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Intel® Server Platform SB-HE Fibre Channel Switch Interoperability Guide

Version 1.0

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Table of Contents

Introduction

The *Intel Server Platform SB-HE Fibre Channel Switch Interoperability Guide* provides the details needed to configure and deploy multi-vendor switched fabrics. Detailed switch configuration data and step-by-step configuration procedures are provided to merge Intel Server Switch Module SBCEFCSWs (Intel Fibre Channel Switch Modules) with Brocade, Cisco, IBM, INRANGE, McDATA, QLogic, and Sun Fibre Channel switched fabrics that comply with the second revision of the Fibre Channel switch standard (FC-SW-2).

Contacting Intel

For more information about merging Intel Server Fibre Channel Switches with other switched fabrics, please contact your Intel Representative.

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 Intel Server Fibre Channel Switch, along with switches from Brocade, Cisco, IBM, INRANGE, McDATA, QLogic, and Sun 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 Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard.

Intel Supported Switch and Firmware Versions

Switch Model	Firmware Version
Intel Server Switch Module SBCEFCSW (Intel Server Fibre Channel Switch)	1.4.0.42.0 and above

The Intel Server Fibre Channel Switch has tested interoperable with the following switches from Brocade, Cisco, IBM, INRANGE, McDATA, QLogic, and Sun that comply with the FC-SW-2 standard. See the referenced page for detailed instructions on merging Intel and these fabrics.

Brocade, Cisco, IBM, INRANGE, McDATA, QLogic, and Sun Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Brocade (see page 7)	Silkworm 3200 Switch	3.0.2j and above
	Silkworm 3800 Switch	3.0.2j and above
	SilkWorm 3900 Switch	4.0.2b and above
	SilkWorm 12000 Switch	4.0.0e and above
Cisco (see page 59)	SN 5428 Storage Router	2.3.1-k9 and above
	MDS 9216 Switch	1.0(1) [build 1.0(0.281)]
	MDS 9509 Director	1.0(1) [build 1.0(0.281)]
IBM (see page 97)	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.42.0 and above
INRANGE (see page 119)	FC/9000 Switch	Code set 3.0.3.2 and above
McDATA (see page 147)	Sphereon 4500 Switch	04.01.00 12 and above
	Intrepid 6064 Director	04.01.02.4 and above
	Intrepid 6140 Director	04.01.02.4 and above
QLogic (see page 215)	SANbox2-8 Switch	1.5.x and above
	SANbox2-16 Switch	1.5.x and above
	SANbox2-64 Switch	1.5.x and above
Sun (see page 241)	Sun StorEdge Network 2 Gb FC Switch-8	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-64	1.5.x and above

How to Use this Guide

The *Intel Server Platform SB-HE Fibre Channel Switch Interoperability Guide* provides detailed switch configuration data and step-by-step configuration procedures for merging the Intel Server Fibre Channel Switch with Brocade, Cisco, IBM, INRANGE, McDATA, QLogic, and Sun Fibre Channel switched fabrics.

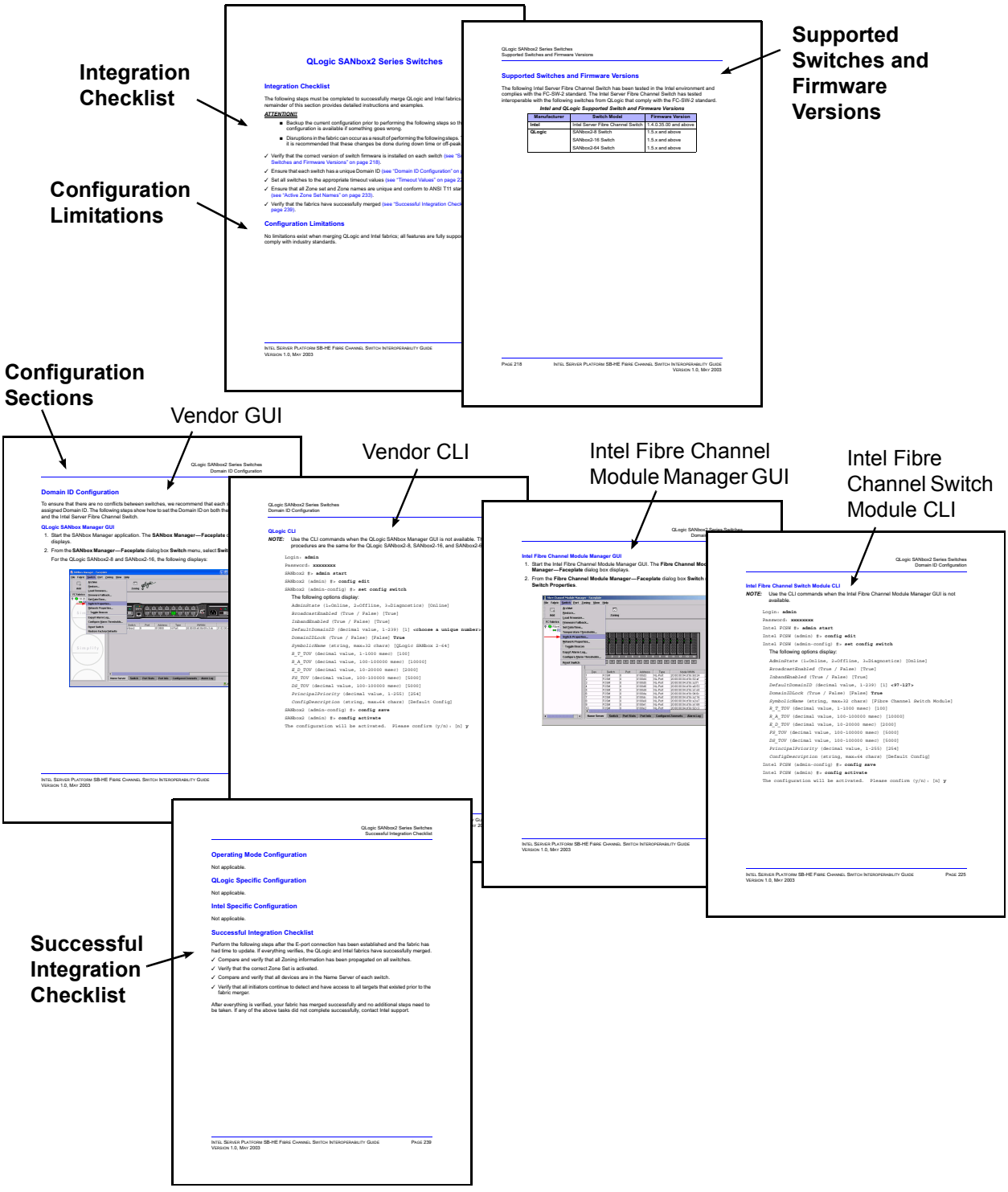
NOTE: Updated versions of this guide can be obtained from your Intel Representative.

All chapters within the *Intel Server Platform SB-HE Fibre Channel 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 the Intel Server Fibre Channel Switch.
- **Supported Switches and Firmware Versions.** The supported switches and firmware versions for which this information applies.
- For the vendor switch and the Intel Server Fibre Channel Switch, 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 Intel Specific Configuration**
- **Successful Integration Checklist.** Lists the steps to be taken after the E-port connection has been established and the fabric has had time to update.

In addition, refer to the **Glossary** (see page 275) for terms used in this guide and to the **Index** (see page 281) for quick reference to key topics.

Visual Representation of How the Chapters Are Organized



Merging Intel and Brocade Fabrics

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

Intel and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Brocade	SilkWorm 3200 Switch	3.0.2j and above
	SilkWorm 3800 Switch	3.0.2j and above
	SilkWorm 3900 Switch	4.0.2b and above
	SilkWorm 12000 Switch	4.0.0e and above

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

- **Brocade SilkWorm 3200 and SilkWorm 3800 Switches** **(see page 9)**
- **Brocade SilkWorm 3900 and SilkWorm 12000 Switches** **(see page 33)**

Brocade SilkWorm 3200 and SilkWorm 3800 Switches

Integration Checklist

The following steps must be completed to successfully merge Brocade and Intel 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 10).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 11).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 17).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 23).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 27).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see “Operating Mode Configuration” on page 31).

✓ Ensure that Brocade’s Platform Management Server is disabled (see “Brocade Specific Configuration” on page 31).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 32).

Configuration Limitations

The configuration limitations are as follows:

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

  NOTE: Existing Brocade switches retain all features that are available with Brocade switches once the Intel Server Fibre Channel Switch is merged 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 Intel fabrics, a maximum of 31 switches can be configured.

Supported Switches and Firmware Versions

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

Intel and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Brocade	SilkWorm 3200 Switch	3.0.2j and above
	SilkWorm 3800 Switch	3.0.2j and above

ATTENTION!! When updating Brocade firmware, the switch may default to a proprietary operating mode. Therefore, after a firmware update, verify that the switch is still set to Interoperability mode (see “Operating Mode Configuration” on page 31).

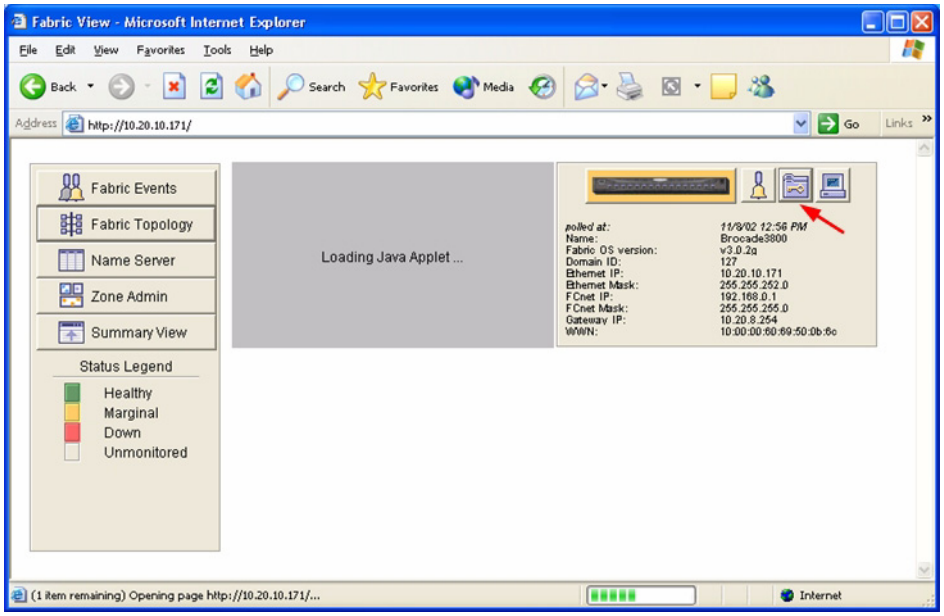
Domain ID Configuration

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 Intel Server Fibre Channel Switch.

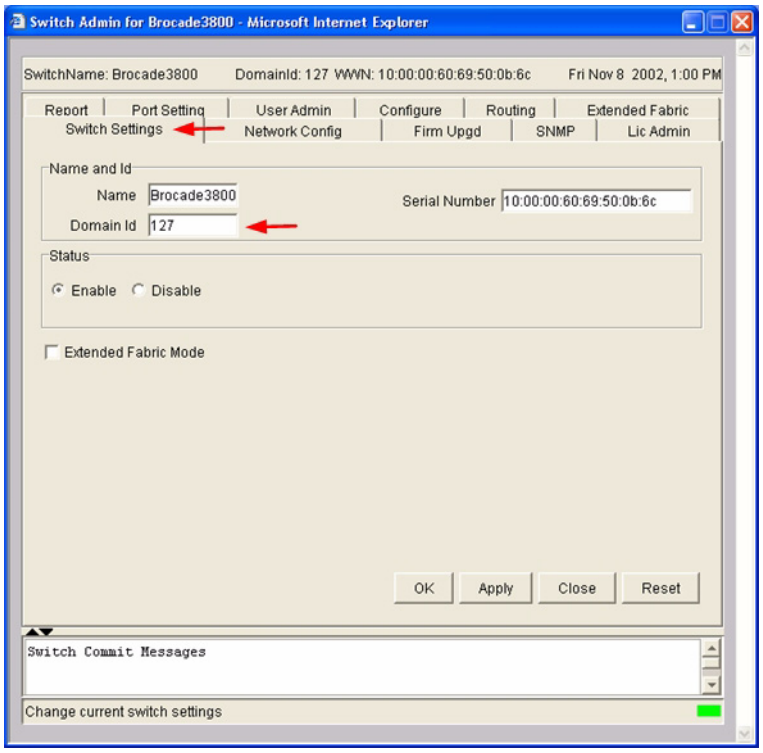
NOTE: The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range.

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.

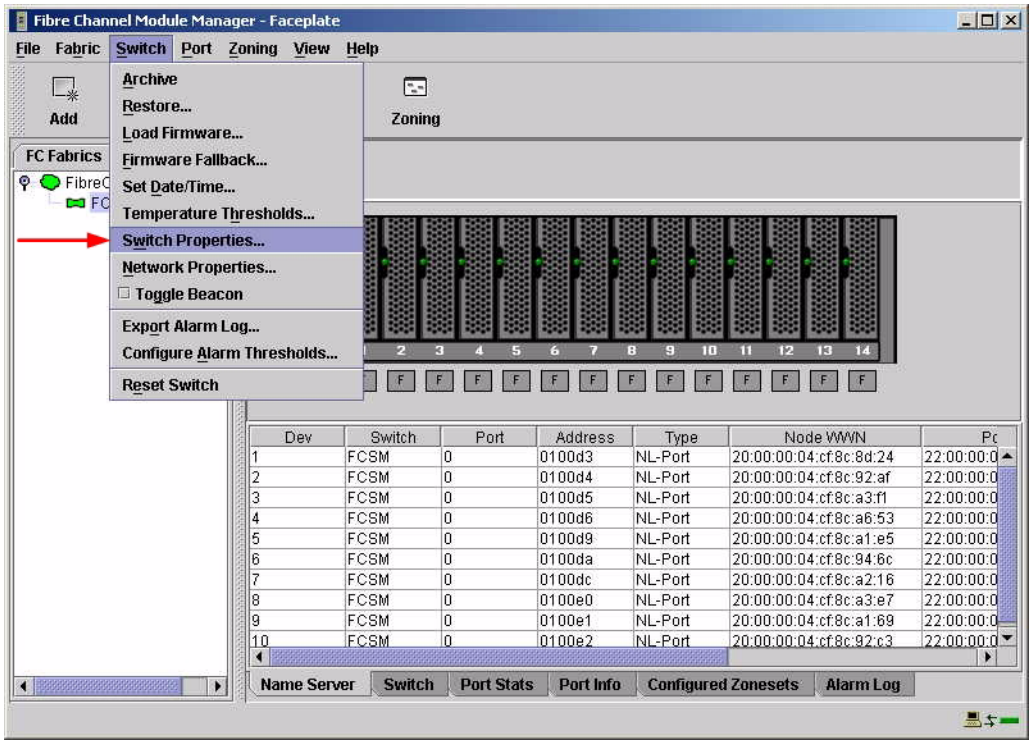
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> switchdisable
Brocade3800:admin> configure
```

The following options display:

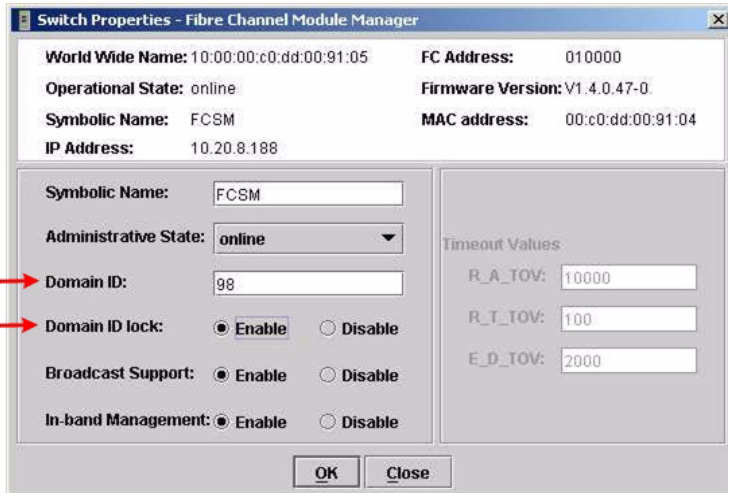
```
Fabric parameters (yes, y, no, n): [no] yes
Domain: (1-239) [98] <97-127>
BB credits: 91-27) [16]
R_A_TOV: (4000..120000) [10000]
E_D_TOV: (1000..5000) [2000]
WAN_TOV: (1000..120000) [0]
WAN_RTT_DLY_MAX: (100..5000) [200]
Data field size: (256..2112) [2112]
Sequence Level Switching: (0..1) [0]
Disable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

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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:

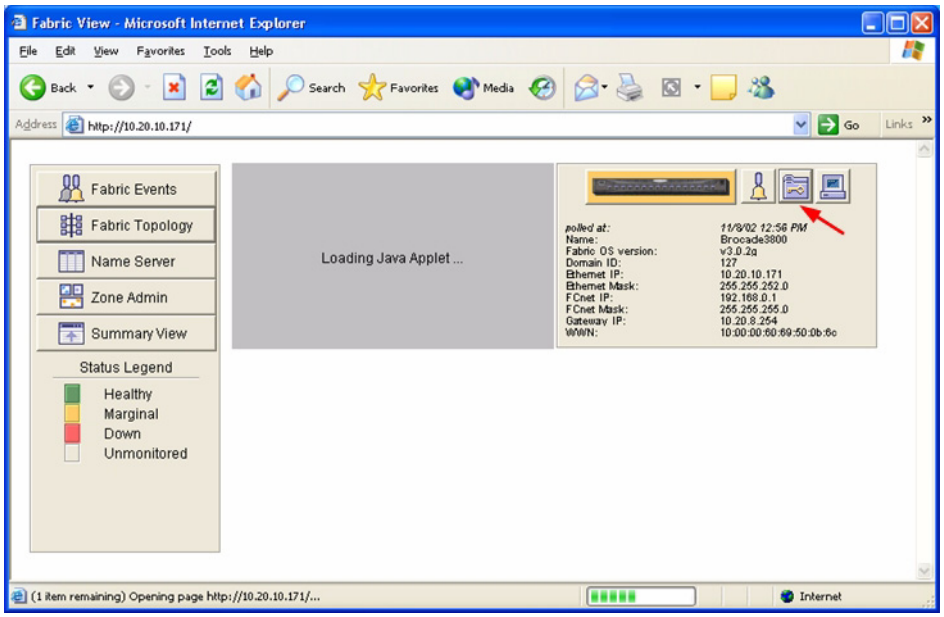
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

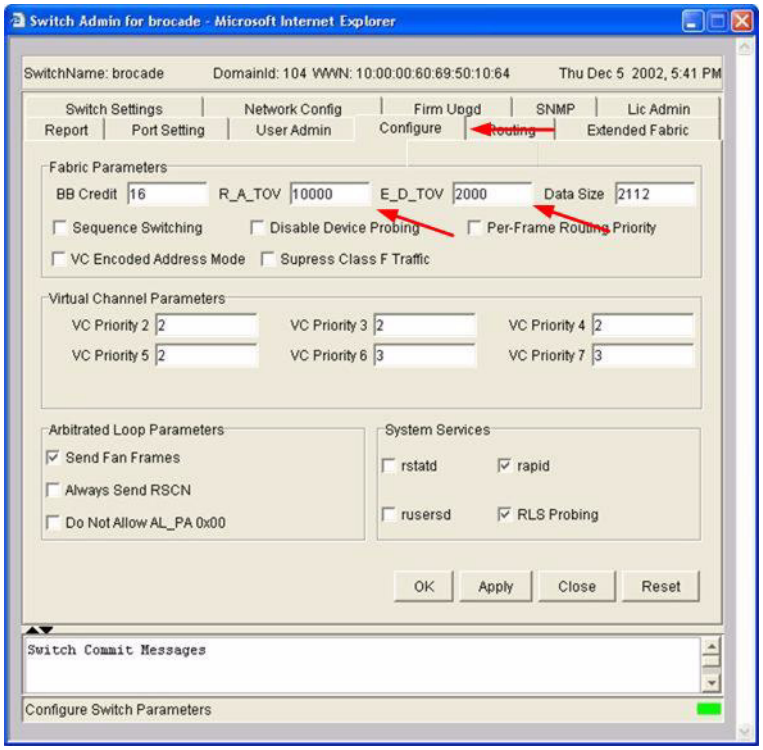
Brocade's Web Tools

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:

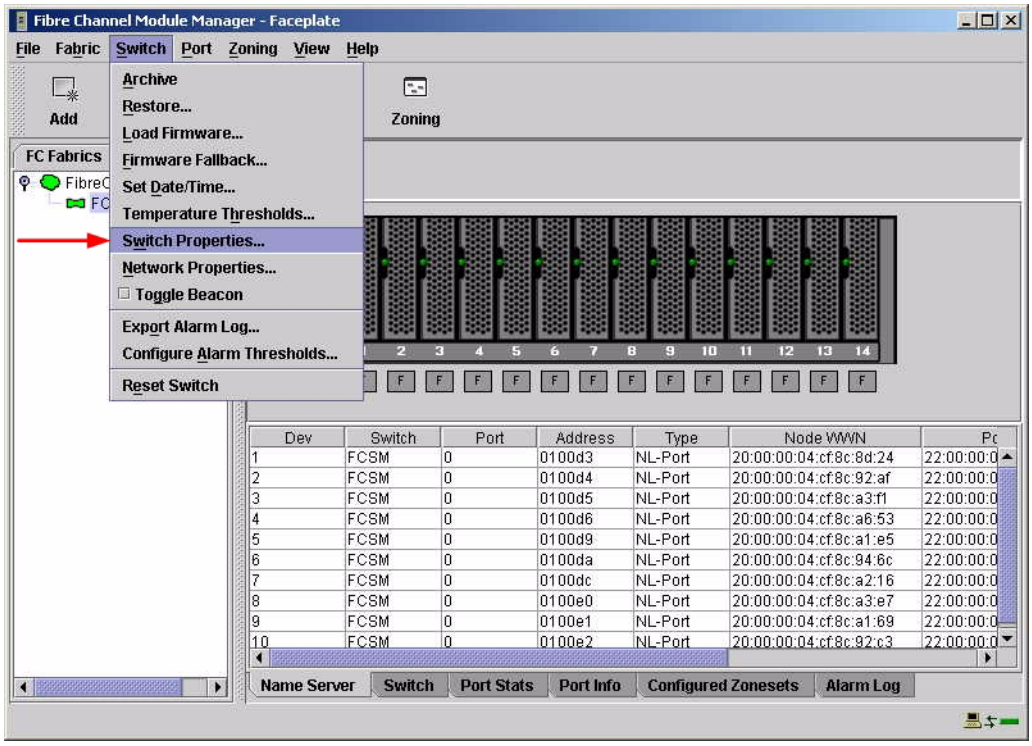
```
Fabric parameters (yes, y, no, n): [no] yes
Domain: (1-239) [98]
BB credits: 91-27) [16]
R_A_TOV: (4000..120000) [9000] 10000
E_D_TOV: (1000..5000) [1000] 2000
WAN_TOV: (1000..120000) [0]
WAN_RTT_DLY_MAX: (100..5000) [200]
Data field size: (256..2112) [2112]
Sequence Level Switching: (0..1) [0]
Disable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

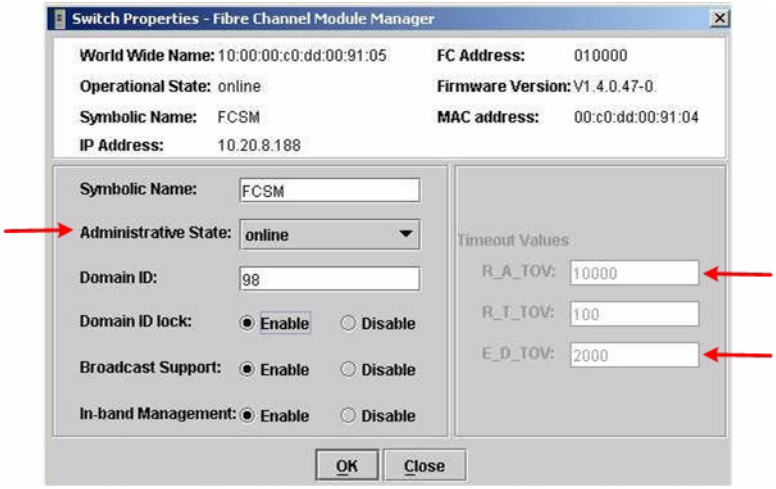
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

Brocade switches and Intel Server Fibre Channel Switches 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.

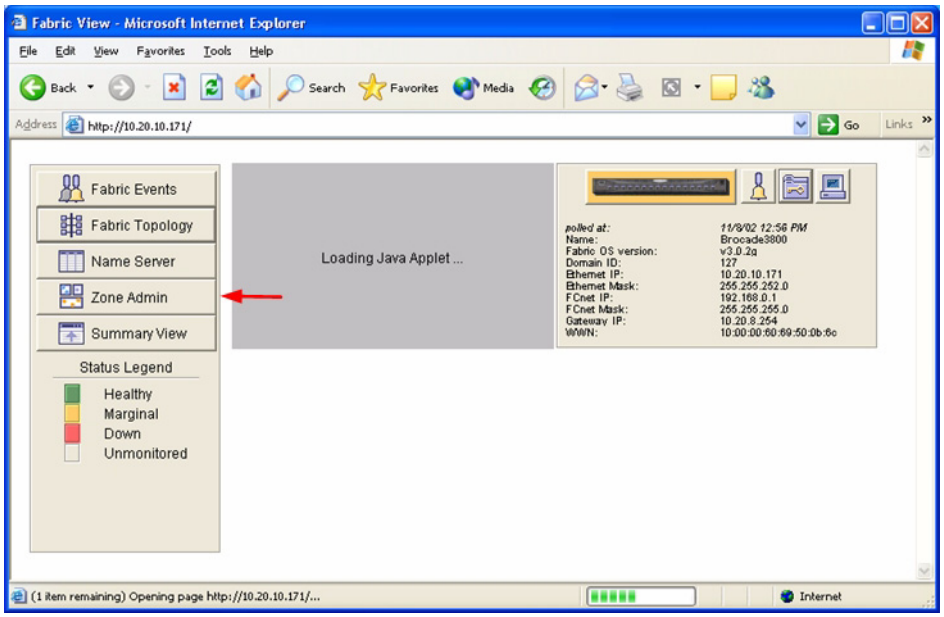
Active Zone Set Names

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):

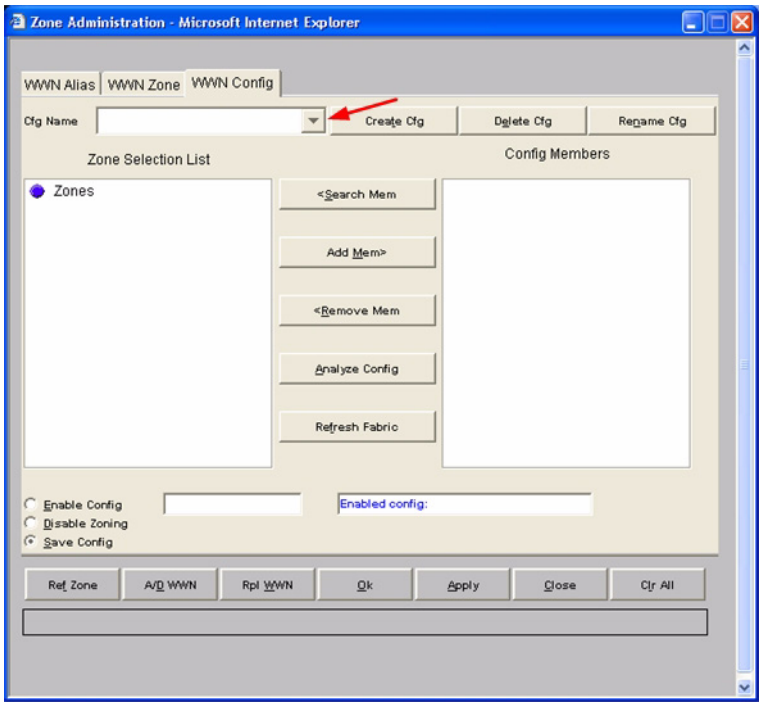
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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" on page 23 and are unique between the switches.



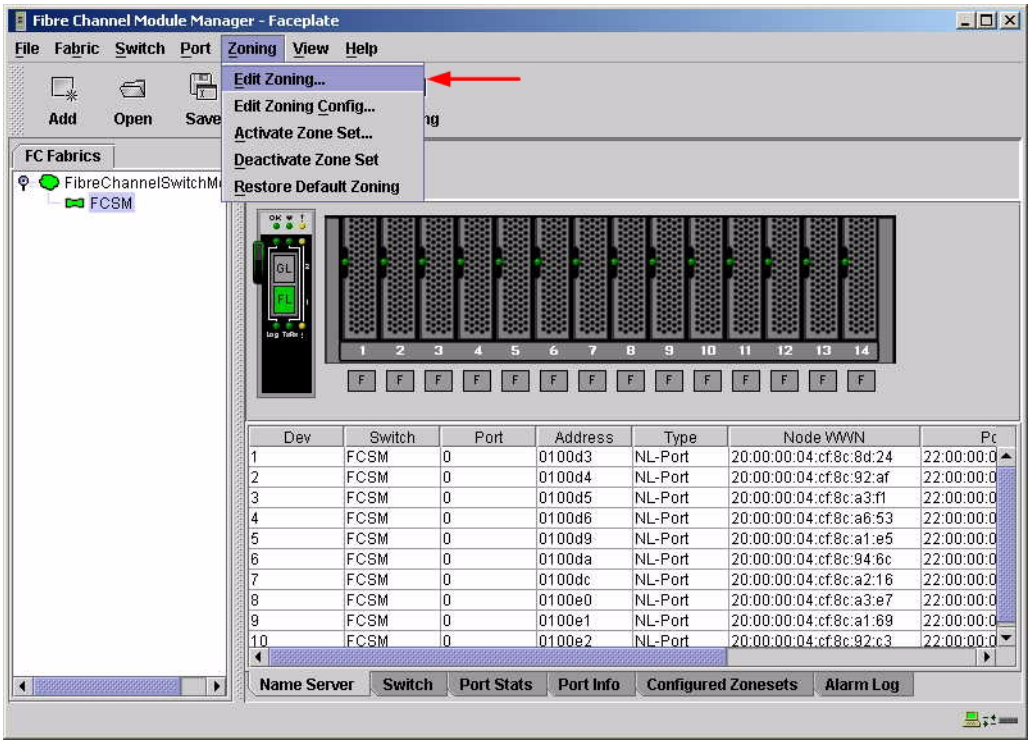
Brocade CLI

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

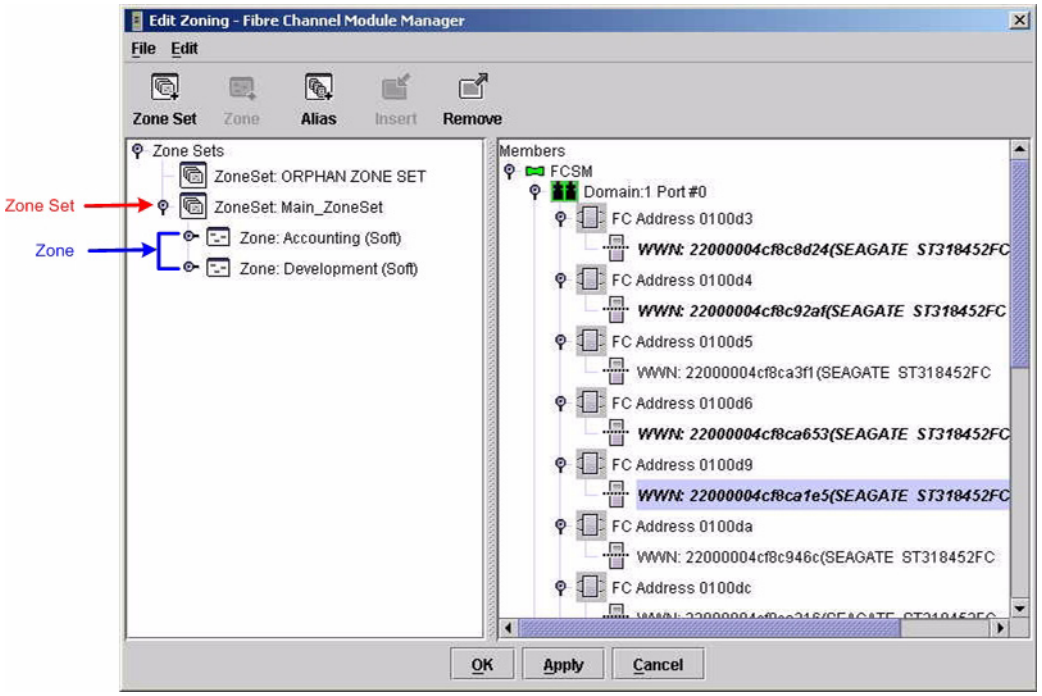
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> cfgshow
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 23.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

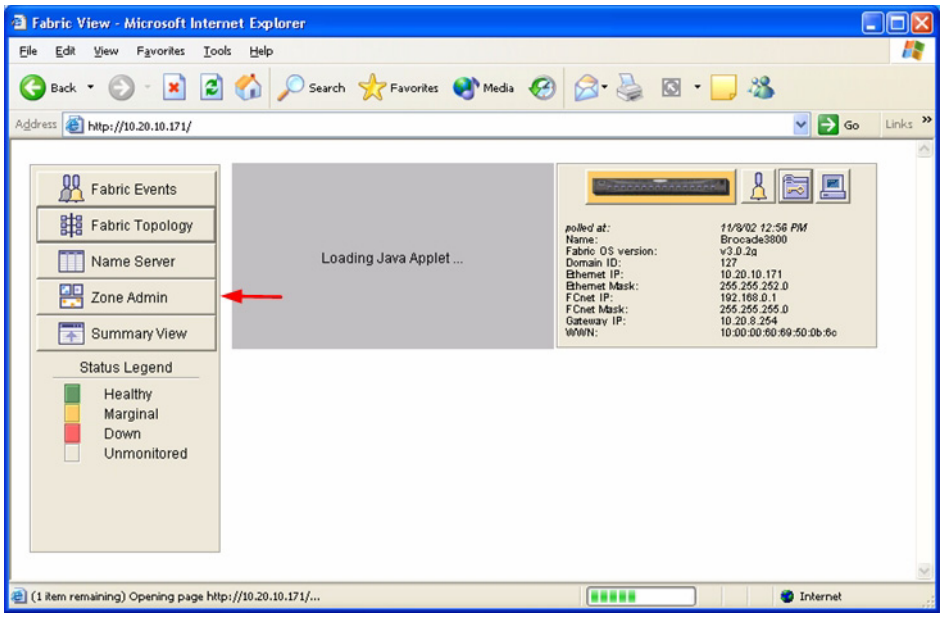
Zone Types

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.

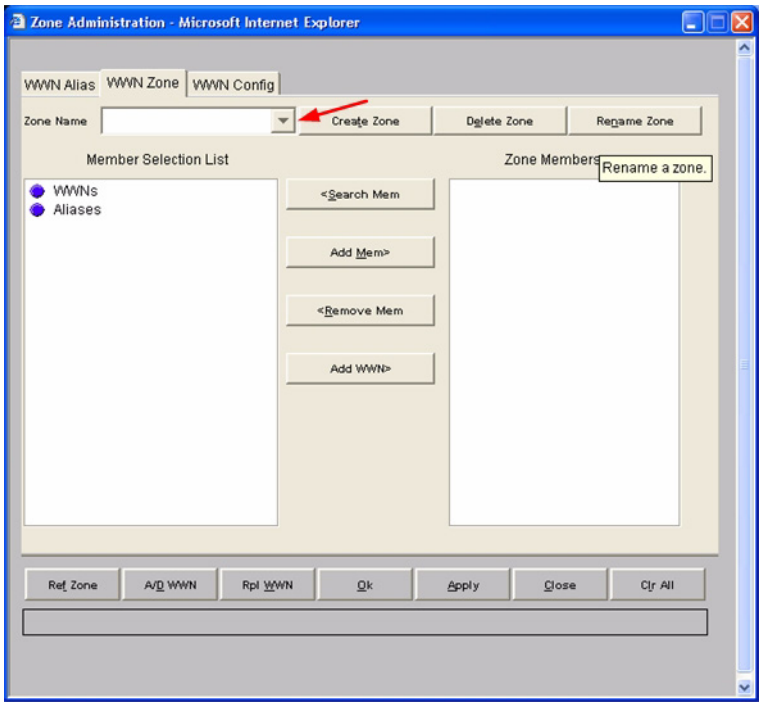
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

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" on page 23 and are unique between the switches.



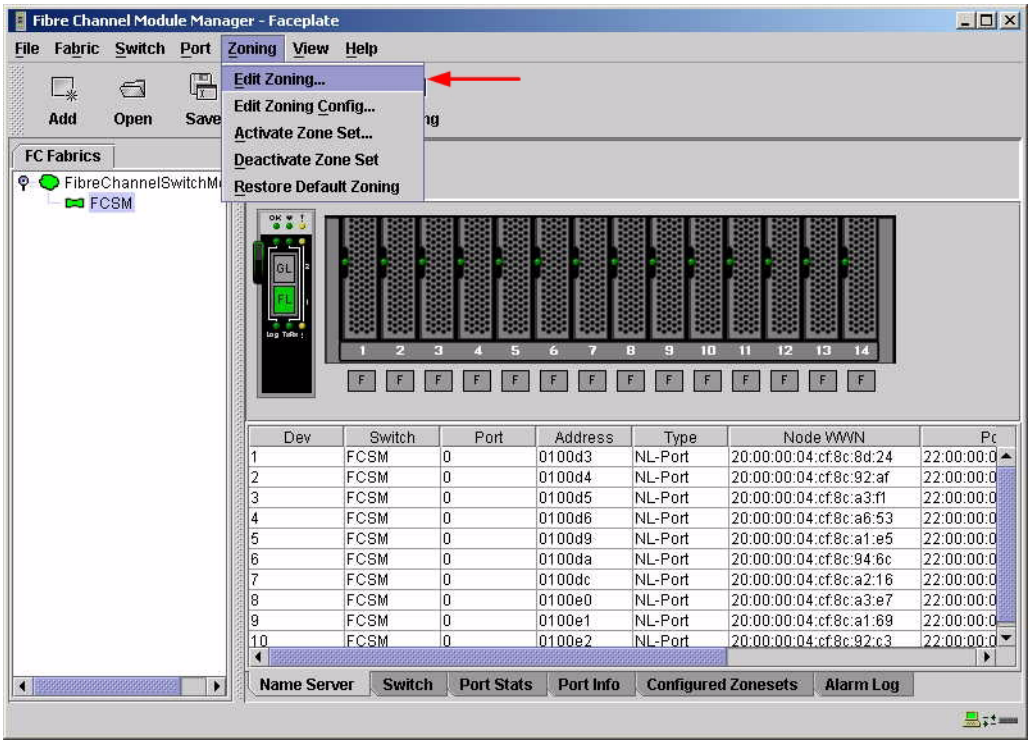
Brocade CLI

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

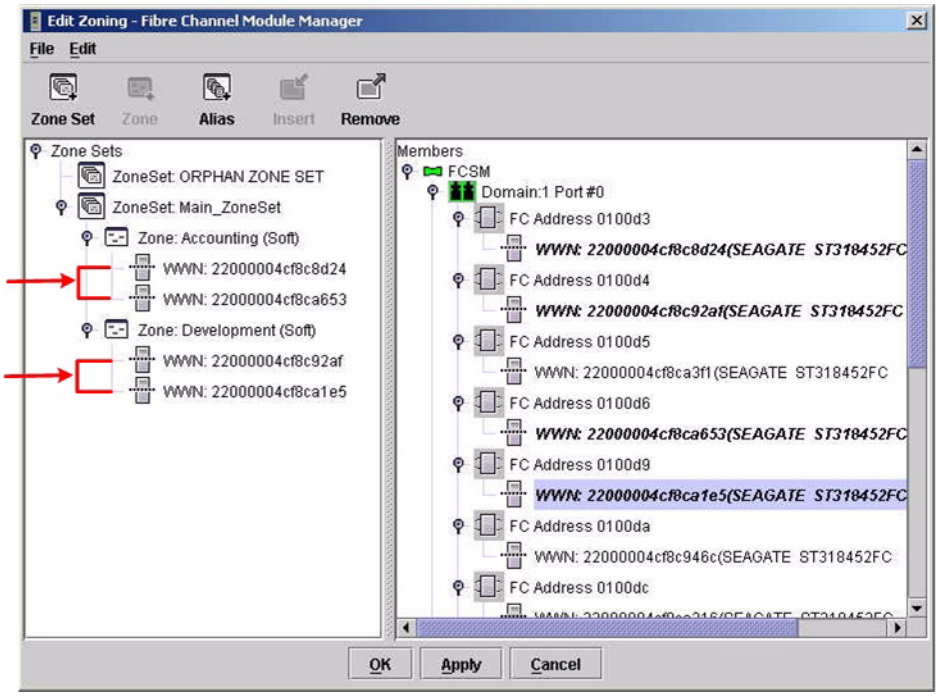
```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> zoneshow
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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
```

Intel Fibre Channel Module Manager GUI

Not applicable.

Intel 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
```

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the Brocade and Intel 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 Intel support.

Brocade SilkWorm 3900 and SilkWorm 12000 Switches

Integration Checklist

The following steps must be completed to successfully merge Brocade and Intel 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 41).

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

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 52).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see “Operating Mode Configuration” on page 56).

✓ Ensure that Brocade’s Platform Management Server is disabled (see “Brocade Specific Configuration” on page 56).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 57).

Configuration Limitations

The configuration limitations are as follows.

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

  NOTE: Existing Brocade switches retain all features that are available with Brocade switches once the Intel Server Fibre Channel Switch is merged 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 Intel fabrics, a maximum of 31 switches can be configured.

Supported Switches and Firmware Versions

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

Intel and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Brocade	SilkWorm 3900 Switch	4.0.2b and above
	SilkWorm 12000 Switch	4.0.0e and above

ATTENTION!! When updating Brocade firmware, the switch may default to a proprietary operating mode. Therefore, after a firmware update, verify that the switch is still set to Interoperability mode (see “Operating Mode Configuration” on page 56).

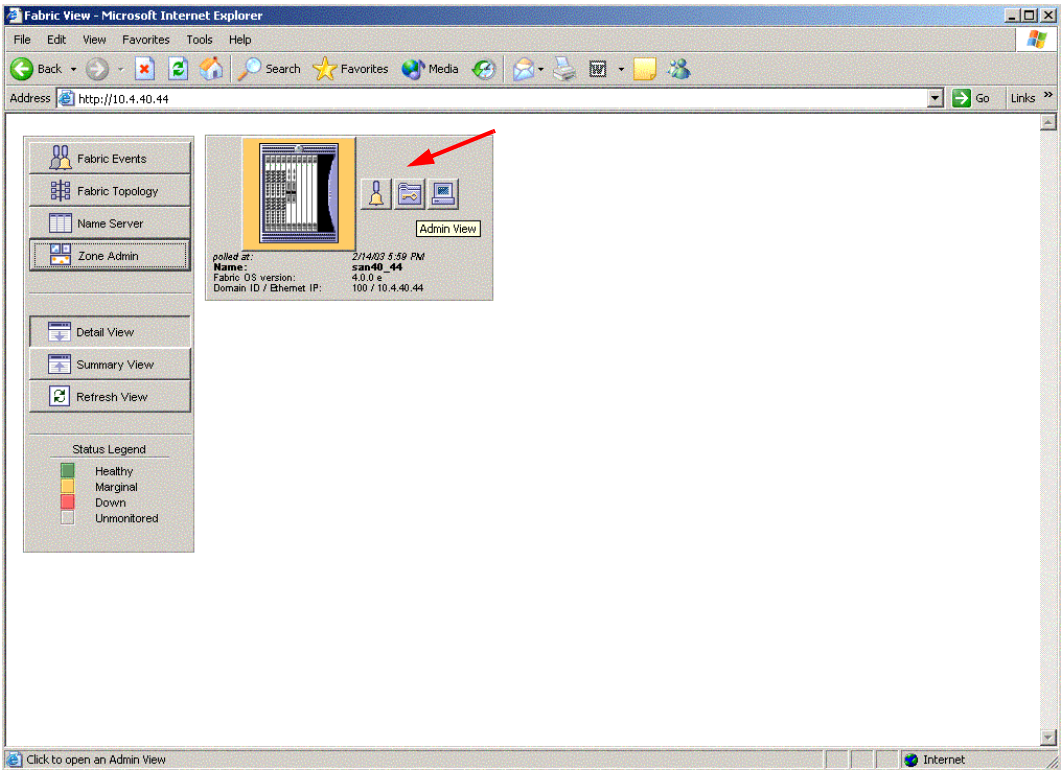
Domain ID Configuration

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 Intel Server Fibre Channel Switch.

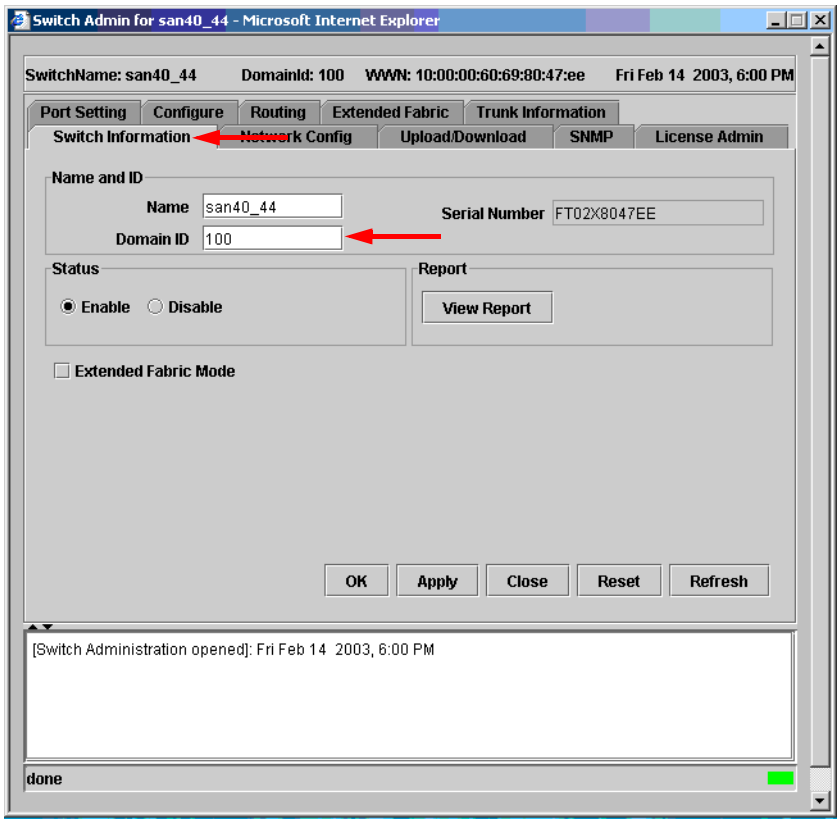
NOTE: The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range.

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**.



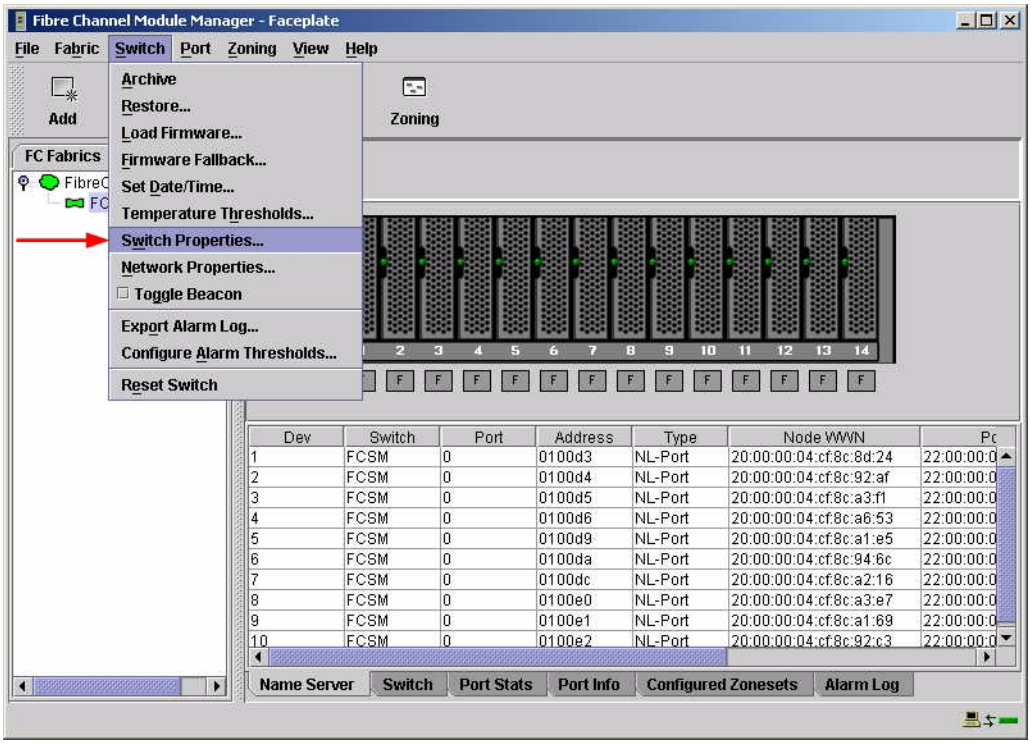
Brocade CLI

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

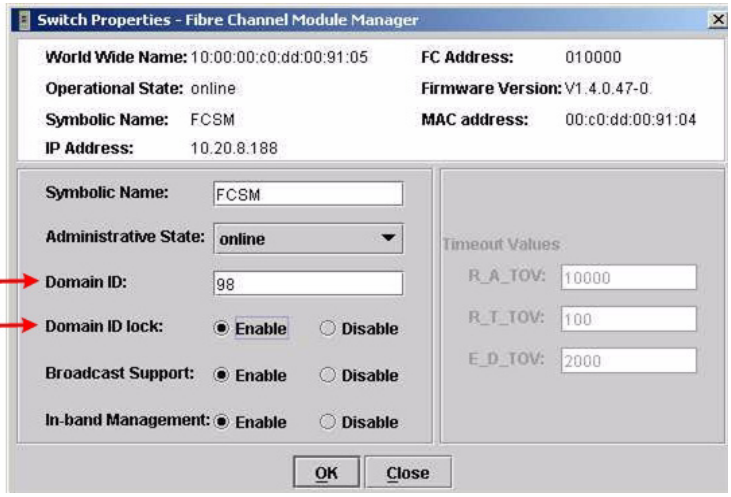
```
Fabric OS (cp1)
cp1 login: admin
Password:
Brocade12000:admin> switchdisable
Brocade12000:admin> configure
Configure...
  Fabric parameters (yes, y, no, n): [no] yes
    Domain: (97..127) [100]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    Data field size: (256..2112) [2112]
    Sequence Level Switching: (0..1) [0]
    Disable Device Probing: (0..1) [0]
    Suppress Class F Traffic: (0..1) [0]
    VC Encoded Address Mode: (0..1) [0]
    Per-frame Route Priority: (0..1) [0]
    BB credit: (1..16) [16]
  Virtual Channel parameters (yes, y, no, n): [no]
  Zoning Operation parameters (yes, y, no, n): [no]
  RSCN Transmission Mode (yes, y, no, n): [no]
  NS Operation Parameters (yes, y, no, n): [no]
  Arbitrated Loop parameters (yes, y, no, n): [no]
  System services (yes, y, no, n): [no]
  Portlog events enable (yes, y, no, n): [no]
No changes.
Brocade12000:admin> switchenable
10  Brocade12000:admin> 9  8  7  6  5  4  3  2  1
fabric: Principal switch
fabric: Domain 100
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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:

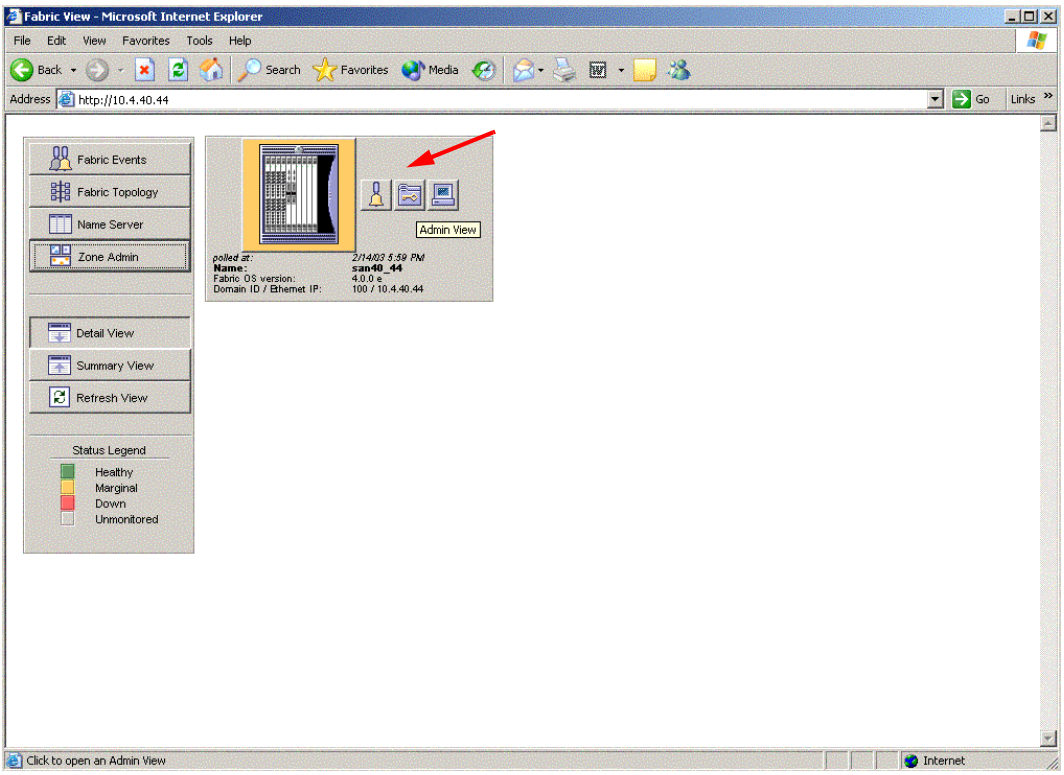
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

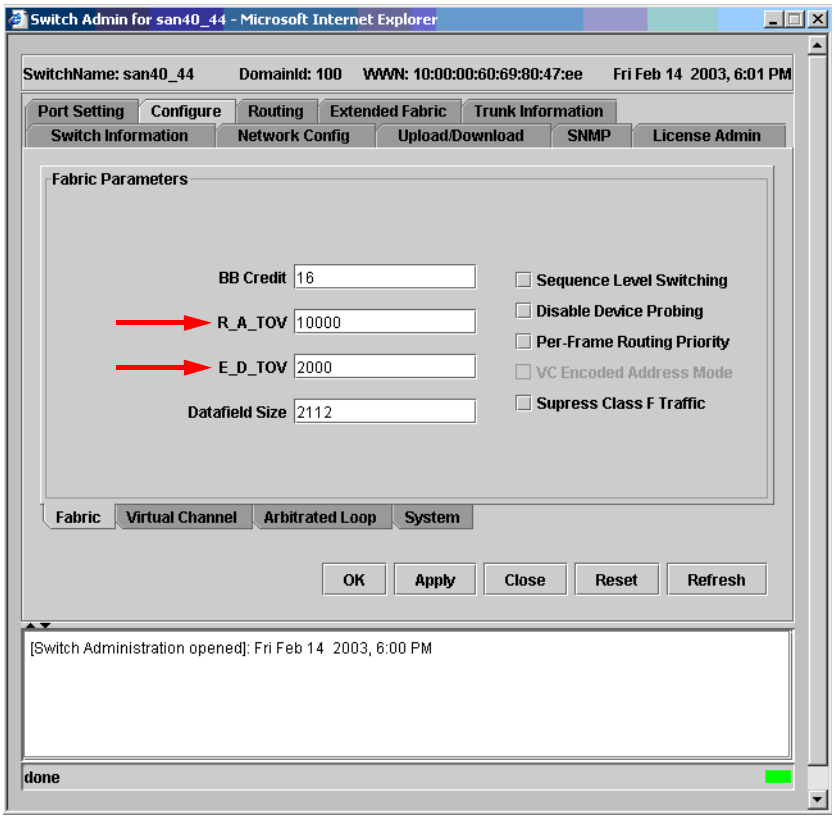
Brocade's Web Tools

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

```
Fabric OS (cp1)
cp1 login: admin
Password: xxxxxxxx
Brocade12000:admin> configshow
```

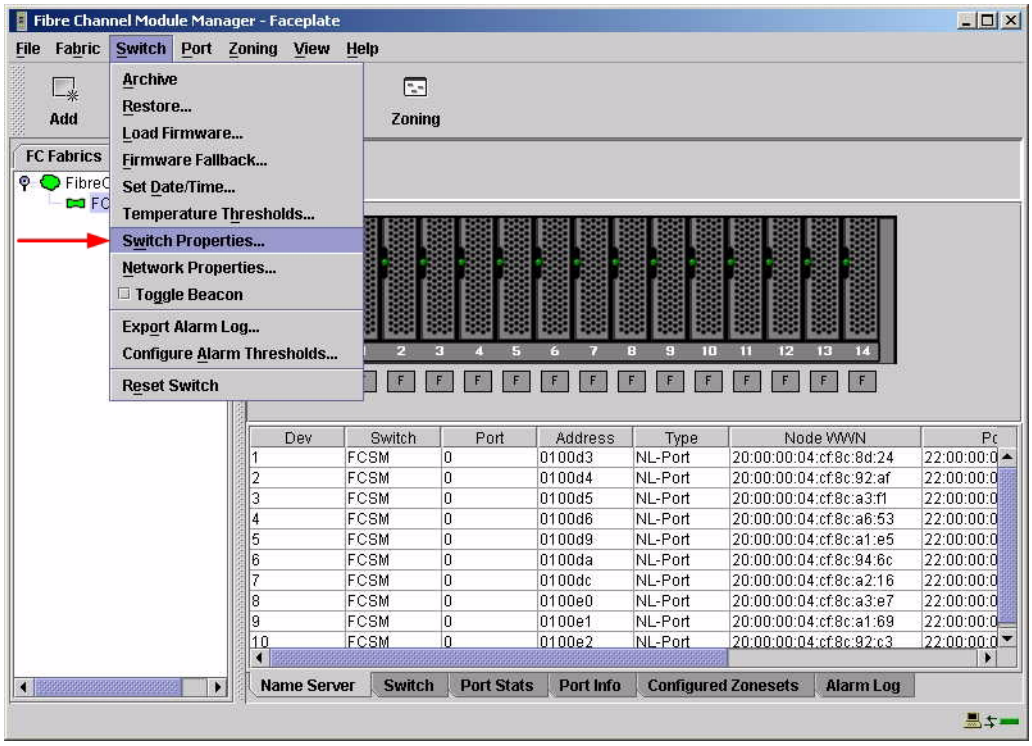
Use the above command to verify that R_A_TOV is set to 10000 and E_D_TOV is set to 2000. If these timeout values are not correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
Brocade12000:admin> switchdisable
Brocade12000:admin> configure
Configure...
  Fabric parameters (yes, y, no, n): [no] yes
    Domain: (97..127) [100]
    R_A_TOV: (4000..120000) [10000]
    E_D_TOV: (1000..5000) [2000]
    Data field size: (256..2112) [2112]
    Sequence Level Switching: (0..1) [0]
    Disable Device Probing: (0..1) [0]
    Suppress Class F Traffic: (0..1) [0]
    VC Encoded Address Mode: (0..1) [0]
    Per-frame Route Priority: (0..1) [0]
    BB credit: (1..16) [16]
  Virtual Channel parameters (yes, y, no, n): [no]
  Zoning Operation parameters (yes, y, no, n): [no]
  RSCN Transmission Mode (yes, y, no, n): [no]
  NS Operation Parameters (yes, y, no, n): [no]
  Arbitrated Loop parameters (yes, y, no, n): [no]
  System services (yes, y, no, n): [no]
  Portlog events enable (yes, y, no, n): [no]
Brocade12000:admin> switchenable
10  Brocade12000:admin> 9  8  7  6  5  4  3  2  1
fabric: Principal switch
fabric: Domain 100
```

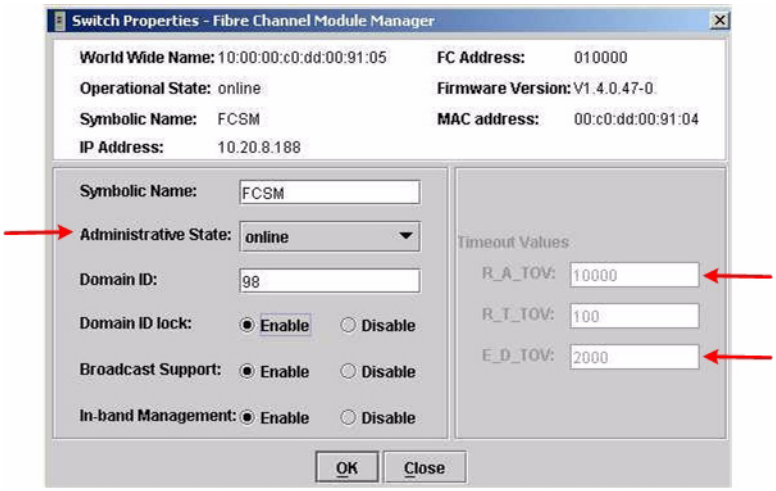
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

Brocade switches and Intel Server Fibre Channel Switches 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.

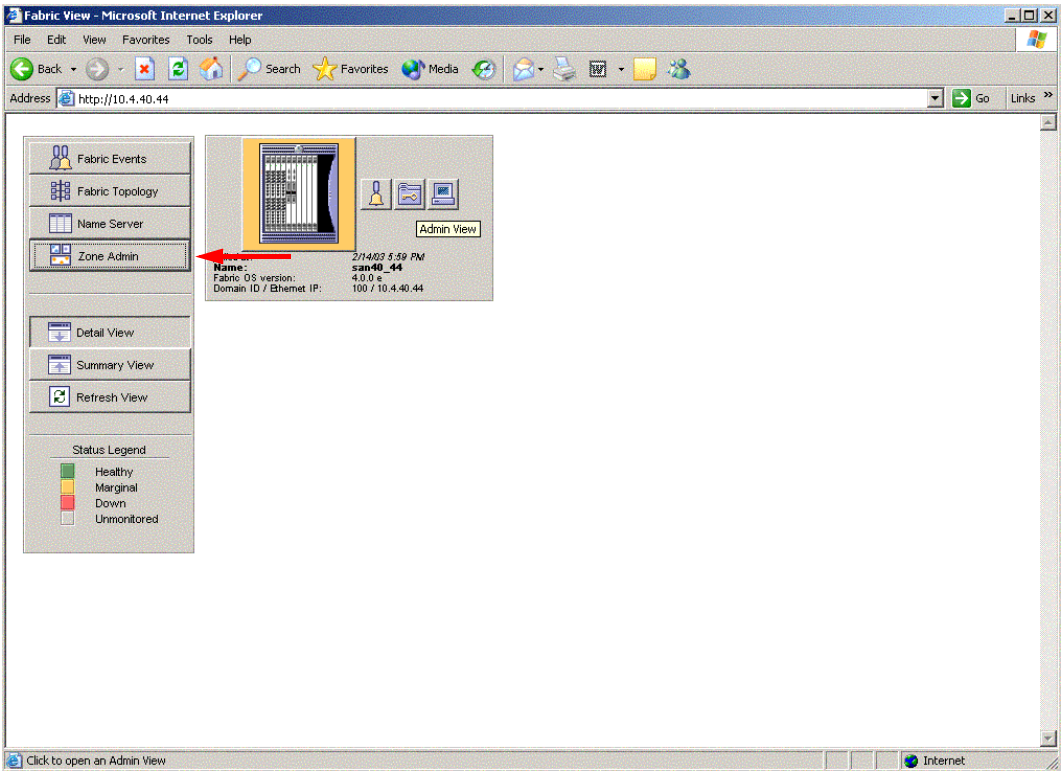
Active Zone Set Names

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):

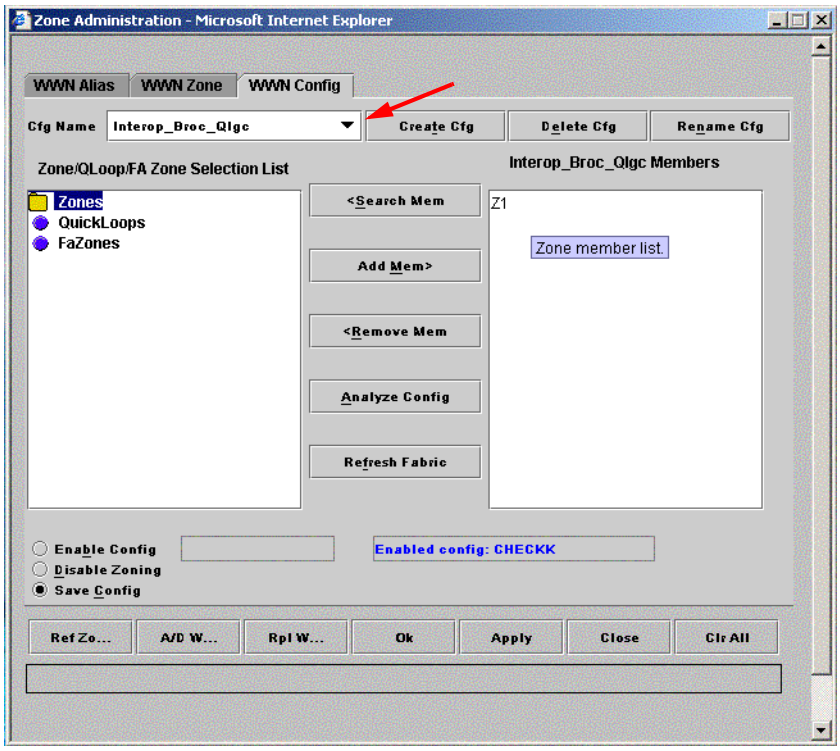
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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" on page 47 and are unique between the switches.



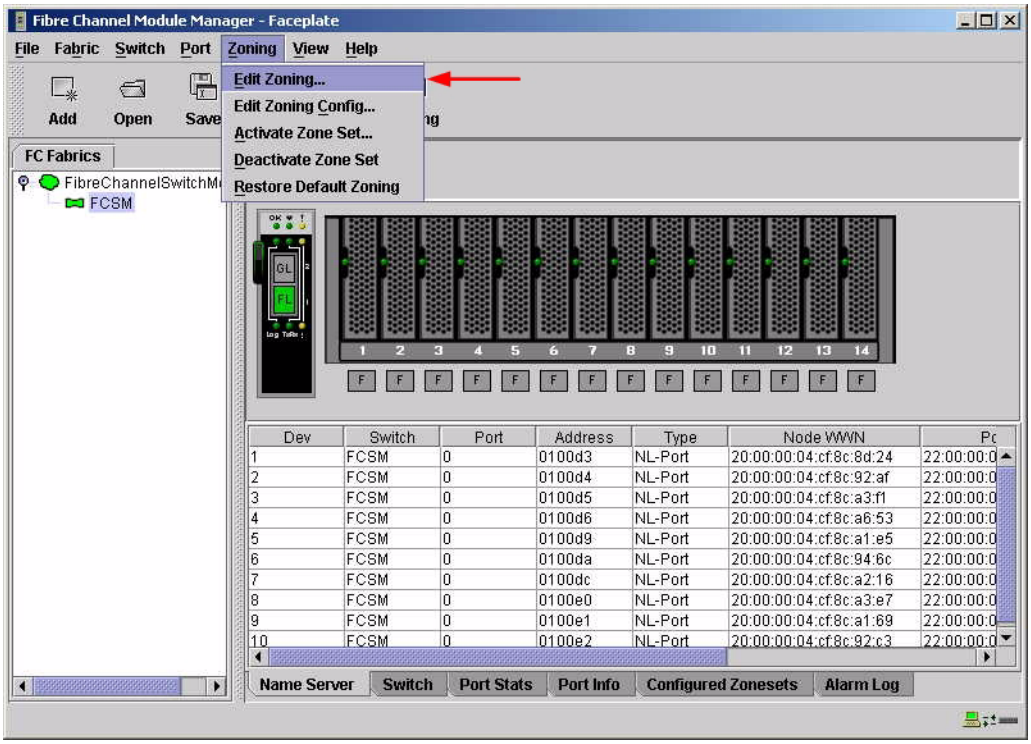
Brocade CLI

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

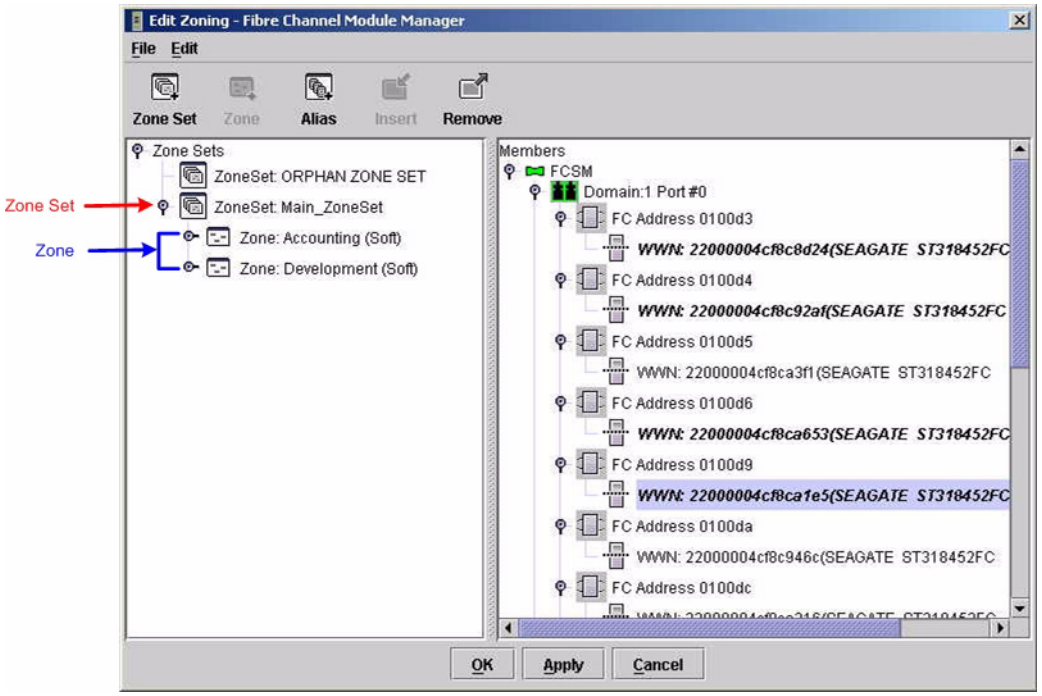
```
Fabric OS (cp1)
cp1 login: admin
Password: xxxxxxxx
Brocade12000:admin> cfgshow
Defined configuration:
  cfg: Interop_Broc_Intel
          Z1
  zone:   Z1    21:00:00:e0:8b:06:01:e6; 21:00:00:e0:8b:06:00:e6;
          21:00:00:e0:8b:06:04:e6; 21:00:00:e0:8b:06:99:67;
          50:02:0f:23:00:00:03:58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

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



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



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

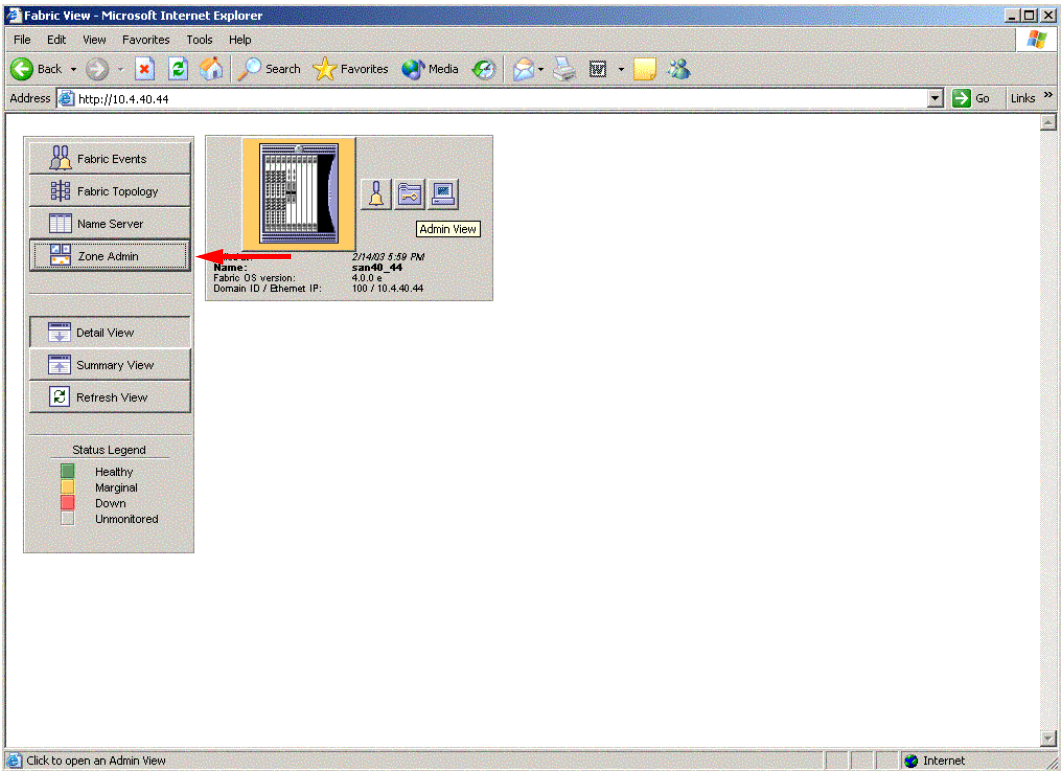
Zone Types

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

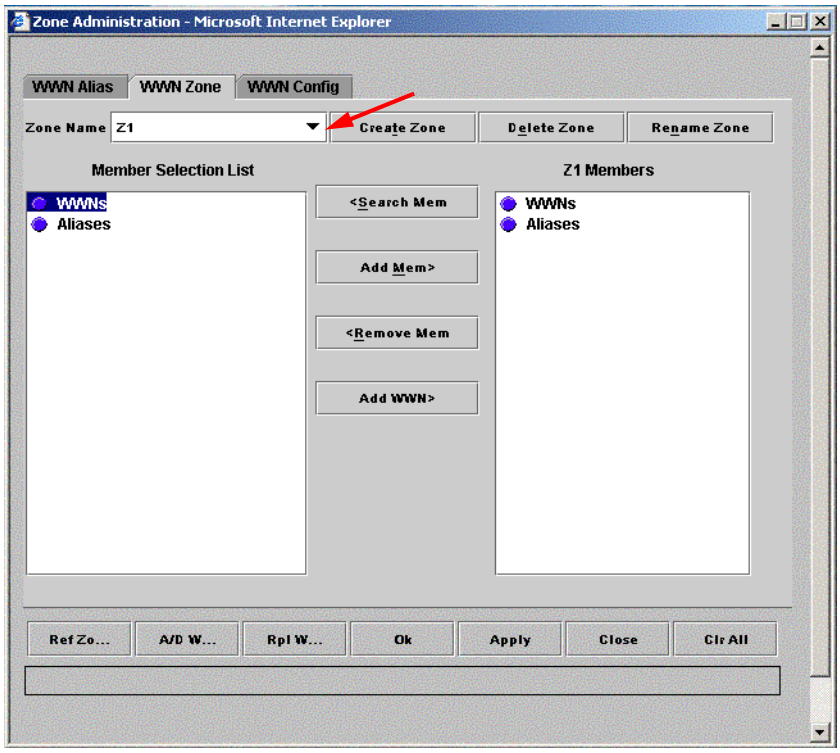
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

Brocade's Web Tools

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



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

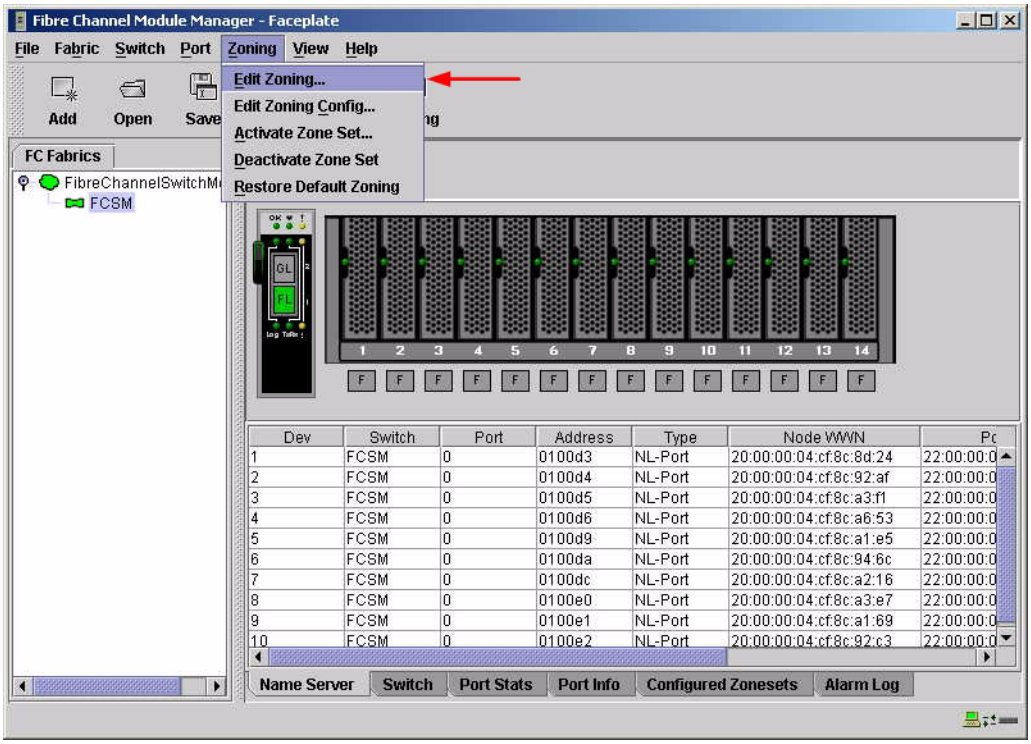


Brocade CLI

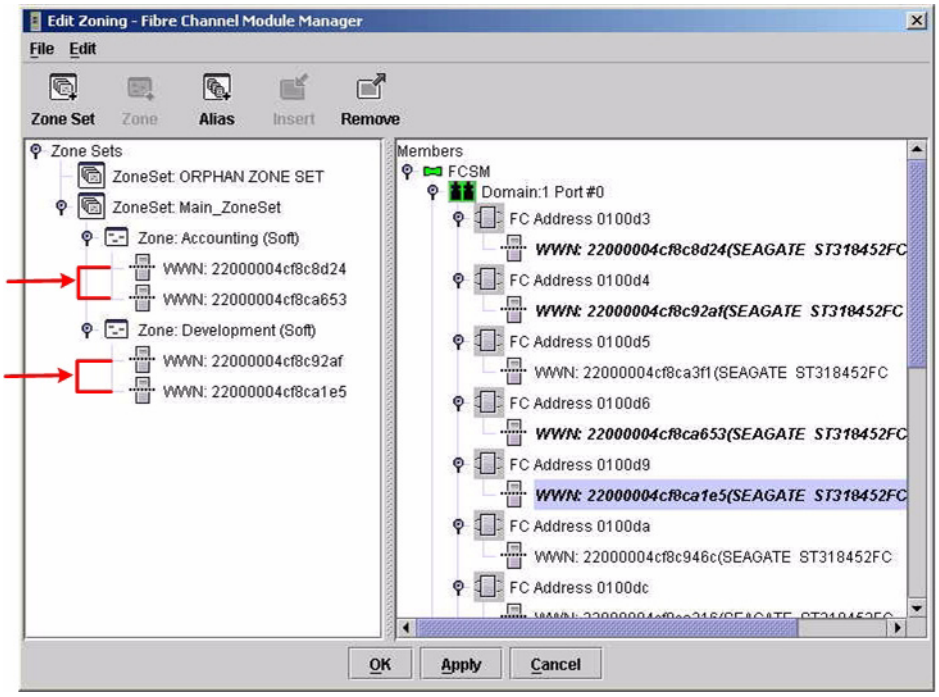
```
Login: admin
Password: xxxxxxxx
Brocade12000:admin> zoneshow
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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
Brocade12000:admin> switchdisable
Brocade12000:admin> interopmode 1
```

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

```
Brocad12000:admin> fastboot
```

Intel Fibre Channel Module Manager GUI

Not applicable.

Intel 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
Brocade12000:admin> msplmgmtdeactivate
```

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the Brocade and Intel 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 Intel support.

Merging Intel and Cisco Fabrics

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

Intel and Cisco Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Cisco	SN 5428 Storage Router	2.3.1-k9 and above
	MDS 9216 Switch	1.0(1) [build 1.0(0.281)]
	MDS 9509 Director	1.0(1) [build 1.0(0.281)]

The following chapters provides detailed information about merging Cisco and Intel fabrics:

- **Cisco SN 5428 Storage Router** **(see page 61)**
- **Cisco MDS 9000 Series Switches** **(see page 77)**.

Cisco SN 5428 Storage Router

Integration Checklist

The following steps must be completed to successfully merge Cisco and Intel 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 62).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see "Domain ID Configuration" on page 63).

✓ 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 72).

✓ Ensure that Zoning Merge type is set to SW2 (see "Cisco Specific Configuration" on page 75).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 76).

Configuration Limitations

No limitations exist when merging Cisco and Intel fabrics; all features are fully supported and comply with industry standards.

Supported Switches and Firmware Versions

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switch from Cisco that complies with the FC-SW-2 standard.

Intel and Cisco Supported Switch and Firmware Versions

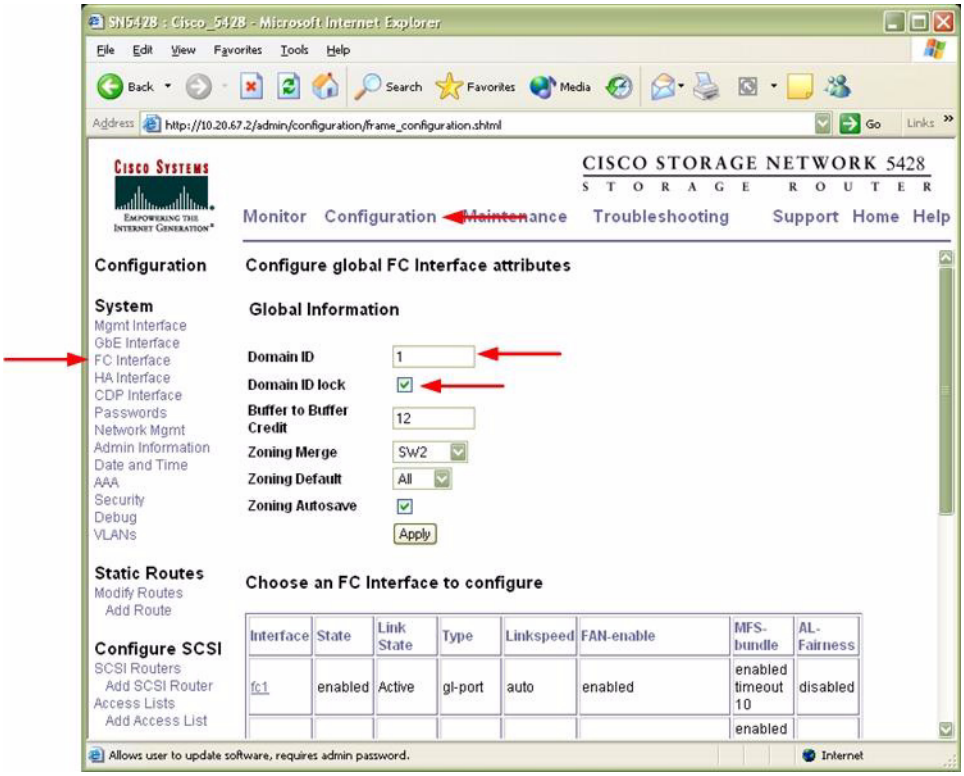
Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Cisco	SN 5428 Storage Router	2.3.1-k9 and above

Domain ID Configuration

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

Cisco SN 5428 Management Interface

1. Start the Cisco SN 5428 Management Interface. The **Cisco Storage Network 5428 Storage Router** dialog box displays.
2. From the **Cisco Storage Network 5428 Storage Router** dialog box, do the following:
   a. Select the primary link **Configuration**.
   b. From the function link **System**, click **FC Interface**.
   c. In the **Global Information Domain ID** box, type or edit the Domain ID as appropriate.
   d. Select the **Global Information Domain ID Lock** check box.
   e. Click **Apply**.



Cisco CLI

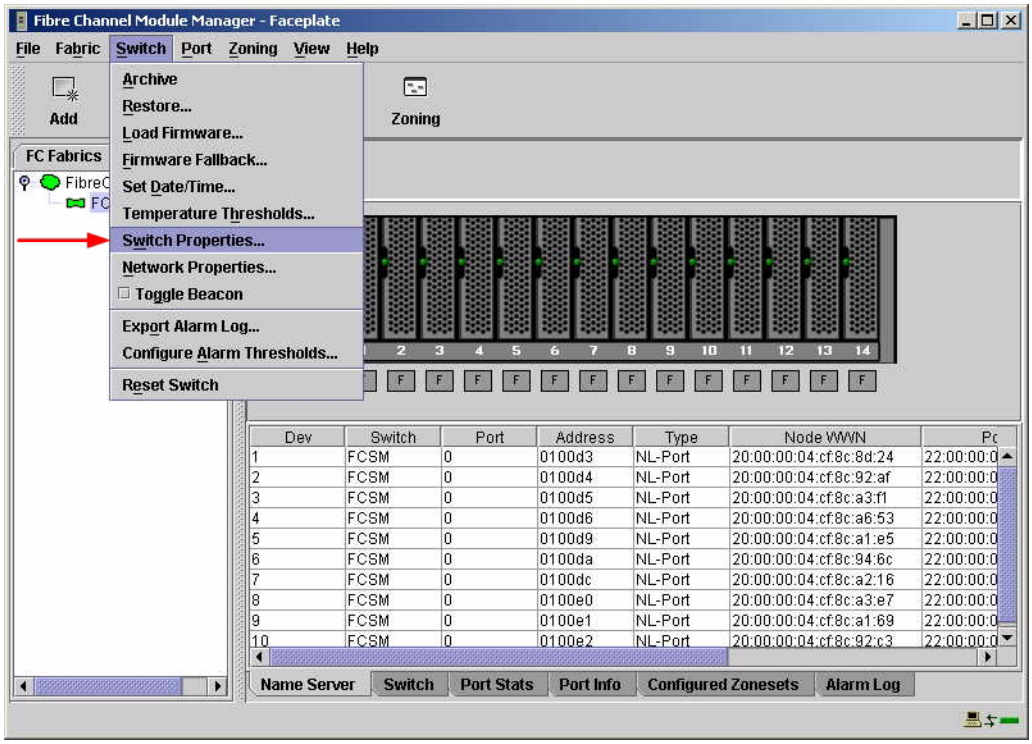
NOTE: Use the following CLI commands when the Cisco SN 5428 Management Interface is not available.

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

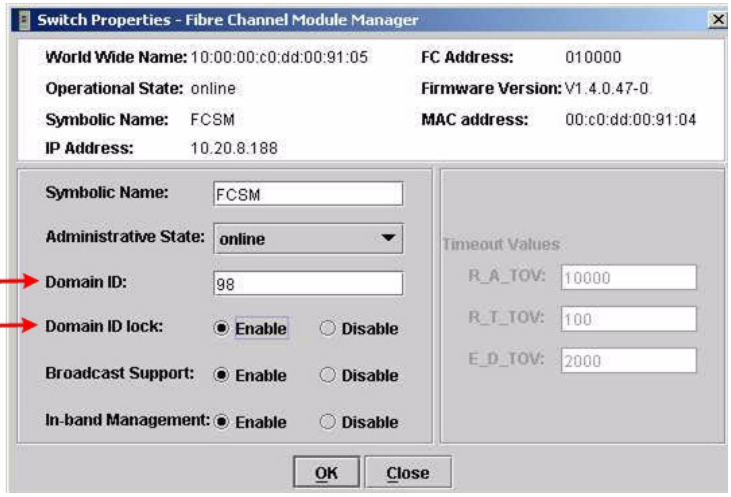
```
CISCO SN 5428 Storage Router
Password: *****

[Cisco_5428]$ ena

Enter admin password: *****
[Entering Administrator mode]

[Cisco_5428]# interface fc domainid <domain id>
[Cisco_5428]# interface fc domainid lock enable
*[Cisco_5428]# save all bootconfig
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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.

NOTE: Timeout values cannot be set using the Cisco SN 5428 Management Interface nor the Cisco CLI. Use the Intel Fibre Channel Module Manager GUI or Intel Fibre Channel Switch Module CLI.

Cisco SN 5428 Management Interface

Not applicable.

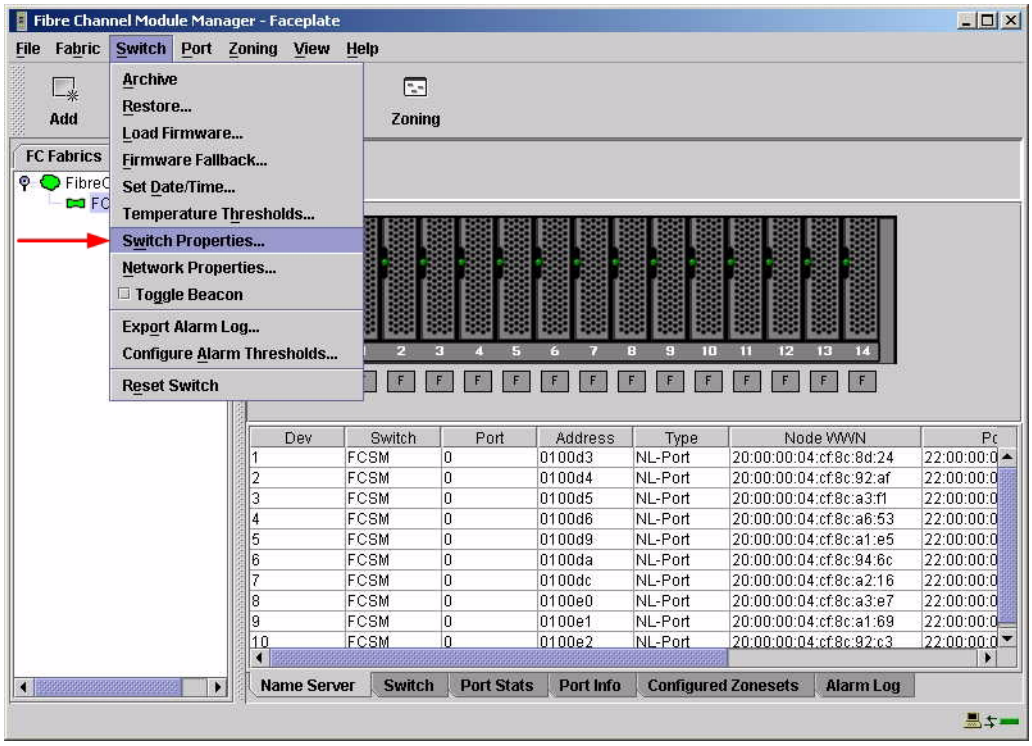
Cisco CLI

Not applicable.

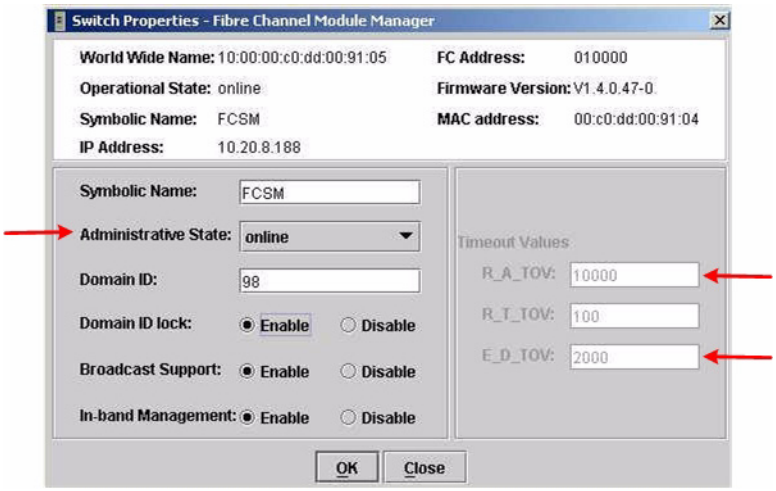
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

Cisco switches and Intel Server Fibre Channel Switches 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.

NOTE: Zone and Zone Set names cannot be set using the Cisco SN 5428 Management Interface nor the Cisco CLI. Use the Intel Fibre Channel Module Manager GUI or Intel Fibre Channel Switch Module CLI.

Cisco SN 5428 Management Interface

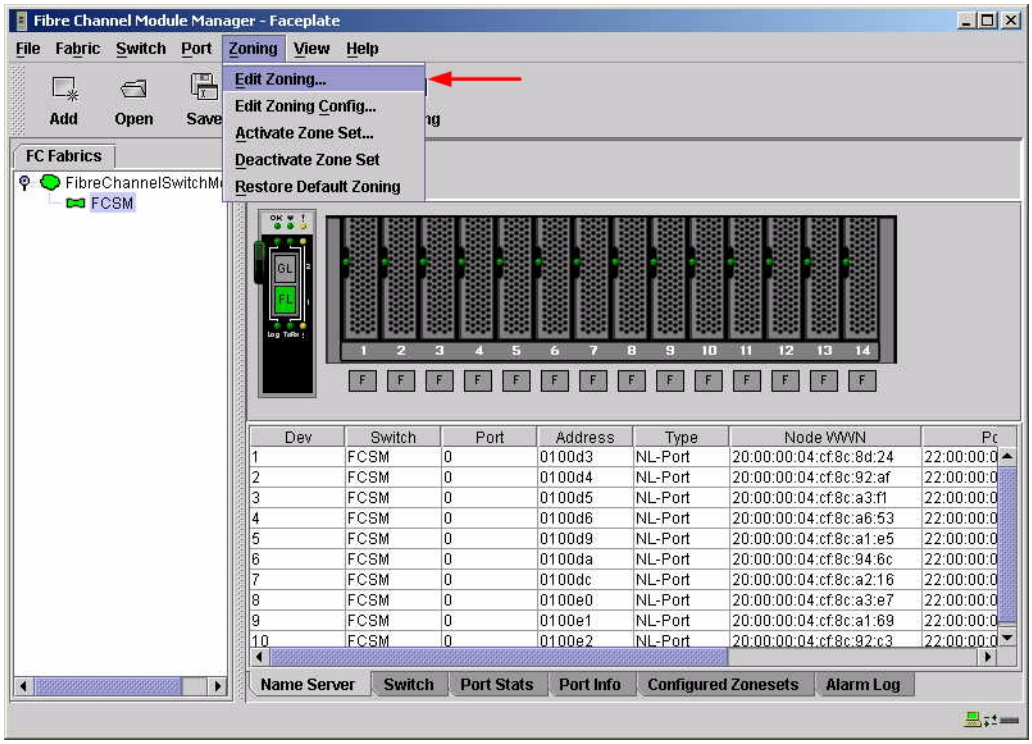
Not applicable.

Cisco CLI

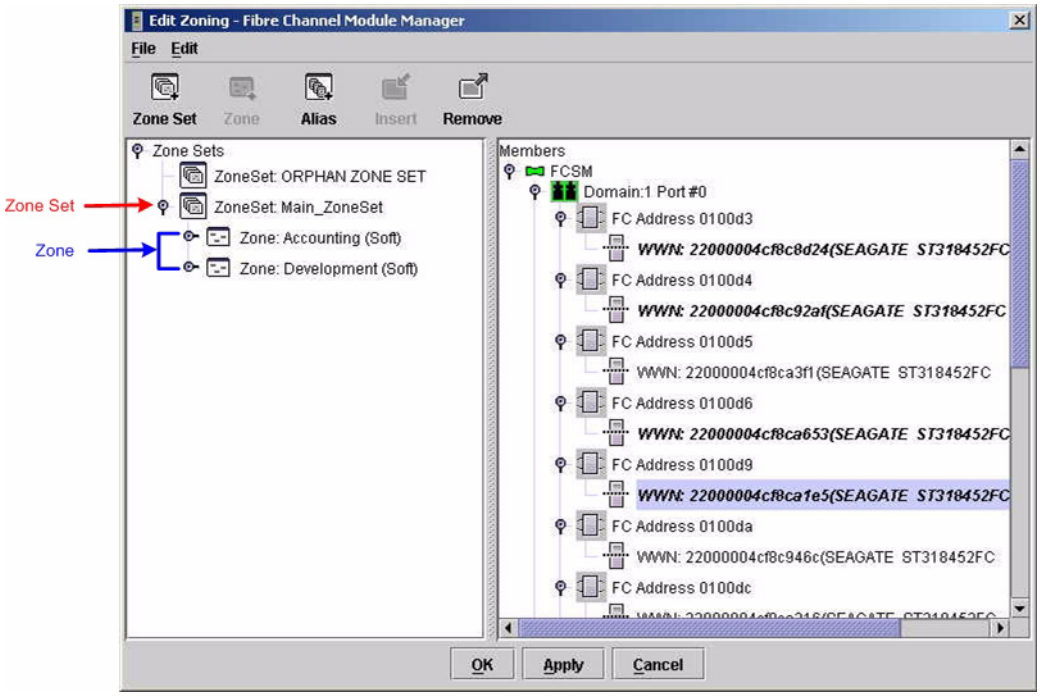
Not applicable.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning— Fibre Channel Module Manager** 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 72.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

Zone Types

Not applicable.

Operating Mode Configuration

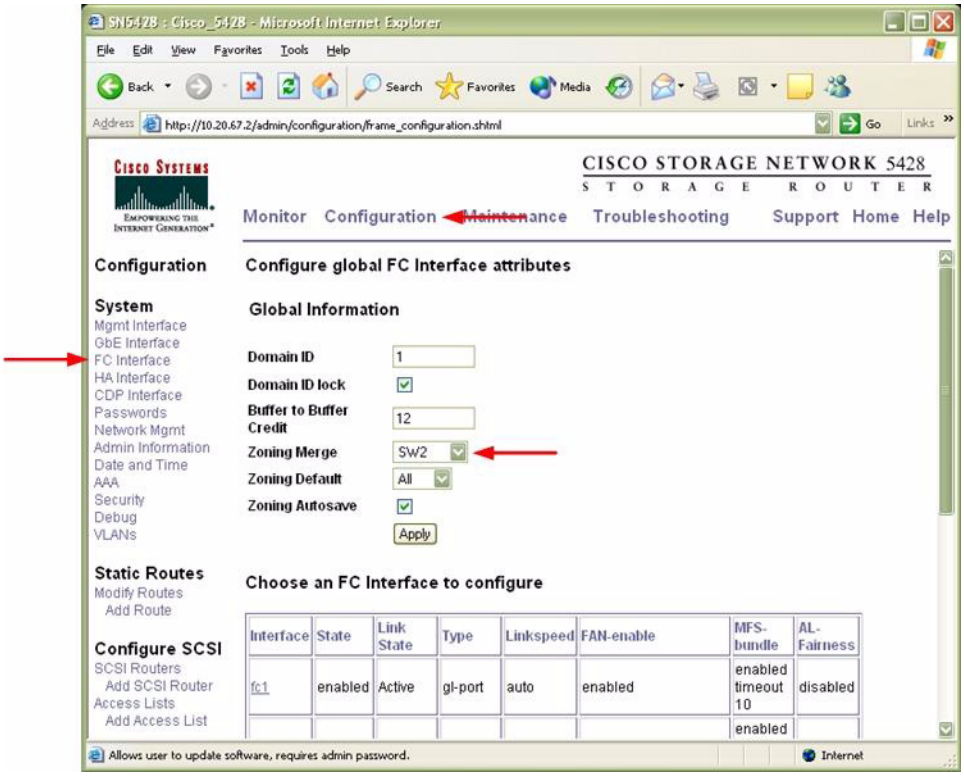
Not applicable.

Cisco Specific Configuration

Set the Zoning Merge type to SW2.

Cisco SN 5428 Management Interface

1. Start the Cisco SN 5428 Management Interface. The **Cisco Storage Network 5428 Storage Router** dialog box displays.
2. From the **Cisco Storage Network 5428 Storage Router** dialog box, do the following:
   a. Select the primary link **Configuration**.
   b. From the function link **System**, click **FC Interface**.
   c. In the **Global Information Zoning Merge** box, select **SW2**.
   d. Click **Apply**.



Cisco CLI

NOTE: Use the following CLI commands when the Cisco SN 5428 Management Interface is not available.

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

```
CISCO SN 5428 Storage Router
Password: *****

[Cisco_5428]$ ena

Enter admin password: *****
[Entering Administrator mode]

[Cisco_5428]# interface fc domainid zoning merge sw2
*[Cisco_5428]# save all bootconfig
```

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the Cisco and Intel 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 Intel support.

Cisco MDS 9000 Series Switches

Integration Checklist

The following steps must be completed to successfully merge Cisco and Intel 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 78).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see "Domain ID Configuration" on page 78).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 83).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 89).

✓ Ensure that all zone members are specified by WWPN (see "Zone Types" on page 93).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 96).

Configuration Limitations

No limitations exist when merging Cisco and Intel fabrics; all features are fully supported and comply with industry standards.

Supported Switches and Firmware Versions

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

Intel and Cisco Supported Switch and Firmware Versions

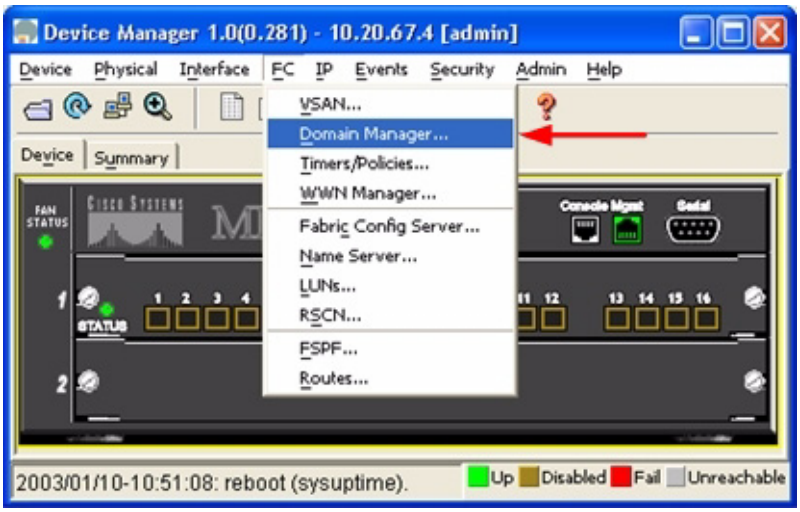
Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Cisco	MDS 9216 Switch	1.0(1) [build 1.0(0.281)]
	MDS 9509 Director	1.0(1) [build 1.0(0.281)]

Domain ID Configuration

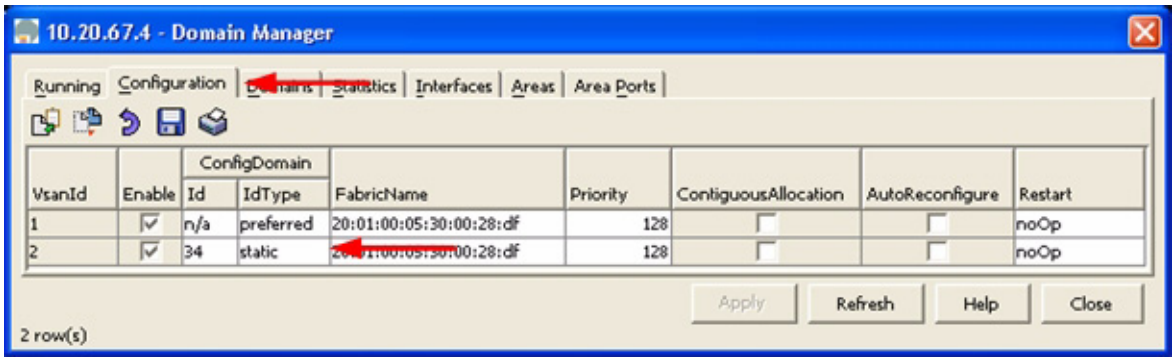
To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the Cisco switch and the Intel Server Fibre Channel Switch.

Cisco Device Manager

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



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



Cisco CLI

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

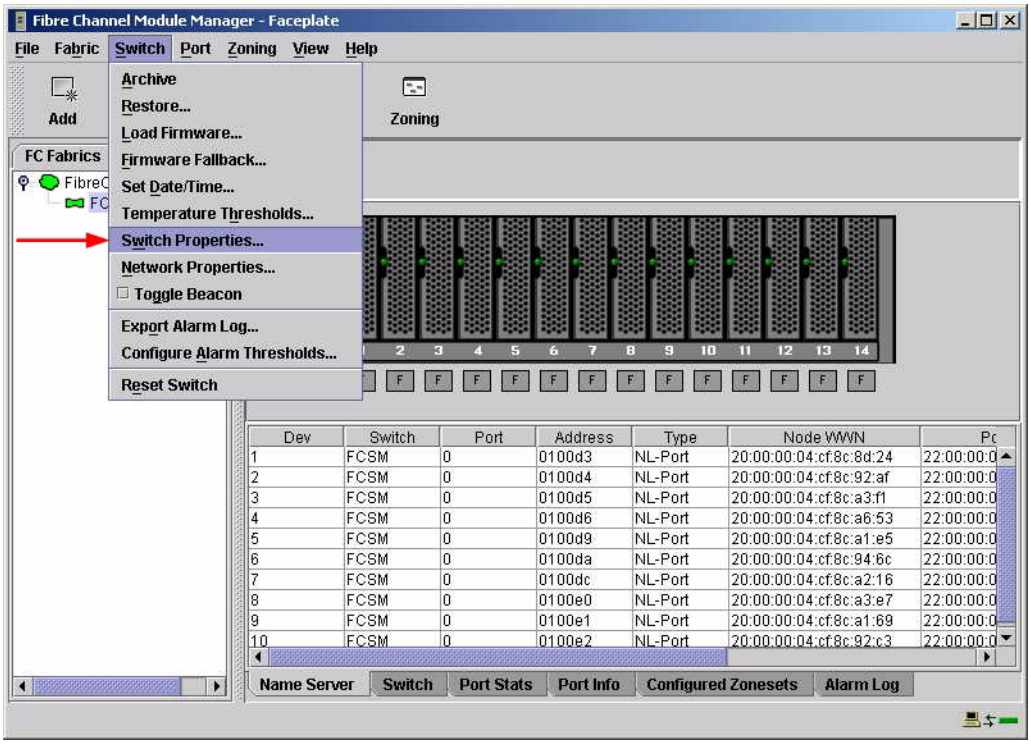
```
login: admin
Password: ********
Cisco_9216# config t
Cisco_9216(config)# fcdomain domain <domain id> static vsan <vsan id>
Cisco_9216(config)# fcdomain restart disruptive vsan <vsan id>
Cisco_9216(config)# end
```

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

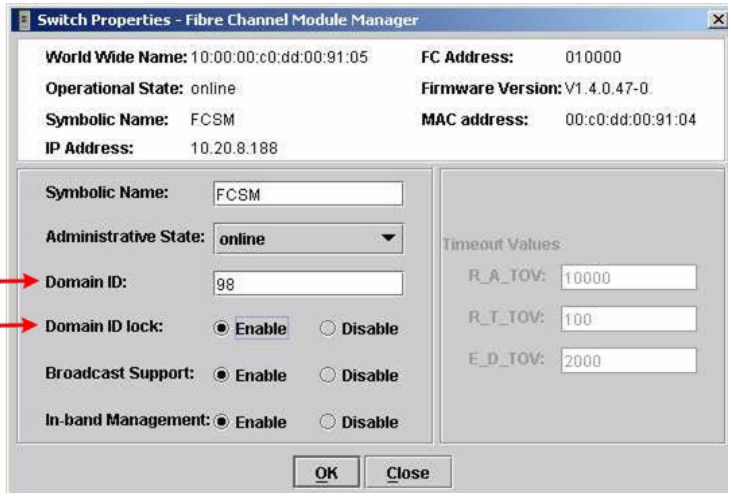
```
Cisco_9216# copy running-config startup-config
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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:

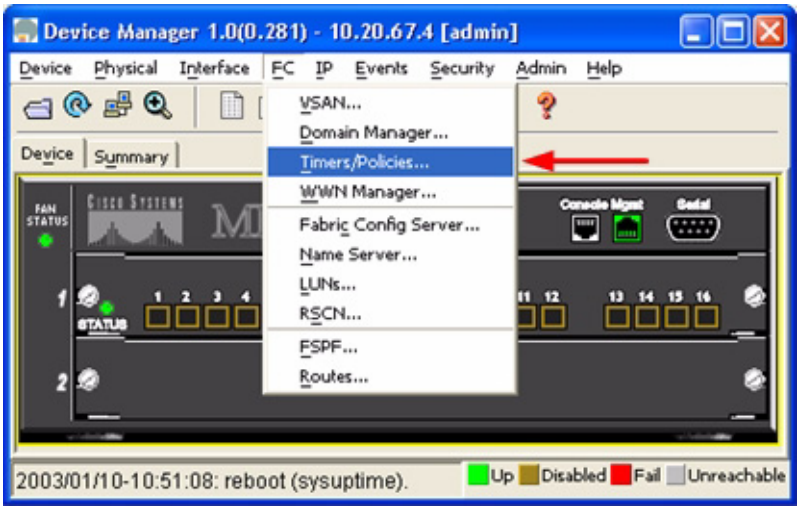
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

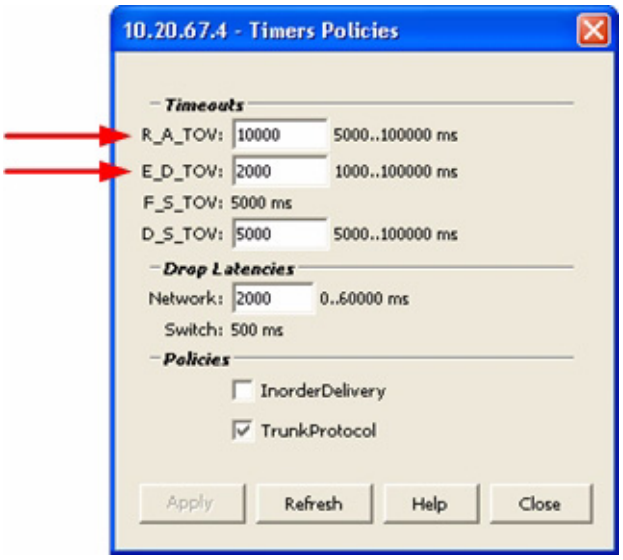
Cisco Device Manager

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

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



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



Cisco CLI

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

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

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

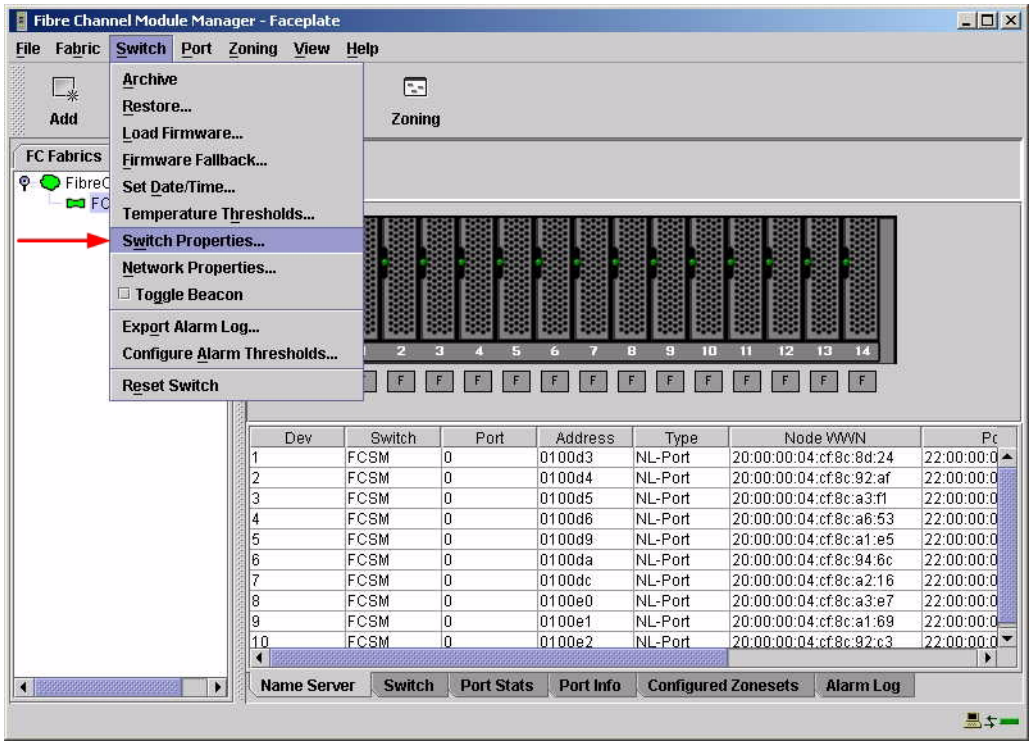
If you want these changes to remain through a switch reset, enter the following command.

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

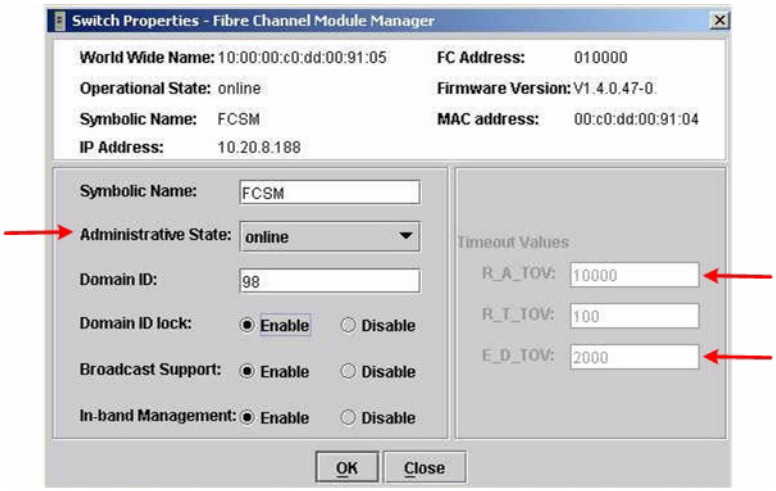
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

Cisco switches and Intel Server Fibre Channel Switches negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

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

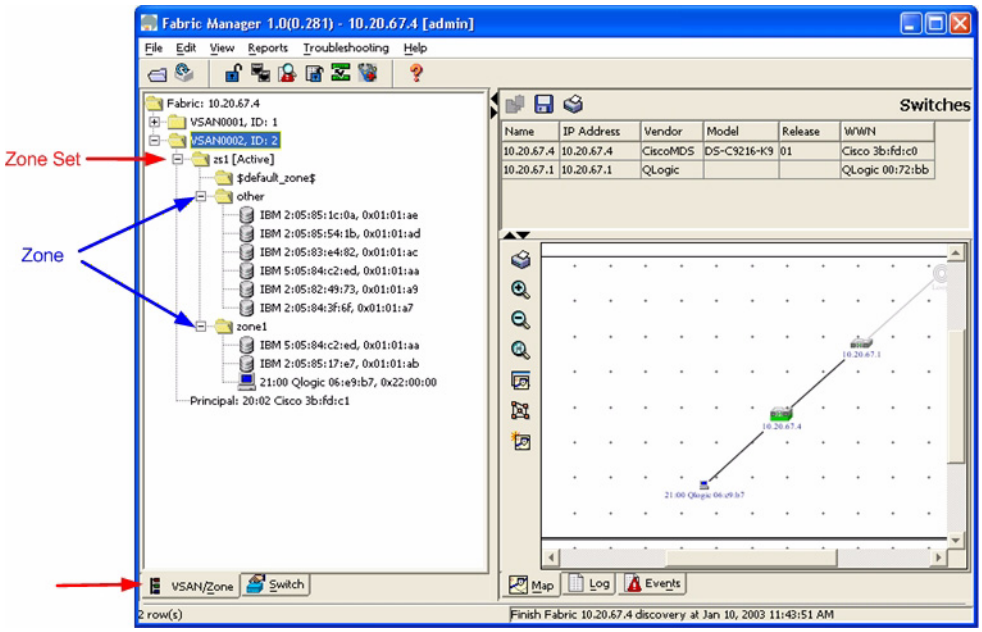
Active Zone Set Names

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

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

Cisco Fabric Manager

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **VSAN/Zone** tab.
   b. Expand the VSAN to which you plan to connect the E-port.
   c. Verify that the Zone Set names and Zone names conform to the standards discussed under "Active Zone Set Names" on page 89 and are unique between the switches.



Cisco CLI

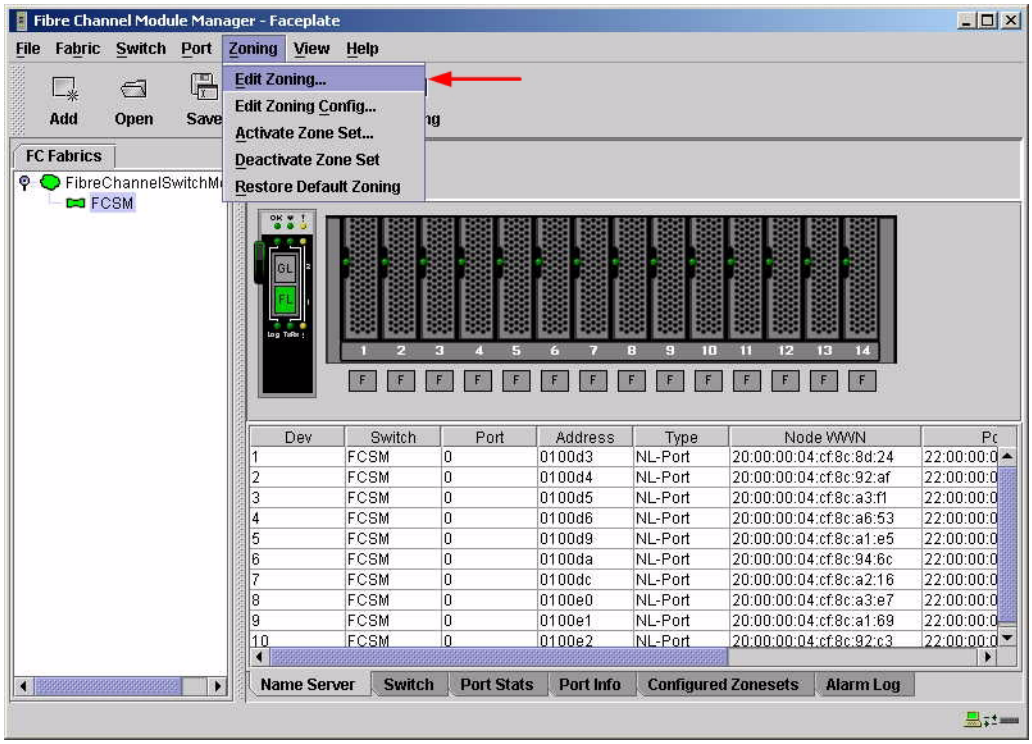
NOTE: Use the following CLI commands when the Cisco Fabric Manager is not available.

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

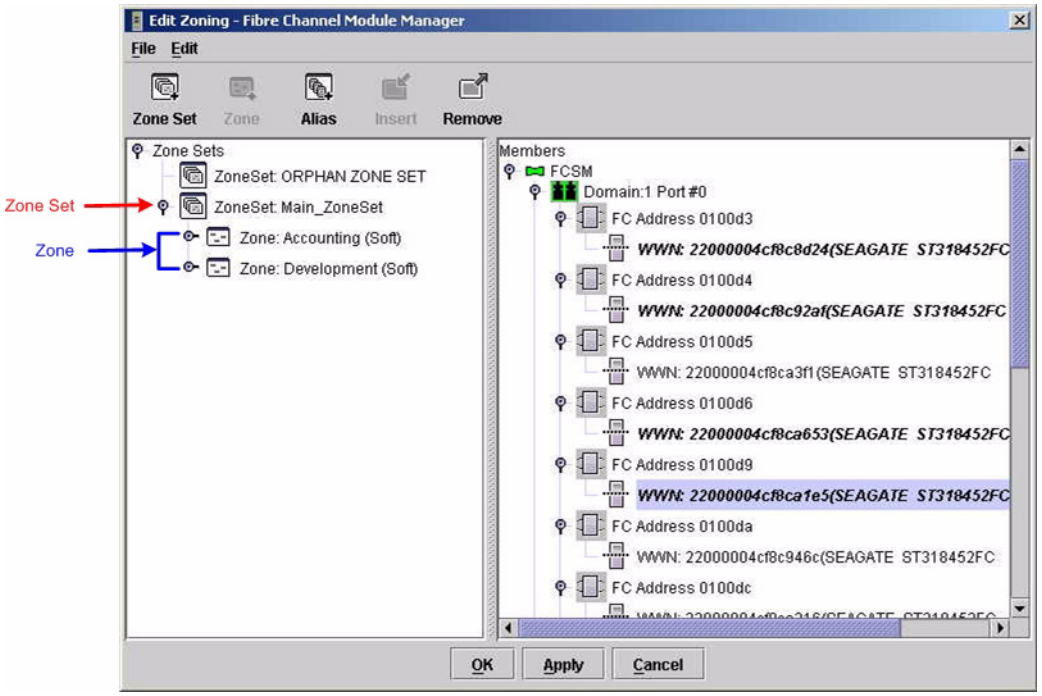
Use the above command to verify that all Zone and Zone Set names in the VSAN conform to FC standards.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 89.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

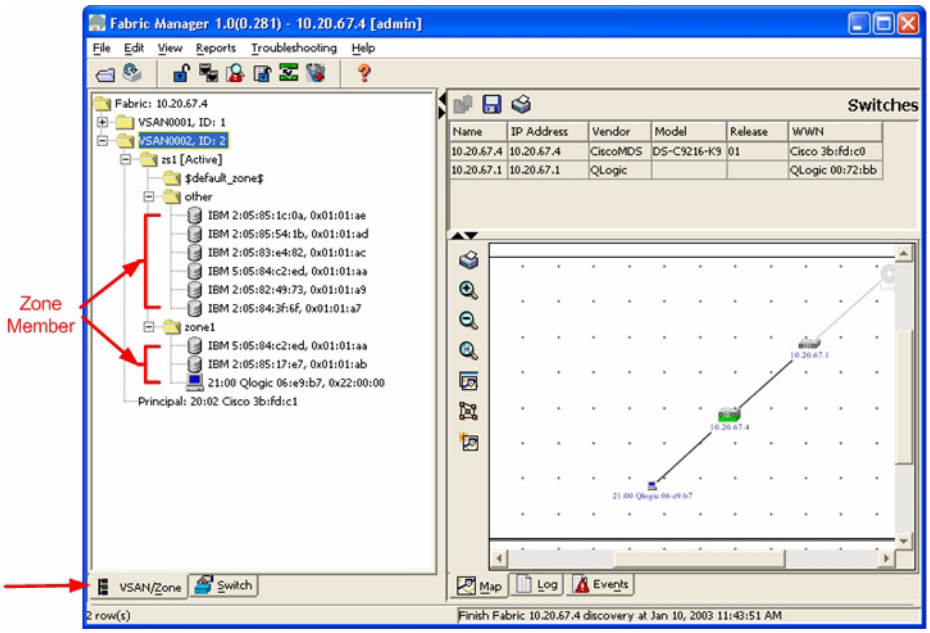
Zone Types

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

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

Cisco Fabric Manager

1. Start Cisco Fabric Manager. The **Fabric Manager** dialog box displays.
2. From the **Fabric Manager** dialog box left panel, do the following:
   a. Select the **VSAN/Zone** tab.
   b. Expand the VSAN to which you plan to connect the E-port.
   c. Verify that the zone member names conform to the standards discussed under "Active Zone Set Names" on page 89 and are unique between the switches.



Cisco CLI

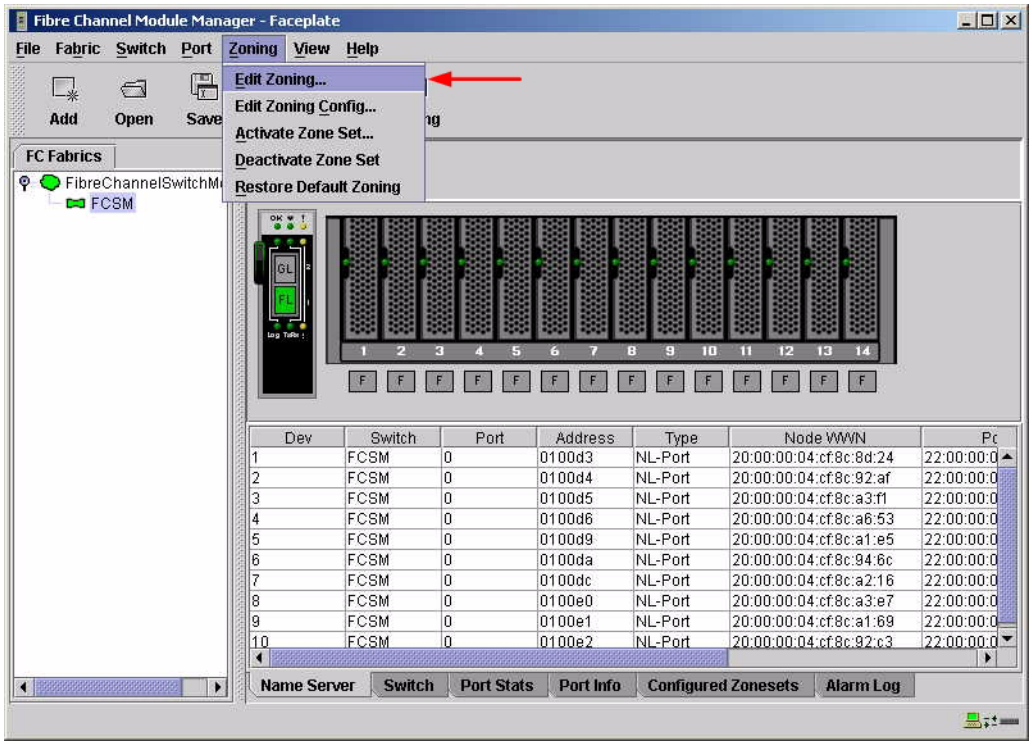
NOTE: Use the following CLI commands when the Cisco Fabric Manager is not available.

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

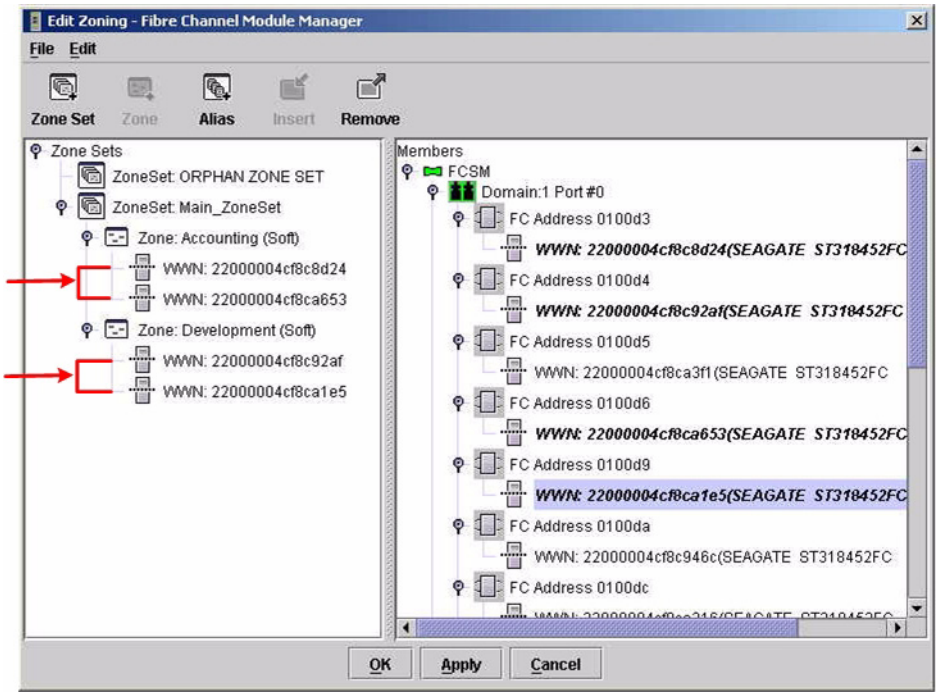
Use the above command to verify that all zone members are specified by pwwn.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone members <zone name>
```

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

Operating Mode Configuration

Not applicable.

Cisco Specific Configuration

Not applicable.

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the Cisco and Intel 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 Intel support.

Merging Intel and IBM BladeCenter Fabrics

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

Intel and IBM Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.42.0 and above

The following chapter provides detailed information about merging Intel and IBM BladeCenter fabrics: **IBM eServer BladeCenter Fibre Channel Switch Module** **(see page 99)**.

IBM eServer BladeCenter Fibre Channel Switch Module

Integration Checklist

The following steps must be completed to successfully merge IBM BladeCenter and Intel 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 100).

✓ Ensure that each switch has a unique Domain ID (see "Domain ID Configuration" on page 101).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 107).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 113).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 117).

Configuration Limitations

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

Supported Switches and Firmware Versions

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

Intel and IBM Supported Switch and Firmware Versions

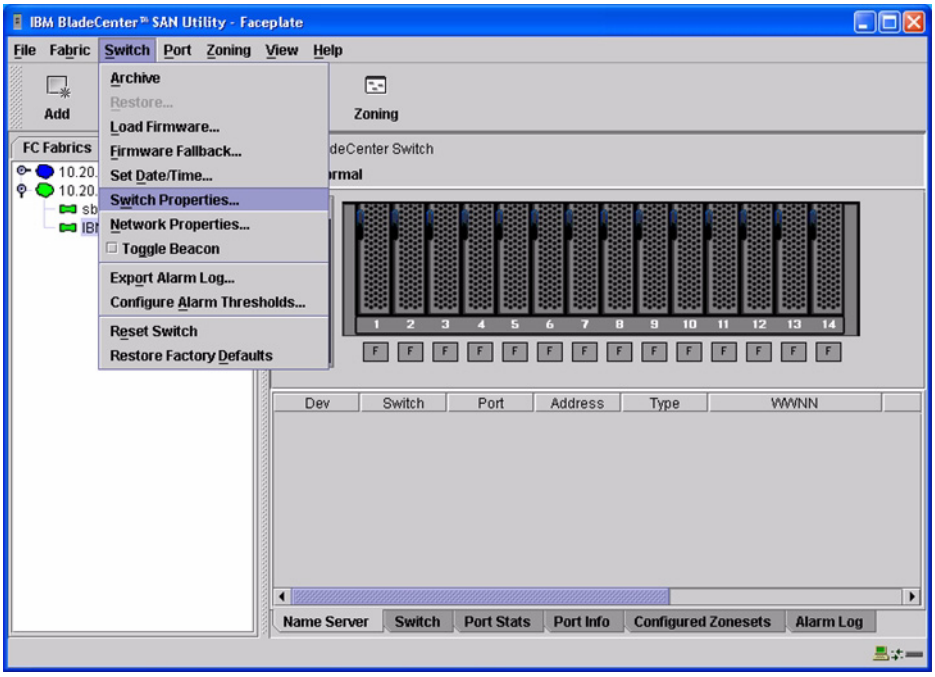
Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.42.0 and above

Domain ID Configuration

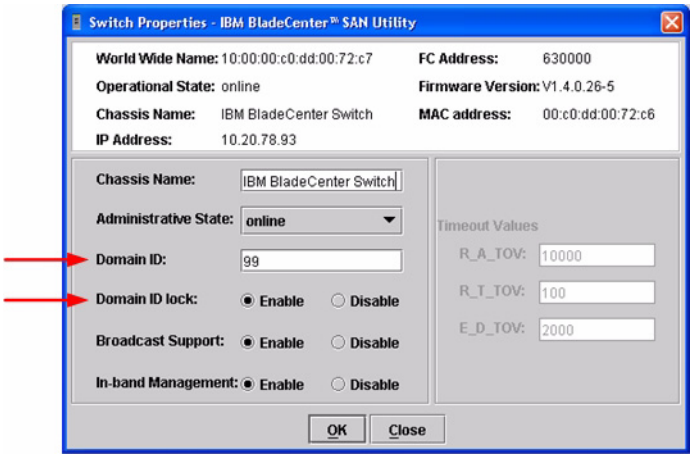
To ensure that there are no conflicts between switches, we recommend that each switch have an assigned Domain ID. The following steps show how to set the Domain ID on both the Intel Server Fibre Channel Switch and the IBM eServer BladeCenter Fibre Channel Switch Module.

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.

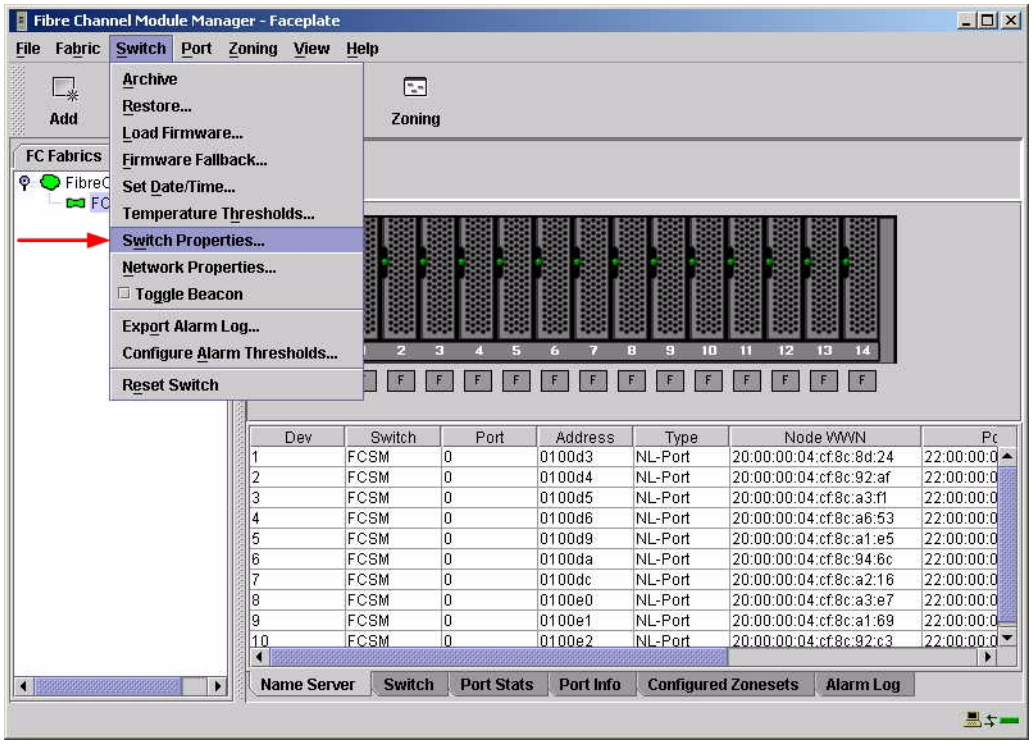
```
Login: admin
Password: xxxxxxxx
IBM BladeCenter #> admin start
IBM BladeCenter (admin) #> config edit
IBM BladeCenter (admin-config) #> set config switch
```

The following options display:

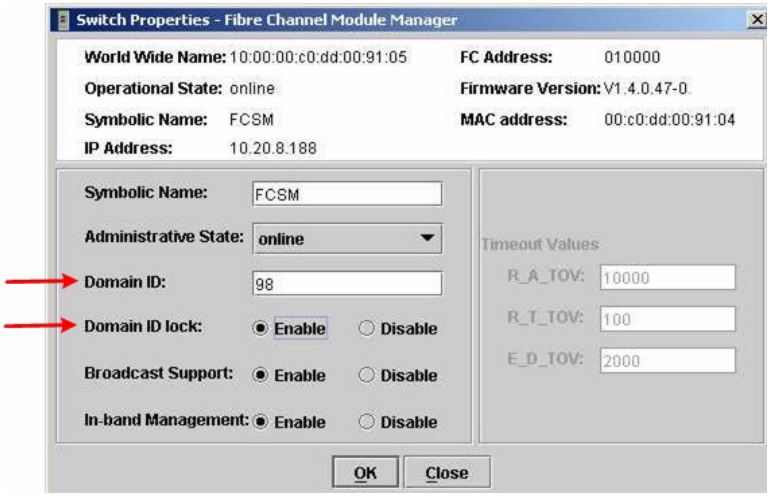
```
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  DefaultDomainID (decimal value, 1-239) [1] <97-127>
  DomainIDLock (True / False) [False] True
  SymbolicName (string, max=32 chars) [Fibre Channel Switch Module]
  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
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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:

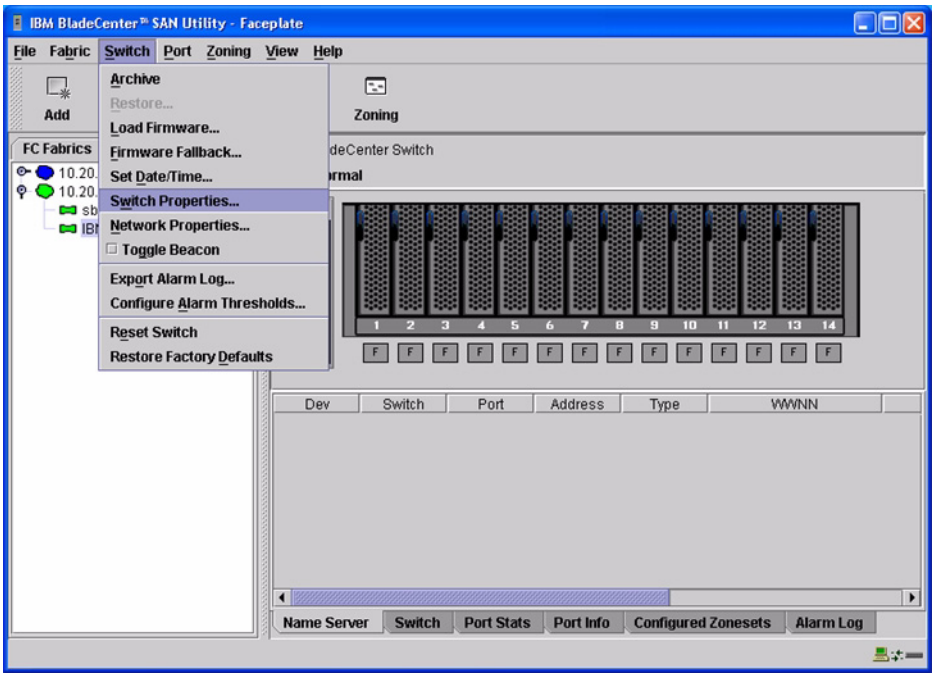
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

This section provides the steps to change these values.

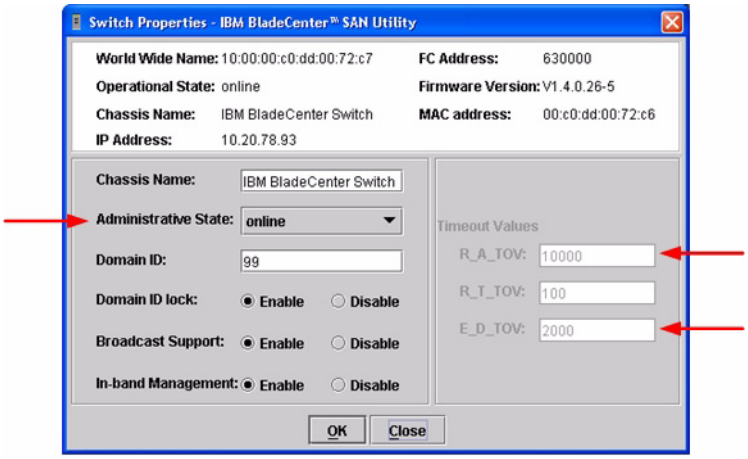
IBM eServer BladeCenter SAN Utility

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
```

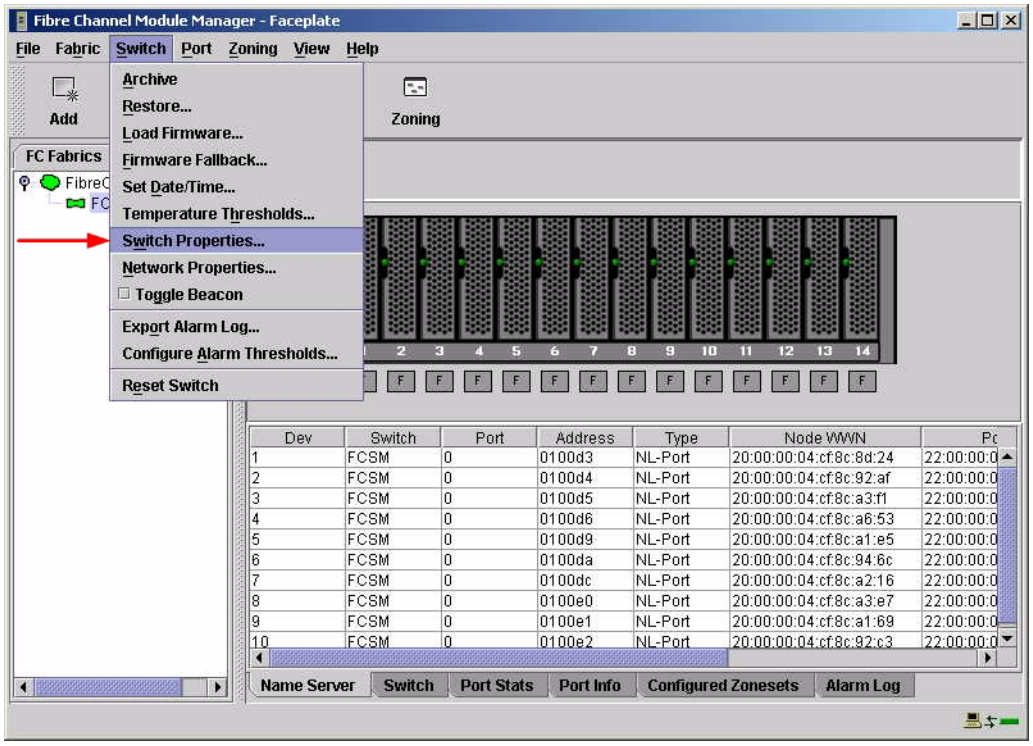
The following options display:

```
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
```

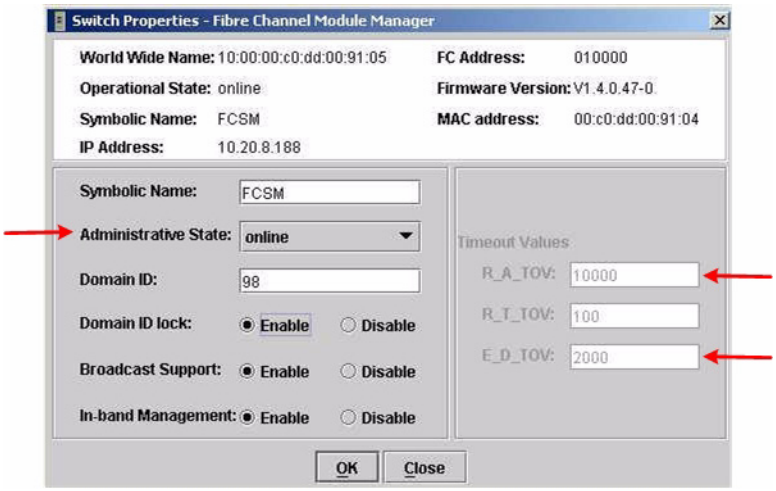
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

IBM eServer BladeCenter Fibre Channel Switch Modules and Intel Server Fibre Channel Switches 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.

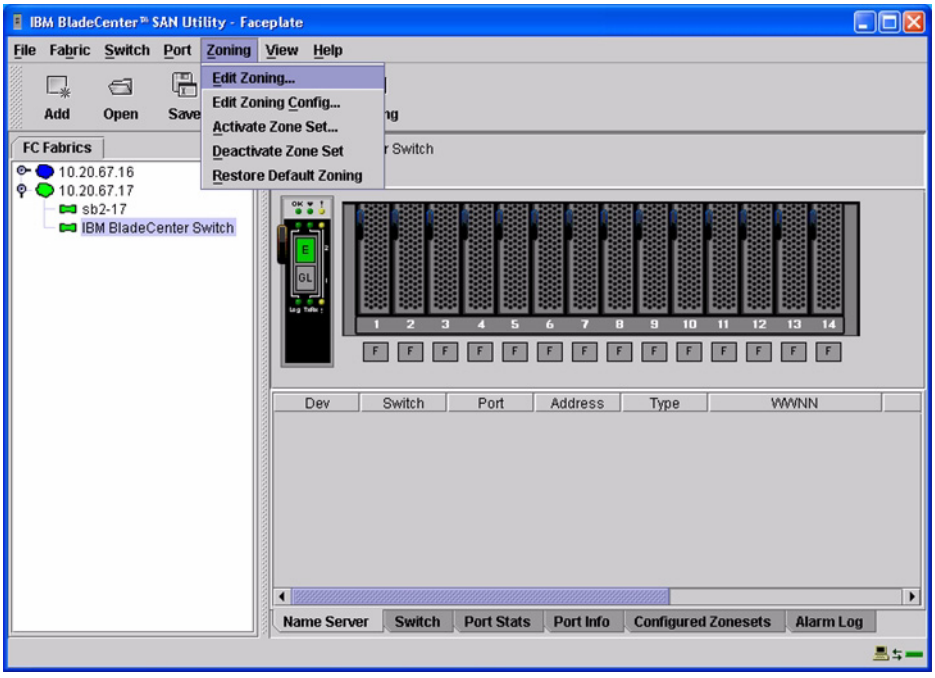
Active Zone Set Names

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):

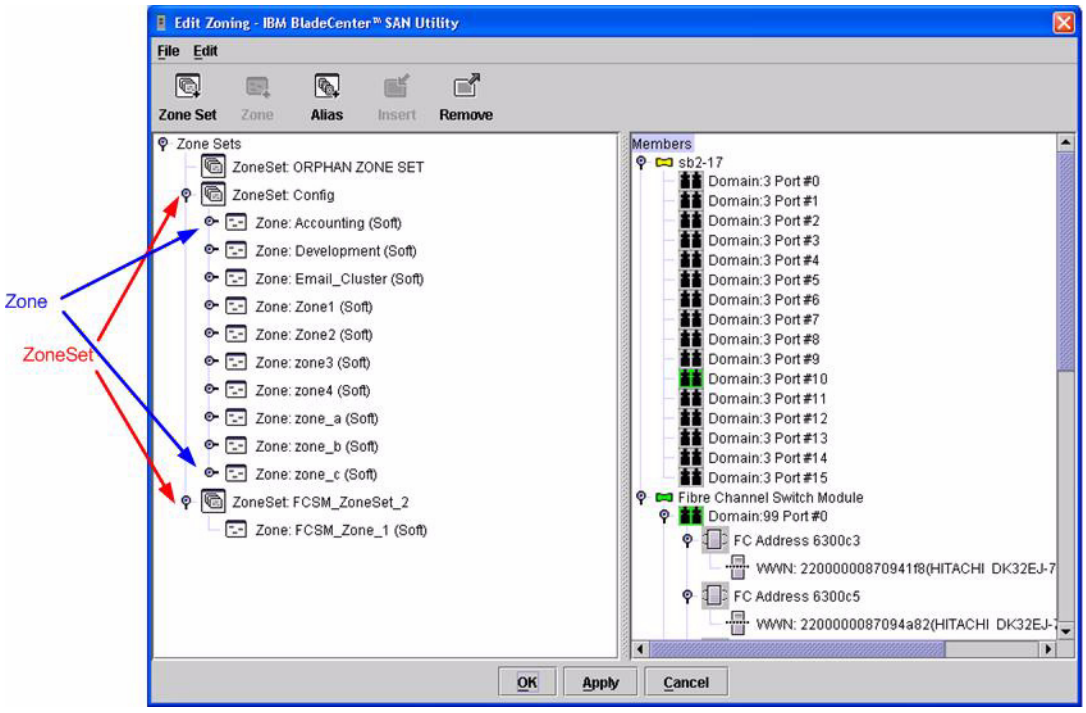
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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 113.



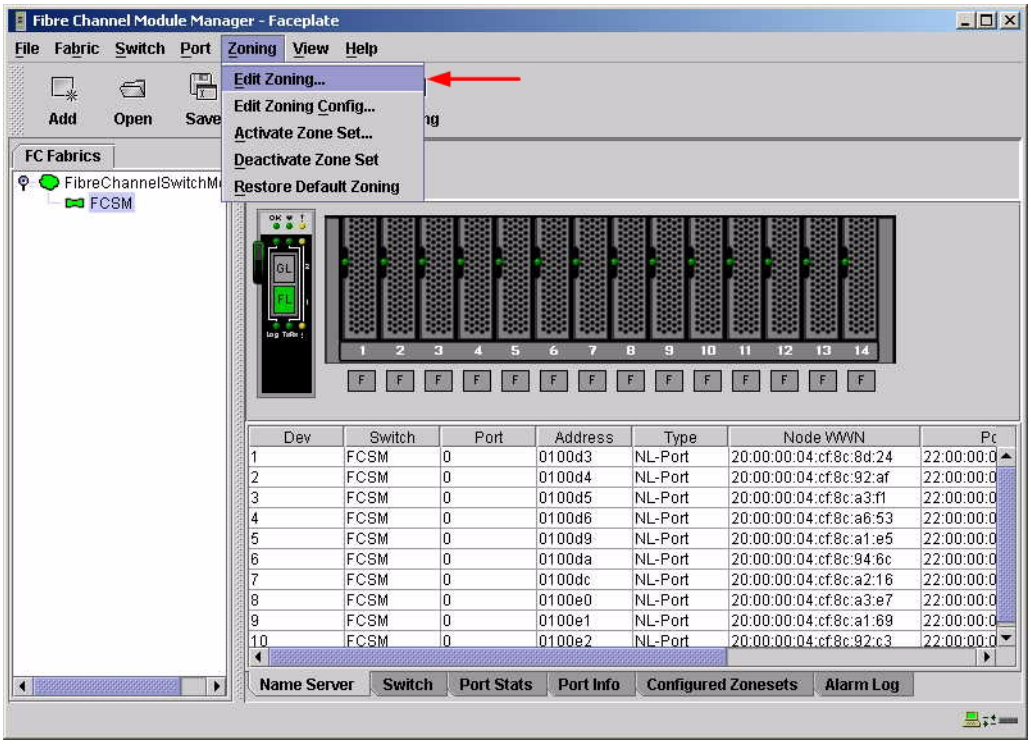
IBM eServer BladeCenter Fibre Channel Switch Module CLI

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

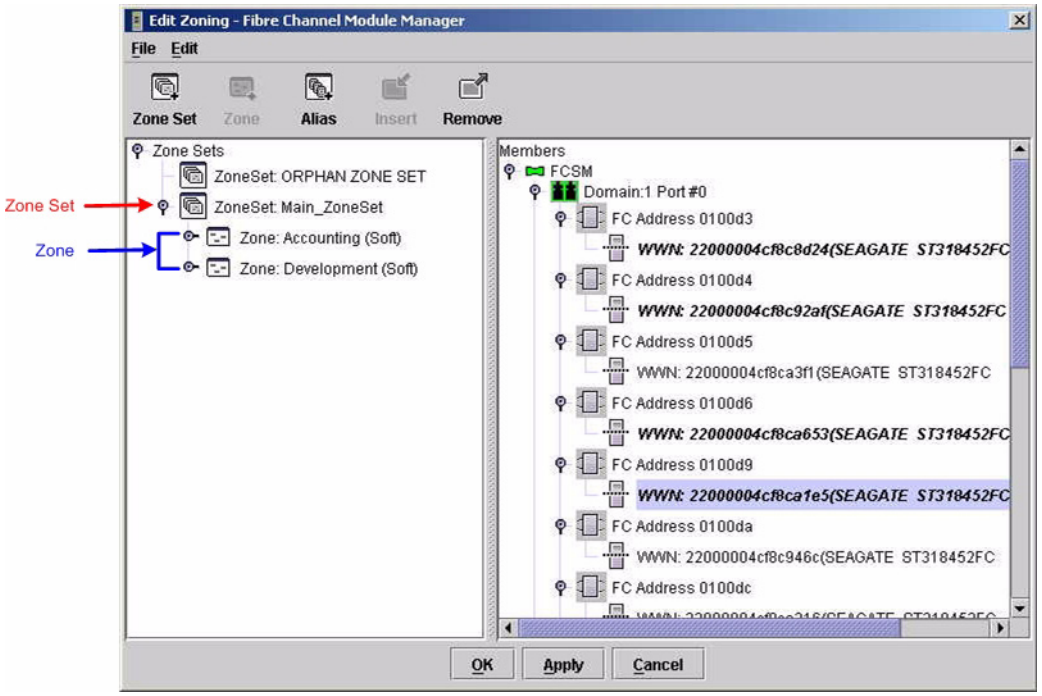
```
Login: admin
Password: xxxxxxxx
IBM BladeCenter  #> zone list
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 113.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

Zone Types

This configuration supports all IBM eServer BladeCenter Fibre Channel Switch Module and Intel Server Fibre Channel Switch types.

Operating Mode Configuration

Not applicable.

IBM BladeCenter Specific Configuration

Not applicable.

Intel 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 IBM BladeCenter and Intel 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 Intel support.

Merging Intel and INRANGE Fabrics

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switch from INRANGE that complies with the FC-SW-2 standard.

Intel and INRANGE Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
INRANGE	FC/9000 Switch	Code set 3.0.3.2 and above

The following chapter provides detailed information about merging Intel and INRANGE fabrics: **INRANGE FC/9000 Switches** **(see page 121)**.

INRANGE FC/9000 Switches

Integration Checklist

The following steps must be completed to successfully merge INRANGE and Intel 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 122).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 122).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 126).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 131).

✓ Ensure that the zone member type is set to Port WWN (see “Zone Types” on page 139).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 145).

Configuration Limitations

When merging INRANGE and Intel 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 Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from INRANGE that comply with the FC-SW-2 standard.

Intel and INRANGE Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
INRANGE	FC/9000 Switch	Code set 3.0.3.2 and above

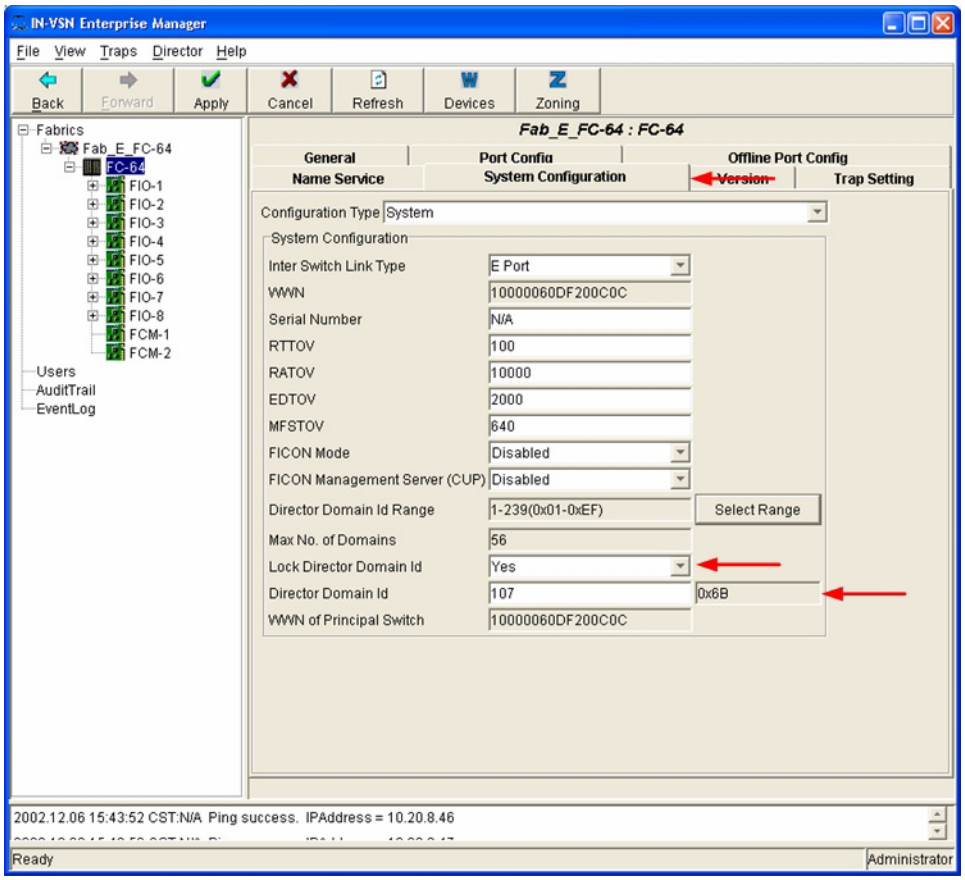
Domain ID Configuration

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 Intel Server Fibre Channel Switch.

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**.

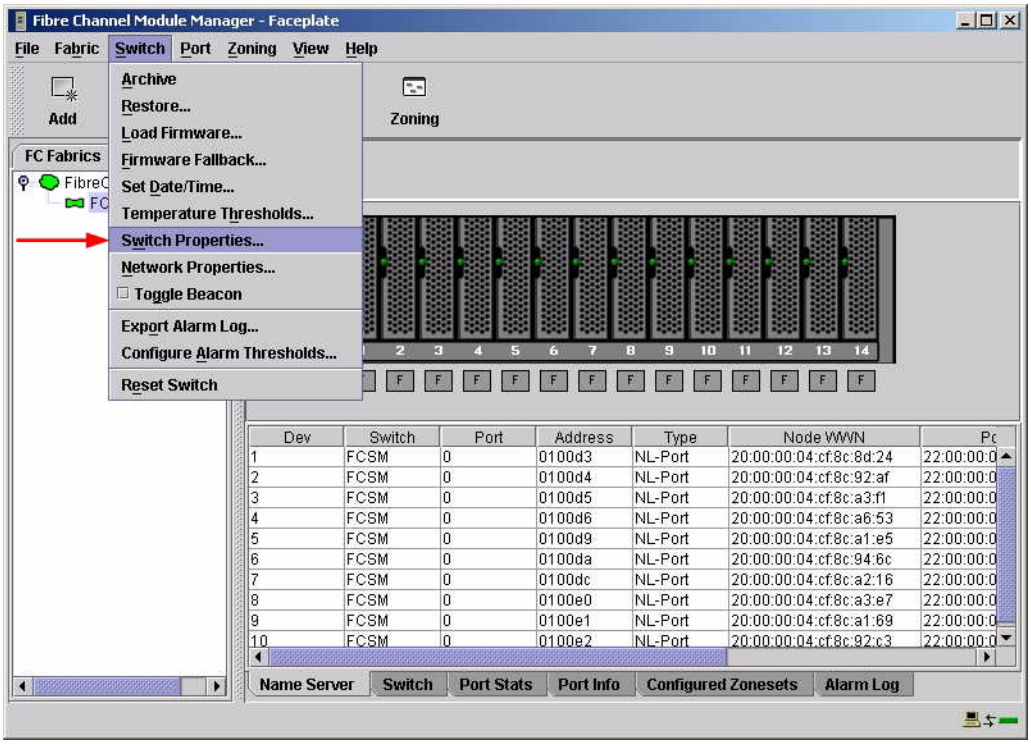


INRANGE CLI

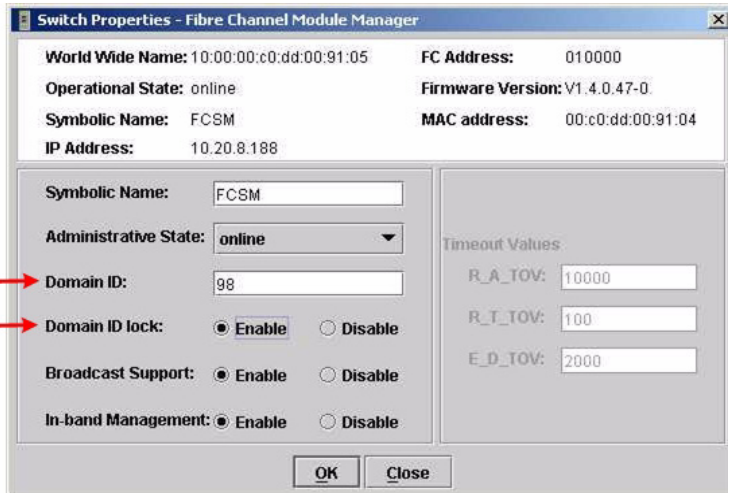
Not applicable.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Timeout Values

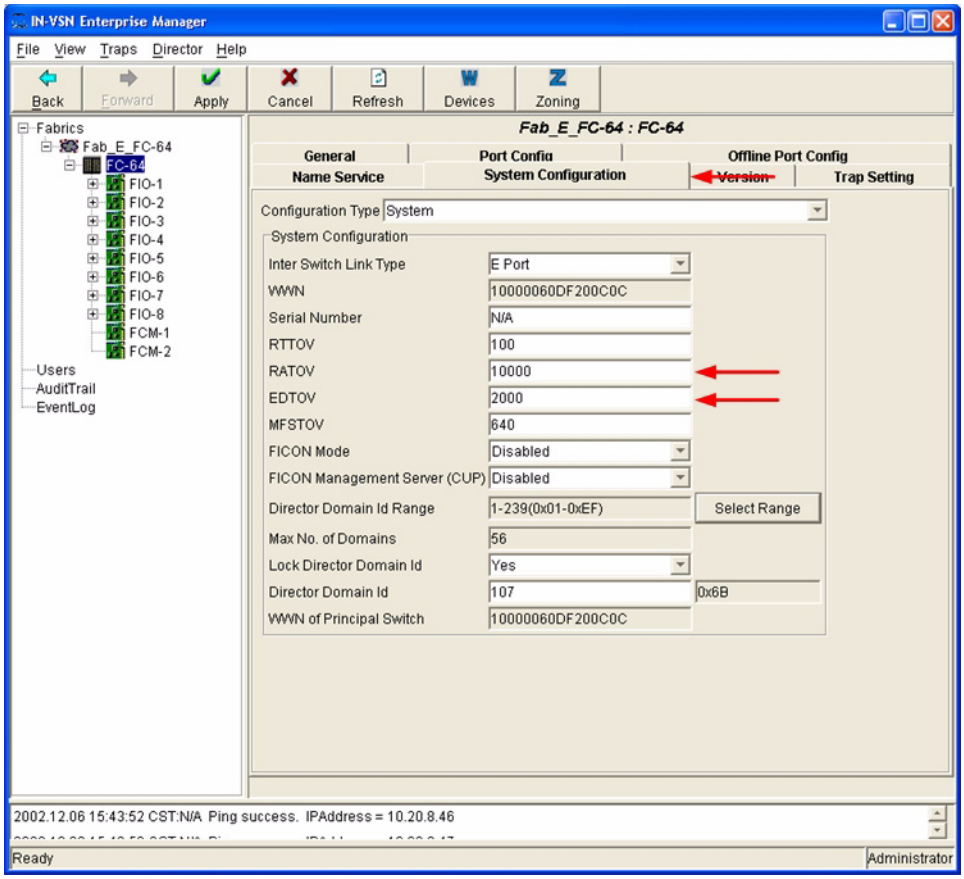
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

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**.



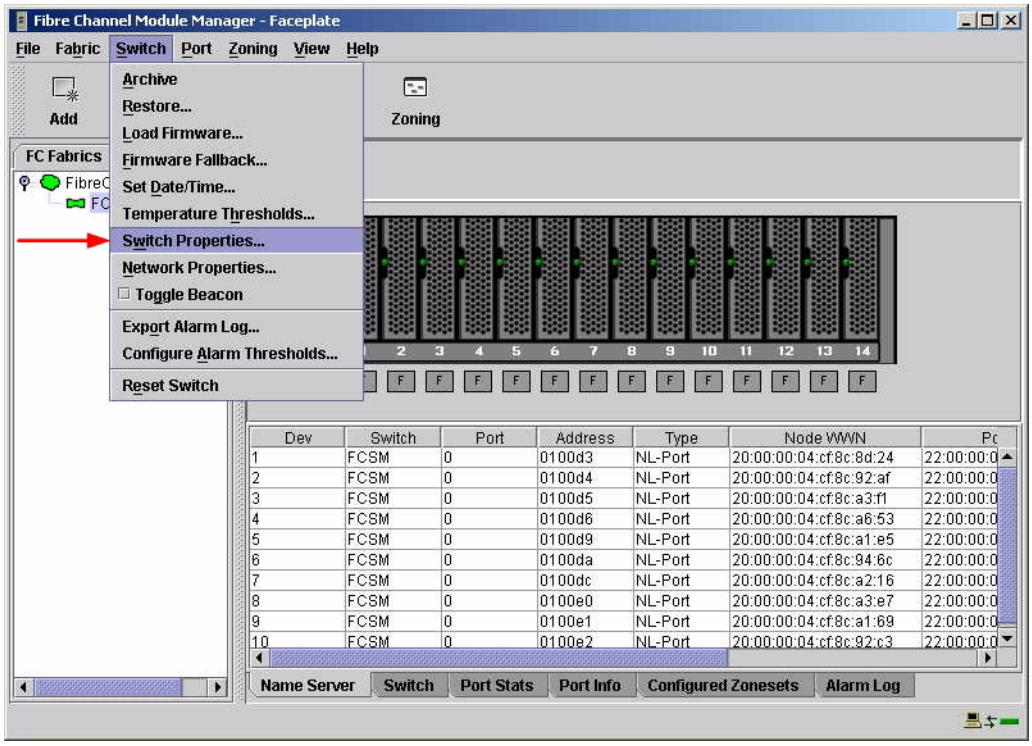
INRANGE CLI

Not applicable.

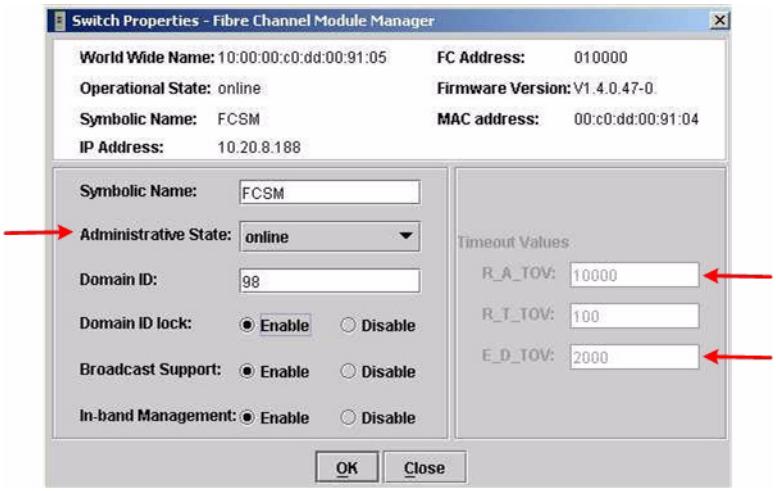
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box, **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

INRANGE switches and Intel Server Fibre Channel Switches 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.

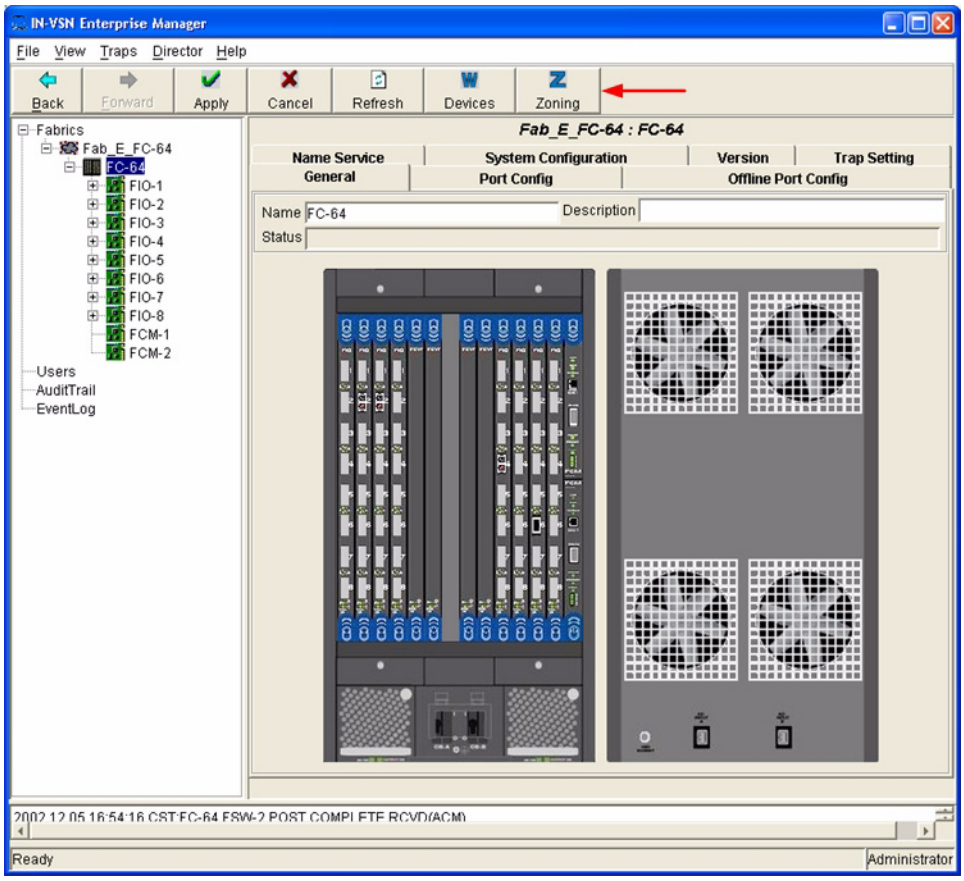
Active Zone Set Names

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):

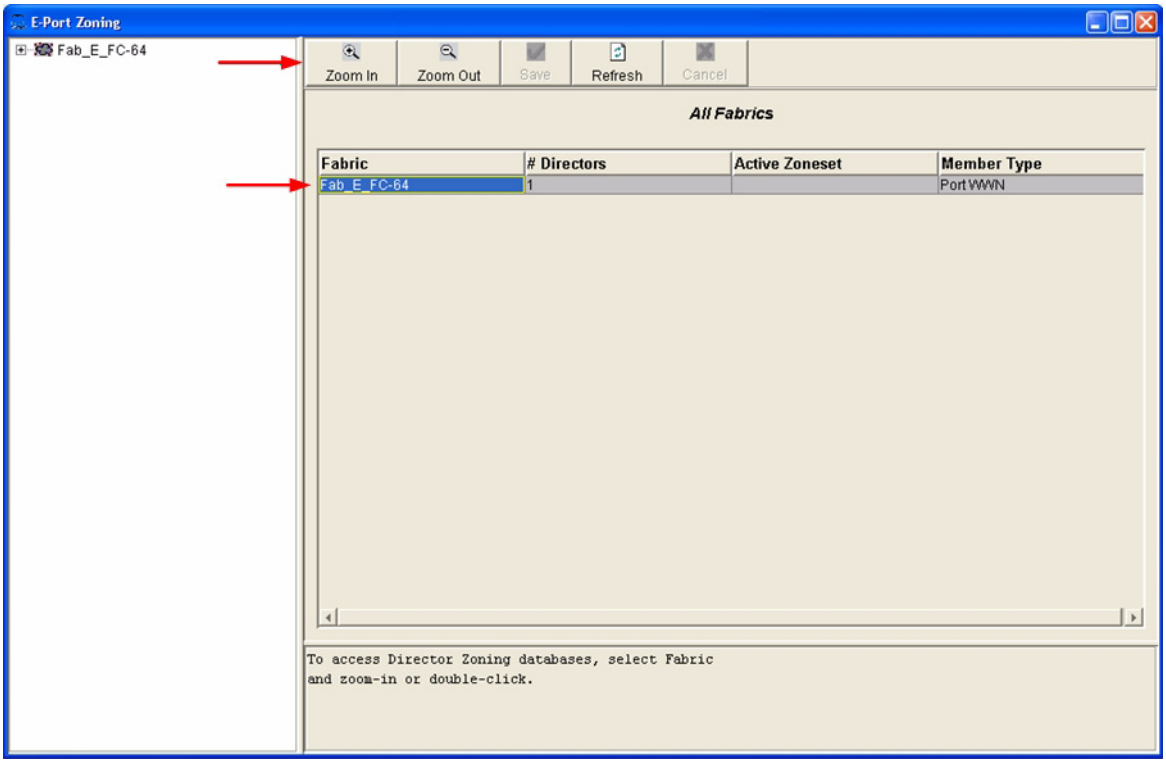
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

INRANGE IN-VSN Enterprise Manager

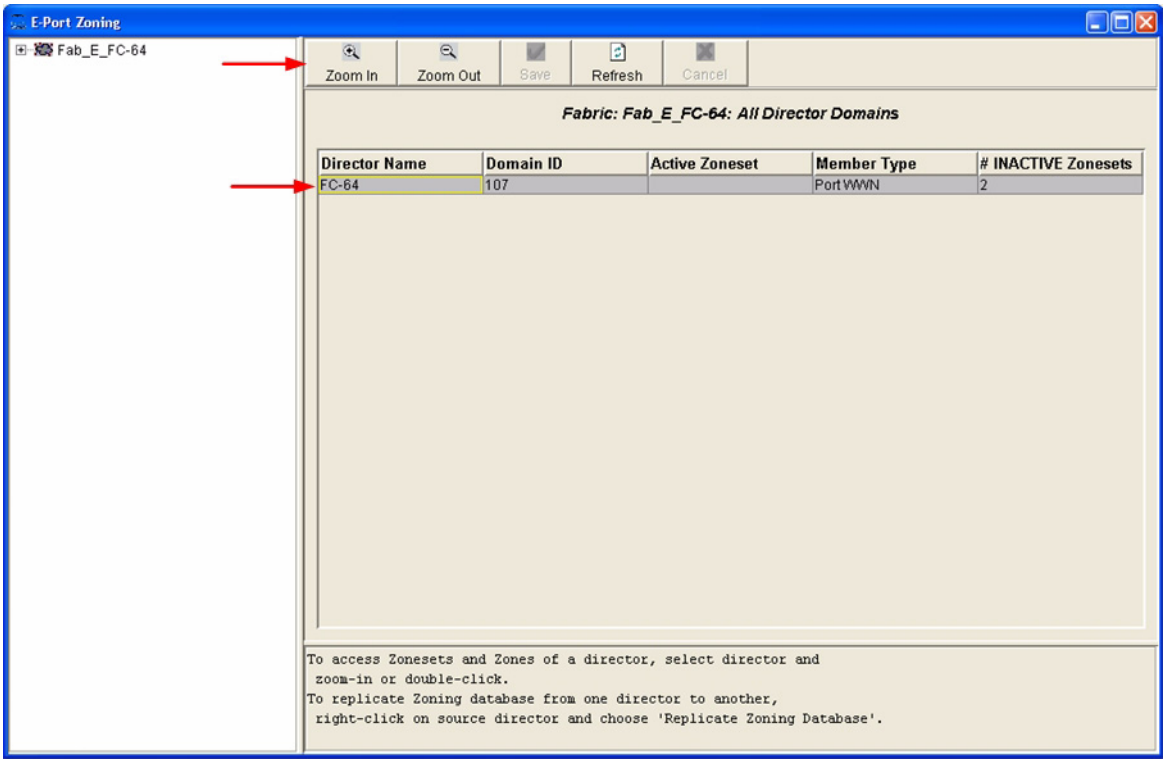
1. Start the INRANGE IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



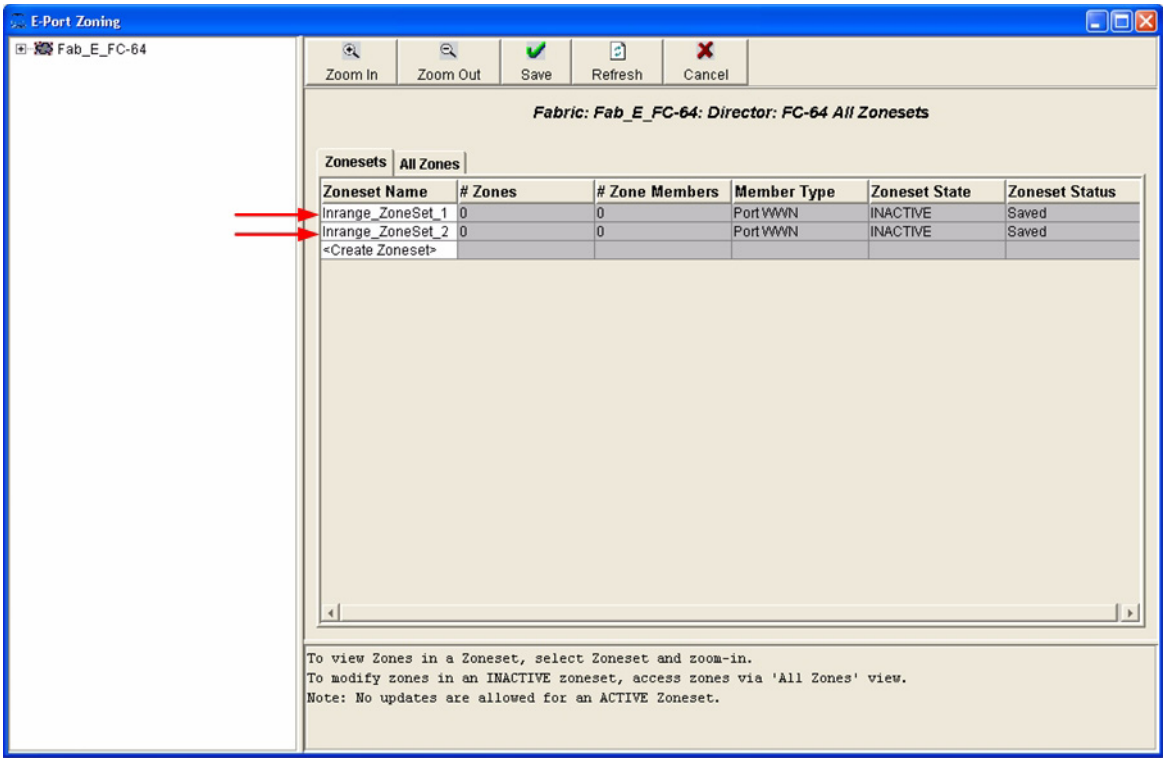
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



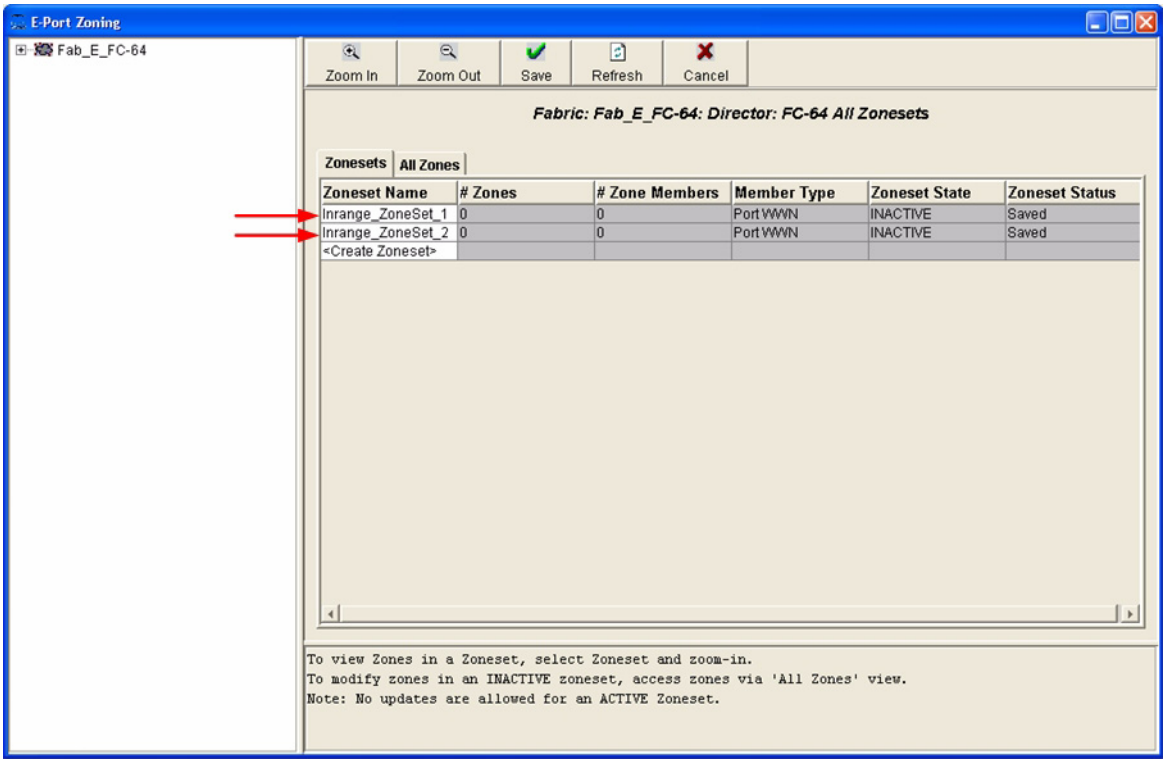
3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



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 131.



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 131.

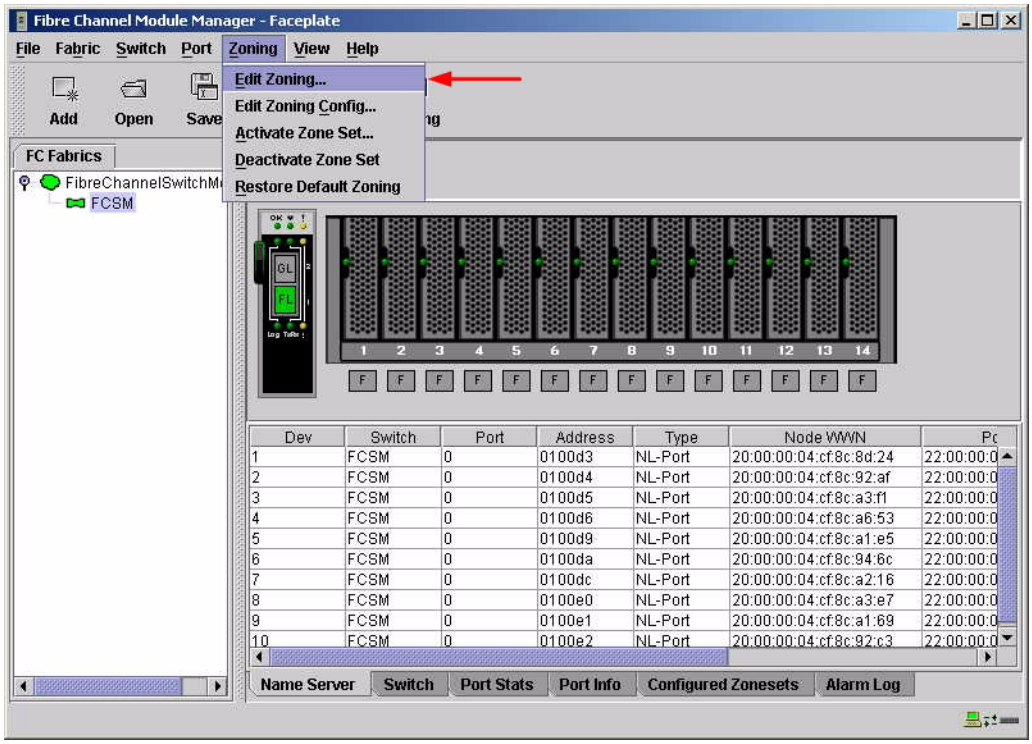


INRANGE CLI

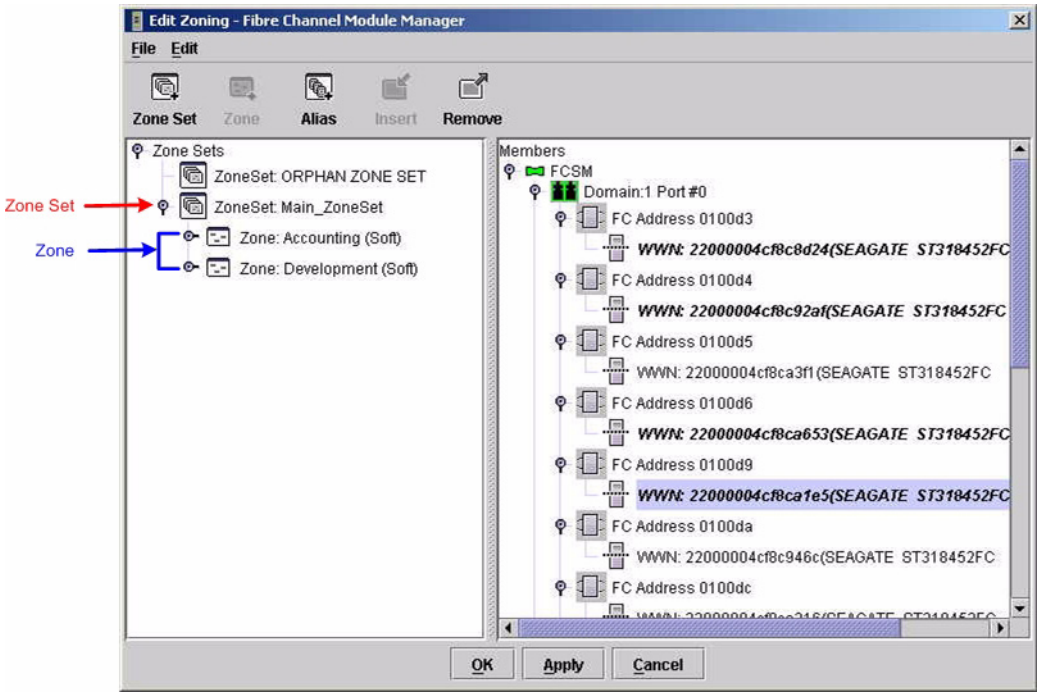
Not applicable.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 131.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

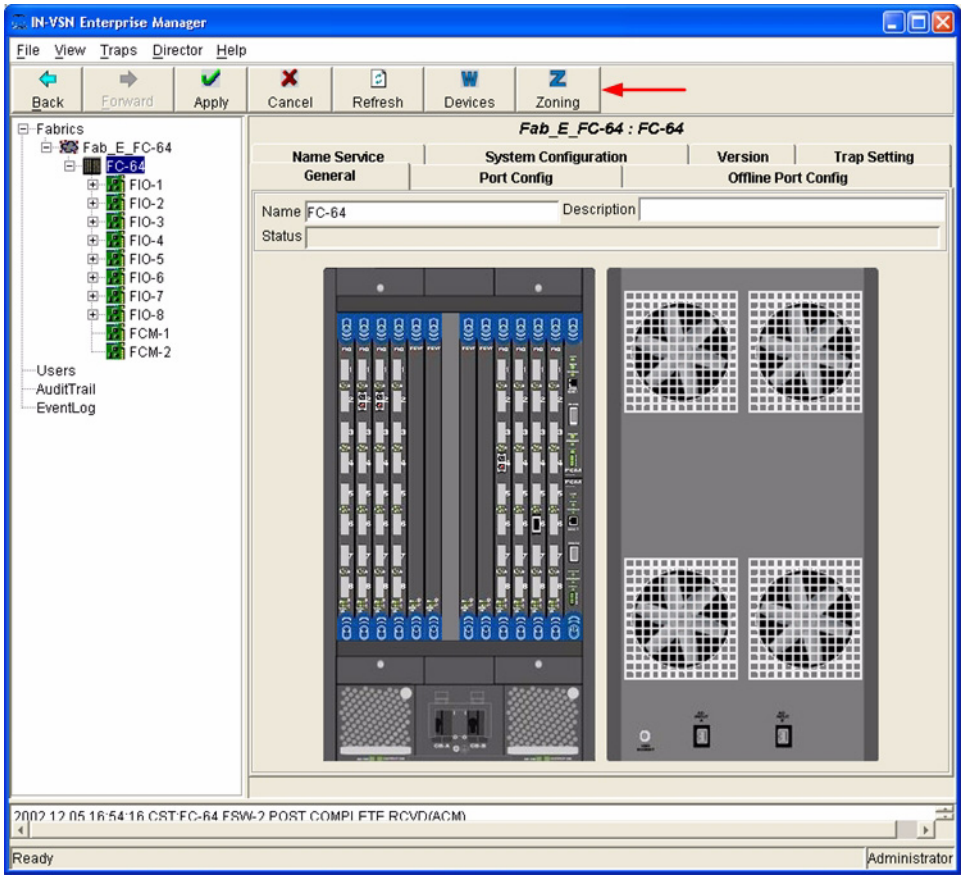
Zone Types

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.

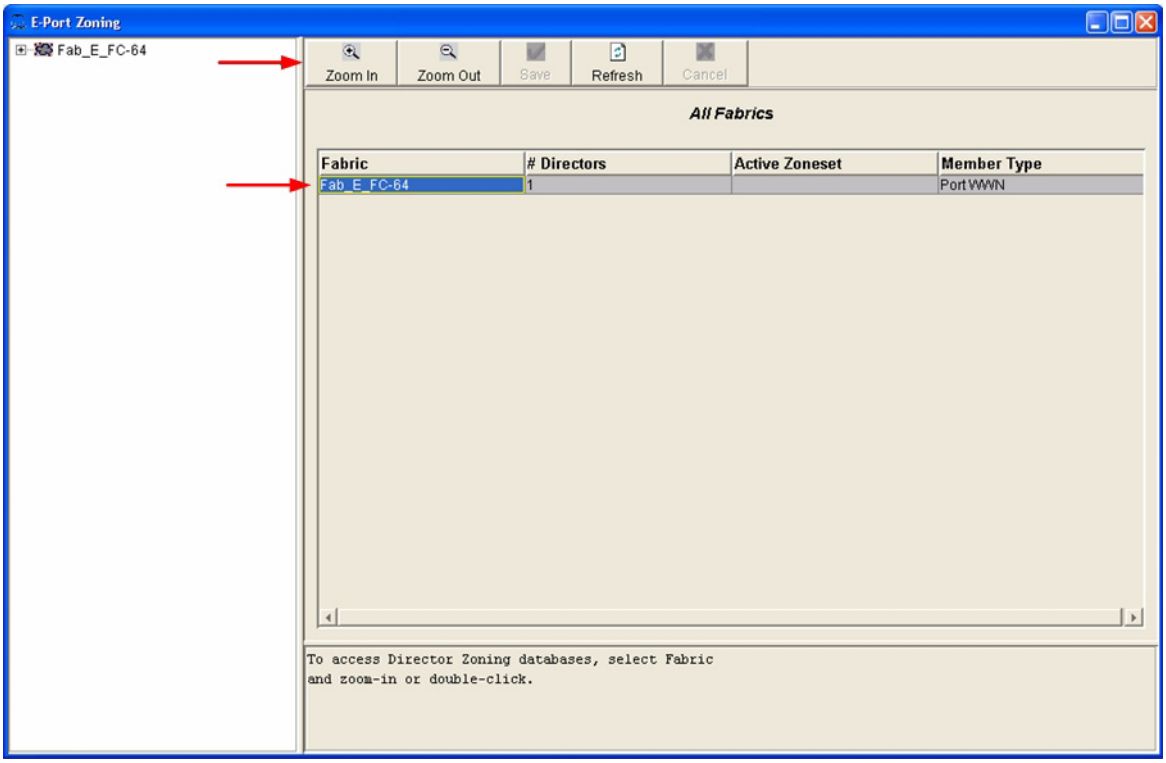
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

INRANGE IN-VSN Enterprise Manager

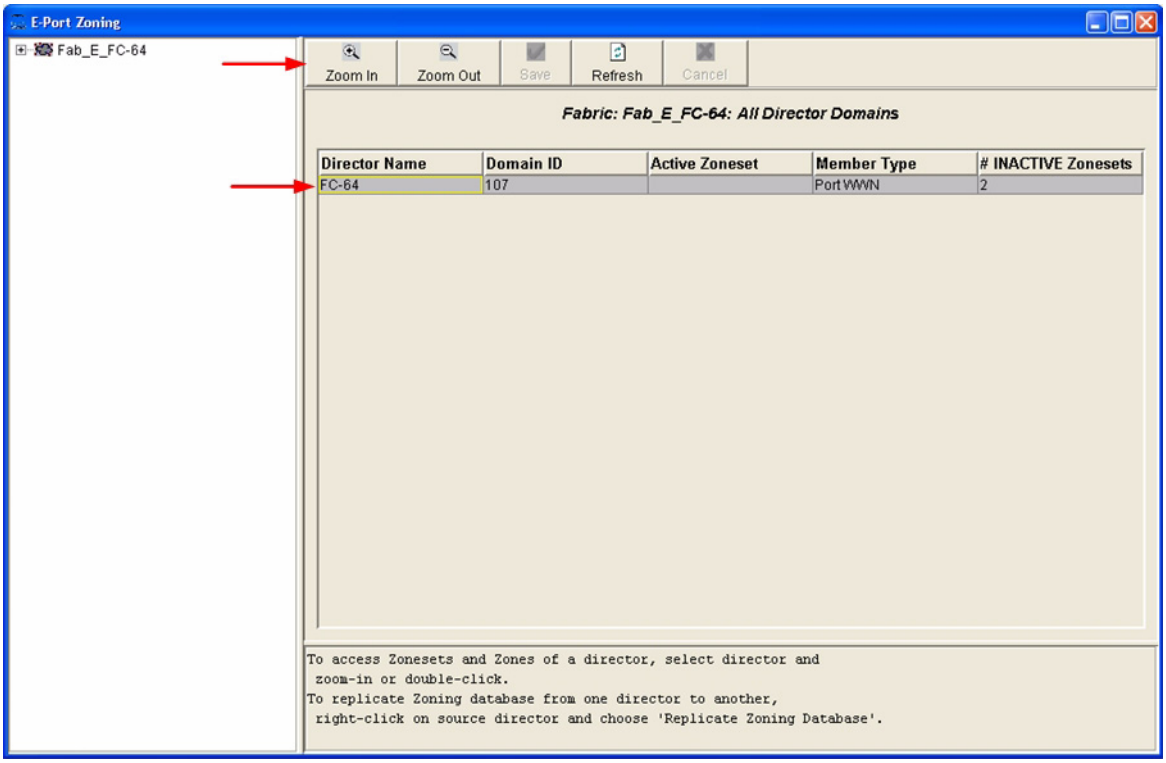
1. Start the INRANGE IN-VSN Enterprise Manager. The **IN-VNS Enterprise Manager** dialog box displays. Click the **Zoning** button.



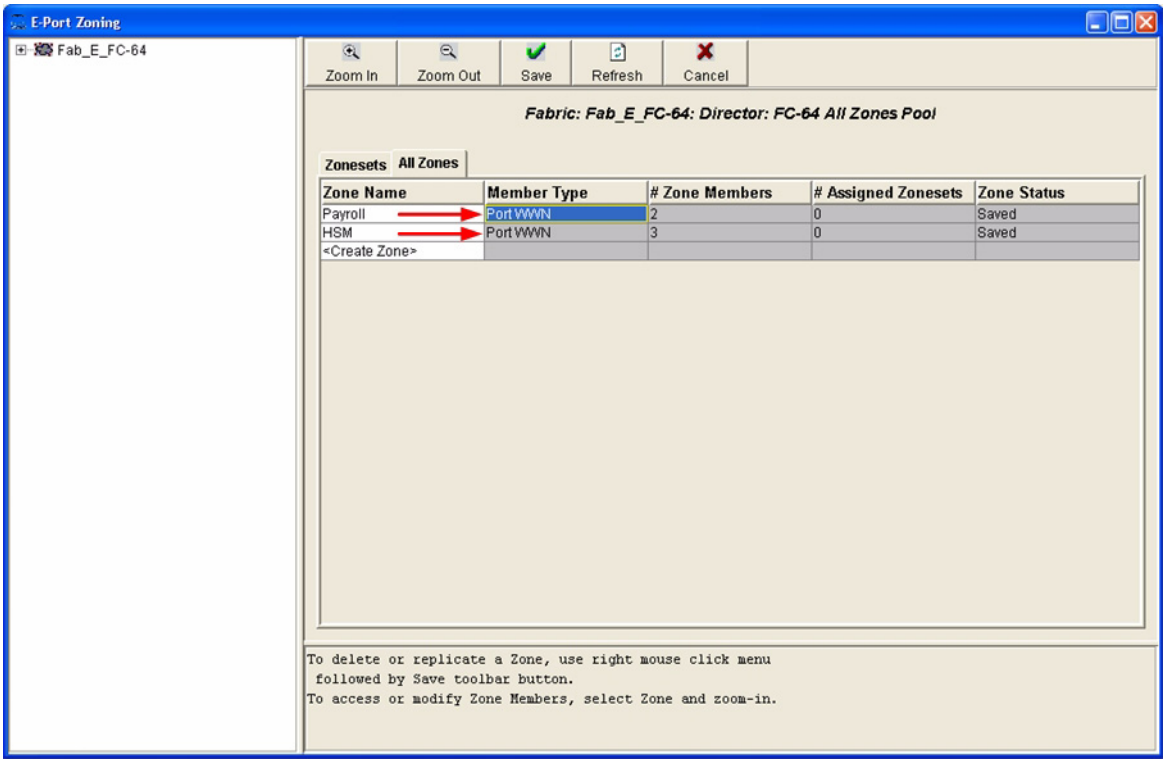
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



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**.

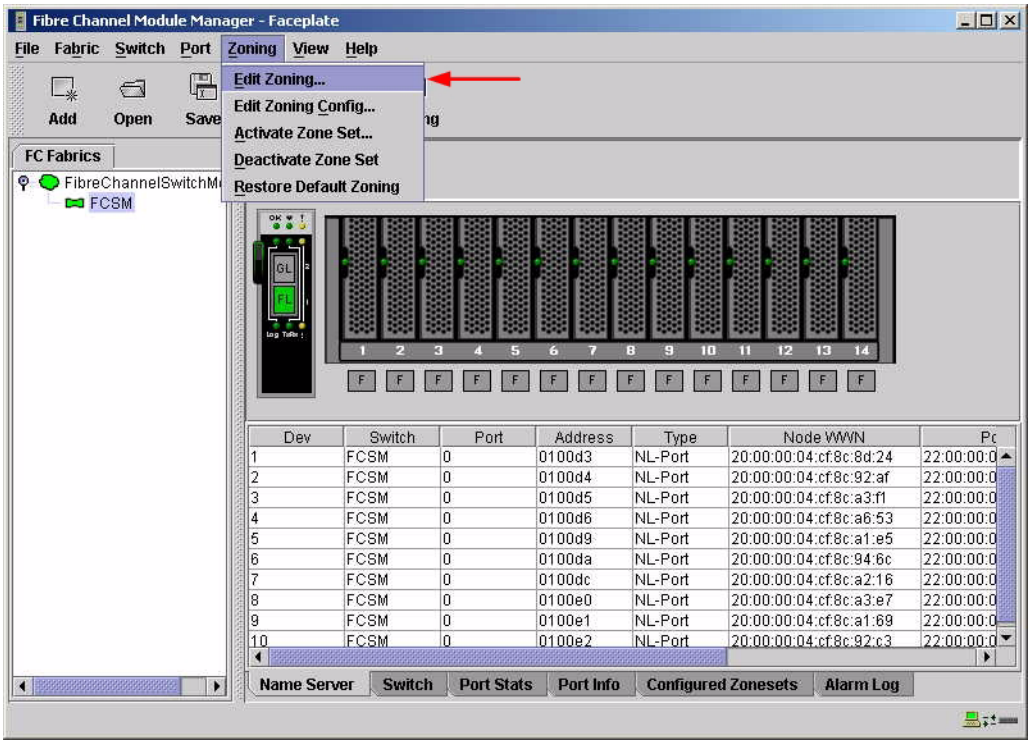


INRANGE CLI

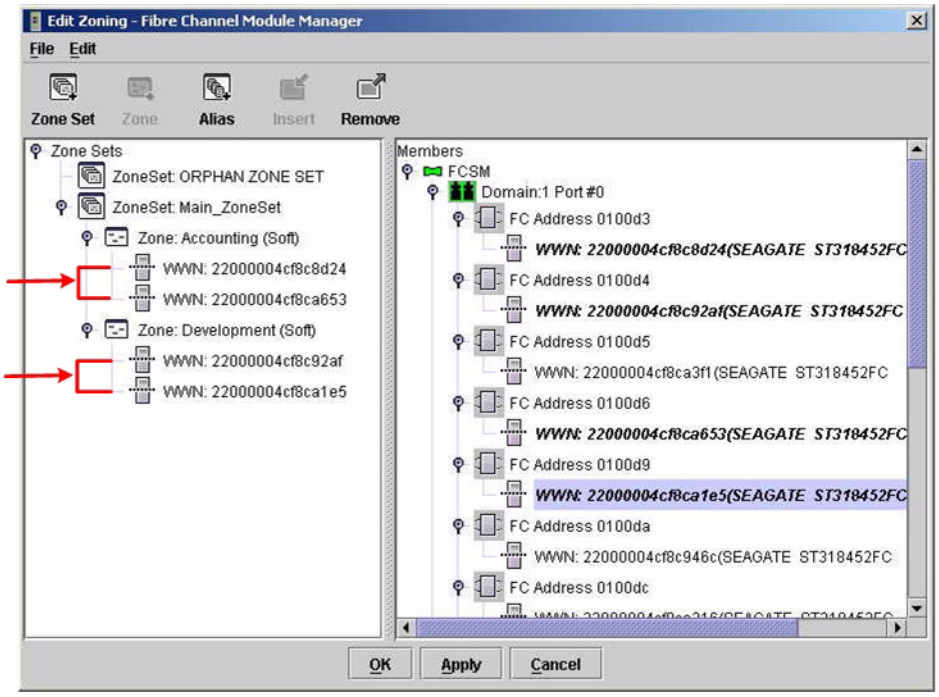
Not applicable.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

Intel 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 INRANGE and Intel 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 Intel support.

Merging Intel and McDATA Fabrics

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

Intel and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
McDATA	Sphereon 4500 Switch	04.01.00 12 and above
	Intrepid 6064 Director	04.01.02.4 and above
	Intrepid 6140 Director	04.01.02.4 and above

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

- **McDATA Sphereon 4500 Switch** **(see page 149)**
- **McDATA Intrepid 6000 Series Directors** **(see page 181)**

McDATA Sphereon 4500 Switch

Integration Checklist

The following steps must be completed to successfully merge McDATA and Intel 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 150).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see "Domain ID Configuration" on page 150).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 157).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 165).

✓ Ensure that all zone members are specified by WWPN (see "Zone Types" on page 170).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see "Operating Mode Configuration" on page 174).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 179).

Configuration Limitations

When merging McDATA and Intel 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 Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switch from McDATA that complies with the FC-SW-2 standard.

Intel and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
McDATA	Sphereon 4500 Switch	04.01.00 12 and above

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 Intel Server Fibre Channel Switch.

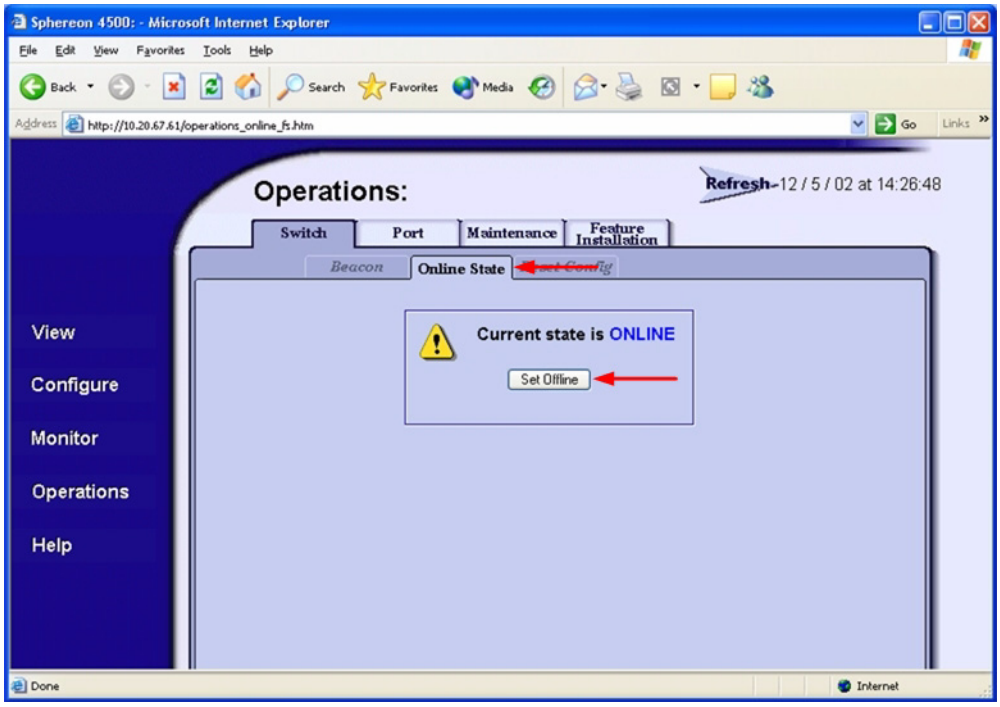
The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range. This is equivalent to 1–31 on the McDATA switch. The following chart lists the McDATA Domain ID and the corresponding Intel Domain ID.

McDATA Versus Intel Domain IDs

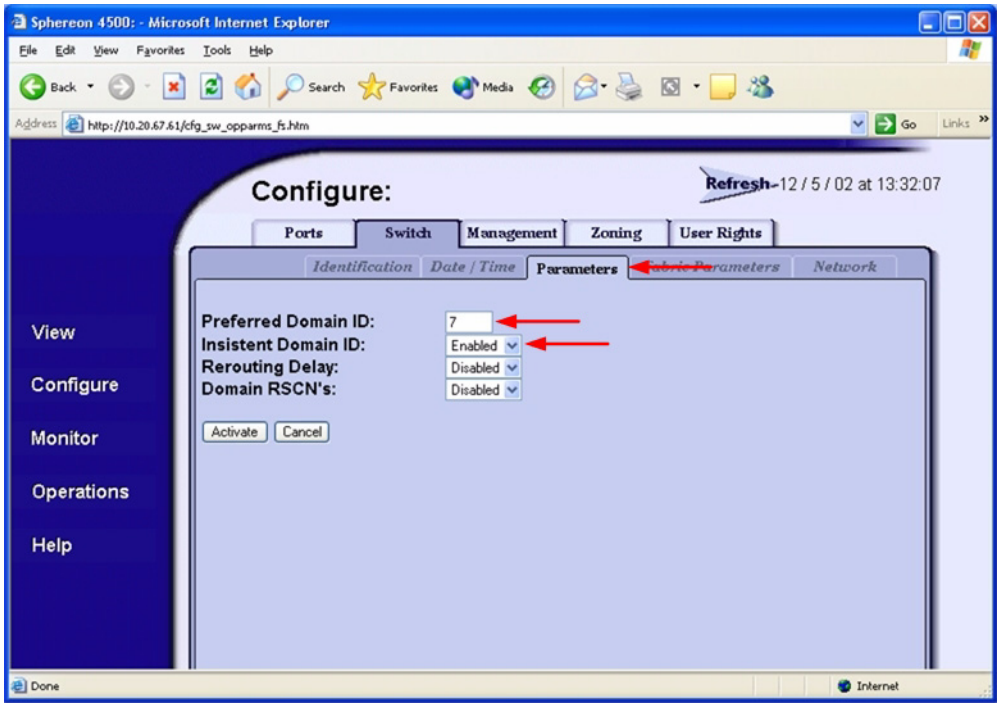
McDATA Domain ID	Intel Domain ID	McDATA Domain ID	Intel Domain ID	McDATA Domain ID	Intel Domain ID
1	97	11	107	21	117
2	98	12	108	22	118
3	99	13	109	23	119
4	100	14	110	24	120
5	101	15	111	25	121
6	102	16	112	26	122
7	103	17	113	27	123
8	104	18	114	28	124
9	105	19	115	29	125
10	106	20	116	30	126
—	—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

McDATA Sphereon Web Management

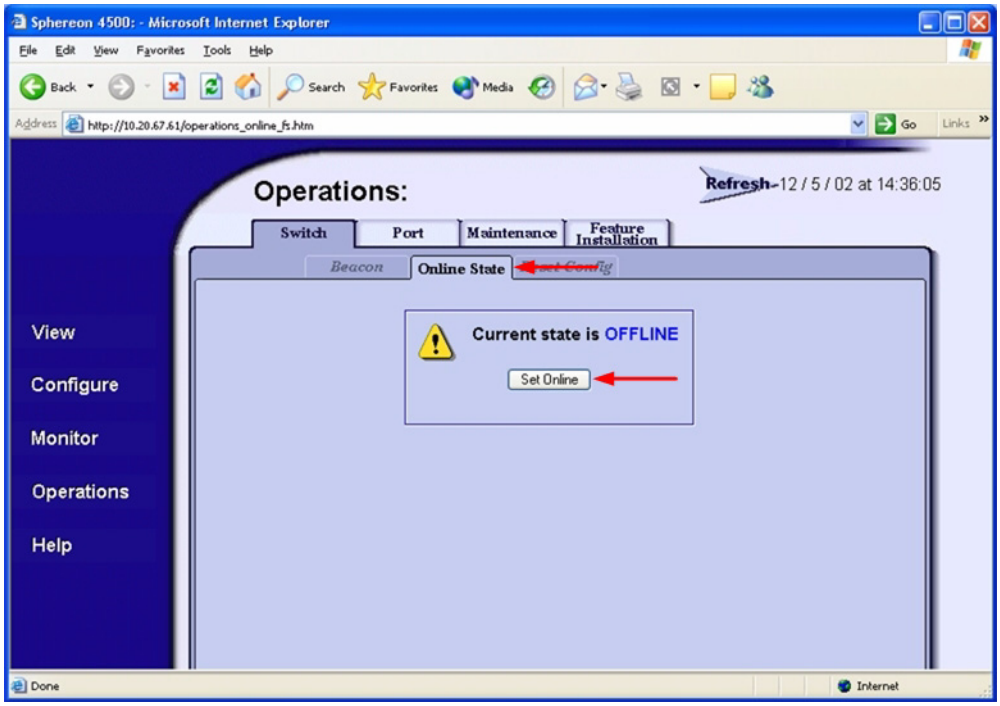
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Offline** button.



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



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



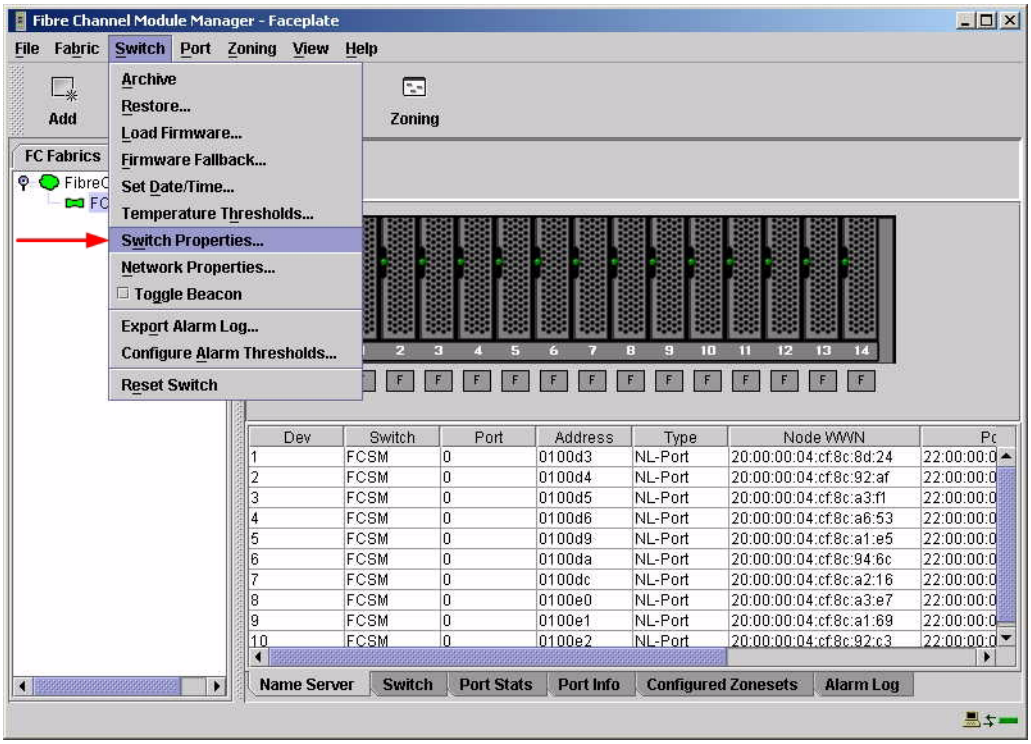
McDATA Telnet CLI

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

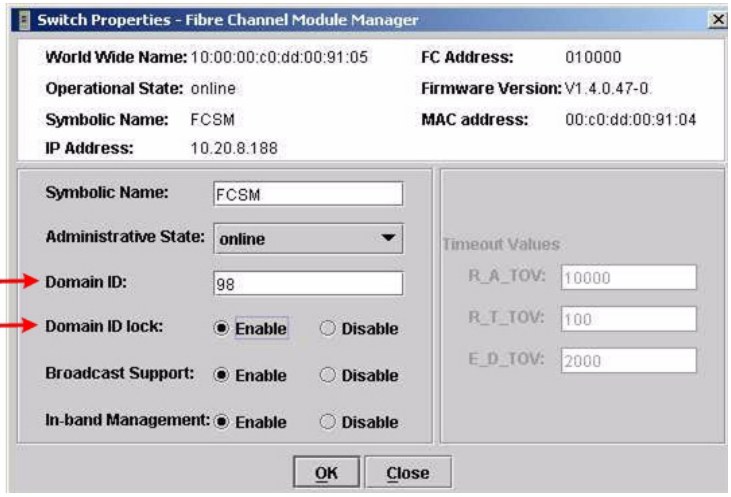
```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState false
Maint.System> root
Root> config switch
Config.Switch> prefDomainId xx  (xx=unique domain id)
Config.Switch> insistDomainId enable
Config.Switch> root
Root> maint system
Maint.System> setOnlineState true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

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Timeout Values

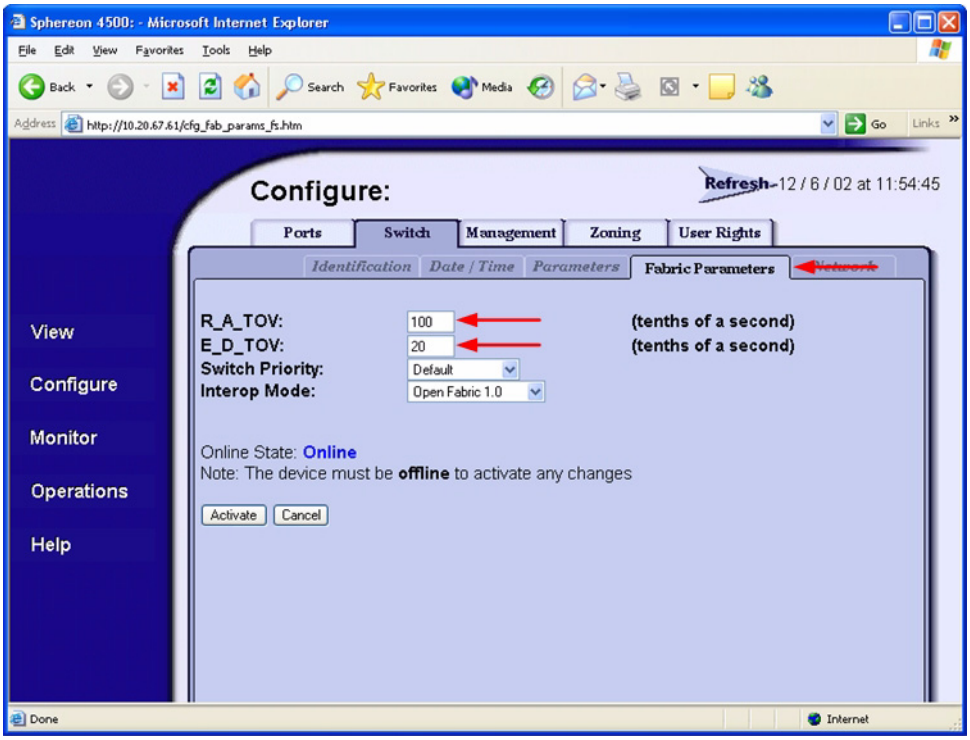
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

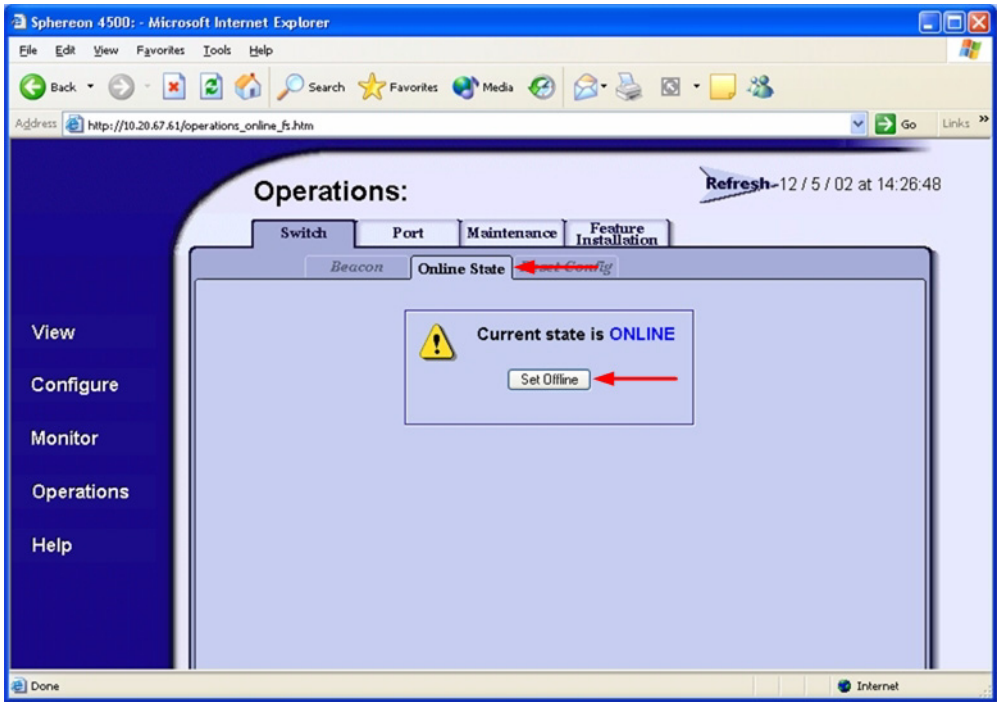
This section provides the steps to change these values.

McDATA Sphereon Web Management

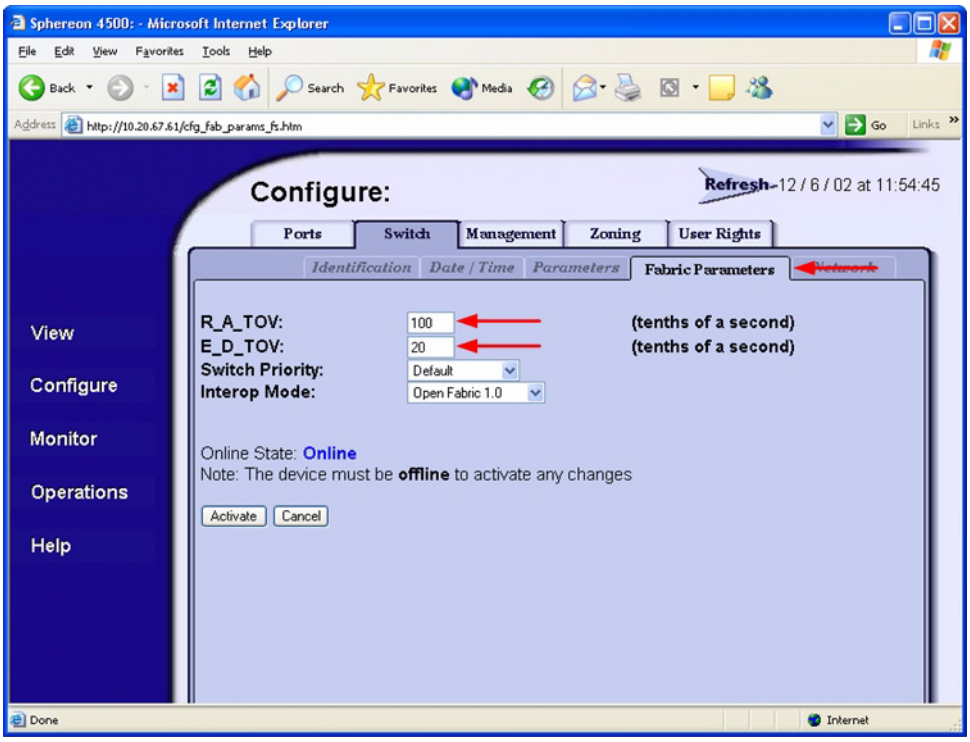
1. Start McDATA Sphereon Web Management. The **Main Switch View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, then select the **Fabric Parameters** tab. Verify that **R_A_TOV** is set to **100** and **E_D_TOV**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



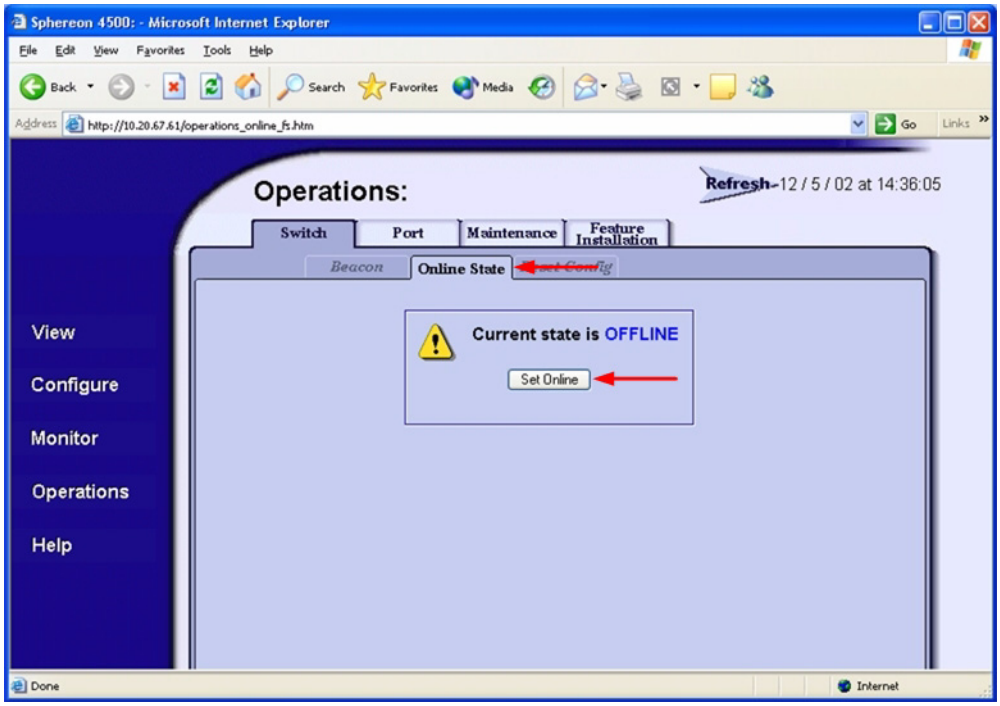
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Offline** button.



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
```

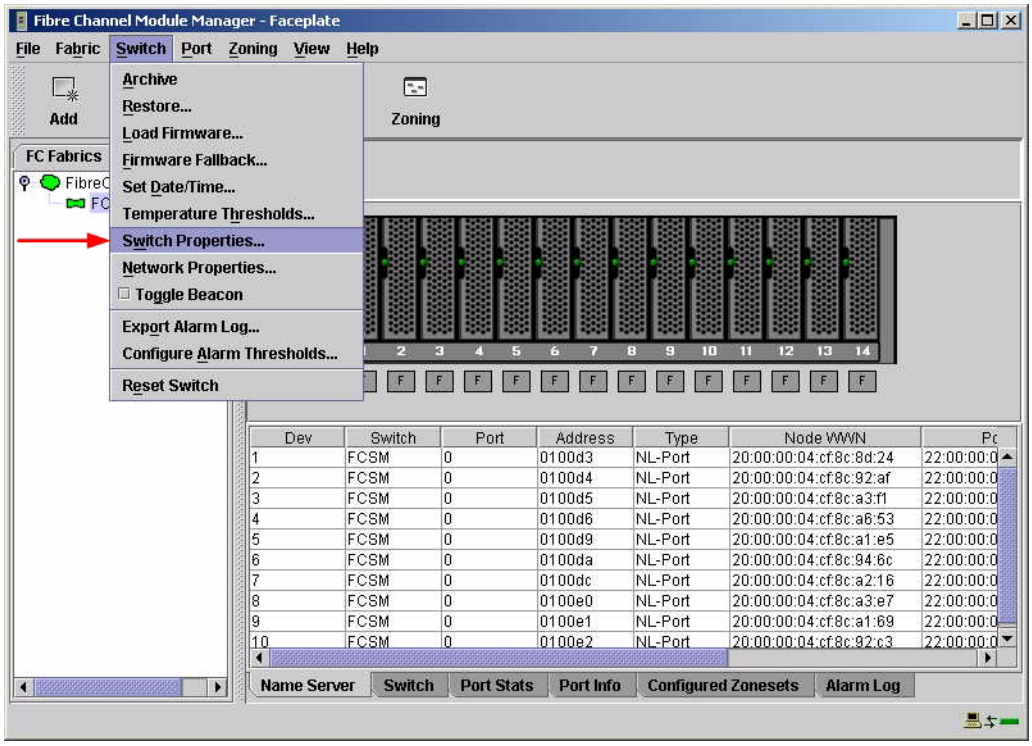
Use the above command to verify that R_A_TOV is set to 100 and E_D_TOV is set to 20. If these timeout values are not correct, continue with this section. If the settings are correct, no changes need to be made; proceed with the next appropriate section.

```
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
```

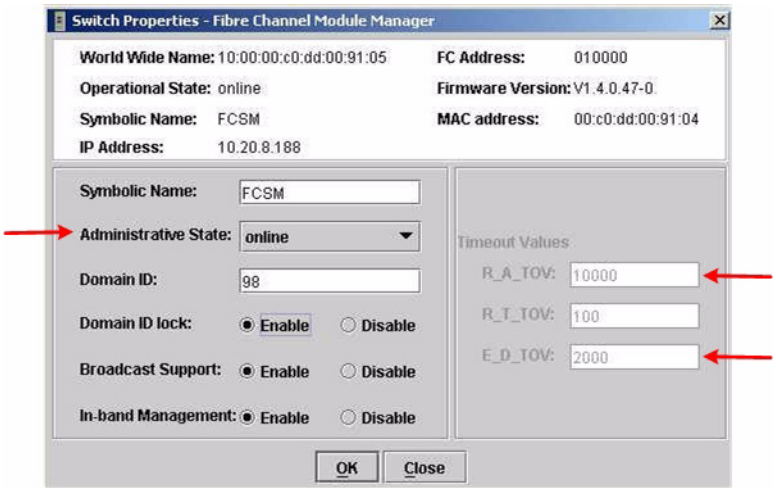
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**, then click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

McDATA switches and Intel Server Fibre Channel Switches 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.

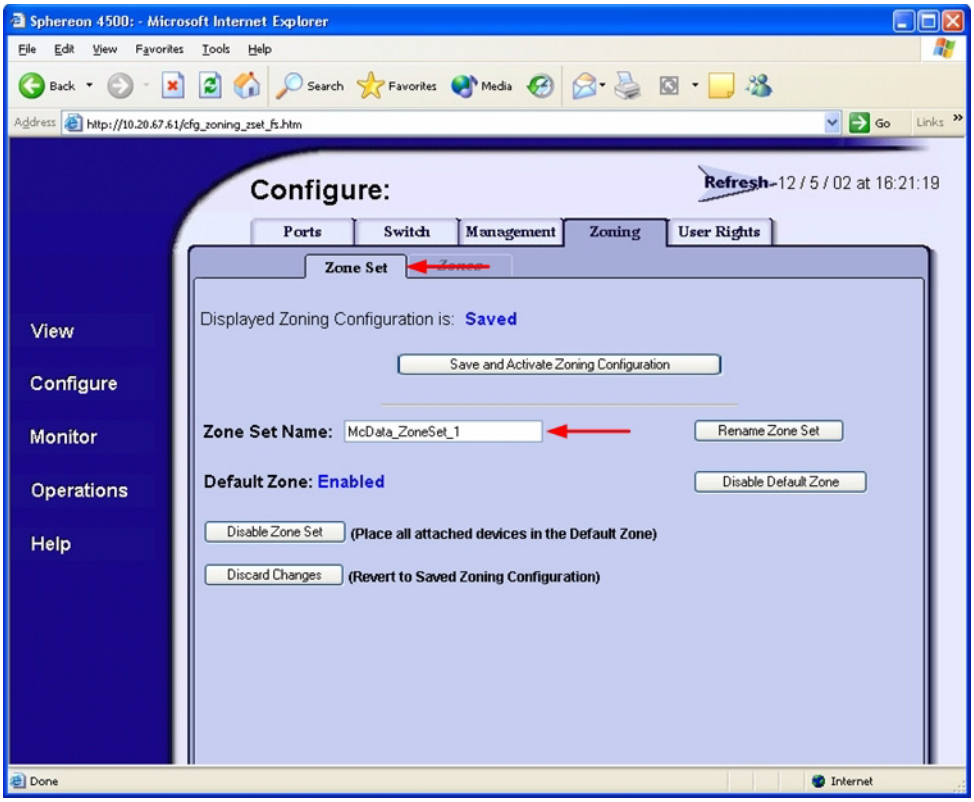
Active Zone Set Names

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):

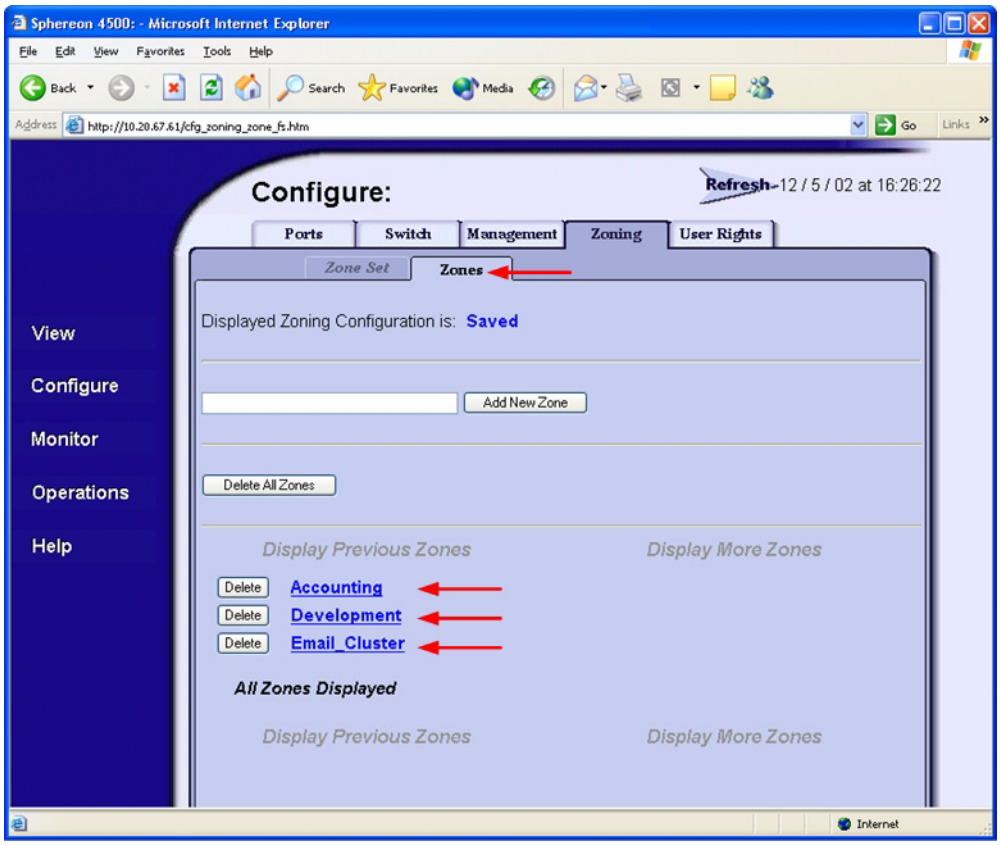
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

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 165.



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 165.



McDATA Telnet CLI

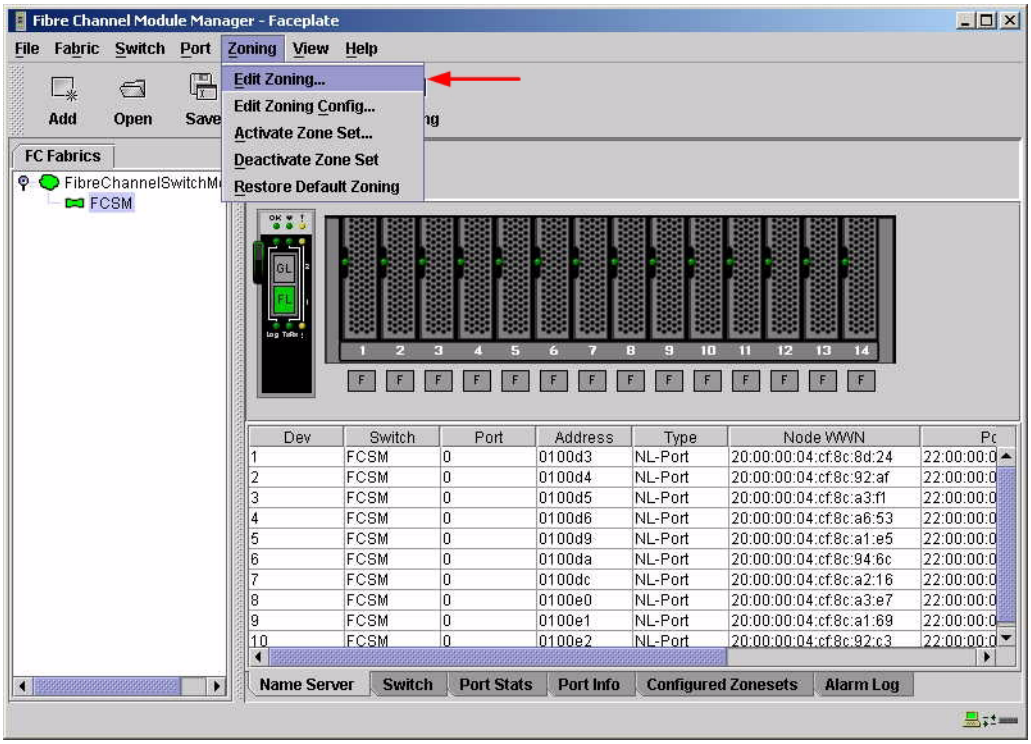
NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

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

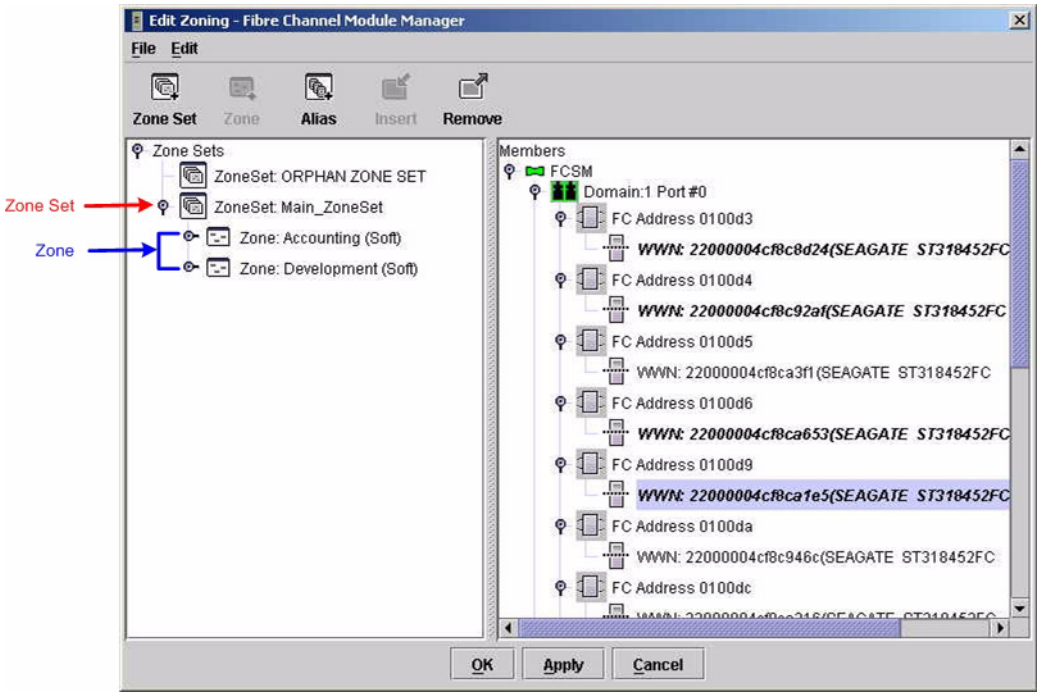
Verify that the Zone Set and Zone Names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 165.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 165.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

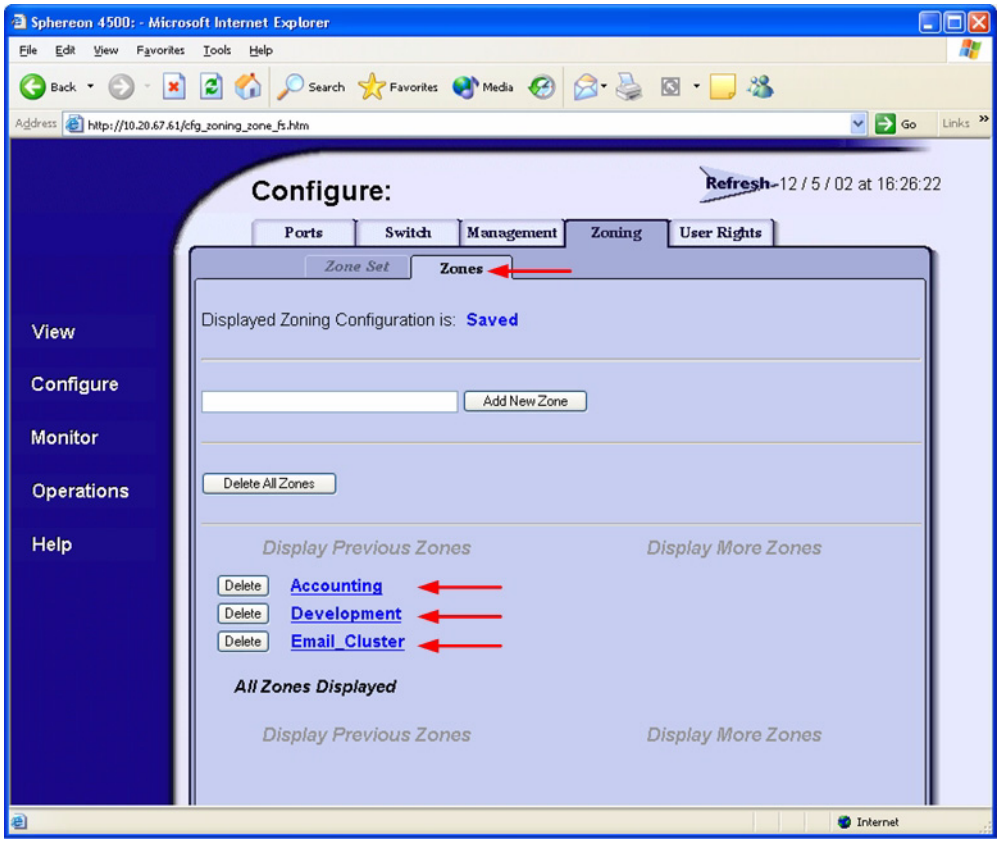
Zone Types

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

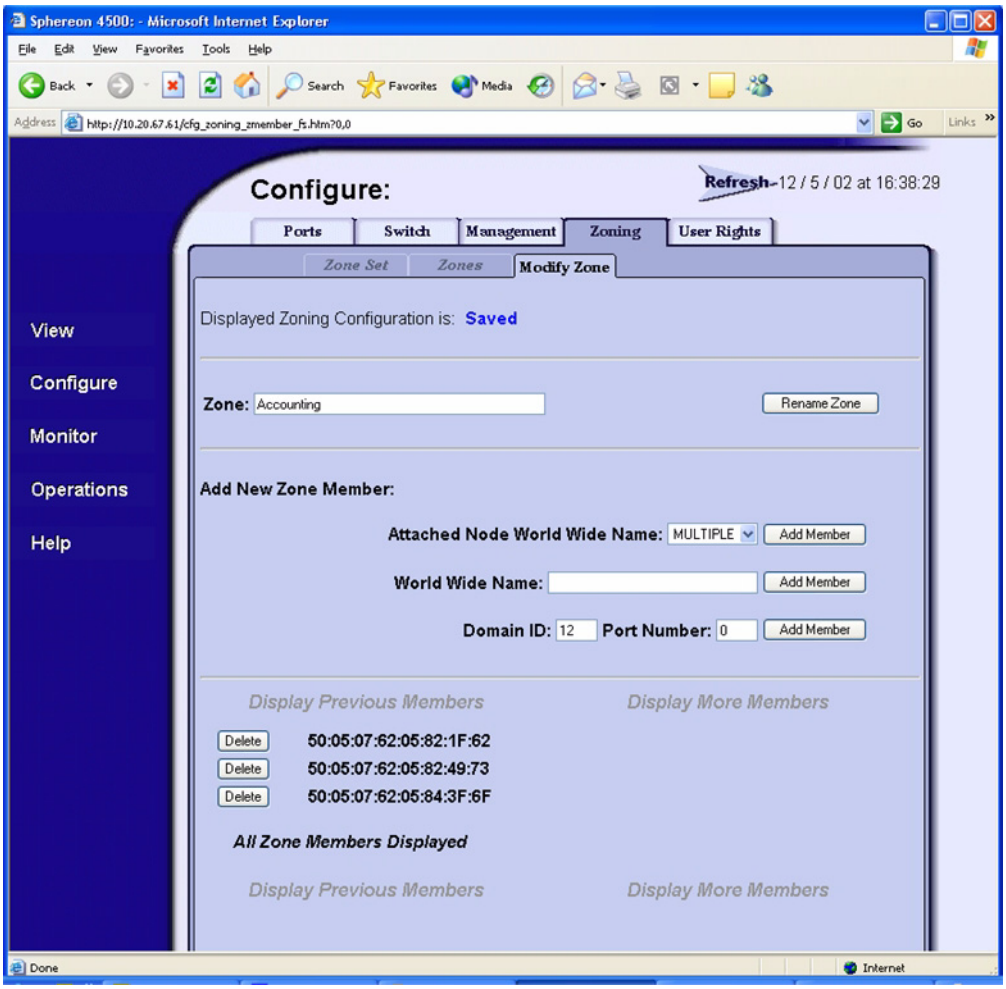
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

McDATA Sphereon Web Management

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



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



McDATA Telnet CLI

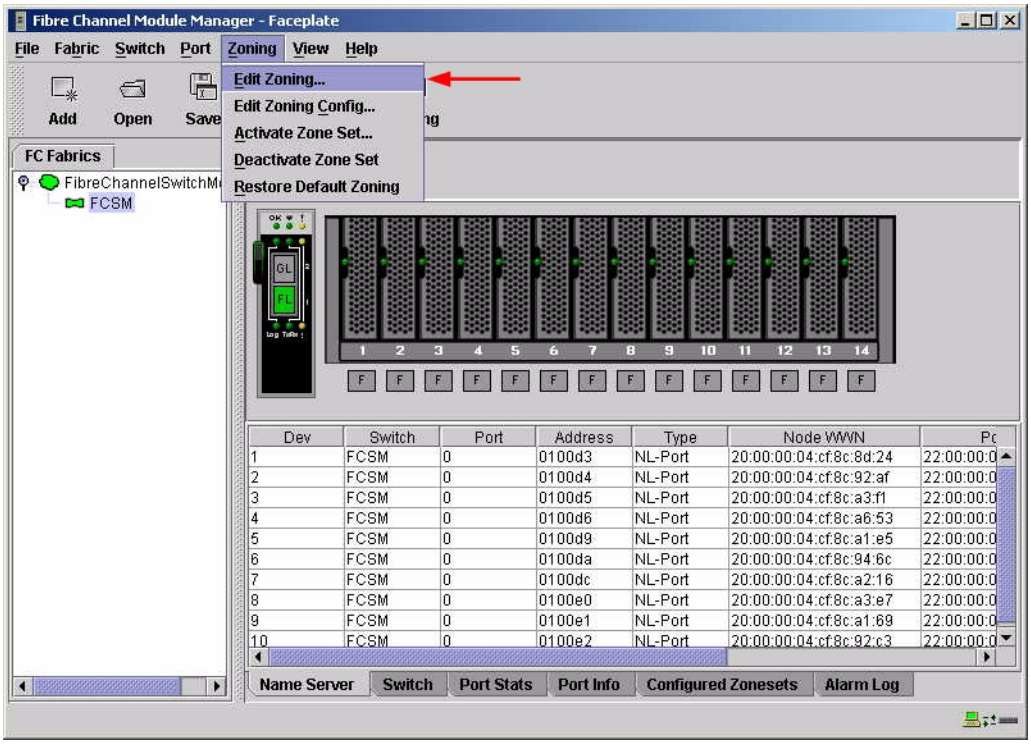
NOTE: Use the following CLI commands when McDATA Sphereon Web Management is not available.

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

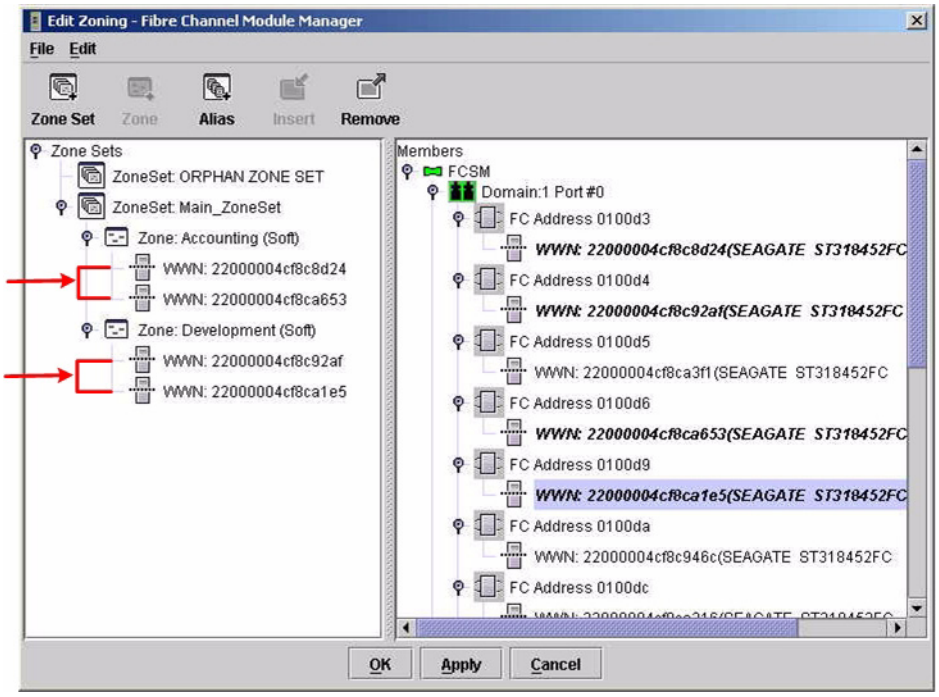
Verify that all of the Zone members are specified by WWN.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

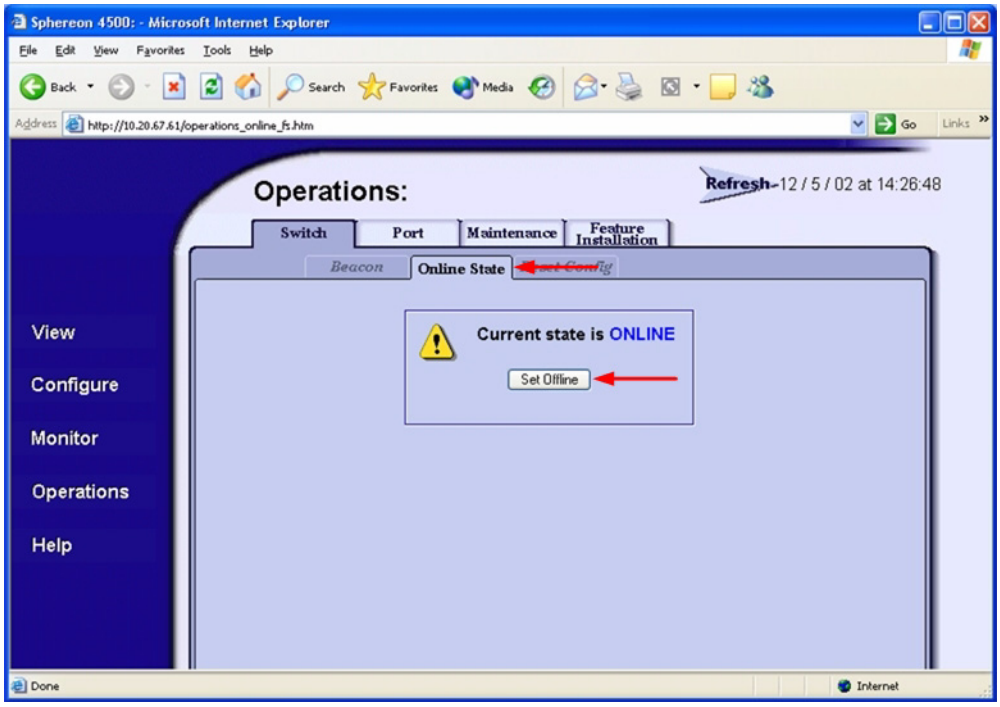
```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone members <zone name>
```

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

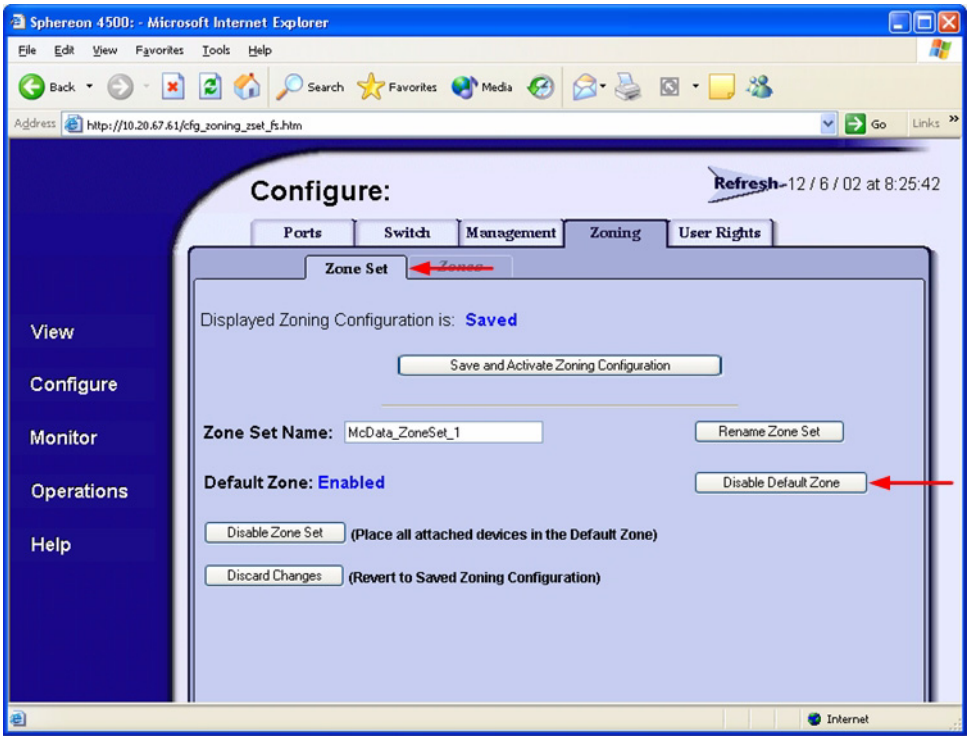
Operating Mode Configuration

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.



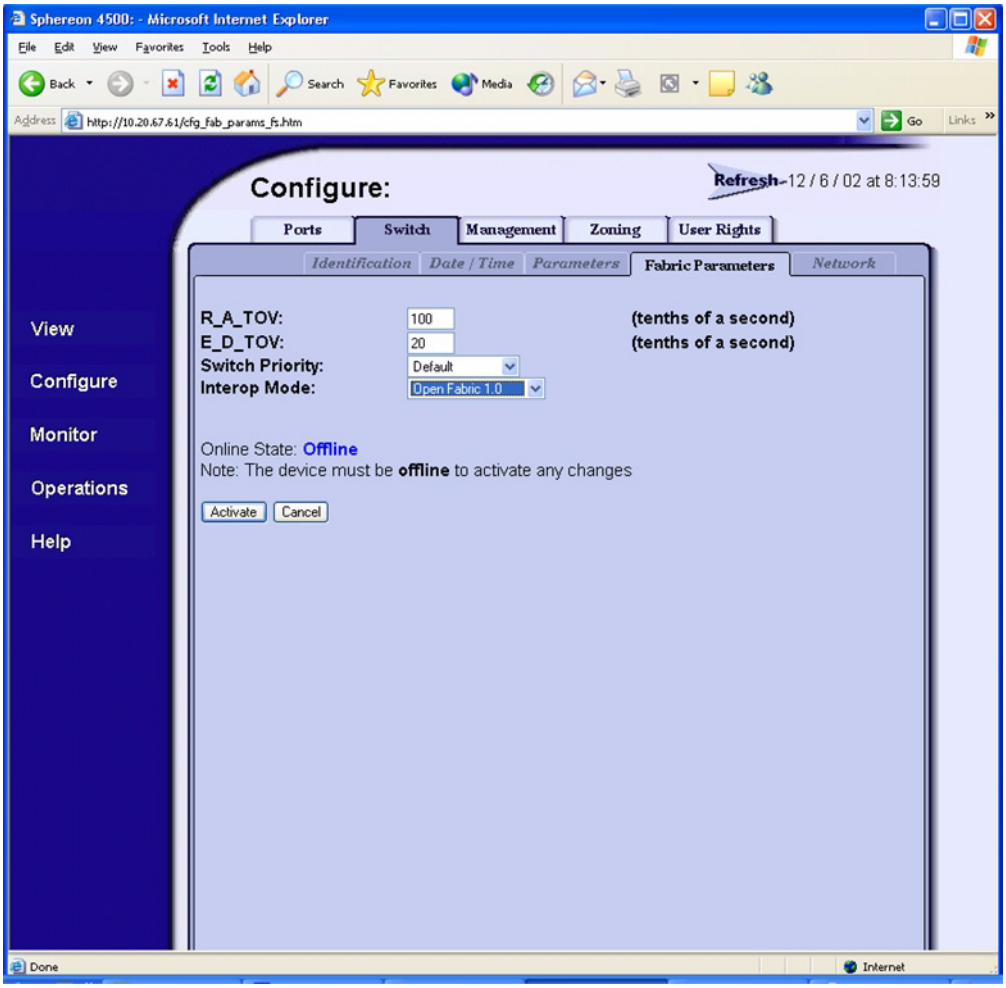
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.



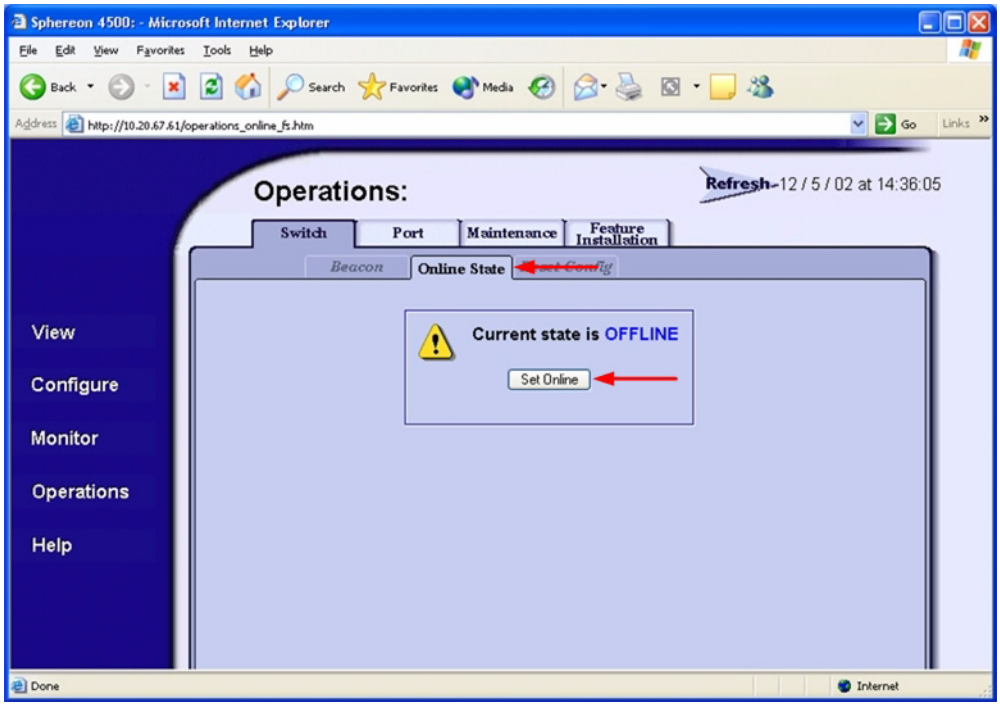
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:

   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
```

Intel Fibre Channel Module Manager GUI

Not applicable.

Intel Fibre Channel Switch Module CLI

Not applicable.

McDATA Specific Configuration

Not applicable.

Intel 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 Intel support.

McDATA Intrepid 6000 Series Directors

Integration Checklist

The following steps must be completed to successfully merge McDATA and Intel 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 182).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 182).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 190).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 198).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 203).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 208).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 213).

Configuration Limitations

When merging McDATA and Intel 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 Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

Intel and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
McDATA	Intrepid 6064 Director	04.01.02.4 and above
	Intrepid 6140 Director	04.01.02.4 and above

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 Intel Server Fibre Channel Switch.

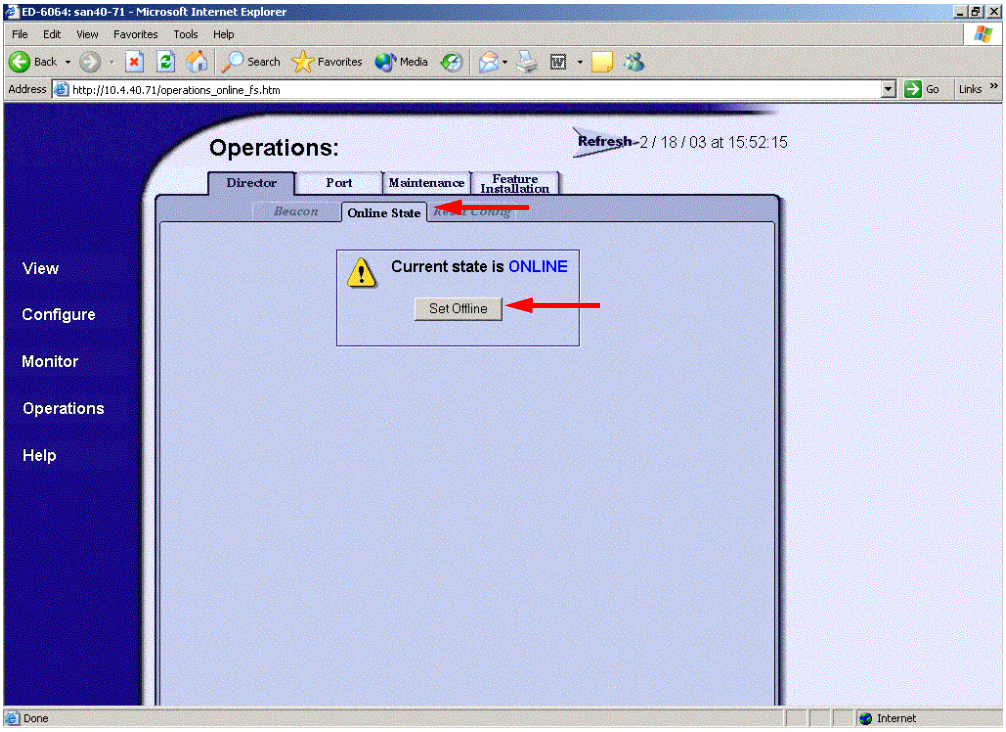
The Domain ID should be locked and unique within the 97–127 (0x61–0x7f) range. This is equivalent to 1–31 on the McDATA switch. The following chart lists the McDATA Domain ID and the corresponding Intel Domain ID.

McDATA Versus Intel Domain IDs

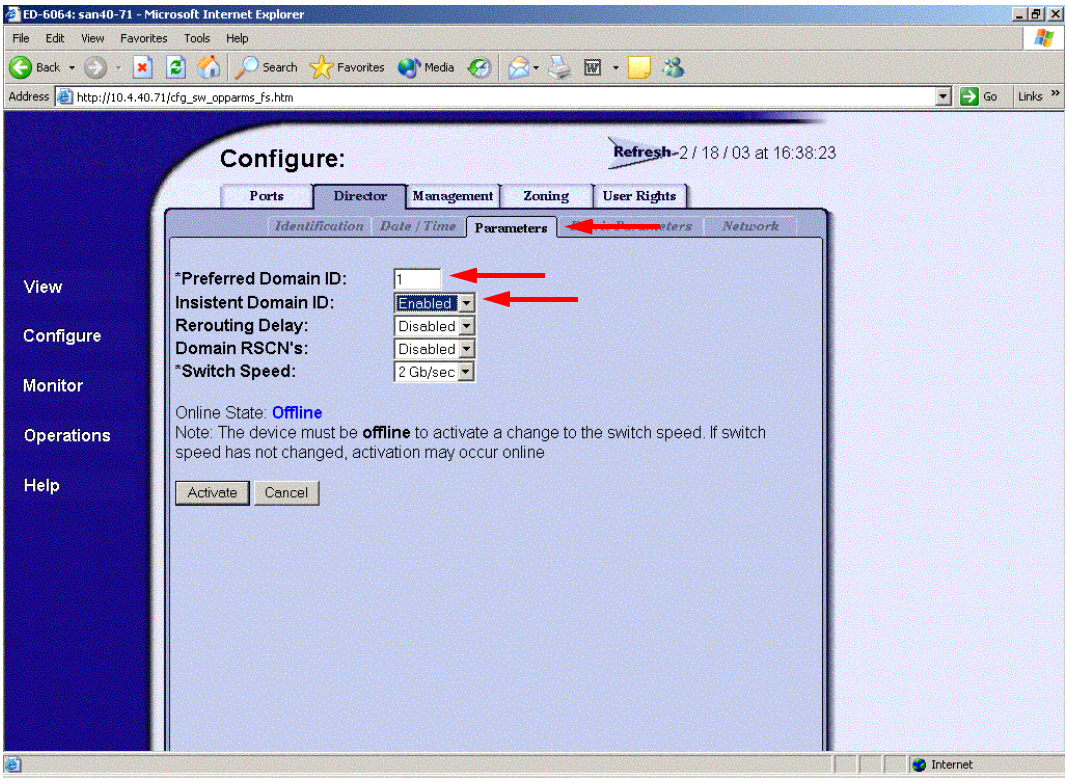
McDATA Domain ID	Intel Domain ID	McDATA Domain ID	Intel Domain ID	McDATA Domain ID	Intel Domain ID
1	97	11	107	21	117
2	98	12	108	22	118
3	99	13	109	23	119
4	100	14	110	24	120
5	101	15	111	25	121
6	102	16	112	26	122
7	103	17	113	27	123
8	104	18	114	28	124
9	105	19	115	29	125
10	106	20	116	30	126
—	—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

McDATA SANpilot Web Management

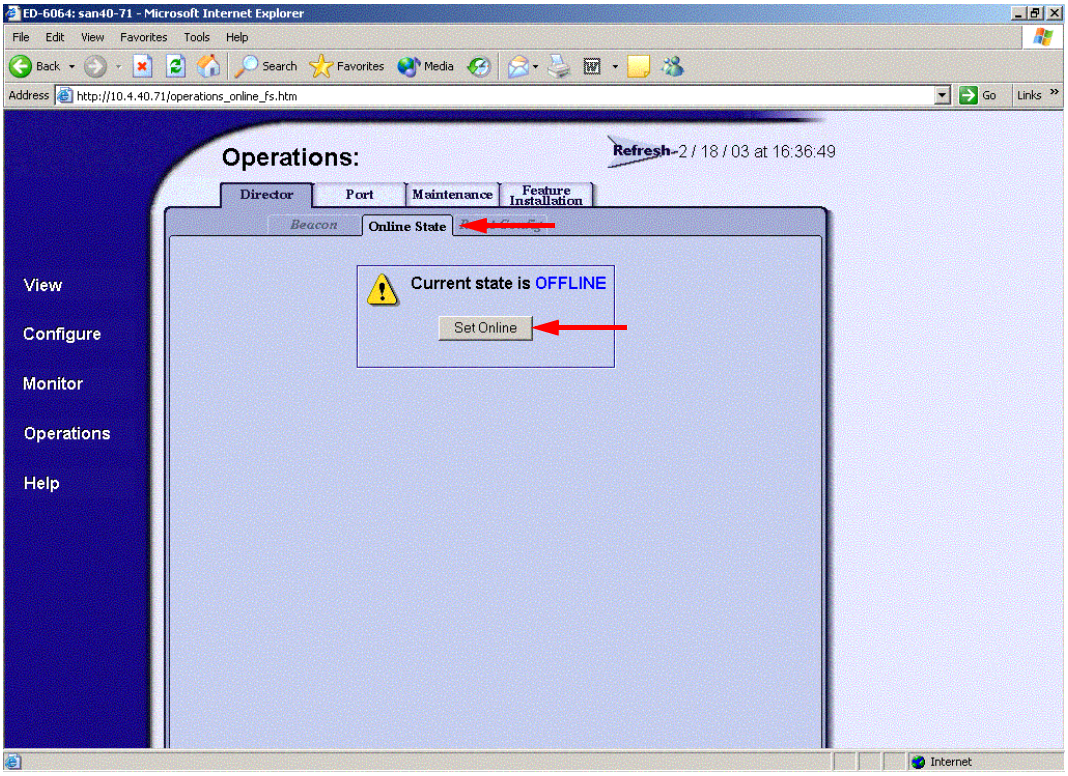
1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Offline** button.



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



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



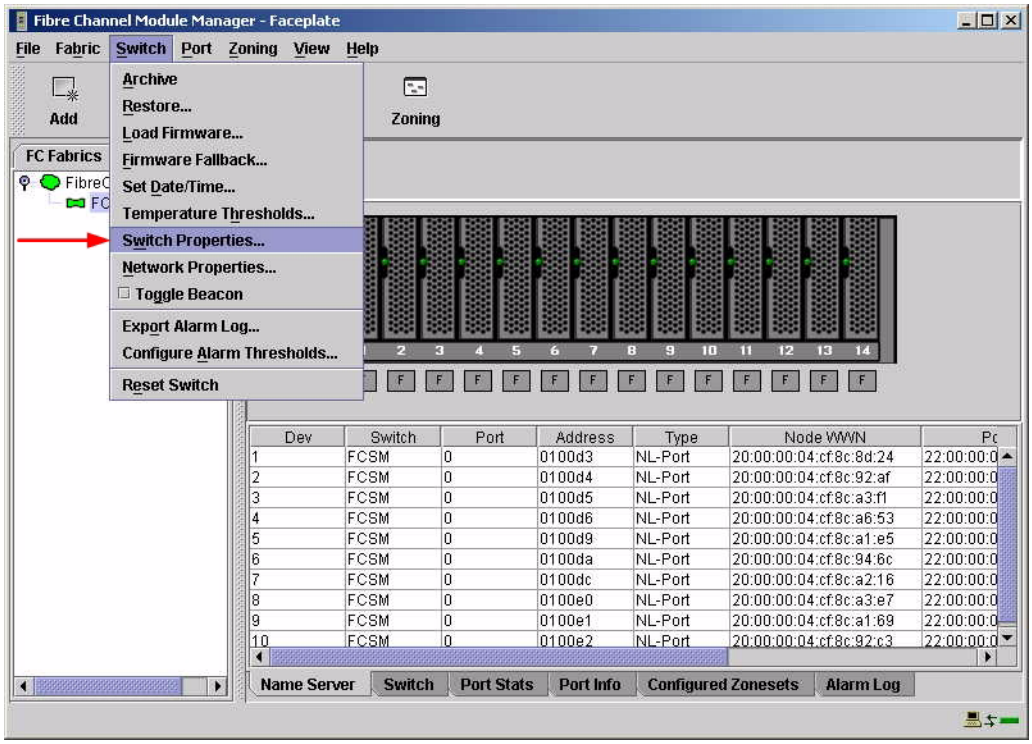
McDATA Telnet CLI

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

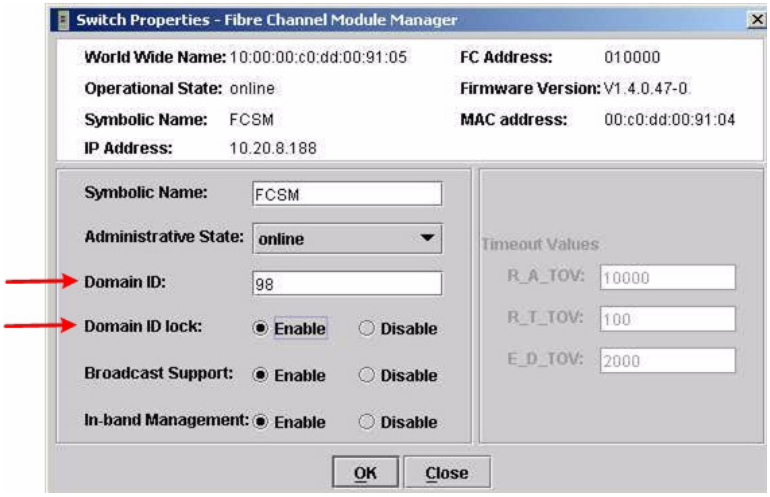
```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState False
Maint.System> root
Root> config switch
Config.Switch> prefDomainId 1
Config.Switch> insistDomainId enable
Config.Switch> show

Switch Information
BB Credit:              16
R_A_TOV:                100
E_D_TOV:                20
Preferred Domain ID:    1
Switch Priority:        Default
Speed:                  2 Gb/sec
Rerouting Delay:        Disabled
Interop Mode:           Open Fabric 1.0
Insistent Domain ID:    Enabled
Domain RSCN:            Disabled

Config.Switch> root
Root> maint system
Maint.System> setOnlineState True
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Timeout Values

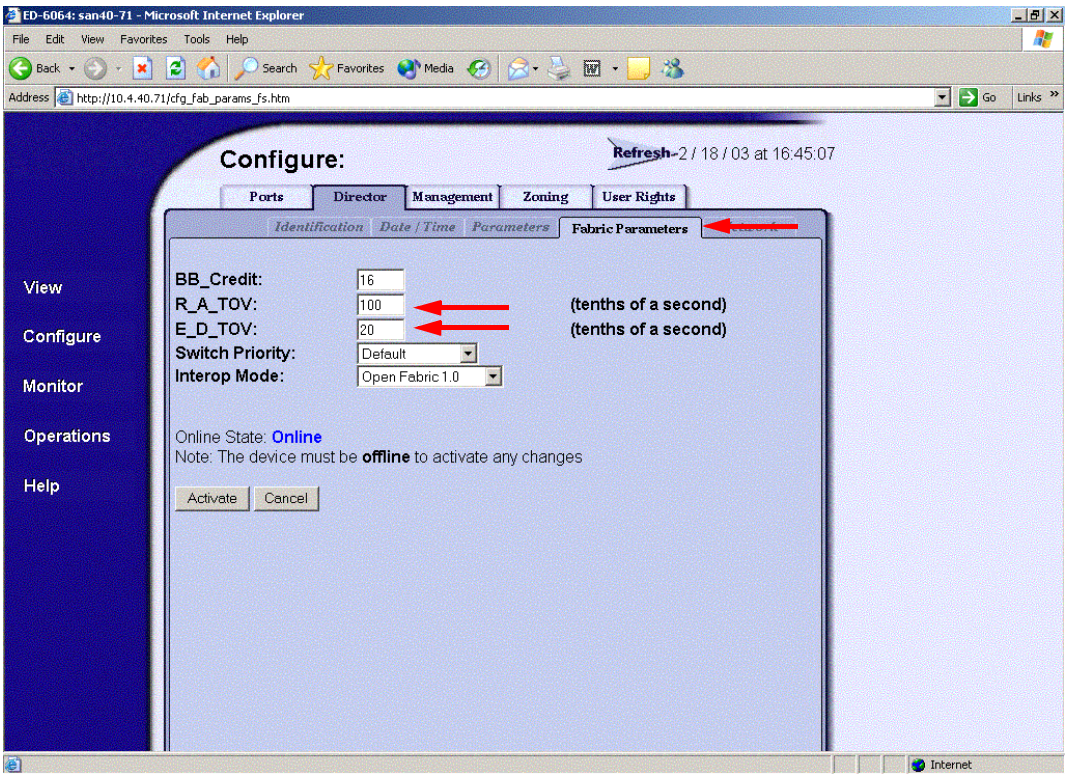
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

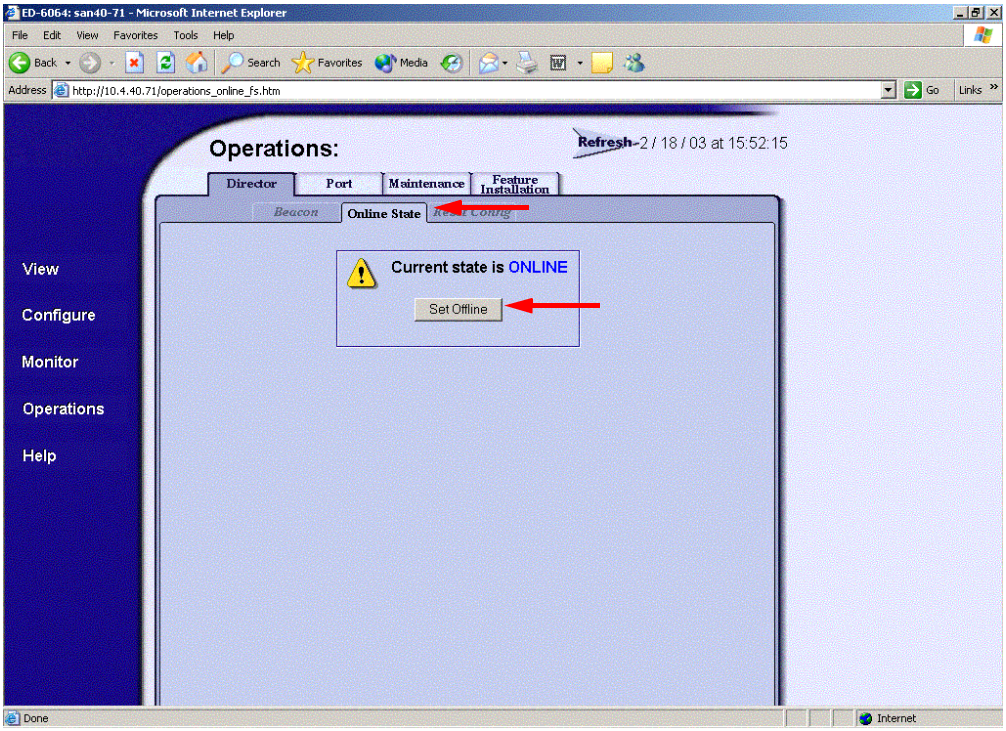
This section provides the steps to change these values.

McDATA SANpilot Web Management

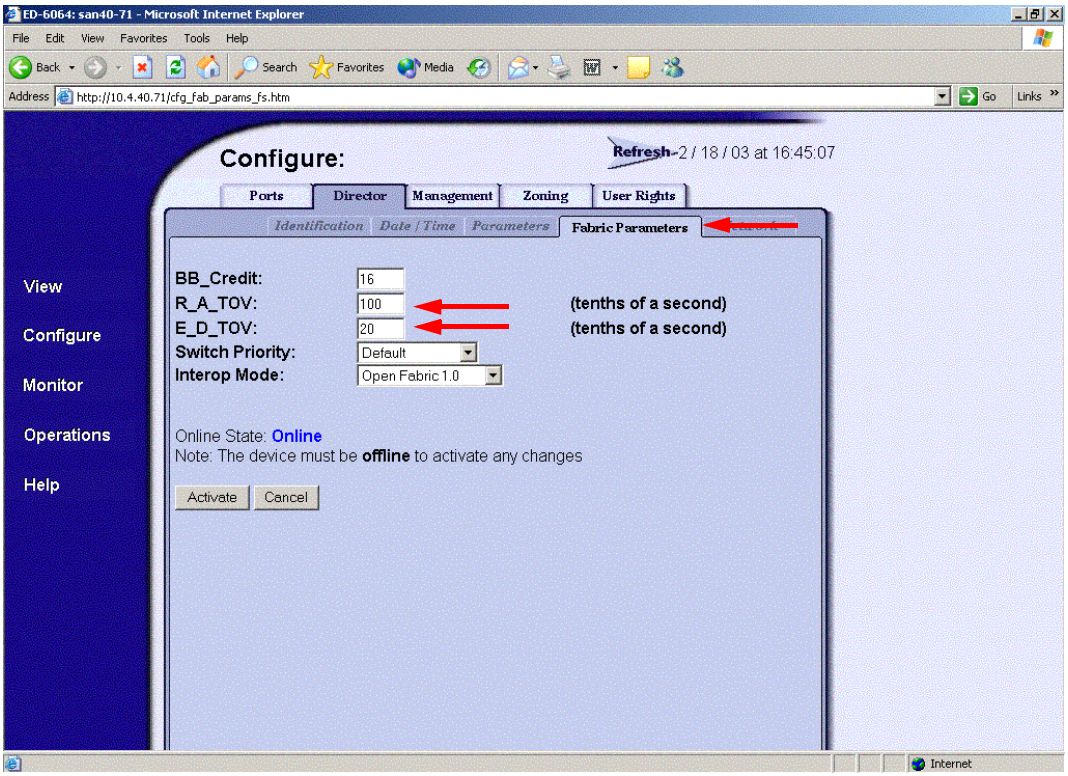
1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, then select the **Fabric Parameters** tab. Verify that **R_A_TOV** is set to **100** and **E_D_TOV**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



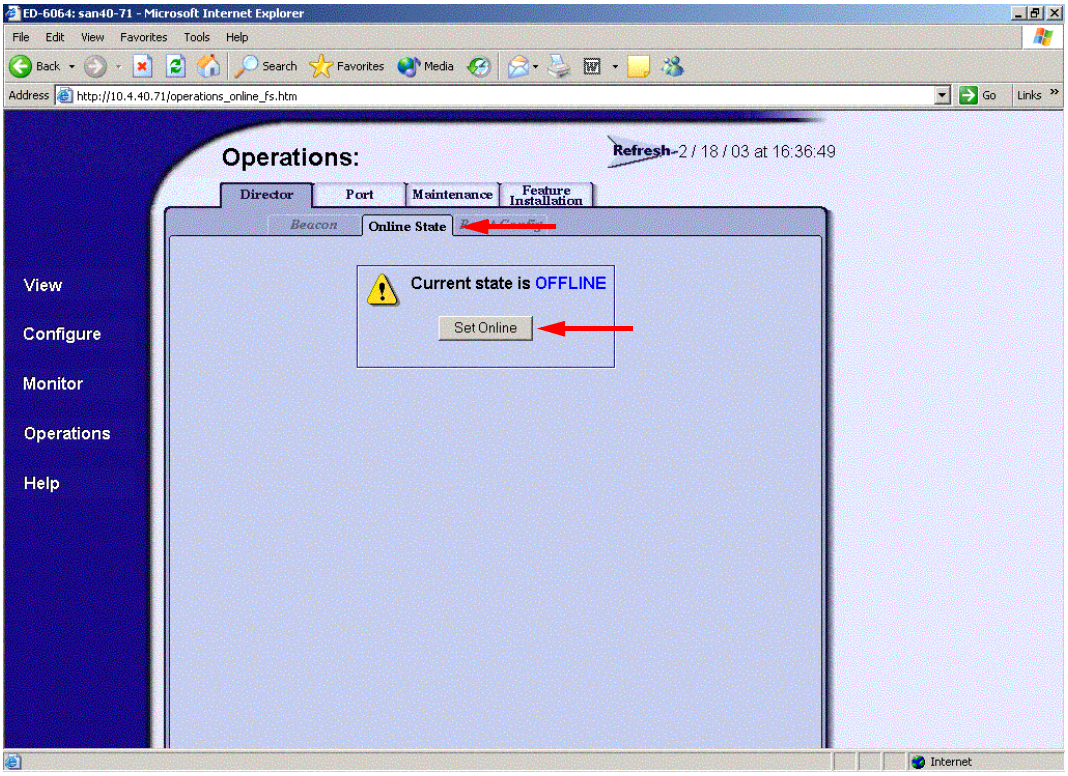
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select **Online State** tab, then click the **Set Offline** button.



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



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



McDATA Telnet CLI

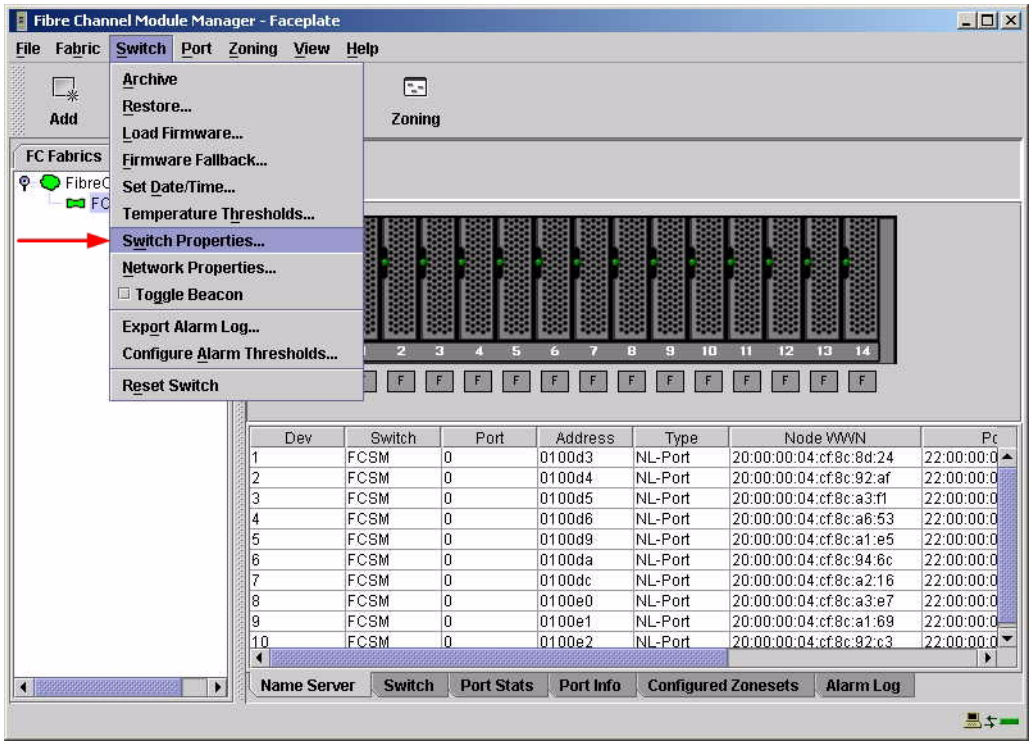
NOTE: Use the following CLI commands when McDATA SANpilot Web Management is not available.

```
Username: Administrator
Password: xxxxxxxx
Root> main system

Maint.System> setOnlineState False
Maint.System> root
Root> config switch
Config.Switch> raTOV 100
Config.Switch> edTOV 20
Config.Switch> show

Switch Information
BB Credit:              16
R_A_TOV:                100
E_D_TOV:                20
Preferred Domain ID:    1
Switch Priority:        Default
Speed:                  2 Gb/sec
Rerouting Delay:        Disabled
Interop Mode:           Open Fabric 1.0
Insistent Domain ID:    Enabled
Domain RSCN:            Disabled
Root> maint system
Maint.System> setOnlineState True
```

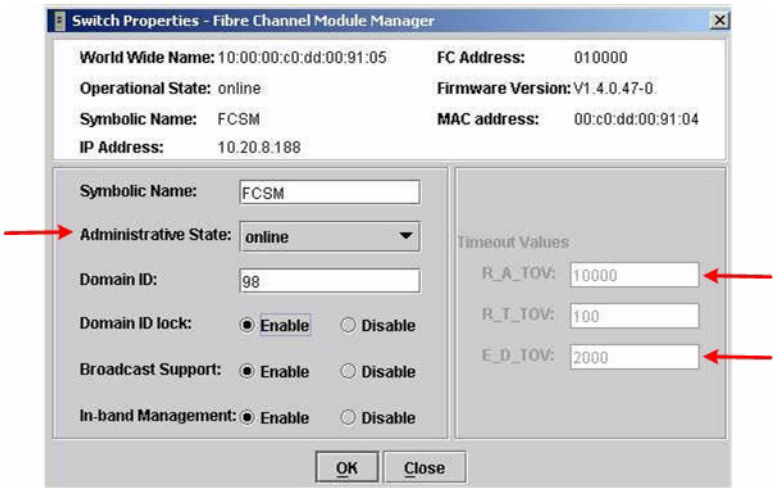
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**, then click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

McDATA switches and Intel Server Fibre Channel Switches negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

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

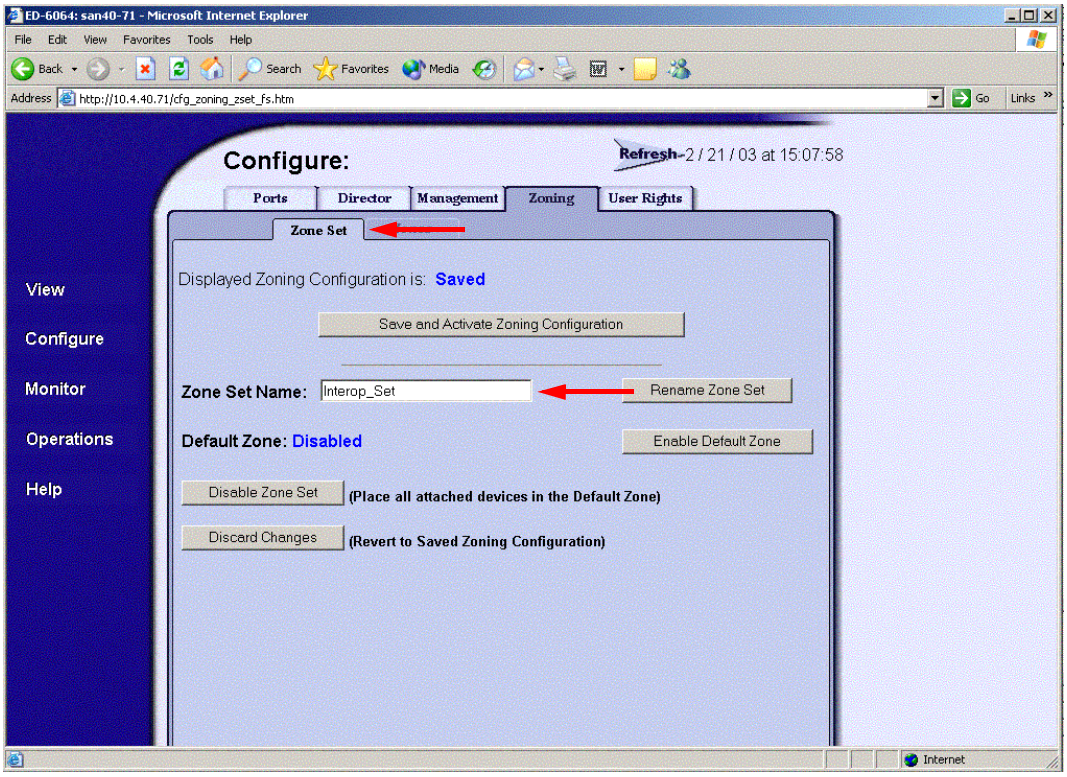
Active Zone Set Names

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

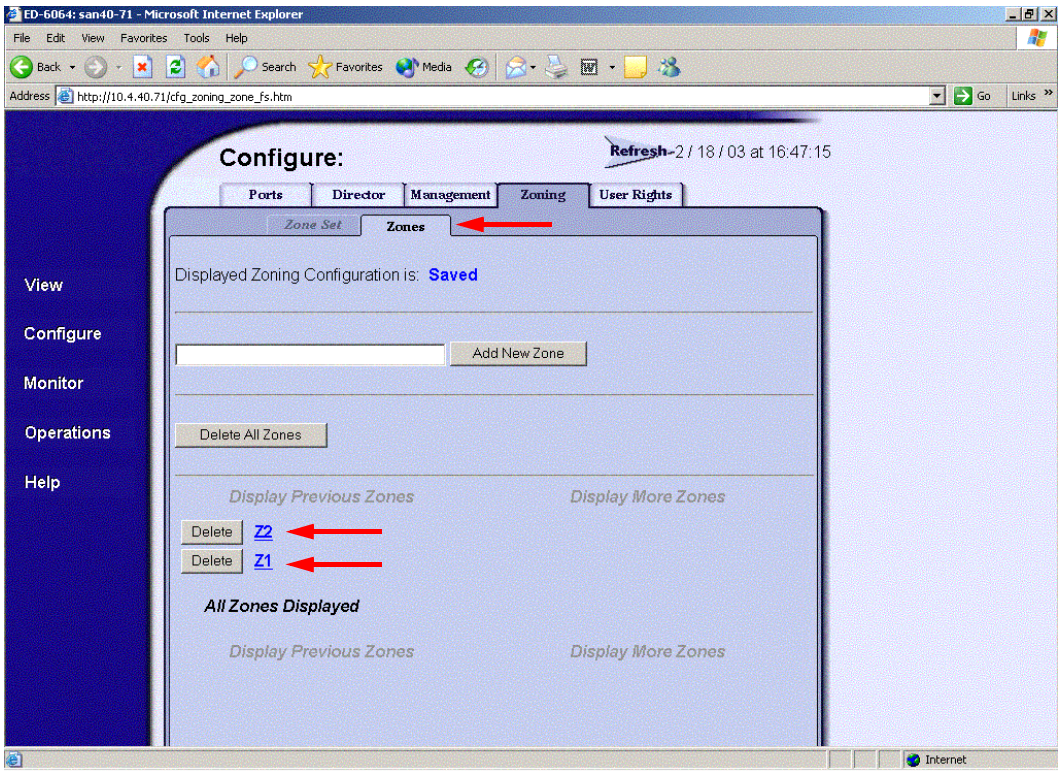
1. Must be 1–64 characters in length.
2. All characters are ASCII.
3. First character is [a–z] or [A–Z].
4. All other characters must be [a–z], [A–Z], [0–9], or the _ character. Other characters ($-^) may not be supported by all vendors and should be avoided.

McDATA SANpilot Web Management

1. Start McDATA SANpilot Web Management. The **Main Director View** dialog box displays.
2. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **ZoneSet** tab. Verify that the Zone Set name conforms to the standards for zone naming as discussed under “Active Zone Set Names” on page 198.



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 198.



McDATA Telnet CLI

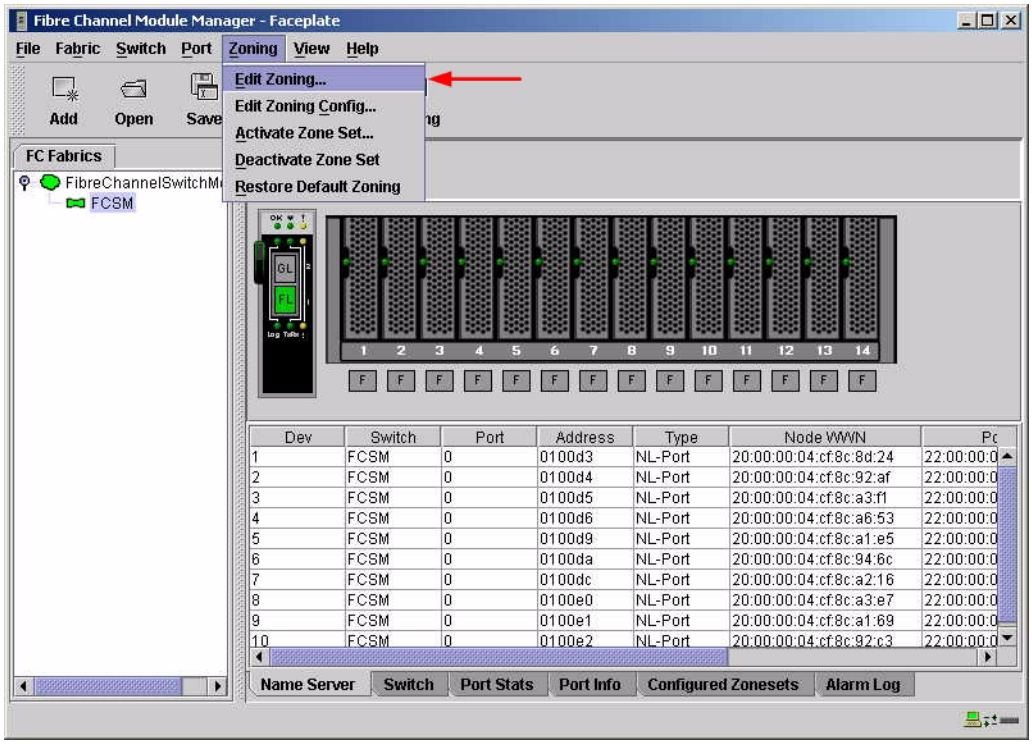
NOTE: Use the following CLI commands when McDATA SANpilot Web Management is not available.

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

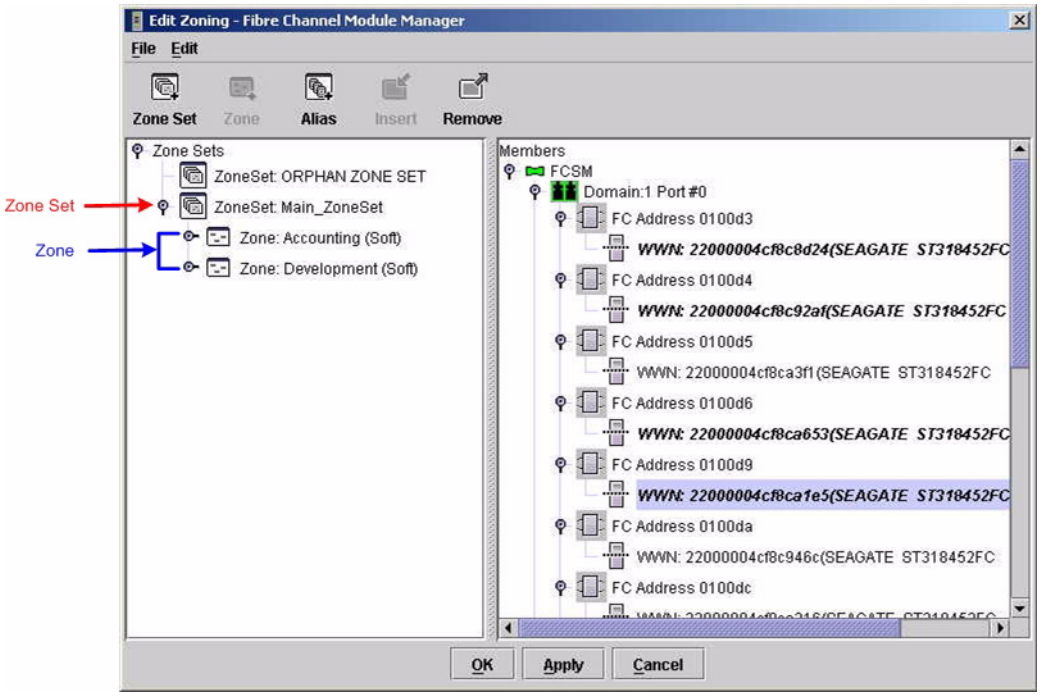
Verify that the Zone Set and Zone Names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 198.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 198



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

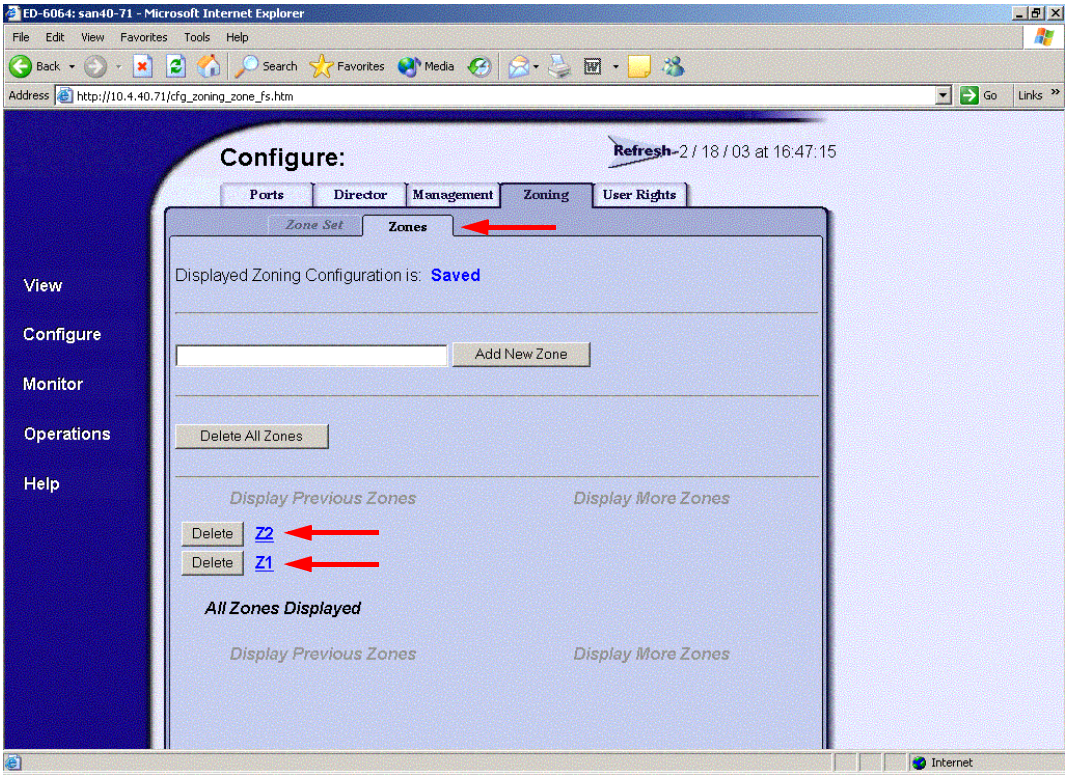
Zone Types

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

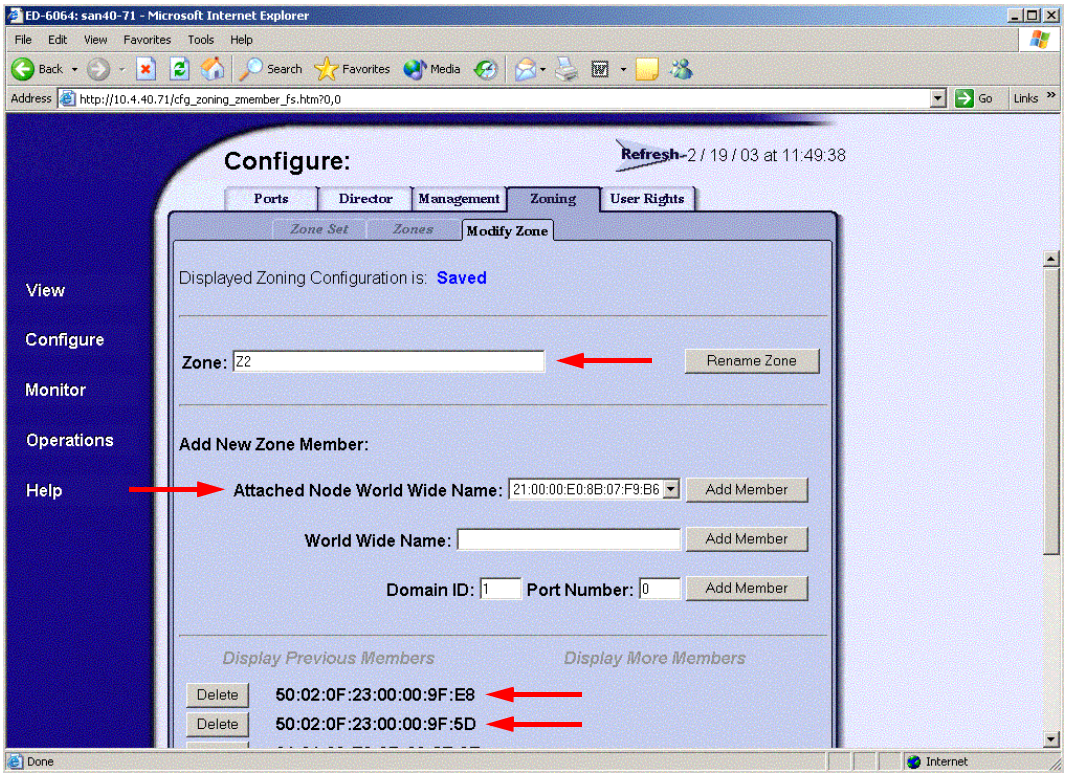
NOTE: A world wide name (WWN) consists of a world wide node name (WWNN) and one or more WWPNs. References in this guide to WWN actually refer to the WWPN.

McDATA Sphereon Web Management

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



3. For each the zone selected in step 2, verify that all members are specified by WWN.



McDATA Telnet CLI

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

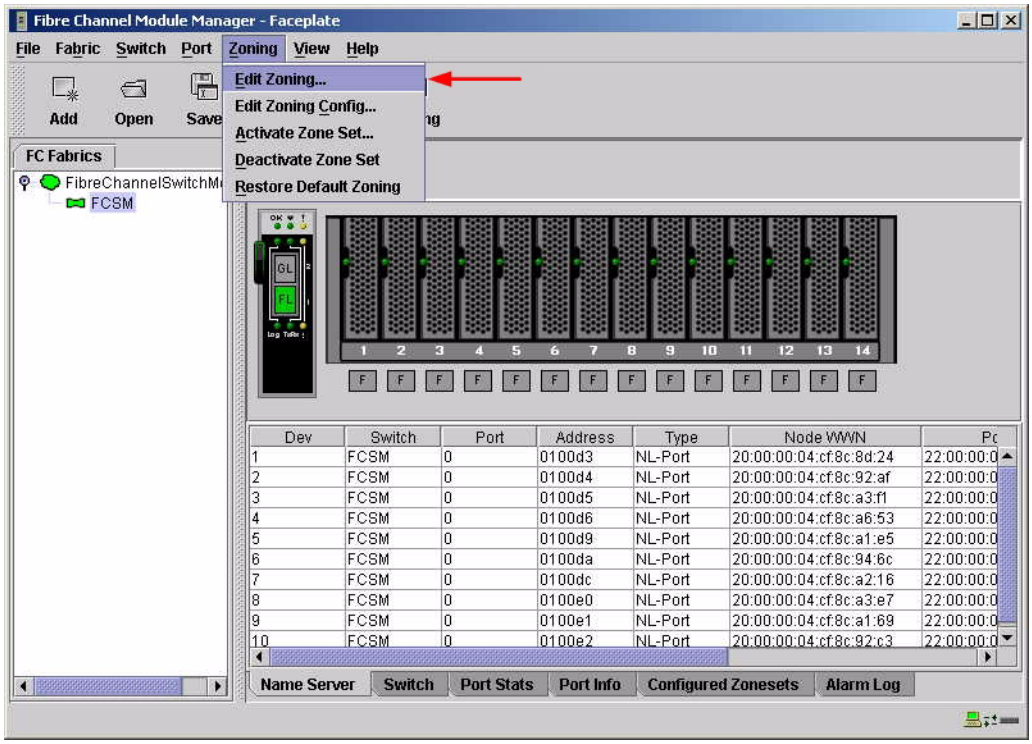
```
Username: Administrator
Password: xxxxxxxx
```

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

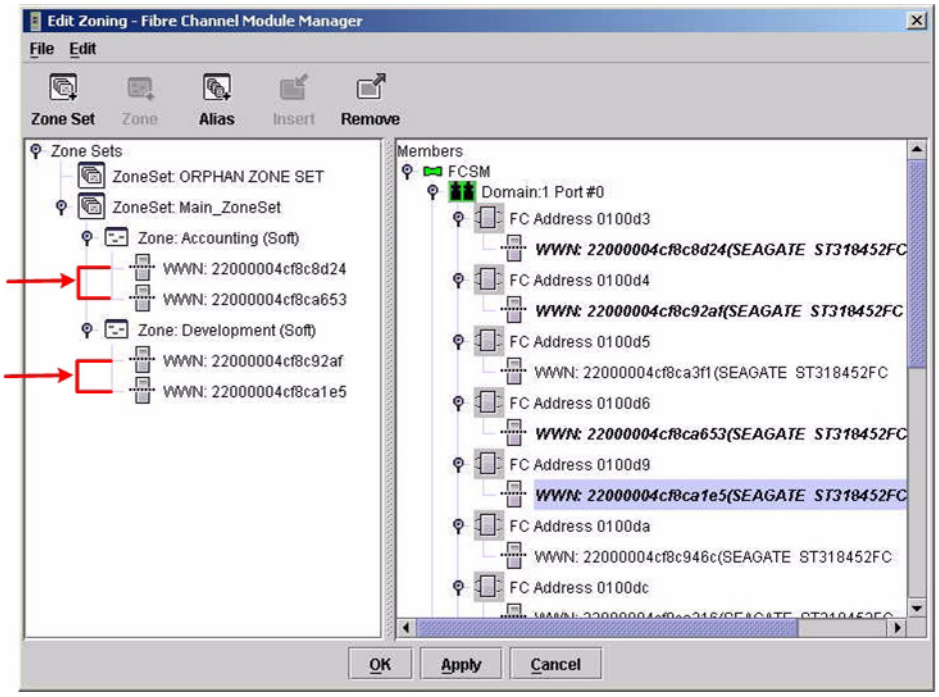
```
Root> show
Show> zoning
Active Zone Set
Default Zone Enabled:    False
Zone Set:  Interop_Set
  Zone:  Z2
      Zone Member:  50:02:0F:23:00:00:9F:E8
      Zone Member:  50:02:0F:23:00:00:9F:5D
      Zone Member:  21:01:00:E0:8B:22:6E:2E
      Zone Member:  21:00:00:E0:8B:09:CA:63
      Zone Member:  21:00:00:E0:8B:09:8F:5E
      Zone Member:  21:00:00:E0:8B:07:4C:B7
      Zone Member:  21:00:00:E0:8B:06:8E:67
      Zone Member:  21:00:00:E0:8B:06:8A:67
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

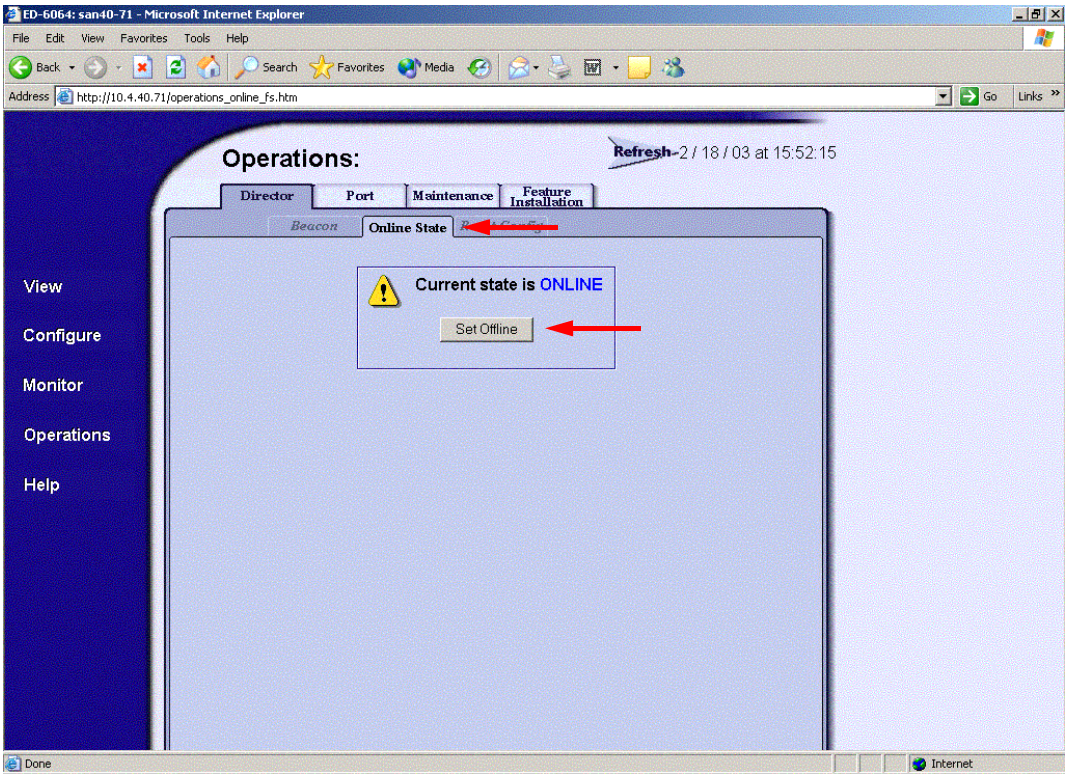
```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone members <zone name>
```

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

Operating Mode Configuration

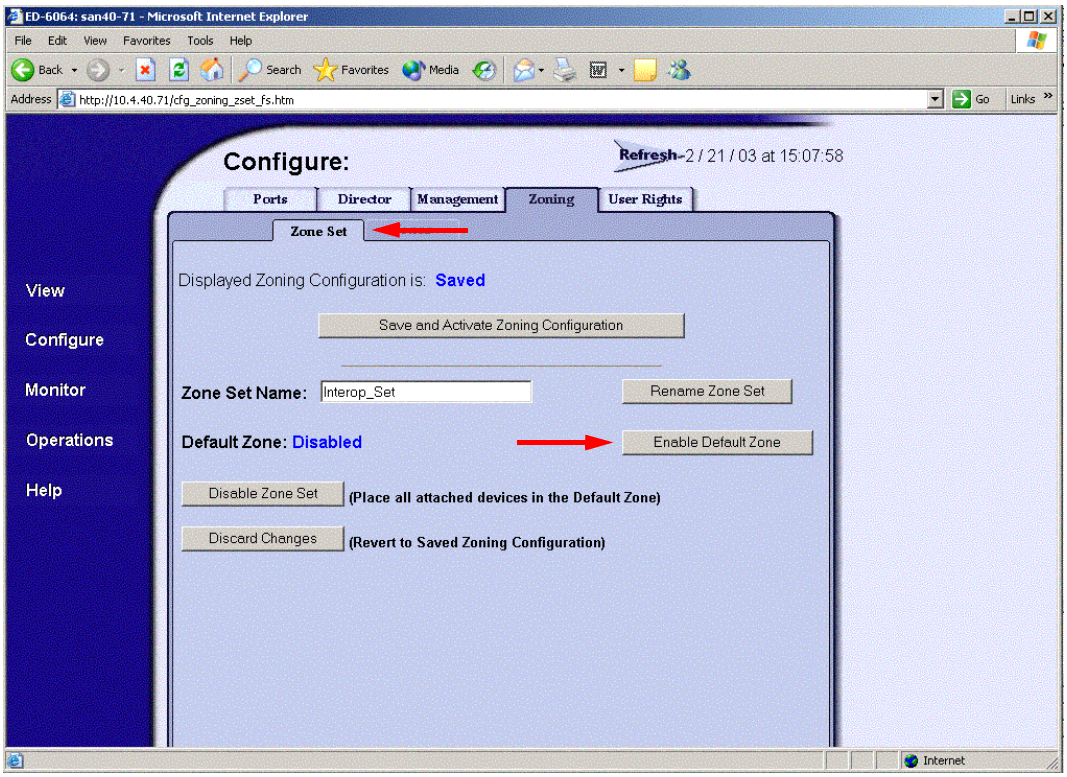
McDATA SANpilot Web Management

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



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

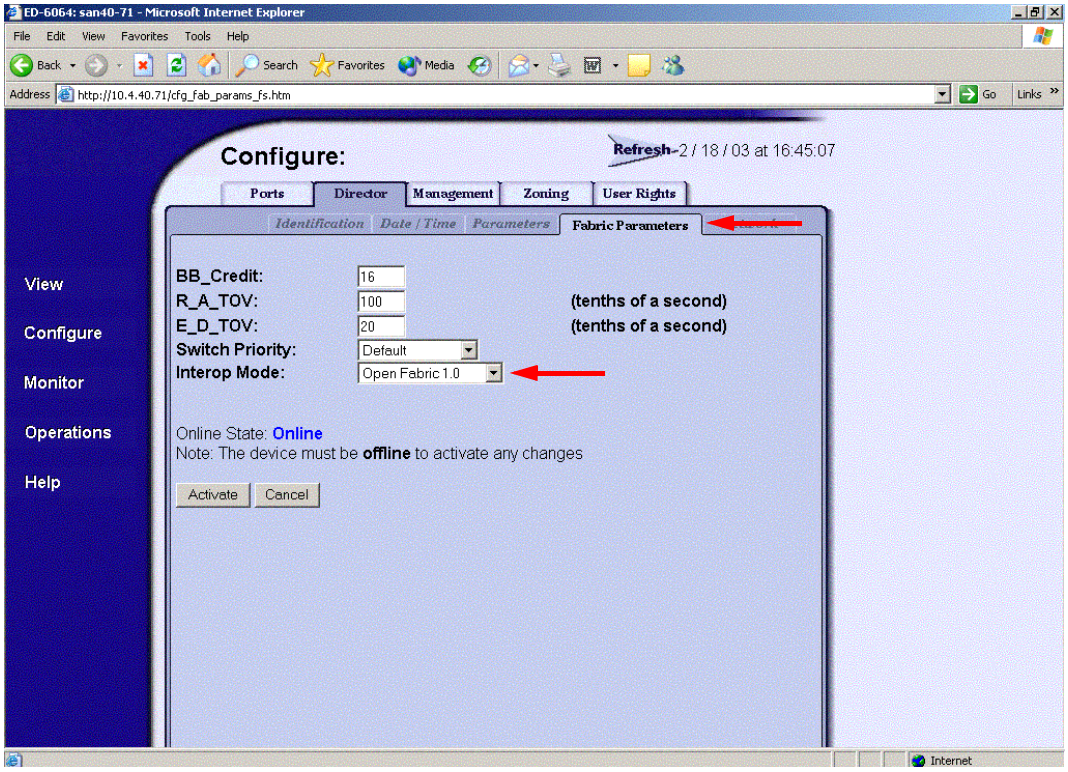
   NOTE: The figure below shows what displays when the **Disable Default Zone** button is selected.



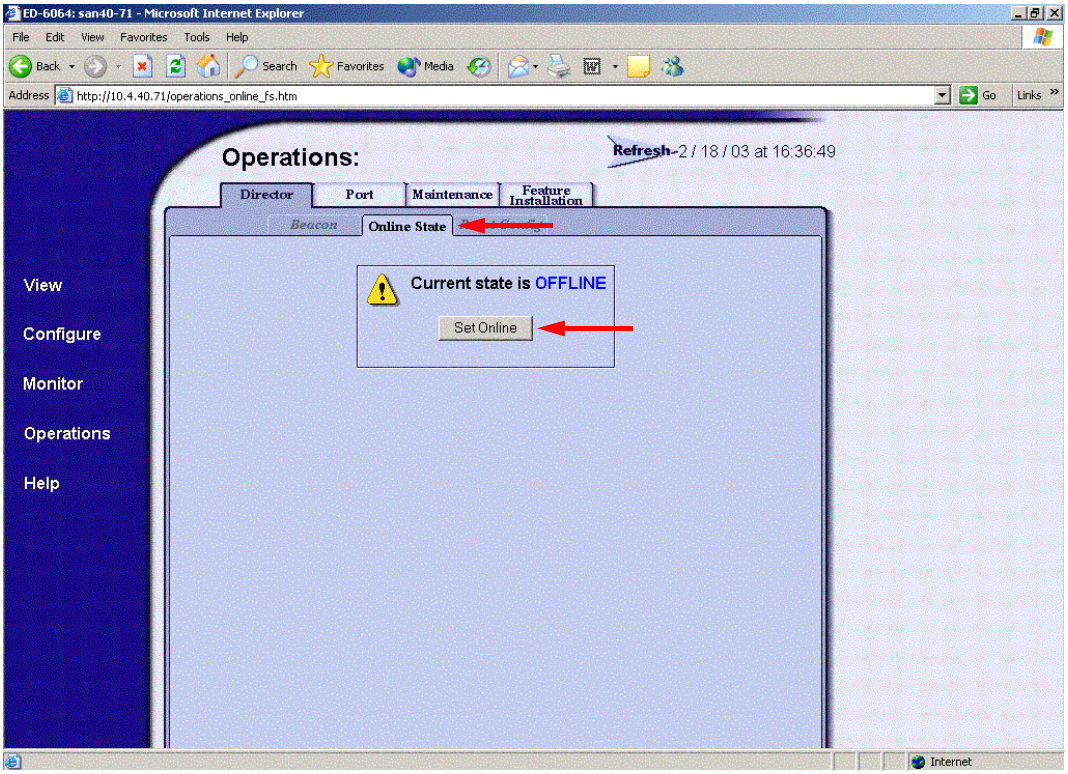
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, select the **Fabric Parameters** tab, then do the following:

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

   b. Click **Activate**.



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



McDATA Telnet CLI

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

```
Username: Administrator
Password: xxxxxxxx
Root> maint system
Maint.System> setOnlineState False
Maint.System> root
Root> config zoning
Config.Zoning> setDefZoneState False
Config.Zoning> root
Root> config switch
Config.Switch> interopMode Open
Config.Switch> root
Root> maint system
Maint.System> setOnlineState True
```

Intel Fibre Channel Module Manager GUI

Not applicable.

Intel Fibre Channel Switch Module CLI

Not applicable.

McDATA Specific Configuration

Not applicable.

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the McDATA and Intel 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 Intel support.

Merging Intel and QLogic Fabrics

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

Intel and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
QLogic	SANbox2-8 Switch	1.5.x and above
	SANbox2-16 Switch	1.5.x and above
	SANbox2-64 Switch	1.5.x and above

The following chapter provides detailed information about merging Intel and QLogic fabrics: **QLogic SANbox2 Series Switches** **(see page 217)**.

QLogic SANbox2 Series Switches

Integration Checklist

The following steps must be completed to successfully merge QLogic and Intel 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 218).

✓ Ensure that each switch has a unique Domain ID (see “Domain ID Configuration” on page 219).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 226).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 233).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 239).

Configuration Limitations

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

Supported Switches and Firmware Versions

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

Intel and QLogic Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
QLogic	SANbox2-8 Switch	1.5.x and above
	SANbox2-16 Switch	1.5.x and above
	SANbox2-64 Switch	1.5.x and above

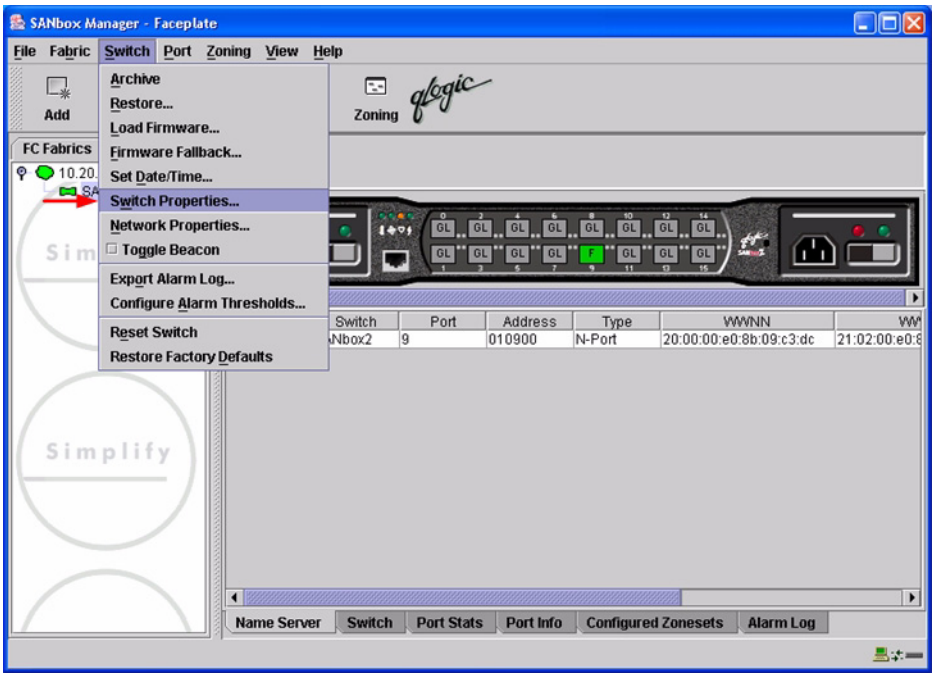
Domain ID Configuration

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 Intel Server Fibre Channel Switch.

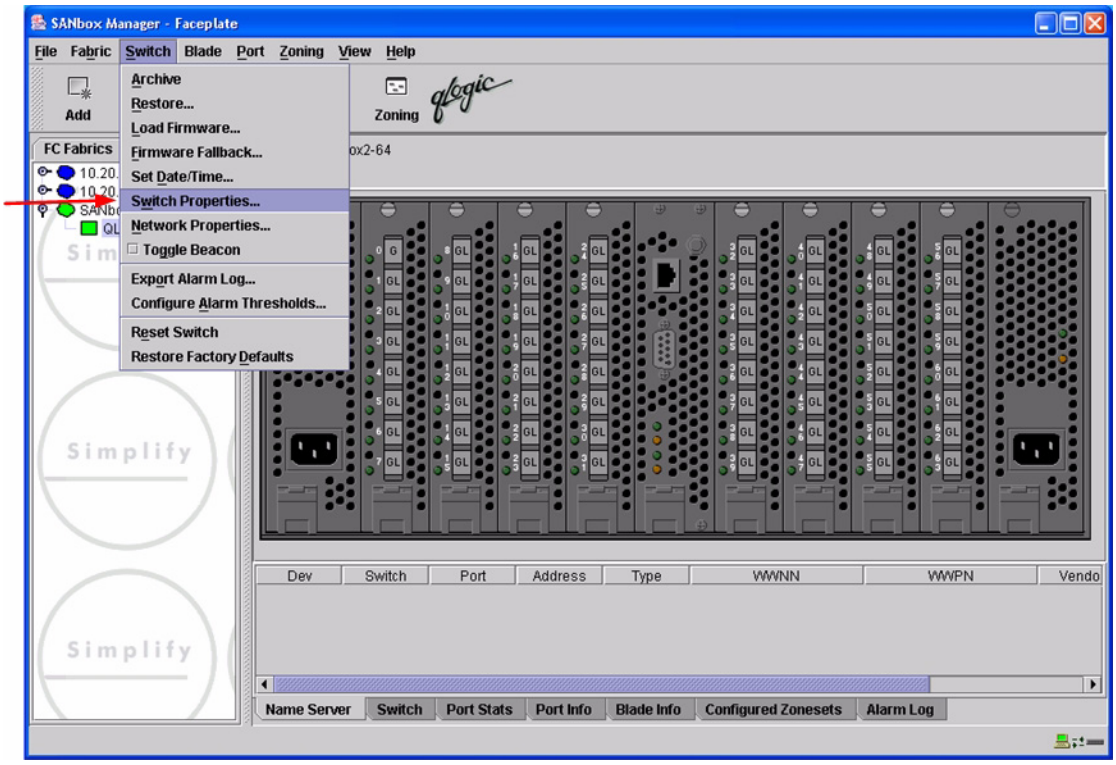
QLogic SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:

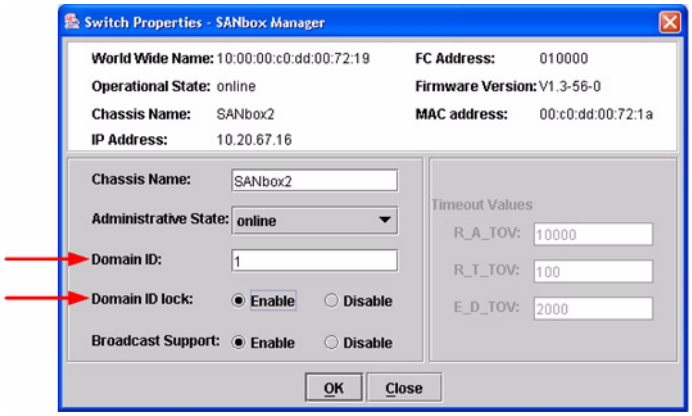


For the QLogic SANbox2-64, the following displays:

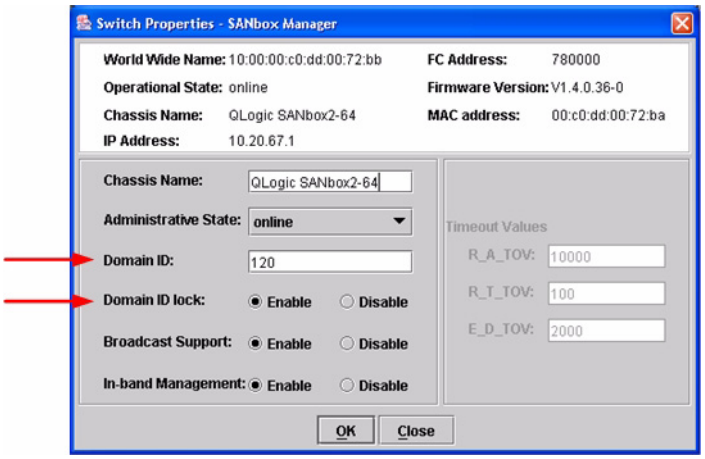


3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



   For the QLogic SANbox2-64, the following displays:



QLogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available. The procedures are the same for the QLogic SANbox2-8, SANbox2-16, and SANbox2-64.

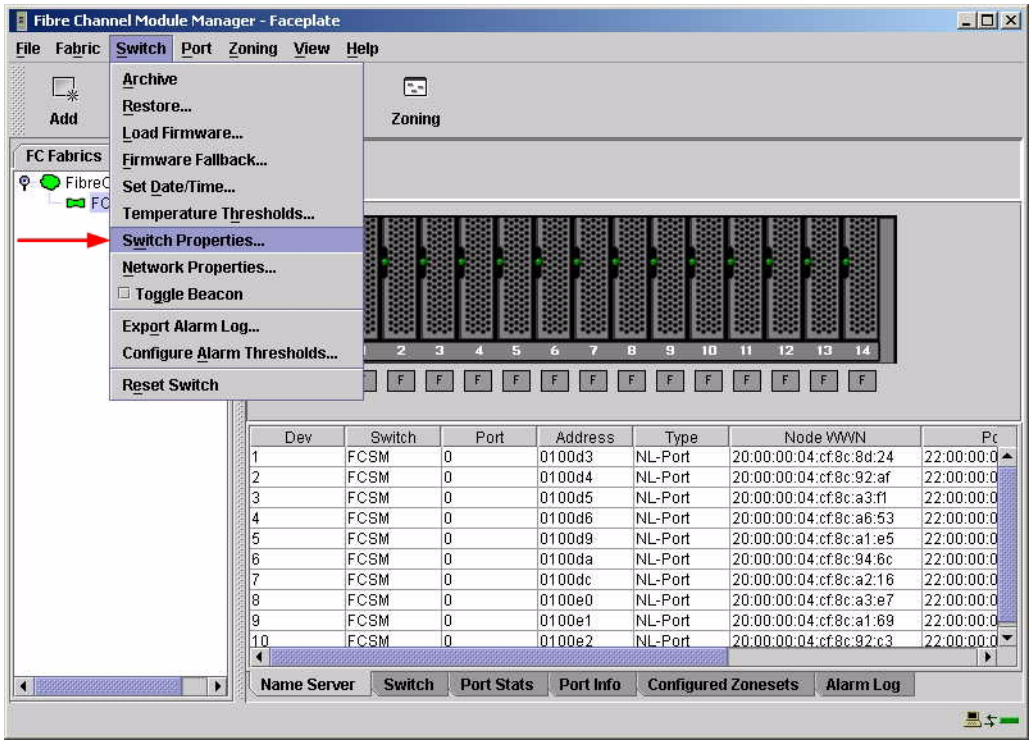
```
Login: admin
Password: xxxxxxxx
SANbox2 #> admin start
SANbox2 (admin) #> config edit
SANbox2 (admin-config) #> set config switch
```

The following options display:

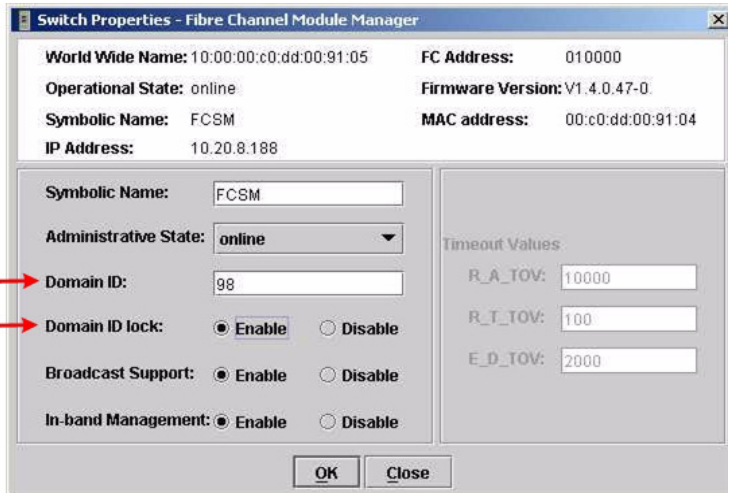
```
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  DefaultDomainID (decimal value, 1-239) [1] <choose a unique number>
  DomainIDLock (True / False) [False] True
  SymbolicName (string, max=32 chars) [QLogic SANbox 2-64]
  R_T_TOV (decimal value, 1-1000 msec) [100]
  R_A_TOV (decimal value, 100-100000 msec) [10000]
  E_D_TOV (decimal value, 10-20000 msec) [2000]
  FS_TOV (decimal value, 100-100000 msec) [5000]
  DS_TOV (decimal value, 100-100000 msec) [5000]
  PrincipalPriority (decimal value, 1-255) [254]
  ConfigDescription (string, max=64 chars) [Default Config]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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

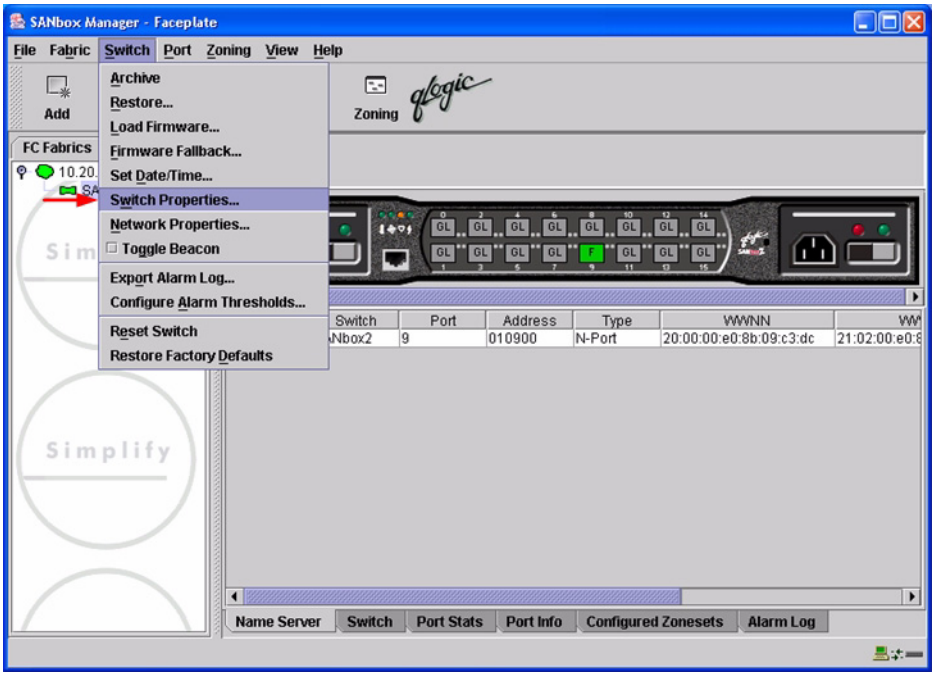
This section provides the steps to change these values.

QLogic SANbox Manager GUI

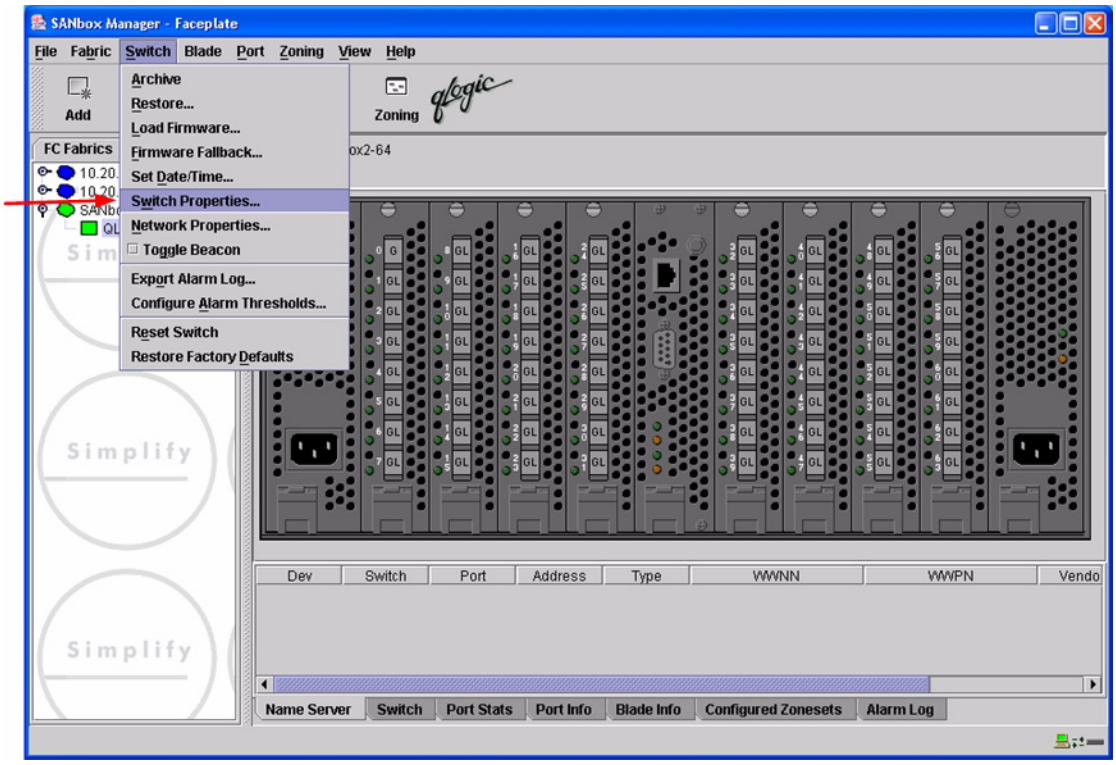
ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

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**.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:

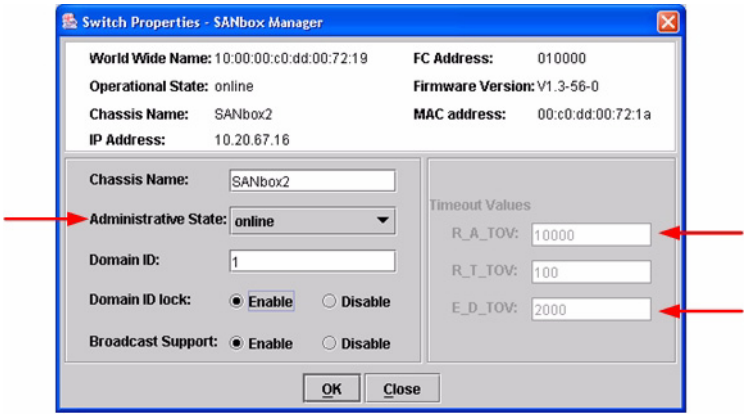


For the QLogic SANbox2-64, the following displays:

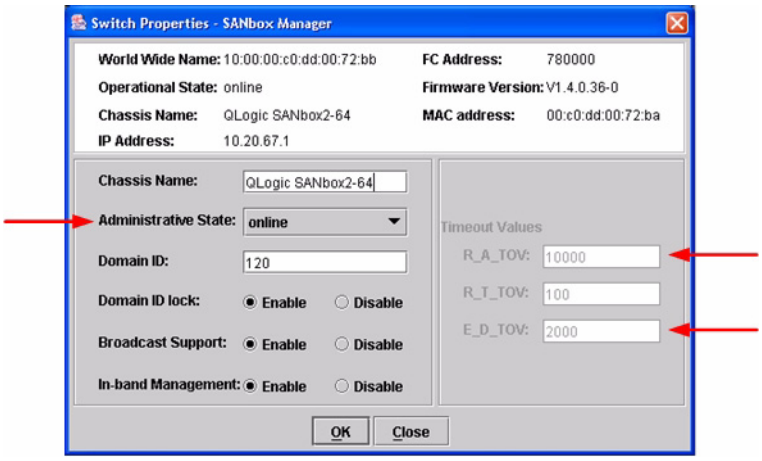


3. From the **Switch Properties—SANbox Manager** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



For the QLogic SANbox2-64, the following displays:



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

QLogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available. The procedures are the same for the QLogic SANbox2-8, SANbox2-16, and SANbox2-64.

```
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
```

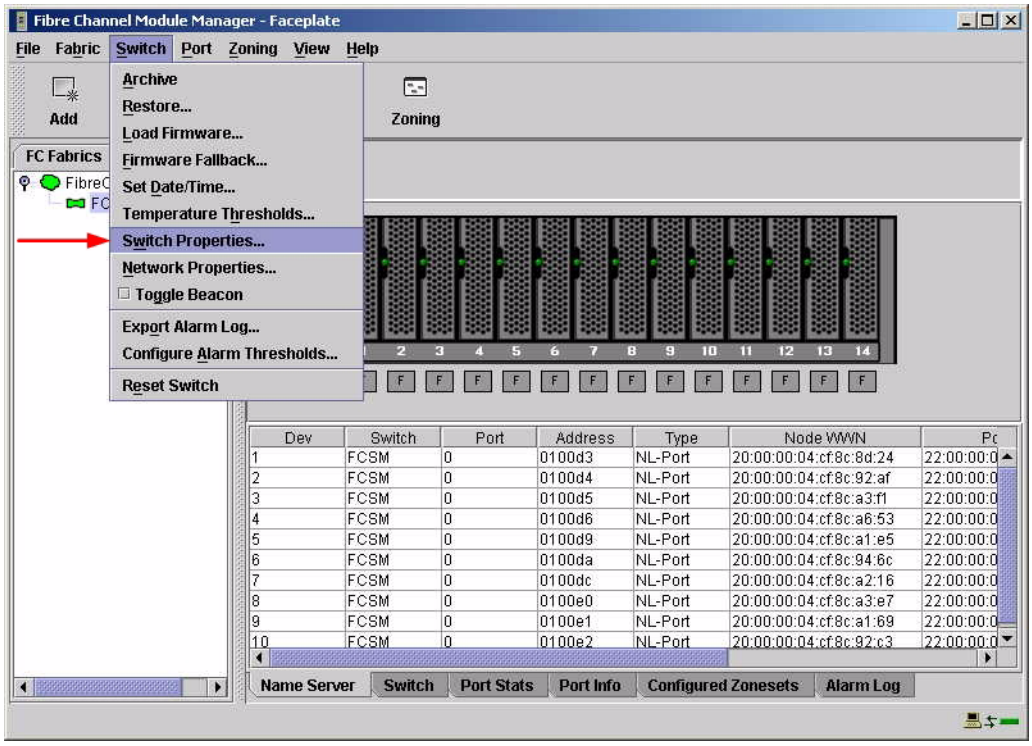
The following options display:

```
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) [QLogic SANbox2-64]
R_T_TOV (decimal value, 1-1000 msec) [100]
R_A_TOV (decimal value, 100-100000 msec) [9000]   10000
E_D_TOV (decimal value, 10-20000 msec) [1000]   2000
FS_TOV (decimal value, 100-100000 msec) [5000]
DS_TOV (decimal value, 100-100000 msec) [5000]
PrincipalPriority (decimal value, 1-255) [254]
ConfigDescription (string, max=64 chars) [Default Config]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

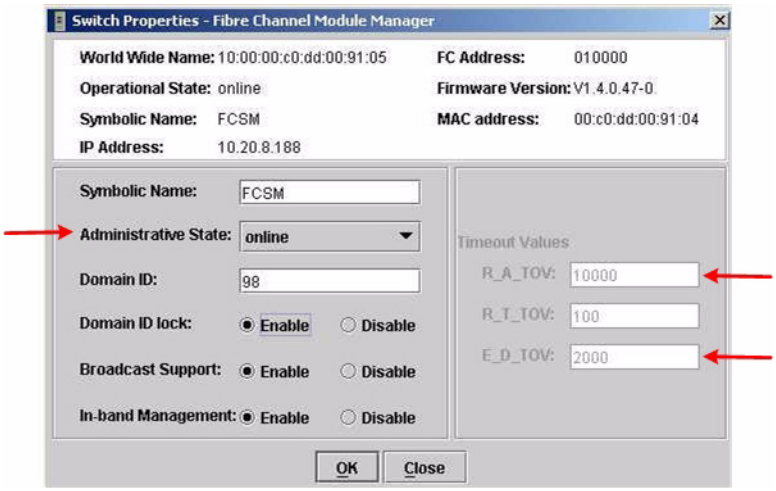
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

QLogic SANblade switches and Intel Server Fibre Channel Switches negotiate for principal switch automatically. Therefore, there are no steps to take.

Zone Configuration

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

Active Zone Set Names

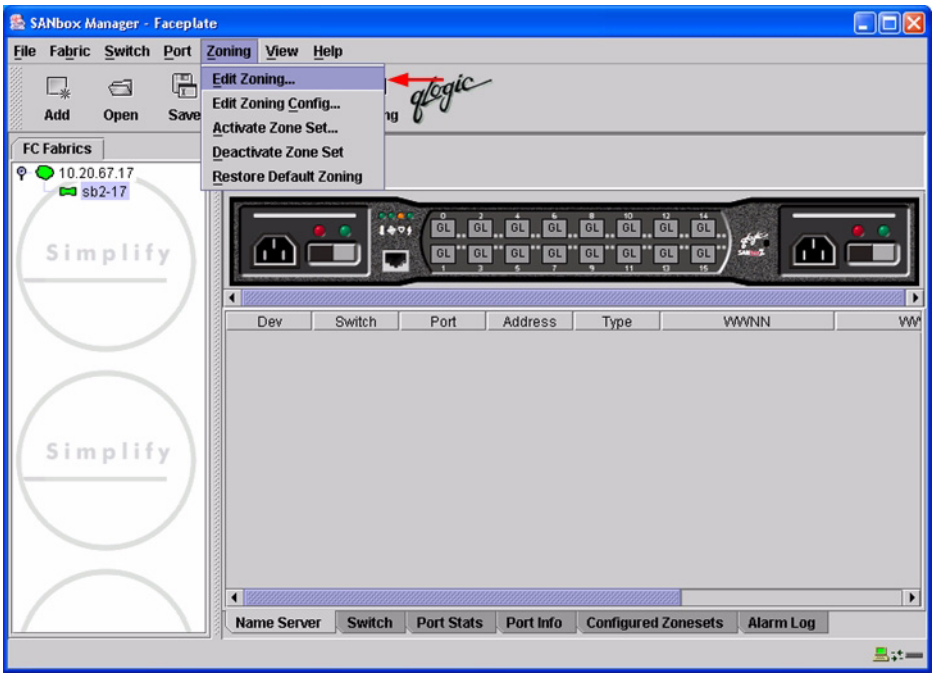
The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

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

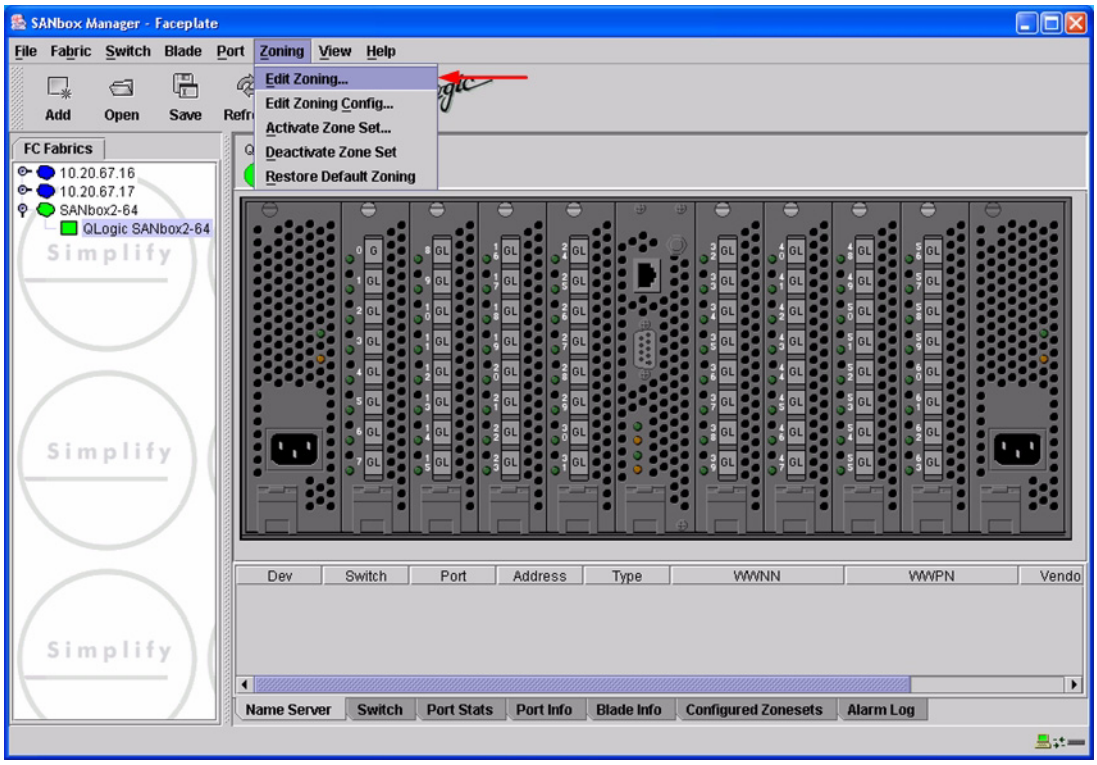
QLogic SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:

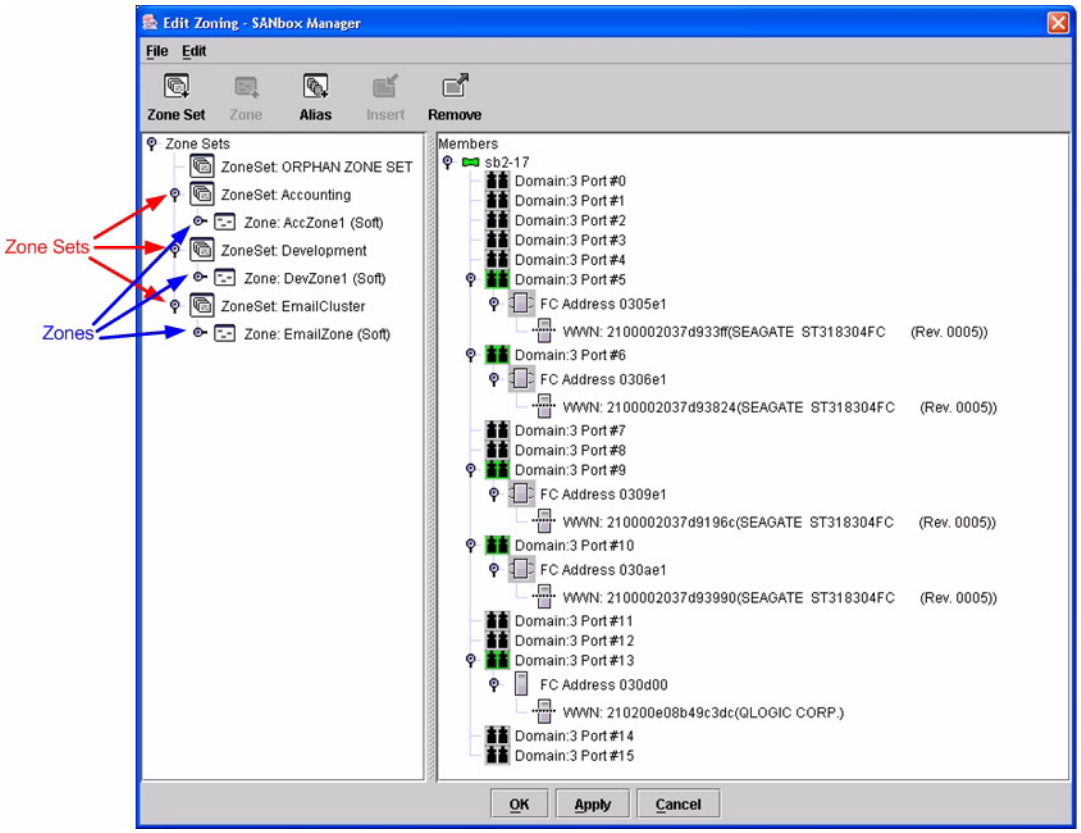


For the QLogic SANbox2-64, the following displays:

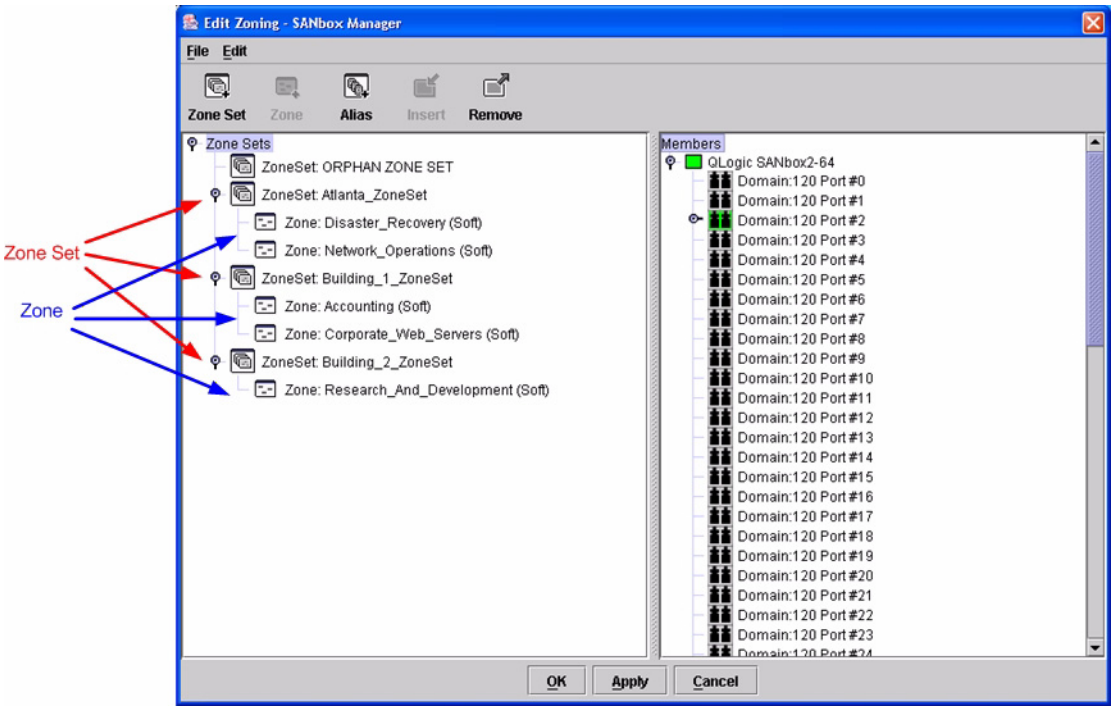


3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 233.

   For the QLogic SANbox2-8 and SANbox2-16, the following displays:



For the QLogic SANbox2-64, the following displays:



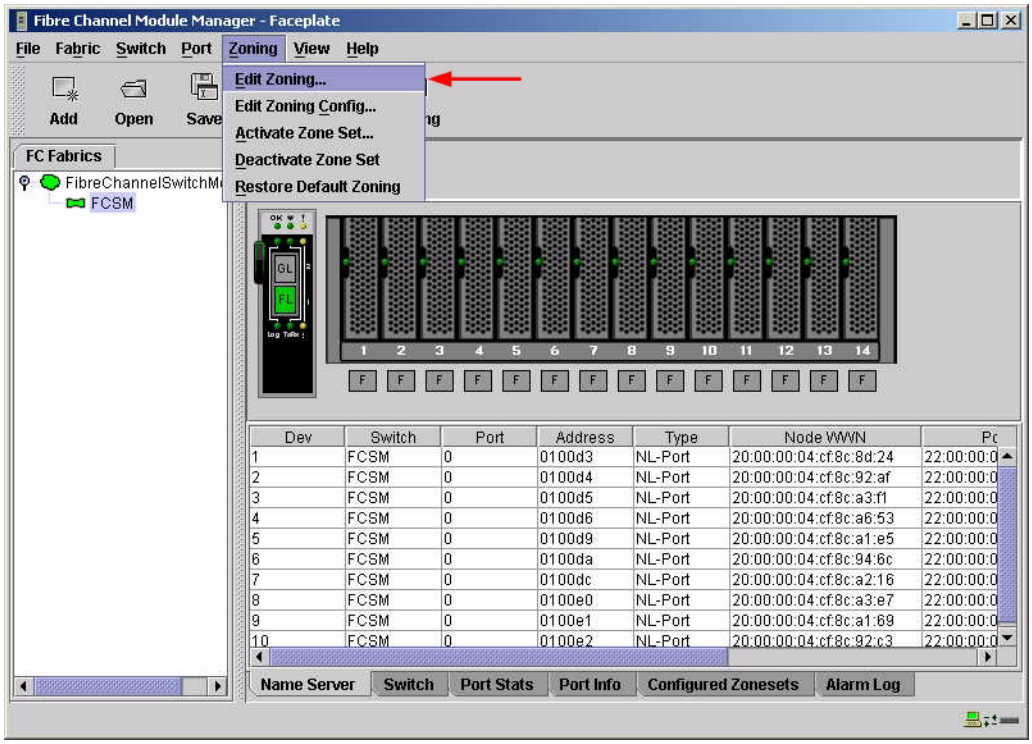
QLogic CLI

NOTE: Use the CLI commands when the QLogic SANbox Manager GUI is not available. The procedures are the same for the QLogic SANbox2-8, SANbox2-16, and SANbox2-64.

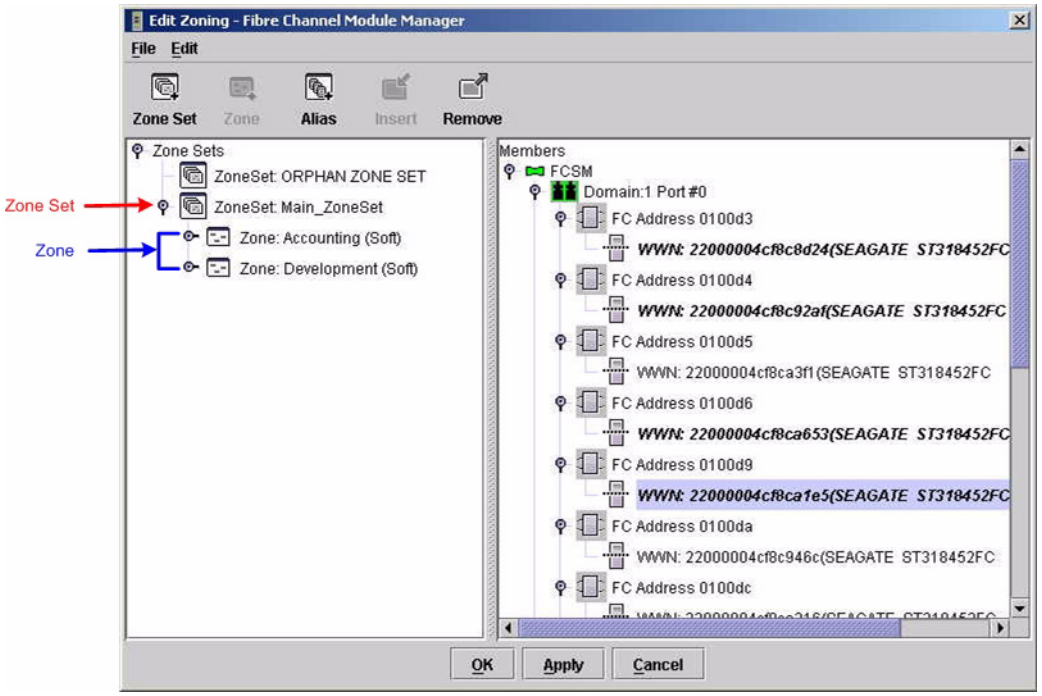
```
Login: admin
Password: xxxxxxxx
SANbox2 #> zone list
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 233.



Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

Zone Types

This configuration supports all QLogic SANbox2 and Intel Server Fibre Channel Switch Zone types.

Operating Mode Configuration

Not applicable.

QLogic Specific Configuration

Not applicable.

Intel Specific Configuration

Not applicable.

Successful Integration Checklist

Perform the following steps after the E-port connection has been established and the fabric has had time to update. If everything verifies, the QLogic and Intel 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 Intel support.

Merging Intel and Sun Fabrics

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from Sun that comply with the FC-SW-2 standard.

Intel and Sun Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Sun	Sun StorEdge Network 2 Gb FC Switch-8	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-64	1.5.x and above

The following chapter provides detailed information about merging Intel and Sun fabrics: **Sun StorEdge Network 2 Gb FC Series Switches** **(see page 243)**.

Sun StorEdge Network 2 Gb FC Series Switches

Integration Checklist

The following steps must be completed to successfully merge Sun and Intel 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 244).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 245).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 252).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 260).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 267).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 273).

Configuration Limitations

The following Intel Server Blade Chassis Enterprise software features are not supported in Sun fabrics.

- Virtual Private Fabric (VPF) Zoning
- Access Control List (ACL) Zoning
- I/O PathGuard
- I/O StreamGuard

No limitations exist when merging Sun and Intel fabrics; all features are fully supported and comply with industry standards.

Supported Switches and Firmware Versions

The following Intel Server Fibre Channel Switch has been tested in the Intel environment and complies with the FC-SW-2 standard. The Intel Server Fibre Channel Switch has tested interoperable with the following switches from Sun that comply with the FC-SW-2 standard.

Intel and Sun Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
Intel	Intel Server Fibre Channel Switch	1.4.0.42.0 and above
Sun	Sun StorEdge Network 2 Gb FC Switch-8	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.5.x and above
	Sun StorEdge Network 2 Gb FC Switch-64	1.5.x and above

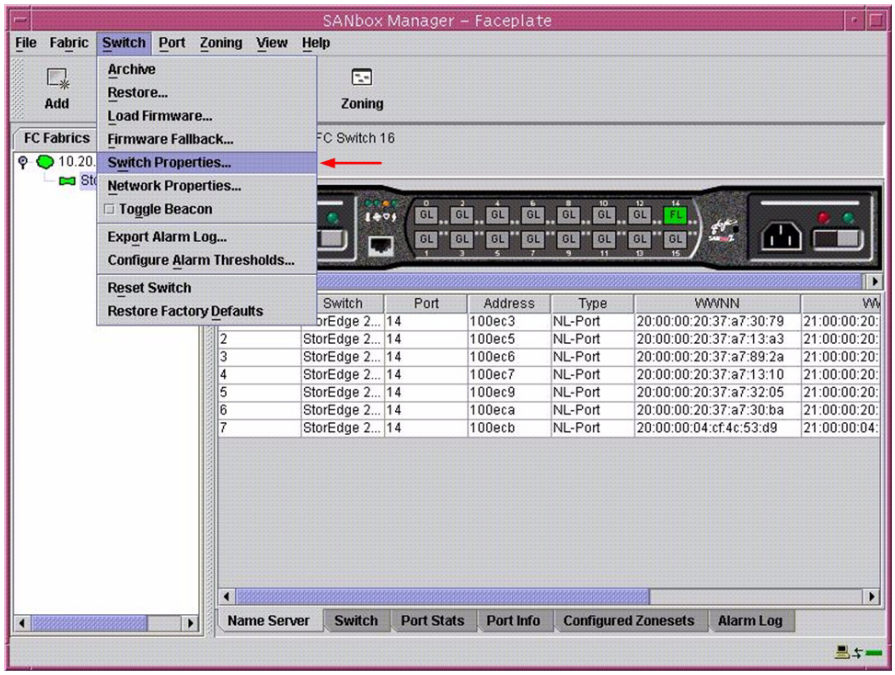
Domain ID Configuration

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 Sun switch and the Intel Server Fibre Channel Switch.

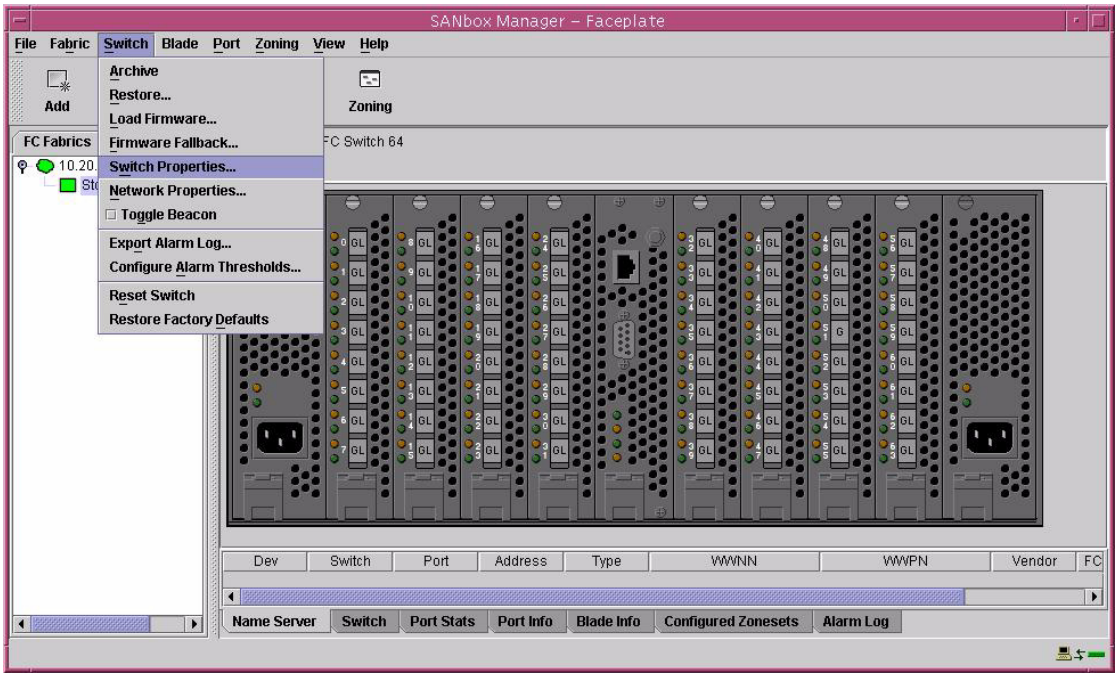
Sun StorEdge SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:

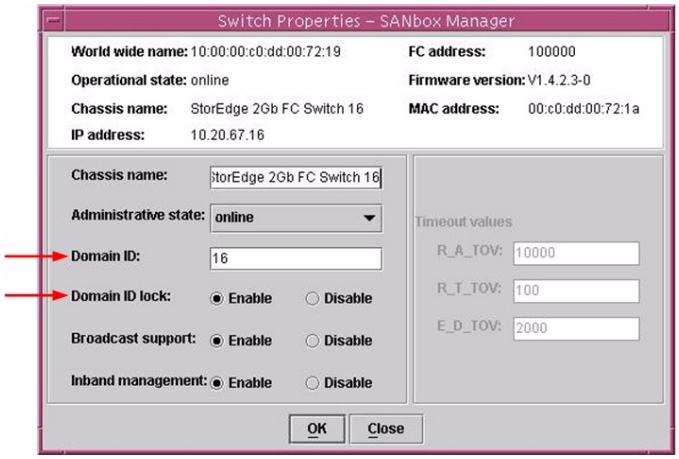


For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:

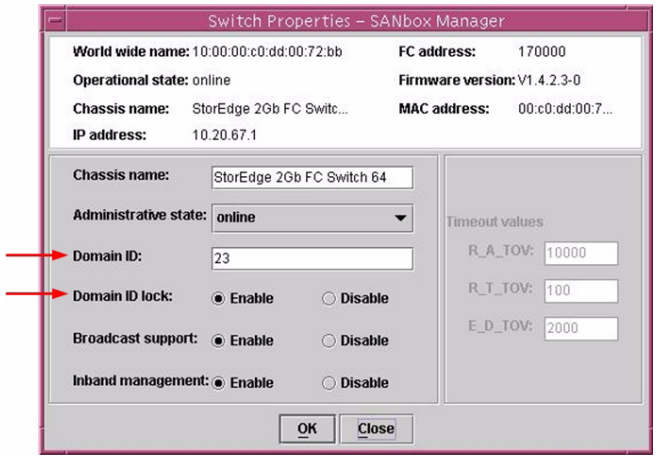


3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:



   For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:



Sun StorEdge CLI

NOTE: Use the CLI commands when the Sun StorEdge SANbox Manager GUI is not available. The procedures are the same for the Sun StorEdge Network 2 Gb FC Switch-8, Sun StorEdge Network 2 Gb FC Switch-16, and Sun StorEdge Network 2 Gb FC Switch-64.

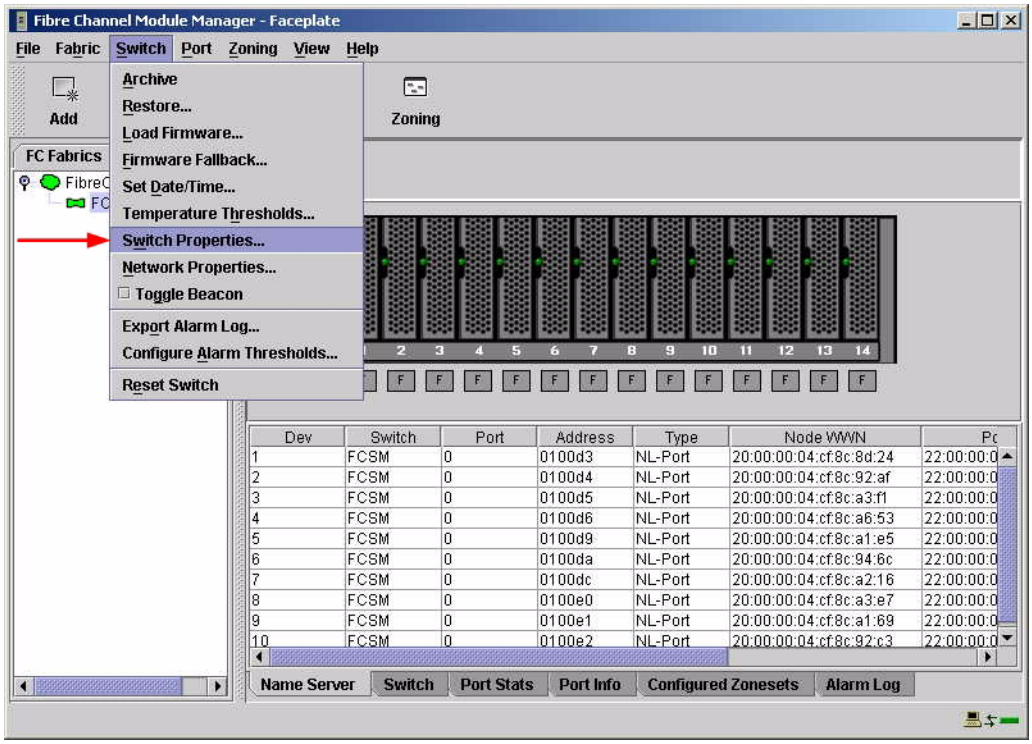
```
Login: admin
Password: xxxxxxxx
StorEdge 2Gb FC Switch 16 #> admin start
StorEdge 2Gb FC Switch 16 (admin) #> config edit
StorEdge 2Gb FC Switch 16 (admin-config) #> set config switch
```

The following options display:

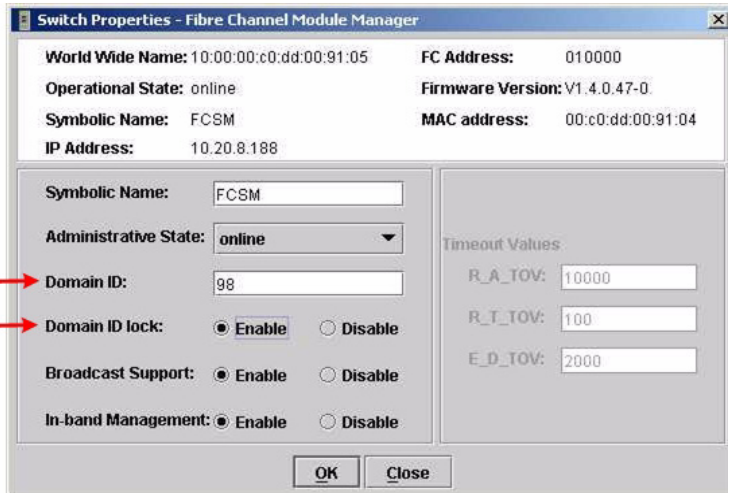
```
  AdminState (1=Online, 2=Offline, 3=Diagnostics) [Online]
  BroadcastEnabled (True / False) [True]
  InbandEnabled (True / False) [True]
  DefaultDomainID (decimal value, 1-239) [1] <choose a unique number>
  DomainIDLock (True / False) [False] True
  SymbolicName (string, max=32 chars) [StorEdge 2Gb FC Switch 16]
  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]
StorEdge 2Gb FC Switch 16 (admin-config) #> config save
StorEdge 2Gb FC Switch 16 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module Manager** 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**.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (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

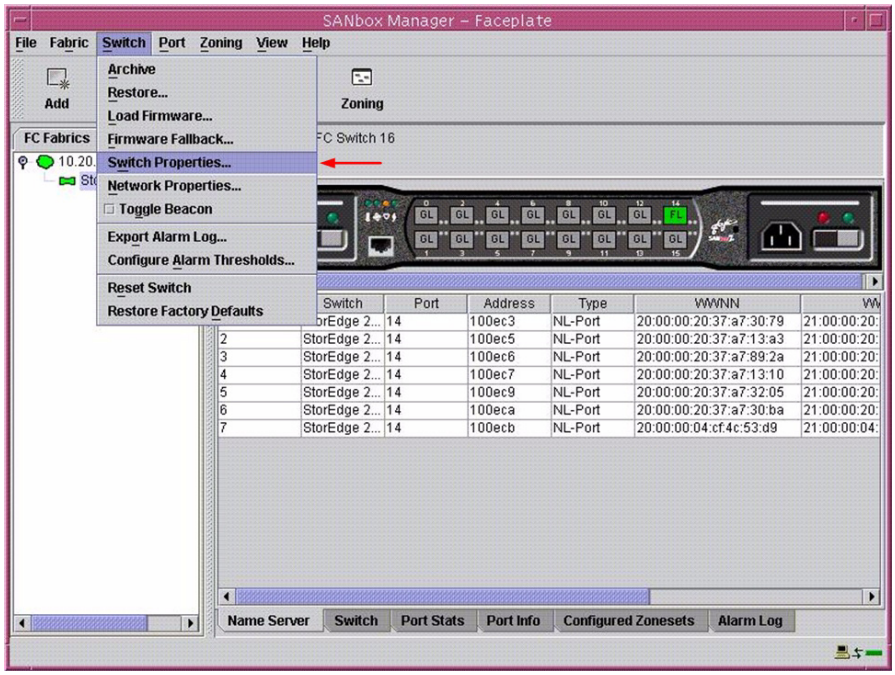
This section provides the steps to change these values.

Sun StorEdge SANbox Manager GUI

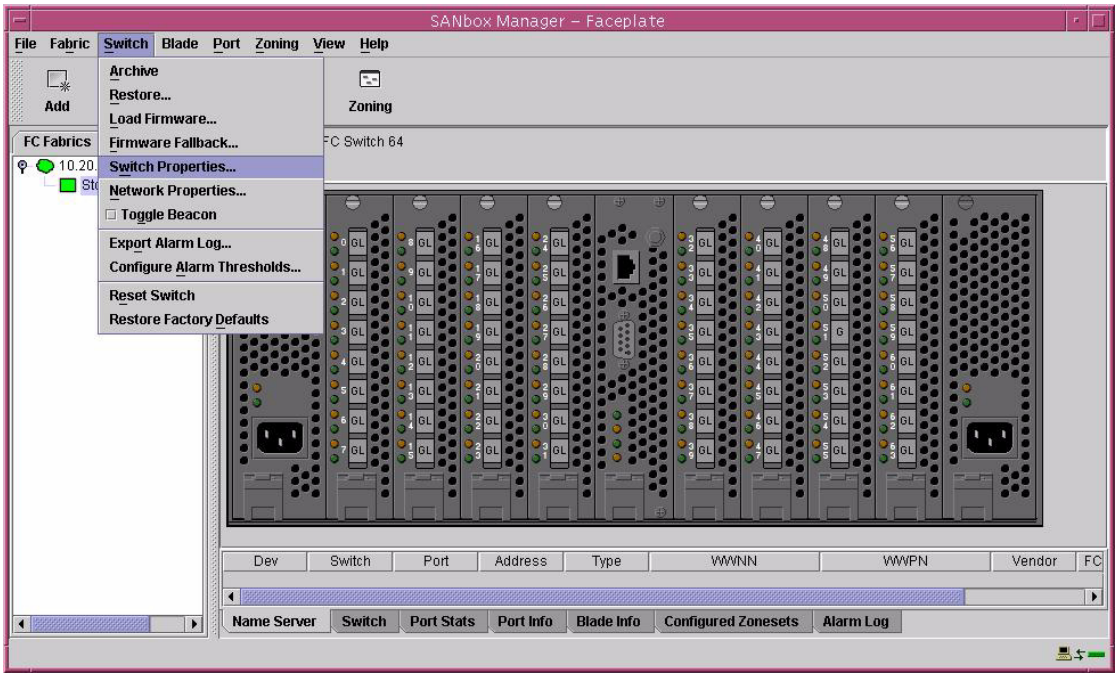
ATTENTION!! The following steps take the switch offline; therefore, do not perform them on a switch being managed in-band.

1. Start the **SANbox Manager** application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:

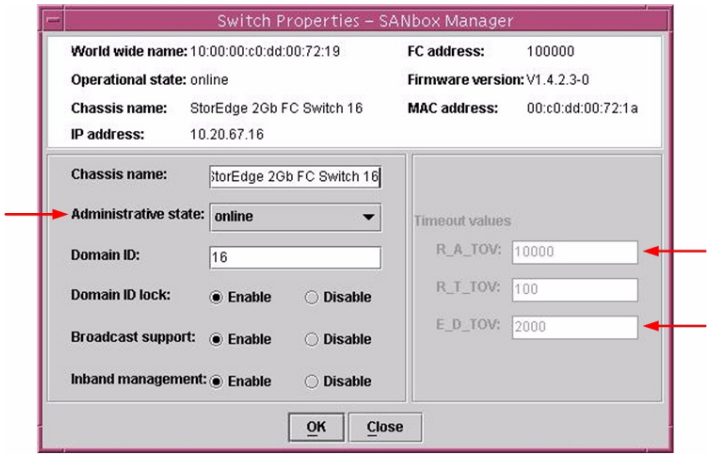


For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:

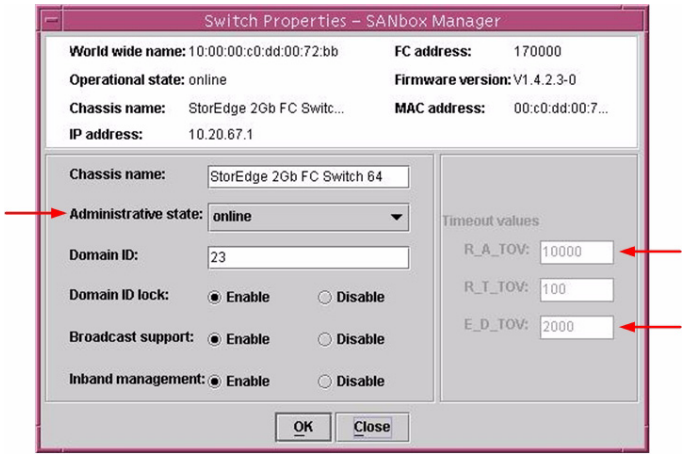


3. From the **Switch Properties—SANbox Manager** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:



   For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:



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

Sun StorEdge CLI

NOTE: Use the CLI commands when the Sun StorEdge SANbox Manager GUI is not available. The procedures are the same for the Sun StorEdge Network 2 Gb FC Switch-8, Sun StorEdge Network 2 Gb FC Switch-16, and Sun StorEdge Network 2 Gb FC Switch-64.

```
Login: admin
Password: xxxxxxxx
StorEdge 2Gb FC Switch 16 #> 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.

```
StorEdge 2Gb FC Switch 16 #> admin start
StorEdge 2Gb FC Switch 16 (admin) #> config edit
StorEdge 2Gb FC Switch 16 (admin-config) #> set config switch
```

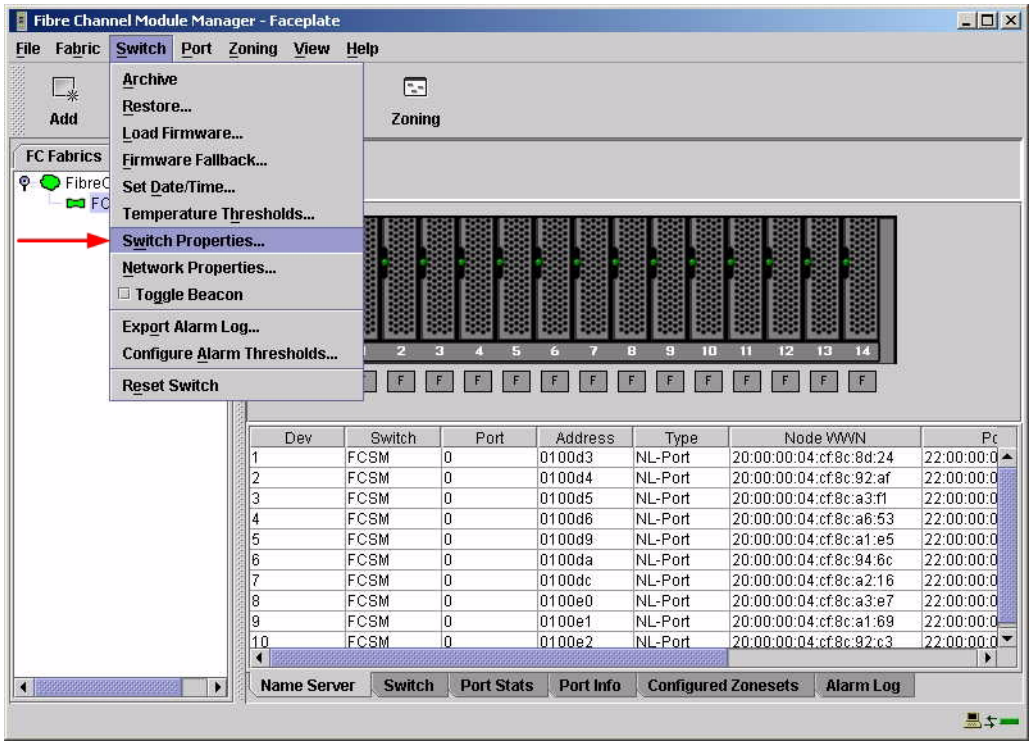
The following options display:

```
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) [StorEdge 2Gb FC Switch 16]
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]
StorEdge 2Gb FC Switch 16 (admin-config) #> config save
StorEdge 2Gb FC Switch 16 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

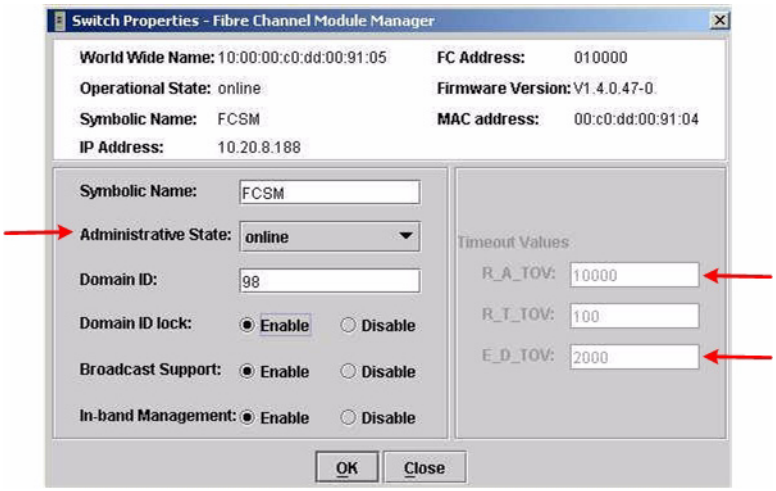
Intel Fibre Channel Module Manager GUI

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

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Switch** menu, select **Switch Properties**.



3. From the **Switch Properties—Fibre Channel Module 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—Fibre Channel Module Manager** dialog box **Administrative State** list, select **offline**. Click **OK**.
5. Re-enter the **Switch Properties—Fibre Channel Module Manager** 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—Fibre Channel Module Manager** dialog box (see step 2). In the **Administrative State** list, select **Online**. Click **OK**.

Intel Fibre Channel Switch Module CLI

NOTE: Use the CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> 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.

```
Intel FCSW #> admin start
Intel FCSW (admin) #> config edit
Intel FCSW (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]
Intel FCSW (admin-config) #> config save
Intel FCSW (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

Principal Switch Configuration

Sun switches and Intel Server Fibre Channel Switches 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

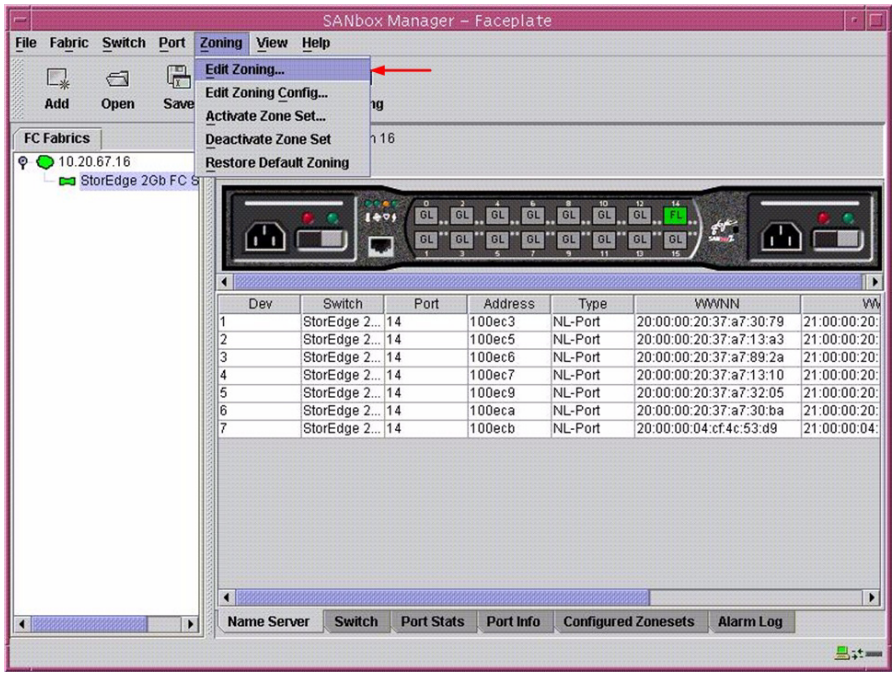
The Zone and Zone Set names on each switch must be unique. If not, change one of the duplicate names. All Zone Set and Zone names must conform to the Fibre Channel (FC) Standards for Zone Naming (ANSI T11/00-427v3):

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.

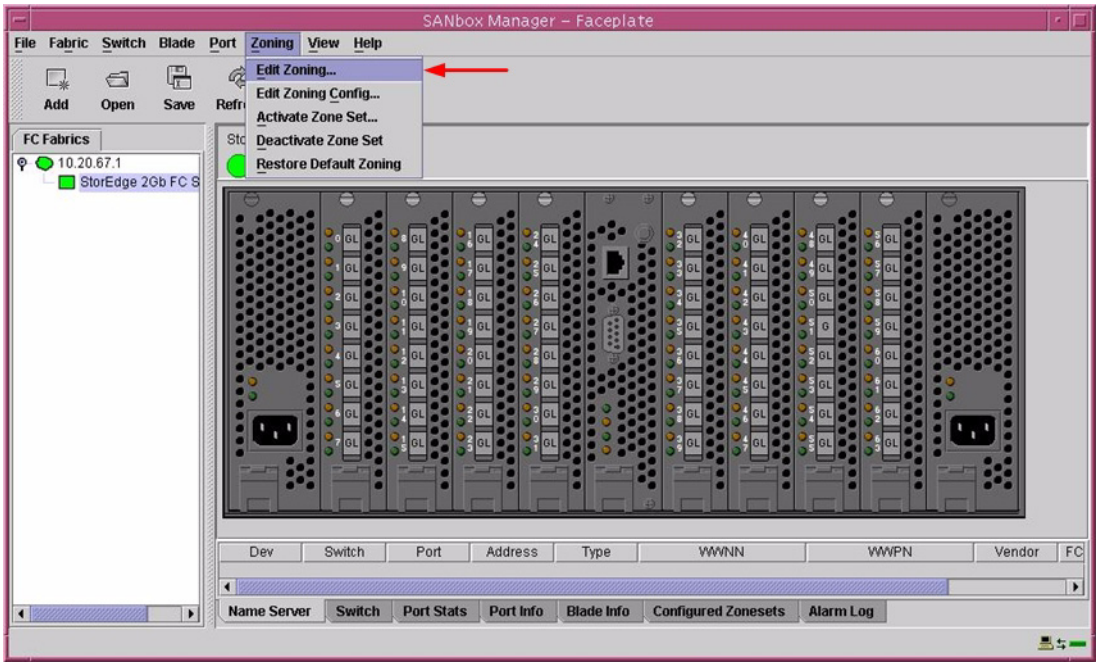
Sun StorEdge SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:

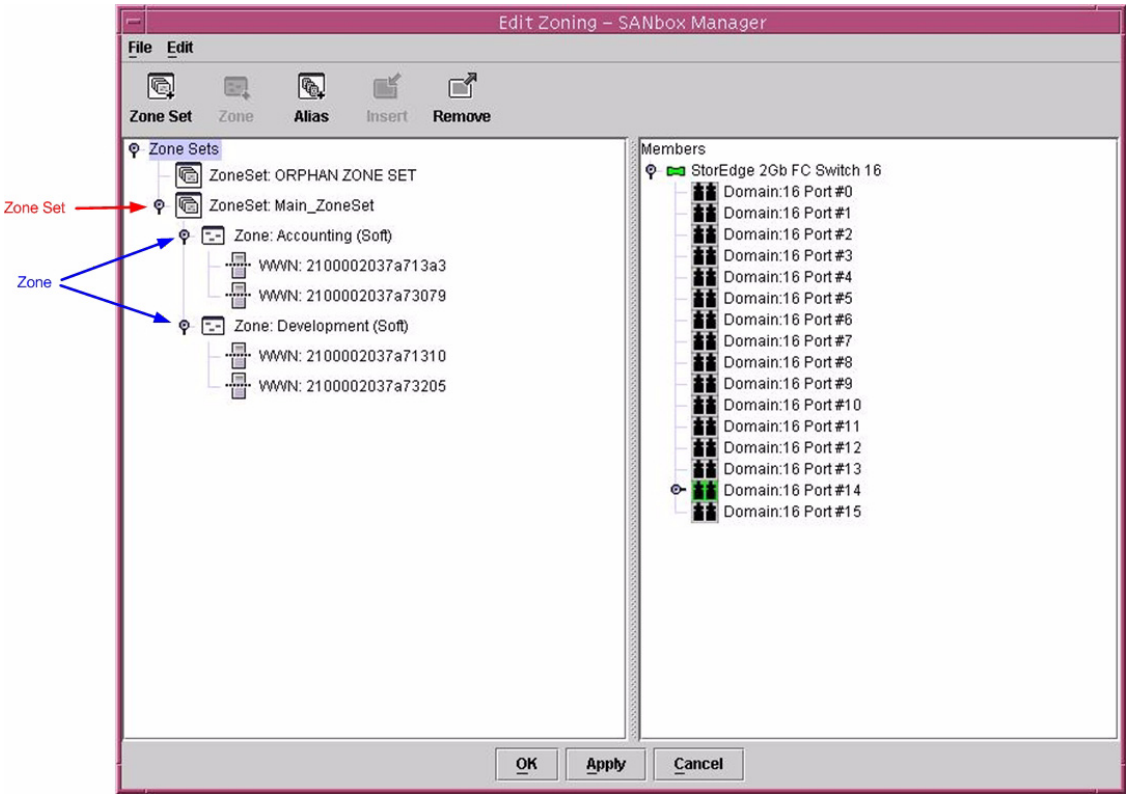


For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:

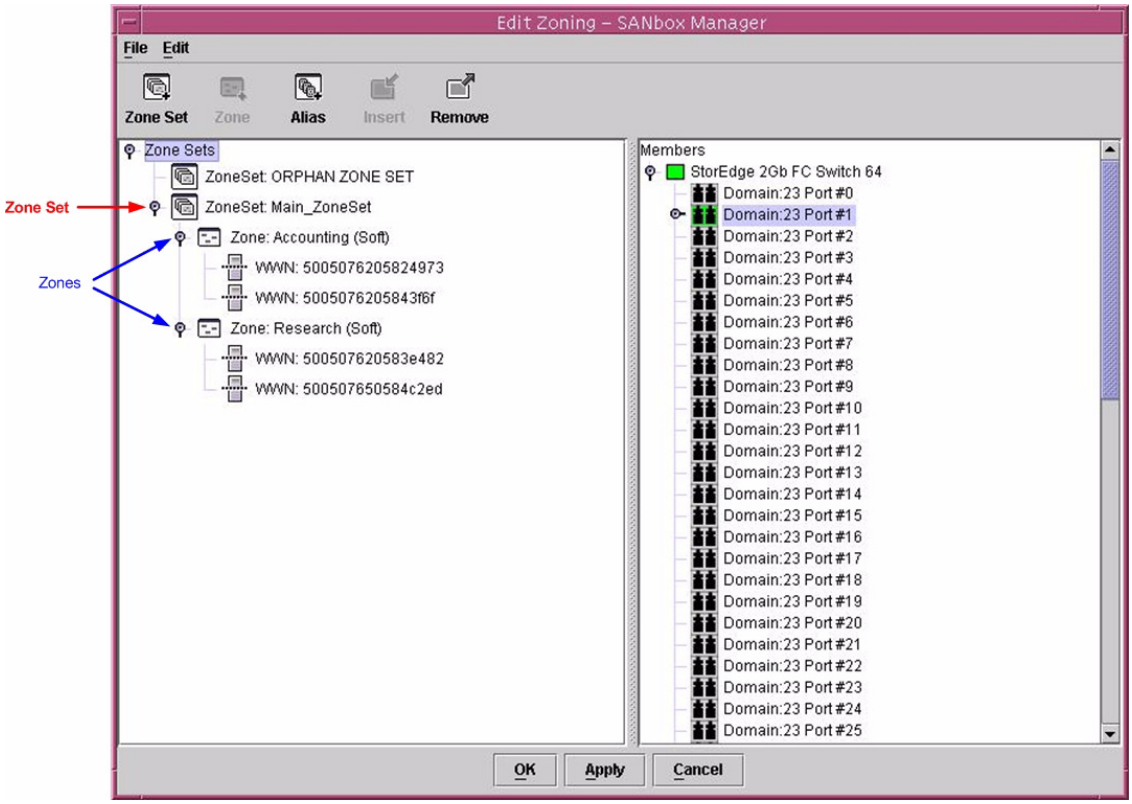


3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 260.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:



For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:



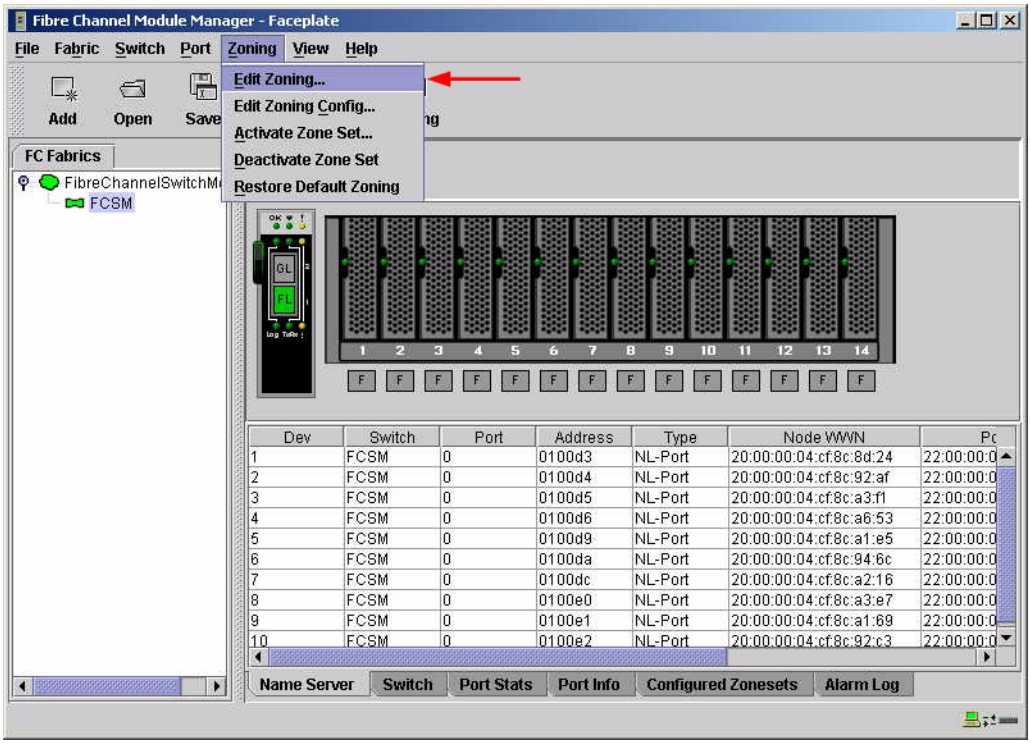
Sun StorEdge CLI

NOTE: Use the CLI commands when the Sun StorEdge SANbox Manager GUI is not available. The procedures are the same for the Sun StorEdge Network 2 Gb FC Switch-8, Sun StorEdge Network 2 Gb FC Switch-16, and Sun StorEdge Network 2 Gb FC Switch-64.

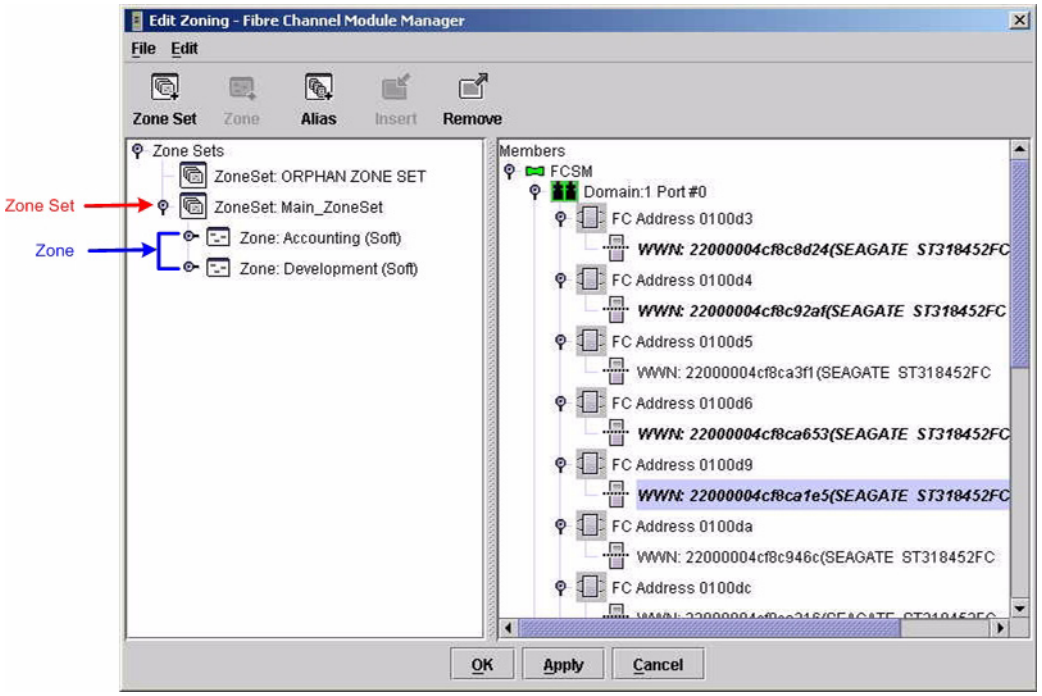
```
Login: admin
Password: xxxxxxxx
StorEdge 2Gb FC Switch 16 #> zone list
```

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. From the **Edit Zoning—Fibre Channel Module Manager** 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 260.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone list
```

Zone Types

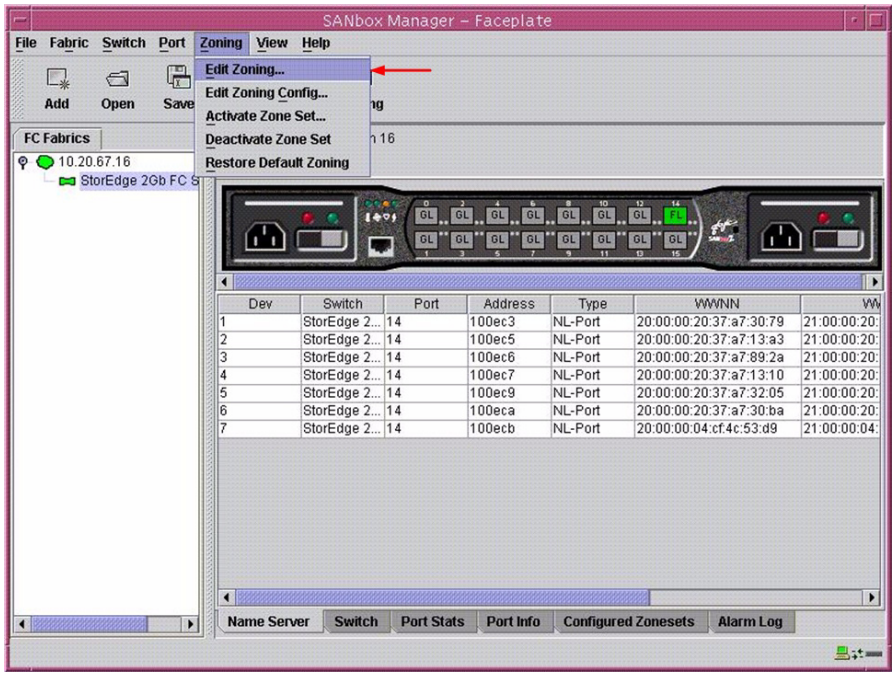
All zone members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

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

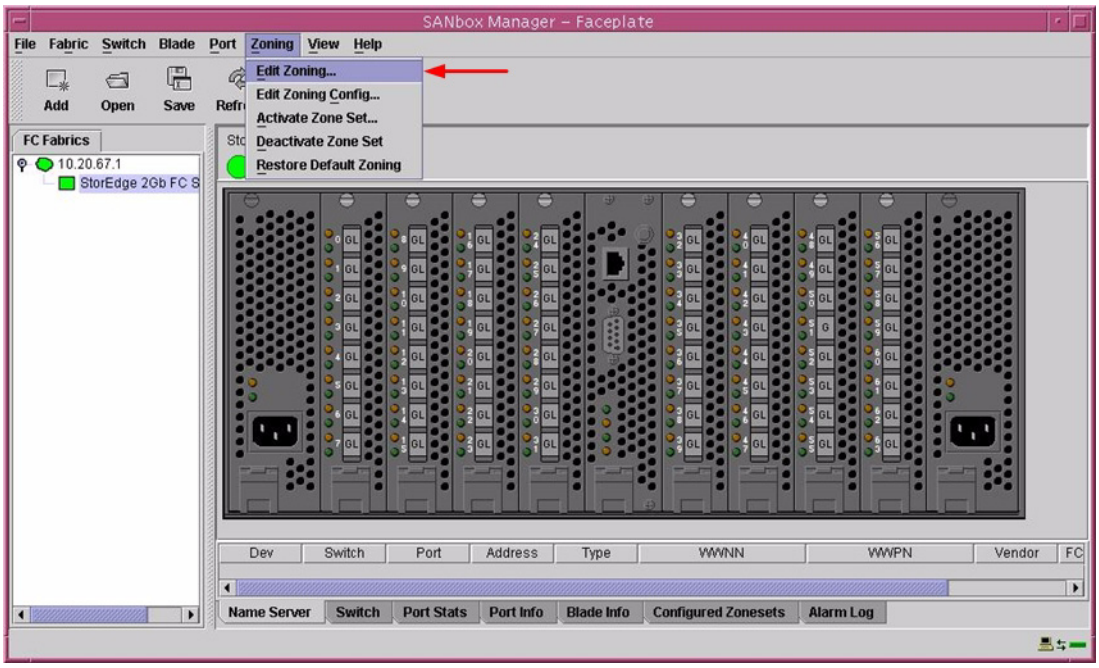
Sun StorEdge SANbox Manager GUI

1. Start the SANbox Manager application. The **SANbox Manager—Faceplate** dialog box displays.
2. From the **SANbox Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:

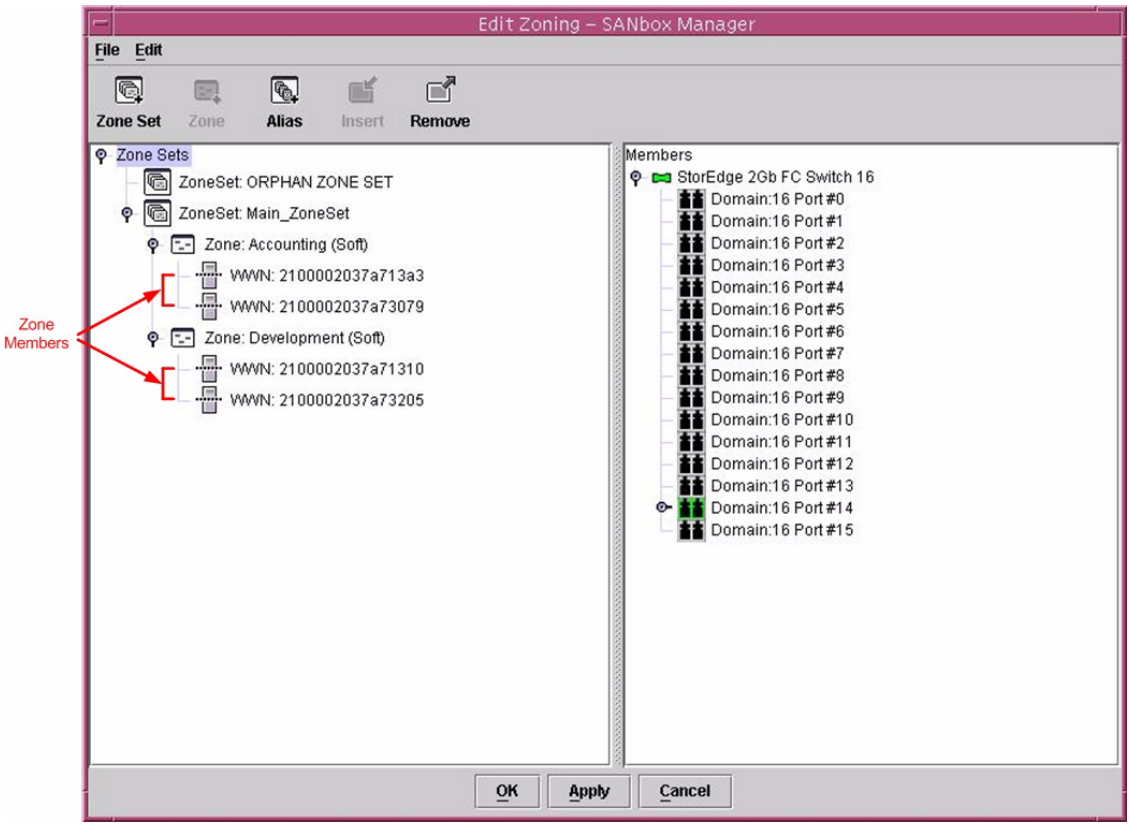


For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:

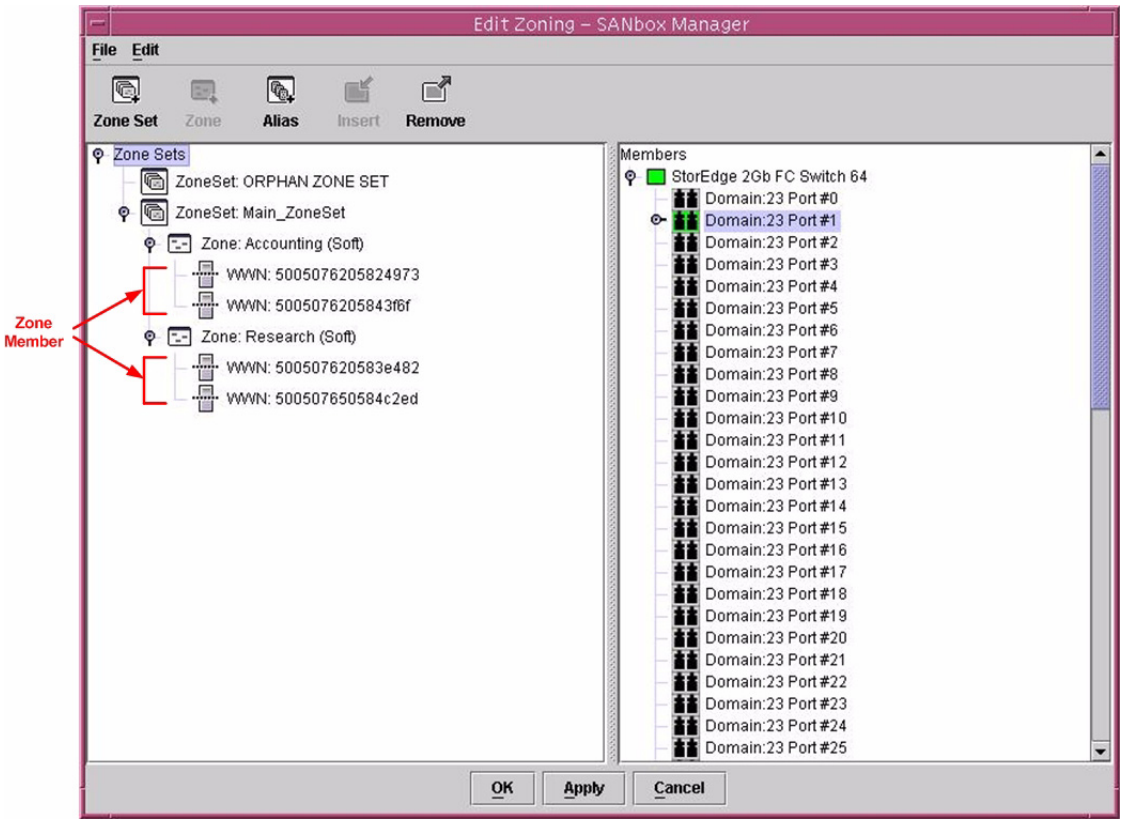


3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, the following displays:



For the Sun StorEdge Network 2 Gb FC Switch-64, the following displays:



Sun StorEdge CLI

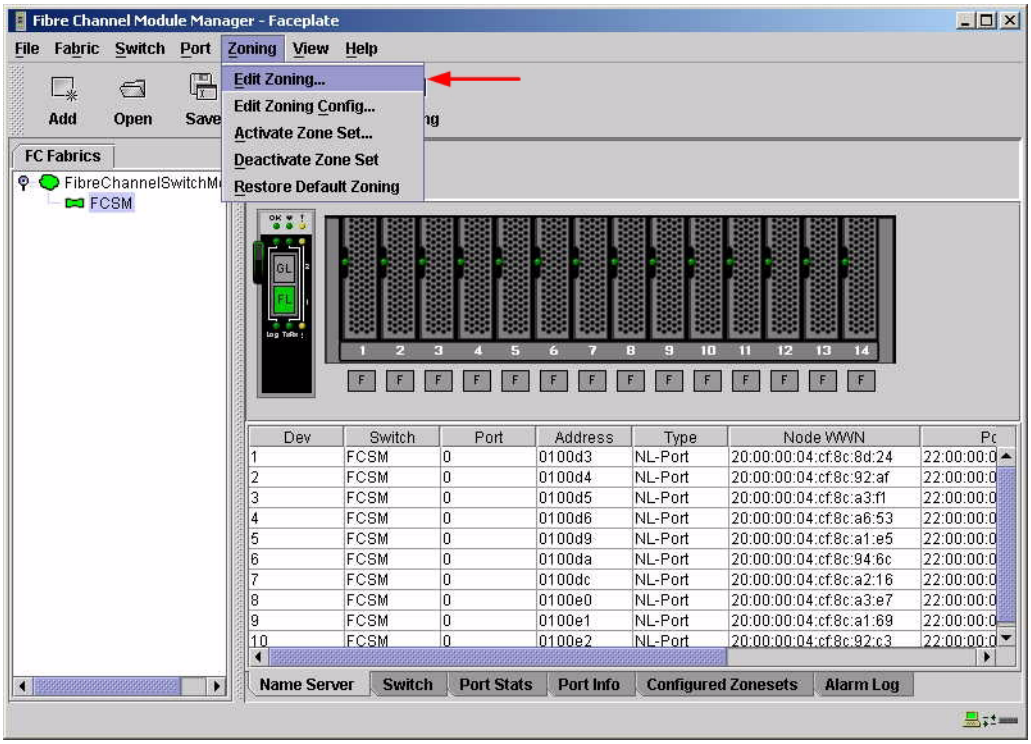
NOTE: Use the CLI commands when the Sun StorEdge SANbox Manager GUI is not available. The procedures are the same for the Sun StorEdge Network 2 Gb FC Switch-8, Sun StorEdge Network 2 Gb FC Switch-16, and Sun StorEdge Network 2 Gb FC Switch-64.

```
Login: admin
Password: xxxxxxxx
StorEdge 2Gb FC Switch 16 #> zone list <zone name>
```

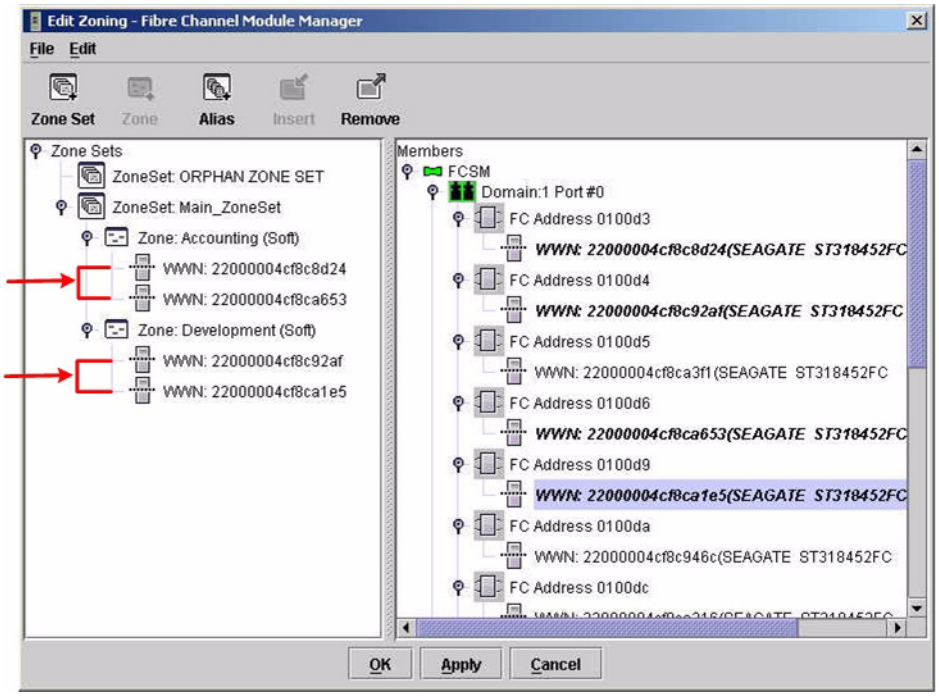
Confirm that only WWNs are listed.

Intel Fibre Channel Module Manager GUI

1. Start the Intel Fibre Channel Module Manager GUI. The **Fibre Channel Module Manager—Faceplate** dialog box displays.
2. From the **Fibre Channel Module Manager—Faceplate** dialog box **Zoning** menu, select **Edit Zoning**.



3. The **Edit Zoning—Fibre Channel Module Manager** dialog box displays. Confirm that all zone members are listed as WWN.



Intel Fibre Channel Switch Module CLI

NOTE: Use the following CLI commands when the Intel Fibre Channel Module Manager GUI is not available.

```
Login: admin
Password: xxxxxxxx
Intel FCSW #> zone members <zone name>
```

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

Operating Mode Configuration

Not applicable.

Sun StorEdge Specific Configuration

Not applicable.

Intel 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 Sun and Intel 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 Intel support.

Glossary

Activity LED

A port LED that indicates when frames are entering or leaving the port.

Alias

A collection of objects that can be zoned together. An alias is not a zone, and can not have a zone or another alias as a member.

ALFairness

On an arbitrated loop, the switch is always highest priority when arbitrating for the right to transfer. To prevent other devices from being locked out, the standard provides for a fairness mode, which if enabled, requires an arbitrator to let all other devices win arbitration before arbing a second time.

AL PA

Arbitrated loop physical address

ANSI

American National Standards Institute

API

Application programming interface

Arbitrated Loop

A Fibre Channel topology where ports use arbitration to establish a point-to-point circuit.

Arbitrated Loop Physical Address (AL PA)

A unique one-byte valid value assigned during loop initialization to each NL port on a loop.

ARB FF

When ARB_FF is enabled, it causes the switch to send the ARB_FF primitive when it is in monitoring mode, rather than idles. The only reason to do this is since the ARB FF has less bit transitions than does an idle, it produces less EMI. It has no other effect.

ASIC

Application specific integrated circuit

BootP

A type of network server.

Buffer Credit

A measure of port buffer capacity equal to one frame.

Class 2 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports with acknowledgment provided.

Class 3 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports without acknowledgment.

CLI

Command line interface

Domain ID

User defined name that identifies the switch in the fabric.

E_D_TOV

Error-detect timeout value

E-Port

Expansion port. A switch port that connects to another FC-SW-2 compliant switch.

Expansion Port

See E-Port.

ExtCredit

Allows full speed operation over distances greater than 10 kilometers. Additional credit buffers are borrowed from other ports (which must be set to donor state). Decimal value 0–65535.

Fabric Management Switch

The switch through which the fabric is managed.

Fabric Name

User-defined name associated with the file that contains user list data for the fabric.

FSPF

Fabric shortest path first

Fan Fail LED

An LED that indicates that a cooling fan in the switch is operating below standard.

FC-PLDA

Fibre Channel-private loop direct attach

FC-SW-2

Fibre Channel switch fabric 2. For detailed information, see the **Introduction** on page 1.

Flash Memory

Memory on the switch that contains the chassis control firmware.

Frame

Data unit consisting of a start-of-frame (SOF) delimiter, header, data payload, CRC, and an end-of-frame (EOF) delimiter.

FRU

Field replaceable unit

GUI

Graphical user interface

Heartbeat LED

A chassis LED that indicates the status of the internal switch processor and the results of the power-on self-test.

Initiator

The device that initiates a data exchange with a target device.

In-Order-Delivery

A feature that requires that frames be received in the same order in which they were sent.

Input Power LED

A chassis LED that indicates that the switch logic circuitry is receiving proper DC voltages.

InteropCredit

This variable determines the number of credits we will advertise on an ISL. Older versions of Brocade software required that we match their offering. Decimal value is 0–255.

IP

Internet protocol

ISLSecurity

ISLSecurity determines which switches a port will establish a link with. Any: we will link with any switch. Ours: we will only link to another QLogic switch. None: the port will not establish an ISL link.

LCFEnable

LCFEable gives preference to link control frames (such as class 2 ACK frames) over other frames, when queued for transmission in the switch. This may provide better performance when running Class 2 traffic. LCFEable is incompatible with MFSEnable, and both cannot be selected.

LIP

Loop initialization primitive sequence

Logged-in LED

A port LED that indicates device login or loop initialization status.

Management Information Base

A set of guidelines and definitions for the Fibre Channel functions.

Management Workstation

PC workstation that manages the fabric through the fabric management switch.

MIB

Management information base

MSEnable

Determines whether GS-3 management server commands will be accepted on the port. It can be used to prevent in-band management of the switch on any or all ports.

NL_Port

Node Loop Port. A Fibre Channel device port that supports arbitrated loop protocol.

N _Port

Node Port. A Fibre Channel device port in a point-to-point or fabric connection.

NoClose

Causes the switch to keep the loop open, if no other device is arbitrating. It is intended to improve performance when there is a single L_Port device connected to the switch.

Output Power LED

A power supply LED that indicates that the power supply is providing DC voltage to the switch

Over Temperature LED

A chassis LED or a power supply LED that indicates that the switch or power supply is overheating.

POST

Power-on self-test

Power-On Self-Test

Diagnostics that the switch chassis performs at start up.

Principal Switch

A switch that has been selected to perform certain fabric configuration duties.

Private Device

A device that can communicate only with other devices on the same loop.

Private Loop

A loop of private devices connected to a single switch port.

pwwn

Port world wide name. See World Wide Port Name.

R_A_TOV

Resource-allocation timeout value

SAN

Storage area network

SANbox Manager

Switch management application

SFF

Small form-factor transceiver

SFP

Small form-factor pluggable. A transceiver device, smaller than a gigabit interface converter, that plugs into the Fibre Channel port.

Small Form Factor

A transceiver device, smaller than a gigabit interface converter, that is permanently attached to the circuit board.

Small Form-Factor Pluggable

A transceiver device, smaller than a gigabit interface converter, that plugs into the Fibre Channel port.

SNMP

Simple network management protocol

Target

A storage device that responds to an initiator device.

Timeout Values

The timeout values (TOV) required by the FC-SW-2 standard to successfully establish an E-port connection.

TOV

Timeout values. The timeout values required by the FC-SW-2 standard to successfully establish an E-port connection.

VCCI

Voluntary control council for interference

VIEnable

Diagnostics that the switch chassis performs at start up.

World Wide Name (WWN)

A unique 64-bit address assigned to a device. The WWN consists of a world wide node name and a world wide port name.

World Wide Node Name (WWNN)

A unique address assigned to a device.

World Wide Port Name (WWPN)

A unique address assigned to a port on a device. There can be more than one WWPN per WWNN.

WWN

World wide name

WWNN

World wide node name

WWPN

World wide port name

Zone

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

Zone Set

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

Index

M

O

P

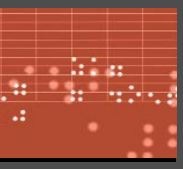
Q

S

T

U

Z



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