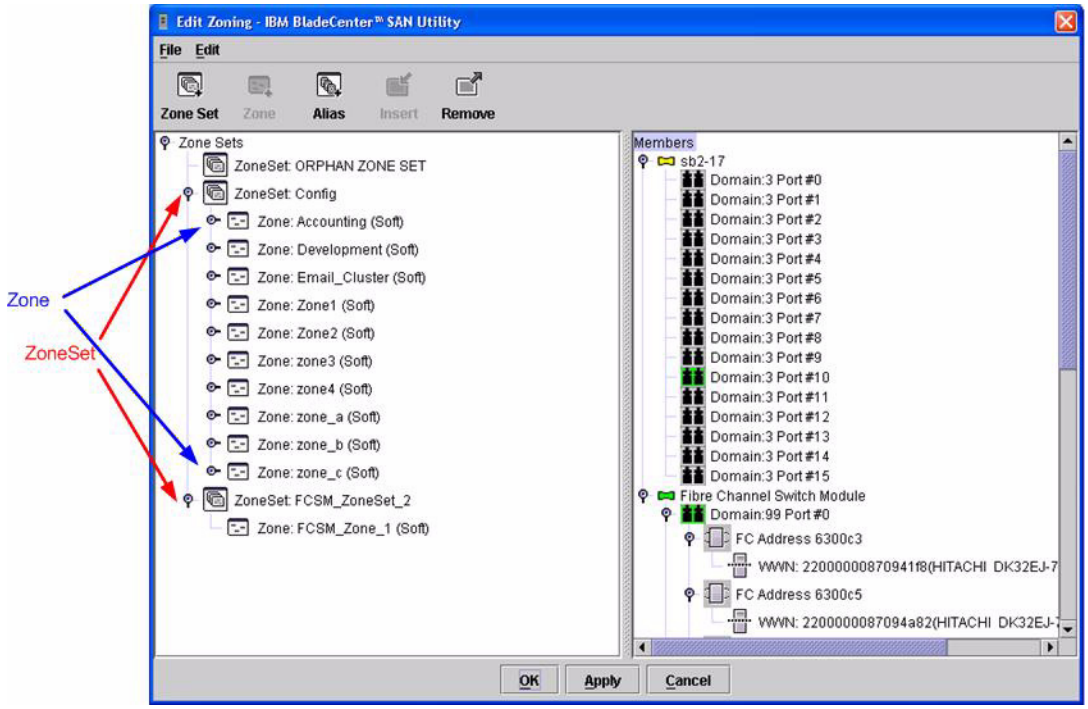
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

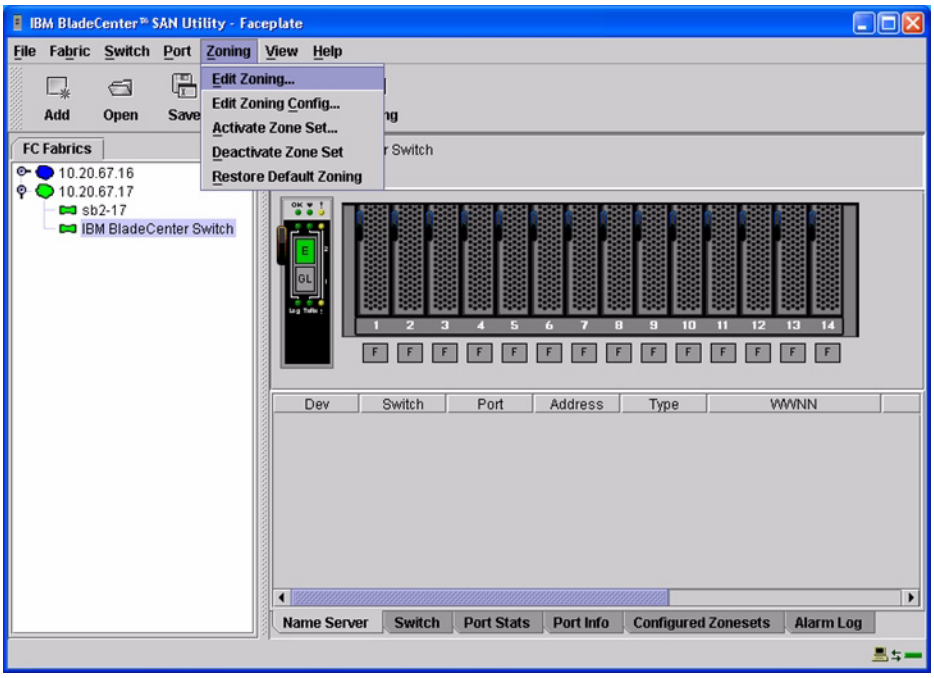


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 157.

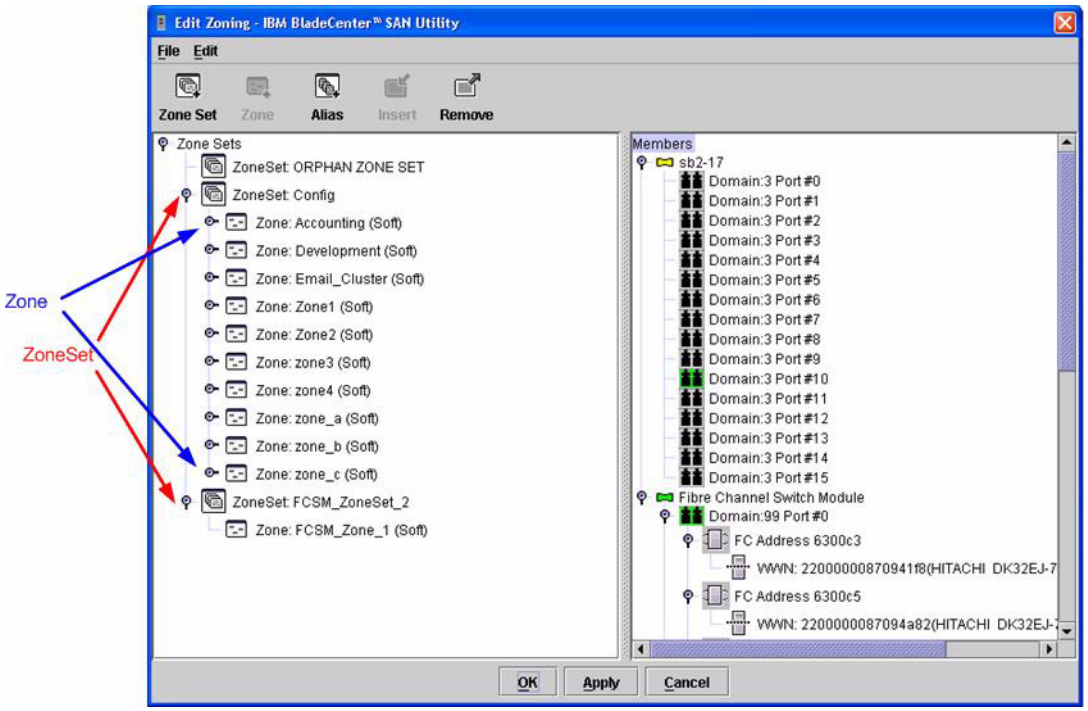


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 157.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

Zone Types

All zone members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

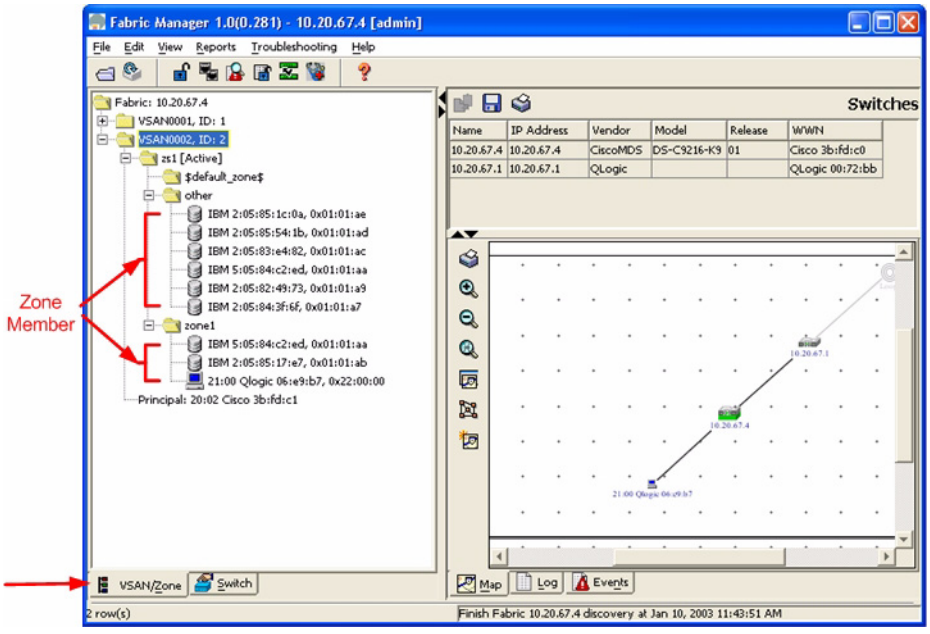
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. For Cisco, references to pwwn refer to the WWPN. For IBM, references to WWN refer to the WWPN.

Cisco Fabric Manager

NOTE: The procedures differ based on the Cisco switch firmware level.

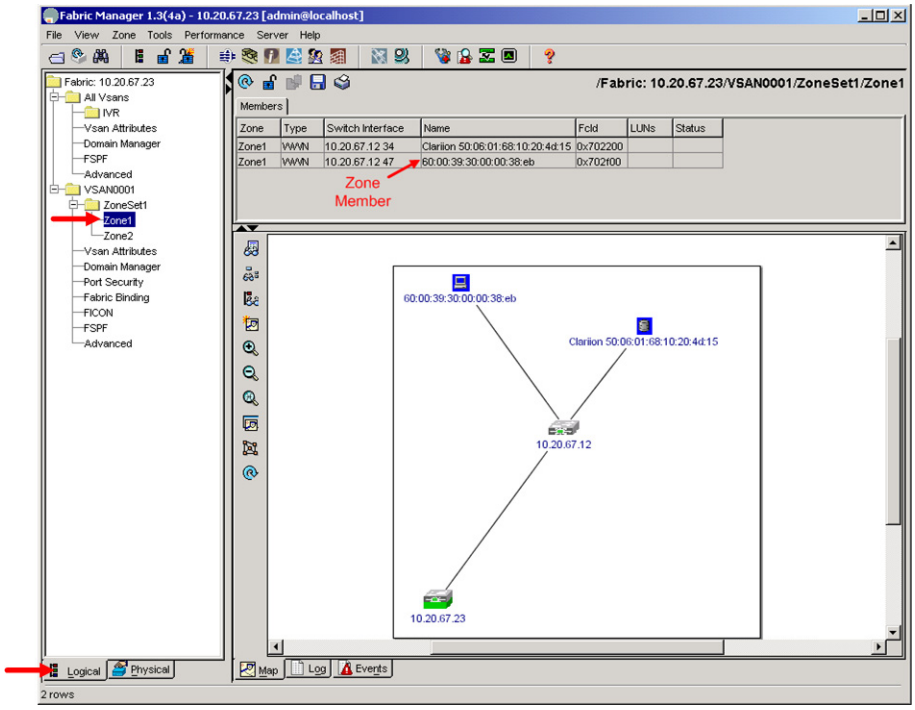
For Cisco switches with firmware levels 1.2(1) and above but less than 1.3(4a), do the following:

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **VSAN/Zone** tab.
   b. Expand the VSAN to which you plan to connect the E_port.
   c. Verify that the zone member names conform to the standards discussed under "Active Zone Set Names" on page 157 and are unique between the switches.



For Cisco switches with firmware levels above 1.3(4a), do the following:

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **Logical** tab.
   b. Expand the VSAN to which you plan to connect the E_port.
   c. Verify that the zone member names conform to the standards discussed under "Active Zone Set Names" on page 157 and are unique between the switches.



Cisco CLI

NOTE: Use the following CLI commands when the Cisco Fabric Manager is not available.

```
login: admin
Password: ********
Cisco_9216# show zone vsan <vsan id>
```

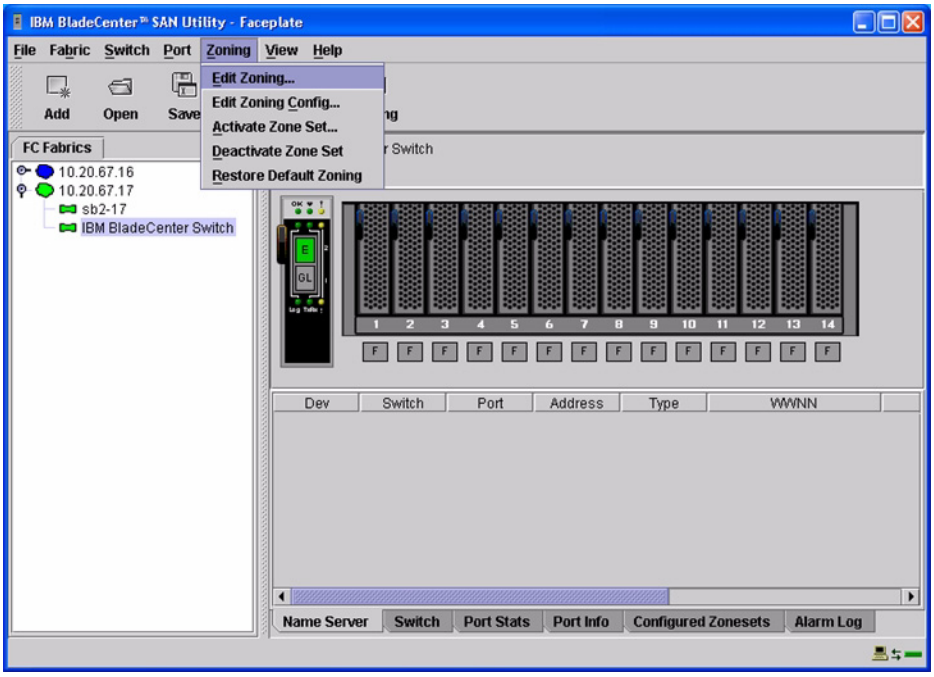
Use the above command to verify that all zone members are specified by pwwn.

IBM BladeCenter GUI

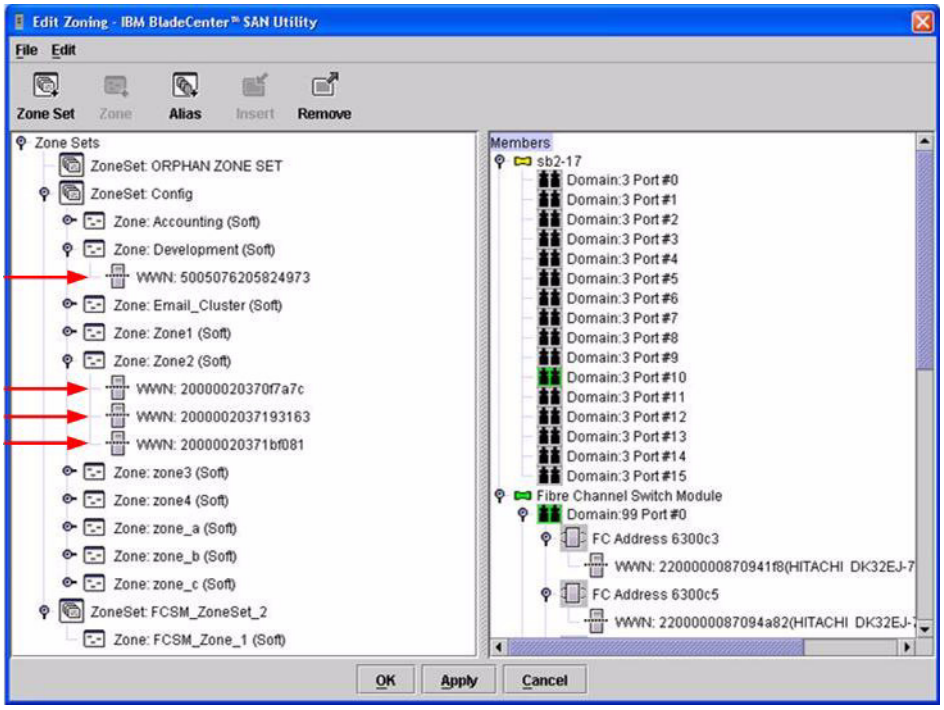
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

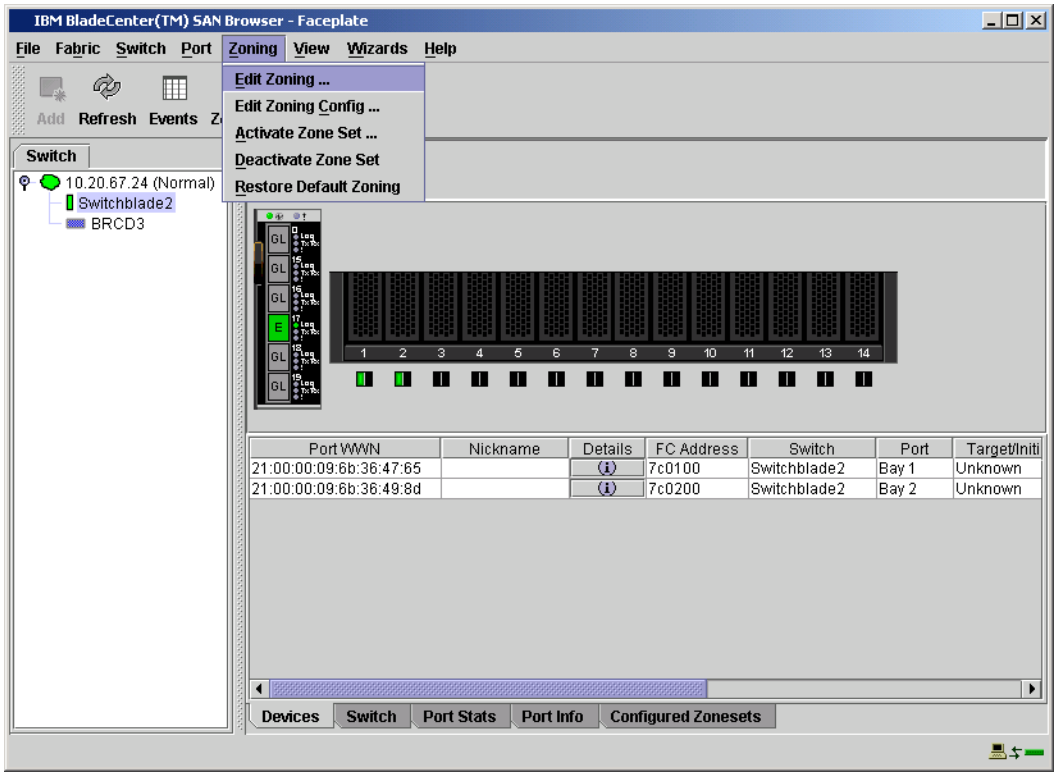


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

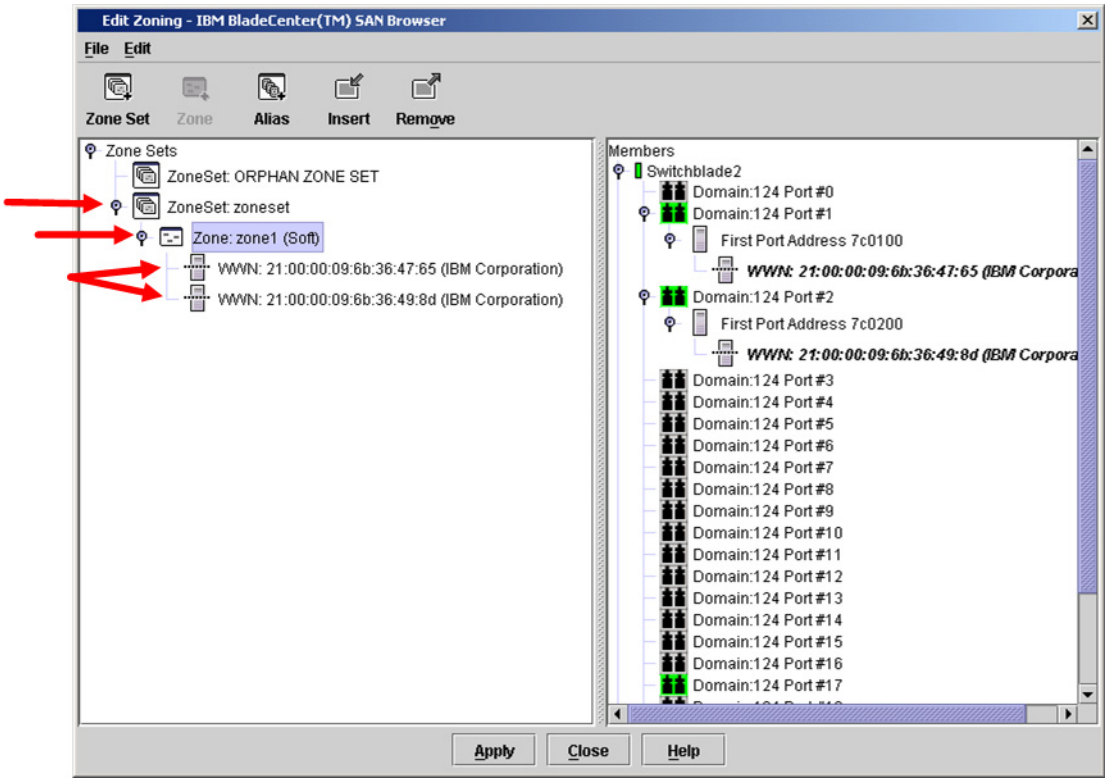


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

Operating Mode Configuration

Not applicable.

Cisco Specific Configuration

Not applicable. *[per email 8/25.04: set the attribute "interop" to "default" under VSAN attibutes. Nik, can you provide this information?]*

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the Cisco and IBM BladeCenter fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

ADMINISTRATIVE NOTE!!

If the Cisco Fabric Manager is unable to see initiators on the IBM BladeCenter, verify that the **InBandEnabled** parameter on the IBM switch module is set to **True**.

Use the following CLI commands to verify that **InbandEnabled** is set to **True**.

```
Sanbox2 login: admin
Password: ********
#> show config switch
```

The following displays:

```
Switch Configuration Information
--------------------------------
AdminState            Online
BroadcastEnabled      True
* InbandEnabled       True
```

If **InbandEnabled** is set to **False**, use the following CLI commands to change the setting.

```
#> admin start
(admin)#> config edit
(admin-config)#> set config switch
```

A list of attributes with formatting and current values displays. Enter a new value or press **ENTER** to accept the current value. If you want to terminate this process before reaching the end of the list, press **q** + **ENTER** or **Q** + **ENTER**.

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [False] True
DefaultDomainID (decimal value, 1-239) [6]
```

This configuration must be saved (using the **config save** command) and activated (using the **config activate** command) before it can take effect. If you want to discard this configuration, use the **config cancel** command.

```
(admin-config) #> config save
(admin) #> config act
```

The Cisco Fabric Manager is now able to display within its topology map the initiators present in the IBM fabric.

Merging IBM BladeCenter and CNT Fabrics

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switch from CNT that complies with the FC-SW-2 standard.

IBM and CNT Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
CNT	FC/9000 Switch	Code set 3.0.3.2 and above

The following chapter provides detailed information about merging IBM BladeCenter and CNT fabrics: **CNT FC/9000 Switches** **(see page 175)**.

CNT FC/9000 Switches

Integration Checklist

The following steps must be completed to successfully merge CNT and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see "Backing Up and Restoring the Current Configuration Settings" on page 177).

✓ Verify that the correct version of switch firmware is installed on each switch (see "Supported Switches and Firmware Versions" on page 176).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see "Domain ID Configuration" on page 177).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 185).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 194).

✓ Ensure that the zone member type is set to Port WWN (see "Zone Types" on page 204).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 212).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

CNT Configuration Limitations

The configuration limitations are:

- When merging CNT and IBM BladeCenter fabrics, the maximum number of switches that can be configured depends upon the CNT switch model.
  - For the FC9000-64, the maximum is 56 interconnected switches per fabric.
  - For the FC9000-128, the maximum is 48 interconnected switches per fabric.
- You may need to manually enter the WWPN for an expansion card if an "Unknown Device" error is reported during configuration.

Otherwise, all features are fully supported and comply with industry standards.

Contacting CNT

For more information on configuring the CNT switches, please see the contact information located in the Introduction (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

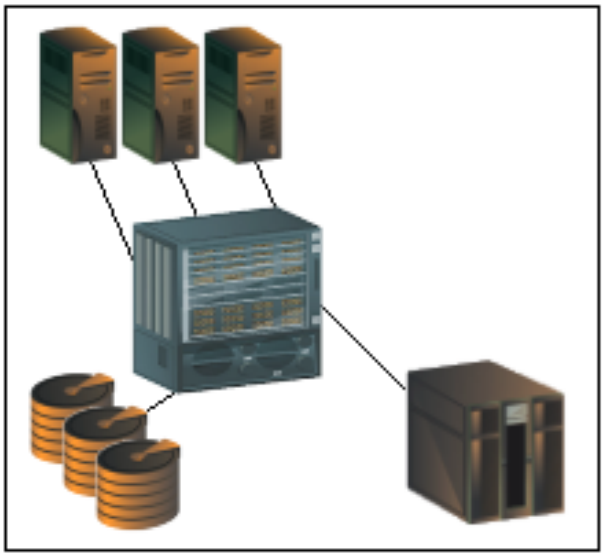
Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switch from CNT that complies with the FC-SW-2 standard.

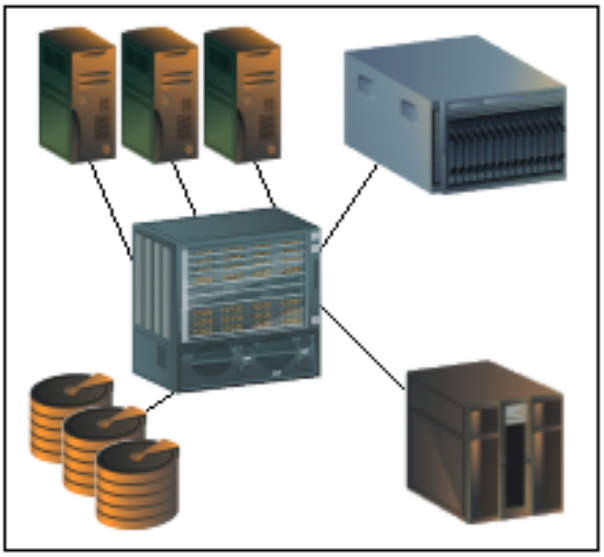
IBM and CNT Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
CNT	FC/9000 Switch	Code set 3.0.3 and above

The following figures illustrate an CNT Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



CNT Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



CNT Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current CNT switch configuration data prior to following the steps to merge CNT and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: Refer to the documentation provided with the switch.

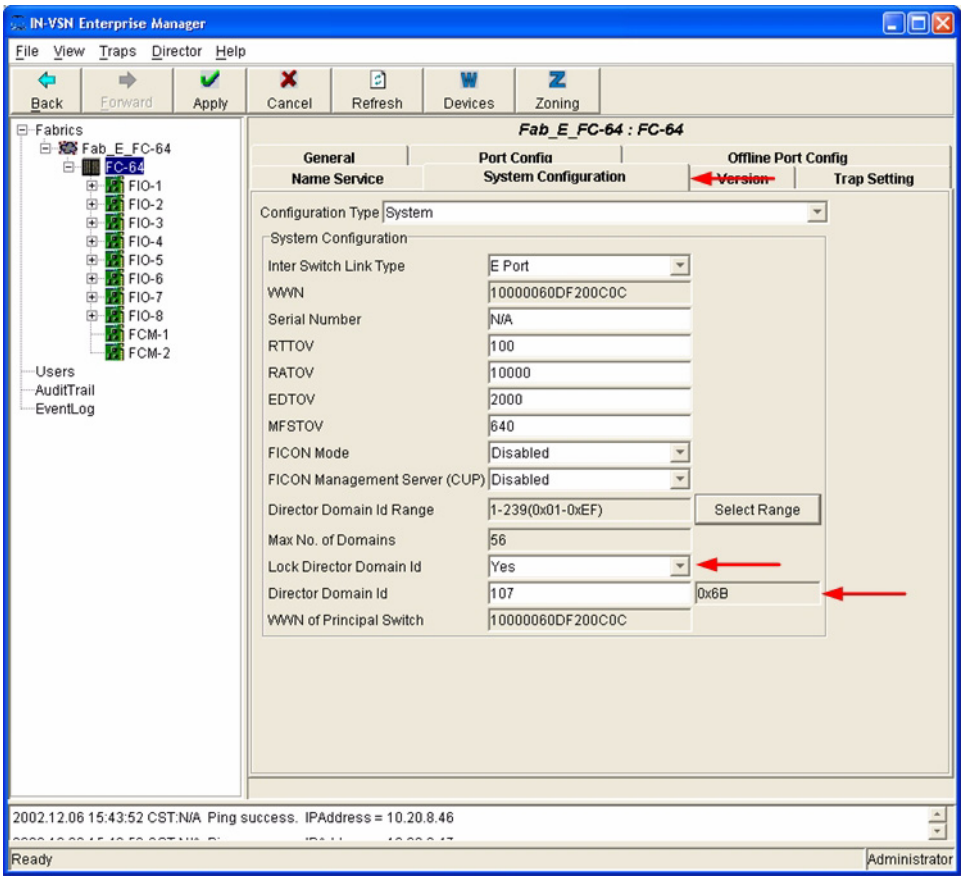
Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the CNT switch and the IBM switch module.

NOTE: The Domain ID should be locked and unique within the 1–239 range.

CNT IN-VSN Enterprise Manager

1. Start the CNT IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays.
2. From the **IN-VNS Enterprise Manager** dialog box, select the **System Configuration** tab and do the following:
   a. In the **Director Domain ID** box, type a unique Domain ID.
   b. In the **Lock Director Domain ID** list, select **Yes**.
   c. Click **Apply**.



CNT CLI

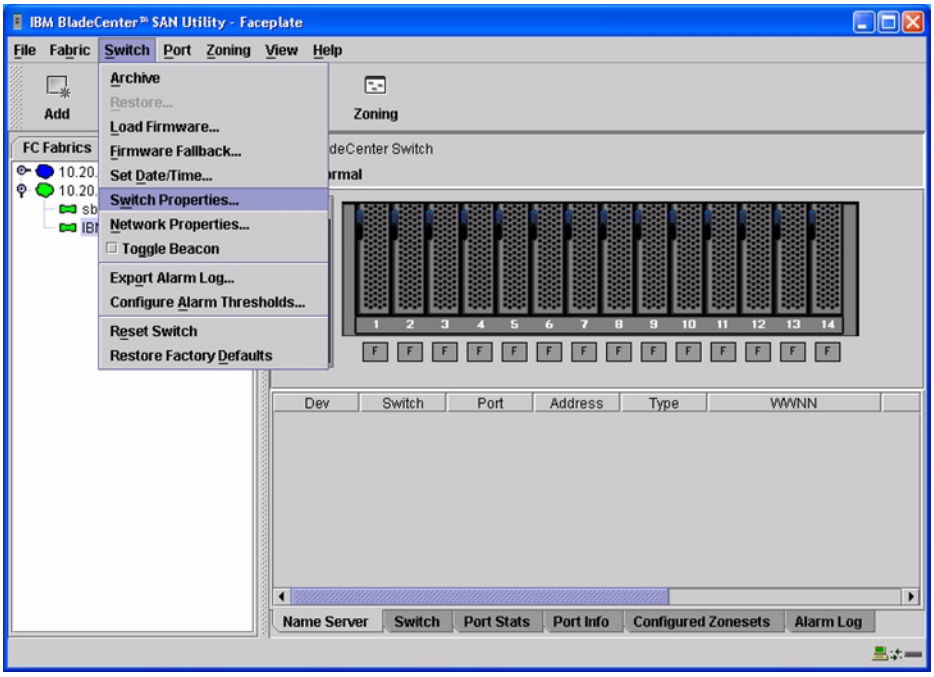
Not applicable.

IBM BladeCenter GUI

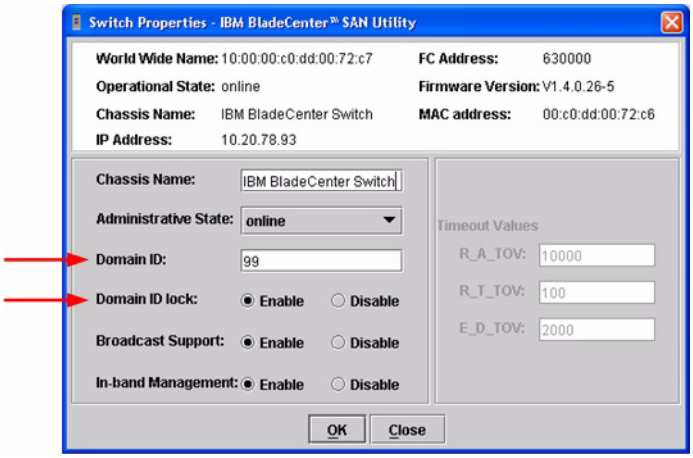
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

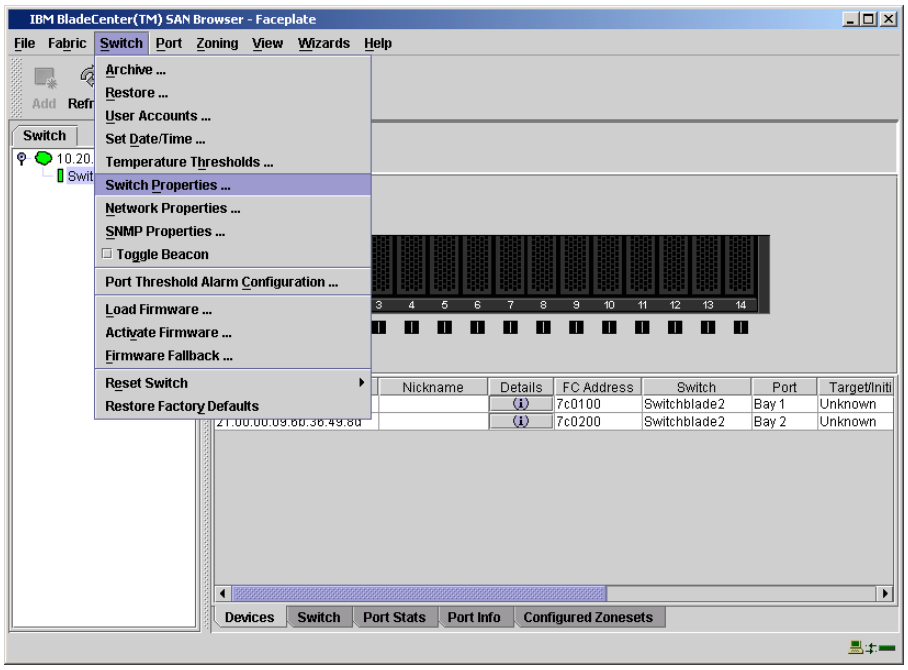


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

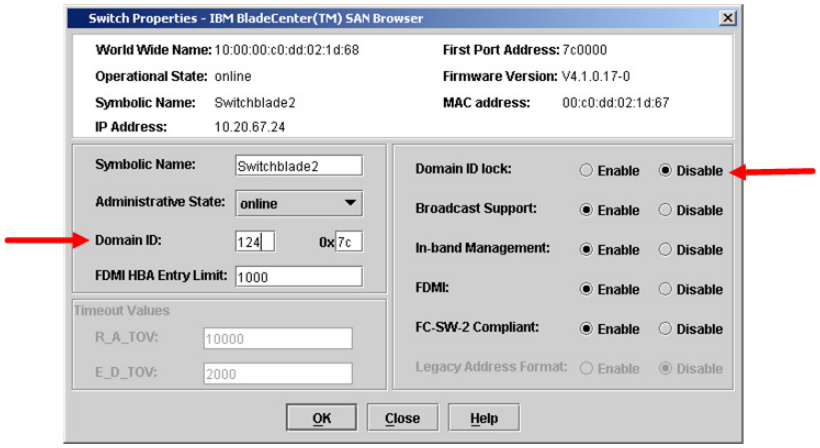


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

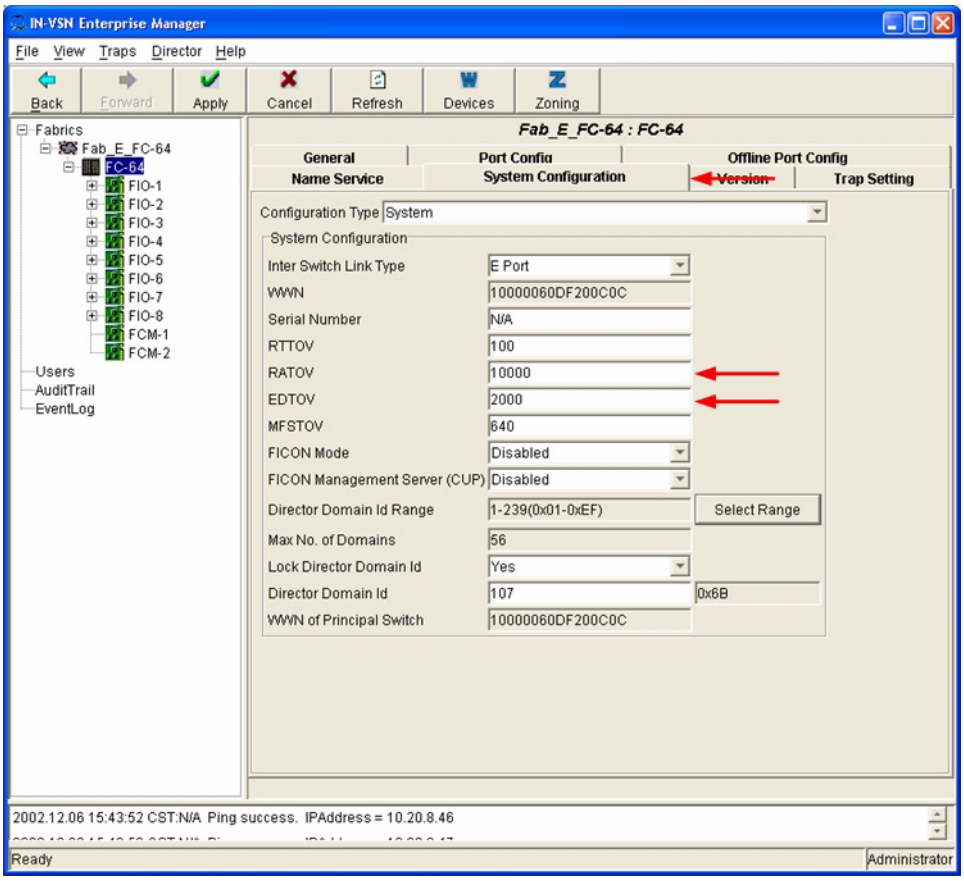
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **10000**.)
E_D_TOV = 2 seconds (The setting is **2000**.)

This section provides the steps to change these values.

CNT IN-VSN Enterprise Manager

1. Start the CNT IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays.
2. From the **IN-VNS Enterprise Manager** dialog box, select the **System Configuration** tab. Verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following.
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV** box, change the setting to **2000**.
   c. Click **Apply**.



CNT CLI

Not applicable.

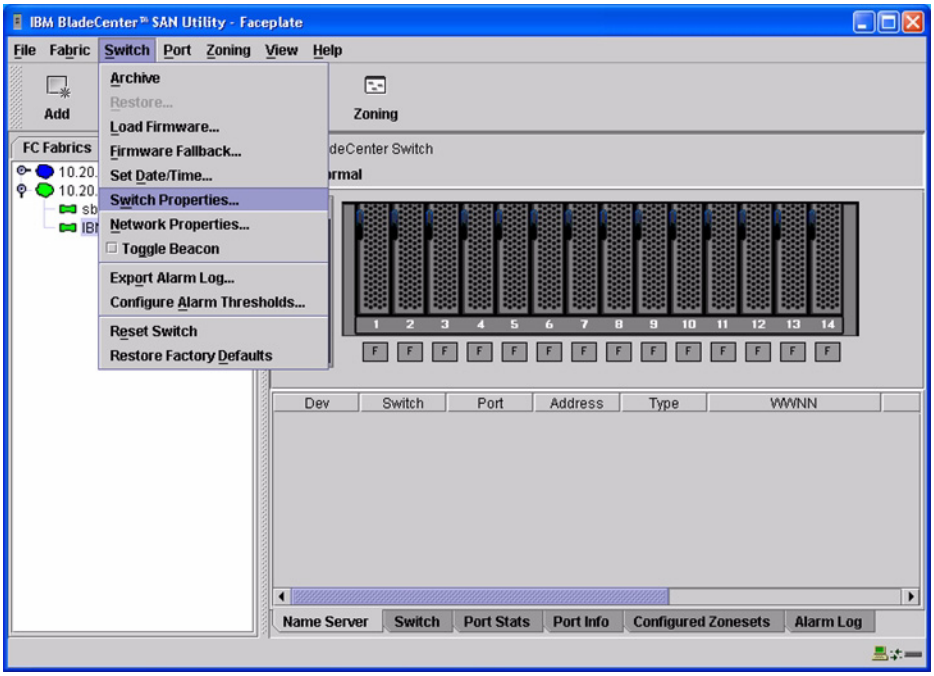
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

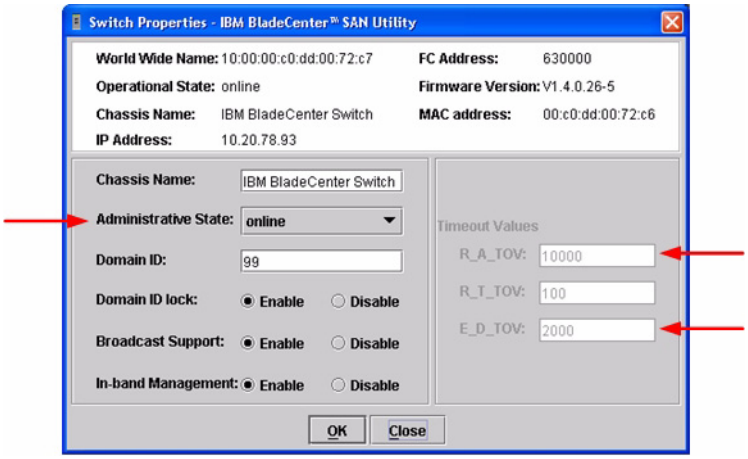
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



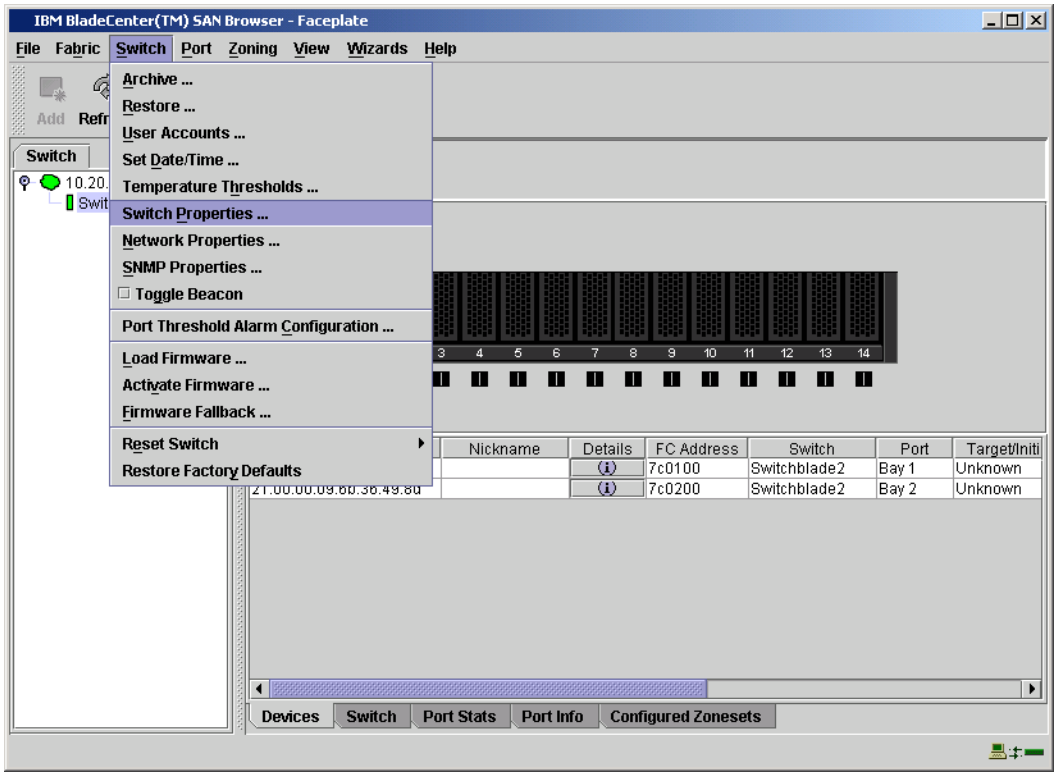
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



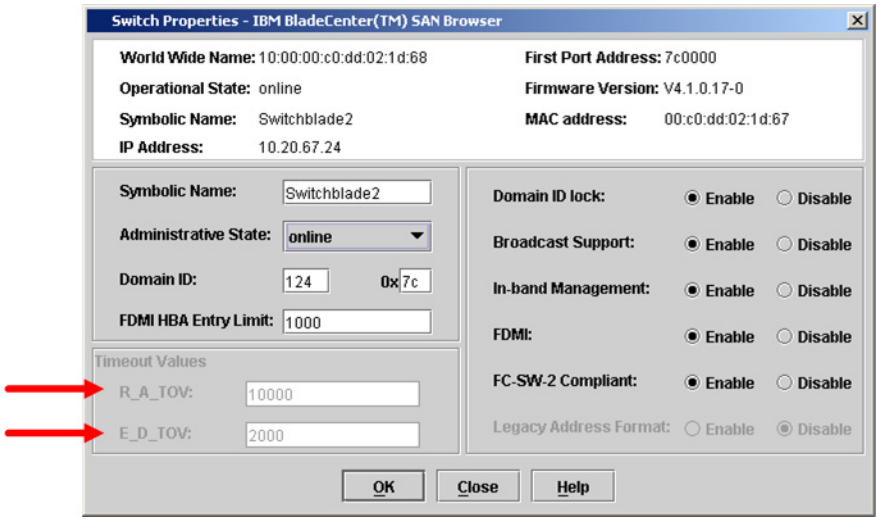
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

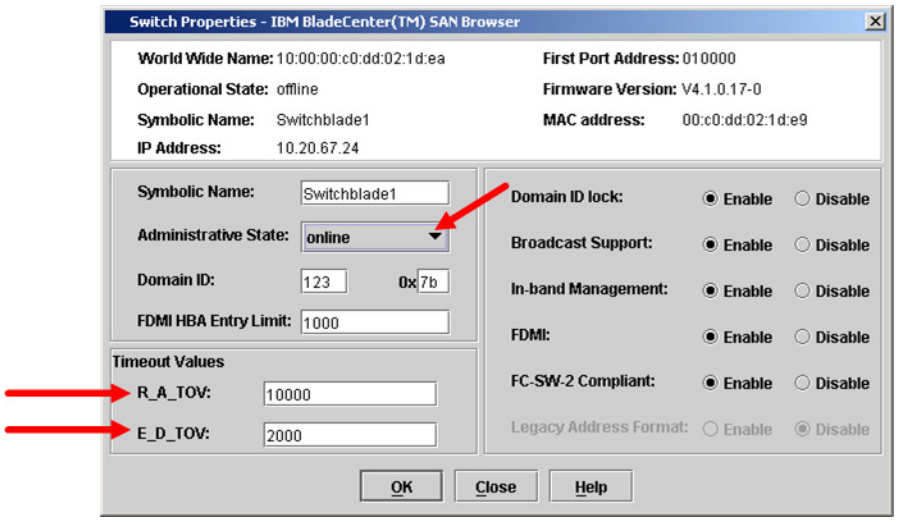
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
    Finished configuring attributes.
    This configuration must be saved (see config save command) and
    activated (see config activate command) before it can take effect.
    To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
    The config named default has been saved.
Switchblade2 (admin): admin> config activate
    The currently active configuration will be activated.
    Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

CNT switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

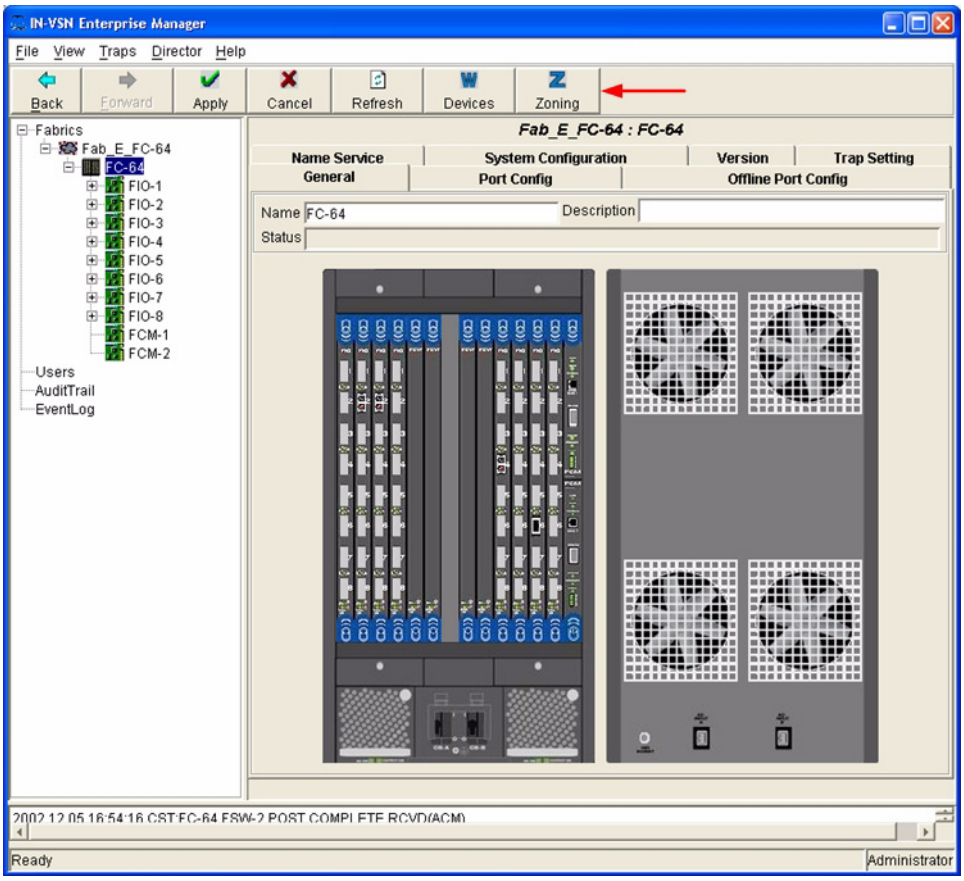
Active Zone Set Names

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

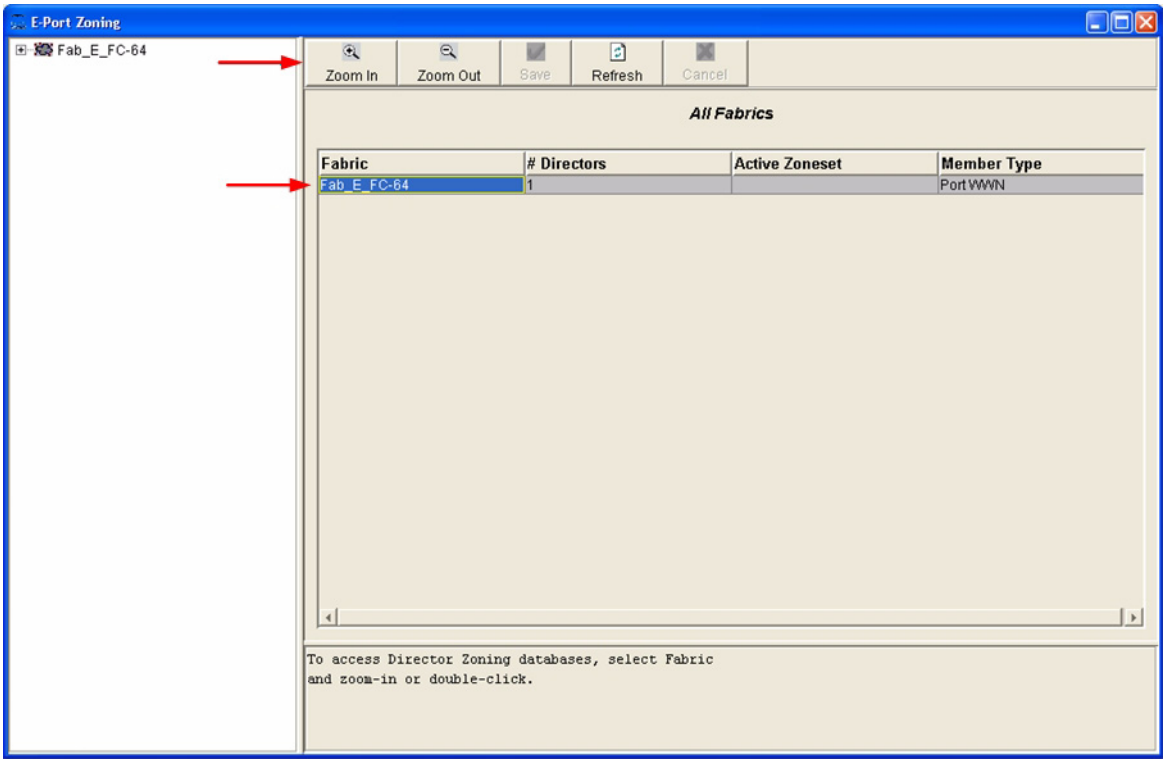
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

CNT IN-VSN Enterprise Manager

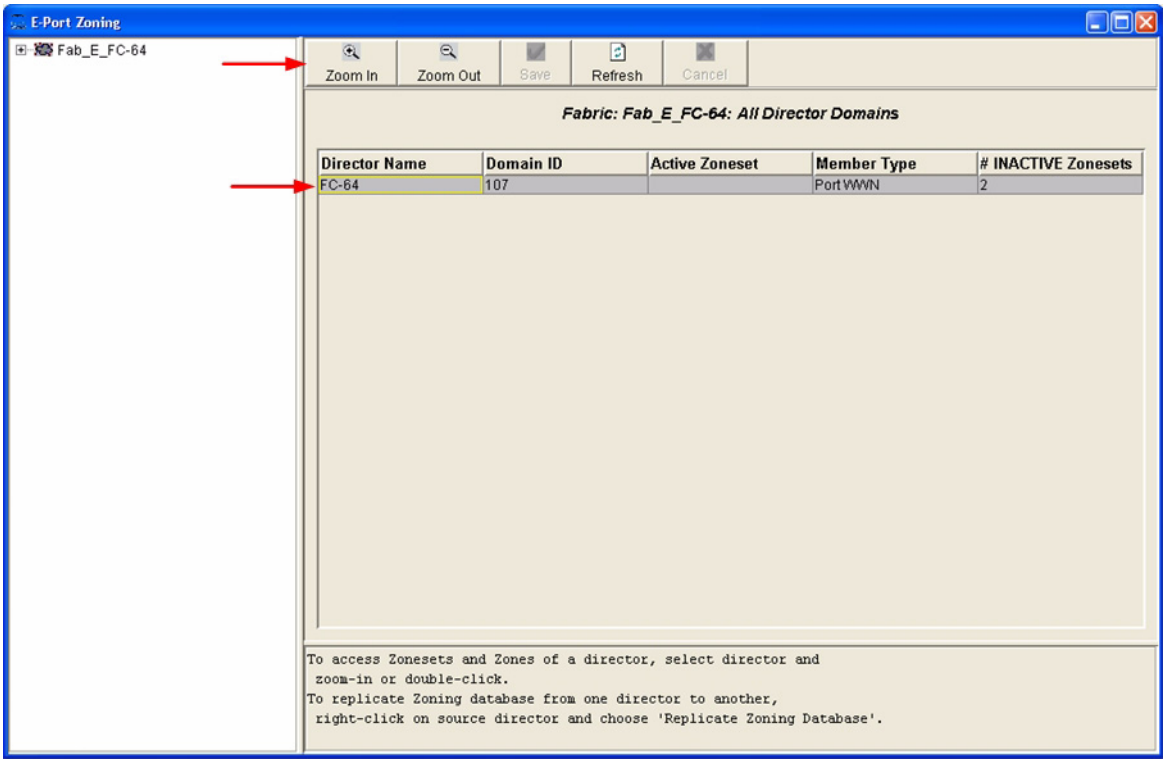
1. Start the CNT IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



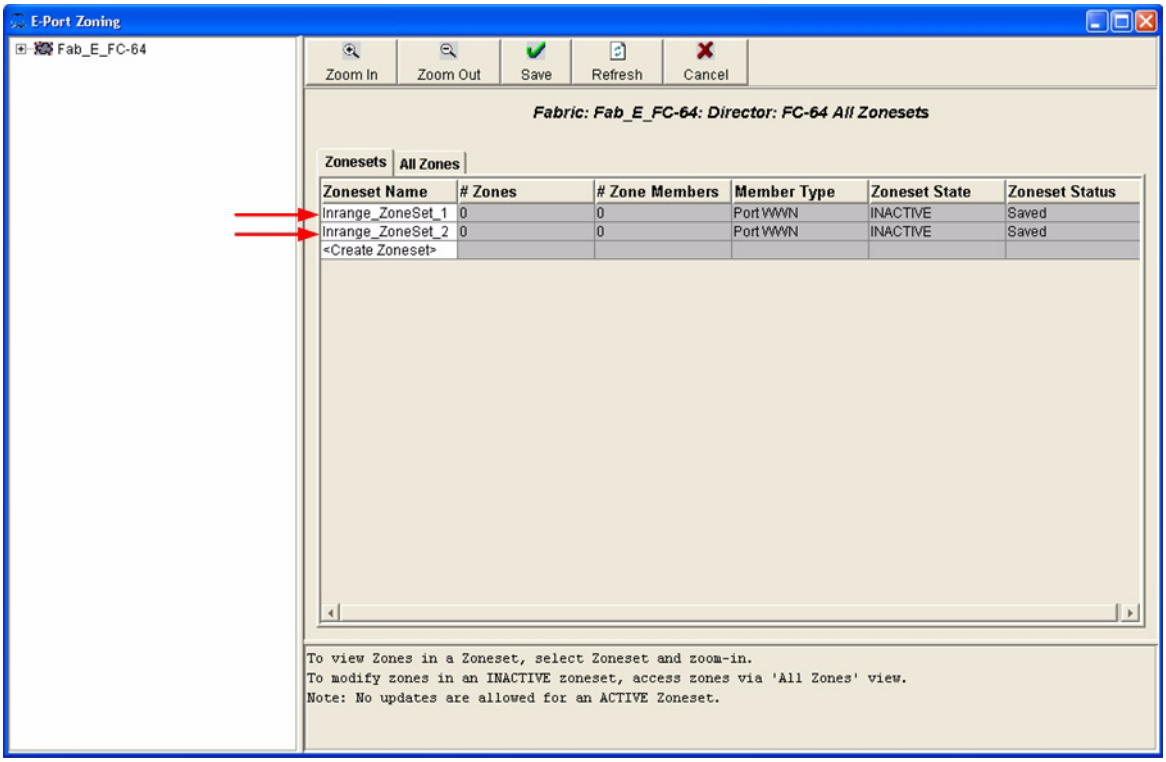
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



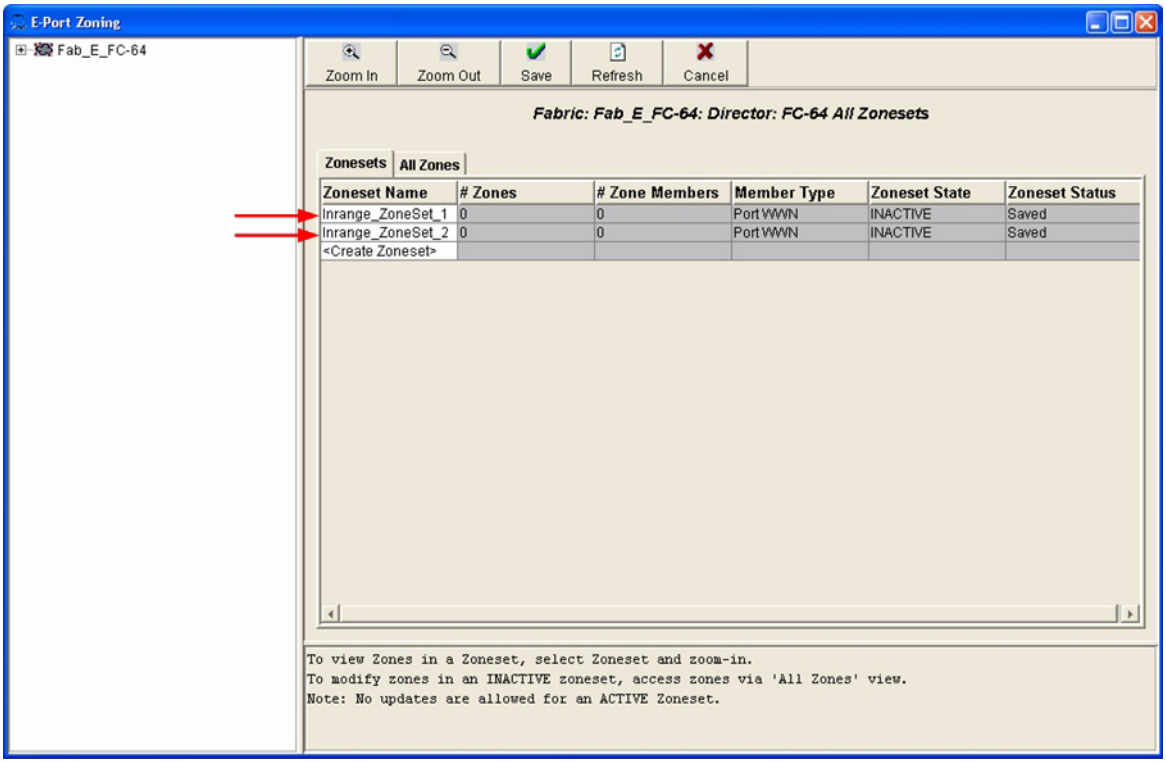
3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



4. From the **E-Port Zoning (Fabric *x*: Director *y*: All Zonesets)** dialog box, select the **Zonesets** tab. Verify that all Zone Set names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 194.



5. Select the **All Zones** tab. Verify that all Zone names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 194.



CNT CLI

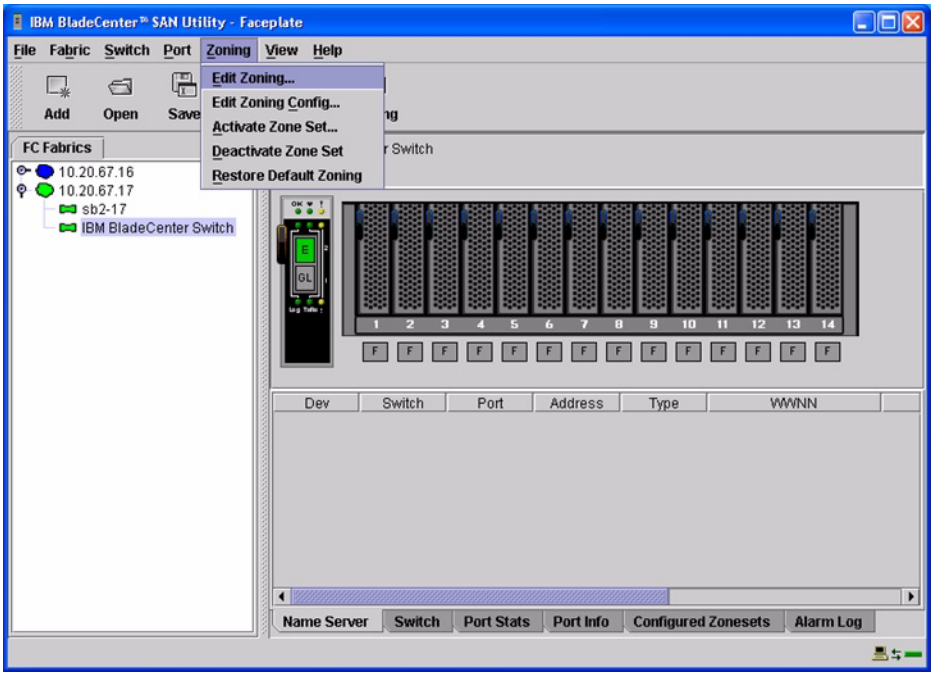
Not applicable.

IBM BladeCenter GUI

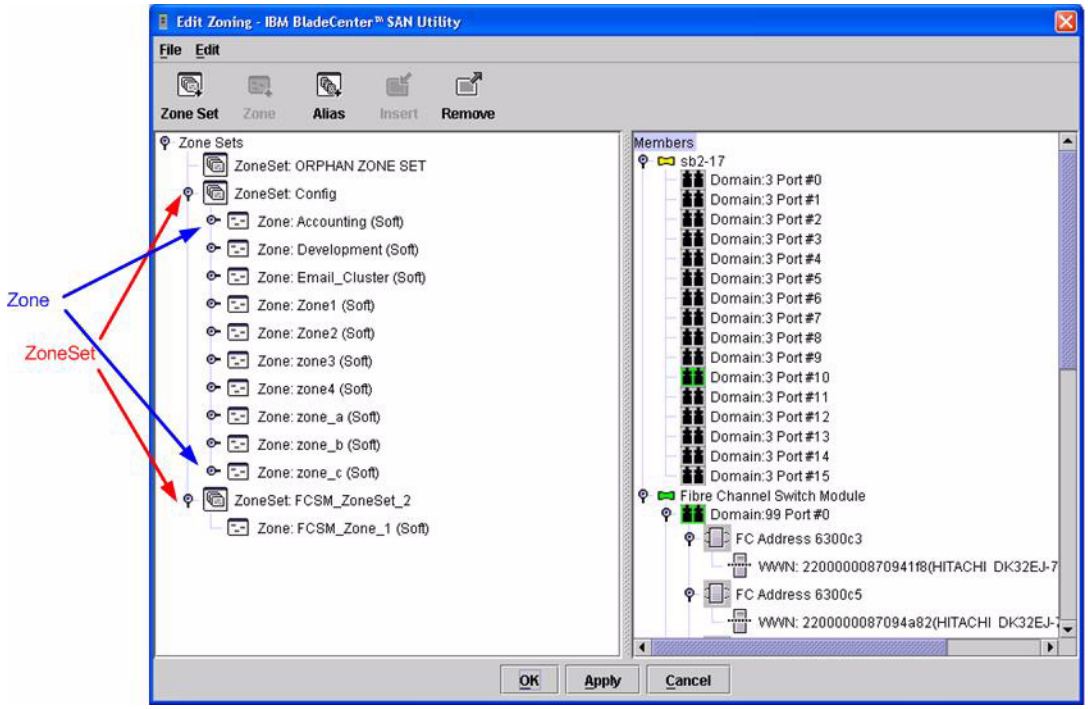
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

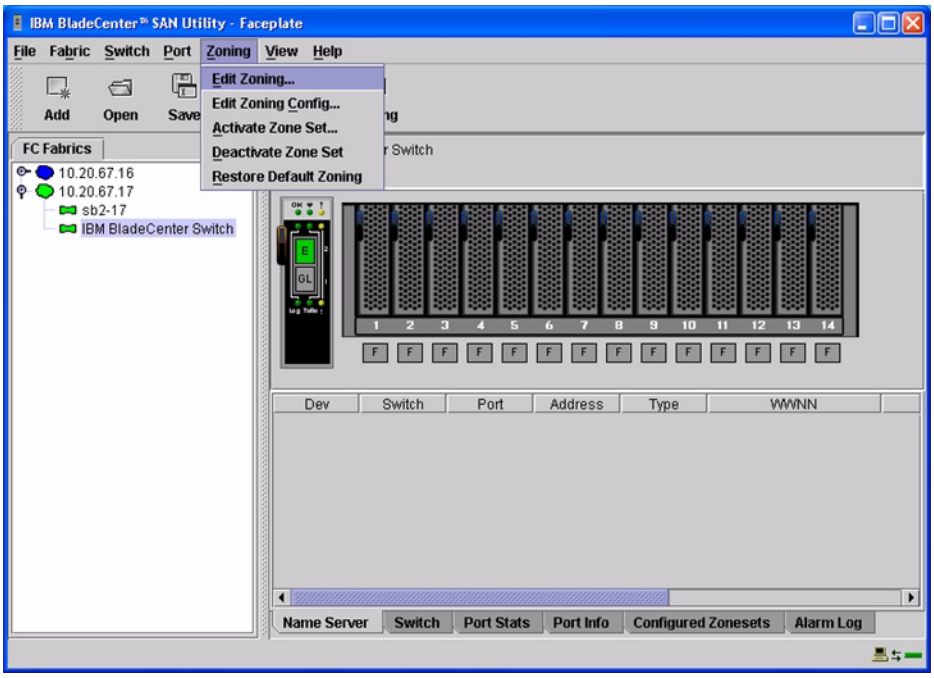


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 194.

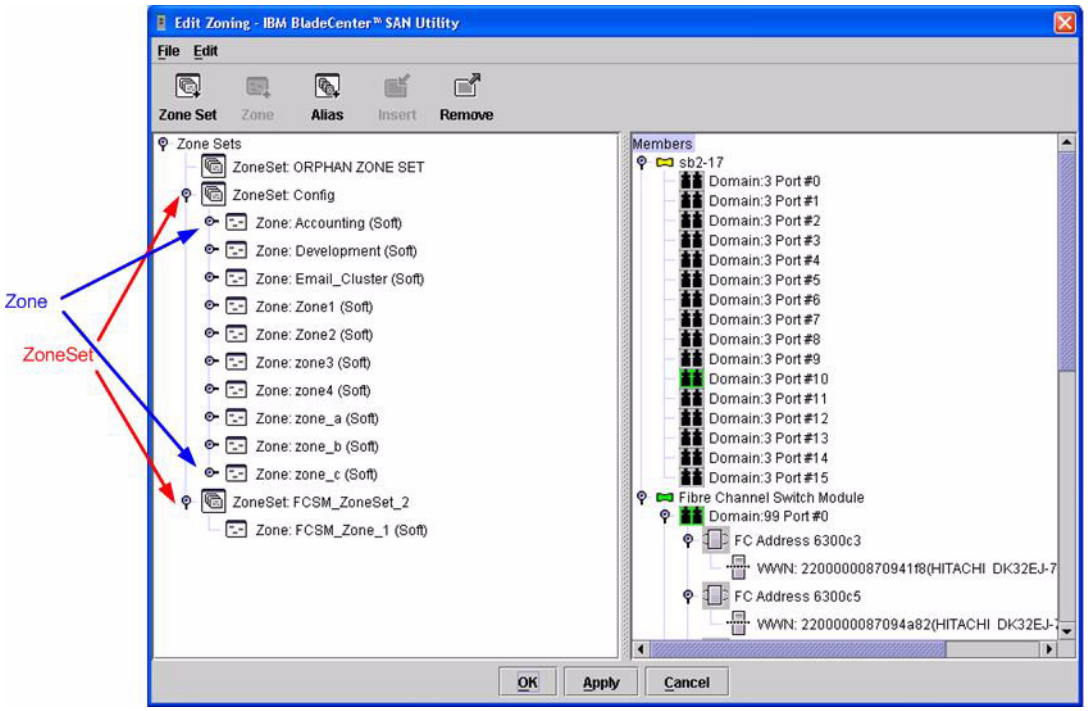


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 194.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

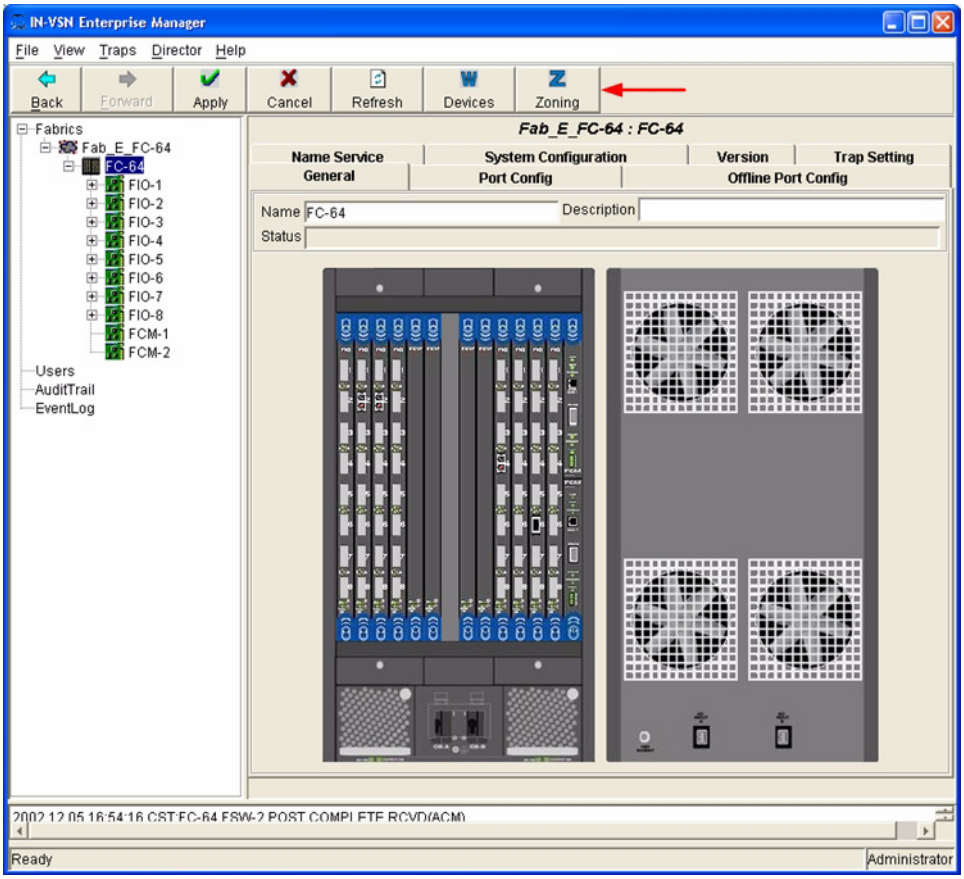
Zone Types

All zones members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

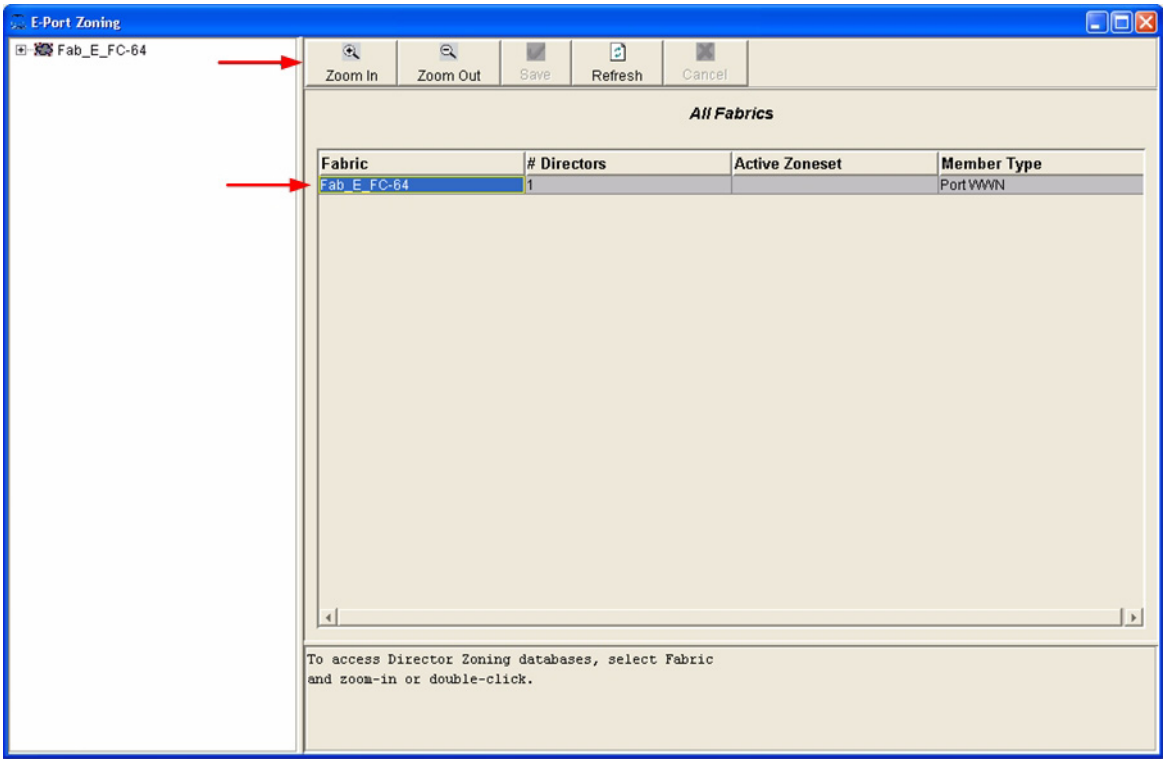
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

CNT IN-VSN Enterprise Manager

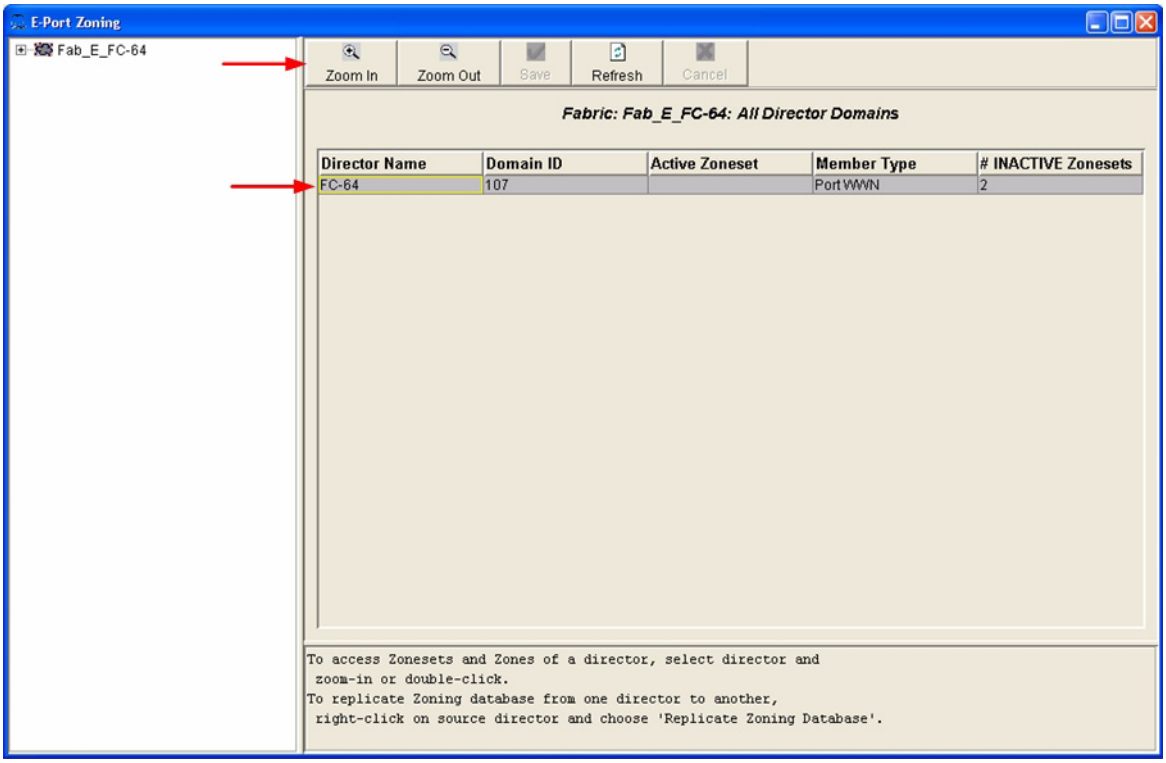
1. Start the CNT IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



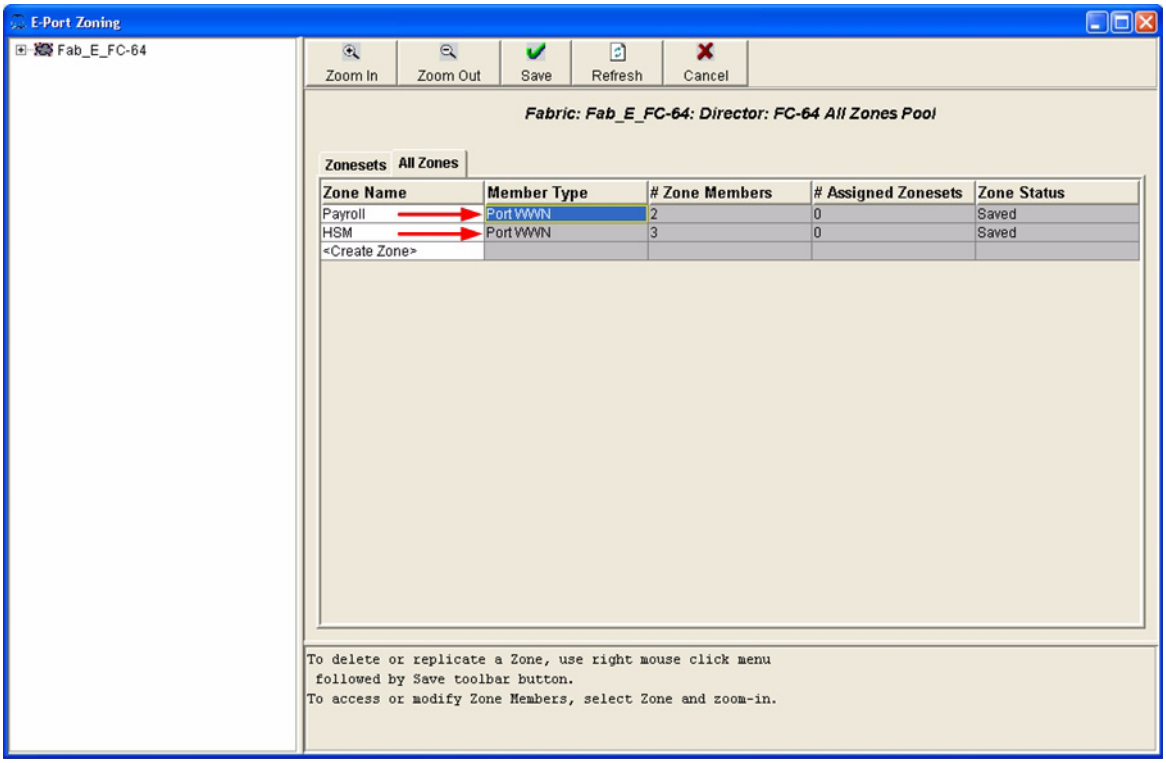
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



4. From the **E-Port Zoning (Fabric *x*: Director *y*: All Zones)** dialog box, select the **All Zones** tab. Verify that all **Zone Member Types** are set to **Port WWN**.



CNT CLI

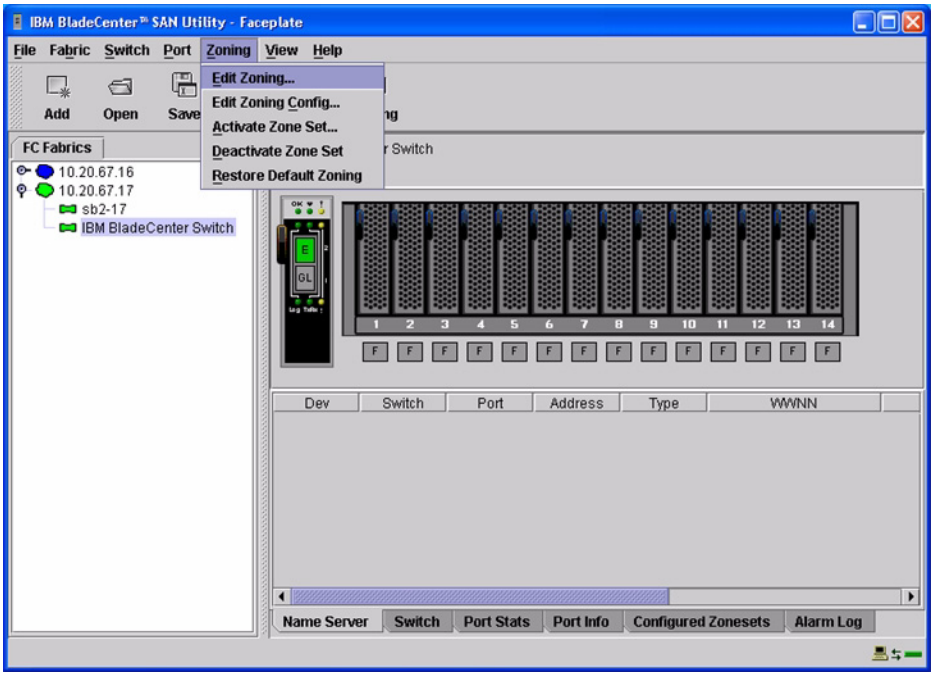
Not applicable.

IBM BladeCenter GUI

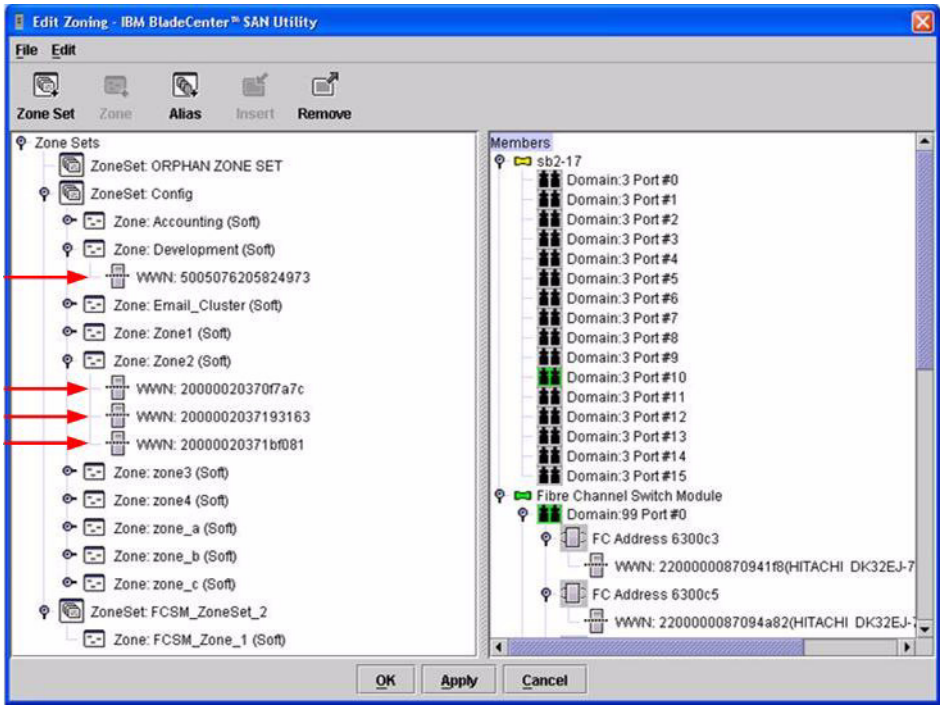
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

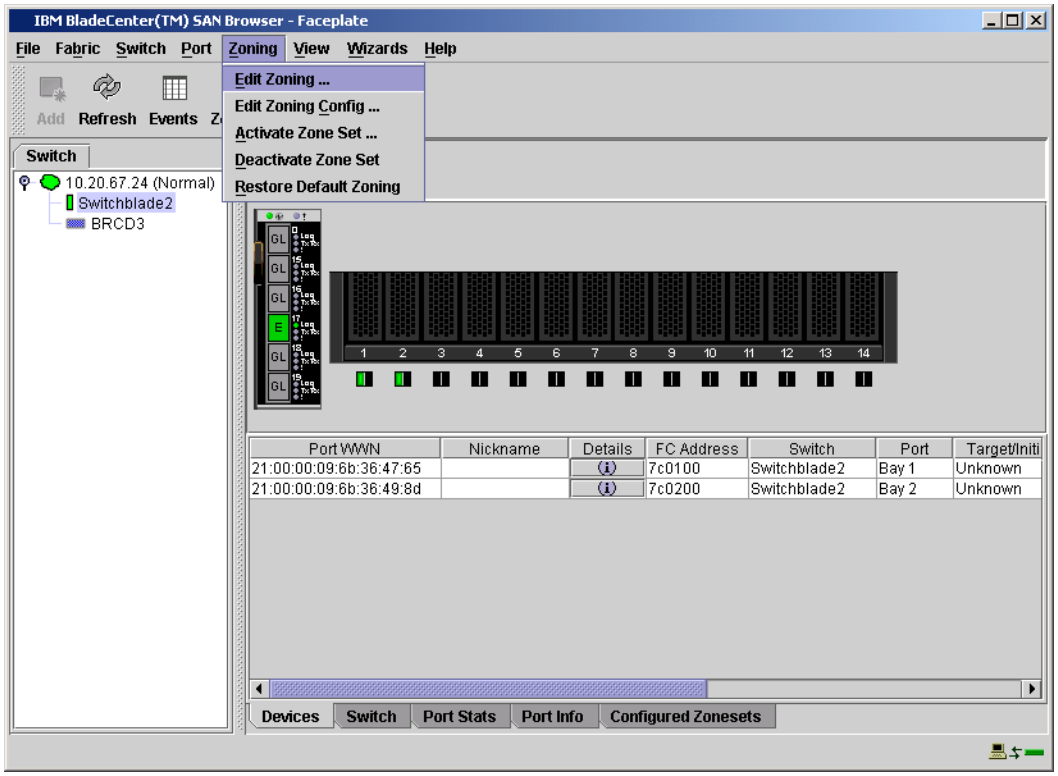


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

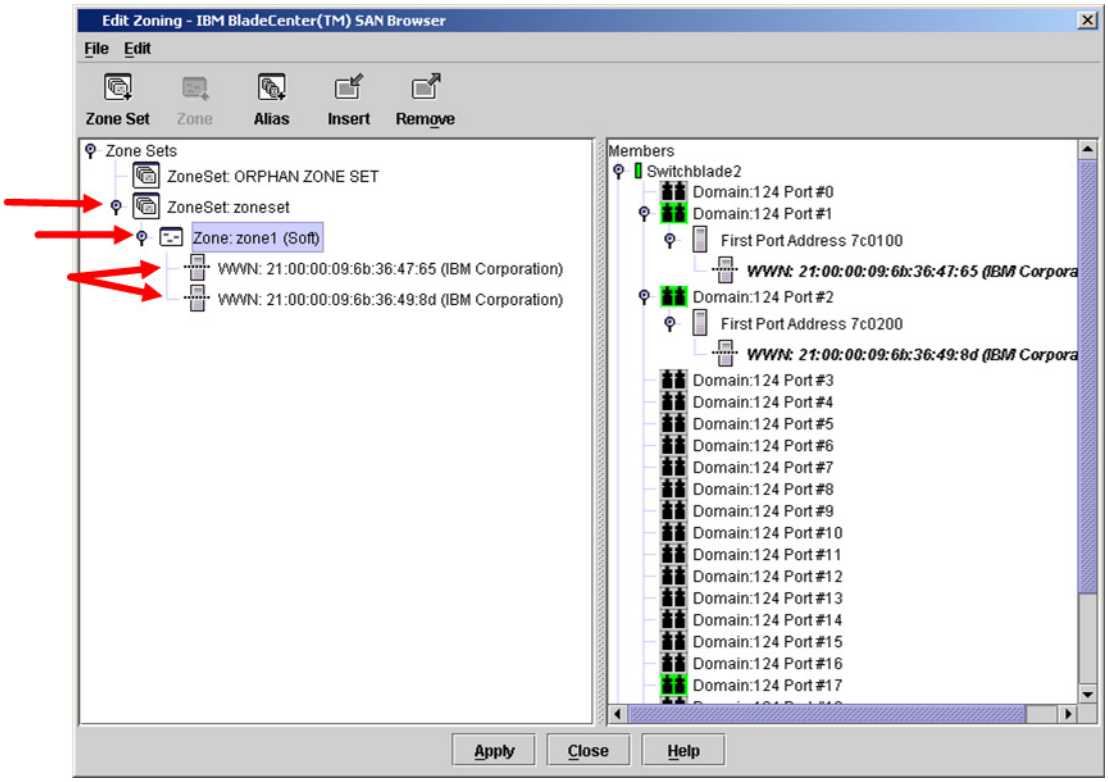


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

Operating Mode Configuration

Not applicable.

CNT Specific Configuration

Not applicable.

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

Merging IBM BladeCenter and McDATA Fabrics

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

IBM and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
McDATA	ES-3016/IBM 2031-16	5.1 and above
	ES-3032/IBM 2031-32	5.1 and above
	Sphereon 3032/IBM 2031-216	5.1 and above
	Sphereon 3232/IBM 2031-232	5.1 and above
	Sphereon 4500 Switch	5.1 and above
	Intrepid 6064 Director	5.1 and above
	Intrepid 6140 Director	5.1 and above

The following chapters provide detailed information about merging McDATA and IBM BladeCenter fabrics:

- **McDATA Edge Switches** **(see page 215)**
- **McDATA Intrepid 6000 Series Directors** **(see page 263)**

McDATA Edge Switches

Integration Checklist

The following steps must be completed to successfully merge McDATA and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see “Backing Up and Restoring the Current Configuration Settings” on page 219).

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 217).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 220).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 231).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 243).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 250).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 256).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 261).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

McDATA Configuration Limitations

When merging McDATA and IBM BladeCenter fabrics, a maximum of 31 interconnected switches per fabric can be configured. Otherwise, all features are fully supported and comply with industry standards.

Contacting McDATA

For more information about configuring McDATA switches, please see the McDATA contact information in the **Introduction** (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

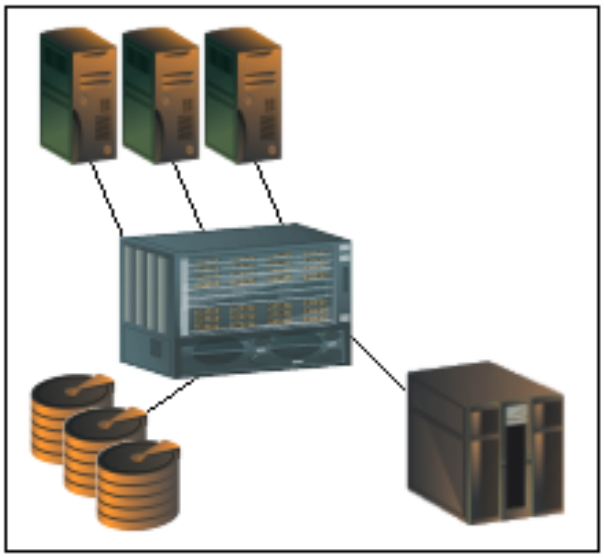
Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

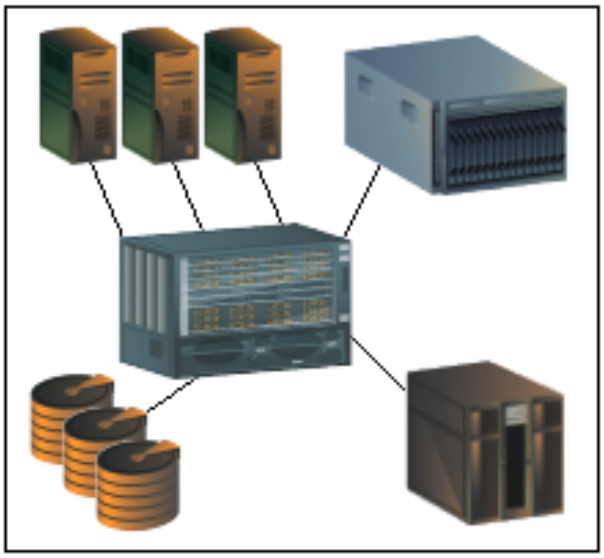
IBM and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
McDATA	ES-3016 and IBM 2031-16	5.1 and above
	ES-3032 and IBM 2031-32	5.1 and above
	Sphereon 3032 and IBM 2031-216	5.1 and above
	Sphereon 3232 and IBM 2031-232	5.1 and above
	Sphereon 4500 and IBM 2031-224	5.1 and above

The following figures illustrate a McDATA Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



McDATA Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



McDATA Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current McDATA switch configuration data prior to following the steps to merge McDATA and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

Note the following:

- Only a single copy of the configuration is kept on the McDATA server hard disk drive.
- The location and file name of the saved configuration cannot be modified.
- The configuration can only be restored to a switch with the same IP address.

Backup Procedure

To backup the current McDATA configuration settings, do the following:

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Maintenance** tab. The **Maintenance** dialog box displays.
3. From the **Maintenance** dialog box, select **Backup and Restore Configuration**. The **Backup and Restore Configuration** dialog box displays. Click **Backup**.
4. When the backup of the configuration completes, a message displays. Click **OK**.

   NOTE: If the backup fails, a message informs you that the backup to the server failed.

Restore Procedure

If you need to restore the McDATA configuration settings that you backed up, do the following.

NOTE: The backed up configuration is restored to the nonvolatile random access memory (NVRAM) on the switch. The restore operation initiates an initial product load (IPL).

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Offline** button.
3. Select the **Maintenance** tab. The **Maintenance** dialog box displays.
4. From the **Maintenance** dialog box, select **Backup and Restore Configuration**. The **Backup and Restore Configuration** dialog box displays. Click **Restore**.
5. A confirmation dialog box displays, stating that the restore overwrites the existing configuration on the switch and the date of the restored backup. Click **OK**.
6. When the restore completes, select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.

Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the McDATA switch and IBM switch module.

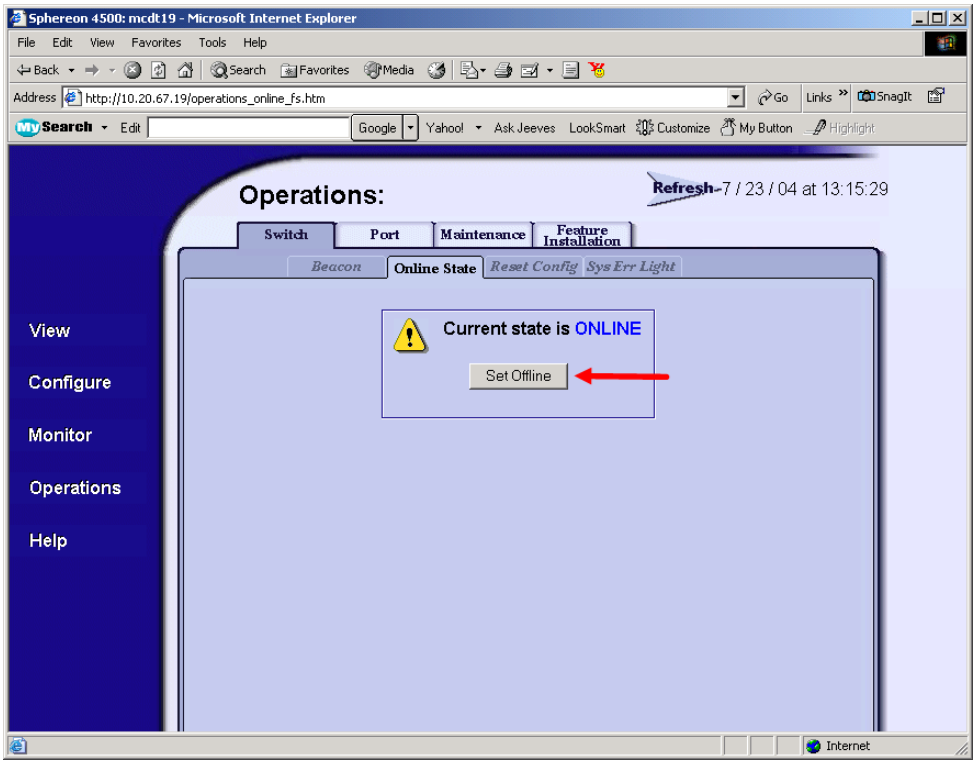
The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range. This is equivalent to 1–31 on the McDATA switch. The following chart lists the McDATA Domain ID and the corresponding IBM Domain ID.

McDATA Versus IBM Domain IDs

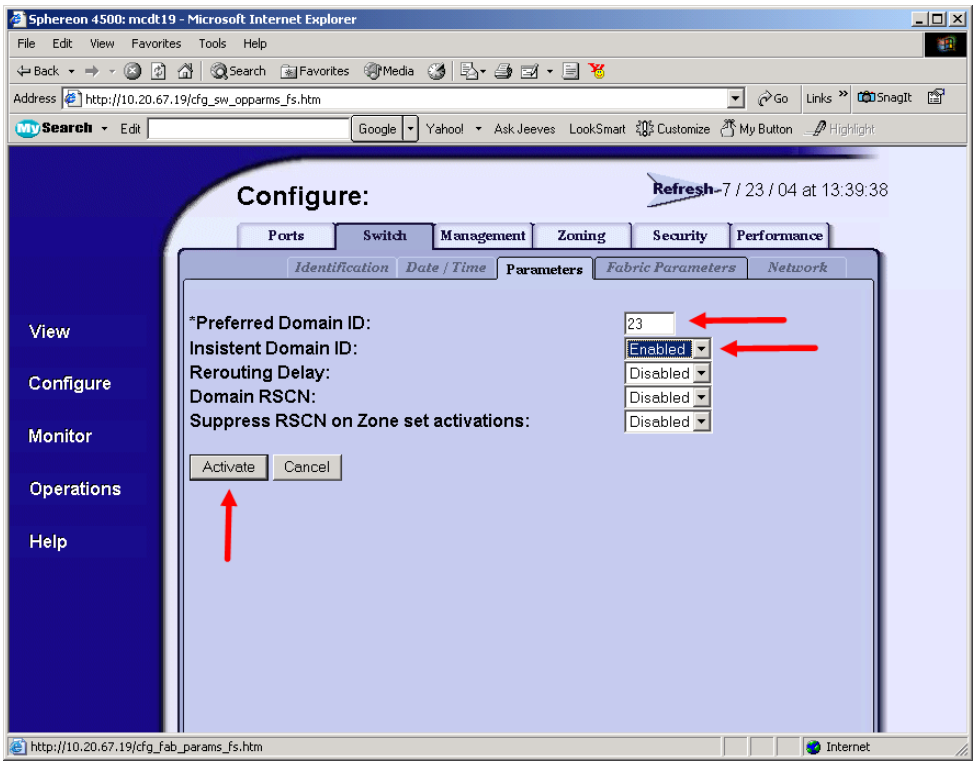
McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID
1	97	11	107	21	117
2	98	12	108	22	118
3	99	13	109	23	119
4	100	14	110	24	120
5	101	15	111	25	121
6	102	16	112	26	122
7	103	17	113	27	123
8	104	18	114	28	124
9	105	19	115	29	125
10	106	20	116	30	126
—	—	—	—	31	127

McDATA Sphereon Web Management

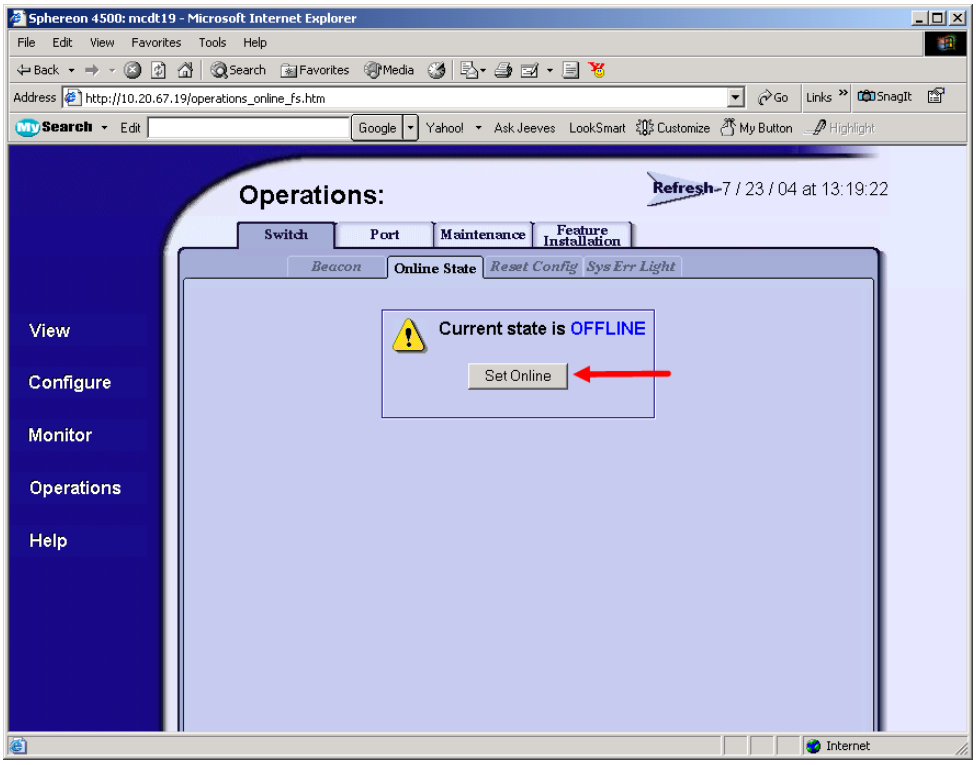
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Offline** button.



3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Parameters** tab, and do the following:
   a. In the **Preferred Domain ID** box, type a unique Domain ID.
   b. From the **Insistent Domain ID** list, select **Enabled**.
   c. Click **Activate**.



4. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

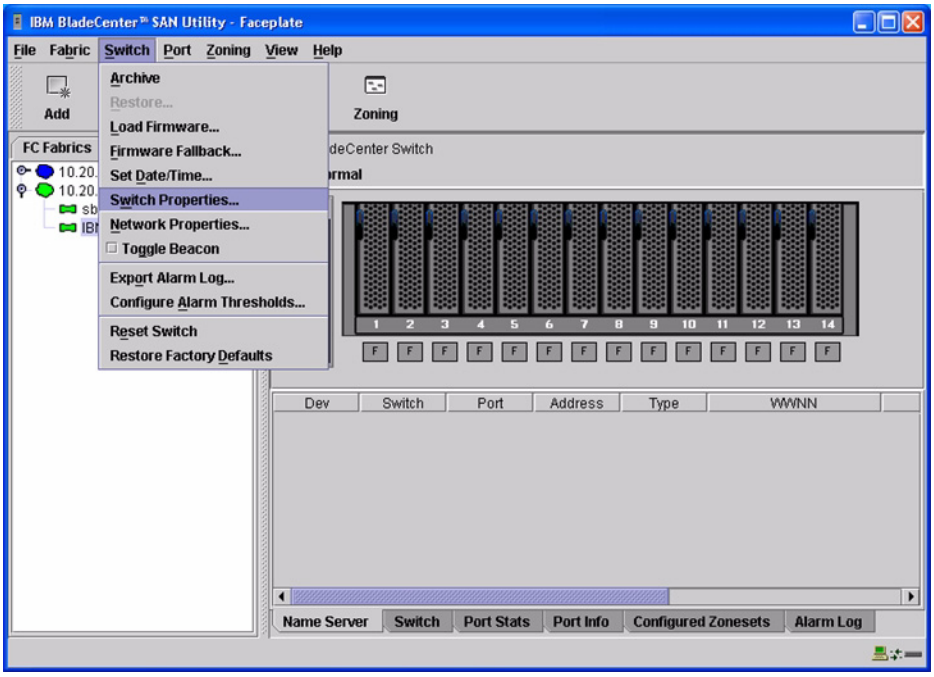
```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState false
Maint.System> root
Root> config switch
Config.Switch> prefDomainId xx  (xx=unique domain id)
Config.Switch> insistDomainId enable
Config.Switch> root
Root> maint system
Maint.System> setOnlineState true
```

IBM BladeCenter GUI

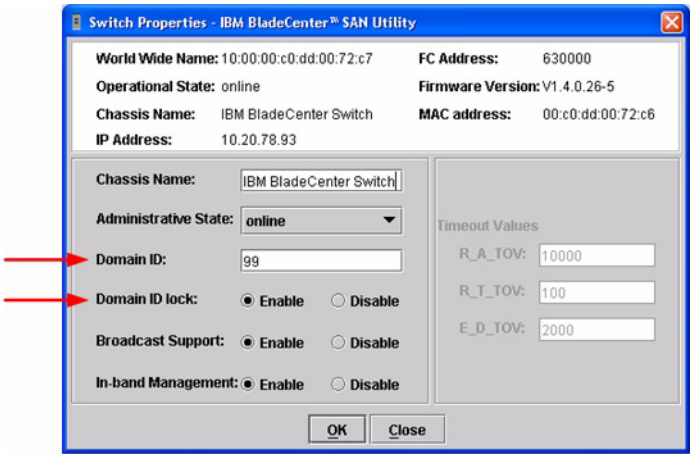
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

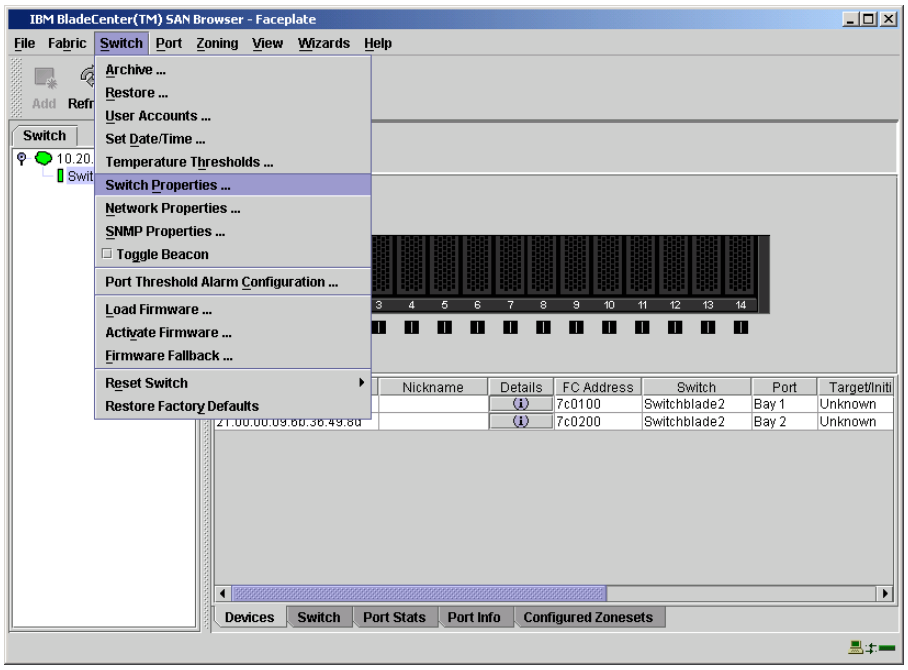


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

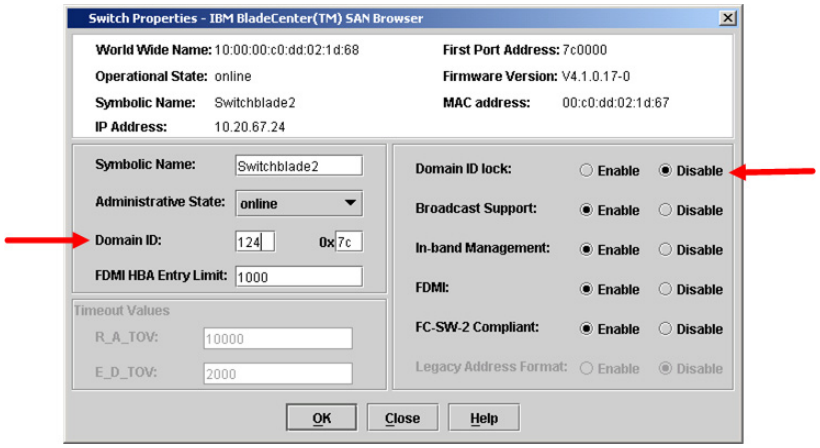


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

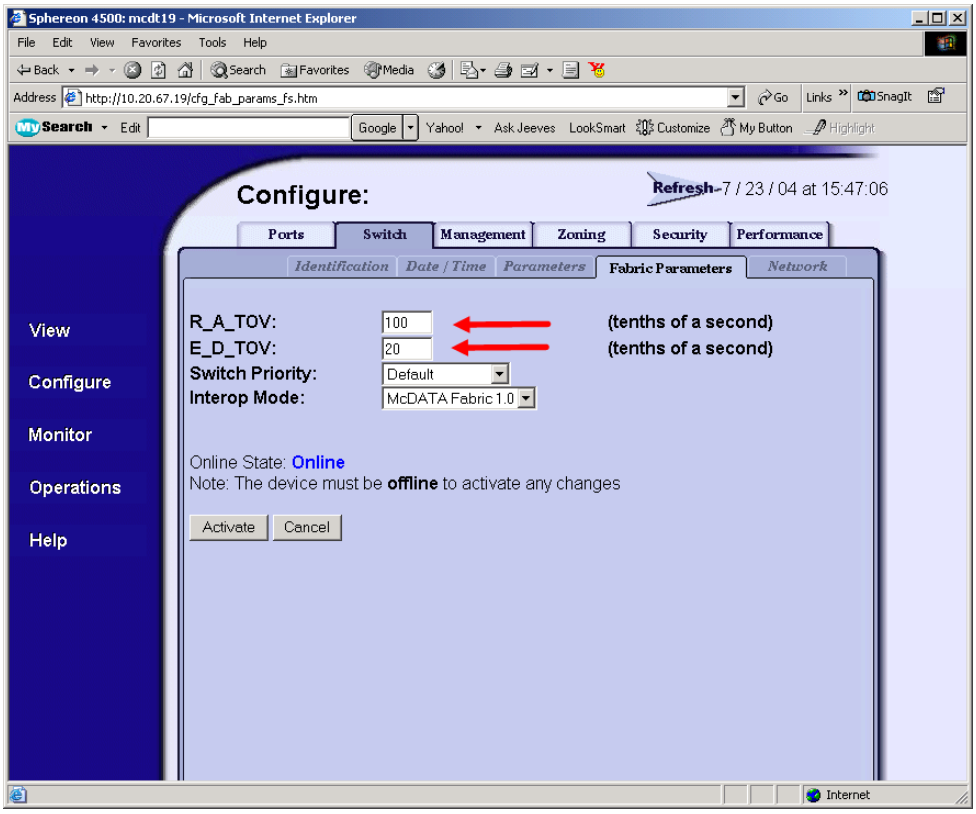
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **100**.)
E_D_TOV = 2 seconds (The setting is **20**.)

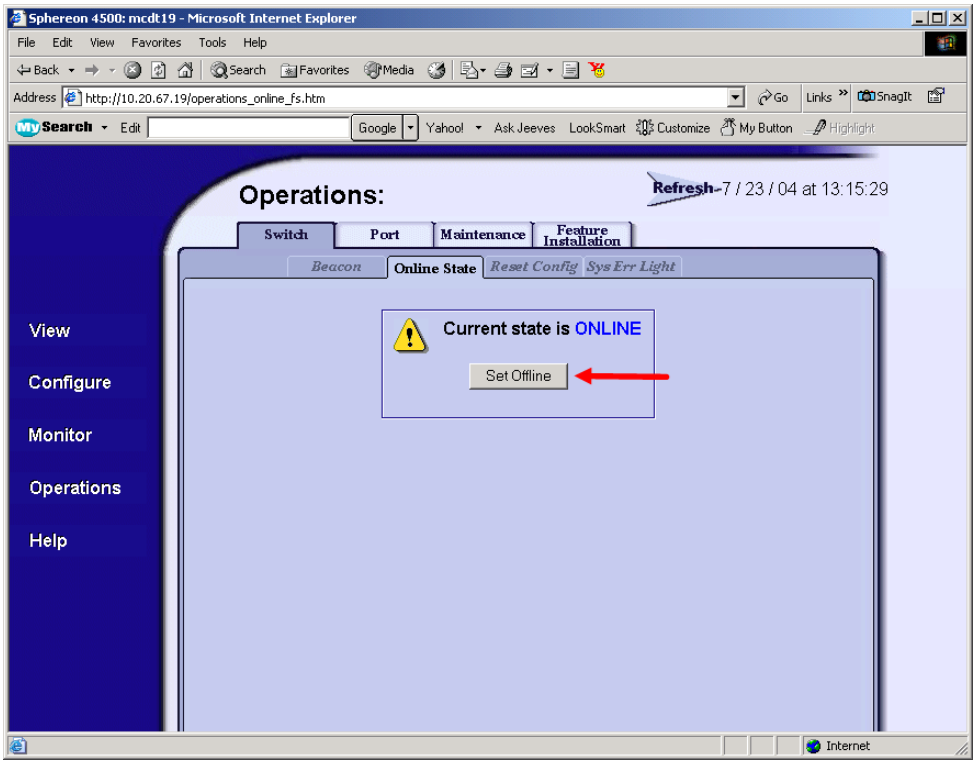
This section provides the steps to change these values.

McDATA Sphereon Web Management

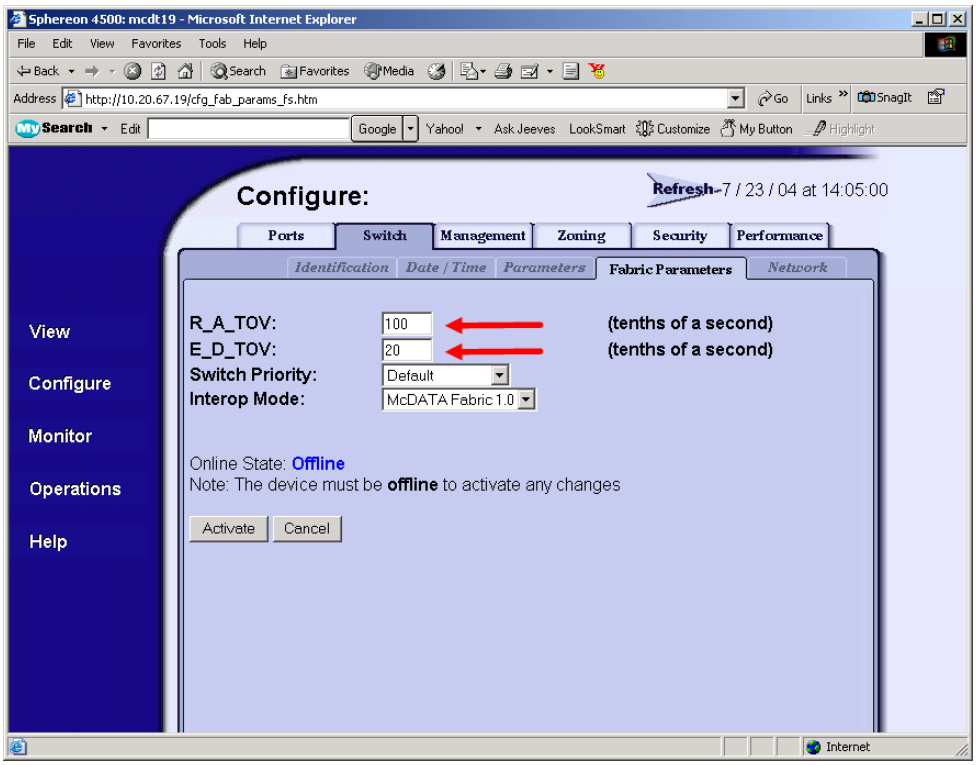
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, then select the **Fabric Parameters** tab. Verify that **R_A_TOV** is set to **100** and **E_D_TOV** is set to **20**. If the settings are *not* correct, proceed to step 3. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



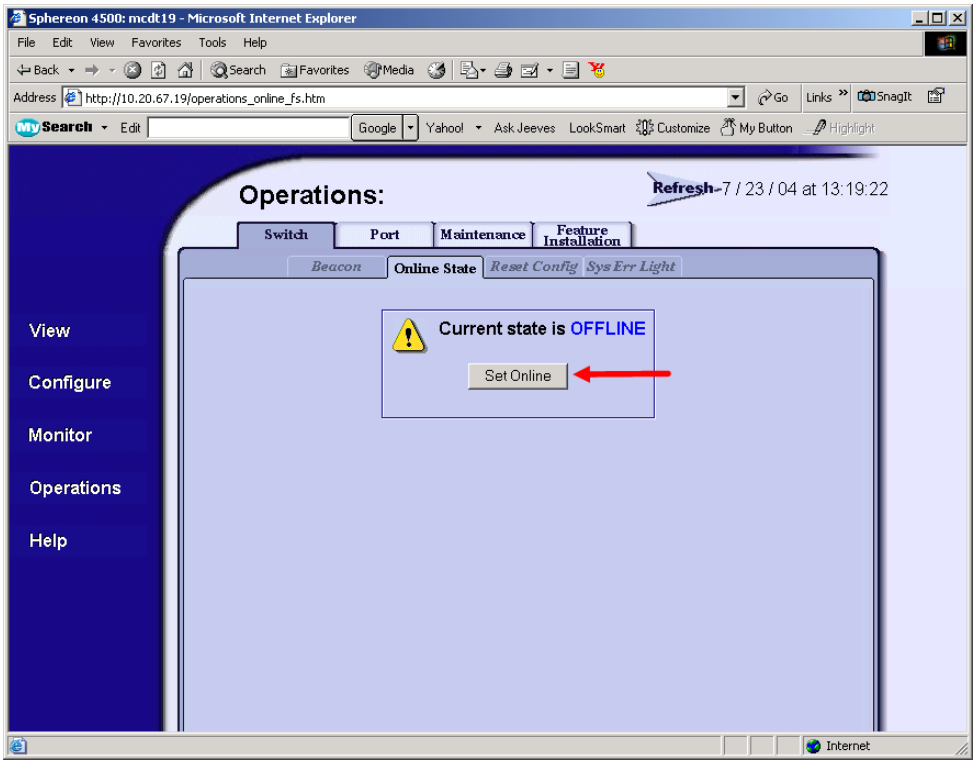
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Offline** button.



4. On the navigation panel, select **Configure**, The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:
   a. In the **R_A_TOV** box, change the setting to **100**.
   b. In the **E_D_TOV** box, change the setting to **20**.
   c. Click **Activate**.



5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 100 and E_D_TOV is set to 20.

```
Root> show
Show> switch
```

If these timeout values are not correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Show> root
Root> maint system
Maint.System> setOnlineState false
Maint.System> root
Root> config switch
Config.Switch> raTOV 100
Config.Switch> edTOV 20
Config.Switch> root
Root> maint system
Maint.System> setOnlineState true
```

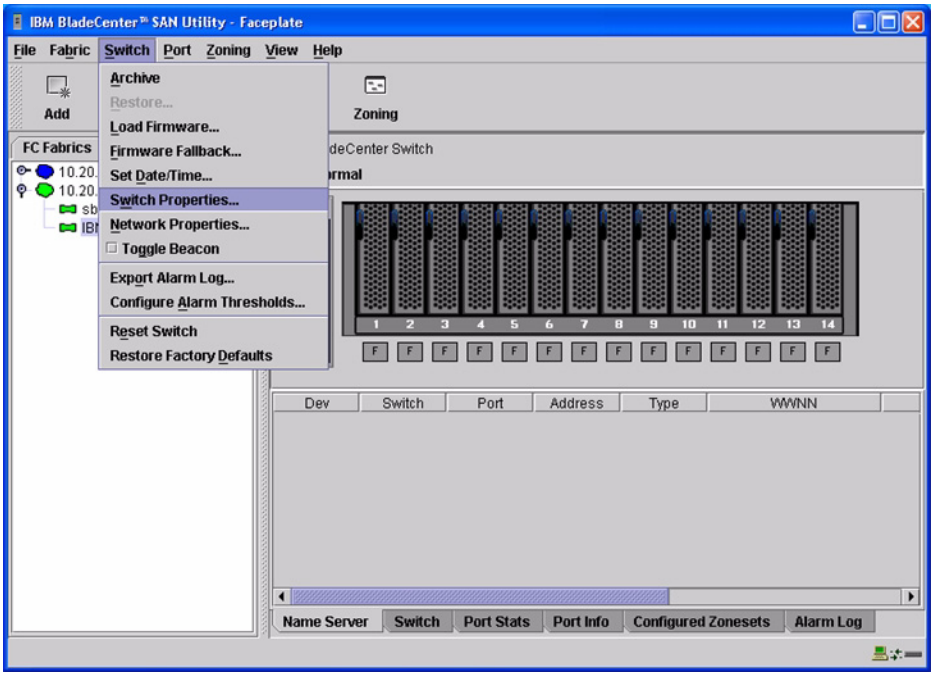
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

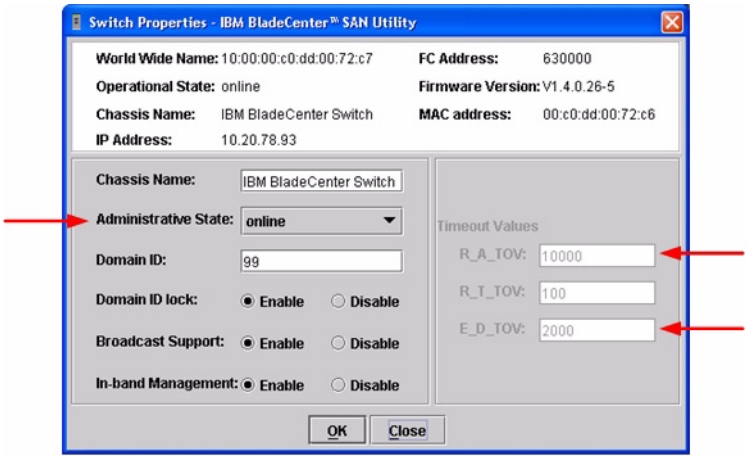
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



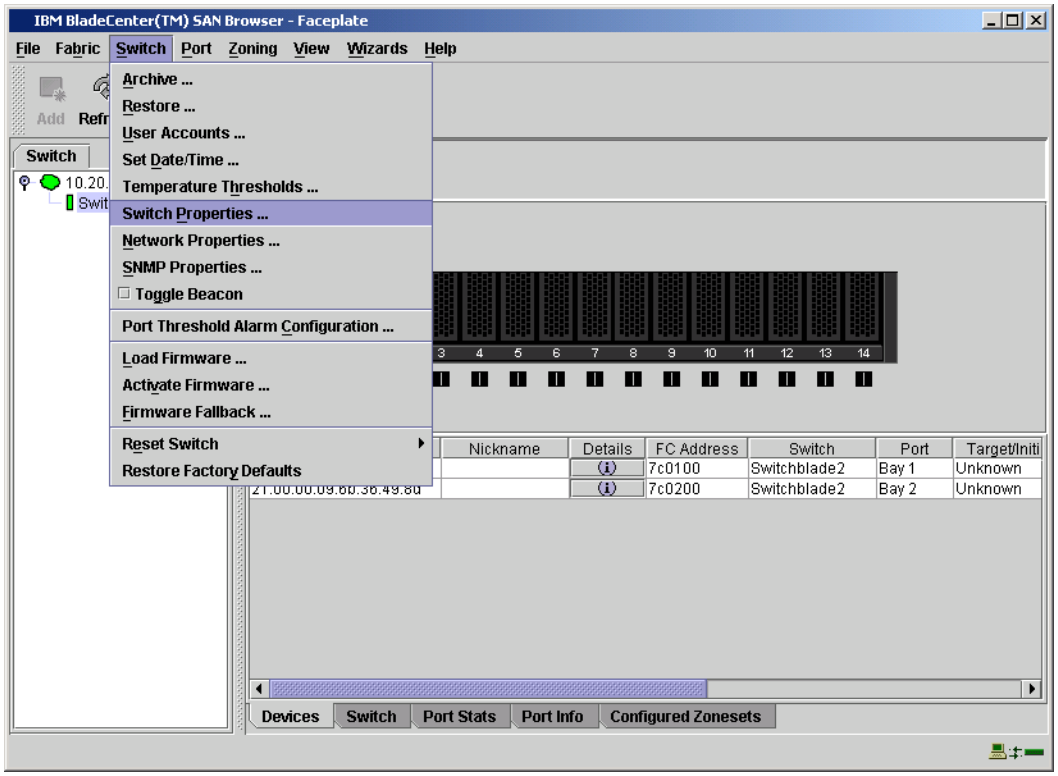
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



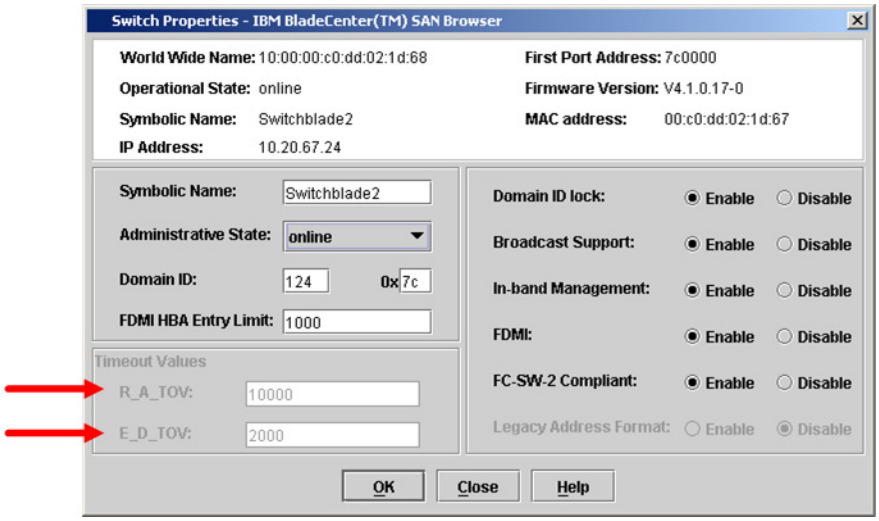
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

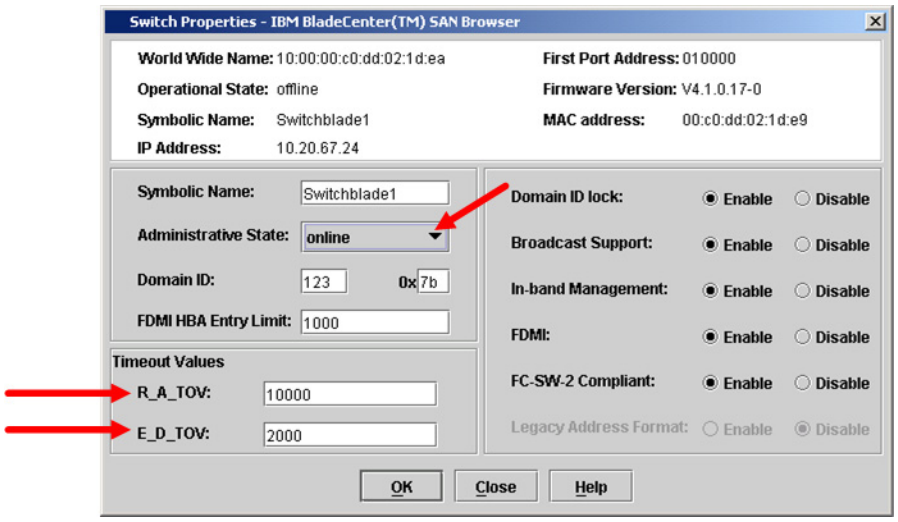
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
    Finished configuring attributes.
    This configuration must be saved (see config save command) and
    activated (see config activate command) before it can take effect.
    To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
    The config named default has been saved.
Switchblade2 (admin): admin> config activate
    The currently active configuration will be activated.
    Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

McDATA switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

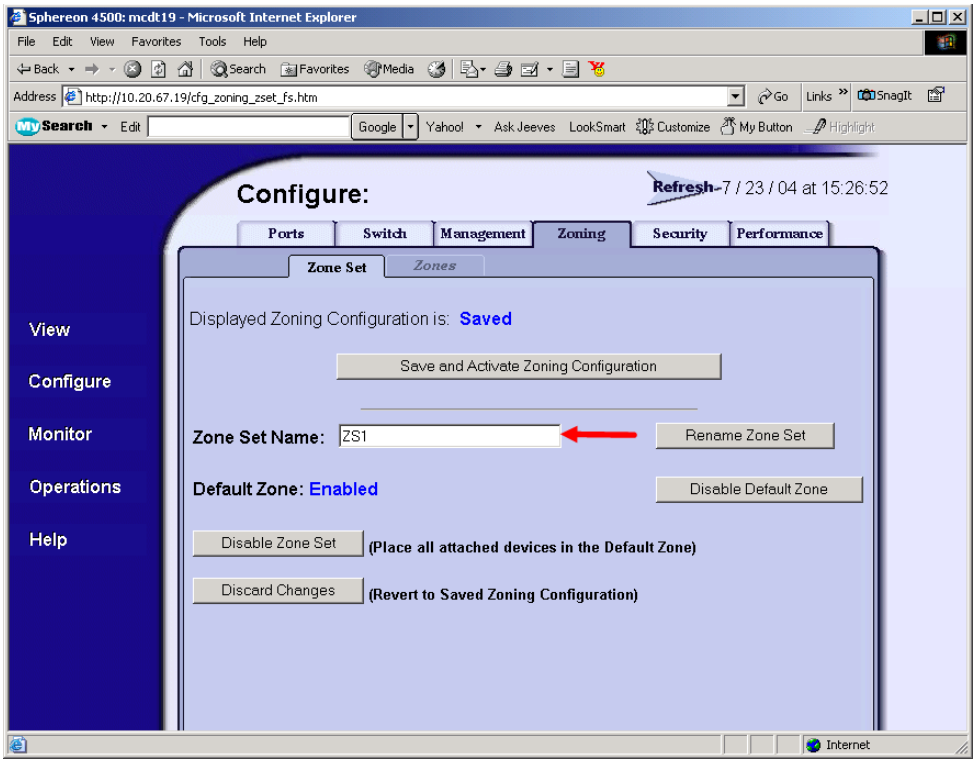
Active Zone Set Names

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

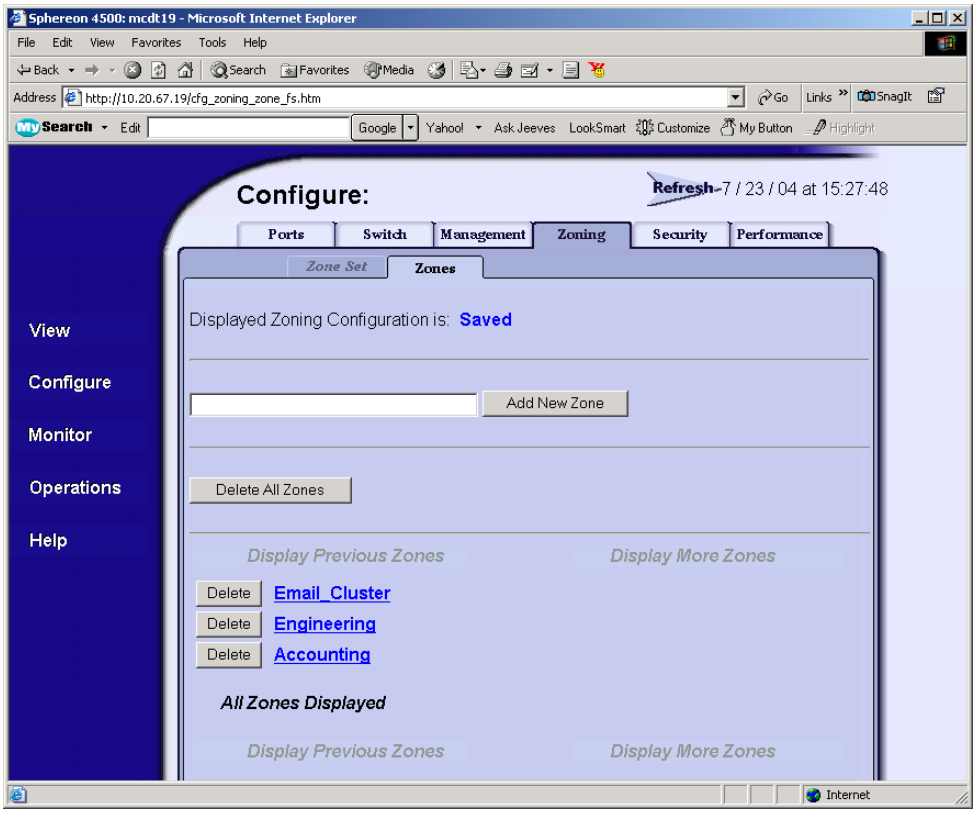
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

McDATA Sphereon Web Management

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **ZoneSet** tab. Verify that the Zone Set name conforms to the standards for zone naming as discussed under "Active Zone Set Names" on page 243.



3. Select the **Zones** tab. Verify that the Zone names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 243.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> show
Show> zoning
```

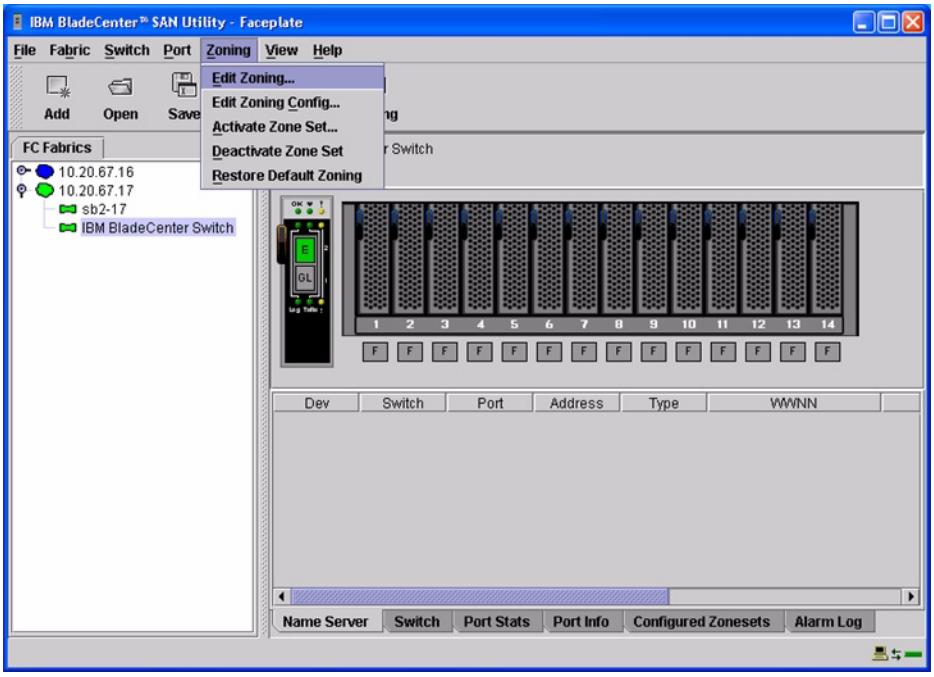
Verify that the Zone Set and Zone Names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 243.

IBM BladeCenter GUI

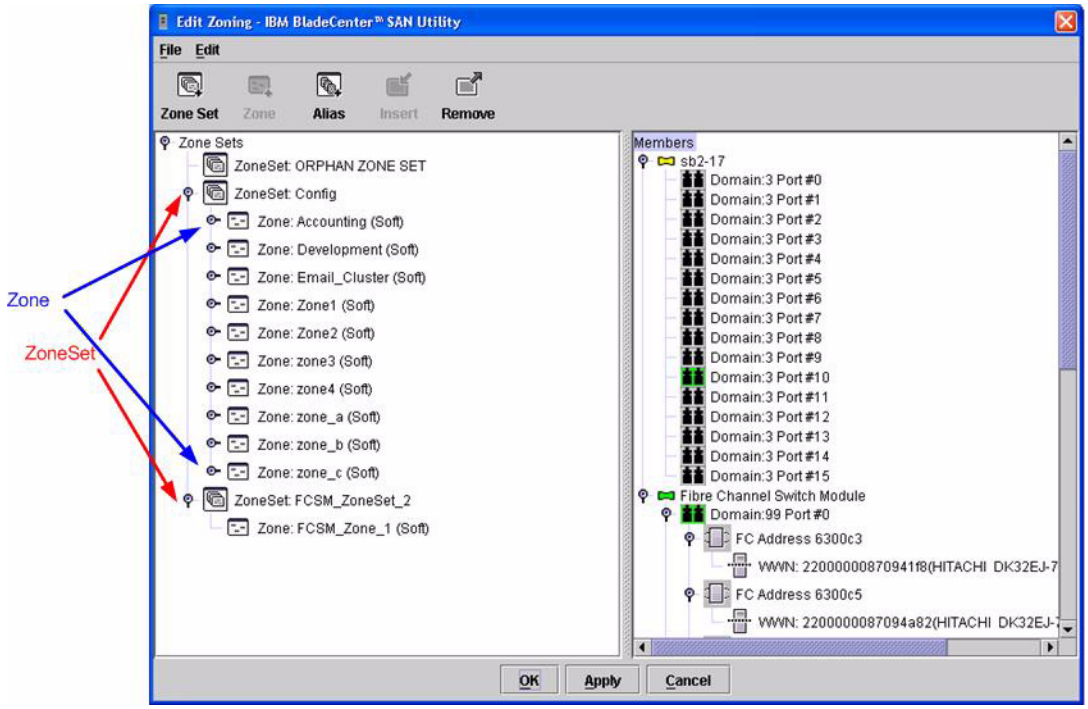
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

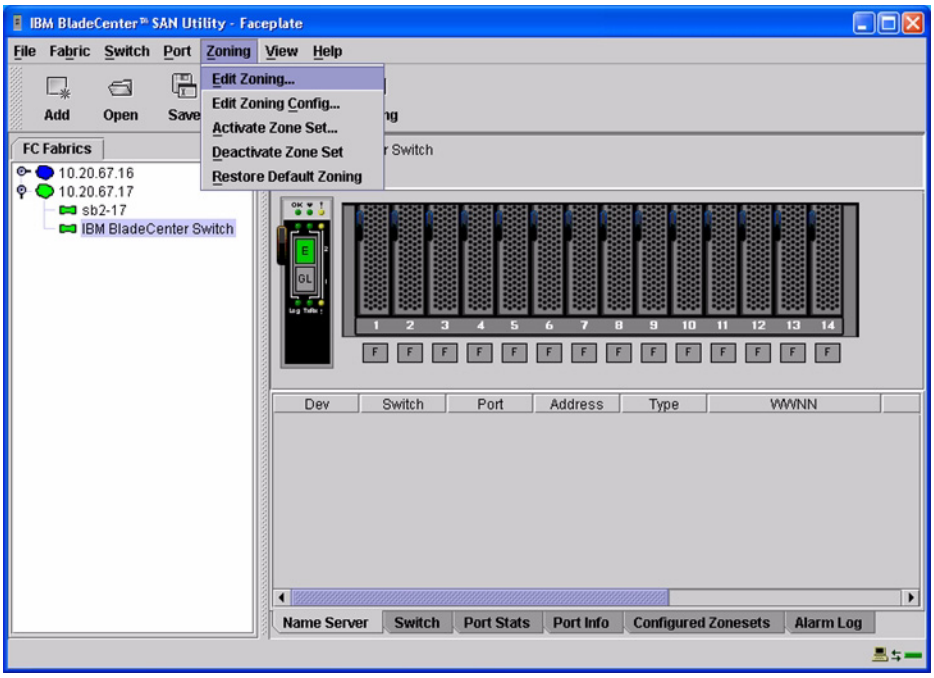


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 243.

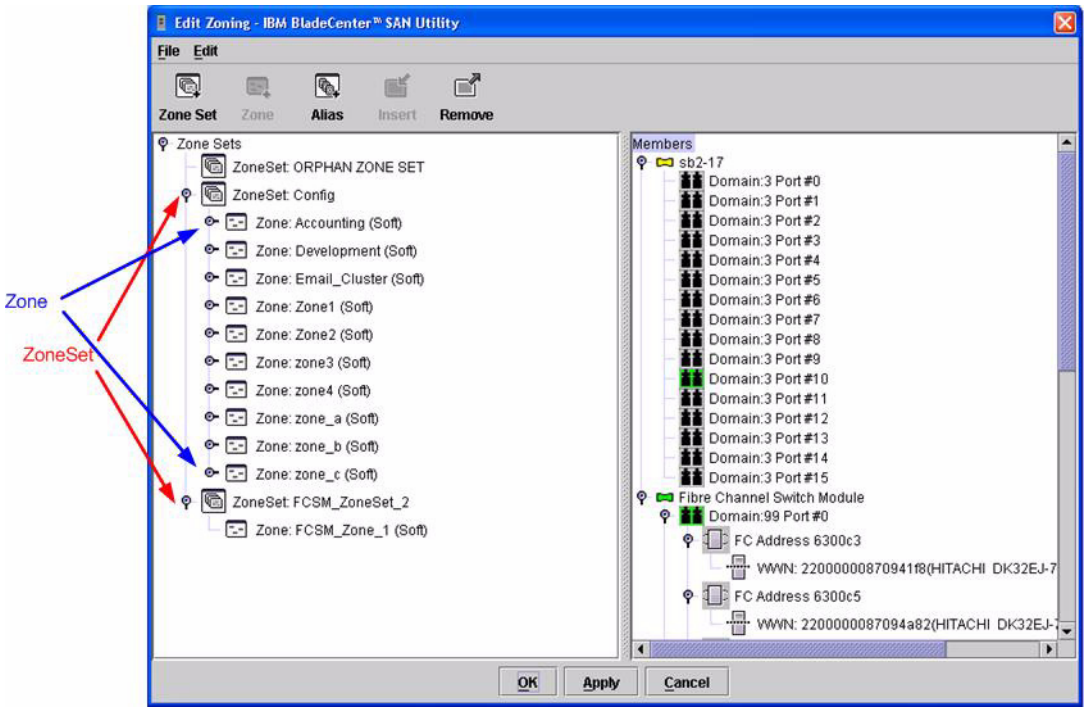


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 243.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

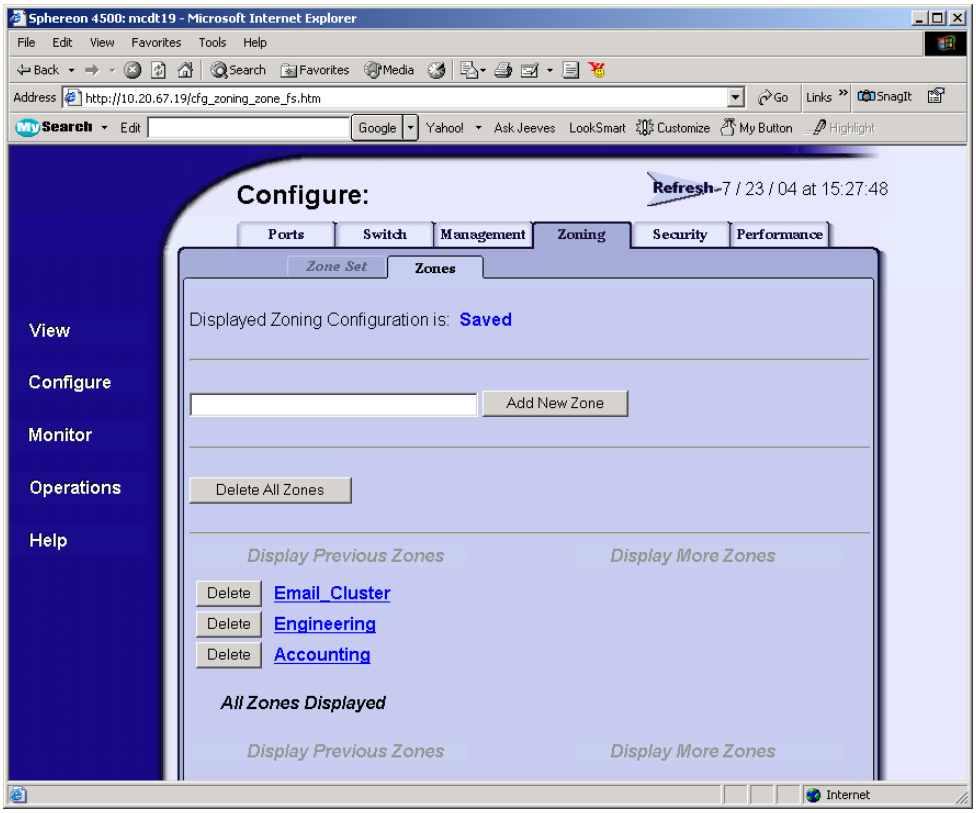
Zone Types

All zones members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

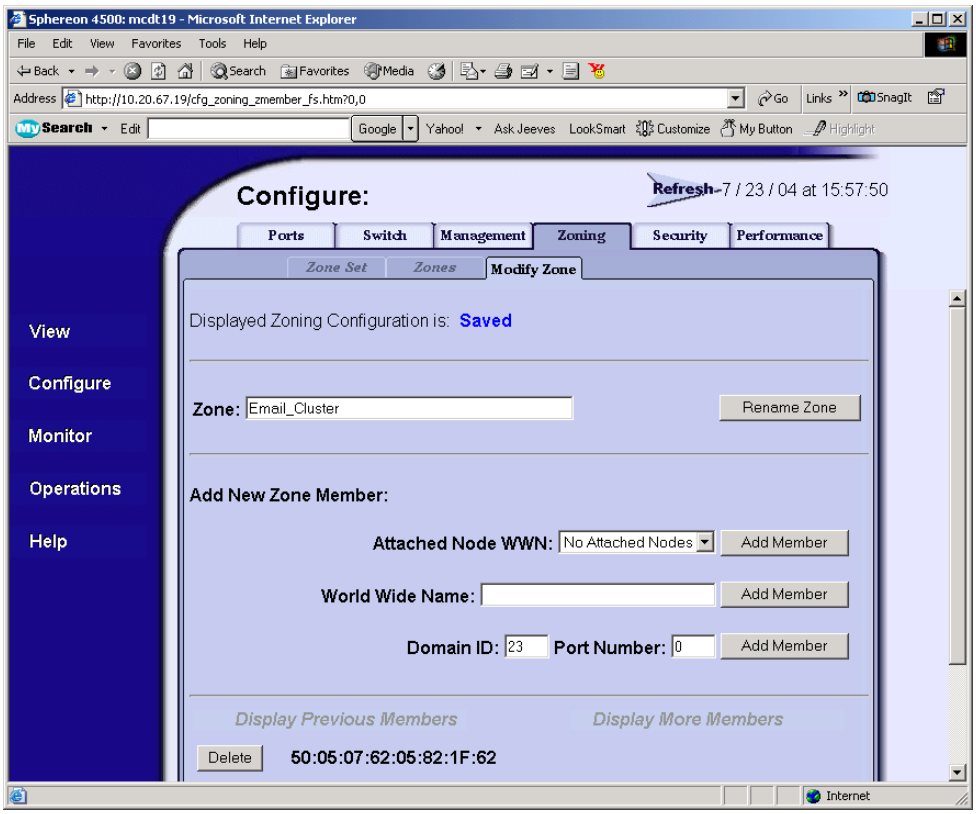
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

McDATA Sphereon Web Management

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **Zones** tab.



3. Select each zone and verify that all members are specified by WWN.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> show
Show> zoning
```

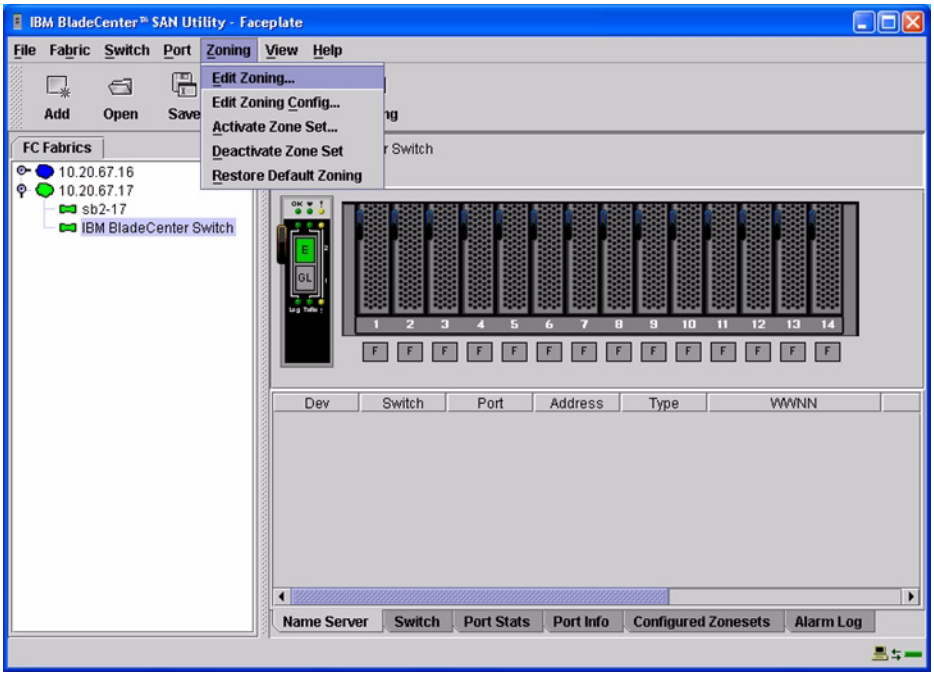
Verify that all of the Zone members are specified by WWN.

IBM BladeCenter GUI

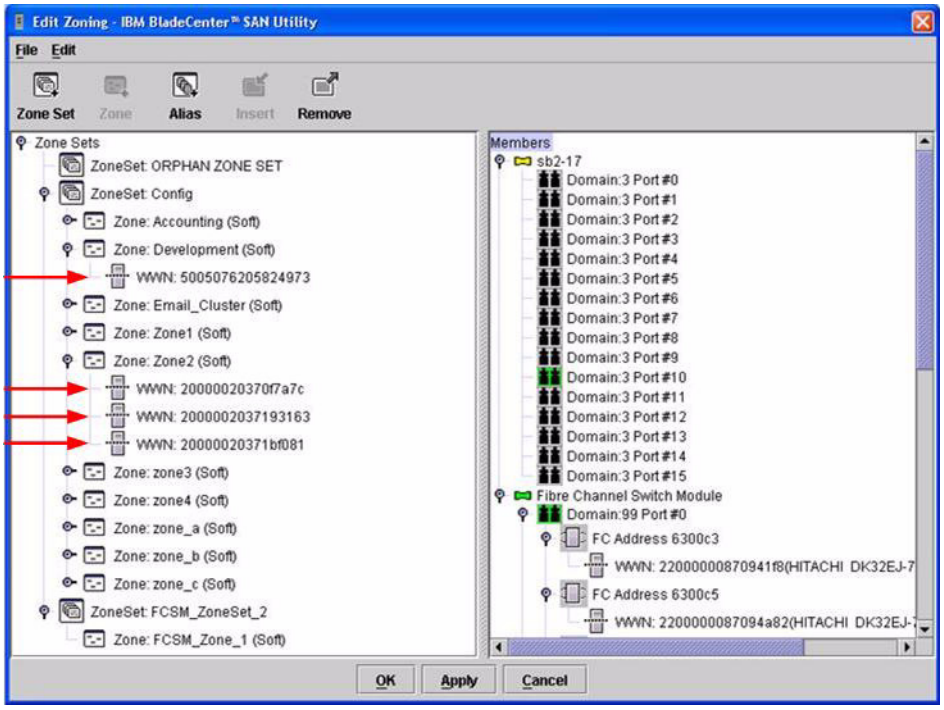
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

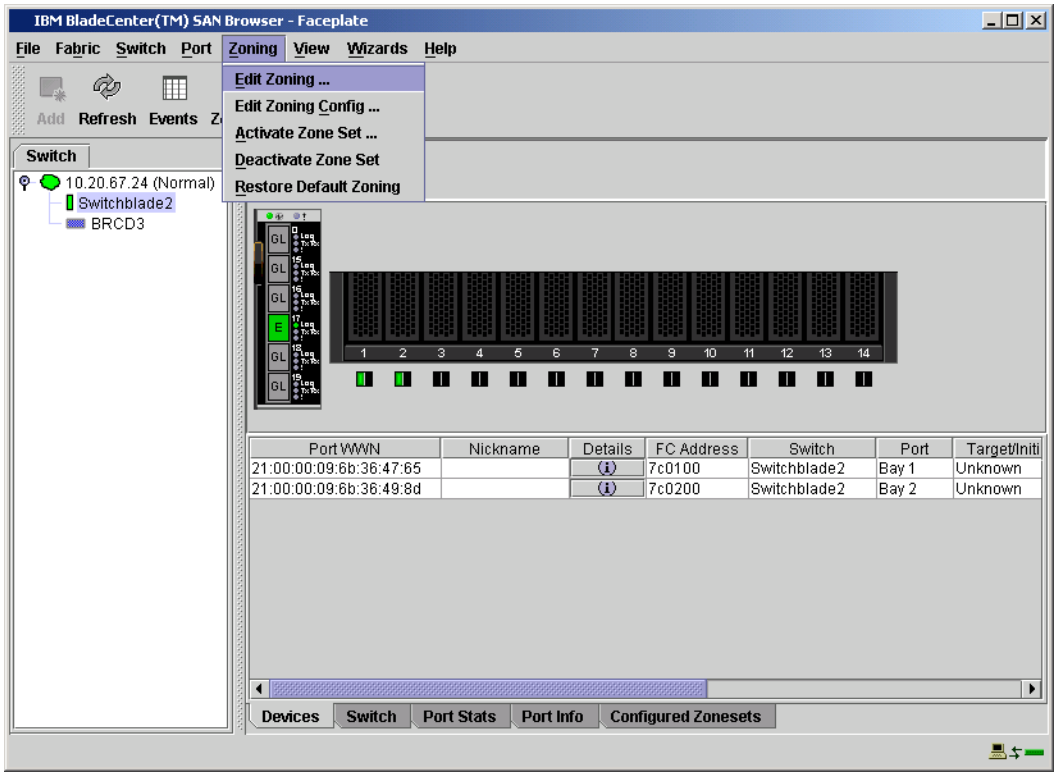


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

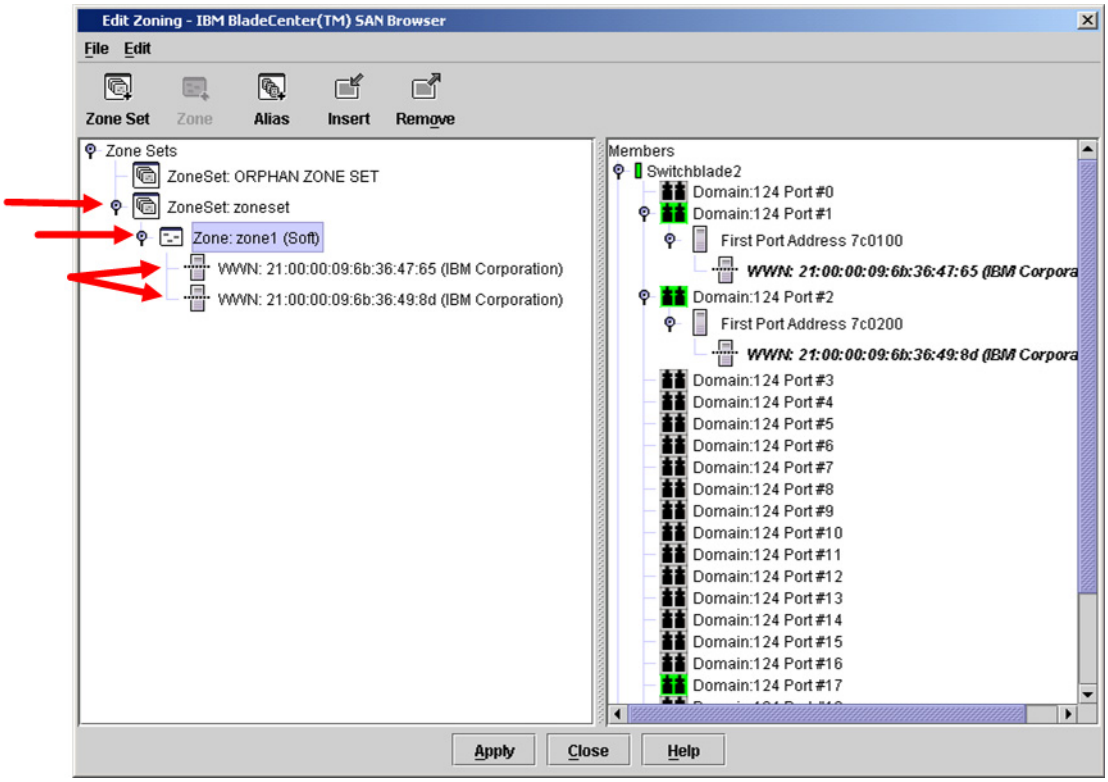


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

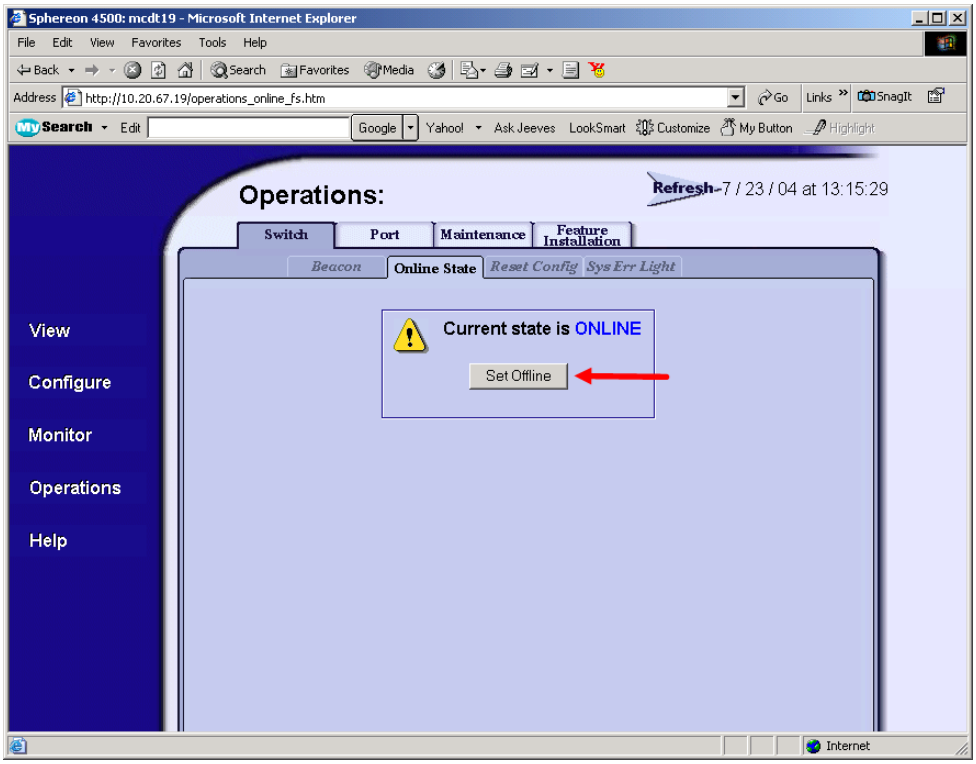
```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

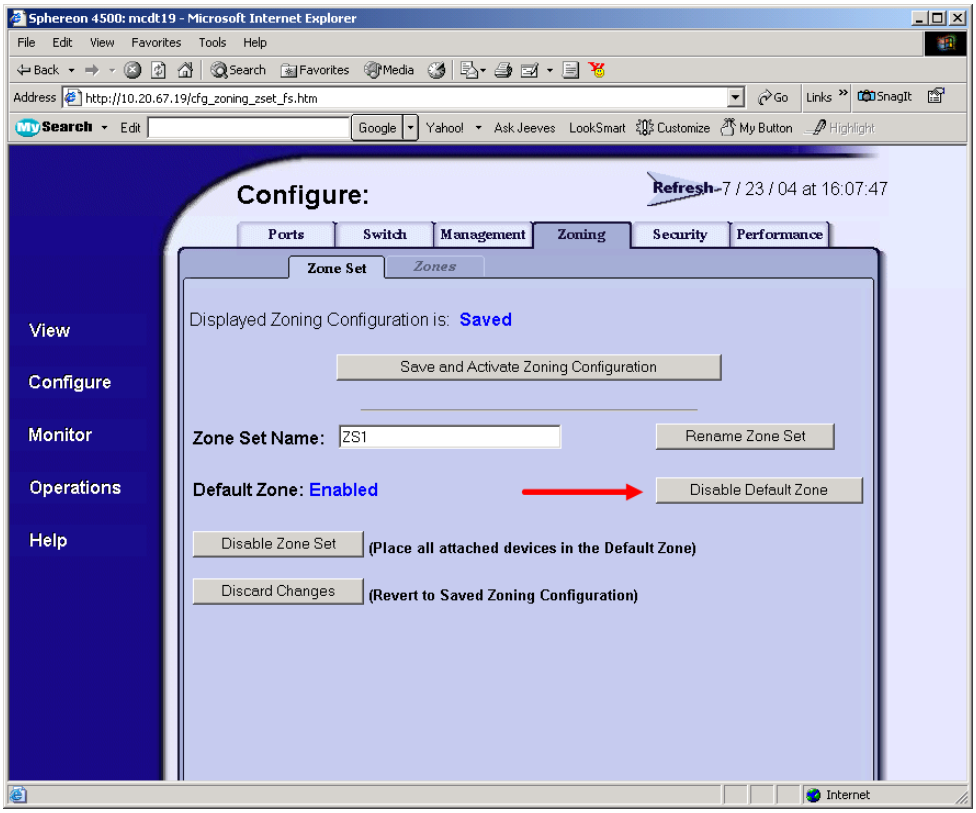
Operating Mode Configuration

McDATA Sphereon Web Management

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Offline** button.



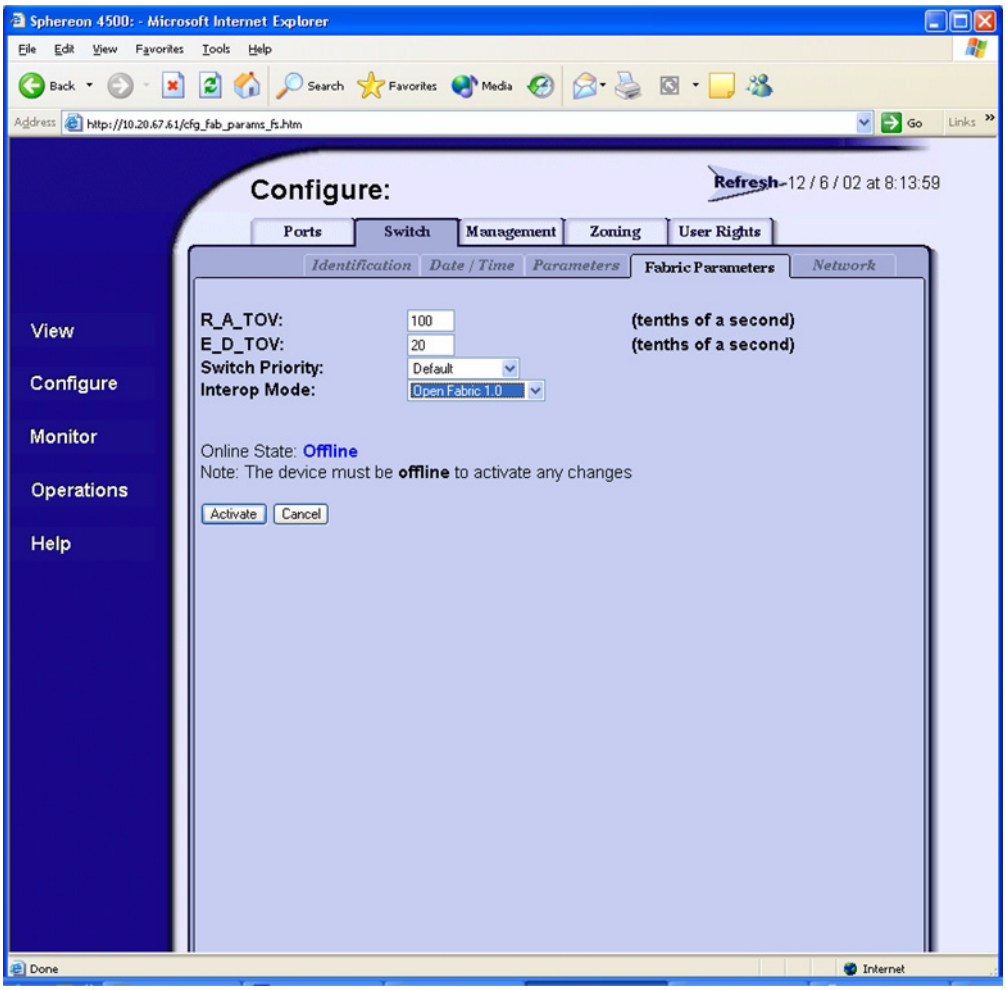
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.



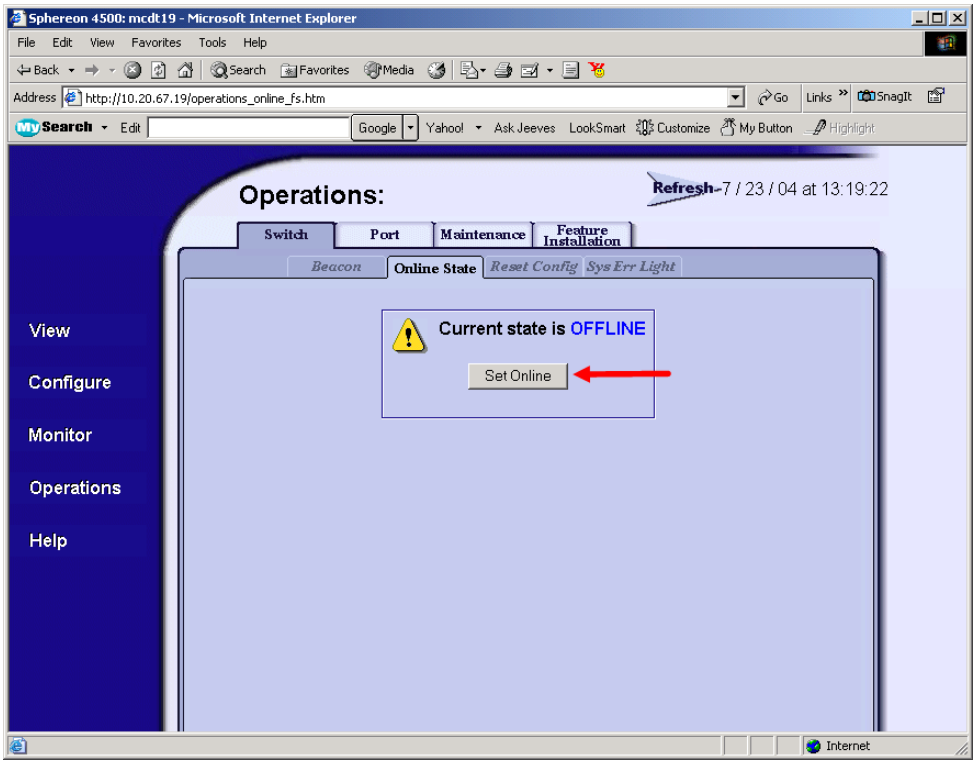
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:

   a. From the **Interop Mode** list, select **Open Fabric 1.0**.

   b. Click **Activate**.



5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState false
Maint.System> root
Root> config zoning
Config.Zoning> setDefZoneState false
Config.Zoning> root
Root> config switch
Config.Switch> interopMode open
Config.Switch> root
Root> maint system
Maint.System> setOnlineState true
```

IBM eServer BladeCenter SAN Utility

Not applicable.

IBM BladeCenter CLI

Not applicable.

McDATA Specific Configuration

Not applicable.

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

McDATA Intrepid 6000 Series Directors

Integration Checklist

The following steps must be completed to successfully merge McDATA and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see “Backing Up and Restoring the Current Configuration Settings” on page 266).

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 265).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 267).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 278).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 291).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 298).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 305).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 310).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

McDATA Configuration Limitations

When merging McDATA and IBM BladeCenter fabrics, a maximum of 31 interconnected switches per fabric can be configured. Otherwise, all features are fully supported and comply with industry standards.

Contacting McDATA

For more information about configuring McDATA switches, please see the McDATA contact information in the **Introduction** (see page 3).

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

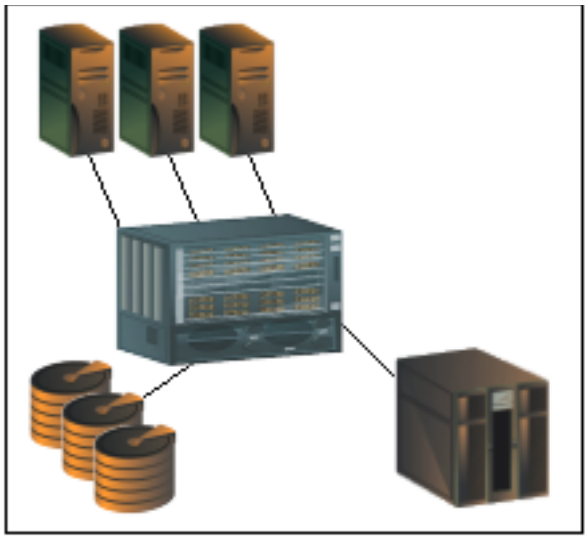
Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

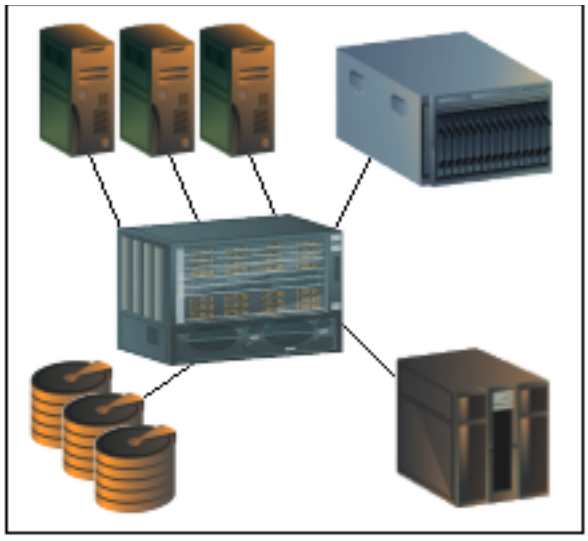
IBM and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
McDATA	Intrepid 6064 Director and IBM 2109F32	5.1 and above
	Intrepid 6140 Director and IBM 2109M12	5.1 and above

The following figures illustrate a McDATA Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



McDATA Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



McDATA Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current McDATA switch configuration data prior to following the steps to merge McDATA and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

Note the following:

- Only a single copy of the configuration is kept on the McDATA server hard disk drive.
- The location and file name of the saved configuration cannot be modified.
- The configuration can only be restored to a switch with the same IP address.

Backup Procedure

To backup the current McDATA configuration settings, do the following:

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Maintenance** tab. The **Maintenance** dialog box displays.
3. From the **Maintenance** dialog box, select **Backup and Restore Configuration**. The **Backup and Restore Configuration** dialog box displays. Click **Backup**.
4. When the backup of the configuration completes, a message displays. Click **OK**.

   NOTE: If the backup fails, a message informs you that the backup to the server failed.

Restore Procedure

If you need to restore the McDATA configuration settings that you backed up, do the following.

NOTE: The backed up configuration is restored to the nonvolatile random access memory (NVRAM) on the switch. The restore operation initiates an initial product load (IPL).

1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Offline** button.
3. Select the **Maintenance** tab. The **Maintenance** dialog box displays.
4. From the **Maintenance** dialog box, select **Backup and Restore Configuration**. The **Backup and Restore Configuration** dialog box displays. Click **Restore**.
5. A confirmation dialog box displays, stating that the restore overwrites the existing configuration on the switch and the date of the restored backup. Click **OK**.
6. When the restore completes, select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.

Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the McDATA switch and IBM switch module.

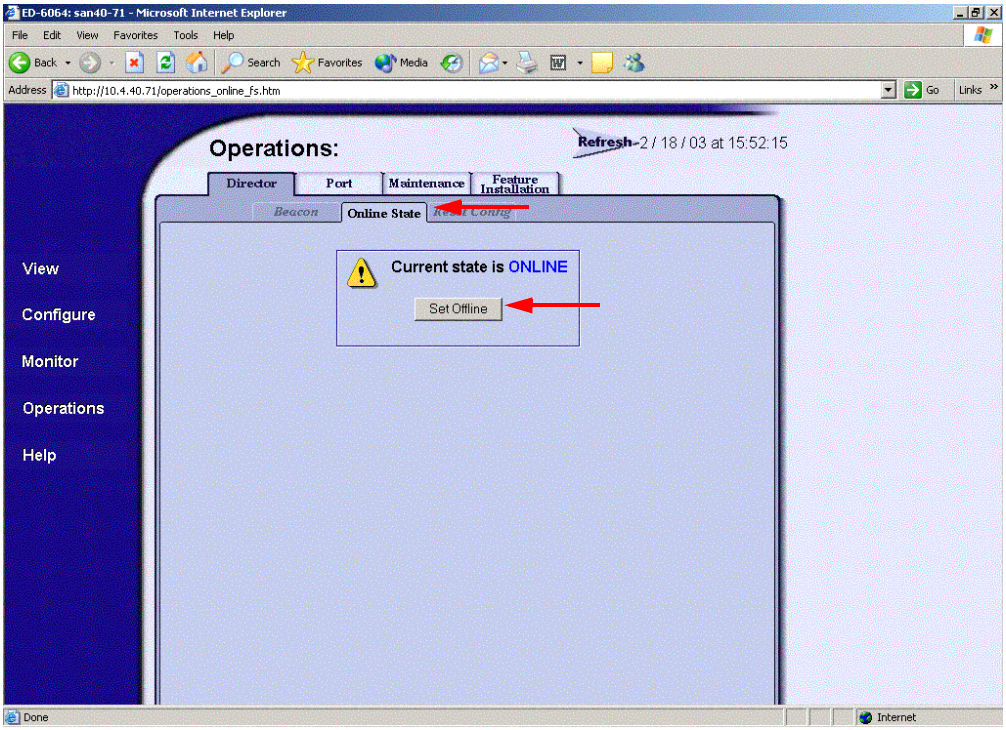
The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range. This is equivalent to 1–31 on the McDATA switch. The following chart lists the McDATA Domain ID and the corresponding IBM Domain ID.

McDATA Versus IBM Domain IDs

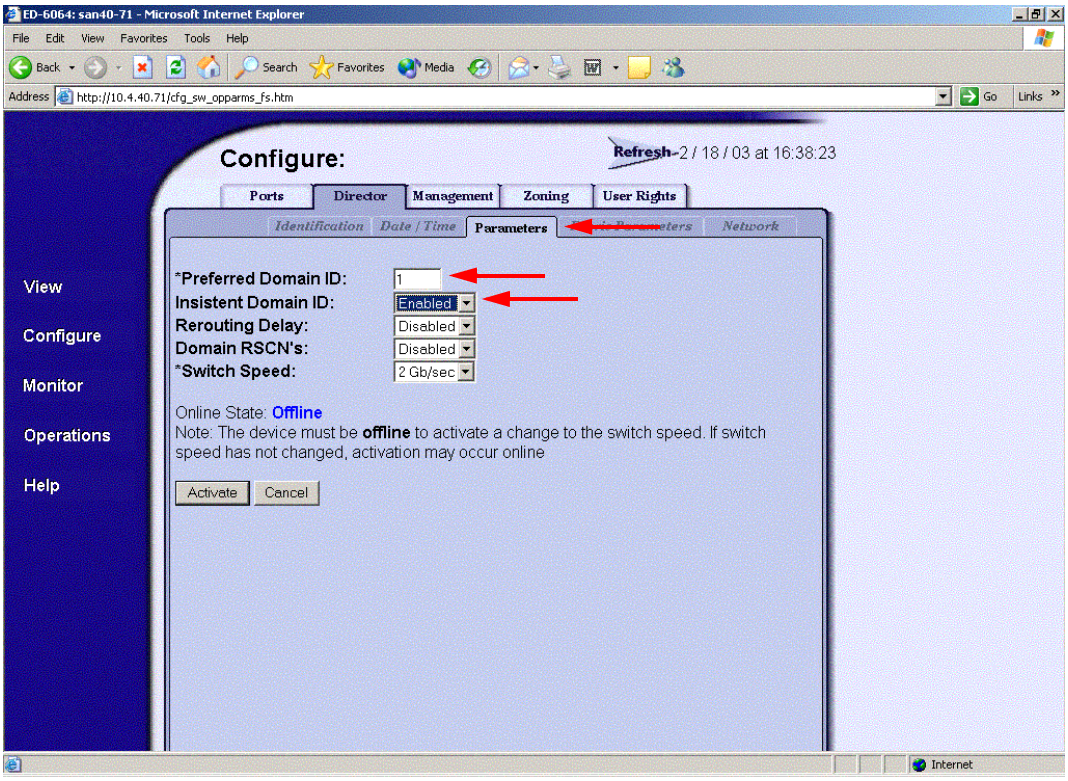
McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID
1	97	11	107	21	117
2	98	12	108	22	118
3	99	13	109	23	119
4	100	14	110	24	120
5	101	15	111	25	121
6	102	16	112	26	122
7	103	17	113	27	123
8	104	18	114	28	124
9	105	19	115	29	125
10	106	20	116	30	126
—	—	—	—	31	127

McDATA SANpilot Web Management

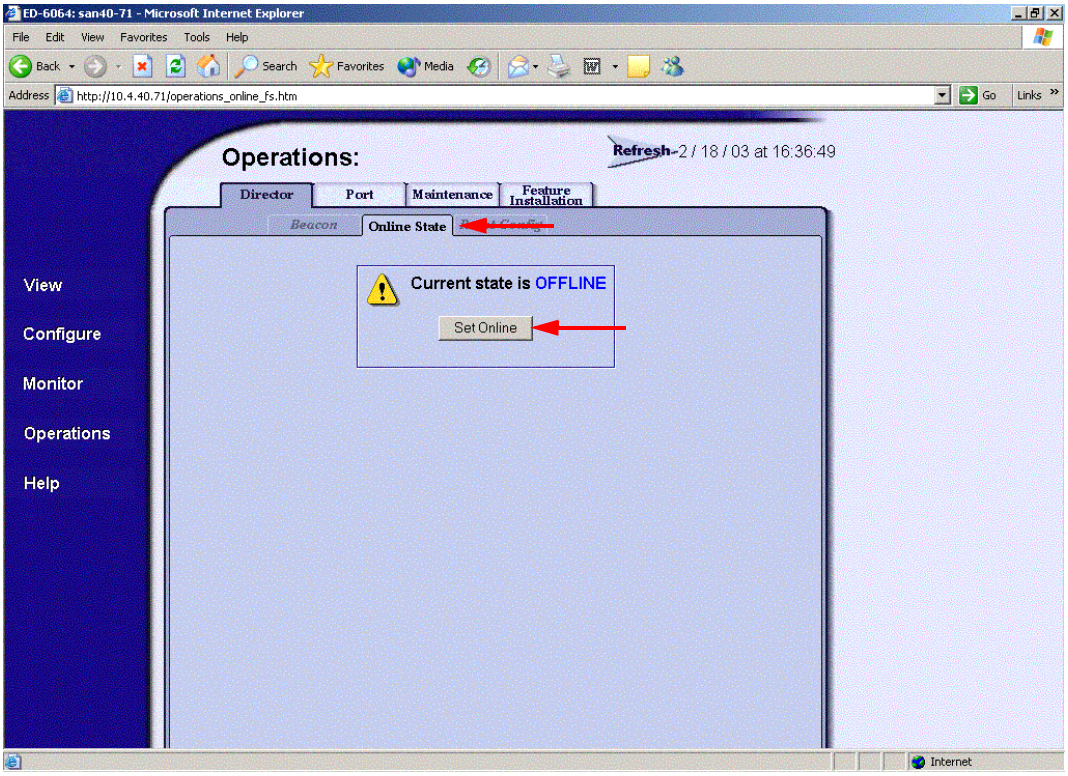
1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Offline** button.



3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, select the **Parameters** tab, and do the following:
   a. In the **Preferred Domain ID** box, type a unique Domain ID.
   b. From the **Insistent Domain ID** list, select **Enabled**.
   c. Click **Activate**.



4. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA SANpilot Web Management is not available.

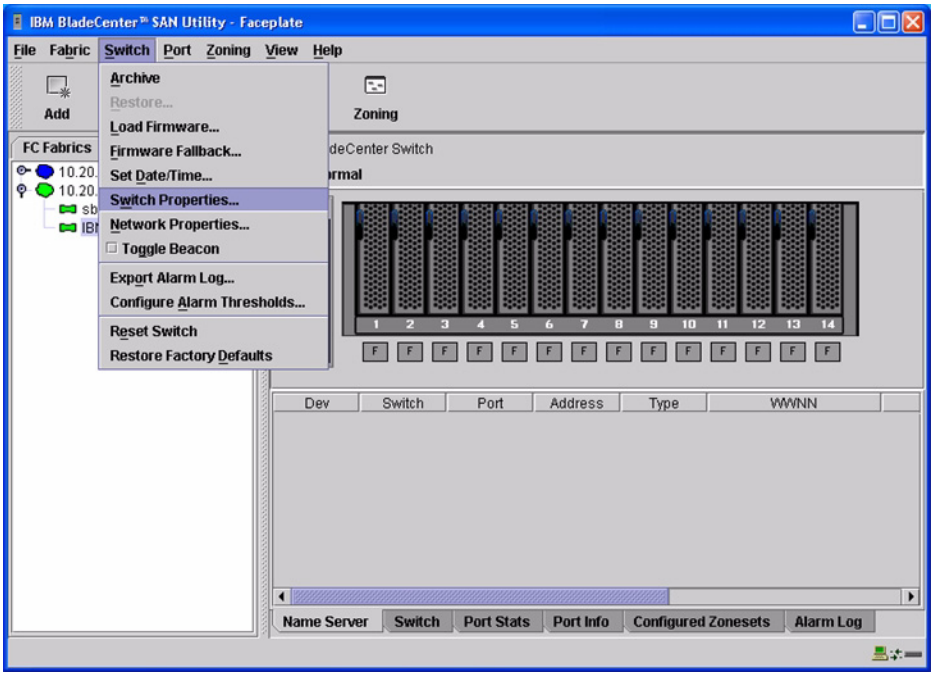
```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState False
Maint.System> root
Root> config switch
Config.Switch> prefDomainId 1
Config.Switch> insistDomainId enable
Config.Switch> show

Switch Information
BB Credit:              16
R_A_TOV:                100
E_D_TOV:                20
Preferred Domain ID:    1
Switch Priority:        Default
Speed:                  2 Gb/sec
Rerouting Delay:        Disabled
Interop Mode:           Open Fabric 1.0
Insistent Domain ID:    Enabled
Domain RSCN:            Disabled

Config.Switch> root
Root> maint system
Maint.System> setOnlineState True
```

IBM BladeCenter GUI

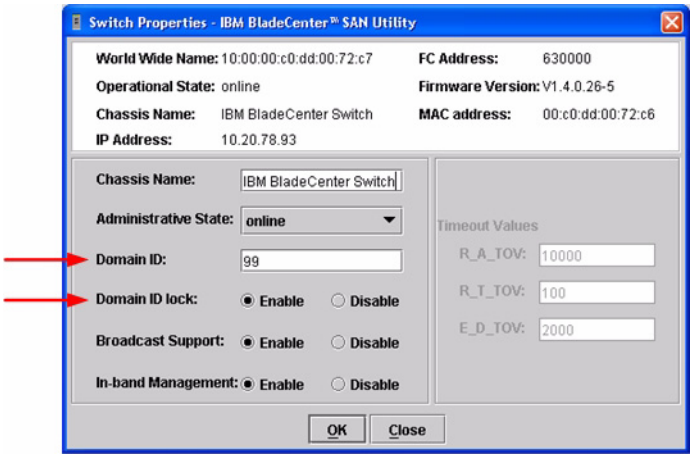
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

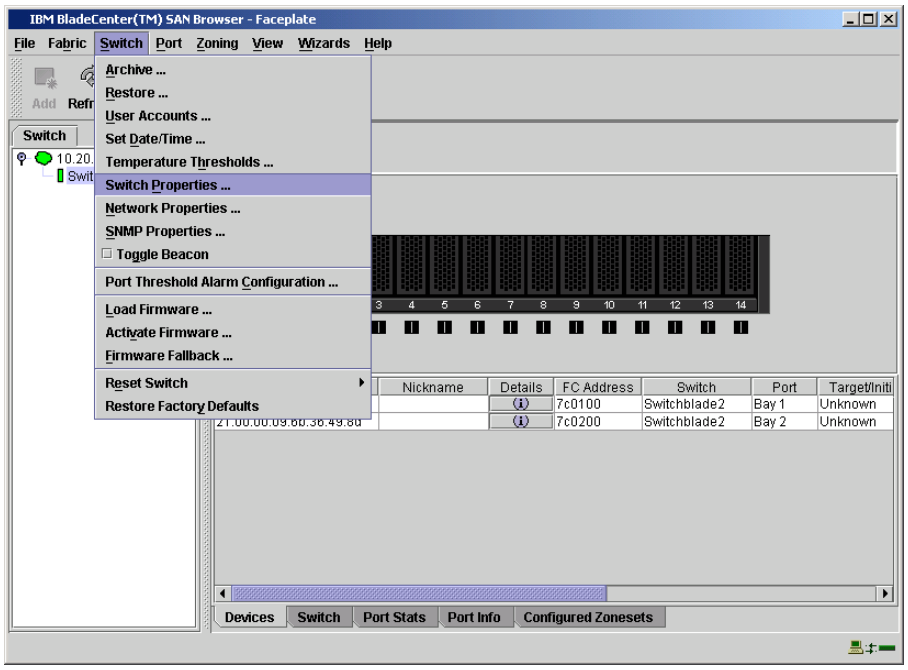


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

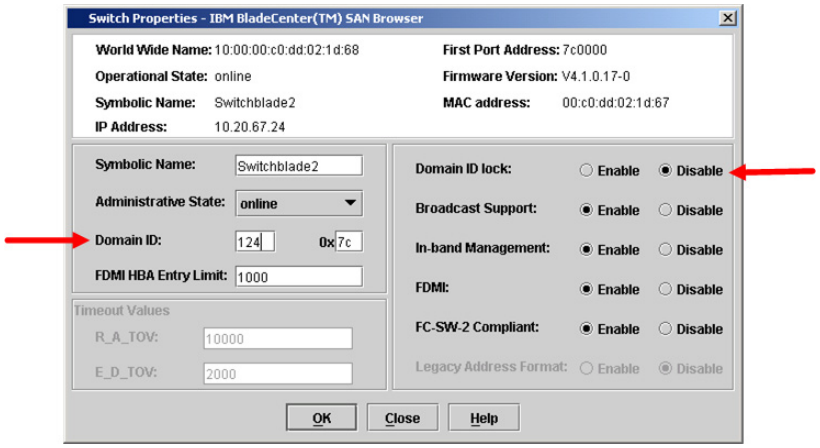


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

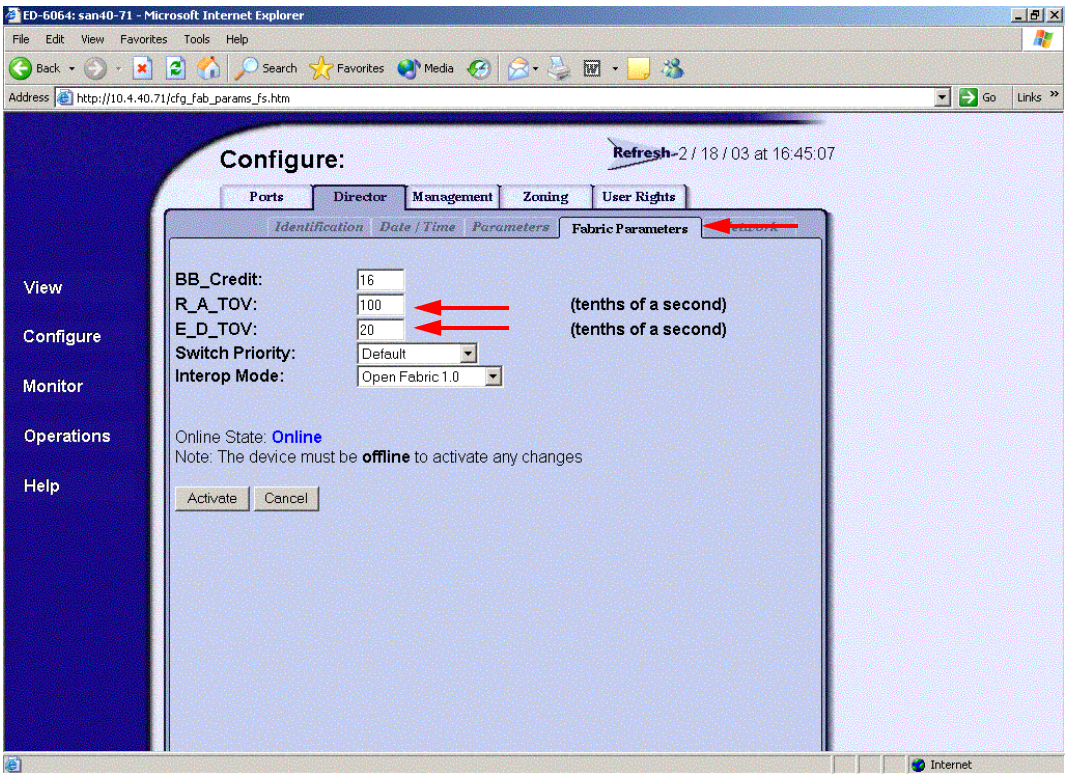
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **100**.)
E_D_TOV = 2 seconds (The setting is **20**.)

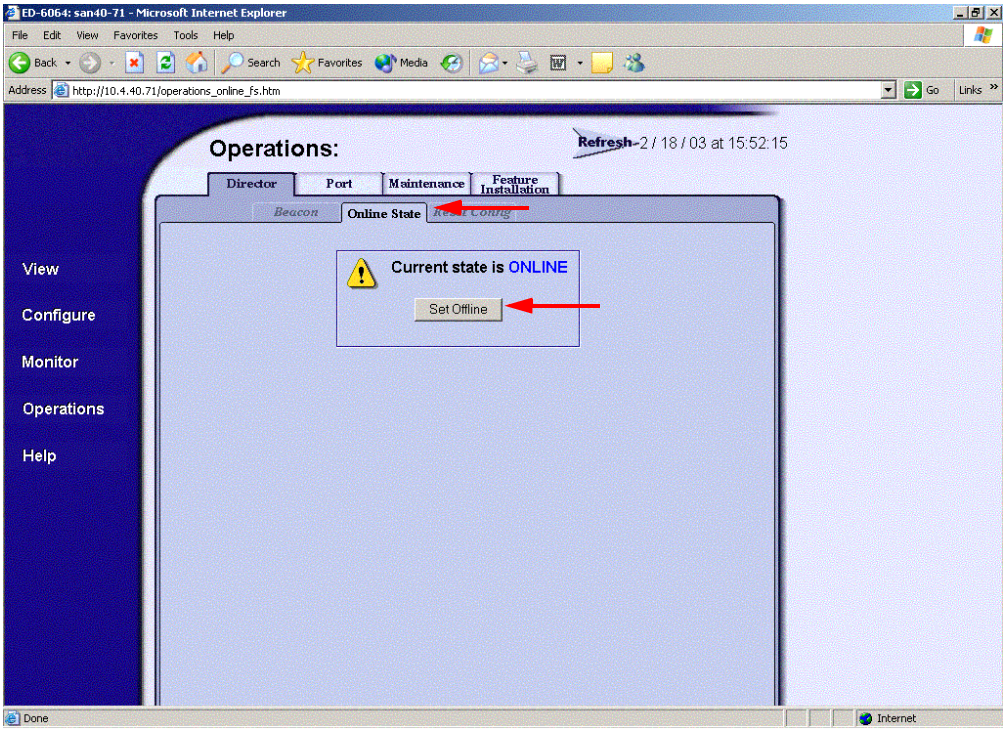
This section provides the steps to change these values.

McDATA SANpilot Web Management

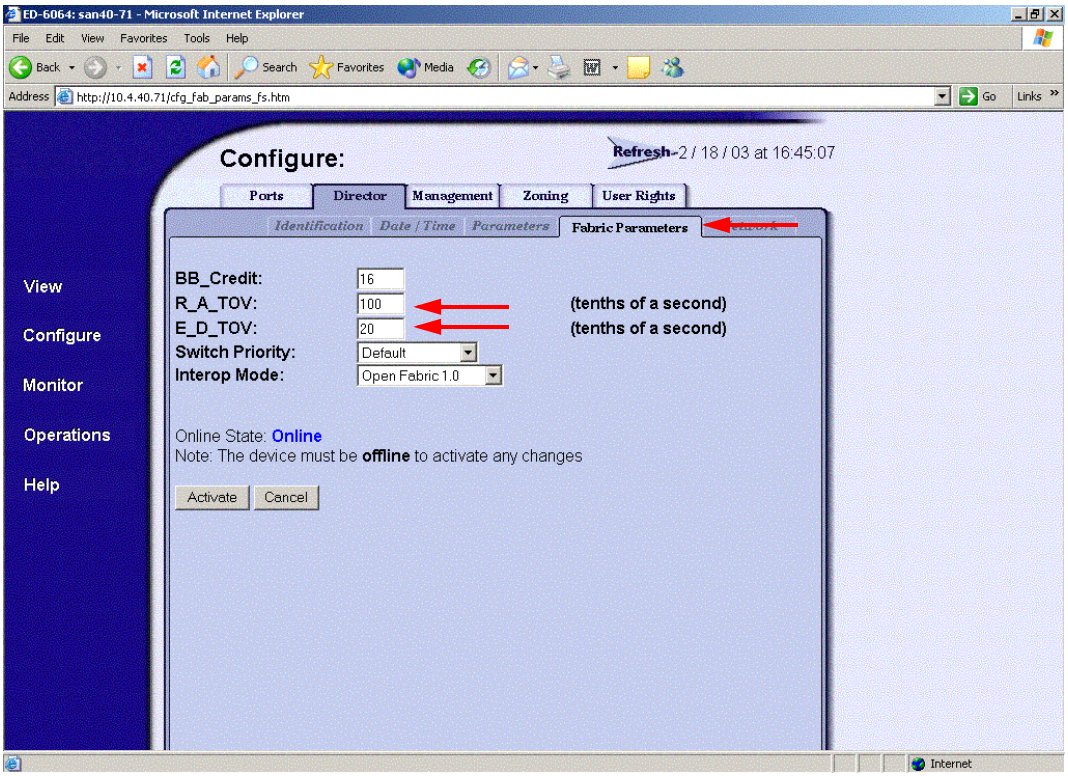
1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, then select the **Fabric Parameters** tab. Verify that **R_A_TOV** is set to **100** and **E_D_TOV** is set to **20**. If the settings are not correct, proceed to step 3. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



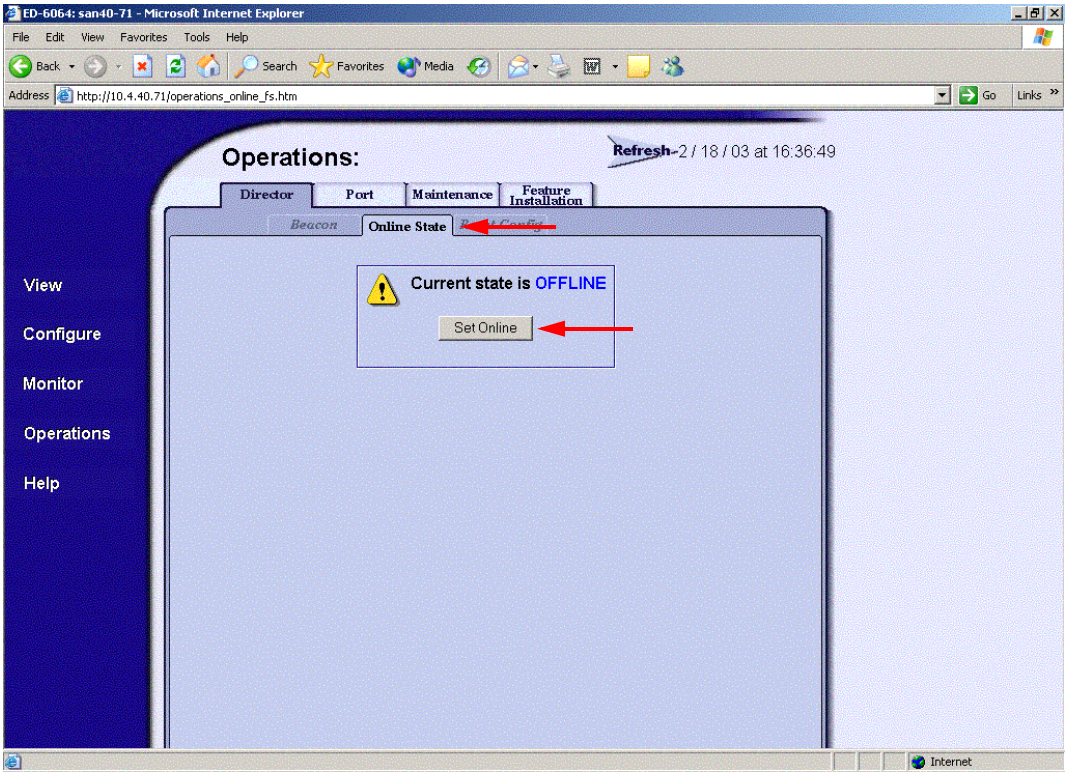
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select **Online State** tab, then click the **Set Offline** button.



4. On the navigation panel, select **Configure**, The **Configure** dialog box displays. Select the **Director** tab, select the **Fabric Parameters** tab, then do the following:
   a. In the **R_A_TOV** box, change the setting to **100**.
   b. In the **E_D_TOV** box, change the setting to **20**.
   c. Click **Activate**.



5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA SANpilot Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> main system

Maint.System> setOnlineState False
Maint.System> root
Root> config switch
Config.Switch> raTOV 100
Config.Switch> edTOV 20
Config.Switch> show

Switch Information
BB Credit:              16
R_A_TOV:                100
E_D_TOV:                20
Preferred Domain ID:    1
Switch Priority:        Default
Speed:                  2 Gb/sec
Rerouting Delay:        Disabled
Interop Mode:           Open Fabric 1.0
Insistent Domain ID:    Enabled
Domain RSCN:            Disabled
Root> maint system
Maint.System> setOnlineState True
```

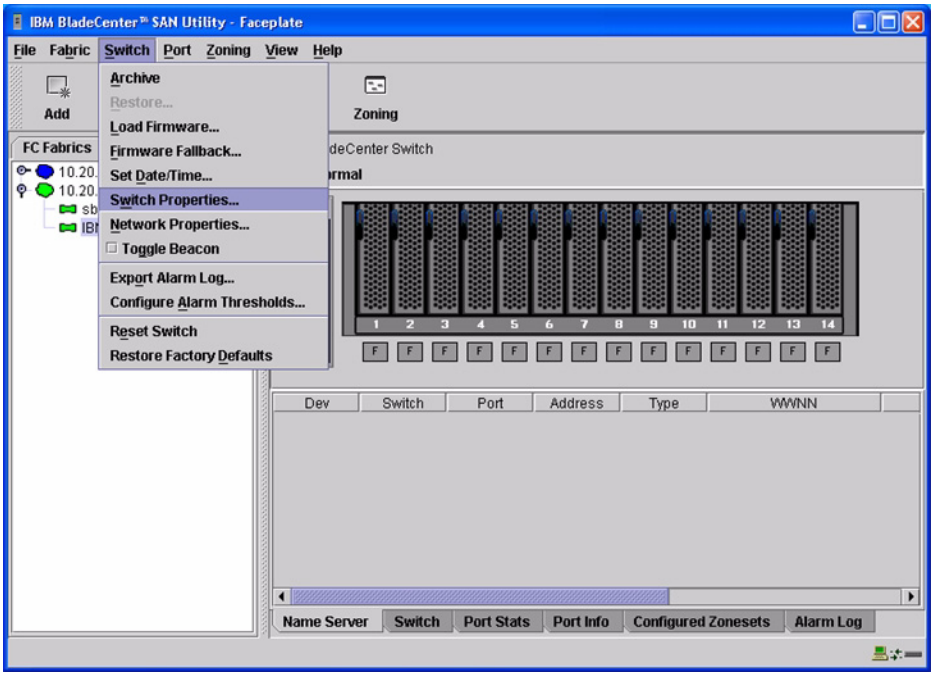
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

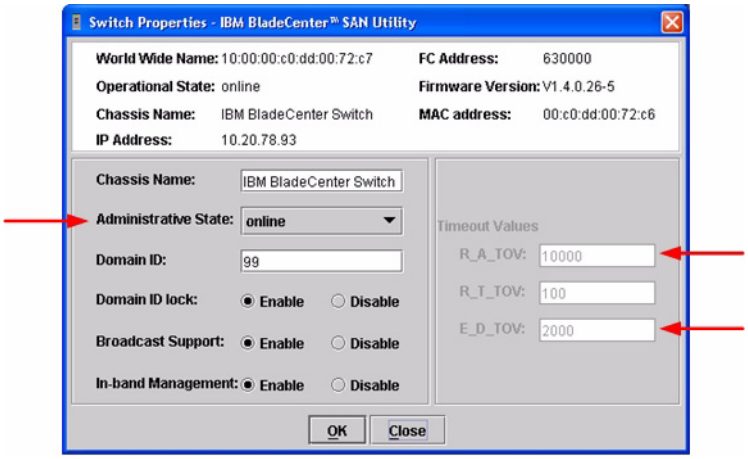
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



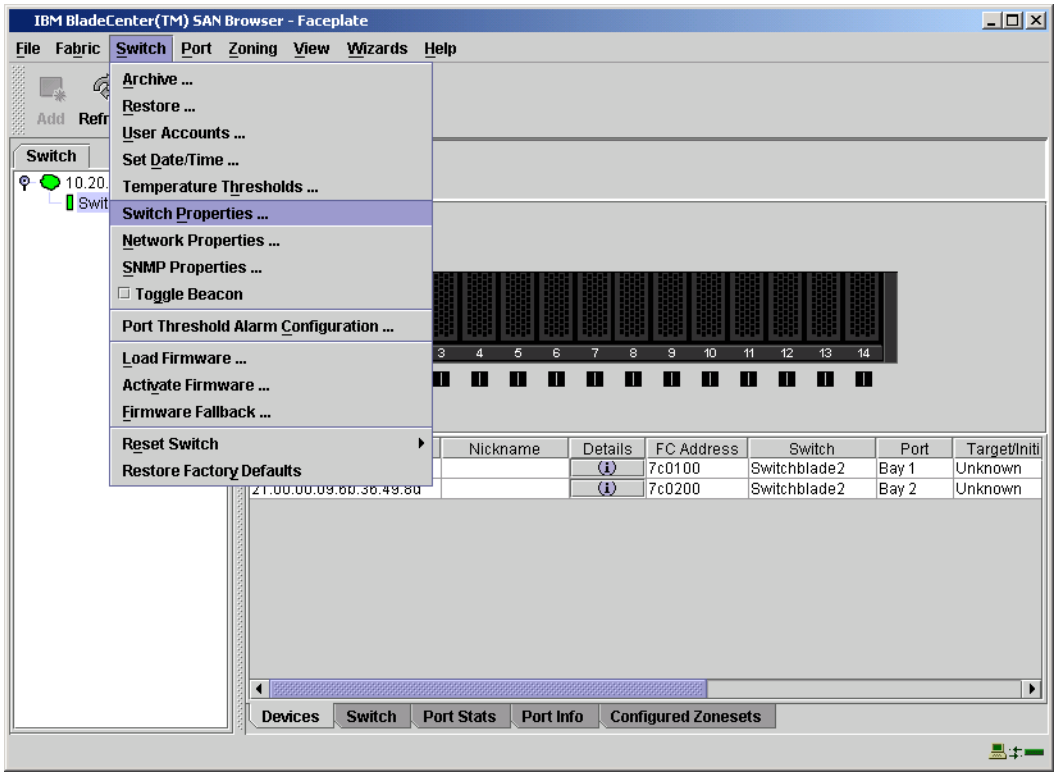
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



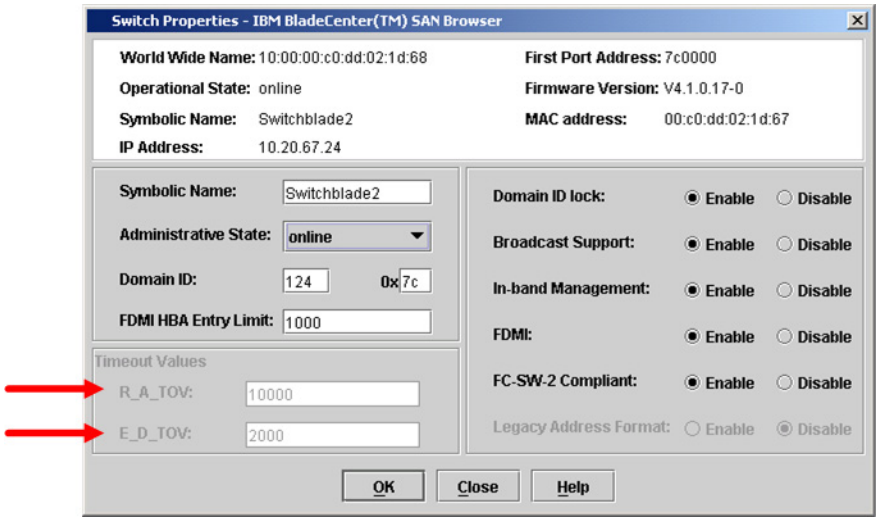
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

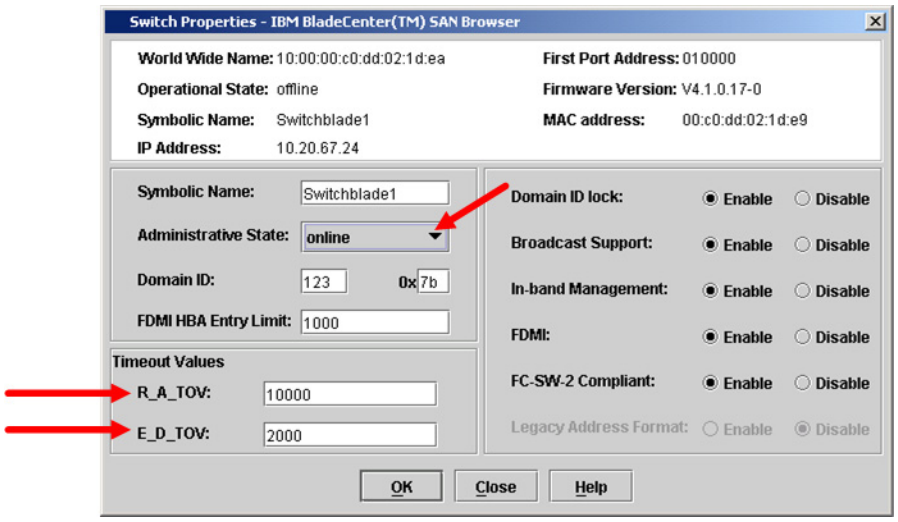
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



5. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

McDATA switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

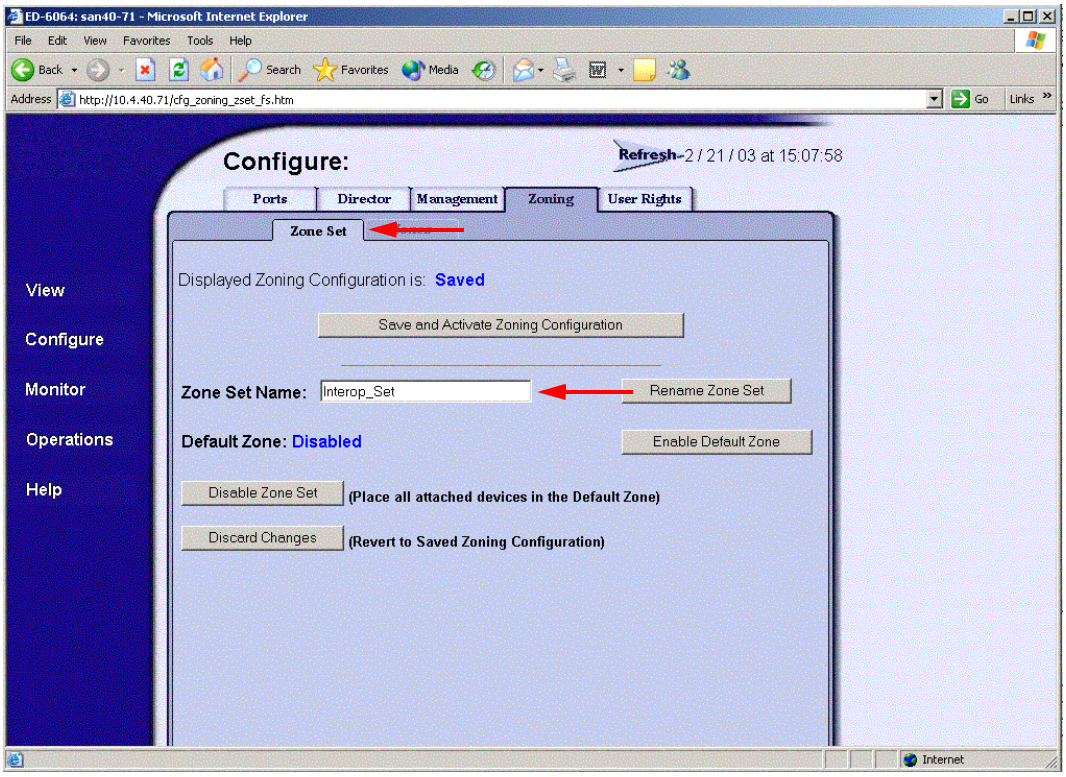
Active Zone Set Names

The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

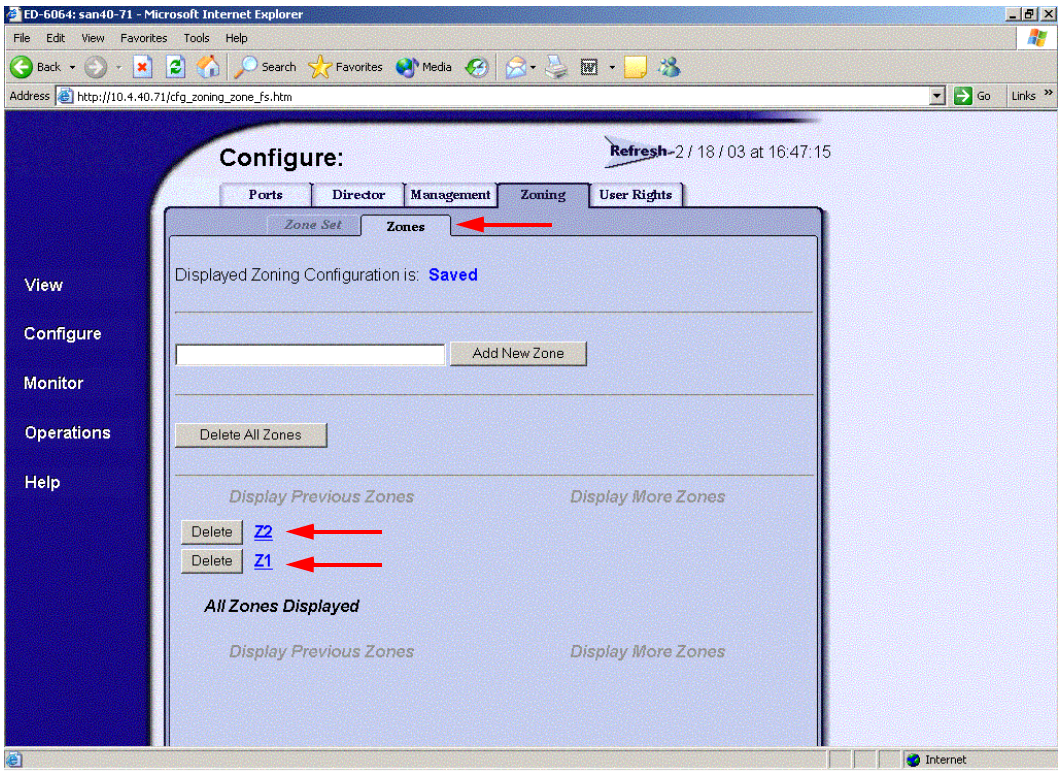
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

McDATA SANpilot Web Management

1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **ZoneSet** tab. Verify that the Zone Set name conforms to the standards for zone naming as discussed under "Active Zone Set Names" on page 291.



3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **Zones** tab. Verify that the Zone names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 291.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA SANpilot Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> show
Show> zoning
```

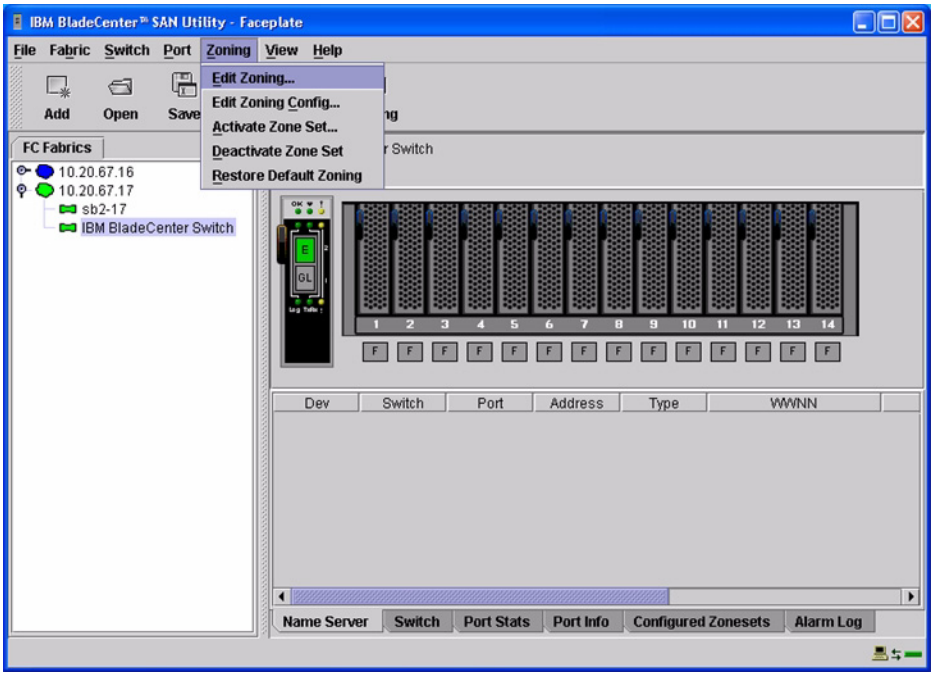
Verify that the Zone Set and Zone Names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 291.

IBM BladeCenter GUI

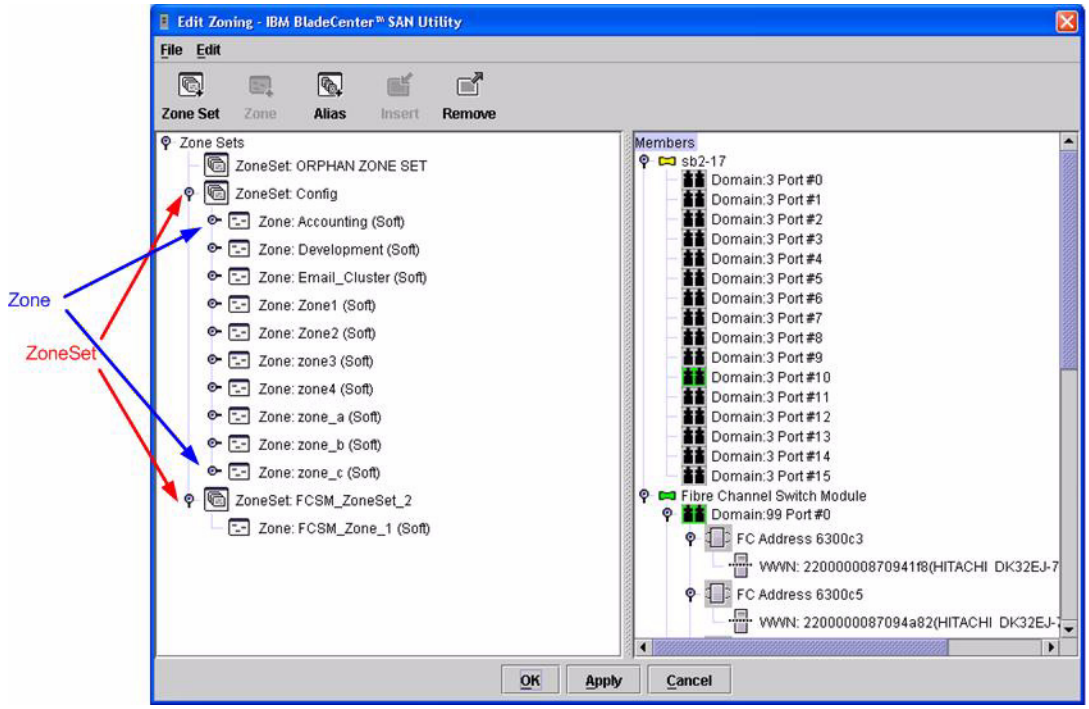
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

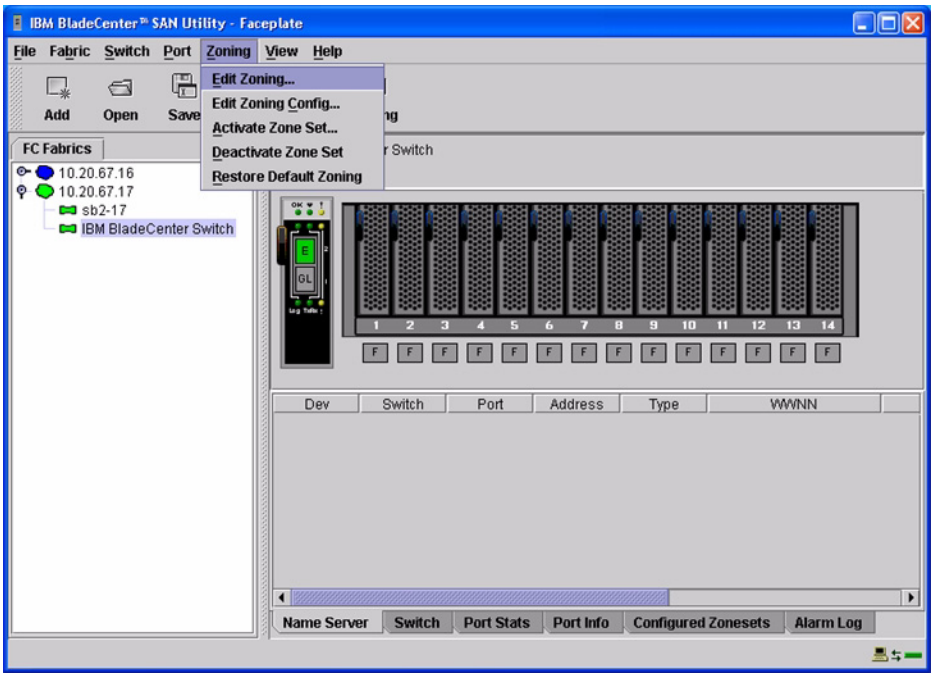


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 291.

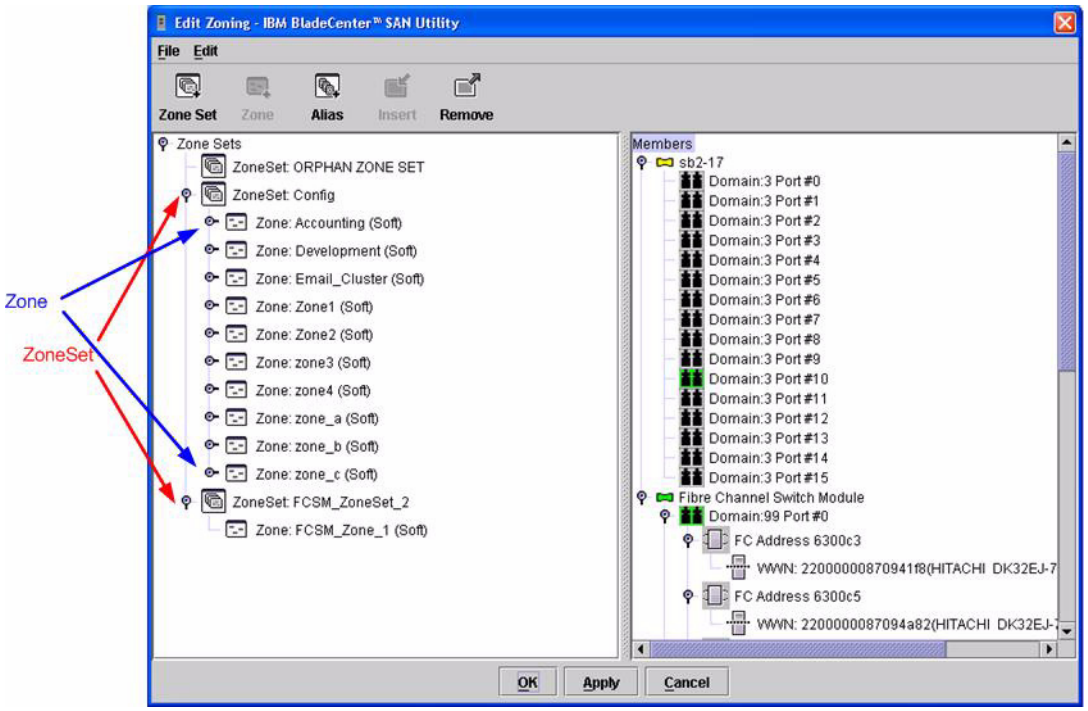


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 291.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

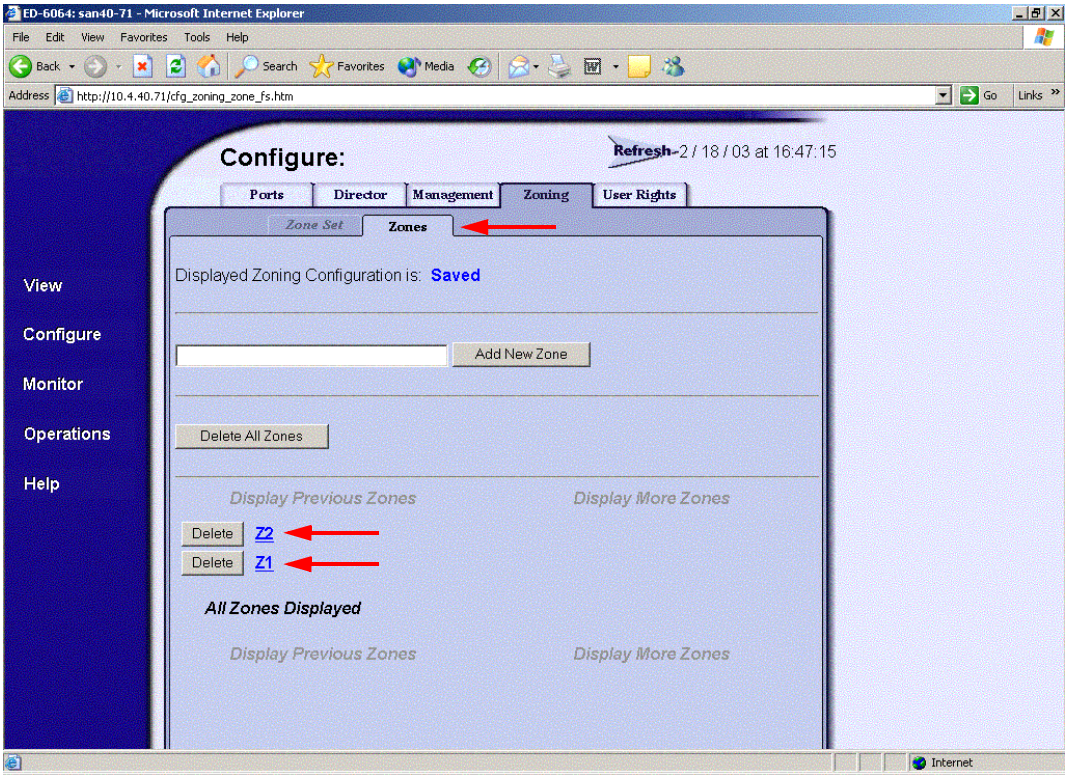
Zone Types

All zone members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

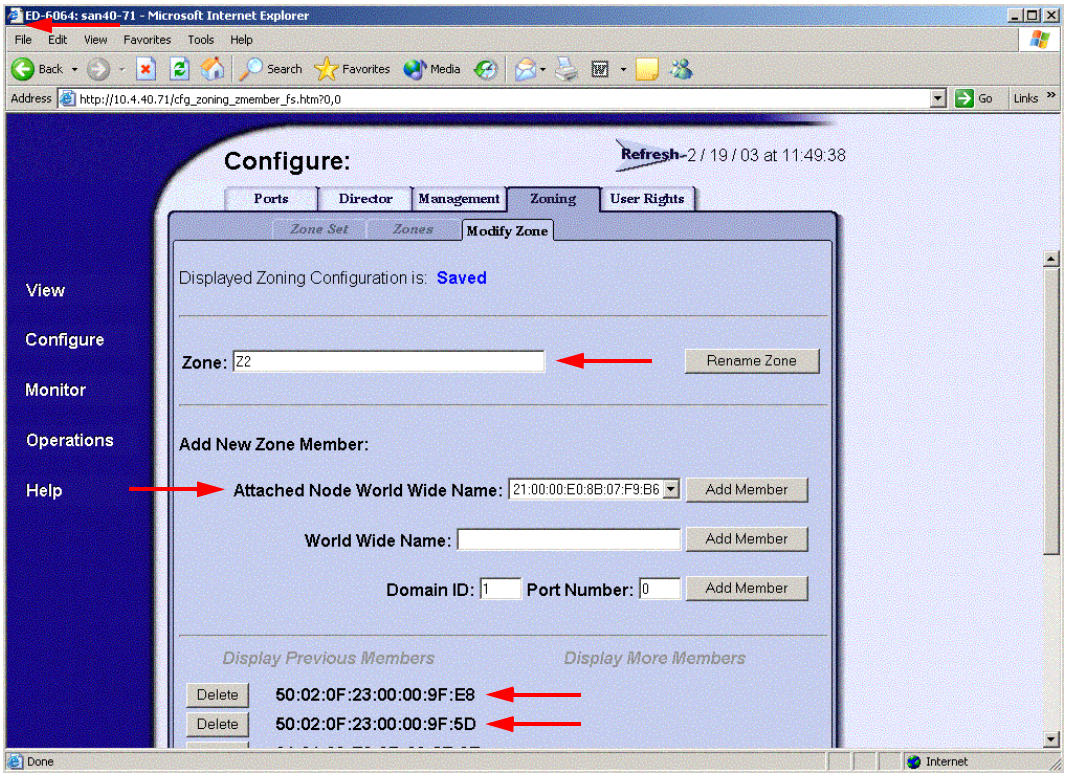
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

McDATA Sphereon Web Management

1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **Zones** tab. Select each zone.



3. For each the zone selected in step 2, verify that all members are specified by WWN.



McDATA Telnet CLI

NOTE: ***NOTE:*** Use the following CLI commands when McDATA SANpilot Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
```

Verify that all of the Zone members are specified by WWN.

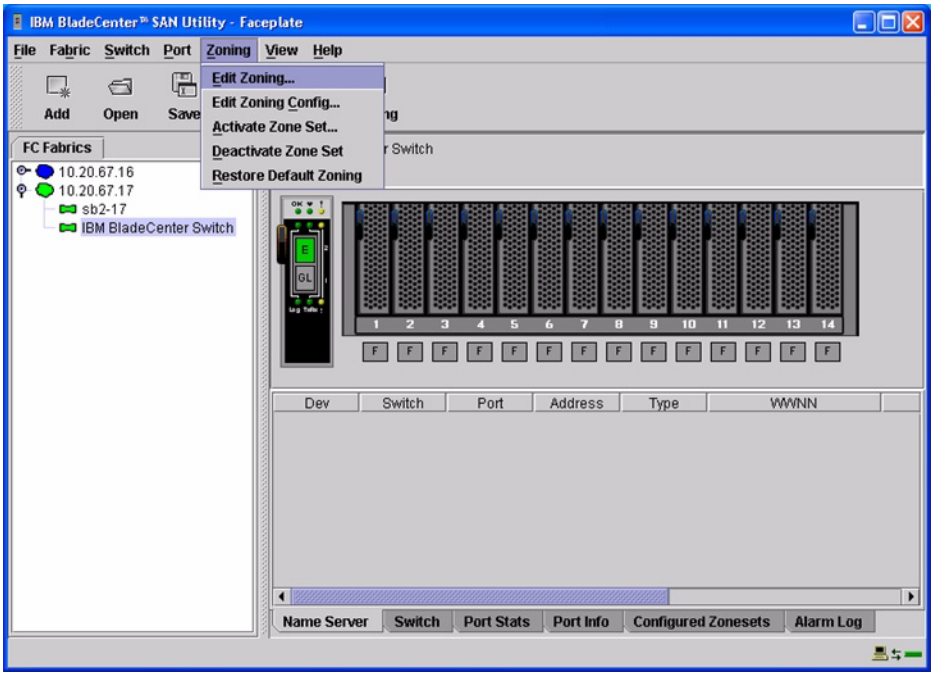
```
Root> show
Show> zoning
Active Zone Set
Default Zone Enabled:    False
Zone Set:  Interop_Set
  Zone:  Z2
      Zone Member:  50:02:0F:23:00:00:9F:E8
      Zone Member:  50:02:0F:23:00:00:9F:5D
      Zone Member:  21:01:00:E0:8B:22:6E:2E
      Zone Member:  21:00:00:E0:8B:09:CA:63
      Zone Member:  21:00:00:E0:8B:09:8F:5E
      Zone Member:  21:00:00:E0:8B:07:4C:B7
      Zone Member:  21:00:00:E0:8B:06:8E:67
      Zone Member:  21:00:00:E0:8B:06:8A:67
```

IBM BladeCenter GUI

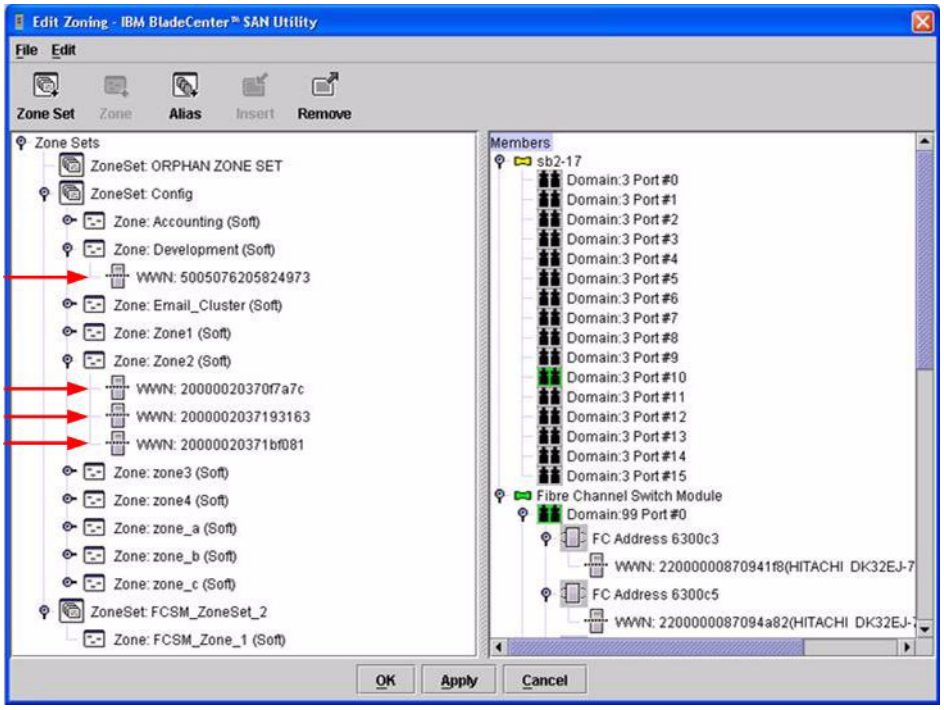
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

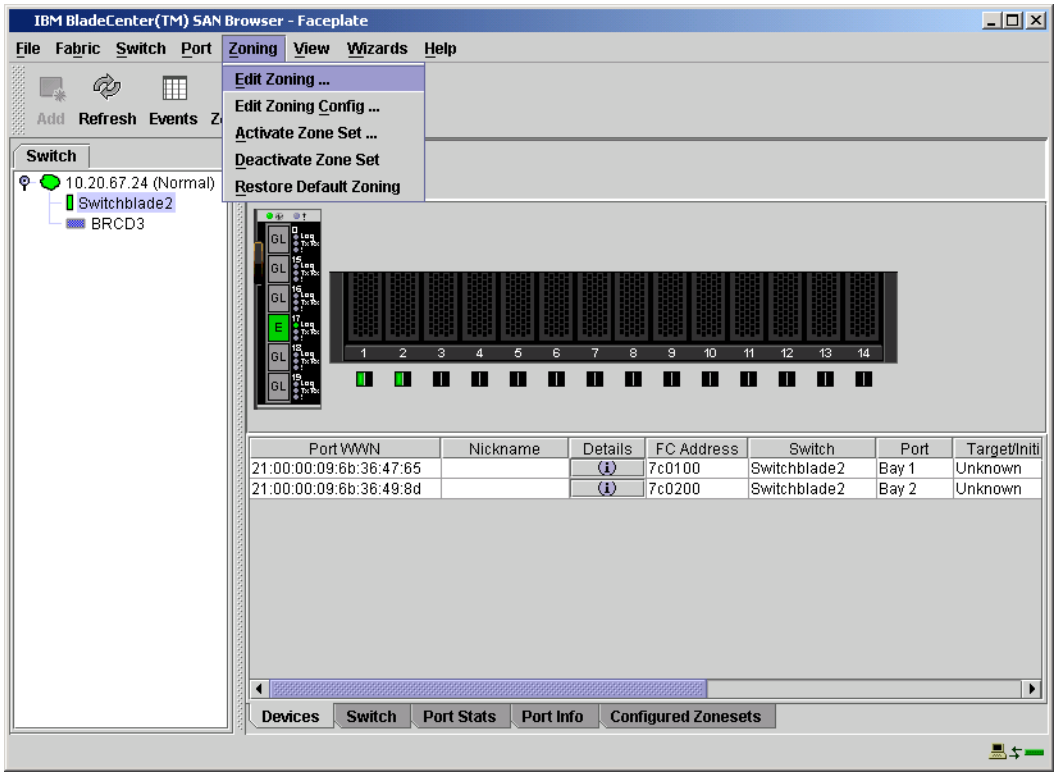


3. The **Edit Zoning—IBM BladeCenter SAN Utility** dialog box displays. Confirm that all zone members are listed as WWN.

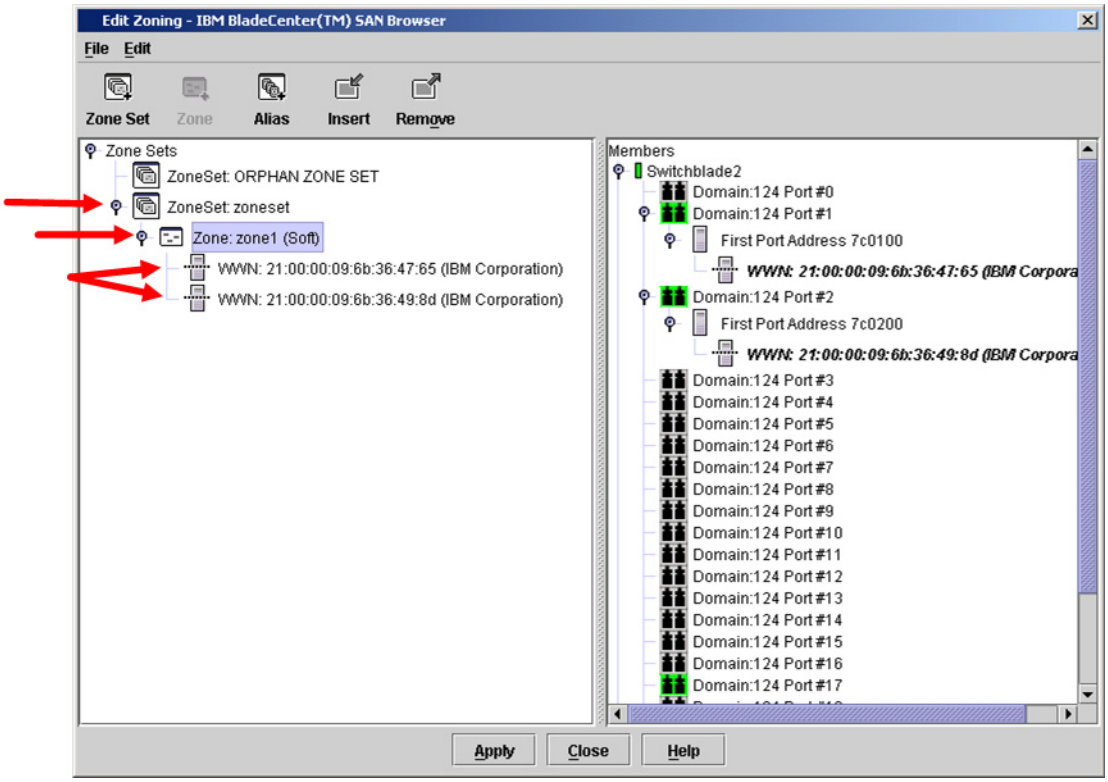


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—IBM BladeCenter SAN Browser** dialog box displays. Do the following:
   a. Select a ZoneSet.
   b. Select a Zone.
   c. In the Zone Members section, confirm that all zone members are listed as WWN.
   d. Repeat the above steps for each zone.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

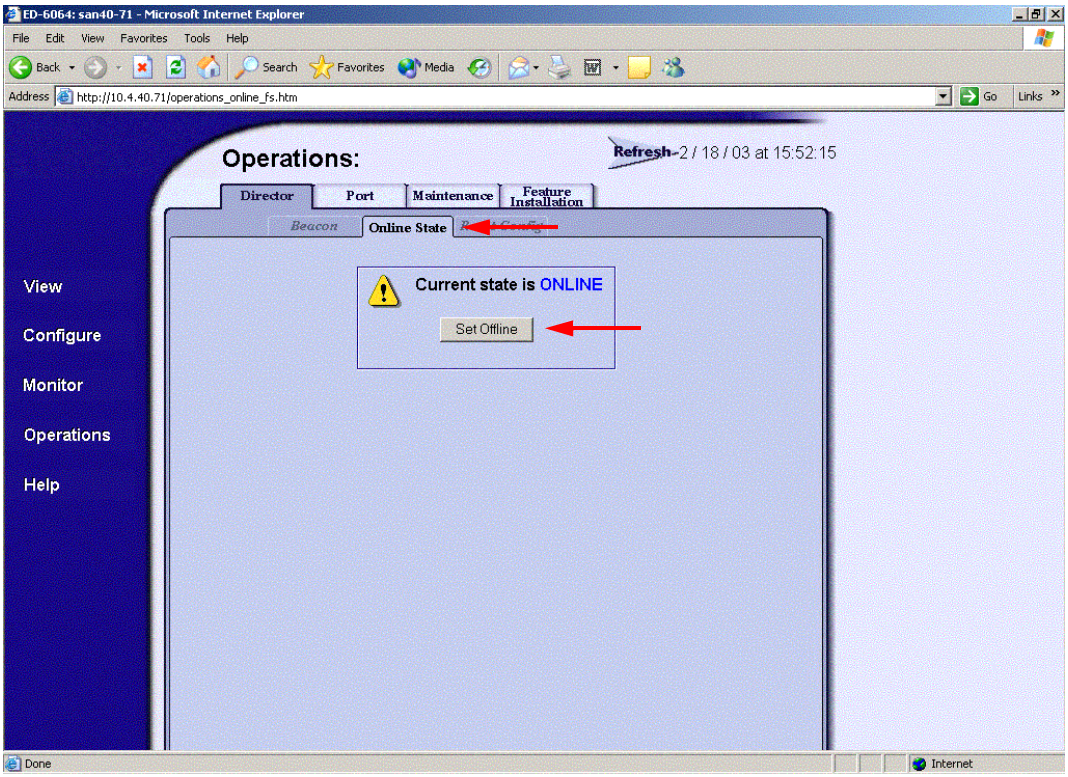
```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone members <zone name>
```

Repeat this statement for each zone and confirm that only WWNs are listed.

Operating Mode Configuration

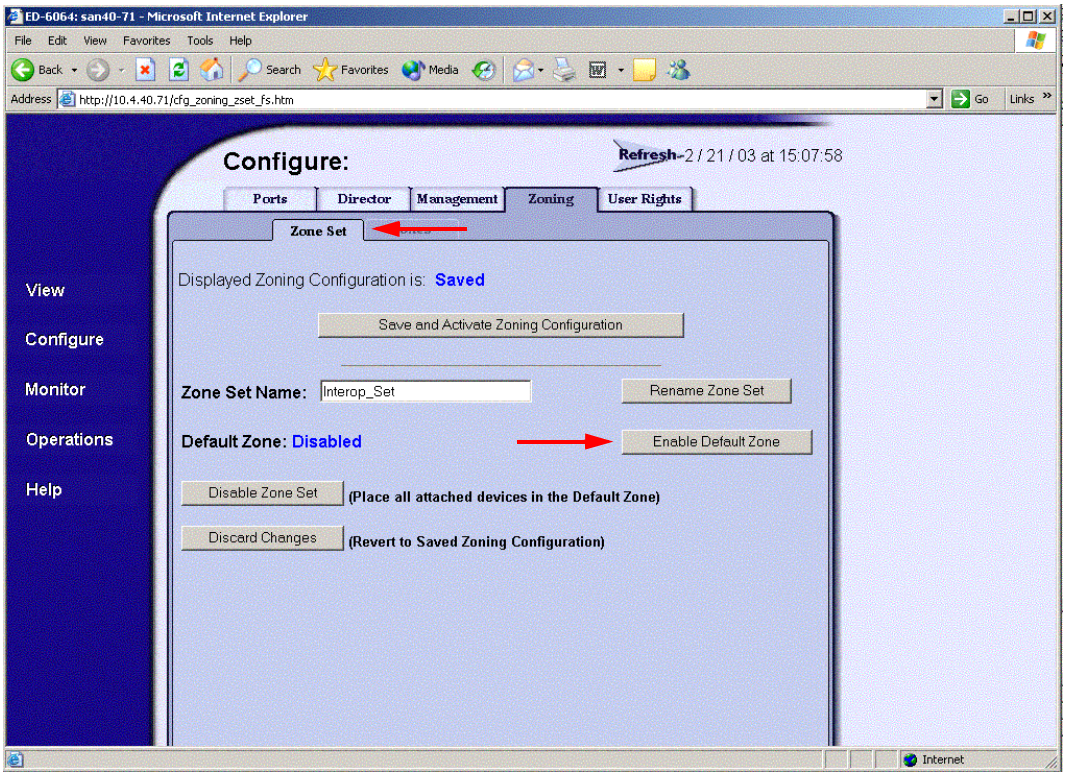
McDATA SANpilot Web Management

1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Offline** button.

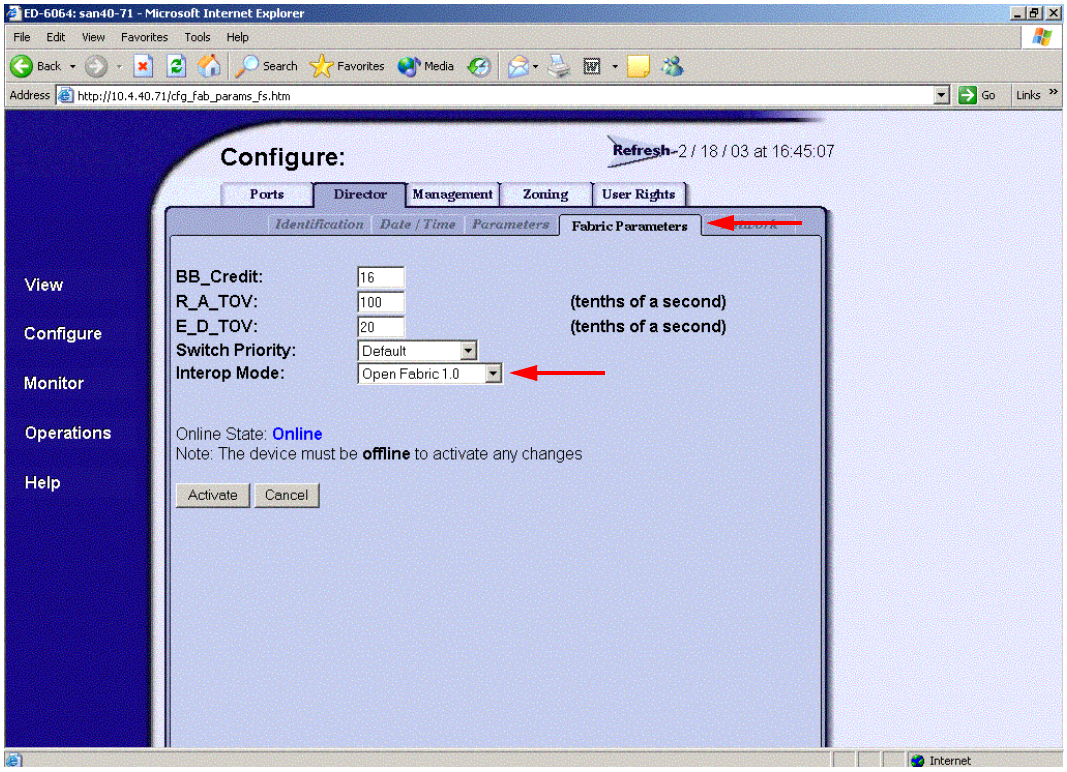


3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.

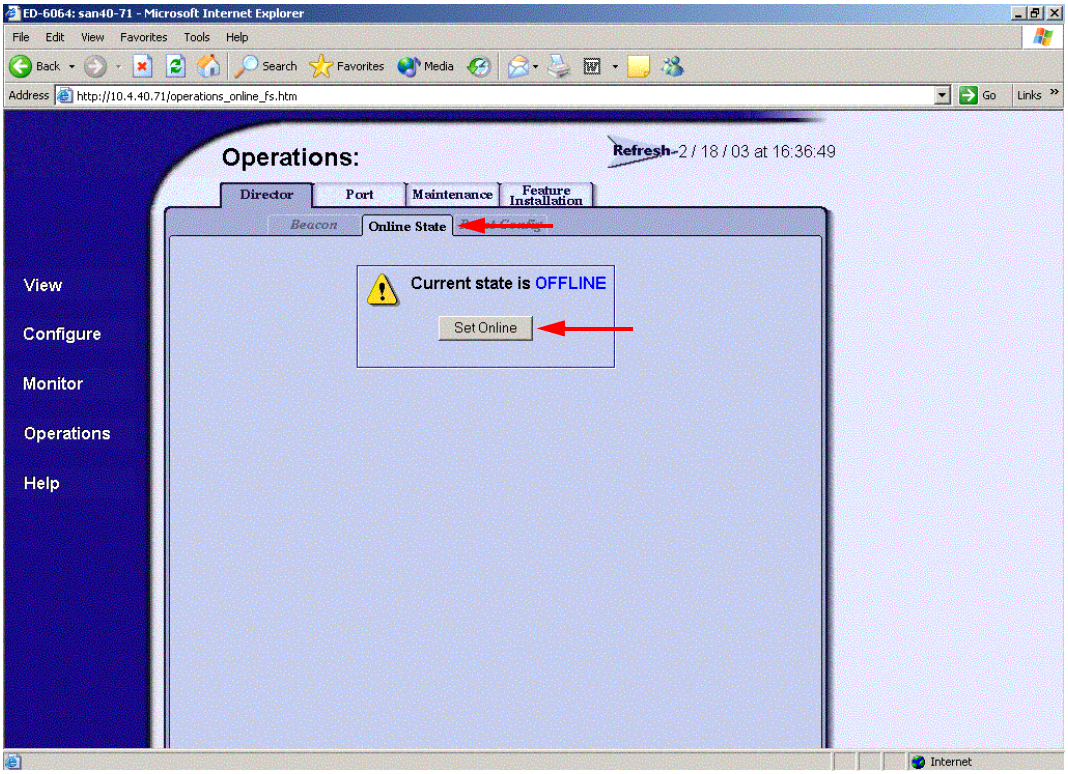
   NOTE: The figure below shows what displays when the **Disable Default Zone** button is selected.



4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, select the **Fabric Parameters** tab, then do the following:
   a. From the **Interop Mode** list, select **Open Fabric 1.0**.
   b. Click **Activate**.



5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



McDATA Telnet CLI

NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState False
Maint.System> root
Root> config zoning
Config.Zoning> setDefZoneState False
Config.Zoning> root
Root> config switch
Config.Switch> interopMode Open
Config.Switch> root
Root> maint system
Maint.System> setOnlineState True
```

IBM eServer BladeCenter SAN Utility

Not applicable.

IBM BladeCenter CLI

McDATA Specific Configuration

Not applicable.

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the McDATA and IBM BladeCenter fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, please contact IBM support.

Merging IBM BladeCenter and QLogic Fabrics

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from QLogic that comply with the FC-SW-2 standard.

IBM and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
QLogic	SANbox 5200	4.0.0.x-x and above
	SANbox2-8	1.5.x and above
	SANbox2-16	1.5.x and above
	SANbox2-64	1.5.x and above

The following chapter provides detailed information about merging QLogic and IBM BladeCenter fabrics: **QLogic SANbox 5000 Series and SANbox2 Series Switches** **(see page 313)**.

QLogic SANbox 5000 Series and SANbox2 Series Switches

Integration Checklist

The following steps must be completed to successfully merge QLogic and IBM BladeCenter fabrics. The remainder of this section provides detailed instructions and examples.

ATTENTION!!

- Back up the current switch configuration data prior to performing the following steps so that the configuration is available if something goes wrong (see the first step for details).
- Disruptions in the fabric can occur as a result of performing the following steps. Therefore, it is recommended that these changes be done during down time or off-peak hours.

✓ Back up the current switch configuration data (see "Backing Up and Restoring the Current Configuration Settings" on page 316).

✓ Verify that the correct version of switch firmware is installed on each switch (see "Supported Switches and Firmware Versions" on page 315).

✓ Ensure that each switch has a unique Domain ID (see "Domain ID Configuration" on page 317).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 329).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 342).

✓ Ensure that all QLogic switches are configured for Merge Active Zonesets Only or SW2 mode, as appropriate (see "Operating Mode Configuration" on page 352).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 354).

✓ Contact IBM Technical Support to obtain the document, *Remote Boot of IBM BladeCenter from IBM FAStT,* if you are planning to use the boot form SAN functionality.

Contacting QLogic

For more information on configuring the QLogic SANbox 5200 and SANbox2 switches, refer to the contact information located in the Introduction (see page 3).

QLogic Configuration Limitations

No limitations exist when merging QLogic and IBM BladeCenter fabrics; all features are fully supported and comply with industry standards.

IBM BladeCenter Configuration Limitations

If you will be implementing the I/O stream guard feature, please contact your IBM technical support representative prior to configuring. Additional configuration procedures may be required.

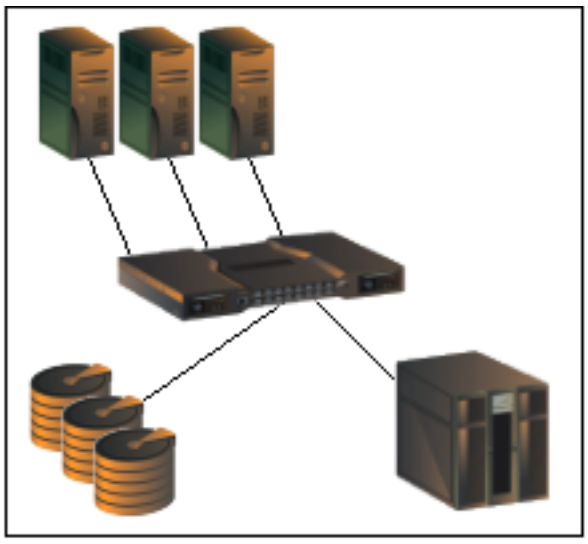
Supported Switches and Firmware Versions

The following IBM switch modules have been tested in the IBM BladeCenter environment and comply with the FC-SW-2 standard. They have tested interoperable with the following switches from QLogic that comply with the FC-SW-2 standard.

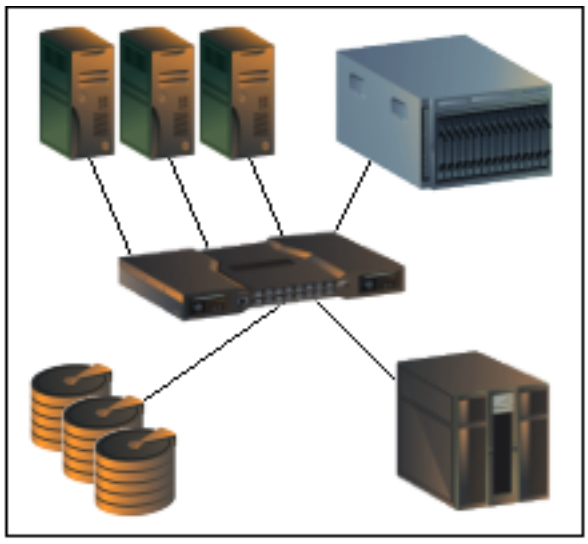
IBM and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.49.0 and above
	QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter	4.1.0.17-0 and above
QLogic	SANbox 5200	4.0.0.x-x and above
	SANbox2-8	1.5.x and above
	SANbox2-16	1.5.x and above
	SANbox2-64	1.5.x and above

The following figures illustrate a QLogic Fibre Channel fabric prior to and after merging with an IBM BladeCenter.



QLogic Fibre Channel Fabric Prior to Merging with the IBM BladeCenter



QLogic Fibre Channel Fabric with the IBM BladeCenter

Backing Up and Restoring the Current Configuration Settings

Back up the current QLogic switch configuration data prior to following the steps to merge QLogic and IBM BladeCenter fabrics so that the configuration can be restored if something goes wrong.

NOTE: For additional information, refer to the documentation provided with the switch.

This backup and restore process uses the SANbox Manager function. Note the following:

- The archive file can be used for restoring the configuration on the same switch or a replacement switch, and as a template for configuring new switches to add to a fabric.
- The switch archive must be compatible with the switch to be restored. For example, you cannot restore a SANbox2-8c switch with a SANbox2-16 archive.

Backup Procedure

Do the following to create an .XML archive file containing the QLogic configuration settings.

1. Open the **Switch** menu and select **Archive**.
2. In the **Save** window, enter a file name.
3. Click the **Save** button.

Restore Procedure

If you need to restore the QLogic switch settings, do the following using the .XML archive file:

1. Log into the fabric through the switch you want to restore. You cannot restore a switch over an inter-switch link (ISL).
2. Open the **Switch** menu and select **Restore**.
3. In the **Restore** window, enter the archive file name or browse for the file.
4. Click the **Restore** button.

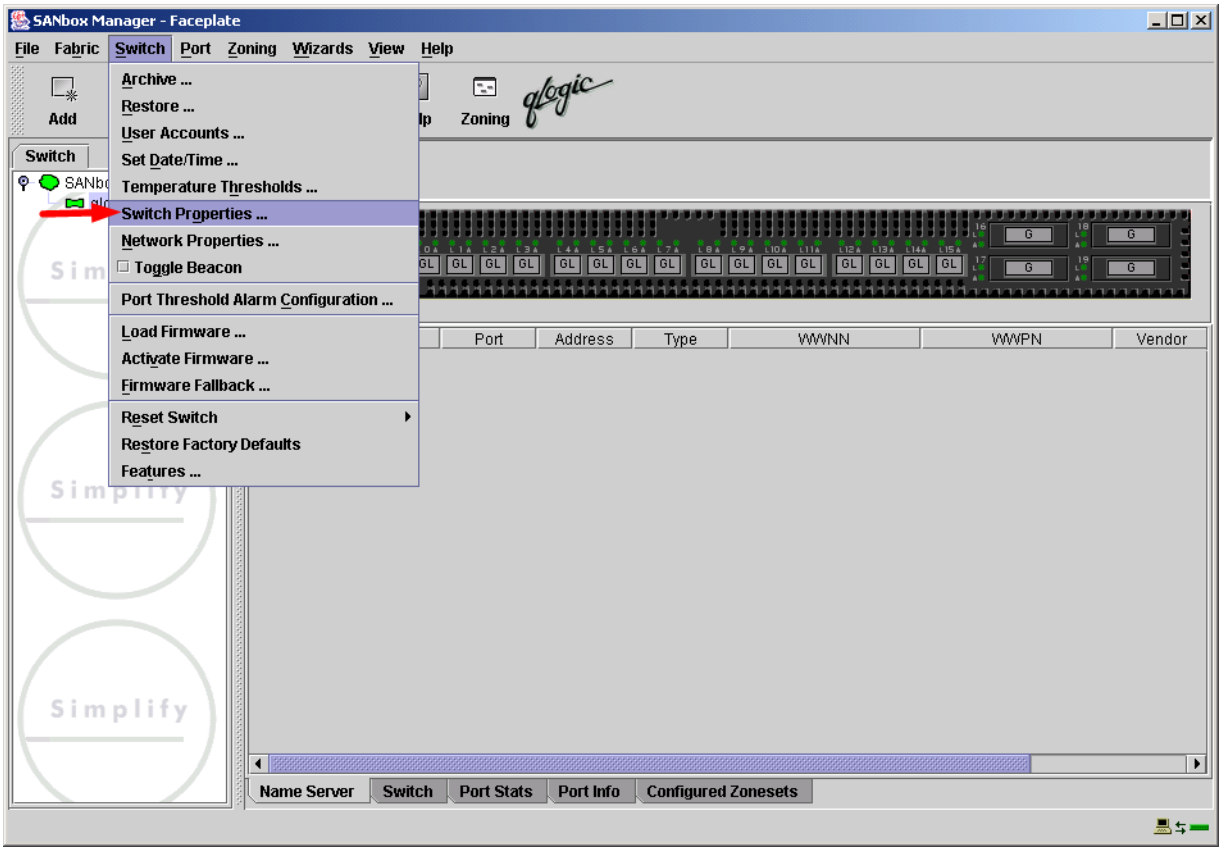
Domain ID Configuration

To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the QLogic switch and IBM switch module.

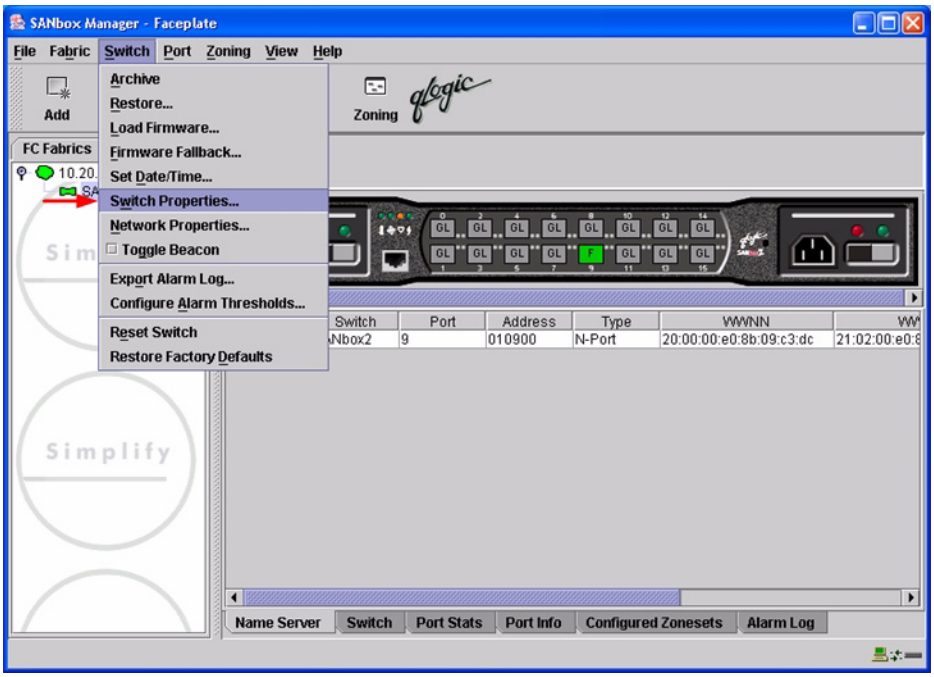
QLogic SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

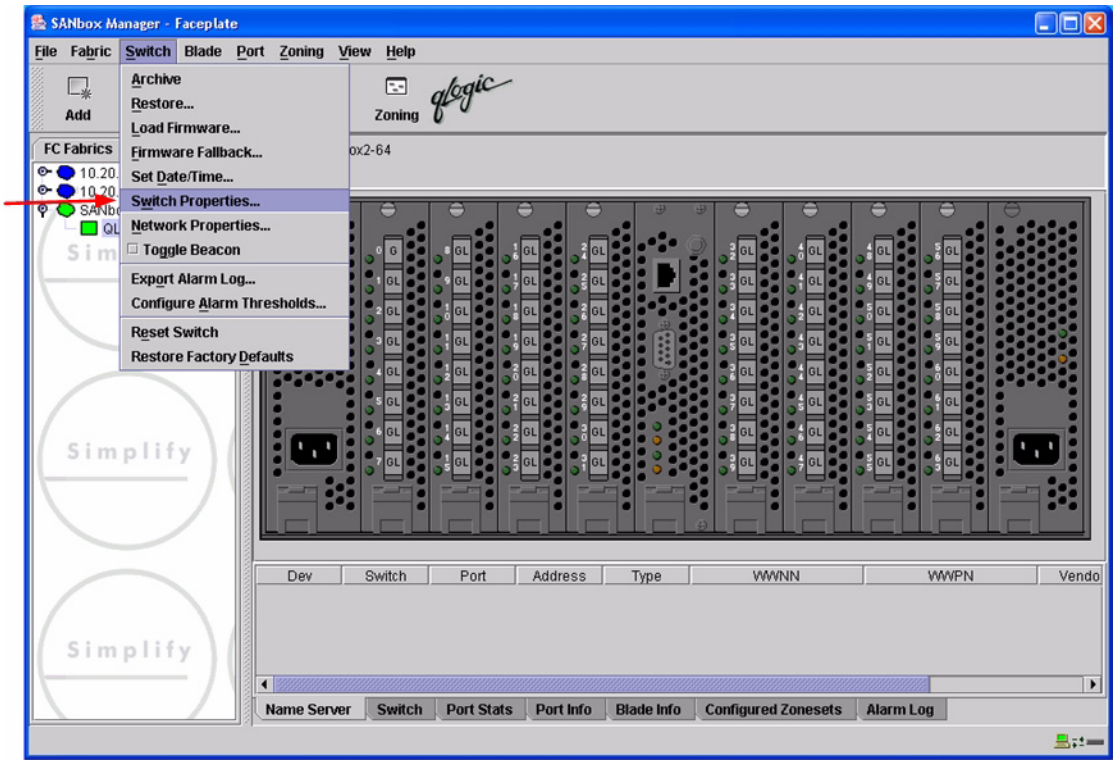
   For the QLogic SANbox 5200, the following displays:



For the QLogic SANbox2-8 and SANbox2-16, the following displays:

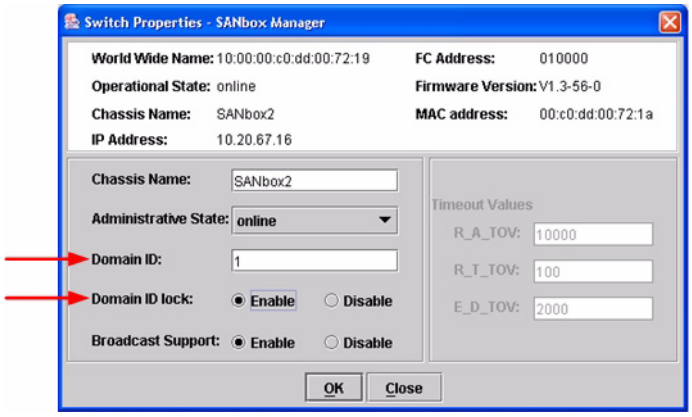


For the QLogic SANbox2-64, the following displays:

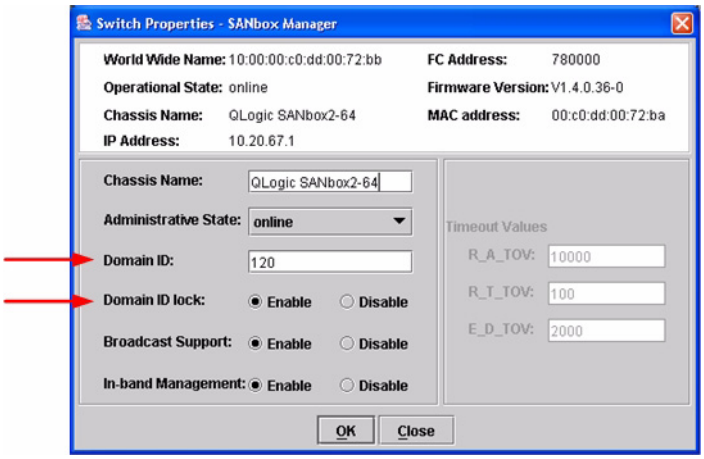


3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



   For the QLogic SANbox2-64, the following displays:



QLogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available. The CLI procedures differ based on QLogic switch model and firmware level.

For QLogic SANbox2 series switches with firmware levels 1.5.x and above but less than 2.0.0.3x-x, do the following:

```
Login: admin
Password: xxxxxxxx
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <choose a unique number>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [QLogic SANbox 2-64]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For QLogic SANbox 5000 series switches with firmware levels 4.0.0.x-x and above and SANbox2 series switches with firmware levels 2.0.0.3x-x and above, do the following:

```
Login: admin
Password: xxxxxxxx
SANbox 5200 #> admin start
SANbox 5200 (admin) #> config edit
SANbox 5200 (admin-config) #> set config switch
```

The following options display:

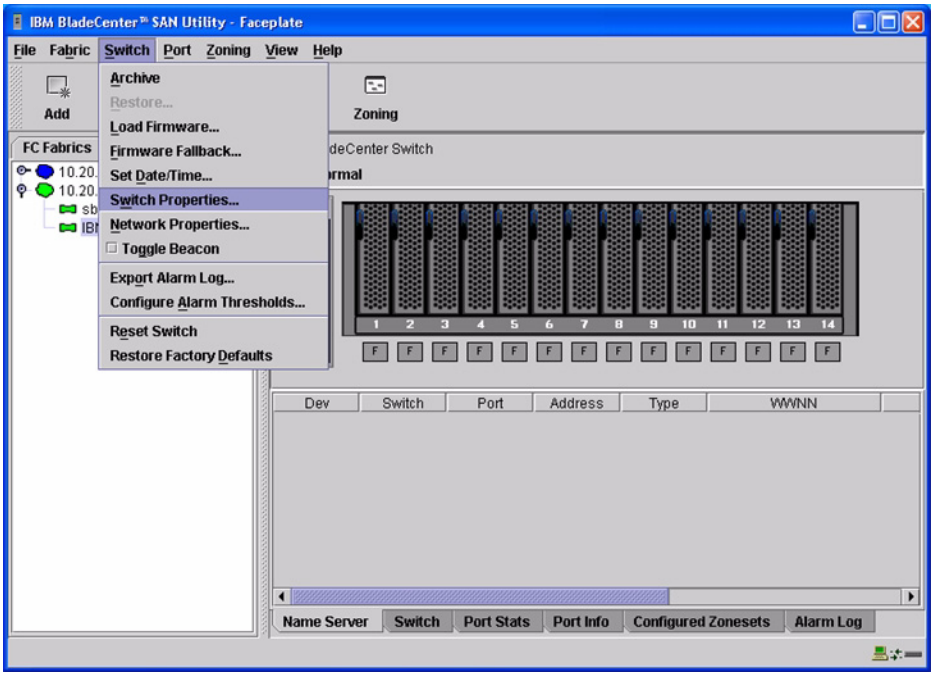
```
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1] <choose a unique number>
  DomainIDLock (True / False) [False] True
  SymbolicName (string, max=32 chars) [SANbox 5200]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [SANbox 5200 FC Switch]
  FC-SW-2 Compliant (True / False) [True]
SANbox 5200 (admin-config) #> config save
SANbox 5200 (admin) #> config act
The currently active configuration will be activated.
  Please confirm (y/n): [n] y
```

IBM BladeCenter GUI

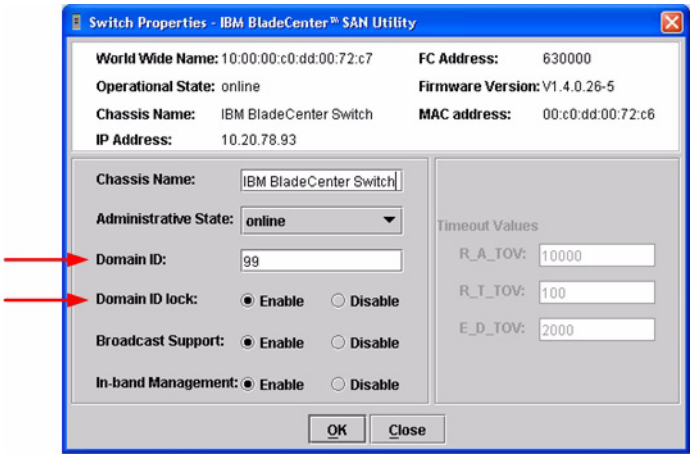
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

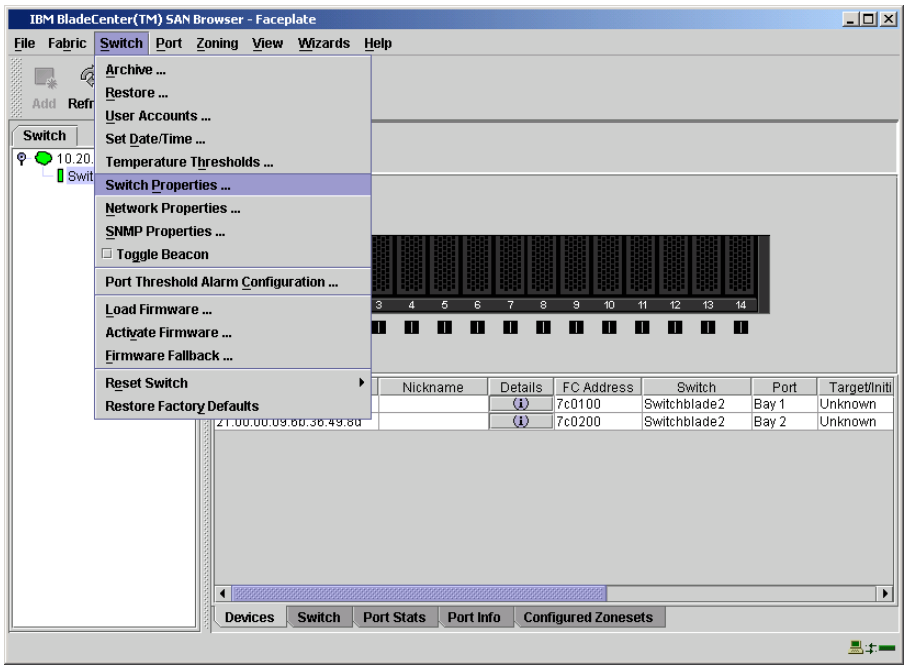


3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.

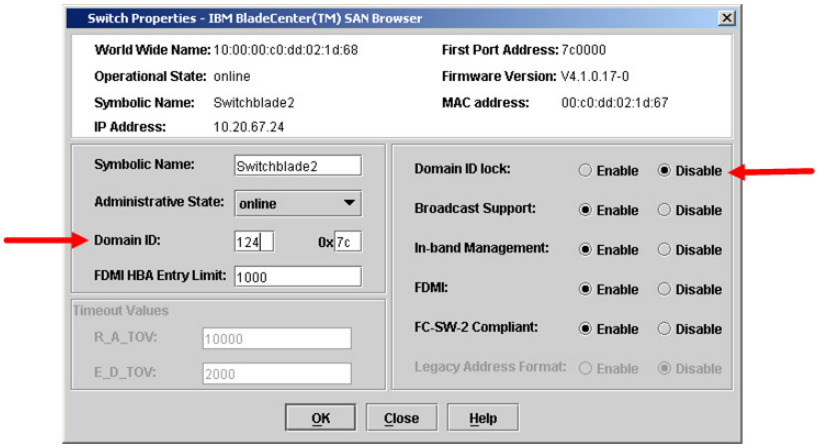


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, do the following:
   a. Select the **Domain ID Lock Disable** radio button to ensure that the switch always has that Domain ID.
   b. In the **Domain ID** box, type a unique Domain ID in the 97–127 range for the switch.
   c. Select the **Domain ID Lock Enable** radio button to ensure that the switch always has that Domain ID.
   d. Click **OK**.



IBM BladeCenter CLI

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <97-127>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [10000]
E_D_TOV (decimal value, 10-20000 msec) [2000]
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [1]  124
  DomainIDLock (True / False) [False]  true
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
Switchblade2 (admin-config): admin> config save
  The config named default has been saved.
Switchblade2 (admin): admin> config activate
  The currently active configuration will be activated.
  Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Timeout Values

As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E_port connection:

R_A_TOV = 10 seconds (The setting is **10000**.)
E_D_TOV = 2 seconds (The setting is **2000**.)

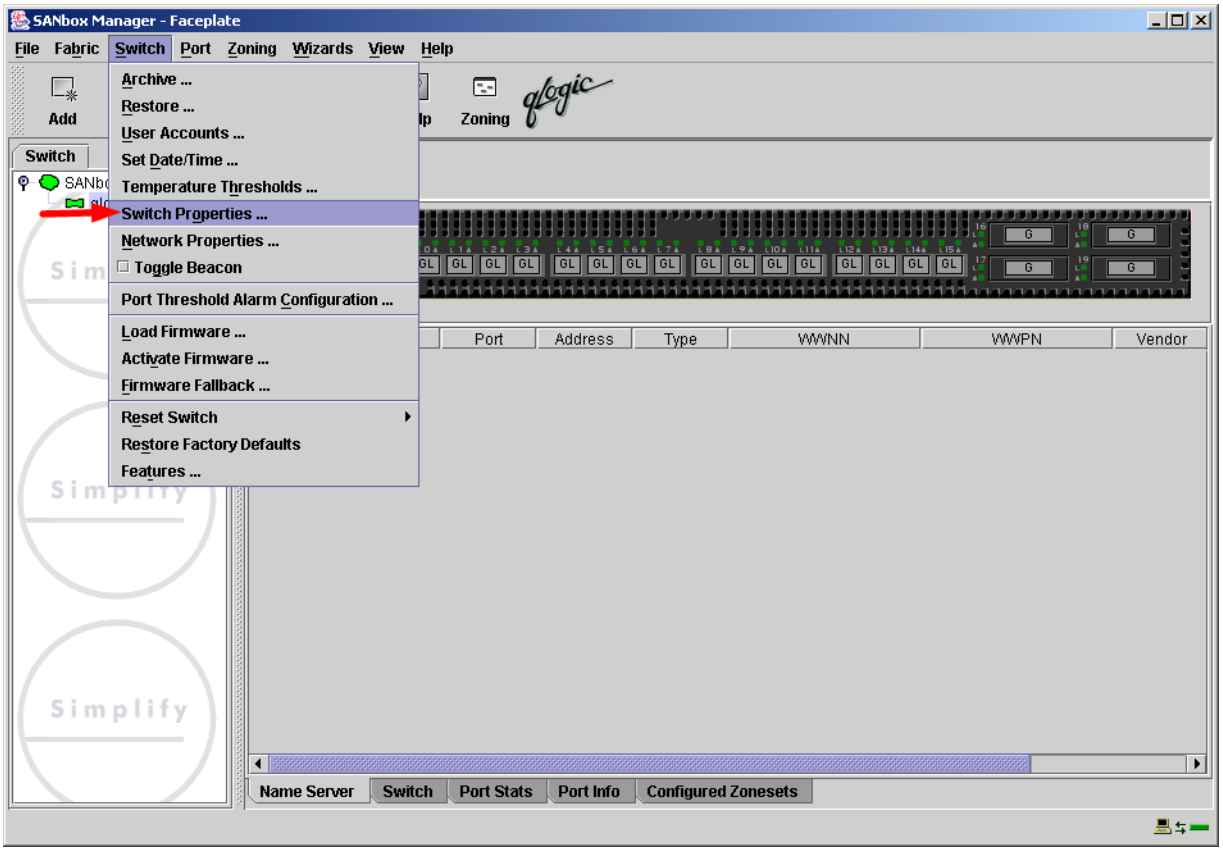
This section provides the steps to change these values.

QLogic SANbox Manager GUI

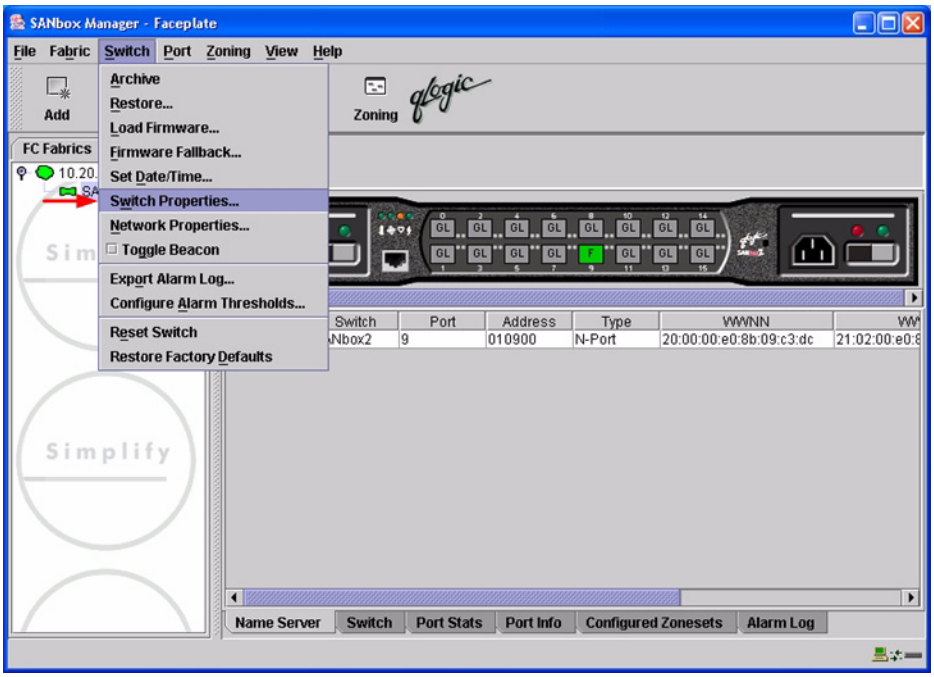
ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

1. Start the **SANbox Manager** application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

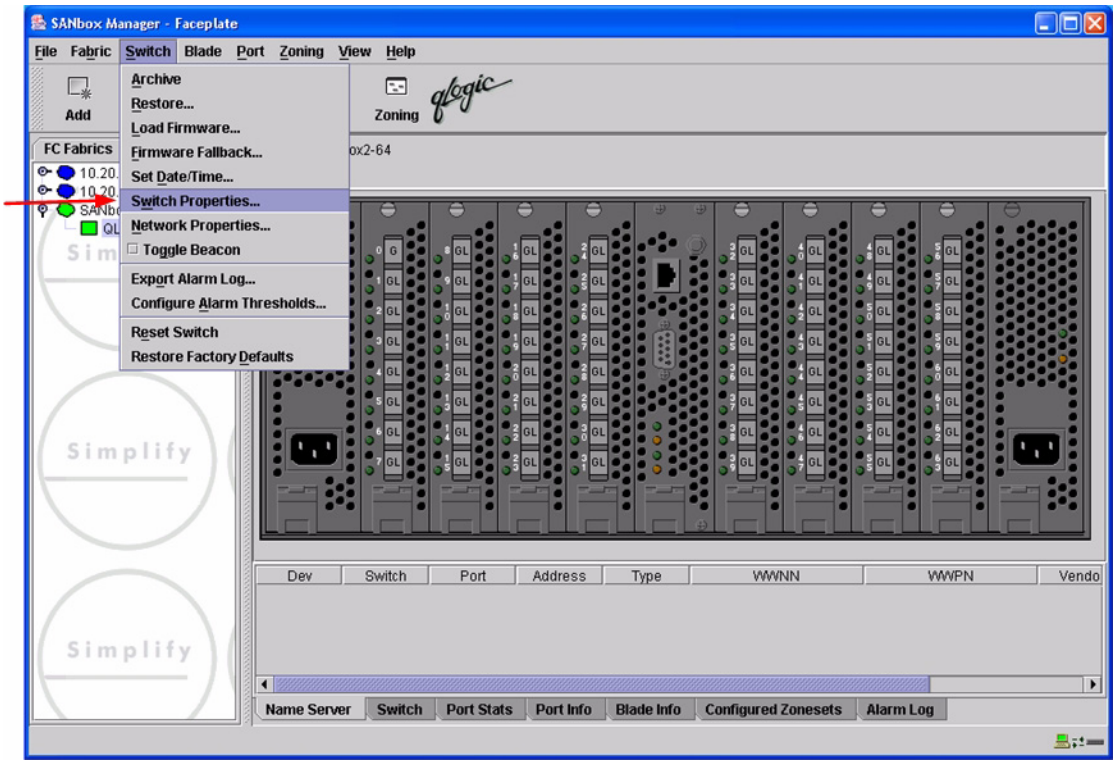
   For the QLogic SANbox 5200, the following displays:



For the QLogic SANbox2-8 and SANbox2-16, the following displays:

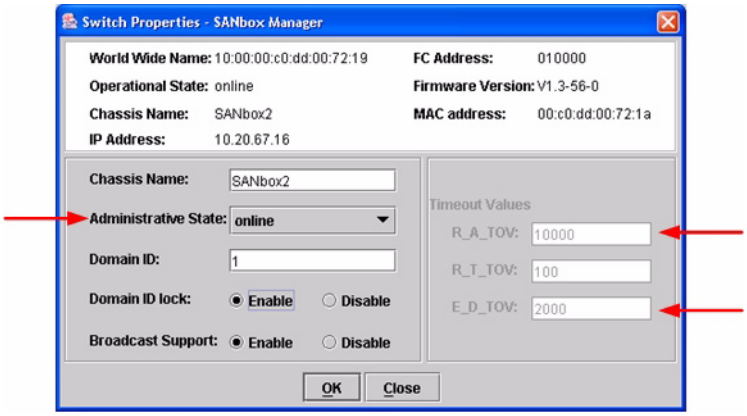


For the QLogic SANbox2-64, the following displays:

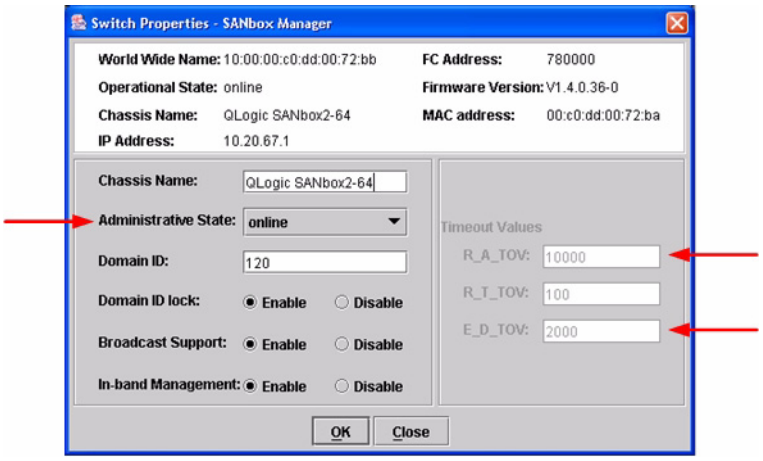


3. From the **Switch Properties—SANbox Manager** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



For the QLogic SANbox2-64, the following displays:



4. From the **Switch Properties—SANbox Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—SANbox Manager** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV** box, change the setting to **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—SANbox Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

QLogic CLI

NOTE: Use the following CLI commands when the QLogic SANbox Manager GUI is not available. The CLI procedures differ based on QLogic switch model and firmware level.

For QLogic SANbox2 series switches with firmware levels 1.5.x and above but less than 2.0.0.3x-x, do the following:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
SANbox2 #> show config switch
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [QLogic SANbox2-64]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For QLogic SANbox 5000 series switches with firmware levels 4.0.0.x-x and above and SANbox2 series switches with firmware levels 2.0.0.3x-x and above, do the following:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
SANbox2 #> show config switch
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
SANbox 5200 #> admin start
SANbox 5200 (admin) #> config edit
SANbox 5200 (admin-config) #> set config switch
```

The following options display:

```
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [100]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [SANbox 5200]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [200] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [SANbox 5200 FC Switch]
  FC-SW-2 Compliant (True / False) [True]
SANbox 5200 (admin-config) #> config save
SANbox 5200 (admin) #> config act
The currently active configuration will be activated.
  Please confirm (y/n): [n] y
```

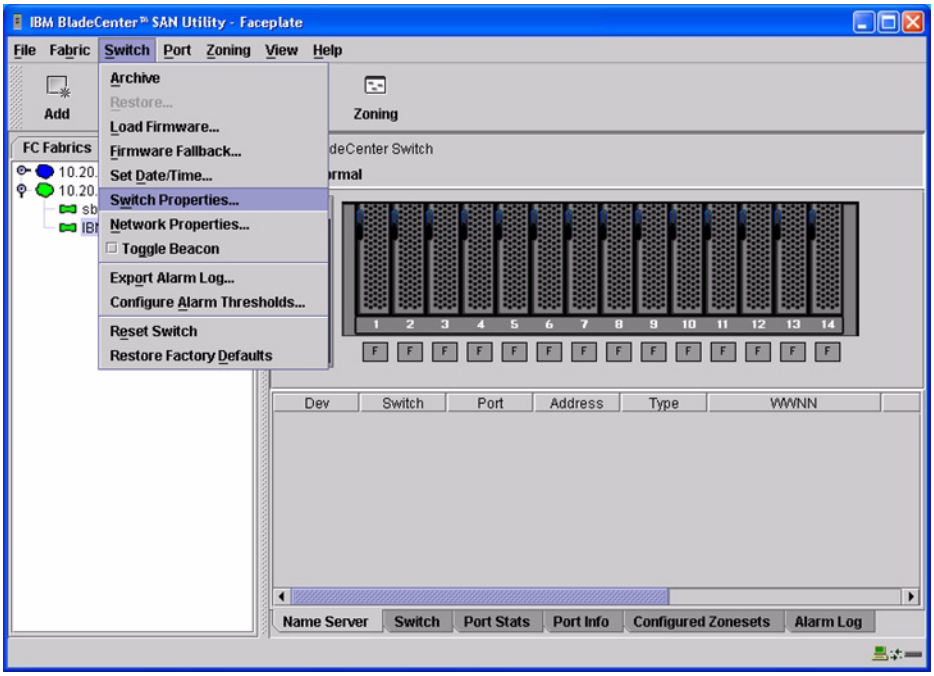
IBM BladeCenter GUI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

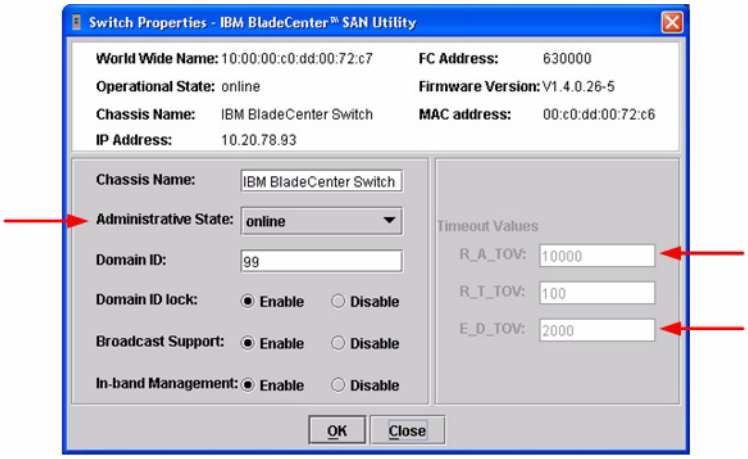
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



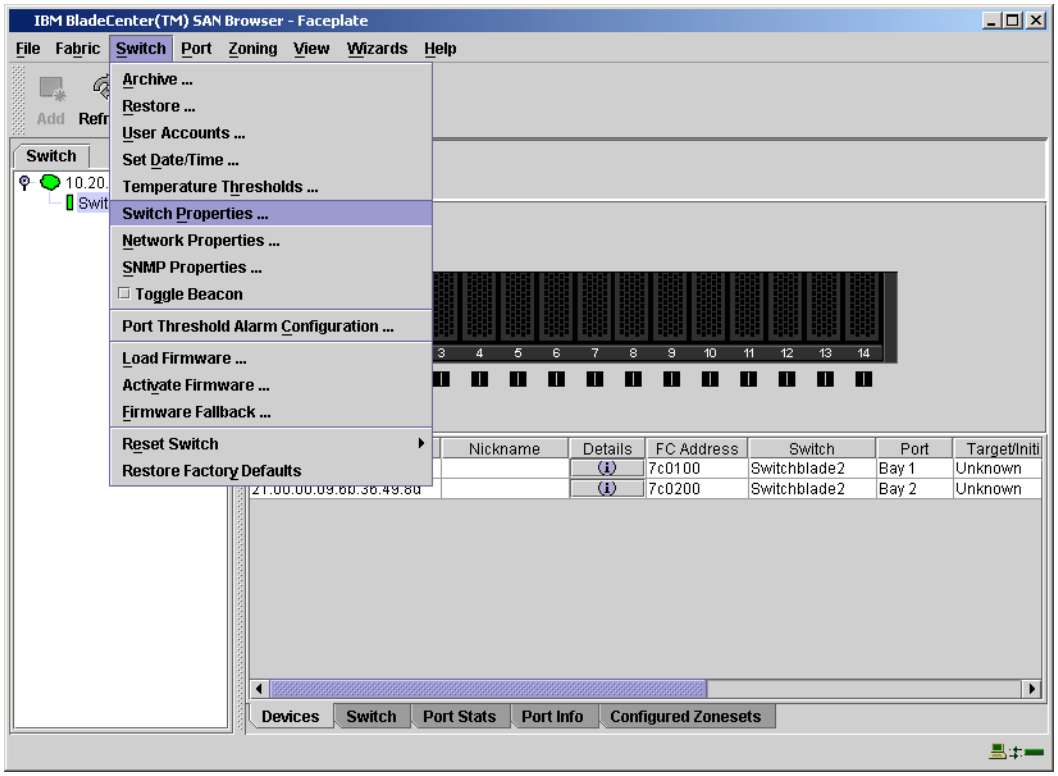
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



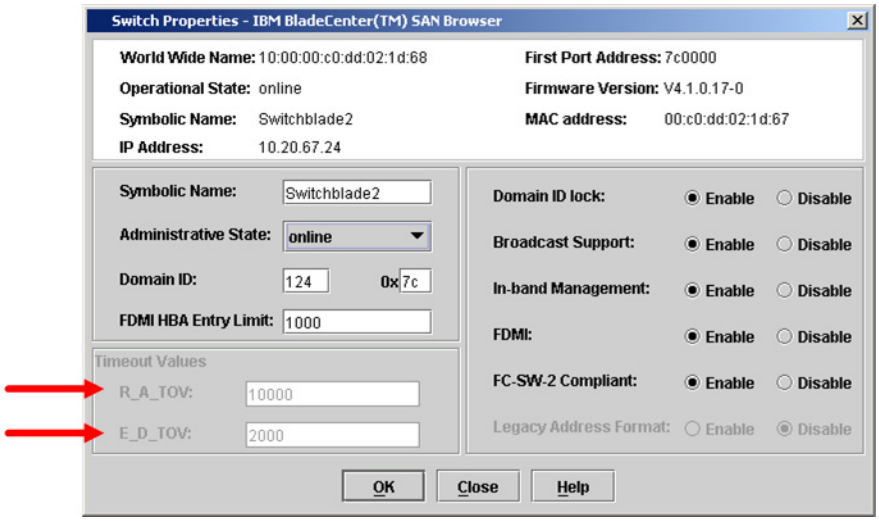
4. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). Do the following:
   a. In the **R_A_TOV** box, enter **10000**.
   b. In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
6. Re-enter the **Switch Properties—IBM BladeCenter SAN Utility** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

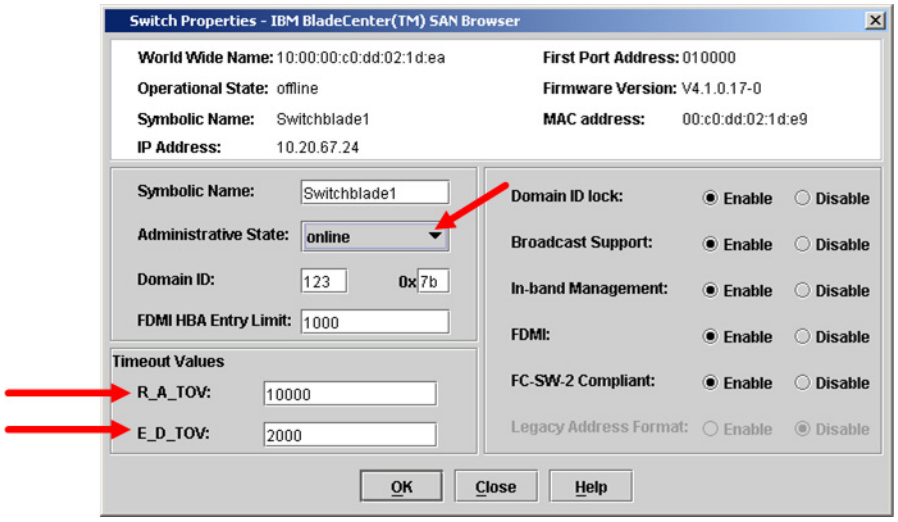
1. Start the IBM BladeCenter SAN Browser. The **IBM BladeCenter SAN Browser—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Browser—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—IBM BladeCenter SAN Browser** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are *not* correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



4. To modify the timeout value settings, do the following:
5.
6.
   a. In the **Administrative State** drop-down box, select **offline**. Click **OK**.
   b. In the Timeout Values section, do the following:
      (1) In the **R_A_TOV** box, enter **10000**.
      (2) In the **E_D_TOV** box, enter **2000**.
   c. Click **OK**.
   d. In the **Administrative State** drop-down box, select **online**. Click **OK**.



7. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify your changes (see step 3).

IBM BladeCenter CLI

ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
IBM BladeCenter #> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1]
DomainIDLock (True / False) [True]
SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
IBM BladeCenter (admin-config) #> config save
IBM BladeCenter (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, use the following CLI commands when the IBM eServer BladeCenter SAN Browser is not available:

```
Login: admin
Password: xxxxxxxx
```

Use the following command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000.

```
Switchblade2: admin> show config switch
```

If these timeout values are *not* correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Switchblade2: admin>
Switchblade2: admin> admin start
Switchblade2 (admin): admin> config edit
  The config named default is being edited.
Switchblade2 (admin-config): admin> set config switch

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current
  value. If you wish to terminate this process before reaching the end of
  the list press 'q' or 'Q' and the ENTER key to do so.

  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  FdmiEnabled (True / False) [True]
  FdmiEntries (decimal value, 0-1000) [1000]
  DefaultDomainID (decimal value, 1-239) [124]
  DomainIDLock (True / False) [True]
  SymbolicName (string, max=32 chars) [Switchblade2]
  R_A_TOV (decimal value, 100-100000 msec) [9000] 10000
  E_D_TOV (decimal value, 10-20000 msec) [1000] 2000
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [IBM eServer BladeCenter(TM)
  6-port Enterprise Fibre Channel Swit]
  FC-SW-2 Compliant (True / False) [True]
```

```
    Finished configuring attributes.
    This configuration must be saved (see config save command) and
    activated (see config activate command) before it can take effect.
    To discard this configuration use the config cancel command.

Switchblade2 (admin-config): admin> config save
    The config named default has been saved.
Switchblade2 (admin): admin> config activate
    The currently active configuration will be activated.
    Please confirm (y/n): [n] y
Switchblade2 (admin): admin> admin end
```

Principal Switch Configuration

QLogic switches and IBM switch modules negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

This section discusses configuring active Zone Set names and Zone types.

Active Zone Set Names

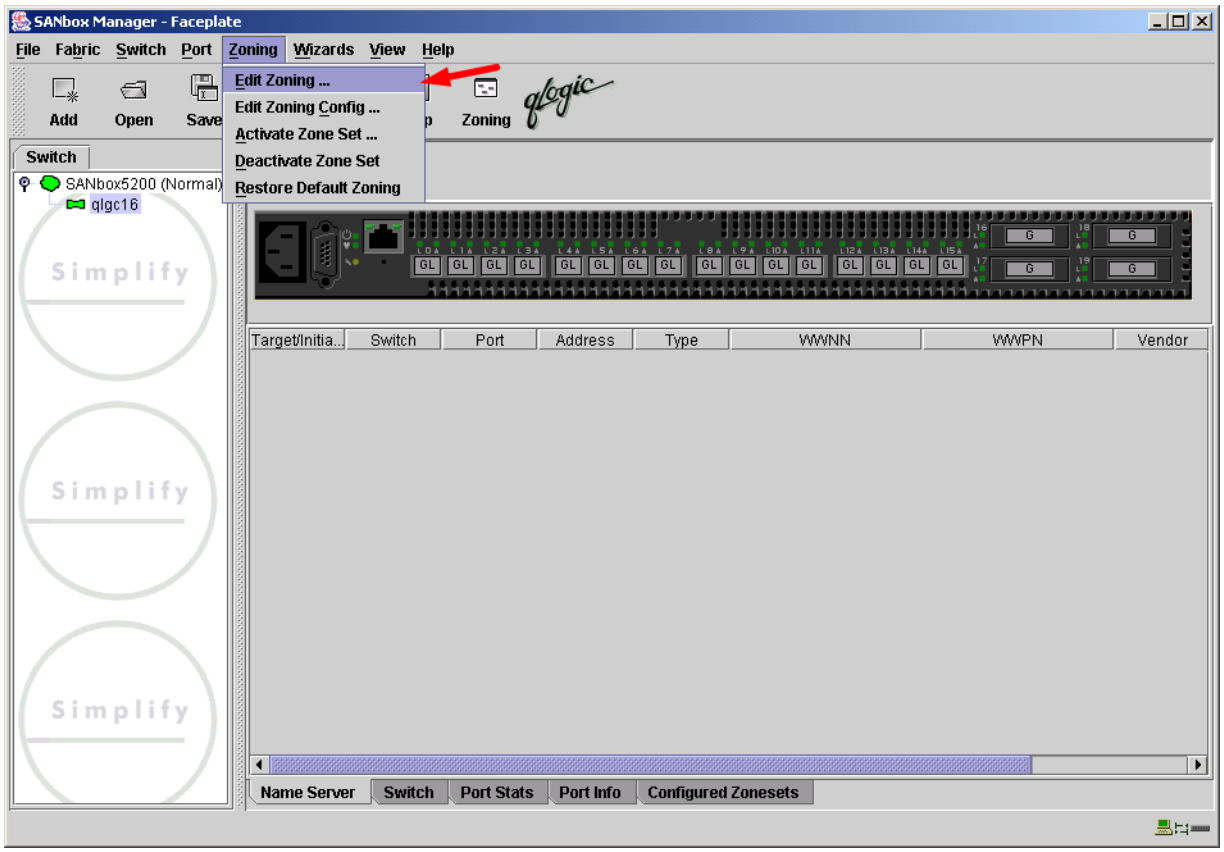
The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

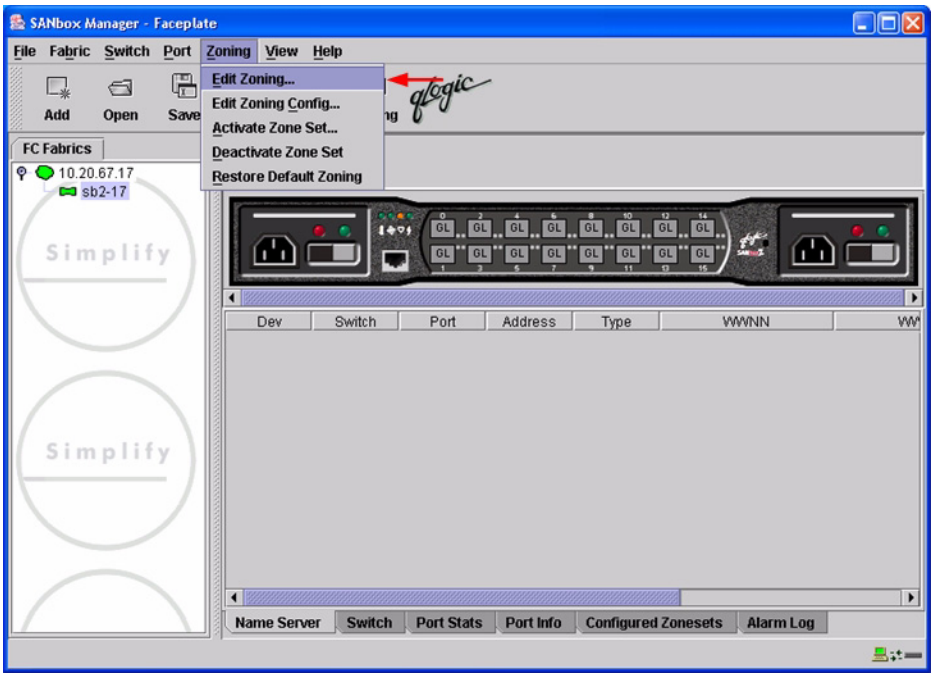
QLogic SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

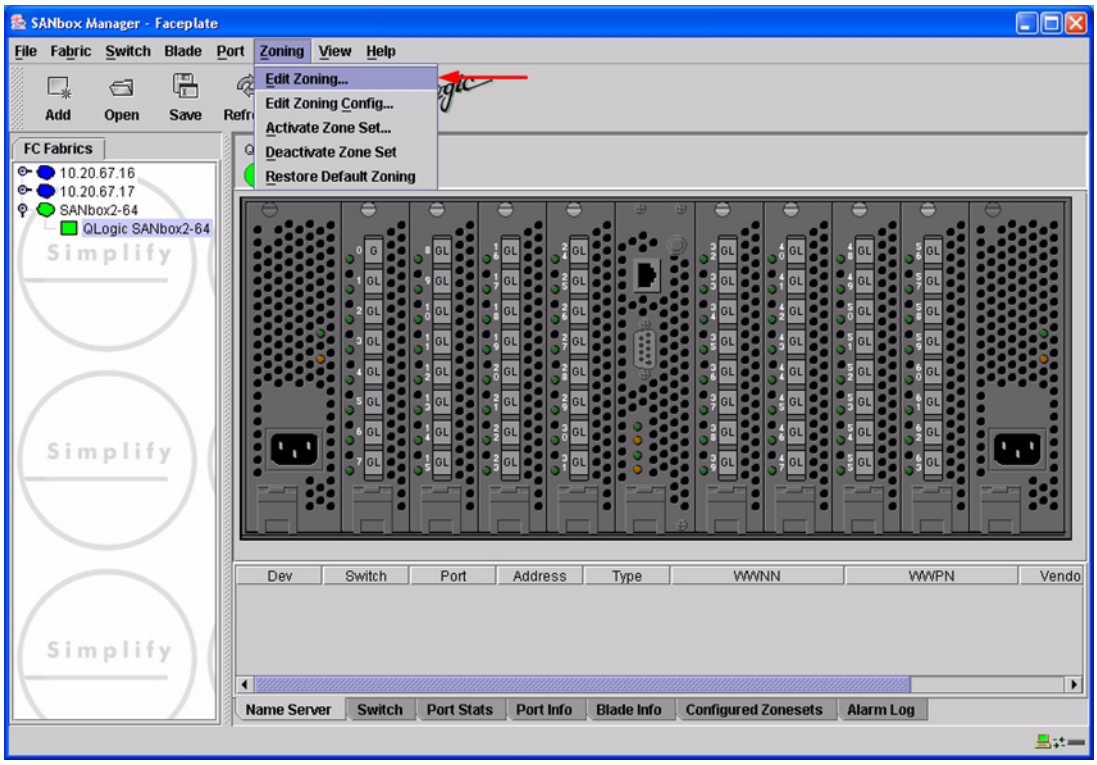
For the QLogic SANbox 5200, the following displays:



For the QLogic SANbox2-8 and SANbox2-16, the following displays:

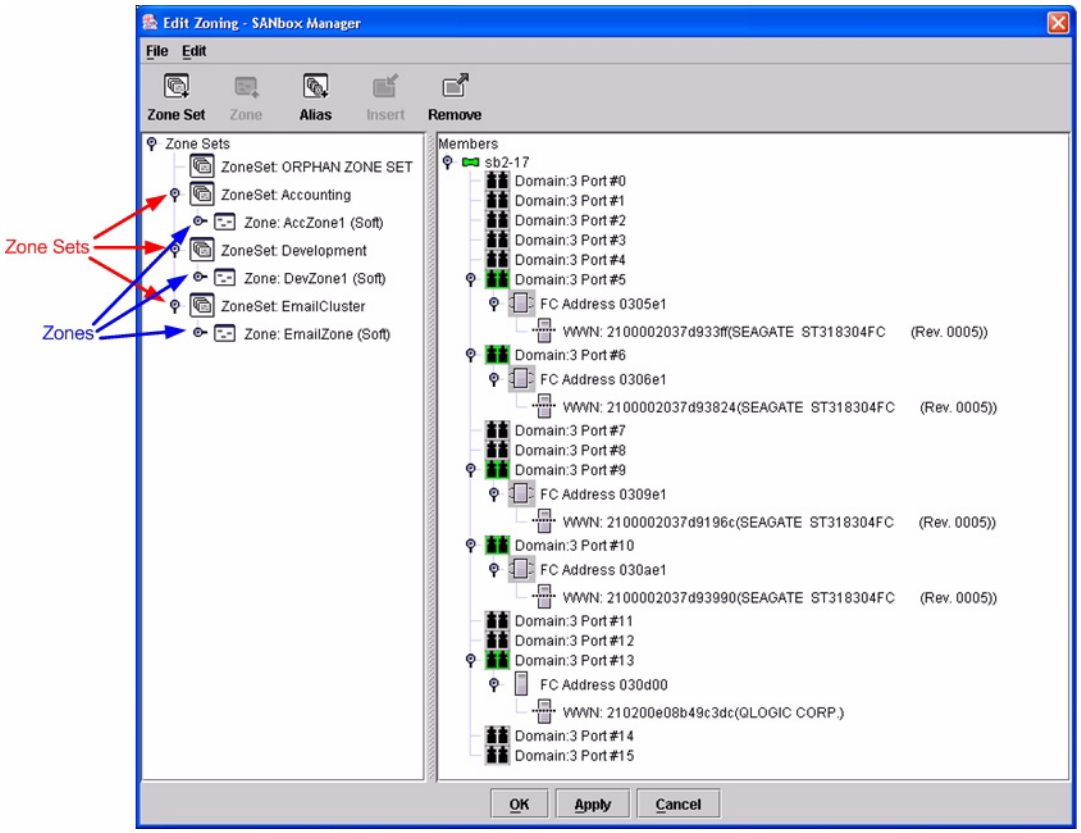


For the QLogic SANbox2-64, the following displays:

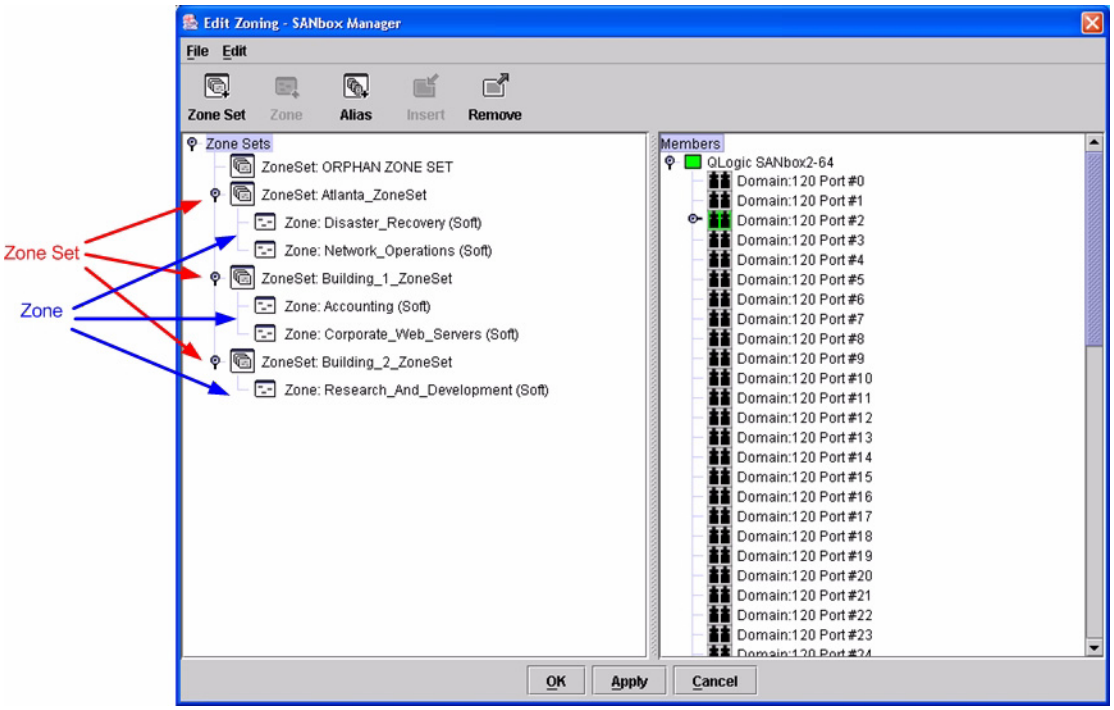


3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 342.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



For the QLogic SANbox2-64, the following displays:



QLogic CLI

NOTE: Use the following CLI commands when the QLogic SANbox Manager GUI is not available. The procedures are the same for the QLogic SANbox 5000 series and SANbox2 series switches.

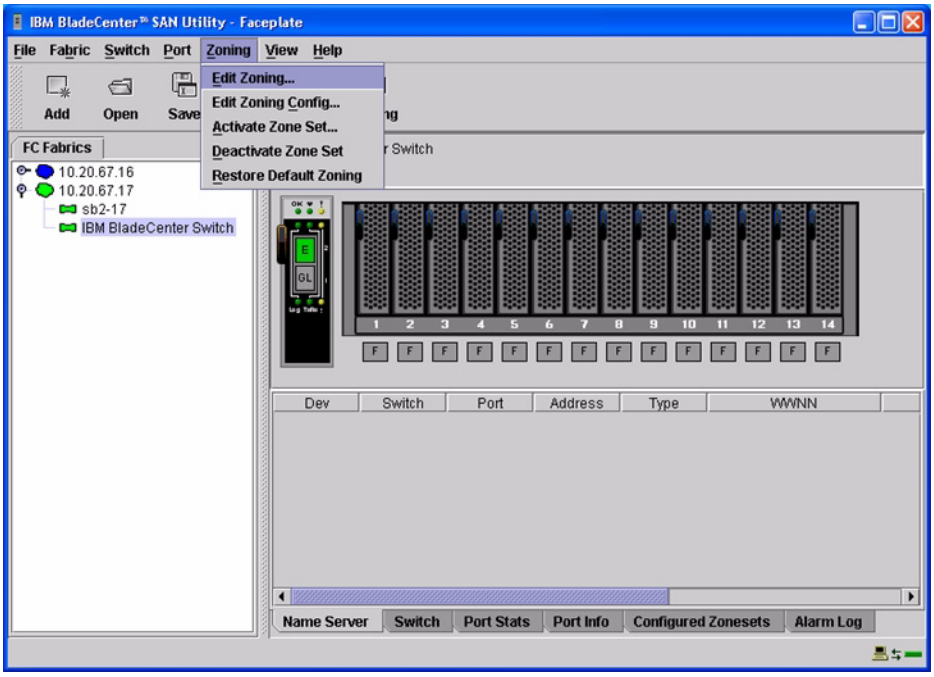
```
Login: admin
Password: xxxxxxxx
SANbox2 #> zone list
```

IBM BladeCenter GUI

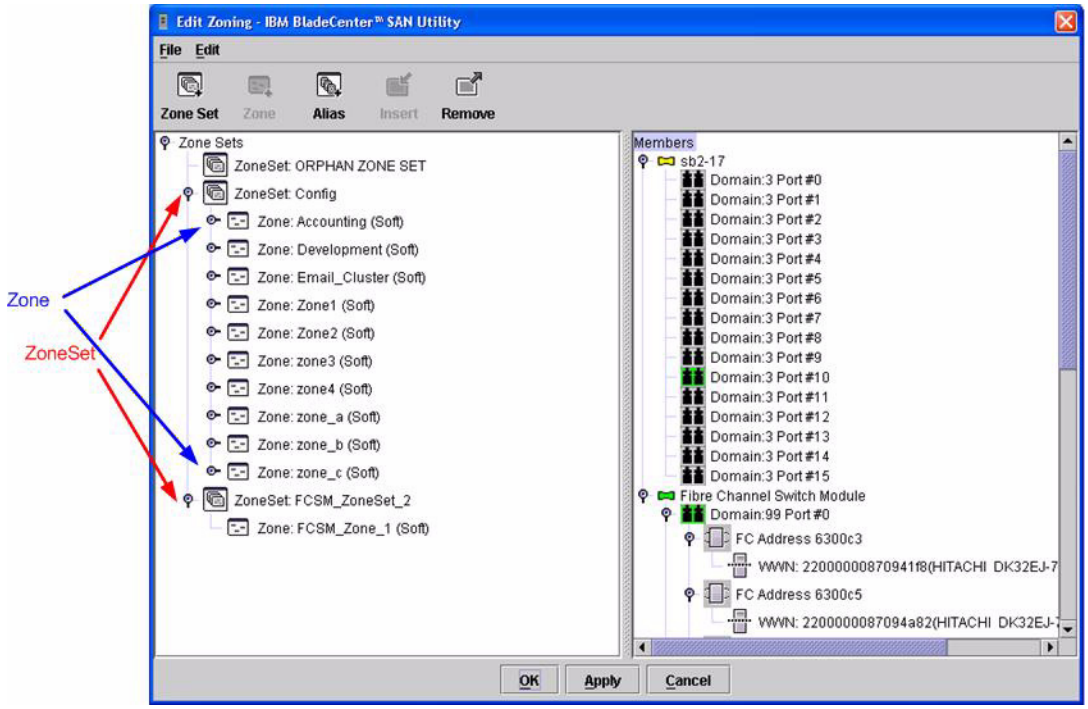
NOTE: The procedures differ based on the IBM switch module model.

For the IBM eServer BladeCenter Fibre Channel Switch Module, do the following using the IBM BladeCenter SAN Utility:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

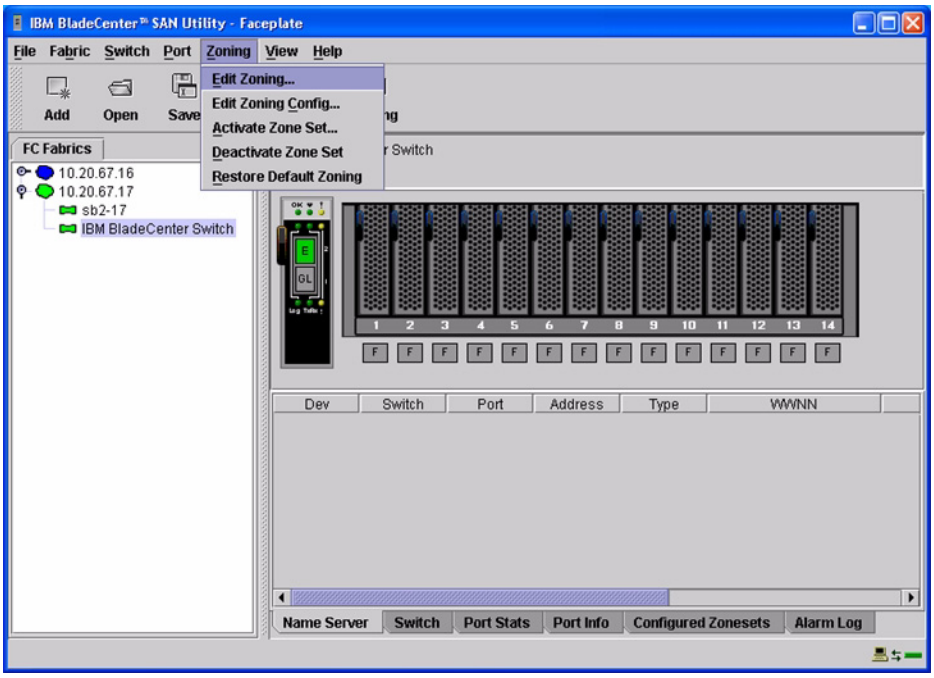


3. From the **Edit Zoning— IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 342.

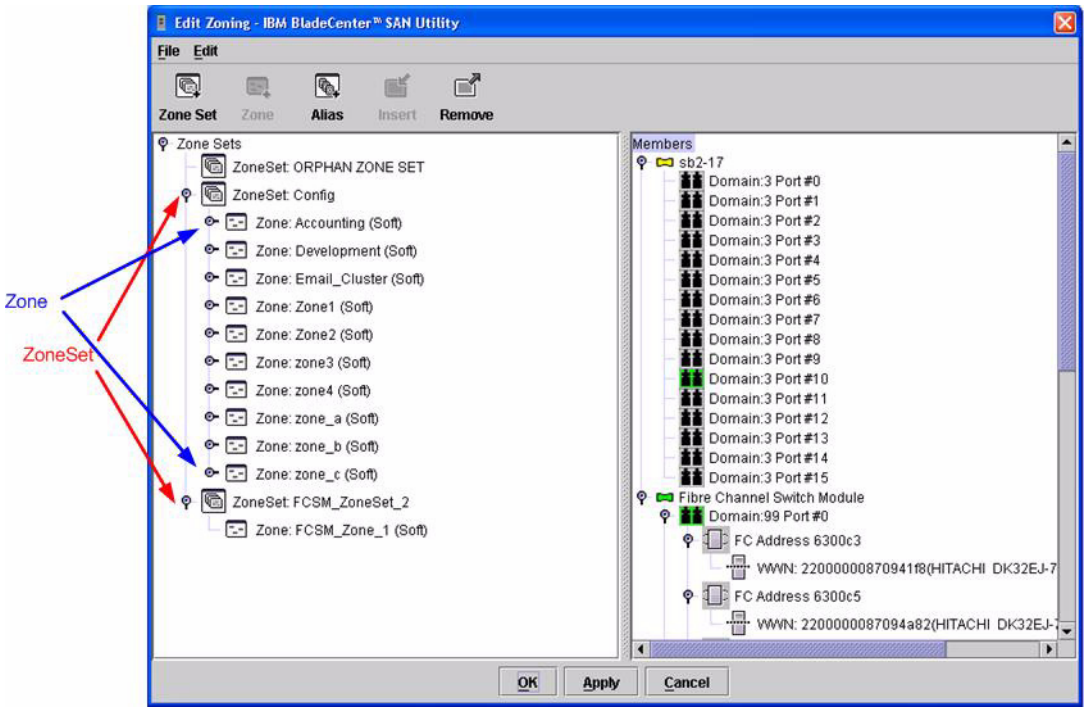


For the QLogic 6-port Enterprise Fibre Channel Switch Module for IBM eServer BladeCenter, do the following using the IBM BladeCenter SAN Browser:

1. Start the IBM eServer BladeCenter SAN Utility. The **IBM BladeCenter SAN Utility—Faceplate** dialog box displays.
2. From the **IBM BladeCenter SAN Utility—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 342.



IBM BladeCenter CLI

NOTE: Use the following CLI commands when the IBM BladeCenter GUI is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> zone list
```

Zone Types

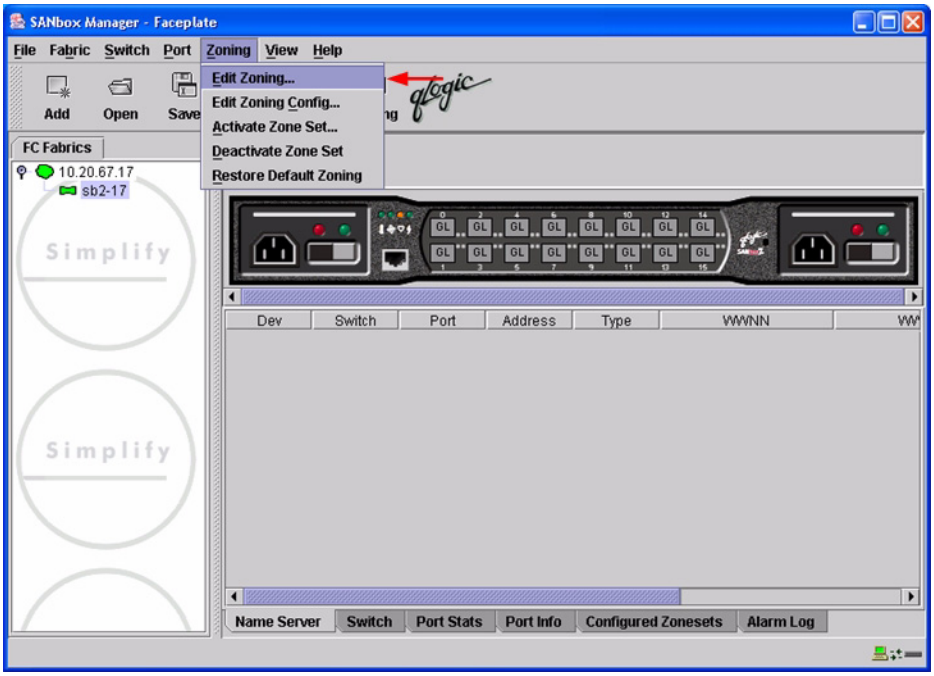
This configuration supports all QLogic switch and IBM switch module Zone types.

Operating Mode Configuration

NOTE: Perform the following steps only when connecting from a QLogic SANbox2-8 or SANbox2-16 with version 1.3.xxx firmware.

QLogic SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning Config**.



3. The **Zoning Config—SANbox Manager** dialog box displays.

   In the **Merge Mode** list, select **Merge Active Zonesets Only**. This is equivalent to SW2 mode in the CLI.

QLogic CLI

NOTE: Use the following CLI commands when the QLogic SANbox Manager GUI is not available. The procedures are the same for the QLogic SANbox2-8 and SANbox2-16.

```
Login: admin
Password: xxxxxxxx
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config zoning
```

The following options display:

```
AutoSave      (True / False)   [True]
Default       (All / None)     [All ]
MergeMode     (Brocade / SW2)  [SW2 ]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

IBM eServer BladeCenter SAN Utility

Not applicable.

IBM BladeCenter CLI

Not applicable.

QLogic Specific Configuration

Not applicable.

IBM BladeCenter Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E_port connection has been established and the fabric has had time to update. If everything verifies, the QLogic and IBM BladeCenter fabrics have successfully merged.

- ✓ Compare and verify that all Zoning information has been propagated on all switches.
- ✓ Verify that the correct Zone Set is activated.
- ✓ Compare and verify that all devices are in the Name Server of each switch.
- ✓ Verify that all initiators continue to detect and have access to all targets that existed prior to the fabric merger.

After everything is verified, your fabric has merged successfully and no additional steps need to be taken. If any of the above tasks did not complete successfully, contact IBM support.

Glossary

Activity LED

A port LED that indicates when frames are entering or leaving the port.

Alias

A collection of objects that can be zoned together. An alias is not a zone, and can not have a zone or another alias as a member.

ALFairness

On an arbitrated loop, the switch is always highest priority when arbitrating for the right to transfer. To prevent other devices from being locked out, the standard provides for a fairness mode, which if enabled, requires an arbitrator to let all other devices win arbitration before arbing a second time.

AL PA

Arbitrated loop physical address

ANSI

American National Standards Institute

API

Application programming interface

Arbitrated Loop

A Fibre Channel topology where ports use arbitration to establish a point-to-point circuit.

Arbitrated Loop Physical Address (AL PA)

A unique one-byte valid value assigned during loop initialization to each NL port on a loop.

ARB FF

When ARB_FF is enabled, it causes the switch to send the ARB_FF primitive when it is in monitoring mode, rather than idles. The only reason to do this is since the ARB FF has less bit transitions than does an idle, it produces less EMI. It has no other effect.

ASIC

Application specific integrated circuit

BootP

A type of network server.

Buffer Credit

A measure of port buffer capacity equal to one frame.

Class 2 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports with acknowledgment provided.

Class 3 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports without acknowledgment.

CLI

Command line interface

Domain ID

User defined name that identifies the switch in the fabric.

E_D_TOV

Error-detect timeout value

E_Port

Expansion port. A switch port that connects to another FC-SW-2 compliant switch.

Expansion Port

See *E_Port*.

ExtCredit

Allows full speed operation over distances greater than 10 kilometers. Additional credit buffers are borrowed from other ports (which must be set to donor state). Decimal value 0–65535.

Fabric Management Switch

The switch through which the fabric is managed.

Fabric Name

User-defined name associated with the file that contains user list data for the fabric.

FSPF

Fabric shortest path first

Fan Fail LED

An LED that indicates that a cooling fan in the switch is operating below standard.

FC PLDA

Fibre Channel-private loop direct attach

FC-SW-2

Fibre Channel switch fabric 2. For detailed information, see the **Introduction** **on page 1**.

Flash Memory

Memory on the switch that contains the chassis control firmware.

Frame

Data unit consisting of a start-of-frame (SOF) delimiter, header, data payload, CRC, and an end-of-frame (EOF) delimiter.

FRU

Field replaceable unit

GUI

Graphical user interface

Heartbeat LED

A chassis LED that indicates the status of the internal switch processor and the results of the power-on self-test.

Initiator

The device that initiates a data exchange with a target device.

In-Order-Delivery

A feature that requires that frames be received in the same order in which they were sent.

Input Power LED

A chassis LED that indicates that the switch logic circuitry is receiving proper DC voltages.

InteropCredit

This variable determines the number of credits we will advertise on an ISL. Older versions of Brocade software required that we match their offering. Decimal value is 0–255.

IP

Internet protocol

ISLSecurity

ISLSecurity determines which switches a port will establish a link with. Any: we will link with any switch. Ours: we will only link to another QLogic switch. None: the port will not establish an ISL link.

~~LCFEnable~~

~~LCFEable gives preference to link control frames (such as class 2 ACK frames) over other frames, when queued for transmission in the switch. This may provide better performance when running Class 2 traffic. LCFEable is incompatible with MFSEnable, and both cannot be selected.~~

LIP

Loop initialization primitive sequence

Logged-in LED

A port LED that indicates device login or loop initialization status.

Management Information Base

A set of guidelines and definitions for the Fibre Channel functions.

Management Workstation

PC workstation that manages the fabric through the fabric management switch.

MIB

Management information base

MSEnable

~~Determines whether GS-3 management server commands will be accepted on the port. It can be used to prevent in-band management of the switch on any or all ports.~~

NL_Port

Node Loop Port. A Fibre Channel device port that supports arbitrated loop protocol.

N _Port

Node Port. A Fibre Channel device port in a point-to-point or fabric connection.

NoClose

Causes the switch to keep the loop open, if no other device is arbitrating. It is intended to improve performance when there is a single L_Port device connected to the switch.

Output Power LED

A power supply LED that indicates that the power supply is providing DC voltage to the switch

Over Temperature LED

A chassis LED or a power supply LED that indicates that the switch or power supply is overheating.

POST

Power-on self-test

Power-On Self-Test

Diagnostics that the switch chassis performs at start up.

Principal Switch

A switch that has been selected to perform certain fabric configuration duties.

Private Device

A device that can communicate only with other devices on the same loop.

Private Loop

A loop of private devices connected to a single switch port.

pwwn

Port world wide name. See *World Wide Port Name*.

R_A_TOV

Resource-allocation timeout value

SAN

Storage area network

SANbox Manager

Switch management application

SFF

Small form-factor transceiver

SFP

Small form-factor pluggable. A transceiver device, smaller than a gigabit interface converter, that plugs into the Fibre Channel port.

Small Form Factor

A transceiver device, smaller than a gigabit interface converter, that is permanently attached to the circuit board.

Small Form-Factor Pluggable

A transceiver device, smaller than a gigabit interface converter, that plugs into the Fibre Channel port.

SNMP

Simple network management protocol

Target

A storage device that responds to an initiator device.

Timeout Values

The timeout values (TOV) required by the FC-SW-2 standard to successfully establish an E_port connection.

TOV

Timeout values. The timeout values required by the FC-SW-2 standard to successfully establish an E_port connection.

VCCI

Voluntary control council for interference

VIEnable

Diagnostics that the switch chassis performs at start up.

World Wide Name (WWN)

A unique 64-bit address assigned to a device. The WWN consists of a world wide node name and a world wide port name.

World Wide Node Name (WWNN)

A unique address assigned to a device.

World Wide Port Name (WWPN)

A unique address assigned to a port on a device. There can be more than one WWPN per WWNN.

WWN

World wide name

WWNN

World wide node name

WWPN

World wide port name

Zone

A set of ports or devices grouped together to control the exchange of information.

Zone Configuration

See *Zone Set*.

Zone Set

A set of zones grouped together. The active zone set defines the zoning for a fabric. For Brocade, Zone Set is referred to as Zone Configuration.

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