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Version 1.0

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Introduction

The *QLogic 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 QLogic switches into existing Brocade, Cisco, IBM, INRANGE, McDATA, and Sun Fibre Channel switched fabrics that comply with the second revision of the Fibre Channel switch standard (FC-SW-2).

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.

QLogic switches, along with switches from Brocade, Cisco, IBM, INRANGE, McDATA, 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.

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard.

QLogic Supported Switch and Firmware Versions

Switch Model	Firmware Version
SANbox2-8 Switch	1.3.x and above
SANbox2-16 Switch	1.3.x and above
SANbox2-64 Switch	1.5.x and above

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

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

Manufacturer	Switch Model	Firmware Version
Brocade (see page 7)	SilkWorm 3200 Switch	3.0.2g and above
	SilkWorm 3800 Switch	3.0.2g and above
	SilkWorm 3900 Switch	4.0.2c and above
	SilkWorm 12000 Switch	4.0.2c and above
Cisco (see page 71)	SN 5428 Storage Router	2.3.1-k9 or 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 119)	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above
INRANGE (see page 147)	FC/9000 Switch	Code set 3.0.3.2 or above
McDATA (see page 181)	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
Sun (see page 261)	Sun StorEdge Network 2 Gb FC Switch-8	1.3.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.3.x and above

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How to Use this Guide

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

NOTE: Updated versions of this guide can be downloaded from the following QLogic Web site: http://www.qlogic.com/interopguide.

All chapters within the *QLogic 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 QLogic switches.
- **Supported Switches and Firmware Versions.** The supported switches and firmware versions for which this information applies.
- For the vendor switch and the QLogic 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 QLogic 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 293) for terms used in this guide, the **Index** (see page 299) for quick reference to key topics, and **Contacting QLogic** (see page 305) for QLogic locations, programs, sales, and technical support.

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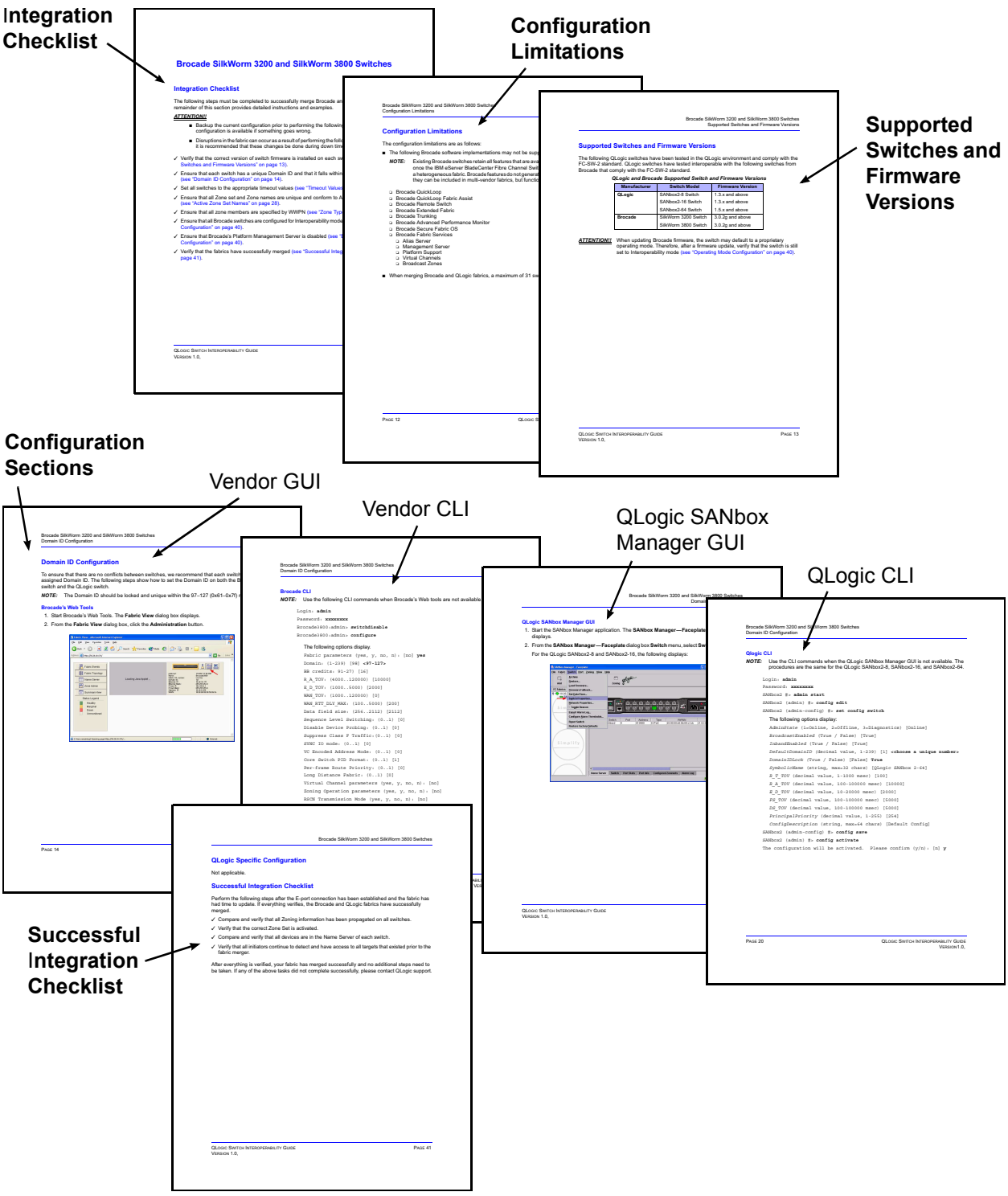
Visual Representation of How the Chapters Are Organized



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Merging QLogic and Brocade Fabrics

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

QLogic and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Brocade	SilkWorm 3200 Switch	3.0.2g and above
	SilkWorm 3800 Switch	3.0.2g and above
	SilkWorm 3900 Switch	4.0.2c and above
	SilkWorm 12000 Switch	4.0.2c and above

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

- **Brocade SilkWorm 3200 and SilkWorm 3800 Switches** **(see page 9)**
- **Brocade SilkWorm 3900 and SilkWorm 12000 Switches** **(see page 39)**

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Brocade SilkWorm 3200 and SilkWorm 3800 Switches

Integration Checklist

The following steps must be completed to successfully merge Brocade and QLogic 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 18).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 25).

✓ Ensure that all zone members are specified by WWPN (see "Zone Types" on page 31).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see "Operating Mode Configuration" on page 37).

✓ Ensure that Brocade's Platform Management Server is disabled (see "Brocade Specific Configuration" on page 37).

✓ Verify that the fabrics have successfully merged (see "Successful Integration Checklist" on page 38).

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Configuration Limitations

The configuration limitations are as follows:

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

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

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

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

Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

QLogic and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Brocade	SilkWorm 3200 Switch	3.0.2g and above
	SilkWorm 3800 Switch	3.0.2g 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 37).

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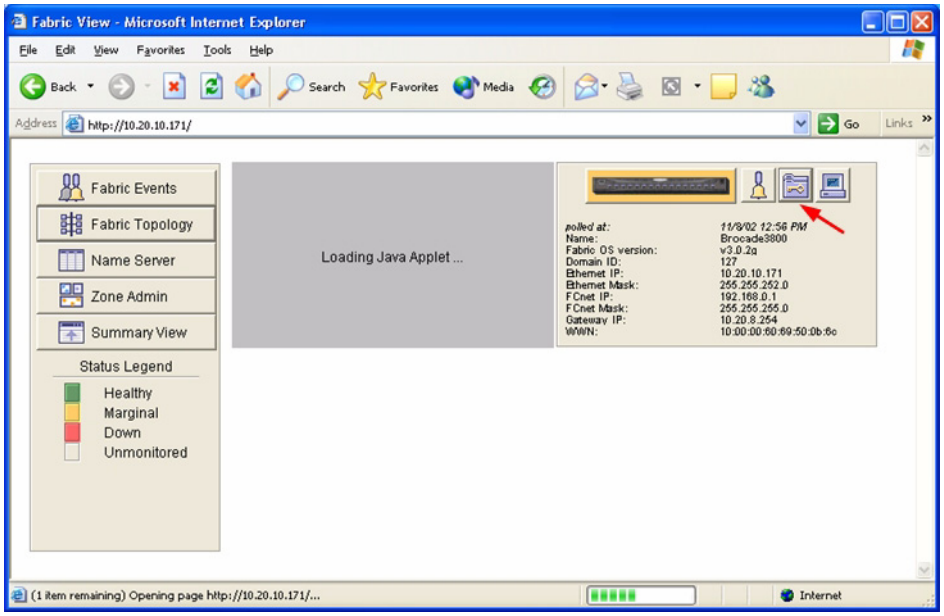
Domain ID Configuration

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 QLogic 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.



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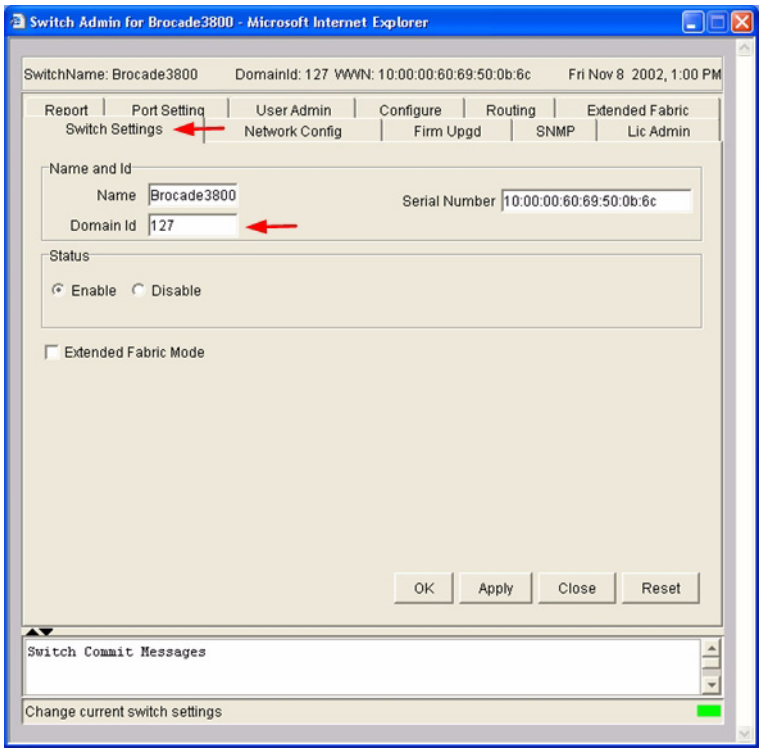
3. From the **Switch Admin for Brocade** dialog box, select the **Switch Settings** tab. Do the following:
   a. In the **Domain ID** field, type or edit the Domain ID as appropriate.
   b. Click **OK**.



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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
```


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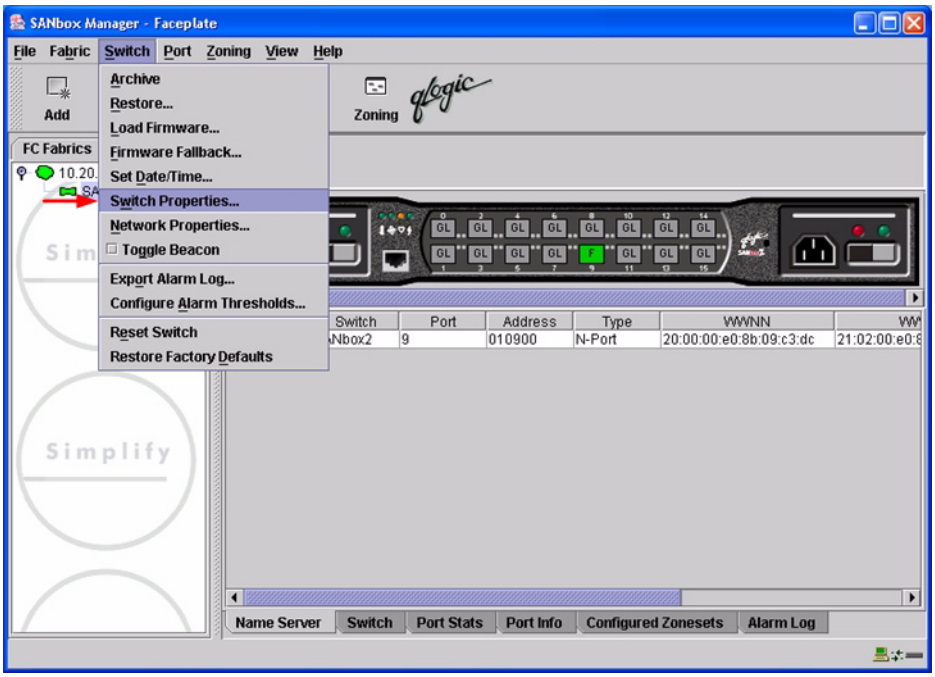
QLogic SANbox Manager GUI

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:



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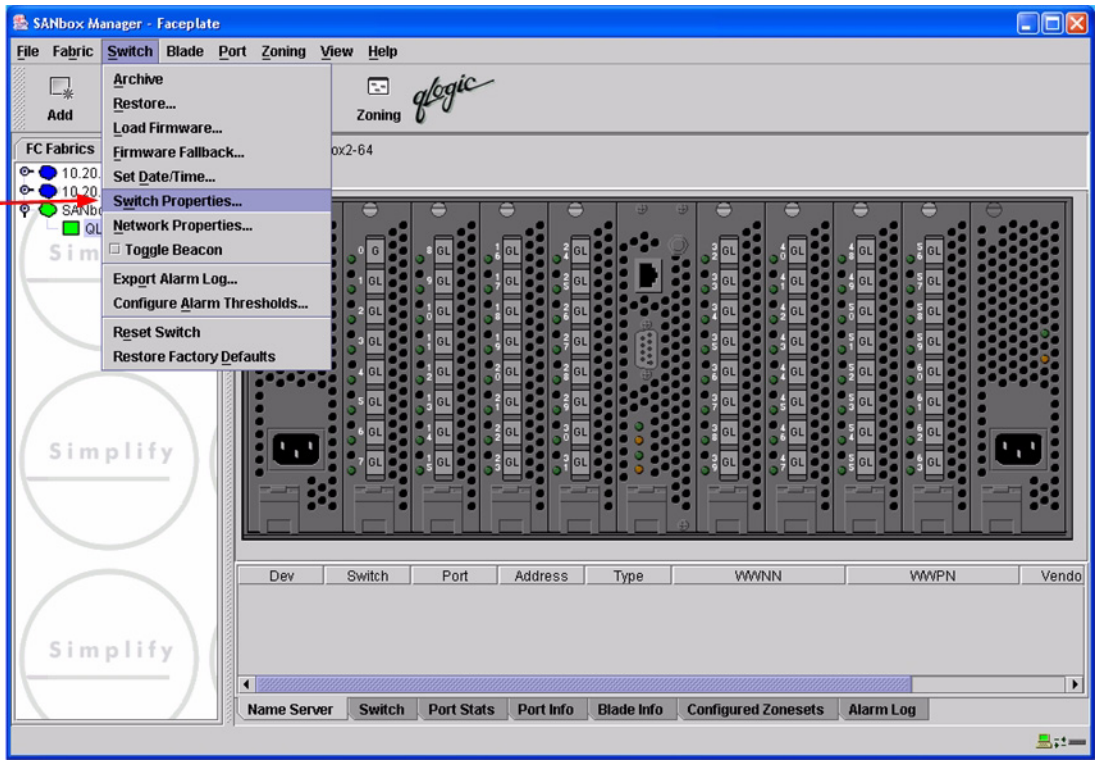
For the QLogic SANbox2-64, the following displays:



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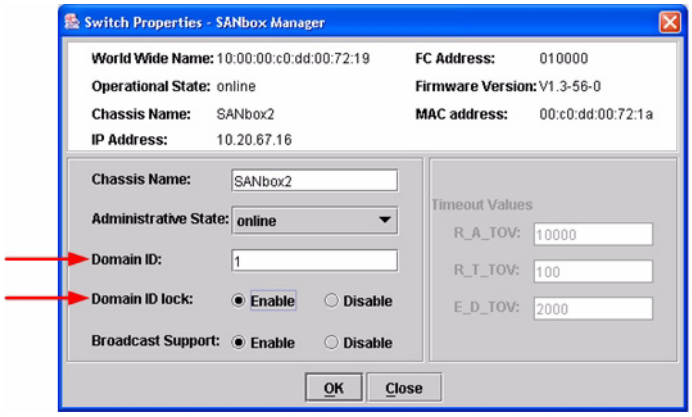
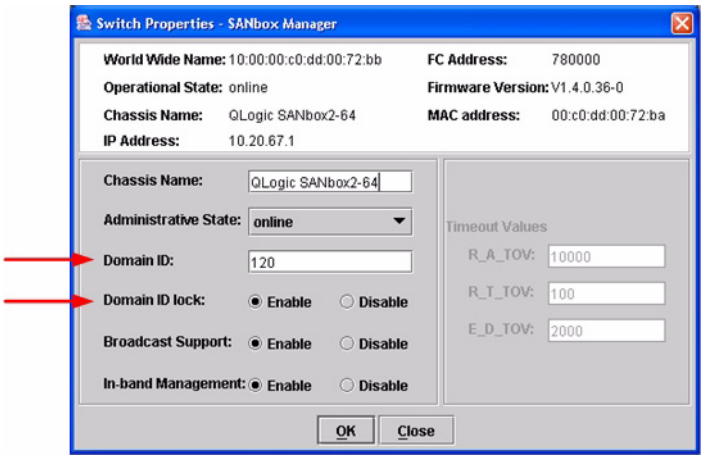
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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:

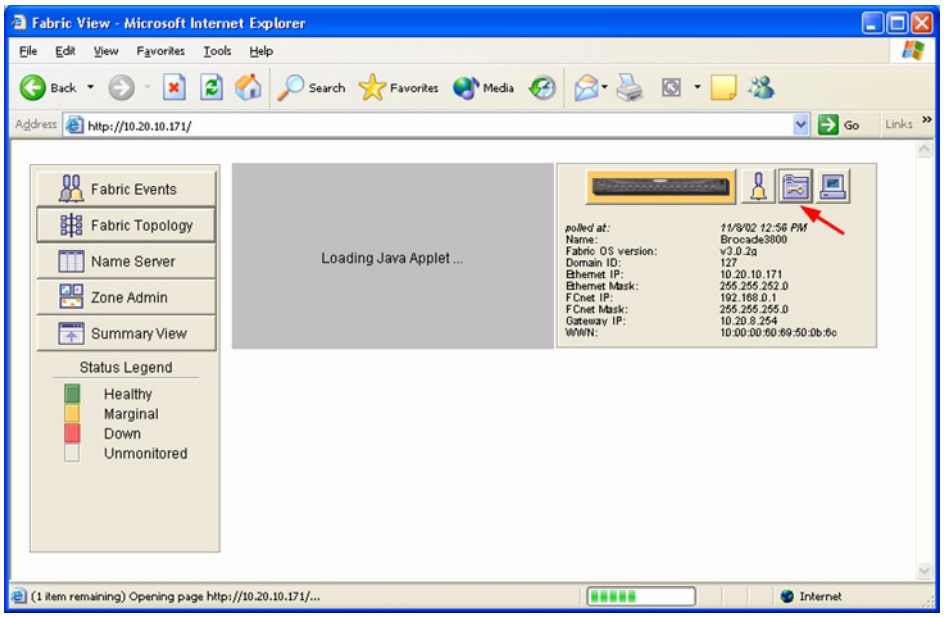
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

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.



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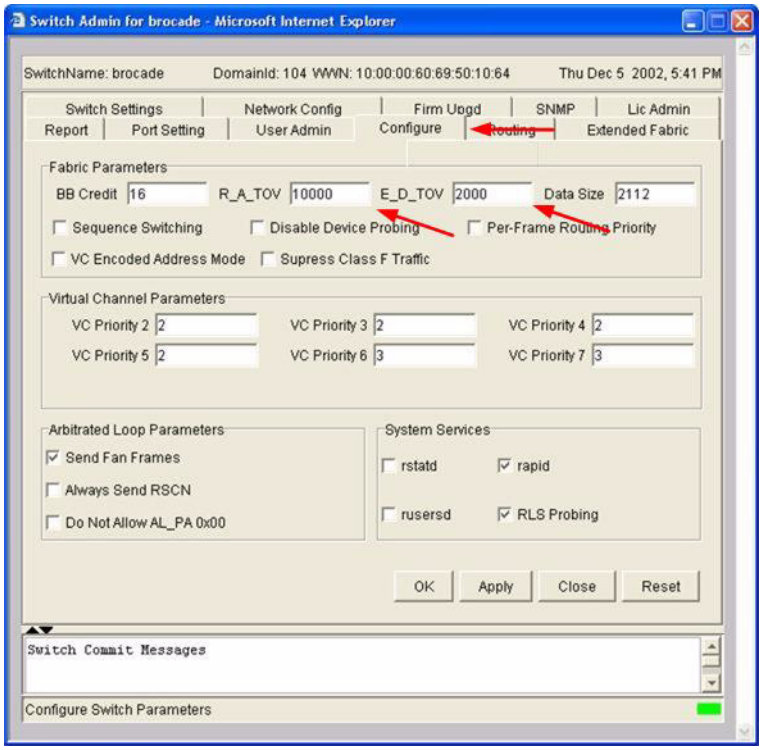
3. From the **Switch Admin for Brocade** dialog box, select the **Configure** tab. Verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV**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



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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
```


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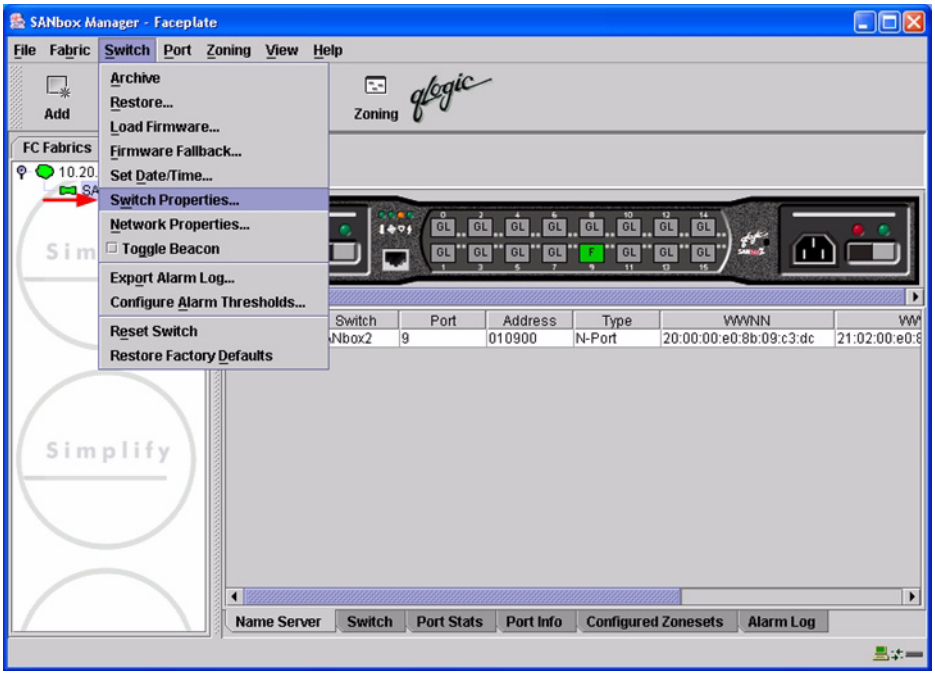
QLogic SANbox Manager GUI

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:



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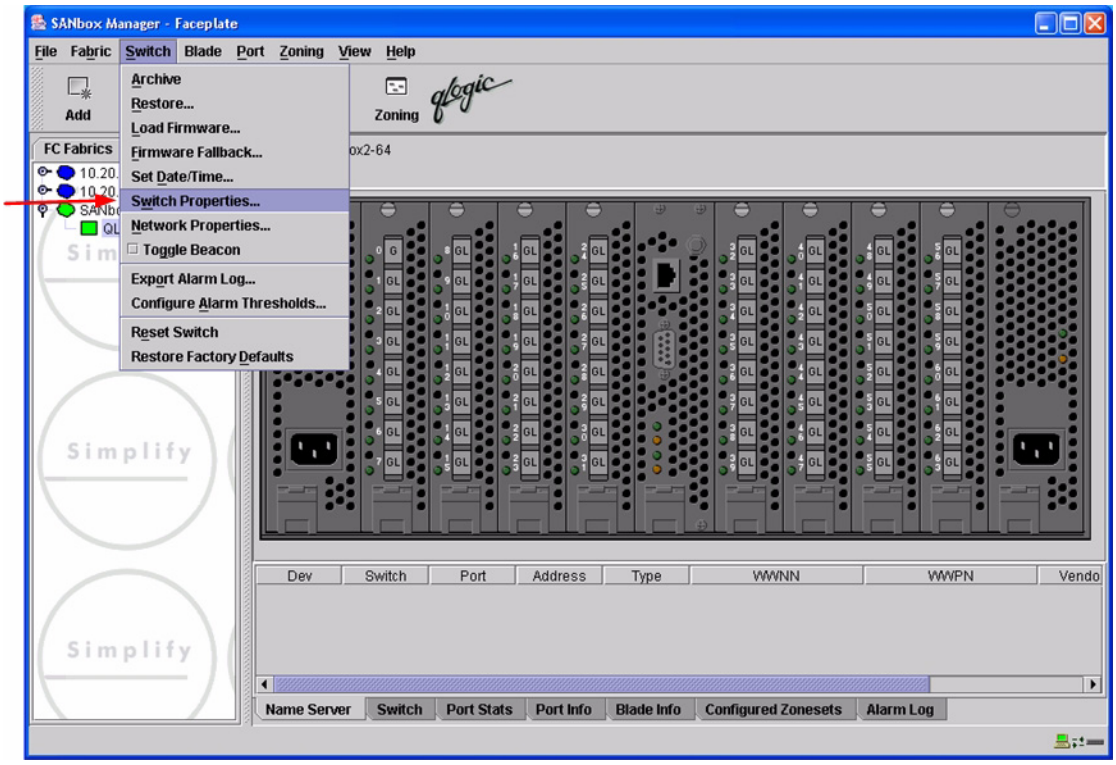
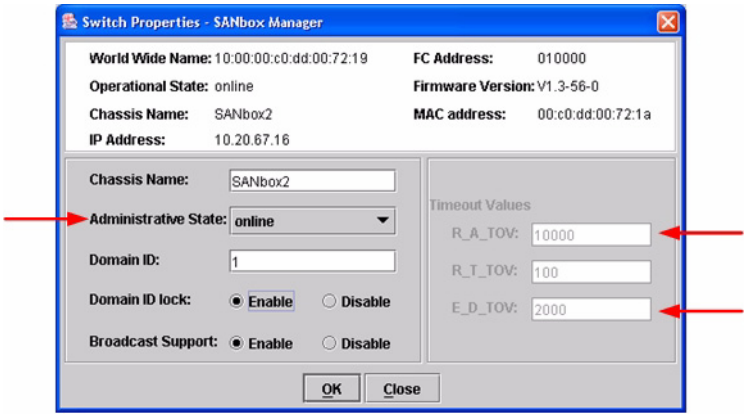
For the QLogic SANbox2-64, the following displays:



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:



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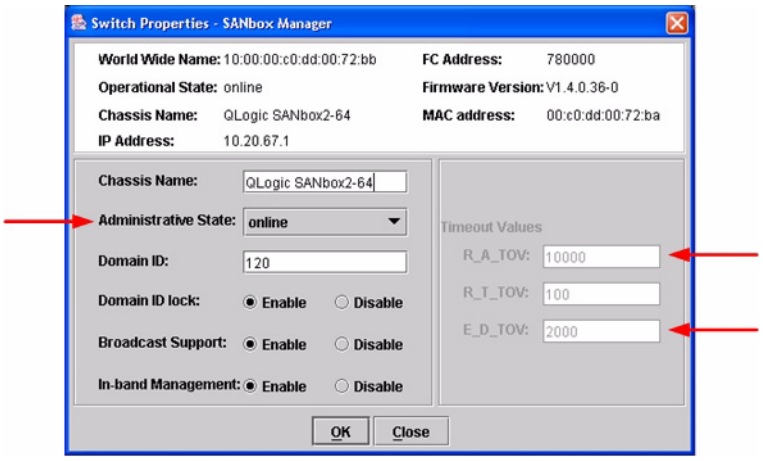
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

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

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Zone Configuration

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

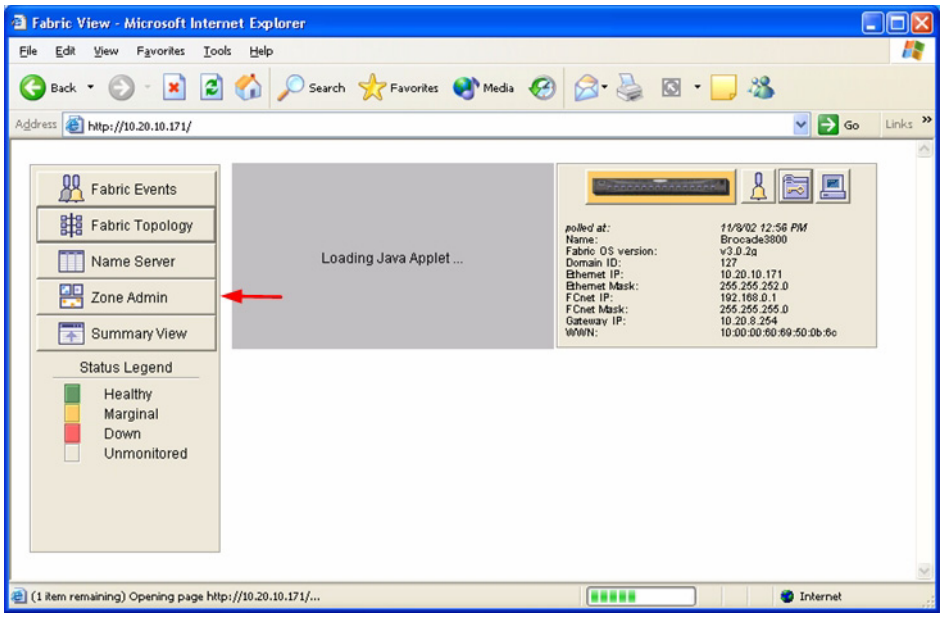
Active Zone Set Names

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.



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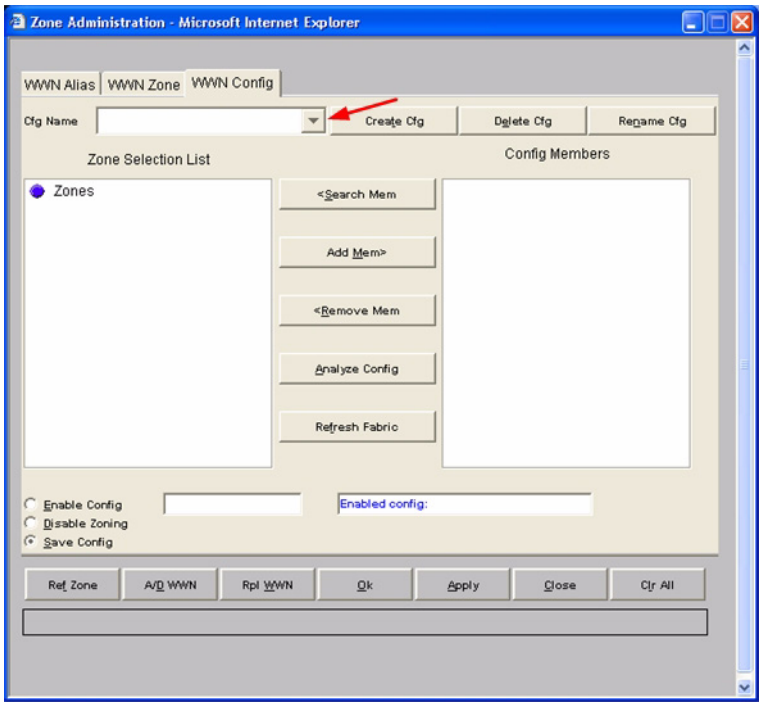
3. From the **Zone Administration** dialog box, select the **WWN Config** tab. Verify that all config names conform to the standards discussed under “Active Zone Set Names” and are unique between the switches.



Brocade CLI

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

```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> cfgshow
```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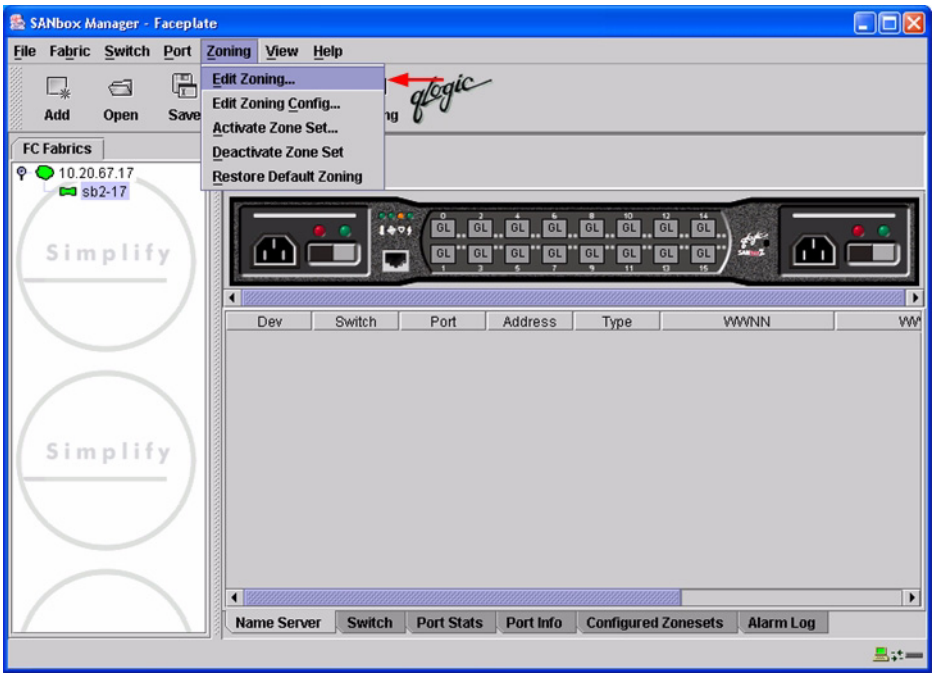
QLogic SANbox Manager GUI

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:



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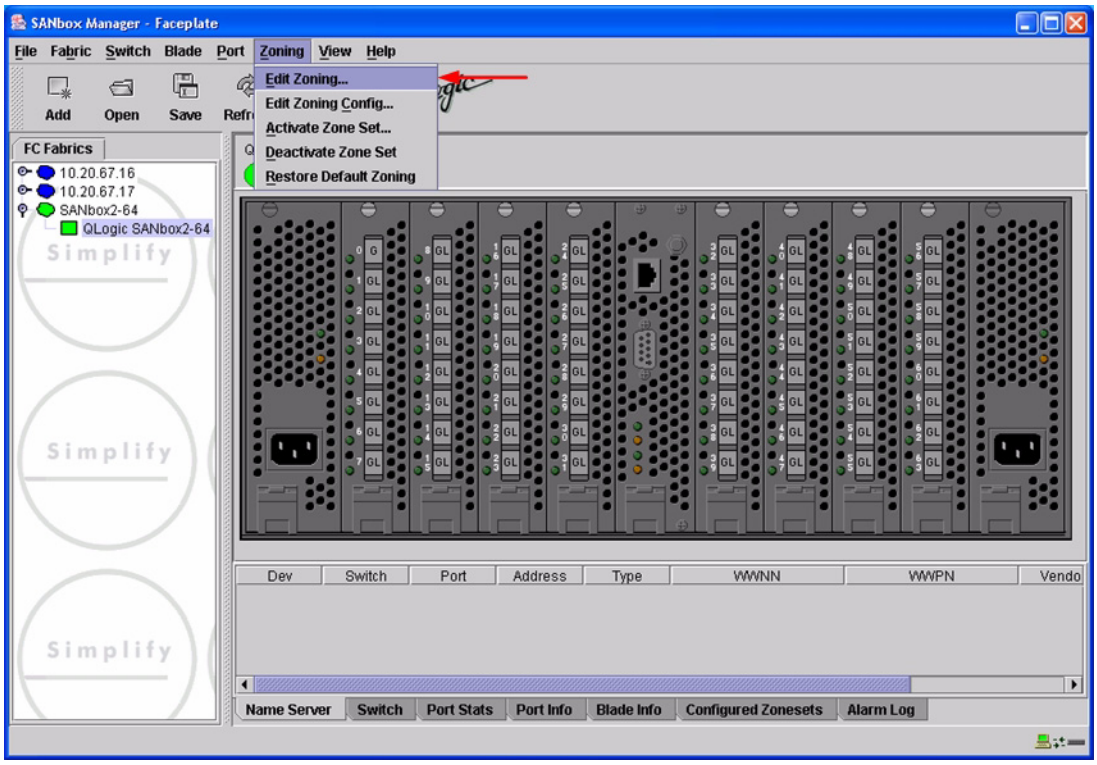
For the QLogic SANbox2-64, the following displays:



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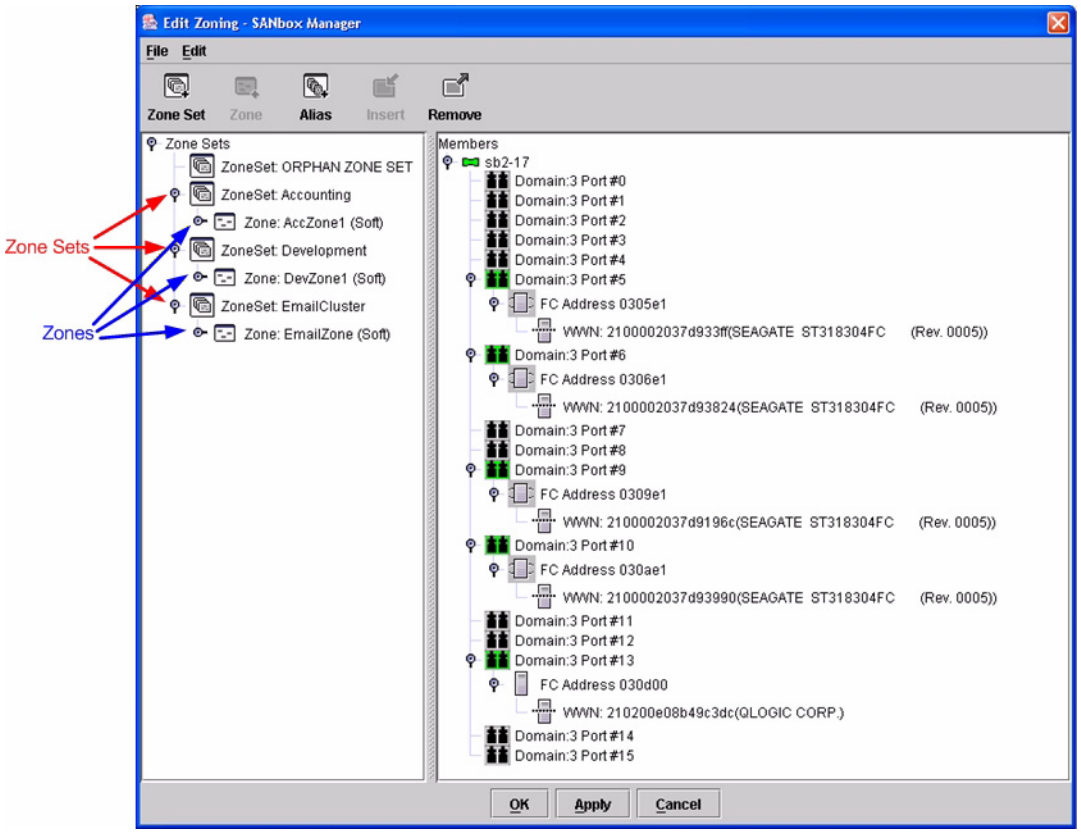
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 25.

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



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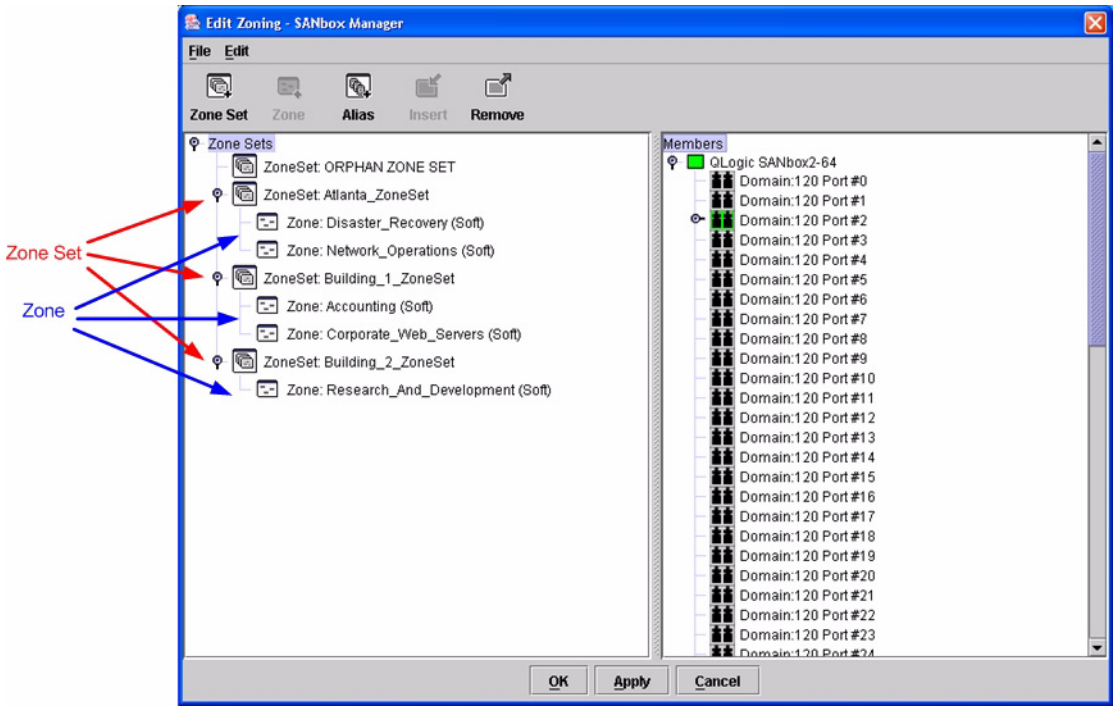
For the QLogic SANbox2-64, the following displays:



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
```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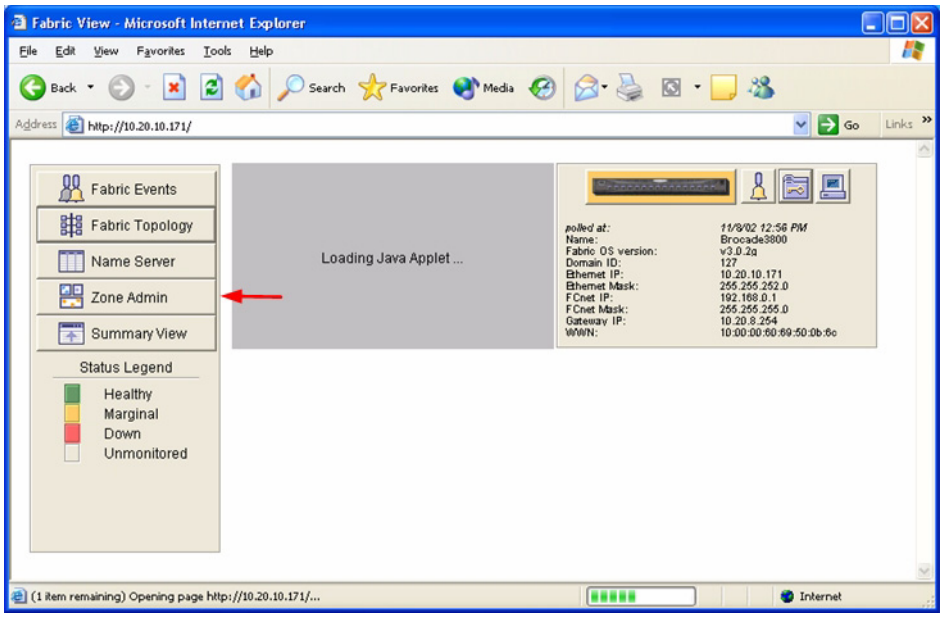
Zone Types

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.



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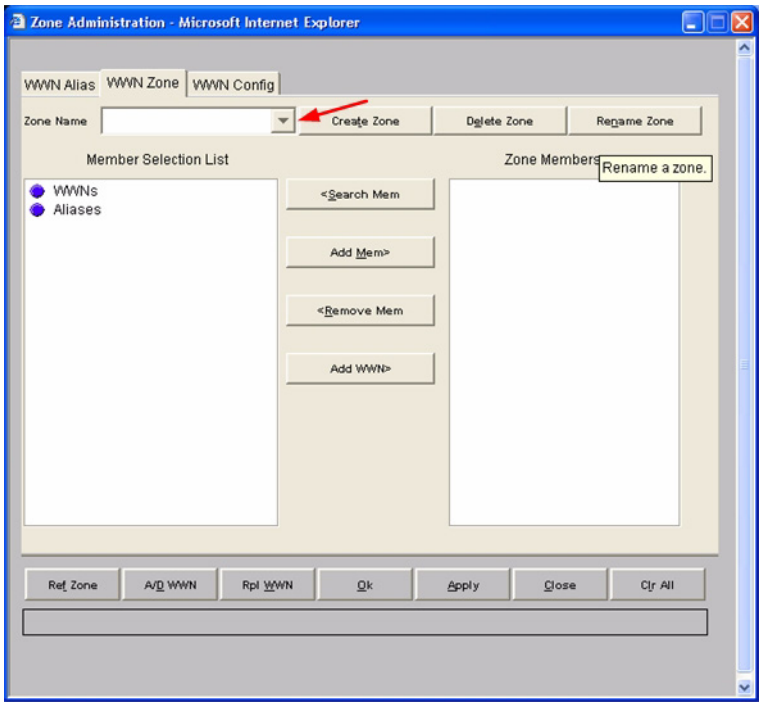
3. From the **Zone Administration** dialog box, select the **WWN Zone** tab. Verify that all zone names conform to the standards discussed under “Active Zone Set Names” and are unique between the switches.



Brocade CLI

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

```
Login: admin
Password: xxxxxxxx
Brocade3800:admin> zoneshow
```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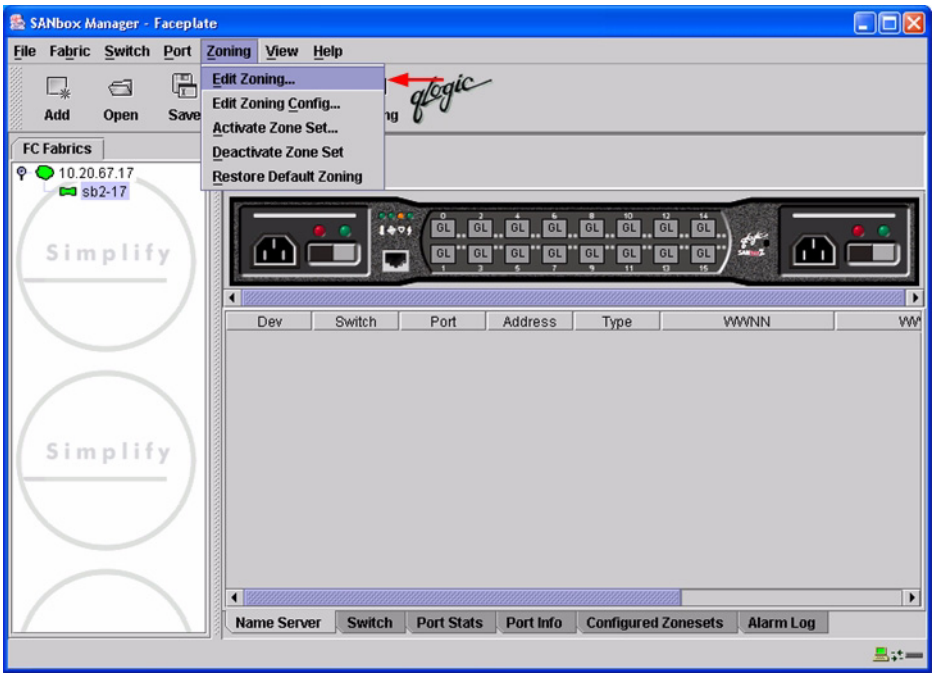
QLogic SANbox Manager GUI

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:



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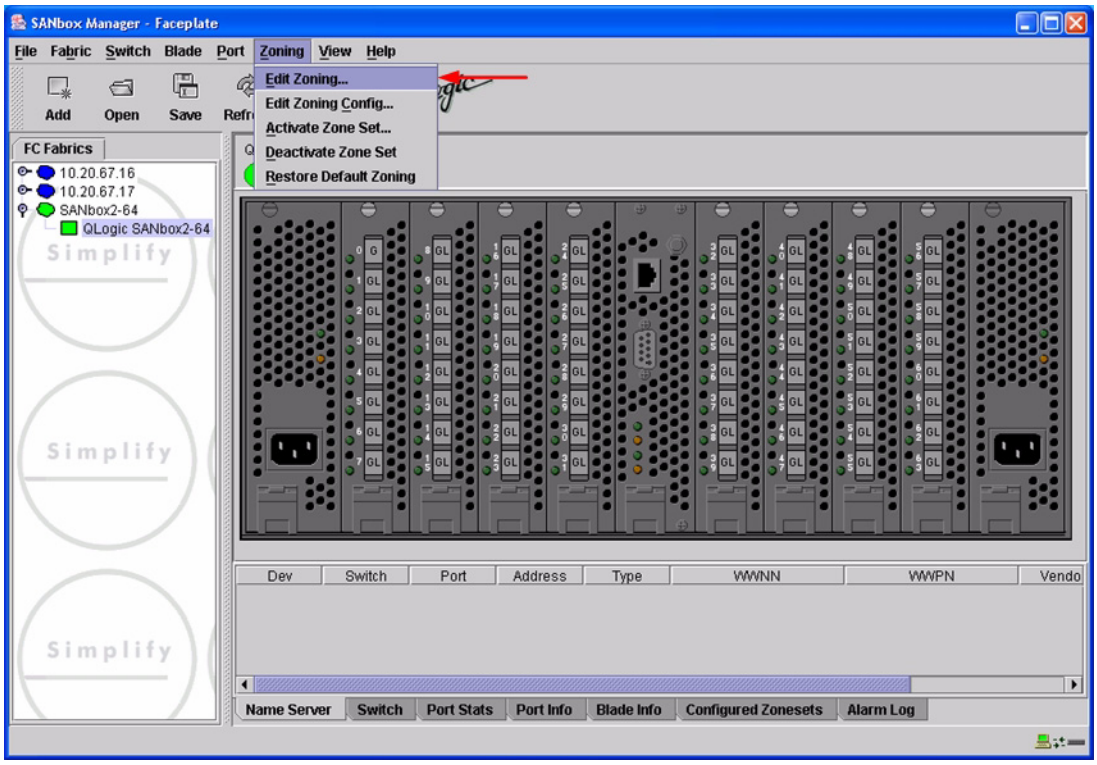
For the QLogic SANbox2-64, the following displays:



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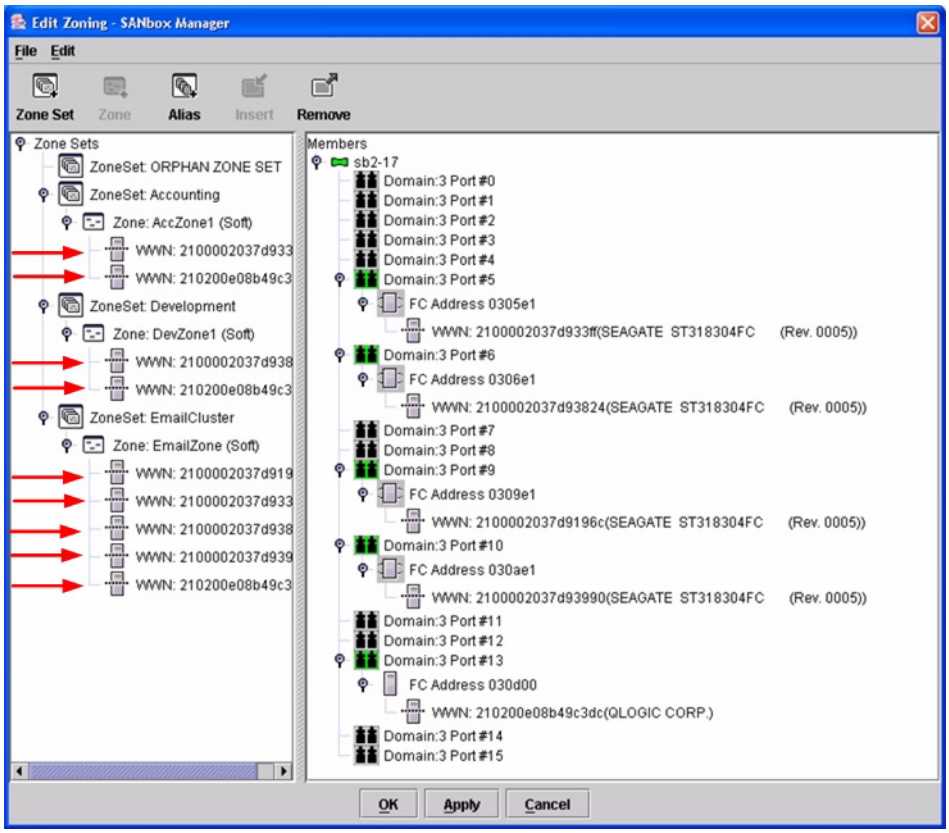
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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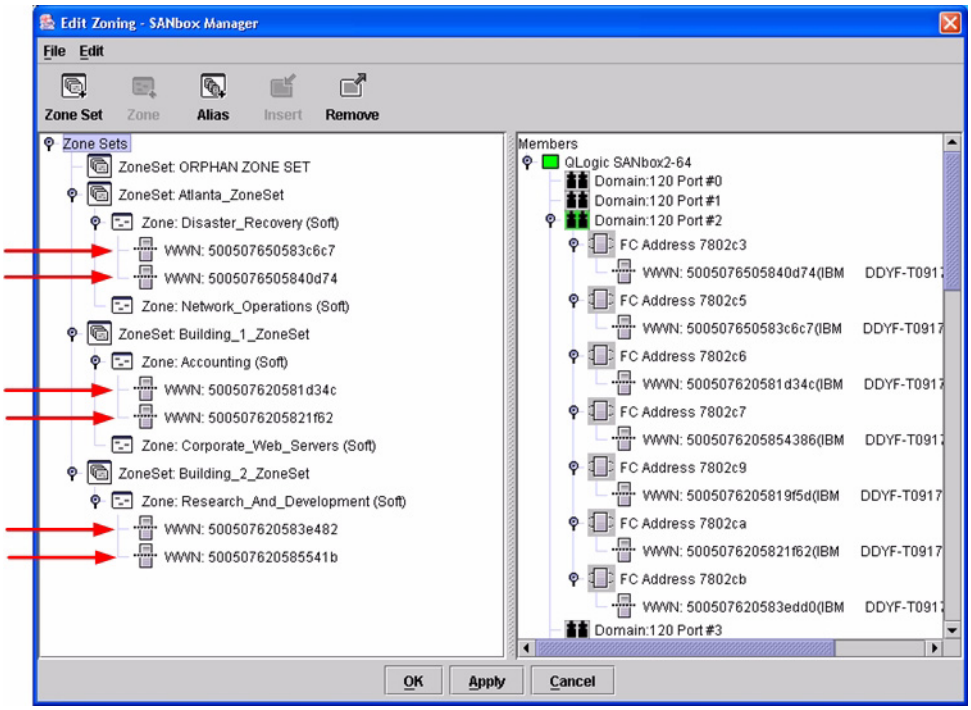
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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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
```

QLogic SANbox Manager GUI

Not applicable.

QLogic 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
```


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QLogic 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 QLogic 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 QLogic support.

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Brocade SilkWorm 3900 and SilkWorm 12000 Switches

Integration Checklist

The following steps must be completed to successfully merge Brocade and QLogic 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 40).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 41).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 48).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 55).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 62).

✓ Ensure that all Brocade switches are configured for Interoperability mode (see “Operating Mode Configuration” on page 68).

✓ Ensure that Brocade’s Platform Management Server is disabled (see “Brocade Specific Configuration” on page 68).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 69).

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Configuration Limitations

The configuration limitations are as follows.

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

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

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

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

Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Brocade that comply with the FC-SW-2 standard.

QLogic and Brocade Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Brocade	SilkWorm 3900 Switch	4.0.2c and above
	SilkWorm 12000 Switch	4.0.2c 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 68).

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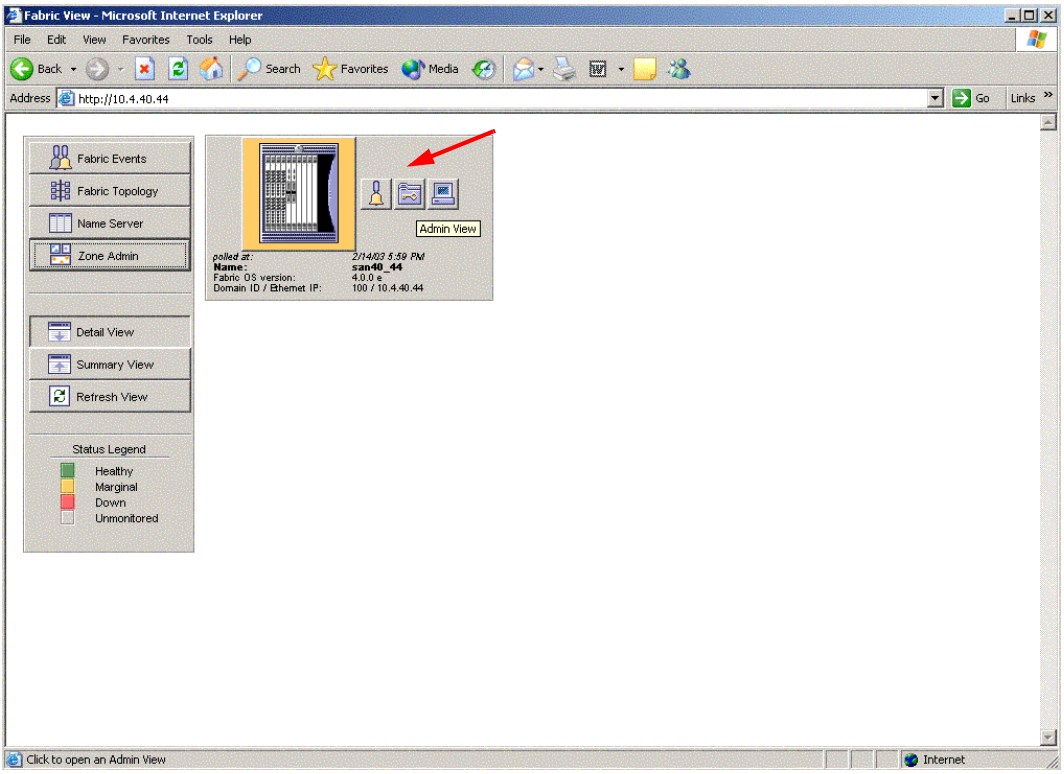
Domain ID Configuration

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 QLogic 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.



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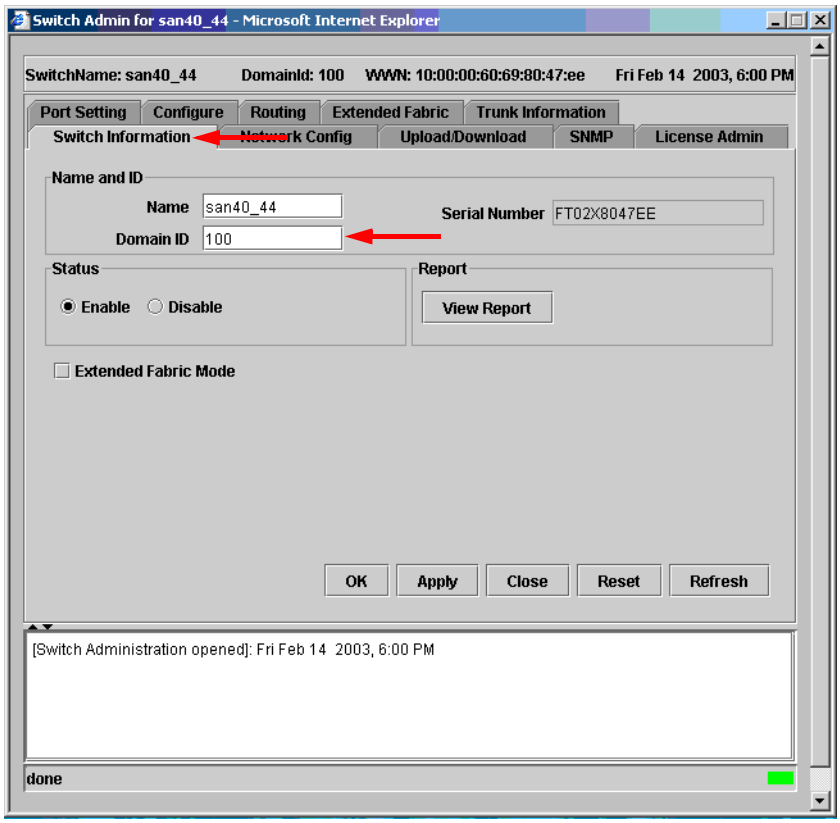
3. From the **Switch Admin for Brocade** dialog box, select the **Switch Settings** tab. Do the following:
   a. In the **Domain ID** field, type or edit the Domain ID as appropriate.
   b. Click **OK**.



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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
```


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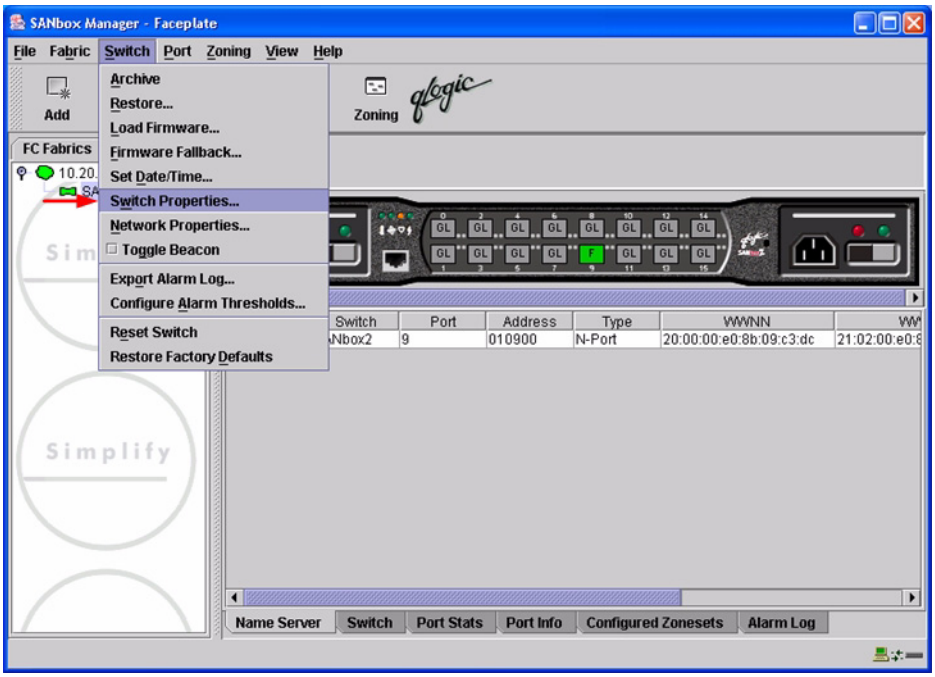
QLogic SANbox Manager GUI

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:



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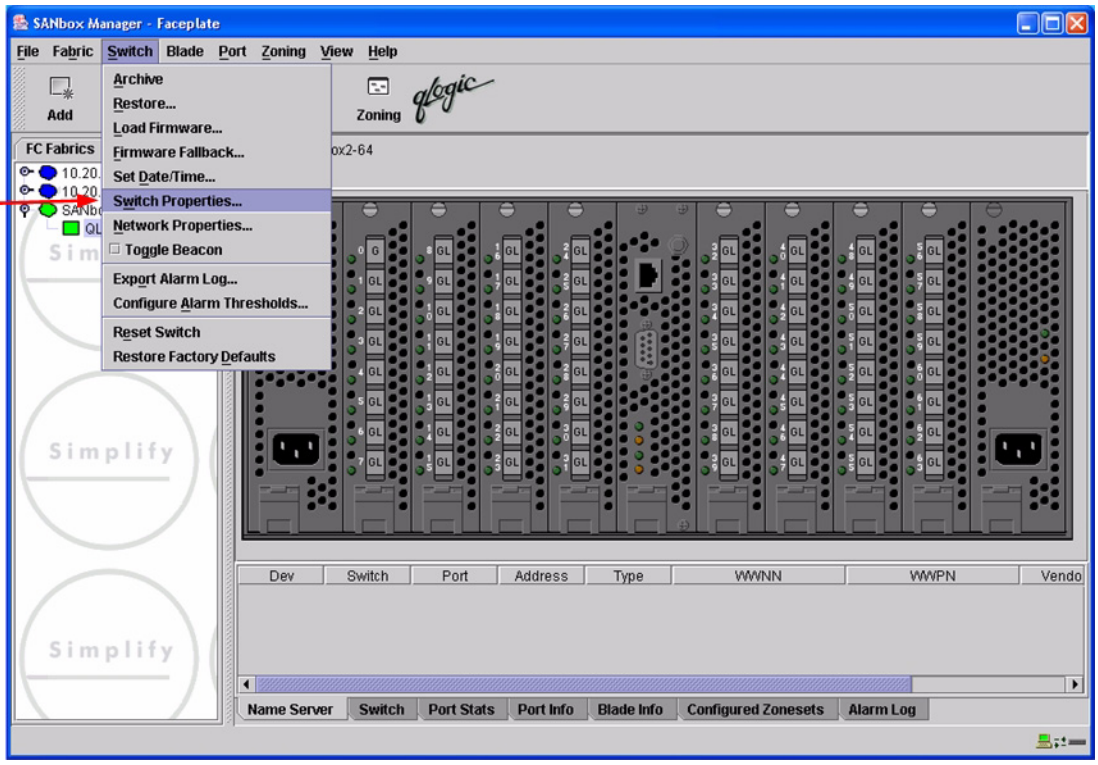
For the QLogic SANbox2-64, the following displays:



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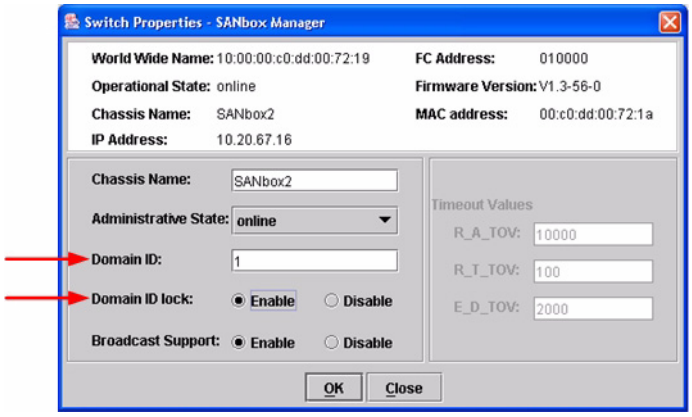
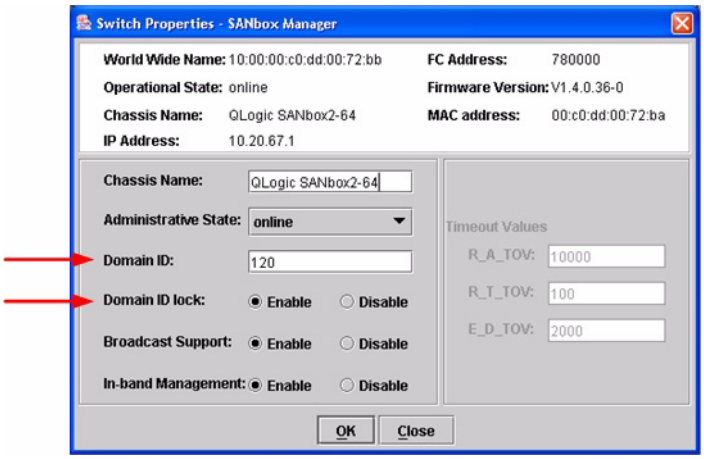
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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:

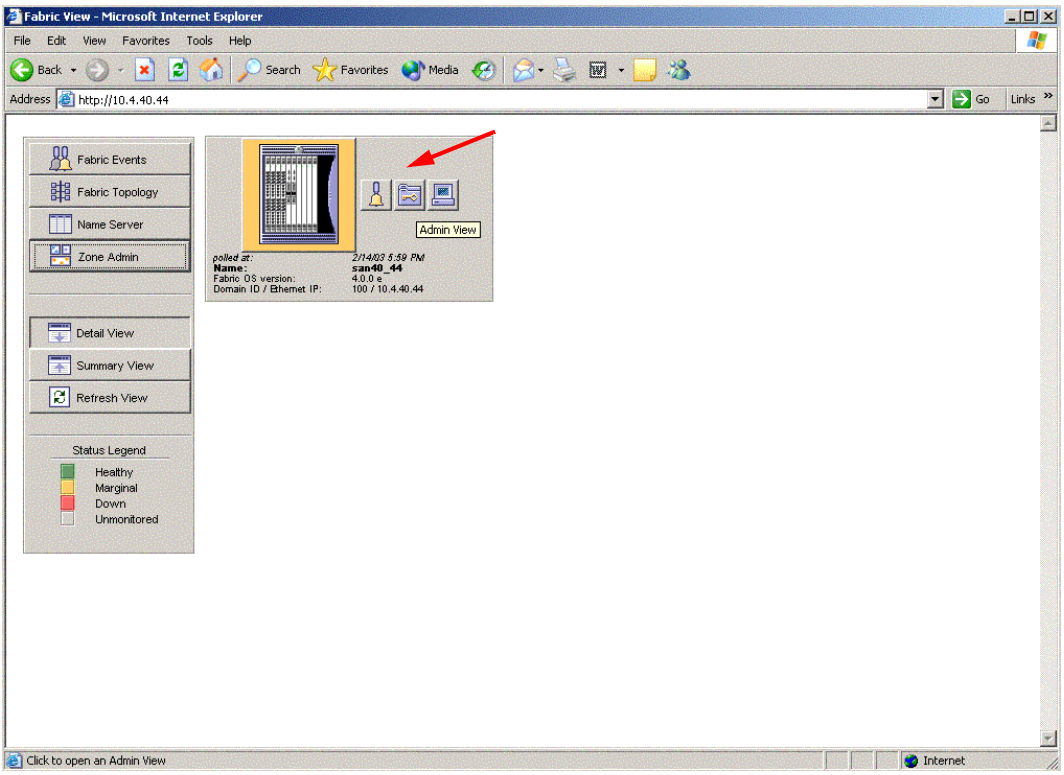
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

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.



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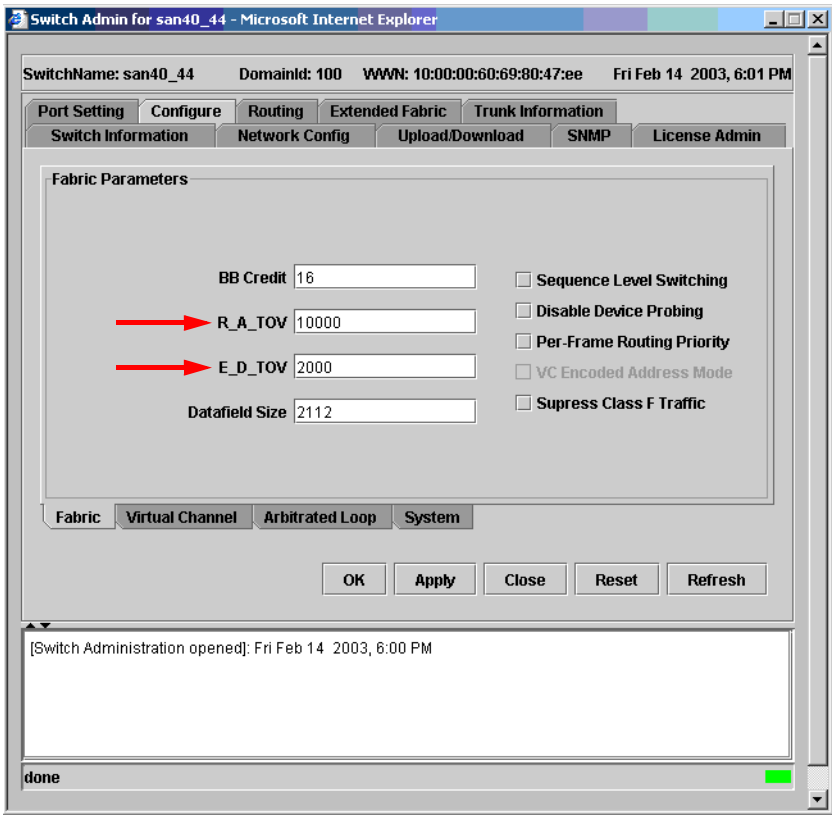
3. From the **Switch Admin for Brocade** dialog box, select the **Configure** tab. Verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV**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



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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
```


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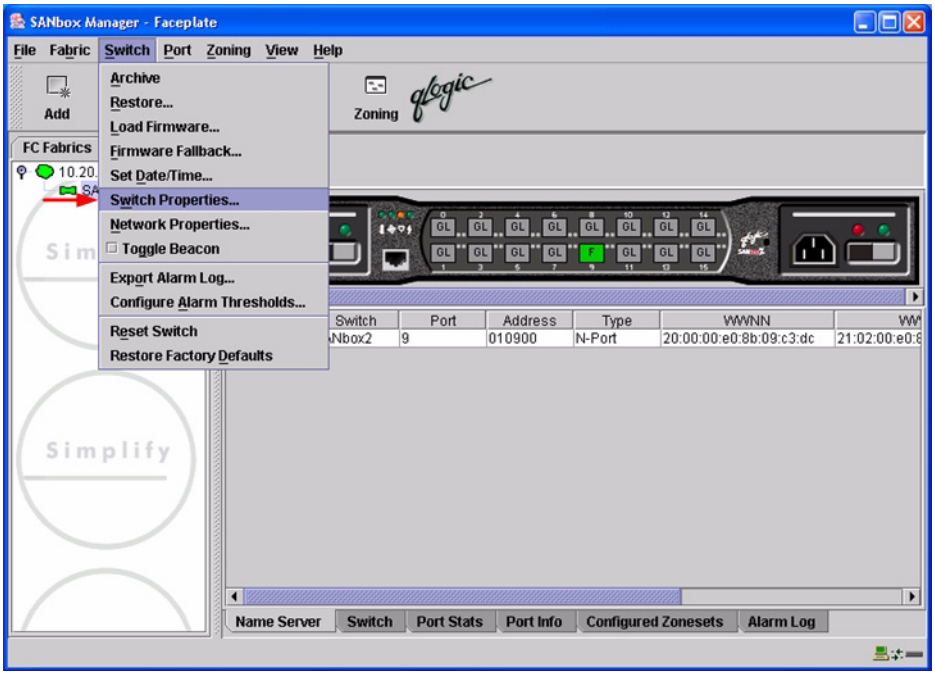
QLogic SANbox Manager GUI

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:



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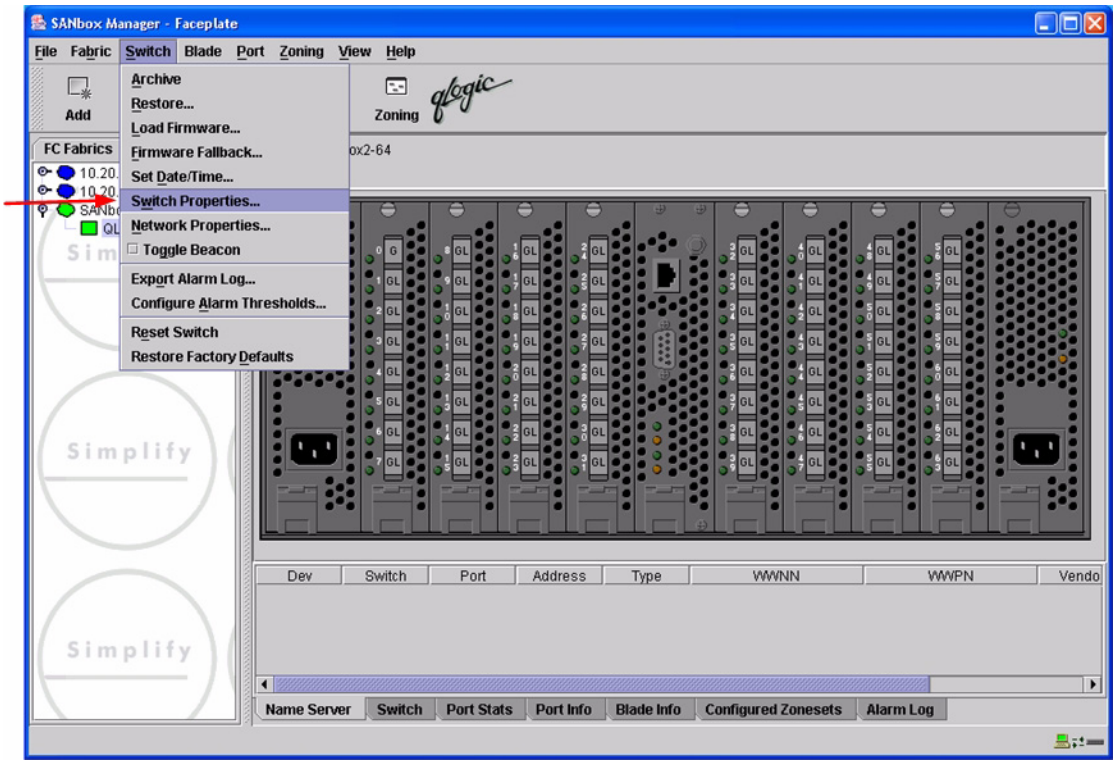
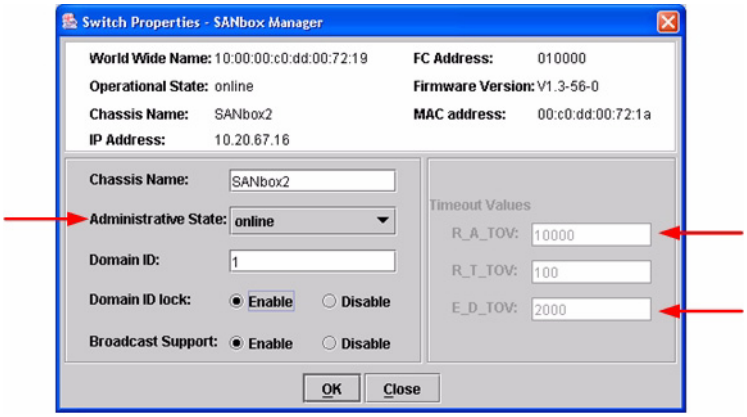
For the QLogic SANbox2-64, the following displays:



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:



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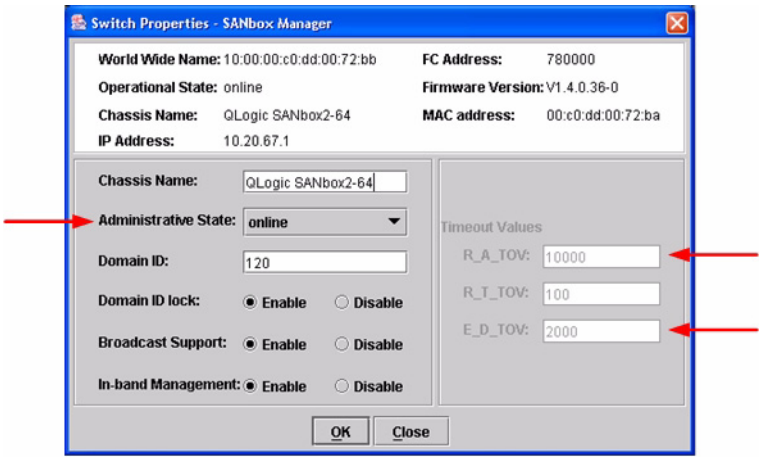
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

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

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Zone Configuration

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

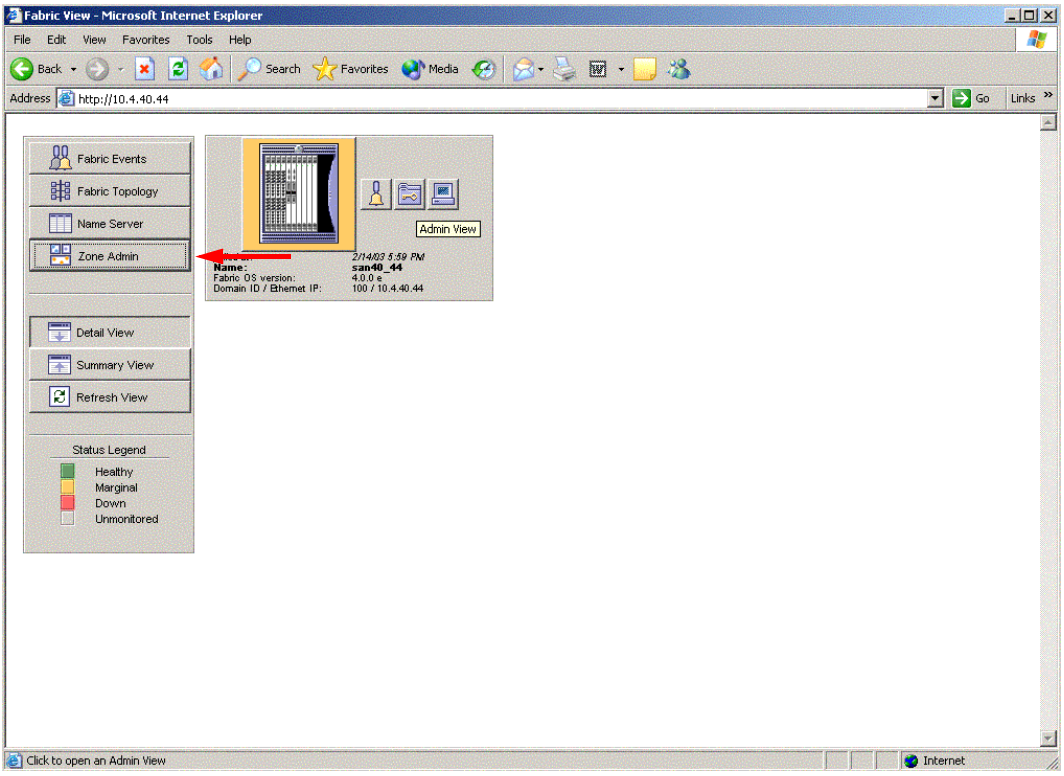
Active Zone Set Names

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.



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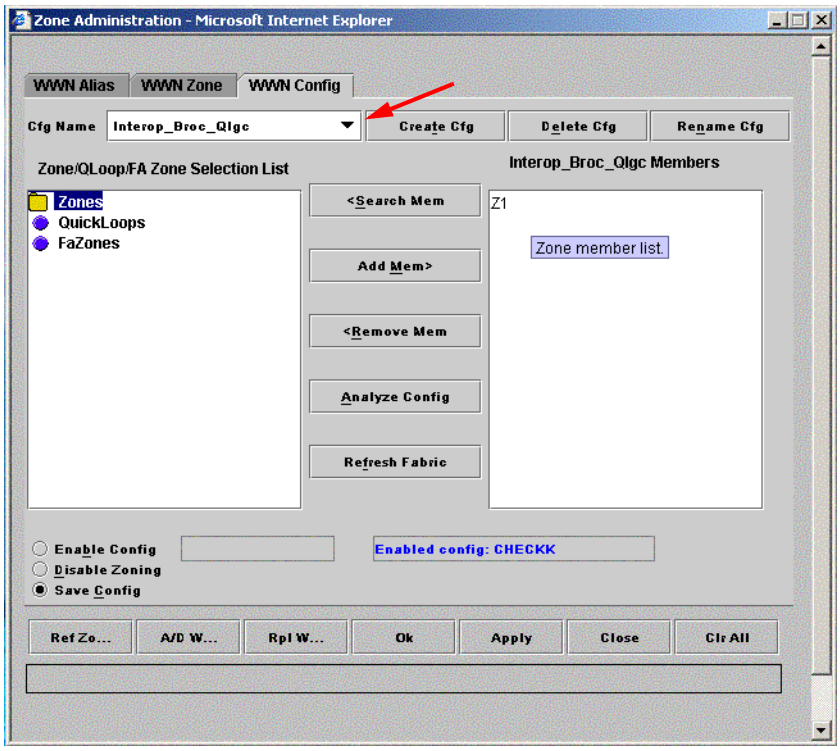
3. From the **Zone Administration** dialog box, select the **WWN Config** tab. Verify that all config names conform to the standards discussed under “Active Zone Set Names” on page 55 and are unique between the switches.



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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_Qlgc
           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
```


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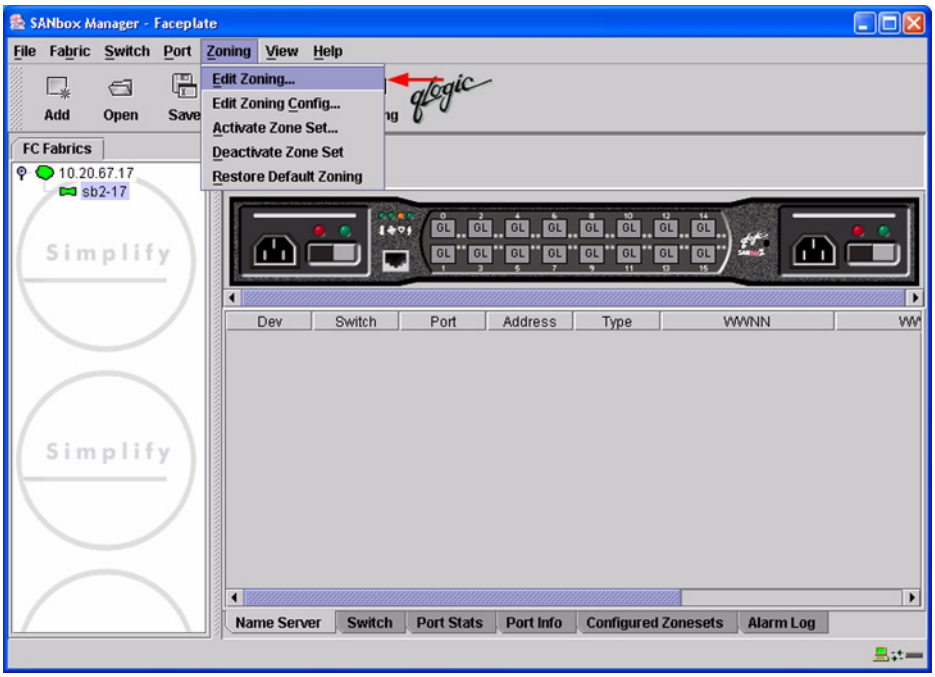
QLogic SANbox Manager GUI

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:



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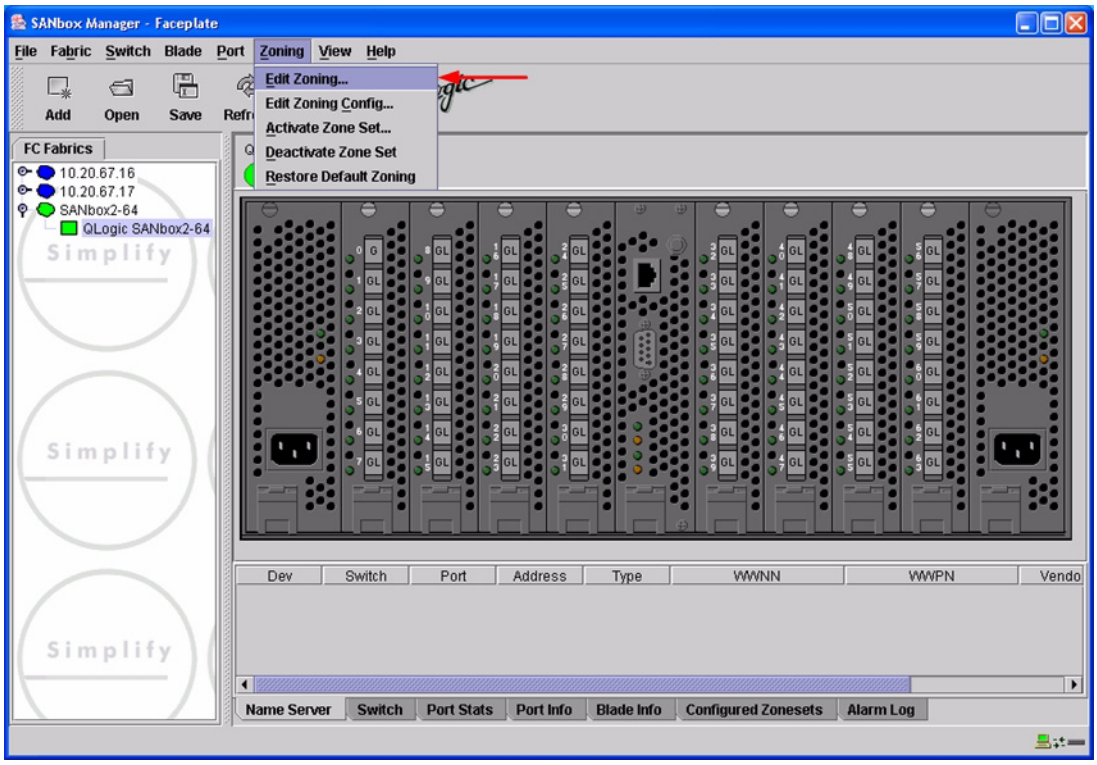
For the QLogic SANbox2-64, the following displays:



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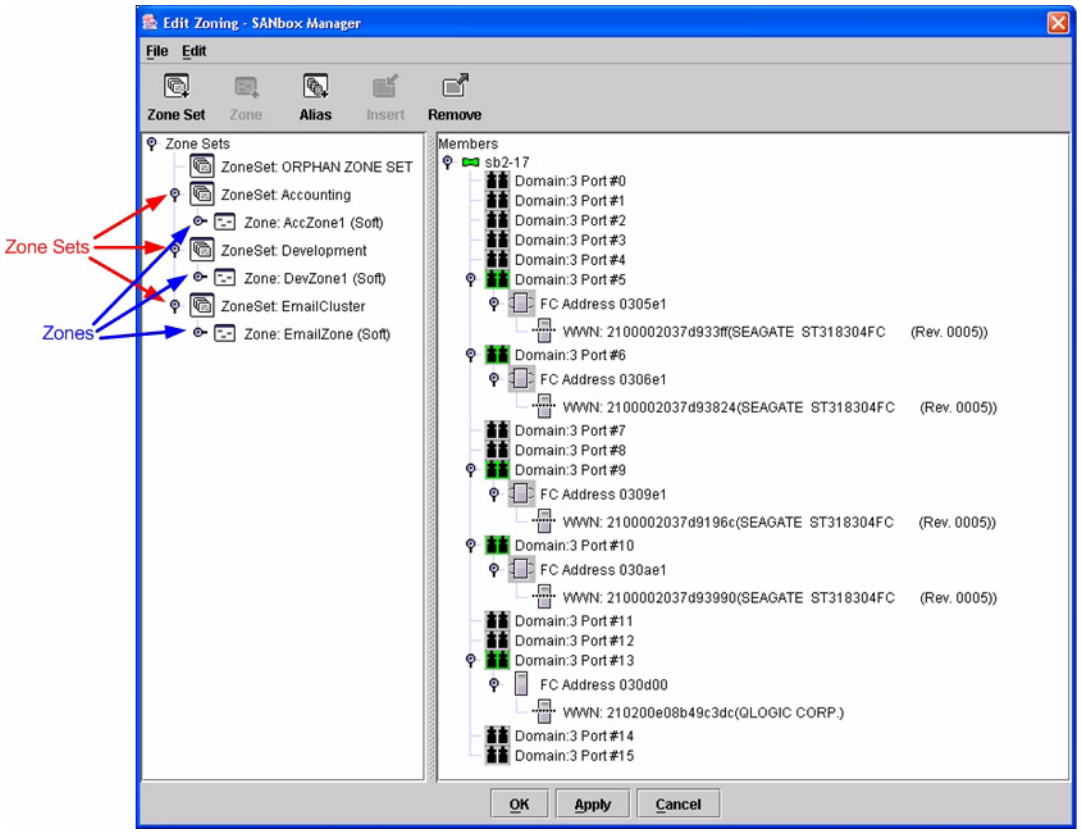
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 55.

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



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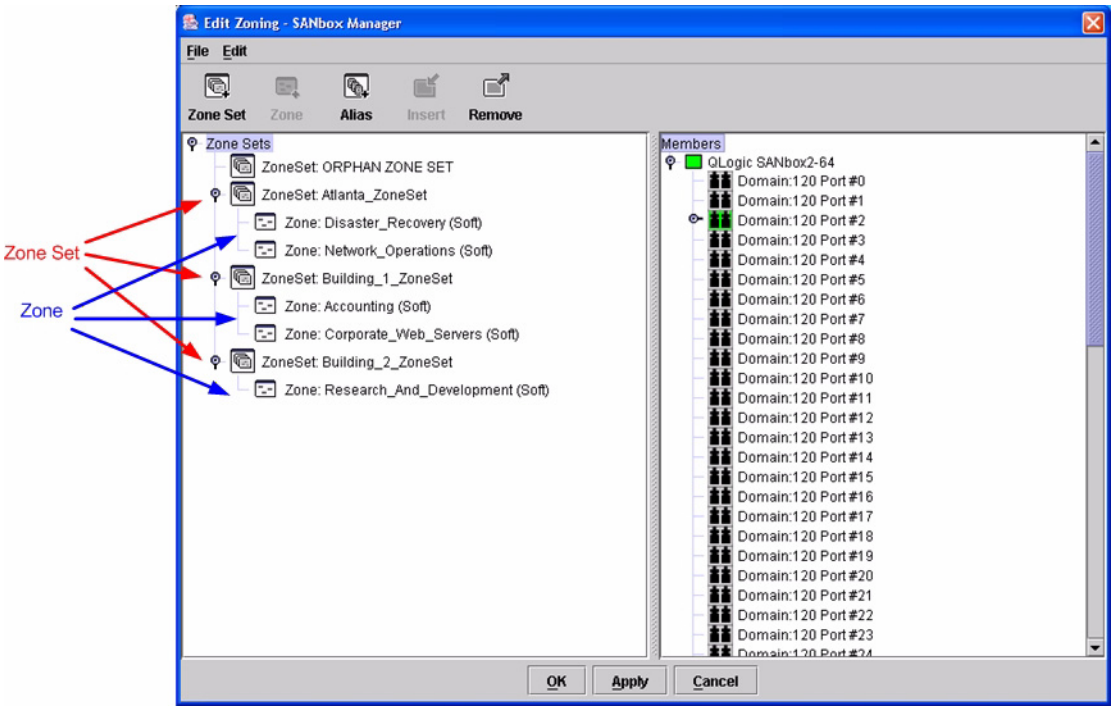
For the QLogic SANbox2-64, the following displays:



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
```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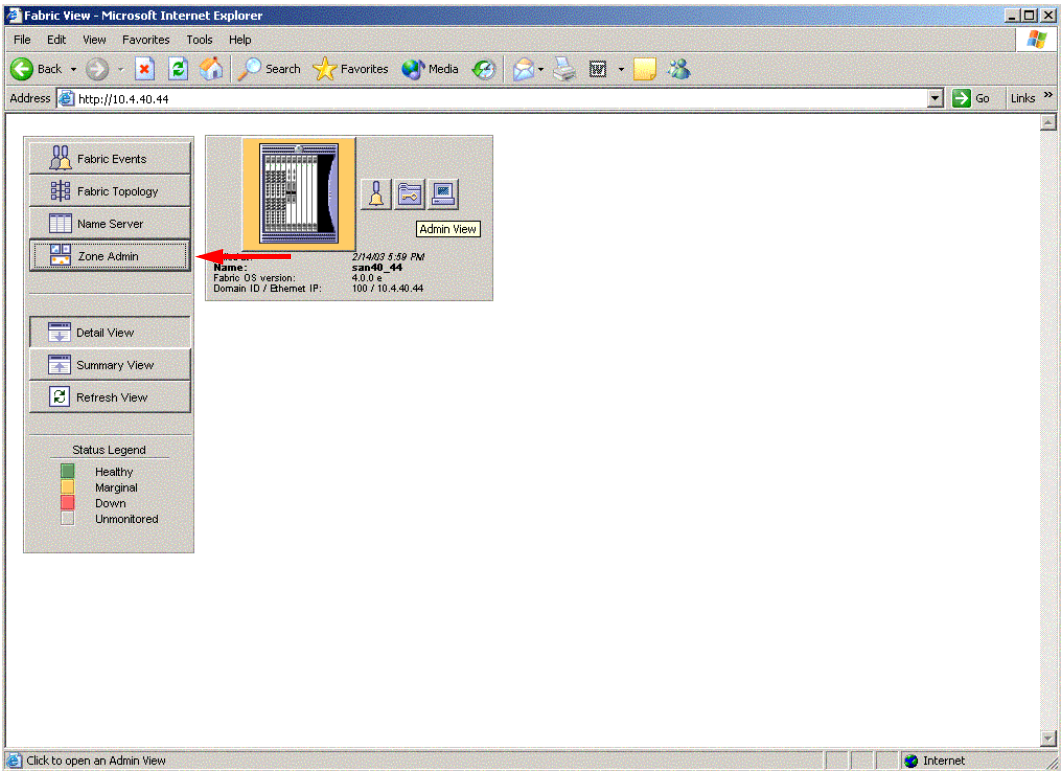
Zone Types

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.



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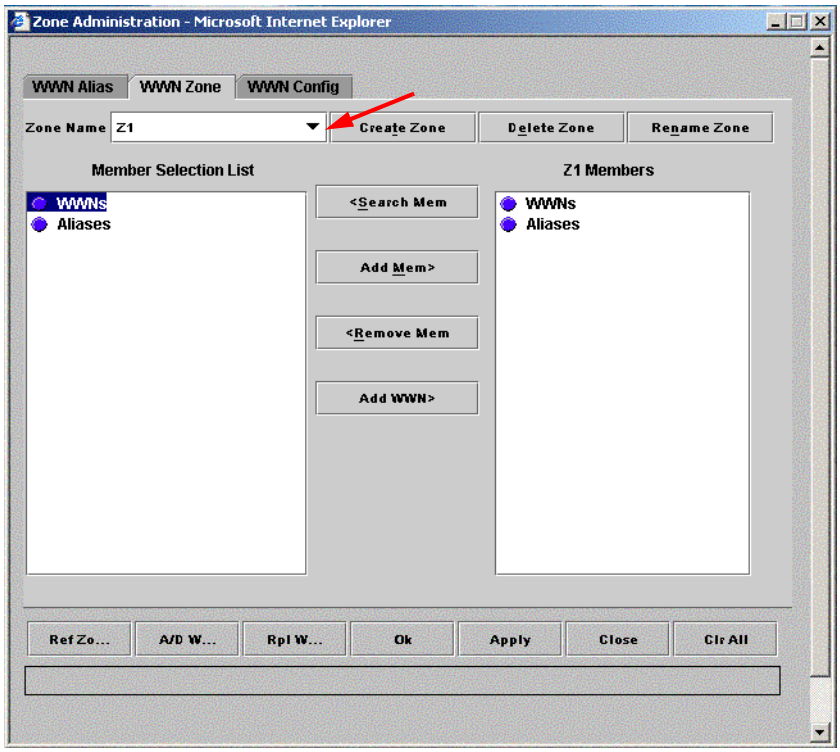
3. From the **Zone Administration** dialog box, select the **WWN Zone** tab. Verify that all zone names conform to the standards discussed under “Active Zone Set Names” on page 55 and are unique between the switches.



Brocade CLI

```
Login: admin
Password: xxxxxxxx
Brocade12000:admin> zoneshow
```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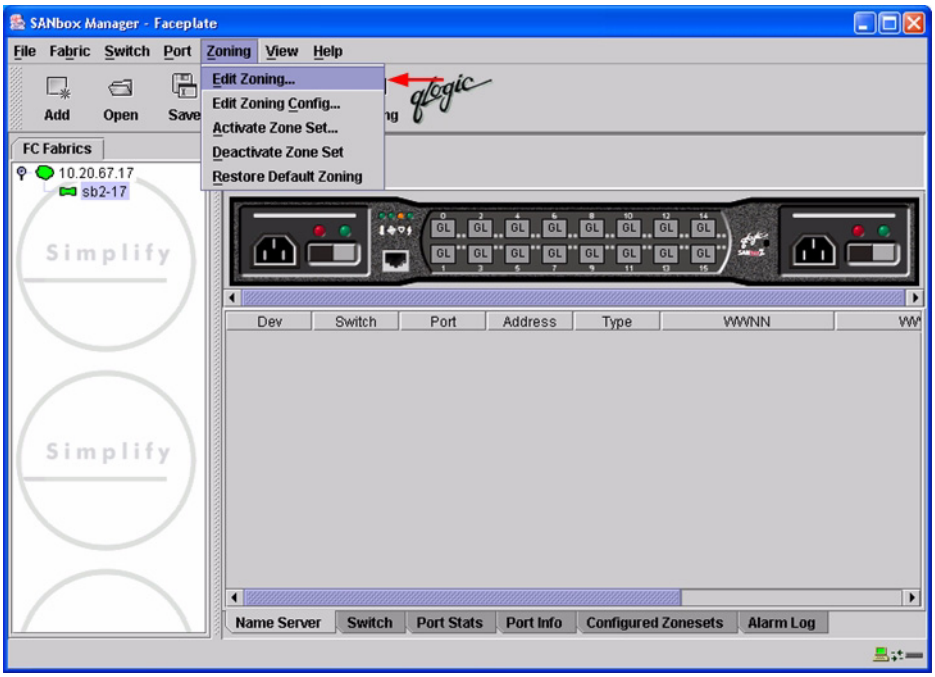
QLogic SANbox Manager GUI

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:



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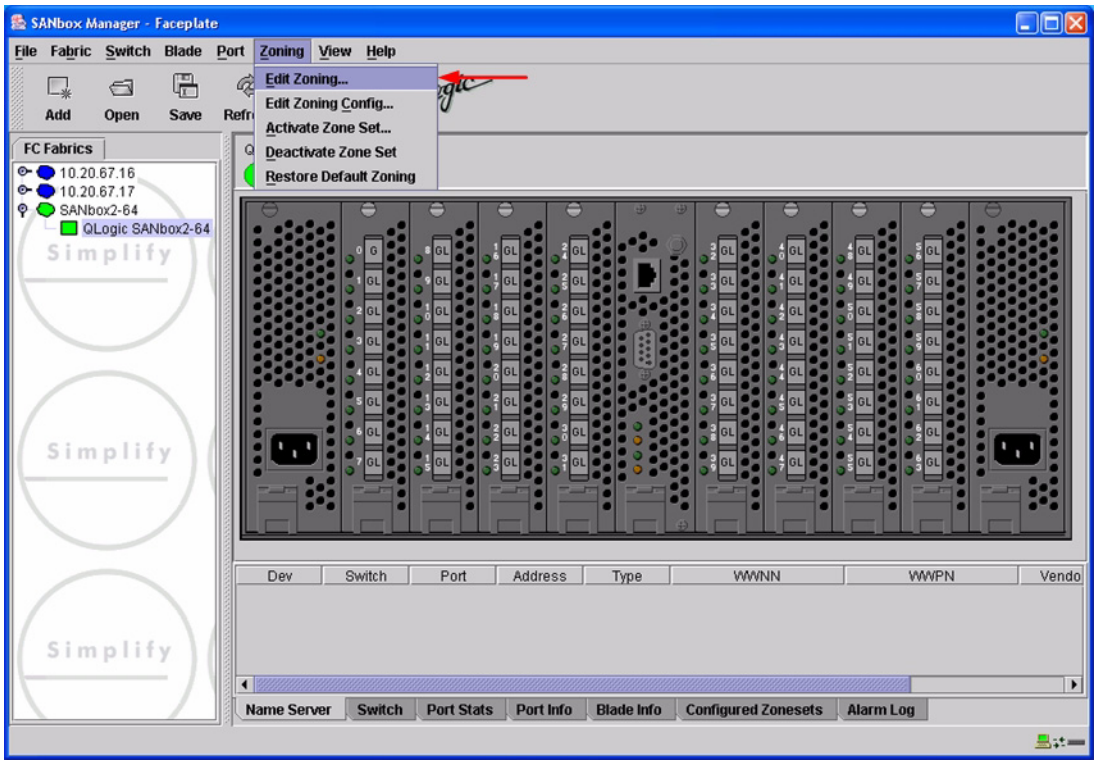
For the QLogic SANbox2-64, the following displays:



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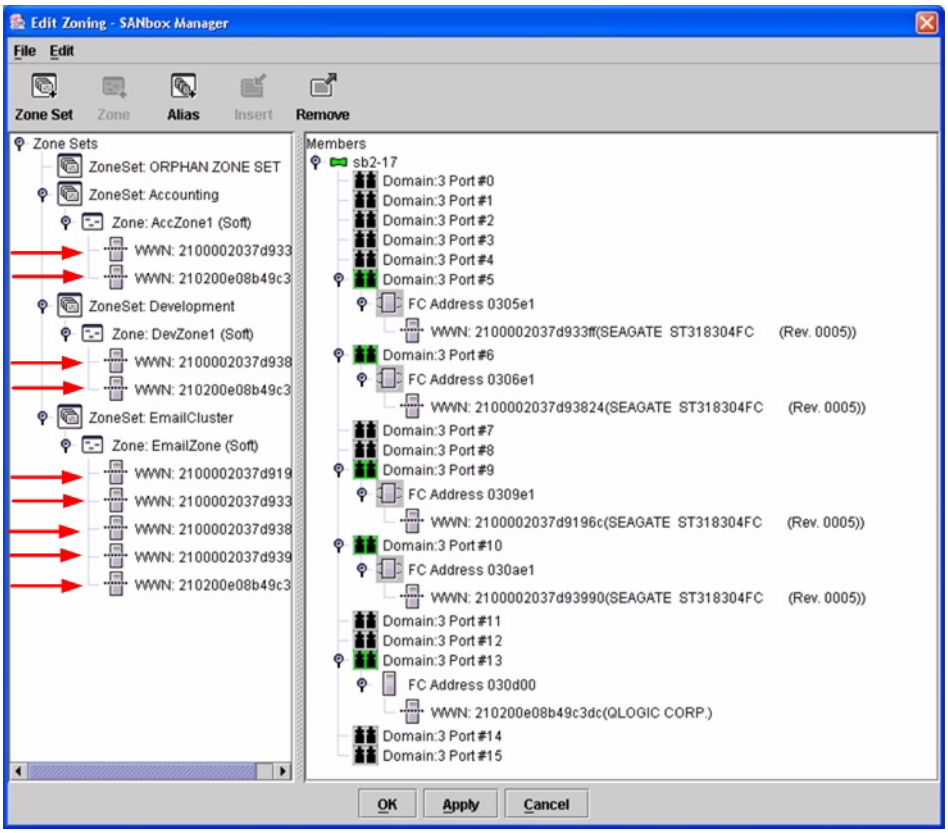
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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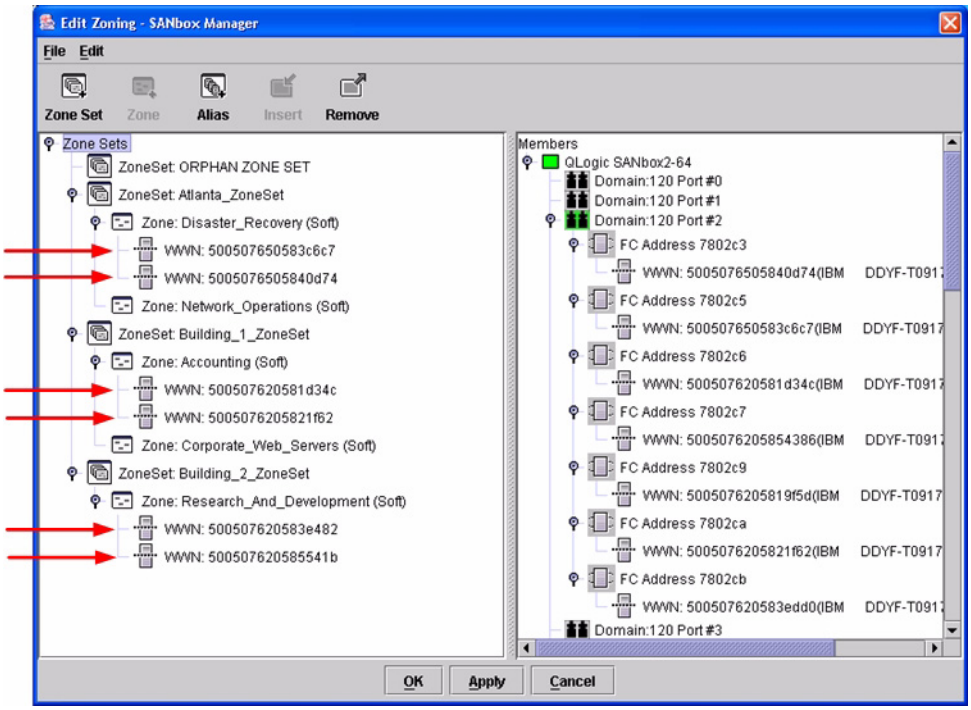
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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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
```

QLogic SANbox Manager GUI

Not applicable.

QLogic 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
```

QLogic Specific Configuration

Not applicable.

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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 QLogic 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 QLogic support.

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Merging QLogic and Cisco Fabrics

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

QLogic and Cisco Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8	1.3.x and above
	SANbox2-16	1.3.x and above
	SANbox2-64	1.5.x and above
Cisco	SN 5428 Storage Router	2.3.1-k9 or 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 provide detailed information about merging QLogic and Cisco fabrics:

- **Cisco SN 5428 Storage Router** **(see page 73)**
- **Cisco MDS 9000 Series Switches** **(see page 93)**

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Cisco SN 5428 Storage Router

Integration Checklist

The following steps must be completed to successfully merge Cisco and QLogic 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 74).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 75).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 81).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 86).

✓ Ensure that Zoning Merge type is set to SW2 (see “Cisco Specific Configuration” on page 91).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 92).

Configuration Limitations

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

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switch from Cisco that complies with the FC-SW-2 standard.

QLogic and Cisco Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Cisco	SN 5428 Storage Router	2.3.1-k9 or above

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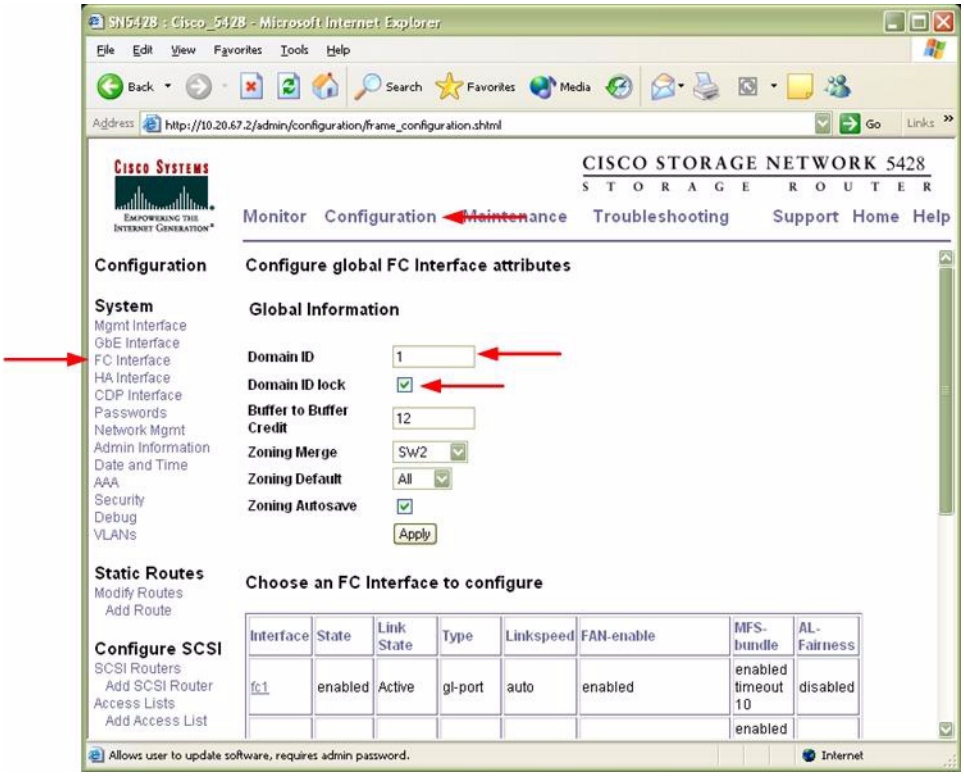
Domain ID Configuration

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 QLogic 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**.



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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
```


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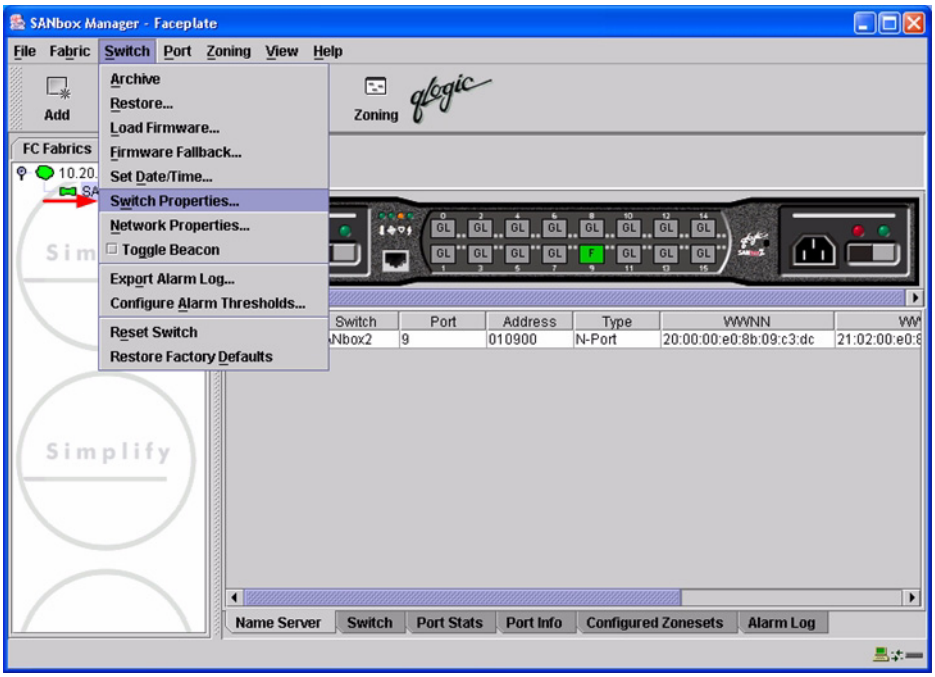
QLogic SANbox Manager GUI

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:



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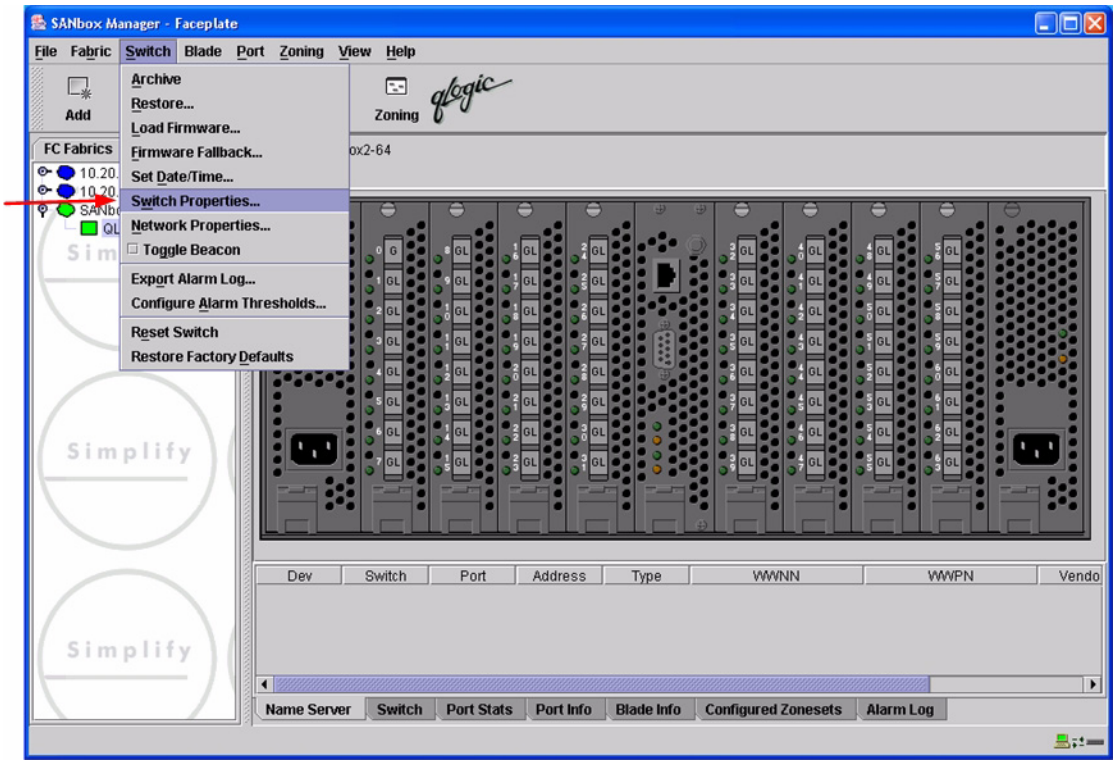
For the QLogic SANbox2-64, the following displays:



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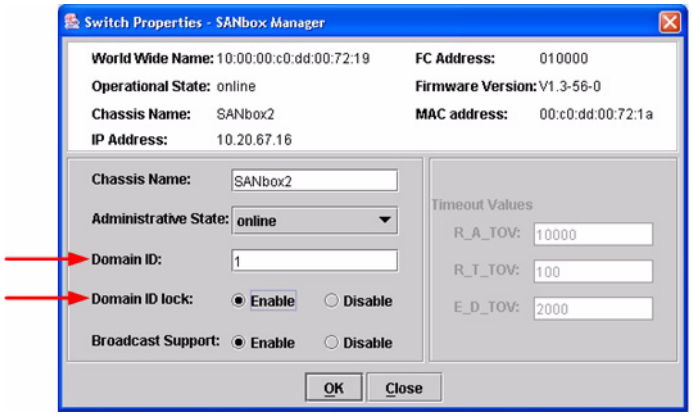
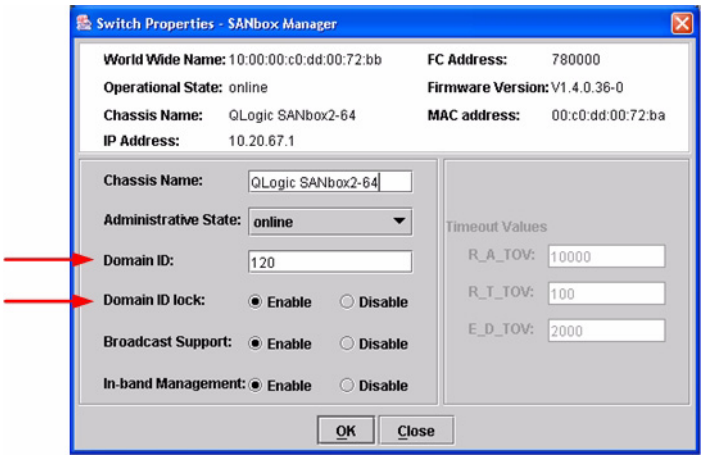
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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 QLogic SANbox Manager GUI or QLogic CLI.

Cisco SN 5428 Management Interface

Not applicable.

Cisco CLI

Not applicable.

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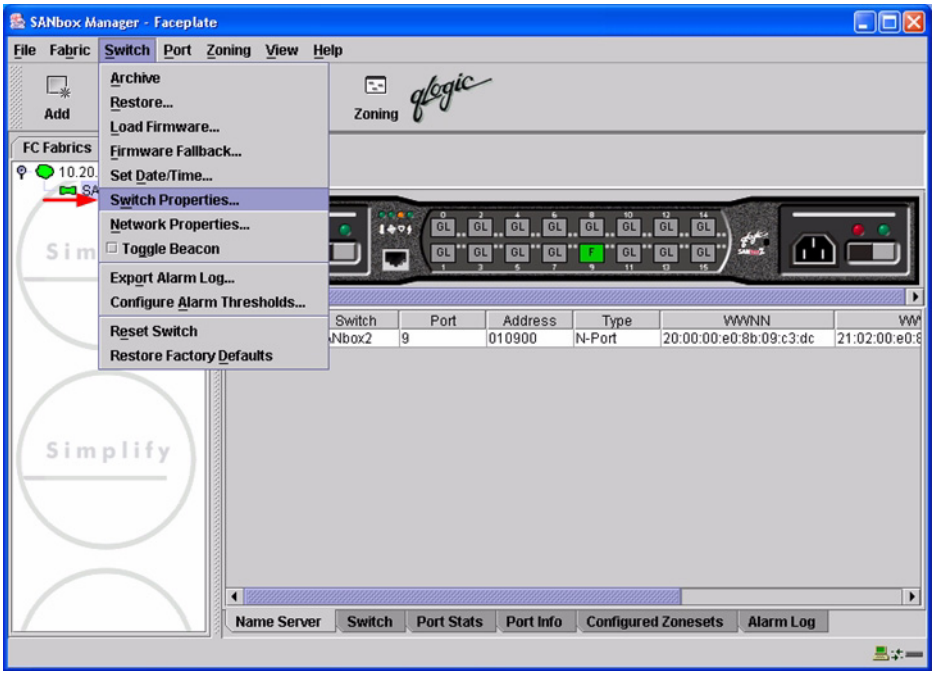
QLogic SANbox Manager GUI

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:



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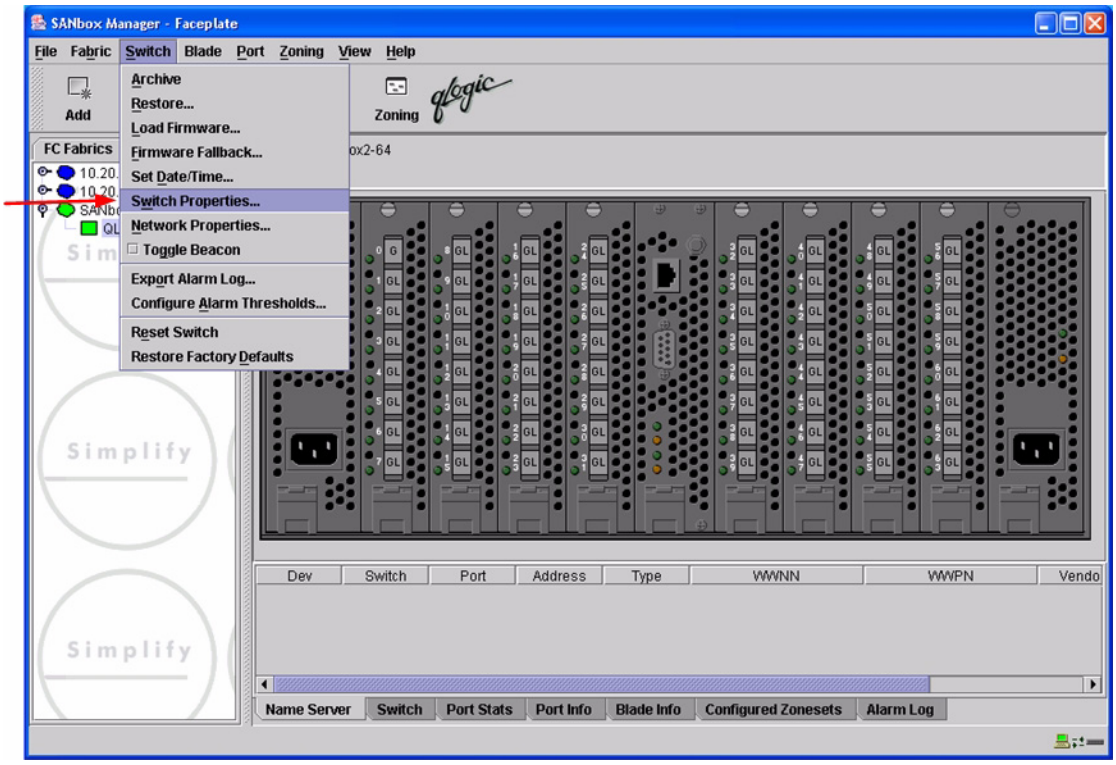
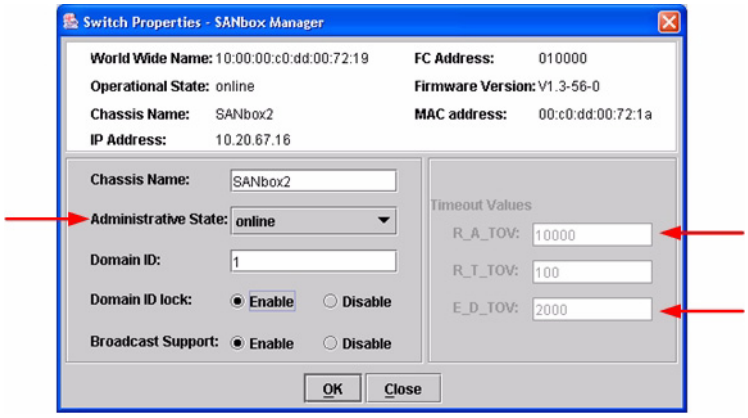
For the QLogic SANbox2-64, the following displays:



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:



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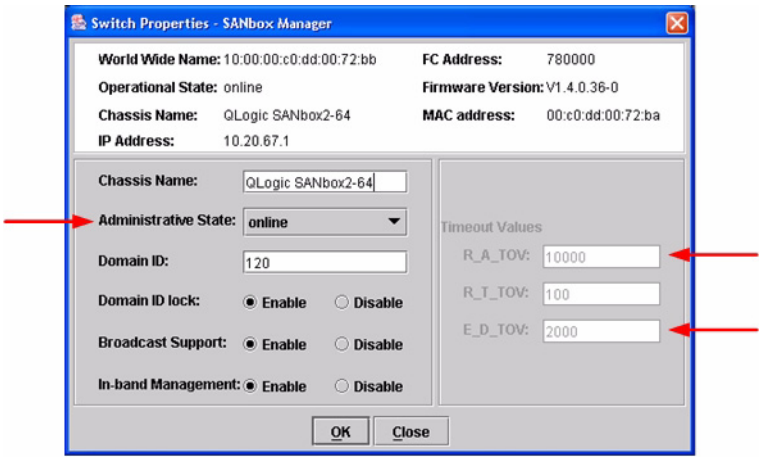
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

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

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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 QLogic SANbox Manager GUI or QLogic CLI.

Cisco SN 5428 Management Interface

Not applicable.

Cisco CLI

Not applicable.

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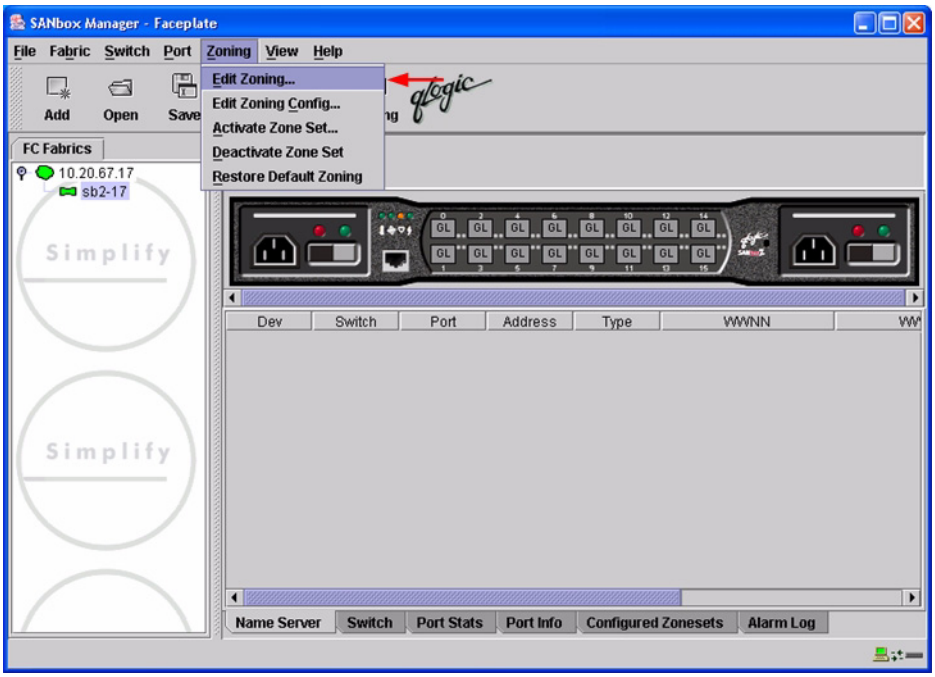
QLogic SANbox Manager GUI

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:



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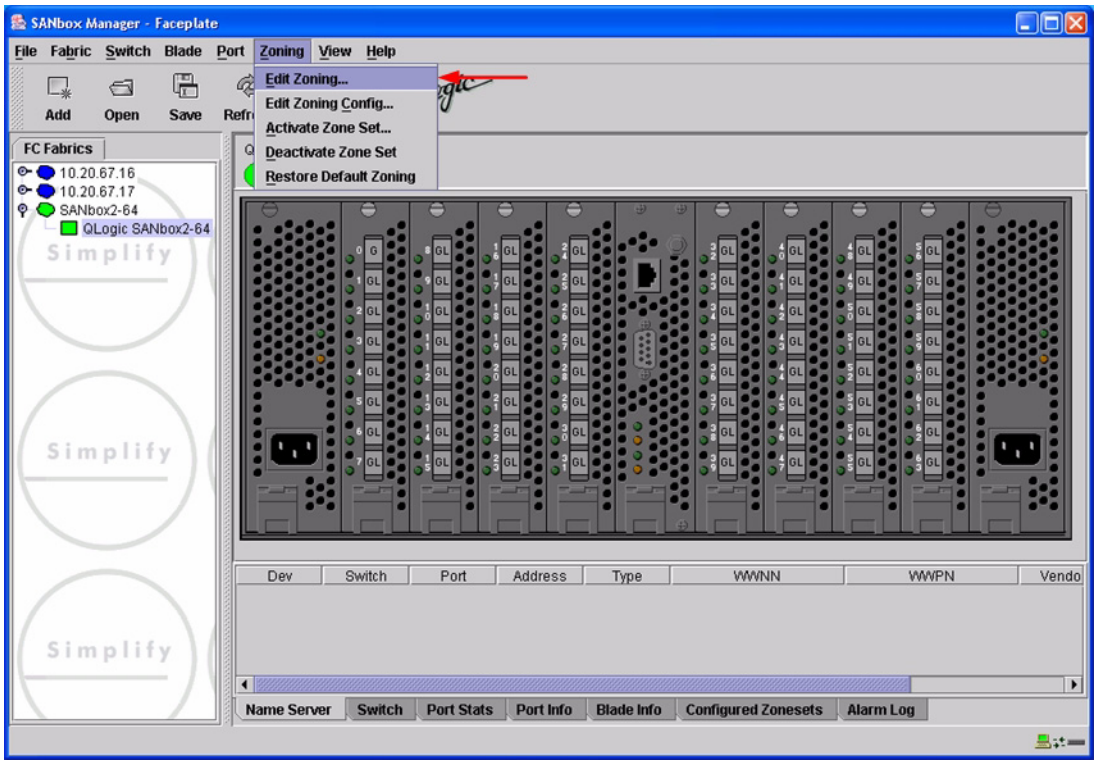
For the QLogic SANbox2-64, the following displays:



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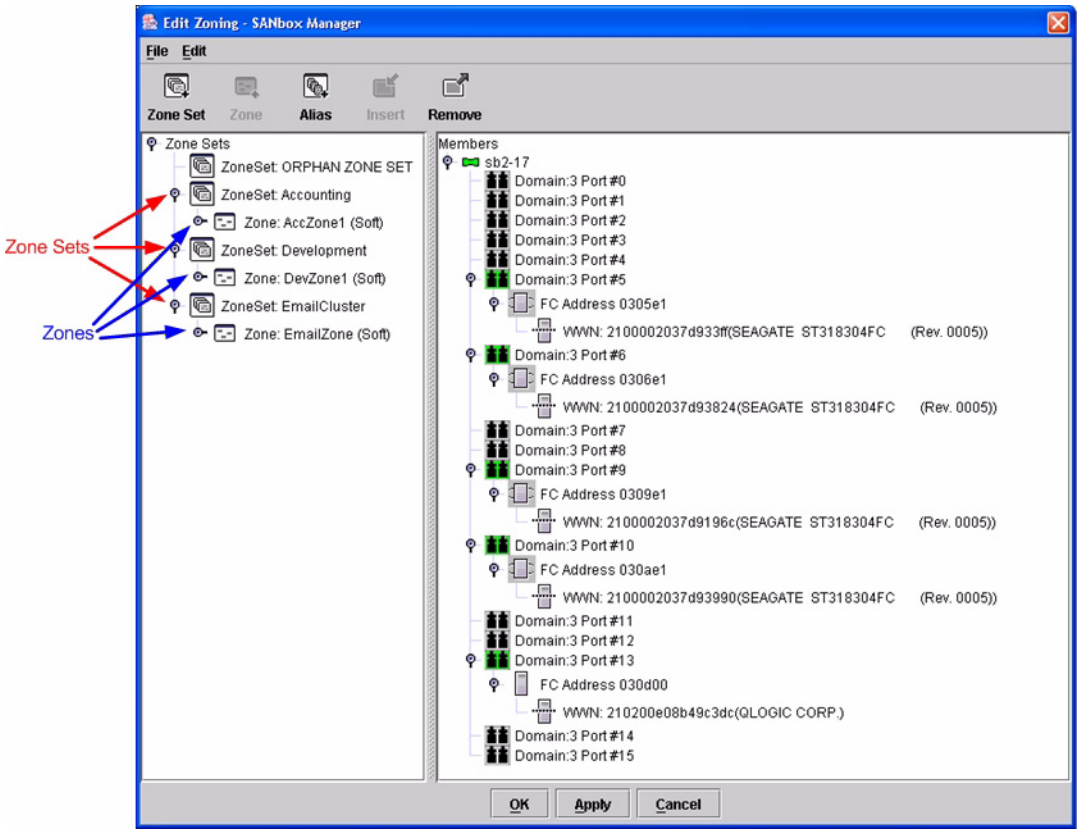
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 86.

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



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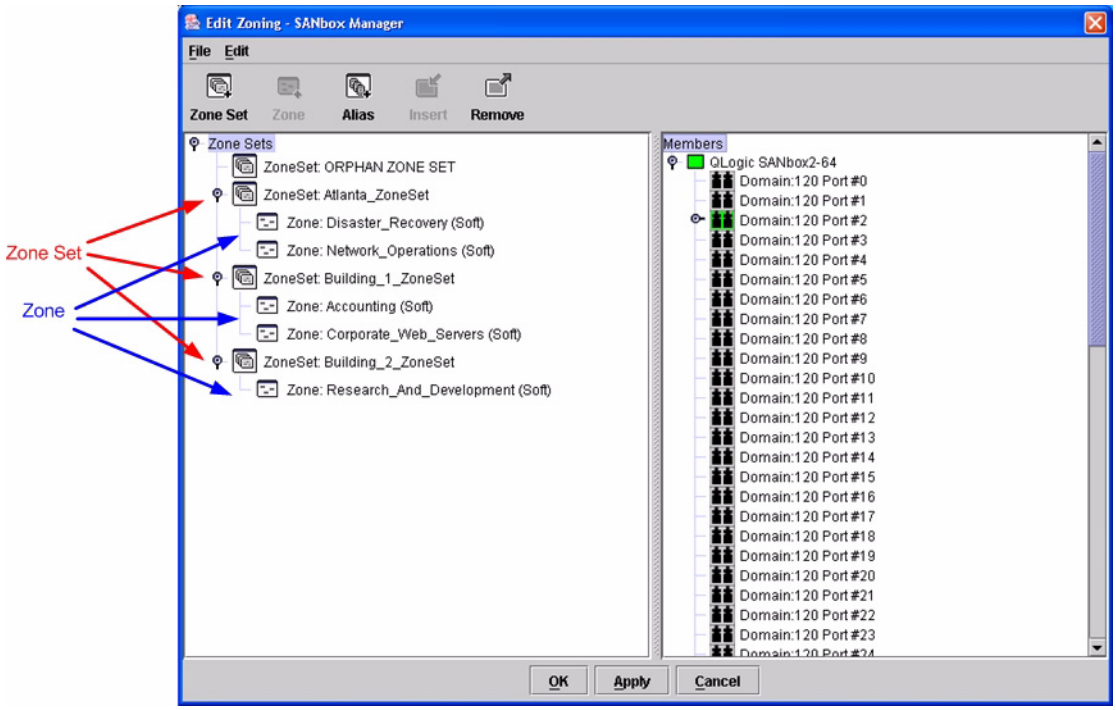
For the QLogic SANbox2-64, the following displays:



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
```

Zone Types

Not applicable.

Operating Mode Configuration

Not applicable.

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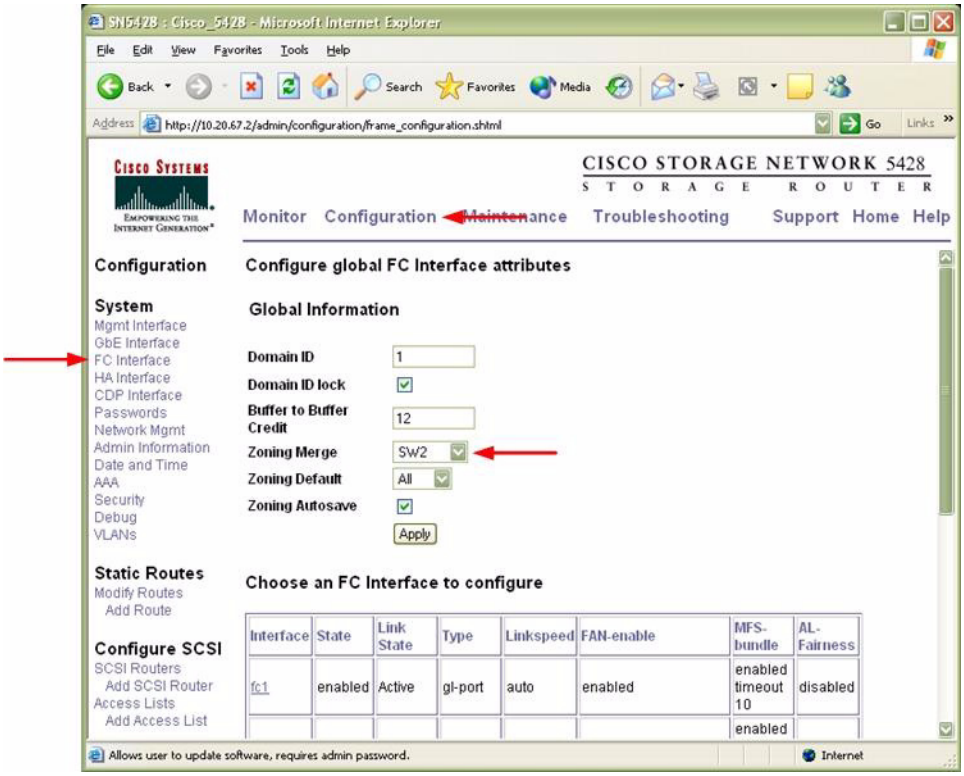
Cisco Specific Configuration

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**.



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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
```

QLogic 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 QLogic 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 QLogic support.

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Cisco MDS 9000 Series Switches

Integration Checklist

The following steps must be completed to successfully merge Cisco and QLogic 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 94).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 94).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 100).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 107).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 113).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 118).

Configuration Limitations

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

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Cisco that comply with the FC-SW-2 standard.

QLogic and Cisco Supported Switch and Firmware Versions

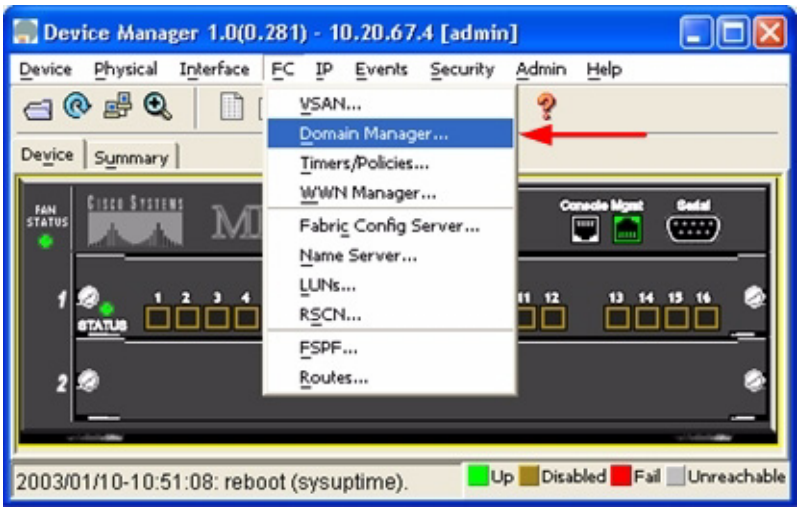
Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Cisco	MDS 9216 Switch	1.0(1) [build 1.0(0.281)]
	MDS 9509 Director	1.0(1) [build 1.0(0.281)]

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 QLogic 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**.



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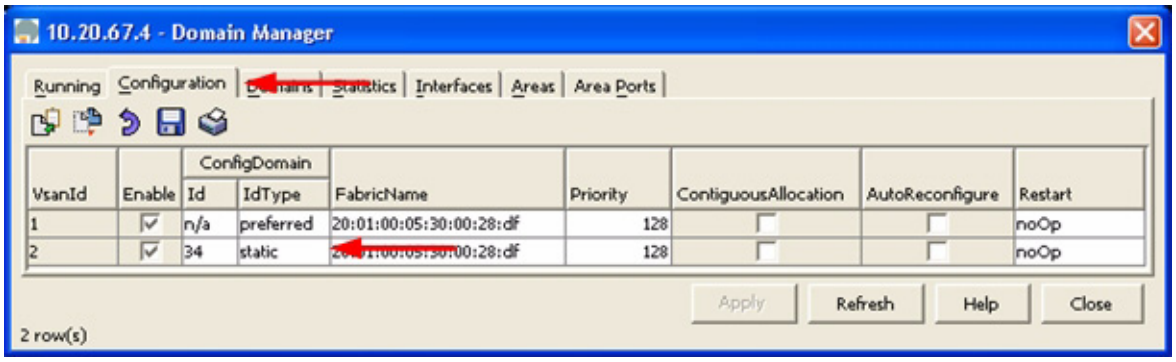
3. From the **Domain Manager** dialog box, select the **Configuration** tab. For the VSAN to which you will connect the E-port, do the following:
   a. In the **Domain ID** field, type or edit the Domain ID as appropriate.
   b. Set the **ConfigDomain IdType** field to **Static**.
   c. Click **Apply**.



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
```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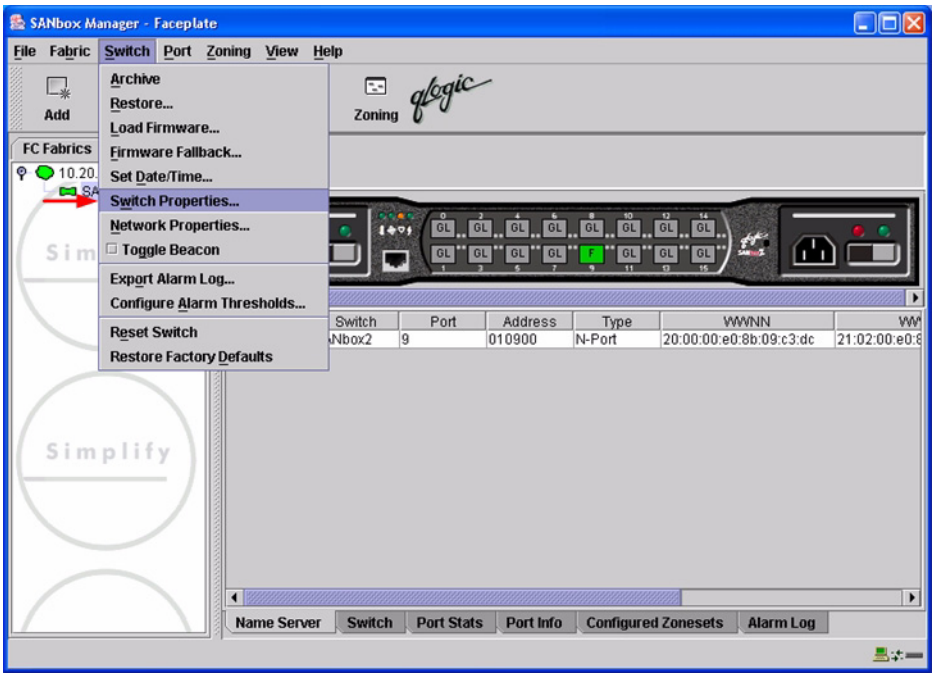
QLogic SANbox Manager GUI

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:



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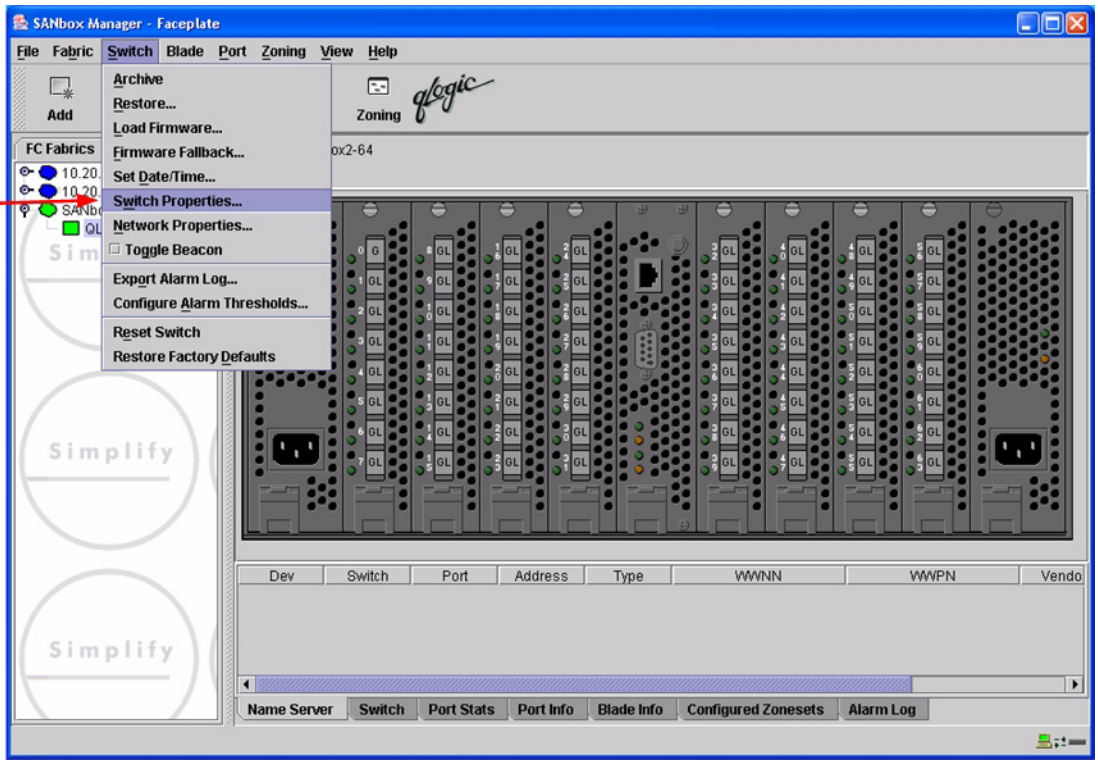
For the QLogic SANbox2-64, the following displays:



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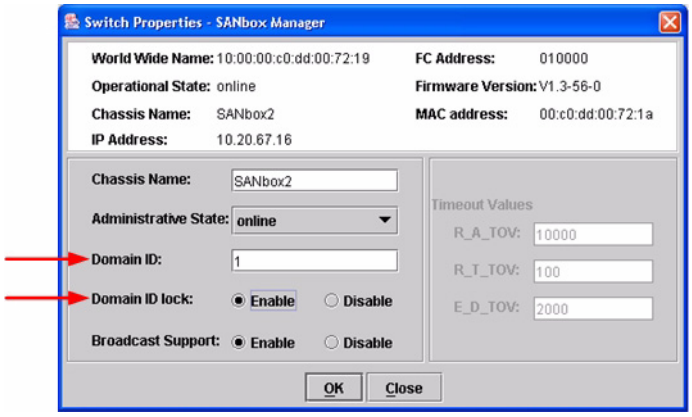
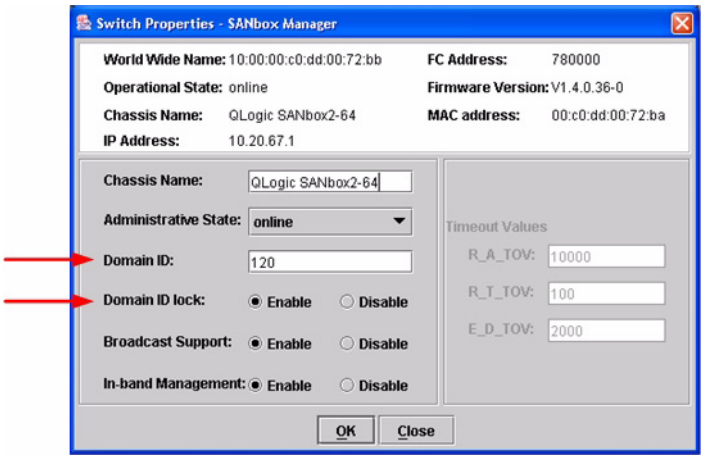
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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:

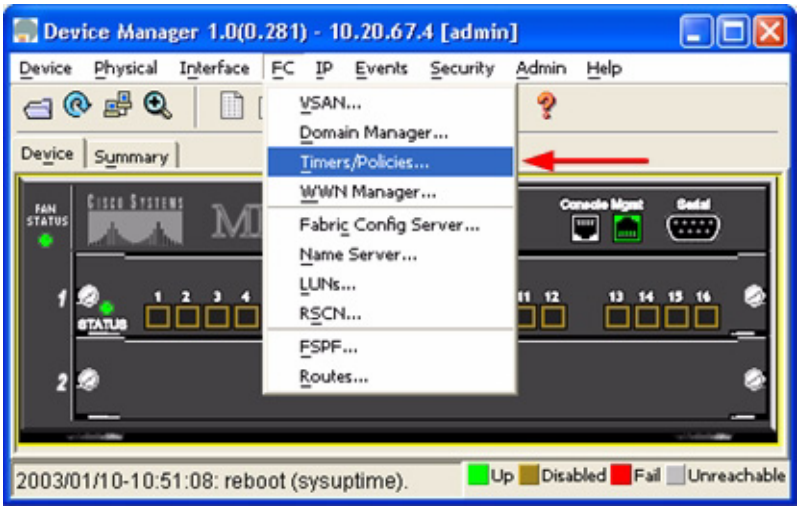
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

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**.



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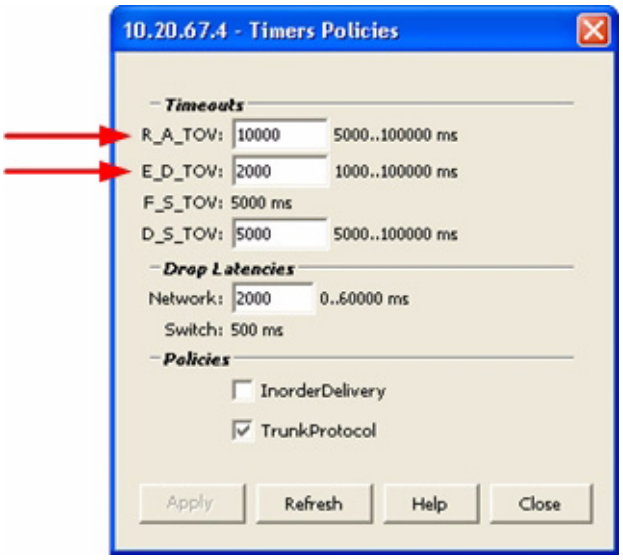
3. From the **Timers Policies** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, do the following:
   a. In the **R_A_TOV** box, change the setting to **10000**.
   b. In the **E_D_TOV** box, change the setting to **2000**.
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



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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
```


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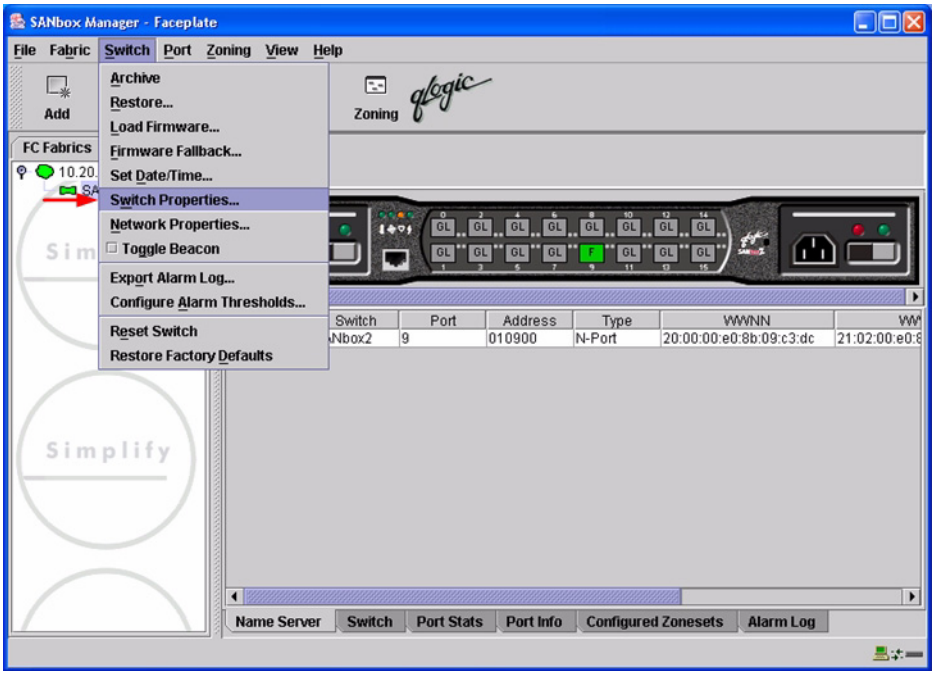
QLogic SANbox Manager GUI

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:



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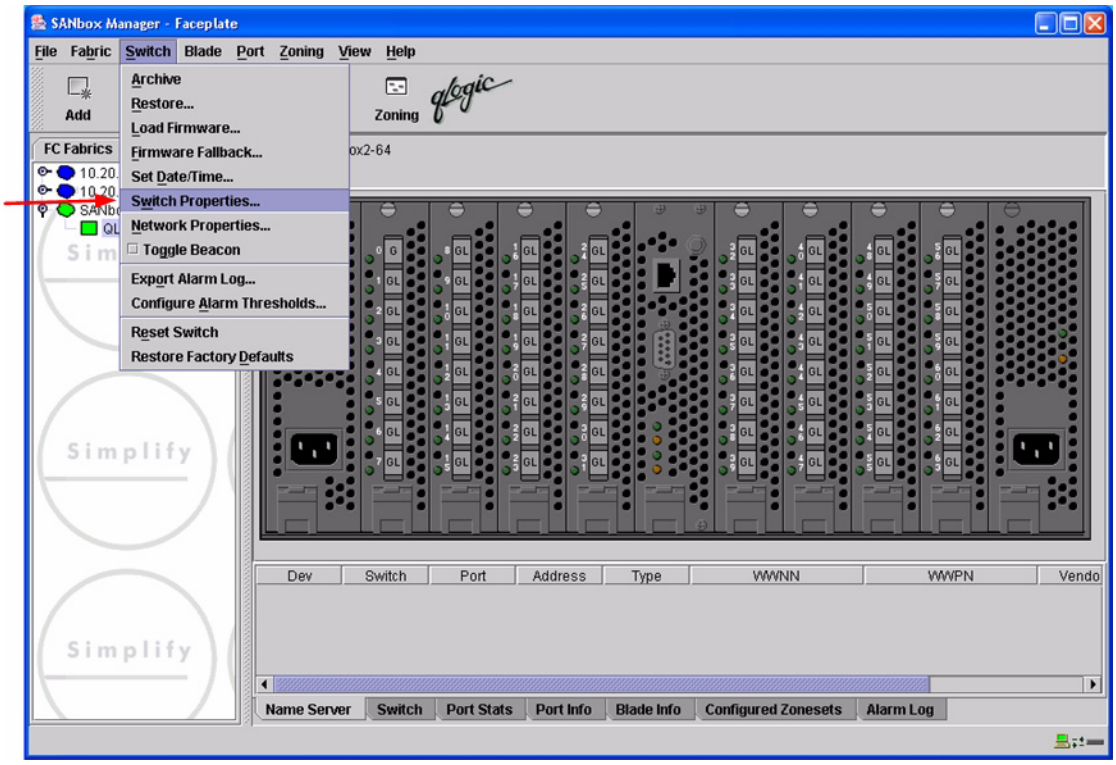
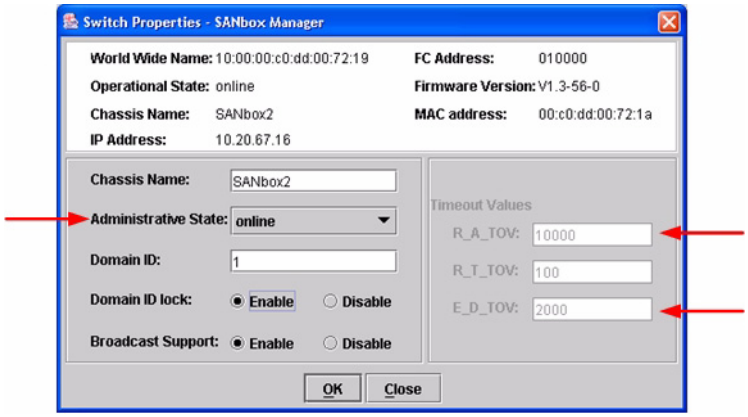
For the QLogic SANbox2-64, the following displays:



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:



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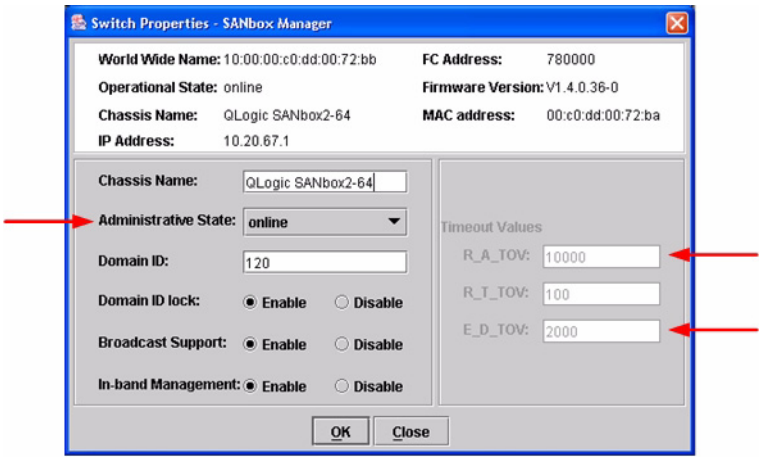
For the QLogic SANbox2-64, the following displays:



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**.

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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
```


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Principal Switch Configuration

Cisco switches and QLogic 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.

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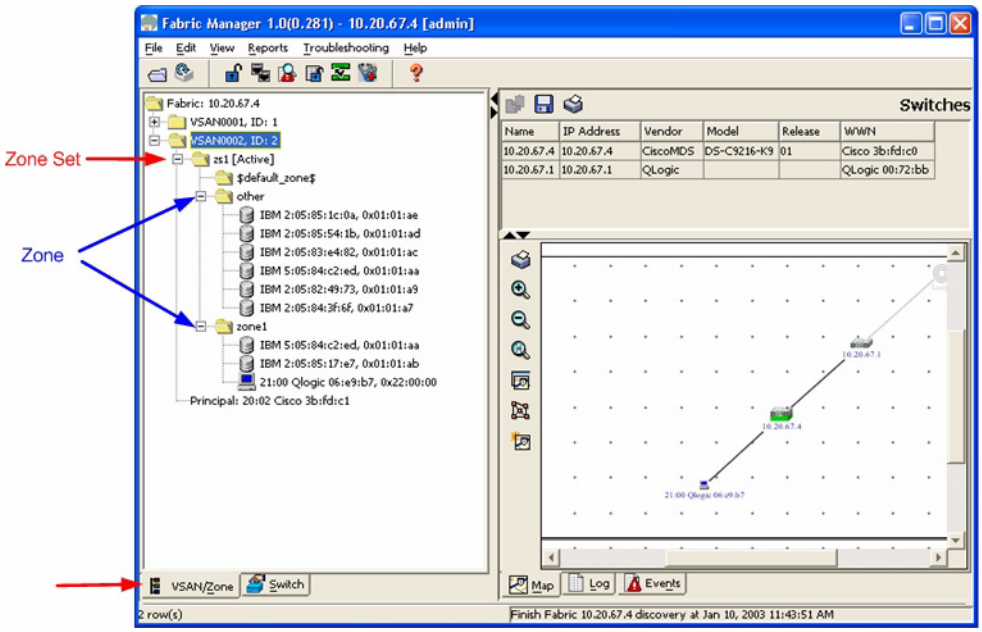
Cisco Fabric Manager

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 107 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.

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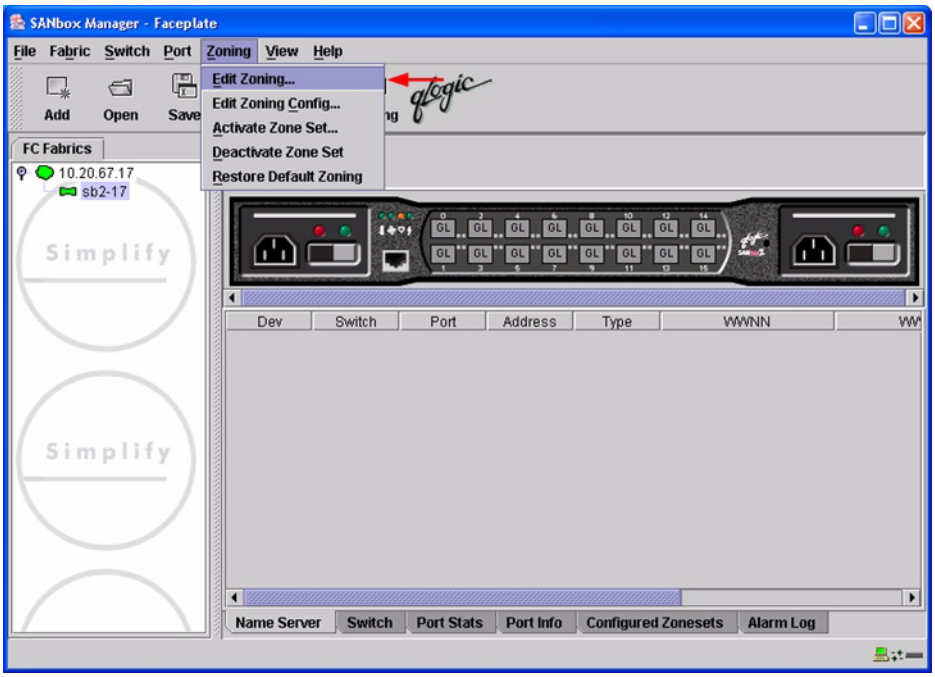
QLogic SANbox Manager GUI

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:



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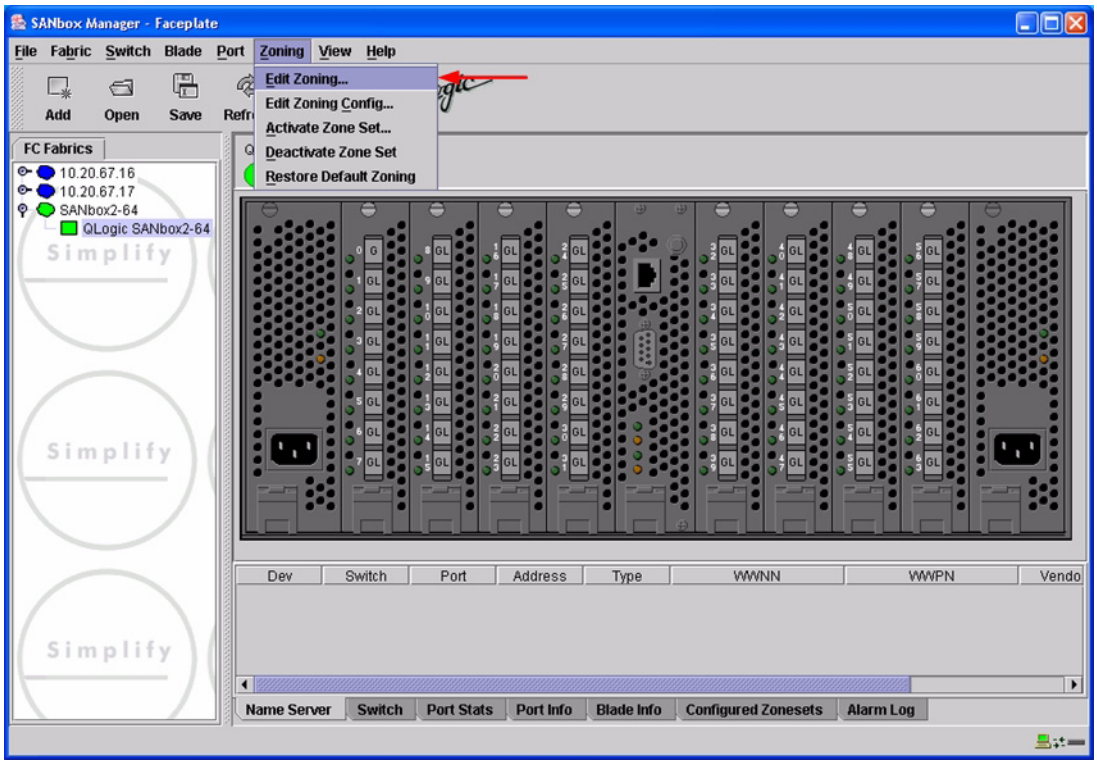
For the QLogic SANbox2-64, the following displays:



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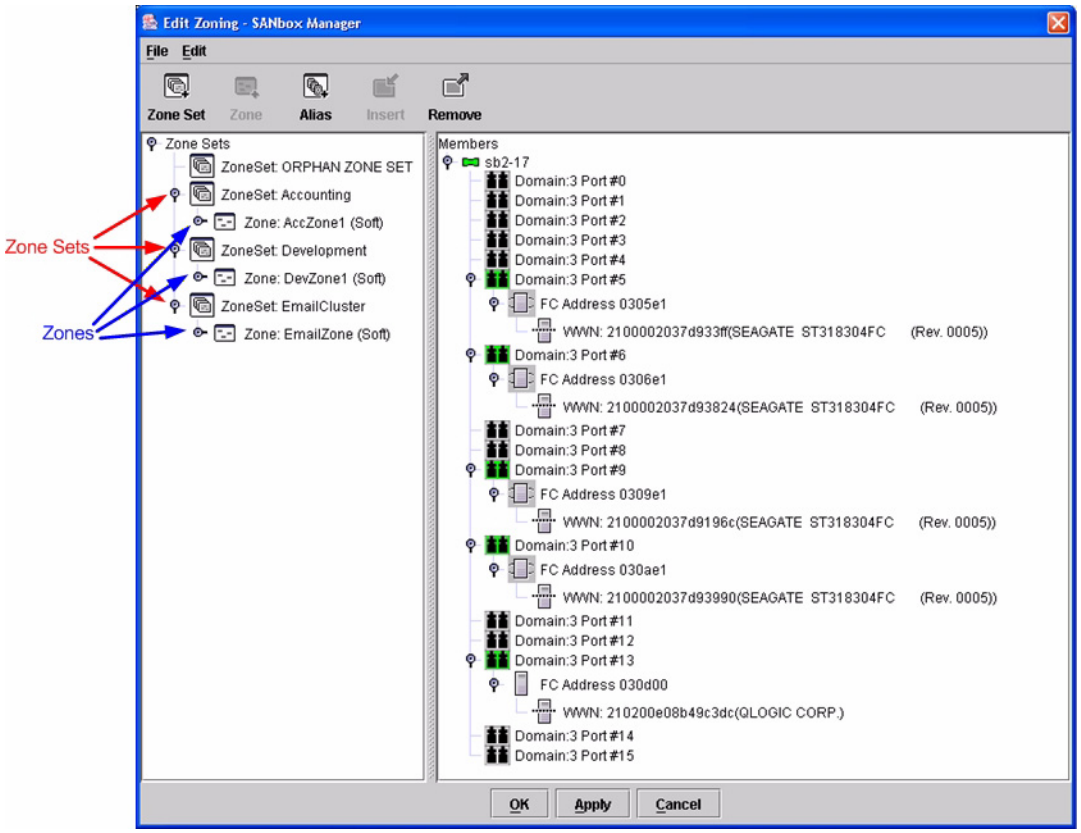
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 107.

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



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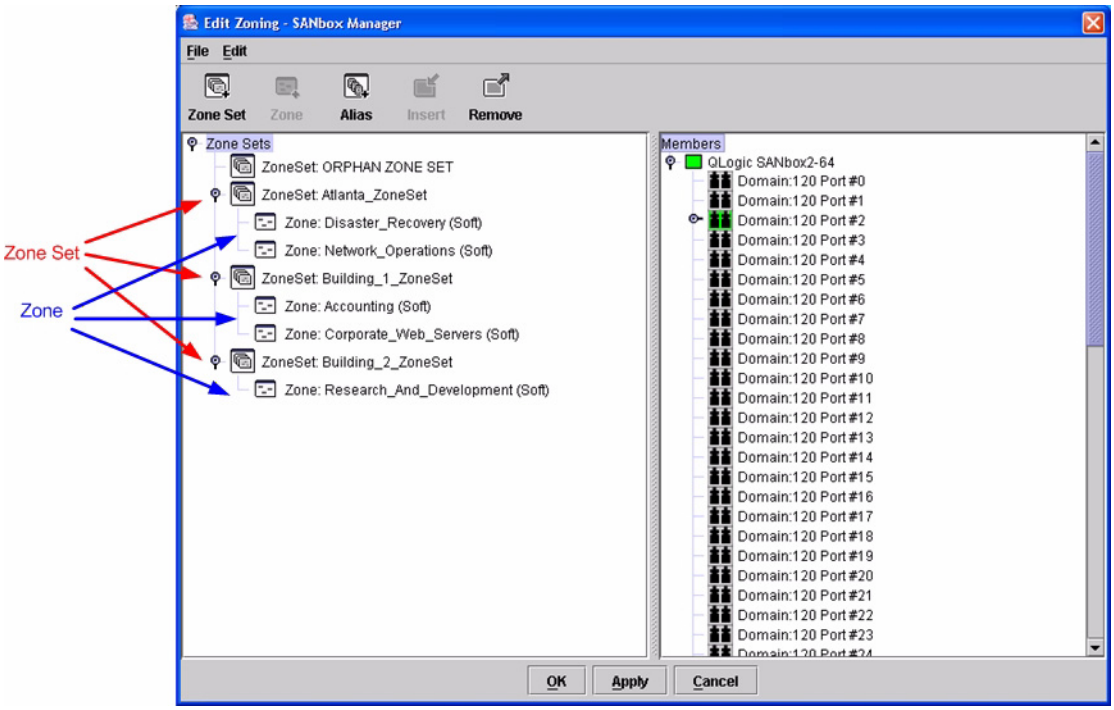
For the QLogic SANbox2-64, the following displays:



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
```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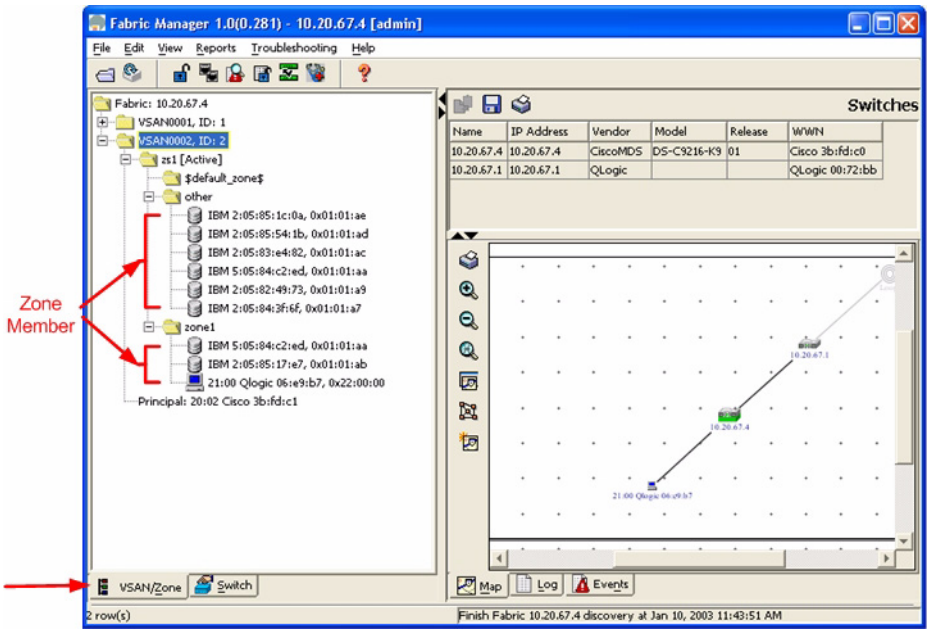
Zone Types

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 QLogic, 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 107 and are unique between the switches.



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Cisco CLI

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

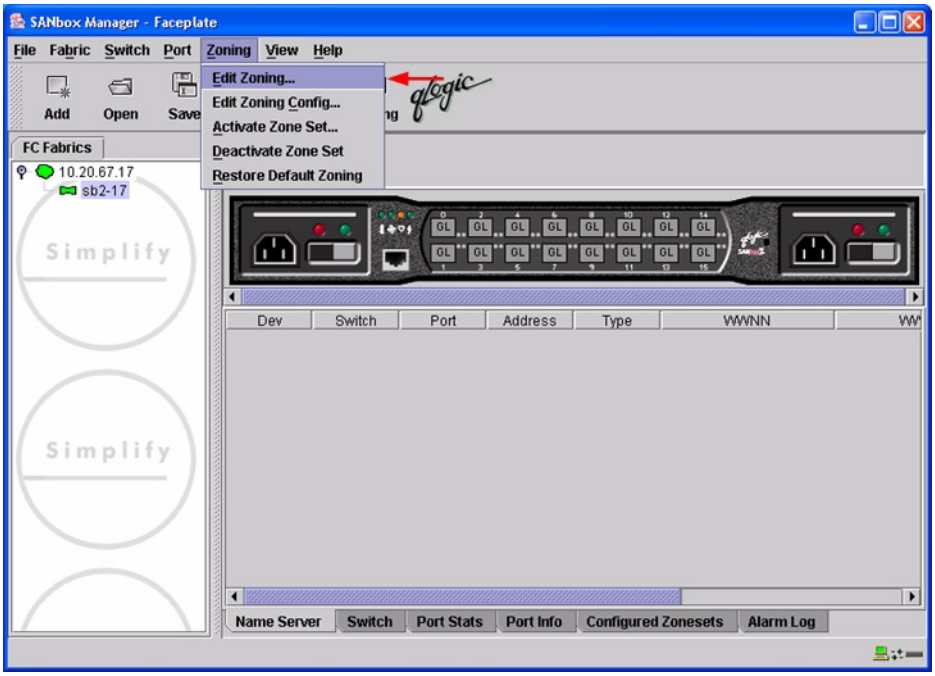
```
login: admin
Password: ********
Cisco_9216# show zone vsan <vsan id>
```

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

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:



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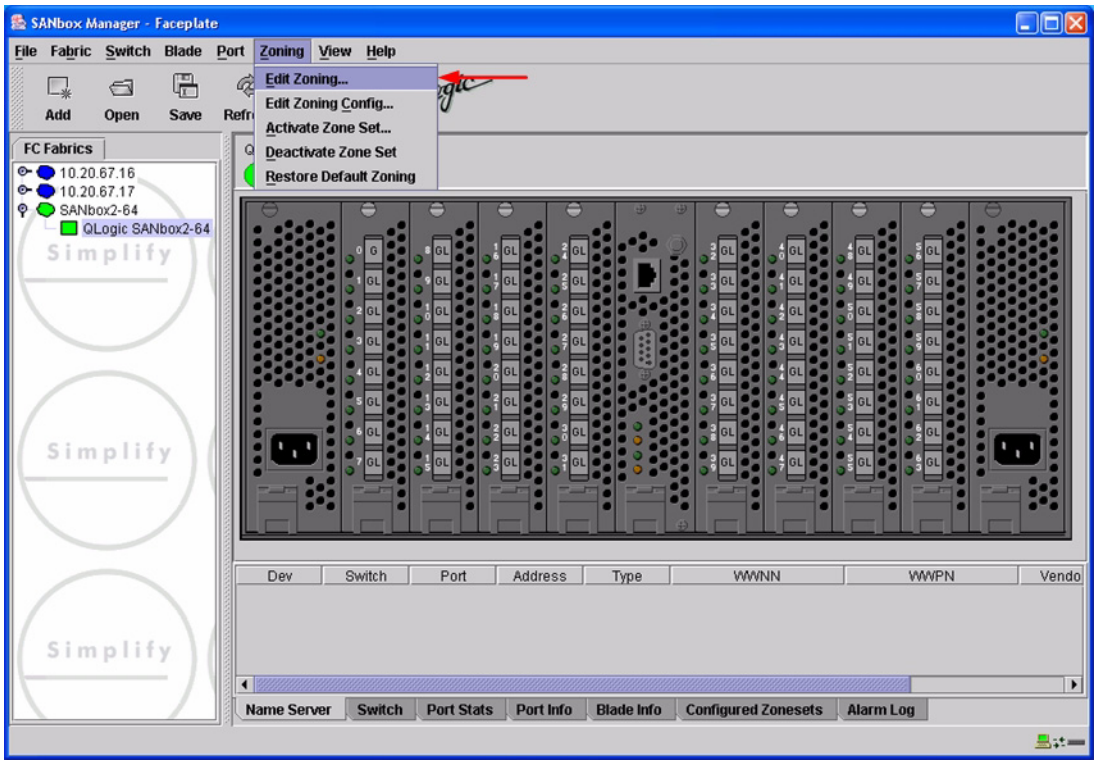
For the QLogic SANbox2-64, the following displays:



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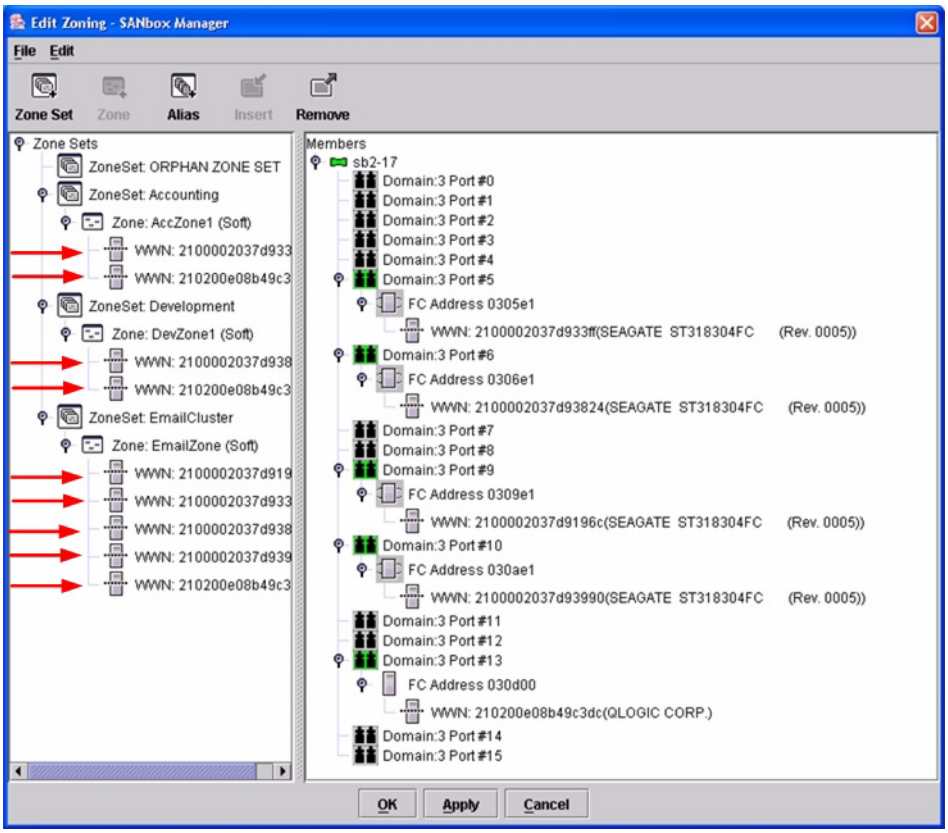
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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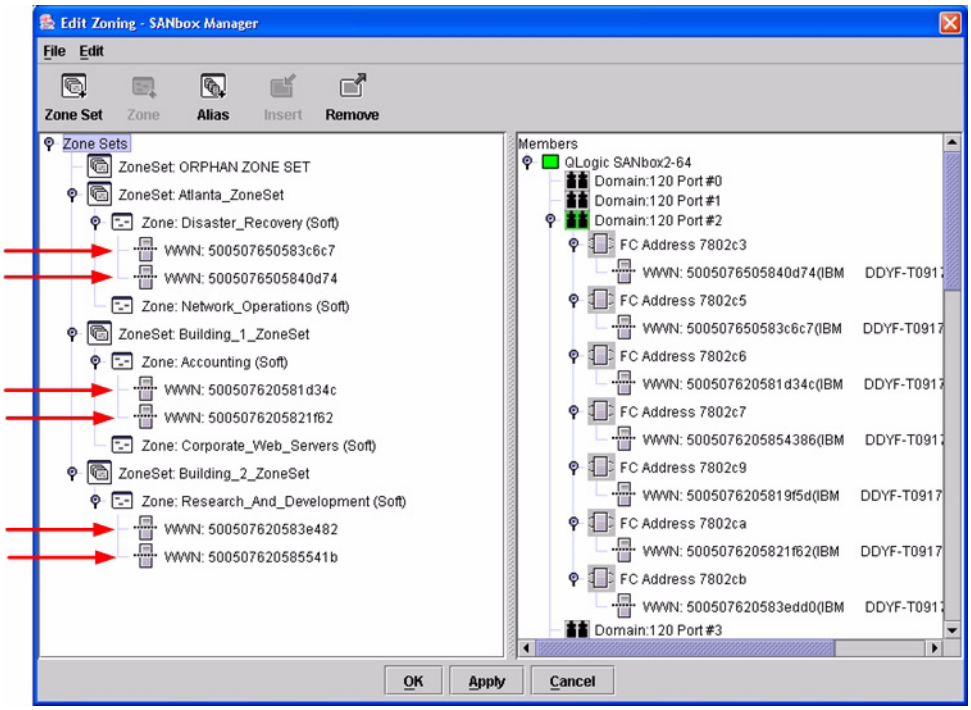
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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Operating Mode Configuration

Not applicable.

Cisco Specific Configuration

Not applicable.

QLogic 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 QLogic 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 QLogic support.

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Merging QLogic and IBM BladeCenter Fabrics

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

QLogic and IBM Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8	1.3.x and above
	SANbox2-16	1.3.x and above
	SANbox2-64	1.5.x and above
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above

IBM eServer BladeCenter Fibre Channel Switch Module **(see page 121)** provides detailed information about merging QLogic and IBM BladeCenter fabrics.

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IBM eServer BladeCenter
Fibre Channel Switch Module

Integration Checklist

The following steps must be completed to successfully merge IBM BladeCenter and QLogic 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 (see "Domain ID Configuration" on page 123).

✓ Set all switches to the appropriate timeout values (see "Timeout Values" on page 130).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see "Active Zone Set Names" on page 137).

✓ Ensure that all QLogic switches are configured for Merge Active Zonesets Only or SW2 mode, as appropriate (see "Operating Mode Configuration" on page 143).

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

Configuration Limitations

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

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Supported Switches and Firmware Versions

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

QLogic and IBM Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
IBM	IBM eServer BladeCenter Fibre Channel Switch Module	1.4.0.35.00 or above

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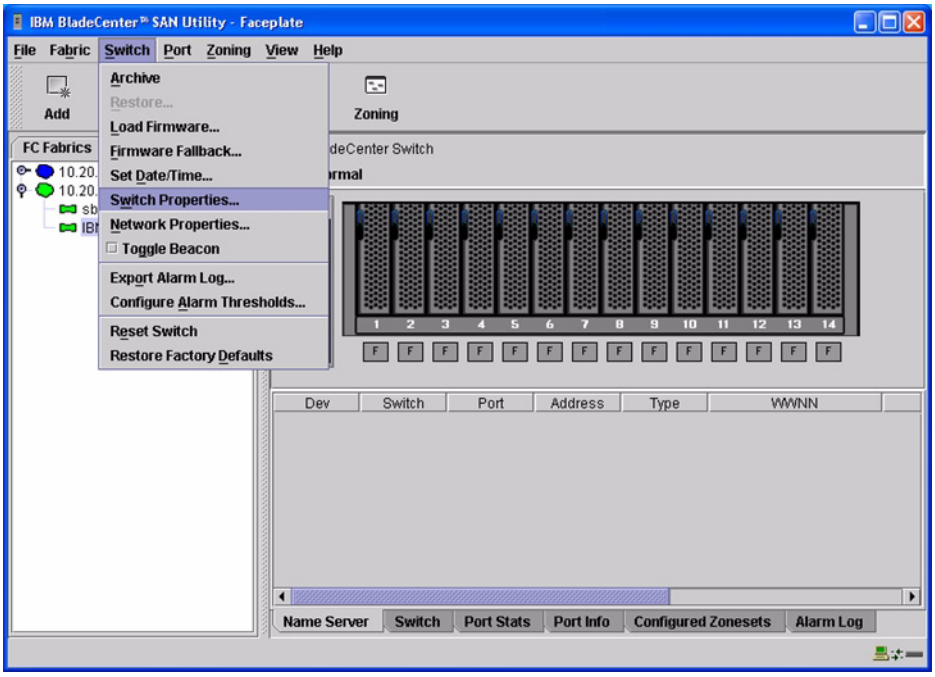
Domain ID Configuration

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

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**.



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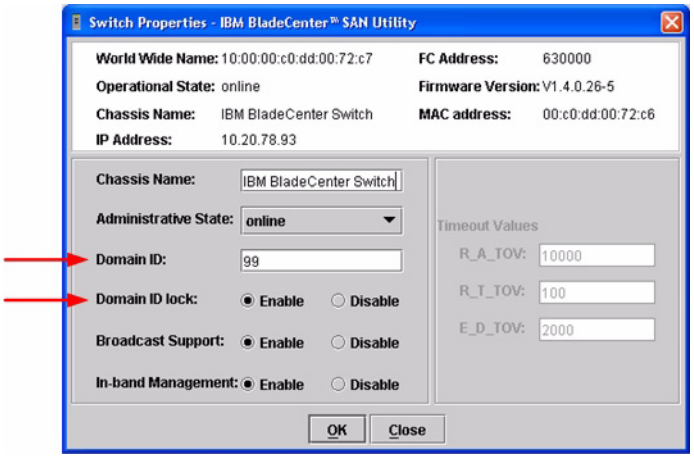
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.



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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
```


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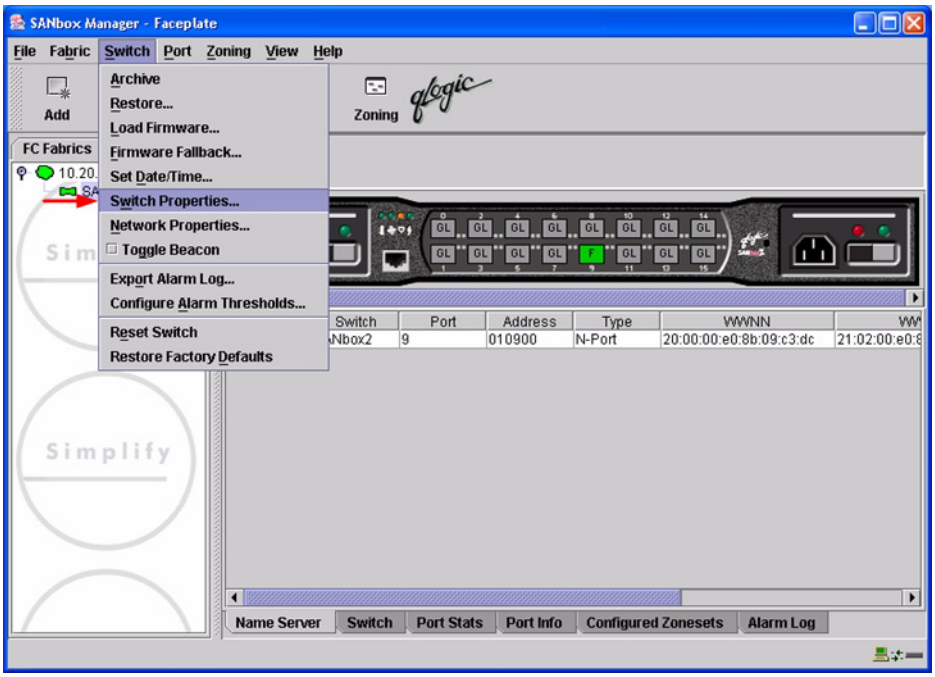
QLogic SANbox Manager GUI

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:



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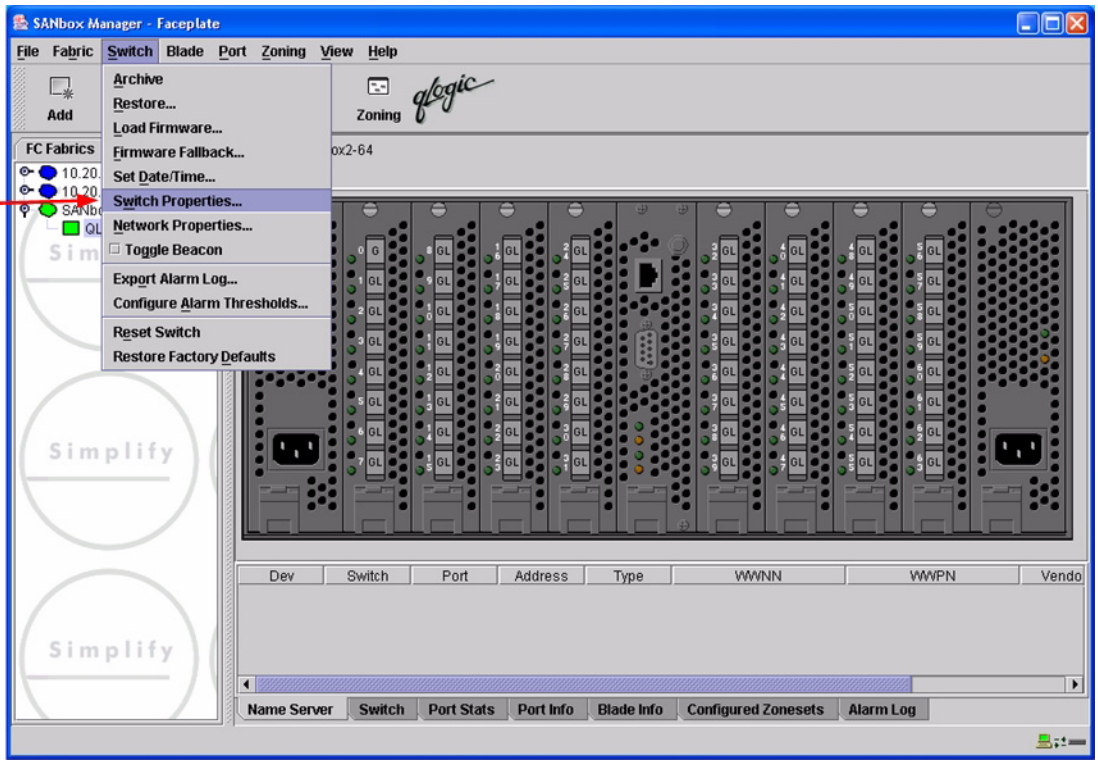
For the QLogic SANbox2-64, the following displays:



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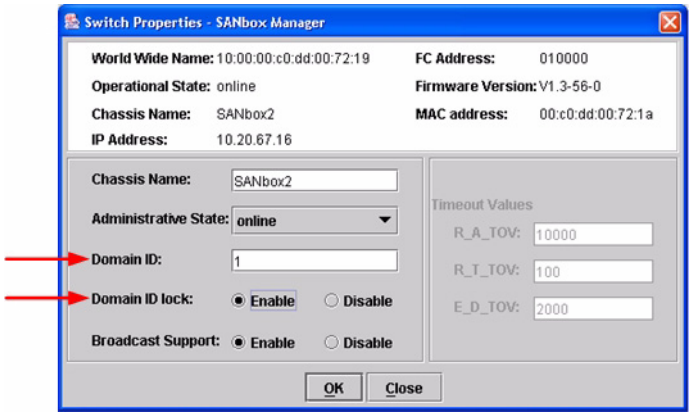
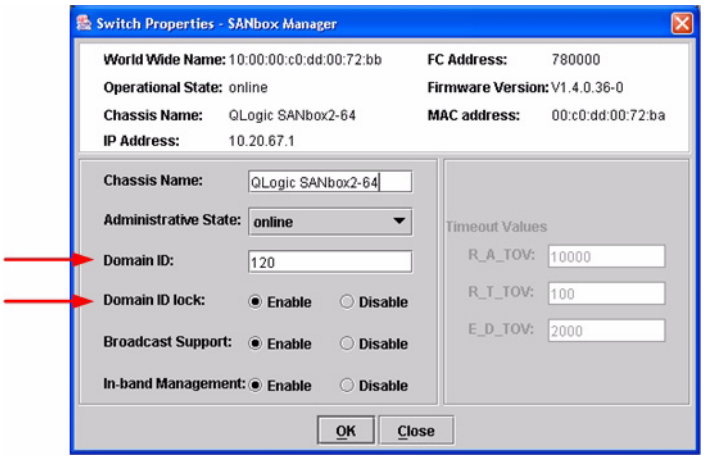
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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:

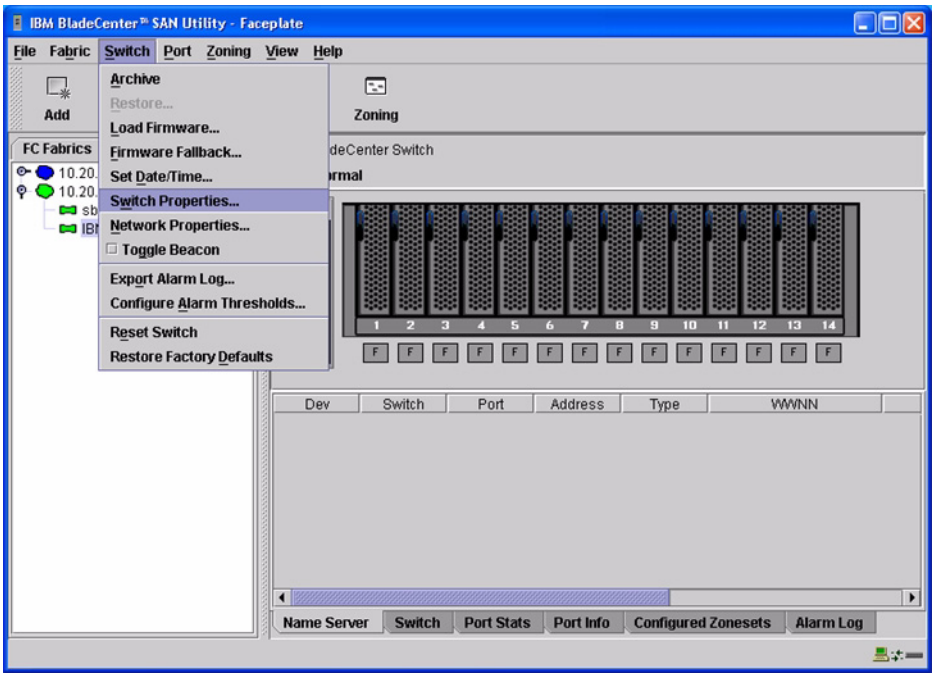
R_A_TOV = 10 seconds
E_D_TOV = 2 seconds

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**.



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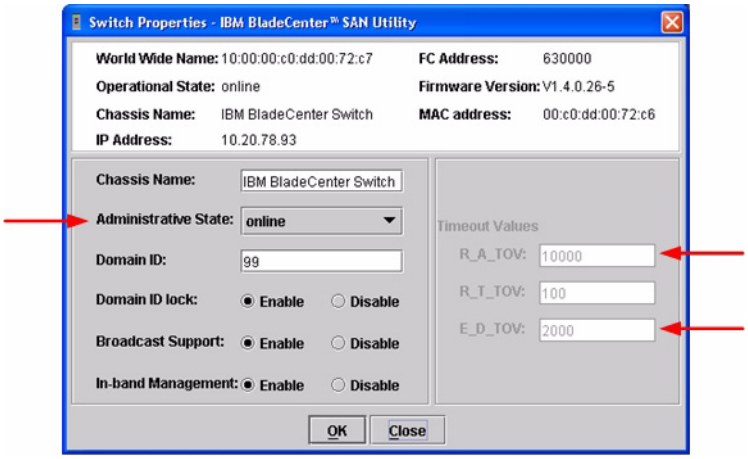
3. From the **Switch Properties—IBM BladeCenter SAN Utility** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.



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**.

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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
```


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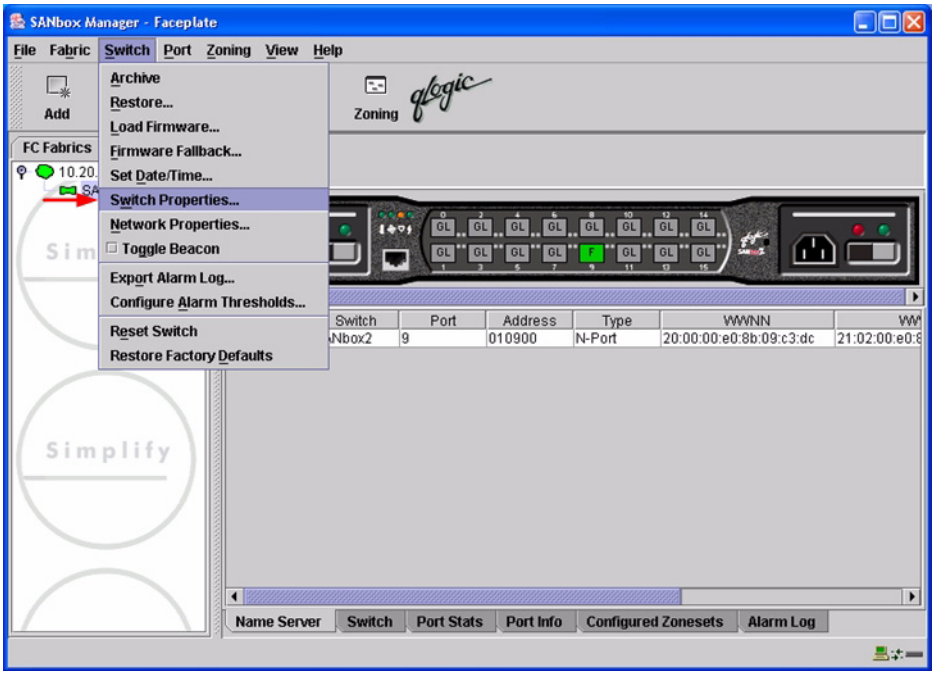
QLogic SANbox Manager GUI

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:



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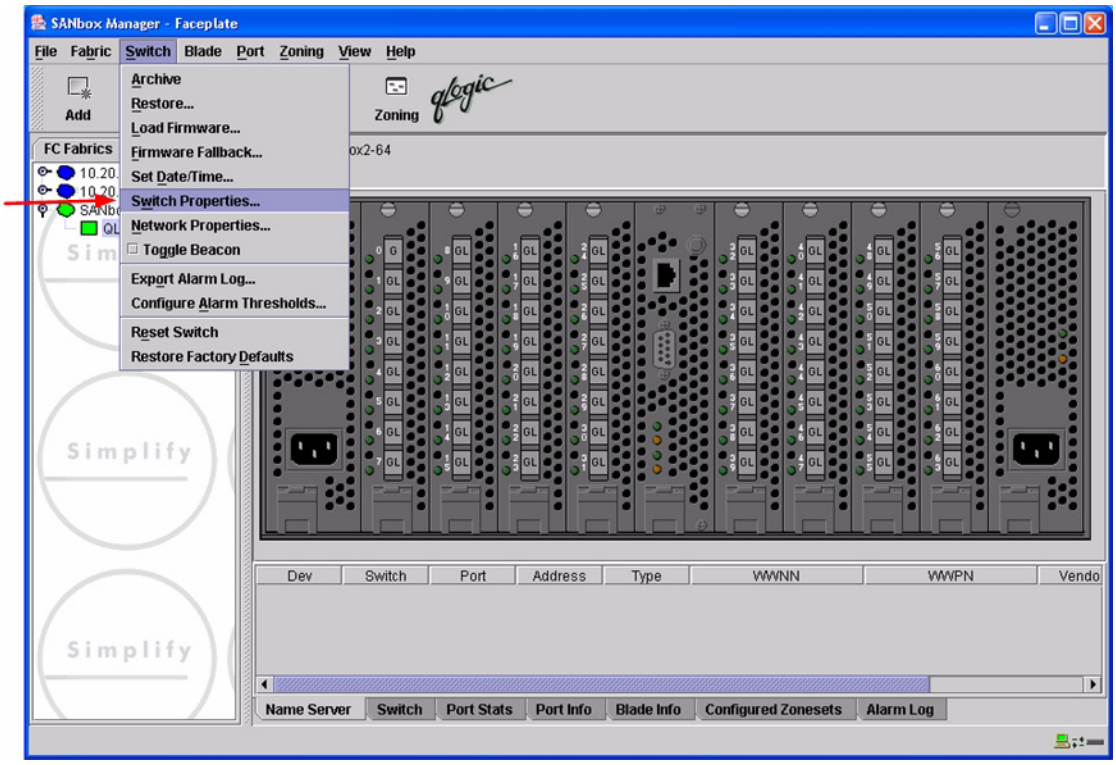
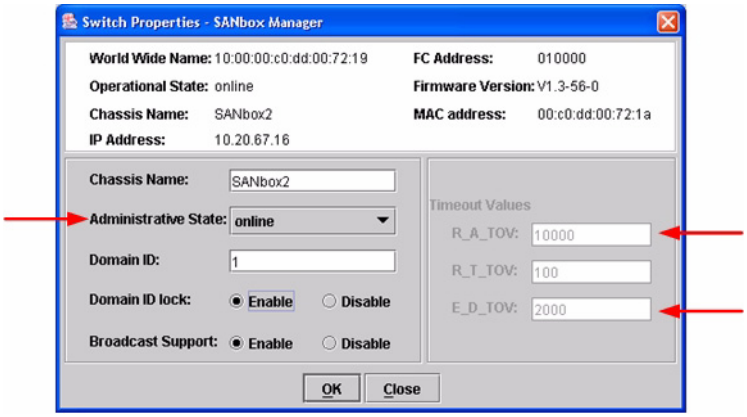
For the QLogic SANbox2-64, the following displays:



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:



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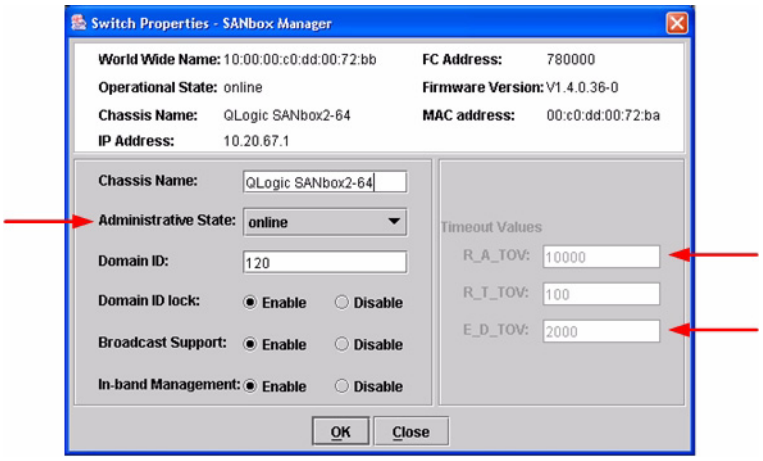
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

IBM eServer BladeCenter Fibre Channel Switch Modules and QLogic SANblade switches negotiate for principal switch automatically. Therefore, there are no steps to take.

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Zone Configuration

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

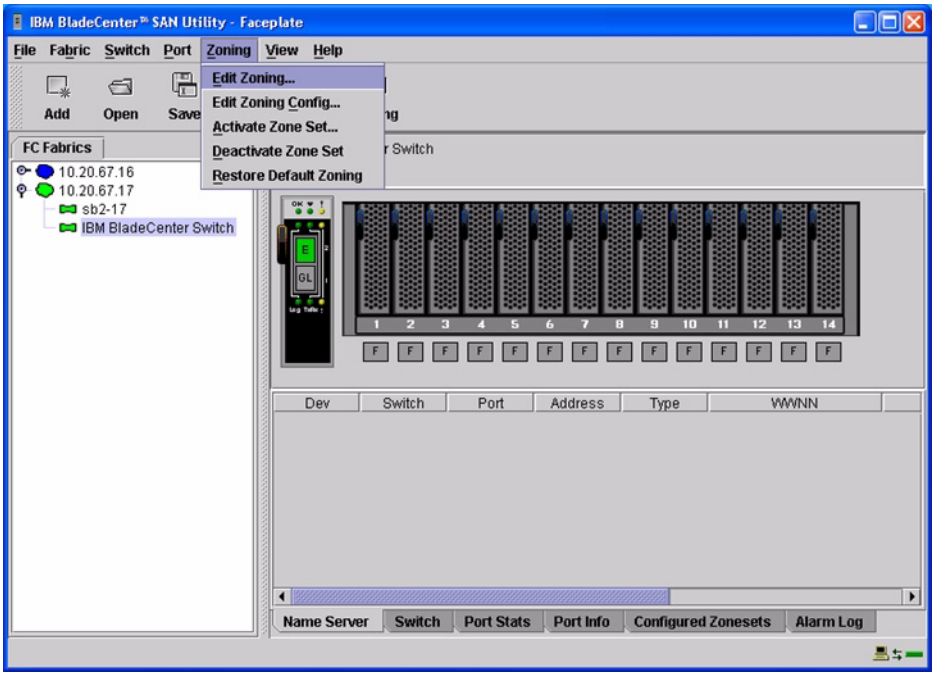
Active Zone Set Names

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**.



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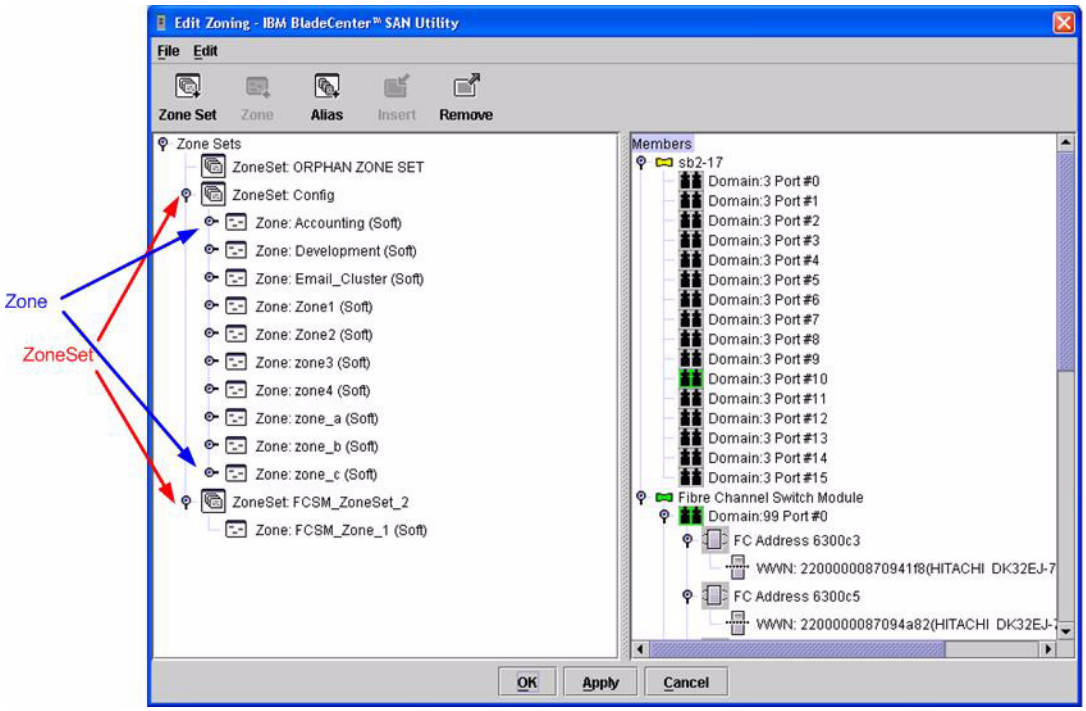
3. From the **Edit Zoning—IBM BladeCenter SAN Utility** dialog box, compare the Zone Set and Zone names from each switch to ensure that none have the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 137.



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
```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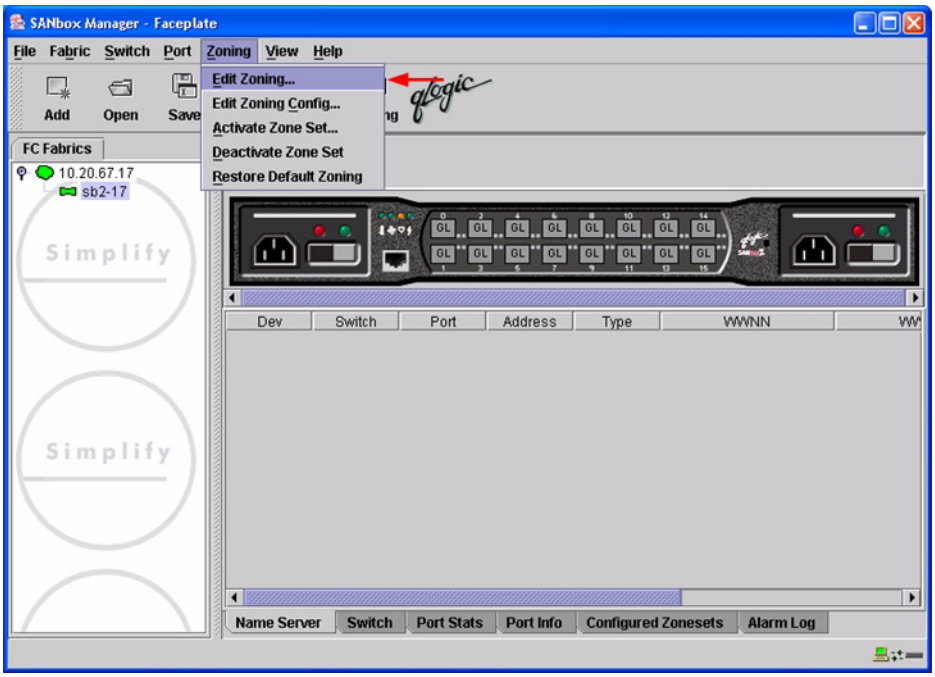
QLogic SANbox Manager GUI

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:



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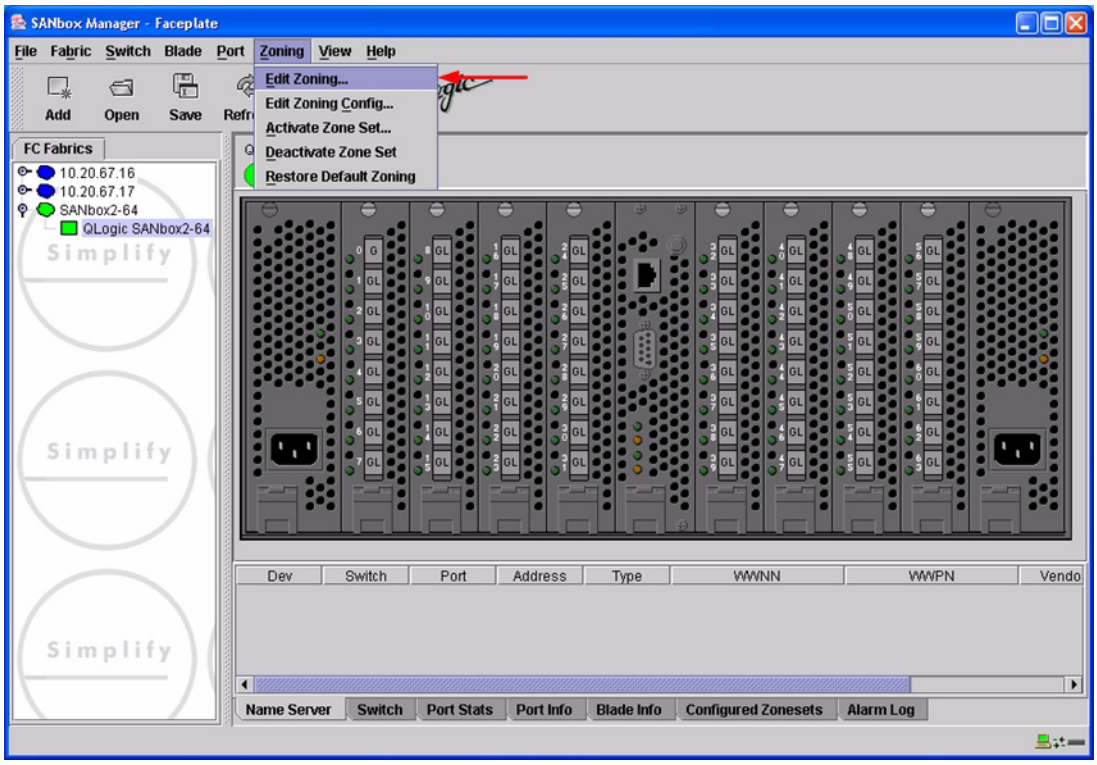
For the QLogic SANbox2-64, the following displays:



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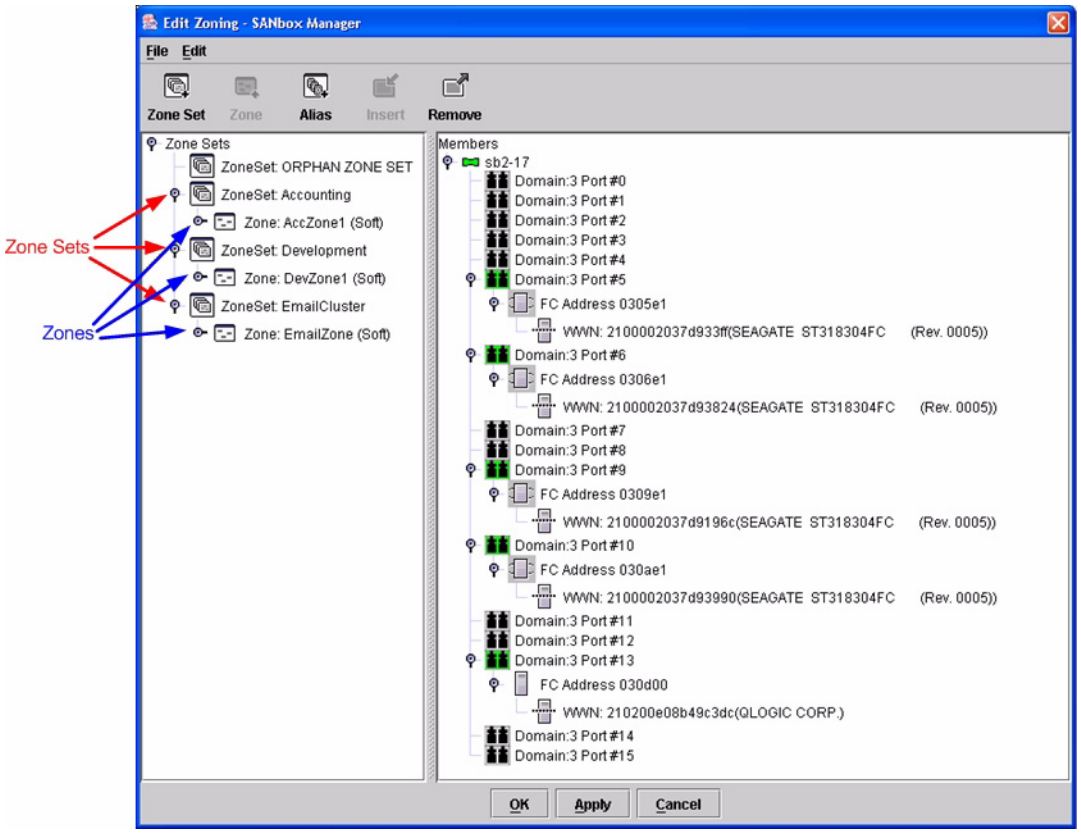
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 137.

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



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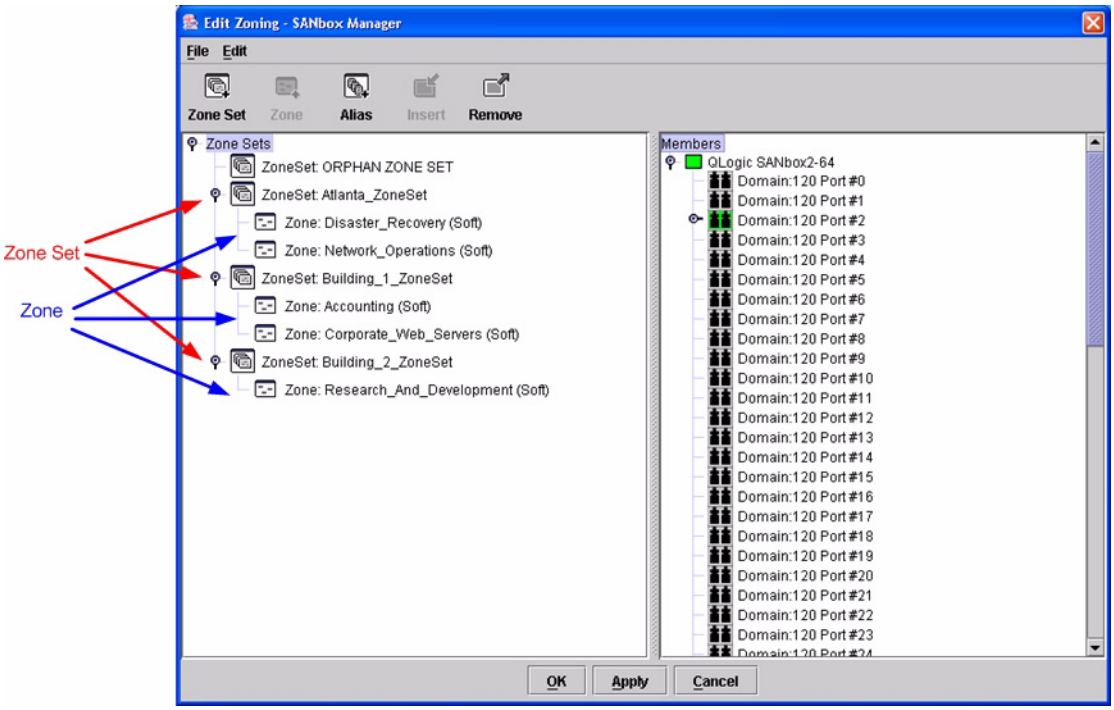
For the QLogic SANbox2-64, the following displays:



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
```

Zone Types

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

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Operating Mode Configuration

NOTE: Perform the following steps only when connecting from a QLogic SANbox2-8 or SANbox2-16 with version 1.3.xxx firmware.

IBM eServer BladeCenter SAN Utility

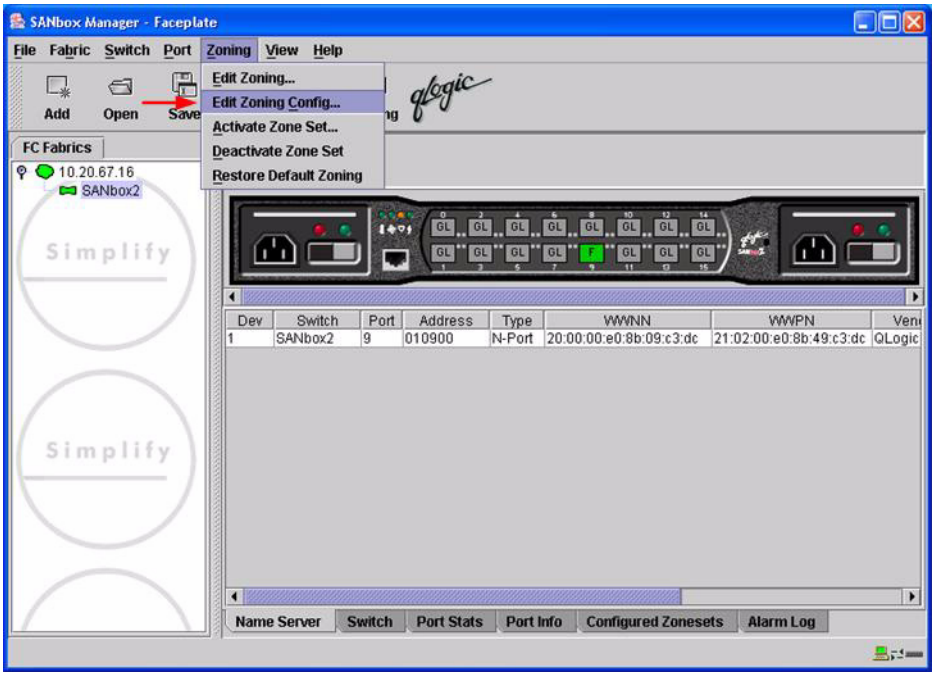
Not applicable.

IBM eServer BladeCenter Fibre Channel Switch Module CLI

Not applicable.

QLogic SANbox Manager GUI

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



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3. The **Zoning Config—SANbox Manager** dialog box displays.

   In the **Merge Mode** list, select **Merge Active Zonesets Only**. This is equivalent to SW2 mode in the CLI.

QLogic CLI

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

The following options display:

```
   AutoSave       (True / False)   [True]
   Default        (All / None)     [All ]
   MergeMode      (Brocade / SW2)  [SW2 ]
SANbox2 (admin-config) #> config save
SANbox2 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```

IBM BladeCenter Specific Configuration

Not applicable.

QLogic Specific Configuration

Not applicable.

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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 QLogic 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 QLogic support.

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Merging QLogic and INRANGE Fabrics

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switch from INRANGE that complies with the FC-SW-2 standard.

QLogic and INRANGE Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
INRANGE	FC/9000 Switch	Code set 3.0.3.2 or above

INRANGE FC/9000 Switch **(see page 149)** provides detailed information about merging QLogic and INRANGE fabrics.

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INRANGE FC/9000 Switch

Integration Checklist

The following steps must be completed to successfully merge INRANGE and QLogic 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 155).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 161).

✓ Ensure that the zone member type is set to Port WWN (see “Zone Types” on page 171).

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

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Configuration Limitations

When merging INRANGE and QLogic fabrics, the maximum number of switches that can be configured depends upon the INRANGE switch configuration.

- For the FC/9000-64, the maximum is 56 interconnected switches per fabric.
- For the FC/9000-128, 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 QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switch from INRANGE that complies with the FC-SW-2 standard.

QLogic and INRANGE Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
INRANGE	FC/9000 Switch	Code set 3.0.3.2 or 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 QLogic Switch.

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

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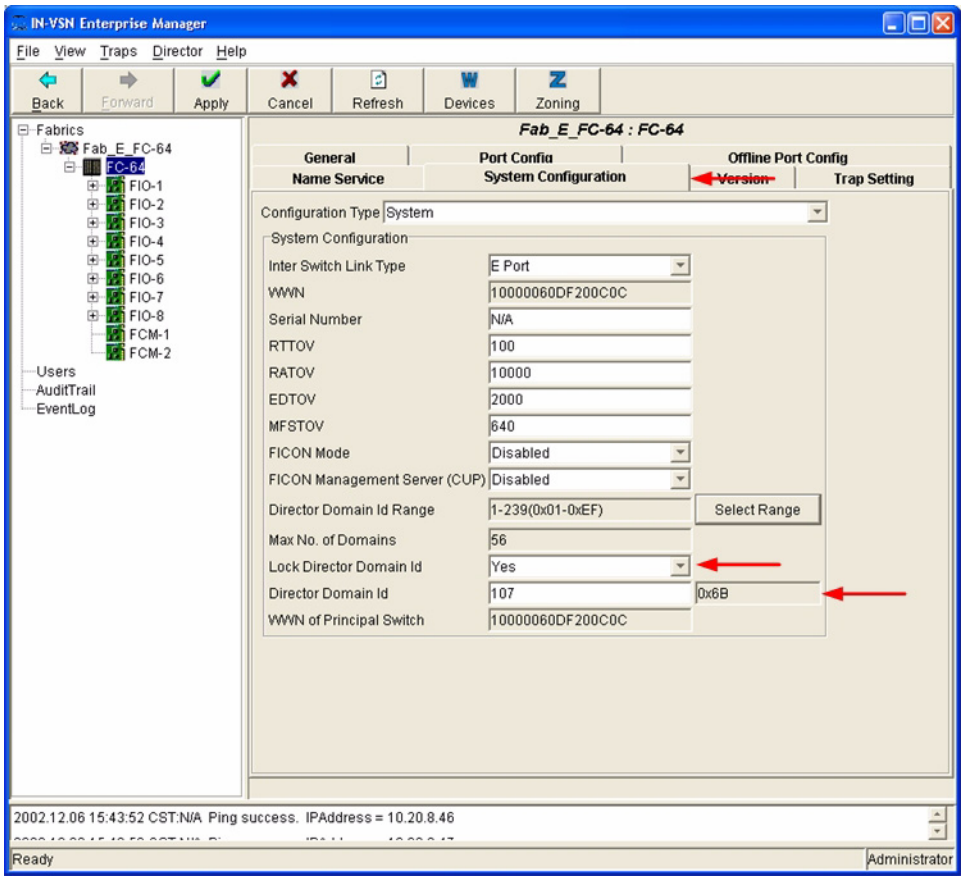
INRANGE IN-VSN Enterprise Manager

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.

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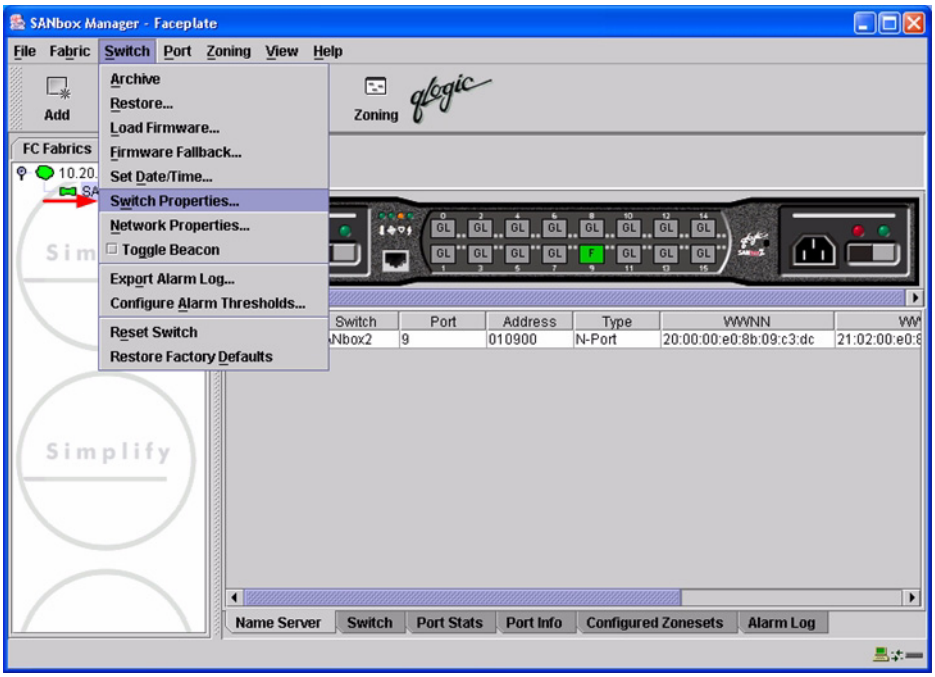
QLogic SANbox Manager GUI

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:



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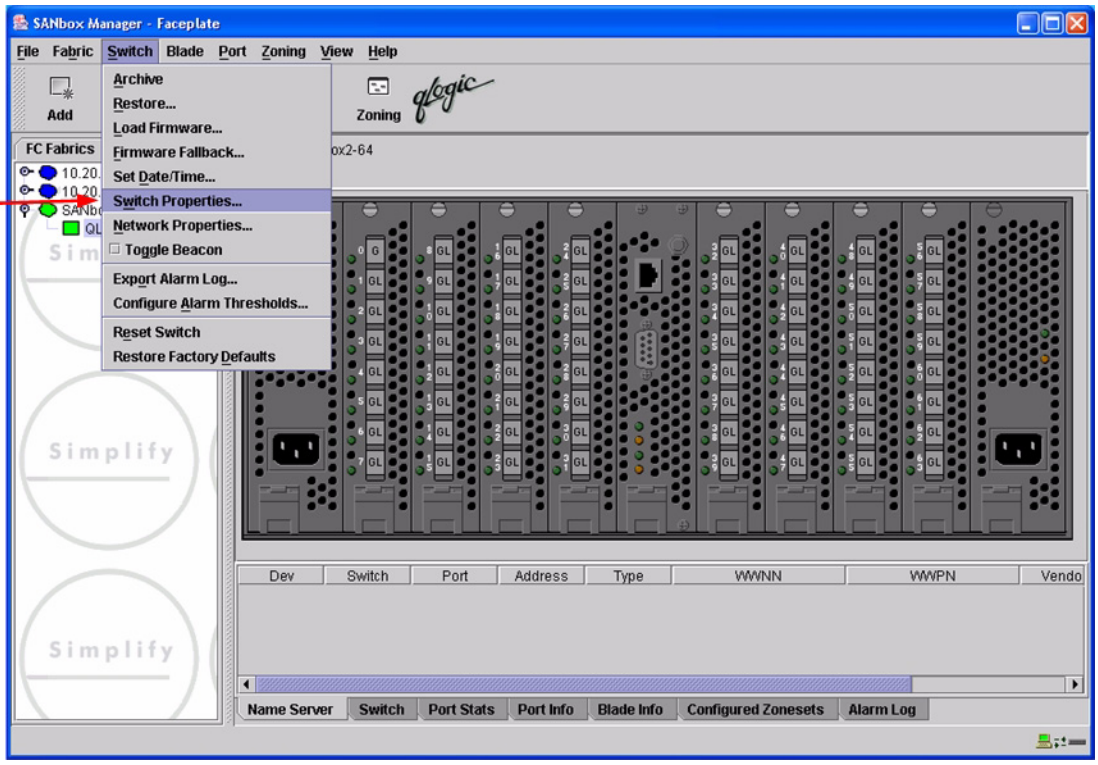
For the QLogic SANbox2-64, the following displays:



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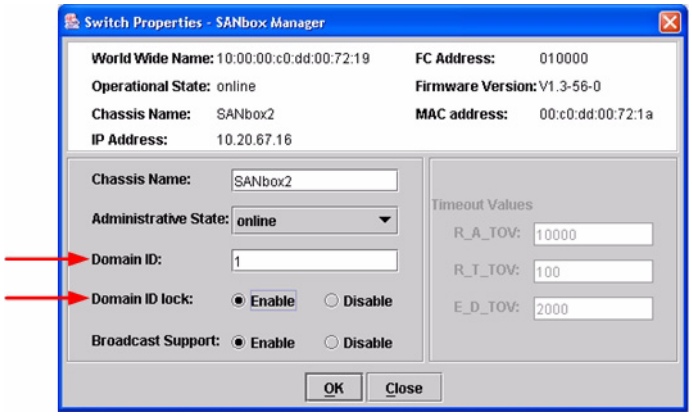
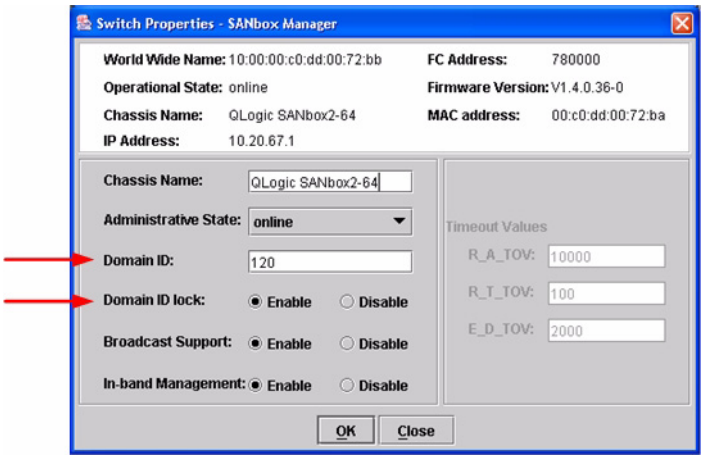
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```

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.

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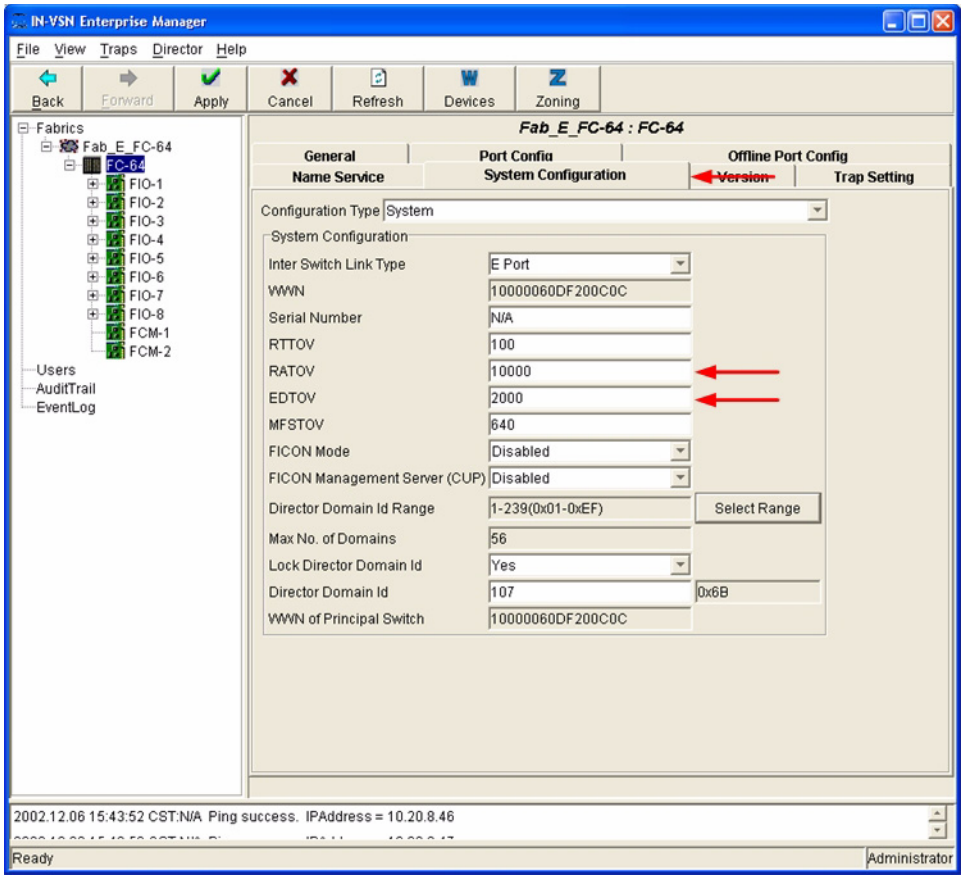
INRANGE IN-VSN Enterprise Manager

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.

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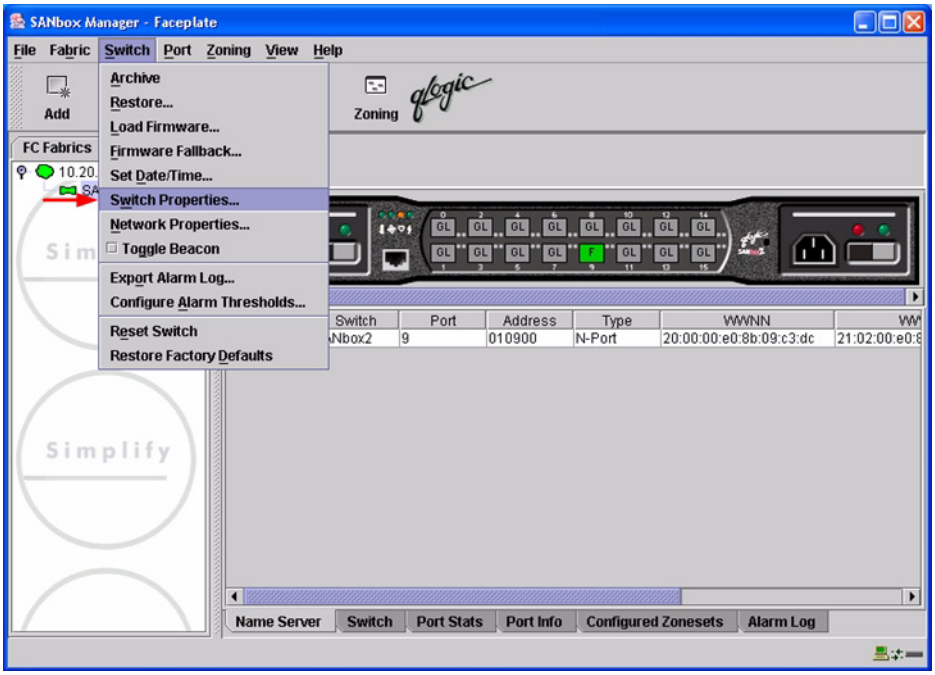
QLogic SANbox Manager GUI

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:



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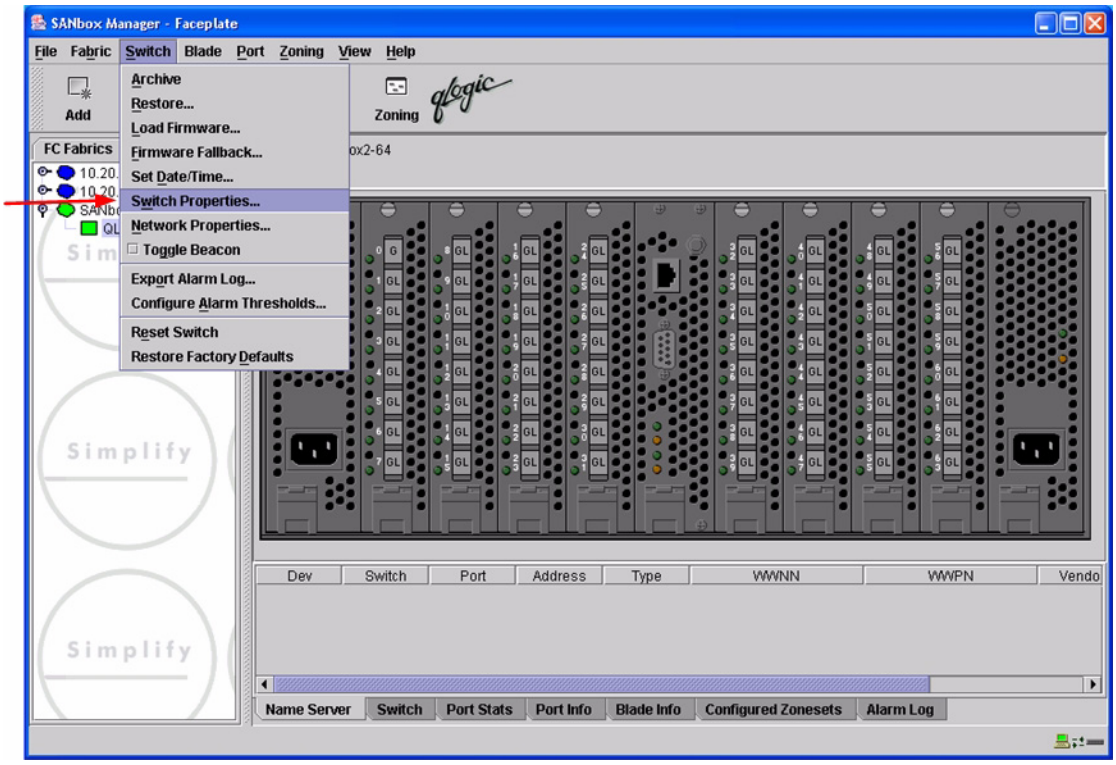
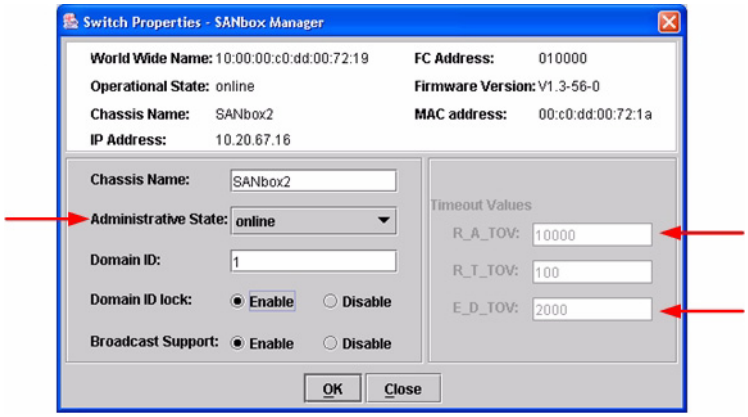
For the QLogic SANbox2-64, the following displays:



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:



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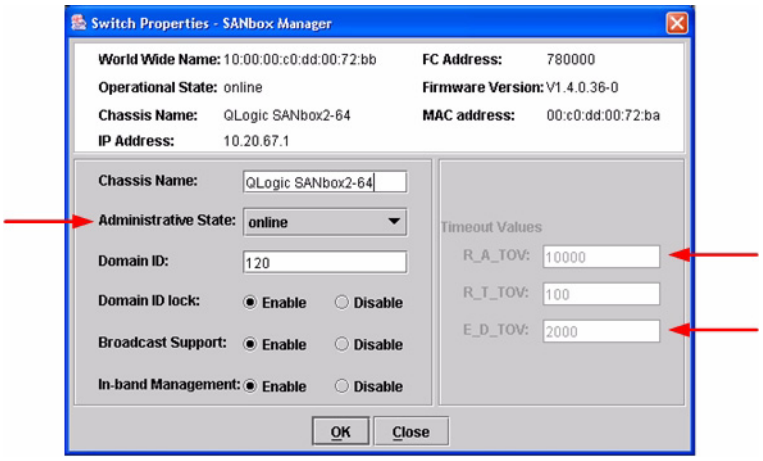
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

INRANGE switches and QLogic switches negotiate for principal switch automatically. Therefore, there are no steps to take.

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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.

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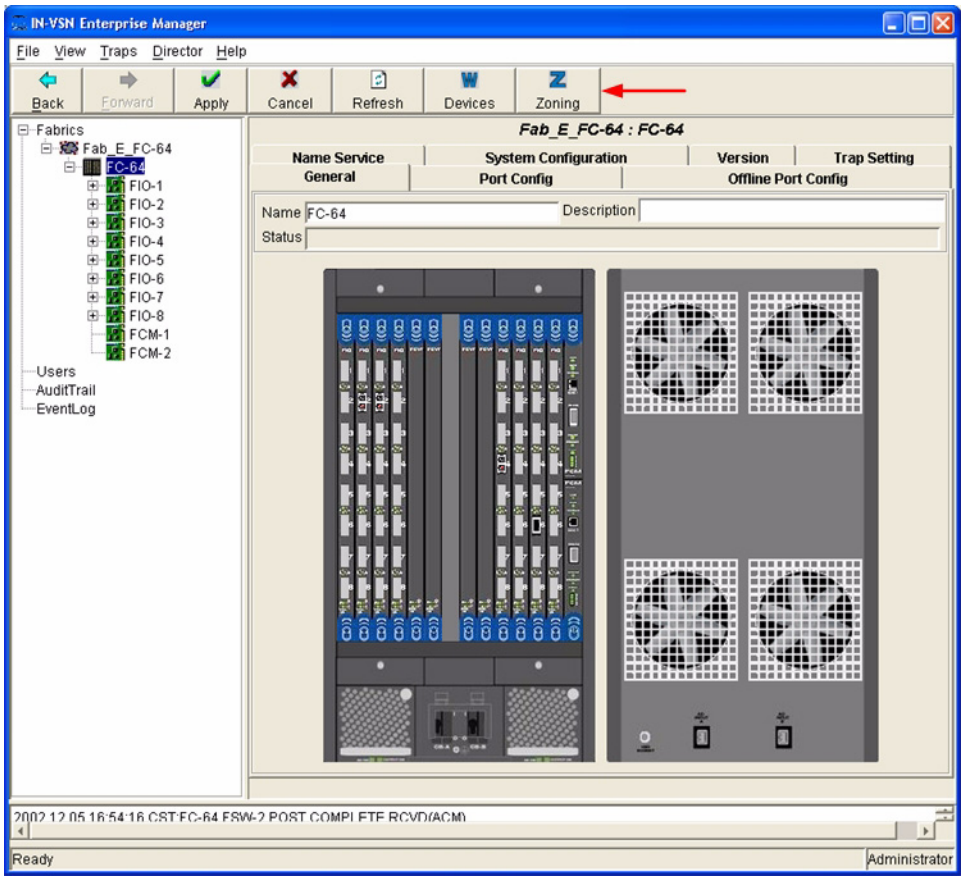
INRANGE IN-VSN Enterprise Manager

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



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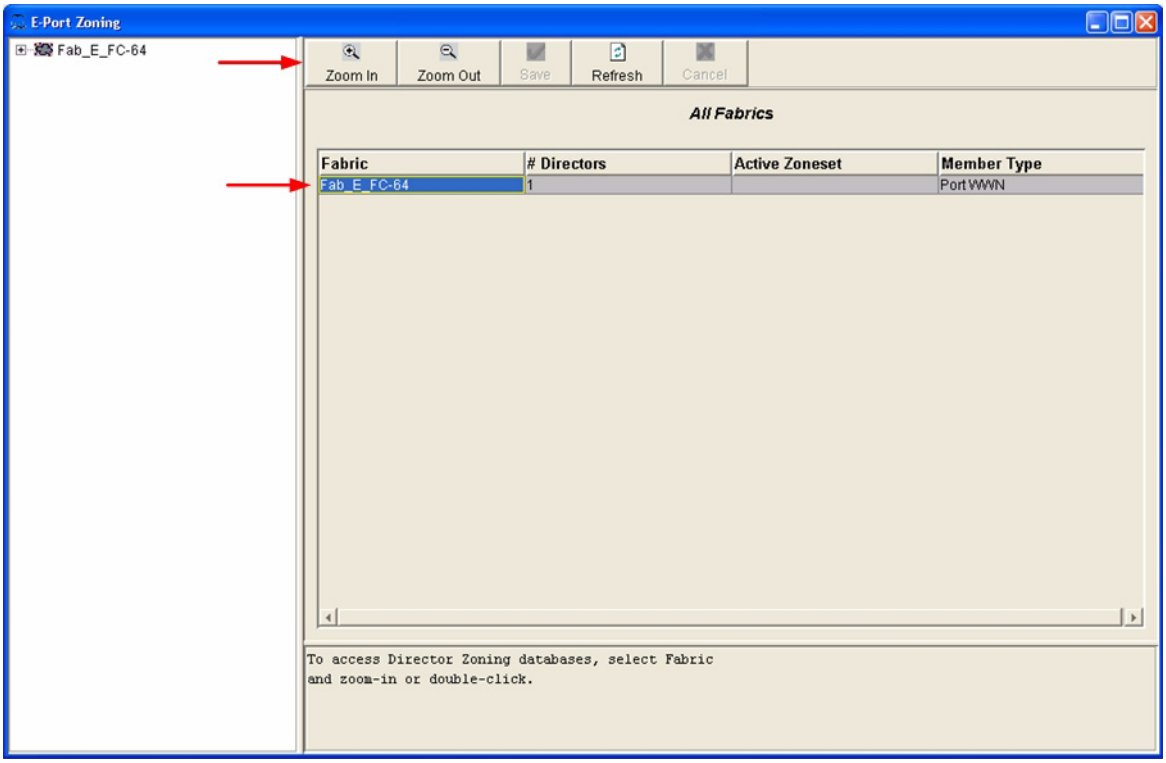
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



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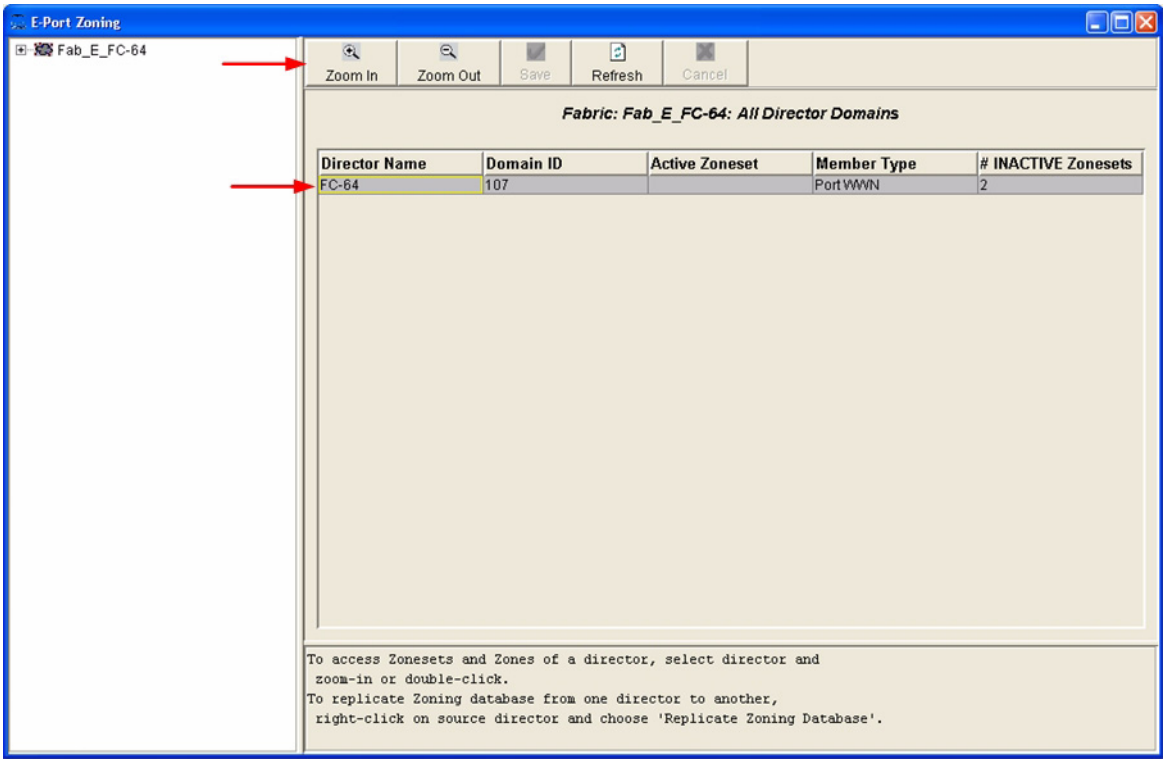
3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



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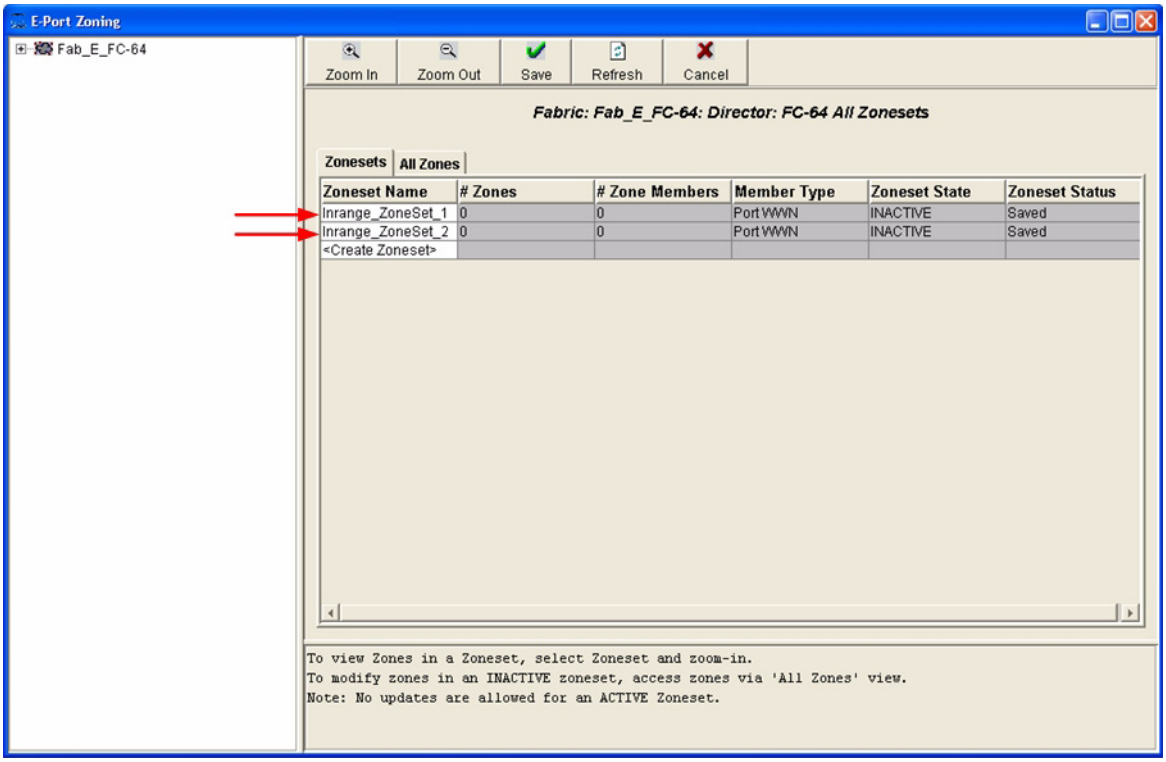
4. From the **E-Port Zoning (Fabric *x*: Director *y*: All Zonesets)** dialog box, select the **Zonesets** tab. Verify that all Zone Set names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 161.



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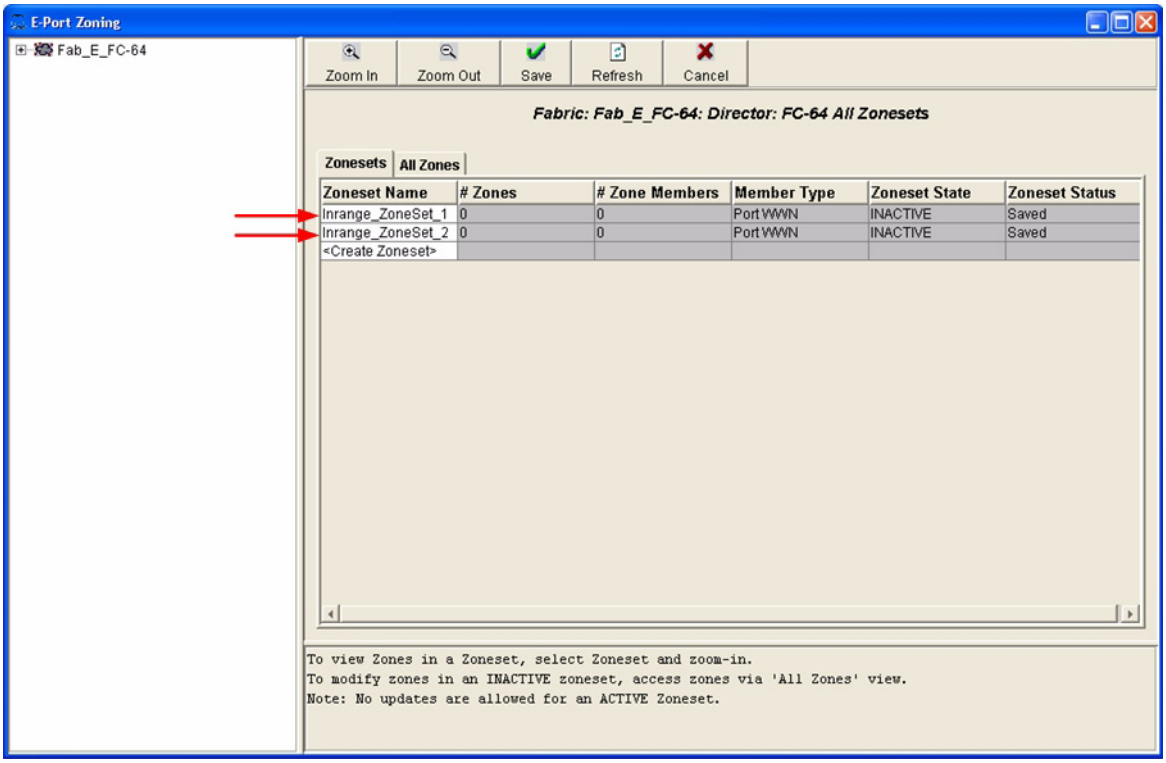
5. Select the **All Zones** tab. Verify that all Zone names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 161.



INRANGE CLI

Not applicable.

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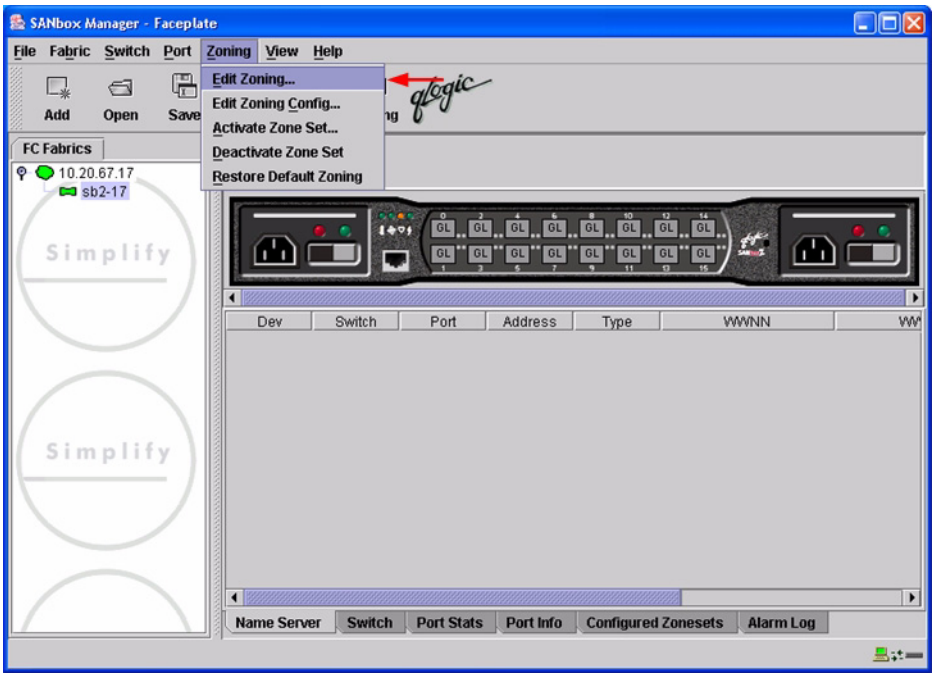
QLogic SANbox Manager GUI

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:



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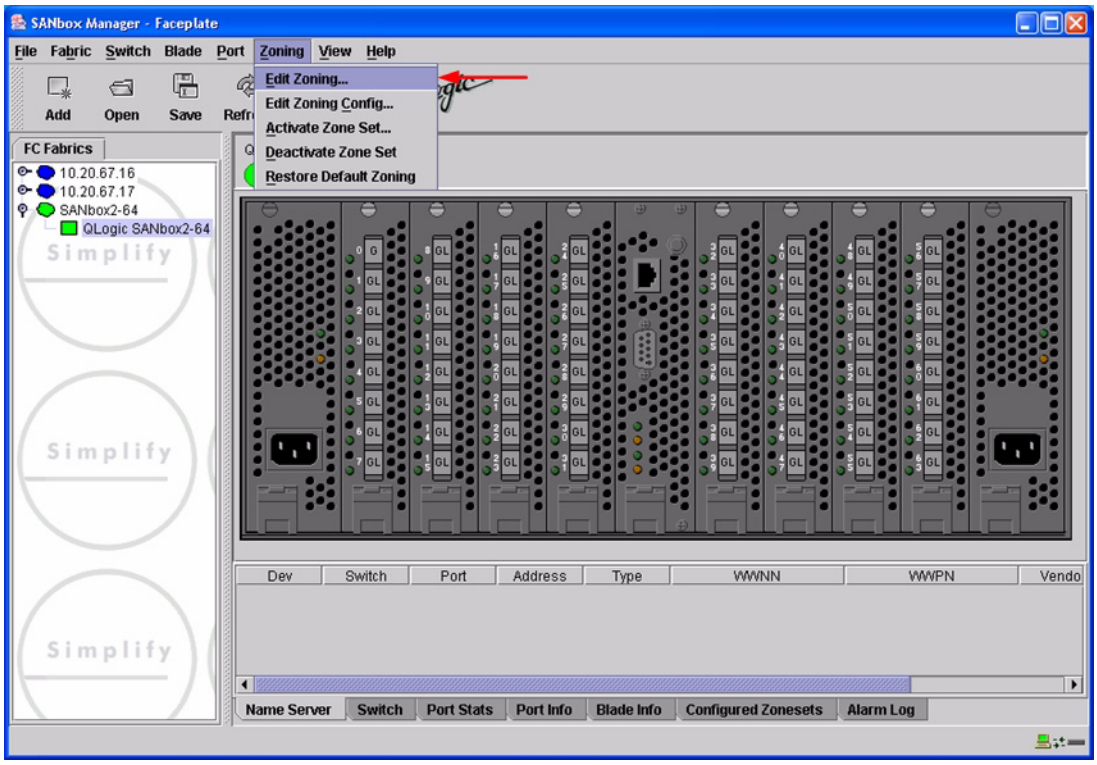
For the QLogic SANbox2-64, the following displays:



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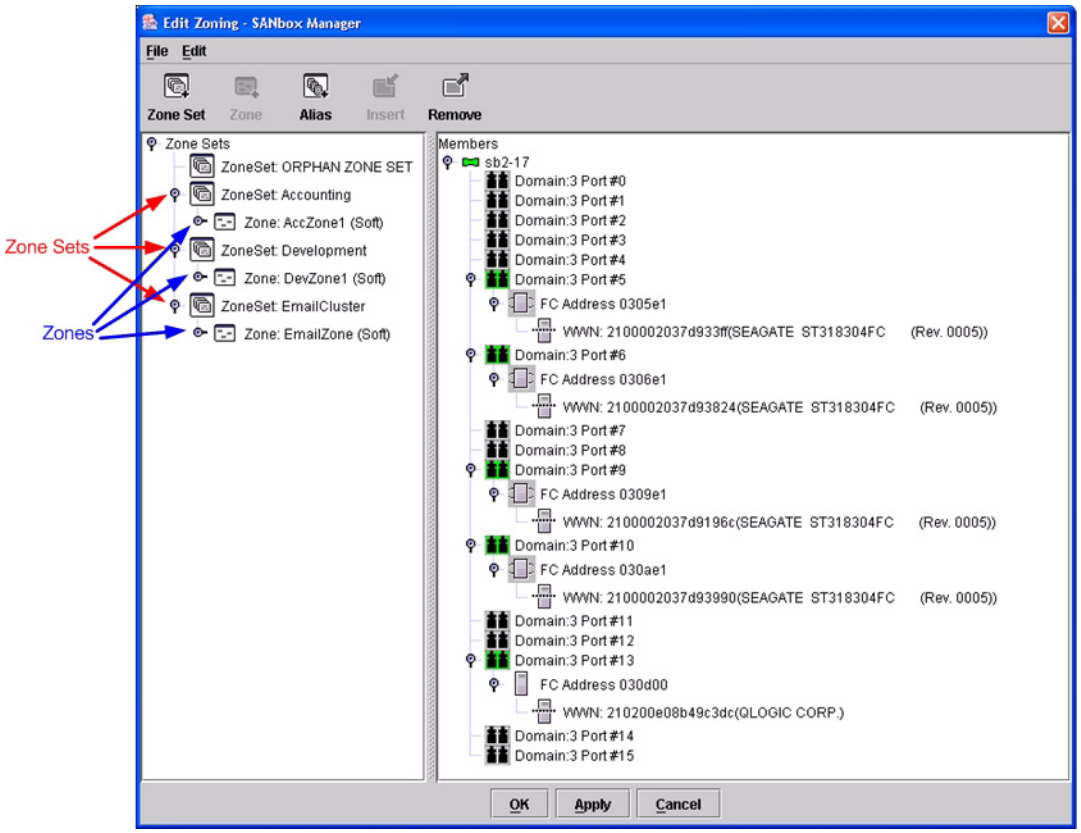
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 161.

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



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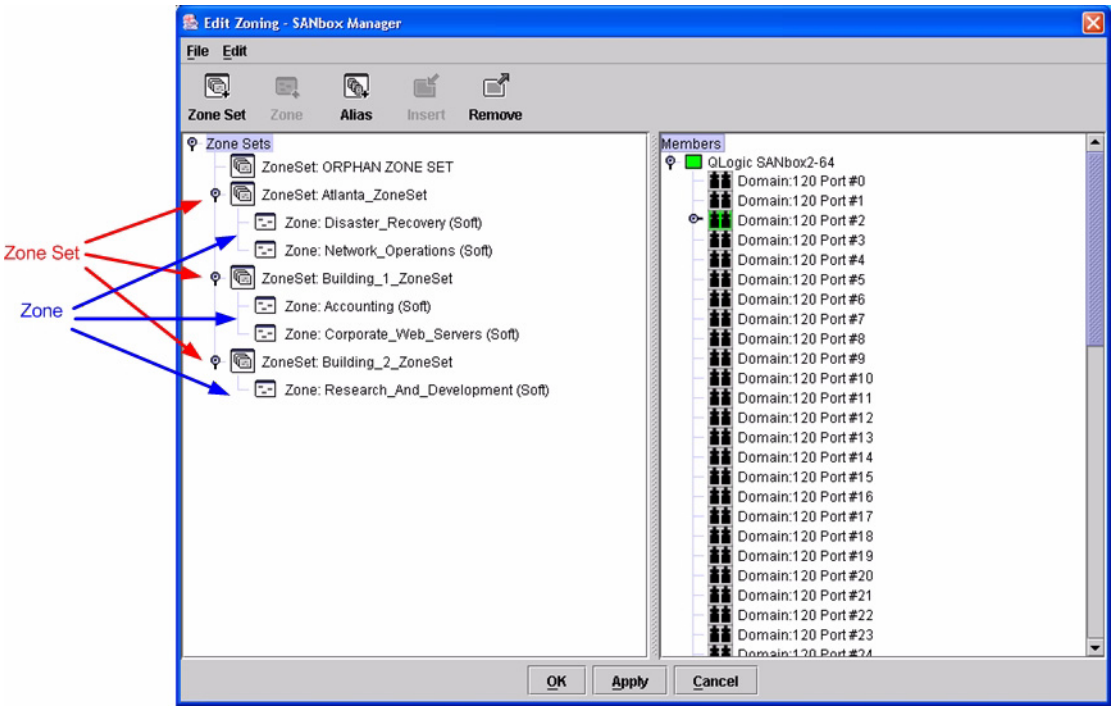
For the QLogic SANbox2-64, the following displays:



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
```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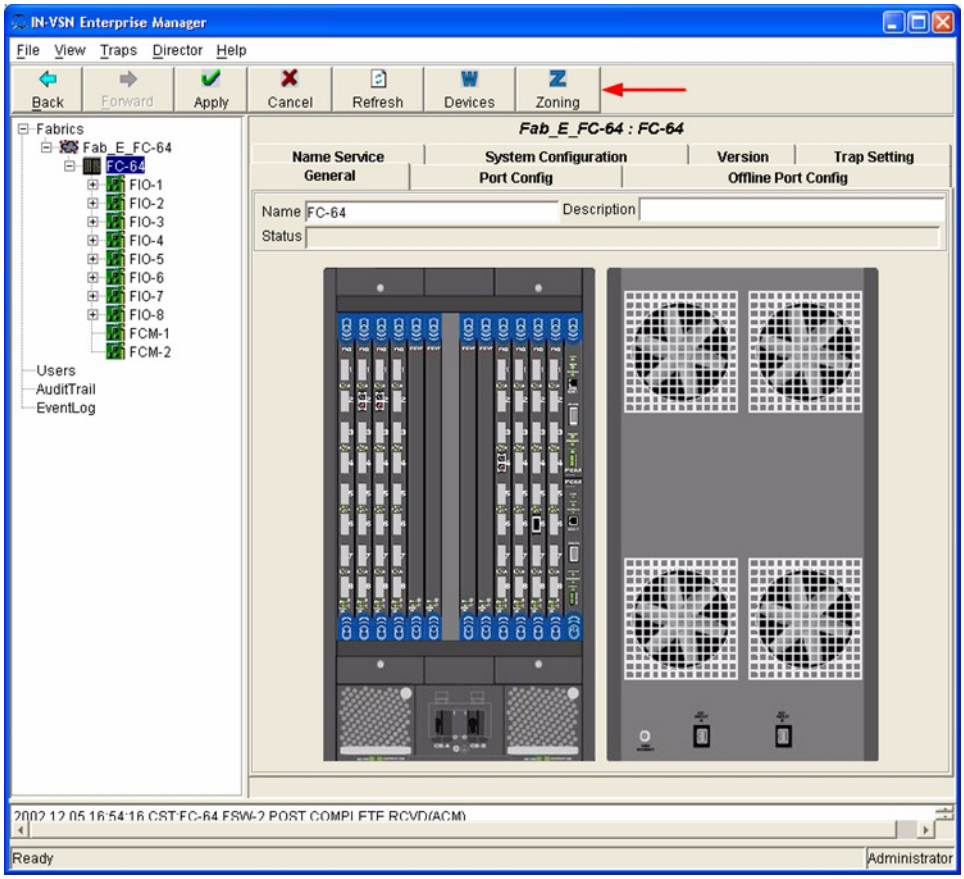
Zone Types

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.

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.



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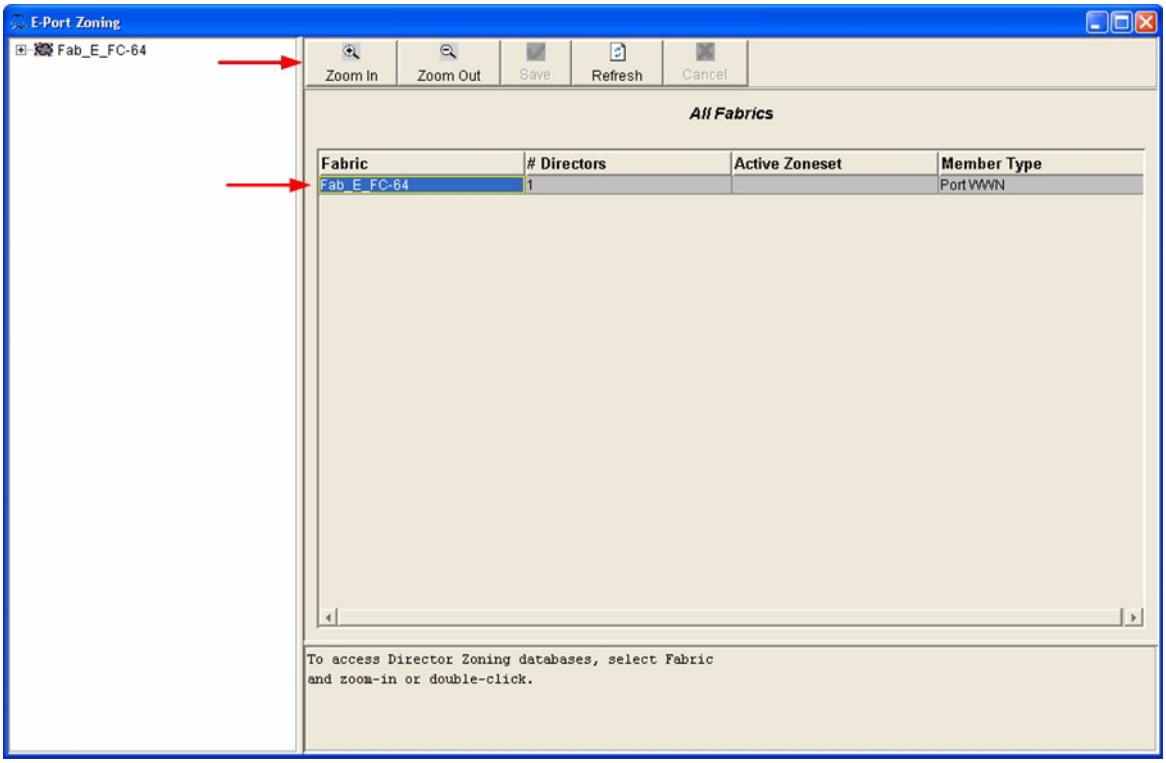
2. From the **E-Port Zoning (All Fabrics)** dialog box, select the fabric and click the **Zoom In** button.



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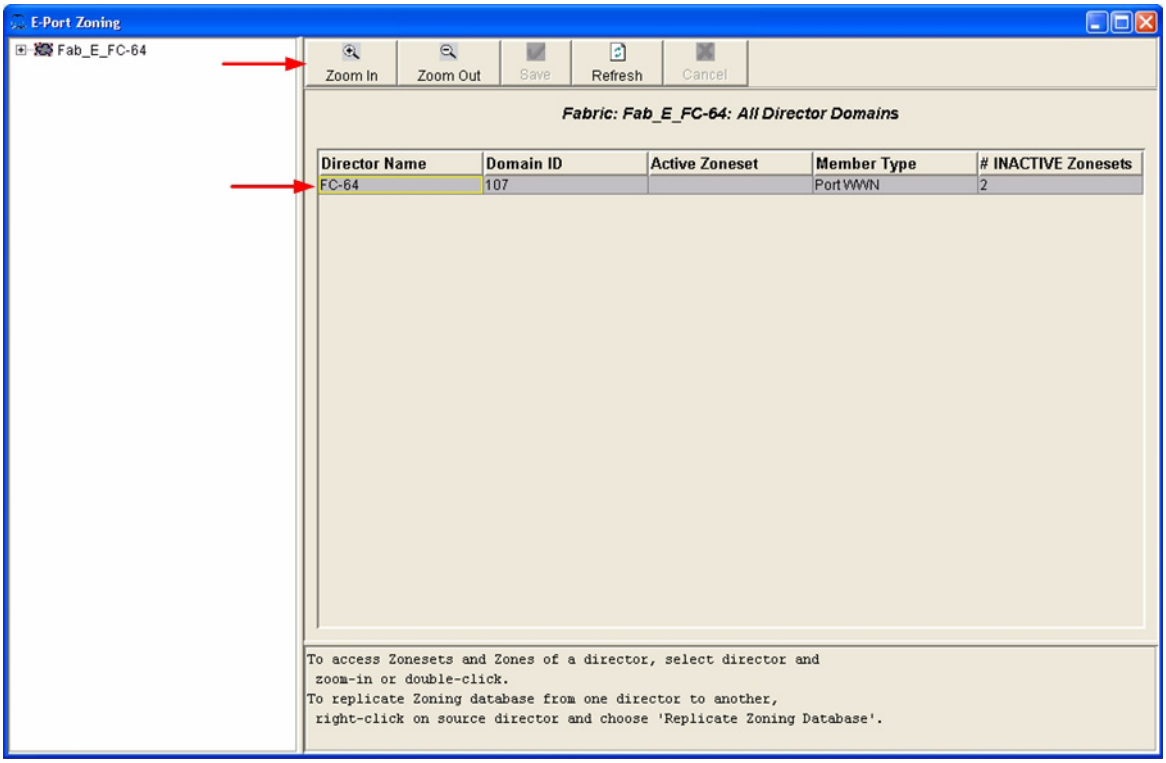
3. From the **E-Port Zoning (Fabric *x*: All Director Domains)** dialog box, select the director and click the **Zoom In** button.



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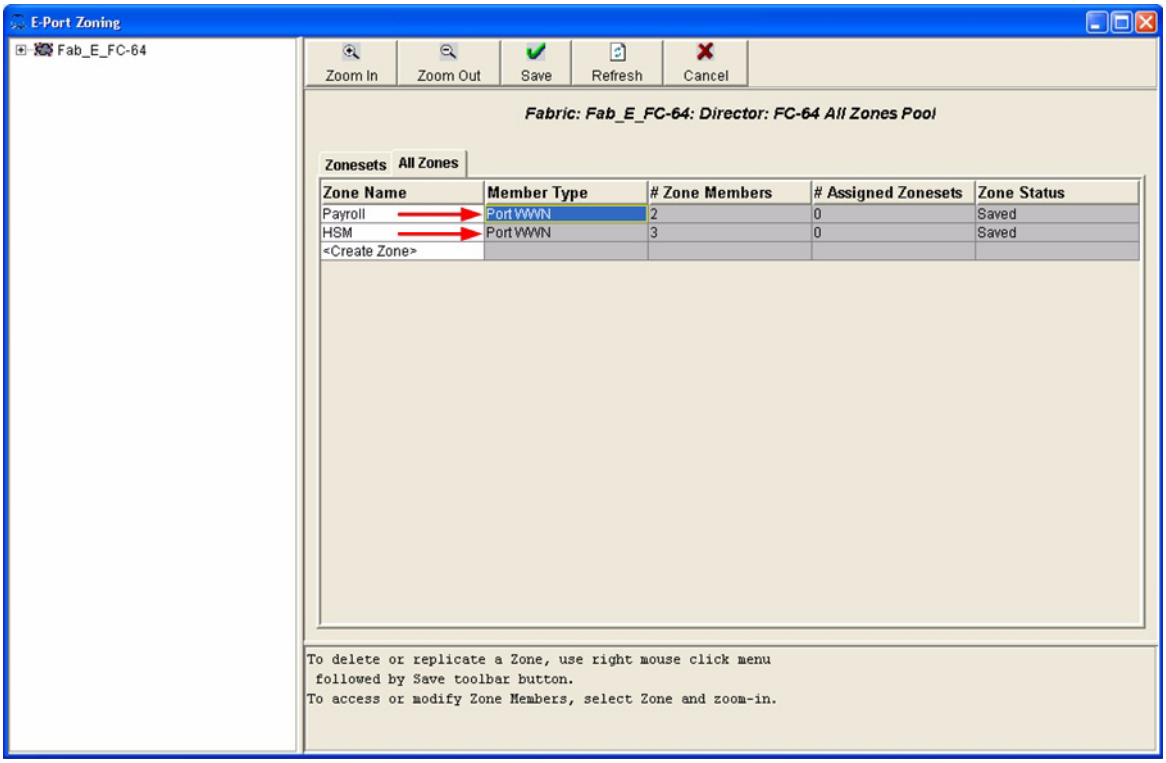
4. From the **E-Port Zoning (Fabric *x*: Director *y*: All Zones)** dialog box, select the **All Zones** tab. Verify that all **Zone Member Types** are set to **Port WWN**.



INRANGE CLI

Not applicable.

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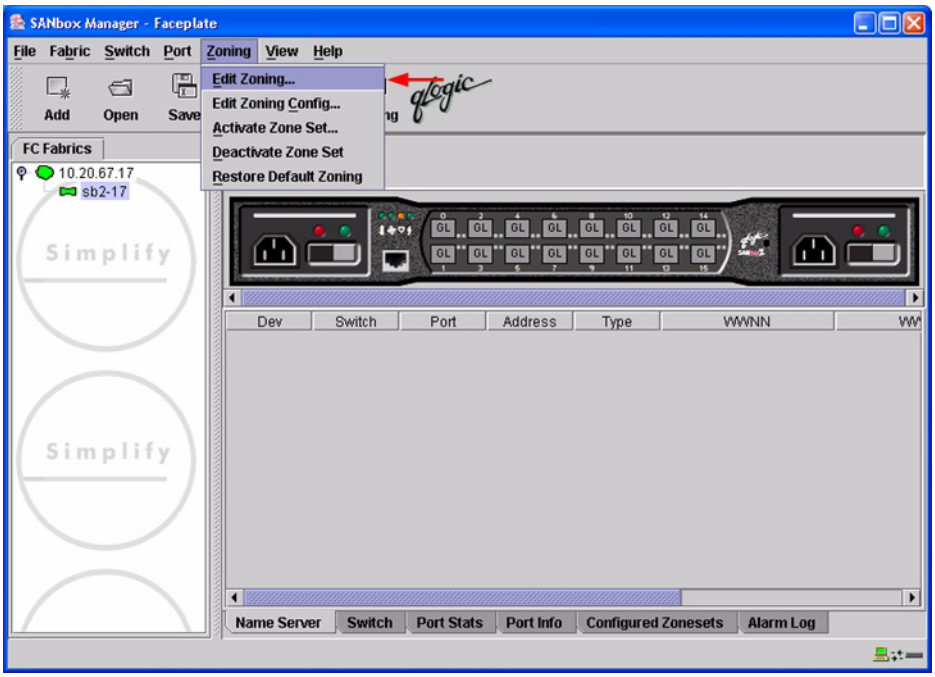
QLogic SANbox Manager GUI

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:



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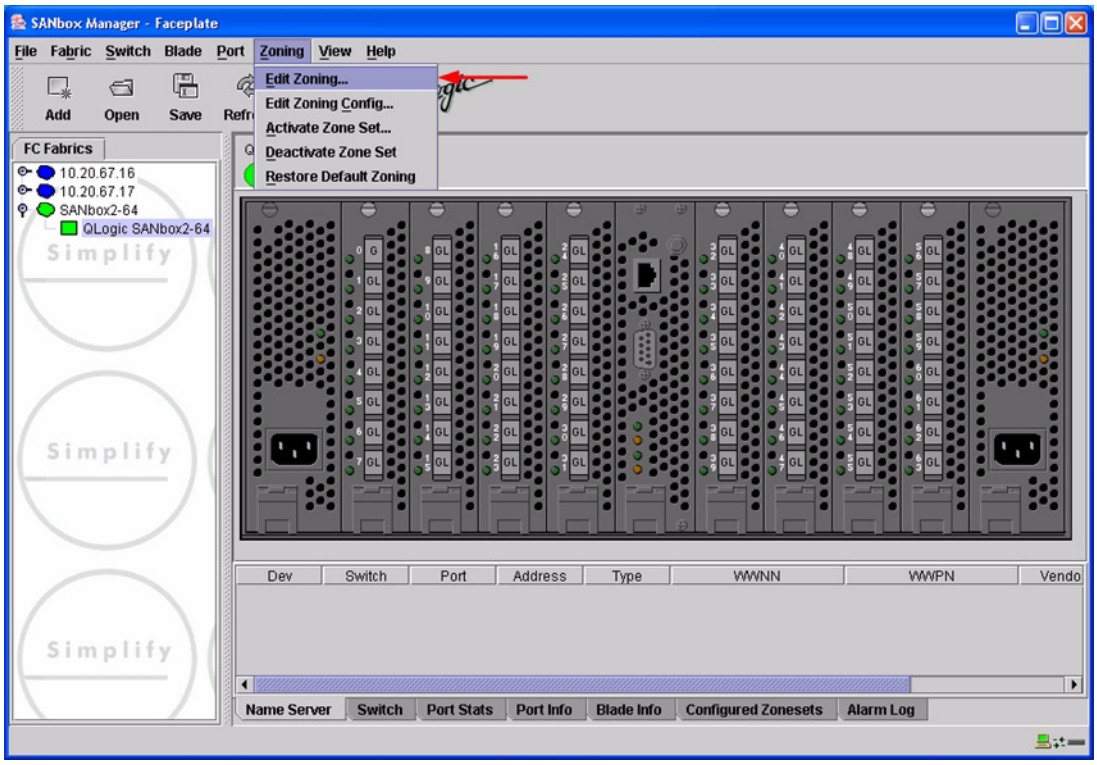
For the QLogic SANbox2-64, the following displays:



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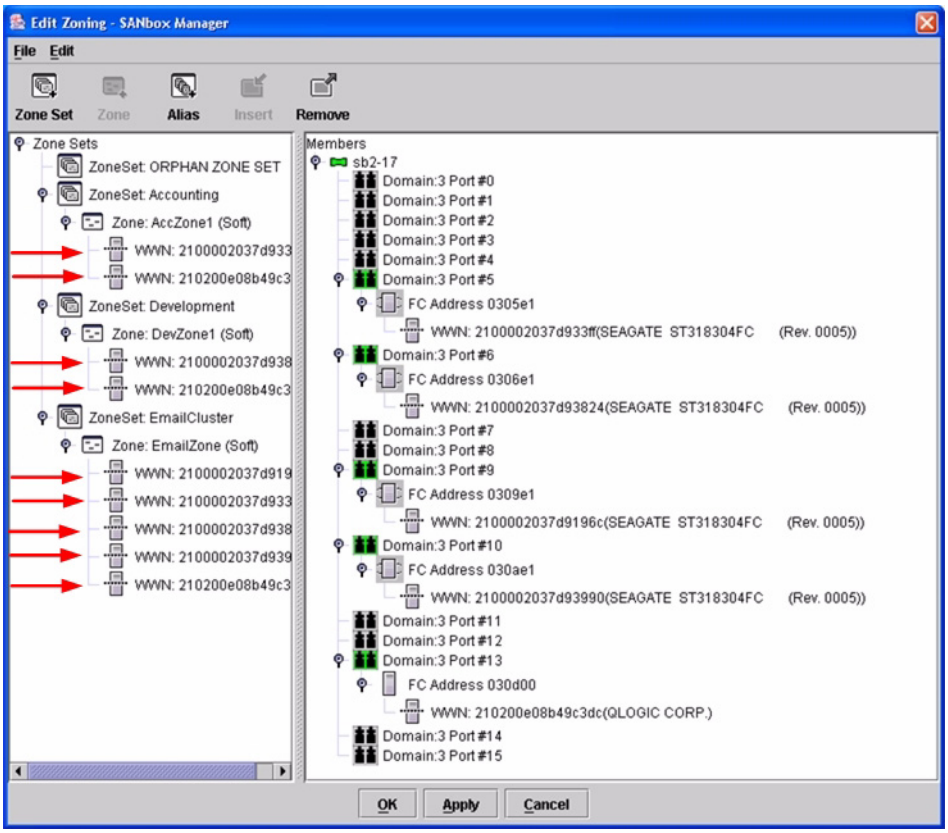
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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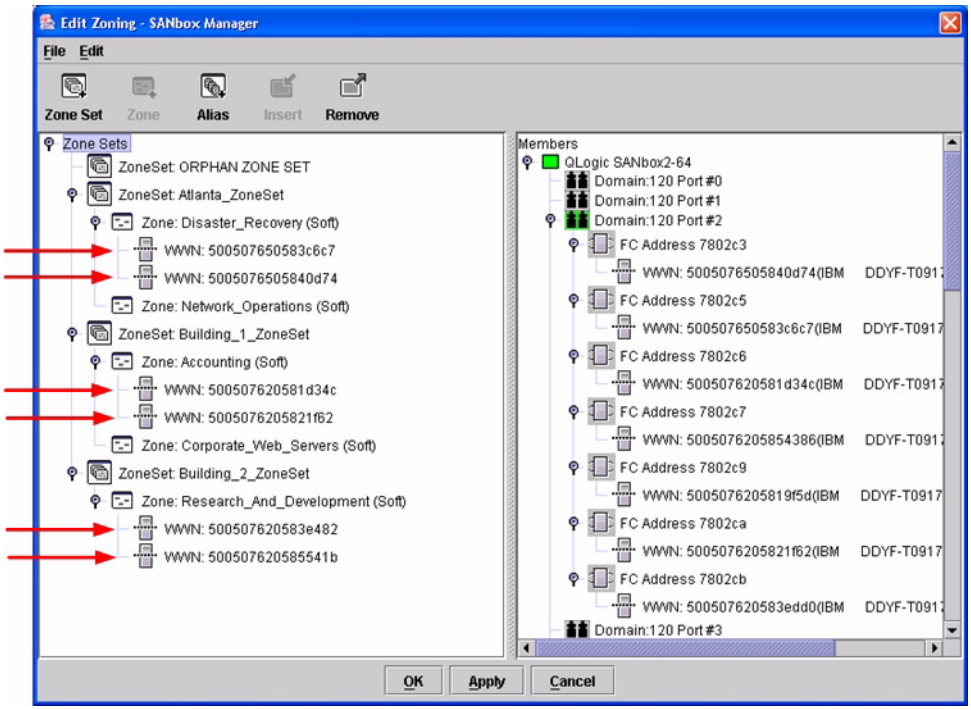
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

Operating Mode Configuration

Not applicable.

INRANGE Specific Configuration

Not applicable.

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QLogic 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 QLogic 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 QLogic support.

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Merging QLogic and McDATA Fabrics

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switch from McDATA that complies with the FC-SW-2 standard.

QLogic and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x 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 QLogic and McDATA fabrics:

- **McDATA Sphereon 4500 Switch** **(see page 183)**
- **McDATA Intrepid 6000 Series Directors** **(see page 221)**

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McDATA Sphereon 4500 Switch

Integration Checklist

The following steps must be completed to successfully merge McDATA and QLogic 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 184).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 184).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 192).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 201).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 208).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 214).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 219).

Configuration Limitations

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

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switch from McDATA that complies with the FC-SW-2 standard.

QLogic and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
McDATA	Sphereon 4500 Switch	04.01.00 12 or 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 QLogic 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 QLogic Domain ID.

McDATA Versus QLogic Domain IDs

McDATA Domain ID	QLogic Domain ID	McDATA Domain ID	QLogic Domain ID	McDATA Domain ID	QLogic 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

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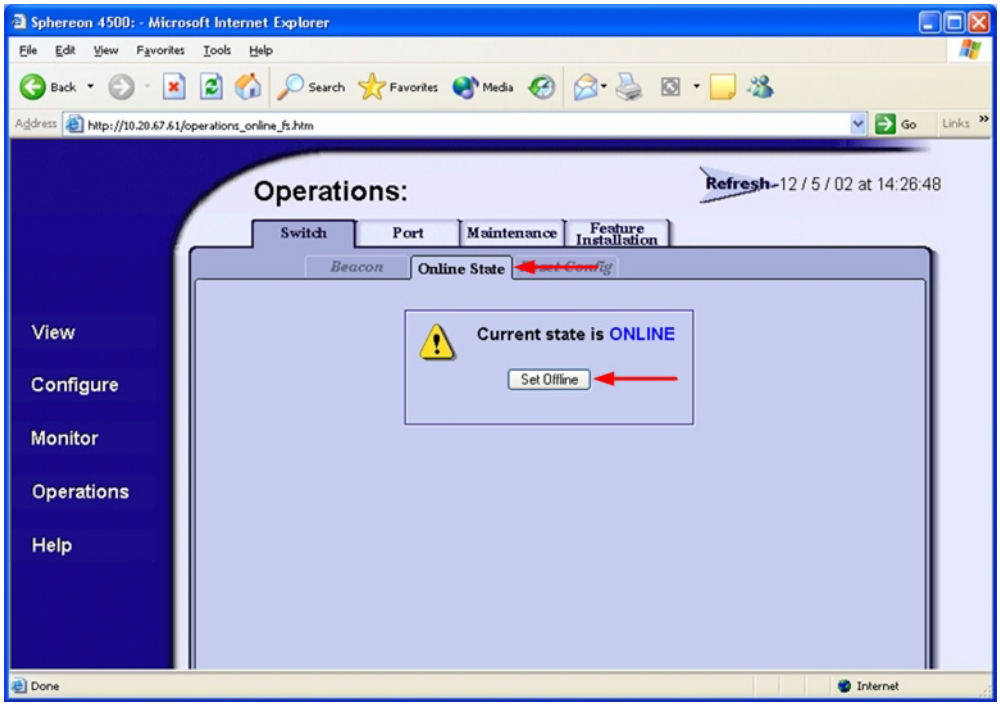
McDATA Sphereon Web Management

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.



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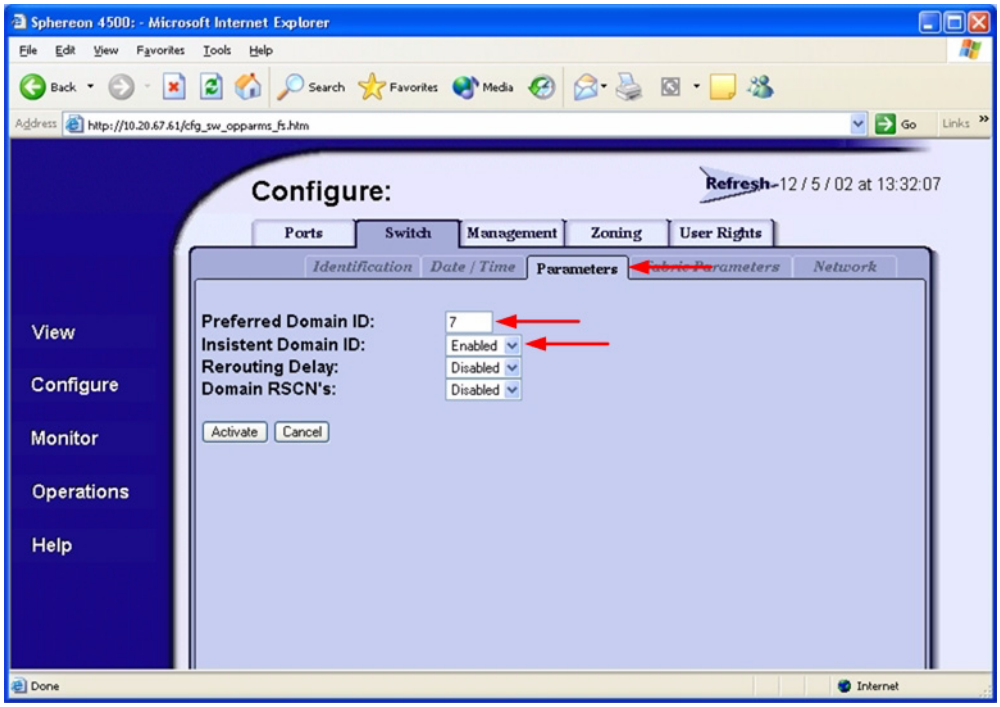
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Parameters** tab, and do the following:
   a. In the **Preferred Domain ID** box, type a unique Domain ID.
   b. From the **Insistent Domain ID** list, select **Enabled**.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



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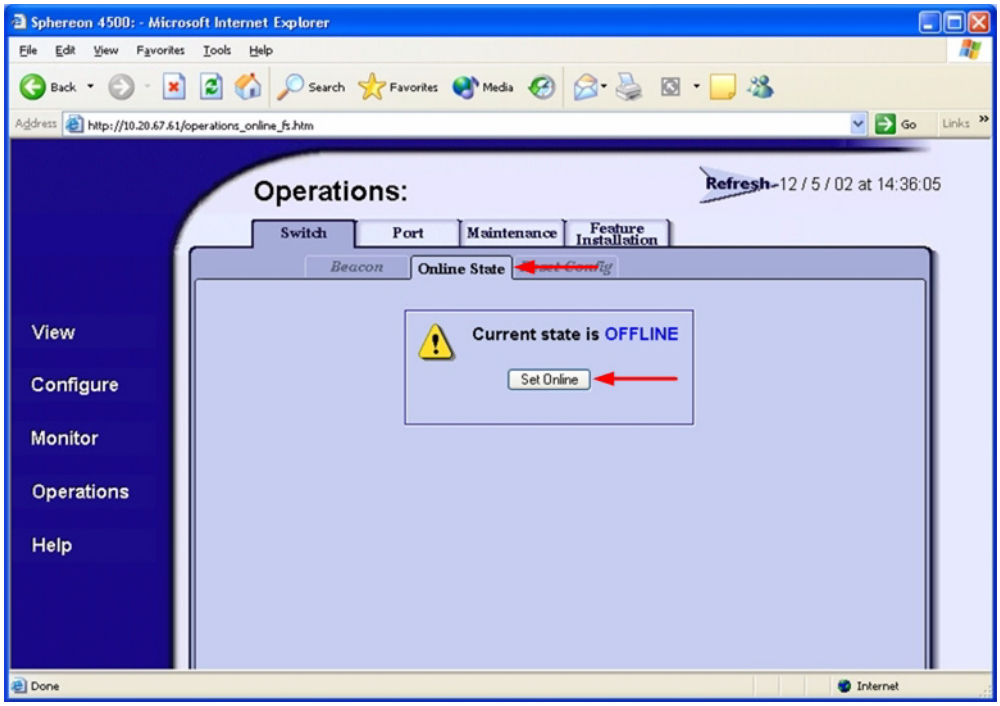
4. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.



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
```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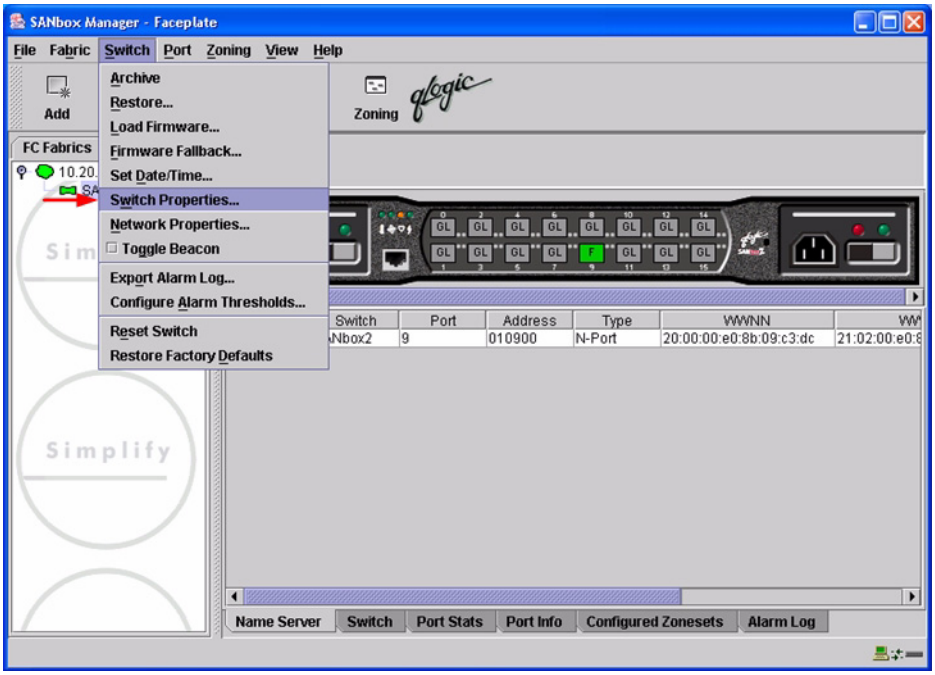
QLogic SANbox Manager GUI

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:



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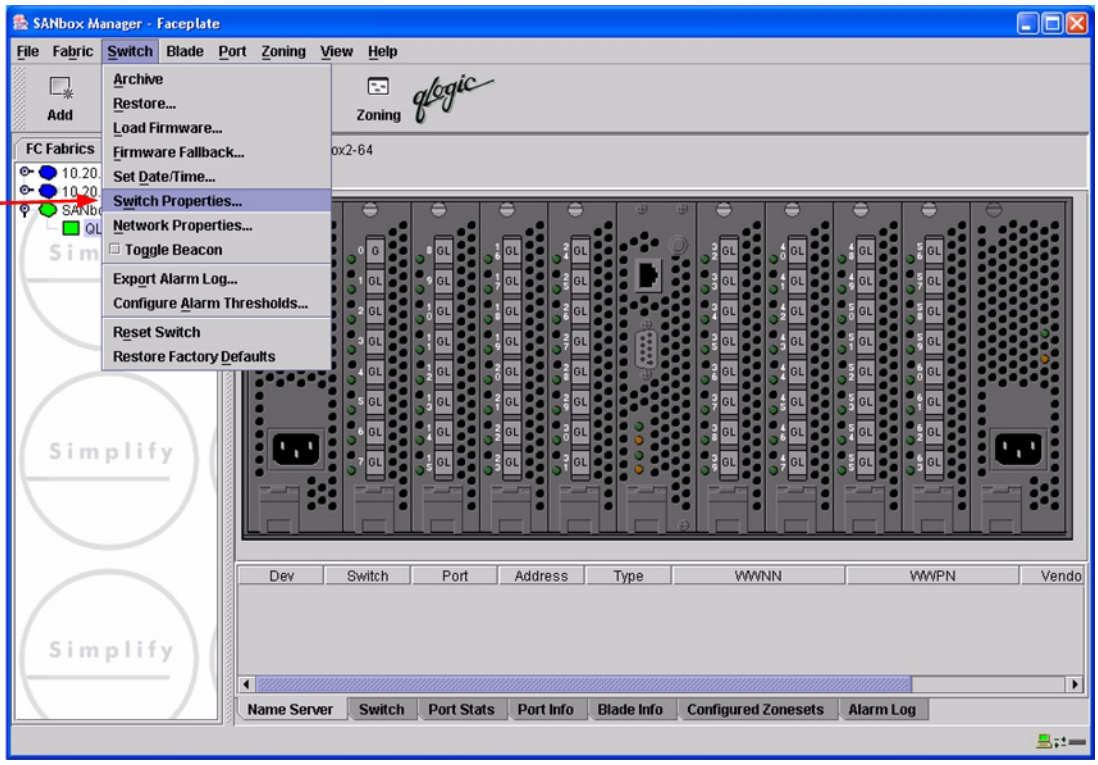
For the QLogic SANbox2-64, the following displays:



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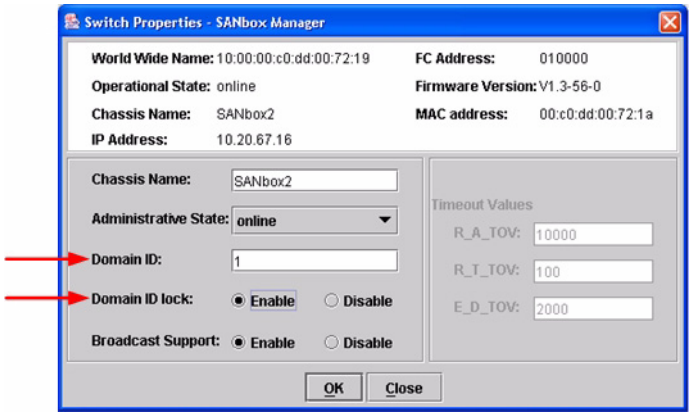
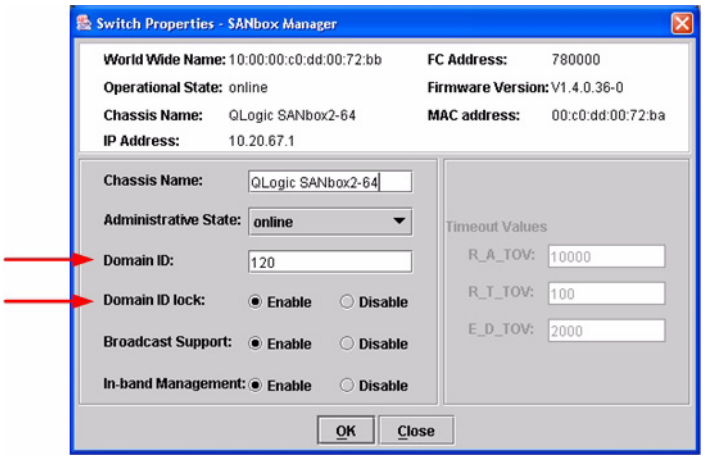
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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Timeout Values

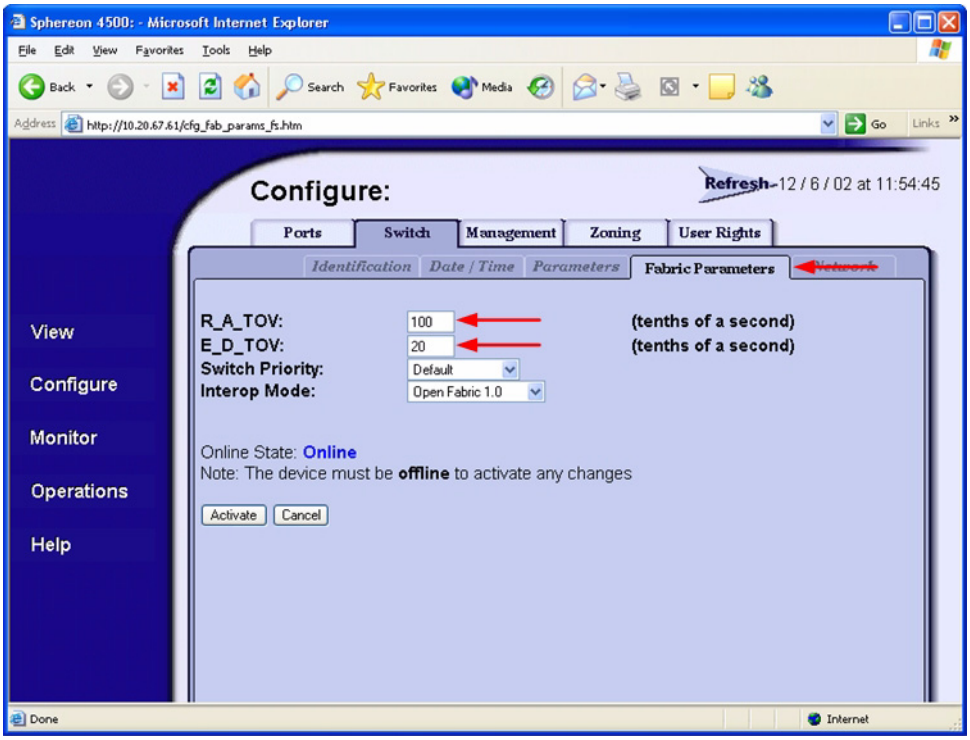
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

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.



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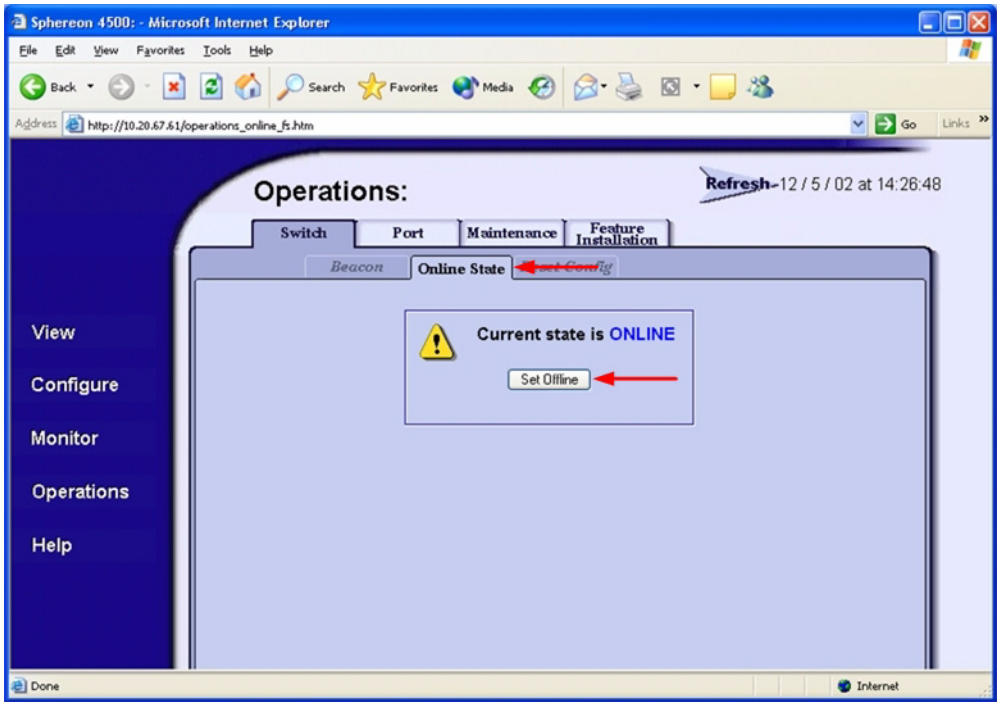
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Offline** button.



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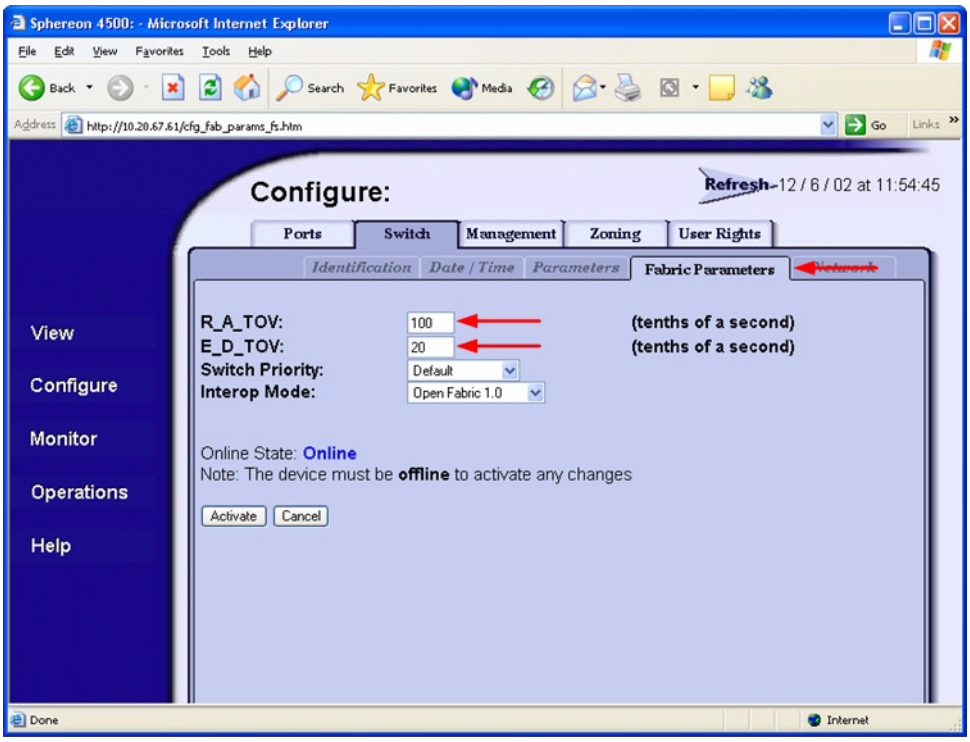
4. On the navigation panel, select **Configure**, The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:
   a. In the **R_A_TOV** box, change the setting to **100**.
   b. In the **E_D_TOV** box, change the setting to **20**.
  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



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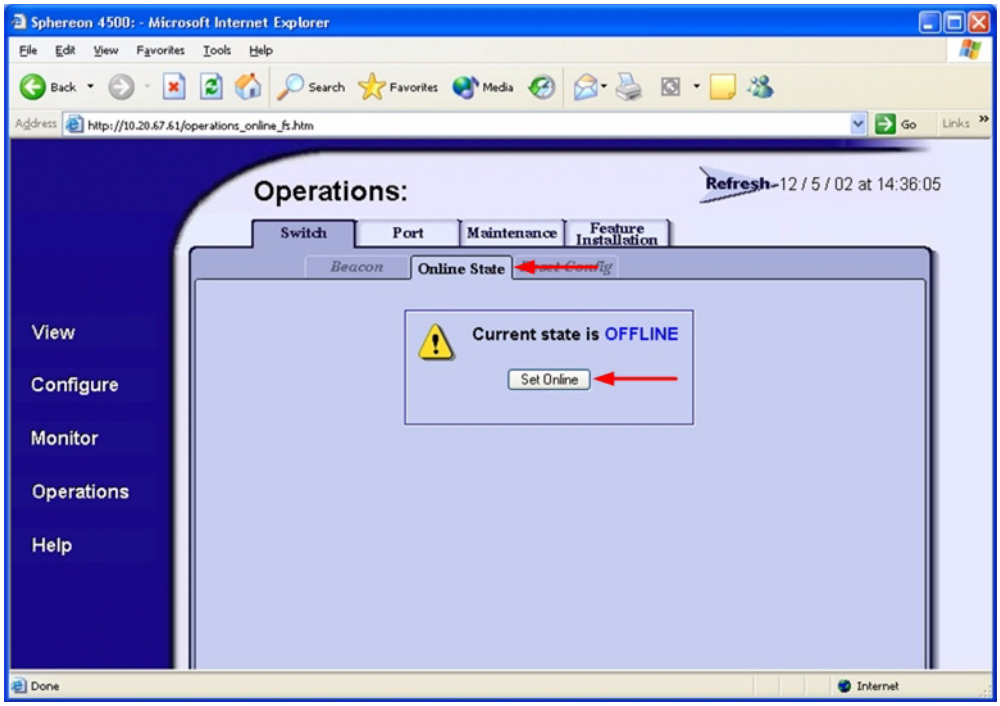
5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select the **Online State** tab, then click the **Set Online** button.



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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
```


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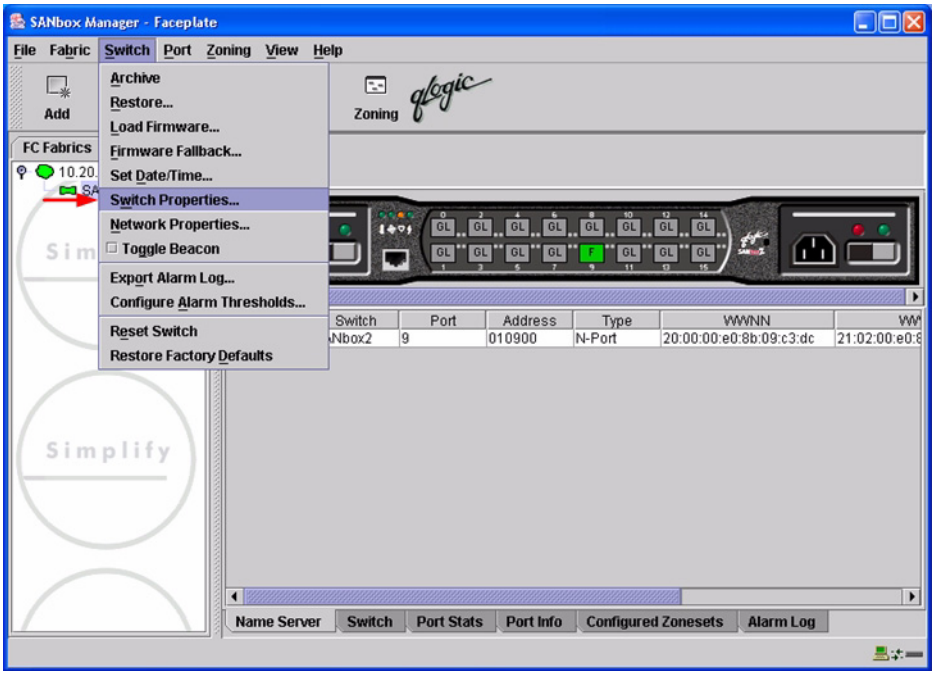
QLogic SANbox Manager GUI

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:



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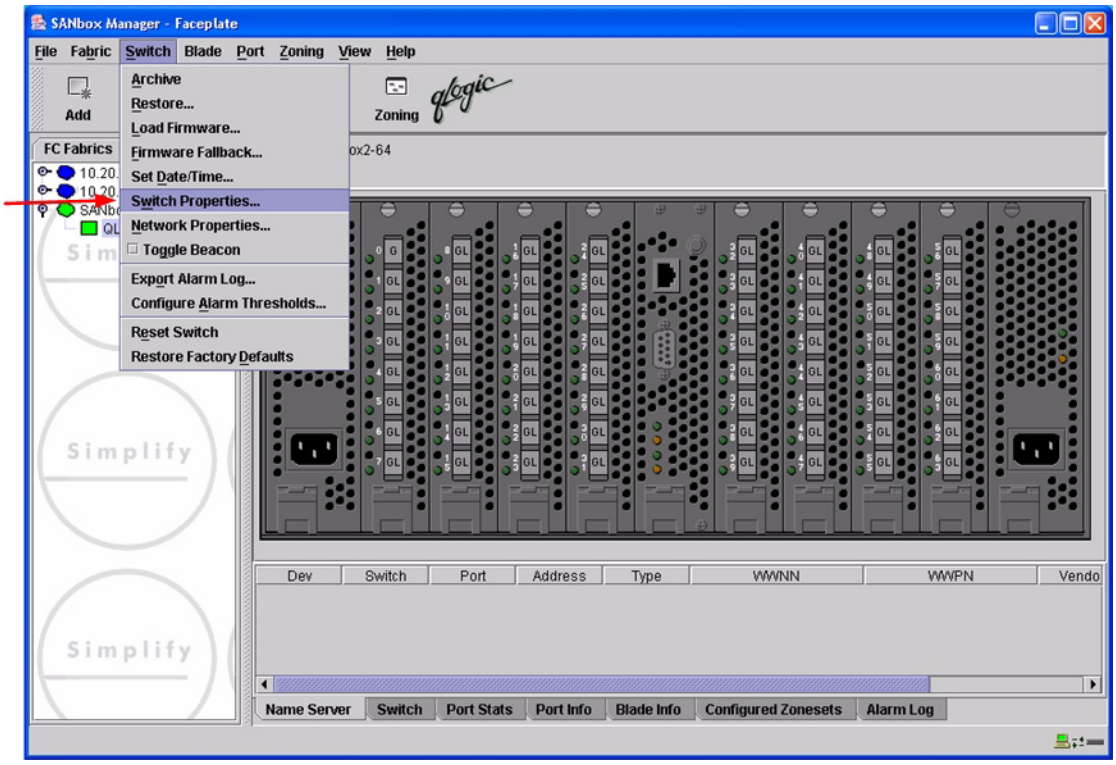
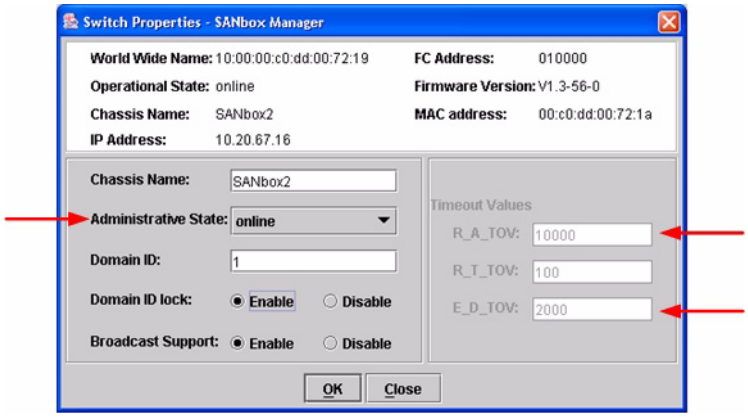
For the QLogic SANbox2-64, the following displays:



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:



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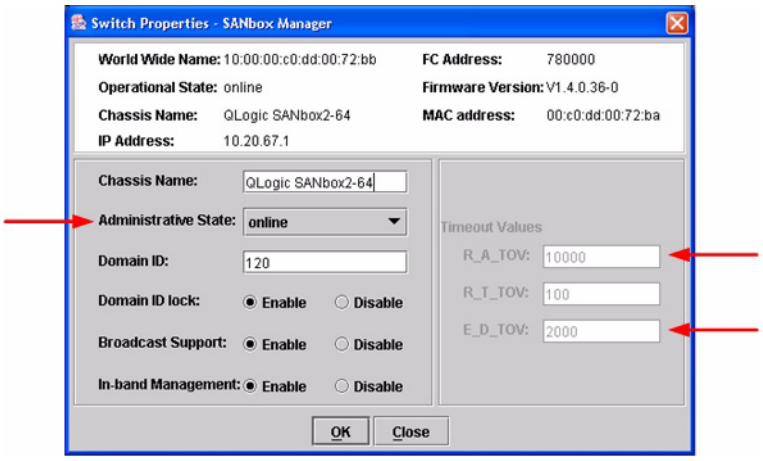
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

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

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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.

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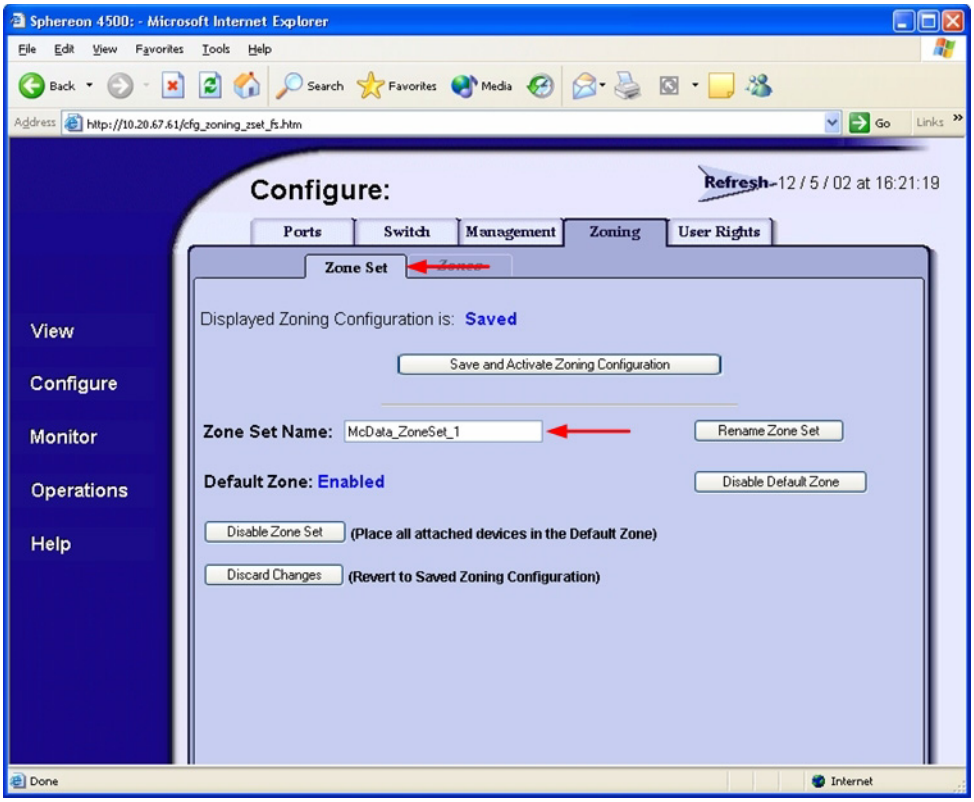
McDATA Sphereon Web Management

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 201.



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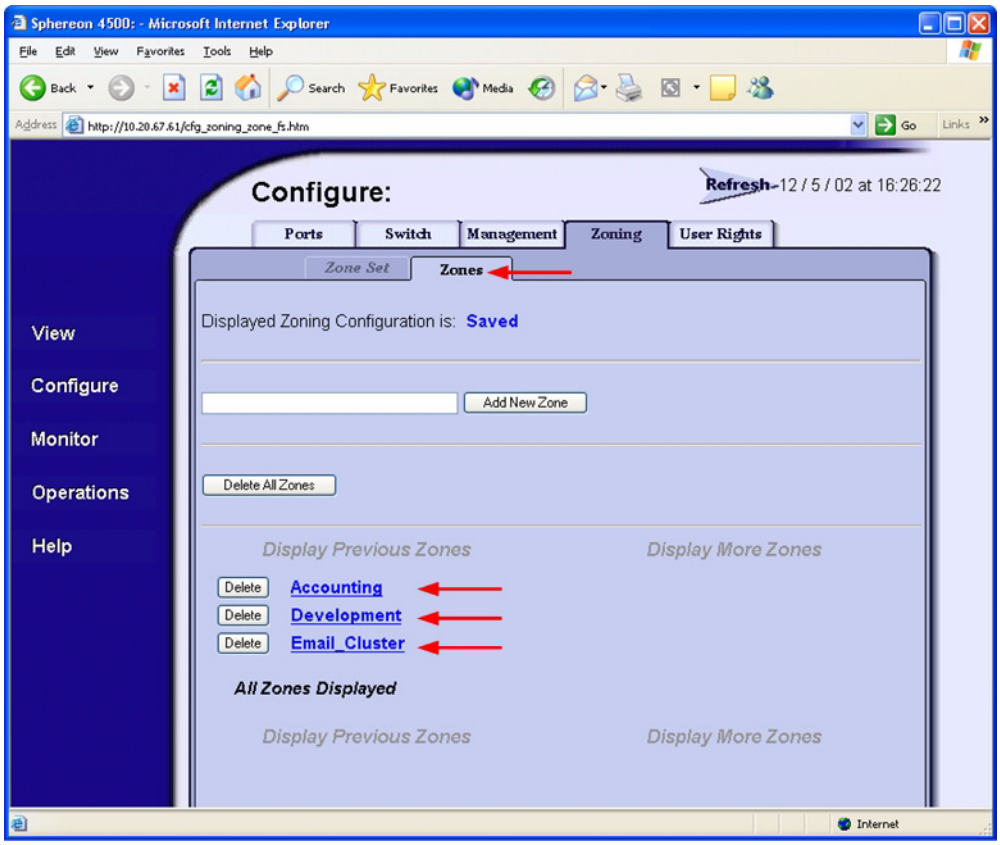
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **Zones** tab. Verify that the Zone names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 201.



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 201.

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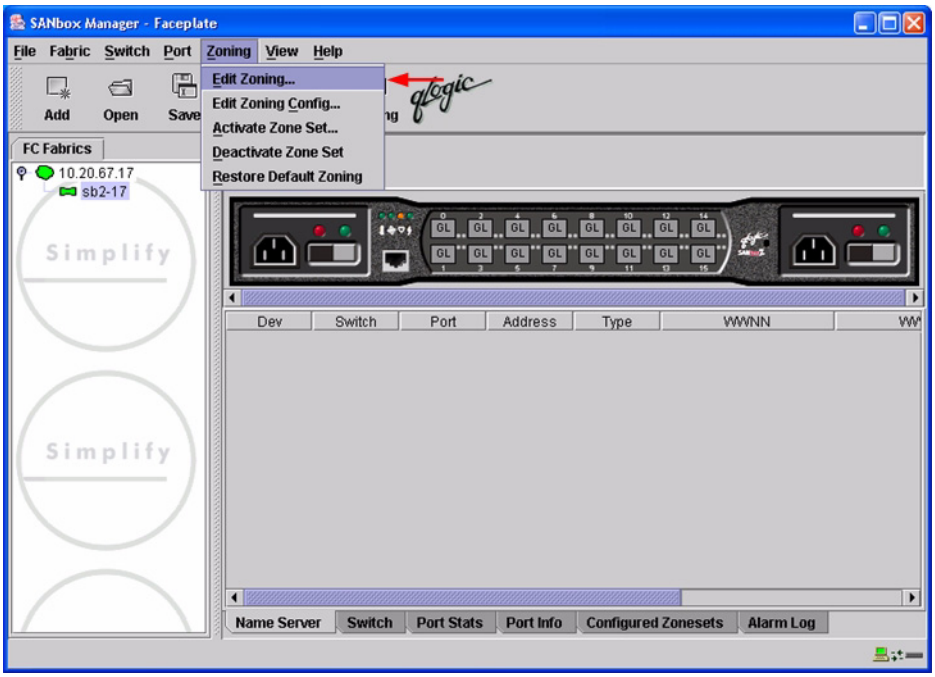
QLogic SANbox Manager GUI

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:



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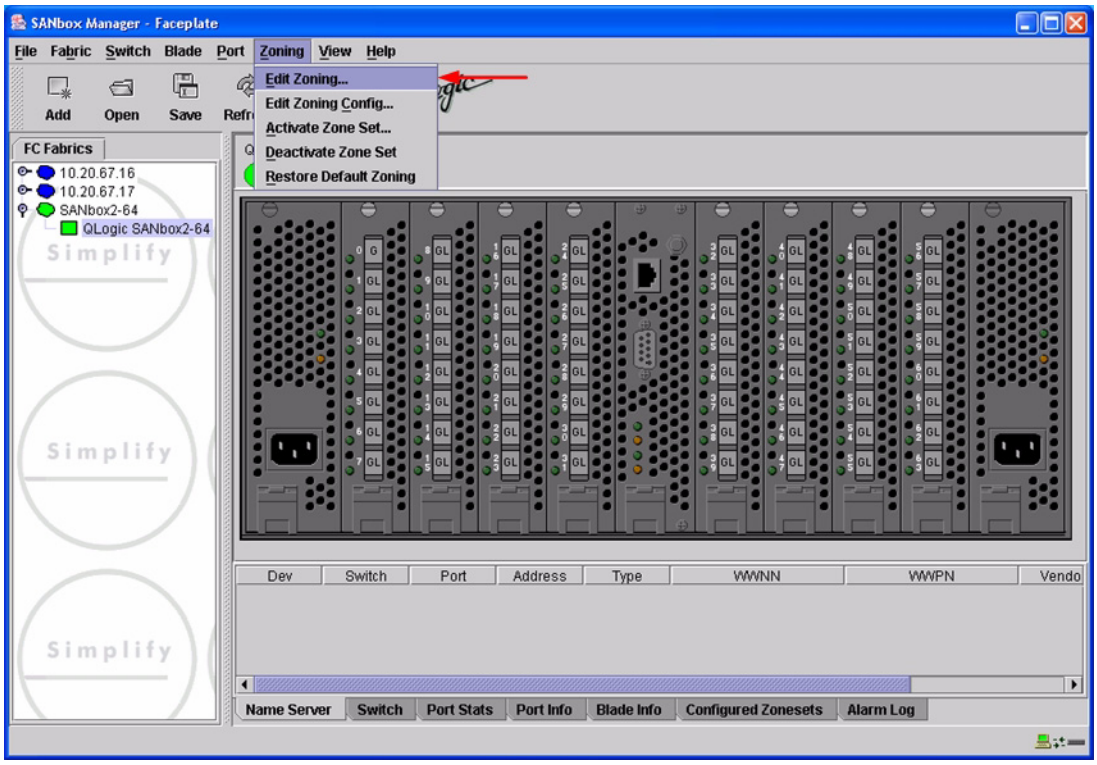
For the QLogic SANbox2-64, the following displays:



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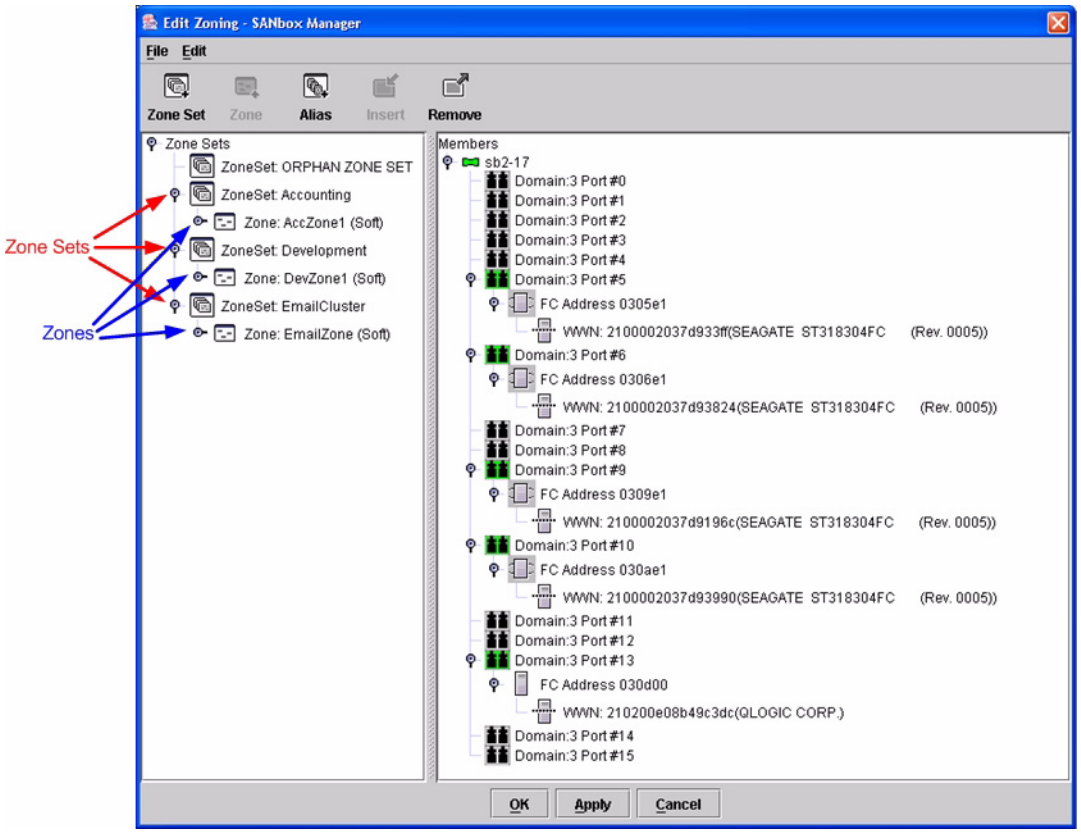
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under “Active Zone Set Names” on page 201.

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



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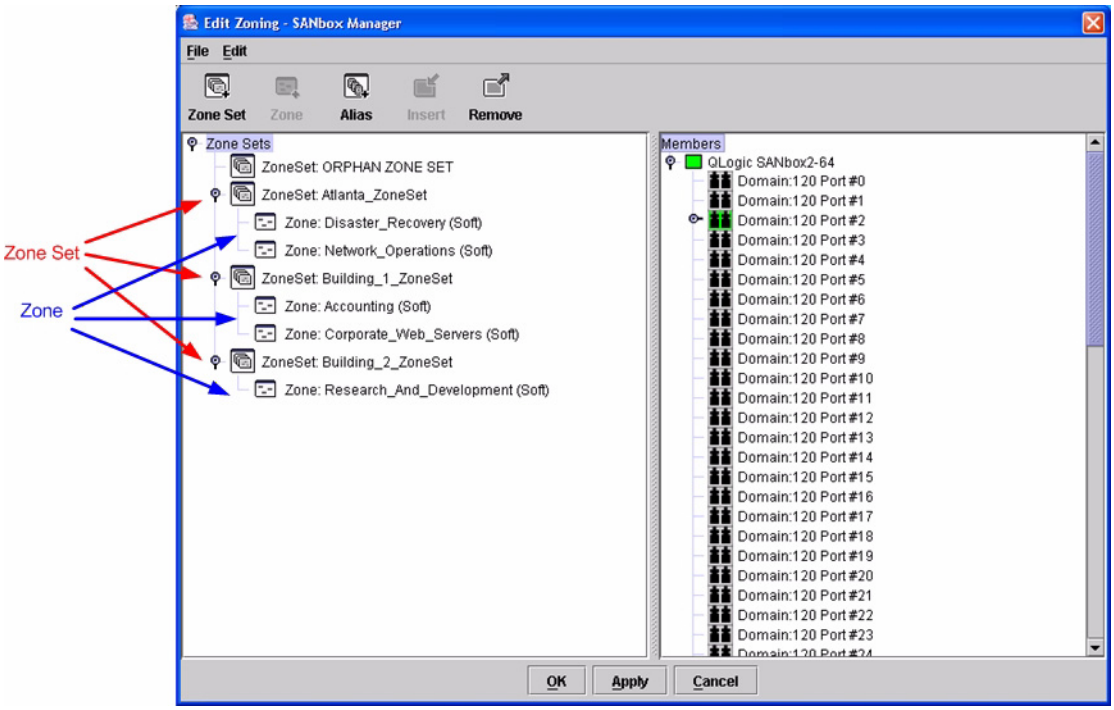
For the QLogic SANbox2-64, the following displays:



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
```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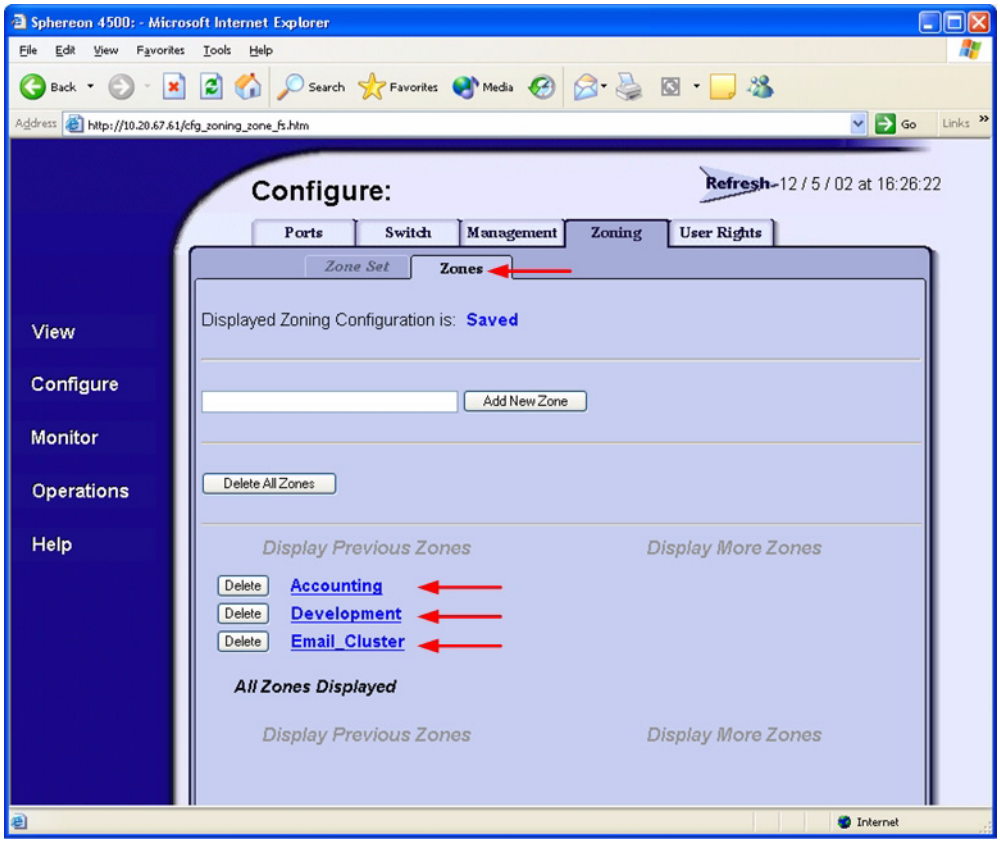
Zone Types

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 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.



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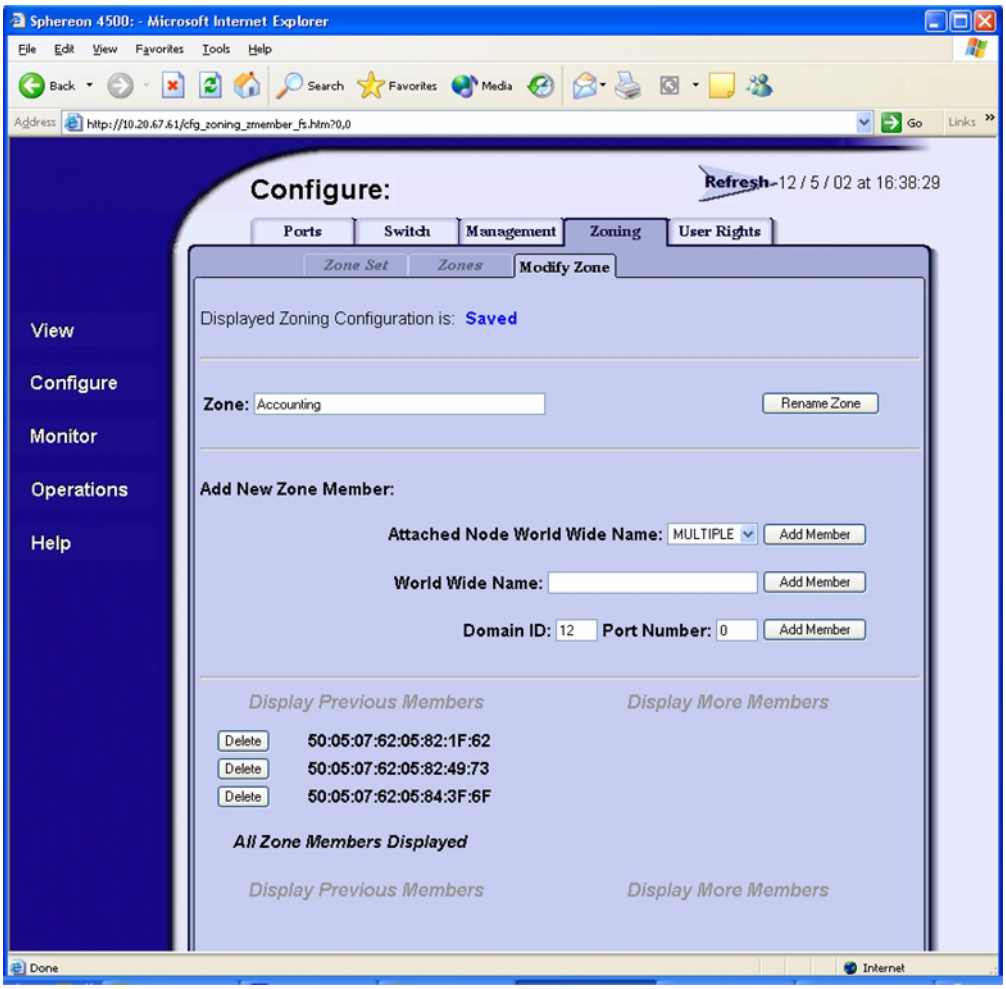
3. Select each zone and verify that all members are specified by WWN.



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.

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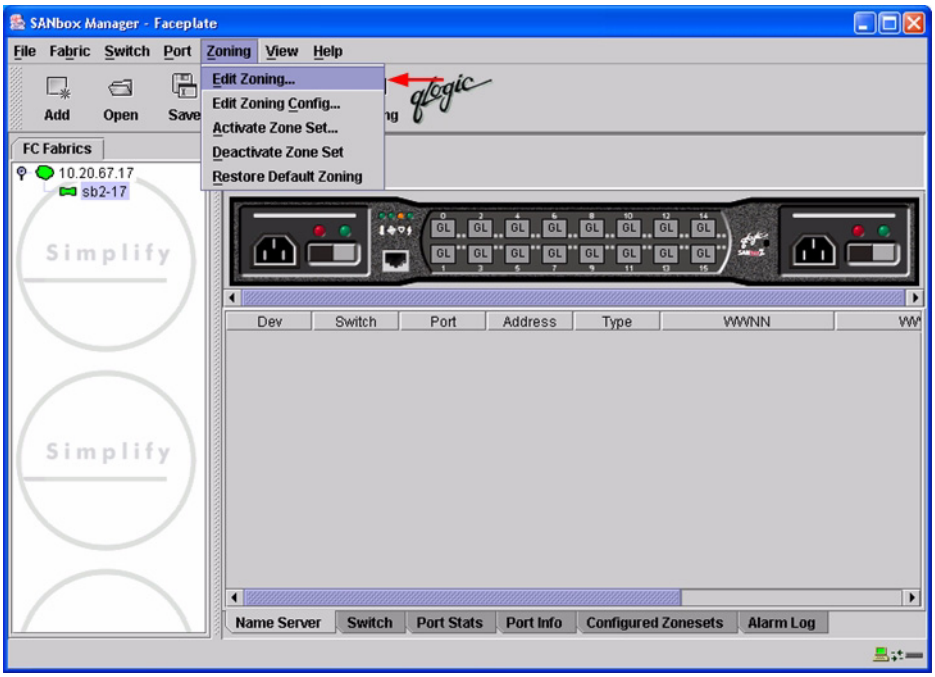
QLogic SANbox Manager GUI

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:



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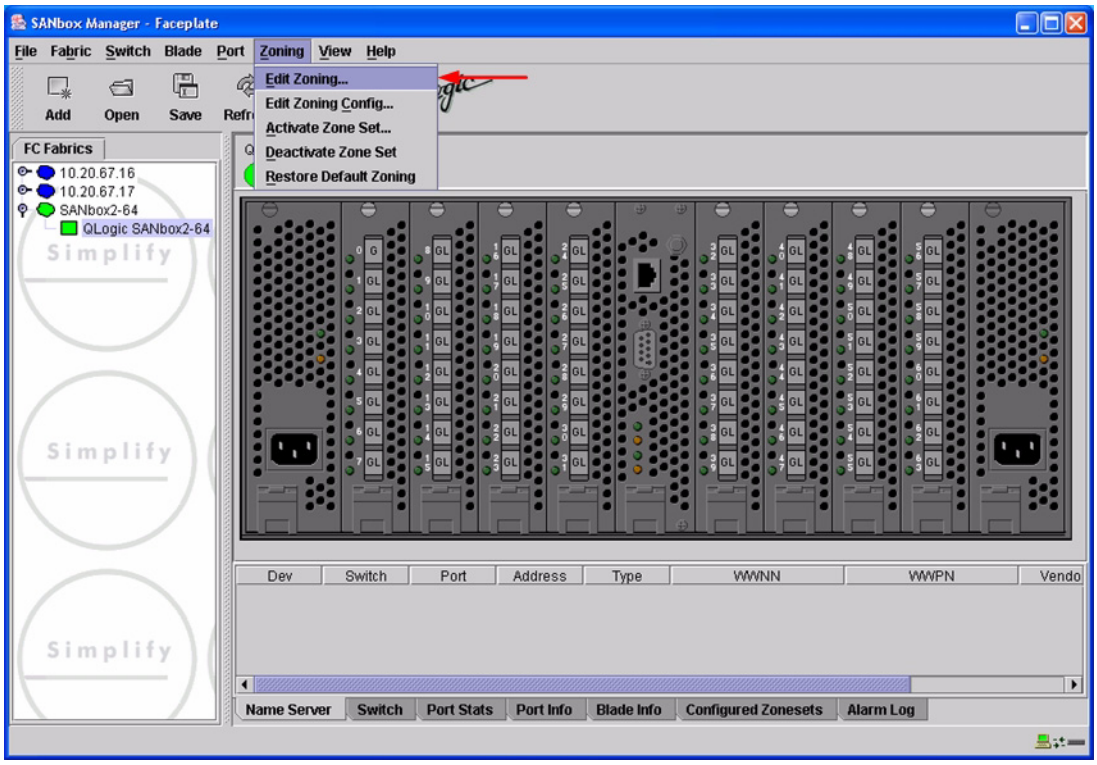
For the QLogic SANbox2-64, the following displays:



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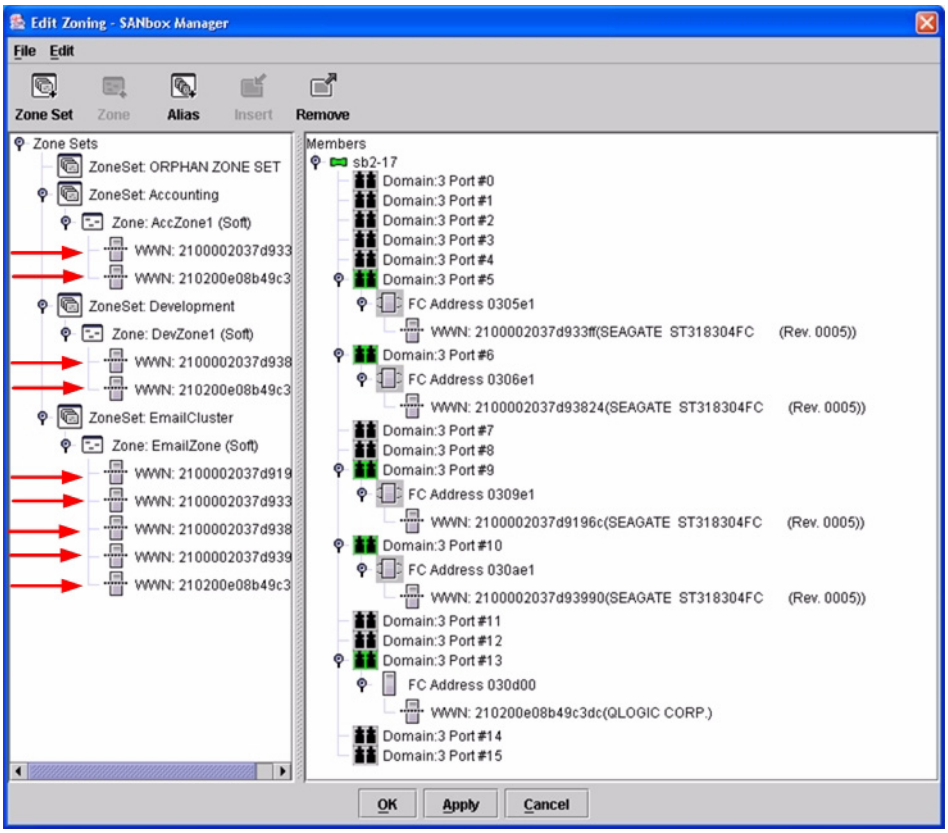
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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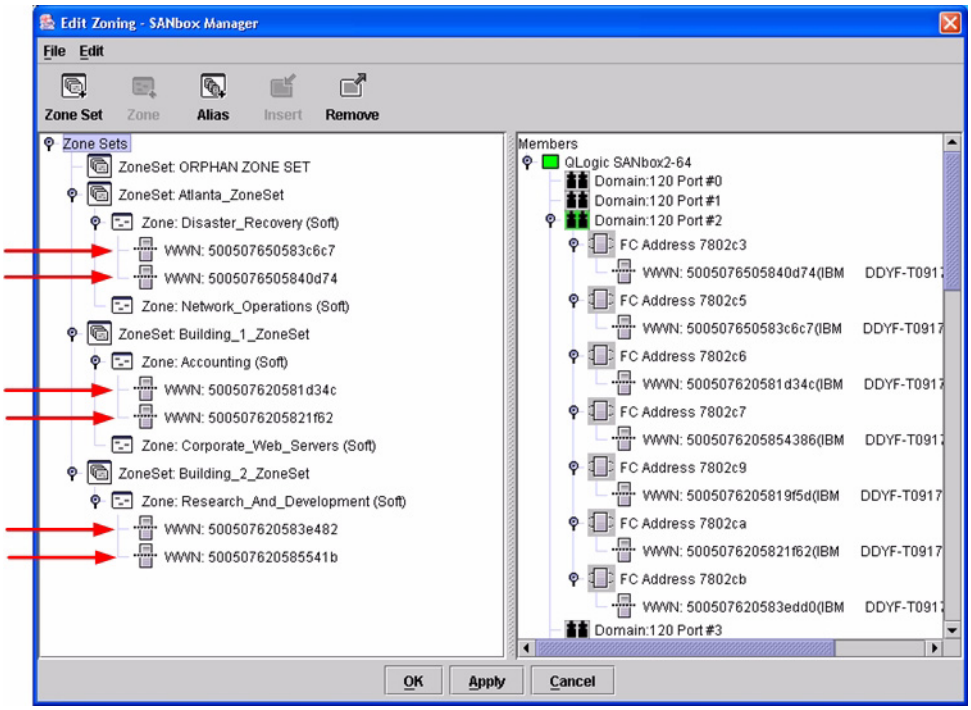
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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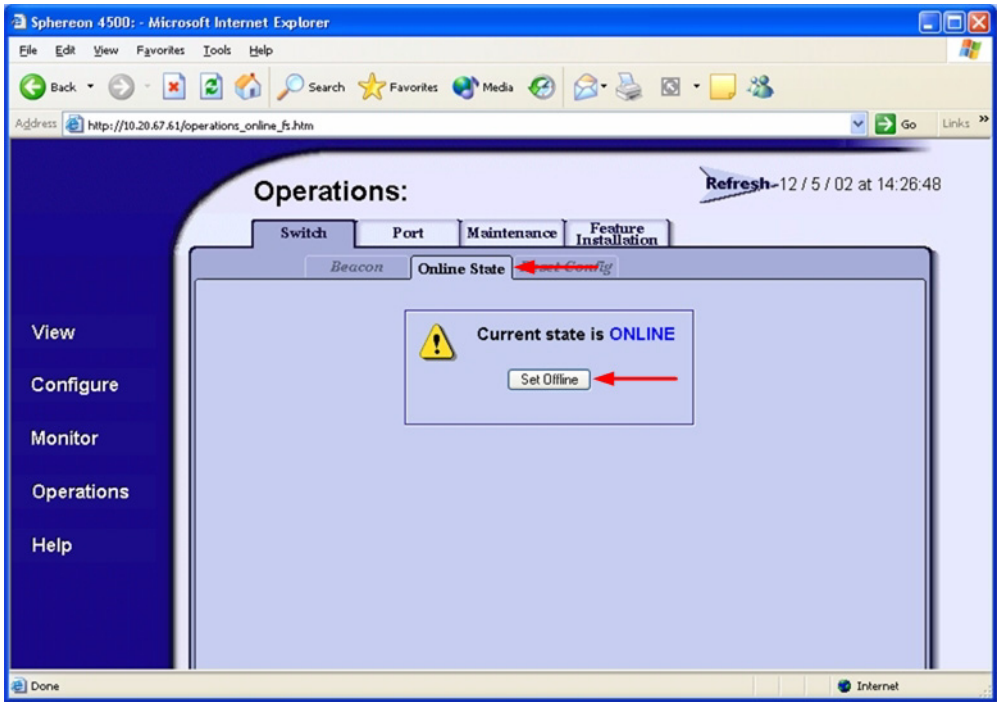
Operating Mode Configuration

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.



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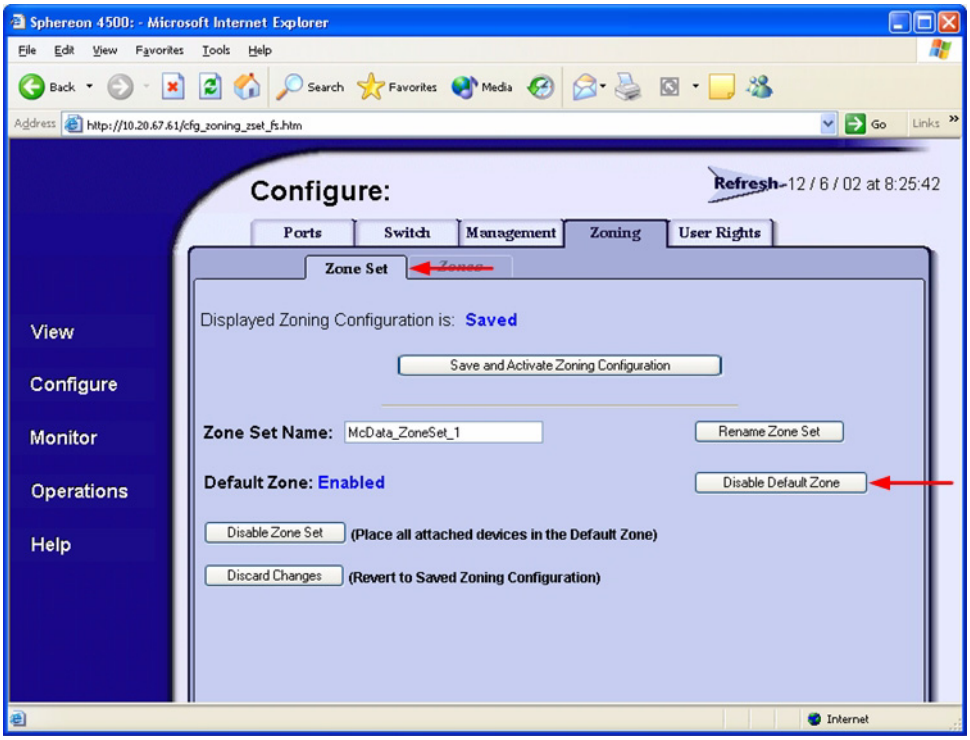
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.



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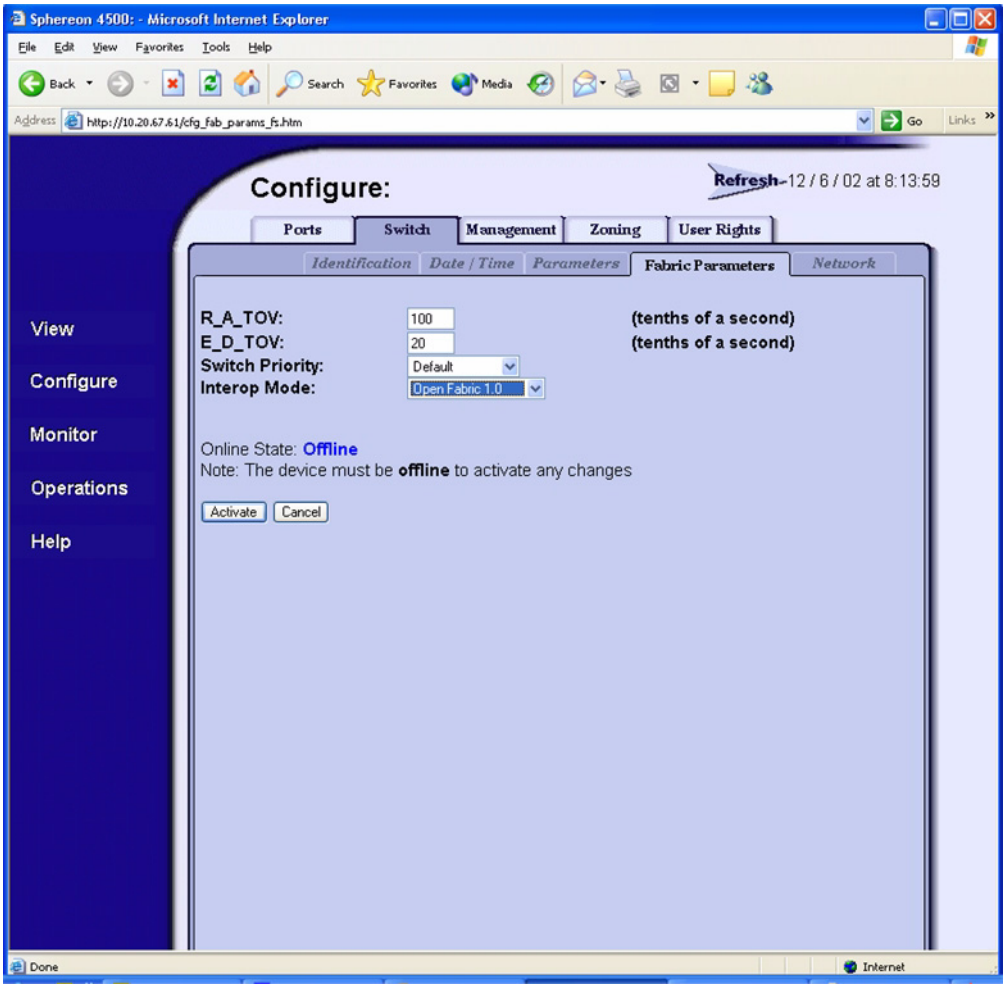
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Switch** tab, select the **Fabric Parameters** tab, then do the following:

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

   b. Click **Activate**.



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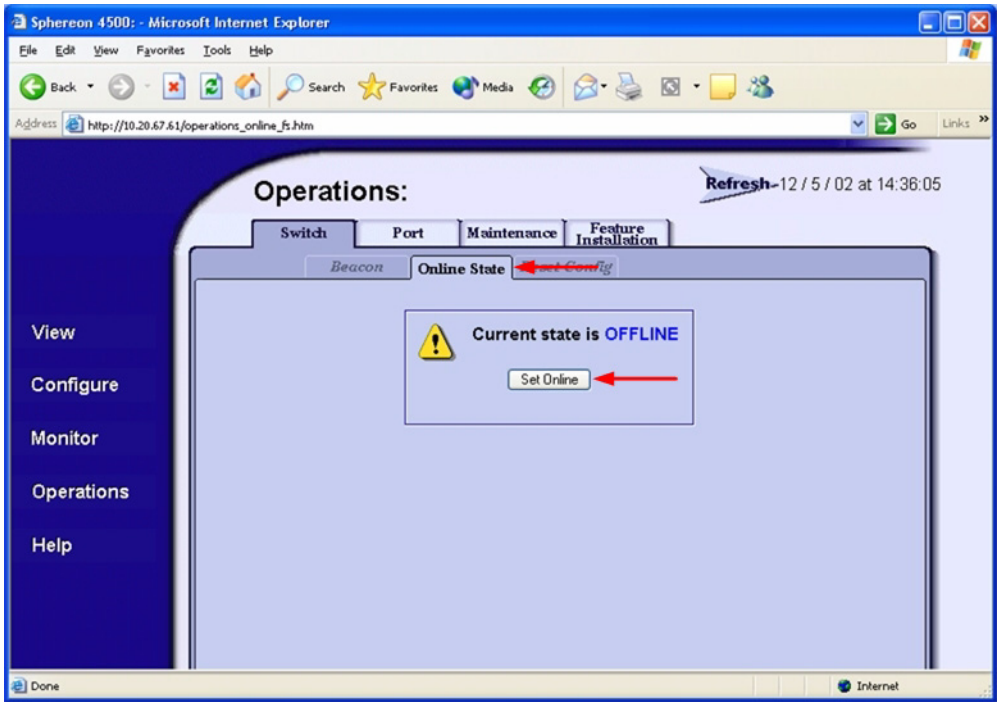
5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Switch** tab, select **Online State** tab, then click the **Set Online** button.



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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
```

QLogic SANbox Manager GUI

Not applicable.

QLogic CLI

Not applicable.

McDATA Specific Configuration

Not applicable.

QLogic Specific Configuration

Not applicable.

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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 QLogic 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 QLogic support.

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McDATA Intrepid 6000 Series Directors

Integration Checklist

The following steps must be completed to successfully merge McDATA and QLogic 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 222).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 222).

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

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 240).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 247).

✓ Ensure that all McDATA switches are configured for Open Fabric Interoperability mode (see “Operating Mode Configuration” on page 254).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 259).

Configuration Limitations

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

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from McDATA that comply with the FC-SW-2 standard.

QLogic and McDATA Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x 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 QLogic 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 QLogic Domain ID.

McDATA Versus QLogic Domain IDs

McDATA Domain ID	QLogic Domain ID	McDATA Domain ID	QLogic Domain ID	McDATA Domain ID	QLogic 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

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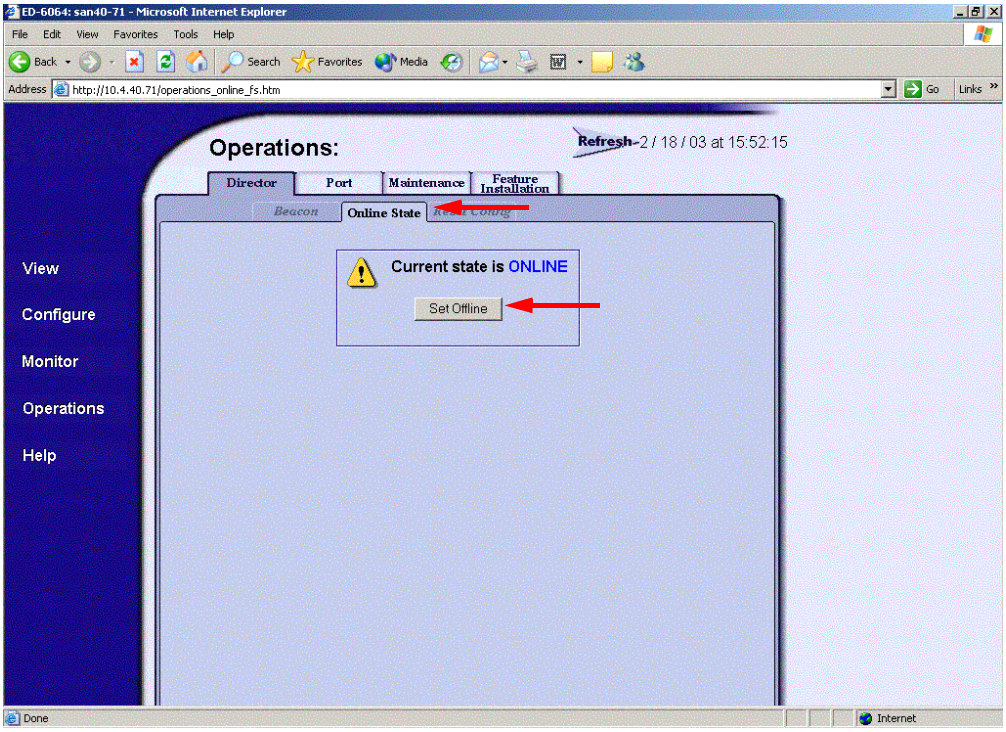
McDATA SANpilot Web Management

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.



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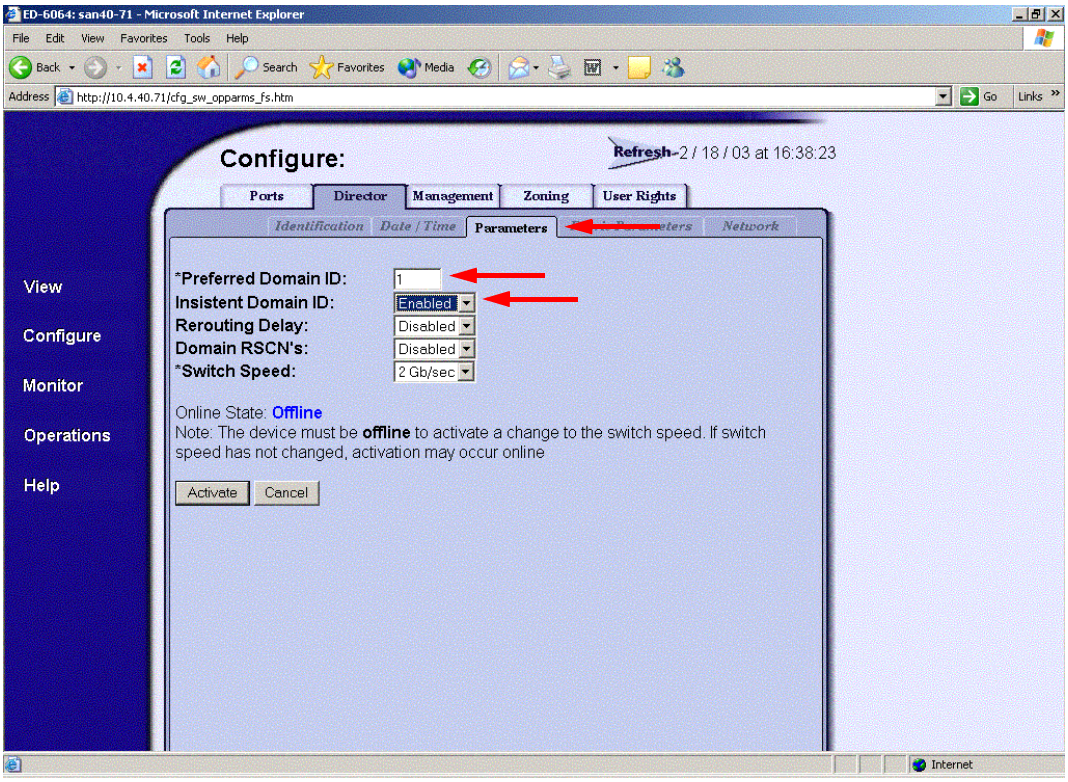
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, select the **Parameters** tab, and do the following:
   a. In the **Preferred Domain ID** box, type a unique Domain ID.
   b. From the **Insistent Domain ID** list, select **Enabled**.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



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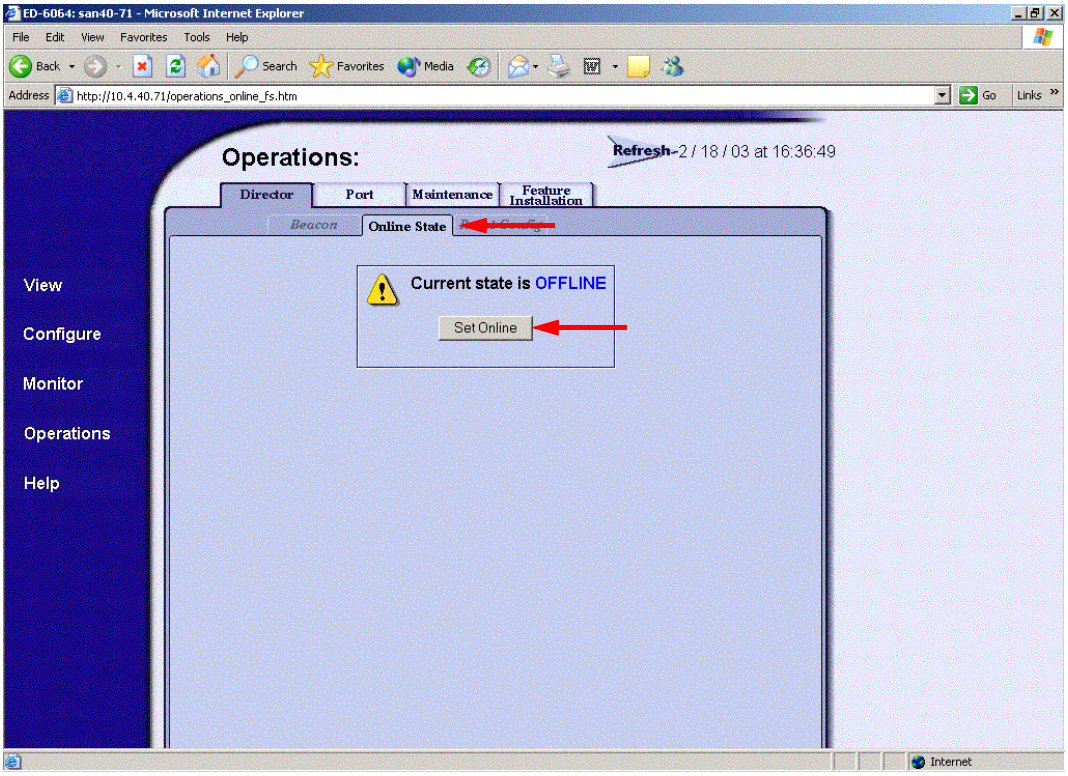
4. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



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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
```


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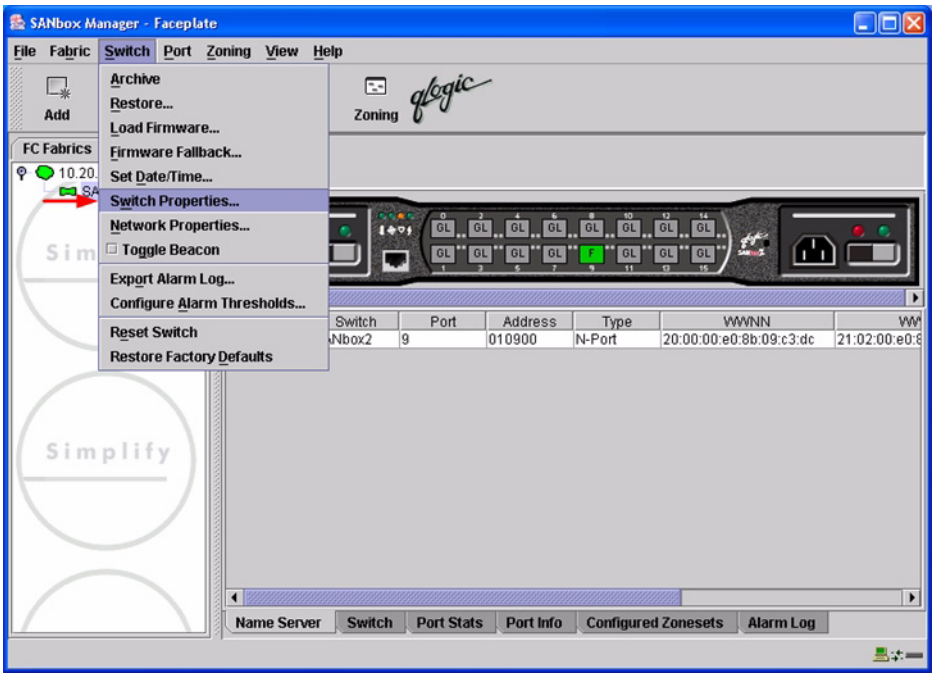
QLogic SANbox Manager GUI

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:



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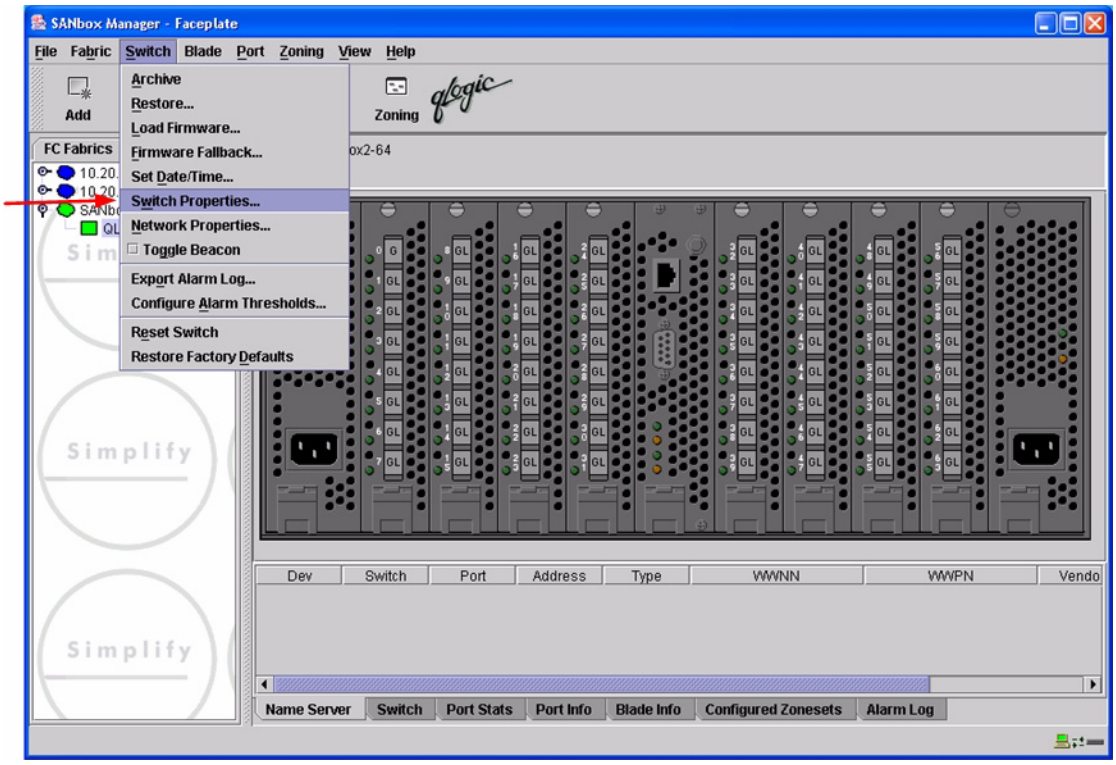
For the QLogic SANbox2-64, the following displays:



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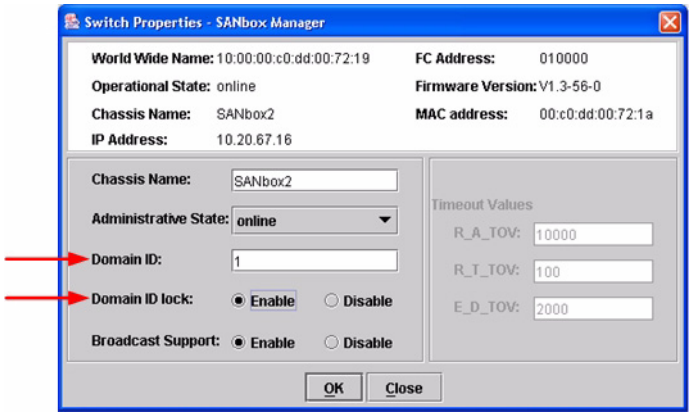
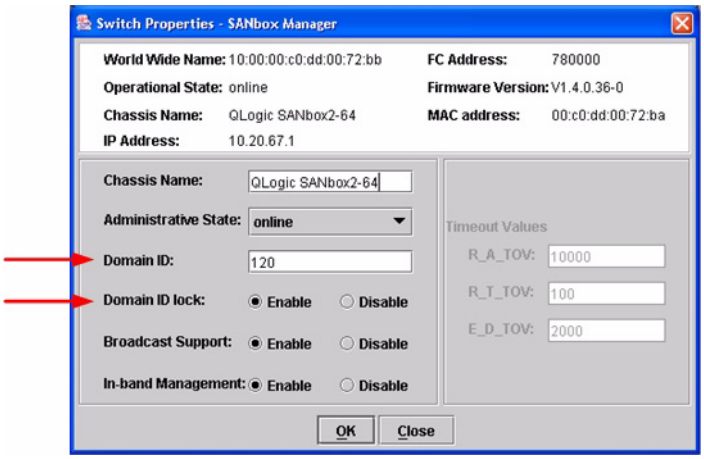
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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Timeout Values

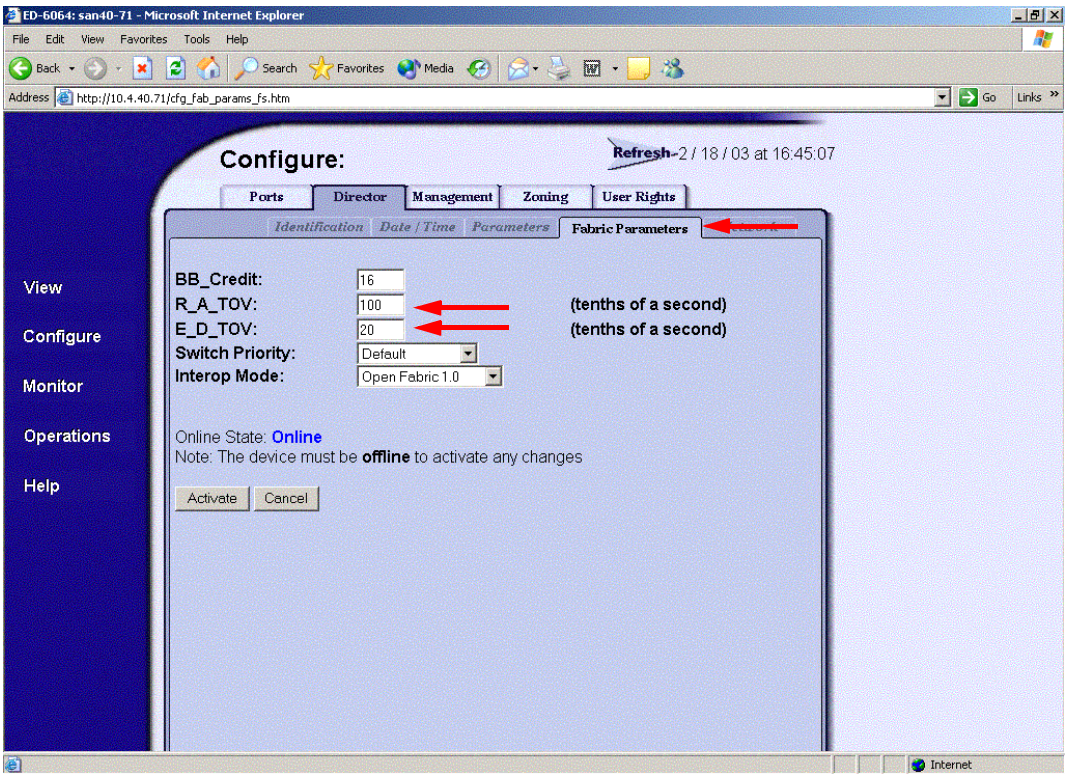
As per FC-SW-2 Fibre Channel standards, set all switches to the following timeout values (TOV) in order to successfully establish an E-port connection:

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.



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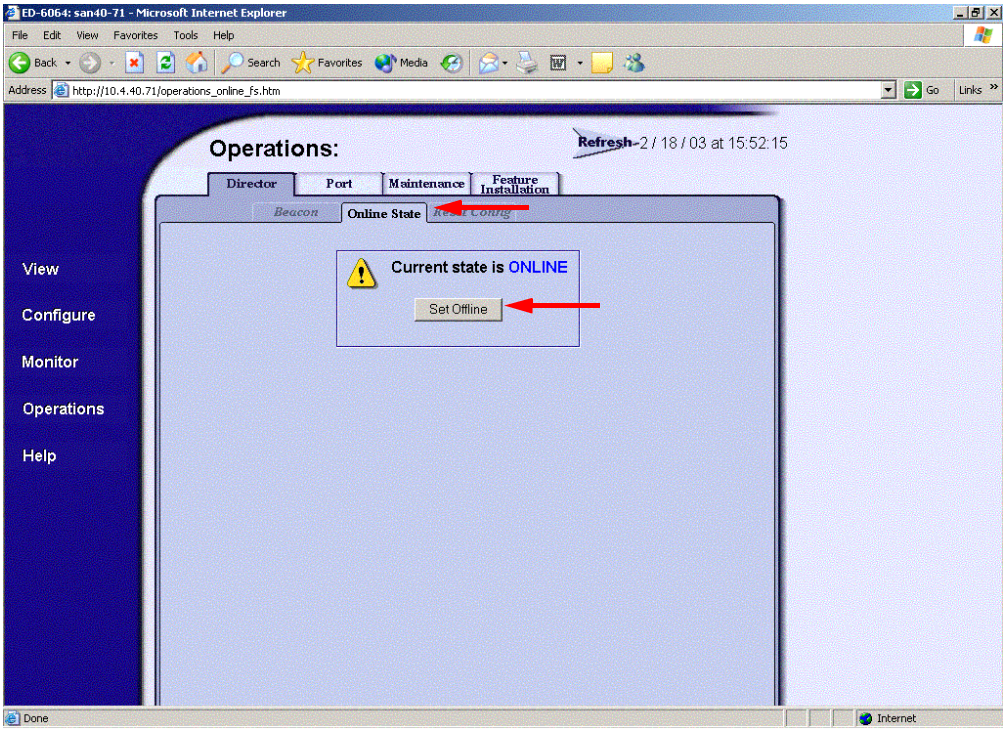
3. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select **Online State** tab, then click the **Set Offline** button.



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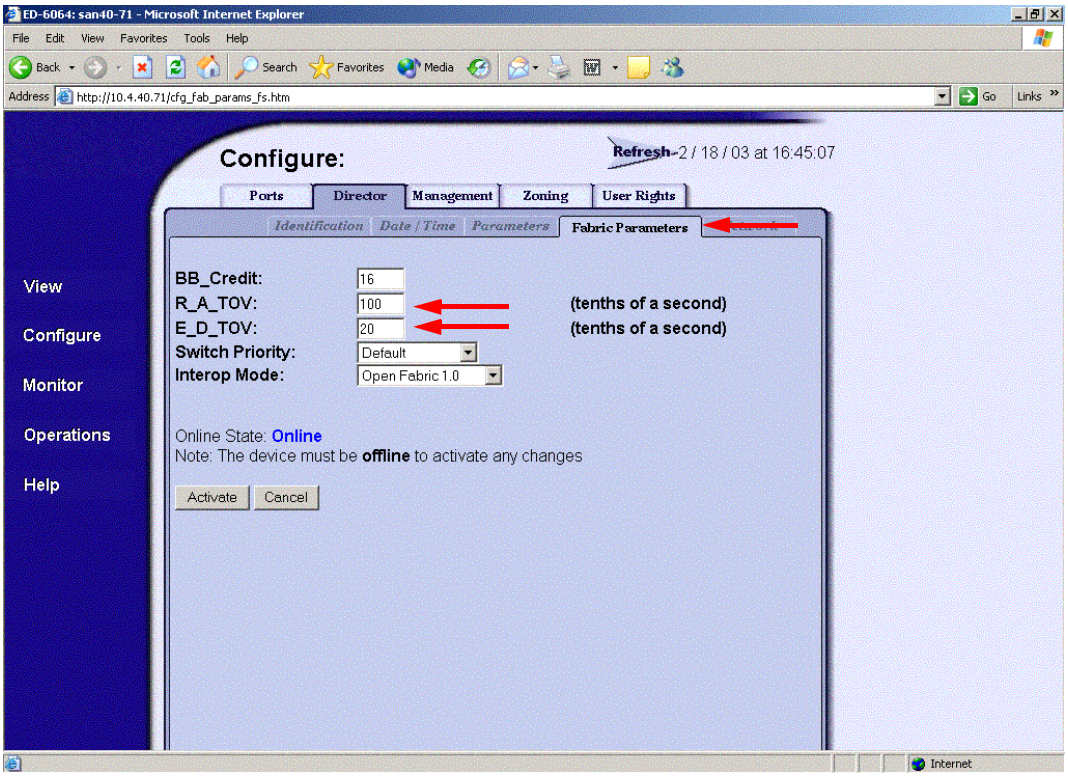
4. On the navigation panel, select **Configure**, The **Configure** dialog box displays. Select the **Director** tab, select the **Fabric Parameters** tab, then do the following:
   a. In the **R_A_TOV** box, change the setting to **100**.
   b. In the **E_D_TOV** box, change the setting to **20**.
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



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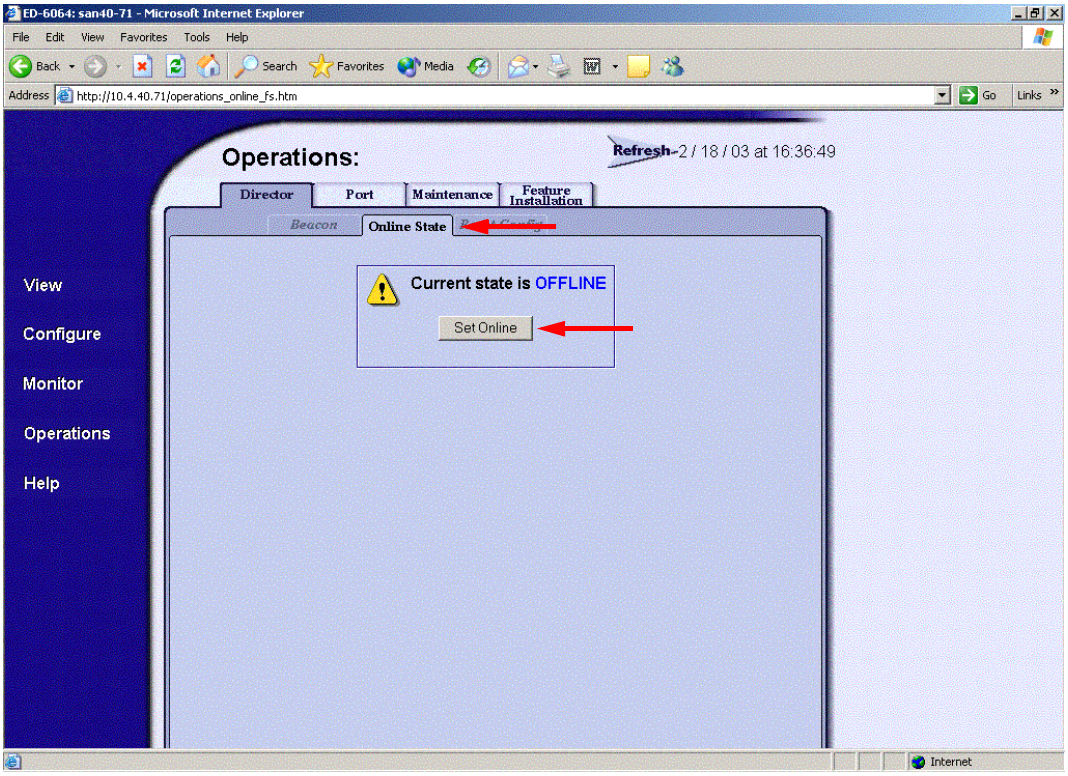
5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



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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
```


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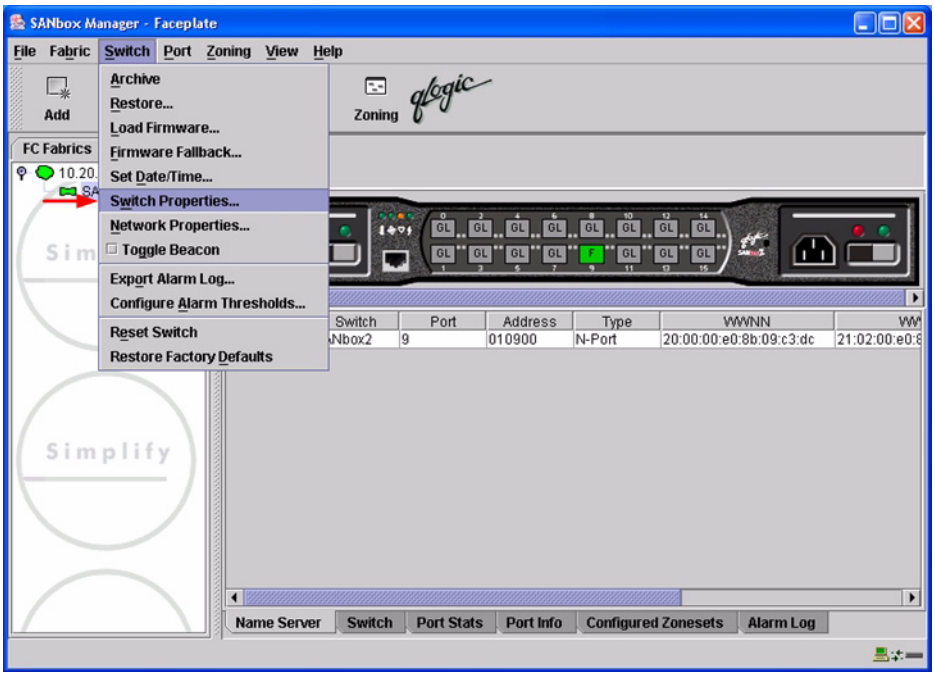
QLogic SANbox Manager GUI

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:



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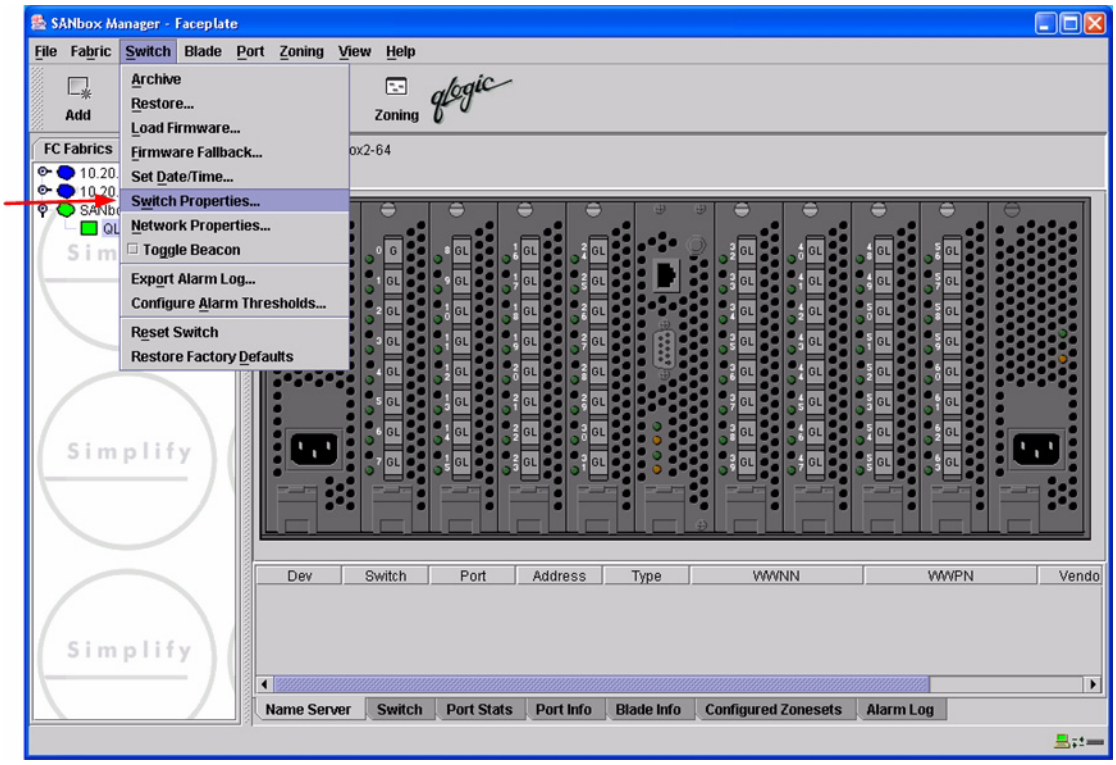
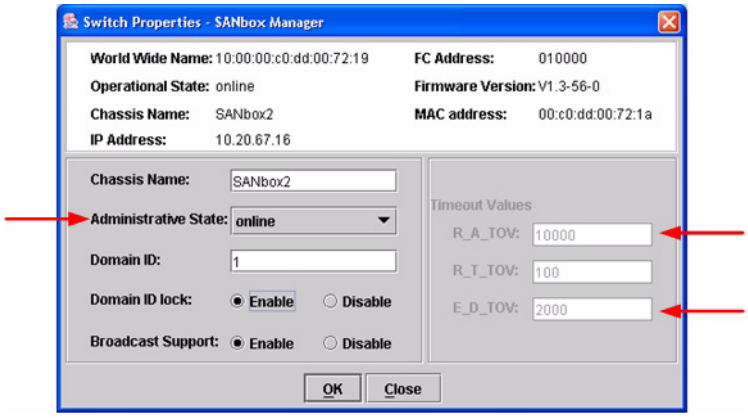
For the QLogic SANbox2-64, the following displays:



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:



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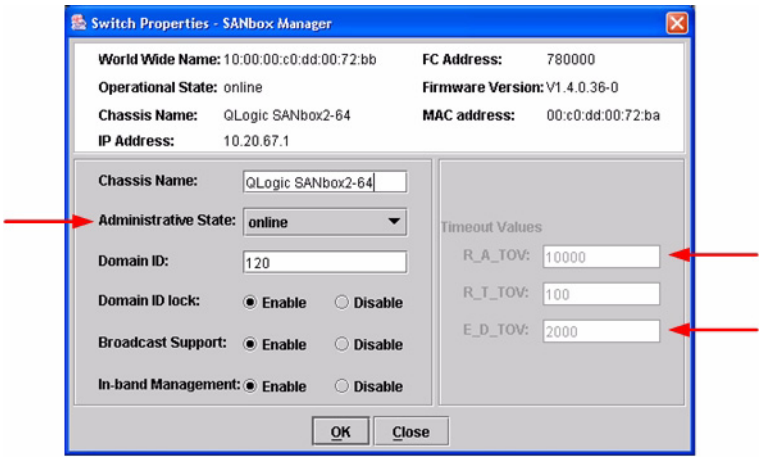
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

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

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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.

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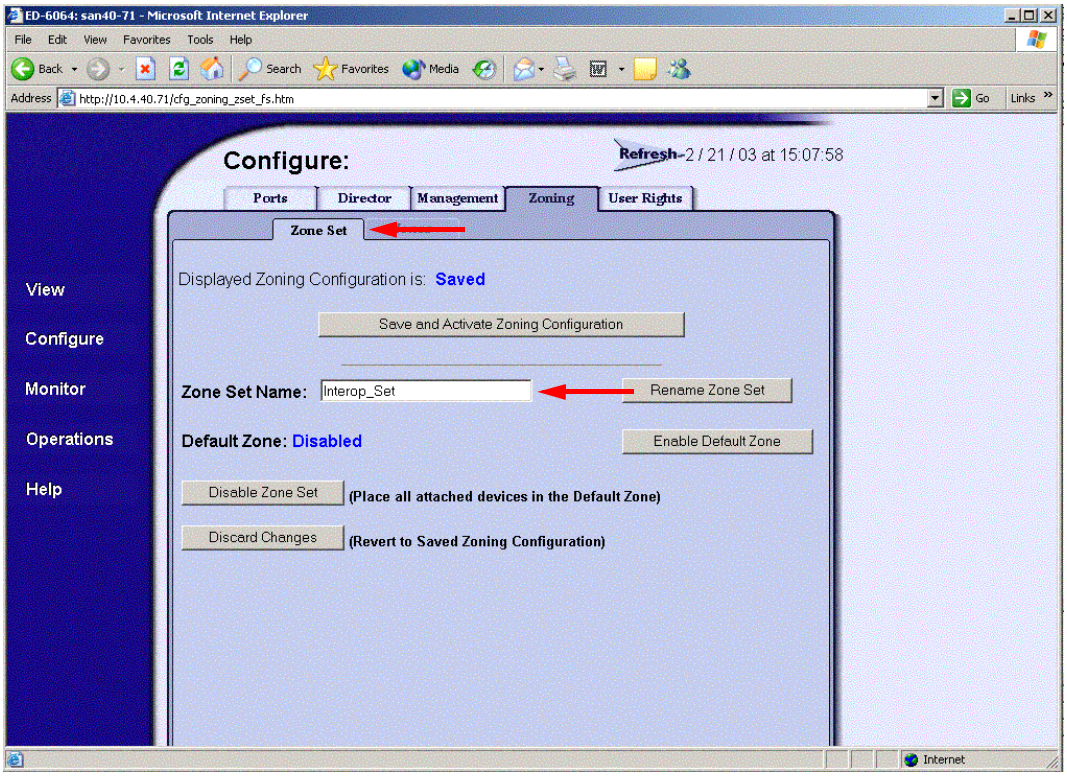
McDATA SANpilot Web Management

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 240.



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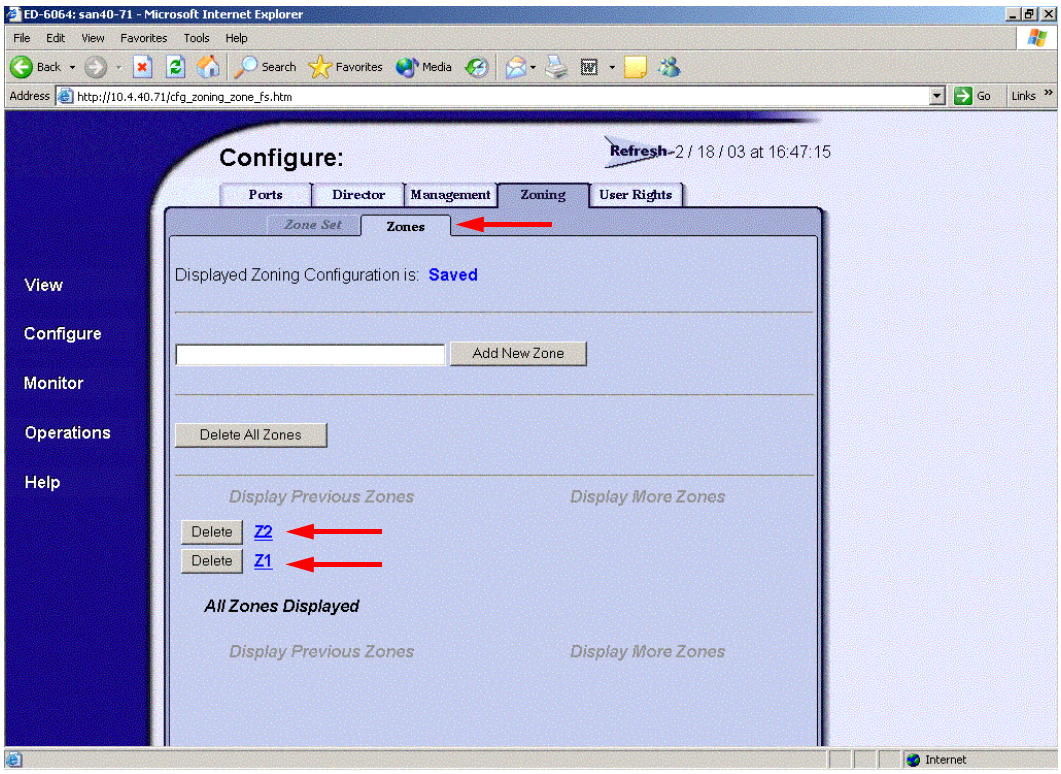
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, then select the **Zones** tab. Verify that the Zone names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 240.



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 240.

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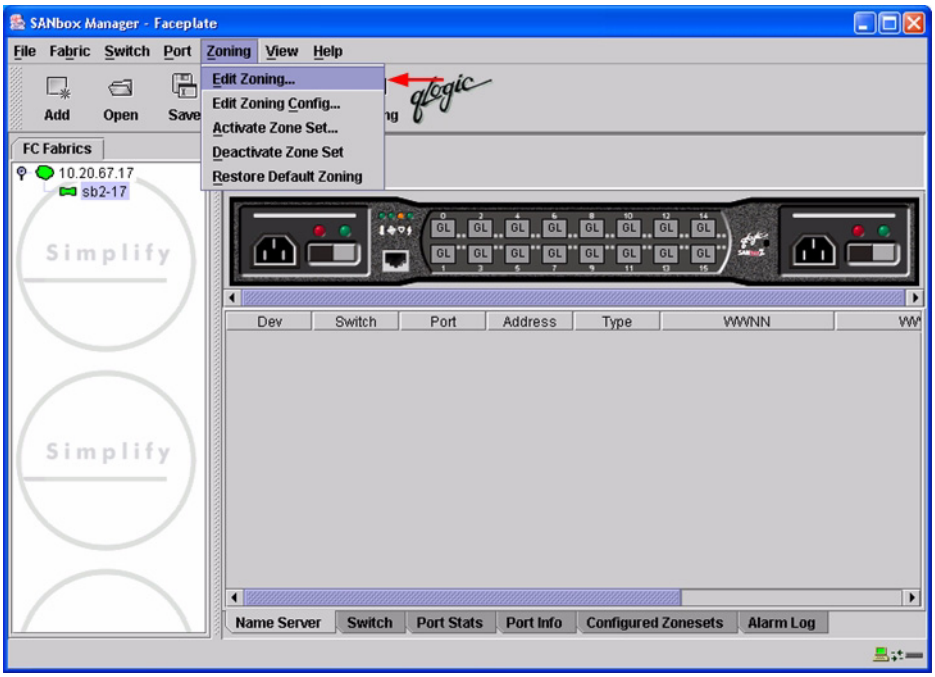
QLogic SANbox Manager GUI

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:



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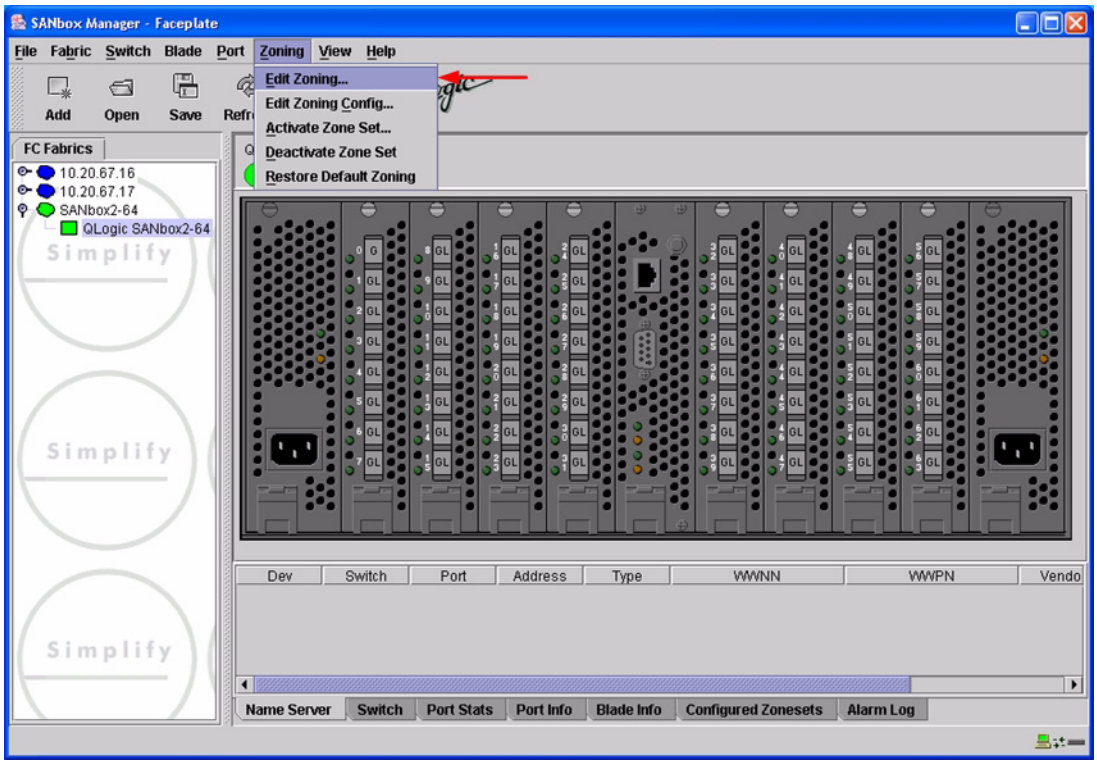
For the QLogic SANbox2-64, the following displays:



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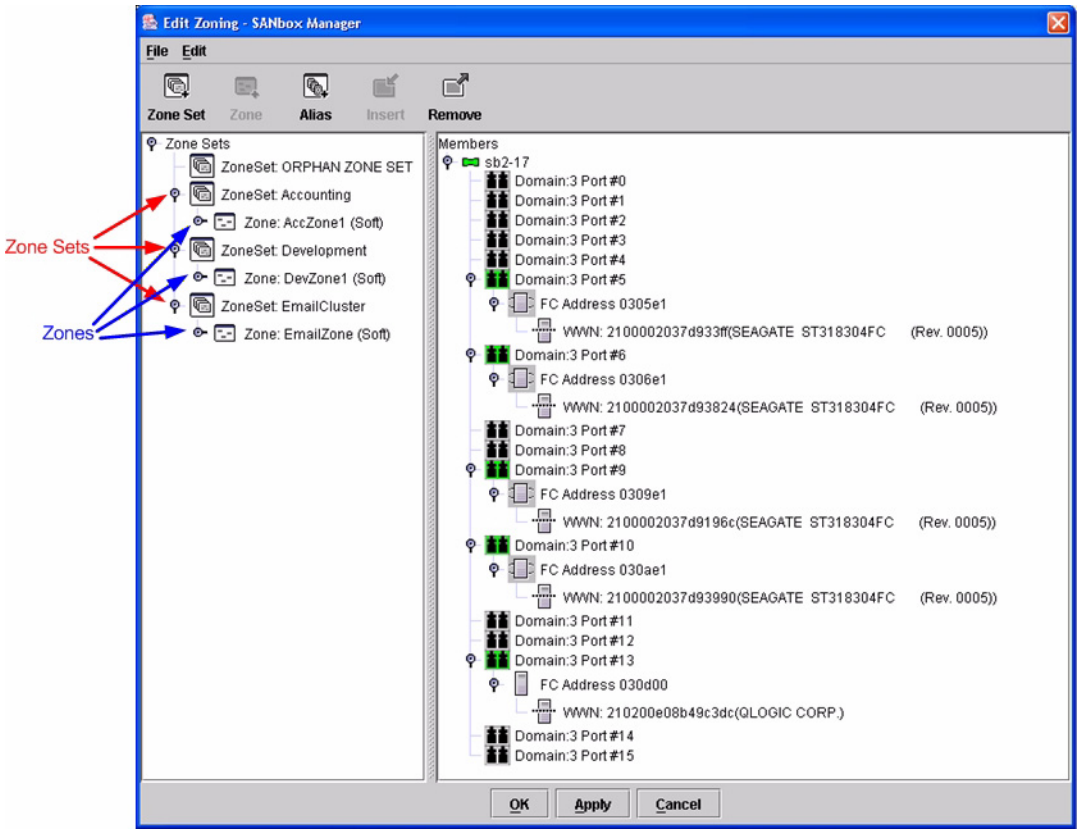
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 240.

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



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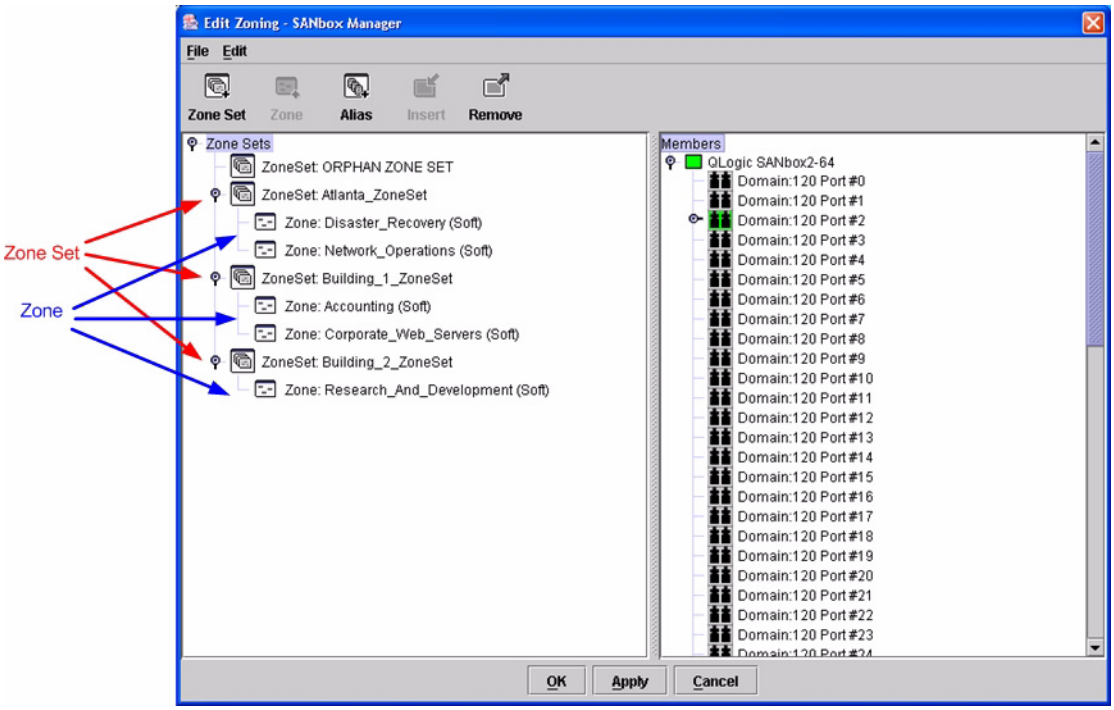
For the QLogic SANbox2-64, the following displays:



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
```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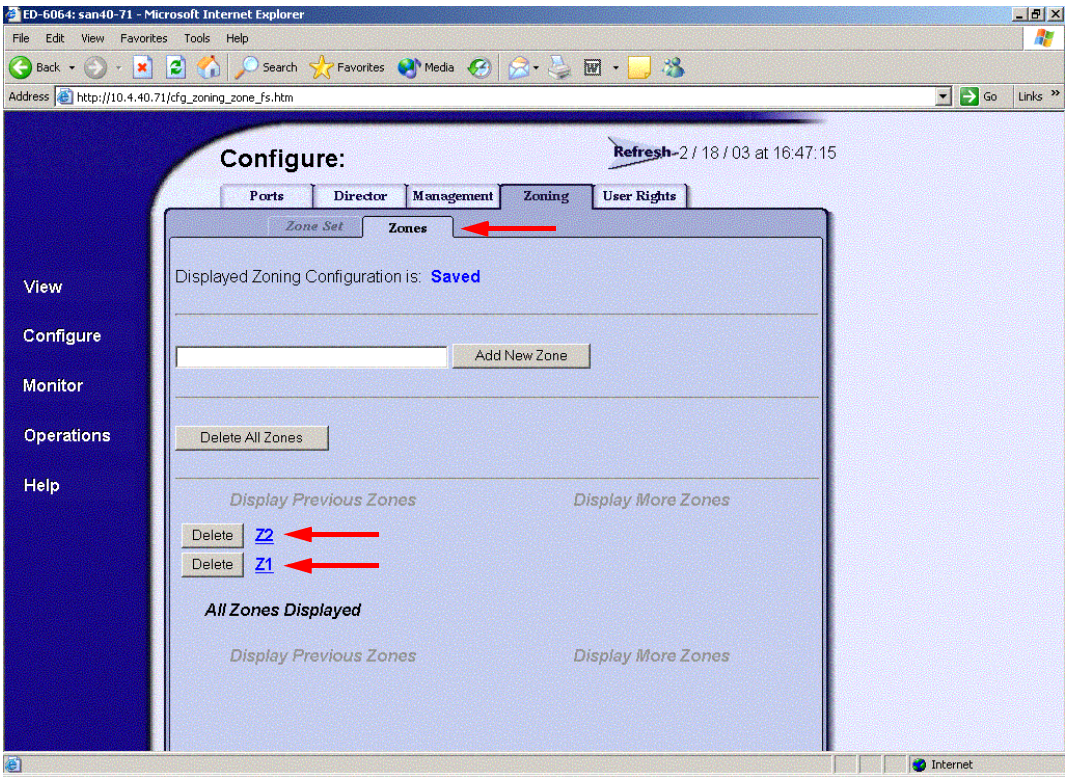
Zone Types

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.

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.



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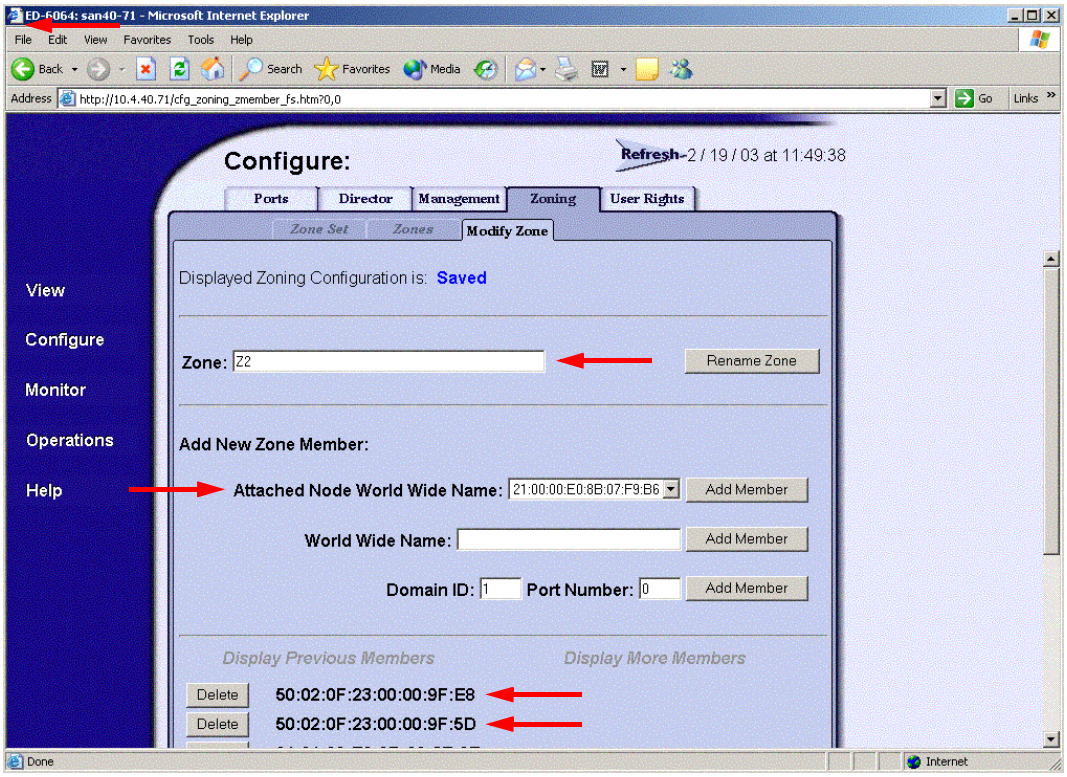
3. For each the zone selected in step 2, verify that all members are specified by WWN.



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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
```


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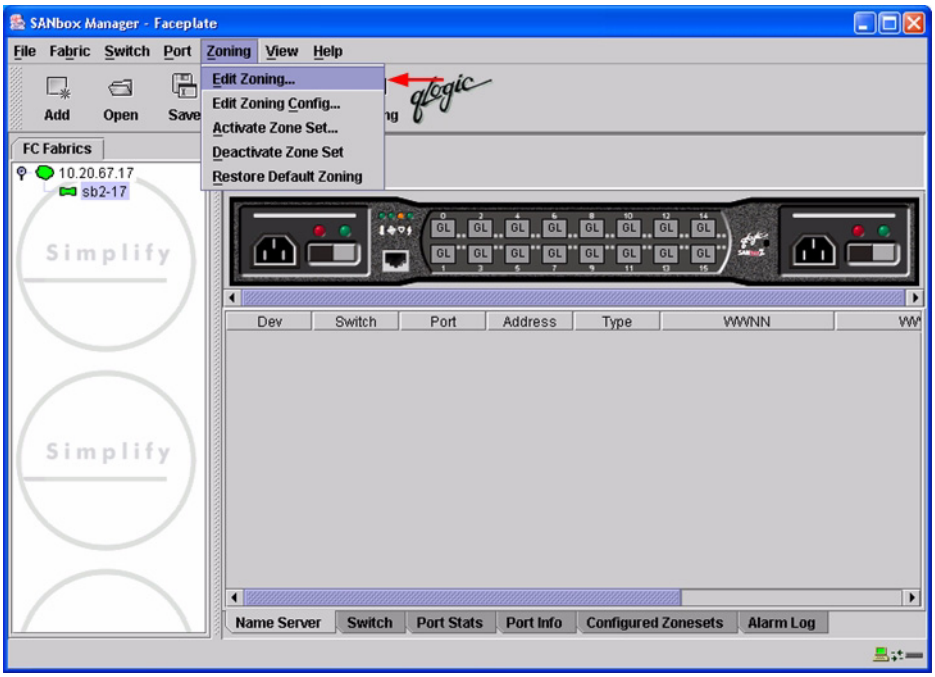
QLogic SANbox Manager GUI

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:



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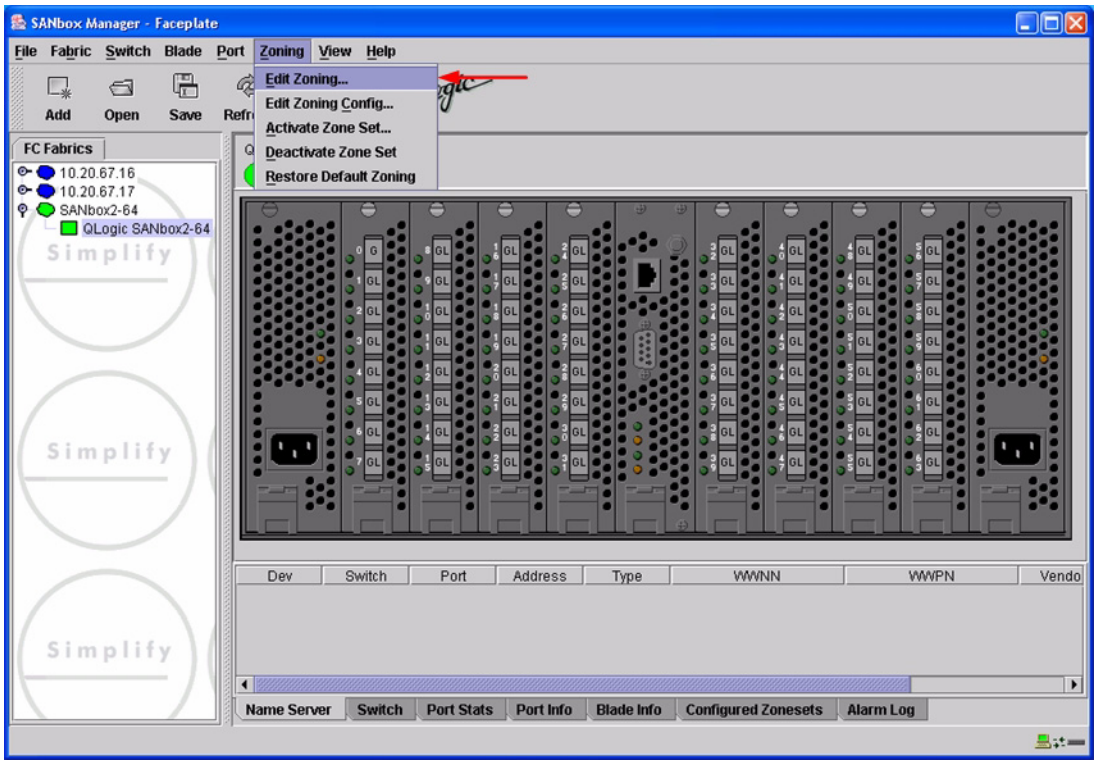
For the QLogic SANbox2-64, the following displays:



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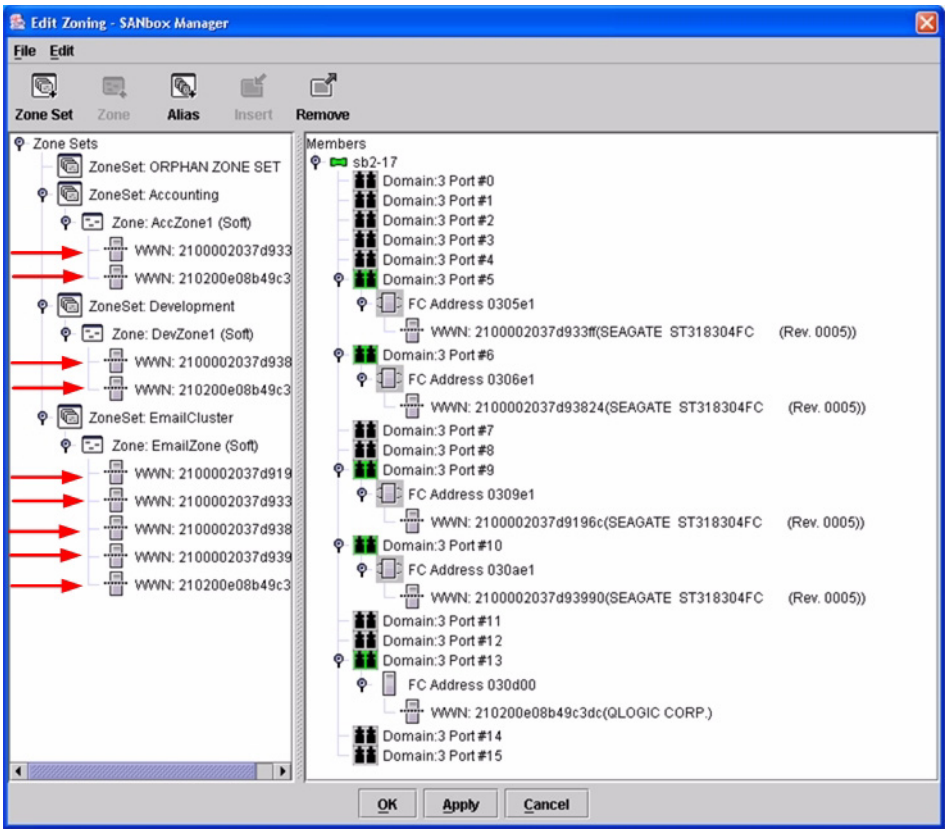
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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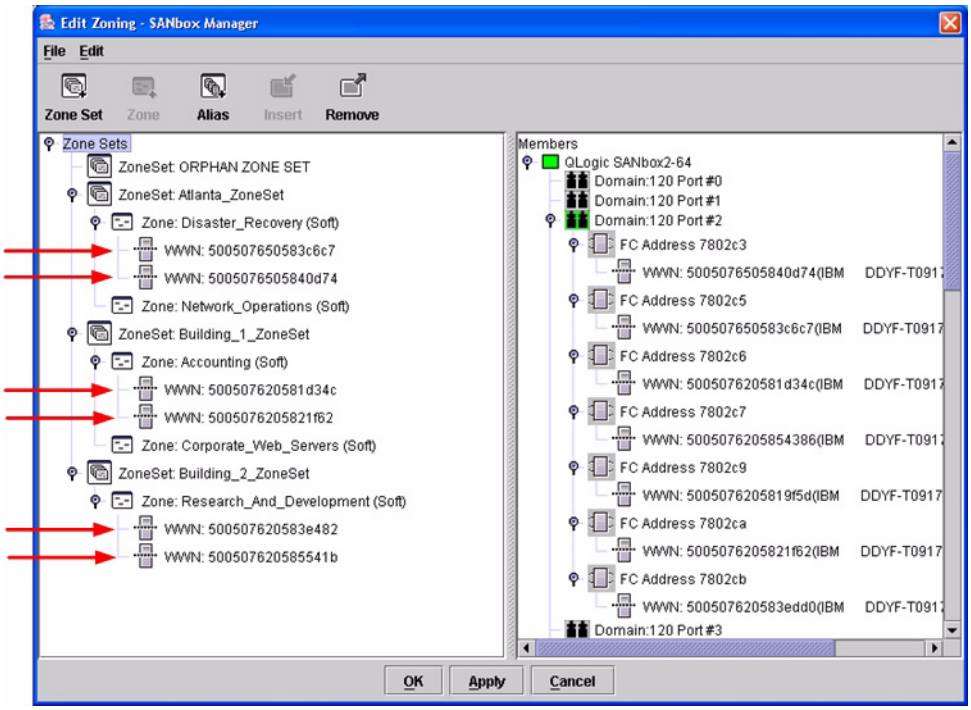
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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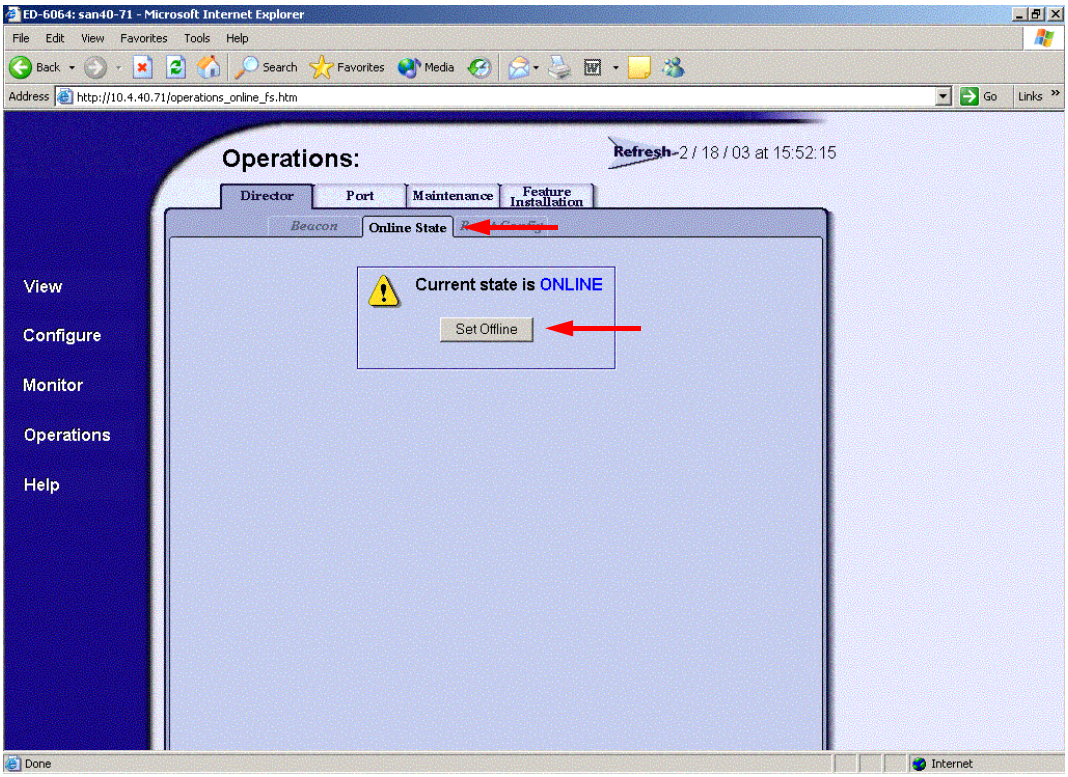
Operating Mode Configuration

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.



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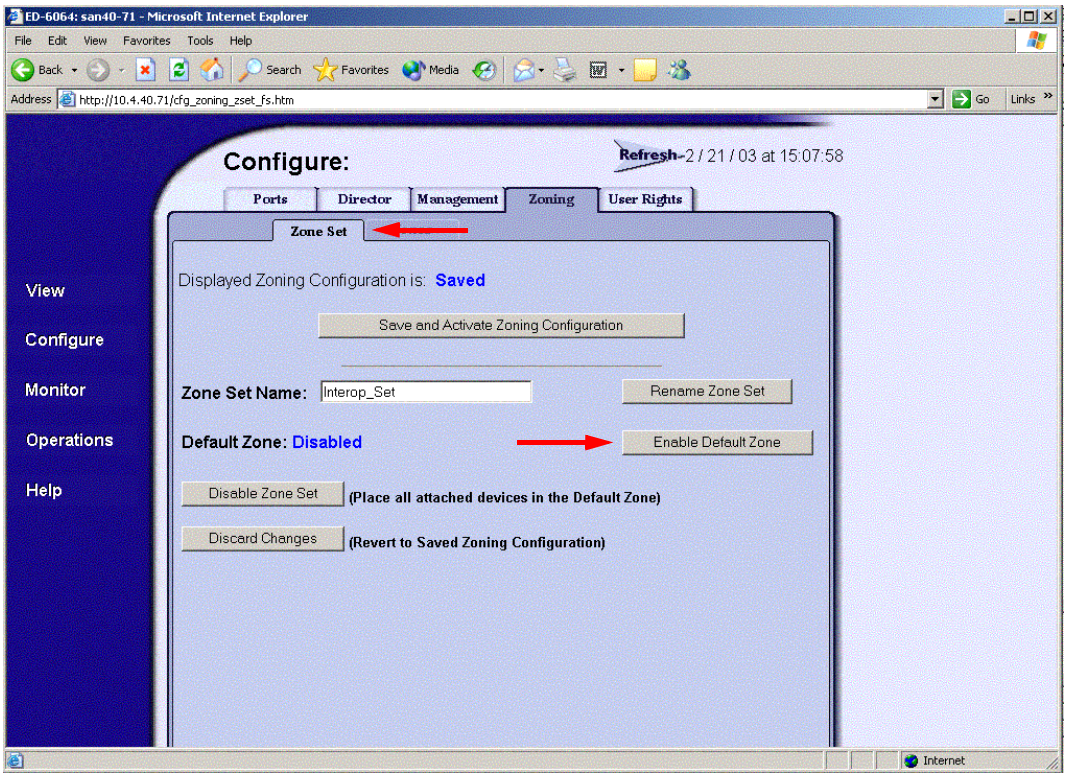
3. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Zoning** tab, select the **Zone Set** tab, then the **Disable Default Zone** button.

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



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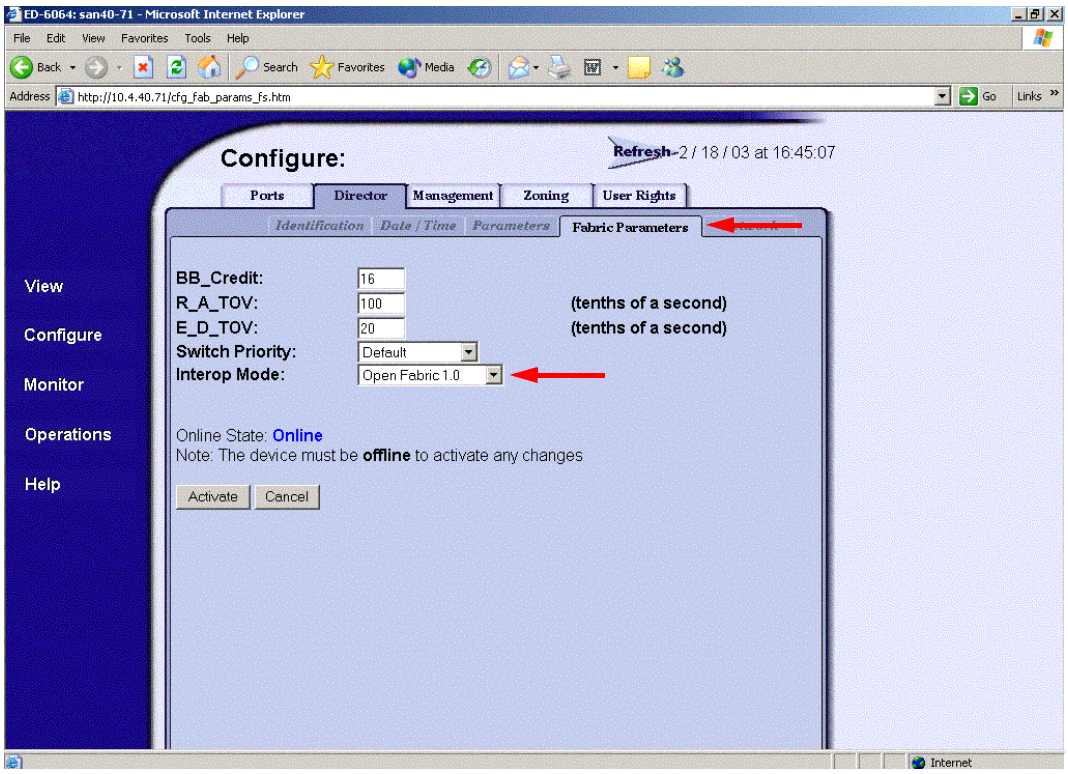
4. On the navigation panel, select **Configure**. The **Configure** dialog box displays. Select the **Director** tab, select the **Fabric Parameters** tab, then do the following:
   a. From the **Interop Mode** list, select **Open Fabric 1.0**.
   b. Click **Activate**.



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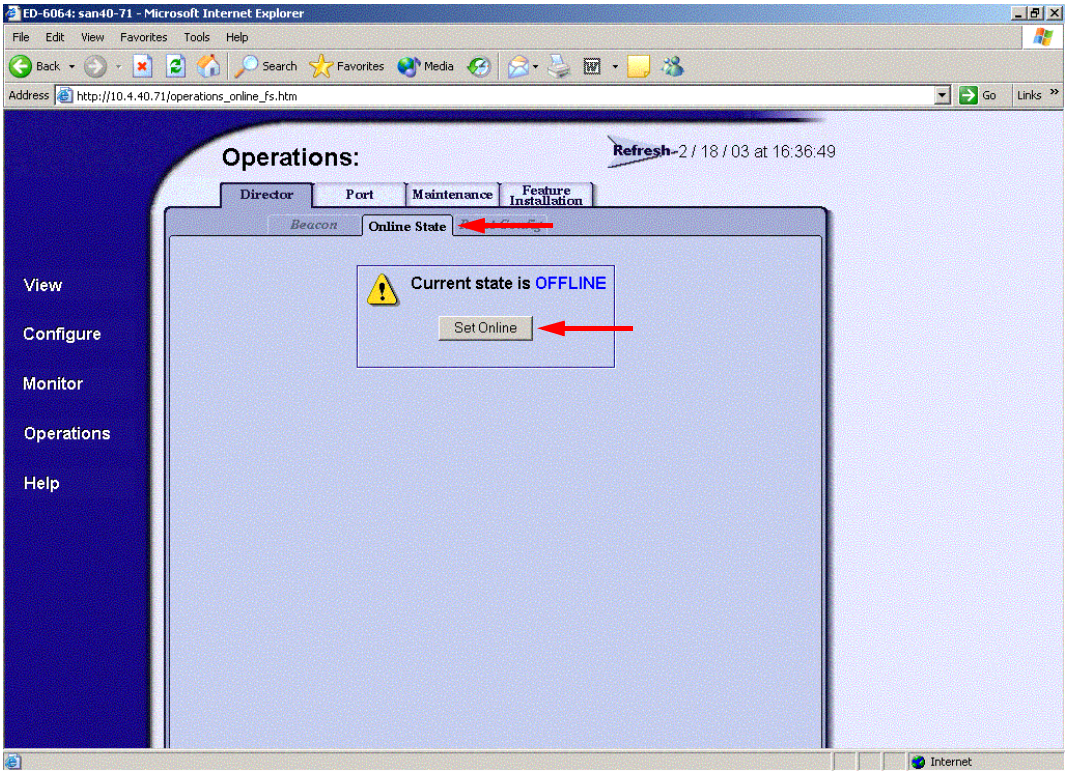
5. On the navigation panel, select **Operations**. The **Operations** dialog box displays. Select the **Director** tab, select the **Online State** tab, then click the **Set Online** button.



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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
```

QLogic SANbox Manager GUI

Not applicable.

QLogic CLI

Not applicable.

McDATA Specific Configuration

Not applicable.

QLogic Specific Configuration

Not applicable.

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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 QLogic 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 QLogic support.

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Merging QLogic and Sun Fabrics

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Sun that comply with the FC-SW-2 standard.

QLogic and Sun Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8	1.3.x and above
	SANbox2-16	1.3.x and above
	SANbox2-64	1.5.x and above
Sun	Sun StorEdge Network 2 Gb FC Switch-8	1.3.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.3.x and above

Sun StorEdge Network 2 Gb FC Series Switches **(see page 263)** provides detailed information about merging QLogic and Sun fabrics.

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Sun StorEdge Network 2 Gb FC Series Switches

Integration Checklist

The following steps must be completed to successfully merge Sun and QLogic 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 264).

✓ Ensure that each switch has a unique Domain ID and that it falls within the proper range (see “Domain ID Configuration” on page 265).

✓ Set all switches to the appropriate timeout values (see “Timeout Values” on page 272).

✓ Ensure that all Zone set and Zone names are unique and conform to ANSI T11 standards (see “Active Zone Set Names” on page 279).

✓ Ensure that all zone members are specified by WWPN (see “Zone Types” on page 286).

✓ Verify that the fabrics have successfully merged (see “Successful Integration Checklist” on page 292).

Configuration Limitations

The following QLogic 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 QLogic fabrics; all features are fully supported and comply with industry standards.

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Supported Switches and Firmware Versions

The following QLogic switches have been tested in the QLogic environment and comply with the FC-SW-2 standard. QLogic switches have tested interoperable with the following switches from Sun that comply with the FC-SW-2 standard.

QLogic and Sun Supported Switch and Firmware Versions

Manufacturer	Switch Model	Firmware Version
QLogic	SANbox2-8 Switch	1.3.x and above
	SANbox2-16 Switch	1.3.x and above
	SANbox2-64 Switch	1.5.x and above
Sun	Sun StorEdge Network 2 Gb FC Switch-8	1.3.x and above
	Sun StorEdge Network 2 Gb FC Switch-16	1.3.x and above

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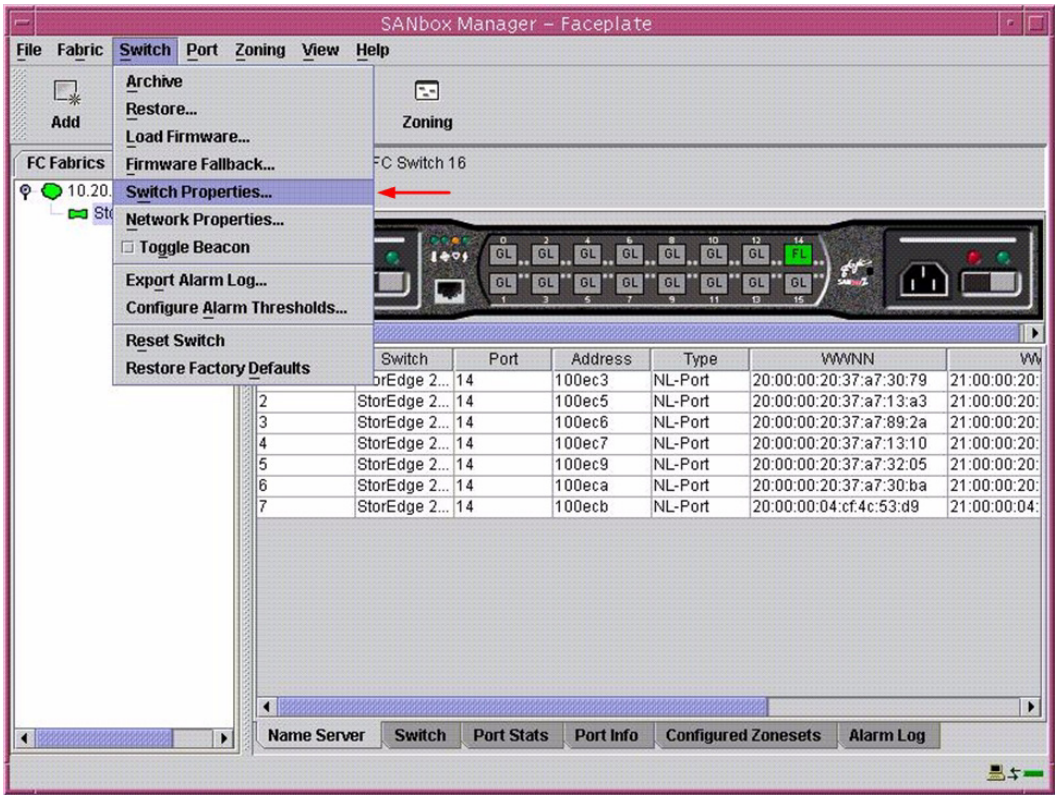
Domain ID Configuration

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 QLogic 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:



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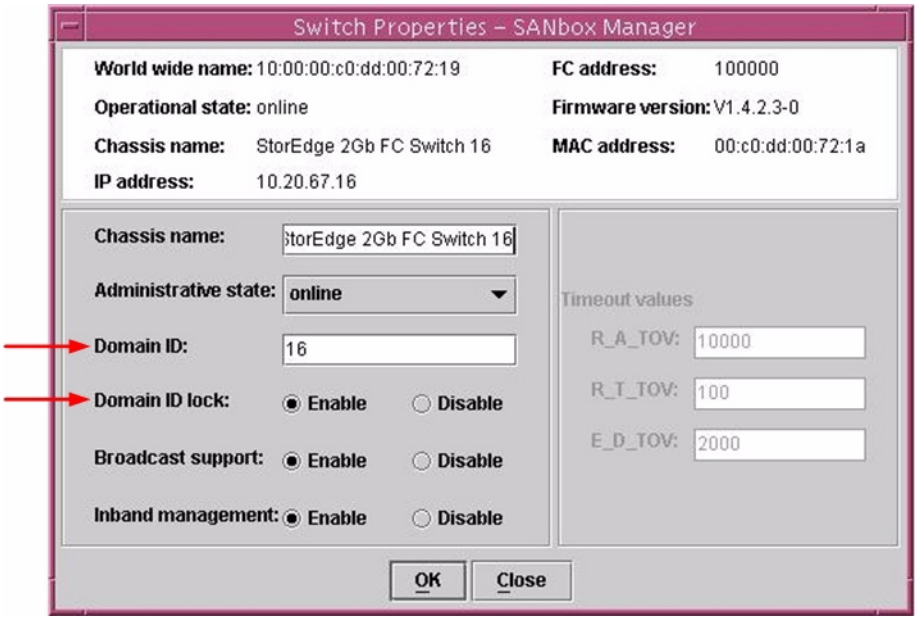
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



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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 64 #> admin start
StorEdge 2Gb FC Switch 64 (admin) #> config edit
StorEdge 2Gb FC Switch 64 (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 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]
StorEdge 2Gb FC Switch 64 (admin-config) #> config save
StorEdge 2Gb FC Switch 64 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```


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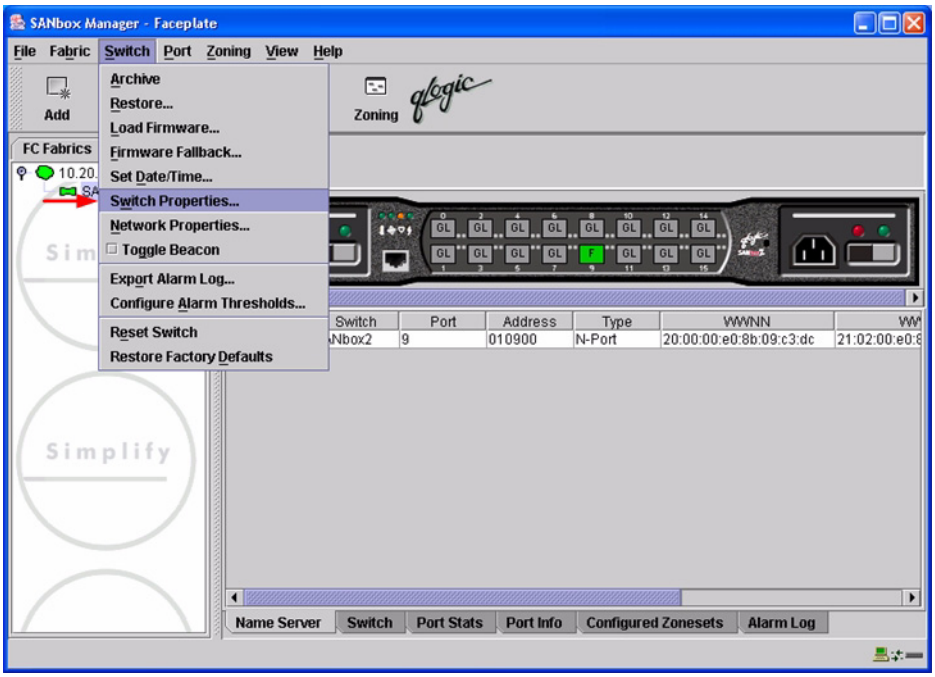
QLogic SANbox Manager GUI

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:



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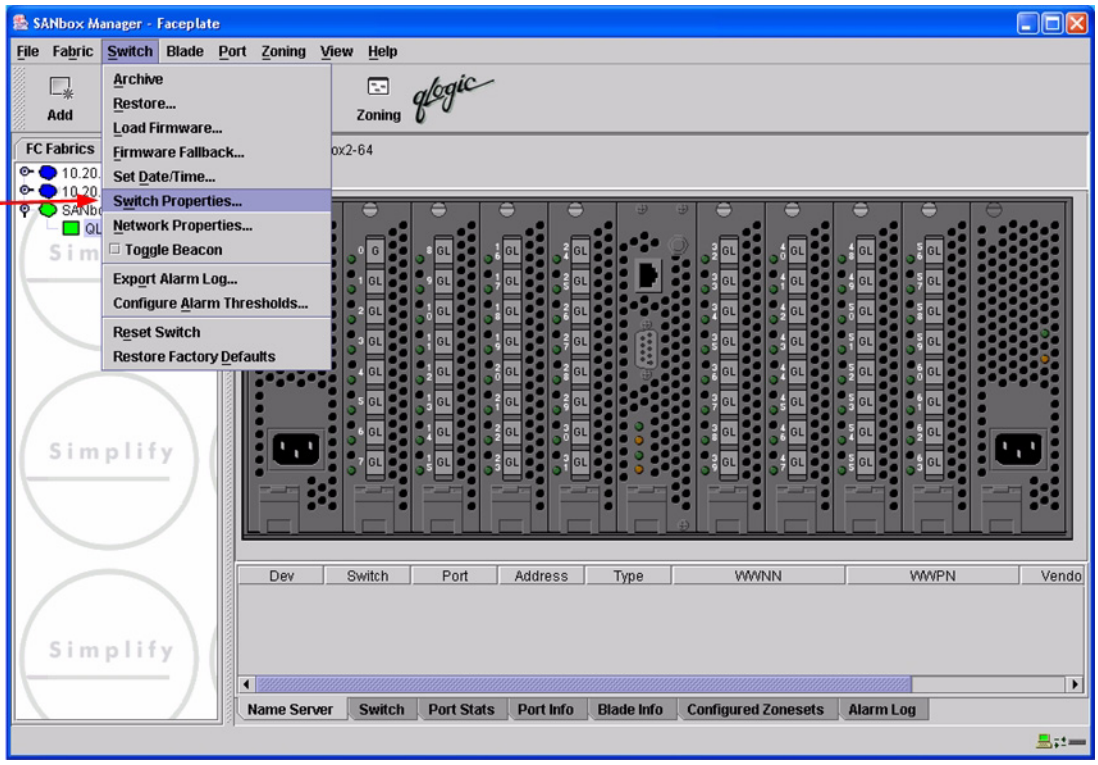
For the QLogic SANbox2-64, the following displays:



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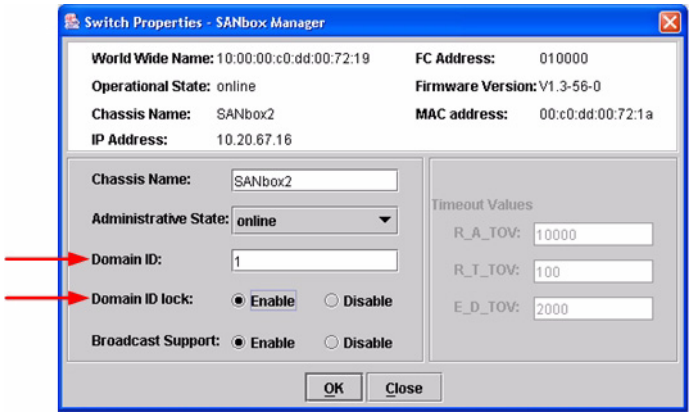
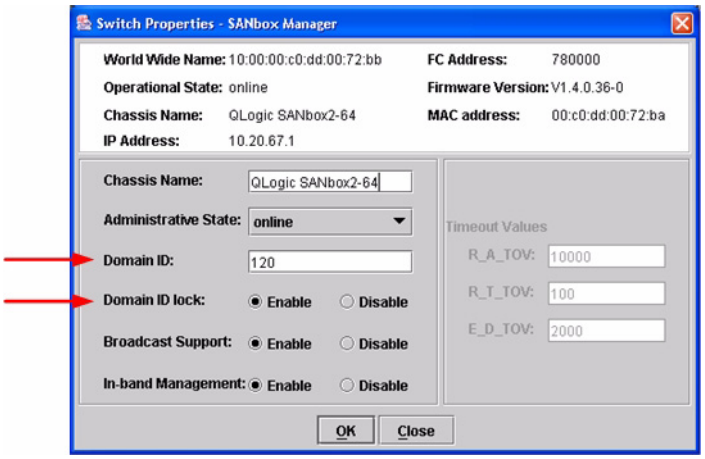
3. From the **Switch Properties—SANbox Manager** dialog box, do the following:
   a. In the **Domain ID** box, type a unique Domain ID for the switch.
   b. In the **Domain ID Lock** field, select **Enable** to ensure that the switch always has that Domain ID.
   c. Click **OK**.

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



   For the QLogic SANbox2-64, the following displays:



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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
```


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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

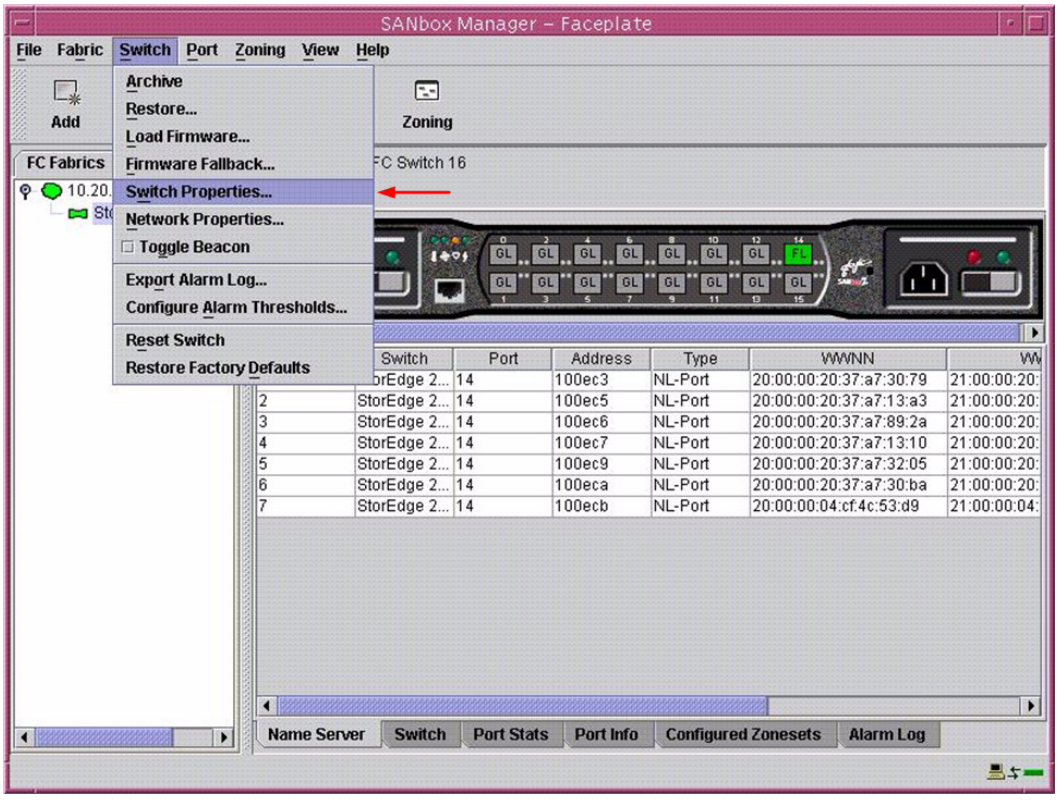
This section provides the steps to change these values.

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:



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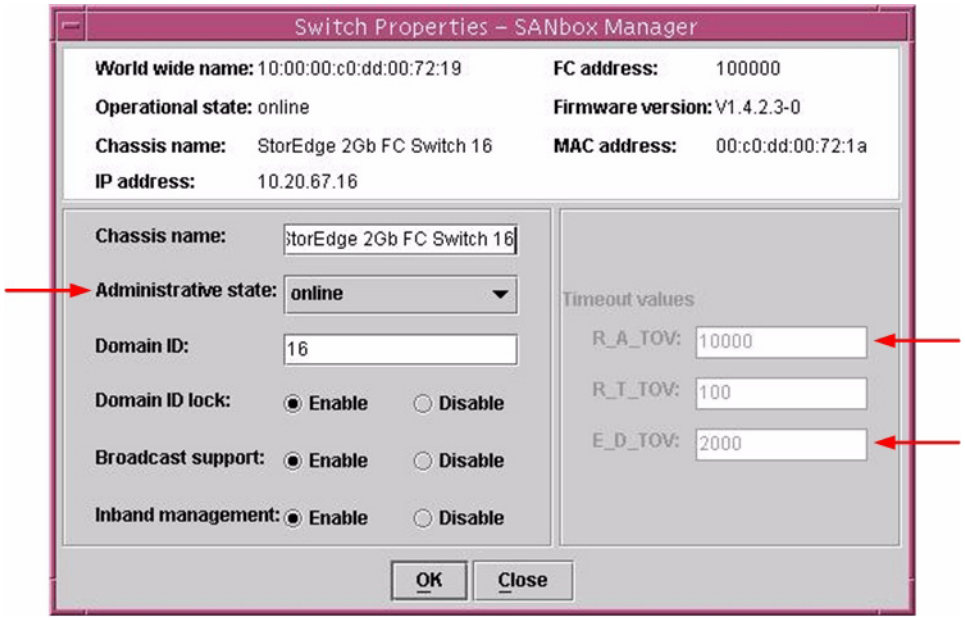
3. From the **Switch Properties—SANbox Manager** dialog box, verify that **R_A_TOV** is set to **10000** and **E_D_TOV** is set to **2000**. If the settings are not correct, proceed to step 4. If the settings are correct, no changes need to be made; proceed to the next appropriate section.

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



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**.

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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 64 #> 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 64 #> admin start
StorEdge 2Gb FC Switch 64 (admin) #> config edit
StorEdge 2Gb FC Switch 64 (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 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]
StorEdge 2Gb FC Switch 64 (admin-config) #> config save
StorEdge 2Gb FC Switch 64 (admin) #> config activate
The configuration will be activated.  Please confirm (y/n): [n] y
```


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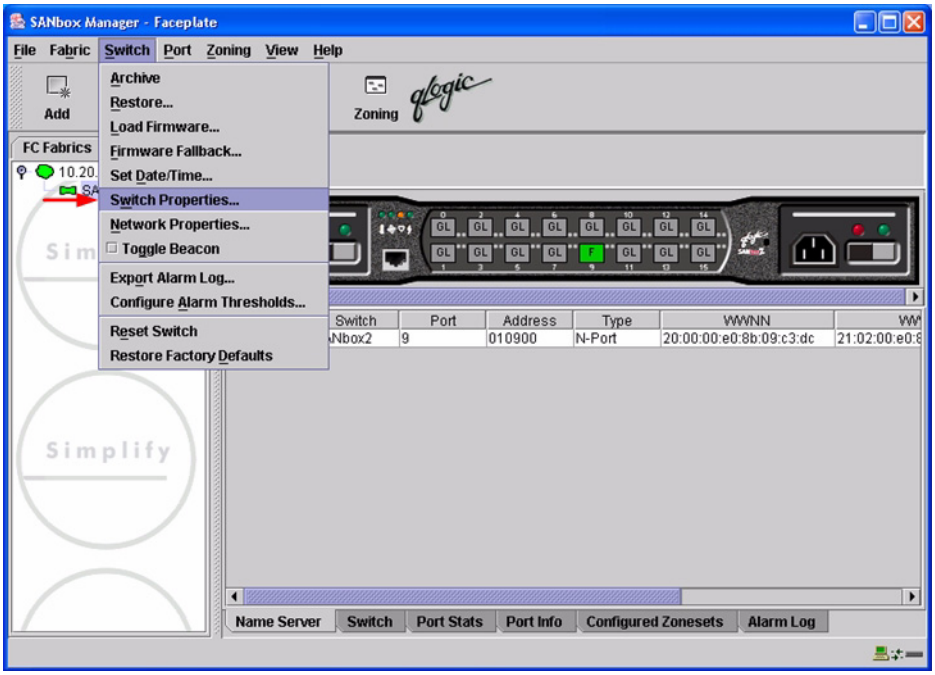
QLogic SANbox Manager GUI

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:



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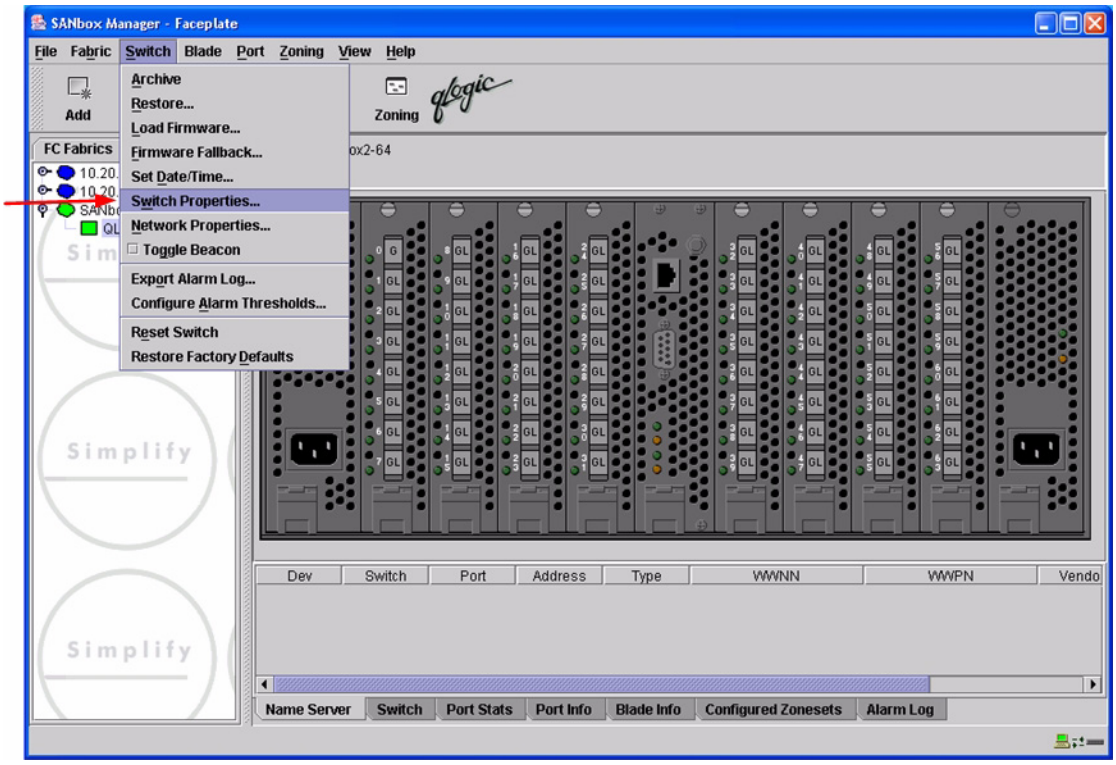
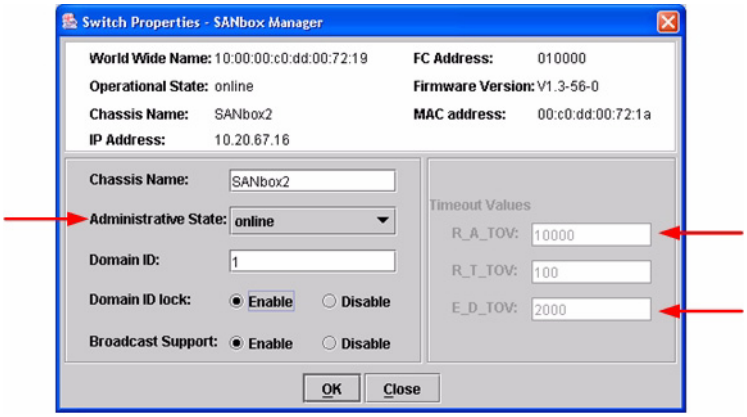
For the QLogic SANbox2-64, the following displays:



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:



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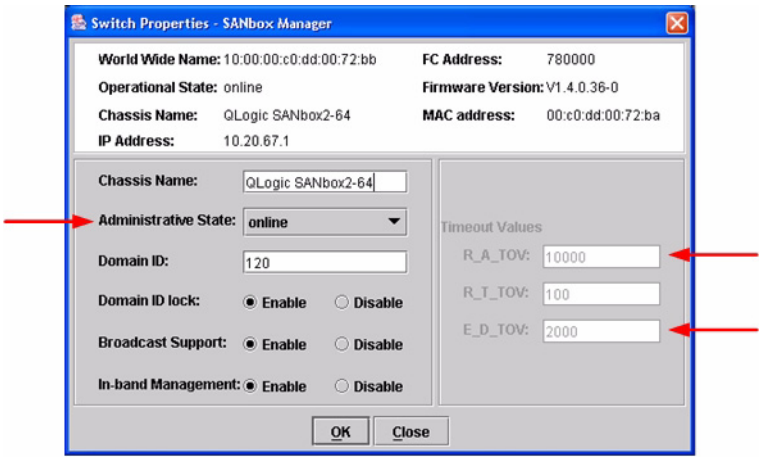
For the QLogic SANbox2-64, the following displays:



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**.

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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
```

Principal Switch Configuration

Sun switches and QLogic switches negotiate for principal switch automatically. Therefore, there are no steps to take.

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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.

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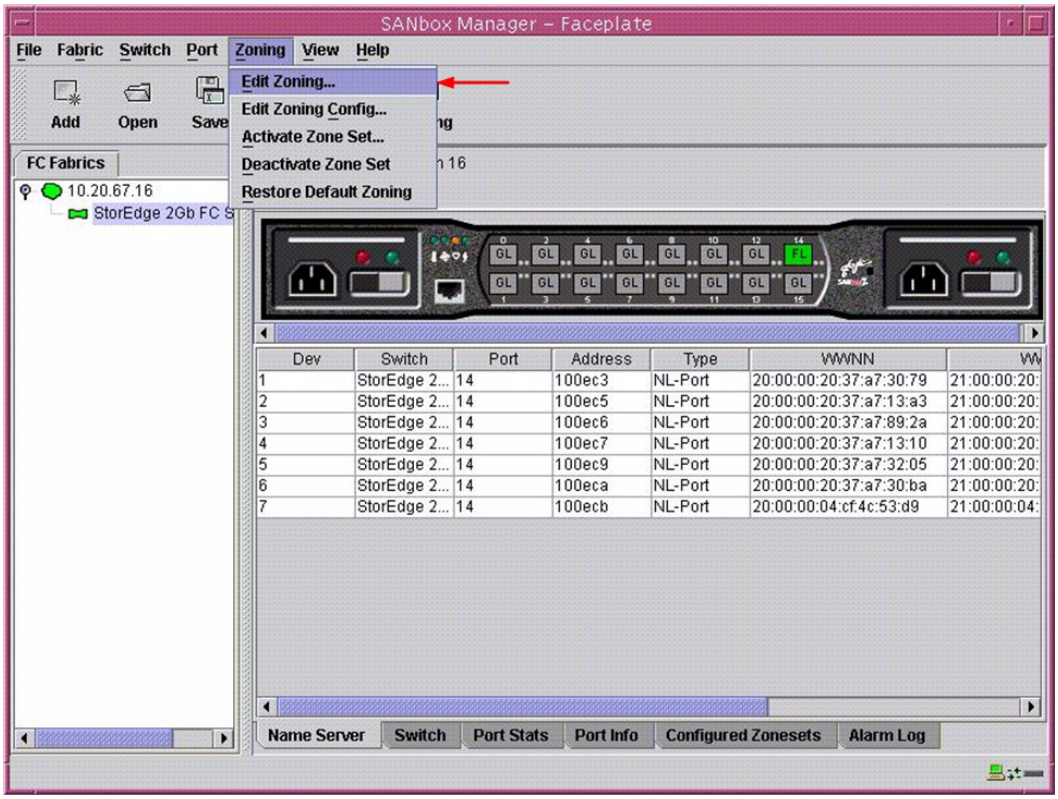
Sun StorEdge SANbox Manager GUI

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:



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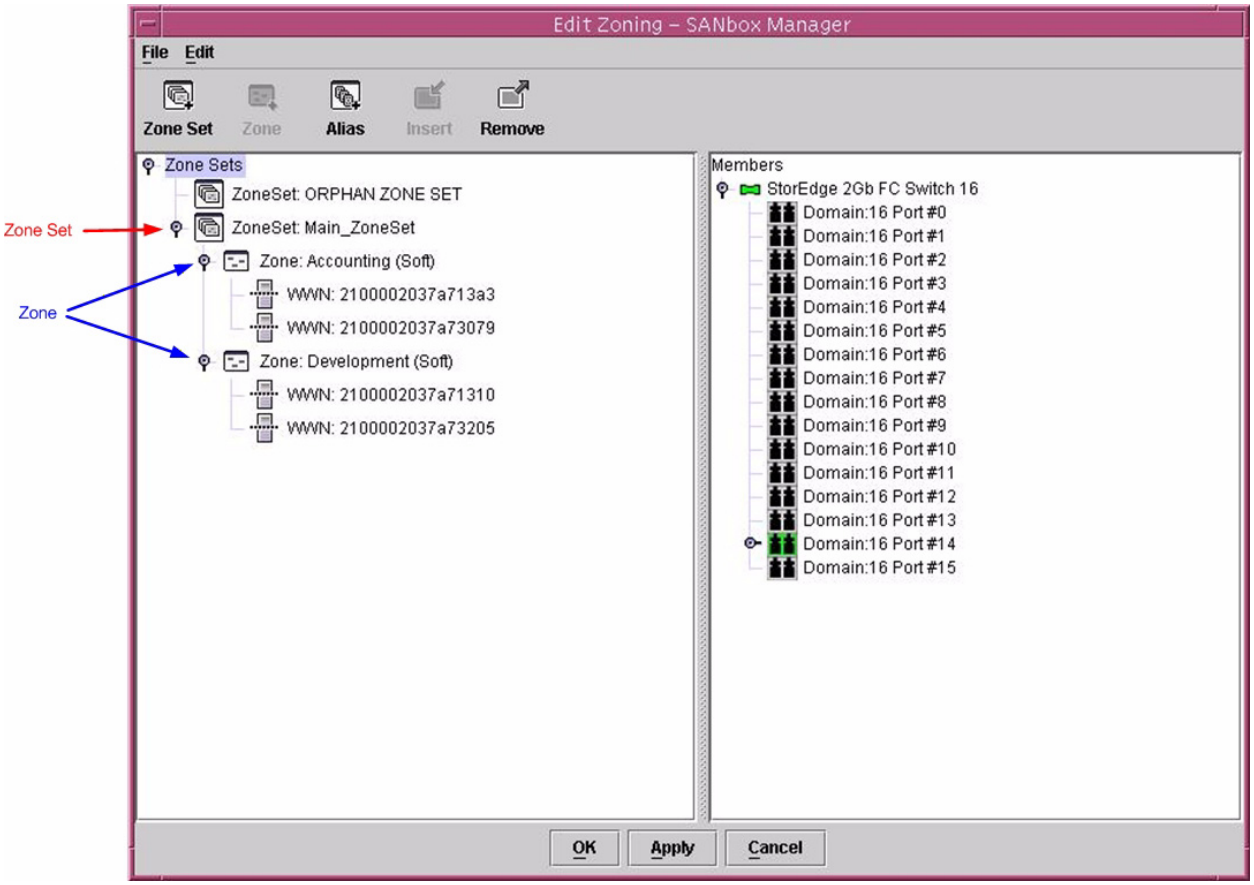
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 279.

   For the Sun StorEdge Network 2 Gb FC Switch-8 and Sun StorEdge Network 2 Gb FC Switch-16, 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 64 #> zone list
```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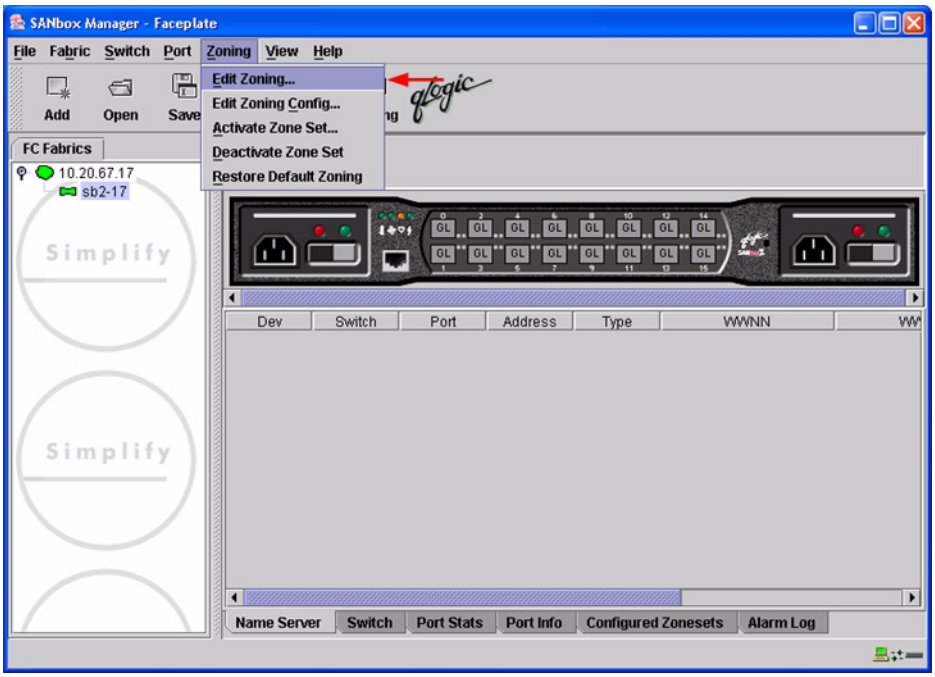
QLogic SANbox Manager GUI

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:



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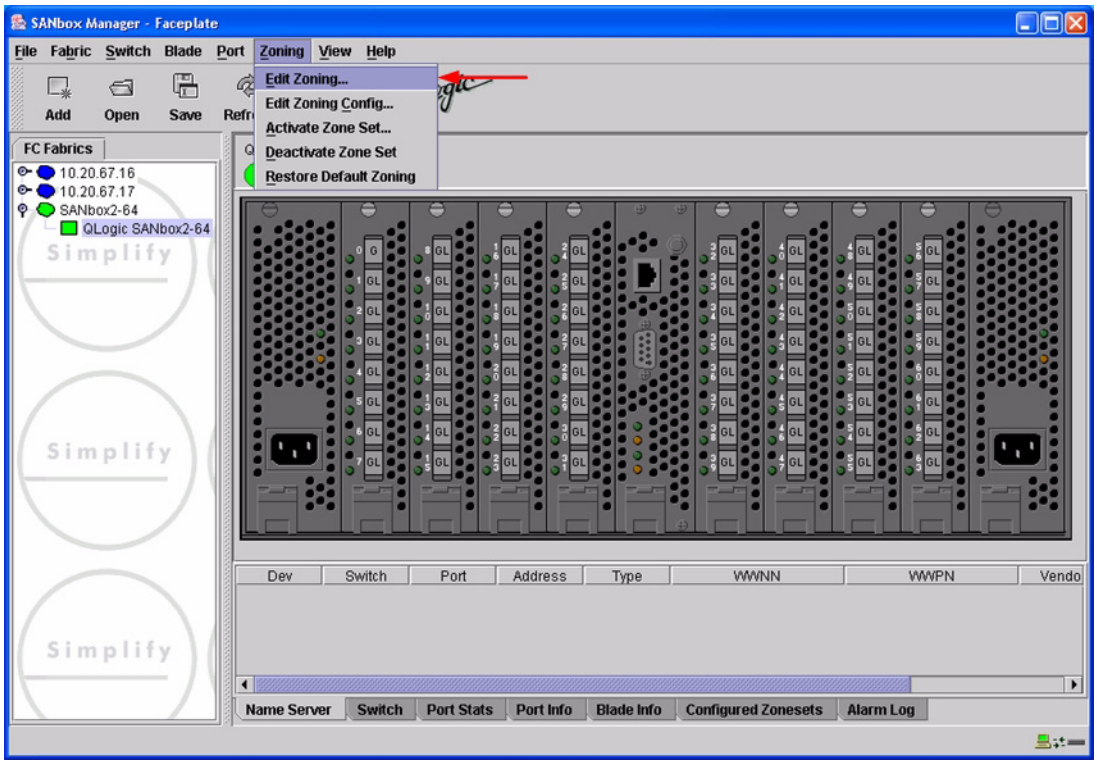
For the QLogic SANbox2-64, the following displays:



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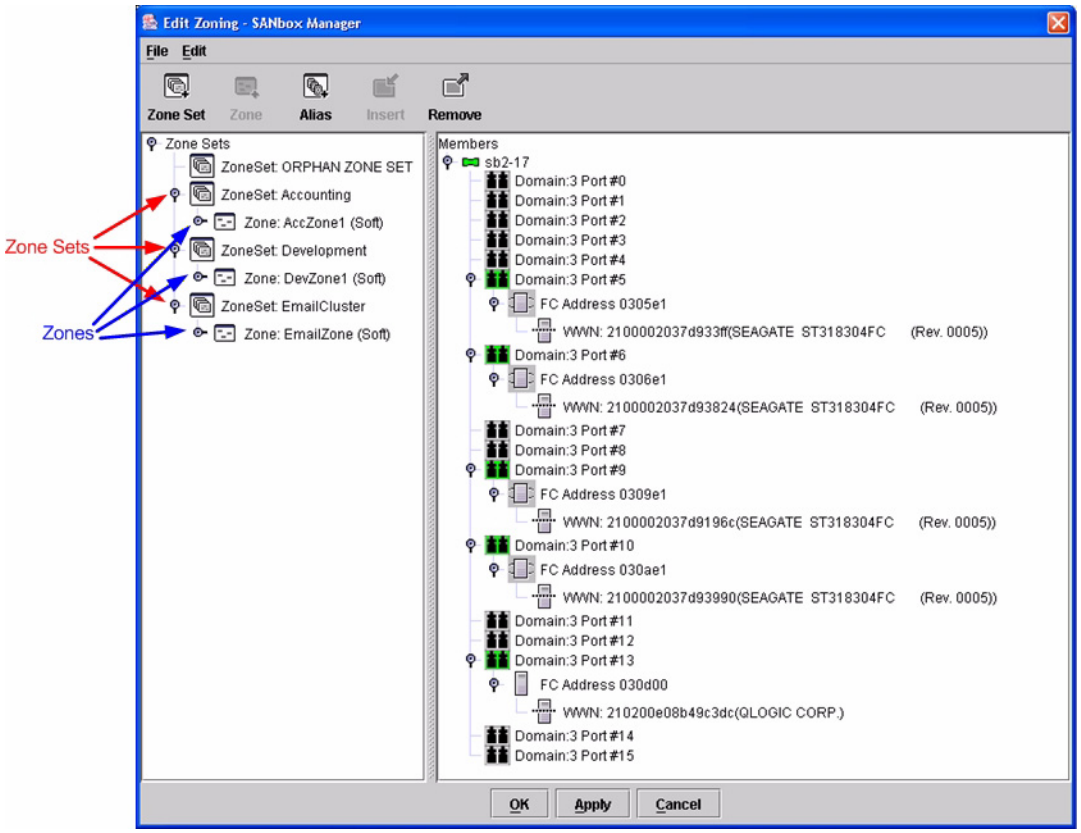
3. From the **Edit Zoning—SANbox Manager** dialog box, compare the Zone Set and Zone names from each switch to ensure there are none with the same name and the names conform to the standards for zone naming as discussed under "Active Zone Set Names" on page 279.

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



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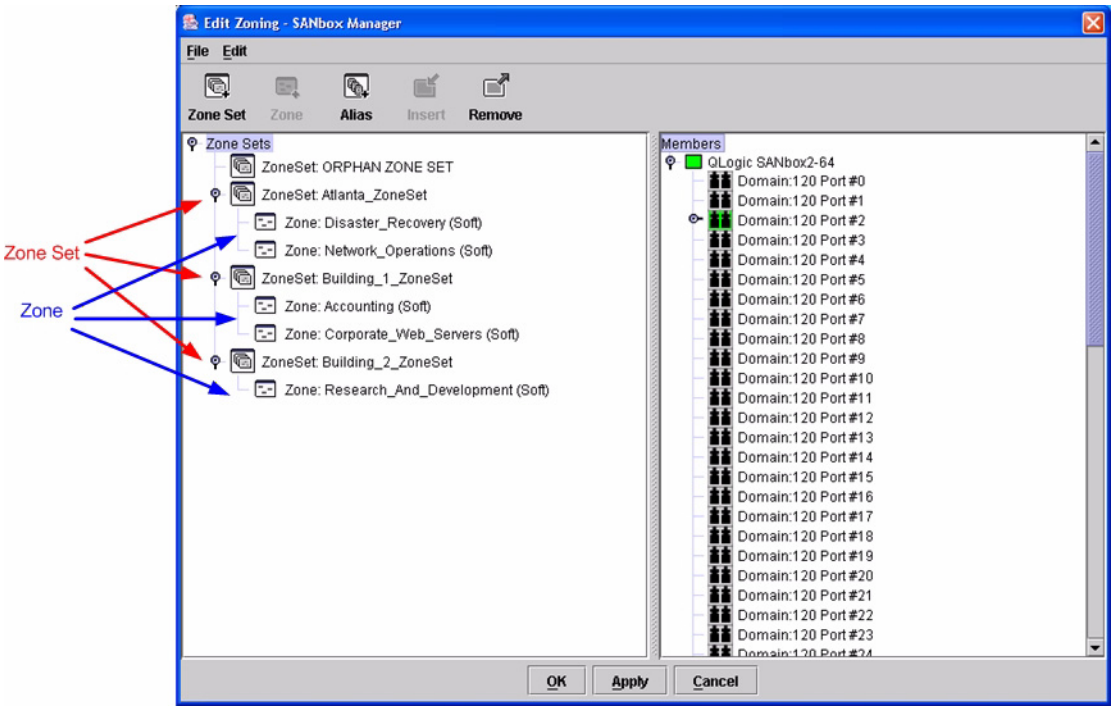
For the QLogic SANbox2-64, the following displays:



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
```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Zone Types

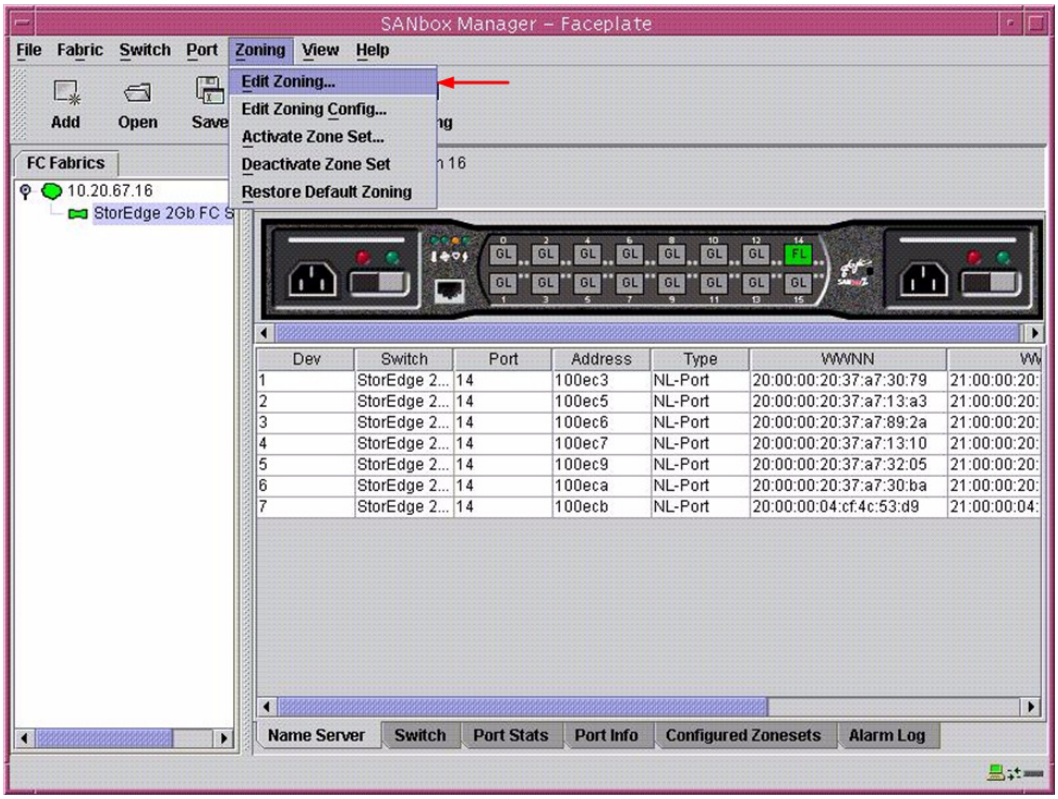
All zone members must be specified by a world wide port name (WWPN) in order to comply with Fibre Channel standards. Any zone member not specified by WWPN cannot participate in the fabric. Below are steps to confirm the zone types.

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:



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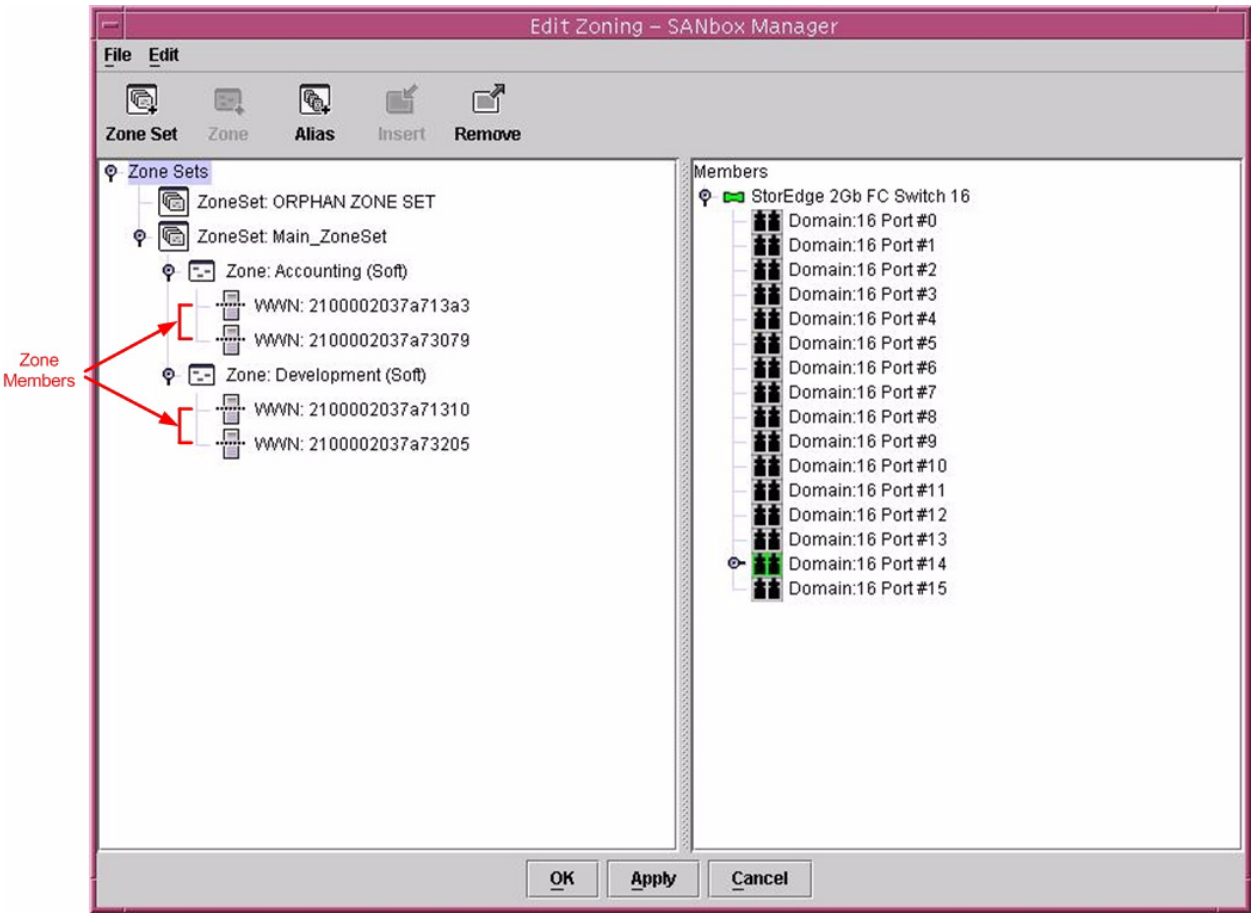
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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 64 #> zone list <zone name>
```

Confirm that only WWNs are listed.

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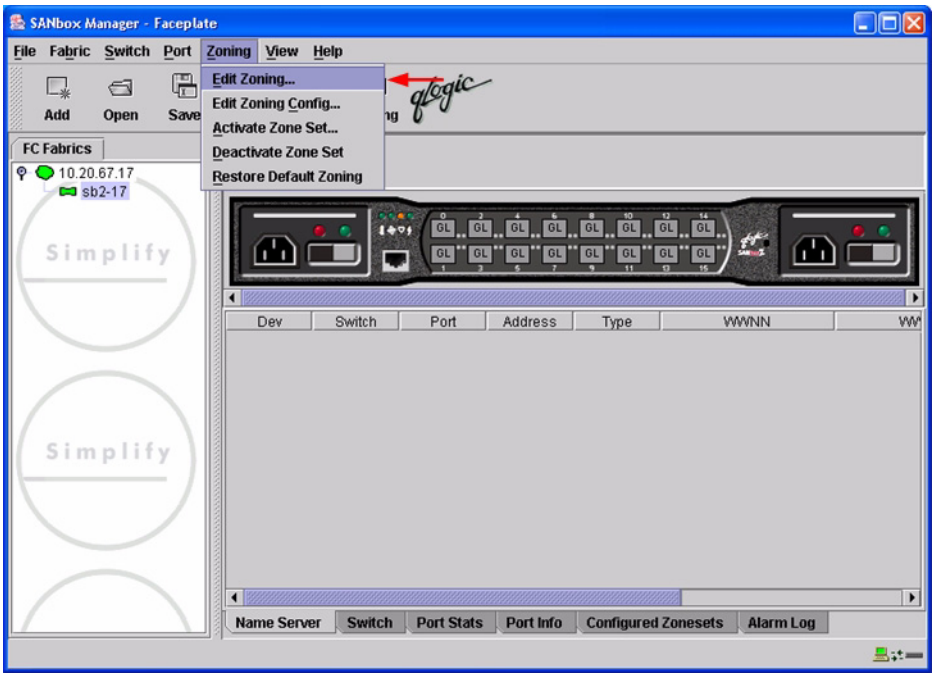
QLogic SANbox Manager GUI

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:



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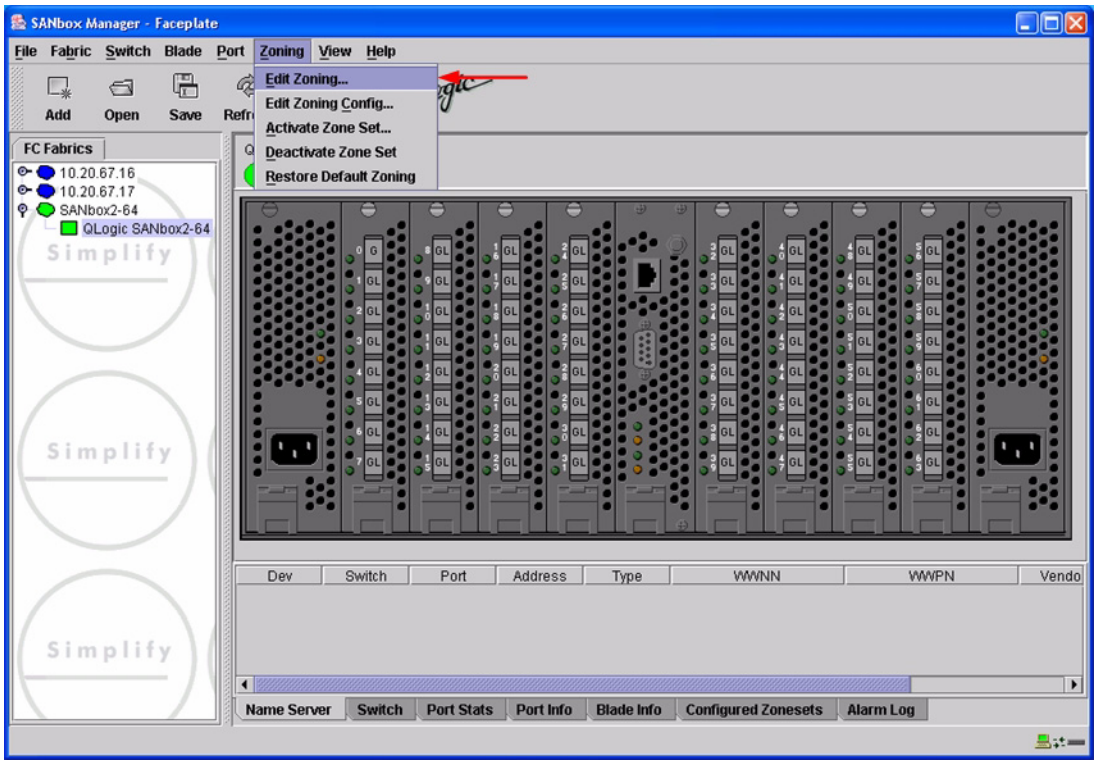
For the QLogic SANbox2-64, the following displays:



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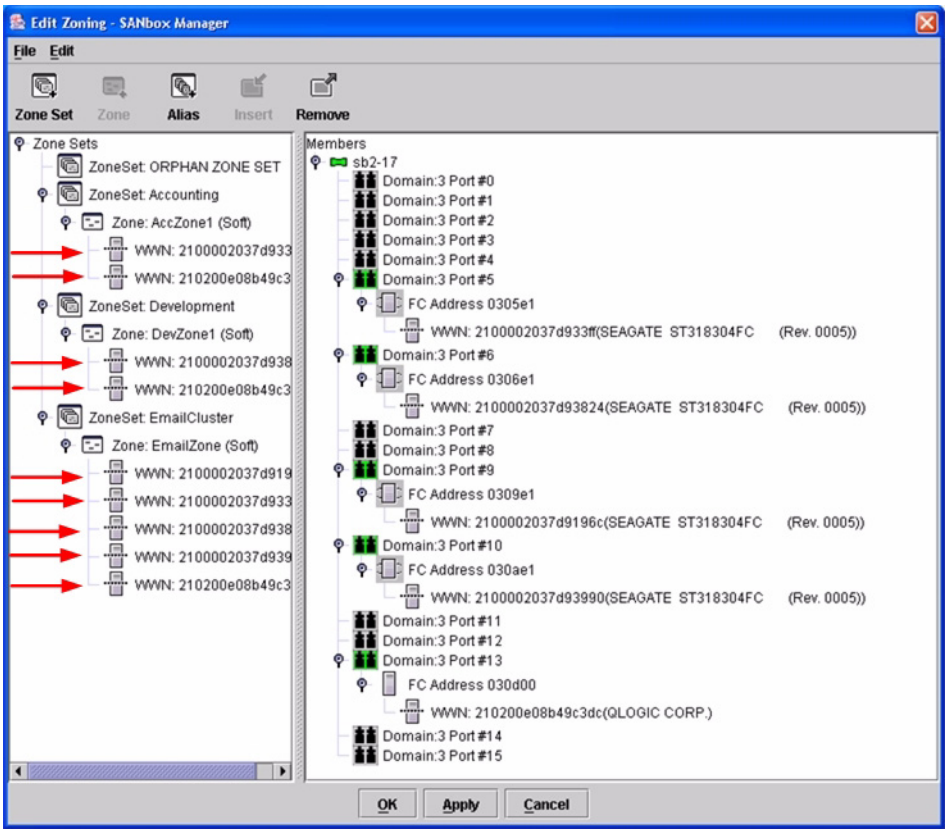
3. The **Edit Zoning—SANbox Manager** dialog box displays. Confirm that all zone members are listed as WWN.

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



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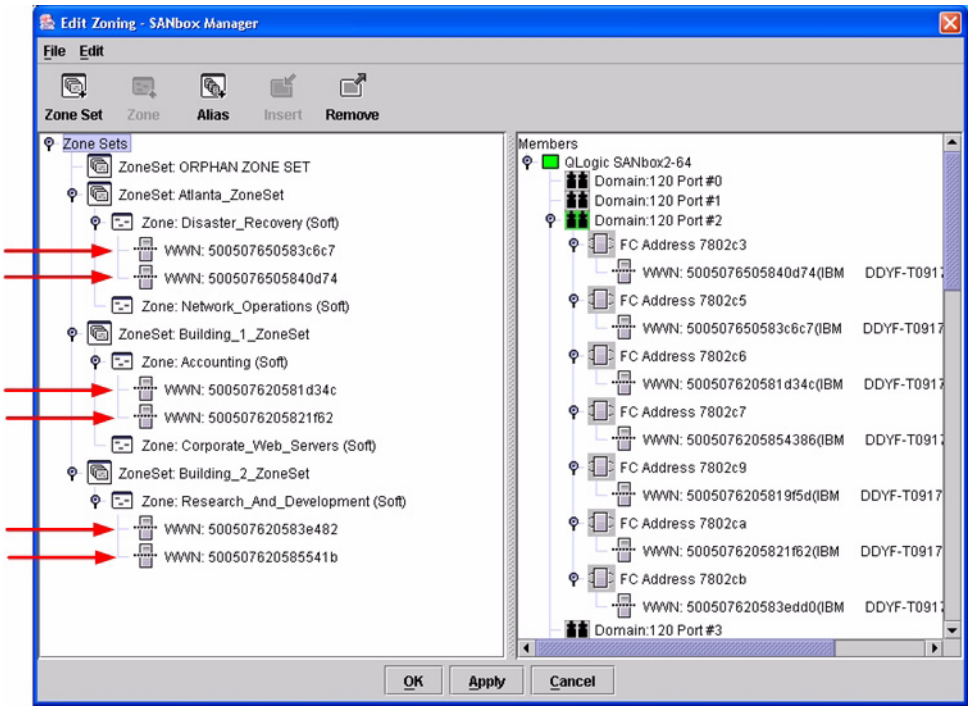
For the QLogic SANbox2-64, the following displays:



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 <zone name>
```

Confirm that only WWNs are listed.

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Operating Mode Configuration

Not applicable.

Sun StorEdge Specific Configuration

Not applicable.

QLogic 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 QLogic 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 QLogic support.

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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

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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

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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.

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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.

.device manufacturer.

FC-VI. When enabled, VI preference frames will be transmitted ahead of other frames.

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

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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.

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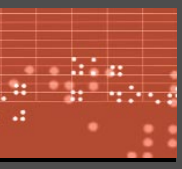

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