IBM eserver BladeCenter™ Fibre Channel Switch Interoperability Guide

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IBM eserver BladeCenter™ Fibre Channel Switch Interoperability Guide

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The IBM home page on the Internet can be found at ibm.com. Updated versions of this guide can be downloaded from the following IBM Web site: http://www.ibm.com/servers/eserver/bladecenter/.

Table of Contents

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 integrate the IBM eServer BladeCenter into existing Brocade, INRANGE, McDATA, and QLogic Fibre Channel switched fabrics that comply with the Fibre Channel switch fabric 2 (FC-SW-2) standard.

Contacting IBM

For more information about integrating the IBM eServer BladeCenter into existing 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/

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, along with switches from Brocade, INRANGE, 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.

Supported Switches and Firmware Versions

The following IBM eServer BladeCenter Fibre Channel Switch Module has been tested in the IBM BladeCenter environment and complies with the FC-SW-2 standard.

IBM Supported Switch and Firmware Versions

Switch Model	Firmware Version
IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above

The IBM eServer BladeCenter Fibre Channel Switch Module has tested interoperable with the following switches from Brocade, INRANGE, McDATA, and QLogic that comply with the FC-SW-2 standard. See the referenced page for detailed instructions on integrating IBM BladeCenter into these fabrics.

Brocade, INRANGE, McDATA, and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Brocade (see page 7)	IBM 3534F08	3.0.2g or above
	IBM 2109F16	3.0.2g or above
	Silkworm 3200	3.0.2g or above
	Silkworm 3800	3.0.2g or above
INRANGE (see page 33)	FC9000-64	Code set 3.0.3.2 or above
	FC9000-128	Code set 3.0.3.2 or above
McDATA (see page 59)	Sphereon 4500	04.01.00 12 or above
QLogic (see page 91)	SANbox2-8	1.3.56 and above
	SANbox2-16	1.3.56 and above
	SANbox2-64	1.3.56 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 integrating the IBM eServer BladeCenter into existing Brocade, Inrange, McDATA, and QLogic Fibre Channel switched fabrics.

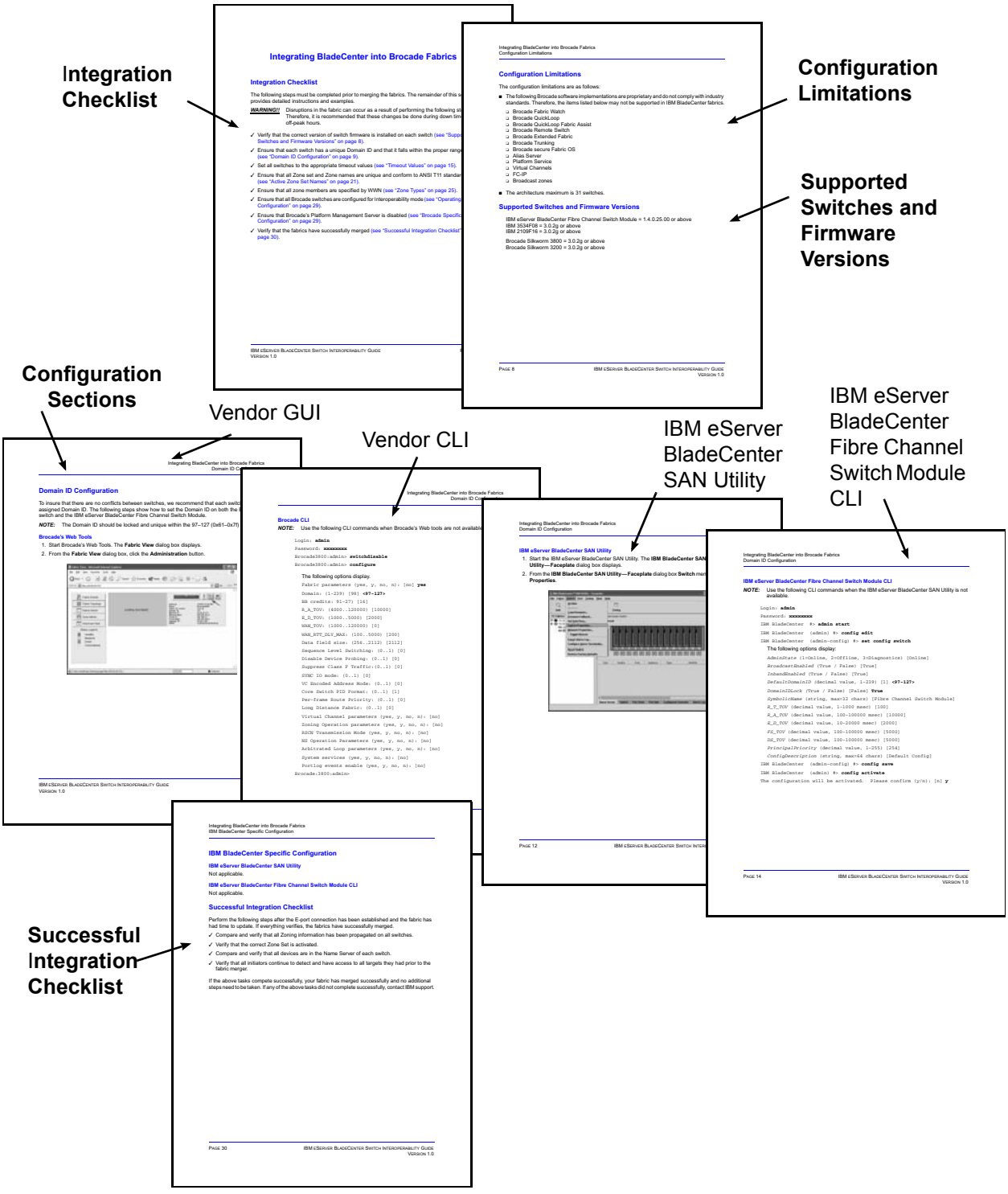
NOTE: Updated versions of this guide can be downloaded from the following IBM Web site: http://www.ibm.com/servers/eserver/bladecenter/.

All chapters within the *IBM eServer BladeCenter Switch Interoperability Guide* are organized the same way. For a visual representation, see page 6.

- **Integration Checklist.** Lists the steps that must be completed to successfully merge the fabrics.
- **Configuration Limitations.** Details the configuration limitations, including features not supported by the vendor switches and IBM eServer BladeCenter Fibre Channel Switch Module.
- **Supported Switches and Firmware Versions.** The supported switches and firmware versions for which this information applies.
- For the vendor switch and the IBM eServer BladeCenter Fibre Channel 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** for terms used in this guide and to the **Index** for quick reference to key topics.

Visual Representation of How the Chapters Are Organized



Integrating BladeCenter into Brocade Fabrics

Integration Checklist

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

ATTENTION!!

- Backup the current configuration prior to performing the following steps so that the configuration is available if something goes wrong.
- 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.

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 9).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 10).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 16).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 22).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 26).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see “Operating Mode Configuration” on page 30).

✓ Ensure that Brocade’s Platform Management Server is disabled (see “Brocade Specific Configuration” on page 30).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 31).

Configuration Limitations

The configuration limitations are as follows:

- The following Brocade software implementations may not be supported in IBM BladeCenter fabrics.

  NOTE: Existing Brocade switches retain all features that are available with Brocade switches once the IBM eServer BladeCenter Fibre Channel Switch Module is integrated into a heterogeneous fabric. Brocade features do not generate interswitch traffic. As such, they can be included in multi-vendor fabrics, but function on Brocade switches only.

  - Brocade QuickLoop
  - Brocade QuickLoop Fabric Assist
  - Brocade Remote Switch
  - Brocade Extended Fabric
  - Brocade Trunking
  - Brocade Advanced Performance Monitor
  - Brocade Secure Fabric OS
  - Brocade Fabric Services
    - Alias Server
    - Management Server
    - Platform Support
    - Virtual Channels
    - Broadcast Zones

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

Supported Switches and Firmware Versions

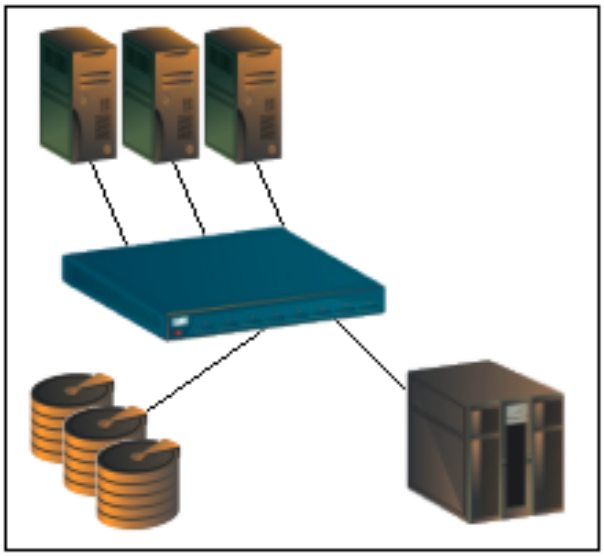
The following IBM eServer BladeCenter Fibre Channel Switch Module has been tested in the IBM BladeCenter environment and complies with the FC-SW-2 standard. IBM eServer BladeCenter Fibre Channel Switch Module has tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

IBM and Brocade Supported Switch and Firmware Versions

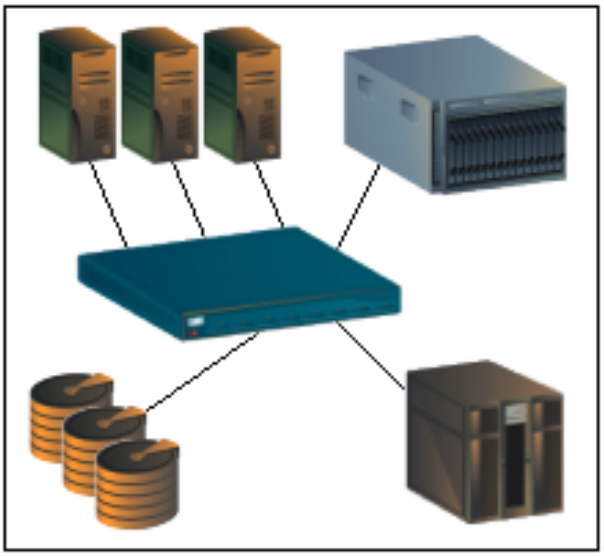
Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above
Brocade	IBM 3534F08	3.0.2g or above
	IBM 2109F16	3.0.2g or above
	Silkworm	3.0.2g or above
	Silkworm	3.0.2g or above

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 30).

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



Brocade Fibre Channel Fabric Prior to Integrating the IBM BladeCenter



Brocade Fibre Channel Fabric with the IBM BladeCenter

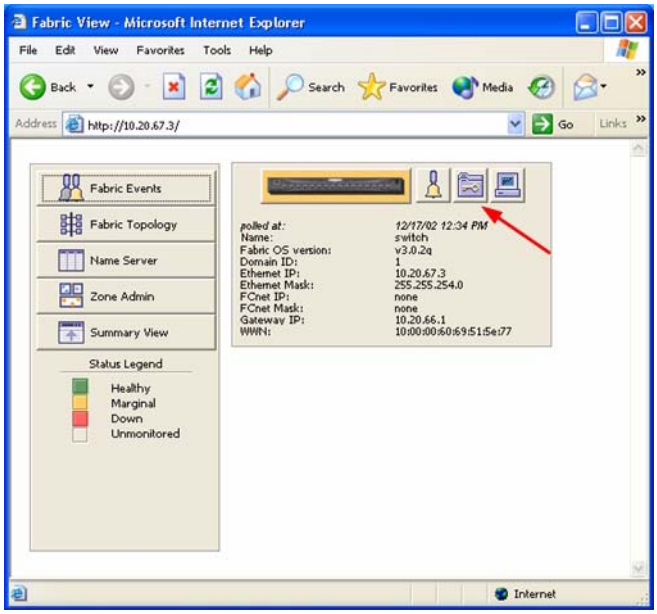
Domain ID Configuration

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 eServer BladeCenter Fibre Channel Switch Module.

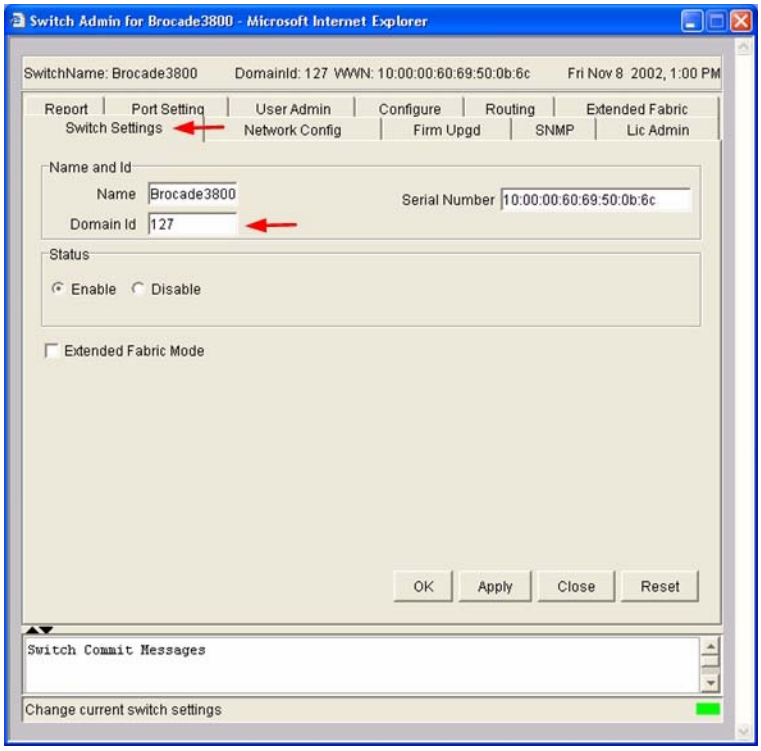
NOTE: The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range.

Brocade's Web Tools

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**.



Brocade CLI

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

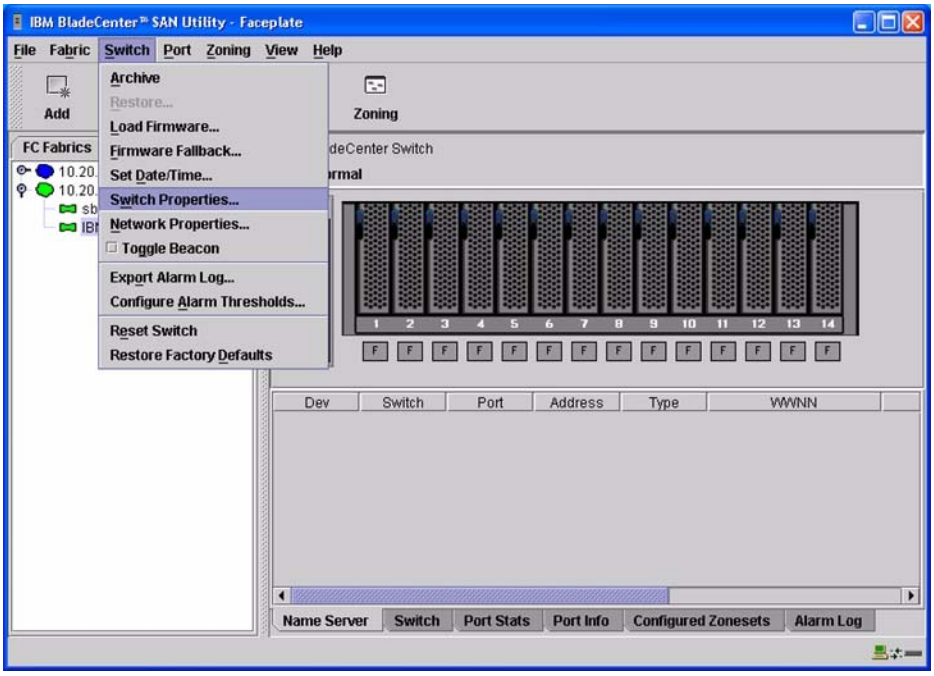
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> switchdisable
Brocade3800:admin> configure
```

The following options display.

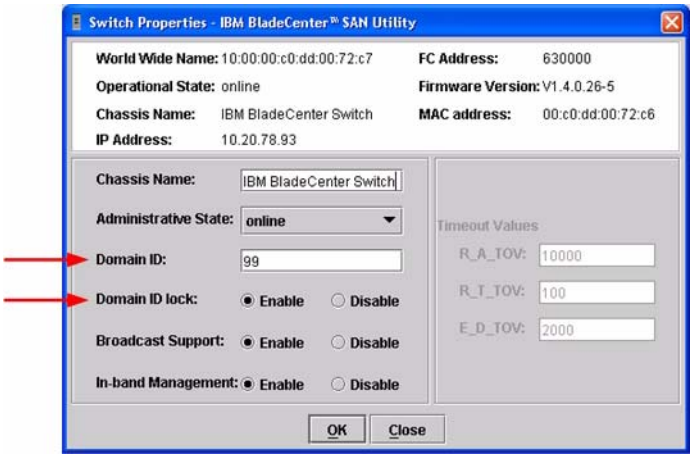
```
Fabric parameters (yes, y, no, n): [no] yes
Domain: (1-239) [98] <97-127>
BB credits: 91-27) [16]
R_A_TOV: (4000..120000) [10000]
E_D_TOV: (1000..5000) [2000]
WAN_TOV: (1000..120000) [0]
WAN_RTT_DLY_MAX: (100..5000) [200]
Data field size: (256..2112) [2112]
Sequence Level Switching: (0..1) [0]
Disable 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
```

IBM eServer 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. In the **Domain ID** box, type a unique Domain ID in the 97–127 range 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**.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxxx
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
```

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:

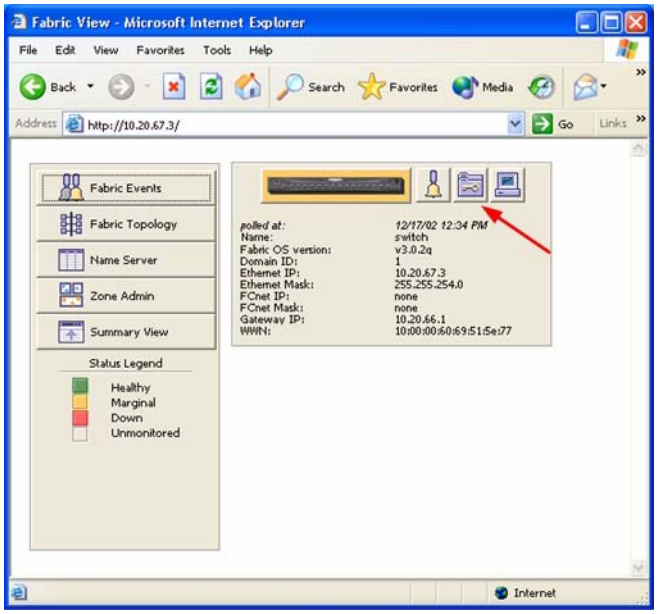
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

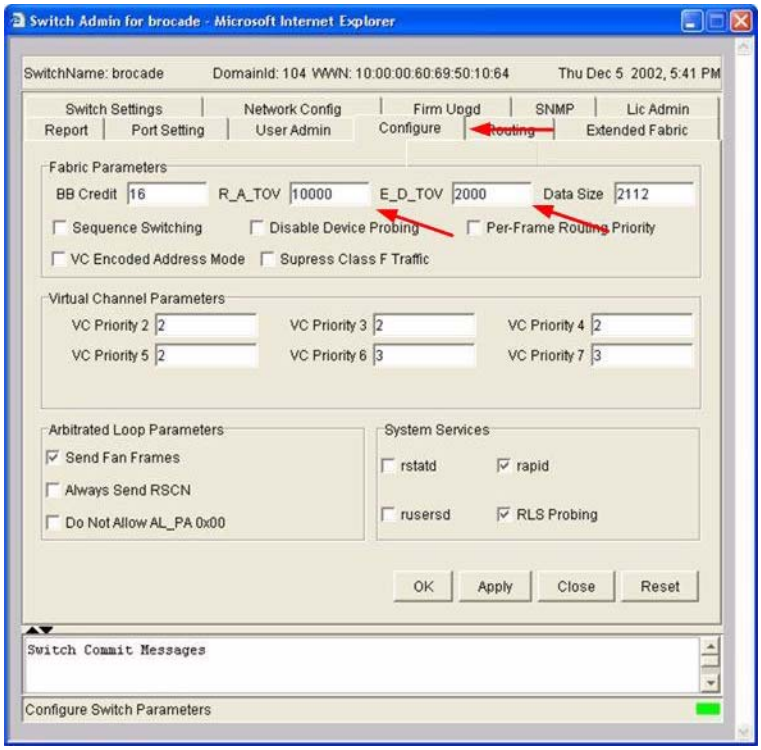
Brocade's Web Tools

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

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** 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 **OK**.



Brocade CLI

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

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.

```
Brocade3800:admin> switchdisable
Brocade3800:admin> configure
```

The following options display:

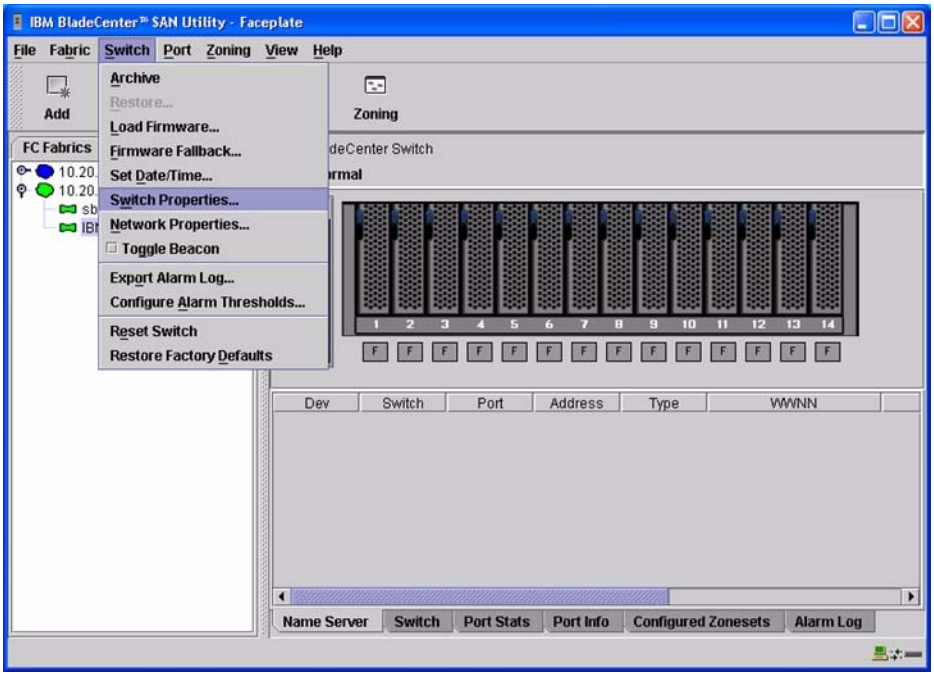
```
Fabric parameters (yes, y, no, n): [no] yes
Domain: (1-239) [98]
BB credits: 91-27) [16]
R_A_TOV: (4000..120000) [9000] 10000
E_D_TOV: (1000..5000) [1000] 2000
WAN_TOV: (1000..120000) [0]
WAN_RTT_DLY_MAX: (100..5000) [200]
Data field size: (256..2112) [2112]
Sequence Level Switching: (0..1) [0]
Disable 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
```

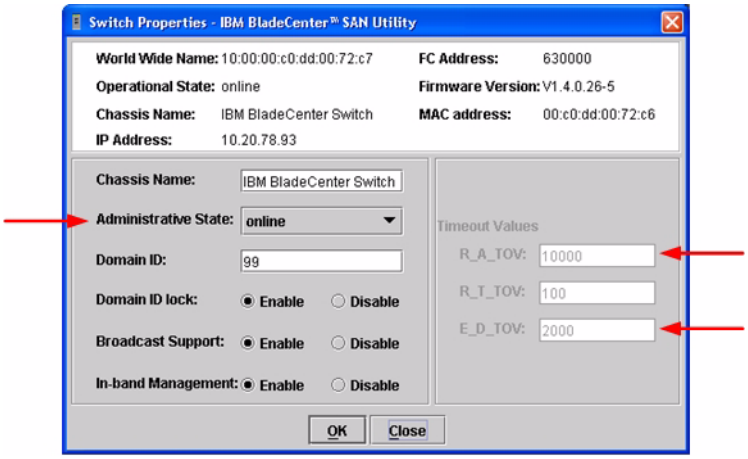
IBM eServer BladeCenter SAN Utility

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

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**.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> show config switch
```

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.

```
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
```

Principal Switch Configuration

Brocade switches and IBM eServer BladeCenter Fibre Channel 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.

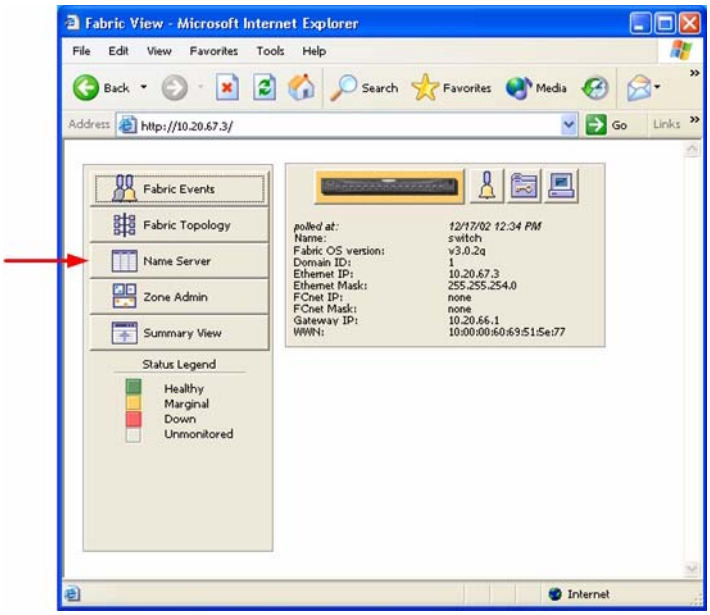
Active Zone Set Names

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):

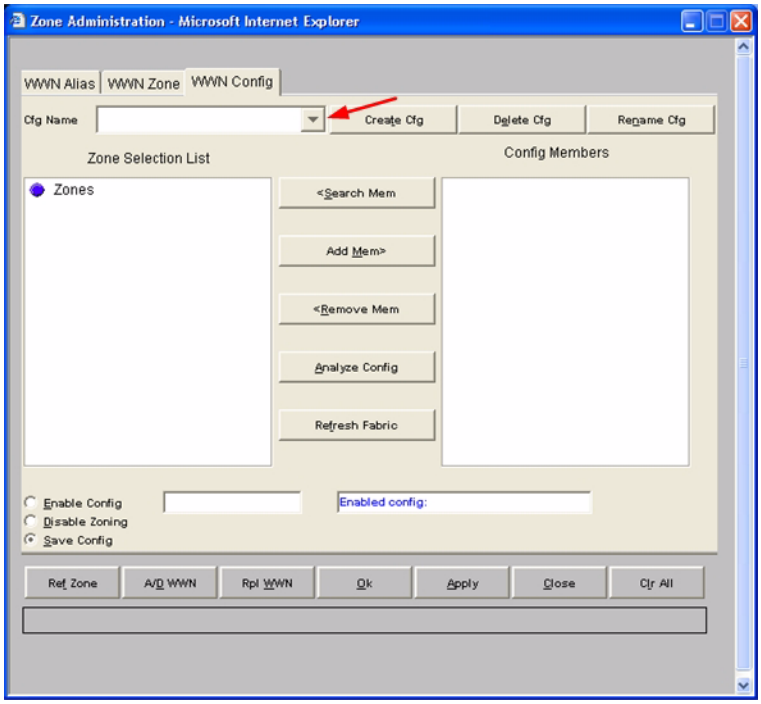
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

Brocade's Web Tools

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" and are unique between the switches.



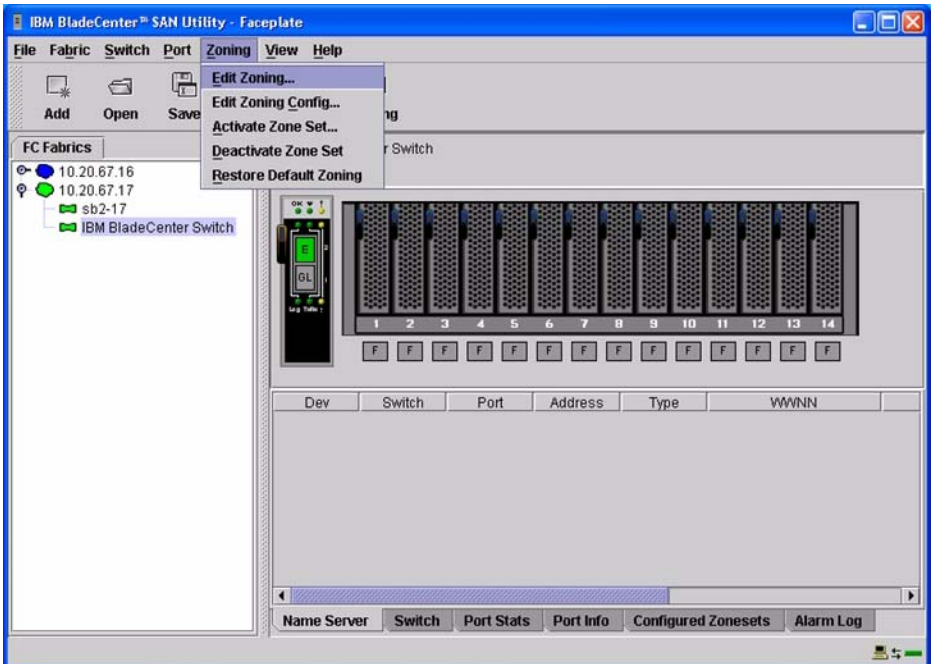
Brocade CLI

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

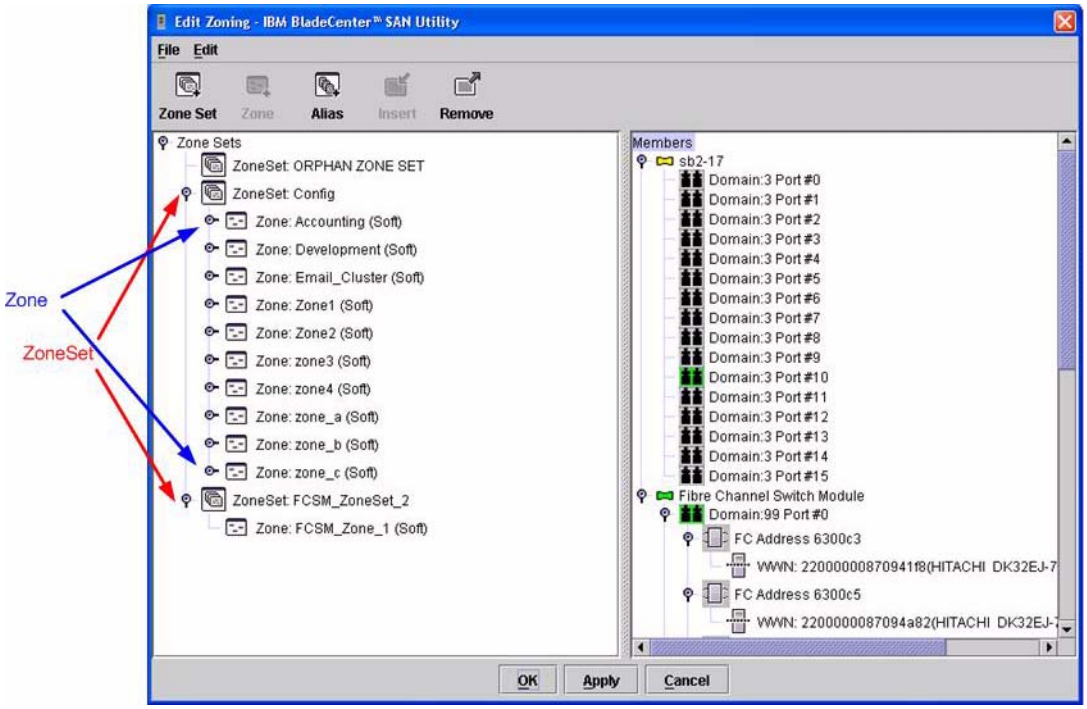
```
Login: admin
Password: xxxxxxxxx
Brocade3800:admin> cfgshow
```

IBM eServer 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 22.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

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

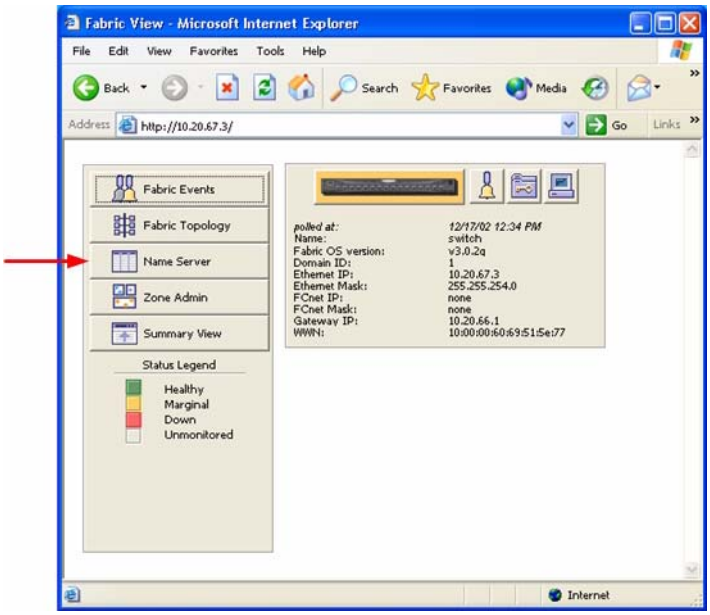
Zone Types

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.

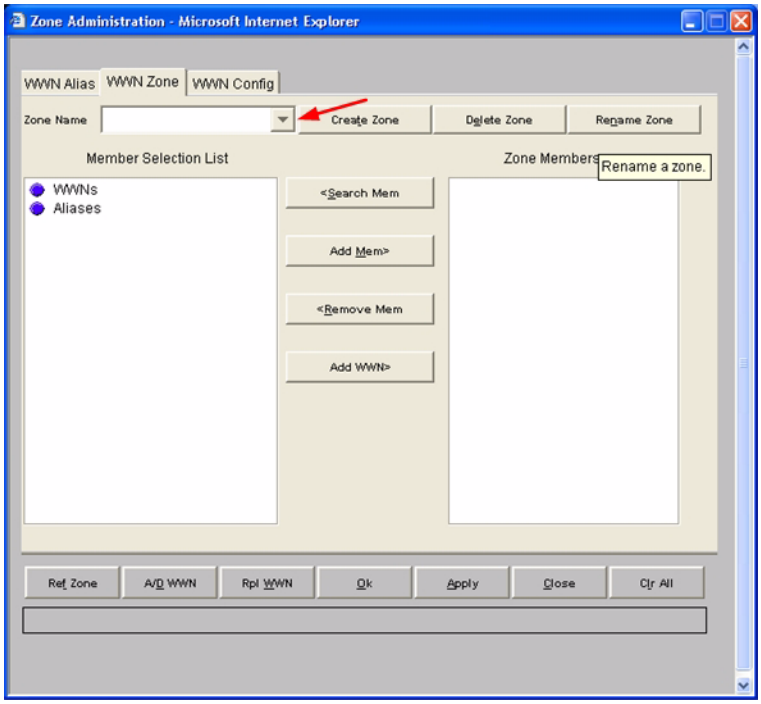
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

Brocade's Web Tools

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" and are unique between the switches.



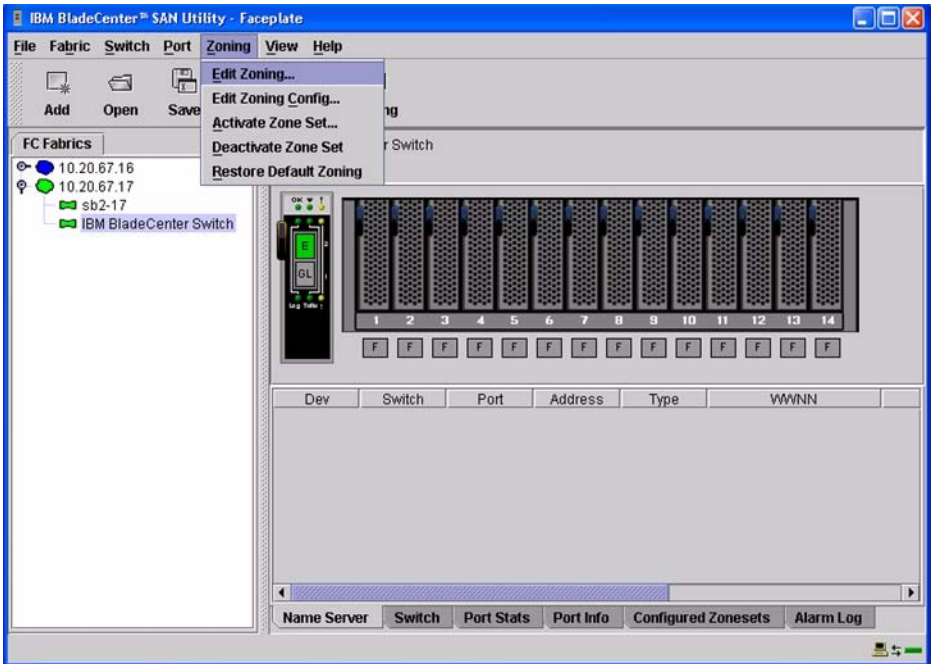
Brocade CLI

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

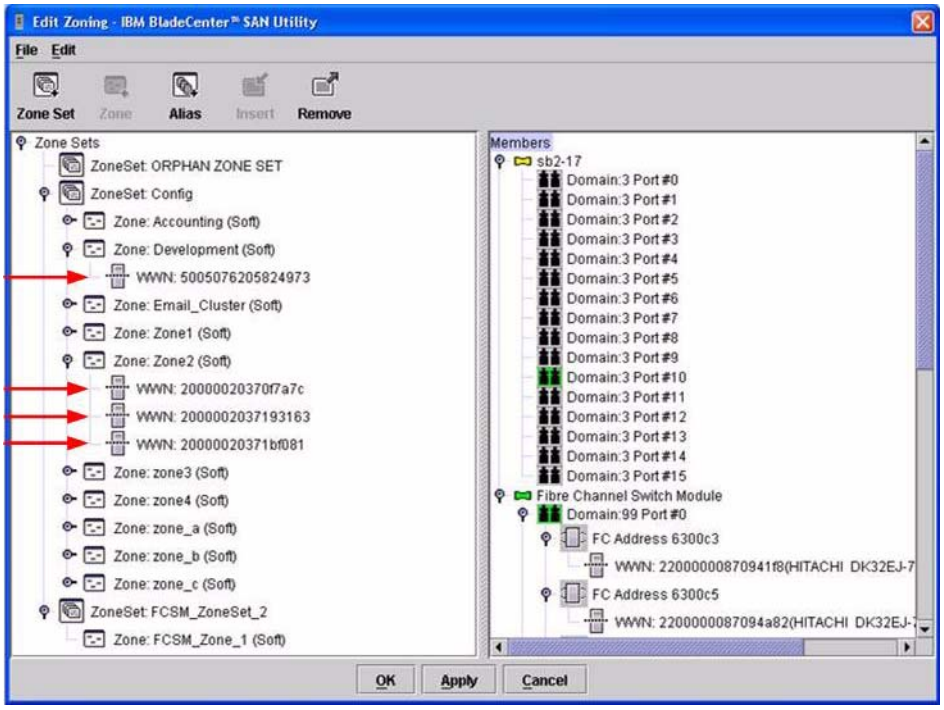
```
Login: admin
Password: xxxxxxxxx
Brocade3800:admin> zoneshow
```

IBM eServer 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.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxxx
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.

Brocade's Web Tools

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

Brocade CLI

The Brocade switch must be in Interoperability mode to be FC-SW2 compliant.

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

```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> switchdisable
Brocade3800:admin> interopmode 1
```

Run this command without the 1 to see its current setting.

```
Brocade3800:admin> fastboot
```

IBM eServer BladeCenter SAN Utility

Not applicable.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

Not applicable.

Brocade Specific Configuration

The Platform Management Server must be disabled.

Brocade's Web Tools

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

Brocade CLI

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

IBM BladeCenter Specific Configuration

IBM eServer BladeCenter SAN Utility

Not applicable.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

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.

Integrating BladeCenter into INRANGE Fabrics

Integration Checklist

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

ATTENTION!!

- Backup the current configuration prior to performing the following steps so that the configuration is available if something goes wrong.
- 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.

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 34).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 35).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 39).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 44).

✓ Ensure that the zone member type is set to Port WWN (see “Zone Types” on page 52).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 58).

Configuration Limitations

When merging INRANGE and IBM BladeCenter fabrics, the maximum number of switches that can be configured depends upon the INRANGE 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.

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

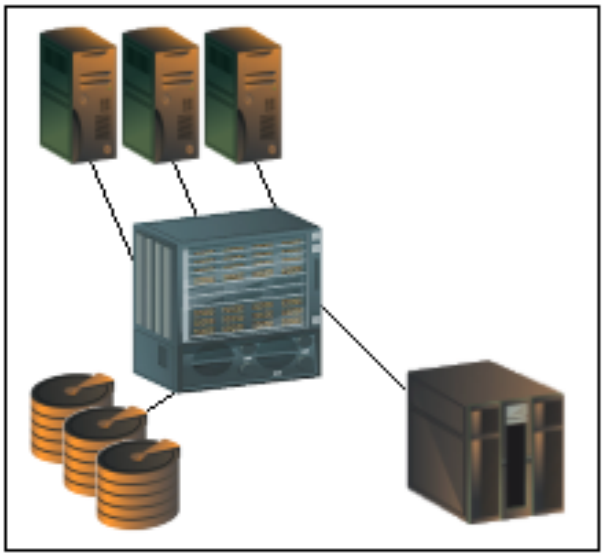
Supported Switches and Firmware Versions

The following IBM eServer BladeCenter Fibre Channel Switch Module has been tested in the IBM BladeCenter environment and complies with the FC-SW-2 standard. IBM eServer BladeCenter Fibre Channel Switch Module has tested interoperable with the following switches from INRANGE that comply with the FC-SW-2 standard.

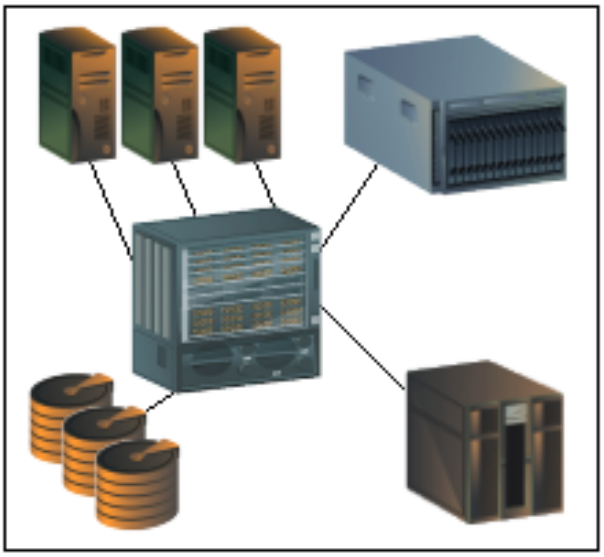
IBM and INRANGE Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above
INRANGE	FC9000-64	Code set 3.0.3.2 or above
	FC9000-128	Code set 3.0.3.2 or above

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



INRANGE Fibre Channel Fabric Prior to Integrating the IBM BladeCenter



INRANGE Fibre Channel Fabric with the IBM BladeCenter

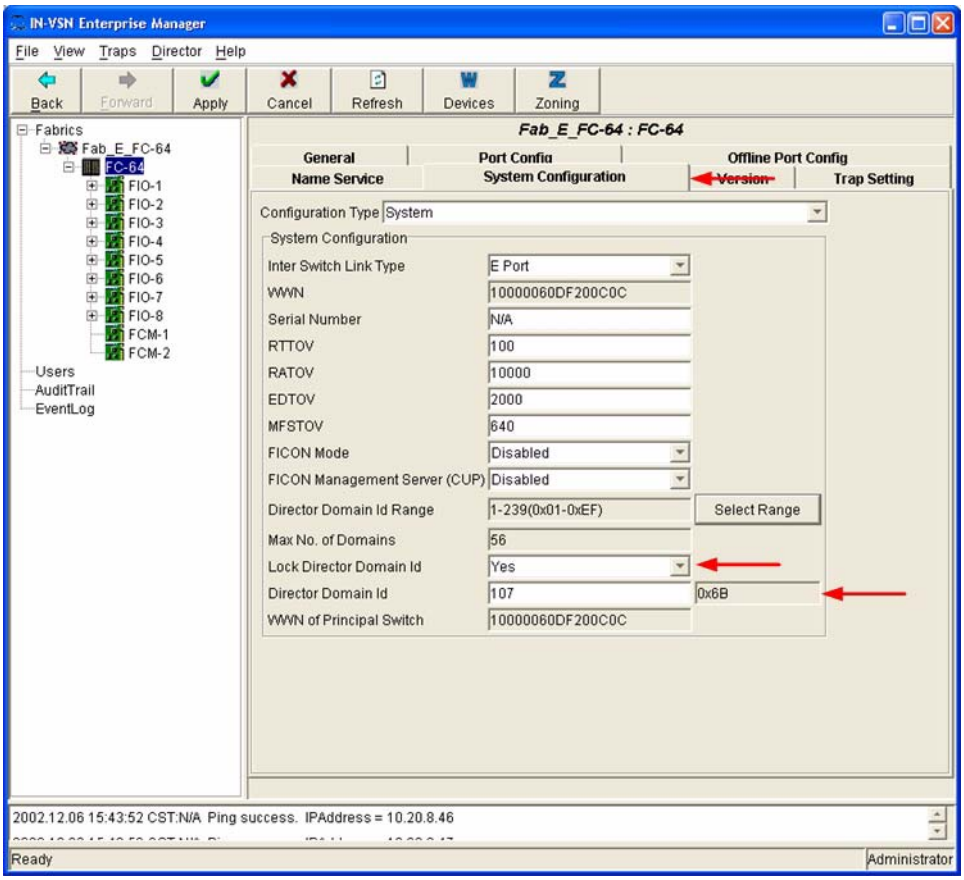
Domain ID Configuration

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 INRANGE switch and the IBM eServer BladeCenter Fibre Channel Switch Module.

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

INRANGE IN-VSN Enterprise Manager

1. Start the INRANGE 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**.

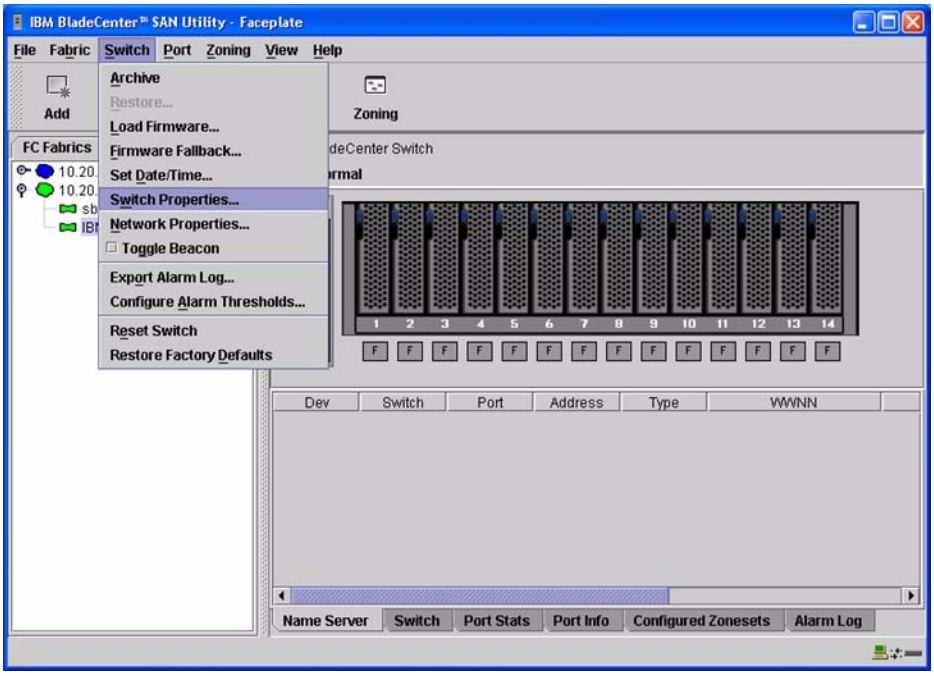


INRANGE CLI

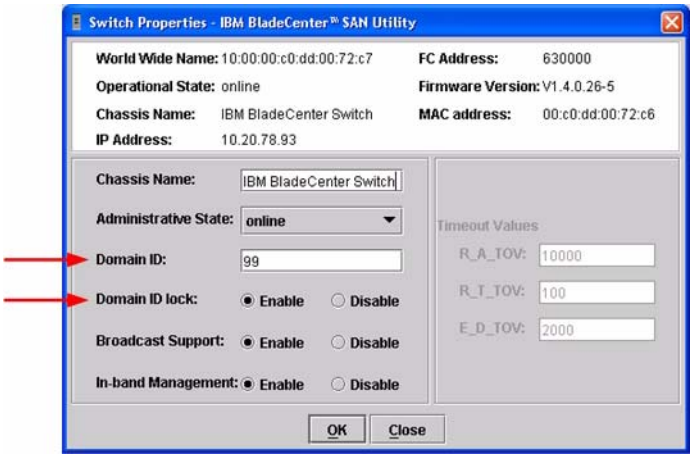
Not applicable.

IBM eServer 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. In the **Domain ID** box, type a unique Domain ID in the 1–239 range 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**.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: 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
```

Timeout Values

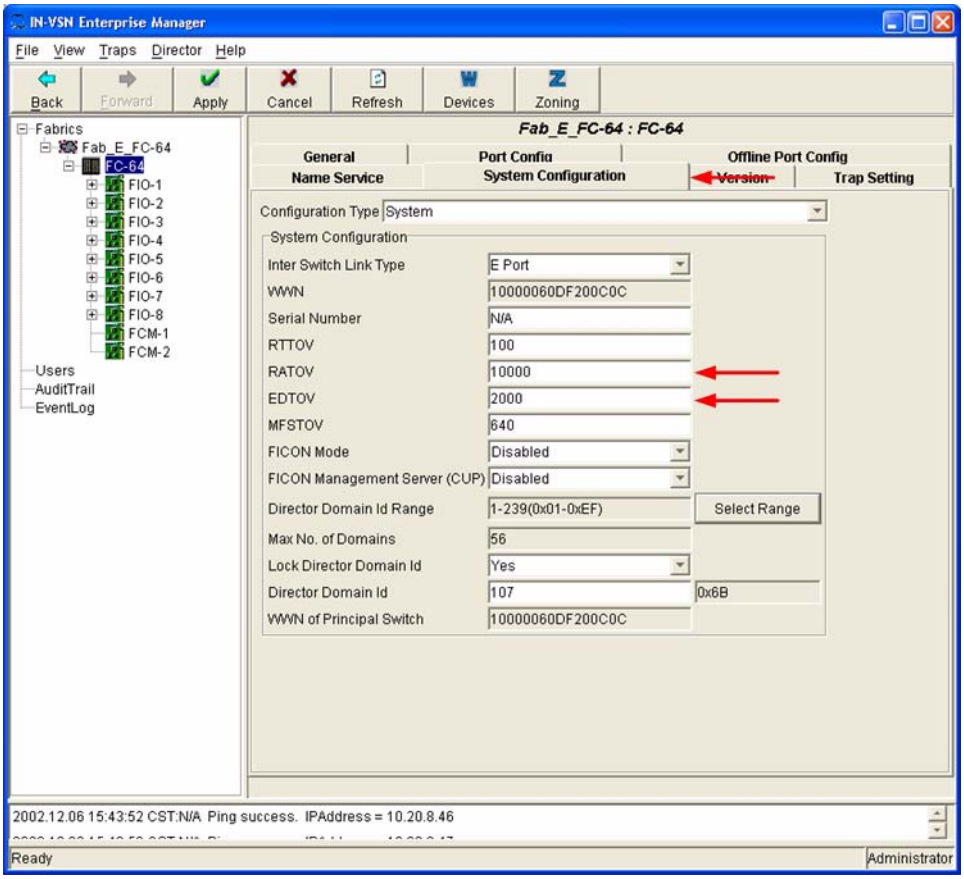
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

INRANGE IN-VSN Enterprise Manager

1. Start the INRANGE 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**.



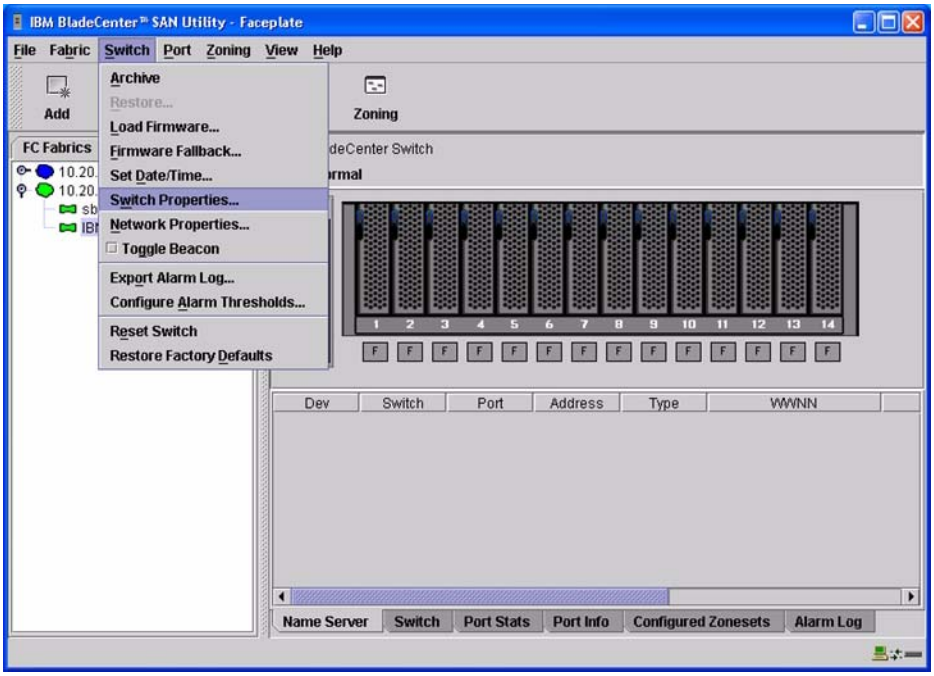
INRANGE CLI

Not applicable.

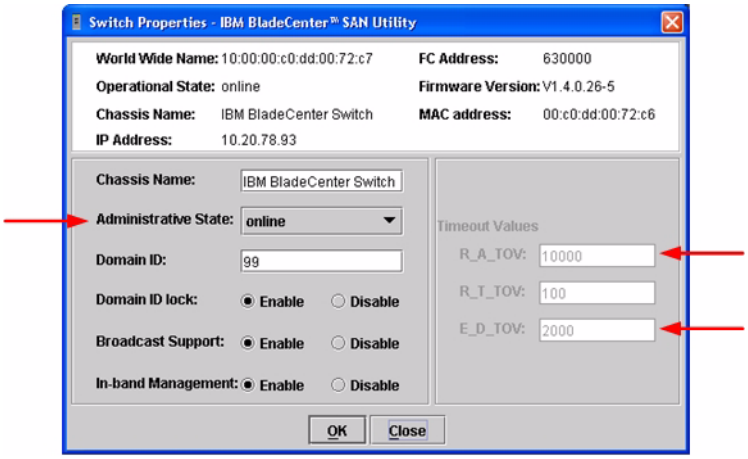
IBM eServer BladeCenter SAN Utility

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

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**.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> show config switch
```

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.

```
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
```

Principal Switch Configuration

INRANGE switches and IBM eServer BladeCenter Fibre Channel 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.

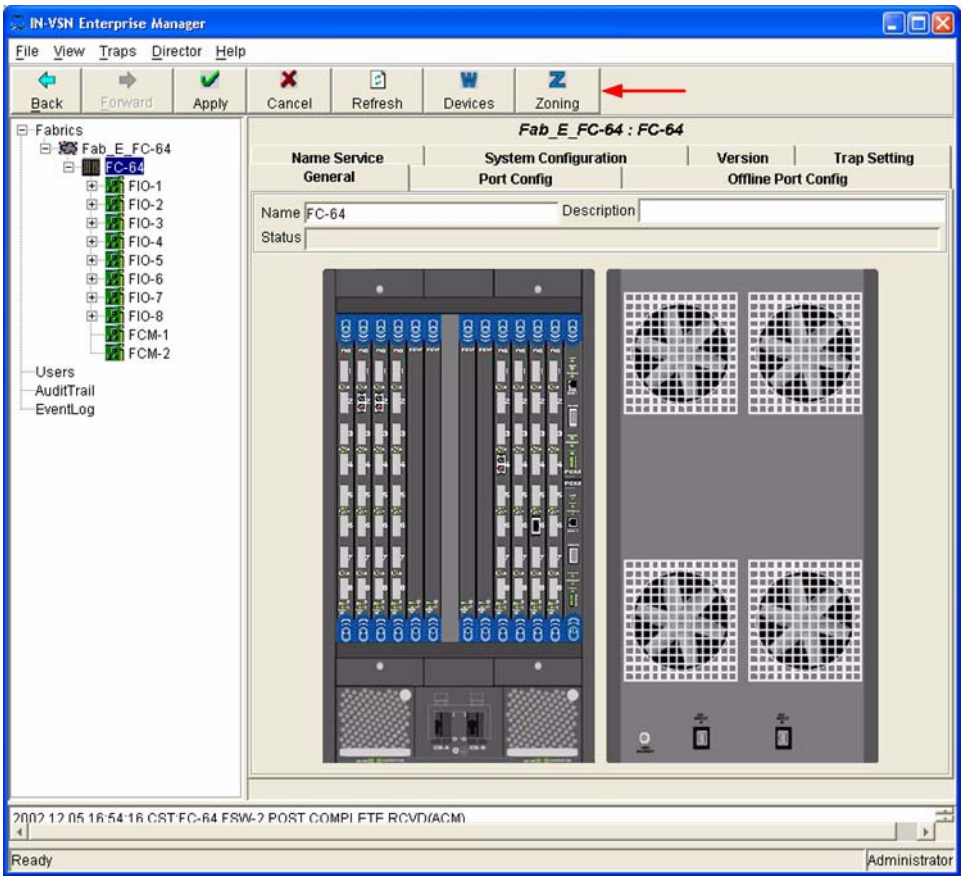
Active Zone Set Names

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):

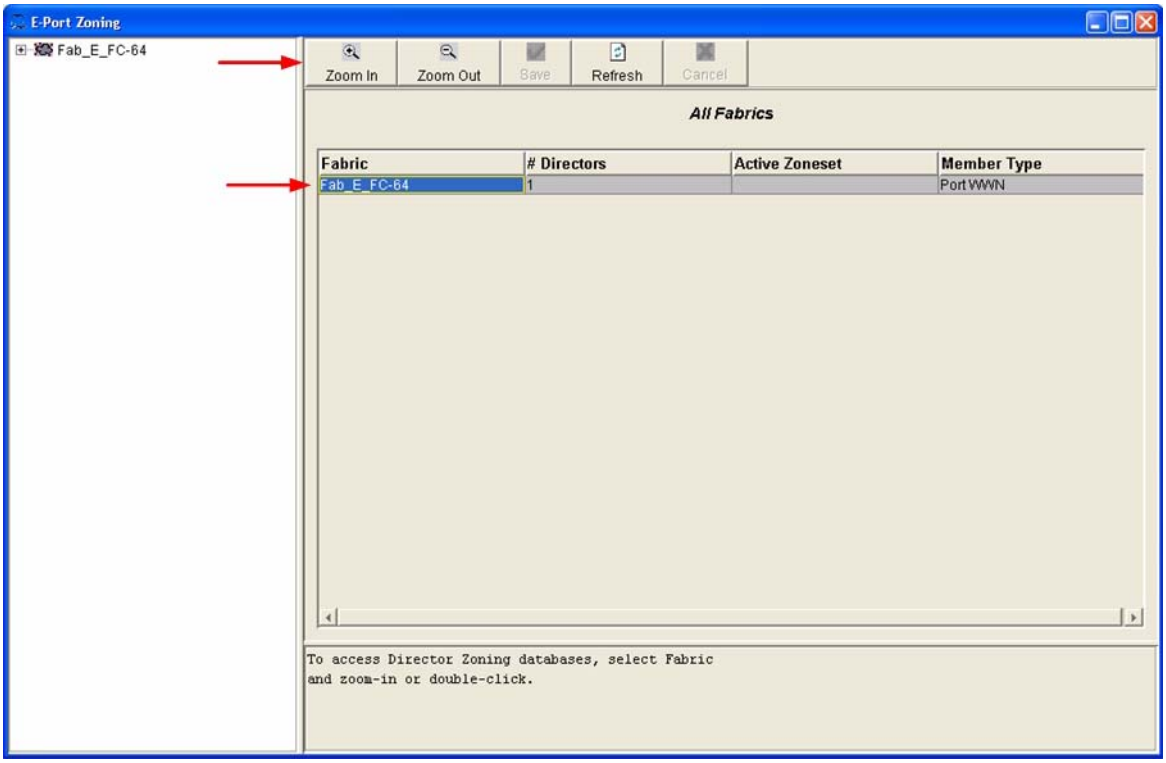
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

INRANGE IN-VSN Enterprise Manager

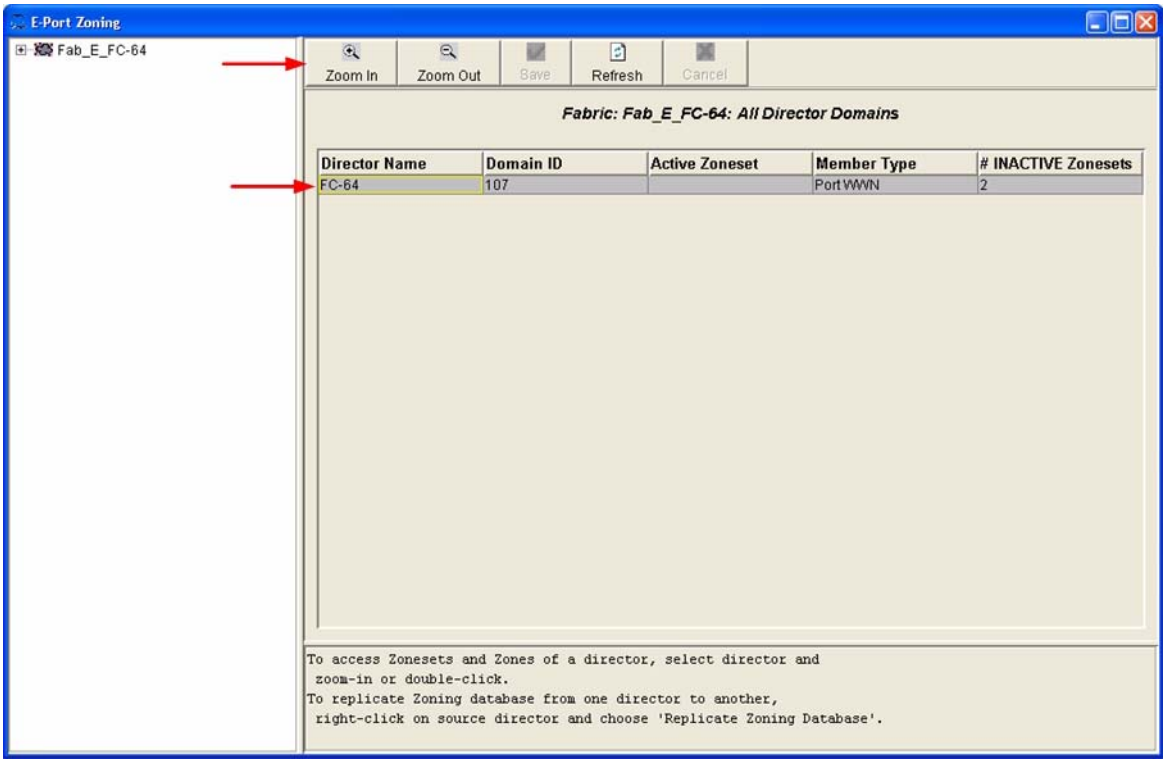
1. Start the INRANGE IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



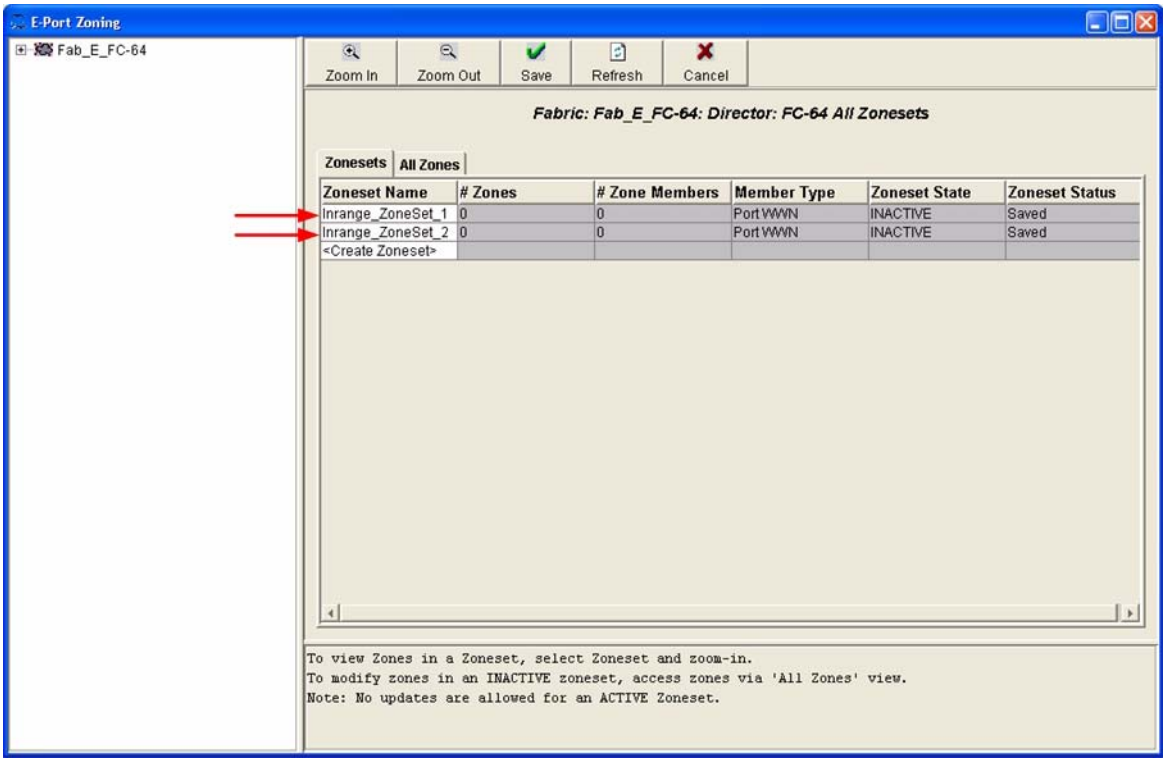
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



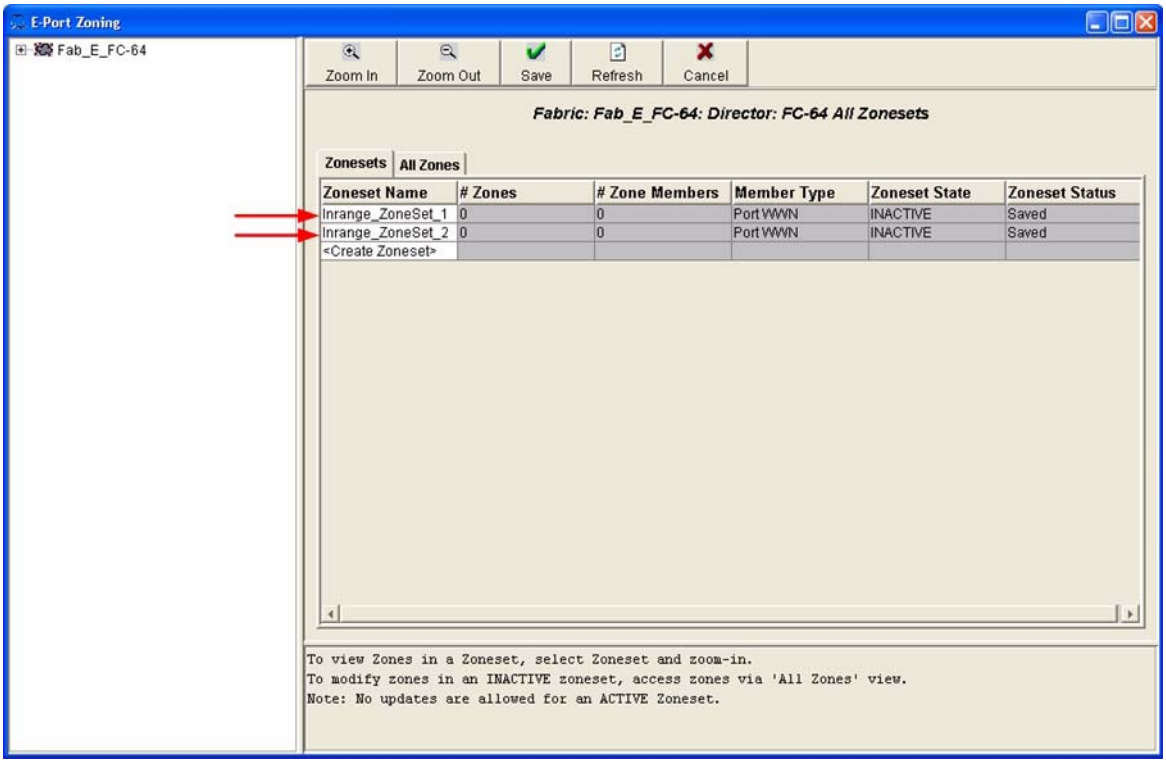
3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



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 44.



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 44.

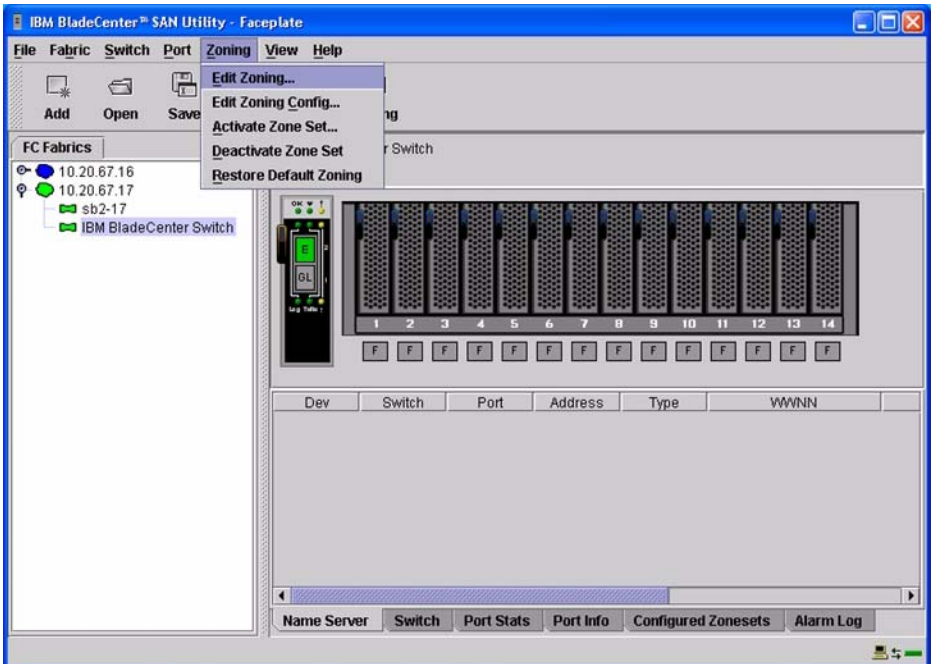


INRANGE CLI

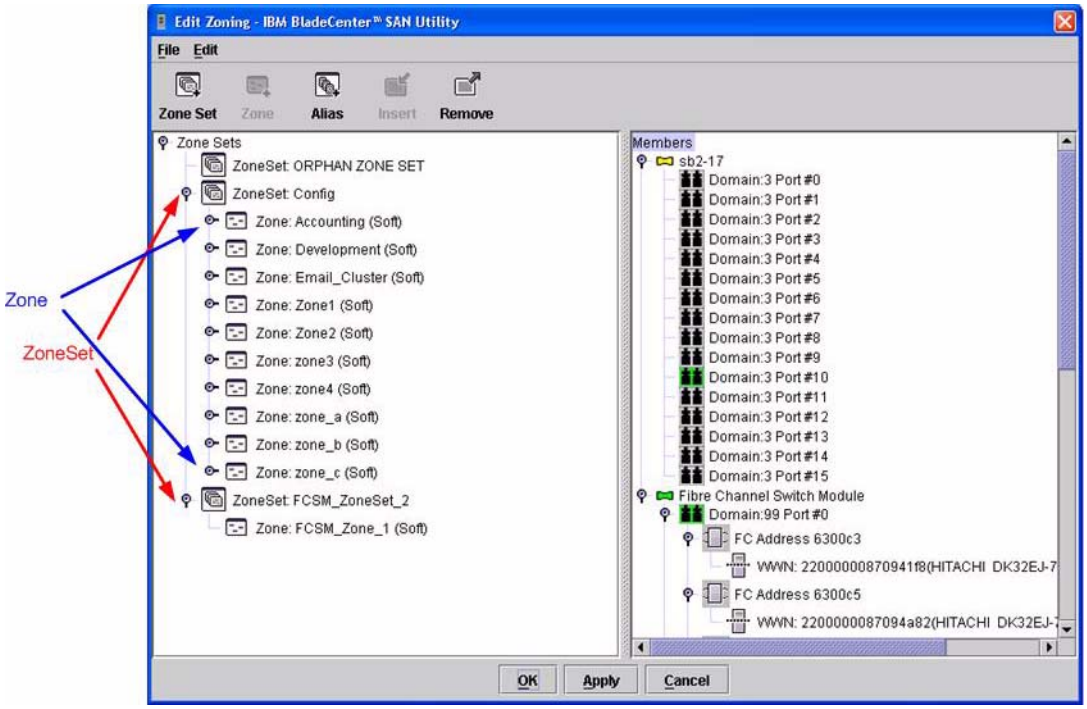
Not applicable.

IBM eServer 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” .



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

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

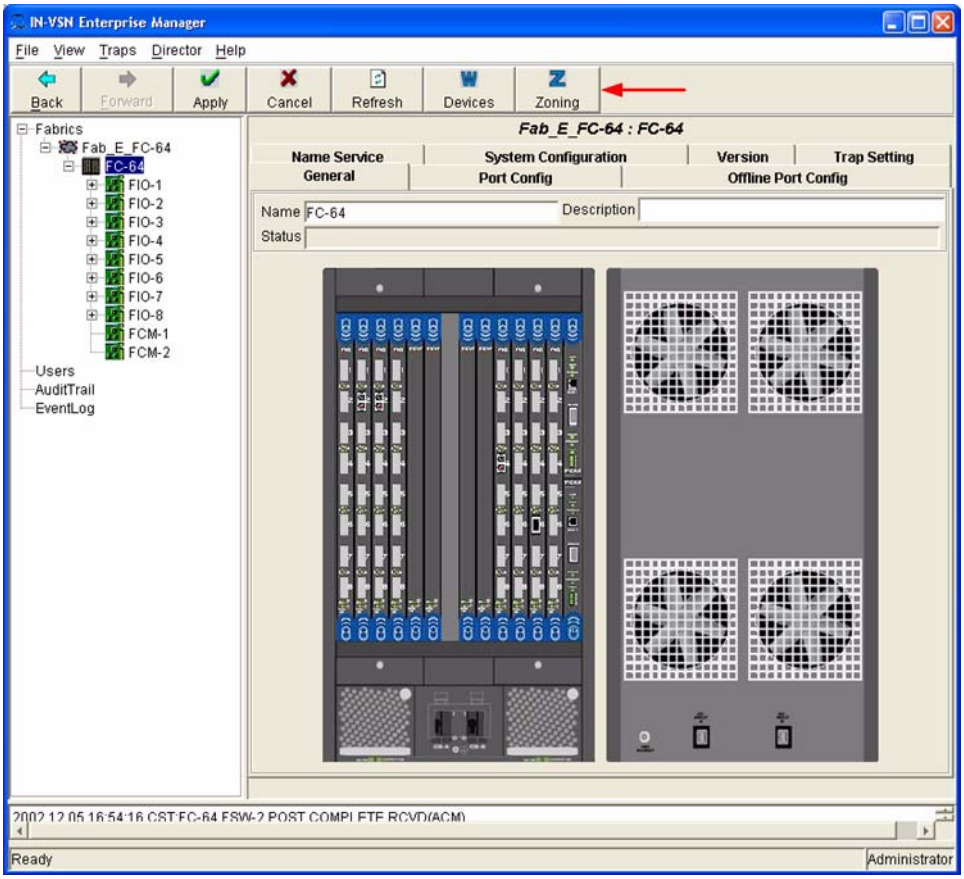
Zone Types

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.

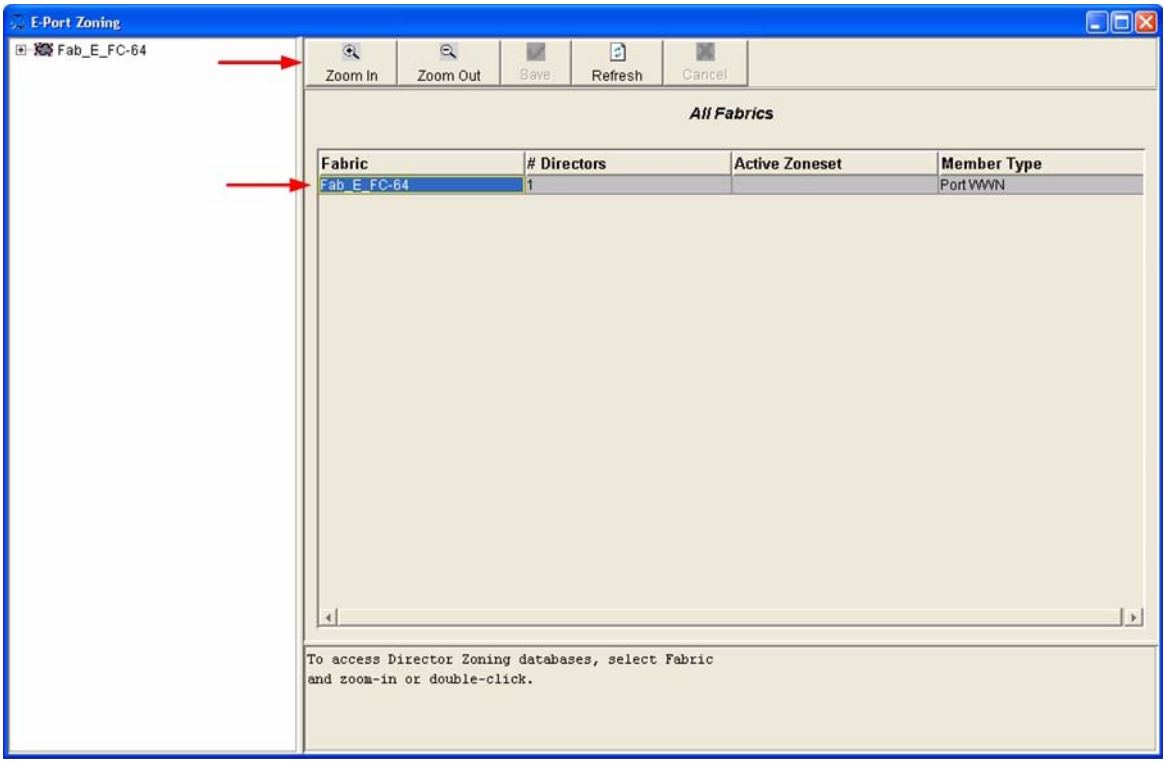
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

INRANGE IN-VSN Enterprise Manager

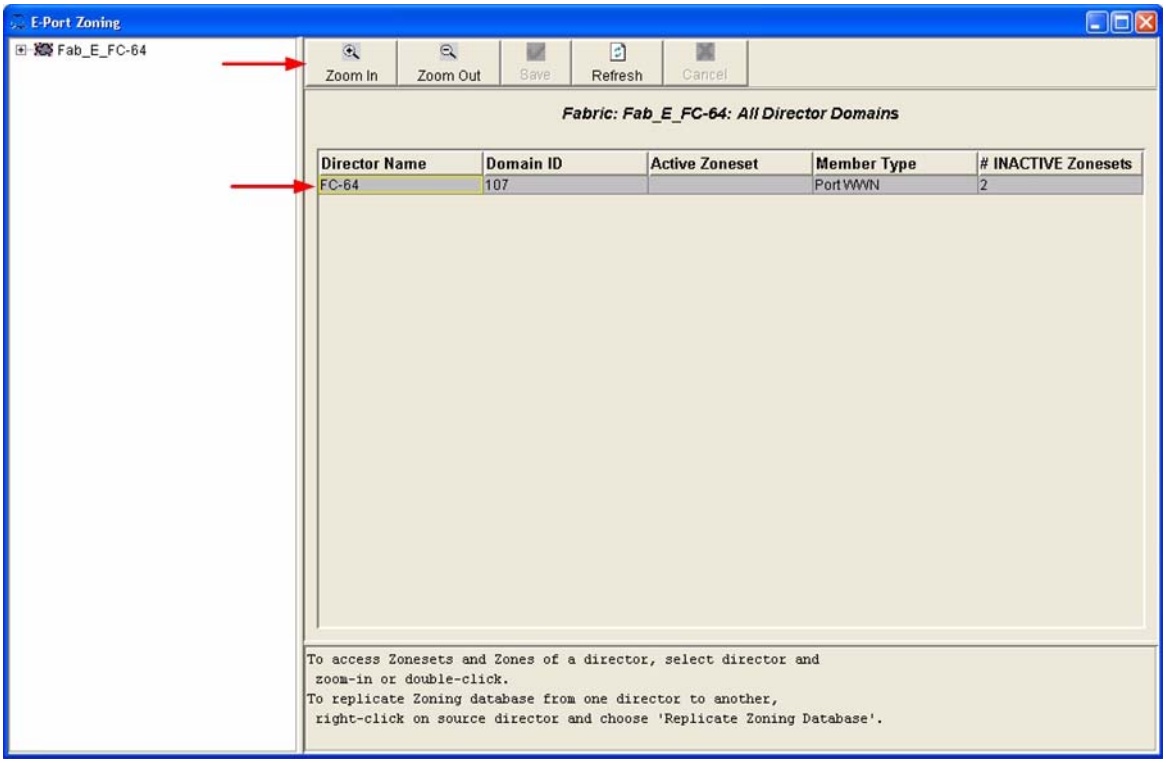
1. Start the INRANGE IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



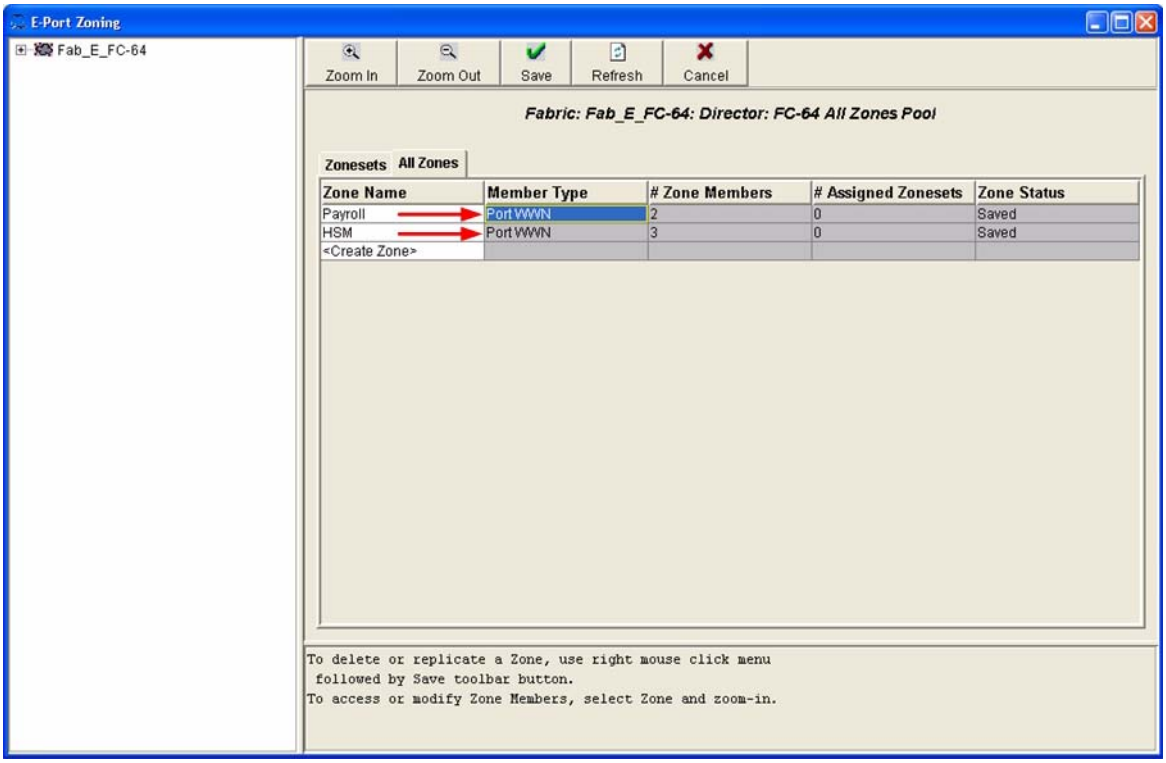
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



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**.

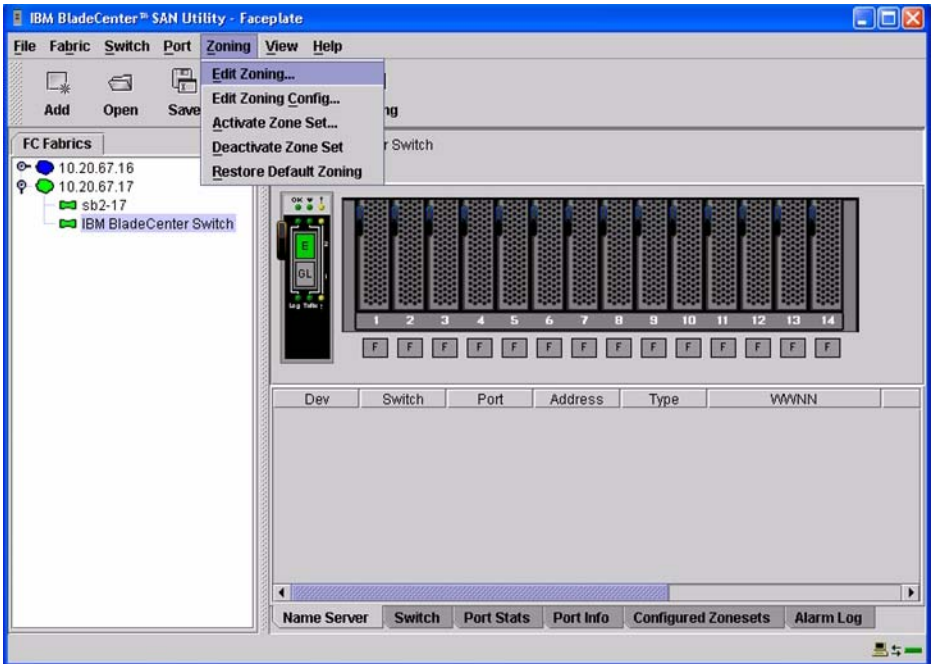


INRANGE CLI

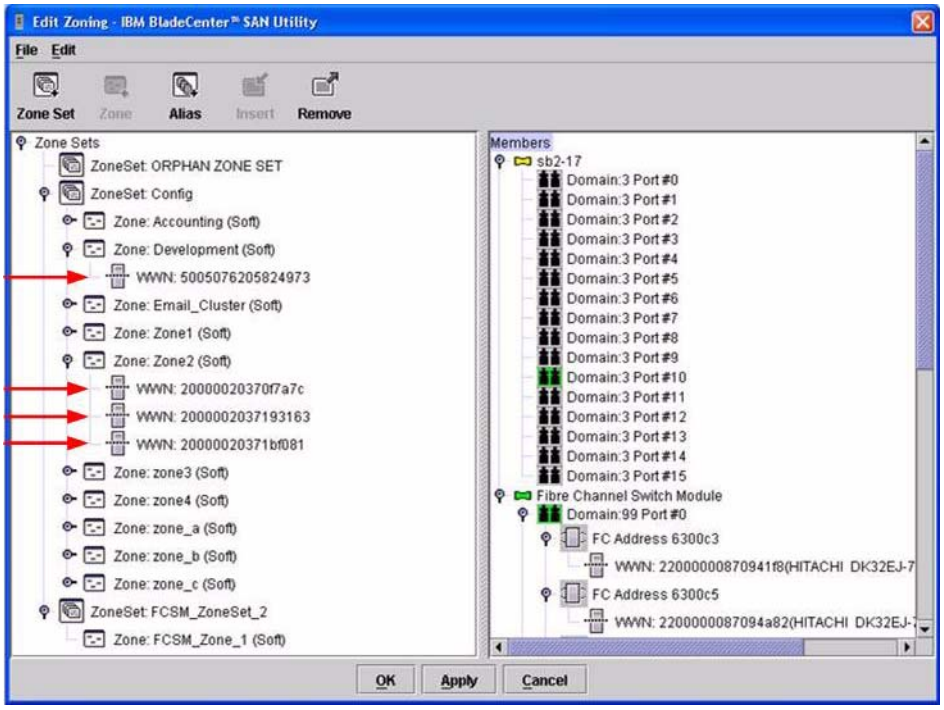
Not applicable.

IBM eServer 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.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

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

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

Operating Mode Configuration

Not applicable.

INRANGE 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.

Integrating BladeCenter into McDATA Fabrics

Integration Checklist

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

ATTENTION!!

- Backup the current configuration prior to performing the following steps so that the configuration is available if something goes wrong.
- 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.

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 60).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 61).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 68).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 76).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 81).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 85).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 90).

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.

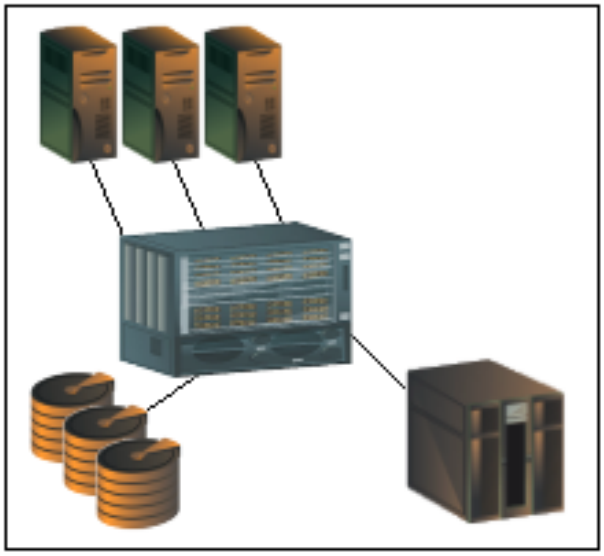
Supported Switches and Firmware Versions

The following IBM eServer BladeCenter Fibre Channel Switch Module has been tested in the IBM BladeCenter environment and complies with the FC-SW-2 standard. IBM eServer BladeCenter Fibre Channel Switch Module has tested interoperable with the following switch from McDATA that complies with the FC-SW-2 standard.

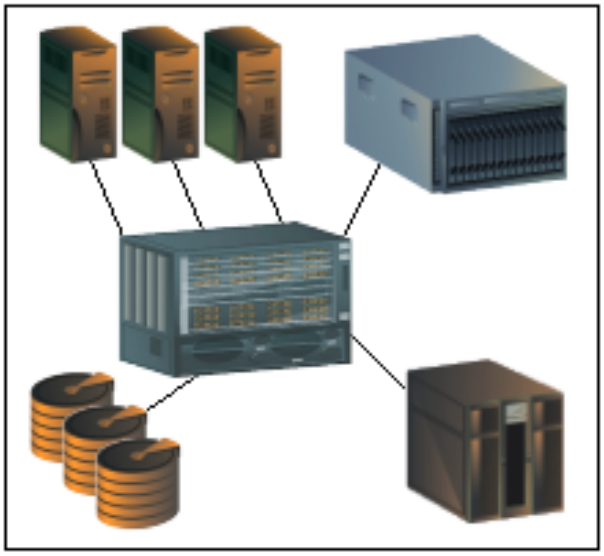
IBM and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above
McDATA	Sphereon 4500	04.01.00 12 or above

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



McDATA Fibre Channel Fabric Prior to Integrating the IBM BladeCenter



McDATA Fibre Channel Fabric with the IBM BladeCenter

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 the IBM eServer BladeCenter Fibre Channel Switch Module.

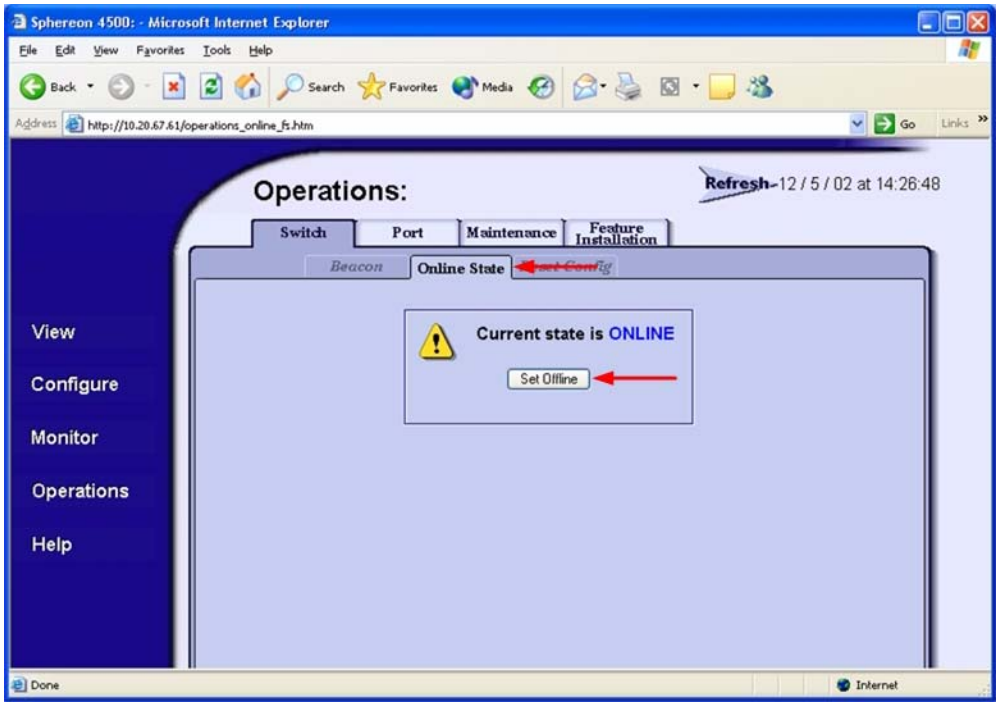
The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range. This is equivalent to 1–31 on the McDATA switch. The following chart lists the McDATA Domain ID and the corresponding IBM Domain ID.

McDATA Versus IBM Domain IDs

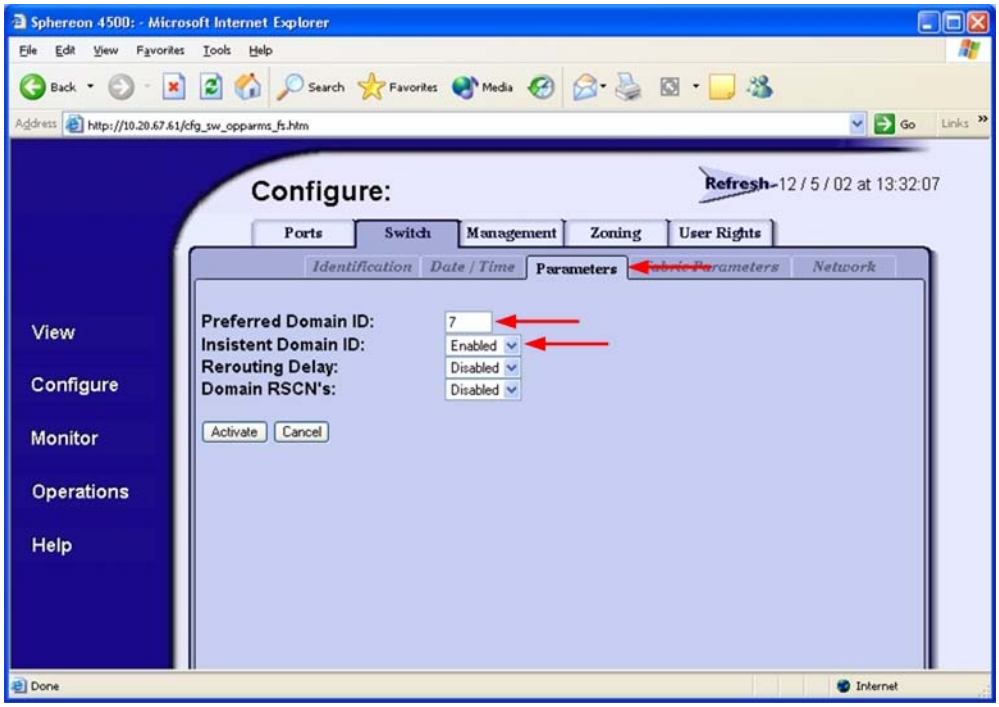
McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID	McDATA Domain ID	IBM Domain ID
1	97	11	107	21	117
2	98	12	108	22	118
3	99	13	109	23	119
4	100	14	110	24	120
5	101	15	111	25	121
6	102	16	112	26	122
7	103	17	113	27	123
8	104	18	114	28	124
9	105	19	115	29	125
10	106	20	116	30	126
—	—	—	—	31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

McDATA Sphereon Web Management

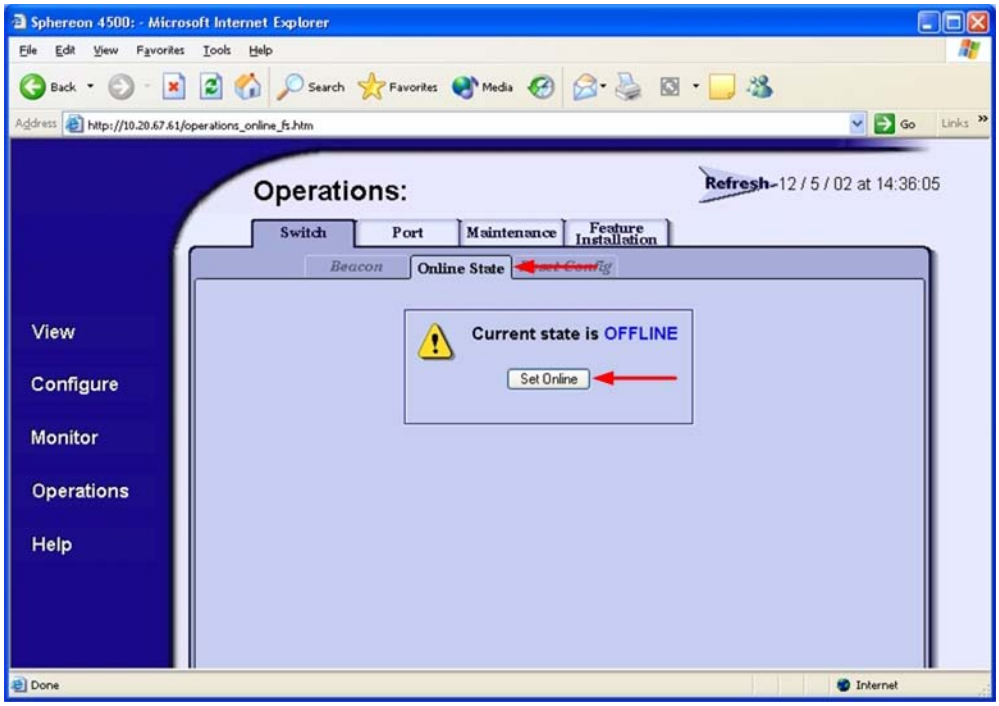
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Offline** button.



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.



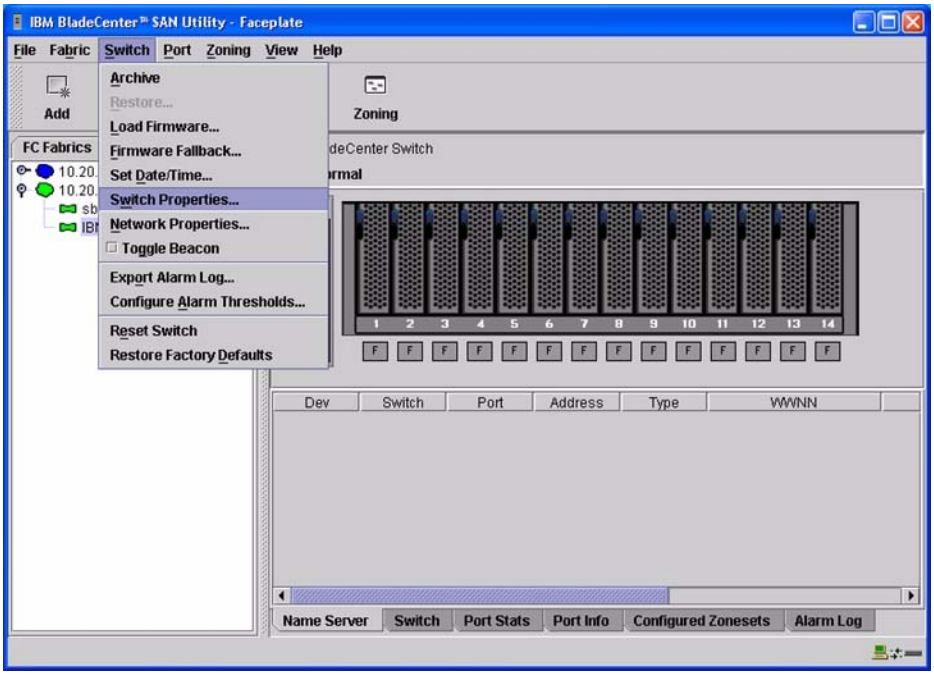
McDATA Telnet CLI

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

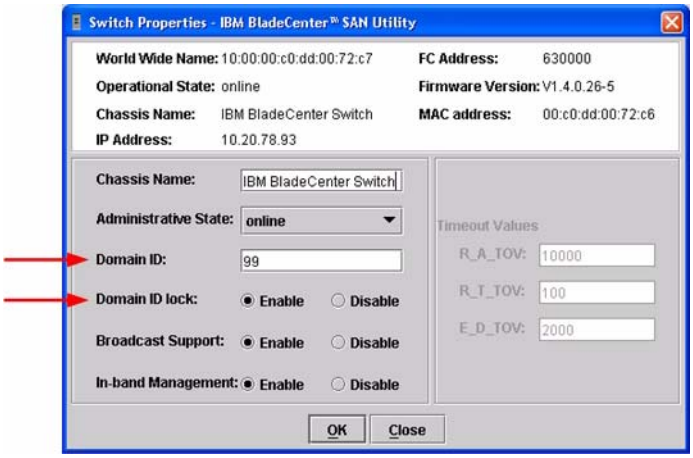
```
Username: Administrator
Password: xxxxxxxxx
Root> maint system
Maint.System> setOnlineState false
Maint.System> root
Root> config switch
Config.Switch> prefDomainId xx  (xx=unique domain id)
Config.Switch> insistDomainId enable
Config.Switch> root
Root> maint system
Maint.System> setOnlineState true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

IBM eServer 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. In the **Domain ID** box, type a unique Domain ID in the 97–127 range 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**.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxxx
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
```

Timeout Values

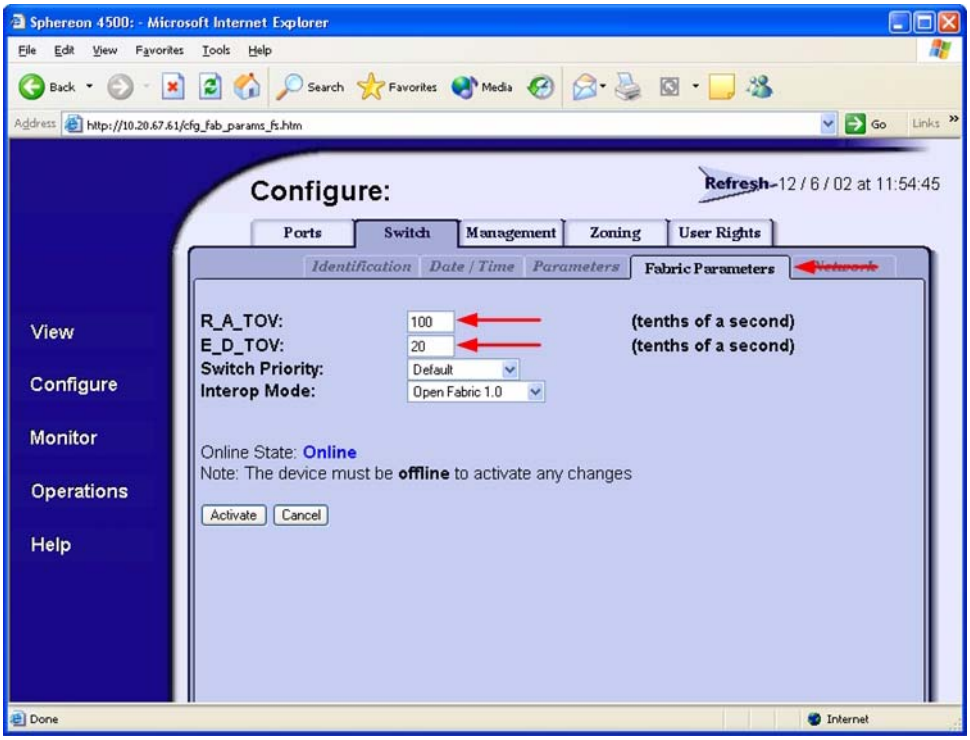
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

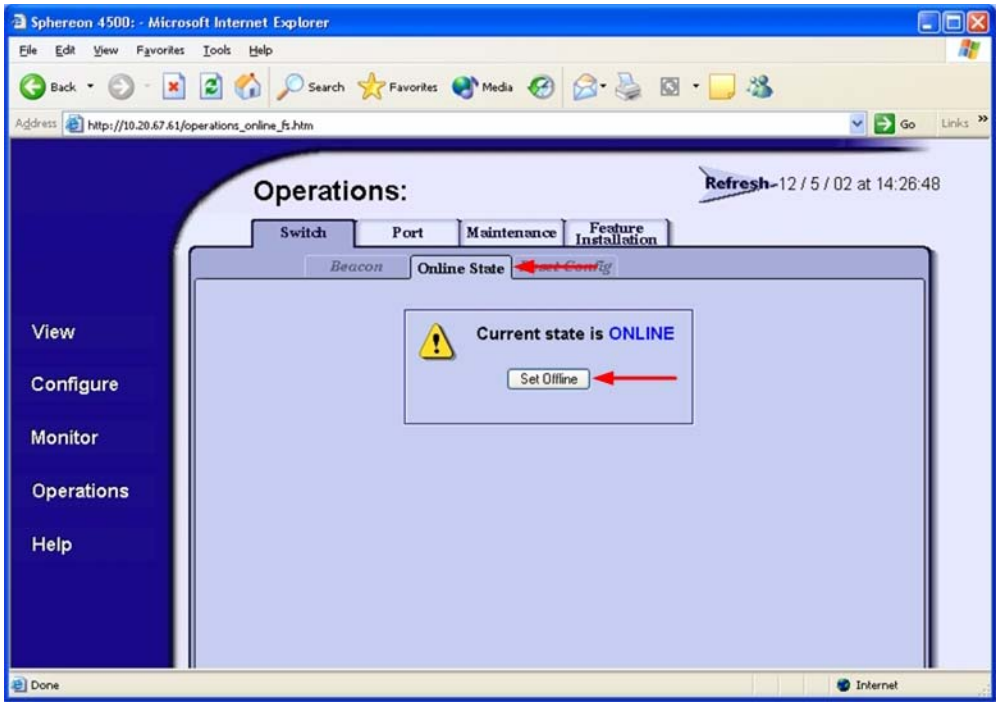
This section provides the steps to change these values.

McDATA Sphereon Web Management

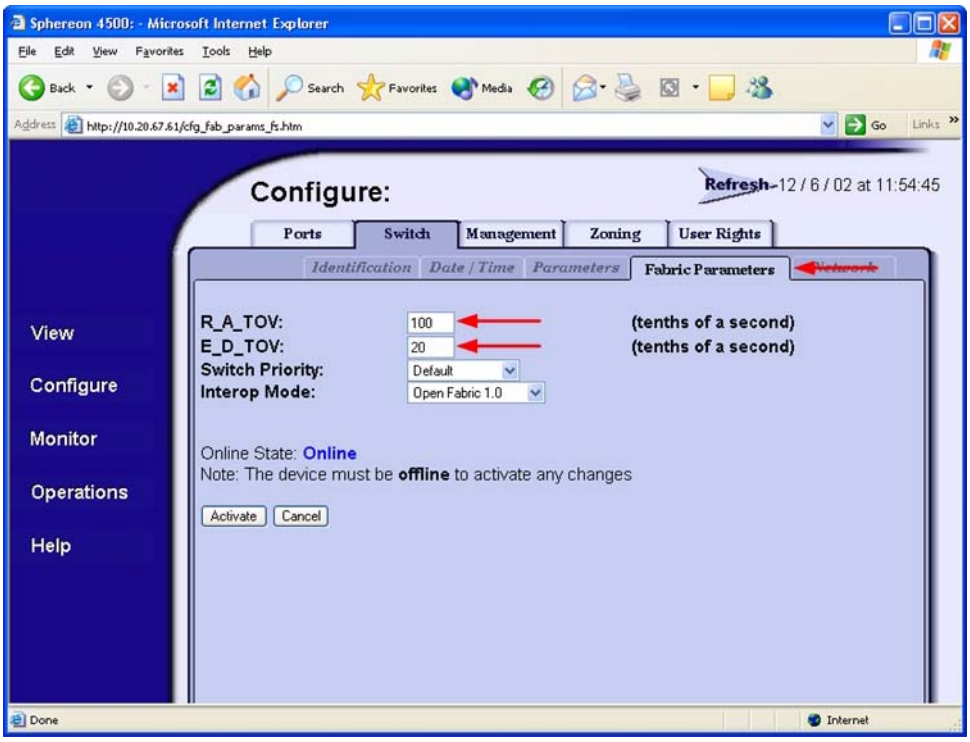
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, then select the **Fabric Parameters** tab. Verify that **R_A_TOV** is set to **100** and **E_D_TOV** 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.



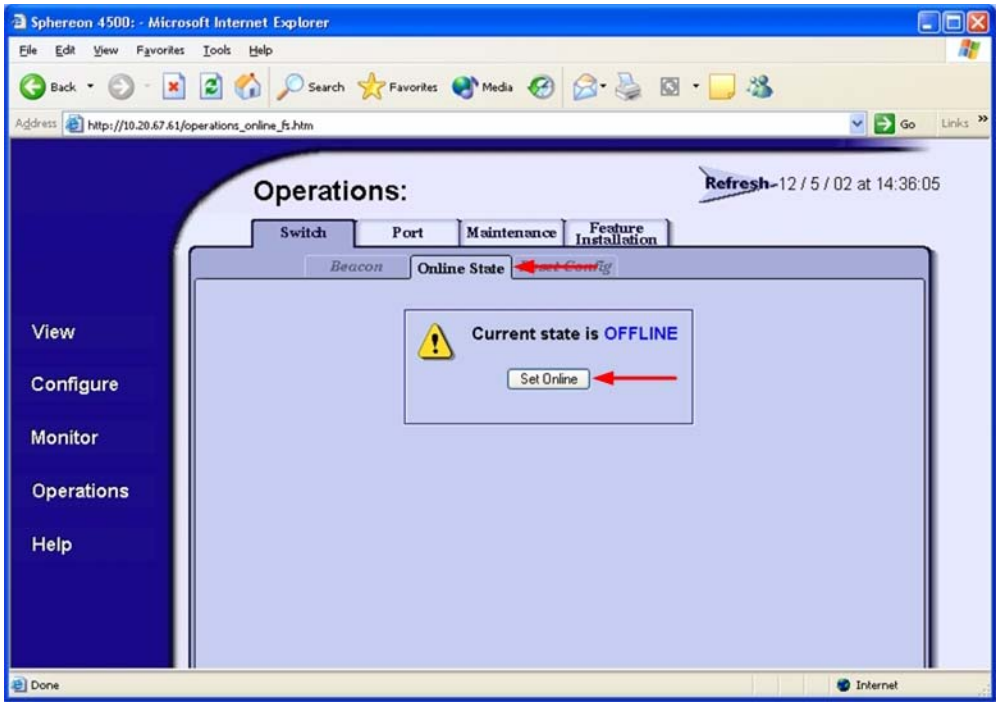
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Offline** button.



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
Root> show
Show> switch
```

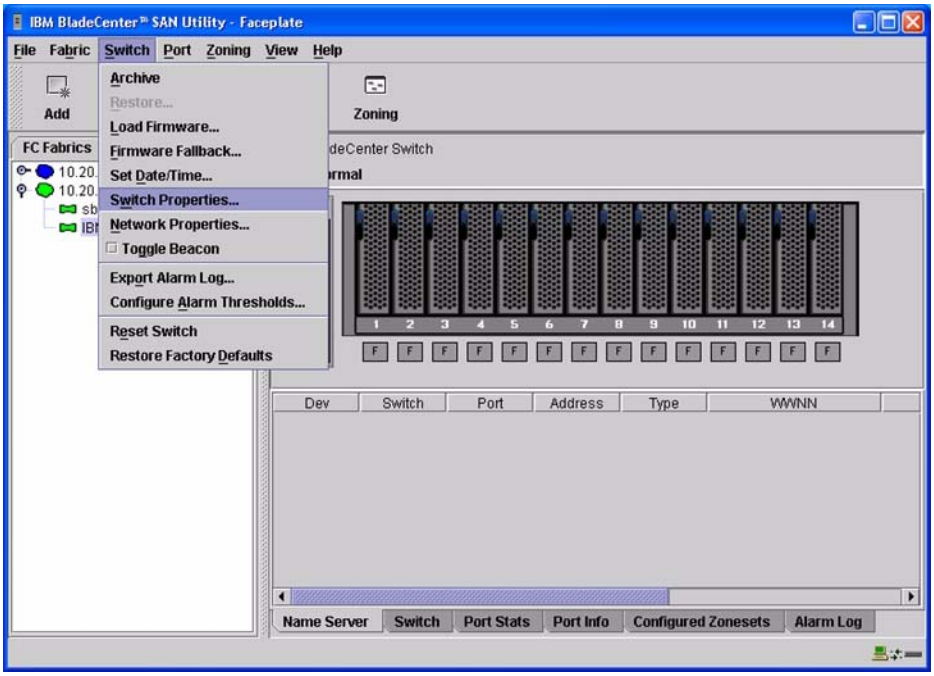
Use the above command to verify that R_A_TOV is set to 100 and E_D_TOV is set to 20. If these timeout values are not correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
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
```

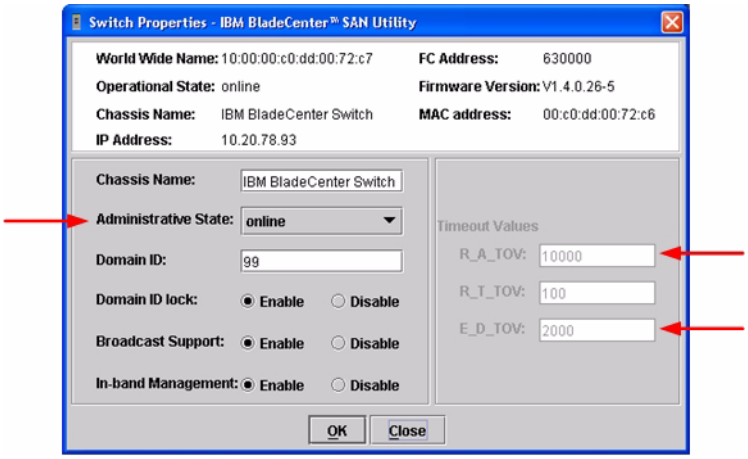
IBM eServer BladeCenter SAN Utility

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

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**, then click **OK**.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> show config switch
```

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.

```
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
```

Principal Switch Configuration

McDATA switches and IBM eServer BladeCenter Fibre Channel 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.

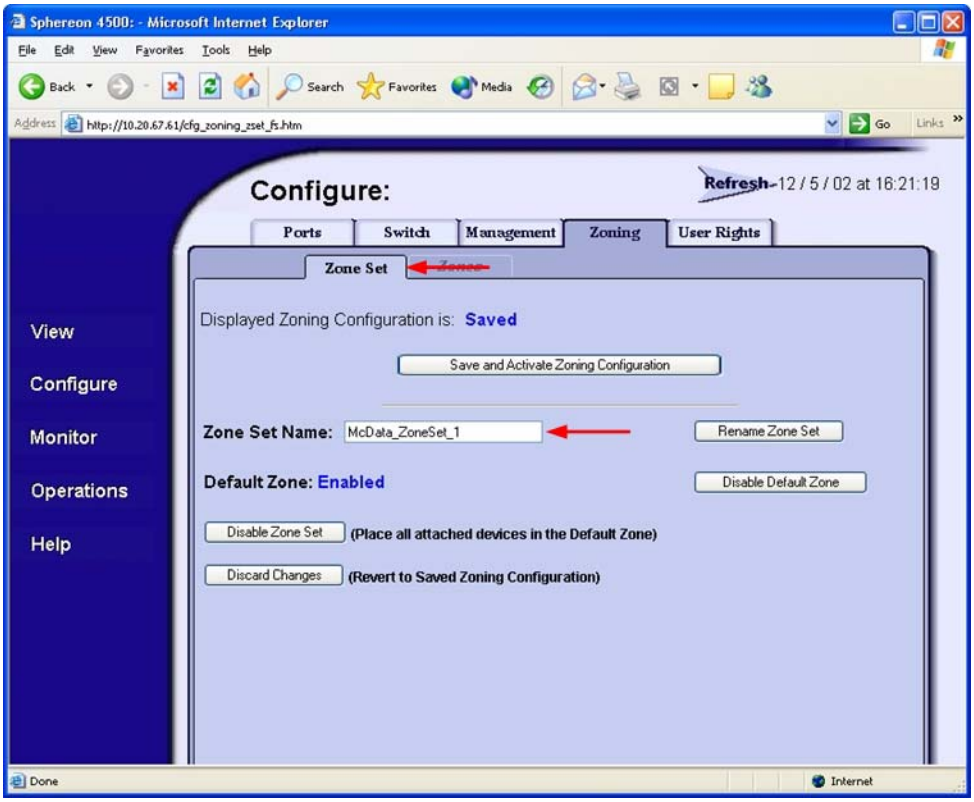
Active Zone Set Names

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):

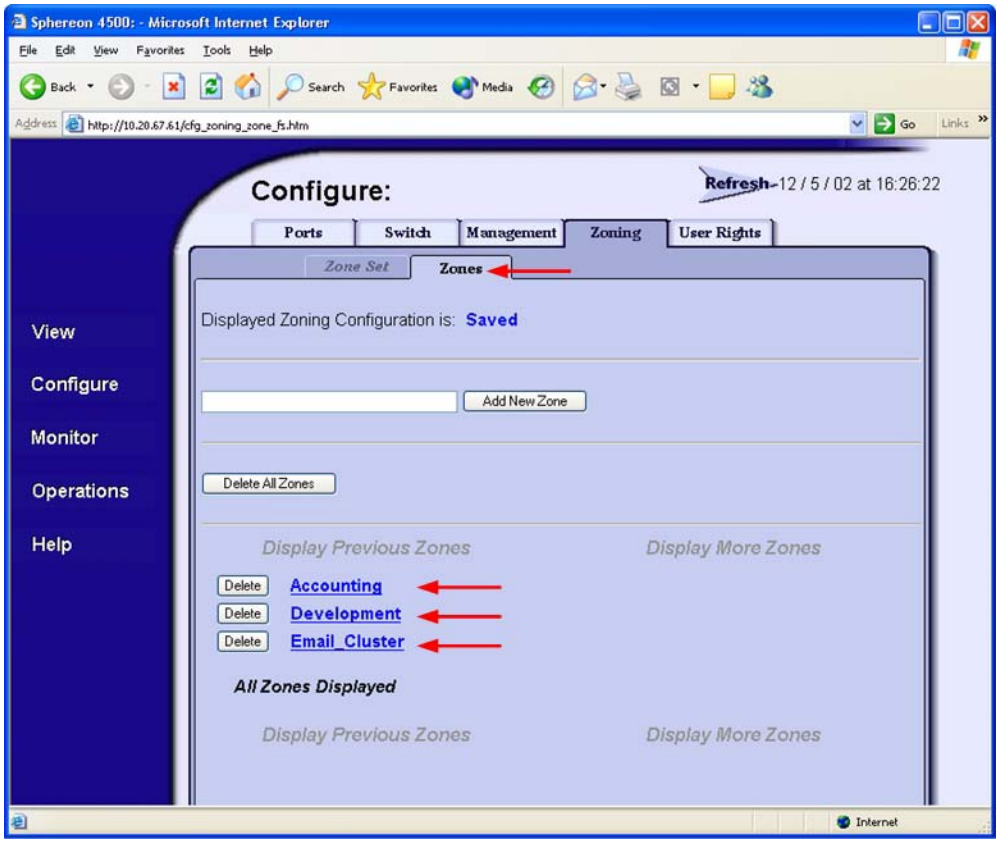
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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 76.



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 76.



McDATA Telnet CLI

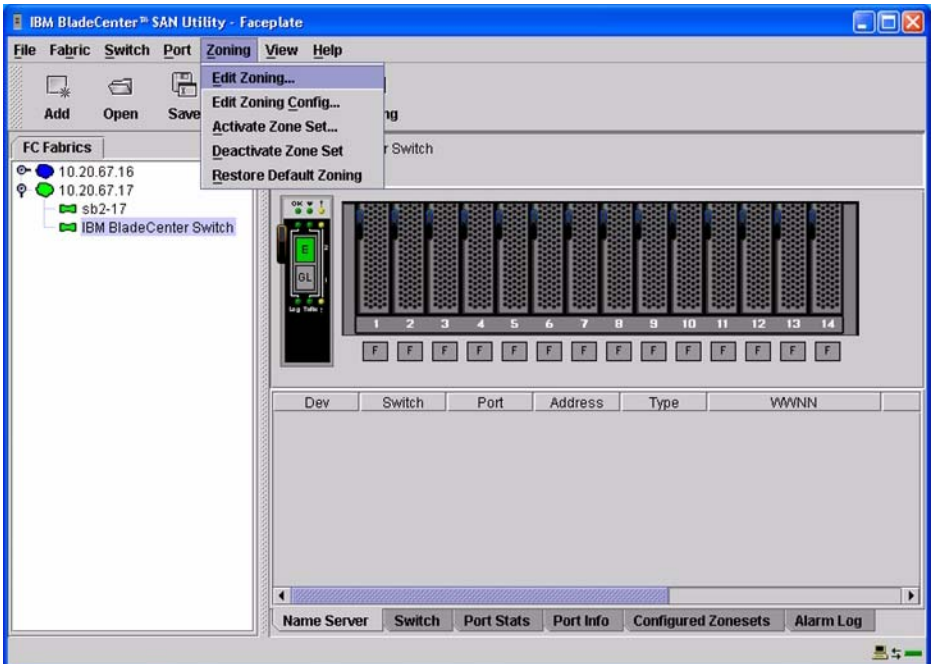
NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

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

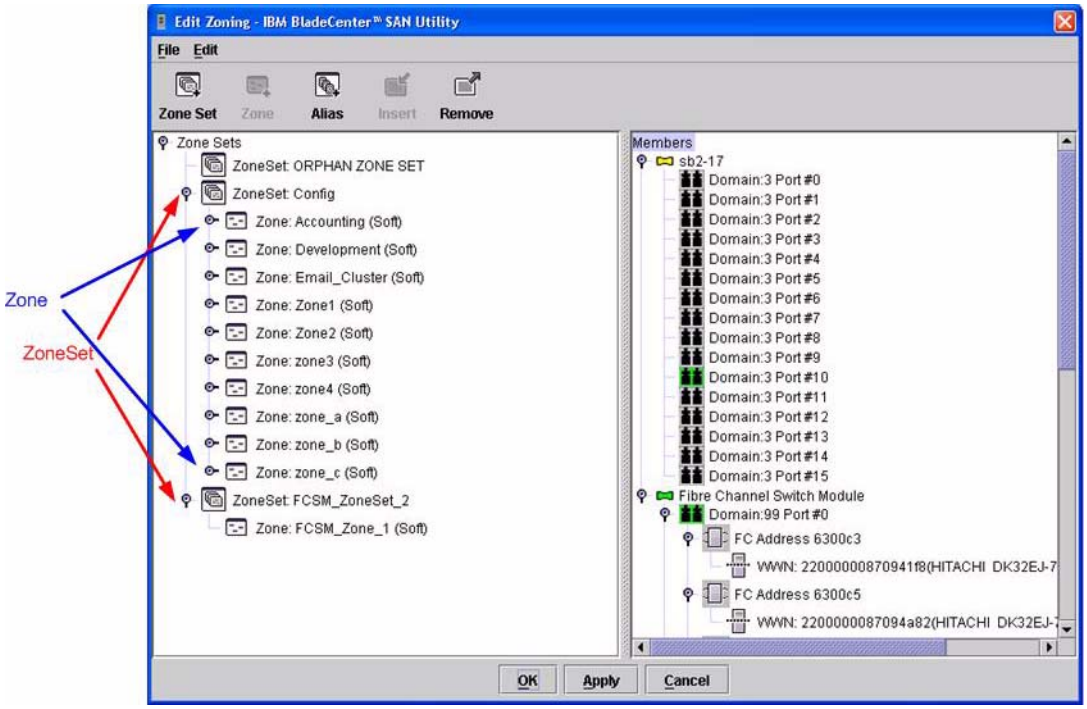
Verify that the Zone Set and Zone Names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 76.

IBM eServer 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 76.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

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

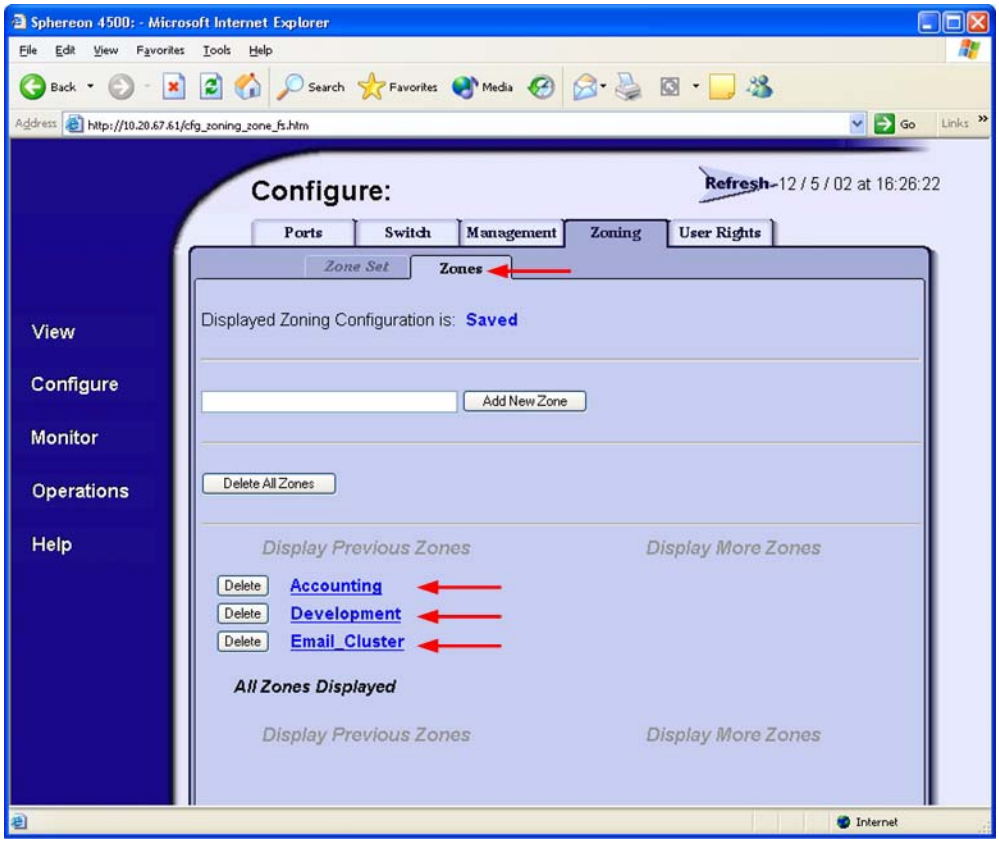
Zone Types

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.

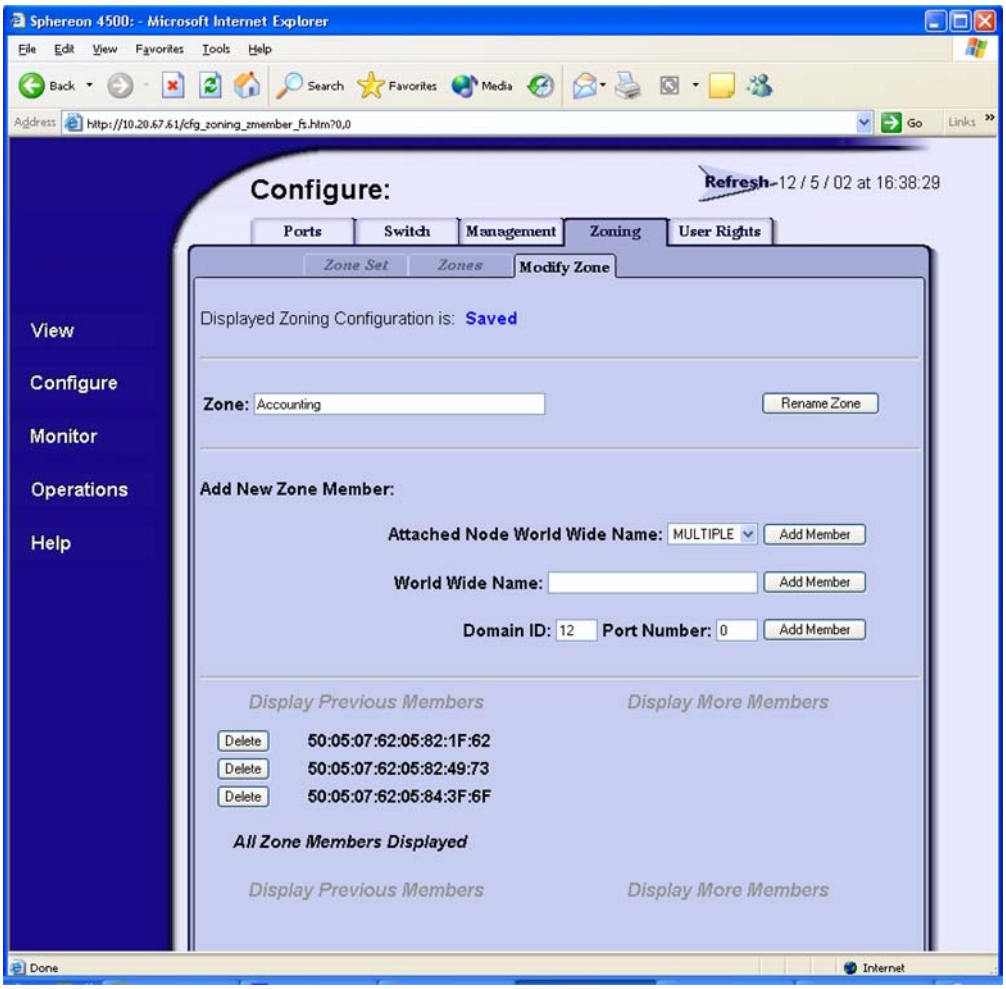
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

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

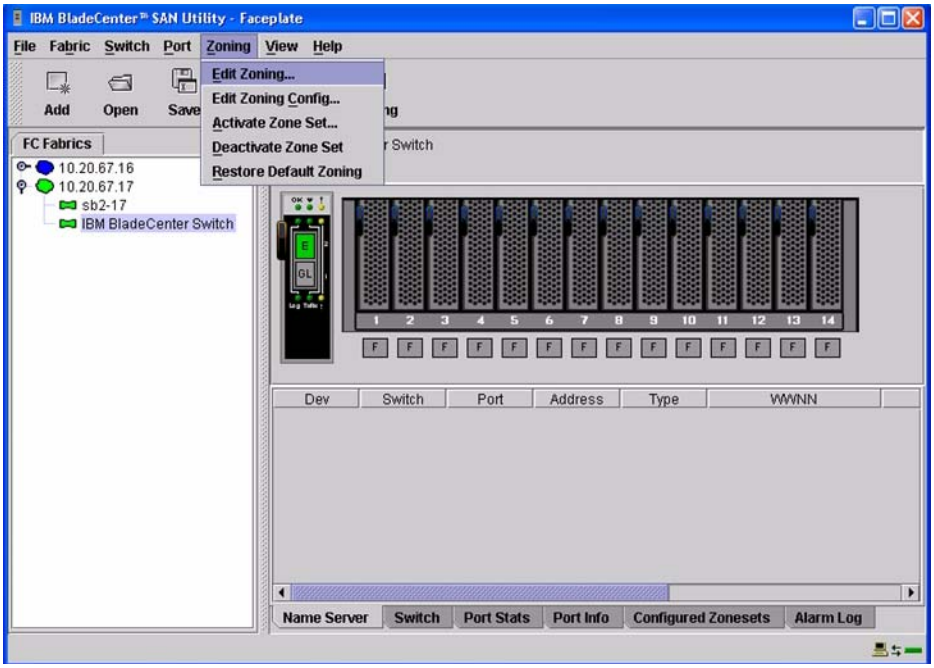
NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

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

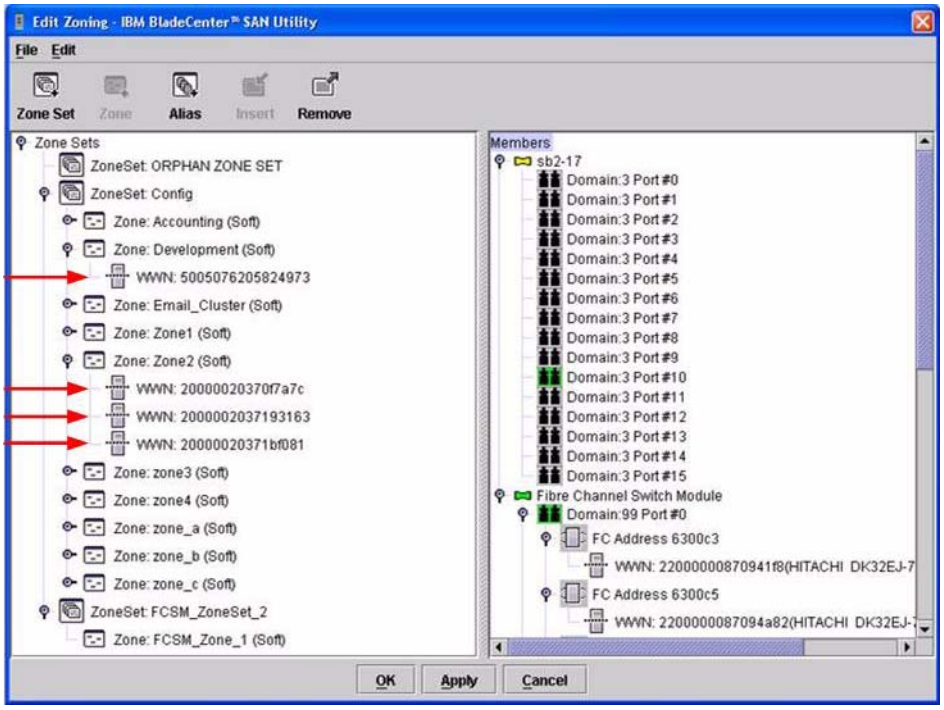
Verify that all of the Zone members are specified by WWN.

IBM eServer 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.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

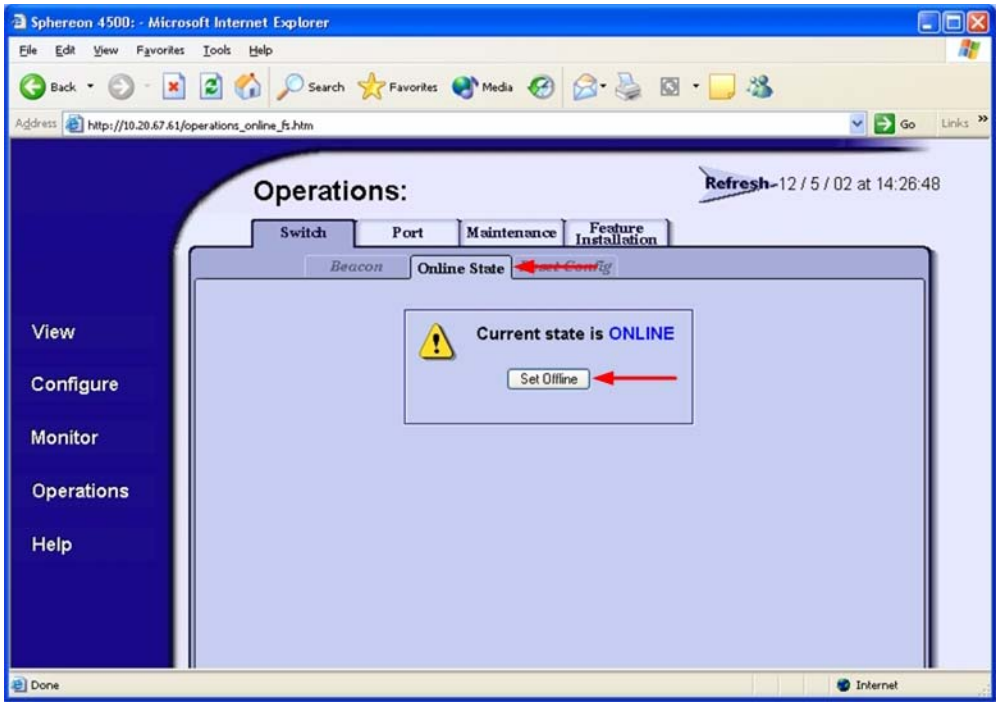
```
Login: admin
Password: xxxxxxxxx
IBM BladeCenter  #> zone members <zone name>
```

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

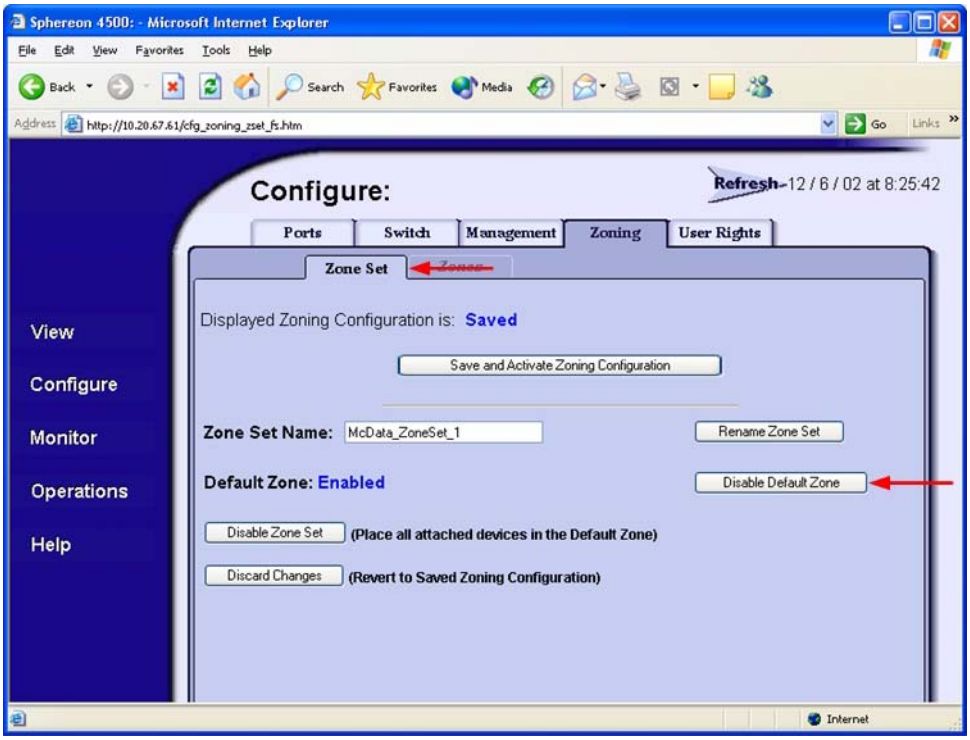
Operating Mode Configuration

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.



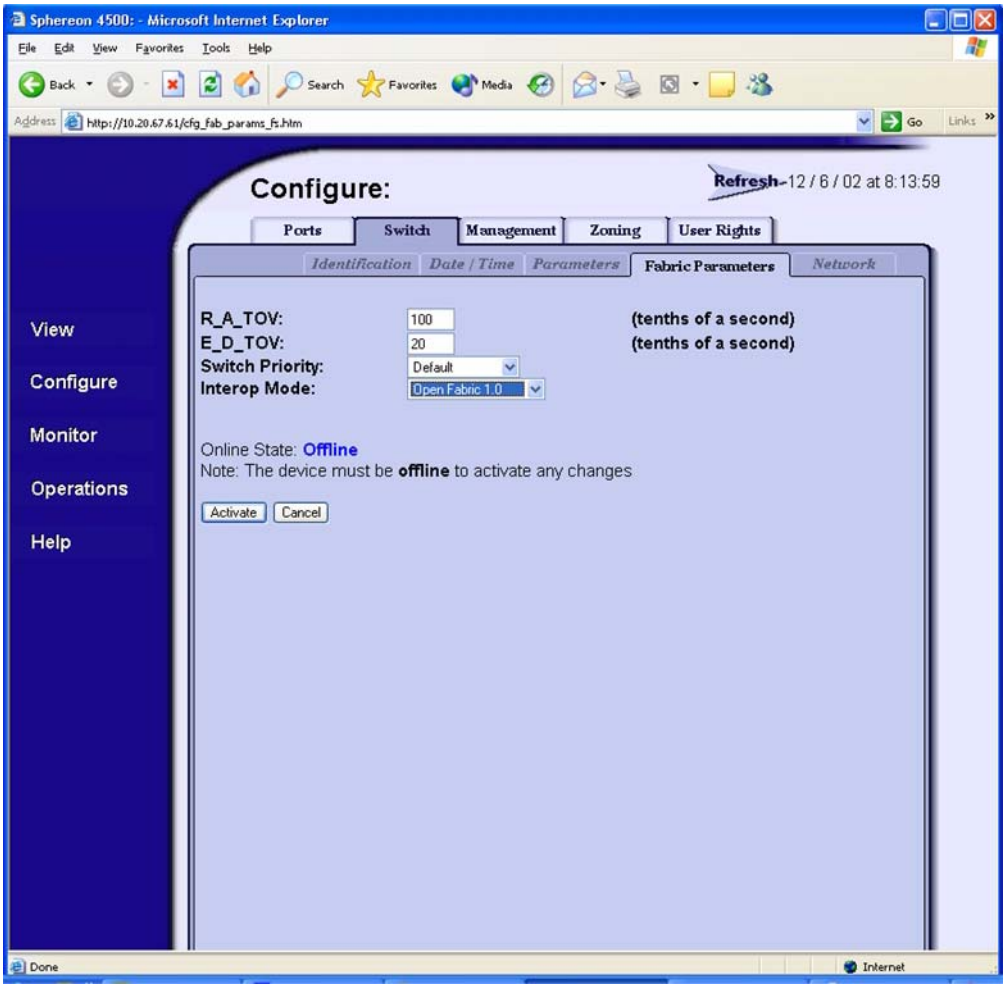
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.



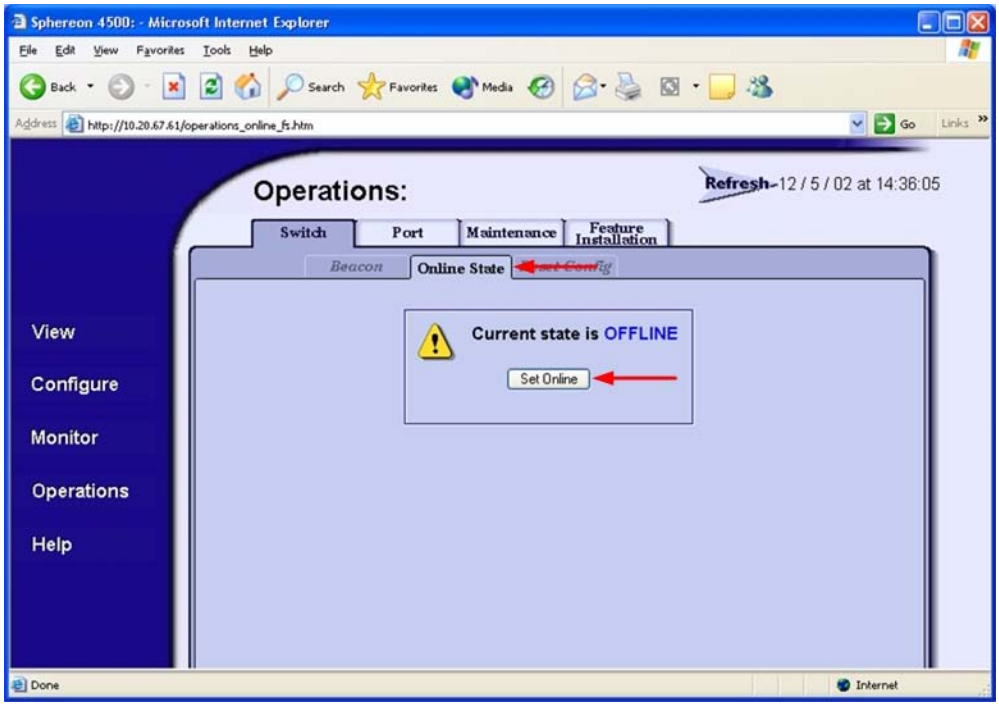
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:

   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 eServer BladeCenter Fibre Channel Switch Module 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.

Integrating BladeCenter into QLogic Fabrics

Integration Checklist

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

ATTENTION!!

- Backup the current configuration prior to performing the following steps so that the configuration is available if something goes wrong.
- 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.

✓ Verify that the correct version of switch firmware is installed on each switch (see “Supported Switches and Firmware Versions” on page 92).

✓ Ensure that each switch has a unique Domain ID (see “Domain ID Configuration” on page 93).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 99).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 105).

✓ Ensure that all QLogic switches are configured for Merge Active Zonesets Only or SW2 mode, as appropriate (see “Operating Mode Configuration” on page 109).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 111).

Configuration Limitations

No limitations exist when merging QLogic and IBM BladeCenter fabrics; all features are fully supported and comply with industry standards.

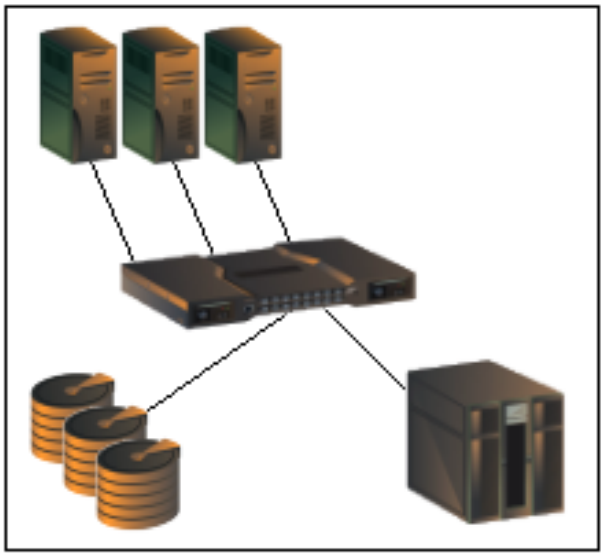
Supported Switches and Firmware Versions

The following IBM eServer BladeCenter Fibre Channel Switch Module has been tested in the IBM BladeCenter environment and complies with the FC-SW-2 standard. IBM eServer BladeCenter Fibre Channel Switch Module has tested interoperable with the following switches from QLogic that comply with the FC-SW-2 standard.

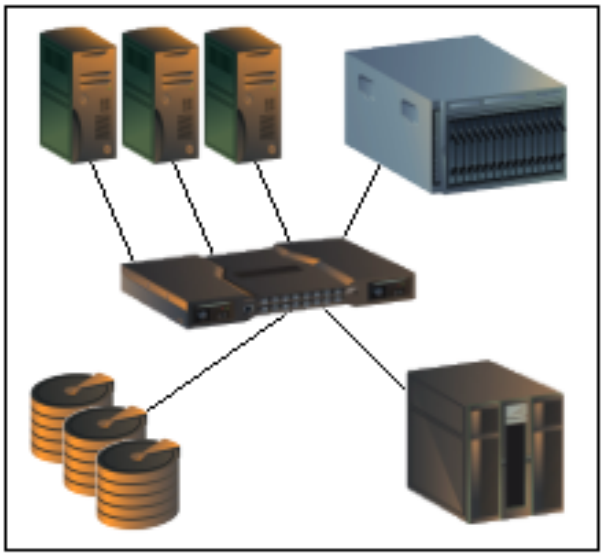
IBM and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above
QLogic	SANbox2-8	1.3.56 and above
	SANbox2-16	1.3.56 and above
	SANbox2-64	1.3.56 and above

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



QLogic Fibre Channel Fabric Prior to Integrating the IBM BladeCenter



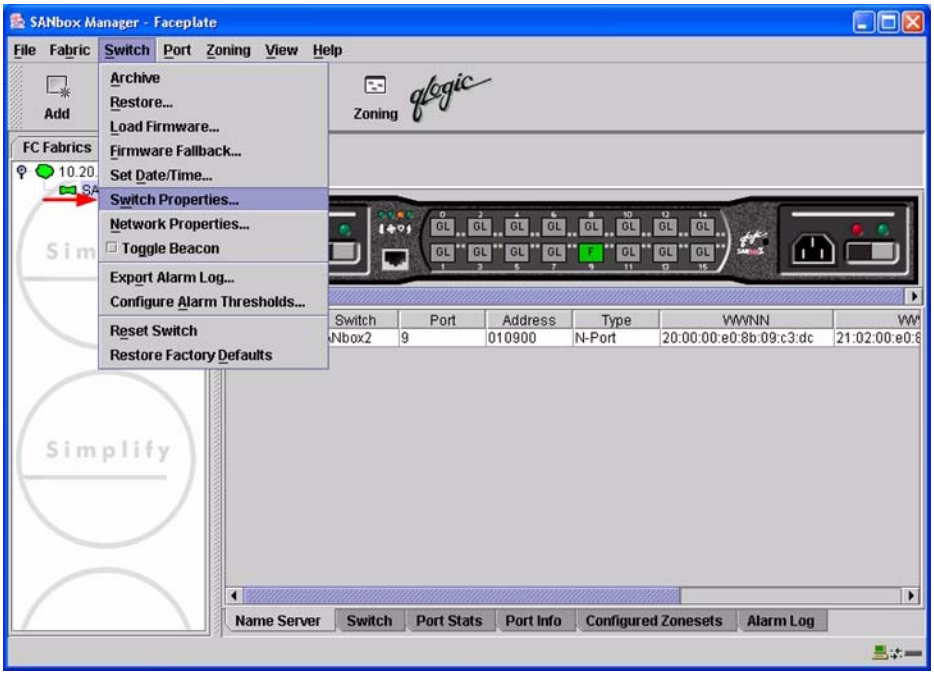
QLogic Fibre Channel Fabric with the IBM BladeCenter

Domain ID Configuration

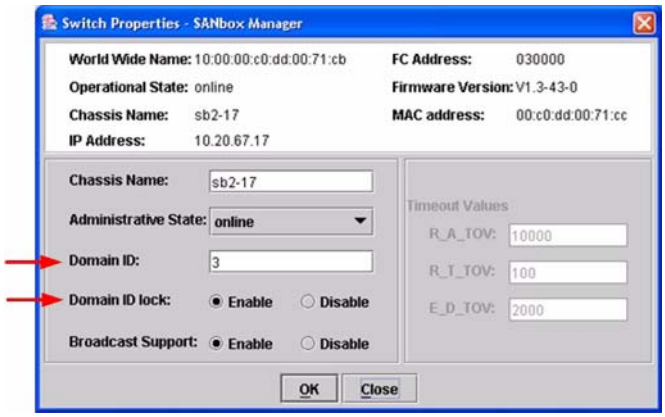
To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the QLogic switch and the IBM eServer BladeCenter Fibre Channel Switch Module.

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**.



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**.



Qlogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available.

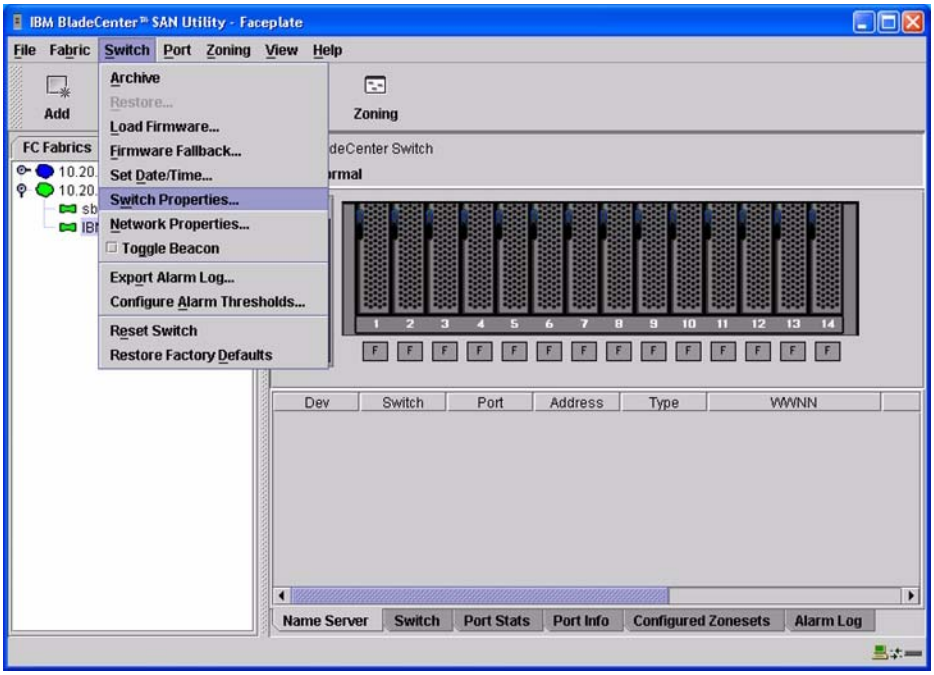
```
Login: admin
Password: xxxxxxxx
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config switch
```

The following options display:

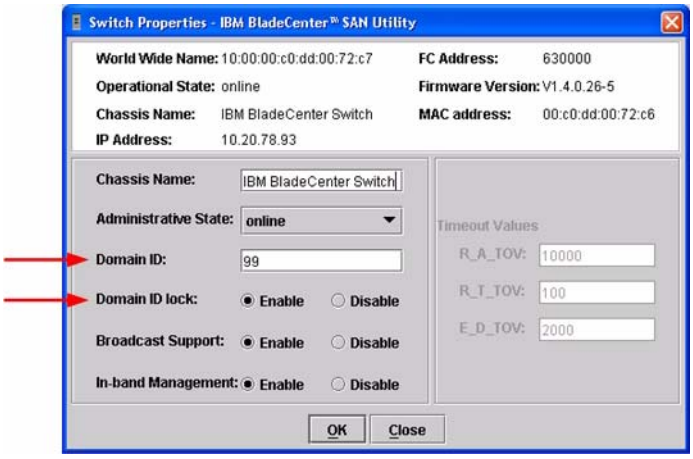
```
AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
BroadcastEnabled (True / False) [True]
InbandEnabled (True / False) [True]
DefaultDomainID (decimal value, 1-239) [1] <choose a unique number>
DomainIDLock (True / False) [False] True
SymbolicName (string, max=32 chars) [Fibre Channel Switch 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]
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

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. 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**.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the 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
```

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:

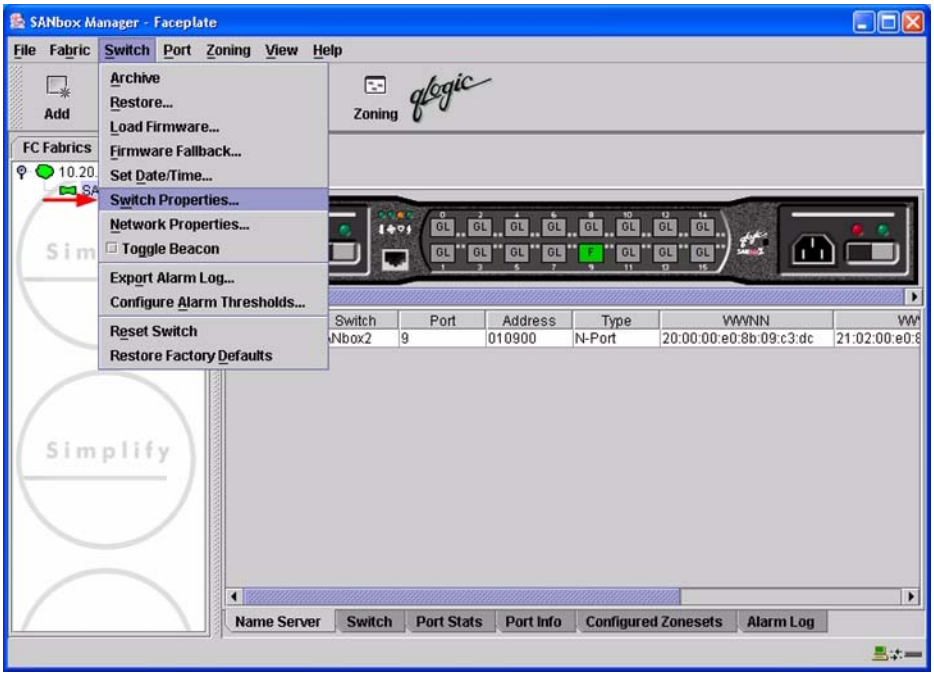
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

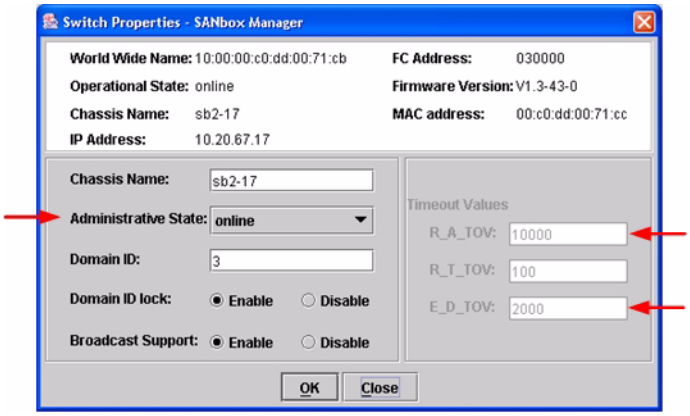
QLogic SANbox Manager GUI

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**.



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.



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 CLI commands when the QLogic SANbox Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
SANbox2 #> show config switch
```

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.

```
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config switch
```

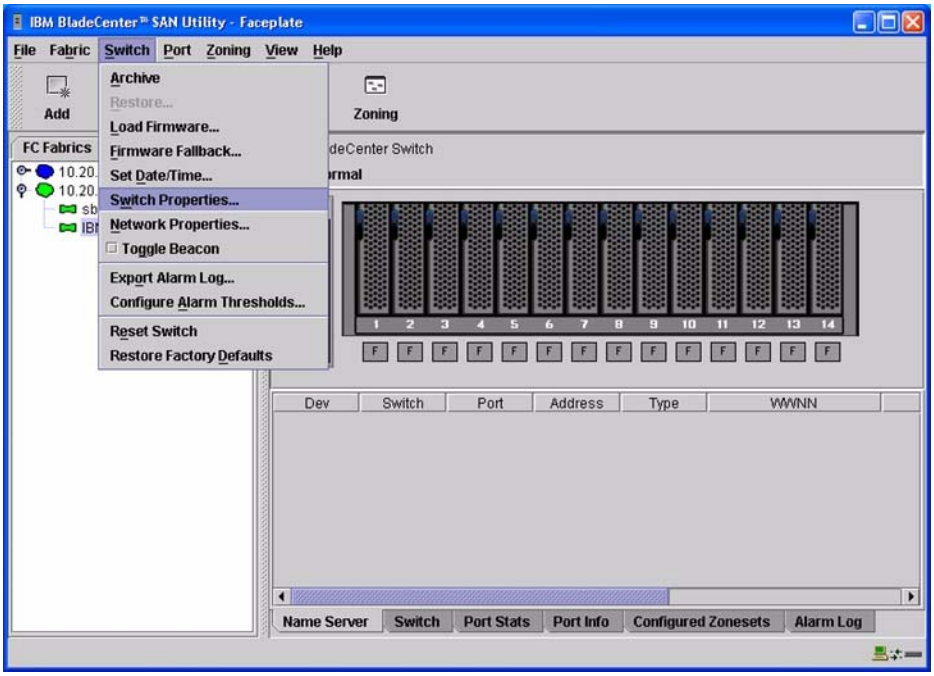
The following options display:

```
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) [Fibre Channel Switch Module]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [xxxx]   10000
E_D_TOV (decimal value, 10-20000 msec) [xxxx]   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
```

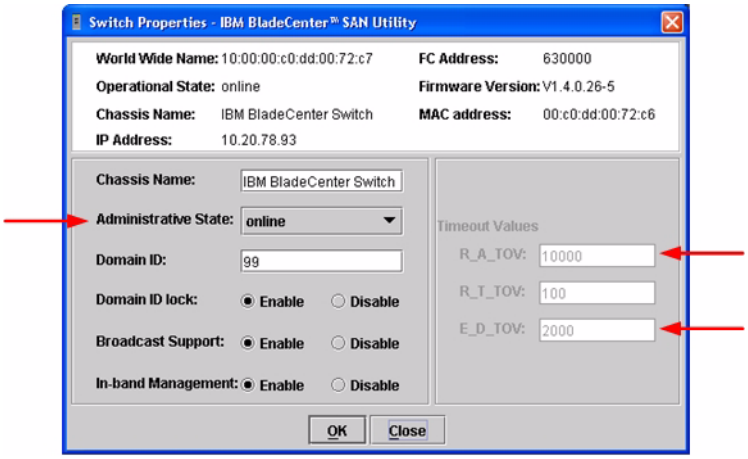
IBM eServer BladeCenter SAN Utility

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

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**.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> show config switch
```

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.

```
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) [xxxx]   10000
E_D_TOV (decimal value, 10-20000 msec) [xxxx]   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
```

Principal Switch Configuration

QLogic SANblade switches and IBM eServer BladeCenter Fibre Channel 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.

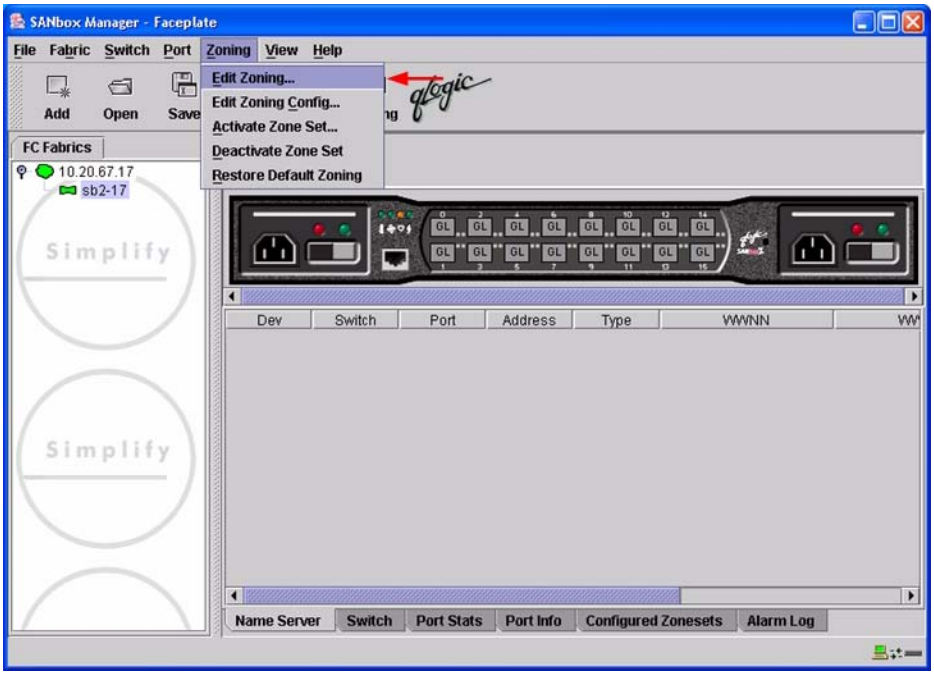
Active Zone Set Names

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):

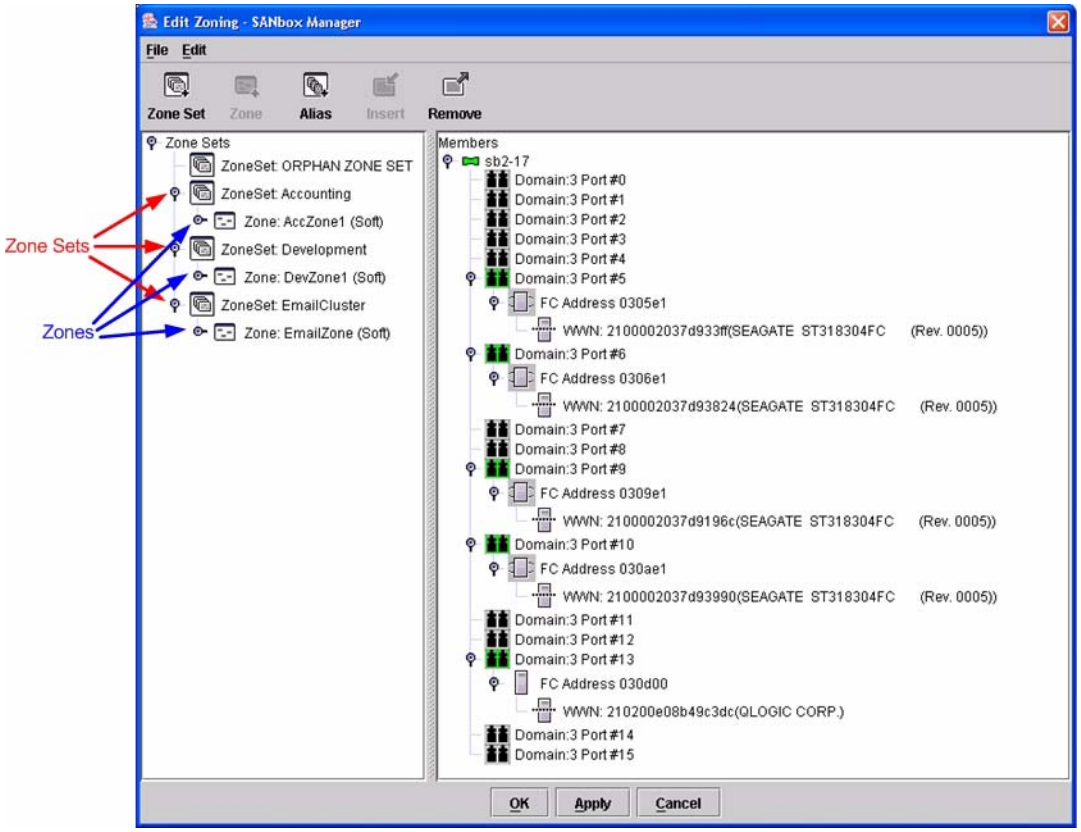
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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**.



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 105.



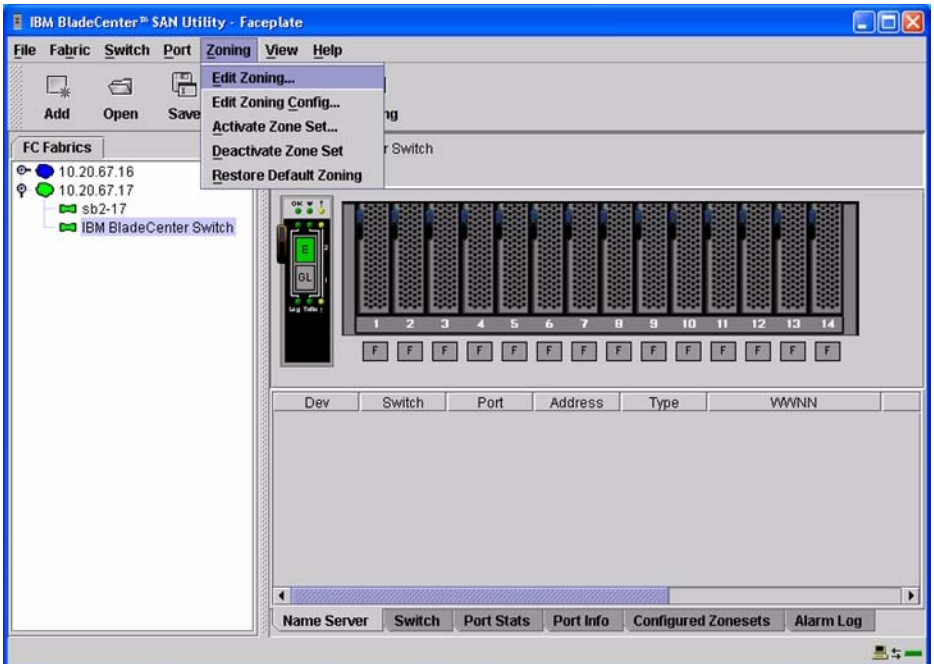
QLogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available.

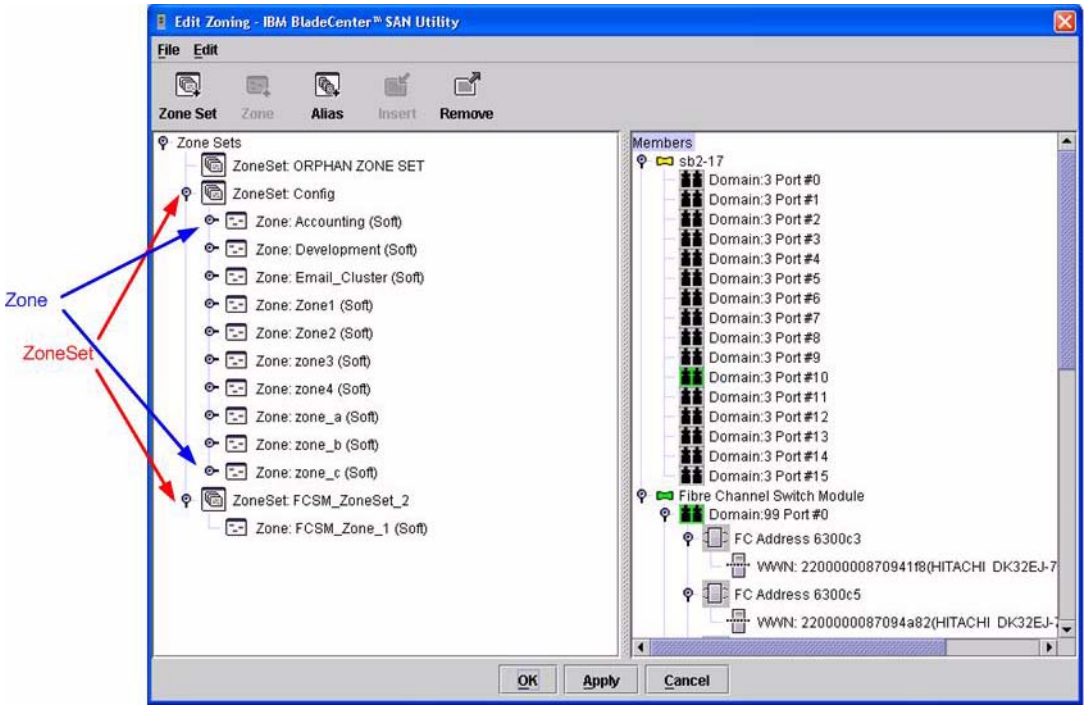
```
Login: admin
Password: xxxxxxxxx
SANbox2 #> zone list
```

IBM eServer 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 105.



IBM eServer BladeCenter Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the IBM eServer BladeCenter SAN Utility is not available.

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

Zone Types

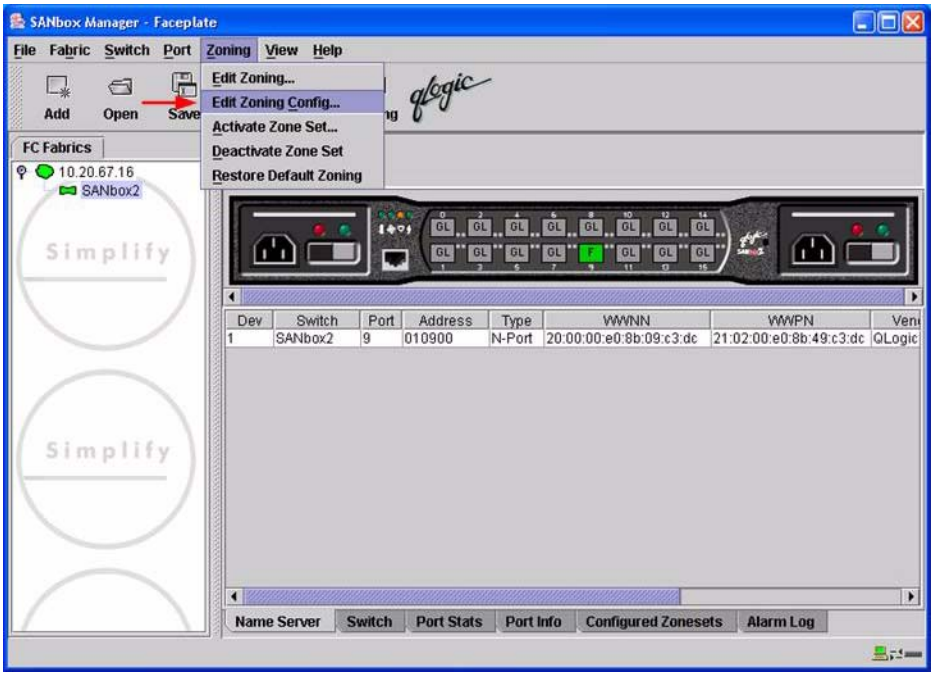
This configuration supports all QLogic SANbox2 and IBM eServer BladeCenter Fibre Channel Switch Module Zone types.

Operating Mode Configuration

NOTE: Perform the following steps only when connecting to a QLogic SANbox2 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 CLI commands when the QLogic SANbox Manager GUI is not available.

```
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 eServer BladeCenter Fibre Channel Switch Module 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 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. (True / False).

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. (True / False)

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. (True / False)

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. (True / False)

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. (True / False)

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.

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.

.device manufacturer.

FC-VI. When enabled, VI preference frames will be transmitted ahead of other frames. (True/ False)

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

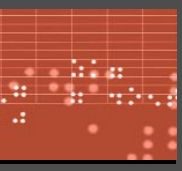
Zone

A set of ports or devices grouped together to control the exchange of information.

Zone Set

A set of zones grouped together. The active zone set defines the zoning for a fabric.

Index



QLOGIC

QLogic end-to-end solutions include industry-leading controller chips, host bus adapters, network switches and management software. Last year, more than 7 million products that shipped from leading storage companies were "Powered by QLogic."

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Network Computing
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