# SANworks by Compaq

SANworks Director Connectivity Manager
User Guide

Part Number: AA-RPL7B-TE

**Second Edition (February 2002)**

This guide describes the SANworks Director Connectivity Manager (SDCM), its features, and how to use it to monitor, configure, and manage the Fibre Channel in which managed products operate. Fabric zoning, SDCM Server adminstration, and SDCM logs are also covered.

**COMPAQ**

# Contents

## *Chapter 2*
## Using the SANworks DC Manager

## *Chapter 5*
## SDCM Server
## Administration

## *Appendix  C*
## Installing Remote Workstations:
## Solaris Systems

## *Appendix  D*
## Installing Remote Workstations:
## HP-UX, AIX, and Linux Systems

## Glossary

## Index

# Figures

# Tables

# About This Guide

This publication provides instructions on using the Compaq SANworks Director Connectivity Manager (SANworks DC Manager or SDCM) application.

## Text Conventions

This document uses the following conventions to distinguish elements of text:

| | |
|---|---|
| **Keys** | Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously. |
| USER INPUT | User input appears in a different typeface and in uppercase. |
| *FILENAMES* | File names appear in uppercase italics. |
| Menu Options, Command Names, Dialog Box Names | These elements appear in initial capital letters. |
| COMMANDS, DIRECTORY NAMES, and DRIVE NAMES | These elements appear in upper case.<br><br>**NOTE:** UNIX commands are case sensitive and will not appear in uppercase. |
| Type | When you are instructed to *type* information, type the information **without** pressing the **Enter** key. |
| Enter | When you are instructed to enter information, type the information and then press the **Enter** key. |

# Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

# Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.

Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

**WARNING**: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

**WARNING**: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING**: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

**WARNING**: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

**WARNING**: To reduce the risk of personal INJURY or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

# Rack Stability

**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

■ The leveling jacks are extended to the floor.

■ The full weight of the rack rests on the leveling jacks.

■ The stabilizing feet are attached to the rack if it is a single rack installation.

■ The racks are coupled together in multiple rack installations.

■ A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

# Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

## Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week.

> **NOTE:** For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Detailed, specific questions

## Compaq Website

The Compaq website has latest information on this product as well as the latest drivers. You can access the Compaq website by logging on to the Internet at http://www.compaq.com/storage.

# Compaq Authorized Reseller

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.

- Elsewhere, see the Compaq website for locations and telephone numbers.

# Chapter 1

# Introduction and General Information

This chapter presents an overview of the features of the SANworks Director Connectivity Manager (SANworks DC Manager or SDCM). It describes how to:

■ Access the features of the SANworks DC Manager and Fabric Manager.

■ Access product information and session information.

■ Access the topology and zoning features of the Fabric Manager.

## Introduction to SANworks DC Management

The SANworks DC Manager is a Java-based graphical user interface (GUI) that enables the user to manage users and products, monitor products, and open Product Managers.

> **NOTE:** Although the SANworks DC Manager and Product Managers are separate applications, the Product Managers are only accessible through the SANworks DC Manager.

The SANworks DC Manager, Fabric Manager, and Product Managers are installed on the SDCM server to provide local access to managed products. These applications can also be installed on remote user workstations to provide remote access to the managed products. A maximum of four concurrent remote users (in addition to the local SDCM server user) can log in to the SANworks DC Manager application.

For details on configuring remote workstations, refer to the appendix in this manual that covers your workstation operating system.
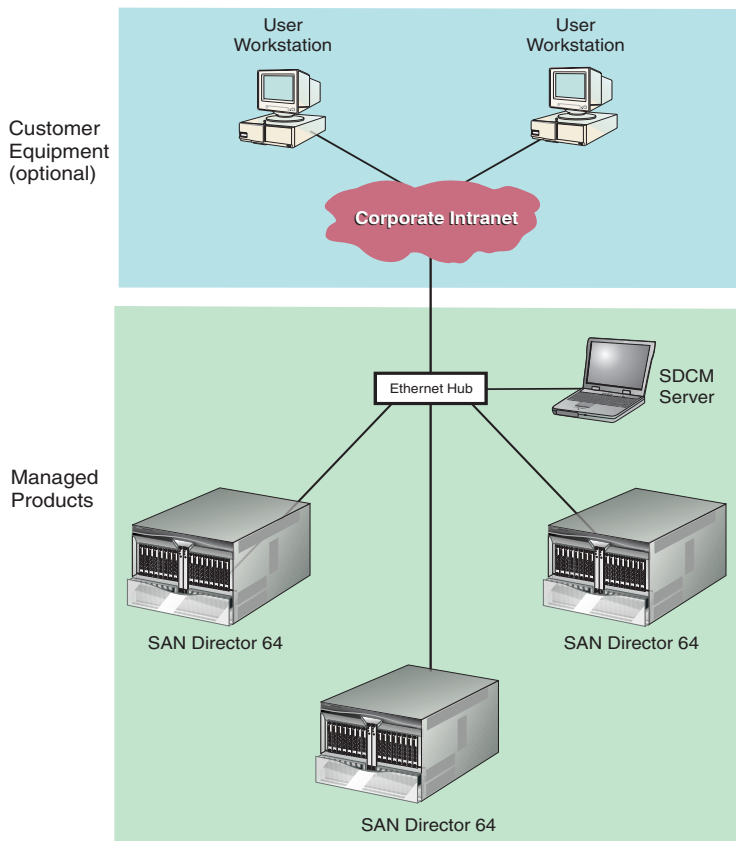


Figure 1–1:  SDCM Server and Remote Workstation Configuration

## SDCM Server Information

The SDCM server is a laptop or desktop personal computer (PC) platform that provides a central point of control for managed Fibre Channel products. The SDCM server is required for installing, configuring, and managing these products.

> **NOTE:** Although products can perform normal operations without an SDCM server, the SDCM server should operate at all times to monitor product operations, report failures, log event changes, and log configuration changes.

# SDC Management Menu Options

This user's guide provides information on the management options on the SDC Manager and Fabric Manager applications only. Information on the Product Manager application is provided in the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE). Following are lists of options available under navigation control panel menus in all three applications. References are provided to the correct publication for detailed information on these options.

## SDC Manager

Following are options available through the SDC Manager. For more information, refer to Using the SANworks DC Manager Navigation Control Panel on page 2- 1.

### *View Menu*

■ Product View

■ Fabric View

■ Session View

### *Configure Menu*

■ New Product

■ Users

■ Nicknames

■ Session Options

■ SNMP

### *Logs Menu*

■ Audit Log

■ Event Log

■ Session Log

■ Product Status Log

### *Maintenance Menu*

■ Test Remote Notification

■ Enable Call Home Event Notification

■ Configure E-Mail

■ Configure Ethernet Events

### *Help*

■ Contents

■ About

### *Logout/Exit Menu*

■ Logout

■ Exit

### Fabric Manager

Following are options available through the Fabric Manager. For more information, refer to Using the Fabric Manager Navigation Control Panel on page 3- 5.

### *View Menu*

■ Topology

■ Zoning

### *Configure Menu*

■ Zone Sets

■ Deactivate Zone Set

■ Default Zone

■ Show Route

### *Help Menu*

■ Contents

■ About

### *Close Menu*

■  Close

### Product Manager

Following are options available through the Product Manager application for your director. For more information on these options, refer to "Navigation Control Panel" under the "Using the Product Manager" section of Chapter 1 in the *SANworks by Compaq SAN Director 64 Product Manager User Guide* (AA-RPL9B-TE).

### *View Menu*

■  Hardware View

■  Port List View

■  FRU List View

■  Node List View

■  Performance View

### *Configure Menu*

■  Identification

■  Operating Mode (interoperability mode)

■  Operating Parameters

■  Ports

■  Management Server

■  SNMP Agent

■  Features

■  Date/Time

■  Threshold Alerts

■  Export Configuration Report

■  Enable Web Server

■  Enable Telnet

### *Logs Menu*

■ Audit Log

■ Event Log

■ Hardware Log

■ Link Incident Log

■ Threshold Alerts Log

### *Maintenance Menu*

■ Port Diagnostics

■ Data Collection

■ IPL

■ Set Online State

■ Firmware Library

■ Enable E-Mail Notification

■ Enable Call Home

■ Backup and Restore Configuration

■ Reset Configuration

### *Help Menu*

■ Contents

■ About

### *Close Menu*

■ Close

## SANworks DC Manager Overview

This section provides a general overview of the SANworks DC Manager features.

### Logging in to the SANworks DC Manager

The SANworks DC Manager starts automatically when the SDCM server is plugged in. If it is desired to start the application yourself, follow step A for your operating system, then continue to Step B: For All Systems.

### *Step A: Windows Systems*

To open the SANworks DC Manager on a Windows 95, Windows 98, Windows 2000, or Windows NT system:

1. Turn on the SDCM server. or if it is already turned on, double click the SANworks DC Manager icon on the desktop.

2. The SANworks DC Manager application opens.

3. Continue to Step B: For All Systems below.

### *Step A: Linux or Solaris Systems*

To open the SANworks DC Manager on a Linux or Solaris system from the home directory:

> **NOTE:** If you have saved SANworks DC Manager to a different location, type in the appropriate directory names.

1. In the Terminal window, type:

   [root@evtcom2 /root]# cd /home

2. Press **Enter**.

3. Then type:

   **[root@evtcom2 /root]# cd SDCM**

4. Press **Enter**.

5. Then type:

   [root@evtcom2 /root]# ./SDC_Manager

6. Press **Enter**.

The SANworks DC Manager application will open.

7. Continue to step Step B: For All Systems below.

### *Step A: HP-UX or AIX Systems*

To open the SANworks DC Manager on an HP-UX or AIX system from the home
directory:

> **NOTE:** If you have saved SANworks DC Manager to a different location, type in the appropriate
> directory names.

1. In the Terminal window, type:

   [root@evtcom2 /root]# cd /home

2. Press **Enter**.

3. In the Terminal window, type:

   [**root@evtcom2 /root]# cd SDCM**

4. Press **Enter**.

5. In the Terminal window, type:

   [root@evtcom2 /root]# SDC_Manager

6. Press **Enter**.

   The SANworks DC Manager application will open.

7. Continue to Step B: For All Systems below.

### *Step B: For All Systems*

1. In the SANworks DC Manager Login screen (Figure 1–2), enter your user name and
   password. User names and passwords are case-sensitive.

   > **NOTE:** If user names have not been established, you can use the default user name
   > (**Administrator**) and password (**password**). The user name and password are case-sensitive.
   > Compaq recommends that you change the default password as soon as possible.

**NOTE:** To add or modify user names, passwords, and user rights, refer to the appropriate sections under User Administration.
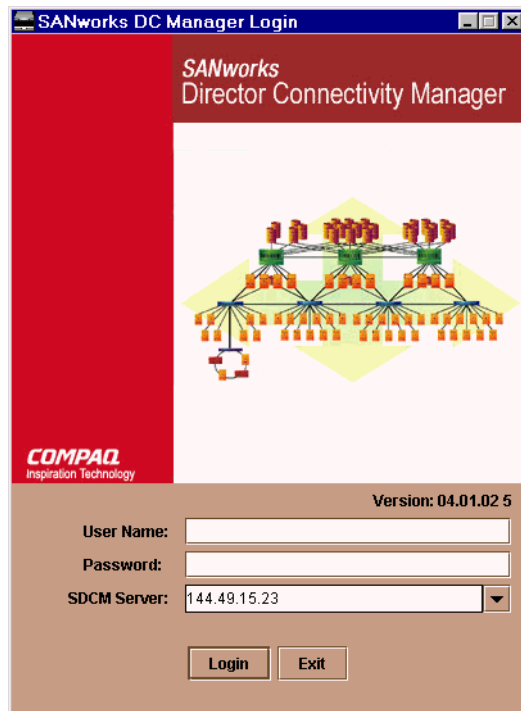


Figure 1–2:  SANworks DC Manager Login Dialog Box

2.  In the SDCM server box, type or select the SDCM server to which you want to connect. If you are logging in to the local SDCM server, the SDCM server name is localhost.

    **NOTE:** The default address that displays in the SDCM server box is the address of the last server accessed. Click the SDCM server arrow to see the network addresses of all SDCM servers that were accessed from the computer you are logged into.

    If you want to connect to an SDCM server that is not listed, enter the server name or IP address in the SDCM server box.

3.  Click Login.

The main SANworks DC Manager window displays the Product View (Figure 1–3).
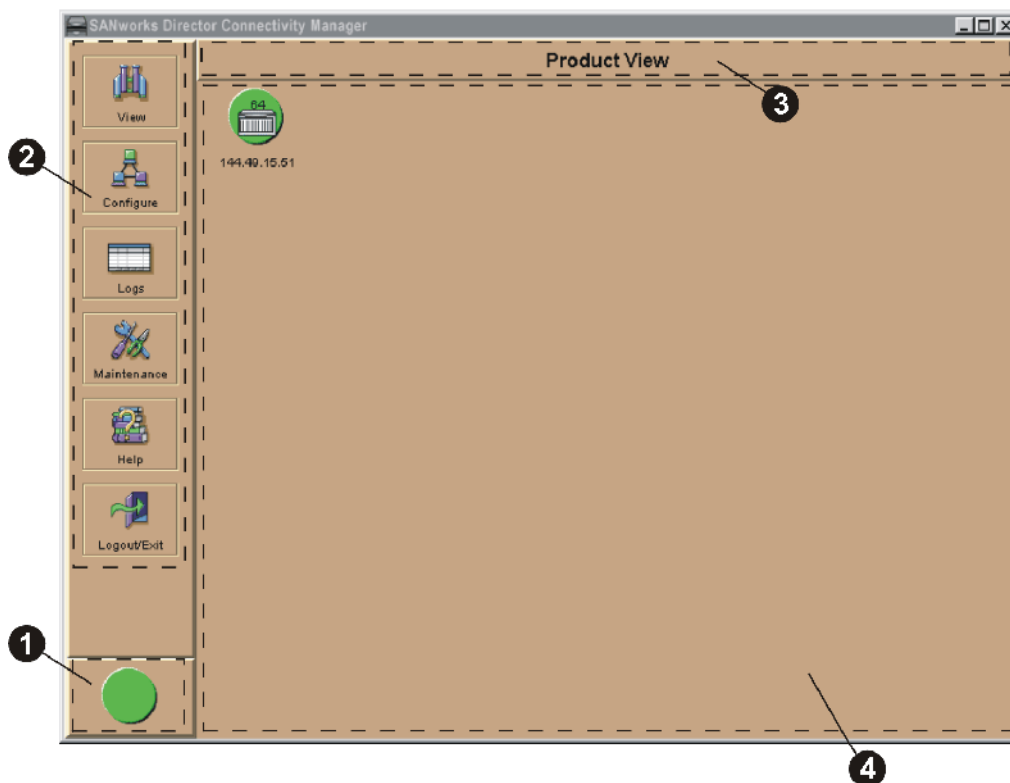


Figure 1–3:  SANworks DC Manager Main Window

❶   Alert Panel. For details, refer to Alert Panel on page 1- 12.

❷   Navigation Control Panel. For details, refer to Navigation Control Panel on page 1- 11.

❸   Title Panel. For details, refer to Title Panel on page 1- 11.

❹   Main Panel. For details, refer to Main Panel on page 1- 12.

## Logging out of the SANworks DC Manager

To log out of the SANworks DC Manager and access the SANworks DC Manager running on another SDCM server, choose Logout from the Logout/Exit menu.

> **NOTE:** If you are on a remote client, select Logout from the Logout/Exit menu.

The SANworks DC Manager Login screen displays (Figure 1–2). To log in again, refer to Logging in to the SANworks DC Manager on page 1- 7 for instructions.

### Exiting the SANworks DC Manager

To exit the SANworks DC Manager application, choose Exit from the Logout/Exit menu.

> **NOTE:** This option is not available from the SDCM server. It is only available for SANworks DC Manager applications running on remote clients.

### Window Layout

The SANworks DC Manager window is shown in Figure 1–3. The Microsoft Windows title bar appears at the top of the window. The rest of the window is divided into four panels:

■ Title panel.

■ Navigation control panel.

■ Alert panel.

■ Main panel.

#### *Title Panel*

The title panel denotes the type of view displayed in the main panel. In Figure 1–3, the title panel indicates that the Product View is displayed in the main panel. Refer to Main Panel Views on page 1- 12, for more details on this and other views.

#### *Navigation Control Panel*

Point to an icon on the navigation control panel to display a menu (refer to Figure 1–3). Menu options provide access to features that enable you to control and monitor Fibre Channel products. Refer to Using the SANworks DC Manager Navigation Control Panel on page 2- 1 for information on SANworks DC Manager menu options.

Instructions on using these menu options are provided in Using the Product View on page 2- 5.

### Alert Panel

The alert panel displays a colored alert symbol that indicates the most critical status of any product managed by the SANworks DC Manager. For example, if one product has failed, and nine other products are fully operational, a red diamond with yellow background displays in the alert panel to indicate the failed product. When all products are operational, a green circle displays.

### Main Panel

This panel displays the view that you choose from the View menu. These views are described in the next section, Main Panel Views.

## Main Panel Views

### Product View

When you first access the SANworks DC Manager the Product View displays, as shown in Figure 1–3 on page 1- 10. To access the Product View from any other view, choose Product from the View menu.

The Product View provides a graphical overview of all products that you can manage and monitor through the SANworks DC Manager. In a full-screen environment on an 800 x 600 resolution monitor, this panel displays up to 48 product icons.

Right click a product icon or a blank part of the view to display a menu. The options on this menu enable you to administer the product for the SANworks DC Manager or change product display options.

The Product View also provides access to the Product Manager application for each displayed product. For more information, refer to Using the Product View on page 2- 5.

### Session View

To access the Session View, choose Session from the View menu.

The Session View (Figure 1–4) displays a list of users currently accessing the SDCM server through a remote connection. This enables the administrator to monitor all users remotely logged into the SDCM server. For more information, refer to Displaying Remote Sessions.
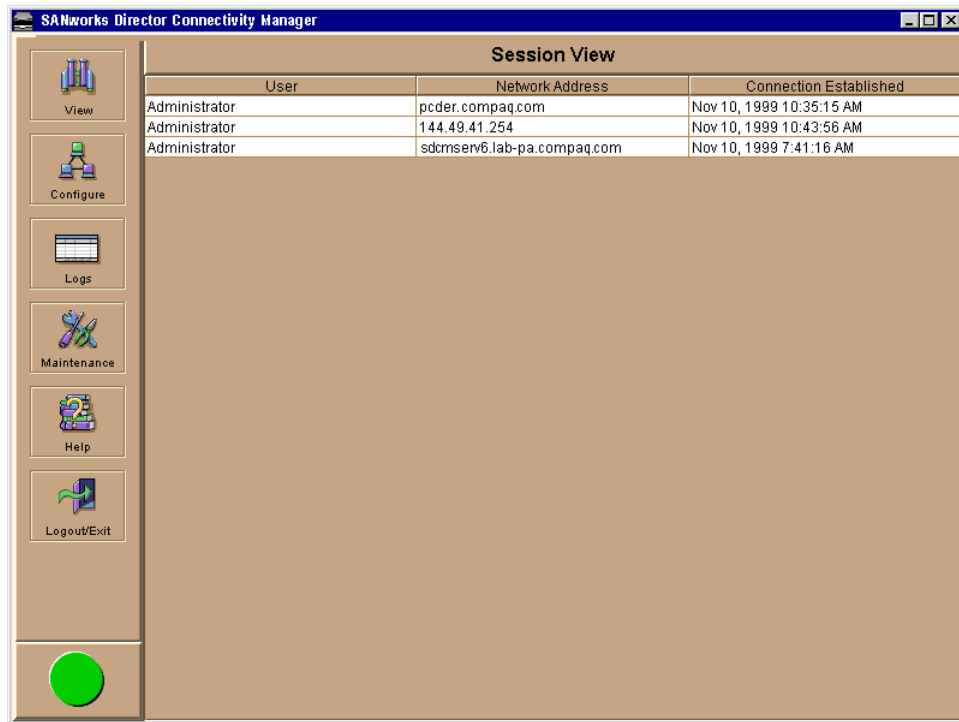


Figure 1–4:  Session View

### Fabric View

To access the Fabric View (Figure 1–5), choose Fabric from the View menu.
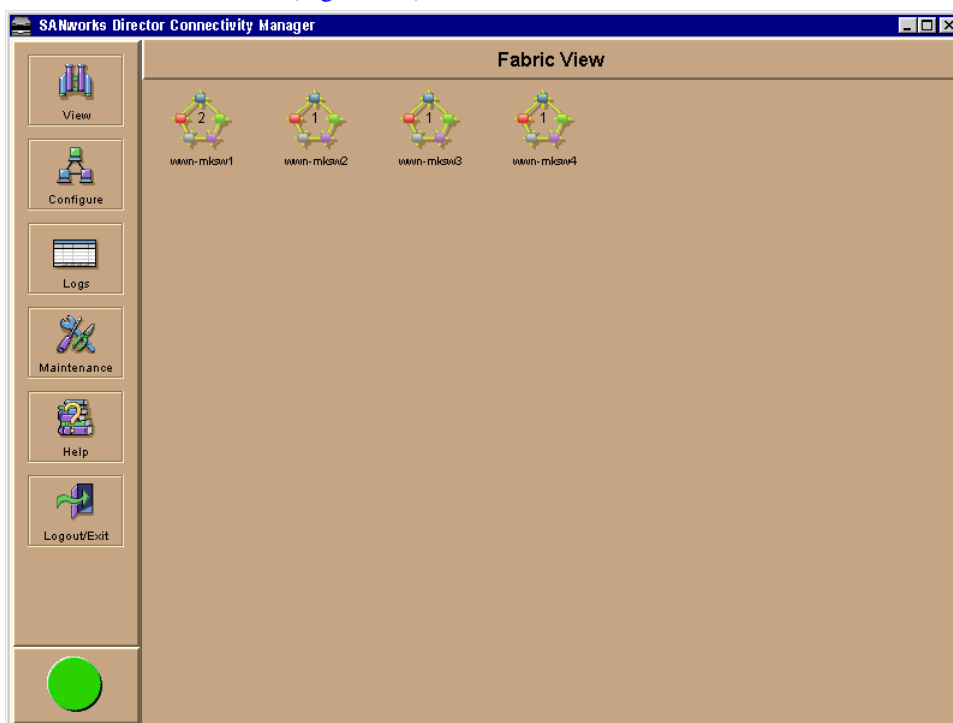


Figure 1–5:  Fabric View

The Fabric View displays all of the fabrics available for management by the SANworks DC Manager. Each fabric is represented by an icon that displays the number of managed products in that fabric as well as the initial characters of the world-wide name (WWN) or nickname (if configured). A fabric can consist of a single managed product or multiple managed products.

You can access the Fabric Manager through the Fabric View, as described in Fabric Manager Overview.

# Fabric Manager Overview

The Fabric Manager displays in a separate window from the SANworks DC Manager. The Fabric Manager enables you to create zones and zone sets and to activate and deactivate zones.

There are two methods for opening the Fabric Manager:

■ Click a fabric icon in the Fabric View (Figure 1–5).

■ Right click a fabric icon in the Fabric View and choose Open.

The Fabric Manager displays with the Topology View open (Figure 1–6).
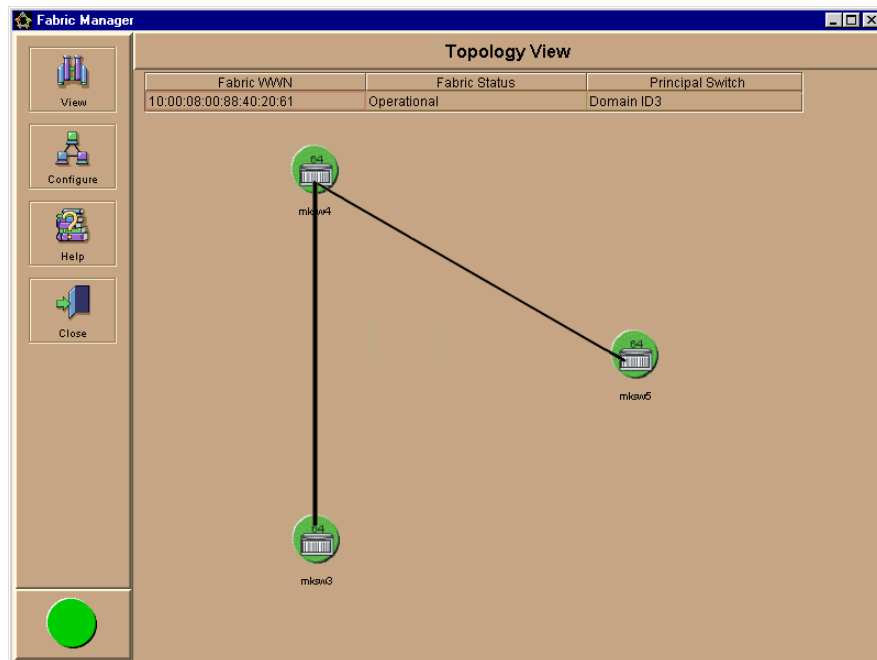


Figure 1–6:  Fabric Manager with Topology View

The Fabric Manager's default view is the Topology View. You can change between this view and the Zoning View (Figure 1–7) by selecting options on the View menu.
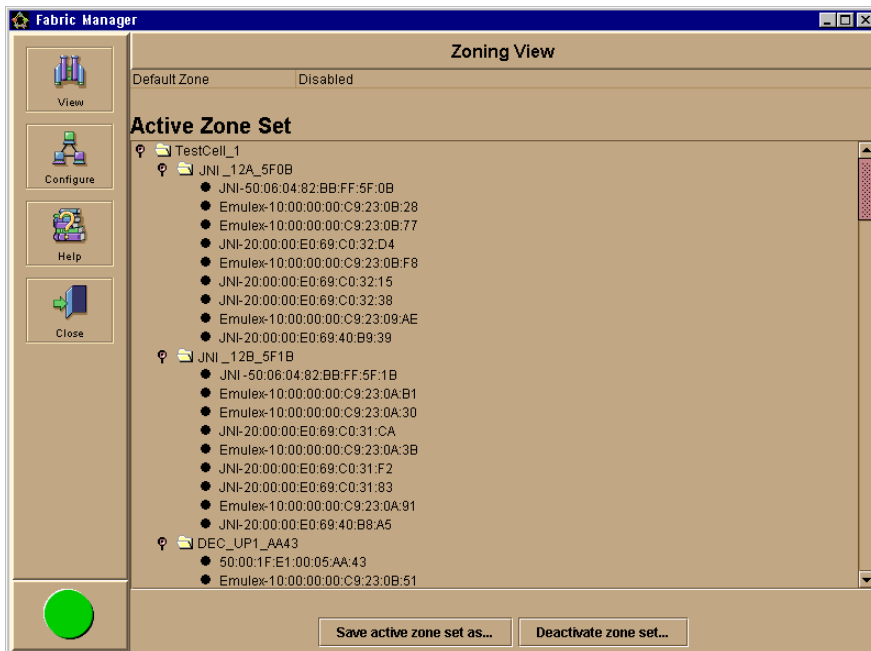


Figure 1–7: Fabric Manager with Zoning View

The Fabric Manager's menu options differ from the SANworks DC Manager's menu options. The Fabric Manager menu options are described in Using the Fabric Manager Navigation Control Panel.

The alert panel operates like the alert panel in the Product View, described in Alert Panel, and shows the most critical status for any product in the fabric.

The Topology View displays all interswitch connections for all E_Ports in a multiswitch fabric. Products that are not managed by the SDCM server display without an alert symbol.

Through the Topology View, you can change the display options for the labels under the product icons, access the Product Manager for each product, view product properties, determine the number of interswitch links (ISLs) present between any two managed products, and display ISL properties.

Refer to Using the Topology View for details on using this view.

The Zoning View, shown in Figure 1–7, provides a complete view of the active zone set, including all zones and zone members.

Fabric zoning is discussed in detail in Chapter 4.

## Backing Up and Restoring Data

The backup and restore of critical SANworks DC Manager data on the Windows NT system is provided by the Iomega QuikSync application, which is installed on the SDCM server when you install the Iomega Zip drive.

### Backup

During installation, QuikSync is automatically configured to mirror the contents of the SdcmData directory to the attached Zip drive any time the contents of that directory change or the server is restarted. Therefore, whenever you make a configuration change, add or remove a managed product, or make any other changes through the SANworks DC Manager or Fabric Manager, the data in this directory is automatically backed up. The existing backup file is updated; no separate versions of the backup file are maintained.

> **NOTE:** To ensure trouble-free backups, it is imperative that you leave the Zip drive connected to the SDCM server and leave a Zip disk in that drive.

When you log into Windows NT on the SDCM server, QuikSync starts automatically. Any data that has changed in the SdcmData directory while you were logged out will automatically be backed up.

The backed up data includes:

■ All SANworks DC Manager configuration (product definitions, user names, encrypted passwords, user rights, nicknames, session options, SNMP configuration, e-mail addresses, etc.).

■ Logs, both for the SANworks DC Manager and any Product Managers.

■ Zoning library, including all zone sets and zone definitions.

■ Firmware library.

■ Call-home configuration information.

Since the configuration data for each individual product is stored in NVRAM on the product itself, there is a separate backup option provided in each Product Manager to save the product configuration to the SDCM server. If you perform a product configuration backup through the Product Manager, the configuration data is stored in the SdcmData directory and automatically mirrored to the QuikSync Zip disk.

The QuikSync application will not back up certain Windows NT configurations that need to be reconfigured on a newly-restored SDCM server, including:

■ Windows NT user names and passwords.

■ TCP/IP network configuration (IP address, Gateway address, DNS names, etc.)

You should use other means to back up this type of information.

The QuikSync application is included on the SDCM Management Applications CD, and automatically installed on the SDCM server during installation. A Zip disk dedicated to QuikSync is needed for each SDCM server and is included with the SDCM installation package.

### Restore

In the event of a system failure, you will be able to return your database to a known state. To restore data from the backup disk to the SDCM server:

1. Close down the SDC Manager application.

2. Click the Windows Start button, then click Programs, then Windows NT Explorer.

   The Exploring window displays.

3. Copy the SdcmData directory from the Zip disk to the SDCM root directory (typically c:\SdcmData).

4. Close the Exploring window.

5. Restart the SDCM server:

   a. On the Windows taskbar, click Start, then click Shut Down.

   b. On the Shut Down Windows dialog box, click Restart the Computer and click Yes.

      c. When prompted, simultaneously press **Ctrl-Alt-Delete** to display the Windows NT Logon Information dialog box.

      d. Type your user name and password and click OK.

6. When the SANworks DC Manager login screen appears, enter your user name and password. Make sure that localhost is selected in the SDCM server box.

7. Click Login to open the SANworks DC Manager.

*Chapter* **2**

# Using the SANworks DC Manager

This chapter provides a description of SANworks DC Manager features. It explains how to:

■   Access the various views

■   Use menus

■   Back up the SANworks DC Manager database.

## Using the SANworks DC Manager Navigation Control Panel

The navigation control panel, located on the left side of the SANworks DC Manager main window, enables you to perform administrative tasks for the SANworks DC Manager. Point to an icon to access each menu. The menus are described in this section.
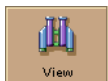
### The View Menu

The View menu provides access to each of the SANworks DC Manager views.

■   **Product**

Select this option to display the Product View.

■   **Fabric**

Select this option to display the Fabric View.

■   **Session**

Select this option to display the Session View.

## The Configure Menu

The Configure menu provides options for configuring and managing users, products, sessions, and SNMP options.

■ **New product**

Select this option to display the New Product dialog box. Use this dialog box to add a product to be managed by the SANworks DC Manager and to assign a network address to the new product.

■ **Users**

Select this option to display the Configure Users dialog box. This dialog box lists and describes current users who can access the SDCM server. It also enables the system administrator to add or delete users, modify information for existing users, and establish or display user rights.

■ **Nicknames**

Select this option to display the Configure Nicknames dialog box. A nickname is a name assigned to a WWN. For example, you might assign the nickname Director_1 to a director instead of using the 8-byte WWN. Use this dialog box to add or delete nicknames.

■ **Session Options**

Select this option to display the Session Options dialog box. Use this dialog box to allow or prohibit access to the SDCM server from remote user workstations.

■ **SNMP**

Select this option to display the Configure SNMP dialog box. Use this dialog box to enable the SNMP agent that runs on the SDCM server and to enable authorization traps (identify and enable specific SNMP users to receive SNMP status messages called "traps").

## The Logs Menu

The Logs menu provides access to all of the SANworks DC Manager logs. The log overwrites the oldest entries after 1000 entries are recorded.

■ **Audit Log**

Select this option to display the Audit Log, which contains a history of user actions performed through the SANworks DC Manager.

- **Event Log**

  Select this option to display the Event Log, which lists errors related to SANworks DC Manager operation.

- **Session Log**

  Select this option to display the Session Log, which lists the users that have logged in and logged out of the SDCM server.

- **Product Status Log**

  Select this option to display the Product Status Log, which records the operational status changes of each managed product.

### The Maintenance Menu

The Maintenance menu provides tools for setting remote communication options.

- **Test Remote Notification**

  Select this option to display the Test Remote Notification dialog box. Use this dialog box to test the remote notification mechanisms that you have configured — e-mail notification and the call-home feature.

- **Enable Call Home Event Notification**

  Select this option to enable and disable the call-home feature.

  **NOTE:** Call home notification requires the installation of Compaq Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register/order Proactive Services software contact your Compaq customer service representative.

- **Configure E-Mail**

  Select this option to display the Configure E-Mail dialog box. Use this dialog box to configure network addresses for administrators or others who should receive notification of product events through e-mail, and to enable e-mail notification.

- **Configure Ethernet Events**

  Select this option to display the Configure Ethernet Events dialog box. Use this dialog box to configure Ethernet events and enable notification for all Product Managers. An Ethernet event occurs when the Ethernet link between the SDCM server and the managed product is lost.

  If e-mail notification is also enabled, an e-mail will be sent when communication between the SANworks DC Manager and a product is lost.

If call-home notification is also enabled, a call home will be generated when communication between the SANworks DC Manager and a product is lost.
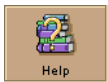
### The Help Menu

The Help menu displays two options.

■ **Contents**

Select this option to open the SANworks DC Manager Online Help window.

■ **About**

Select this option to display version and copyright information for the SANworks DC Manager.

### The Logout/Exit Menu

The Logout/Exit menu displays two options.

■ **Logout**

Select this option to close the SANworks DC Manager window and return to the Login dialog box.

■ **Exit**

Select this option to exit the SANworks DC Manager.

> **NOTE:** This option is only available for remote clients.

## Using the Alert Panel

This panel, located below the navigation control panel, displays a colored alert symbol that indicates the most critical status of any product managed by the SANworks DC Manager. For example, if one product has failed, and nine other products are fully

operational, a red diamond with yellow background, indicating a product failure, displays in the alert panel. The alert panel displays one of four alert symbols as described in Table 2–1.

**Table 2–1: Operational States and Symbols**

| Operational State | Symbol |
|---|---|
| **Operational**<br><br>■ Network communication is established. All products are operational and no failures are indicated. |  |
| **Degraded**<br><br>■ At least one product under management is operating in a degraded mode and requires service. This condition typically occurs when a redundant FRU fails and the backup FRU is operational. |  |
| **Failed**<br><br>■ A product under management has failed and requires immediate service. |  |
| **Unknown**<br><br>■ The SANworks DC Manager cannot determine product status because of a network communication failure between the product and the SDCM server, or because the managed product is not responding. The link may never have been established, or the link may have malfunctioned. |  |

## Using the Product View

The SANworks DC Manager's default view is the Product View. Icons in the Product View represent each managed product. The panel displays up to 48 icons. Use the scroll bar to display any icons that are out of view.

You can determine the type of product by looking at the icon that displays in the Product View or Topology View or by right clicking the icon and choosing Properties to display the product's Properties dialog box. The icon in Figure 2–1 is a StorageWorks SAN Director 64 icon. Refer to Expand Name or Address for icon functionality information.

Figure 2–1:  Example of a Compaq Product Icon

## Shortcut Menu

The Product View shortcut menu enables you to add products, change product icon labels, and sort product icons in the panel. Access this menu by right clicking in the Product View, away from a product icon. The options available from the shortcut menu are:

■ **New**

Select this option to display the New Product dialog box. Use this dialog box to add a new product to the SANworks DC Manager.

■ **Display Options**

❏ **Product Name -** Select this option to display the product's name in the icon label. Change a product's name through the Product Manager. Refer to the product's user manual for instructions.

❏ **Network Address -** Select this option to display the product's IP address or DNS (Domain Name Server) host name in the icon label. Configure network addresses through the New Product dialog box. Refer to Display Product Properties for more information.

■ **Sort Options**

Allows additional options for displaying product icons.

❏ **Alphabetically -** Arrange icons alphabetically, by product name.

❏ **By Status -** Arrange icons according to the product's operating status. Failed products appear first, followed by products with degraded, unknown, and operational status. Within these groupings, icons appear alphabetically by their network address (IP address or DNS host name) or product name, depending on the selected display option.

## Product Icon Shortcut Menu

Each product icon has a menu, which is accessed by right clicking the icon. The options in the product icon shortcut menu are listed below.

■ **Open**

Select this option to open the Product Manager for the product.

■ **Modify**

Select this option to display the Modify Network Address dialog box. Use this dialog box to modify the network address.

■ **Delete**

Select this option to delete the product from the Product View. This process deletes all administration for the product, including log files and all configurations.

■ **Properties**

Select this option to display the product's Properties dialog box, which lists the name, location, contact person, description, product type, and network address, and operational status for the product. The product name, location, contact person, and description are configured through the Product Manager. Refer to the *SANworks by Compaq SAN Director 64 Product Manager User Guide* for instructions. The network address is configured in the New Product dialog box in the SANworks DC Manager. Refer to Chapter 6, SANworks DC Manager Administration for more information.

## Accessing a Product Manager

There are two ways to access a product's Product Manager through the Product View.

■ Click the product icon.

■ Right click the product icon and choose Open.

The Product Manager provides in-depth management and monitoring functions for individual Fibre Channel devices. The Product Manager Hardware View provides views of hardware components and includes component status. Through these views, you can quickly manage and monitor the Fibre Channel devices on your network.

Through a Product Manager, you can:

■ Configure the device name, location, description, and contact person.

■ Monitor the operational status of a managed device and its components.

■ Perform other configuration and monitoring tasks specific to the type of Product Manager.

> **NOTE:** A maximum of four remote users (in addition to the local SDCM server user) can concurrently access Product Managers for a specific product.

A Product Manager's navigation control panel functions like the navigation control panel in the SANworks DC Manager. The Product Manager also has an alert panel with alert status colors and symbols that are identical to those in the SANworks DC Manager.

The SANworks DC Manager and Fabric Manager windows are still available as separate windows when a Product Manager is open. You can drag the Product Manager window away from the SANworks DC Manager window and view both on your desktop. You can also minimize each window.

To return to the SANworks DC Manager, choose Close from the Close menu in the Product Manager.

Refer to the user manual for the appropriate product for information on using the Product Manager.

### Expand Name or Address

Point to a product icon. A blue border displays around the icon to indicate that it is selected, and the complete product name displays in the icon label.

### Monitor Product Operating Status

Determine product operational status from the symbol that displays behind the product icon. The meaning of the symbols representing product status are the same as for the alert symbols described in Table 2–1. If an alert symbol does not display, the product is not managed by the SDCM server to which you are logged in.

# *Chapter* **3**

# Using the Fabric Manager

This chapter includes information on how to use the Fabric Manager to monitor, configure, and manage the Fibre Channel fabrics in which managed products operate.

## Opening the Fabric Manager

To access the Fabric Manager, open the SANworks DC Manager, then choose Fabric from the View icon. The Fabric View displays (Figure 3–1).
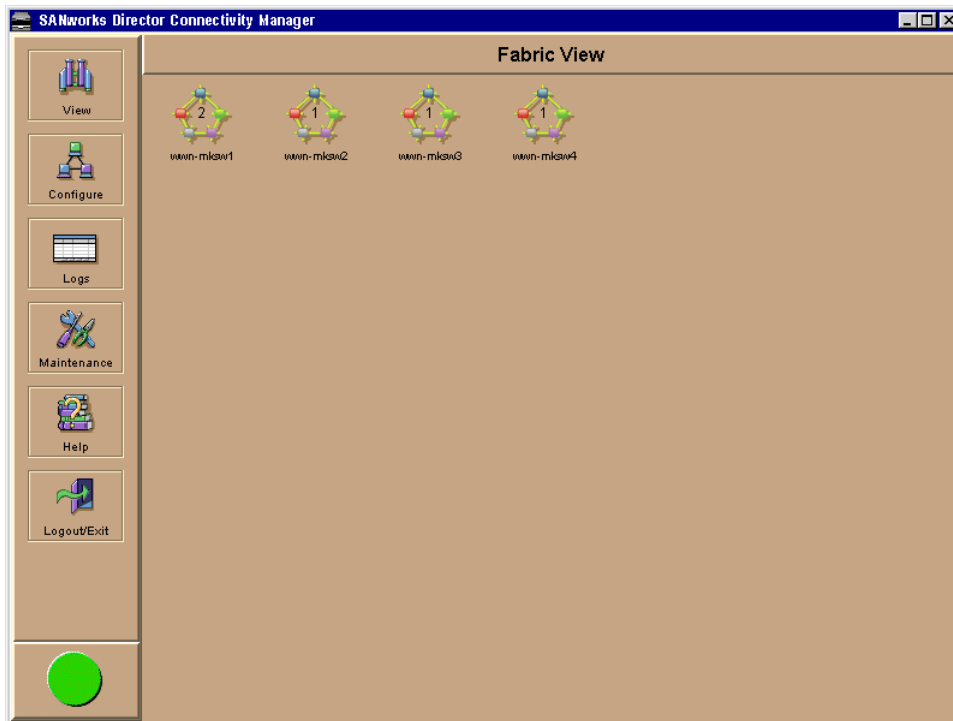
Figure 3–1:  SANworks DC Manager Fabric View

The Fabric View displays all of the fabrics available to a user via the SANworks DC Manager. Each fabric is represented by an icon that displays the number of managed products in that fabric as well as the initial characters of the WWN or nickname (if configured). The number of products in the fabric is represented by the number in the middle of the icon; the initial characters of the WWN or the nickname display as the icon label.

Each icon in the Fabric View has pass-over functionality. When the pointer is placed over an icon, the icon's label expands to display the complete WWN or nickname of the principal switch in the selected fabric (as shown in Figure 3–2).

> **NOTE:**  The fabric name is based on the WWN of the fabric's principal switch.
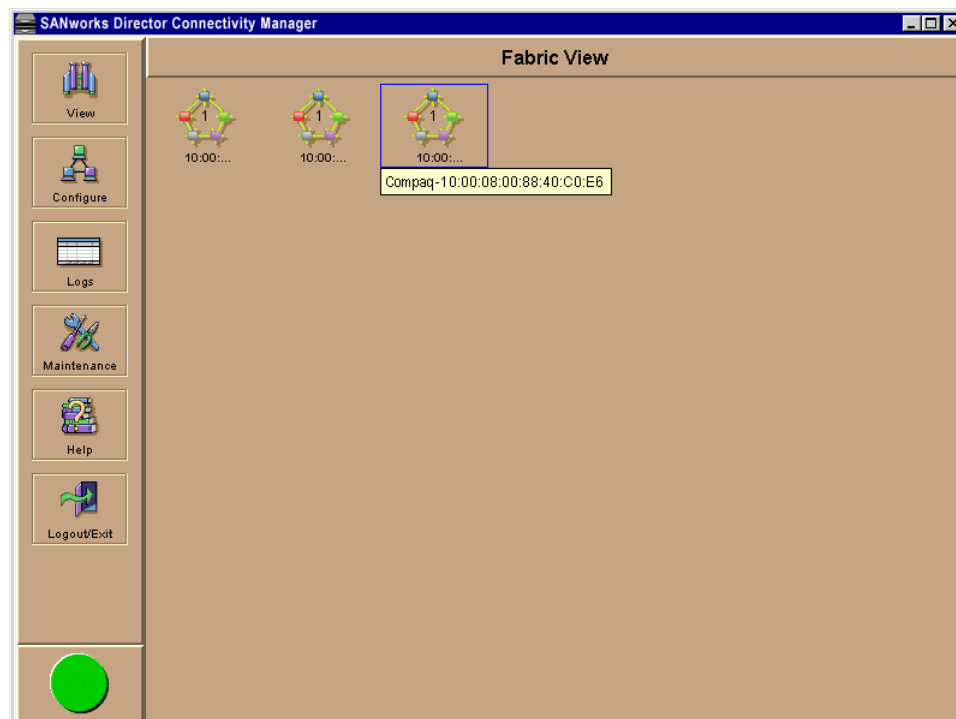
Figure 3–2:  Fabric View with WWNs Displayed

Use one of the following methods to open the Fabric Manager from the Fabric View:

■ Click a fabric icon in the Fabric View.

■ Right click a fabric icon in the Fabric View and choose Open.

## Fabric Manager Views

The Fabric Manager's default view is the Topology View (Figure 3–3). This view displays all products connected in a single fabric. When there is more than one product in a fabric, the interswitch link connections display. For details on this view, refer to Using the Topology View.

The other Fabric Manager view is the Zoning View (Figure 3–4), which provides a complete view of the active zone set, including all zones and zone members. For details on this view, refer to Using the Zoning View.
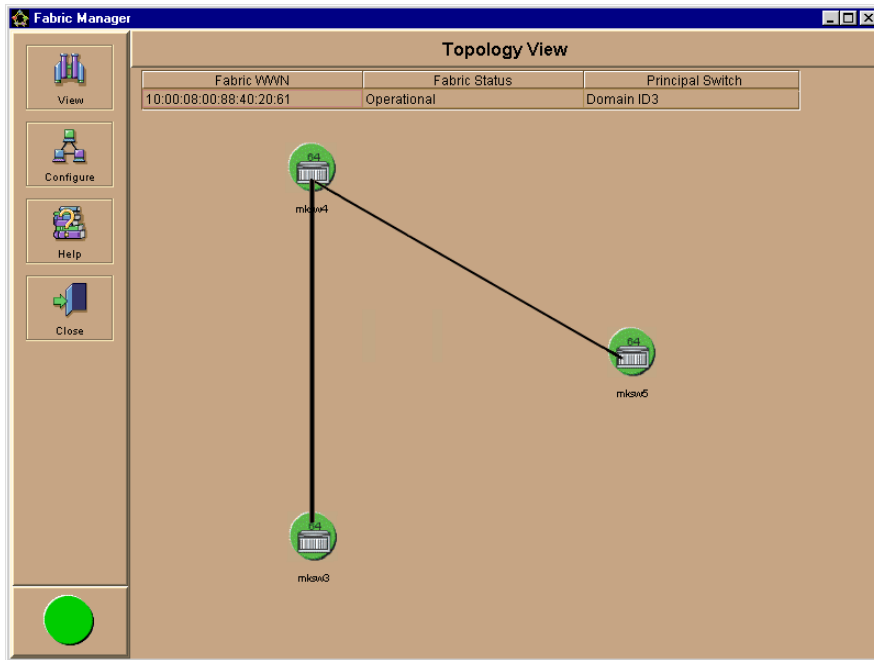
Figure 3–3: Topology View with Interswitch Link Displayed
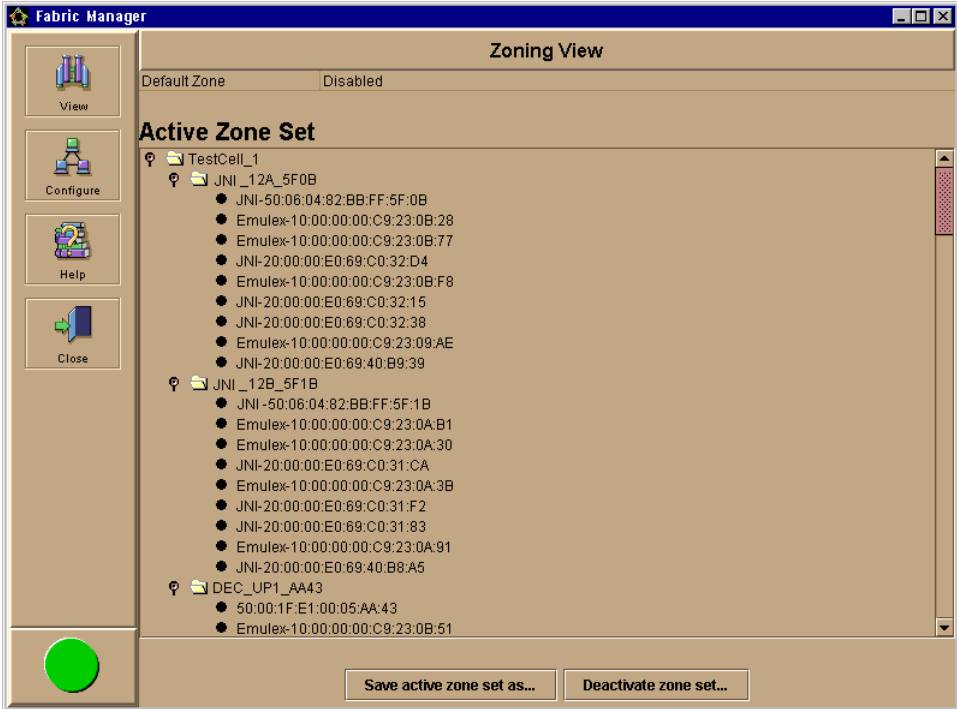
Figure 3–4:  Zoning View with the Active Zone Set Displayed

## Using the Fabric Manager Navigation Control Panel

The menu options on the Fabric Manager's navigation control panel enable you to manage fabrics.
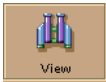
### The View Menu

The View menu provides access to each of the Fabric Manager views.

■  **Topology**

Select this option to display the Topology View.

■  **Zoning**

Select this option to display the Zoning View.

### The Configure Menu

The Configure menu displays three options. For details regarding these three options, refer to Chapter 4.

■ **Zone Sets**

Select this option to activate a zone set and to create, modify, delete, copy, find, replace, and view zones, zone members, and zone sets.

■ **Deactivate Zone Set**

Select this option to deactivate the currently-active zone set. This option is necessary if you do not want any zone set to be active.

> **NOTE:** Replacing the active zone set with another zone set activates the new zone set.

■ **Default Zone**

Select this option to enable or disable the default zone for the fabric.

■ **Show Route**

Select this option to view the route between two end devices in the fabric. For more information see Show Routes on page 6- 12.
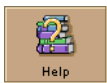
### The Help Menu

The Help menu provides access to two options.

■ **Contents**

Select this option to open the Fabric Manager Online Help window. The Contents, Index, and Glossary items in the left frame of the Help window are hyperlinked to topic text and graphics in the right frame.

■ **About**

Select this option to display version and copyright information for the SANworks DC Manager application.

### The Close Menu

The Close menu displays one option.

■ **Close**

Select this option to close the Fabric Manager window.

## Using the Alert Panel

This panel, located below the navigation control panel, displays a colored alert symbol that indicates the most critical status of any product managed by the Fabric Manager. For example, if one product has failed, and nine other products are fully operational, a red diamond with yellow background, indicating a product failure, displays in the alert panel. The alert panel displays one of four alert symbols as described in Table 2–1.

## Using the Topology View

The Topology View displays all products in a fabric, as well as the interswitch links between products in a multiswitch fabric. Switches and directors that are being managed by another SDCM server display without an alert symbol.

Like the Fabric View, the icons in the Topology View have a pass-over functionality. When the pointer is placed over an icon, the icon's label expands to display the complete WWN or nickname of the director. This expanded label displays detailed information for managed products. The type of information displayed is determined by the display options selected.

The status table at the top of the Topology View displays the selected fabric's WWN, operational status, and domain ID of the principal switch. The Fabric Status shows one of the following:

■ **Operational**

All units in the fabric are operational. If one managed product is degraded but operational (indicated by a yellow triangle status symbol behind the product icon), the fabric is operational.

■ **Unknown**

No information about the fabric is available. This status typically results after removal or failure of the fabric's principal switch.

■ **Transitioning**

This state occurs during a fabric build just before the fabric becomes operational. Unless a problem occurs, this status appears only briefly.

### Display Options

There are four display options for the product icon label in the Topology View. To set the Topology View's display options, right click in an open area of the Topology View, and choose one of the following options from the menu:

■ **Product Name**

■ **Network Address**

■ **Domain ID**

■ **World Wide Name**

### Product Icons

To open the Product Manager for a managed product, click the product icon in the Topology View. Refer to the appropriate product's user manual for instructions on Product Manager operations.

> **NOTE:** A product icon without a status symbol designates that the product is not managed by the SDCM server.

Right click a product icon in the Topology View to display a shortcut menu which has two options.

■ **Open**

Select this option to open the Product Manager for the selected product.

■ **Properties**

Select this option to open the Properties dialog box, shown in Figure 3–5.
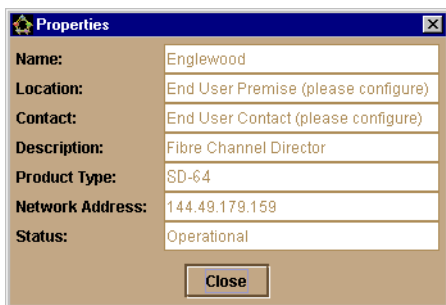


Figure 3–5: Fabric Manager's Director Properties Dialog Box

### ISL Properties

In the Topology View, an ISL displays as a line that connects two director or switch icons. Point to the connection to display the number of ISLs.

Click on the link between the two icons to open the ISL Properties dialog box (Figure 3–6). The ISL Properties dialog box displays the domain ID and port number for each product connected by the ISL.

| ISL Properties | ☒ |
| --- | --- |
| ┌─Interswitch Links──────────────────────────── | |

| Domain Id:Port number | Domain Id:Port Number |
| --- | --- |
| 2:9 | 1:1 |
| 2:13 | 1:5 |

**Close**
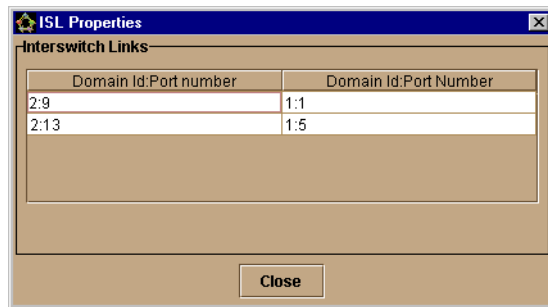
Figure 3–6:  ISL Properties Dialog Box

## Determining Product Status

The alert panel in the Fabric Manager displays the most critical status for a product in the current fabric (refer to Using the Alert Panel). Alert symbols also appear behind product icons in the Topology View. If no alert symbol displays behind the icon, the product is not managed by the SDCM server.

In the Fabric View in Figure 3–7, the yellow triangle that displays in the alert panel indicates that at least one product belonging to one of the four fabrics shown is in a degraded status.
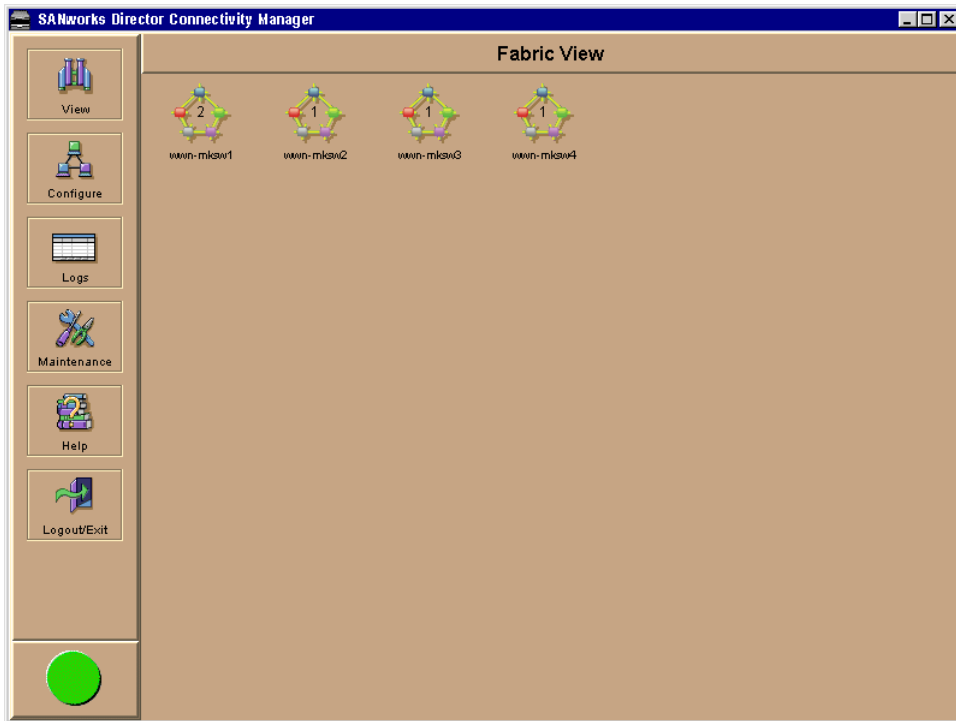
Figure 3–7:  Fabric View with Degraded Status

To determine which fabric has a managed product with a degraded or failed status, click a fabric icon to display the Topology View for that fabric. Look for the degraded or failed alert symbol behind the product's icon. The degraded or failed alert symbol also appears in the alert panel to show the most critical status of a product in the fabric. Refer to Figure 3–8.
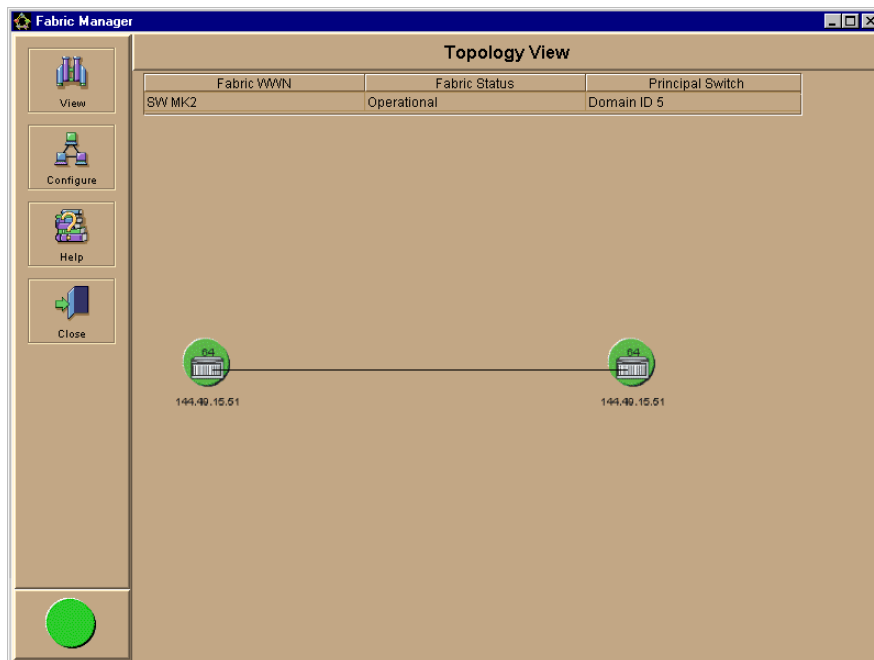
Figure 3–8:  Topology View Showing Degraded Product

Another example of product status that you may see in the Topology View is when a product is managed by an SDCM server other than the one that you are logged into. As shown in Figure 3–9, there are two products, one being managed by another SDCM server.

> **NOTE:**  The grey square in the alert panel reflects that the operating status of at least one product cannot be determined.
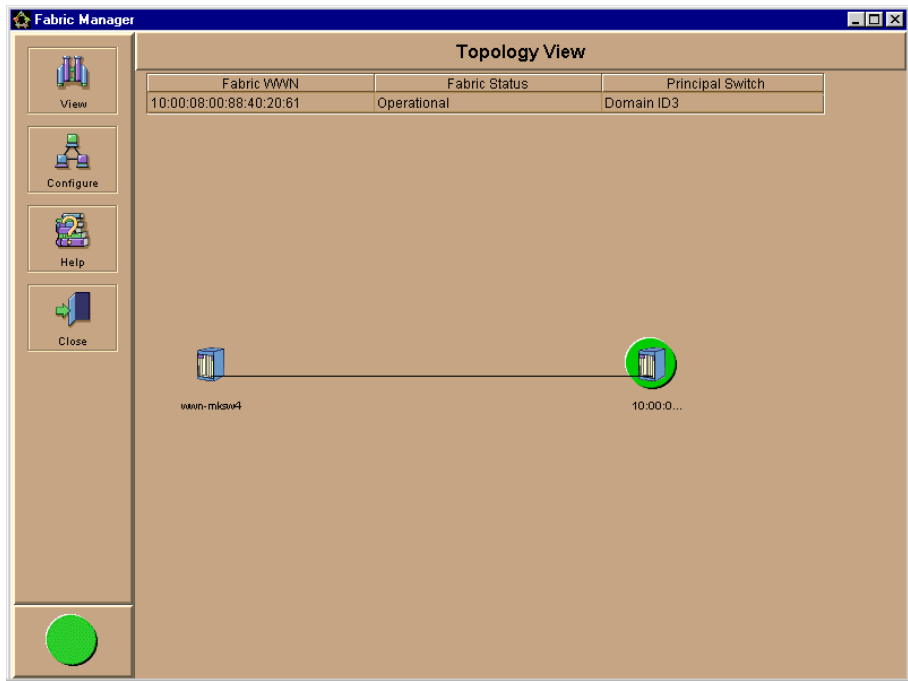
Figure 3–9:  Topology View Showing Products Managed by Another Server

## Using the Zoning View

The Zoning View provides a complete view of the active zone set, including all zones and zone members. The active zone set name displays at the top of the list, followed by the zone names, then the zone members in each zone. The table at the top of the view indicates whether the default zone is enabled or disabled. The buttons at the bottom of the view enable you to save the active zone set as a new zone or to deactivate the current zone set. Point to a WWN to display its corresponding nickname.
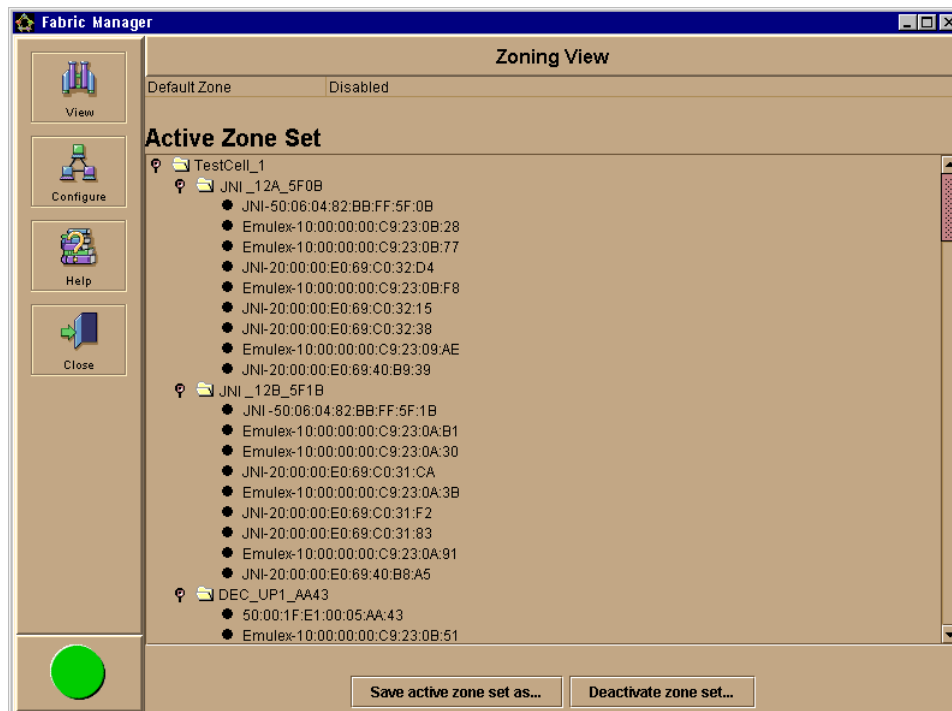
Figure 3–10:  Zoning View with Active Zone Set

To display a list of members in a zone, click the horizontal magnifying glass symbol by a zone name. To close a zone list, click the vertical magnifying glass symbol by the zone name. Zone members display as a list of the following:

■ **World-wide names**

Unique 16-digit decimal number identifying the device attached to a port. For example, 10:00:02:06:77:43:B0:1C. If nicknames have been configured, they will display instead.

■ **Domain ID, port numbers**

Unique domain identification of a connectivity product (for example, 1-31) followed by the port number (for example, 0-31). For example, Domain 1, Port 7.

## Determining the Default Zone Status

A default zone consists of all devices that have not been configured as members of a zone in a currently enabled (active) zone set. You can enable or disable the default zone separately from the active zone set.

The state of the default zone (enabled or disabled) displays at the top of the view.

■ When no zone set is active and the default zone is enabled, then all devices are considered to be in the default zone.

■ If a zone set is active, then all connected devices that are not included in at least one of the zones in the active zone set are included in the default zone.

■ If no zone set is active and the default zone is disabled, then no device can access or communicate with any other device in the fabric.

## Deactivating a Zone Set

Click the Deactivate Zone Set button at the bottom of the Zoning View to display the Deactivate Zone Set dialog box (Figure 3–11), where you can deactivate the currently active zone set.

> **NOTE:** Only one zone set can be active at a time.
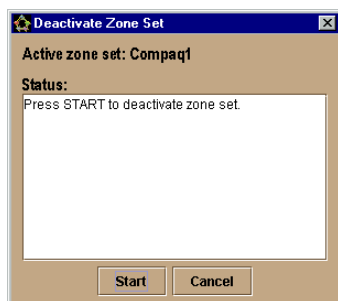


Figure 3–11: Deactivate Zone Set Dialog Box

1. Click Start to deactivate the zone.

   Messages appear in the Status area indicating the progress and the Cancel button changes to a Close button.

2. When the process completes, click Close to close the dialog box.

When you deactivate the currently active zone set:

- All devices are considered to be in the default zone if the default zone is enabled. In this case, all devices in the fabric can communicate with and access each other.

- If the default zone is disabled, then no device can access or communicate with any other device in the fabric.

### Save Active Zone Set

Use the following procedure to save the active zone set as a different zone set in the zone set library or to save zoning configurations that you changed.

1. Click the Save Active Zone Set As button at the bottom of the Zoning View.

   The Save Active Zone Set As dialog box displays (Figure 3–12).
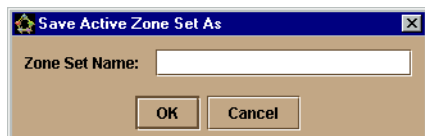


Figure 3–12:  Save Active Zone Set As Dialog Box

2. Enter a name for the selected zone set.

3. Click OK.

To view the new zone set in the Zoning View, choose Zone Sets from the Configure menu. The Zone Sets dialog box displays with the new zone set listed in the Zone Set Library area.

Refer to Chapter 4 for complete information on managing zones and zone sets.

*Chapter* **4**

# Fabric Zoning

This chapter explains how to:

■ Zone fabrics

■ Use zoning features and dialog boxes

## Overview

> **NOTE:** Designing zoning can be a complex task, especially for multiswitch fabrics. Refer to Compaq's professional services organization before configuring zoning.

The fabric zoning feature enables you to partition devices attached to managed Fibre Channel products into groups called zones. A zone contains devices that can access one another through port-to-port connections. Devices in the same zone can recognize and communicate with one another; devices in different zones cannot.

System administrators create zones to increase system security and to prevent data loss or corruption by controlling access between devices (such as servers and data storage units), or between separate user groups (such as engineering or human resources). Zoning allows an administrator to:

■ Establish barriers between devices that use different operating systems. For example, it is often critical to separate servers and storage devices with different operating systems because accidental transfer of information from one to another can delete or corrupt data. Zoning prevents this accidental transfer of information by grouping devices that use the same operating systems into zones.

■ Create logical subsets of closed user groups. Administrators can authorize access rights to specific zones for specific user groups, thereby protecting confidential data from unauthorized access.

■ Create groups of devices that are separate from devices in the rest of a fabric. Zoning allows certain processes (such as maintenance or testing) to be performed on devices in one group without interrupting devices in other groups.

■ Allow temporary access between devices for specific purposes. Administrators can remove zoning restrictions temporarily (for example, to perform nightly data backup), then restore zoning restrictions to return to normal processes.

Figure 4–1 illustrates three zones established on a single managed product with four devices in each zone. Devices in each zone can communicate with and access devices only in their respective zones.
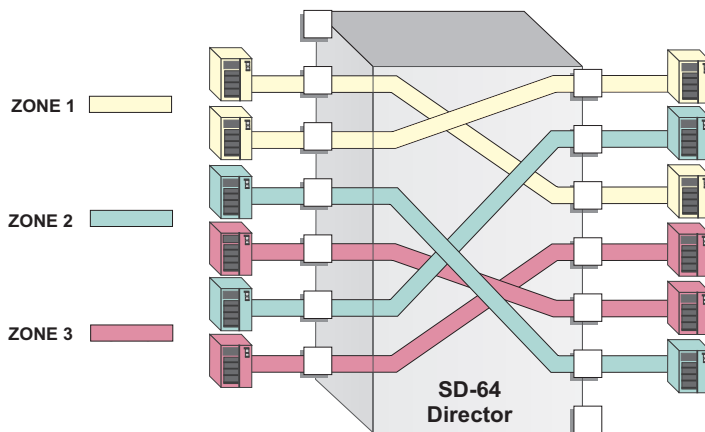


Figure 4–1: Zoning through a Single Fibre Channel Managed Product

Figure 4–2 illustrates how zones can consist of ports and/or devices installed on ports in three managed products in a multiswitch fabric.
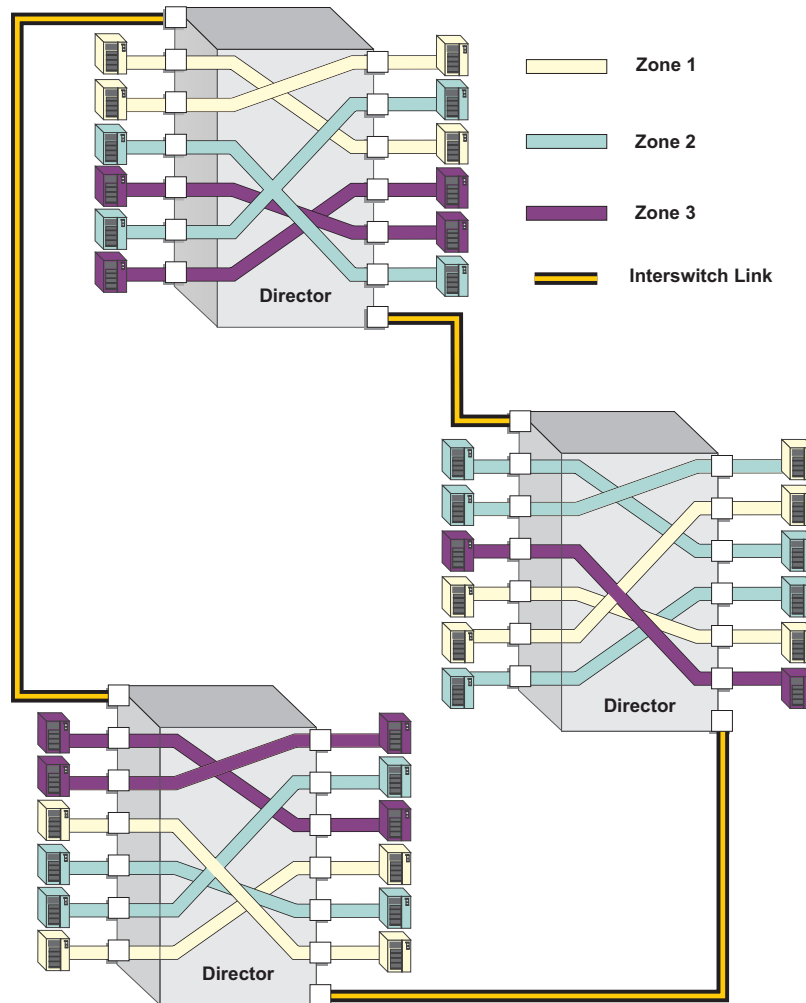
Figure 4–2:  Zoning Through a Multiswitch Fabric

## Zoning Concepts

Zoning is configured by authorizing or restricting access to name server information associated with device ports that attach to product ports. A zone member is specified by the number of the product port to which a device is attached, or by the 8-byte worldwide name assigned to the host bus adapter or Fibre Channel interface installed in a device. A device port can belong to multiple zones.

Zoning concepts include:

■ Zones

■ Default Zone

■ Zone Sets

■ Zone Library

■ Active Zone Set

## Zones

A zone is composed of a set of members (maximum 4096) that can access each other. A member can be a product port or the WWN of the device. Ports and devices spread throughout multiple managed products in a multiswitch fabric may be grouped into the same zone. Members of a zone can communicate with one another; members in different zones cannot. The number of members that you can configure for a zone varies according to the number of zones in the zone set, the length of the zone names, and other factors, but is essentially bounded by the available nonvolatile random-access memory (NVRAM) in the managed product.

The type of zone members identified for a zone may be mixed and matched. For example, two members may be specified by a port number and the third member by the WWN of the device.

Please note the following naming conventions when naming zones:

■ The first character of a zone name must be a letter (A-Z, a-z).

■ A zone name cannot contain spaces.

■ Valid characters are all letters, all numbers, and the special characters ($-^_).

■ A zone name can have a maximum of 64 characters.

### Using WWNs

To identify a zone member by WWN, use the 16-digit WWN of the device. For example:

**10:00:08:00:88:40:C0:D4**

In the SANworks DC Manager, Fabric Manager and Product Manager, the WWN is preceded with the switch or director manufacturer's name. The WWN is assigned to the Fibre Channel interface or HBA installed in devices such as servers or storage devices. Although the device may also have a node WWN, this WWN is not used for zoning

identification. If you have assigned a nickname to the WWN through the Configure Nicknames dialog box, that nickname appears when you point to the WWN. In this case, you will assign the nickname as the zone member.

The advantage of identifying a zone member as the WWN of the attached device is that the identification will not change if fiber cable connections to ports are rearranged. This is especially important if you are using spare ports. You can simply move the fiber cable to a spare port from a failed port and still maintain the zoning configuration.

The disadvantage of identifying a zone member by the WWN is that removal and replacement of a device HBA or Fibre Channel interface (thereby changing the device WWN) disrupts zone operation and may incorrectly include or exclude a device from a zone.

### *Using Port Numbers*

To identify a zone member by port number, use the domain identification number of the managed product and the port number on that managed product. For example:

**Domain 1, Port 1**

Port numbers can be 0-n, with n representing the number of ports on the managed product minus one. When you define a zone member by a port number, any device attached through that port is included in the zone. A port number that you assign as a zone member is automatically prefixed with the domain identification number of the managed product.

The advantage of identifying a zone member by port number is that if the HBA on an attached device fails, you do not have to identify the member with the WWN of the replacement HBA.

A disadvantage of port zoning is that someone may rearrange cable connections to ports (because of port failures or other reasons) and inadvertently allow devices to communicate that should not have access to each other.

> **NOTE:** If a managed product's Domain ID changes, you must reconfigure all zones that contained the managed product's port as a zone member. Compaq recommends assigning unique preferred Domain ID's to each switch in the fabric using the Operating Parameters dialog box in the Product Manager.

### Default Zone

A default zone consists of all devices that have not been configured as members of a zone in a currently active zone set. Here are some important points to remember about zone sets:

■ You can enable or disable the default zone separately from the active zone set using the Default Zone option in the Configure menu. Enabling the default zone allows all devices and ports not configured as members of the active zone set to communicate. If the default zone is disabled, these ports and devices cannot communicate.

■ When no zone set is activated, then all devices are considered to be in the default zone.

■ If a zone set is active, then all connected devices that are not included as a members of a zone in the active zone set are included in the default zone.

### Zone Sets

A zone set is a group of zones that you can activate or deactivate as a single entity across all managed products in either a single switch or a multiswitch fabric. Only one zone set can be active at one time. Devices that are members of zones in the zone set can only communicate with members of zones in the same zone set. However, devices can be included as members of more than one zone set. By activating a zone set, you are making all zones in the set active. You can configure up to 1024 zones in a zone set and up to 64 zone sets.

Here are some important points to remember about zone sets:

■ If no zone set is active, and the default zone is disabled, then no devices can communicate.

■ If you activate a zone set when there is already an active zone set, that set will replace the currently active zone set.

■ If you deactivate the current active zone set, then all devices connected in the fabric become members of the default zone.

Please note the following naming conventions when naming zone sets:

■ The first character of a zone set name must be a letter (A-Z, a-z).

■ A zone set name cannot contain spaces.

■ Valid characters are all letters, all numbers, and the special characters ($-^_).

■ A zone set name can have a maximum of 64 characters.

### Active Zone Set

An active zone set is a zone set that is currently active on a single-switch fabric or across all managed products in a multiswitch fabric. At any time, you can disable zoning by deactivating the active zone set and enabling the default zone, or you can enable zoning by activating a zone set. When a zone set is active, all zones that are members of that zone set are active. Only one zone set can be active for the fabric at one time. If no zones are active, then all devices are considered to be in the default zone.

### Zone Set Library

The Zone Set Library contains all of the zone sets configured through the Fabric Manager. Any zone set in the library may be selected and activated on a fabric. You can view this library through the Zone Sets dialog box. This dialog box provides a branching tree structure of all zone sets, zones, and members of each zone.

### Zone Library

The Zone Library contains all zones configured through the Fabric Manager. Any zone in the library may be selected and added to a zone set. You can view this library through the New Zone Set and Modify Zone Set dialog boxes. By selecting a zone and clicking View Zone Members on the dialog box's Actions menu, you can see all members currently in a zone.

## Controlling Access at the Server or Storage Device

Features available at the server or storage device can add methods, beyond zoning, to increase network security measures, differentiate between operating systems, and prevent data loss or corruption by controlling access between devices or between separate user groups (such as Engineering or Human Resources).

Server-level access control is called persistent binding. Persistent binding uses configuration information stored on the server and is implemented through the server's host bus adapter (HBA) driver. The process binds a server device name to a specific Fibre Channel storage volume or logical unit number (LUN), through a specific HBA and storage port WWN. In essence, this feature creates a reliable route across the fabric that sustains the small computer system interface (SCSI) connection between a server and storage device.

For persistent binding:

■ Each server HBA is explicitly bound to a storage volume or LUN, and access is explicitly authorized (access is blocked by default).

■ The process is compatible with open system interconnection (OSI) standards. The following are transparently supported:

❑ Different operating systems and applications.

❑ Different storage volume managers and file systems.

❑ Different fabric devices, including disk drives, tape drives, and tape libraries.

■ If the server is rebooted, the server-to-storage connection is automatically re-established.

■ The connection is bound to a storage port WWN. If the fiber optic cable is disconnected from the storage port, the server-to-storage connection is automatically re-established when the port cable is reconnected. The connection is also automatically re-established if the storage port is cabled through a different managed product port.

Access can also be controlled at the storage device as an addition or enhancement to redundant array of independent disks (RAID) controller software. Data access is controlled within the storage device, and server HBA access to each LUN is explicitly limited (access is blocked by default). Storage-level access control:

■ Provides control at the storage port and LUN level, and does not require configuration at the server.

■ Is typically proprietary and protects only a specific vendor's storage devices. Storage-level access control may not be available for many legacy devices.

> **NOTE:** Refer to Compaq's professional services organization before establishing persistent binding.

> **NOTE:** Refer to Compaq's professional services organization when establishing access control features at the storage device.

## Merging Zoned Fabrics

Managed products are linked through ISLs to form multiswitch fabrics. In a multiswitch fabric, the active zoning configuration applies to the entire fabric. Any change to the configuration applies to all switches in the fabric.

### Configurations of Merged Zoned Fabrics

When fabrics join through an ISL, adjacent managed products exchange active zone configurations and determine if the configurations are compatible and can merge. If the configurations can merge, the fabrics join. The resulting configuration will be a single zone set containing zone definitions from each fabric.

If configurations cannot merge, the expansion ports (E_Ports) on each product become segmented. Segmented E_Ports cannot carry traffic from attached devices (class 2 or 3 traffic), but can carry management and control traffic (class F traffic) between managed products.

Zoning configurations are compatible if the active zone names in each fabric are unique. If there are identical zone names in each fabric, then the zones must have identical members for the fabrics to join.

### Rules for Merging Zoned Fabrics

Certain rules are enforced to ensure that zoning is consistent across the fabric. Table 4–1 summarizes rules for joining two fabrics through an ISL. The the following terms are used in the table:

■ **Not zoned**

No zone set is active in the fabric and the default zone is enabled. In other words, all devices in the fabric are visible to all other devices in the fabric.

■ **Zoned**

A zone set is active in the fabric and/or the default zone is disabled. In this case, devices can discover other devices that are members of the same zone.

■ **Zoning configuration**

Combination of the active zone set definition and the default zone state (enabled or disabled).

**Table 4–1: Merging Fabrics - Results for Zone Configurations**

| Fabric A | Fabric B | Result |
|----------|----------|--------|
| Not zoned | Not zoned | Fabrics join successfully. The new fabric remains not zoned. |
| Not zoned | Zoned | Fabrics join successfully and the active zone set will propagate across the fabric. Fabric A inherits zoning configuration from Fabric B. |

**Table 4–1: Merging Fabrics - Results for Zone Configurations  (Continued)**

| Fabric A | Fabric B | Result |
|----------|----------|--------|
| Zoned | Not zoned | Fabrics join successfully and the active zone set will propagate across the fabric. Fabric B inherits zoning configuration from Fabric A. |
| Zoned | Zoned | Fabrics can merge if the zone names in each fabric are unique. The resulting active zone set is a union of the zones from each fabric. Once you have merged the two zoned fabrics, click the Save Active Zone Set As button in the Zoning View to save the active zone set to the zone set library. |
| | | If there is a zone name conflict (the same zone name in each fabric) then the zones must have identical members for the fabrics to join. |
| | | If the two zones have the same name but contain different members, then the E_Ports will segment and the fabrics will not join. |

**NOTE:**  If merging zones will result in segmented E_Ports and the fabrics will not join, you can join the fabrics by deactivating the active zone set on one of the fabrics (default zone is enabled). This eliminates any conflicts because the fabrics will then join using only the active zone set. After the fabrics join, you can make adjustments to zoning configurations as you desire.

## Configuring and Managing Zoning

This section contains detailed steps for establishing new zones and zone sets in a fabric. Steps are also provided for other zoning tasks. In addition, a quick reference chart on using zoning options and dialog boxes to perform specific zoning tasks is included in Table 4–2.

**NOTE:**  Designing zoning can be a complex task, especially for multiswitch fabrics. You should obtain help from Compaq's professional services organization before configuring zoning.

### Opening the Fabric Manager

You configure and manage all zoning through the Fabric Manager. To access the Fabric Manager:

1.  In the SANworks DC Manager's Product View or Session View, choose Fabric from the View menu.

    The Fabric View displays.

2.  In the Fabric View, click a fabric icon.

    The Topology View displays as the default view.

Point to the Fabric Manager's Configure icon to display a menu of zoning options.
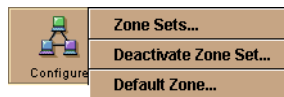


Figure 4–3:  Zoning Menu

Using zoning options available from the Configure menu, you can establish zones for devices attached to ports in one product (single-switch fabric) or in multiple products linked through ISLs. A fabric containing multiple managed products linked through ISLs is called a multiswitch fabric.

## Configuring New Zoning for a Fabric

Use the following tasks to configure a new zone and zone set, then activate the new zone set for the fabric. Steps are provided in each task to show how to use dialog boxes and other features of fabric zoning.

All features to configure zones and zone sets are available through the Zone Sets dialog box. To display this dialog box, choose Zone Sets from the Configure menu.

### Task 1: Create Zones

A zone is a set of physical ports on managed products in the fabric and/or devices attached to the ports. Ports are identified by the managed product domain and physical port member. Devices are identified by the WWN of the device. Use this task to define and add up to 1024 zones.

To create zones, perform the following steps:

1.  In either the Topology View or Zoning View, choose Zone Sets from the Configure menu.

    The Zone Sets dialog box displays.

    The Zone Set Library area of the Zone Sets dialog box displays all of the defined zone sets. If zone sets are not defined, this library is empty. Click the horizontal magnifying glass icon by a zone set to expand the list of zones included in the set. Click the vertical magnifying glass icon by a zone to expand the list of members included in the zone (as shown in Figure 4–4).

Figure 4–4:  Zone Sets Dialog Box (Actions Menu Displayed)

2.  Choose New from the Actions menu.

    The New Zone Set dialog box displays.
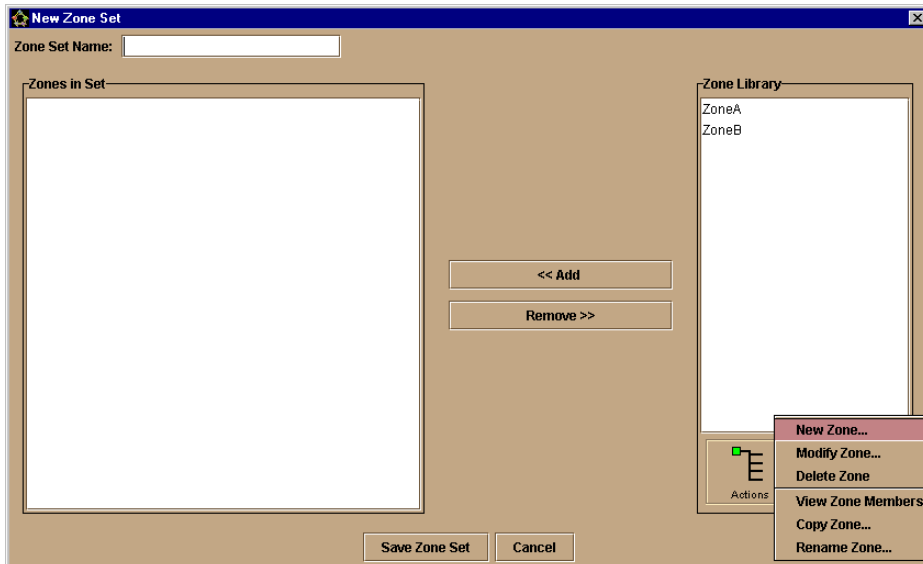


Figure 4–5:  New Zone Set Dialog Box

3.  From the Actions menu, choose New Zone.

The New Zone dialog box displays (Figure 4–6).
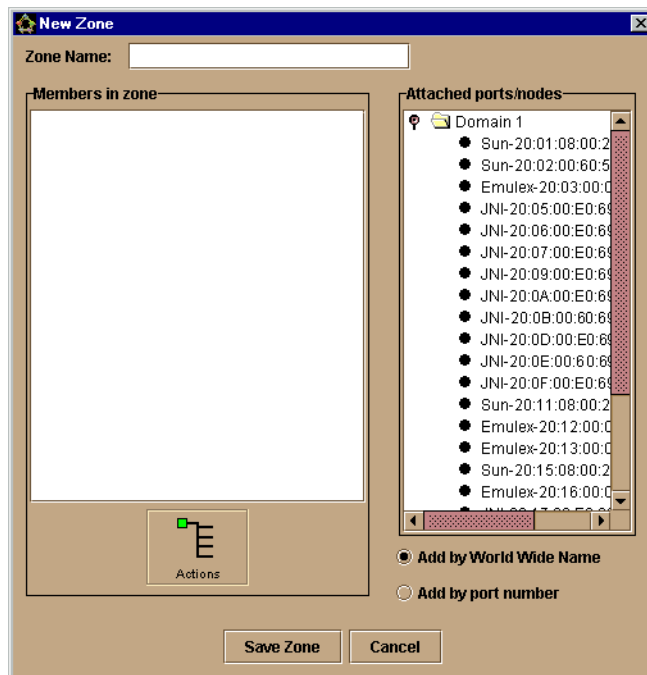


Figure 4–6:  New Zone Dialog Box (Add by WWN Selected)

4.  In the New Zone dialog box, type a name for the new zone in the Zone Name box. Refer to Zones for zone naming requirements.

> **NOTE:** Upper and lower case letters are allowed. Spaces are not allowed.

5.  Display ports in the Attached Ports/Nodes section by clicking on the horizontal magnifying glass icon by a numbered domain. A list of ports expands under the selected domain (refer to Figure 4–7).

> **NOTE:** The magnifying glass icon may not appear by a domain if Add By World Wide Name (the default) is selected and there are no nodes attached to ports on a product.
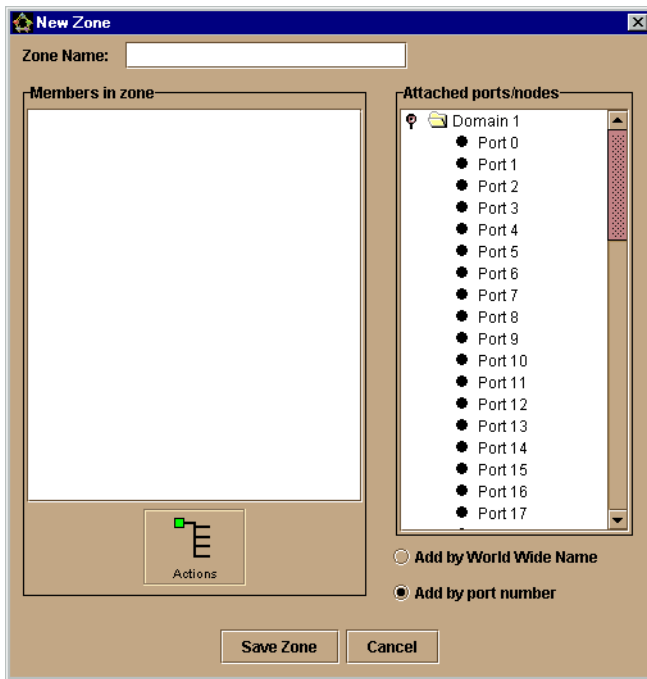
Figure 4–7: New Zone Dialog Box (Add by Port Number Selected)

6. Add members to the zone as follows:

   a. Click Add By World Wide Name or Add By Port Number.

      ■ **Add by World Wide Name (default)**

      Adds the device attached to a port on the product to the new zone, using the node's world-wide name.

      ■ **Add by port number**

      Adds the port on the product to the new zone, using the port number.

      **NOTE:** If the operating mode is set to Open Fabric Mode and you select the *Add by port number* option, a message will display that states, "Zoning may be configured by port but will actually be enforced by WWN in Open Fabric Mode."

   b. Select and drag members from the Attached Ports/Nodes area to the Members in Zone area.

      Figure 4–8 illustrates how members are added to the zone. The first two items in the Members In Zone section were added with Add By Port Number selected. The next two items were added with Add By World Wide Name selected.
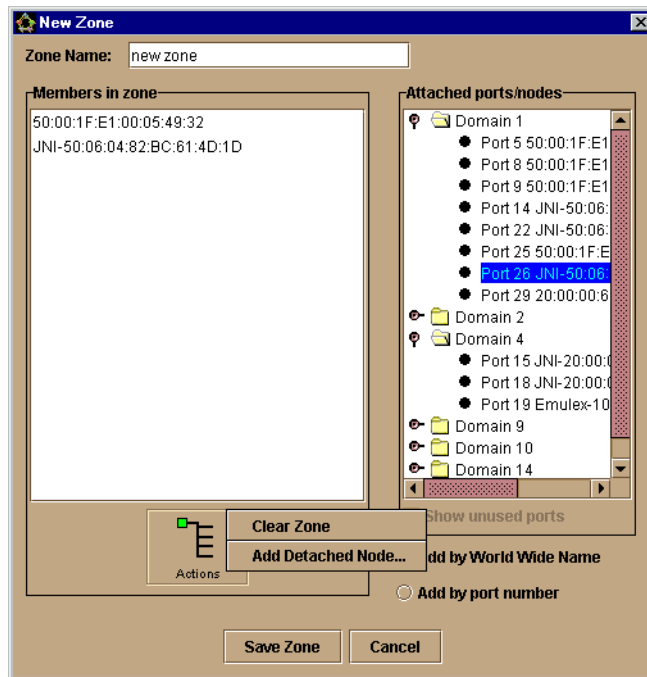
Figure 4–8:  Ports and WWNs Added to Members in Zone Section

> **NOTE:**  To select multiple members individually, press **Ctrl** and click members. To select multiple members in order, press **Shift** and click the first and last members of the group you want to move. After the members are selected, press **Ctrl-C** and **Ctrl-V** to copy and paste the members to the Members In Zone section.

### Adding Detached Nodes

> **NOTE:**  This option may be desirable for nodes that have not yet been connected to a product port in the fabric. Knowledge of the port where the node attaches is not necessary. When a node is later connected to a port, zoning is already complete.

To add nodes that are not listed in the Attached Nodes/Port section (for example, detached nodes) perform the following steps:

1.  From the Actions menu, choose Add Detached Node.

    The Add Detached Node dialog box displays.

2.  Type in the WWN of the node that you want to add as a zone member and click OK.

3.  The WWN is added to the Members In Zone area.

4.  Add additional members by repeating steps 1-2.

### Removing Zone Members

To clear members from the Members In Zone section perform one of the following steps:

■  To clear a single member, select the member and drag it out of the frame.

■  To clear all members, choose Clear Zone from the Actions menu. When the warning appears asking if you want to remove all members in the zone, click Yes.

### Saving the Zone

1.  When the zone is complete, click Save Zone on the New Zone dialog box.

2.  If you are finished creating zones, click Cancel. The new zone is added to the Zone Library and saved to the SDCM server.

3.  Click Close to close the Zone Sets dialog box.

### Task 2: Create Zone Sets

A zone set is a collection of zones that you can activate or deactivate as a single entity across all managed products in a multiswitch fabric or on one product in a single switch fabric. Devices in each zone are identified using the steps in Task 1: Create Zones on page 4-11.

Configure up to 1024 zones in a zone set and up to 64 zone sets using the following steps:

1.  In either the Topology View or Zoning View, choose Zone Sets from the Configure menu.

    The Zone Sets dialog box displays (Figure 4–9).
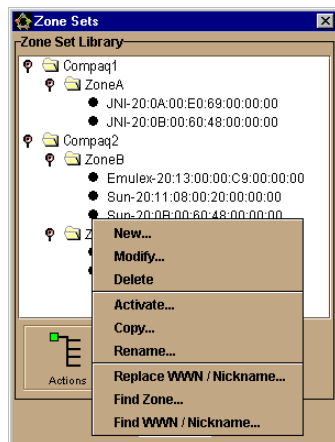


Figure 4–9:  Zone Sets Dialog Box

    The Zone Set Library displays all the defined zone sets. Click the horizontal magnifying glass icon by a zone set to expand the list of zones included in the set. Click the vertical magnifying glass icon by a zone to expand the list of members included in the zone. If zone sets are not defined, this library is empty.
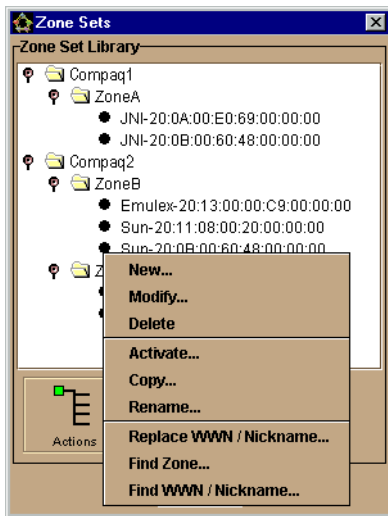
2.  From the Actions menu, choose New.

    The New Zone Set dialog box displays (Figure 4–5).
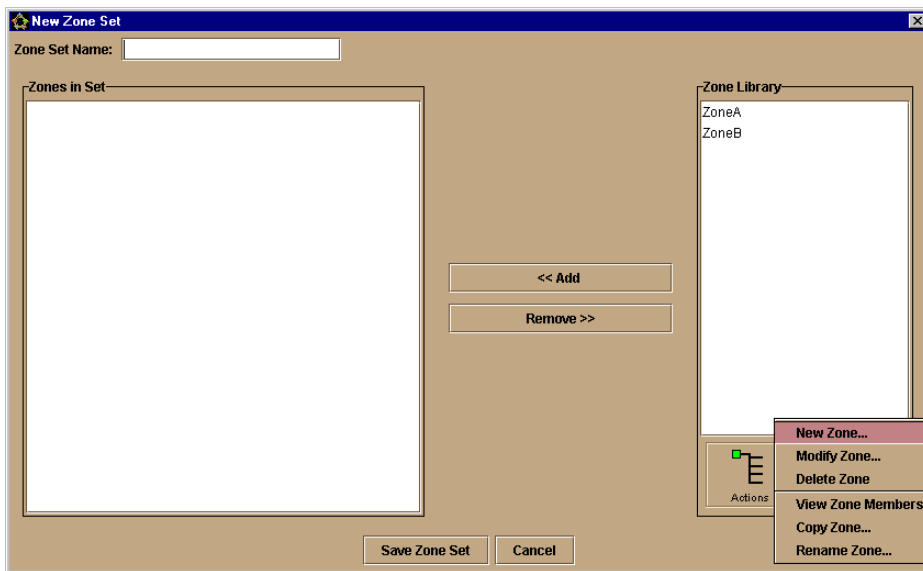
Figure 4–10:  New Zone Set Dialog Box

3.  Type in a name for the zone set in the Zone Set Name box.

    **NOTE:**  Upper and lower case letters are allowed. Spaces are not allowed.

4.  All zones currently defined are listed in the Zone Library section of the dialog box.
    Add zones from this library to the set by selecting a zone in the Zone Library section
    and clicking Add.

    **NOTE:**  To move multiple zones, press the **Ctrl** or **Shift** key while clicking the zones. Then press
    **Ctrl+C** to copy and **Ctrl+V** to paste to add the members to the Members In Zone section.

5.  To clear a single zone from the Zones In Set section, select the zone and click Remove.

6.  Continue adding zones to the set or modifying zones in the set by repeating the
    previous steps.

7.  When the zone set is complete, click Save Zone Set on the New Zone Set dialog box.

8.  If you are finished defining zone sets, click Close on the Zone Sets dialog box.

### Task 3: Activate the Zone Set

To enable a zone set to control access between devices in a fabric, you must activate the
zone set. Changing the configuration for an active zone set does not dynamically apply
changes. For **any** change to a zone set, even modifying members in a zone that belongs to
a zone set, activate the zone set using the following steps.

**NOTE:** It is not necessary to deactivate the active zone set before activating a new zone set.

1. In either the Zoning View or the Topology View, choose Zone Sets from the Configure menu.

   The Zone Sets dialog box displays.

2. Select a zone set in the Zone Set Library area of the dialog box.

3. From the Actions menu, choose Activate.

   The Zone Set To Be Activated dialog box displays.
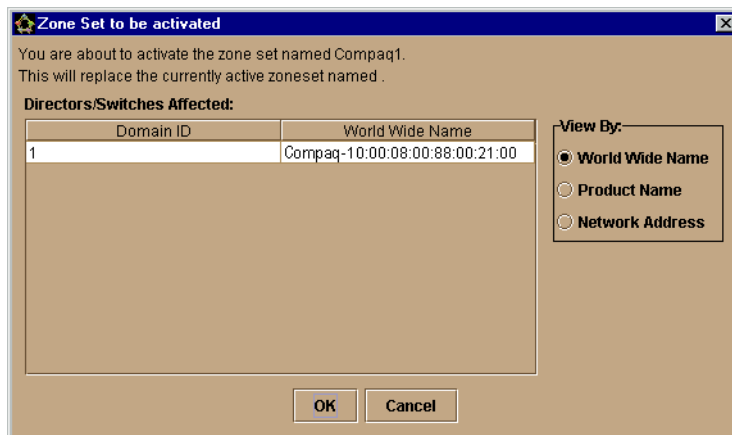


Figure 4–11:  Zone Set To Be Activated Dialog Box

4. The Zone Set To Be Activated dialog box displays the directors or switches that will be affected by activating the zone set. You can view the directors' or switches' WWNs, product names, or network addresses, by changing the View By selection.

   If the operating mode is set to Open Fabric Mode and you activate a zone set that was configured by portID, a message displays stating, "XYZ zone was configured by portID, but will actually be enforced by WWN in Open Fabric Mode."

5. Click OK.

   The Activate Zone Set dialog box displays.
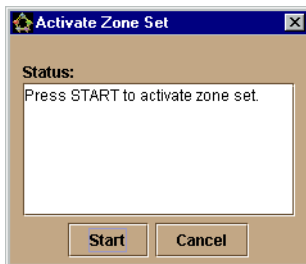
Figure 4–12: Activate Zone Set Dialog Box

6. Click Start to begin the activation.

   Messages appear in the Status area indicating the progress of the command. Buttons on the dialog box disable until the process is complete.

   When the process is complete, the Start button changes to a Close button.

7. Click Close to close the dialog box.

8. If you are finished activating zones, click Close on the Zone Sets dialog box.

   **NOTE:** When you activate a zone that was configured by portID, an alert message will display in the top area of the Zoning View window, which states "[zone set name] was configured by portID, but will actually be enforced by WWN in Open Fabric Mode."

## Other Zoning Tasks

Copy, delete, and modify zones through either the New Zone Set or Modify Zone Set dialog box. Use the Actions menu options Copy Zone, Delete Zone, and Modify Zone in either dialog box.

The following steps refer to the Modify Zone Set dialog box as an example.

To open the Modify Zone Set dialog box:

1. In either the Zoning View or Topology View, choose Zone Sets from the Configure menu.

   The Zone Sets dialog box displays (Figure 4–4).

2. Select a zone set in the Zone Set Library area of the dialog box.

3. Choose Modify from the Actions menu.

The Modify Zone Set dialog box displays (Figure 4–13).
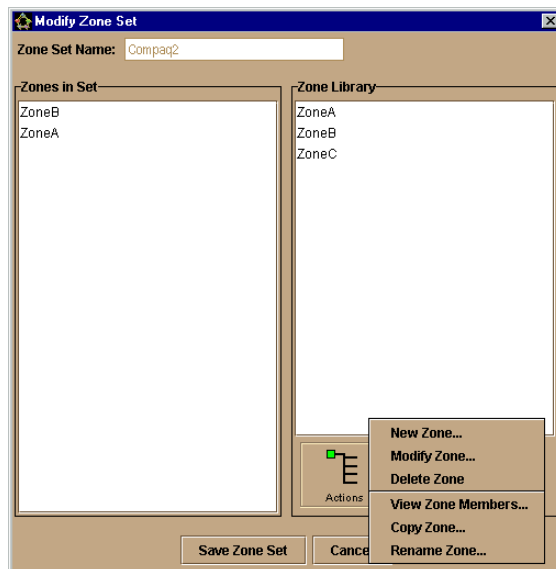


Figure 4–13:  Modify Zone Set Dialog Box (Actions Menu)

### *Copy Zones*

Use the Copy Zone option from the Actions menu to create a new zone for the Zone Library based on an existing zone.

1.  Select a zone from the Zone Library area on the Modify Zone Set dialog box.

2.  Choose Copy Zone from the Actions menu.

3.  In the Copy Zone dialog box, enter a zone name in the Copy <zone name> to: box and click OK.

    This creates a new zone containing the same members in the zone that you selected in the Zone Library.

4.  Click Cancel to close the Modify Zone Set dialog box. The new zone is added to the Zone Library and saved to the SDCM server.

5.  Click Close to close the Zone Sets dialog box.

### Delete Zones

Use the Delete Zone option from the Actions menu to delete zones from the Zone Library.

1. Select a zone from the Zone Library area on the Modify Zone Set dialog box.

2. Choose Delete Zone from the Actions menu.

3. When the dialog box displays asking you to confirm the deletion, click Yes.

   The zone is removed from the Zone Library and all zone sets.

4. Click Cancel to close the Modify Zone Set dialog box. The new zone is added to the Zone Library and saved to the SDCM server.

5. Click Close to close the Zone Sets dialog box.

### Modify Zones

Use the Modify Zone option from the Actions menu to modify an existing zone.

1. Select a zone from the Zone Library area of the Modify Zone Set dialog box.

2. Choose Modify Zone from the Actions menu.

The Modify Zone dialog box displays (Figure 4–14).
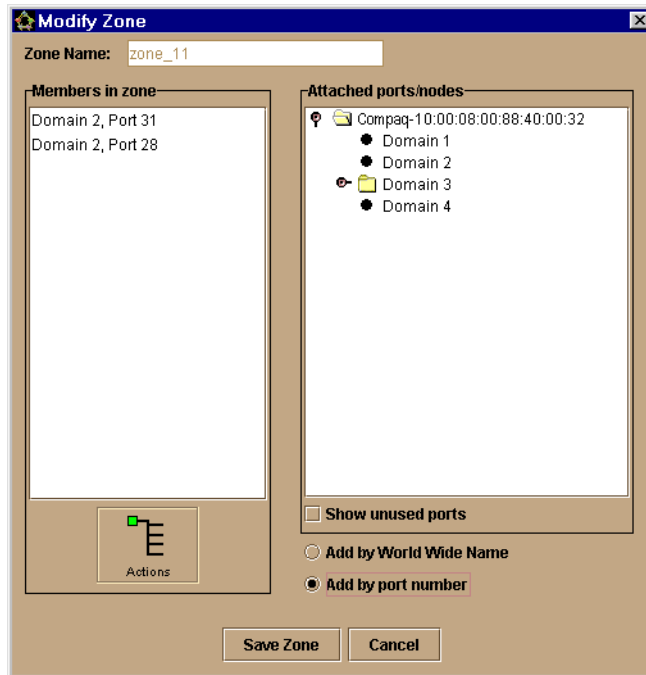


Figure 4–14:  Modify Zone Dialog Box

3. Add or remove members to or from the zone using the procedures described in Task 1: Create Zones on page  4–11.

4. When the zone is complete, click Save Zone.

5. Click Cancel to close the Modify Zone Set dialog box. The modified zone is added to the Zone Library and saved to the SDCM server.

6. Click Close to close the Zone Sets dialog box.

Changing the configuration for an active zone set does not dynamically apply changes. For **any** change to an active zone set, even modifying members in a zone that belongs to a zone set, activate the zone set using steps in Activate/Deactivate Zone Sets on page 4-26.

> **NOTE:**  It is not necessary to deactivate the active zone set before activating a new zone set.

### View Zone Members

Use the View Zone option from the Actions menu on the Modify Zone Set dialog box to view zones in a selected zone set.

1. Select a zone from the Zone Library area on the Modify Zone Set dialog box.

2. Choose View Zone Members from the Actions menu.

   The View Zone Members dialog box displays. Scroll through the list of zone members assigned to the zone.

3. Click Close to close the View Zone Members dialog box.

4. Click Cancel to close the Modify Zone Set dialog box.

5. Click Close to close the Zone Sets dialog box.

### Copy, Delete, Rename and Modify Zone Sets

Copy, delete, rename and modify zone sets through the Zone Sets dialog box Copy, Delete, Rename and Modify options.

To display the Zone Sets dialog box:

   In either the Zoning View or the Topology View, choose Zone Sets from the Configure menu.

   The Zone Sets dialog box displays (Figure 4–4).

### Copy Zone Sets

1. Select a zone set in the Zone Set Library area on the Zone Sets dialog box.

2. Choose Copy from the Actions menu.

3. In the Copy Zone Set dialog box, enter a zone set name in the Copy <zone set> to: box and click OK. The new zone set is listed in the Zone Set Library.

4. Click Close to close the Zone Sets dialog box.

### Rename Zone Set

Use the Rename option on the Actions menu to rename a zone set.

1. Select a zone set from the Zone Set Library area on the Zone Sets dialog box.

2. From the Actions menu, choose Rename.

3. In the Rename Zone Set dialog box, change the zone set name in the Rename to box and click OK.

   The zone set name is changed without losing zoning configurations.

4. Click Close to close the Zone Sets dialog box. The name is changed in the Zone Library and saved to the SDCM server.

### *Delete Zone Sets*

1. Select a zone set in the Zone Set Library area on the Zone Sets dialog box.

2. From the Actions menu, choose Delete.

3. When the Warning dialog box displays asking you to confirm the deletion, click Yes. The zone set is deleted from the Zone Set Library.

4. Click Close to close the Zone Sets dialog box.

### *Modify Zone Sets*

1. Select a zone set in the Zone Set Library area on the Zone Sets dialog box.

2. From the Actions menu, choose Modify.

   The Modify Zone Set dialog box displays (Figure 4–13). The current zones in the set are listed in the Zones In Set area, while all defined zones are listed in the Zone Library area.

3. Add zones to the set by selecting zones from the Zone Library area and clicking Add.

4. To clear a single zone from the Zones In Set area, select the zone set and click Remove.

5. When the zone set is complete, click Save Zone Set.

6. Click Close to close the Zone Sets dialog box.

Changing the configuration for an active zone set does not dynamically apply changes. For **any** change to an active zone set, even modifying members in a zone that belongs to a zone set, activate the zone set using steps in Task 3: Activate the Zone Set on page 4-18.

> **NOTE:** It is not necessary to deactivate the active zone set before activating a new zone set.

## Activate/Deactivate Zone Sets

To enable a zone set to control access between devices in a fabric, you must activate the zone set. Changing the configuration for an active zone set does not dynamically apply changes. For **any** change to an active zone set, even modifying members in a zone that belongs to a zone set, you must also activate the zone set.

> NOTE: It is not necessary to deactivate the active zone set before activating a new zone set.

### *Activate Zone Set*

To activate a zone set, follow the steps in Task 3: Activate the Zone Set.

### *Deactivate Zone Set*

When you deactivate the active zone set, all attached devices become members of the default zone. If the default zone is enabled, the devices can access and communicate with each other. If the default zone is not enabled, devices cannot access and communicate with each other.

1. In either the Zoning View or the Topology View, choose Deactivate Zone Set from the Configure menu.

   The Deactivate Zone Set dialog box displays (Figure 4–16).



Figure 4–15: Deactivate Zone Set Dialog Box

2. Click Start.

   Messages appear in the Status area indicating the progress of the command. Buttons on the dialog box will disable until the process completes.

   When the process finishes, the Start button changes to a Close button.

3. Click Close to close the dialog box.

### Find Zones

You can find zone sets by using the Find Zone option on the Actions menu on the Zone Sets dialog box. Use this option to get a quick view of which zones are in specific zone sets. Once located, you can remove the zone from one or more zone sets by using the Remove function.

1. In either the Zoning View or the Topology View, choose Zone Sets from the Configure menu.

    The Zone Sets dialog box displays (Figure 4–4). Click the horizontal magnifying glass icon by a zone set to expand the list of zones in the set.

2. Select a zone.

3. From the Actions menu, choose Find Zone.

    The Find Zone dialog box displays. All zone sets that contain the selected zone display in the dialog box.
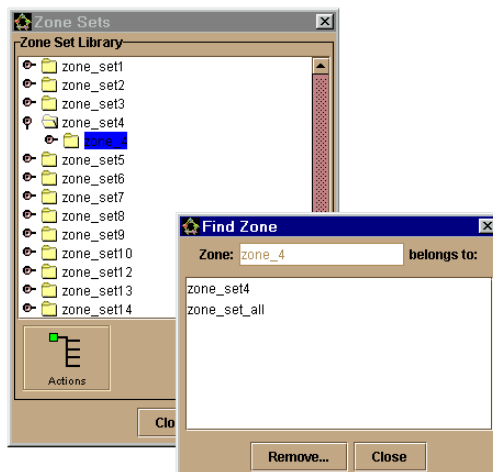


Figure 4–16:  Find Zone Dialog Box

4. Click Remove.

    The Remove Zone dialog box displays (Figure 4–17).
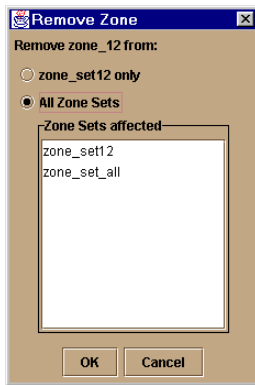
Figure 4–17:  Remove Zone Dialog Box

5.  Perform one of the following steps:

    a.  Click the selected zone set option to remove the zone from that zone set only.

    b.  Click All Zone Sets option to remove the zone from all configured zone sets.

6.  Click OK to remove the zones.

    The Remove Zone dialog box closes.

7.  Click Close to close the Zone Sets dialog box.

## Find WWNs and Nicknames

Use the Find WWN/Nicknames option to find zones in which a specific WWN or nickname is located. Once located, you can remove the WWN or nickname from one or more zones by using the remove function.

1.  In either the Zoning View or the Topology View, choose Zone Sets from the Configure menu.

    The Zone Sets dialog box displays (Figure 4–4). Click the horizontal magnifying glass icon by a zone set to expand the list of zones in the set. Click the vertical magnifying glass icon by a zone (as shown in the figure) to hide the list of zones in the set.

2.  Select the WWN or nickname that you want to find. If you can't find the WWN or nickname in the Zone Set Library, you can enter it in the Find WWN/Nickname dialog box that displays after step 3.

3.  From the Actions menu, choose Find WWN/Nickname.

    The Find WWN/Nickname dialog box displays with the WWN or nickname that you selected (Figure 4–18).
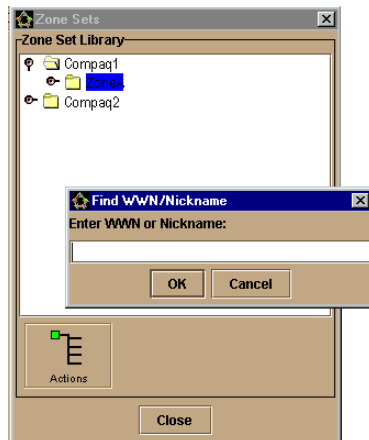
Figure 4–18: Find WWN/Nickname Dialog Box

4.  Click OK.

The second Find WWN/Nickname dialog box displays (Figure 4–19).

The WWN or nickname you searched for is found in the zone sets and zones that display in the Zone Set and Zone columns.
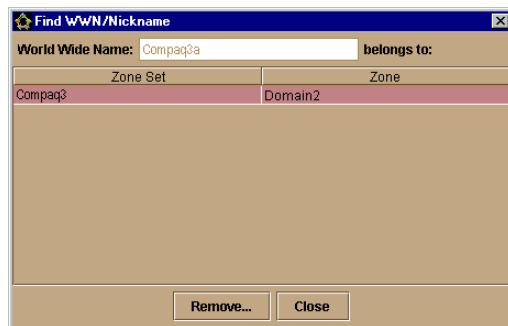


Figure 4–19: Find WWN/Nickname Dialog Box

5.  To remove a nickname from zone or zone set, select the zone or zone set from which you want to remove the nickname.

6.  Click Remove to remove the nickname.

The Remove WWN/Nickname dialog box displays (Figure 4–20).
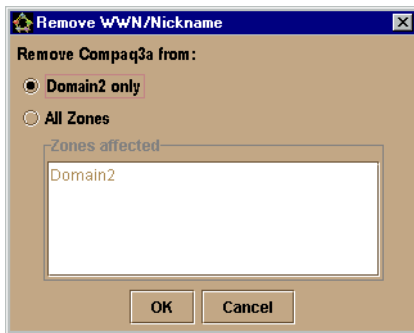
Figure 4–20: Remove WWN/Nickname Dialog Box

7. Perform one of the following steps:

   a. Click the selected zone option to remove the WWN or nickname from that zone only.

   b. Click All Zones to remove the WWN from all zones in the zone library.

8. Click OK to remove the WWN or nickname.

   The Remove WWN/Nickname dialog box closes.

9. Click Close to close the Zone Sets dialog box.

## Replace WWNs and Nicknames

Use the Replace WWN/Nicknames option to replace a node's WWN or nickname with another node's WWN or nickname. This function applies in all zones where the original WWN or nickname was a member. This action does not work for zone members defined as ports.

1. In either the Zoning View or the Topology View, choose Zone Sets from the Configure menu.

   The Zone Sets dialog box displays (Figure 4–4). Click the magnifying glass icon next to a zone set to expand or hide the list of zones in the set and list of members in the zone.

2. Select the WWN or nickname that you want to replace.

3. From the Actions menu, choose Replace WWN/Nickname.

   The Replace WWN/Nickname dialog box displays (Figure 4–21).
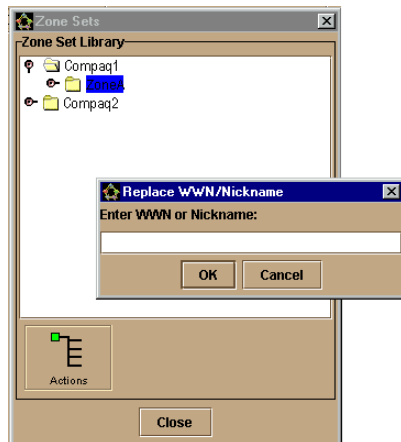
Figure 4–21:  Replace WWN/Nickname Dialog Box

4.  Enter the WWN or nickname that you want to replace.

5.  Click OK.

    The Replace WWN/Nickname dialog box displays. The WWN or nickname that you
    selected to replace displays at the top of the dialog box. The Zones Affected section
    lists the zones in which the specified WWN or nickname is found.

6.  Enter the replacement WWN or nickname.

7.  Click OK.

    The Replace WWN/Nicknames dialog box closes.

    All of the specified WWNs or nicknames are replaced.

8.  Click Close in the Zone Sets dialog box.

### Enable and Disable Default Zone

A default zone consists of all devices that have not been configured as members of a zone
in a currently-active zone set. When no zone set is active, then all devices are considered
to be in the default zone. If a zone set is active, then all connected devices that are not
included in at least one of the zones in the active zone set are included in the default zone.

Enabling the default zone allows any device in the default zone to see any other device in
the default zone. If the default zone is disabled and no zone set is active, then devices
connected to the product cannot communicate.

To disable or enable the default zone, perform the following steps:

1. In either the Zoning View or the Topology View, choose Default Zone from the Configure menu.

   The Configure Default Zone dialog box displays (Figure 4–22). A message at the top of the dialog box indicates whether the default zone is currently enabled or disabled.
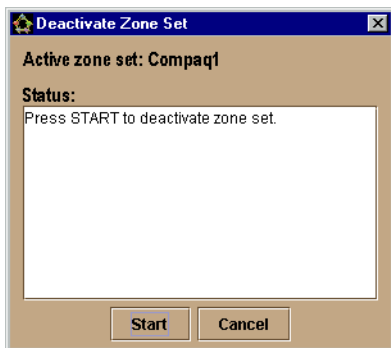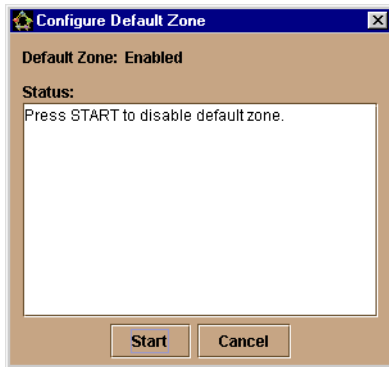
Figure 4–22: Configure Default Zone Dialog Box

2. To enable or disable the default zone, click Start. Messages appear in the Status area indicating the progress of the command. Buttons on the dialog box disable until the process is complete.

   When the process finishes, the Start button changes to a Close button.

3. Click Close to close the dialog box.

## Zoning Tasks Reference Chart

Table 4–2 provides a summary of tasks that you can perform using the Zoning options and a quick reference on how to use these options.

Configuring New Zoning for a Fabric provides detailed steps on how to establish new zones and zone sets in a fabric.

Other Zoning Tasks provides detailed instructions on performing other zoning tasks such as copying, deleting, and modifying zones and zone sets; deactivating and activating zone sets; finding zones and WWNs; and enabling and disabling the default zone.

**Table 4–2:  Zoning Task Reference Chart**

| Task | Dialog Box Names | Displaying Dialog Boxes | Using the Dialog Boxes | Page Reference |
|------|------------------|-------------------------|------------------------|----------------|
| Display zone sets. | Zone Sets | From the Configure menu, choose Zone Sets. | Expand and collapse a list of zones in a zone set by clicking the magnifying glass icon by zone set.\n\nExpand and collapse a list of zone members by clicking the magnifying glass icon by a zone name.\n\nSelect Action menu options to perform additional zoning tasks. | Zone Sets on page 4-6. |
| Create zones. | New Zone | From the Configure menu, choose Zone Sets.\n\nFrom the Zone Set dialog box's Configure menu, choose New.\n\nFrom the New Zone Set dialog box's Actions menu, choose New Zone. | Enter a zone name, then add members by selecting port numbers or WWNs.\n\nClick Add to add them to the Members In Zone area. | Task 1: Create Zones on page 4-11. |
| Create zone sets. | New Zone Set | From the Configure menu, choose Zone Sets.\n\nFrom the Zone Sets dialog box's Actions menu, choose New. | Enter a zone set name, then select zones from the Zone Library area.\n\nClick Add to add them to the zones in the Zones in Set area. | Task 2: Create Zone Sets on page 4-16. |
| Modify zones. | Modify Zone | Select a zone in the Zone Library section of Modify Zone Set dialog box.\n\nFrom the Actions menu, choose Modify Zone. | Select port numbers and WWNs in the Modify Zone dialog box.\n\nClick Add to add them to the Members in zone area.\n\nYou cannot edit the text in the Zone Name box. | Modify Zones on page 4-22. |

**Table 4–2: Zoning Task Reference Chart  (Continued)**

| Task | Dialog Box Names | Displaying Dialog Boxes | Using the Dialog Boxes | Page Reference |
|---|---|---|---|---|
| Delete zones. | Modify Zone Set or New Zone Set | Select a zone in the Zone Library area of the Modify Zone Set dialog box.<br><br>From the Actions menu, choose Delete Zone. | Select a zone in the Zone Library section.<br><br>From the Actions menu, choose Delete Zone. | Delete Zones on page 4-22. |
| Copy zones. | Copy Zone | From the Configure menu, choose Zone Sets.<br><br>Select a zone set in the Zone Library section of the Zone Set dialog box.<br><br>From the Actions menu, choose Modify.<br><br>Select a zone from the Zone Library section of the Modify Zone Set dialog box.<br><br>From the Actions menu, choose Copy Zone. | Enter a zone name in the Copy to box. | Copy Zones on page 4-21. |
| Modify zone sets. | Modify Zone Set | From the Configure menu, choose Zone Sets.<br><br>Select a zone set in the Zone Sets dialog box.<br><br>From the Actions menu, choose Modify. | To add or remove zones, select the zone name and click Add or Remove.<br><br>You cannot edit the text in box the Zone Set Name. | Modify Zone Sets on page 4-25. |
| Delete zone sets. | Zone Sets | From the Configure menu choose Zone Sets.<br><br>Select a zone set in the Zone Sets dialog box.<br><br>From the Actions menu, choose Delete. | Select a zone set in the Zone Set Library area.<br><br>From the Actions menu, choose Delete. | Delete Zone Sets on page 4-25. |

**Table 4–2: Zoning Task Reference Chart (Continued)**

| Task | Dialog Box Names | Displaying Dialog Boxes | Using the Dialog Boxes | Page Reference |
|---|---|---|---|---|
| Copy zone sets. | Copy Zone Set | From the Configure menu, choose Zone Sets.<br><br>Select a zone set in the Zone Sets dialog box.<br><br>From the Actions menu, choose Copy. | Select a zone set from the Zone Library section.<br><br>From the Actions menu, choose Copy. | Copy Zone Sets on page 4-24. |
| Find which zone sets contain a specific zone.<br><br>The zone can be removed from one or all configured zone sets. | Find Zone | From the Configure menu, choose Zone Sets.<br><br>Select a zone in the Zone Set Library of the Zone Sets dialog box.<br><br>From the Actions menu, choose Find Zone. | The Find Zone dialog box lists zone sets that the zone belongs to.<br><br>Click Remove to remove the selected zone or remove the zone from all zone sets. | Find Zones on page 4-27. |
| Find which zones contain members with a specific WWN or nickname. | Find WWN/ Nickname | From the Configure menu, choose Zone Sets.<br><br>Select a WWN or nickname in the Zone Sets dialog box.<br><br>From the Actions menu, choose Find WWN/Nickname. | The Find WWN/Nickname dialog box lists zones of which the specified WWN or nickname is a member.<br><br>Select a zone, then click Remove to remove the WWN or nickname from the selected zone or all zones. | Find WWNs and Nicknames on page 4-28. |
| Replace WWN or nickname. | Replace WWN/ Nickname | From the Actions menu, choose Zone Sets.<br><br>Select a WWN or nickname in the Zone Sets dialog box.<br><br>From the Actions menu, choose Replace WWN/Nickname. | Type new WWN or nickname in the dialog box.<br><br>Click OK. | Replace WWNs and Nicknames on page 4-30. |

**Table 4–2:  Zoning Task Reference Chart  (Continued)**

| Task | Dialog Box Names | Displaying Dialog Boxes | Using the Dialog Boxes | Page Reference |
|---|---|---|---|---|
| Activate zone set. | Zone Set to be activated | From the Configures menu, choose Zone Sets.<br><br>Select a zone set from the Zone Sets dialog box.<br><br>From the Actions menu, choose Activate. | Click Start. Only one zone set can be active at one time.You do not have to deactivate one zone set before activating another. After **any** change to a zone set, you must activate the zone set to apply changes. | Activate Zone Set on page 4-26. |
| Deactivate the current active zone set. | Deactivate Zone Set | From the Configure menu, choose Deactivate Zone Set. | Click Start. | Deactivate Zone Set on page 4-26. |
| Enable or disable the default zone as the active zone for the fabric. | Configure Default Zone | From the Configure menu, choose Default Zone. | Click Start to enable or disable the default zone, depending on the current status. | Enable and Disable Default Zone on page 4-31. |
| Display tree structure of configured zone sets, zones, and members. | Zoning View | From the View menu, choose Zoning. | Refer to Using the Zoning View on page 3-12 for more information. | |

*Chapter* **5**

# SDCM Server Administration

This chapter describes how to:

■ Access remote SDCM servers

■ Manage remote access to the SDCM server

■ Modify SDCM server session parameters

■ Configure SNMP

## Accessing Remote SDCM Servers

To access remote SDCM servers, enter the SDCM server's network address or DNS host name in the SANworks DC Manager Login dialog box. If you are already logged into the SANworks DC Manager and want to access this dialog box, choose Logout from the Logout/Exit menu.
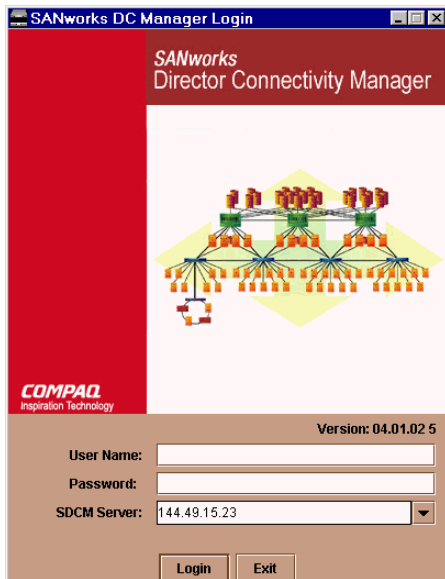
Figure 5–1: SANworks DC Manager Login Screen

1. In the SANworks DC Manager Login screen, enter your user name and password.

    NOTE: If user names have not been established, you can use the default user name (**Administrator**) and password (**password**). The user name and password are case-sensitive. Compaq recommends that you change the default password as soon as possible.

    NOTE: User names and passwords are case sensitive.

2. Delete the existing host name or IP address in the SDCM server box and enter or select a valid SDCM server IP address or host name.

3. Click Login.

If the SANworks DC Manager window displays, you have logged into the server. The server network address you entered will remain in the SDCM server list for future logins. If you fail to connect to the SDCM server, the network address will not remain in the list.

## User Administration

To grant access to the SANworks DC Manager, the administrator can assign user names, passwords, and access rights to users. The administrator can configure up to 16 users in the SANworks DC Manager, but no more than five users (including the local user) can simultaneously access one SDCM server.

## User Rights

Specific levels of access, called "user rights," are assigned to Product Manager users by the SANworks DC Manager's system administrator in the SANworks DC Manager application.

> **NOTE:** Note that the SANworks DC Manager's system administrator only has view rights while actually operating in a specific Product Manager application. Conversely, a Product Manager's product administrator only has view rights while operating in the SANworks DC Manager application.

There are five levels of access or "user rights" that can be assigned to specific users:

■ System Administrator

■ Product Administrator

■ Maintenance

■ Operator

■ View

By default, all users have View rights, which allow for the viewing of configurations but not the changing of configurations. View rights cannot be removed.

The users with System Administrator rights can make all control and configuration changes implemented through the SANworks DC Manager application.

### *User Rights for Specific Functions*

Table 5–1 lists the specific functions available to SANworks DC Manager users that have been assigned rights of Product Administrator, Operator, and/or Maintenance. If a user does not have the right to perform a specific operation, a Not Authorized message displays when the operation is attempted.

**Table 5–1: User Rights for SANworks DC Manager Functions**

| Rights | Product Administrator | Maintenance | Operator |
|---|---|---|---|
| Backup/Restore Configuration | X | X | X |
| Clear Audit Log | X | | |
| Clear Event Log | | X | |
| Clear Hardware Log | X | X | |
| Configure New Product | X | X | X |
| Configure Nicknames | X | X | X |

**Table 5–1: User Rights for SANworks DC Manager Functions (Continued)**

| Rights | Product Administrator | Maintenance | Operator |
|---|---|---|---|
| Configure e-mail Notification | X | | |
| Configure SNMP | X | | |
| Enable Call Home Notification | X | | |
| Export Configuration Report | X | X | X |
| Show Route | X | | |
| View Event Log | | X | |
| View Hardware Log | X | X | |
| View SNMP | X | X | |

### Viewing User Rights

1. From the Configure menu, choose Users.

   The Configure Users dialog box displays (Figure 5–3).

2. Select a user from the User column.

3. Click Rights.

4. The rights currently assigned to that user display in the User Rights dialog box (Figure 5–2).



Figure 5–2: User Rights Dialog Box

5. Click Close to close the User Rights dialog box.

6. Click Close to close the Configure Users dialog box.

### Open the Configure User Dialog Box

1. From the Configure menu, choose *Users*.

The Configure Users dialog box displays (Figure 5–3).

2. Use the appropriate buttons along the bottom of the dialog box to administer users.
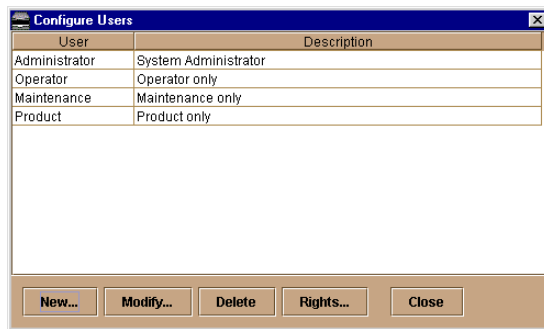


Figure 5–3: Configure Users Dialog Box

### Add New User

Use the New User dialog box (Figure 5–4) to create new users for the SANworks DC Manager. Assign a user name, a password, and certain permissions, or "rights," to each user configured.

1. From the Configure menu, choose Users.

   The Configure Users dialog box displays (Figure 5–3).

2. Click New.

   The New User dialog box displays (Figure 5–4).
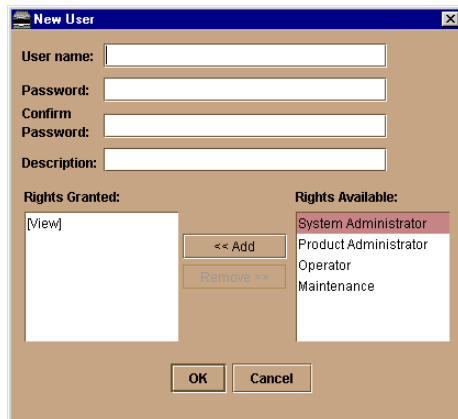


Figure 5–4: New User Dialog Box

3. In the User name box, enter a user name of 16 characters or less.

   **NOTE:** The user name is case-sensitive.

4. In the Password box, enter a password of 16 characters or less for the new user.

   **NOTE:** The password is case-sensitive.

5. In the Confirm Password box, re-enter the password exactly as you entered it in the Password box.

6. (Optional) In the Description field, provide a description of the user (employee number, department, function, etc.).

   Assign rights to the new user using the Add and Remove buttons. Select a right in the Rights Available list and click Add to display the right in the Rights Granted list. For a discussion of user rights, refer to Managing Remote Access to the SDCM Server.

   **NOTE:** By default, view rights are granted to all users.

7. Click OK to activate the administration and close the New User dialog box.

8. Click Close to close the Configure Users dialog box.

## Open the Modify User Dialog Box

1. From the Configure menu, choose Users.

   The Configure Users dialog box displays (Figure 5–3).

2. In the User column, select the user whose parameters are to be changed.

3. Click Modify.

   The Modify User dialog box displays, with the name of the selected user in the User name box.
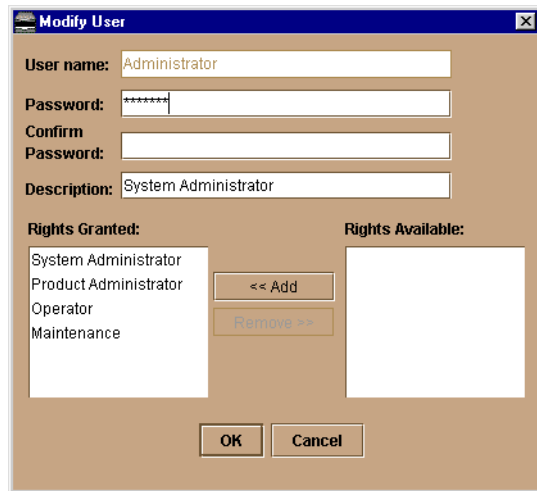
Figure 5–5: Modify User Dialog Box

## Modify User Parameters

The Modify User dialog box (Figure 5–5) is used to change the password, description, and rights for those users already configured in the SANworks DC Manager.

1. In the Password box, delete the current password and enter another password of 16 characters or less.

    **NOTE:** The password is case-sensitive.

2. In the Confirm Password box, re-enter the new password exactly as it was entered in the Password box.

3. (Optional) In the Description box, change the description of the user (such as employee number, department, function) as necessary.

4. Re-assign rights to the user using the Add and Remove buttons to display the right in the Rights Granted list. Refer to User Rights on page 5-3 for definitions of user rights.

    **NOTE:** By default, view rights are granted to all users.

5. Click OK to activate the administration and close the dialog box.

6. Click Close to close the Configure Users dialog box.

### Delete User

Delete users from the system through the Configure Users dialog box (Figure 5–3).

1. From the Configure menu, choose Users.

   The Configure Users dialog box displays (Figure 5–3).

2. In the User column, select the user to be deleted.

3. Click Delete.

   A warning window opens confirming the deletion (Figure 5–6).
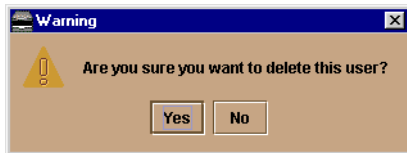


Figure 5–6:  Delete User Warning

4. Click Yes to delete the user from the SANworks DC Manager.

5. Click Close to close the Configure Users dialog box.

## Managing Remote Access to the SDCM Server

Users at the SDCM server can open the SANworks DC Manager and Product Managers loaded on the server itself. Users at remote PC workstations can also access the same SDCM server or other SDCM servers if the workstations meet minimum hardware and software requirements and are running the SANworks DC Manager application. Workstations must also be configured to connect with the SDCM server over a TCP/IP network connection.

The following figure illustrates two remote user workstations connected to the SDCM server through a corporate intranet. Please note that this is an example configuration only.
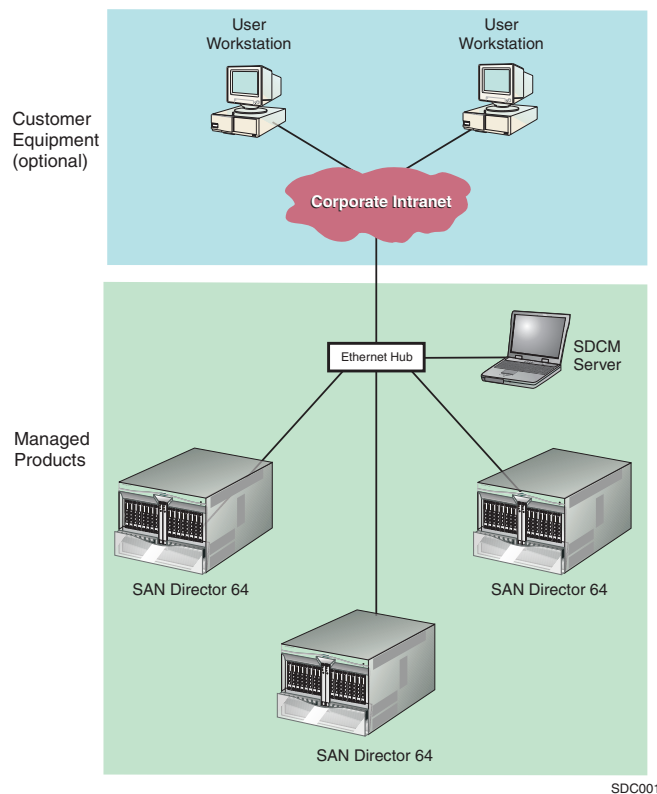
Figure 5–7: Remote Workstation Configuration

Operators at remote workstations can manage and monitor all products controlled by the SDCM server. Each active connection between a remote workstation and an SDCM server and managed products is called a *session*. A maximum of four concurrent remote users (in addition to the local SDCM server user) can log in to the SANworks DC Manager application.

## Requirements for Remote Workstations

The SANworks DC Manager is downloaded and installed to user workstations from the SDCM server. The remote workstations can be Windows 95, Windows 98, Windows 2000, Windows NT, HP-UX, AIX, Linux, or Solaris systems.

For the minimum system requirements for remote workstations, refer to the appendix in this manual for the appropriate operating system:

- Appendix B, Installing Remote Workstations: Windows Systems

- Appendix C, Installing Remote Workstations: Solaris Systems

- Appendix D, Installing Remote Workstations: HP-UX, AIX, and Linux Systems

### Installing Software on Remote Workstations

For procedures to install SDC Management software on remote user workstations and configure the workstations for connection to an SDCM server, refer to the appendix in this manual for the appropriate operating system.

- Appendix B, Installing Remote Workstations: Windows Systems

- Appendix C, Installing Remote Workstations: Solaris Systems

- Appendix D, Installing Remote Workstations: HP-UX, AIX, and Linux Systems
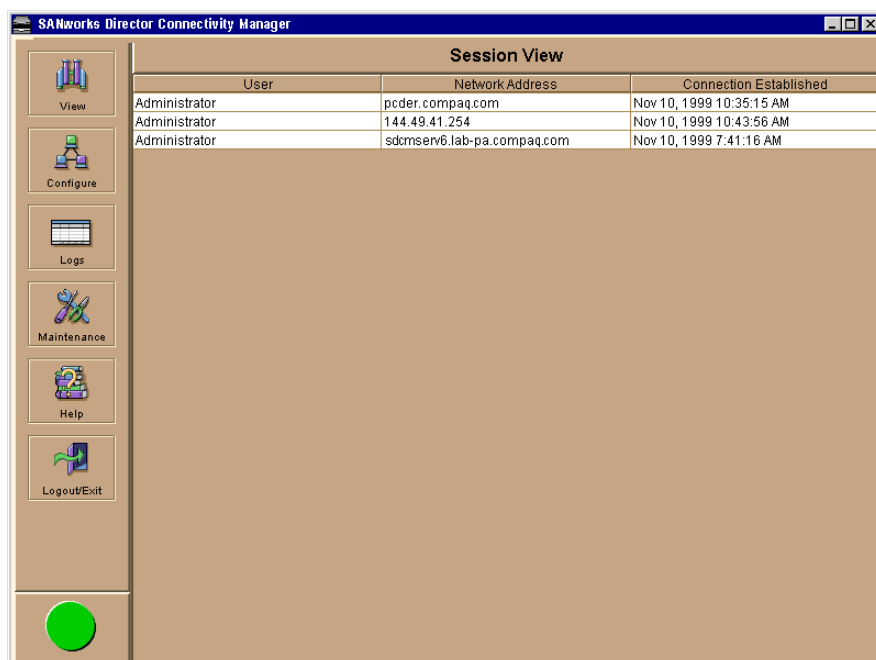
### Displaying Remote Sessions

A maximum of four concurrent remote users (in addition to the local SDCM server user) can log in to the SANworks DC Manager application. Display the current active sessions for the SDCM server that you are logged into via the Session View.

To display the Session View:

From the View menu, choose Session.

The Session View displays (Figure 5–8).



Figure 5–8:  Session View

The Session View displays active session information in this format:

■ **User**

The name of the current user (in Figure 5–8, Administrator) in the User column.

■ **Network Address**

The network address of the current user appears in the Network Address column.

■ **Connection Established**

The date and time that the session was established display in the Connection Established column.

## Modifying SDCM Server Session Parameters

Allow access to the SDCM server from all workstations or only from specific remote workstations through the Session Options dialog box.

1. From the Configure menu, choose Session Options.

The Session Options dialog box (Figure 5–9) displays.
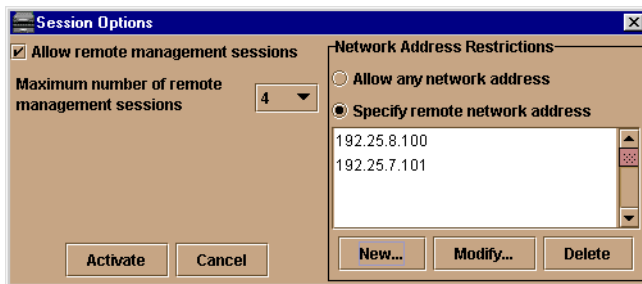


Figure 5–9:  Session Options Dialog Box

2. Click the Allow Remote Management Sessions check box (a check mark appears) to allow remote access from remote workstations. If you do not select this option, remote access is blocked even if you provide access information in other parts of this dialog box. Use this check box as a method to prohibit remote access while saving the current access administration in this dialog box.

> **NOTE:** If this option is not selected, existing sessions will not terminate, but future sessions will be prohibited.

3. Select the number of remote management sessions to be allowed from the Maximum Number Of Remote Management Sessions list.

4. If you do not want to restrict access to the SANworks DC Manager, click Allow Any Network Address and skip to step 5. If you want to restrict access to a new address, continue to step a.

   a.  Click Specify Remote Network Address.

   b.  Click New.

      The New Network Address dialog box displays.

   c.  Enter the IP address of the remote workstation to be authorized in the Network Address box.

   d.  Click OK.

      The New Network Address dialog box closes.

   e.  Click Activate on the Session Options dialog box.

5. If you want to modify the access currently granted to a remote workstation:

   a.  Click Specify Remote Network Address.

      The IP addresses display in the Network Address Restrictions area.

   b.  Select the address to be changed.

    c. Click Modify.

       The Modify Network Address dialog box displays.

    d. Edit the IP address of the remote workstation to be authorized.

    e. Click OK.

       The Modify Network Address dialog box closes.

    f. Click Activate on the Session Options dialog box.

6. If you want to delete an existing address:

    a. Click Specify Remote Network Address.

       The IP addresses display in the Network Address Restrictions area.

    b. Select the address to be deleted.

    c. Click Delete.

    d. Click Yes in the Warning dialog box.

    e. Click Activate to save the required changes.

## Configuring SNMP

The SDCM Server software contains a simple network management protocol (SNMP) agent component. The SDCM SNMP agent instruments the objects defined in the Fibre Channel Management (FCMGMT) Management Information Base (MIB) Version 2.2 and a small number of objects defined in MIB II. Through instrumentation of these MIB objects, the agent acts as a translator of information stored on the SDCM Server and attached directors into a form usable by SNMP management stations such as HP OpenView. Refer to the *StorageWorks by Compaq SAN Director SNMP Guide* (AA-RQ7BA-TE).

Use these steps to configure the simple network management protocol (SNMP) agent that runs on the SDCM server and implements the Fibre Alliance Management Information Base (MIB).

You can configure network addresses and community names for up to 12 SNMP trap recipients, which receive messages through SNMP for specific events that occur on the SDCM server.

When configuring SNMP, you can configure just the community names of valid SNMP management stations. In this case, you do not need to fill in the Trap Recipient column or the UDP Port Number column.

To configure and enable SNMP traps, use the following steps:

1. From the Configure menu, choose SNMP.

   The Configure SNMP dialog box displays (Figure 5–10).
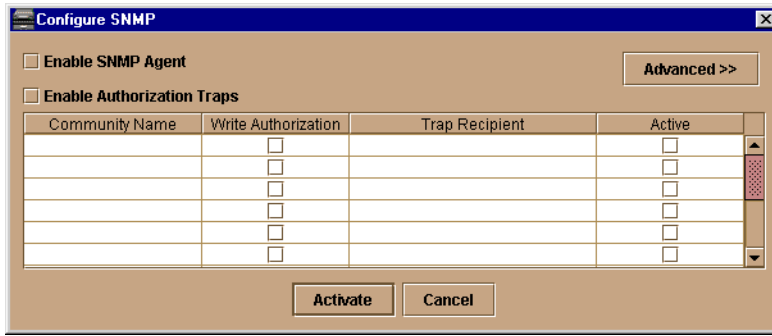


Figure 5–10:  Configure SNMP Dialog Box

2. Click in the Community Name column and enter the SNMP community name for a trap recipient. This name defines the community name that SNMP managers use for reading variables from or writing variables to the SDCM server. This name must be 64 characters or less.

   **NOTE:** To modify existing fields in this dialog box, click in the field and enter your changes.

3. Click the Write Authorization check box to grant or deny the configured SNMP management station write authorization. When this option is selected, an administrator at an SNMP management station has write permissions for writable MIB objects on the SDCM server.

4. Click in the Trap Recipient column and enter the IP address or DNS host name for a trap recipient (SNMP management station). This must be 64 characters or less.

5. To override the default User Datagram Protocol (UDP) port number for a trap recipient with any legal, decimal UDP number, click Advanced.

   The dialog box expands to show the UDP Port Number column (Figure 5–11).
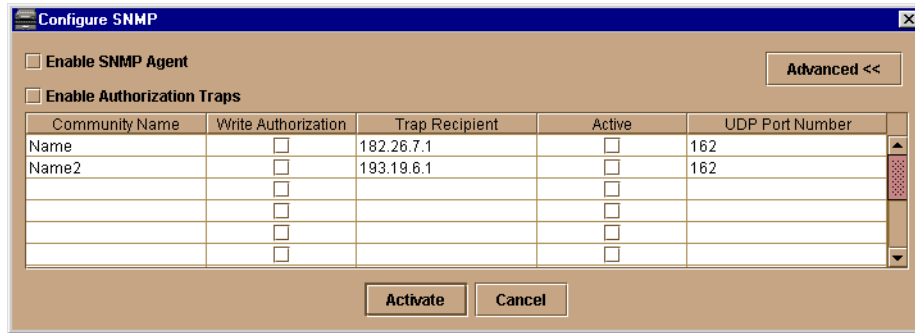
Figure 5–11:  Configure SNMP Dialog Box - Advanced

6.  Enter the new UDP port number in the UDP Port Number column.

7.  To enable or disable the SNMP agent to capture events, select the Enable SNMP Agent check box.

8.  To enable or disable authorization traps to be sent when unauthorized management stations try to access SNMP information through the SDCM server, select the Enable Authorization Traps check box.

9.  Click Activate to accept and activate the data.

*Chapter* **6**

# SANworks DC Manager
# Administration

This chapter describes how to administer products through the SANworks DC Manager including:

■ Managing products

■ Configuring call-home, e-mail and Ethernet event notification

Be sure to back up configurations each time you make changes through dialog boxes and menu options in the SANworks DC Manager. Use the procedure in Backing Up and Restoring Data.

## Managing Products

Information entered into dialog boxes during product administration provides the SDCM server with information to communicate with the Fibre Channel connectivity products over the LAN.

### Add a Product

To identify a product to the SANworks DC Manager and add its icon to the Product View, use the following steps:

1. Open the New Product dialog box using one of the following methods:

   ❑ Right click in a blank area of the Product View and choose New.

   ❑ From the Configure menu, choose New product.

The New Product dialog box displays. Figure 6–1 is an example for the StorageWorks SAN Director 64.
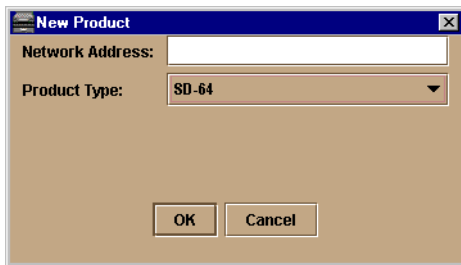


Figure 6–1: New Product Dialog Box

2. Enter a valid IP address or domain name server (DNS) host name in the Network Address box. A valid IP address is in the form nnn.nnn.nnn.nnn, where nnn is a decimal in the range 0-255.

3. Select the product type from the Product Type list.

4. Click OK.

A new icon for the product displays in the Product View.

### Modify a Product

To modify existing product properties, use the following steps:

1. In the Product View, right click a product icon for which you want to change administration and choose Modify.

The Modify Network Address dialog box displays (Figure 6–2). This dialog box contains the network address of the product.
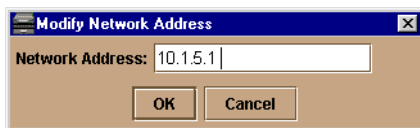


Figure 6–2: Modify Network Address Dialog Box

2. Change the address in the Network Address box.

3. Click OK.

### Delete a Product

⚠️ **CAUTION:** Deleting a product from the *Product View* removes all information about the product from the system. This includes configuration information, event logs, diagnostic information, and any other data maintained by the corresponding Product Manager.

To delete a product from the Product View, use the following steps:

1. Right click a product icon in the Product View and choose Delete.

   A warning dialog box displays asking if you want to remove the item from the system.

2. Click Yes on the Warning dialog box.

   The product icon is deleted from the Product View.

### Determine Product Status

You can determine a product's operating status by the alert symbol that displays behind the product's icon. These symbols are the same as those that appear in the alert panel, and are defined Using the Alert Panel. If no alert symbol displays behind the icon, the product is not managed by the SDCM server.

### Display Product Properties

You can display product properties through the Product View. To display information about a managed product:

1. Right click a product icon in the Product View and choose Properties.

   The Properties dialog box displays. Figure 6–3 is an example for the StorageWorks SAN Director 64.
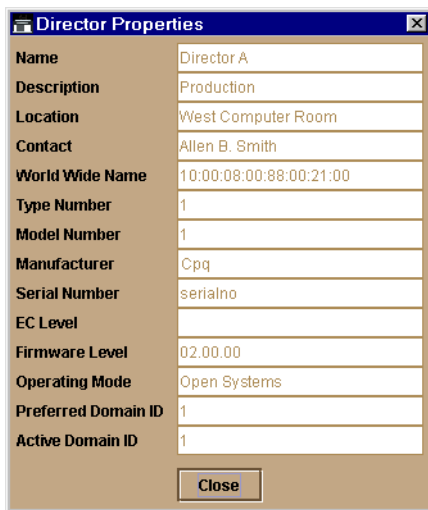
Figure 6–3: Product Properties Dialog Box

The Properties dialog box displays information about a product managed by the SANworks DC Manager. For example, for a director, the following information displays:

■ Name of the product as configured through the Product Manager.

■ Location of the product as configured through the Product Manager.

■ Contact person for the product as configured through the Product Manager.

■ Description of the product as configured through the Product Manager.

■ Product type, for example "SD-64," as configured through the SANworks DC Manager's *New Product* dialog box.

■ Network address as configured through the SANworks DC Manager's New Product dialog box.

■ Current product operational status:

❏ **Operational**

  Product is fully operational.

❏ **Degraded**

  Product needs attention. Typically, this appears when a redundant FRU fails, but the product is still performing as designed.

❏ **Failed**

  Product needs immediate attention.

❏ **Unknown**

The SANworks DC Manager cannot determine product status because of a network communication failure between the product and the SDCM server, or because the managed product is not responding.

## Configure Notification

### Configure Call-Home Event Notification

The SDCM server call-home feature provides automatic event notification to a support center for reporting Director problems. In order to report events, this feature requires the SDCM server to have a valid LAN connection to a SANworks Management Appliance or other server running the Compaq Proactive Service Software.

> **NOTE:** Compaq Proactive Service software is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register/order Proactive Services software contact your Compaq customer service representative.

To configure the call-home feature on the SDCM server:

1. Ensure that the server is connected to a LAN with internet access.

2. Locate the rns.properties file in the following location on the SDCM server:

   c:\Program Files\Compaq\SDCM

   Following is an example of file contents:

   RnsDataDir=c:\SdcmData\RnsData
   RnsEventDir=c:\SdcmData\RnsData
   RnsLogDir=c:\SdcmData\RnsData

   CSGIpAddress=
   CSGPort=2069
   CSGExePath=/ms/eventAsync

3. Using any ASCII text editor, such as Microsoft Notepad or Wordpad, make the following changes:

   a. CSGIpAddress — Enter an IP address of the Compaq Services Gateway in appropriate format (xxx.xxx.xxx).

   b. CSGPort — This is the port that data is sent to on the Compaq Services Gateway. By default, the value is set at 2069.

   c. CSGExePath — This is the executable path that is configured in conjunction with CSGIpAddress and CSGPort. By default, the path is set to /ms/eventAsync.

You should only need to enter an IP address for CSGIpAddress, unless default values were changed on the Compaq Services Gateway.

## Enable Call-Home Event Notification

The call-home feature, which you configure for each product through the Product Manager, enables the SDCM server to automatically contact a support center to report system problems. The support center server accepts calls from the SDCM server, logs reported events, and can notify one or more support center representatives.

To enable and disable call-home notification for system problems, use the following procedure:

1. Place the pointer over the Maintenance icon.

2. To enable or disable call-home notification, select the Enable Call Home Event Notification check box.

    A check mark appears to indicate that call-home notification is enabled.

    **NOTE:** Call home notification requires the installation of Compaq Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register/order Proactive Services software contact your Compaq customer service representative.

## Configure E-mail Notification for Events

Configure up to five e-mail addresses for administrators or others who should be notified of significant product events. The events that initiate e-mail notification are specific to each managed product. Some examples of events that initiate e-mail notification are:

■ Change in system operational status.

■ Problem detection, such as a failed field-replaceable unit (FRU).

■ State change that requires user attention or a report to product administrator or service representative.

To display and modify e-mail notification:

1. From the Maintenance menu, choose Configure E-Mail.

    The Configure E-Mail dialog box displays.
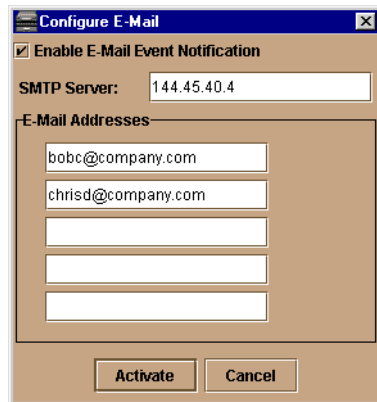
Figure 6–4:  Configure E-Mail Dialog Box

2.  Enter an IP address or DNS host name for your SMTP server.

3.  Enter up to five e-mail addresses for personnel who should be notified automatically of system events.

4.  To enable or disable e-mail notification, select the Enable E-Mail Event Notification check box.

5.  This will enable e-mail notification for all Product Managers if e-mail notification is enabled through each Product Manager's Enable E-Mail Notification option. If the Enable E-Mail Event Notification check box is not selected, e-mail notification is disabled for all Product Managers.

6.  Click Activate to confirm the information that you have entered.

> **NOTE:** The SMTP server address and e-mail addresses can be up to 64 characters.

## Test Remote Notification

Use the test remote notification feature to test the call-home feature and the current configuration parameters for the e-mail notification feature.

> **NOTE:** Call home notification requires the installation of Compaq Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or on-site storage hardware support contract. To register/order Proactive Services software contact your Compaq customer service representative.

> **NOTE:** To use this feature, you must configure and enable the call-home feature through the appropriate Product Manager and configure the e-mail notification feature (Refer to Configure E-mail Notification for Events).

Once you have run the test, you should contact the call-home recipient or the e-mail recipient to confirm that a message was received.

1. From the Maintenance menu, choose Test Remote Notification.

   The Test Remote Notification dialog box displays (Figure 6–5).
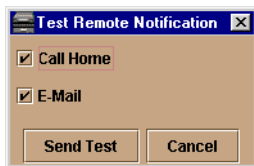


Figure 6–5:  Test Remote Notification Dialog Box

   You can check remote notification for one or both remote communication methods.

2. To test the call-home feature, click the Call Home check box.

3. To test the e-mail notification feature, click the E-Mail check box.

4. Click Send Test.

   A message box displays indicating that the test was initiated (Figure 6–6).
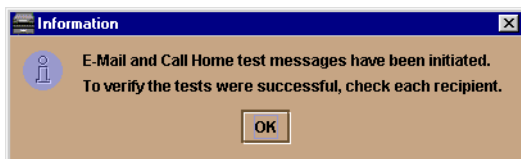


Figure 6–6:  Results of Remote Notification Test

5. Click OK to close the message box.

## Configure Ethernet Events

To configure Ethernet events for all managed products, you can enable notification and configure the Ethernet event timeout period through the SANworks DC Manager. An Ethernet event occurs when the Ethernet link between the SDCM server and the managed product is dropped. You can set a specific time interval for an event to be generated after the communication drops.

1. From the Maintenance menu, choose Configure Ethernet Events.

   The Configure Ethernet Events dialog box displays (Figure 6–7).
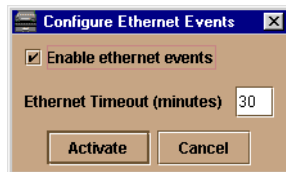
Figure 6–7: Configure Ethernet Events Dialog Box

2. To enable Ethernet events, click the Enable ethernet events check box.

3. To change the default timeout of 30 minutes, enter a new value in the Ethernet Timeout box. The value must be between 10 and 120.

4. Click Activate to accept and activate the data.

If e-mail notification is also enabled, an e-mail will be sent if the SANworks DC Manager cannot communicate with a product.

If call-home notification is also enabled, a call home will be generated if the SANworks DC Manager cannot communicate with a product.

## Configure Nicknames

Nicknames replace the standard 8-byte world-wide names of switches and directors. By setting a nickname, you can assign a more meaningful name for a product. When you assign a nickname to a product, the nickname replaces the world-wide name in the SANworks DC Manager views.

> **NOTE:** Nicknames may have a maximum of 32 characters.

When you add a nickname, you will be asked to specify whether the nickname is for a detached node or an attached node. An attached node is a device that is connected to a port on any of the managed products, while a detached node is not currently connected to a port.

1. From the Configure menu, choose Nicknames.

   The Configure Nicknames dialog box displays with existing nicknames that have already been configured (Figure 6–8).
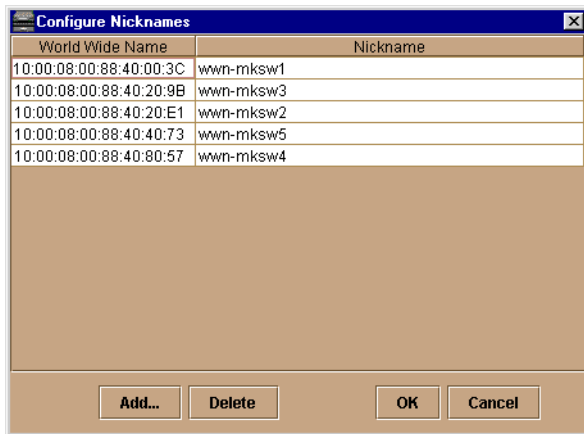
Figure 6–8:  Configure Nicknames Dialog Box

The left column in the dialog box shows the world-wide name, while the right column shows the assigned nickname.

2. Click Add to add a new nickname.

   The Add Nickname dialog box displays (Figure 6–9).
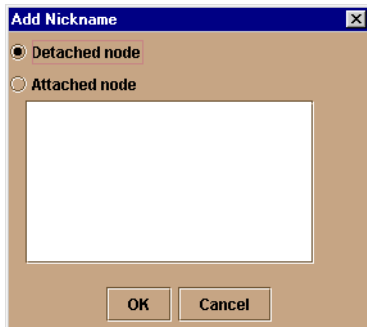


Figure 6–9:  Add Nickname Dialog Box (Detached Node)

3. To add a detached node:

   a. Click Detached node.

   b. Click OK.

      A blank row is added to the list in the Configure Nicknames dialog box.

   c. In the World Wide Name column, enter the 8-byte world-wide name, in the standard format. For example, 10:00:08:00:88:40:20:B1.

    d.  In the right column, enter the nickname you want to assign.

    e.  Click OK.

4.  To add an attached node:

    a.  Click Attached node.

    A list of products or nodes is displayed, as shown in Figure 6–10.
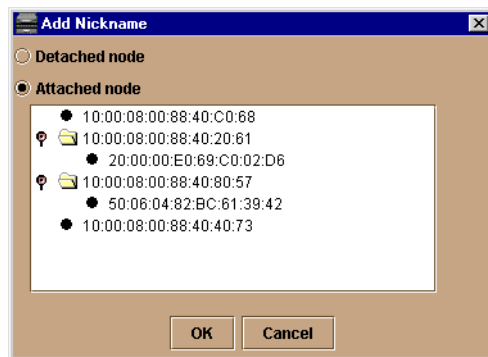


Figure 6–10:  Add Nickname Dialog Box (Attached Node)

    b.  Select a node or managed product from the list.

    If needed, expand a managed product by clicking on its symbol. Then select a node from the managed product list.

    c.  Click OK.

    d.  The world-wide name now appears in the World Wide Name column of the Configure Nicknames dialog box.

    **NOTE:** You cannot assign more than one nickname to the same world-wide name.

    e.  In the Nickname column, enter the nickname that you want to assign.

5.  Click OK to close the Configure Nicknames dialog box.

To delete a nickname:

1.  In the Configure Nicknames dialog box, select the nickname that you want to delete (Figure 6–8).

2.  Click Delete.

3.  Click Yes to confirm that you want to delete the nickname.

4.  Click OK to close the Configure Nicknames dialog box.

## Show Routes

The *Show Routes* option allows you to view the path that Fibre Channel frames will take between two end devices in a multiswitch fabric.

In order to view the route between two devices, the following must be true:

■ All directors in the route must be managed by SDC Manager and attached to the same SDCM Server.

■ All directors in the route must be SD-64 models and be running firmware version 1.3 or higher.

■ All switches or directors in the route must be in the same zone.

To view the route between two end devices, use the following procedure:

1. Open the *Fabric View* by selecting *Fabric View* from the SDC Manager *View* menu.

2. Open the Fabric Manager by clicking the pentagonal icon for the appropriate fabric.

3. Choose *Show Route* from the Fabric Manager *Configure* menu. The *Show Route* dialog box displays.

Switches and directors that support route reporting and that are managed by this SDCM Server display in the left column of the dialog box.
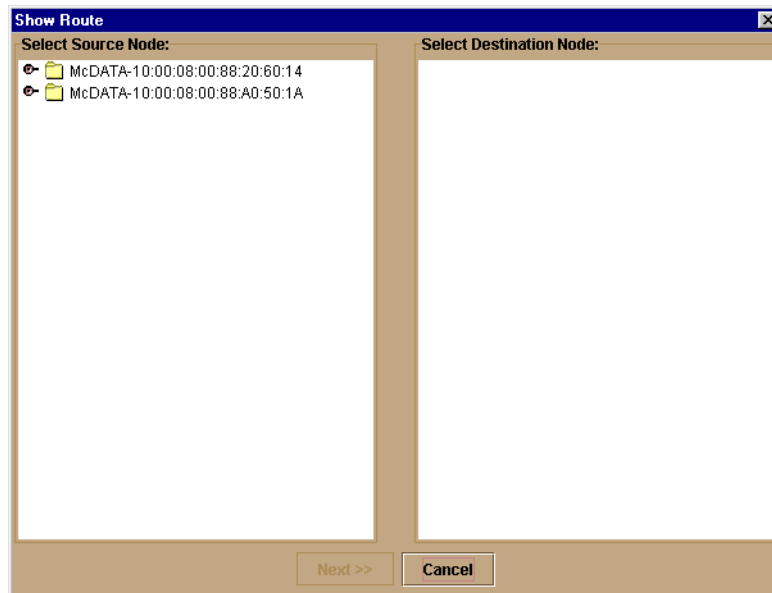


Figure 6–11:  Show Route Dialog Box

4.  In the *Select Source Node* field, expand the list of attached nodes by clicking on the magnifying glass next to the appropriate director or switch.

    A list of directors with attached destination nodes for the source node displays in the right column.

5.  Select the appropriate source node.

    This will cause a list of directors and switches to display in the *Select Destination Node* field.

6.  In the *Select Destination Node* field, expand the list of nodes by clicking the magnifying glass next to the appropriate director or switch.

7.  Select the appropriate destination node.

8. Click *Next.* If all the switches and directors in the path are managed by the same SDCM Server, a dialog box will display showing the routes between the two devices.
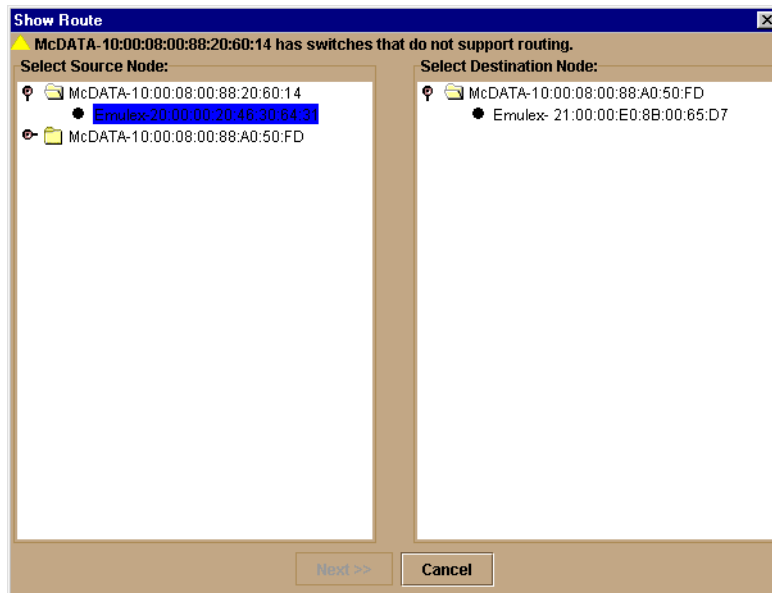


Figure 6–12:  Show Route Dialog Box (Panel 2)

A new *Show Route* panel displays with the source and destination nodes you selected listed at the top. Tables show the route going from the source node to the destination node and the route going from the destination node to the source node.

**Show Route**

**Source:** Emulex-**20:00:00:20:46:30:64:31**

**Destination:** Emulex-**21:00:00:E0:8B:00:65:D7**

**Route Source To Destination**

|  | In Port # | Out Port # |
|---|---|---|
| Emulex- 20:00:00:20:46:30:64:31 |  |  |
| McDATA-10:00:08:00:88:20:60:14 | 34 | 7 |
| McDATA-10:00:08:00:88:A0:50:FD | 14 | 12 |
| McDATA-10:00:08:00:88:A0:50:1A | 12 | 9 |
| Emulex- 21:00:00:E0:8B:00:65:D7 |  |  |

**Route Destination To Source**

|  | In Port # | Out Port # |
|---|---|---|
| Emulex- 21:00:00:E0:8B:00:65:D7 |  |  |
| McDATA-10:00:08:00:88:A0:50:1A | 9 | 12 |
| McDATA-10:00:08:00:88:A0:50:FD | 12 | 14 |
| McDATA-10:00:08:00:88:20:60:14 | 7 | 34 |
| Emulex- 20:00:00:20:46:30:64:31 |  |  |

[ << Previous ]  [ Close ]

Figure 6–13:  Show Route Dialog Box (Panel 3)

The incoming and outgoing ports on each director or switch in the route between the two nodes also display. The directors or switches are listed by their WWN or nickname (if configured), depending on display options set through the Fabric Manager. Error messages may display when the *Next* button is pressed to access this panel if all switches and directors in the route are not managed by SDCM.

# Chapter *7*

# SANworks DC Manager Logs

This chapter contains information on the SANworks DC Manager logs.

## Using Logs

The Audit, Event, Hardware, and Link Incident Logs store up to 1000 entries each. The most recent entry displays at the top of the log. After 1000 entries are stored, new entries overwrite the oldest entries.

### Button Function

Button function is the same for all logs:

■ **Clear**

Click Clear to clear all entries for all users. A Warning dialog box displays requesting confirmation that you want to clear all entries in the log.

■ **Refresh**

Click Refresh to update the display.

■ **Close**

Click Close to close the log and display the Product Manager window.

■ **Export**

Click Export to display the Save dialog box shown in Figure 7–5 on page 7-7. Click Home to display the folders that are stored in your home directory. If you choose, you may create a folder for your home directory and save the file there.

### Expanding Columns

Expand columns in logs by placing the pointer over the line separating column headings until a double arrow appears, then drag the line to widen the column as necessary.

## The SANworks DC Manager Audit Log

The SANworks DC Manager Audit Log displays a history of user actions performed through the SANworks DC Manager. The log stores up to 1000 entries, the most recent displaying at the top of the log. After 1000 entries have been stored, new entries take the place of the log's oldest entries.

To display the Audit Log, choose Audit Log from the Logs menu. The Audit Log displays (Figure 7–1).

| Date/Time | Event | Parameter | Source |
|---|---|---|---|
| 11/22/99 1:42 PM | Zone Set activated | Compaq-10:00:08:00:88:40:00:32:Kevins_fix | Administrator@144.49.12.74 |
| 11/22/99 1:42 PM | Zone Set activated | Compaq-10:00:08:00:88:40:00:32:A | Administrator@144.49.12.74 |
| 11/22/99 1:42 PM | Zone Set modified | A | Administrator@144.49.12.74 |
| 11/22/99 1:36 PM | Zone created | 21 | Administrator@144.49.12.31 |
| 11/22/99 1:36 PM | Zone deleted | e | Administrator@144.49.12.31 |
| 11/22/99 1:36 PM | Zone deleted | d | Administrator@144.49.12.31 |
| 11/22/99 1:35 PM | Zone deleted | 0 | Administrator@144.49.12.31 |
| 11/22/99 1:33 PM | Zone Set activated | Compaq-10:00:08:00:88:40:00:32:A | Administrator@144.49.12.31 |
| 11/22/99 1:33 PM | Zone Set modified | A | Administrator@144.49.12.31 |
| 11/22/99 1:32 PM | Zone Set activated | Compaq-10:00:08:00:88:40:00:32:A | Administrator@144.49.12.31 |
| 11/22/99 1:32 PM | Zone Set modified | A | Administrator@144.49.12.31 |
| 11/22/99 12:54 PM | Zone Set created | test | Administrator@144.49.12.31 |
| 11/22/99 12:53 PM | Zone created | testing2 | Administrator@144.49.12.31 |
| 11/22/99 12:53 PM | Zone created | testing | Administrator@144.49.12.31 |
| 11/22/99 12:52 PM | Zone modified | Kevin | Administrator@144.49.12.31 |
| 11/22/99 12:52 PM | Zone modified | 1 | Administrator@144.49.12.31 |
| 11/22/99 12:50 PM | Zone modified | Kevin | Administrator@144.49.12.31 |
| 11/22/99 12:50 PM | Zone modified | 1 | Administrator@144.49.12.31 |
| 11/22/99 12:31 PM | Product deleted | 144.49.12.223 | Administrator@144.49.12.31 |
| 11/22/99 11:40 AM | Zone Set deleted | a | Administrator@144.49.12.31 |

Export...  Clear  Refresh  Close

Figure 7–1: SANworks DC Manager Audit Log

- The Date/Time column logs the date and time that the logged event took place.
- The Event column describes the action that took place. Logged actions could include:
  - ❏ Defining a new product.
  - ❏ Modifying product attributes.
  - ❏ Deleting product definitions.
  - ❏ Defining a new user.

❏ Modifying user administration.

❏ Deleting user administration.

❏ Creating a zone set.

❏ Modifying a zone set.

❏ Modifying SNMP options.

■ The Parameter column describes the parameter affected by the event. For example, if a product is added or deleted, the product's network address displays as shown in Figure 7–1.

Note that the type of network address that displays—such as network IP address or host name—is determined on a product-by-product basis according to how the product is identified in the New Product dialog box.

■ The Source column identifies the workstation from which the user performed the logged action. If the change was made locally from the SDCM server, the SDCM server address displays.

## The SANworks DC Manager Event Log

The SANworks DC Manager Event Log displays events or error conditions recorded by the SDCM Services application. Entries reflect the status of the application and managed switches or directors.

Information associated with a call-home failure is intended for use by maintenance personnel to fault isolate the problem (modem failure, no dial tone, etc.), while information provided in all other entries is generally intended for use by third-level support personnel to fault isolate more significant problems.

The log stores up to 1000 entries, the most recent displaying at the top of the log. After 1000 entries are stored, new entries take the place of the oldest entries.

To display the Event Log, choose Event Log from the Logs menu. The Event Log displays (Figure 7–2).
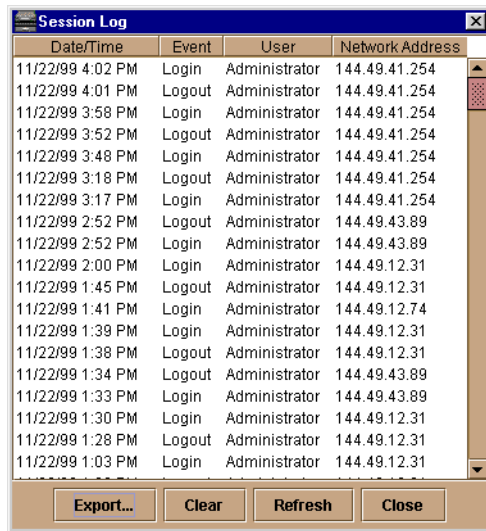
Figure 7–2: SANworks DC Manager Event Log

■ The Date/Time column logs the date and time the event was reported to the SDCM server.

■ The Event column lists an event number and brief description of the event. It includes both the event number and description when reporting an event to third-level customer support.

■ The Product column lists the product associated with the event. Some events are associated with the SDCM Services application, while others are associated with a specific instance of the Product Manager application. In the latter case, the product (StorageWorks SAN Director 64) and configured name (or IP address) associated with the instance are displayed.

■ The Qualifier column provides an event qualifier for use by engineering personnel. Include this number when reporting an event to third-level customer support.

■ The Data column includes additional event data for use in fault isolating a problem. Use the information when fault isolating a call-home problem, or include the information when reporting an event to third-level customer support.

## The SANworks DC Manager Session Log

The SANworks DC Manager Session Log provides the date/time, user name, and network address of each login and logout on the SDCM server.

To display the Session Log, choose Session Log from the Logs menu. The Session Log displays (Figure 7–3).



Figure 7–3:  Session Log

- The Date/Time column displays the date and time of the event.

- The Event column displays either login or logout.

- The User column displays the user name.

- The Network Address column displays the IP address of the remote workstation or SDCM server where the user logged in.

## The SANworks DC Manager Product Status Log

The SANworks DC Manager Product Status Log reflects the time and nature of significant events on all managed products, and indicates which specific Product Manager applications should be opened to further investigate product status changes.

To display the Product Status Log, choose Product Status Log from the Logs menu. The Product Status Log displays (Figure 7–4).

Figure 7–4: Product Status Log

■ The Date/Time column displays the date and time of the change in the product's operational status.

■ The Network Address column displays the IP address or host name of the product.

■ The Previous Status column displays the product's old or previous operational status (Unknown, Operational, Degraded, or Failed). The Unknown status indicates that the SANworks DC Manager has lost contact with the product and has initiated a call-home and/or e-mail (if configured).

■ The New Status column displays the product's current operational status.

## Export Log Files

To save a log file in American Standard Code for Information Exchange (ASCII) format to a location on your system's hard drive or to a diskette, use the following steps. You can open this file in any desktop publisher for viewing or printing.
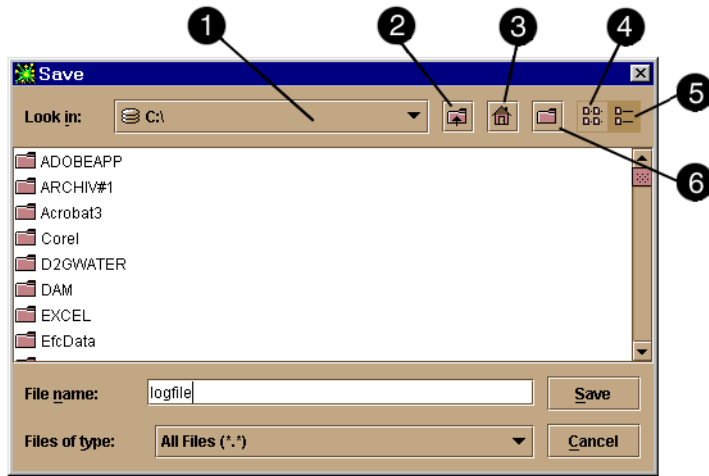
Figure 7–5: Save Dialog Box

❶    Drive List

❷    Go Up One Level

❸    Home

❹    List

❺    Details

❻    Create New Folder

Click the Export button on a log window to display a dialog box similar to that shown in Figure 7–4. The folders listed in this dialog box are those that are stored in your home directory.

1.  Click Export on the log window.

2.  In the Save dialog box, browse to the folder where you want to save the file.

3.  Type in a file name and extension in the File Name box.

4.  Click Save.

The file saves to the specified folder as an ASCII text file.

# Appendix *A*

# Information and Error Messages

This appendix lists information and error messages in alphabetical order that appear in pop-up message boxes at the SANworks Director Connectivity Manager (SDCM), Fabric Manager, and SANworks SAN Director 64 Product Manager applications.

The first section of the appendix lists SDCM and Fabric Manager messages. The second section lists Product Manager messages. The text of each message is followed by a description and recommended course of action.

# SDCM and Fabric Manager Messages

This section lists SANworks DC Manager (SDCM) and Fabric manager information and error messages in alphabetical order.

**Table A–1:  SDCM Messages**

| Message | Description | Action |
|---------|-------------|--------|
| An SDCM application session is already active from this workstation. | Only one instance of the SDCM application is allowed to be open per remote workstation. | Close all but one of the SDCM application sessions. |
| Are you sure you want to delete this nickname? | The selected nickname will be deleted from the list of nickname definitions. | Click Yes to delete the nickname or No to cancel the operation. |
| Are you sure you want to delete this product? | The selected product will be deleted from the list of product definitions. | Click Yes to delete the product or No to cancel the operation. |
| Are you sure you want to delete this user? | The selected user will be deleted from the list of user definitions. | Click Yes to delete the user or No to cancel the operation. |
| Are you sure you want to delete this zone set? | The selected zone set will be deleted from the zone library. | Click Yes to delete the zone set or No to cancel the operation. |
| Are you sure you want to delete this zone? | The selected zone will be deleted from the zone library. | Click Yes to delete the zone or No to cancel the operation. |
| Are you sure you want to remove all members from this zone? | All members will be deleted from the selected zone. | Click Yes to delete the members or No to cancel the operation. |
| Cannot connect to SDCM server. | The SDCM application at a remote workstation could not connect to the SDCM server. | Verify the SDCM server internet protocol (IP) address is valid. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot delete product. | The selected product cannot be deleted. | Verify the SDCM server-to-product link is up.<br><br>■ If the link is up, the SDCM server may be busy.<br><br>■ Another Product Manager instance may be open.<br><br>■ The user may not have permission to delete the product. |
| Cannot have spaces in field. | Spaces are not allowed as part of the entry for this field. | Delete spaces from the field entry. |
| Cannot modify product. | The selected product cannot be modified. | Verify the SDCM server-to-product link is up.<br><br>■ If the link is up, the SDCM server may be busy.<br><br>■ Another Product Manager instance may be open.<br><br>■ The user may not have permission to modify the product. |
| Cannot open Fabric Manager. | The SDCM application encountered an internal error and cannot open the Fabric Manager application. | Contact the next level of support to report the problem. |
| Click OK to remove all contents from log. | This action deletes all contents from the selected log. | Click OK to delete the log contents or Cancel to cancel the operation. |
| Connection to SDCM server lost. Click OK to exit application. | The SDCM application at a remote workstation lost the network connection to the SDCM server. | Start the SDCM application to connect to the SDCM server. |
| Could not export log to file. | A log file input/output (I/O) error occurred and the file could not be saved to the specified destination. The disk may be full or write protected. | If the disk is full, use another disk. If the disk is write protected, change the write-protect properties or use another disk. |

| Table A–1: SDCM Messages (Continued) | | |
|---|---|---|
| **Message** | **Description** | **Action** |
| Download complete. Click OK and start the SDCM. | Download of the SDCM and Product Managers applications is complete. | Start the SDCM application to continue. |
| Duplicate name in zoning configuration. | Every name in the zoning library must be unique. | Modify (to make it unique) or delete the duplicate name. |
| Duplicate nickname in nickname configuration. | Duplicate nicknames cannot be configured. | Modify the selected nickname to make it unique. |
| Duplicate World-Wide Name in nickname configuration. | A world-wide name can be associated with only one nickname. | Modify (to make it unique) or delete the selected world-wide name. |
| Duplicate zone in zone set configuration. | More than one instance of a zone is defined in a zone set. | Delete one of the duplicate zones from the zone set. |
| Duplicate zone member in zone configuration. | More than one instance of a zone member is defined in a zone. | Delete one of the duplicate zone members from the zone. |
| Error transferring files < *message* >. | An error occurred while transferring files from the PC hard drive to the SDCM application. The message varies, depending on the problem. | Try the file transfer operation again. If the problem persists, contact the next level of support. |
| Field cannot be blank. | The data field requires an entry and cannot be left blank. | Enter appropriate information in the data field. |
| Field has exceeded maximum number of characters. | The maximum number of data entry characters allowed in the field was exceeded. | Enter the information using the proscribed number of characters. |
| Invalid character in field. | An invalid character was entered in the data field. | Remove invalid characters from the entry. |
| Invalid network address. | The IP address specified for the product is unknown to the domain name server (invalid). | Verify and enter a valid product IP address. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Invalid SDCM server address. | The IP address specified for the SDCM server is unknown to the domain name server (invalid). | Verify and enter a valid SDCM server IP address. |
| Invalid UDP port number. | The specified user datagram protocol (UDP) port number is invalid. The number must be an integer from **1** through **65535** inclusive. | Verify and enter a valid UDP port number. |
| Invalid World-Wide Name. | The specified world-wide name format is invalid. The valid format is eight two-digit hexadecimal numbers separated by colons (**xx:xx:xx:xx:xx:xx:xx:xx**). | Enter a world-wide name using the correct format. |
| Invalid zone in zone set. | The defined zone no longer exists and is invalid. | Delete the invalid zone from the zone set. |
| No attached nodes selected. | An operation was attempted without an attached node selected. | Select an attached node and try the operation again. |
| No SDCM server specified. | An SDCM server is not defined to the SDCM application. | At the SDCM Login screen, type a server name in the SDCM server field and click Login. |
| No zone member selected. | A zoning operation was attempted without a zone member selected. | Select a zone member and try the operation again. |
| No zone selected. | A zoning operation was attempted without a zone selected. | Select a zone and try the operation again. |
| No zone set active. | A zone set cannot be deactivated if there are no active zones. | Informational message only-no action is required. |
| No zone set selected. | A zoning operation was attempted without a zone set selected. | Select a zone set and try the operation again. |

**Table A–1: SDCM Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Password and confirmation don't match. | Entries in the password field and confirmation password field do not match. The entries are case sensitive and must be the same. | Enter the password and confirmation password again. |
| Product Manager instance is currently open. | A product cannot be deleted while an instance of the Product Manager application is open. | Close the Product Manager application, then delete the product. |
| Remote session support has been disabled. | The connection between the specified remote workstation and the SDCM server was disallowed. | Consult with the customer's network administrator to determine if the workstation entry should be modified at the Session Options dialog box. |
| Remote sessions are not allowed from this network address. | Only IP addresses of remote workstations specified at the Session Options dialog box are allowed to connect to the SDCM server. | Consult with the customer's network administrator to determine if the IP address is to be configured for remote sessions. |
| Resource is unavailable. | The specified operation cannot be performed because the product is unavailable. | Verify the SDCM server-to-product link is up. If the link is up, the SDCM server may be busy. Try the operation again later. |
| SDCM error <*error number 1 through 8* >. | The SDCM application encountered an internal error (**1** through **8** inclusive) and cannot continue operation. | Contact the next level of support to report the problem. |
| SDCM is shutting down. Connection will be terminated. | The SDCM application is closing and terminating communication with the attached product. | Reboot the SDCM server. If the problem persists, contact the next level of support. |
| SDCM server could not log you on. Verify your username and password. | The incorrect username and password (both case sensitive) were used while attempting to login to the SDCM application | Verify the user name and password with the customer's network administrator and retry the operation. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| SDCM server could not log you on. Verify your username and password. | The incorrect username and password (both case sensitive) were used while attempting to login to the SDCM application. | Verify the user name and password with the customer's network administrator and retry the operation. |
| Server shutting down. | The SDCM application is closing and terminating communication with the attached product. | Reboot the SDCM server. If the problem persists, contact the next level of support. |
| SNMP trap address not defined. | If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined. | Enter a corresponding SNMP trap recipient address. |
| The Administrator user cannot be deleted. | The administrator user is permanent and cannot be deleted from the Configure Users dialog box. | Informational message only-no action is required. |
| The link to the director is not available. | The Ethernet connection between the SDCM server and Director is down or unavailable. | Establish and verify the network connection. |
| The maximum number of members has already been configured. | The maximum number of zone members that can be defined to the Fabric Manager application was reached. | Delete an existing zone member before adding a new zone member. |
| The maximum number of nicknames has already been configured. | The maximum number of nicknames that can be defined to the SDCM application was reached. | Delete an existing nickname before adding a new nickname. |
| The maximum number of products has already been configured. | The number of managed Compaq products (48) that can be defined to the SDCM application was reached. | Delete an existing product before adding a new product. |

**Table A–1: SDCM Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| The maximum number of products of this type has already been configured. | The number of Compaq products of this type (48) that can be defined to the SDCM application was reached. | Delete an existing product of this type before adding a new product. |
| The maximum number of remote network addresses has already been configured. | A maximum of four IP addresses for remote workstations can be configured at the Session Options dialog box. That number was reached. | Delete an existing IP address before adding a new IP address. |
| The maximum number of SDCM application sessions has been reached. | A maximum of four concurrent remote management sessions can be configured at the Session Options dialog box. The specified number was reached. | Increase the number of remote sessions allowed (if less than four), or terminate a session before attempting to initiate a new session. |
| The maximum number of SDCM server network addresses has already been configured. | The number of SDCM server IP addresses that can be defined to the SDCM application was reached. | Delete an existing IP address before adding a new address. |
| The maximum number of users has already been configured. | The number of users (16) that can be defined to the SDCM application was reached. | Delete an existing user before adding a new user. |
| The maximum number of zone sets has already been configured. | The maximum number of zone sets that can be defined to the Fabric Manager application was reached. | Delete an existing zone set before adding a new zone set. |
| The maximum number of zones per zone set has already been configured. | The maximum number of zones that can be defined in a zone set to the Fabric Manager application was reached. | Delete an existing zone before adding a new zone to the zone set. |

**Table A–1:  SDCM Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| The SDCM server is busy processing a request from another Product Manager. | The SDCM server PC is processing a request from another instance of a Product Manager application, and cannot perform the requested operation. | Wait until the process is completes, then perform the operation again. |
| The software version on this SDCM server is not compatible with the version on the remote SDCM server. | A second SDCM server PC (client) connecting to the SDCM server must be running the same software version to log in. | Upgrade the software version on the downlevel SDCM server PC. |
| This network address has already been assigned. | The specified IP address was assigned and configured. A unique address must be assigned. | Consult with the customer's network administrator to determine a new IP address to be assigned and configured. |
| This user name has already been assigned. | The specified user name is already assigned and configured. | Modify (to make it unique) or delete the duplicate name. |
| You do not have a compatible version of the SDCM server software. In order for the SDCM application to function properly, a compatible version must be installed on the client machine. Click OK to install a compatible version. | The SDCM application version running on the SDCM server differs from the version running on the remote workstation (client). A compatible version must be downloaded from the SDCM server. | Download a compatible version of the SDCM application to the remote workstation (client) using the web install procedure. |
| You do not have rights to perform this action. | Configured user rights do not allow this operation to be performed. | Verify user rights with the customer's network administrator and change as required. |
| You must define an SMTP server address. | A simple mail transfer protocol (SMTP) server address must be defined and configured for e-mail to be activated. | Define the SMTP server address at the Configure E-Mail dialog box. |

**Table A–1: SDCM Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| You must define at least one E-mail address. | At least one e-mail address must be defined and configured for e-mail to be activated. | Define an e-mail address at the Configure E-Mail dialog box. |
| You must define at least one remote network address. | At least one IP address for a remote workstation must be configured for a remote session to be activated. | Define an IP address for at least one remote workstation at the Session Options dialog box. |
| You must download the SDCM client via the web install | An attempt was made to download the SDCM application to a remote workstation (client) using an improper procedure. | Download a compatible version of the SDCM application to the remote workstation (client) using the web install procedure. |
| Zoning name already exists. | Duplicate zone names are not allowed in the zoning library. | Modify (to make it unique) or delete the duplicate zone name. |

# SANworks SAN Director 64 Product Manager Messages

This section lists SANworks SAN Director 64 Product Manager information and error messages in alphabetical order.

**Table A–2:  Product Manager Messages**

| Message | Description | Action |
|---------|-------------|--------|
| A Product Manager instance is already open. | Only one instance of the Product Manager application can be open at one time. | Close the open Product Manager application so the desired instance of the Product Manager application can be opened. |
| All port names must be unique. | A duplicate Fibre Channel port name was configured. All port names must be unique. | Reconfigure the Fibre Channel port with a unique name. |
| Another Product Manager is currently performing a firmware install. | Only one instance of the Product Manager application can install a firmware version to the Director at a time. | Wait for the firmware installation process to complete and try the operation again. |
| Are you sure you want to delete firmware version? | This message requests confirmation to delete a firmware version from the SDCM server's firmware library. | Click Yes to delete the firmware version or No to abort the operation. |
| Are you sure you want to send firmware version? | This message requests confirmation to send a firmware version from the SDCM server's firmware library to the Director. | Click Yes to send the firmware version or No to abort the operation. |
| Cannot have spaces in field. | Spaces are not allowed as part of the entry for this field. | Delete spaces from the field entry. |
| Cannot install firmware to a director with a failed CTP card. | A firmware version cannot be installed on a Director with a failed control processor (CTP) card. | Replace the failed CTP card and retry the firmware installation. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Cannot retrieve current SNMP configuration. | The Director SNMP configuration cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve diagnostics results. | Director diagnostic results cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve director date and time. | The Director date and time cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve director state. | The Director state cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve port configuration. | The port configuration cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve port information. | Port information cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot retrieve port statistics. | Port statistics cannot be retrieved by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot run diagnostics on a port that is failed. | Port diagnostics (loopback tests) cannot be performed on a port that has failed any previous diagnostic (power-on diagnostic, online diagnostic, or loopback test). The amber LED associated with the port illuminates to indicate the failed state. | Reset the port and perform diagnostics again. |
| Cannot run diagnostics on a port that is not installed. | Port diagnostics (loopback tests) cannot be performed on a port that does not have a small form factor (SFF) optical transceiver installed. | Install a transceiver in the port and perform diagnostics again. |
| Cannot run diagnostics while a device is logged-in to the port. | Port diagnostics (internal loopback test) cannot be performed on a port while an attached Fibre Channel device is logged in. | Ensure the device is logged out and perform diagnostics again. |
| Cannot save port configuration. | The port configuration cannot be saved at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot save SNMP configuration. | The Director SNMP configuration cannot be saved at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot set director date and time. | The Director date and time cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Cannot set director state. | The Director state cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot set fibre channel parameters. | Fibre Channel parameters for the Director cannot be set at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot start data collection. | The data collection procedure cannot be started by the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Cannot start firmware install while CTP synchronization is in progress. | The Director's CTP cards are synchronizing and firmware cannot be installed until synchronization is complete. | Install the firmware after CTP card synchronization completes. |
| Cannot start port diagnostics. | Port diagnostics cannot be started at the Product Manager application because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Click OK to remove all contents from log. | This action deletes all contents from the selected log. | Click OK to delete the log contents or Cancel to cancel the operation. |
| Connection to SDCM server lost. Click OK to exit application. | The SDCM application at a remote workstation lost the network connection to the SDCM server. | Start the SDCM application to connect to the SDCM server. |

| Table A–2: Product Manager Messages (Continued) | | |
|---|---|---|
| **Message** | **Description** | **Action** |
| Could not export log to file. | A log file I/O error occurred and the file could not be saved to the specified destination. The disk may be full or write protected. | If the disk is full, use another disk. If the disk is write protected, change the write-protect properties or use another disk. |
| Could not find firmware file. | A firmware version could not be found because the data directory structure for the SDCM server is corrupt. | Reinstall the SDCM and Product Manager applications. If the condition persists, contact the next level of support. |
| Could not remove dump files from server. | Dump files could not be deleted from the SDCM server because the notebook PC or Product Manager application is busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Could not stop port diagnostics. | Port diagnostics could not be stopped by the Product Manager application because the Ethernet link is down or busy, or because the Director is busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Could not write firmware to flash. | A firmware version could not be written from the SDCM server to FLASH memory on the Director's FCTP card. | Retry the operation again. If the condition persists, contact the next level of support. |
| Date entered is invalid. | The date is entered incorrectly at the Configure Date and Time dialog box. Individual field entries may be correct, but the overall date is invalid (for example, a day entry of **31** for a 30-day month). | Verify each entry is valid and consistent. |
| Device applications should be terminated before starting diagnostics. Press NEXT to continue. | Port diagnostics (loopback tests) cannot be performed on a port while an attached device application is running. | Terminate the device application and perform diagnostics again. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---|---|---|
| Director must be offline to configure. | The Director must be set offline prior to configuring Fibre Channel operating parameters. | Set the Director offline, reconfigure parameters at the Configure Operating Parameters dialog box, and retry the operation. |
| Do you want to continue with IPL? | This message requests confirmation to initial program load (IPL) the Director. | Click OK to IPL the Director or No to cancel the operation. |
| Duplicate Community names require identical write authorizations. | Duplicate community names are entered at the Configure SNMP dialog box, and have different write authorizations. | Delete the duplicate community name or make the write authorizations consistent. |
| Error retrieving port information. | An error occurred at the Product Manager application while retrieving port information because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Error retrieving port statistics. | An error occurred at the Product Manager application while retrieving port statistics because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Error stopping port diagnostics. | An error occurred at the Product Manager application while attempting to stop port diagnostics from running because the Ethernet link is down or busy. | Retry the operation later. If the condition persists, contact the next level of support. |
| Error transferring files < *message* >. | An error occurred while transferring files from the PC hard drive to the Product Manager application. The message varies, depending on the problem. | Try the file transfer operation again. If the problem persists, contact the next level of support. |

## Table A–2:  Product Manager Messages  (Continued)

| Message | Description | Action |
|---|---|---|
| Field cannot be blank. | The data field requires an entry and cannot be left blank. | Enter appropriate information in the data field. |
| File transfer aborted. | The user aborted the file transfer process. | Verify the file transfer is to be aborted, then click OK to continue. |
| File transfer is in progress. | A firmware file is being transferred from the SDCM server hard drive, or a data collection file is being transferred to a diskette. | Informational message only-no action is required. |
| File transfer is in progress. | A firmware file is being transferred from the SDCM server hard drive, or a data collection file is being transferred to a diskette. | Informational message only-no action is required. |
| Firmware download timed out. | A firmware download operation timed out and aborted. | Retry the operation. If the problem persists, contact the next level of support. |
| Firmware file I/O error. | A firmware download operation aborted because a file I/O error occurred. | Retry the operation. If the problem persists, contact the next level of support. |
| Firmware file not found. | The firmware version is not installed (or was deleted) from the firmware library at the SDCM server. | Add the firmware version to the library and retry the operation. |
| Internal file transfer error received from director. | The Director detected an internal file transfer error. | Retry the operation. If the problem persists, contact the next level of support. |
| Invalid character in field. | An invalid character was entered in the data field. | Remove invalid characters from the entry. |
| Invalid firmware file. | The file selected for firmware download is not a firmware version file. | Select the correct firmware version file and retry the operation. |

**Table A–2: Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Invalid network address. | The IP address specified for the product is unknown to the domain name server (invalid). | Verify and enter a valid product IP address. |
| Invalid port number. | The Fibre Channel number entered is invalid. The port number must be an integer from **0** through **63** inclusive. | Verify and enter a valid port number. |
| Invalid response received from director. | An error occurred at the Director during a firmware download operation. | Retry the firmware download operation. If the problem persists, contact the next level of support. |
| Invalid SDCM server address. | The IP address specified for the SDCM server is unknown to the domain name server (invalid). | Verify and enter a valid SDCM server IP address. |
| Invalid UDP port number. | The specified user datagram protocol (UDP) port number is invalid. The number must be an integer from **1** through **65535** inclusive. | Verify and enter a valid UDP port number. |
| Invalid value for BB_Credit. | At the Configure Operating Parameters dialog box, the buffer-to-buffer credit (BB_Credit) value must be an integer from **1** through **60** inclusive. | Verify and enter a valid number. |
| Invalid value for day (1 - 31). | At the Configure Date and Time dialog box, the DD value (day) must be an integer from **1** through **31** inclusive. | Verify and enter a valid date. |
| Invalid value for E_D_TOV. | At the Configure Operating Parameters dialog box, the error detect time-out value (E_D_TOV) must be an integer from **2** through **600** inclusive. | Verify and enter a valid number. |

**Table A–2:  Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Invalid value for hour (0 - 23). | At the Configure Date and Time dialog box, the HH value (hour) must be an integer from **0** through **23** inclusive. | Verify and enter a valid time. |
| Invalid value for minute (0 - 59). | At the Configure Date and Time dialog box, the MM value (minute) must be an integer from **0** through **59** inclusive. | Verify and enter a valid time. |
| Invalid value for month (1 - 12). | At the Configure Date and Time dialog box, the MM value (month) must be an integer from **1** through **12** inclusive. | Verify and enter a valid date. |
| Invalid value for R_A_TOV. | At the Configure Operating Parameters dialog box, the resource allocation time-out value (R_A_TOV) must be an integer from **10** through **1200** inclusive. | Verify and enter a valid number. |
| Invalid value for second (0 - 59). | At the Configure Date and Time dialog box, the SS value (second) must be an integer from **0** through **59** inclusive. | Verify and enter a valid time. |
| Invalid value for year. | At the Configure Date and Time dialog box, the YYYY value (year) must be a four-digit value. | Verify and enter a four-digit value for the year. |
| Invalid World-Wide Name. | The specified world-wide name format is invalid. The valid format is eight two-digit hexadecimal numbers separated by colons (**xx:xx:xx:xx:xx:xx:xx:xx**). | Enter a world-wide name using the correct format. |

**Table A–2: Product Manager Messages (Continued)**

| Message | Description | Action |
|---------|-------------|--------|
| Link dropped. | The SDCM server-to-Director Ethernet link was dropped. | Retry the operation. If the condition persists, contact the next level of support. |
| Log is currently in use. | Access to the log is denied because the log was opened by another instance of the Product Manager application. | Retry the operation later. If the condition persists, contact the next level of support. |
| Maximum number of versions already installed. | The number of firmware versions that can be defined to the SDCM application's firmware library was reached. | Delete an existing firmware version before adding a new version. |
| No firmware versions to delete. | There are no firmware versions in the firmware library to delete, therefore the operation cannot be performed. | Informational message only-no action is required. |
| Nonredundant director must be offline to install firmware. | If the Director has only one CTP card, the Director must be set offline to install a firmware version. | Set the Director offline and install the firmware. |
| Performing this operation will change the current state to Offline. | This message requests confirmation to set the Director offline. | Click OK to set the Director offline or Cancel to cancel the operation. |
| Performing this operation will change the current state to Online. | This message requests confirmation to set the Director online. | Click OK to set the Director online or Cancel to cancel the operation. |
| Product Manager error *< error number 5001 or 5002 >.* | The Product Manager application encountered an internal error (**5001** or **5002**) and cannot continue operation. | Contact the next level of support to report the problem. |

**Table A–2:  Product Manager Messages  (Continued)**

| Message | Description | Action |
|---|---|---|
| Product Manager error < *error number 5001 or 5002* >. | At the Configure Operating Parameters dialog box, the R_A_TOV entry must be greater than E_D_TOV entry. | Verify and change one of the entries to make the relationship valid. |
| Send firmware failed. | A firmware download operation failed. | Retry the firmware download operation. If the problem persists, contact the next level of support. |
| SNMP trap address not defined. | If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined. | Enter a corresponding SNMP trap recipient address. |
| The data collection process failed. | An error occurred while performing the data collection procedure. | Try the data collection procedure again. If the problem persists, contact the next level of support. |
| The data collection process has been aborted. | The user aborted the data collection procedure. | Verify the data collection procedure is to be aborted, then click OK to continue. |
| The director did not accept the request. | The Director cannot perform the requested action. | Retry the operation. If the condition persists, contact the next level of support. |
| The director did not respond in the time allowed. | While waiting to perform a requested action, the Director timed out. | Retry the operation. If the condition persists, contact the next level of support. |
| The director is busy saving maintenance information. | The Director cannot perform the requested action because it is busy saving maintenance information. | Retry the operation later. If the condition persists, contact the next level of support. |
| The Ethernet link dropped. | The Ethernet connection between the SDCM server and the Director is down or unavailable. | Establish and verify the network connection. |
| The firmware file is corrupted. | A firmware version file is corrupt. | Contact the next level of support to report the problem. |
| The firmware version already exists. | This firmware version already exists in SDCM server's firmware library. | Informational message only-no action is required. |

**Table A–2: Product Manager Messages  (Continued)**

| Message | Description | Action |
| --- | --- | --- |
| The link to the director is not available. | The Ethernet connection between the SDCM server and the Director is down or unavailable. | Establish and verify the network connection. |
| The SDCM server is busy processing a request from another Product Manager. | The SDCM server PC is processing a request from another instance of a Product Manager application, and cannot perform the requested operation. | Wait until the process is completes, then perform the operation again. |
| This feature is not installed. Please contact your sales representative. | This feature is not supported in this software version. | Contact your sales representative. |
| Unable to save data collection file to destination. | The SDCM server could not save the data collection file to the specified location (PC hard drive, diskette, or network). | Retry the operation. If the condition persists, contact the next level of support. |
| You do not have rights to perform this action. | Configured user rights do not allow this operation to be performed. | Verify user rights with the customer's network administrator and change as required. |

# *Appendix* **B**

# Installing Remote Workstations:
# Windows Systems

This section describes the procedures for installing the SANworks DC Manager on a remote workstation running Windows 95, Windows 98, Windows 2000, or Windows NT. To run the SANworks DC Manager on a remote workstation, you must first download and install the SANworks DC Manager application from the SDCM server.

> **NOTE:** The figures in this chapter show Netscape Navigator as the Internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures

## Requirements

The download and installation process requires the use of a personal computer (PC) with the following minimum system requirements:

■ Operating system (one of the following):

❏ Windows 95

❏ Windows 98

❏ Windows 2000

❏ Windows NT

■ 200 megahertz (MHz) Pentium processor.

■ 32 megabyte (MB) random access memory (RAM) memory.

■ 15 MB available disk space.

■ Video card supporting 256 colors at 800 x 600 resolution.

■ Ethernet network adapter.

■ Java-enabled Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the SANworks DC Manager or Product Managers installed on the SDCM server will automatically download when the remote clients log in to the server.

## Procedure

To install the SANworks DC Manager on a remote workstation:

1. Open a World Wide Web (WWW) browser.
2. Type the address of the SDCM server in the Location (or Address) box on the browser, then press **Enter**.

   For example:

   **http://sdcmserver**

   where "sdcmserver" is the network address of the SDCM server.

   > **NOTE:**  Obtain the SDCM server address from your network administrator

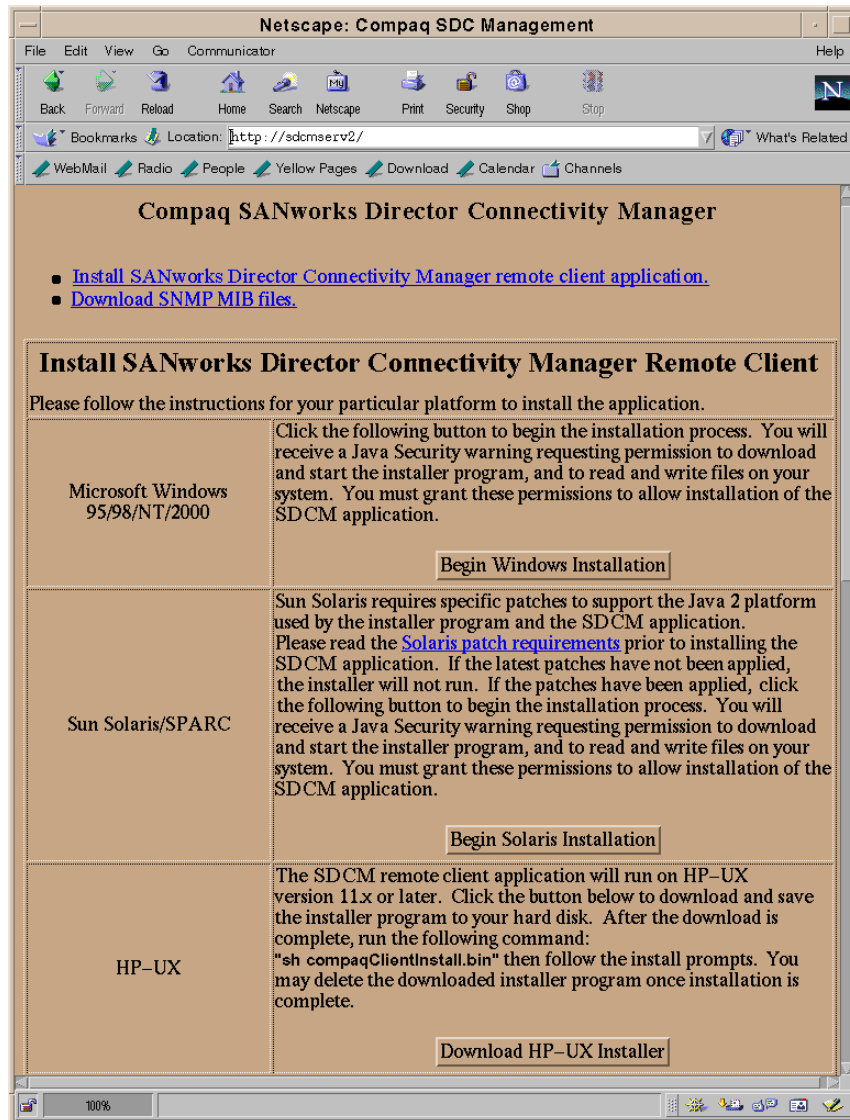The following Compaq SANworks Director Connectivity Management page displays.
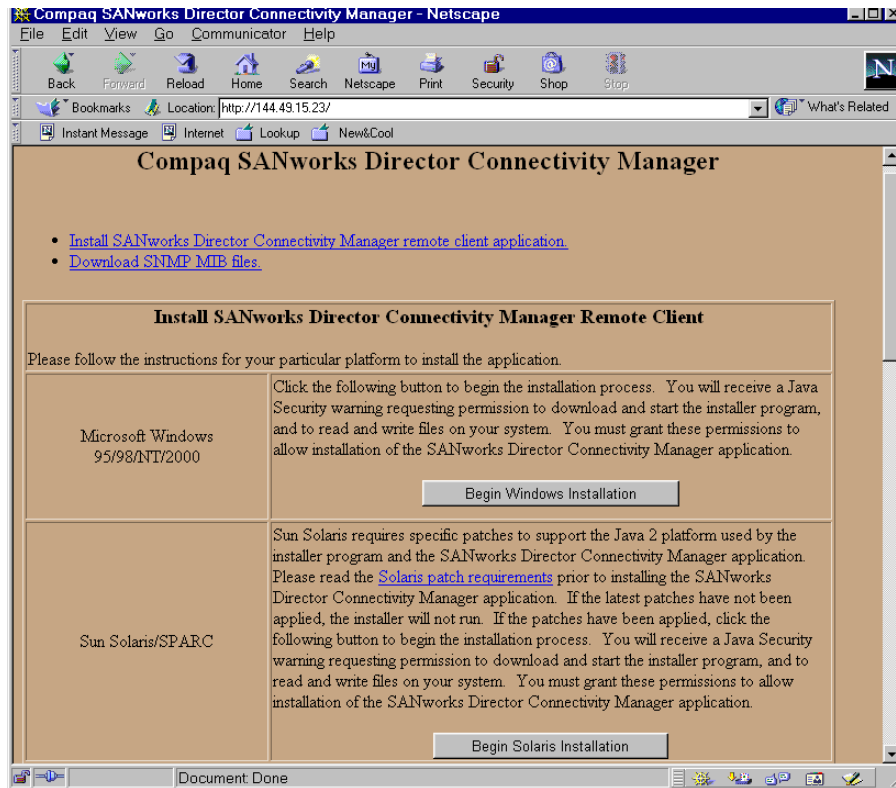
Figure B–1: Compaq SANworks Director Connectivity Management Page

3. On the page, click *Begin Windows Installation* to begin the installation process. The InstallAnywhere Web Installer page displays (Figure B–2).
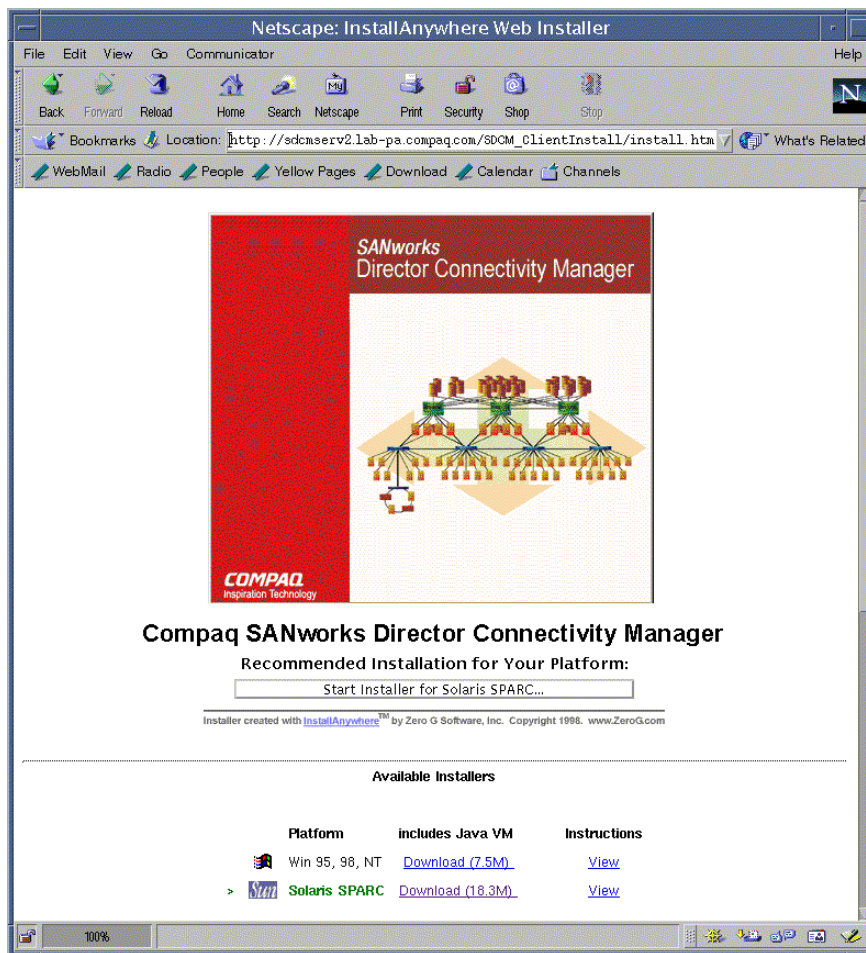
Figure B–2: InstallAnywhere Web Installer Page

A security warning displays. This message warns you that a Java applet is requesting additional privileges to start programs stored on your computer.

4. Click Grant. Another security warning displays.

This message warns you that a Java applet is requesting additional privileges, such as reading, modifying, or deleting files. This Java applet is used to download the appropriate program files to your computer and to start the SANworks DC Manager Installer program.

5. Click Grant. The security message closes.

6. On the InstallAnywhere Web Installer page, click Download Installer for Windows 95, 98, NT. The system begins downloading the SANworks DC Manager installer.

7. When the download is complete, the Introduction screen displays (Figure B–3).
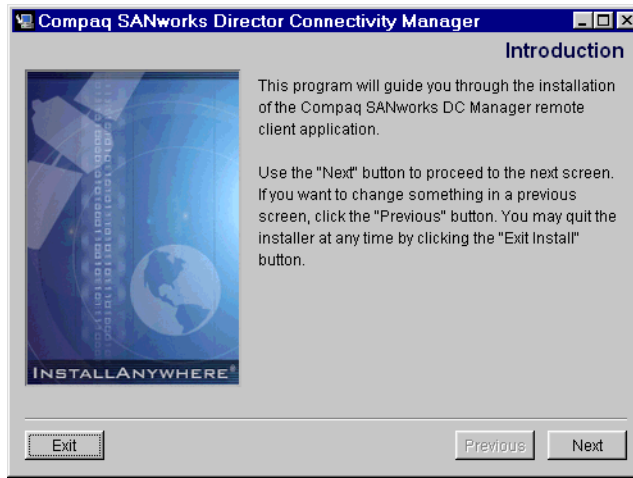
Figure B–3:  SDCM Installer - Introduction Screen

8. Click Next.

> **NOTE:**  At any time, you may return to the previous page by clicking Previous or quit the Installer
> by clicking Exit.

The License Agreement screen displays (Figure B–4).
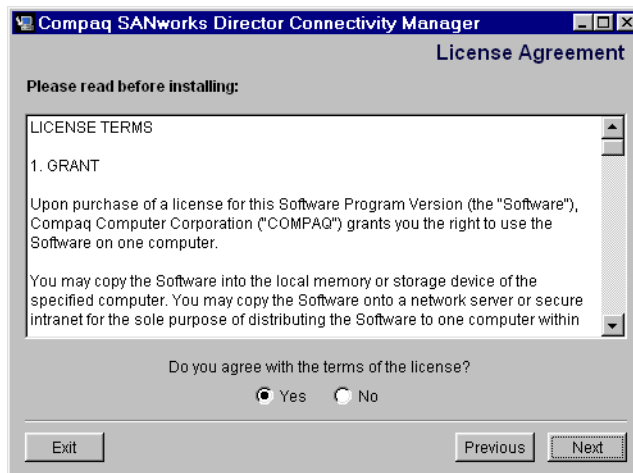


Figure B–4:  SDCM Installer - License Agreement

9. Read the license agreement. Click Yes. Click *Next*.

The Important Information screen displays (Figure B–5).
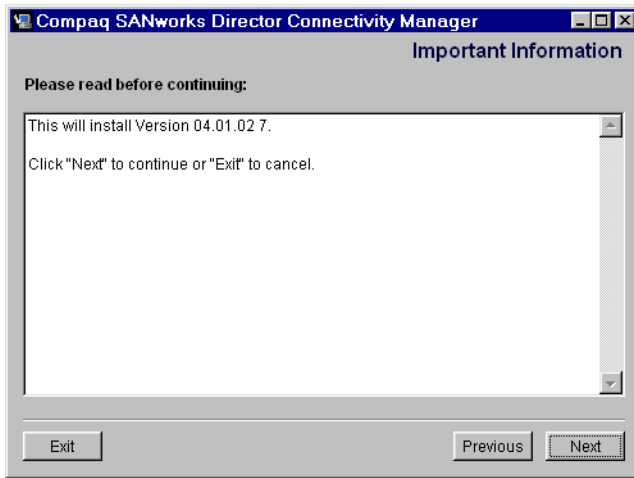
Figure B–5: SDCM Installer - Important Information

10. Click Next.

The Choose Install Folder screen displays (Figure B–6).
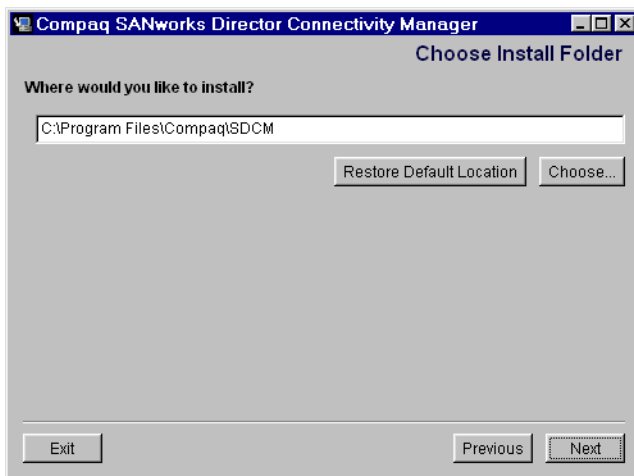


Figure B–6: SDCM Installer - Choose Install Folder

11. Choose a folder on the remote workstation in which to store the SDC Management software. You can accept the default location, type in the path to a new location, or click Choose to browse for an appropriate location. Click Restore Default Location to change the location back to the default.

12. Click Next.

The Choose Shortcut Location screen displays.
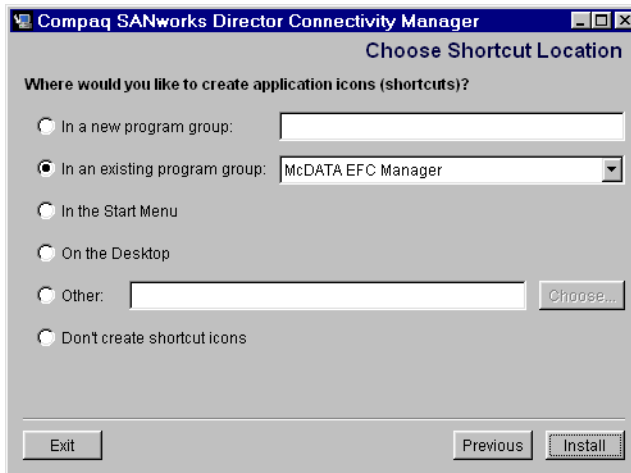
Figure B–7:  SDCM Installer - Choose Shortcut Location

13. Select a shortcut location and click Install to begin the installation.

When complete, the following screen displays. Click Done to close the Install Complete dialog box.
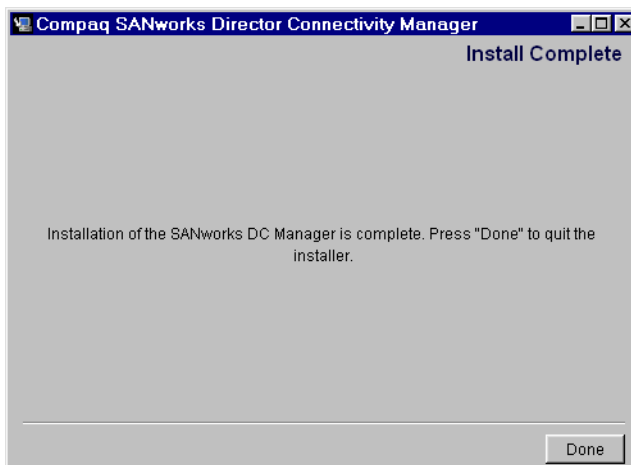
Figure B–8:  SDCM Installer - End Screen

## Running the SANworks DC Manager

1. On the desktop, right click the My Computer icon and choose Exploring. In the Exploring window, browse to the directory in which you saved the SANworks DC Manager program (the default is a subdirectory named SDCM in your home directory).

2. Double click the SANworks DC Manager icon to run the SANworks DC Manager program.

*Appendix* **C**

# Installing Remote Workstations: Solaris Systems

This section describes the procedures for installing the SANworks DC Manager on a remote Solaris workstation. To run the SANworks DC Manager on a remote workstation, you must first download and install the SANworks DC Manager application from the SDCM server.

> **NOTE:** The figures in this chapter show Netscape Navigator as the Internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures

## Requirements

The download and installation process requires the use of a workstation with the following minimum system requirements:

- Operating systems (one of the following):
  - ❏ SunOS version 5.5.1 or higher
  - ❏ Solaris version 2.5.1 or higher
- 300 megahertz (MHz) UltraSPARC-II processor.
- 32 megabyte (MB) random access memory (RAM) memory.
- 15 MB available disk space.
- Video card supporting 256 colors at 800 x 600 resolution.
- Network connection.
- Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the SANworks DC Manager or Product Managers installed on the SDCM server will automatically download when the remote clients log in to the Server.

## Procedure

To install the SANworks DC Manager on a remote workstation:

1. Open a World Wide Web (WWW) browser.

2. Type the address of the SDCM server in the Location (or Address) box of the browser, then press **Enter**.

   For example;

   **http://sdcmserv2**

   where "sdcmserv2" is the network address of the SDCM server.

   > **NOTE:** Obtain the SDCM server address from your network administrator.

The following Compaq SANworks Director Connectivity Management page displays (Figure C–1).

Figure C–1:  Compaq SANworks Director Connectivity Management Page

1. On the page, click Begin Solaris Installation to begin the installation process. The InstallAnywhere Web Installer page displays (Figure C–2).

Figure C–2: InstallAnywhere Web Installer Page

A security warning displays. This message warns you that a Java applet is requesting additional privileges to start programs stored on your computer.

2. Click Grant. Another security warning displays.

This message warns you that a Java applet is requesting additional privileges, such as reading, modifying, or deleting files. This Java applet is used to download the appropriate program files to your computer and to start the SANworks DC Manager Installer program.

3. Click Grant. The security message closes.

4. On the InstallAnywhere Web Installer page, click Download Installer for Solaris SPARC. The system begins downloading the SANworks DC Manager Installer.

   When the download is complete, the Introduction screen displays.

5. Click Next.

   > **NOTE:** At any time, you may return to the previous page by clicking Previous or quit the Installer by clicking Exit.

   The License Agreement screen displays.

6. Read the license agreement. Click Yes. Click Next.

   The Important Information screen displays.

7. Click Next.

   The Choose Install Folder screen displays.

8. Choose a folder on the remote workstation in which to store the SDC Management software. You can accept the default location, type in the path to a new location, or click Choose to browse for an appropriate location. Click Restore Default Location to change the location back to the default.

9. Click Next.

   The Choose Shortcut Location screen displays.

10. Select a shortcut location and click Install to begin the installation.

    When complete, the screen shown in Figure B–8, *SDCM Installer - End Screen* displays.

11. Click Done to close the Install Complete dialog box.

## Running the SANworks DC Manager

Run the SANworks DC Manager program from the directory in which you saved it (the default is a subdirectory named SDCM in your home directory).

1. In the Terminal window, type **cd SDCM**.

2. Press **Enter**.

3. Then type **SDCM_Manager**.

4. Press **Enter**.

The SANworks DC Manager application opens.

# Appendix *D*

# Installing Remote Workstations: HP-UX, AIX, and Linux Systems

This appendix describes the procedures for installing the SANworks DC Manager on a remote HP-UX, AIX, or Linux workstation. To run the SANworks DC Manager on a remote workstation, you must first download and install the SANworks DC Manager application from the SDCM server.

> **NOTE:** The figures in this chapter show Netscape Navigator as the Internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures

## Requirements

The download and installation process requires the use of a PC with the following minimum system requirements:

- Operating system:
  - ❏ HP-UX 11.
  - ❏ AIX minimum version 4.3.3.
  - ❏ Linux minimum version 2.2.5.
- 360 MHz HA PA-RISC processor.
- 32 MB RAM.
- 15 MB available disk space.
- Video card supporting 256 colors at 800 x 600 resolution.
- Ethernet network adapter.

■ Java-enabled Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the SANworks DC Manager or Product Managers installed on the SDCM server will automatically download when the remote clients log in to the SDCM server.

## Procedure

1. Open a Terminal window by choosing Terminal from the Personal Applications subpanel.

2. At the prompt (#), type **netscape**. Press **Enter**.

   The Netscape browser opens.

3. Type the address of the SDCM server in the Location (or Address) box of the browser, then press **Enter**.

   **http://sdcmserver**

   where "sdcmserver" is the IP address and DNS host name of the SDCM server.

   > **NOTE:** Obtain the SDCM server address from your network administrator.

The Compaq Enterprise Fabric Connectivity Management page displays (Figure D–1).
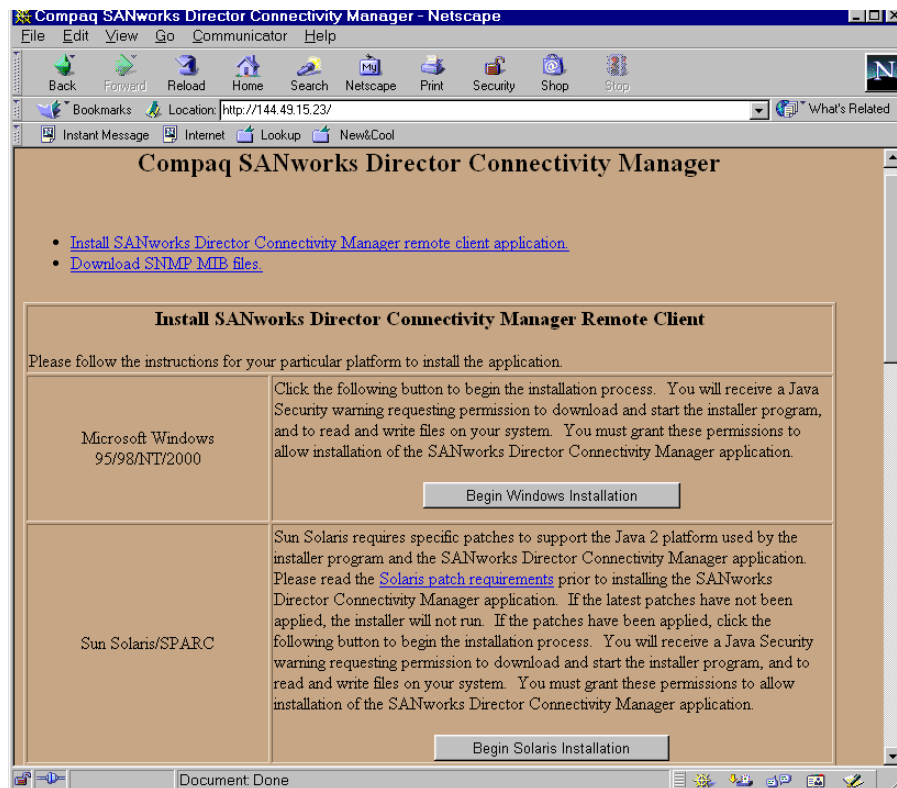
Figure D–1:  Compaq SANworks Director Connectivity Management Page

1. Read the instructions for your operating system.

   If a reference to fixes is made, click the hyperlink and verify that your system is up-to-date.

2. Click the appropriate button (Download HP-UX/AIX/Linux Installer) to begin the installation process.

3. A Save As dialog box displays automatically with the default filename **compaqClientInstall.bin**. Change the filename to **/home/compaqClientInstall.bin**. Click OK.

   Software download begins.

4. Close the Netscape window.

5. In the Terminal window, type **cd home**. Press **Enter**. Then type **sh compaqClientInstall.bin**. Press **Enter**.

The Introduction screen displays.

> **NOTE:** Be aware that there may be a considerable delay.

6. Click Next.

> **NOTE:** At any time, you may return to the previous page by clicking Previous or quit the Installer by clicking Exit.

The License Agreement screen displays.

7. Read the license agreement. Click Yes. Click Next**.**

The Important Information screen displays.

8. Click Next.

The Choose Install Folder screen displays.

9. Choose a folder on the remote workstation in which to store the SANworks DC Manager software. You can accept the default location, type in the path to a new location, or click Choose to browse for an appropriate location. Click Restore Default Location to change the location back to the default.

10. Click Next.

The Choose Shortcut Location screen displays.

11. Select a shortcut location and click Install to begin the installation.

When complete, the Install Complete dialog box displays. Click Done.

## Running the SANworks DC Manager

Run the SANworks DC Manager program from the directory in which you saved it.

1. In the Terminal window, type **cd SDCM** .

2. Press **Enter**.

3. Type **./SDCManager**.

4. Press **Enter**.

The SANworks DC Manager application will open.

# Glossary

This glossary defines terms used in this guide or related to this product and is not a comprehensive glossary of computer terms.

### access control

List of all devices that can access other devices across the network and the permissions associated with that access. *See also* persistent binding and zoning.

### active zone set

Single zone set that is active in a multiswitch fabric. It is created when you enable a specified zone set. This zone set is compiled by checking for undefined zones or aliases.

### agent

Software that processes queries on behalf of an application and returns replies.

### alarm

SNMP message notifying an operator of a network or device problem.

### alias server

Fabric software facility that supports multicast group management.

### arbitration

Process of selecting one device from a collection of devices that request service simultaneously.

**audit log**

Log summarizing actions (audit trail) made by the user.

**authentication**

Verification of identity for a person or process.

**beaconing**

Use of light-emitting diodes on ports, port cards, field-replaceable units, and directors to aid in the fault-isolation process; when enabled, active beaconing will cause LEDs to illuminate for faulty components.

**BB_Credit**

Also known as buffer-to-buffer credit. Indicates the maximum number of frames a port can transmit without receiving a receive ready signal from the receiving device.

**BER**

*See* bit error rate.

**bidirectional**

In Fibre Channel, the capability to simultaneously communicate at maximum speeds (100 Mbps) in both directions over a link.

**bit error rate**

Also known as BER. Ratio of received bits that contain errors to total of all bits transmitted.

**blocked port**

Devices communicating with the port are prevented from logging into the director or communicating with other devices attached to the director. A blocked port continuously transmits the offline sequence.

**bridge**

Device that connects and passes packets between two network segments that use the same communications protocol.

**broadcast**

Send a transmission to all N_Ports on a fabric.

### broadcast frames

Data packet, also known as a broadcast packet, whose destination address specifies all computers on a network. *See also* multicast.

### buffer

Storage area for data in transit. Buffers compensate for differences in processing speeds between devices. *See also* BB_Credit.

### call-home

Product feature which enables the SDCM server to automatically dial out to a support center and report system problems. The support center server accepts calls from the SDCM server, logs reported events, and can notify one or more support center representatives.

### central memory module card

Also known as CMM. Circuit card that provides the storage area for Fibre Channel ports to deposit and retrieve Fibre Channel frames. Each port is allocated a portion of this memory divided into a fixed number of frame buffers.

### channel

Point-to-point link that transports data from one point to the other.

### class of Fibre Channel service

Defines the level of connection dedication, acknowledgment, and other characteristics of a connection.

### Class F Fibre Channel service

Used by switches to communicate across interswitch links (ISLs) to configure, control, and coordinate a multiswitch fabric.

### Class 2 Fibre Channel service

Provides a connectionless (not dedicated) service with notification of delivery or nondelivery between two N_Ports. In-order delivery of frames is not guaranteed.

**Class 3 Fibre Channel service**

Provides a connectionless (not dedicated) service without notification of delivery or nondelivery between two N_Ports. Also known as a datagram.

**CMM**

*See* central memory module card.

**community profile**

Information that specifies which management objects are available to what management domain or SNMP community name.

**concurrent maintenance**

Ability to perform maintenance tasks, such as removal or replacement of field-replaceable units, while a hardware product is operating. *See also* nondisruptive maintenance.

**configuration data**

Configuration data includes: identification data, port configuration data, operating parameters, SNMP configuration, and zoning configuration. A configuration backup file is required to restore configuration data if the nonredundant CTP card in a director is removed and replaced.

**connectionless**

Nondedicated link. Typically used to describe a link between nodes which allows the switch to forward Class 2 or Class 3 frames as ports allow. Contrast this to the dedicated bandwidth that is required in a Class 1 Fibre Channel Service point-to-point link.

**connector**

*See* optical fiber connector.

**control processor card**

Also known as CTP. Circuit card that contains the director microprocessor. The CTP card also initializes hardware components of the system after power-on. A 10 Mbps RJ-45 twisted pair connector is located on the CTP card to connect to the Ethernet LAN and communicate with the SDCM server or a specific management station.

**CRC**

*See* cyclic redundancy check.

**CTP**

*See* control processor card.

**cyclic redundancy check**

Also known as CRC. System of error checking performed at both the sending and receiving station using the value of a particular character generated by a cyclic algorithm. When the values generated at each station are identical, data integrity is confirmed.

**DASD**

Direct access storage device such as a disk drive.

**datagram**

*See* Class 3 Fibre Channel service.

**default**

Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

**default zone**

Contains all attached devices that are not members of a separate zone.

**destination address**

Address identifier that indicates the targeted destination of a data frame.

**device**

Product, connected to a managed director, that is not controlled directly by the Product Manager. *See also* node.

**diagnostics**

Procedures used by computer users and service personnel to diagnose hardware or software error conditions.

**dialog box**

A dialog box is a window containing informational messages or data fields to be modified or filled in with desired options.

**D_ID**

*See* destination address.

**director**

An intelligent Fibre Channel switching device providing any-to-any port connectivity between nodes (end devices) on a switched fabric. The director sends data transmissions (data frames) between nodes in accordance with the address information present in the frame headers of those transmissions.

**DNS name**

Domain name system or (domain name service). Host or node name for a device or managed product that is translated to an IP address through a domain name server.

**domain ID**

Number (1 through 31) that uniquely identifies a switch in a multiswitch fabric. A distinct domain ID is automatically allocated to each switch in the fabric by the principal switch.

**E_Port**

*See* expansion port.

**E_D_TOV**

*See* error detect time-out value.

**error-detect time-out value**

E_D_TOV defines the time the switch waits for an expected response before declaring an error condition.

**error message**

Indication that an error has been detected. *See also* error message and information message.

**Ethernet**

A widely-implemented local area network (LAN) protocol that uses a bus or star topology and served as the basis for the IEEE 802.3 standard, which specifies the physical and software layers. Baseband LAN allows multiple station access to the transmission medium at will, without prior coordination, and avoids or resolves contention.

### event code

Code that provides the operator with information concerning events.

### event log

Record of significant events that have occurred on the director, such as FRU failures, degraded operation, and port problems.

### expansion port

Physical interface on a Fibre Channel switch within a fabric, that attaches to an expansion (E_Port) on another Fibre Channel switch to form a multiswitch fabric. *See also* segmented E_Port.

### explicit fabric login

Data field size, supported by an F-Port, that is agreed upon during fabric login.

### fabric

Entity that interconnects N_Ports and is capable of routing (switching) Fibre Channel frames using the destination ID information in the Fibre Channel frame header accompanying the frames.

### fabric element

Any active director or node in a switched fabric.

### fabric port

Physical interface within the fabric that connects to an N_Port through a point-to-point full duplex connection.

### failover

Automatic and nondisruptive transition of functions from an active FRU that has failed to a backup FRU.

### FCC-IOC

*See* Fibre Channel I/O controller.

### FCP

A standard Fibre Channel protocol used to run SCSI over Fibre Channel.

**FE-MIB**

*See* Fibre Channel fabric element.

**fiber optics**

Branch of optical technology concerned with the transmission of light pulses through fibers made of transparent materials such as glass, fused silica, and plastic.

**fiber**

Physical media types supported by the Fibre Channel specification, such as optical fiber, twisted pair, and coaxial cable.

**Fibre Channel**

Integrated set of standards recognized by ANSI which defines specific protocols for flexible information transfer. Logically, a point-to-point serial data channel, structured for high performance.

**Fibre Channel fabric element**

Any device linked to a fabric. Information about these devices is recorded in a management information base (MIB) which can be accessed by fabric management software.

**Fibre Channel I/O controller**

Controls the embedded Fibre Channel port on the message path controller card (MPC) and configures the ports' ASICs.

**field-replaceable unit**

Assembly removed and replaced in its entirety when any one of its components fails.

**firmware**

Embedded program code that resides and executes on the director.

**F_Port**

*See* fabric port.

**FRU**

*See* field-replaceable unit.

**gateway address**

In TCP/IP, a device that connects two systems that use the same or different protocols.

**generic port**

Also known as G_Port. Physical interface on a director that can function either as a fabric port (F_Port) or an extension port (E_Port) depending on the port type to which it connects.

**G_Port**

*See* generic port.

**GPM card**

*See* G_Port module card.

**G_Port module card**

Also known as GPM card. Port card that implements four G_Ports and provides the physical connection point for links to Fibre Channel devices.

**hardware log**

Record of FRU insertions and removals in the director.

**HBA**

*See* host bus adapter.

**high availability**

A performance feature characterized by hardware component redundancy and support for hot-swapping (enabling non-disruptive maintenance). These systems maximize system uptime while providing superior reliability, availability, and serviceability.

**hop**

Data transfer from one node to another node.

**host bus adapter**

Logic card that provides a link between the server and storage subsystem, and that integrates the operating systems and I/O protocols to ensure interoperability.

**hot-swapping**

Removing and replacing a device's components while the device continues to operate normally.

**hub**

In Fibre Channel, a device that connects nodes into a logical loop by using a physical star topology.

**IML**

*See* initial machine load.

**information message**

Message telling a user that a function is performing normally or has completed normally. *See also* error message and warning message.

**initial machine load**

Also known as IML. Hardware reset for all installed CTP cards on the director. It does not affect other hardware. It is initiated by pushing the IML button on a director's operating panel.

**initial program load**

Process of initializing the device and causing the operating system to start. Initiated through a menu in the Product Manager, this option performs a hardware reset on the active CTP only.

**interface**

Hardware, software, or both, linking systems, programs, or devices.

**internet protocol address**

Unique string of numbers (in the format xxx.xxx.xxx.xxx) that identifies a device on a network.

**interoperability**

Ability to communicate, execute programs, or transfer data between various functional units over a network.

**interswitch link**

Also known as ISL. Physical E_Port connection between two directors in a fabric.

**IP address**

*See* internet protocol address.

**IPL**

*See* initial program load.

**ISL**

*See* interswitch link.

**jumper cable**

Optical cable that provides physical attachment between two devices or between a device and a distribution panel. Contrast with trunk cable.

**latency**

When used in reference to a Fibre Channel switching device, latency refers to the amount of time elapsed between receipt of a data transmission at a switch's incoming F_Port (from the originating node port) to retransmission of that data at the switch's outgoing F_Port (to the destination N_Port). The amount of time it takes for data transmission to pass through a switching device.

**LIN**

*See* link incident.

**link**

Physical connection between two devices on a switched fabric.

**link incident**

Interruption to link due to loss of light or other causes.

**load balancing**

Ability to evenly distribute traffic over multiple interswitch links within a fabric. Load balancing on Compaq directors takes place automatically.

### logical unit number

Also known as LUN. In Fibre Channel addressing, a logical unit number is a number assigned to a storage device which, in combination with the storage device's node port's world-wide name, represents a unique identifier for a logical device on a storage area network.

### loopback plug

In a fiber optic environment, a type of duplex connector used to wrap the optical output signal of a device directly to the optical input.

### loopback test

Test that checks attachment or control unit circuitry, without checking the mechanism itself, by returning the output of the mechanism as input.

### LUN

*See* logical unit number.

### MAC address

*See* Media Access Control address.

### maintenance port

Connector on the director operator panel where a PC running an ASCII terminal emulator can be attached or dial-up connection made for specialized maintenance support.

### managed product

Hardware product that can be managed with the Product Manager. For example, the StorageWorks SAN Director 64 is a managed product. *See also* device.

### management information base

Related set of software objects (variables) containing information about a managed device and accessed via SNMP from a network management station.

### management session

Management session exists when a user logs on to the SANworks DC Manager. SDCM can support multiple concurrent management sessions. The user must specify the network address of the SANworks DC Manager's server at logon time.

**Media Access Control address**

Hardware address of a node (device) connected to a network.

**message path controller card**

Message path controller card (MPC) provides the mechanism for messages to be sent and received between ports on the director. The card also provides a system clock source, and central control and distribution of clocks for MPC, GPM, and CMM cards.

**MIB**

*See* management information base.

**MPC**

*See* message path controller card.

**multicast**

Delivery of a single transmission to multiple destination N_Ports. Can be one to many or many to many. All members of the group are identified by one IP address.

**multi-switch fabric**

Fibre Channel fabric created by linking more than one director or fabric switching device within a fabric.

**name server**

Program that translates names from one form into another. Domain name servers (DNS) translate domain names into IP addresses.

**name server zoning**

N_Port access management that allows N_Ports to communicate if and only if they belong to a common name server zone.

**network address**

Name or address that identifies a managed product, such as the StorageWorks SAN Director 64 on a TCP/IP network. The network address can be either an IP address in dotted-decimal notation (comprised of four three-digit octets in the format xxx.xxx.xxx.xxx), or a domain name (as administered on a customer network).

**nickname**

Alternate name assigned to a worldwide name for a node or director in the fabric.

**node**

In Fibre Channel terminology, mode refers to an end device (Server or storage device) that is or can be connected to a switched fabric.

**node port**

Physical interface within an end device which can connect to an F_Port on a switched fabric or directly to another N_Port (in point-to-point communications).

**nondisruptive maintenance**

Ability to service FRUs (including maintenance, installation, removal and replacement) while normal operations continue without interruption. *See also* concurrent maintenance.

**N_Port**

*See* node port.

**offline sequence (OLS)**

Sequence sent by the transmitting port to indicate that it is attempting to initialize a link and has detected a problem in doing so.

**optical cable**

Fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications. *See also* jumper cable*,* optical cable assembly, and trunk cable.

**optical cable assembly**

Optical cable that is connector-terminated. *See* jumper cable and optical cable.

**optical fiber connector**

Hardware component that transfers optical power between two optical fibers or bundles and is designed to be repeatedly connected and disconnected.

**out-of-band management**

Transmission of management information using frequencies or channels other than those routinely used for information transfer.

**packet**

Logical unit of information (usually in the form of a data frame) transmitted on a network. It contains a header (with all relevant addressing and timing information), the actual data, and a trailer (which contains the error checking function, usually in the form of a cyclic redundancy check), and frequently user data.

**password**

Unique string of characters known to the computer system and to a user who must specify it to gain full or limited access to a system and to the information stored within it.

**path**

In a network, any route between any two ports.

**persistent binding**

A form of server-level access control that uses configuration information to bind a server to a specific Fibre Channel storage volume (or logical device) using a unit number.

**port**

Receptacle on a device to which a cable leading to another device can be attached.

**port card**

Field-replaceable hardware component that provides the port connections for fiber cables and performs specific device-dependent logic functions.

**port name**

Name that the user assigns to a particular port through the Product Manager.

**POST**

*See* power-on self-test.

**power-on self-test**

Series of self-tests executed each time the unit is started or reset.

**preferred domain ID**

Domain ID assigned to a switch is assigned by the principal switch in a switched fabric. The preferred domain ID becomes the active domain ID except when configured otherwise by the user.

**principal switch**

In a multiswitch fabric, the switch that allocates domain IDs to itself and to all other switches in the fabric. There is always one principal switch in a fabric. If a switch is not connected to any other switches, it acts as its own principal switch.

**Product Manager**

Application that implements the management user interface for the director.

**product name**

User-configurable identifier assigned to a managed product. Typically, this name is stored on the product itself. For the StorageWorks SAN Director 64, the product name can also be accessed by an SNMP manager as the system name.

**R_A_TOV**

*See* resource allocation time-out value.

**redundancy**

Performance characteristic of a system or product whose integral components are backed up by identical components to which operations will automatically failover in the event of a component failure. Redundancy is a vital characteristic of virtually all high-availability (24 hr/7 days per week) computer systems and networks.

**remote access link**

Connection to a device or program on a computer network via a (geographically) remote workstation.

**remote notification**

A process by which a system is able to inform remote users and/or workstations of certain classes of events that occur on the system. E-mail notification and the configuration of SNMP trap recipients are two examples of remote notification programs that can be implemented on director-class switches.

### remote user workstation

Workstation, such as a PC, using SANworks DC Manager and Product Manager software that can access the SDCM server over a LAN connection.

### resource allocation time out value

R_A_TOV is a value used to time out operations that depend on the maximum possible time that a frame could be delayed in a fabric and still be delivered.

### SAN

See storage area network.

### SANworks DC Management Services

Software application that provides back-end product-independent services to the SANworks DC Manager application. SDC Management Services runs only on the SDCM server (and cannot be downloaded to remote workstations).

### SANworks Director Connectivity Manager

Software application that is the system management framework providing the user interface for managing Compaq Fibre Channel connectivity products. The SANworks DC Manager can run both locally on the SDCM server and remotely on a user workstation.

### SC

Subscriber connectors.

### SDCM server

PC shipped with a product to run the SANworks DC Manager, Product Manager, and SDC Fabric Manager applications.

### segmented E_Port

E_Port that has ceased to function as an E_Port within a multiswitch fabric due to an incompatibility between the fabrics that it joins. *See also* expansion port.

### SEL

System error light.

### SNMP

Simple network management protocol.

### SNMP community

Also known as SNMP community string. An SNMP community is a cluster of managed products (in SNMP terminology, hosts) to which the server or managed product running the SNMP agent belongs.

### SNMP community name

The name assigned to a given SNMP community. Queries from an SNMP management station to a device running an SNMP agent will only elicit a response if those queries are addressed with the correct SNMP community name.

### SSP

*See* system services processor.

### storage area network

A high-performance data communications environment that interconnects computing and storage resources so that the resources can be effectively shared and consolidated.

### subnet mask

Used by a computer to determine whether another computer with which it needs to communicate is located on a local or remote network. The network mask depends upon the class of networks to which the computer is connecting. The mask indicates which digits to look at in a longer network address and allows the router to avoid handling the entire address. Subnet masking allows routers to move the packets more quickly. Typically, a subnet may represent all the machines at one geographic location, in one building, or on the same local area network.

### switch priority

Value configured into each switch in a fabric that determines its relative likelihood of becoming the fabric's principal switch.

### system services processor

Controls the RS-232 maintenance port, the Ethernet port, and the operator panel of a Fibre Channel Director.

**Tivoli**

A suite of Enterprise management software products produced by a division of IBM.

**topology**

Logical and/or physical arrangement of stations on a network.

**trap**

Unsolicited notification of an event originating from a SNMP managed device and directed to an SNMP network management station.

**trap host**

SNMP management workstation that is configured to receive traps.

**trunk cable**

Cable consisting of multiple fiber pairs that do not directly attach to an active device. This cable usually exists between distribution panels and can be located within, or external to, a building. *Contrast with* jumper cable.

**unblocked port**

Devices communicating with an unblocked port can log in to the director and communicate with devices attached to any other unblocked port, assuming that this is supported by the current zoning configuration.

**unicast**

Communication between a single sender and a single receiver over a network. Compare to *multicast* (communication between a single sender and multiple receivers) and *anycast* (communication between any sender and the nearest of a group of receivers). Similar in meaning to *point-to-point communication*.

**vital product data**

System-level data stored by the backplane in the electrically erasable programmable read-only memory. This data includes serial numbers and identifies the manufacturer.

**VPD**

*See* vital product data.

**warning message**

Indication that a possible error has been detected. *See also* error message and information message.

**wrap plug**

*See* loopback plu*g*.

**World-Wide Names**

Eight-byte address that uniquely identifies a switch, or a node (end device), even on global networks.

**WWN**

*See* World-Wide Names.

**zone**

Set of devices that can access one another. All connected devices may be configured into one or more zones. Devices in the same zone can see each other. Those devices that occupy different zones cannot.

**zone member**

Specification of a device to be included in a zone. A zone member can be identified by the port number of the director to which it is attached or by its device (or HBA) world-wide name. In multiswitch fabrics, identification of end-devices/nodes by world-wide name is preferable.

**zone set**

*See* zone.

**zoning**

Grouping of several devices by function or by location. All devices connected to a connectivity product, such as the director, may be configured into one or more zones. *See also* zone.

# Index