# Sun StorEdge™ 5210 NAS Software Installation, Configuration, and User Guide

Sun Microsystems, Inc.
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CHAPTER 1

# Introduction

The Sun StorEdge™ 5210 NAS Web Administrator is a graphical user interface (GUI) that makes it easy to set security and network configurations, and to perform administrative tasks on Sun Microsystems innovative Sun StorEdge 5210 NAS systems.

## About Sun StorEdge 5210 NAS

The Sun StorEdge 5210 NAS employs innovative hardware and software technology to bring you the industry's most efficient network attached storage.

The Sun StorEdge 5210 NAS supports file sharing between UNIX® and Windows environments, significantly accelerating file I/O services, and ensuring data integrity by relying on a fully journaling file system. It also optimizes application server performance by off-loading data sharing responsibilities.

The Sun StorEdge 5210 NAS attaches directly to the network as quickly and simply as a network printer, and features high-speed RAID controller architecture as well as redundant components that improve data availability. The modular, scalable Sun StorEdge 5210 NAS offers non-stop performance for users who require optimum file-sharing capabilities.

The Sun StorEdge 5210 NAS is designed for the workgroup or small business that needs to add a significant amount of additional storage, but cannot afford the time, manpower, or financial resources to managing a complex storage subsystem. It is a single-head system.

# Other Sun StorEdge 5210 NAS Documentation

The following documentation is included as part of your Sun StorEdge 5210 NAS package. If you find that any of these documents are damaged or missing, contact your Sun Microsystems sales representative or reseller.

## Setup Poster and Quick Reference Manual

The Sun StorEdge 5210 NAS includes a printed *Setup Poster* and a *Quick Reference Manual* and *Hardware Installation, Configuration, and User Guide* on the documentation CD.

- The Setup Poster quickly guides you through hardware and software setup.
- The Quick Reference Manual on the documentation CD provides a shorter version of the hardware setup and software instructions contained in this software guide.

## Sun StorEdge 5210 NAS Hardware User's Guide

The *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* on the documentation CD provides detailed information and procedures for installing, connecting, and using the hardware components of your Sun StorEdge 5210 NAS system.

# About This User's Guide

This guide is designed as a user reference and operational guide for the Sun StorEdge 5210 NAS Web Administrator software application.

The procedures and screen shots in this guide are intended to help you perform system tasks. Because the information displayed by the Web Administrator software is based on your Sun StorEdge 5210 NAS server configuration, the screen shots displayed on your monitor may not be the same as the screen shots shown in this guide.

## Conventions Used in This Guide

This guide was designed to make it easy for you to find the information you need quickly. Familiarize yourself with the following:

| Convention | Meaning |
|---|---|
| *Italic* | Points out cross references to other sections in this guide, identifies the titles of other documents, and emphasizes key terms and definitions. |
| **Bold** | Identifies keystrokes, menu items, window components (for example, panel titles or field labels), and mouse commands. |
| C: | Disk drives, such as drive A, drive C, or network drives, are referred to as A:, C:, etc. |
| Click | Press and release the left mouse button. |
| `admin` | Words in `Courier` type indicate typed commands or prompts. |

# Software Requirements and Updates

The Sun StorEdge 5210 NAS system ships with the Web Administrator software installed. You do not need to install any software to manage your Sun StorEdge 5210 NAS system.

## Web Administrator Requirements

To access the Web Administrator management interface, you must have the following software:

- Windows 98/NT/2000/XP, Sun Solaris™ 5.7 Operating System, or Red Hat Linux
- Internet Explorer 5.5 (or later) on systems using Windows 98/NT/2000/XP

or

- Netscape™ software 4.77 (or later) on systems using Windows 98/NT/2000/XP and Sun Solaris Operating System. **Netscape 6.0 and 6.01 are not supported.**
- Mozilla™ browser
- Java™ platform-enabled browser with Java Plug-In 1.3.1 (or later).

**Note –** To download the latest Java Plug-In, go to http://java.com.

# Initial Sun StorEdge 5210 NAS Configuration

To complete the initial Sun StorEdge 5210 NAS configuration, you must:

- Provide an IP address, either through Dynamic Host Configuration Protocol (DHCP) or through the Sun StorEdge 5210 NAS Liquid Crystal Display (LCD) panel.
- Access the Wizard through the Web Administrator
- Follow the instructions provided by the Wizard

## IP Address Configuration

To configure the Sun StorEdge 5210 NAS system, you must have an Internet Protocol (IP) address for the system. You can assign an IP address in one of two ways:

- Automatic IP address assignment through a DHCP server
- Manual IP address assignment through the LCD panel on the Sun StorEdge 5210 NAS

### Automatic (DHCP) IP Address Configuration

To dynamically acquire an IP address through a DHCP server, you must either have an existing DHCP server on the network or have a DHCP relay agent on the network with an accessible DHCP server on another network. (If your network does not support DHCP, you must input the IP address through the LCD panel on the front panel of the Sun StorEdge 5210 NAS unit. See "Accessing the Web Administrator" on page 6.)

**Note –** If your system uses DHCP to assign Domain name System (DNS) and Windows Internet Naming System (WINS) as well as IP and gateway addresses, the corresponding fields in the Wizard and Web Administrator screens are dynamically configured. Verify the information when it is presented by the Wizard during system configuration.

If your system supports DHCP, the DHCP server automatically assigns an IP address when the Sun StorEdge 5210 NAS boots up for the first time.

Write down the IP address displayed on the LCD panel.

## Manual IP Address Configuration

If your network does not support DHCP, you must configure the IP address using the LCD panel.

To configure the IP address using the LCD panel:

1. **Turn on the Sun StorEdge 5210 NAS unit and wait for the boot sequence to complete. The LCD panel displays the following:**


**FIGURE 1-1** LCD Panel Without DHCP

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**Note –** To avoid waiting, you can press Up-arrow Up-arrow Down-arrow and go on to Step 2.

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2. **Press the Select button once, then select Set Static IP.**


**FIGURE 1-2** Setting the Static IP Address

3. **Enter or accept the values listed below, then move the cursor to the far right to save them:**
   - IP address
   - Subnet mask
   - Broadcast address
   - Gateway address (if necessary)

# Accessing the Web Administrator

Accessing the Web Administrator consists of the following:

1. **Configuring Transmission Control Protocol/Internet Protocol (TCP/IP), either with or without DHCP. See "Automatic (DHCP) IP Address Configuration" on page 4 or "Manual IP Address Configuration" on page 5 for more information.**
2. **Connecting to Web Administrator on a computer attached to the same network and running the Configuration Wizard. See "Connecting to the Web Administrator" on page 6 or "Running the Configuration Wizard" on page 12 for more information.**

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**Note –** Before you can access Web Administrator, you must have connected the Sun StorEdge 5210 NAS to your network, provided an IP address, and prepared a client browser on the same network as the Sun StorEdge 5210 NAS.

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## Connecting to the Web Administrator

When you connect to the Web Administrator for the first time, the Configuration Wizard launches automatically. If you need instructions for navigating within the Web Administrator, see "Navigating in Web Administrator" on page 8. Otherwise, proceed to "Running the Configuration Wizard" on page 12.

To connect to the Web Administrator:

1. **From a client on the same network, open a web browser and type the IP address of the Sun StorEdge 5210 NAS in the address or location field, for example:**

   **`http://123.111.78.99`**

   and press **Enter**. If you have trouble connecting, try enabling the browser option to bypass the proxy server for local addresses. See your browser's online help or documentation for more information.

The Sun StorEdge 5210 NAS Web Administrator page appears in your browser with a login screen.

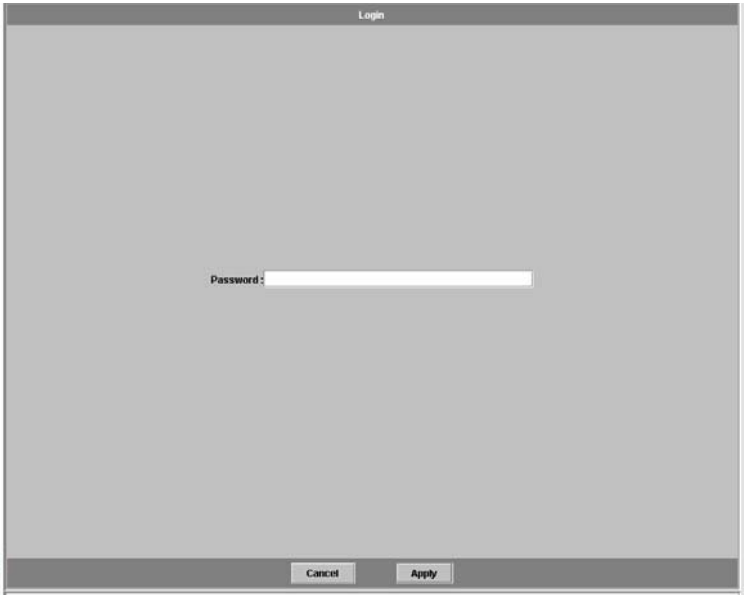


**FIGURE 1-3** The Login Screen

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**Note –** Once you reach the login screen, you may want to bookmark it or add it to your favorites so that you do not have to remember the IP address in the future.

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2. **By default a password is not specified. Simply click the Apply button to access the system. For information on changing the administrator password, refer to "Setting the Administrator Password" on page 49.**

   The End User License Agreement screen appears.

3. **Accept or decline the license agreement. If you decline, Web Administrator returns you to the main login screen. If you accept, the Sun StorEdge 5210 NAS Configuration Wizard starts automatically.**

4. **Follow the on-screen prompts, entering information as requested. For more detailed descriptions of the Wizard screens, see "Starting the Wizard" on page 13. If your system uses DHCP to assign DNS, WINS, or IP and gateway addresses, these fields are automatically configured. When you reach these screens in the Wizard, verify the information, then continue with the Wizard.**

# Navigating in Web Administrator

The Sun StorEdge 5210 NAS Web Administrator is an easy-to-use graphical user interface (GUI) that lets you configure system parameters through a series of menus and tab screens, or panels. These tab screens and settings are discussed in later chapters. If at any point you want to return to the main screen, click  (home system button) from the toolbar.

If you need help in any screen, click  (Help button).

## Logging In

For all users, the normal login procedure is:

1. **Access the Login screen as described in "Connecting to the Web Administrator" on page 6.**

   The **User Name**, *Administrator*, is permanent and unchangeable.

2. **Enter the Password in the field provided.**

   By default, a password is not specified. For information about setting the administrator password, refer to "Setting the Administrator Password" on page 49.

3. **Click the Cancel button to exit the login screen or click the Apply button to login.**

# Using the Graphical User Interface

The main window of Web Administrator lets you navigate, configure, and view Sun StorEdge 5210 NAS system events and services. The appearance of this window varies based on your hardware configuration.

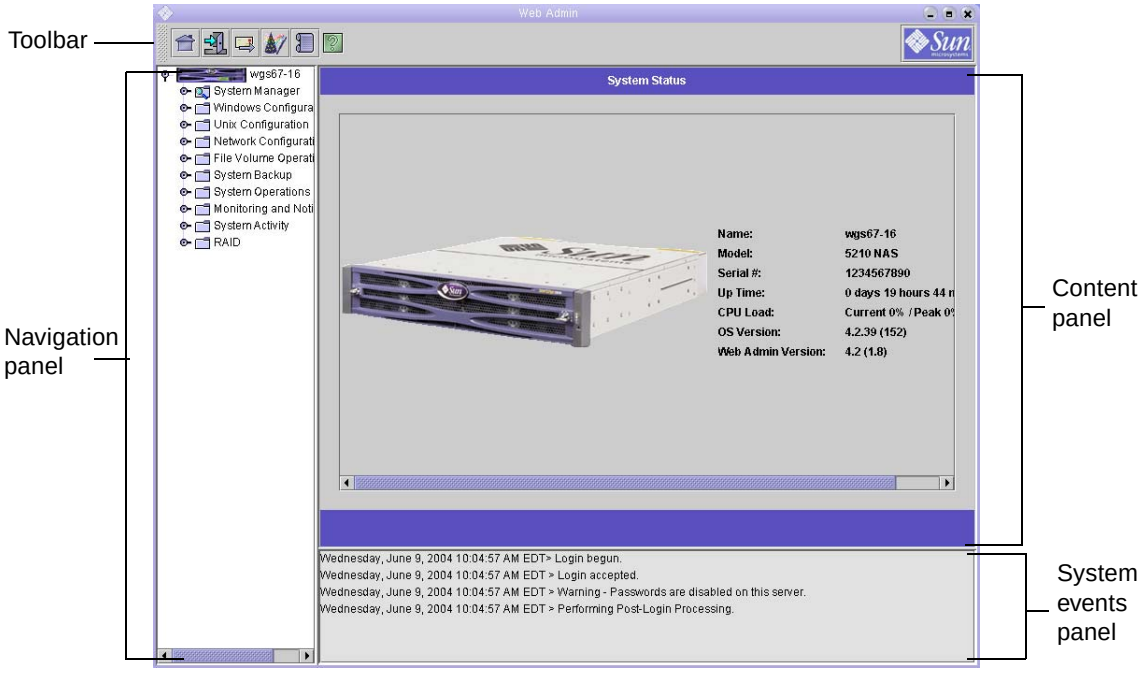



**FIGURE 1-4** The Main Window

## The Toolbar

The toolbar at the top of the Web Administrator window lets you access the home status screen, log out, send a diagnostic e-mail, run the configuration Wizard, and access help pages.

**FIGURE 1-5** The Toolbar

The toolbar icons run the following tasks:

**TABLE 1-1** Toolbar Icons

| | |
|---|---|
|  | View the home system status screen |
|  | Log out |
|  | Send a diagnostic e-mail |
|  | Run the configuration Wizard |
|  | Access the system log |
|  | Access help |

## The Navigation Panel

Use this panel to navigate within the Web Administrator. You can access all configuration, setup, and administrative functions through the navigation panel.

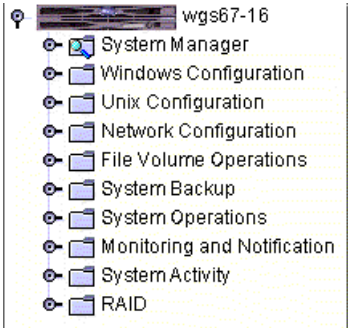
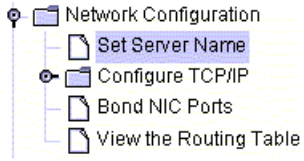



**FIGURE 1-6** The Navigation Panel

To open a folder, click the symbol next to the folder. It changes to the position. For example: Network Configuration becomes:




To close the folder, click the symbol back to the position.

## Content Panel

This panel contains the screens showing Sun StorEdge 5210 NAS status or configuration settings.

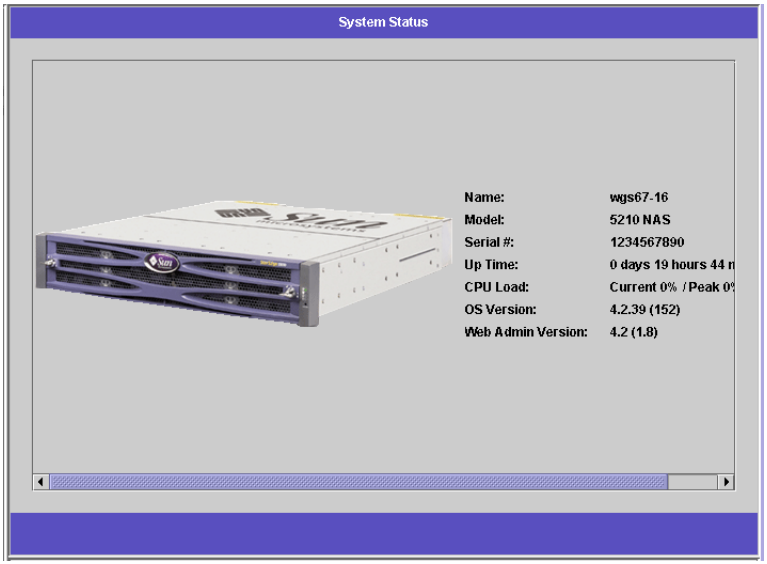



**FIGURE 1-7** The Content Panel Showing System Status

## System Events Panel

At the bottom of the Web Administrator window, the system events panel displays all events that have occurred since the last login. Use this panel to verify that your changes were saved or your system commands have run successfully. Errors and warnings are also displayed in this panel.

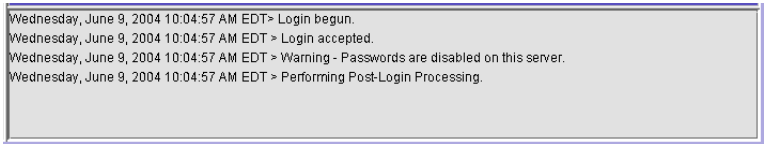



**FIGURE 1-8** The System Events Panel

## Using Help

Help screens are available in every tab screen of the Sun StorEdge 5210 NAS Web Administrator to provide more detailed information regarding the terms, fields, checkboxes, option buttons (radio buttons), and action buttons in that screen.

To reach the help screen for any Web Administrator topic, click the  button, located in the toolbar. The corresponding help window for the content panel currently displayed appears alongside the Web Administrator screen.

# Running the Configuration Wizard

The configuration wizard runs automatically the first time you log on. The wizard is designed to guide you through the initial setup of your Sun StorEdge 5210 NAS unit. It helps you complete all of the steps necessary to establish communication between the Sun StorEdge 5210 NAS and your network. Once you complete the wizard, you still need to set up your file system and configure user access.

## Configuration Wizard Variations

The configuration wizard offers several options. Some of these options are automatically determined by the Sun StorEdge 5210 NAS unit itself. Other options are determined by you, based on the network environment you are running. This guide cannot cover all of the possible configurations in the available space. This section provides an overview of the configuration wizard itself and describes the possible paths you can take through the wizard.

Other functions and features also vary based on the features of the Sun StorEdge 5210 NAS unit. These variations are discussed in the appropriate locations within this guide.

There are three primary paths that the wizard can take. These three paths are based on the network environment you are running and you must choose the wizard's path. These three paths are:

- **UNIX Only—**This path helps you configure the Sun StorEdge 5210 NAS for operation in a pure UNIX network. It skips over all Windows-dependent features and functions.
- **Windows Only—**This path helps you configure the Sun StorEdge 5210 NAS for operation in a pure Windows network. It skips over all UNIX-dependent features and functions.
- **Both UNIX and Windows—**This path combines all functions and features, helping you configure the Sun StorEdge 5210 NAS for a mixed network environment combining Windows and UNIX features.

Select the path appropriate to your network environment.

## Starting the Wizard

To run the configuration wizard, click the  icon on the tool bar. The wizard opens to an introductory page. Click **Next** to proceed. The wizard then progresses through the following steps:

1. **Setting the server name and contact information**
2. **Configuring network adapters**
3. **Setting the gateway**
4. **Configuring Domains and Workgroups (Windows environments and mixed environments) and enabling and configuring Active Directory Service (ADS) (Windows environments and mixed environments)**
5. **Configuring WINS (Windows environments and mixed environments)**
6. **Setting up DNS**
7. **Setting up Network Information Service (NIS) (UNIX environments and mixed environments)**
8. **Setting up Network Information Service Plus (NIS+) (UNIX environments and mixed environments)**
9. **Configuring name services (UNIX environments and mixed environments)**
10. **Setting up e-mail notification**

11. **Setting up remote and local logging**
12. **Assigning the language**
13. **Confirming your settings**

    The wizard then saves your settings and lets you know if any configuration changes failed.

    If you do not want to run the wizard, Chapter 2, *Initial Network Configuration*, describes accessing the same functions in the same sequence through the navigation panel.

# Where to Go from Here

At this point, the Sun StorEdge 5210 NAS should be up and running and you should have a basic understanding of how to get around in Web Administrator. From here you need to establish your file system and configure user access.

Setting up your file system includes any RAIDs, LUNs, Partitions, File Volumes, and Segments that you need to establish. See "File System Concepts" on page 35 for more information on these concepts.

When your file system is complete, you must set up user access rights and any other system management features. Chapter 4, "System Management" on page 49, covers the basic management functions. Refer to the index to find any specific features, including descriptions of the features, how they work, when and why they apply, and any specific rules for setting them up.

CHAPTER 2

# Initial Network Configuration

This chapter describes configuring your Sun StorEdge 5210 NAS for communication on your network. After you configure network communication and services, you still need to configure your file system, user access rights, any other features, and any options that you purchased.

This chapter follows the same sequence as the installation wizard. It does not cover all of the features you may want to set up. If you want to set up a specific feature that is not covered in this chapter, look it up in the index to find the instructions.

## Setting the Server Name

To set the Sun StorEdge 5210 NAS server name as it will appear on the network:

1. **In the navigation panel, select Network Configuration > Set Server Name.**

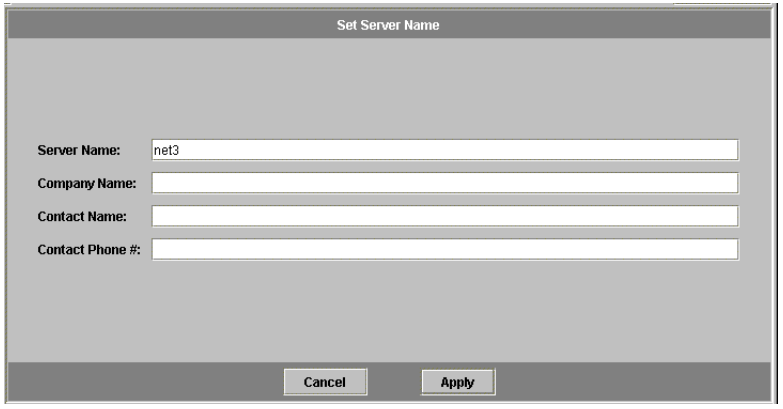



**FIGURE 2-1** The Set Server Name Panel

2. **Enter the Sun StorEdge 5210 NAS server name in the Server Name box. This name identifies the Sun StorEdge 5210 NAS (or this head unit, for dual-head systems) on the network. The server name can include alphanumeric (a–z, A–Z, 0–9), "-" (dash), "_" (underscore), and "." (period) characters.**

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**Note –** The server name must begin with a letter (a–z or A–Z), not a number or a symbol. For example "Astro2" and "Staturn_05" are acceptable server names. However "5Saturn" and "_Astro2" are not.

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3. **Enter the contact information for your company, including your company name and contact information for the Sun StorEdge 5210 NAS administrator. The Sun StorEdge 5210 NAS includes this information in any diagnostic e-mail messages sent. For more information about diagnostic e-mail messages, refer to "Sending a Diagnostic E-mail Message" on page 239.**
4. **Click Apply to save your settings.**

# Configuring the Network Ports

You can either enable DHCP or specify the IP address(s), netmask, broadcast, and network interface card (NIC) port role for each network port through the **Configure Network Adapters** panel. You can also add alias IP addresses for each NIC port.

You can bond two or more ports together to create a port bond. A port bond has higher bandwidth than the component ports assigned to it. More information and instructions for bonding network ports are provided in "Port Bonding" on page 60.

## Sun StorEdge 5210 NAS Port Locations

The Sun StorEdge 5210 NAS identifies ports in a predefined order based on their type and their physical and logical location on the server. Refer to your *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* to identify the network port locations for configuration. Note that system configurations vary and those shown are examples.

The relationship of network interface cards (NICs) to ports is shown in the *Hardware User Guide* located on your documentation CD.

# Configuring Network Adapters

To configure network adapters:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Configure Network Adapters.**

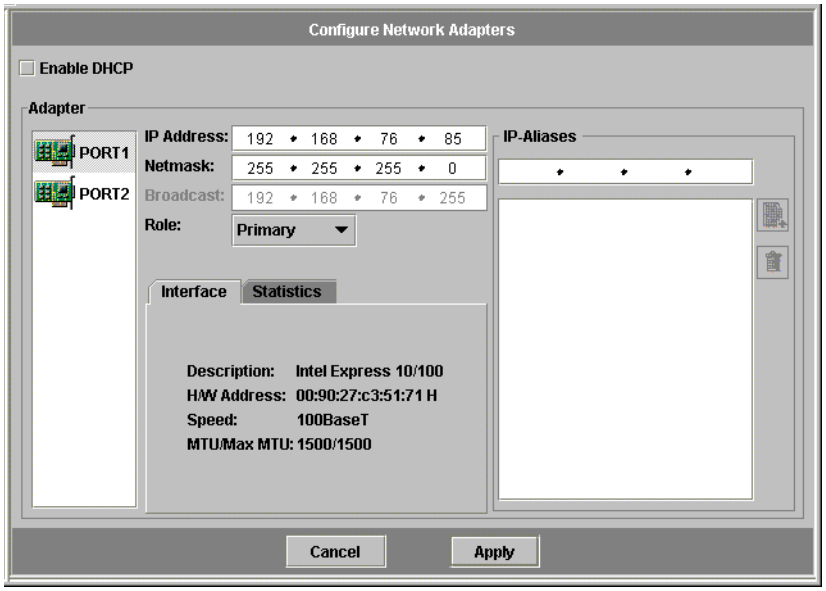


**FIGURE 2-2** Configuring Network Adapters

2. **If your network uses a DHCP server to assign IP addresses, select the Enable DHCP checkbox.**

   Clear this checkbox to enter a static IP address, subnet mask, or gateway address manually. If you do not enable DHCP, the netmask is still disabled if the port is a member of an aggregate port. See "Port Bonding" on page 60 for more information on creating and setting up aggregate ports.

3. **Select from the Adapter list the port you want to configure.**

   If you have already created a port bond and want to add alias IP addresses to it, select the port bond from this list. Individual ports are labeled *PORTx* and port bonds are labeled *BONDx*. For example, if you have bonded Port 2 and Port 3 to form BOND1, you cannot add alias IP addresses to Port 2 or Port 3. You can only add aliases to BOND1.

4. **Enter the IP address for the selected port or port bond.**

5. **Enter the Netmask for the selected port or port bond.**

   The read-only **Broadcast** field is filled automatically when you enter the IP address and netmask.

6. **For each port, select one of the following roles.**

   - **Primary—**The port role of **Primary** identifies an active network port.

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   **Note –** At least one port must be assigned a primary role.

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   - **Independent**—The port role of **Independent** identifies an active network port used for purposes other than serving data, such as backup.

7. **To add an alias IP address to the selected port, enter it in the IP-Aliases field, then click the**  **button to add it to the IP-Aliases list.**

   You can set up to nine aliases. To remove an alias from the list, select it and click the  button. Changes are not saved until you click **Apply**.

8. **Repeat steps 3-7 for all ports in the Adapter list.**

9. **Click Apply to save your settings.**

# Setting the Default Gateway Address

The default gateway address is the IP address of the gateway or router on the local subnet that is used by default to connect to other subnets. A gateway or a router is a device that sends data to remote destinations.

To specify the default gateway address for the Sun StorEdge 5210 NAS server:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Set Gateway Address.**

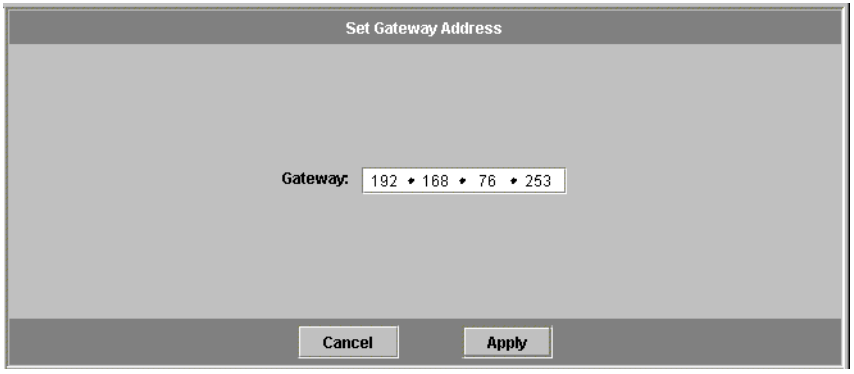


**FIGURE 2-3** The Set Gateway Address Panel

2. **Enter the gateway address in the Gateway text box.**
3. **Click Apply to save your settings.**

# Name Services

This section describes setting up Windows security, WINS, DNS, NIS, NIS+, and configuring name services.

For more detail about name services, refer to Chapter 7, "Name Services" on page 69.

# Configuring Windows Security

Configuring the domain, workgroup, or Active Directory Service (ADS) is a Windows function. If you are running a pure UNIX network, you do not need to configure either Windows Domains or Windows Workgroups.

Enable Windows Workgroup, NT Domain security, or ADS through the **Configure Domains and Workgroups** panel. By default, your Sun StorEdge 5210 NAS is configured in Windows Workgroup mode, with a workgroup name of "workgroup."

To configure Windows security:

1. **In the navigation panel, select Windows Configuration > Configure Domains and Workgroups.**

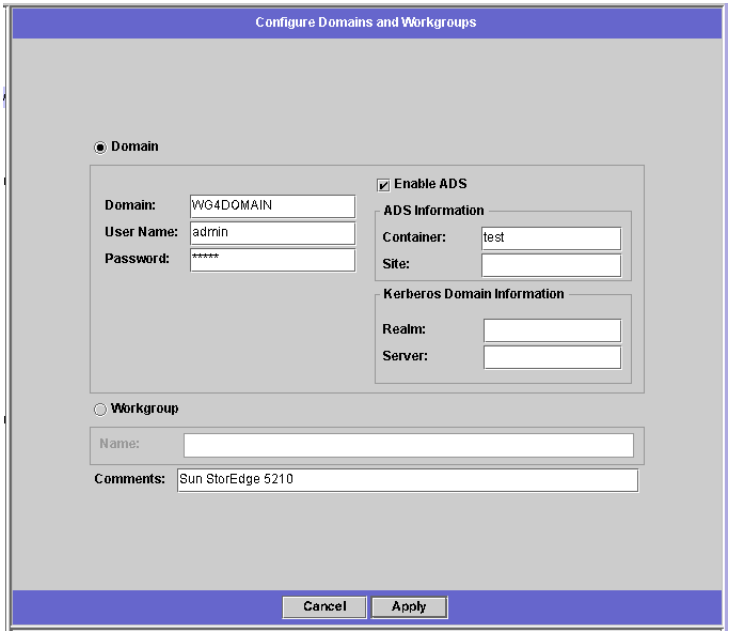


**FIGURE 2-4** The Configure Domains and Workgroups Panel

2. **To enable Windows domain security, select the Domain option button. This option creates an account on the domain for this server. You must specify a user account with rights to add servers to the specified domain.**

   Then enter the following:

   a. **Enter the name of the domain in the Domain field. This name must conform to the 15-character NetBIOS limitation.**

b. **Enter the name and password of the administrative domain user in the User Name and Password fields. The user name can be 16 characters or fewer.**

3. **To enable Windows workgroup security, click the Workgroup option button.**

   Then enter the following:

   a. **Enter the name of the workgroup in the Name field. This name must conform to the 15-character NetBIOS limitation.**

   b. **In the Comments field, enter a description of the Sun StorEdge 5210 NAS server (optional).**

4. **To enable ADS, click the Enable ADS checkbox. For more detail about ADS, refer to "Active Directory Services" on page 70.**

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**Note –** Prior to enabling ADS, you must verify that the Sun StorEdge 5210 NAS time is within five minutes of any ADS Windows 2000 domain controller. To verify the Sun StorEdge 5210 NAS time, select **System Operations > Set Time and Date** from the navigation panel.

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Then enter the following:

a. **In the Domain field, enter the Windows 2000 Domain in which ADS is running. The Sun StorEdge 5210 NAS must belong to this domain.**

b. **In the User Name field, enter the user name of a Windows 2000 user with administrative rights. This person must be the domain administrator or a user who is a member of the domain administrators group. The ADS client verifies secure ADS updates with this user.**

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**Note –** If you enter the domain administrator name here and the ADS update fails, you must change the domain administrator password (on the domain controller). Only the administrator user must do this and can reuse the same password. For more information, refer to the Microsoft Support Services Web site, Article Q248808.

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c. **In the Password field, enter the Windows 2000 administrative user's password.**

d. **In the Container field, enter the ADS path location of the Windows 2000 administrative user in Lightweight Directory Access Protocol (LDAP) distinguished name (DN) notation. For more information, see "Active Directory Services" on page 70.**

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**Note –** Do not include the domain name in the path.

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e. **Enter the name of the local ADS site in the Site field.**

f. **In the Kerberos Realm Info section, enter the Realm name used to identify ADS. This is normally the ADS domain or the DNS domain. When you click Apply, this entry is converted to all upper-case letters.**

g. **In the Server field, enter the host name of the Kerberos Key Distribution Center (KDC) server. This is usually the host name of the main domain controller in the ADS domain. You can leave this field blank if the Sun StorEdge 5210 NAS can locate the KDC server through DNS.**

5. **Click Apply to save your settings. If you change the security mode from workgroup to NT domain, or vice versa, the server automatically reboots when you click Apply.**

# Setting Up WINS

Windows Internet Name Services (WINS) is a Windows function. If you are running a pure UNIX network, you do not need to set up WINS.

To set up WINS:

1. **In the navigation panel, select Windows Configuration > Set Up WINS.**

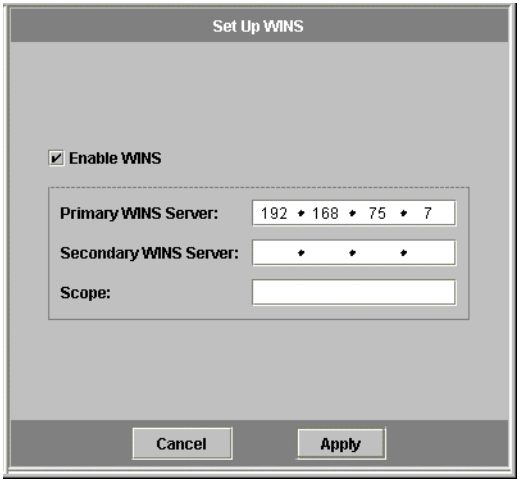


**FIGURE 2-5** The Set Up WINS Panel

2. **To enable WINS, click the Enable WINS checkbox. Checking this box makes the Sun StorEdge 5210 NAS server a WINS client.**

3. **Enter the IP address of the Primary WINS Server in the space provided.**

   The primary WINS server is the server consulted first for NetBIOS name resolution. If the primary WINS server does not respond, the Sun StorEdge 5210 NAS consults the secondary WINS server.

4. **Enter the Secondary WINS Server in the space provided.**

   If the primary WINS server does not respond, the Sun StorEdge 5210 NAS consults the secondary WINS server.

5. **Enter the NetBIOS Scope identifier (optional) in the Scope field.**

   Defining a scope will prevent this computer from communicating with any systems that are outside the scope. The scope is useful if you want to divide a large Windows workgroup into smaller groups. If you use a scope, the scope ID must follow NetBIOS name conventions or domain name conventions and is limited to 16 characters.

6. **Click Apply to save your settings.**

## Setting Up DNS

DNS (Domain Name System) resolves host names to IP addresses for your Sun StorEdge 5210 NAS system.

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**Note –** If you are using DNS without Dynamic DNS, add the Sun StorEdge 5210 NAS server's host name and IP address to your DNS database before you enter the values in this panel. If you are using Dynamic DNS, you do not need to manually update the DNS database. See your DNS documentation for more information.

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To set up DNS:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Set Up DNS.**

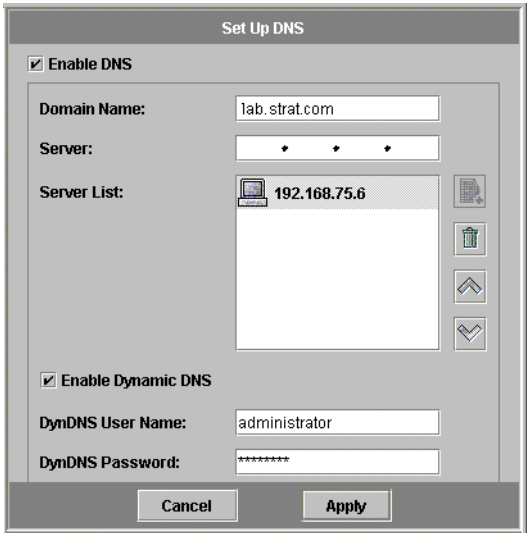



**FIGURE 2-6** The Set Up DNS Panel

2. **Select the Enable DNS checkbox.**
3. **Enter the DNS server Domain Name.**
4. **Enter the IP address of a DNS Server you want to make available to the network, then click the button to add the server to the Server List. Repeat this step for each DNS server you want to add. You can add a maximum of two DNS servers to this list.**

   A Network node first queries the DNS server at the top of the server list for domain name resolution. If that server cannot resolve the request, the query goes to the next server on the list.

5. **To rearrange the search order of the DNS servers in the list, click on the server you want to move and click the or buttons. To remove a server from the list, select the server IP address and click .**
6. **Select the Enable Dynamic DNS checkbox to let a Dynamic DNS client add the Sun StorEdge 5210 NAS into the DNS namespace. (Do not enable this option if your DNS server does not accept dynamic updates.) You must also configure the**

**Kerberos realm and KDC server in "Configuring Windows Security" on page 20. If you enable Dynamic DNS by selecting this checkbox, non-secure dynamic updates occur automatically if they are allowed by the DNS server.**

7. **To enable secure Dynamic DNS updates, complete the following information. This information is not required for non-secure updates.**

   a. **In the DynDNS User Name field, enter the user name of a Windows 2000 user with whom the dynamic DNS client can verify secure dynamic DNS updates. This user must reside within the ADS domain and Kerberos realm specified in the Configure Domains and Workgroups panel described in "Configuring Windows Security" on page 20.**

---

**Note –** If you enter the domain administrator name here and the ADS update fails, the domain administrator must change his password (on the domain controller). Only the administrator user must do this, and he can reuse the same password. For more information, refer to the Microsoft Support Services Web site, Article Q248808.

---

   b. **In the DynDNS Password, enter the password of the DynDNS user. If you update this field, delete the entire password before entering a new one.**

8. **Click Apply to save your settings.**

# Setting Up NIS

Network Information Service (NIS) is a UNIX function. If you are running a pure Windows network, you do not need to set up NIS.

The **Set Up NIS** panel lets you enable NIS and specify the domain name and server IP address.

To set up NIS:

1. **In the navigation panel, select UNIX Configuration > Set Up NIS.**

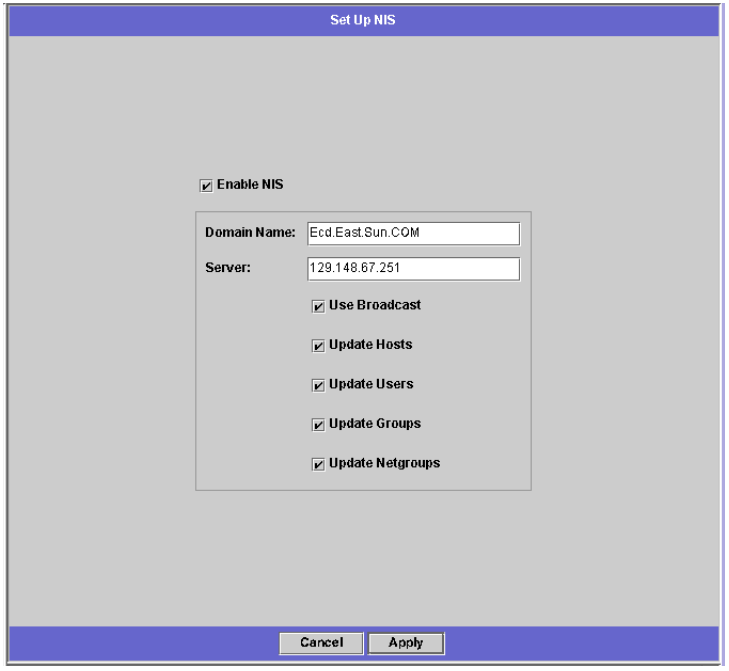



**FIGURE 2-7** The Set Up NIS Panel

2. **Select the Enable NIS checkbox. Enabling NIS creates a central database on the Sun StorEdge 5210 NAS for host, user, and group information.**

3. **Enter the name of the domain you want to use for NIS services in the Domain Name field. Use the DNS naming convention (for example, hostname.domain.com).**

4. **Enter the IP address or name of the NIS server in the Server field.This is the server from which the database is imported.**

   Leave the **Server** field blank if you do not know the server IP address. However, if you leave the **Server** field blank, you must select the **Use Broadcast** checkbox. **Use Broadcast** automatically acquires the appropriate IP address of the NIS server.

5. **Select the Use Broadcast checkbox to automatically acquire the NIS server IP address.**

6. **Select the Update Hosts checkbox to download host information from the NIS server to the Sun StorEdge 5210 NAS server.**

7. **Select the Update Users checkbox to download user information from the NIS server to the Sun StorEdge 5210 NAS server.**
8. **Select the Update Groups checkbox to download group information from the NIS server to the Sun StorEdge 5210 NAS server.**
9. **Select the Update Netgroups checkbox to download netgroup information from the NIS server to the Sun StorEdge 5210 NAS server.**
10. **Click Apply to save your changes.**

## Setting Up NIS+

Network Information Services Plus (NIS+) is a UNIX function. If you are running a pure Windows network, you do not need to set up NIS+.

---

**Note –** There is no relation between NIS+ and NIS. The commands and structure of NIS+ are different from NIS.

---

To set up NIS+:

1. **For the Sun StorEdge 5210 NAS to function correctly in an NIS+ environment, you must add the Sun StorEdge 5210 NAS to the host credential file on the NIS+ server. Complete the following steps at your NIS+ server:**

   a. **Log in as root.**

   b. **Enter the following command:**

   ```
   nisaddcred -p unix.SERVER@DOMAIN -P SERVER.DOMAIN. des
   ```

   where *SERVER* is the name of the Sun StorEdge 5210 NAS server, and *DOMAIN* is the name of the NIS+ domain that the Sun StorEdge 5210 NAS is joining.

---

**Note –** You must add a period to the end of the domain name only after the **`-P`** argument.

---

   For example, if the Sun StorEdge 5210 NAS is named **SS1**, and its NIS+ domain is **sun.com**, enter:

   ```
   nisaddcred -p unix.ss1@sun.com -P ss1.sun.com. des
   ```

   c. **You are prompted for a password. This password is also used later in this procedure for configuring the Sun StorEdge 5210 NAS to use NIS+. Enter the password.**

2. **From a remote client, open a Web browser window to the Sun StorEdge 5210 NAS server and log into Web Administrator.**

3. **In the navigation panel, select UNIX Configuration > Set Up NIS+.**

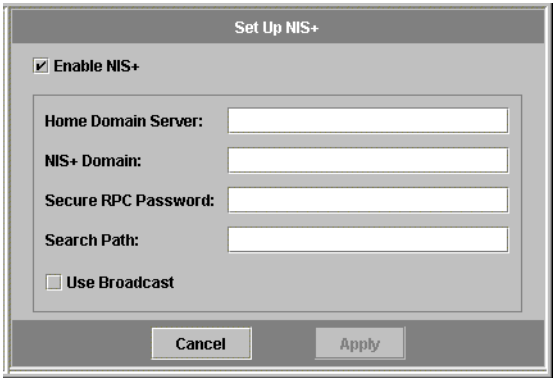



**FIGURE 2-8** The Set Up NIS+ Panel

4. **Select the Enable NIS+ checkbox.**

5. **In the Home Domain Server field, enter the NIS+ home domain server IP address.**

   If you don't know the home domain server IP address, leave this field blank and select the **Use Broadcast** checkbox. When this option is selected, the Sun StorEdge 5210 NAS automatically acquires the appropriate IP address for the home domain server.

6. **In the NIS+ Domain field, enter the NIS+ home domain.**

---

**Note –** NIS + domain names must end with a period (".").

---

7. **Enter the Secure RPC Password for the NIS+ server. This is the password that was set during Step 1c. on page 27.**

8. **Enter the Search Path as a colon-separated list of domains. The search path identifies the domains that NIS+ searches through when looking for information. Leave this space empty to search only the home domain and its parents.**

   For Example: If the NIS+ domain is **eng.sun.com.** and the search path is blank, Sun StorEdge 5210 NAS first searches **eng.sun.com.** then **sun.com.**, and so on, when resolving names. Conversely, if you specify a search path like **sun.com.,** Sun StorEdge 5210 NAS searches only the domain of sun when resolving names.

9. **Select the Use Broadcast checkbox if you do not know the IP address of the home domain server (see step 5).**
10. **Click Apply to save your settings.**

## Configuring Name Services

Configuring name services is a UNIX function. If you are running a pure Windows network, you do not need to configure name services.

To configure name services:

1. **In the navigation panel, select UNIX Configuration > Configure Name Services.**

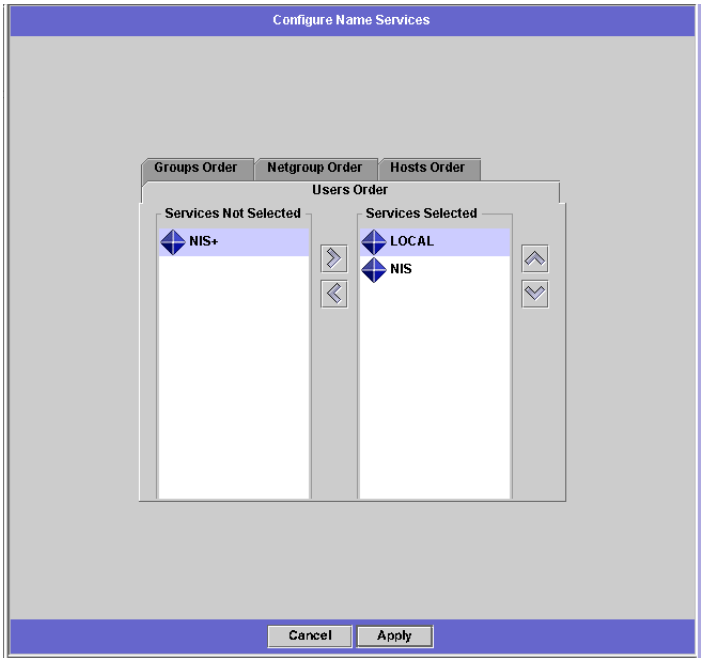



**FIGURE 2-9** The Configure Name Services Panel

2. **Add NIS or NIS+ service to the Services Selected list by selecting it and clicking the button.**
3. **Using the and buttons, set the order in which the server should use the name services (including NIS+) for user, group, and host name resolution.**
4. **Click Apply to save your settings.**

# Setting Up E-mail Notification

Set the SMTP (Simple Mail Transfer Protocol) server name and e-mail notification recipients in this screen. When the system detects an error, the Sun StorEdge 5210 NAS sends a notification e-mail message.

In order to ensure name resolution, you must have either set up the SMTP server host name in the **Configure Hosts** panel (see "Configuring Hosts" on page 87) or set up DNS (see "Setting Up DNS" on page 23).

To set up SMTP and send e-mail messages to the recipients:

1. **In the navigation panel, select Monitoring and Notification > Set Up Email Notification.**

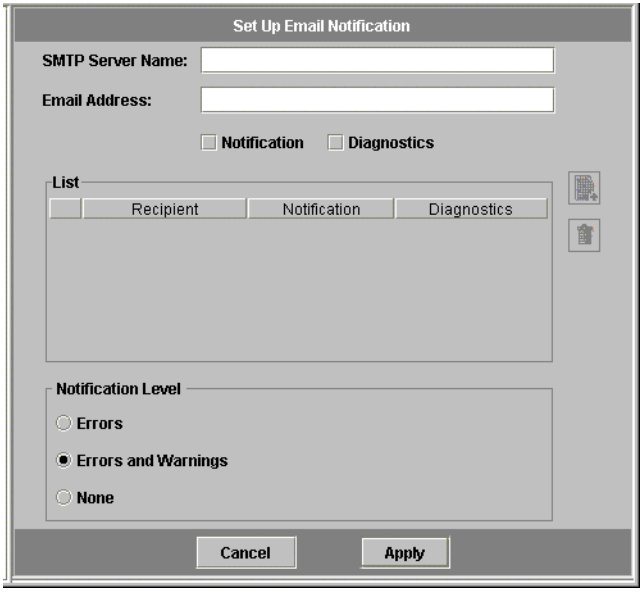



**FIGURE 2-10** The Set Up Email Notification Panel

2. **Enter the name of the SMTP server to which you want to send notification.**
3. **Enter the e-mail address of a person you want to automatically notify of system errors in the Email Address box.**
4. **Specify the types of e-mail for this recipient. Check Notification, Diagnostics, or both.**
5. **Select a notification level by clicking Error, Errors and Warnings, or None.**

6. **Click  to add the new recipient to the List of recipients. Repeat steps 1. - 5. for all recipients. You may enter a maximum of four e-mail addresses.**

   To remove someone from the list, select the address and click  .

7. **Select the Notification Level.**
   - Click the **Errors and Warnings** checkbox to notify recipients of all warnings and errors.
   - Click **Errors Only** to notify e-mail recipients of errors, but not warnings.
   - Click **None** to notify no one.

8. **Click Apply to save your settings.**

# Setting Up Logging

Enabling remote logging lets the Sun StorEdge 5210 NAS send its system log to a designated server and save it to a local archive. The designated server must be a UNIX server running **syslogd**. If you will be referring to the logging host by domain name, you must configure the DNS settings on the Sun StorEdge 5210 NAS server before you enable remote logging.

To set up remote and local logging:

1. **In the navigation panel, select Monitoring and Notification > View System Events > Set Up Remote Logging.**

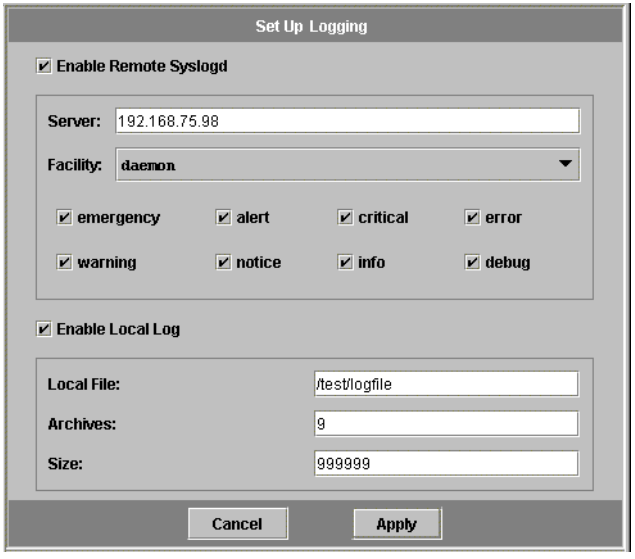



**FIGURE 2-11** The Set Up Remote Logging Panel

2. **Select the Enable Remote Syslogd box.**
3. **In the Server field, enter the DNS host name if you have configured the DNS settings. Otherwise, enter the IP address. This is where the system log is sent.**
4. **Select the appropriate Facility.**

   The facility indicates the application or system component generating the messages. *All messages sent to the syslogd server will have this facility value.* The possible facility values in the Set Up Remote Logging panel include:

   - **Kern—**Messages generated by the kernel. These cannot be generated by any user processes.

- **User—**Messages generated by random user processes. This is the default facility identifier if none is specified.
- **Mail—**The mail system.
- **Daemon—**System or network daemons.
- **Auth—**Authorization systems, such as login.
- **Syslog—**Messages generated internally by syslogd.
- **Local0 – Local7—**Reserved for local use.

5. **Select the type of system events the Sun StorEdge 5210 NAS logs by placing a check mark on the type of event (see "System Events" on page 142).**
6. **Check the Enable Local Log option to maintain a local log file.**

**Caution –** You must enable remote logging or create a log file on local disk to prevent the log from disappearing on system shutdown. When it first starts up, the Sun StorEdge 5210 NAS creates a temporary log file in volatile memory to retain any errors that might occur during initial startup.

7. **Enter the log file's path (directory on the NAS) and filename in the Log File field.**
8. **Enter the maximum number of archive files in the Archives field. The allowable range is from 1 to 9.**
9. **Type the maximum file size in kilobytes for each archive file in the Size field. The allowable range is from 1000 to 999,999 kilobytes.**
10. **Click Apply to save your settings.**

# Assigning the Language

The Sun StorEdge 5210 NAS operating system supports Unicode, officially known as the Unicode Worldwide Character Standard. Unicode lets you change the language of operating system messages quickly and easily.

To select the language:

1. **In the navigation panel, select System Operations > Assign Language.**


**FIGURE 2-12** The Assign Language Panel

2. **Select a language for the Sun StorEdge 5210 NAS from the languages displayed in the drop-down list.**
3. **Click Apply to save your setting.**

# Where to Go from Here

At this point, your Sun StorEdge 5210 NAS is in full communication with the network. However, before your users can begin storing data, you must set up the file system and establish user access rights. The next chapter, "Initial File System Setup" on page 35, describes the initial setup of a file system. It does not cover all of the possible functions of the file system.

To set up quotas, shares, exports, or other access controls, see "Shares, Quotas, and Exports" on page 97 for detailed instructions. If there is a specific function you want to set up, look it up in the index to find the instructions.

CHAPTER 3

# Initial File System Setup

This chapter covers initial file system setup. However, it does not cover all of the file system functions of the Sun StorEdge 5210 NAS. If there is a feature that you want to set up that is not described in this chapter, look it up in the index to find the instructions.

The Sun StorEdge 5210 NAS combines and simplifies the process of establishing the file system. Because some of the processes have been combined to simplify them, some of the terminology can be confusing. File system concepts are described below.

## File System Concepts

The following paragraphs provide definitions of some of the basic file system concepts and attributes used in the following discussions. Familiarize yourself with these terms.

### RAID

RAID stands for Redundant Array of Independent Disks. RAID systems allow data to be distributed to multiple drives through an array controller for greater performance, data security, and recoverability. The basic concept of a RAID is to combine a group of smaller physical drives into what looks to the network as a single very large drive. From the perspective of the computer user, a RAID looks exactly like a single drive. From the perspective of the system administrator, the physical component of the RAID is a group of drives, but the RAID itself can be administered as a single unit. There have been many types of RAIDS defined by various groups and all have their strengths and weaknesses. The Sun StorEdge 5210 NAS supports RAID 5. Also, a group of drives that have not been combined into a RAID set are referred to as an expansion unit.

## RAID 5

The RAID 5 array claims the best of both the performance improvements of *striping* and the redundancy of *mirroring*, without the expense of doubling the number of drives in the overall array.

Striping means that data is divided into stripes. One stripe is written to the first drive, the next to the second drive, and so on. The primary advantage of striping is the ability for all drives in the array to process reads and writes simultaneously. Simultaneous access greatly speeds both writes and reads.

RAID 5 uses striping and *parity* information. Parity information is data created by combining the bits in the information to be stored and creating a small amount of data from which the rest of the information can be extracted.

In other words, the parity information repeats the original data in such a way that if part of the original is lost, combining the remainder of the original and the parity data reproduces the complete original.

The RAID 5 array includes the parity information as one of the stripes in the stripe arrangement. If one drive in the array fails, the parity information and the remaining portion of the original data from the surviving drives are used to rebuild the now missing information from the failed drive. Thus the RAID 5 array combines the fault tolerance of the mirror with the performance of the stripes and produces the best overall RAID type. It also has the advantage of requiring very little "extra" space for the parity information, making it a less expensive solution as well. Recovery from a drive failure and normal operation do carry some overhead as the parity information is used to rebuild the RAID set and extracted, respectively.

---

**Warning –** Do not update system software or RAID firmware when the RAID subsystem is in critical state, creating a new volume, or rebuilding an existing one.

---

# LUN

LUN stands for Logical Unit Number and identifies the logical representation of a physical or virtual device. In the Sun StorEdge 5210 NAS there is a one to one correspondence between RAID sets and LUNs. However, the Sun StorEdge 5210 NAS manages LUNs as independent entities. The Sun StorEdge 5210 NAS treats the LUN as a single storage volume.

By treating LUNs this way, the Sun StorEdge 5210 NAS greatly simplifies the process of establishing a file system. The space on the RAID set is accessed independently of the physical drive limits through the LUN.

Management of the storage resources of the Sun StorEdge 5210 NAS is accomplished through the LUN, with little direct management of the RAID sets themselves. See "Creating a RAID/LUN" on page 39 for directions and more information on setting up both RAID sets and LUNs.

# Partition

Partitions are sections on a LUN and provide a way to subdivide the total space available within a LUN. The Sun StorEdge 5210 NAS operating system supports a maximum of 31 partitions per LUN.

When a LUN is first created, all of the available space is located in the first partition and any others are empty. To use the space in a partition, you must create a file volume. Each partition can contain only one file volume, though a single file volume can span several partitions. When you make a file volume, the size of the partition is automatically adjusted to match the size of the file volume. Any additional space on the LUN is automatically assigned to the next partition. Once you have made all of the file volumes the operating system supports, any extra space on that LUN is inaccessible.

You can increase the size of a file volume by attaching a segment (see "Segment" on page 38) The segment is essentially another file volume with special characteristics. When you add a segment to an existing volume, the two become inseparable and the only thing the user sees is more space in the volume. The flexibility of this system allows you to create a file volume and then to expand it as needed without disturbing your users and without forcing them to spread their data over several volumes.

While the system administrator may be adding drives, entire RAID sets, and LUNs, all that the user sees is that there is more space within the volume.

# File Volume

File volumes define the spaces that are available for storing information, and are created from partitions that have available space. If the volume does not use up all the available space in a partition, the remaining space is automatically allocated into the next partition. After four volumes are created on a LUN, any remaining space on that LUN is inaccessible. New file volumes are limited to 255 GB in size. To create a larger file volume, you can create and attach up to 63 segments (see *Segment* below) to the original file volume.

From the user's point of view, the file volume and any directory structures within it are all that he needs to concern himself with. If the file volume begins to fill up, the administrator can attach another segment and increase the available space within

that file volume. In physical terms, this may involve adding more drives, RAID sets, even entire NAS (Network Attached Storage) units. However, the physical aspect is invisible to the user. All the user sees is more storage space within the volume.

## Segment

Segments are “volumes” of storage space created much like file volumes and they can be “attached” to an existing file volume at any time. Attaching a segment increases the original file volume’s total capacity. Each segment must be created independently and then attached to a file volume. Once attached to a file volume, the volume and the segment are inseparable.

In general, segments are created as needed and attached to volumes as the volumes begin to fill with data. The main advantage of adding space by attaching segments is that you can create the segment on a new drive, or even a new array and, once attached to the original file volume, the different physical storage locations are invisible to the user. Therefore space can be added at need, without bringing down the network to restructure the data storage and create a bigger file volume.

# Establishing the File System

Establishing the file system requires three fundamental steps.

1. Establish the hardware configuration.
2. Define the software configuration.
3. Create a file system.

In the Sun StorEdge 5210 NAS, many of the tasks associated with these steps are automatically performed, greatly simplifying the task of creating functional storage space from new disks.

The Sun StorEdge 5210 NAS combines the creation and definition of the RAID set into the definition of the LUN. (See "File System Concepts" on page 35 for more information.) In effect, you create both objects simultaneously. The Sun StorEdge 5210 NAS lets you choose the basic structure of the RAID set and defines the LUN, automating the many tasks usually associated with defining a RAID set.

The Sun StorEdge 5210 NAS also automates the definition of partitions. Partitions are automatically defined when you create a LUN. Initially, the Sun StorEdge 5210 NAS has a LUN containing two volumes, vol01A and vol01B. Vol01A is the default volume of about 256GB plus a segment of about 30GB.

# Creating a RAID/LUN

RAID sets and LUNs are created simultaneously in Sun StorEdge 5210 NAS, simplifying the process of establishing both.

## Adding a LUN

When adding a LUN, be sure that you have not assigned the disks in the LUN another function (for example, hot spare) prior to LUN creation. Any drive which has been assigned to another LUN or as a hot spare is not available for inclusion in a new LUN.

To add a new LUN:

1. **In the navigation panel, select RAID > Manage RAID.**

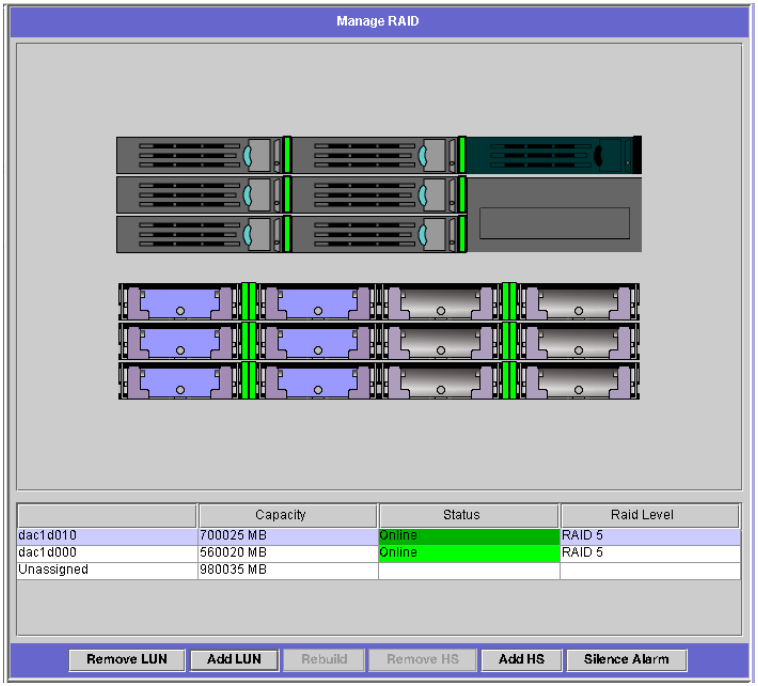



**FIGURE 3-1** The Manage RAID Panel with Expansion Unit

2. **Click Add LUN.**

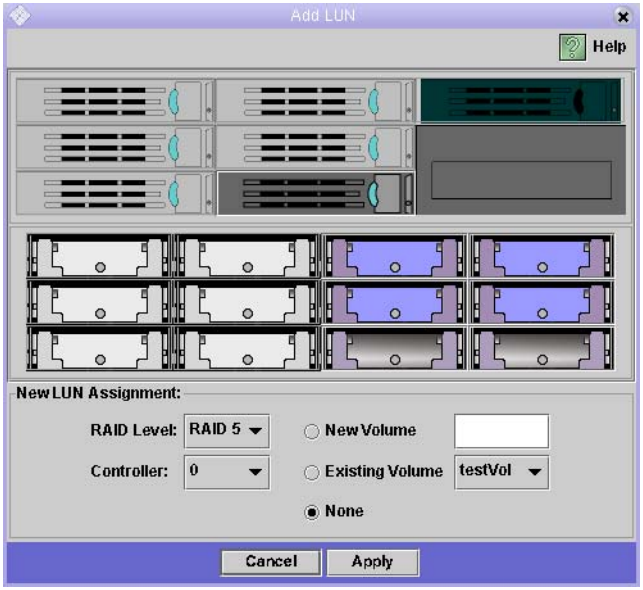



**FIGURE 3-2** The Add LUN Dialog Box

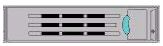
---

**Note –** If you have additional LUNs, the dialog box will appear differently than that shown above. Sun StorEdge 5210 NAS systems that include the expansion units display the additional drives for inclusion in new LUNs.

---

3. **Select the drives that will belong to the LUN by clicking each drive image. You must select at least three drives. If only three drives are available, they are automatically selected. The drive images show the status of each drive:**

**TABLE 3-1** Add LUN Dialog Box Drive Status Indicators

| Drive (5210) | Drive (5210 EU) | Meaning |
|---|---|---|
|  |  | The drive in this slot is available for LUN membership |
|  |  | The drive in this slot has been selected for LUN membership. |
|  |  | The drive in this slot cannot be selected because it has another role. |
|  |  | No drive is present in this slot |

4. **Choose one of the following options for the new LUN:**
   - **New Volume—**Select this option to create a new volume for this LUN. Type the name of the new volume in the space provided.
   - **Existing Volume—**Select this option if the purpose of this LUN is to add disk space to an existing volume (to create and attach a segment). Then select the volume you are expanding from the drop-down list.
   - **None—**Select this option to create a new LUN without assigning it a name.
5. **Click Apply to add the new LUN. Allow several hours for the system to create the LUN.**

## Designating a Hot Spare

To designate a drive as a hot spare:

1. **In the navigation panel, select RAID > Manage RAID.**
2. **Click the Add HS button at the bottom of the screen.**

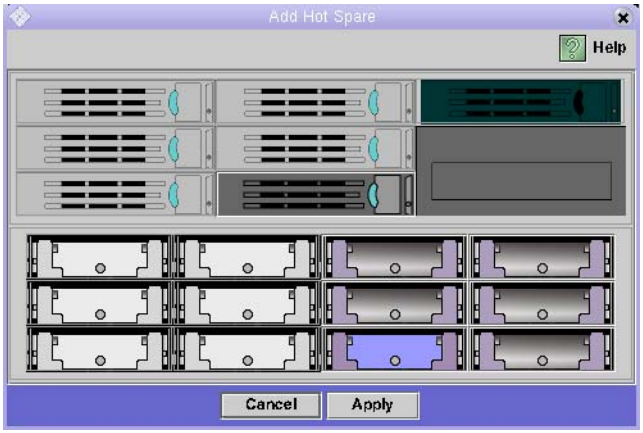



**FIGURE 3-3** The Add Hot Spare Dialog Box

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**Note –** Sun StorEdge 5210 NAS systems that include the Expansion Unit storage module display the additional drives for selection as hot spares.

---

3. **Select the drive you want by clicking the drive image. Be sure that the disk you use as a hot spare is at least as large as the largest disk in any LUN on this Sun StorEdge 5210 NAS unit.**

The drive images show the status of each drive as follows

**TABLE 3-2** Add Hot Spare Drive Status Images

| Drive | Indication |
|---|---|
|  | The drive in this slot is available as a hot spare. |
|  | The drive in this slot has been selected as a hot spare. |
|  | The drive in this slot cannot be used as a hot spare because it already has another designation. |
|  | No drive is present in this slot. |

4. **Click Apply to add the new hot spare.**

# Creating a File Volume or a Segment

New file volumes are limited to 255 GB in size. To create a larger file volume, you can add up to sixty-three (63) segments to the primary volume. If you want a larger file volume, create one primary volume and up to 63 segments. Then attach the segment(s) to the primary volume to increase its size.

A file volume or segment can be created using the Create File Volume panel or the System Manager.

## Create a File Volume or Segment Using the Create File Volume Panel

1. **In the navigation panel, select File Volume Operations > Create File Volumes.**

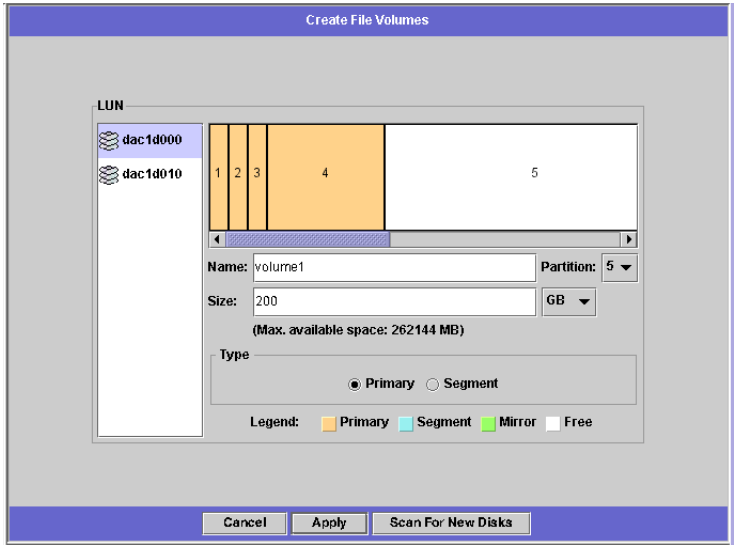


**FIGURE 3-4** The Create File Volumes Panel

2. **In the LUN box, click the LUN where you want to create the primary file volume.**

   The partition number for the file volume in the **Partition** drop-down list will automatically increment when the file volume is created.

3. **Type in the name of the new volume or segment in the Name field.**

   Valid characters include alphanumeric (a–z, A–Z, 0–9) and "_" (underscore) characters. The name must be 12 characters or fewer and must begin with an alphabetical character (a–z, A–Z).

4. **Select the file volume type (Primary or Segment).**

5. **Select whether the size of the file volume is reported in MB (megabytes) or GB (gigabytes) by clicking on the drop-down list.**

6. **Type in the file volume Size in whole numbers. The total space available is shown directly beneath this field.**

7. **Click Apply to create the new file volume or segment.**

## Create a File Volume or Segment Using the System Manager

1. **Right-click System Manager in the Navigation Panel.**
2. **Click Create Volume... or Create Segment... on the pop-up menu to open the desired dialog box.**
3. **In the LUN box, click the LUN where you want to create the primary file volume.**

   The partition number for the file volume in the **Partition** drop-down list will automatically increment when the file volume is created.
4. **Type in the name of the new volume or segment in the Name field.**

   Valid characters include alphanumeric (a–z, A–Z, 0–9) and "_" (underscore) characters. The name must be 12 characters or fewer and must begin with an alphabetical character (a–z, A–Z).
5. **Select the file volume type (Primary or Segment).**
6. **Select whether the size of the file volume is reported in MB (megabytes) or GB (gigabytes) by clicking on the drop-down list.**
7. **Type in the file volume Size in whole numbers. The total space available is shown directly beneath this field.**
8. **Click Apply to create the new file volume or segment.**

## Attaching Segments to a Primary File Volume

Attaching segments to a primary file volume expands its size. The segment becomes permanently associated to the volume and cannot be removed. In other words, the process cannot be reversed. You must create a segment before you can attach it to a volume. Refer to "Creating a File Volume or a Segment" on page 43 for instructions.

---

**Caution –** Attaching a segment to a primary file volume cannot be reversed.

---

A file volume by itself is limited to 255 GB; however, up to 63 segments from any LUN can be attached to any file volume. Each segment can be as small as 8 MB and as large as 255 GB.

A segment can be attached using the Attach Segments panel or the System Manager.

*Attach a Segment Using the Attach Segments Panel*

1. **Access the Attach Segments panel by clicking File Volume Operations > Attach Segments.**

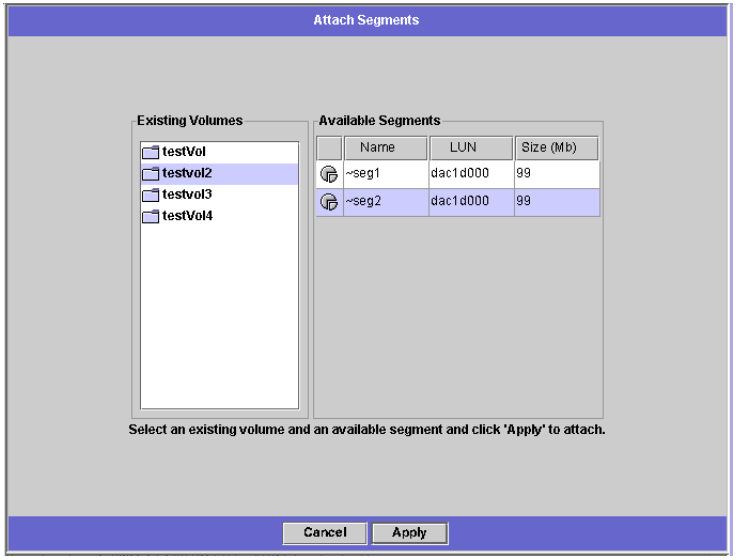


**FIGURE 3-5** The Attach Segments Panel

2. **Click to select the desired volume from the Existing Volumes box.**
3. **Click to select the desired segment from the Available Segments box.**
4. **Click Apply to attach.**

*Attach a Segment Using the System Manager*

1. **Click System Manager in the Navigation pane to view existing volumes.**
2. **Right-click the desired file volume to access the pop-up menu, and select Attach Segment... .**

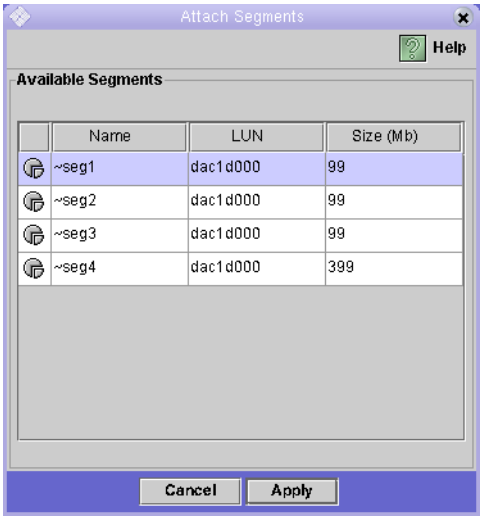


**FIGURE 3-6** Available Segments

3. **Click to select the desired segment. Only one segment can be selected and attached at a time.**
4. **Click Apply to attach the selected segment. Repeat Steps 3 and 4 to attach more segments.**

# Where to Go from Here

At this point, your file system is set up and ready to use. From here, you need to set up access privileges, quotas, and whatever directory structures you need. These management functions are described beginning in Chapter 4, "System Management" on page 49.

Monitoring functions, which are essential to managing resources, are covered in Chapter 11, "Monitoring" on page 137. Maintenance functions like backup and restore are covered in Chapter 12, "System Maintenance" on page 159.

CHAPTER 4

# System Management

This chapter describes several basic system management functions. Many of these functions are primarily used only during initial system setup. However, they are available if you ever need to reset them.

## Setting the Administrator Password

To set the administrator password:

1. **In the navigation panel, select System Operations > Set Administrator Password.**

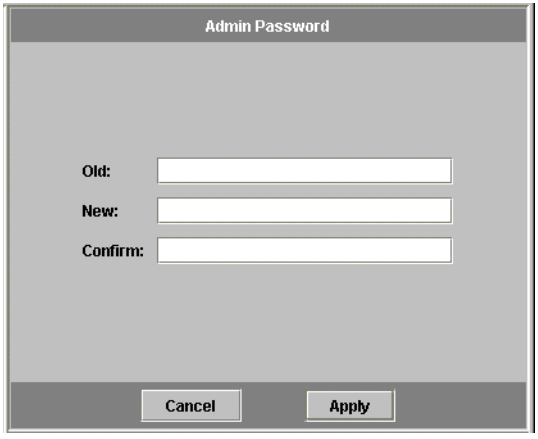


**FIGURE 4-1** The Admin Password Panel

2. **Enter the old password (if any) in the Old Password field. If there is no password, leave this field blank.**

3. **Enter the new password in the New Password field. The password must be at least 1 and no more than 21 characters long. There are no limitations on character type.**
4. **Enter the new password again in the Confirm Password field.**

   If you want to disable passwords, leave the **New Password** and **Confirm Password** fields blank.
5. **Click Apply to save your changes.**

# Controlling the Time and Date

Controlling the time and date on the Sun StorEdge 5210 NAS is essential for controlling file management. This section describes the functions available to maintain the correct time and date on the Sun StorEdge 5210 NAS.

## About Time Synchronization

The Sun StorEdge 5210 NAS supports two types of time synchronization; Network Time Protocol (NTP) protocol or RDATE time protocol. You can configure the Sun StorEdge 5210 NAS to synchronize its time with either NTP or an RDATE server.

- NTP is an Internet protocol used to synchronize the clocks of computers to a reference time source, such as a radio, satellite receiver, or modem. Typical NTP configurations use multiple redundant servers and diverse network paths to achieve high accuracy and reliability.
- The RDATE time protocol provides a site-independent date and time. RDATE can retrieve the time from another machine on your network. RDATE servers are commonly present on UNIX systems, and allow you to synchronize Sun StorEdge 5210 NAS server time with RDATE server time.

A third “method”, called manual synchronization, disables time synchronization. In this method, the system administrator sets the Sun StorEdge 5210 NAS time and it tracks time independently from the other nodes on the network.

## Setting Up Time Synchronization

You can set up either method of time synchronization in the **Set Up Time Synchronization** panel.

To set up time synchronization:

1. **In the navigation panel, select System Operations > Set Up Time Synchronization.**

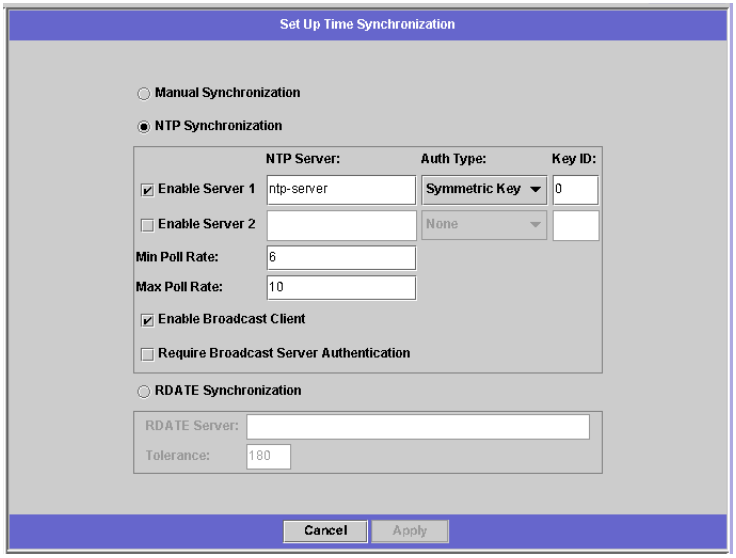


**FIGURE 4-2** The Set Up Time Synchronization Panel

2. **Choose one of the following three options:**
   - **Manual Synchronization—**Select this option if you do not want to use either NTP or RDATE time synchronization.
   - **NTP Synchronization—**If you want to use NTP synchronization and have at least one NTP server on the network, select this option button and complete the following:
     - **Enable Server 1—**To enable an NTP server, select the **Enable Server 1** checkbox and enter the information in the corresponding fields. Do the same with a second NTP server if you want. You can configure up to two NTP servers.
     - **Enable Server 2—**To enable a second, or alternate, NTP server, select the **Enable Server 2** checkbox and enter the information in the corresponding fields. You can configure up to two NTP servers.
     - **NTP Server—**Enter the name or IP address of the NTP server the Sun StorEdge 5210 NAS will poll for the current time.
     - **Auth Type—**Authentication support allows the Sun StorEdge 5210 NAS to verify that the server is known and trusted by using a key and key identifier. The NTP server and the Sun StorEdge 5210 NAS must agree on the key and key identifier to authenticate their messages. Choose the type of authentication you want to use, either **None** (do not use an authentication scheme) or **Symmetric Key**.

- **Key ID—**If you selected **Symmetric Key** as the authorization scheme in the previous field, enter the key identifier for this NTP server. The valid range for this value is **1** to **65534**.
- **Min Poll Rate—**Enter the minimum polling rate for NTP messages. This value, raised to the power of two, is the minimum number of seconds of the polling interval. For example, entering 4 means poll events occur at least 16 seconds apart. The valid range for this field is **4** to **17**.
- **Max Poll Rate—**Enter the maximum polling rate for NTP messages. This value, raised to the power of two, is the maximum number of seconds of the polling interval. For example, entering 4 means that poll events occur no more than 16 seconds apart. The valid range for this field is **4** to **17**, but must be larger than the minimum polling interval.
- **Enable Broadcast Client—**Select this checkbox for the Sun StorEdge 5210 NAS to respond to server broadcast messages received on any interface. This function is intended for configurations involving one or a few NTP servers with a large number of clients requiring time synchronization from those servers.
- **Require Broadcast Server Authentication—**Select this checkbox to require the NTP client to verify that a server which has broadcast messages to the Sun StorEdge 5210 NAS is a known and trusted server.

- **RDATE Synchronization—**To set up the RDATE server and tolerance window, select this checkbox and enter the following:
  - **RDATE Server—**Enter the name or IP address of the RDATE server.
  - **Tolerance—**Enter the maximum tolerance allowed for the time received from the RDATE server, from **0** to **3600** seconds. If the Sun StorEdge 5210 NAS server time is different than the RDATE server time by less than this number of seconds (+ or -), the Sun StorEdge 5210 NAS server time is synchronized with the RDATE server time. If there is a larger discrepancy, Sun StorEdge 5210 NAS server time is not automatically synchronized with the RDATE server. This check occurs every day at 11:45 PM.

3. **Click Apply to save your changes.**

# Setting the Time and Date Manually

To set the time and date for the Sun StorEdge 5210 NAS server:

1. **In the navigation panel, select System Operations > Set Time and Date.**

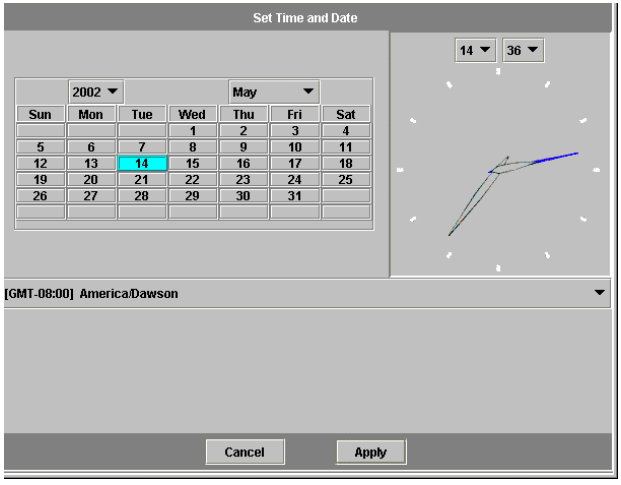


**FIGURE 4-3** The Set Time and Date Panel

2. **Select the correct year from the drop-down list box above the calendar and to the left.**
3. **Select the correct month from the drop-down list box above the calendar and to the right.**
4. **Click the correct date in the calendar.**
5. **Select the correct hour from the drop down list box above the clock and to the left. The values range from 0 (midnight) to 23 (11:00 PM).**
6. **Select the correct minute (0 to 59) from the drop-down list box above the clock and to the right.**
7. **Select the correct time zone from the drop-down list at the bottom of the screen. Selecting the correct time zone allows the Sun StorEdge 5210 NAS to automatically adjust the setting for Daylight Saving Time.**
8. **Click Apply to save your time and date settings.**

# Changing the Server Name

To change the Sun StorEdge 5210 NAS server name as it appears on the network:

1. **In the navigation panel, select Network Configuration > Set Server Name.**

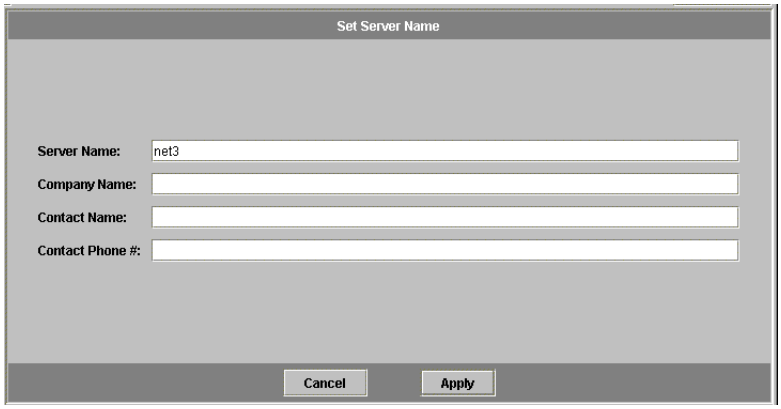


**FIGURE 4-4** The Set Server Name Panel

2. **Enter the Sun StorEdge 5210 NAS server name in the Server Name box. This name identifies the Sun StorEdge 5210 NAS on the network. The server name can include alphanumeric (a–z, A–Z, 0–9), "-" (dash), "_" (underscore), and "." (period) characters.**

---

**Note –** The server name must begin with a letter (a–z or A–Z), not a number or a symbol. For example "Astro2" and "Saturn_05" are acceptable server names. However "5Saturn" and "_Astro2" are not.

---

3. **Enter the contact information for your company, including your company name and contact information for the Sun StorEdge 5210 NAS administrator. The Sun StorEdge 5210 NAS includes this information in any diagnostic e-mail messages sent. For more information about diagnostic e-mail messages, refer to "Sending a Diagnostic E-mail Message" on page 239.**

4. **Click Apply to save your settings.**

# Resetting the Language

The Sun StorEdge 5210 NAS operating system supports Unicode, officially known as the Unicode Worldwide Character Standard. Ordinarily, you assign the language when you run the wizard during initial system setup. However, if you need to reset the language at a later time, you can set it manually.

To select the language in which system commands, reports, and prompts are displayed:

1. **In the navigation panel, select System Operations > Assign Language.**


**FIGURE 4-5** The Assign Language Panel

2. **Select a language for the Sun StorEdge 5210 NAS from the languages displayed in the drop-down list.**
3. **Click Apply to save your changes.**

CHAPTER 5

# Managing System Ports

This chapter describes the setup and configuration of the network ports.

You can either enable DHCP or specify the IP address(s), netmask, broadcast address, and port role (dual-head models only) for each port through the **Configure Network Adapters** panel. You can also add alias IP addresses for each port.

You can bond two or more ports together to create a port bond. A port bond has higher bandwidth than the component ports assigned to it.

## Sun StorEdge 5210 NAS Port Locations

The Sun StorEdge 5210 NAS identifies ports in a predefined order based on their type and their physical and logical location on the server. Refer to your *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* to identify the port locations for your Sun StorEdge 5210 NAS.

Each port must have an assigned role. The possible roles are:

- **Primary**—The port role of **Primary** identifies an active network port. At least one port must be assigned a primary role.
- **Independent**—The port role of **Independent** identifies an active network port used for purposes other than serving data, such as backup.

# About Alias IP Addresses

IP Aliasing is a networking feature that lets you assign multiple IP addresses to a single port. All of the IP aliases for the selected port must be on the same physical network and share the same *netmask* and *broadcast address* as the first, or **primary**, IP address specified for the selected port.

You can add up to nine alias IP addresses to the primary IP address of each port. Therefore, a single network interface card (NIC) with two ports could provide up to 20 usable IP addresses.

# Configuring Network Ports

To configure network ports:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Configure Network Adapters.**

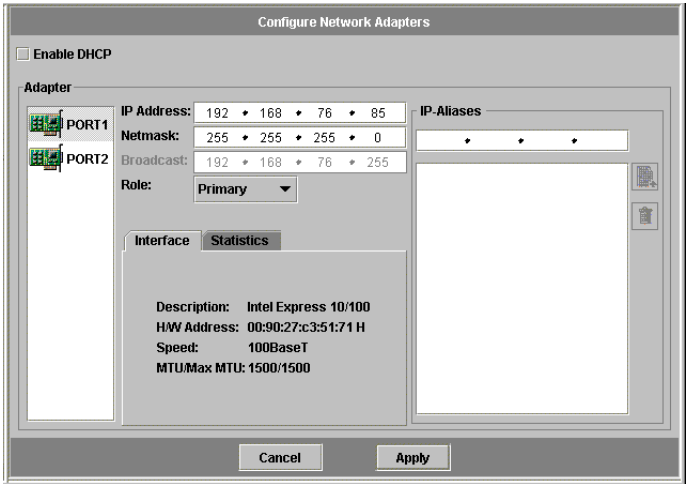


**FIGURE 5-1** The Configure Network Adapters Panel

2. **If your network uses a DHCP server to assign IP addresses and you want to enable it, select the Enable DHCP checkbox.**

   Enabling DHCP allows the Sun StorEdge 5210 NAS server to dynamically acquire an IP address from the DHCP server. Clear this checkbox to manually enter a static IP address, subnet mask, or gateway address. If you do not enable DHCP, the netmask is still disabled if the port is a member of an aggregate port. See "Port Bonding" on page 60 for more information on creating and setting up aggregate ports.

3. **Select from the Adapter list the port you want to configure.**

   If you have already created a port bond and want to add alias IP addresses to it, select the port bond from this list. (See "Port Bonding" on page 60 for more information on creating port bonds.) Independent ports are labeled *PORTx* and port bonds are labeled *BONDx*.

   Once you create a port bond, you cannot add alias IP addresses to the individual ports, only to the bond.

4. **Enter the IP address for the selected port or port bond.**

5. **Enter the Netmask for the selected port or port bond. The netmask indicates which portion of an IP address identifies the network address and which portion identifies the host address.**

   The read-only **Broadcast** field is filled automatically when you enter the IP address and netmask. The broadcast address is the IP address used to send broadcast messages to the subnet.

6. **For each port, select one of the following roles.**

   - **Primary—**The port role of **Primary** identifies an active network port.

   ---

   **Note –** At least one port must be assigned a primary role.

   ---

   - **Independent**—The port role of **Independent** identifies an active network port used for purposes other than serving data, such as backup.

7. **To add an alias IP address to the selected port, enter it in the IP-Aliases field. Then click**  **to add it to the IP-Aliases list.**

   You can have up to nine aliases. To remove an alias from the list, select it and click  . Changes are not saved until you click **Apply**.

8. **Repeat Steps 3-7 for all ports in the Adapter list.**

9. **Click Apply to save your changes.**

# Port Bonding

There are two types of port bonding: port aggregation and high availability. Port aggregation bonding combines two or more adjacent ports to created a faster port, a port of greater bandwidth. High availability bonding combines two or more ports to provide NIC port failover services or backup ports.

A Sun StorEdge 5210 NAS system may have up to four (4) bonds of any type. Each bond may have up to eight (8) ports.

## Port Aggregation Bonds

Port aggregation bonding (otherwise known as *channel bonding*, *aggregating*, or *trunking*) lets you scale network I/O by joining adjacent ports. This forms a single network channel of high bandwidth from two or more channels of lower bandwidth.

An aggregation bond requires a minimum of two available ports. The ports also must be of the same interface type (for example, fast Ethernet with fast Ethernet), connect to the same subnet, and must connect to adjacent ports on the same network switch.

---

**Note –** For systems that use switches, the switch must support channel bonding. Contact Sun Microsystems Technical Support for information on current switches supporting channel bonding.

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## High Availability Bonds

High availability port bonding provides port failover capabilities to the Sun StorEdge 5210 NAS system. Two or more available ports are bonded so that if the primary port fails, a secondary port in the high availability bond automatically takes over the burden to enable Sun StorEdge 5210 NAS services to continue without any interruptions.

In such a bond, at least two available ports are required. However, they do not have to be of the same type of interface card, connected to the same subnet, or connected to adjacent ports.

**Note –** Any type of switches can be used for an HA bond. The only requirement is that the switches must be connected to the same subnet.

# Bonding Ports

You can bond ports after configuring them. However, alias IP addresses and some other aspects of the original configurations may change. After you create a port bond, return to "Configuring Network Ports" on page 58 to configure the port bond. Once you bond two or more ports, you cannot add IP aliases to the individual ports, only to the bond.

To bond ports:

1. **In the navigation panel, select Network Configuration > Bond NIC Ports.**

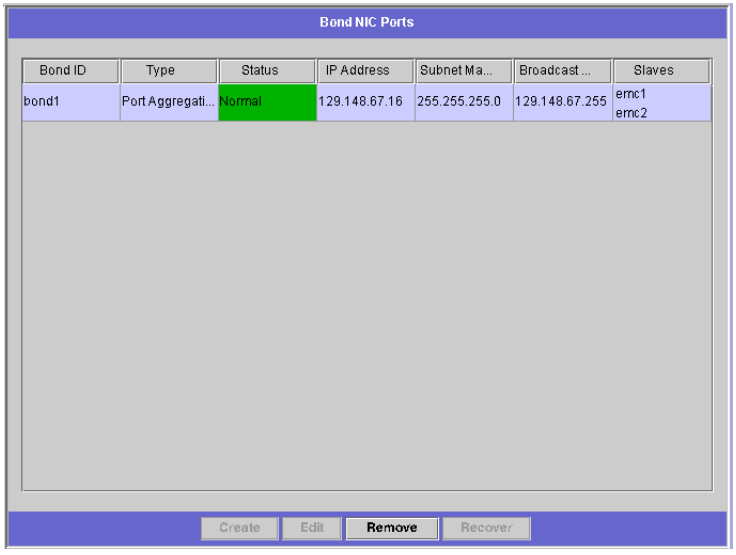


**FIGURE 5-2** The Bond NIC Ports Panel

2. **Click Create.**

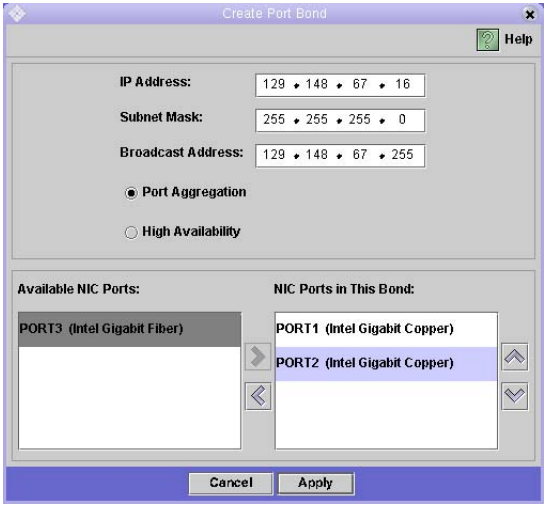


**FIGURE 5-3** The Create Port Bond Dialog Box

3. **Click either Port Aggregation or High Availability to designate the type of bond you want to create.**

4. **Choose at least two available ports to bond by clicking the desired port in the Available NIC Ports box, then clicking**  **to add it to the NIC Ports in This Bond list.**

   If you chose Port Aggregation in Step 3, you must choose ports that have the same type of interface, are connected to the same subnet, and are connected to adjacent ports.

   To remove a port from this list, select the port and click  .

5. **Type the required information in the IP Address, Subnet Mask, and Broadcast Address fields. By default these fields contain the information from the primary port, the first port listed in the NIC Ports in This Bond box.**

6. **Click Apply to complete the port bonding process. Web Administrator prompts you to confirm an automatic reboot. After the reboot, all alias IP addresses have been removed from the ports in the bond.**

   To add alias IP addresses to the port bond, see "Configuring Network Ports" on page 58.

CHAPTER 6

# File System Management

This chapter describes Sun StorEdge 5210 NAS file system management tasks beyond those described in Chapter 3, "Initial File System Setup."

## LUN Management

### Rebuilding a LUN

If one of the drives in a LUN fails, the LED on that drive turns red. LUN rebuilding occurs automatically if a drive in the Sun StorEdge 5210 NAS is specified as a hot spare. Rebuilding may take several hours to complete.

If your system does not include a hot spare, you must remove the failed drive and replace it with another drive of the same or larger capacity. See the *Sun StorEdge 5210 NAS Hardware User Guide* on your documentation CD for information on replacing a failed drive.

After you replace the faulty disk, the RAID controller automatically rebuilds the LUN. LUN rebuilding may take several hours, depending on disk capacity. The LUN drive LEDs blink yellow during LUN rebuilding.

### Removing a LUN

To remove a LUN:

1. **In the navigation panel, select RAID > Manage RAID.**
2. **Click Remove LUN.**

3. **The system automatically selects the drives belonging to the LUN you are removing. You can only remove the most recently added LUN.**

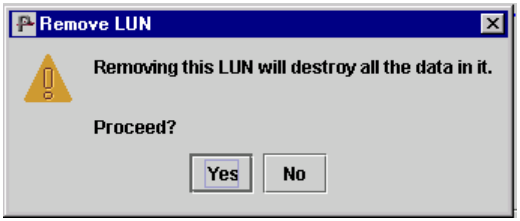


**FIGURE 6-1** The Remove LUN Dialog Box

**Caution –** When you select **Yes**, all data on the LUN will be destroyed.

4. **Click Yes to remove the LUN.**

## Removing a Hot Spare

To remove hot spare status from a drive in the RAID array:

1. **In the navigation panel, select RAID > Manage RAID.**
2. **Select the hot spare to be removed by clicking the drive image. If there is only one hot spare, it is automatically selected.**

   The drive images show the status of each drive as follows:

**TABLE 6-1** Remove Hot Spare Drive Status Images

| Drive | Indication |
|---|---|
|  | The drive in this slot is a hot spare. |
|  | The drive in this slot has been selected for removal. |
|  | The drive in this slot cannot be selected because it is not a hot spare. |
|  | No drive is present in this slot. |

3. **Click Remove HS.**


**FIGURE 6-2** The Remove Hot Spare Dialog Box

4. **Click Yes to remove the hot spare.**

# File Volume and Segment Management

## Editing File Volume Properties

To rename a volume, enable checkpoints, or enable quotas:

1. **In the navigation panel, select File Volume Operations > Edit Properties.**

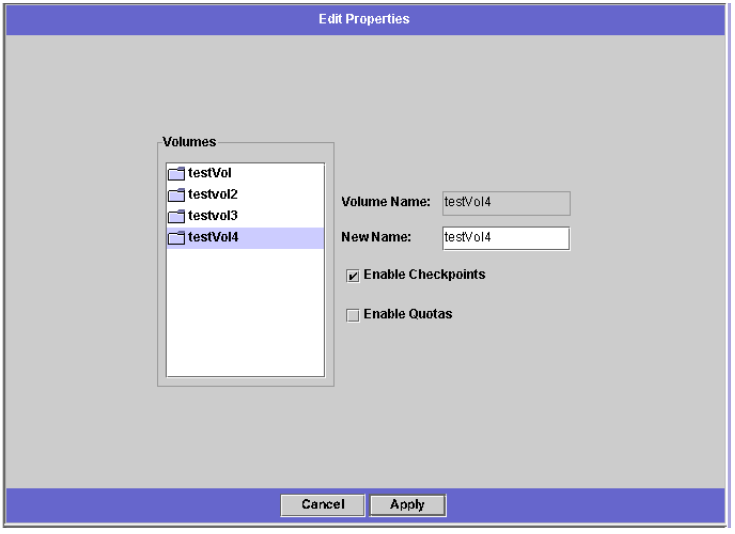


**FIGURE 6-3** The Edit Properties Panel

2. **Select the name of the volume you want to change from the Volumes list.**

3. **Enter the volume's new name (if applicable) in the New Name field. Valid characters include alphanumeric (a–z, A–Z, 0–9) and "_" (underscore) characters. The name must be 12 characters or fewer and must begin with an alphabetical character (a–z, A–Z).**

4. **Select either or both of the following options for this volume:**
   - **Enable Checkpoints—**Select this checkbox to create checkpoints for the file volume. Checkpoints are enabled by default when you create a file volume.
   - **Enable Quotas—**Select this checkbox to enable quotas for the selected volume. Quotas are disabled by default when you create a file volume.

5. **Click Apply to save your changes.**

# Deleting File Volumes

To delete a file volume or segment:

1. **In the navigation panel, select File Volume Operations > Delete File Volumes.**

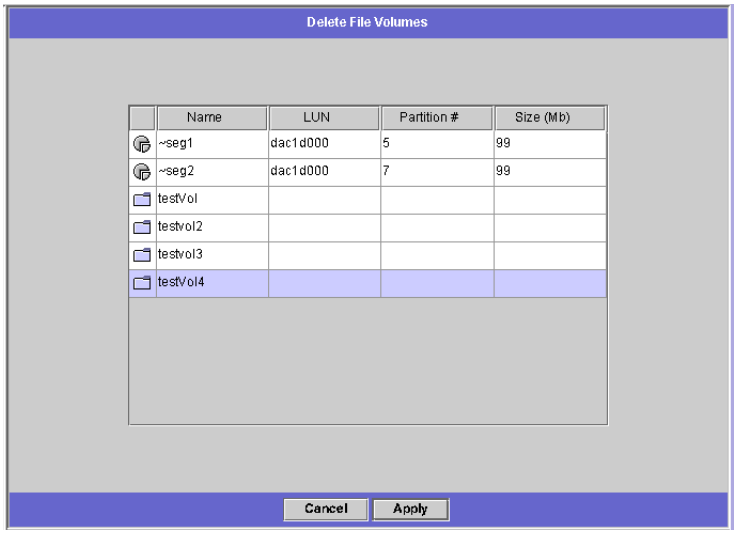


**FIGURE 6-4** The Delete File Volumes Panel

2. **Select the file volume or segment you want to delete.**

3. **Click Apply.**

## About File Deletion

By default, the Sun StorEdge 5210 NAS deletes files as a background process, freeing blocks as the process completes, providing better performance to foreground processes. If many files have been deleted and the systems is very busy, this can take some time.

Background file deletion is provided by the `.attic$` directory feature. The `.attic$` directory is located at the root of each volume.

### *Managing the .attic$ Directory*

In rare cases on very busy file systems, the `.attic$` directory can be filled faster than it processes deletes, leading to a lack of free space and slow performance. In such a case, you should disable the `.attic$` directory by doing the following for each volume that requires it:

1. **Connect to the StorEdge 5210 NAS command line interface using Telnet, Secure Shell, or keyboard console. (Refer to Appendix A for details on the command line interface.)**
2. **Type `admin` at the menu prompt and enter the administrator password.**
3. **Then enter `fsctl attic disable <volumename>` entering the appropriate volume name.**

### *Managing File Deletion and Checkpoints*

In some instances, after deleting files, volume free space does not change, most likely due to the checkpoint feature. Checkpoints store deleted and changed data for a defined period of time to enable retrieval for data security. This means that the data is not removed from disk until the checkpoint is expired, a maximum of two weeks, except in the case of manual checkpoints which can be kept indefinitely.

If you are deleting data to free disk space, you will need to remove or disable checkpoints. Refer to "Removing File Checkpoints" on page 170 for instructions on removing checkpoints.

# Viewing Volume Partitions

The View Volume Partitions panel is a read-only display of the LUNs defined for the Sun StorEdge 5210 NAS.

To view volume partitions:

1. **In the navigation panel, select File Volume Operations > View Volume Partitions.**

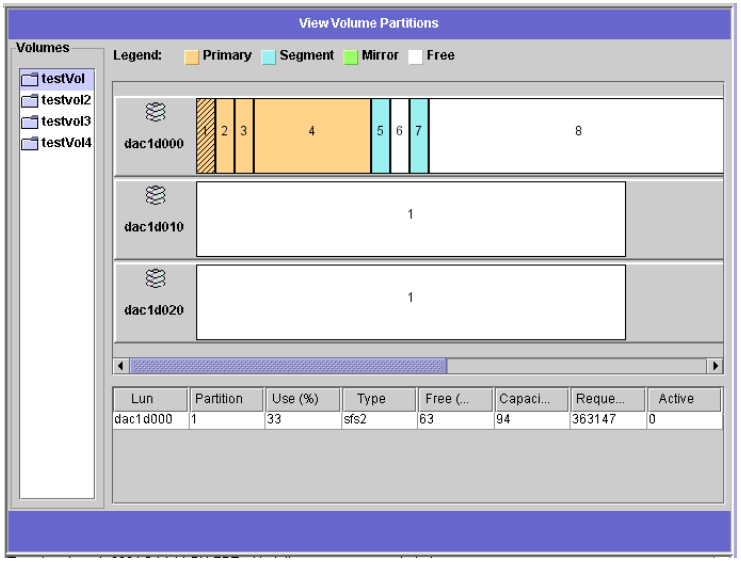


**FIGURE 6-5** The View Volume Partitions Panel

2. **In the Volumes list, select the file volume for which you want to view partitions.**

   The following information is shown for the selected volume:

   - **LUN—**Lists all LUNs for the selected file volume.
   - **Partition—**Shows partitions for the selected file volume.
   - **Use—**Shows the percentage of the partition in use.
   - **Type—**Shows the partition type as either sfs2 (primary) or sfs2ext (segment).
   - **Free—**Shows the amount of unused space on the partition.
   - **Capacity—**Shows the total size of the partition.
   - **Requests—**Displays the total number of requests processed for the partition.
   - **Active—**Displays the active requests that have not yet been processed for the partition.

CHAPTER 7

# Name Services

The Sun StorEdge 5210 NAS supports a variety of name services for both Windows networks and UNIX networks. These name services include:

- **ADS—**Active Directory Service (ADS) is a Windows 2000 name service integrated with the Domain Name System (DNS, see "Setting Up DNS" on page 23). ADS runs only on domain controllers. In addition to storing and making data available, ADS protects network objects from unauthorized access and replicates objects across a network so that data is not lost if one domain controller fails. When you enable and set up ADS, the Sun StorEdge 5210 NAS automatically performs ADS updates. See "Active Directory Services" on page 70 for more information.
- **LDAP—**Lightweight Data Access Protocol (LDAP) is a UNIX service that enables authentication.
- **WINS—**A Windows Internet Naming Service (WINS) server resolves NetBIOS names to IP addresses, allowing computers on your network to locate other NetBIOS devices more quickly and efficiently. The WINS server performs a similar function for Windows environments as a DNS server does for UNIX environments. See "Setting Up WINS" on page 22 for more information.
- **DNS—**Domain Name System (DNS) resolves domain names to IP addresses for the Sun StorEdge 5210 NAS system. This service allows you to identify a server by either its IP address or its name. See "Setting Up DNS" on page 23 for more information.
- **NIS—**Network Information Service (NIS) creates a central database on the Sun StorEdge 5210 NAS for host, user, and group information. It maintains this database and administers access to resources based on the users group and host information. See "Setting Up NIS" on page 25 for more information.
- **NIS+—**Network Information Service Plus (NIS+) was designed to replace NIS, and is the new default naming service for Solaris. NIS+ can provide limited support to NIS clients, but was mainly designed to address problems that NIS cannot address. Primarily, NIS+ adds credentials and secured access to the NIS functionality. See "Setting Up NIS+" on page 27 for more information.

This chapter describes ADS services in detail, LDAP setup, and how to change name service lookup order. For setup instructions for WINS, DNS, NIS, and NIS+, refer to "Name Services" on page 19.

# Active Directory Services

For the Sun StorEdge 5210 NAS to integrate seamlessly into a Windows 2000 Active Directory environment, the following items must exist on the network:

- A Windows 2000 server domain controller
- An Active Directory-integrated DNS server allowing dynamic updates (needed in order to use the Sun StorEdge 5210 NAS Dynamic DNS capability) is recommended but not required for using ADS.

After setting up ADS, you can set ADS to publish specific Sun StorEdge 5210 NAS shares in the ADS directory. To do so, create or update Sun StorEdge 5210 NAS SMB shares and specify the share container for each share you want to publish.

## Setting Up ADS

To enable ADS service on the Sun StorEdge 5210 NAS:

1. **In the navigation panel, select System Operations > Set Time and Date.**

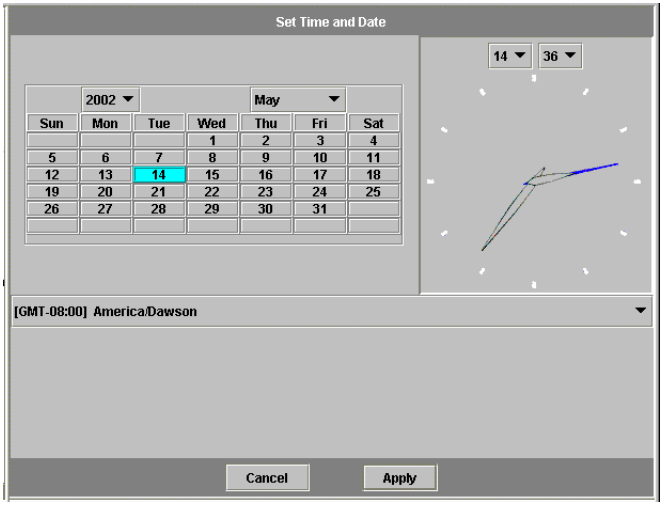


**FIGURE 7-1** The Set Time and Date Panel

2. **Verify that the Sun StorEdge 5210 NAS time is within five minutes of any ADS Windows 2000 domain controller.**

3. **Click Apply to save any changes you make.**

4. **In the navigation panel, select Windows Configuration > Configure Domains and Workgroups.**

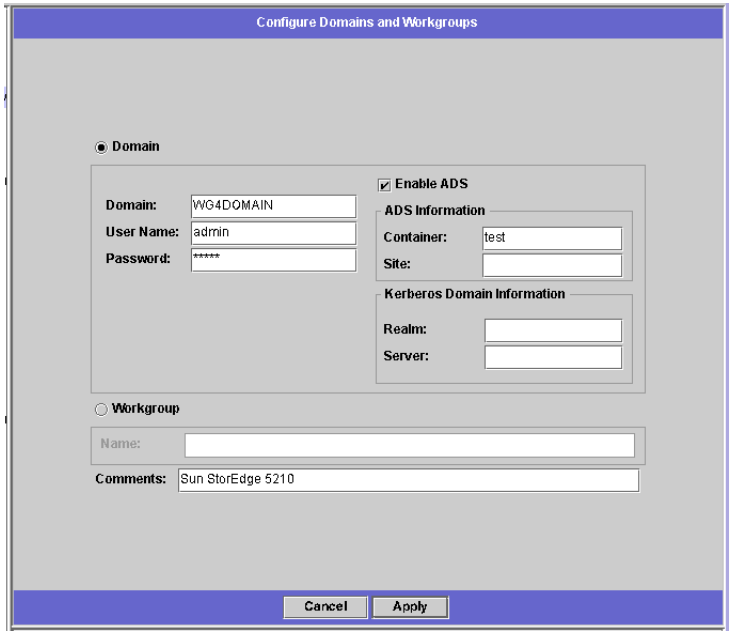


**FIGURE 7-2** The Configure Domains and Workgroups Panel

5. **Select the Enable ADS checkbox.**

6. **In Domain, enter the Windows 2000 Domain in which ADS is running. The Sun StorEdge 5210 NAS must belong to this domain.**

7. **In the User Name field, enter the user name of a Windows 2000 user with administrative rights. This user must be the domain administrator or a user who is a member of the domain administrators group. The ADS client verifies secure ADS updates with this user.**

---

**Note –** If you enter the domain administrator name here and the ADS update fails, the domain administrator password must be changed (on the domain controller). This is only required for the administrator user, and the same password may be reused. For more information, refer to the Microsoft Support Services Web site, Article Q248808.

---

8. **In the Password field, enter the Windows 2000 administrative user's password.**

9. **In the Container field, enter the ADS path location of the Windows 2000 administrative user in Lightweight Directory Access Protocol (LDAP) distinguished name (DN) notation.**

   Objects, including users, are located within Active Directory domains according to a hierarchical path, which includes each level of "container" object. Enter the path in terms of the user's **cn** (common name) folder or **ou** (organizational unit). The **cn** folders are default folders in the root folder. All other folders are **ou** folders.

   For example, if the user resides in a "users" folder within a parent folder called "accounting," you would type the following:

   **`ou=users,ou=accounting`**

   Do not include the domain name in the path.

10. **In the Site field, enter the name of the local ADS site if different from the ADS domain. This field is usually left blank.**

11. **In the Kerberos Realm Info section, enter the Realm name used to identify ADS. This is normally the ADS domain or the DNS domain. When you click Apply, this entry is converted to all upper-case letters.**

12. **In the Server field, enter the host name of the of the Kerberos KDC server. The KDC server name is usually the host name of the main domain controller in the ADS domain. You can leave this field blank, if the Sun StorEdge 5210 NAS can locate the KDC server through DNS.**

13. **Click Apply to save and invoke your changes.**

## Verifying Name Service Lookup Order

To verify name service lookup order:

1. **Select UNIX Configuration > Configure Name Services.**

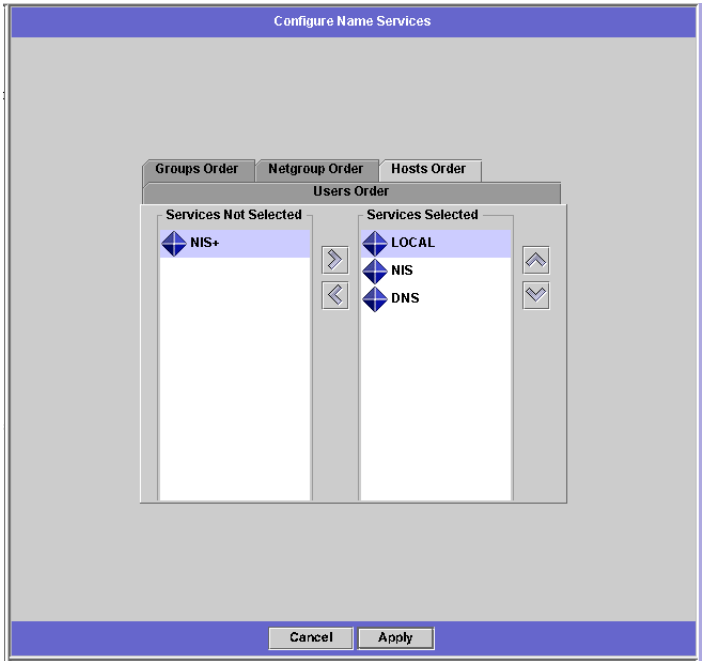


**FIGURE 7-3** The Configure Name Services Panel

2. **Verify that the name service lookup order for DNS is enabled and set to the correct priority.**

   a. **Select the Hosts Order tab. Be sure DNS service is listed under Services Selected in the right-hand box. If it is not, select DNS service and click the button.**

   b. **Use the and buttons to change the order in which the selected services are scanned.**

3. **Click Apply to save any changes.**

## Verifying DNS Configuration

To verify that DNS is enabled and configured properly to support ADS:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Set Up DNS.**

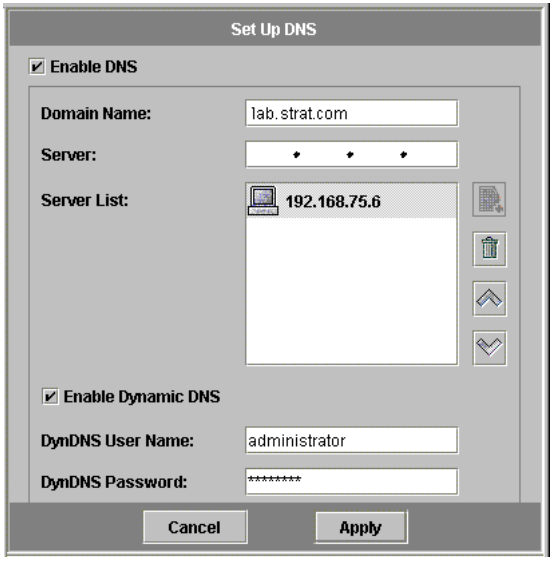


**FIGURE 7-4** The Set Up DNS Panel

2. **If DNS is not enabled, select the Enable DNS checkbox.**
3. **If you have not entered a domain name, enter the DNS Domain Name. This name must be the same as the ADS domain.**
4. **In the Server field, enter the IP address of the DNS server you want the Sun StorEdge 5210 NAS server to use. Then click  to place the server address in the DNS Server List. You may add up to two servers to the list.**
5. **Select the Enable Dynamic DNS checkbox. If you do not enable Dynamic DNS, you must add the Sun StorEdge 5210 NAS host name and IP address manually.**
6. **In the DynDNS User Name field, enter the user name of a Windows 2000 user with the administrative rights to perform secure dynamic DNS updates. Use the same user that you specified in the Configure Names and Workgroups panel (step 7. on page 71).**

   You can leave this field blank for non-secure updates if they are allowed by the DNS server.

7. **In the DynDNS Password field, enter the password of the Dynamic DNS user.**
8. **Click Apply to save your changes. If Dynamic DNS is enabled, the Sun StorEdge 5210 NAS immediately updates DNS with its host name and IP address.**

## Publishing Shares in ADS

To publish shares in ADS:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**
2. **Click Add.**

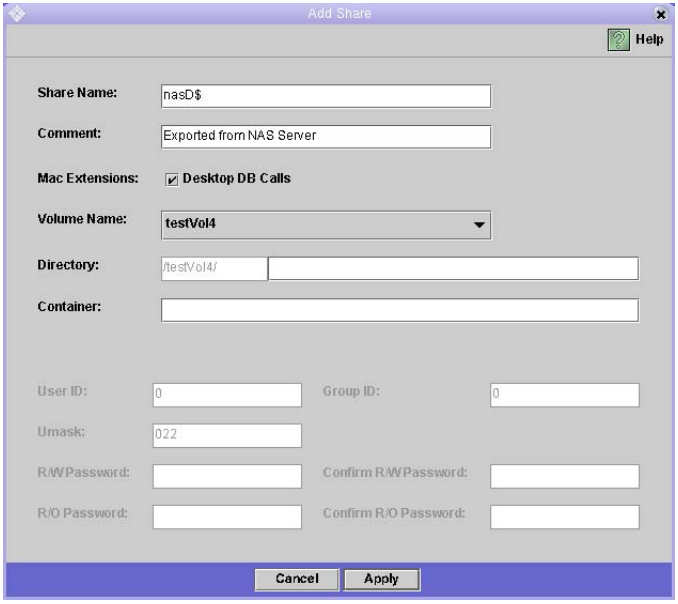


**FIGURE 7-5** The Add Share Dialog Box

3. **Enter a Share Name.**
4. **Optionally, add a Comment to describe the share. You can enter up to 60 alphanumeric characters.**
5. **Select a volume to share from the pull-down box.**
6. **In the Directory field, enter an existing directory on the selected volume that you want to share. This field is optional.**

**Note –** A root-level share is created if the directory is omitted.

7. **In the Container field, enter the location in the ADS directory where the share will be published. The Container field identifies the ADS container. Enter the ADS location for the share in Lightweight Directory Access Protocol (LDAP) distinguished name (DN) notation. See step 9. on page 72 for more information.**
8. **Click Apply. The share is added to the specified container.**

**Note –** The container specified must already exist for the share to be published in that container. Sun StorEdge 5210 NAS does not create container objects in the ADS tree.

## Updating ADS Share Containers

To update the ADS container of a share:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**
2. **Select the share you want to update.**
3. **Click Edit to display the Edit Share dialog box.**
4. **Enter the new share container.**
5. **Click Apply. The Sun StorEdge 5210 NAS updates the share container.**

## Removing Shares from ADS

To remove a share from the ADS directory:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**
2. **Select the share you want to remove from ADS.**
3. **Click Edit to display the Edit Share dialog box.**
4. **Delete the share container from the Container field.**
5. **Click Apply.**

# Setting Up LDAP

To use LDAP, the LDAP server must be running.

To enable LDAP service on the Sun StorEdge 5210 NAS:

1. **In the navigation panel, select UNIX Configuration> Set Up NSSLDAP.**

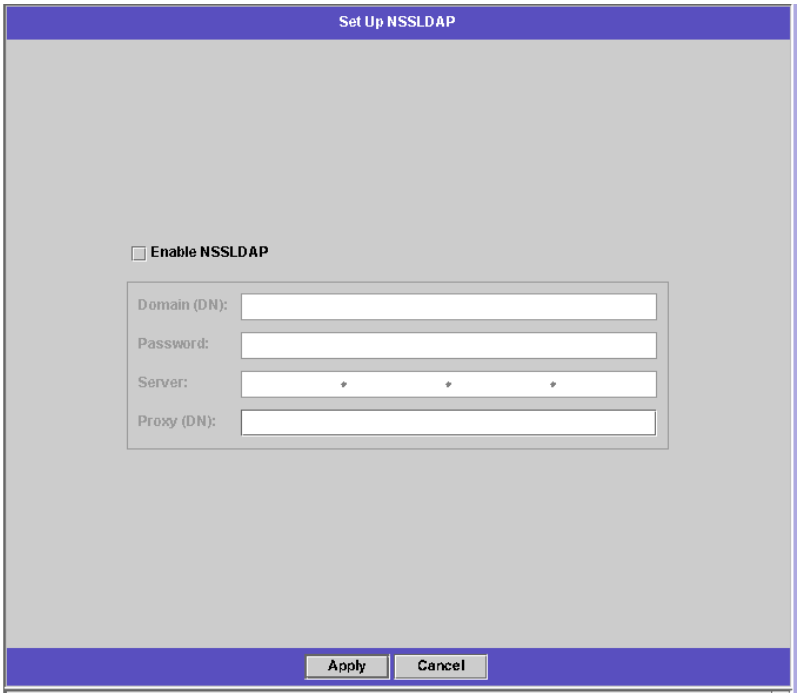


**FIGURE 7-6** The Set Up NSSLDAP Panel

2. **To enable LDAP, check the Enable NSSLDAP checkbox.**
3. **In the Domain field, enter the domain name of the LDAP server, e.g., foo.com.**
4. **In the Password field, enter the password set on the LDAP server.**
5. **In the Server field, enter the IP address fo the LDAP server.**
6. **In the Proxy field, enter the proxy domain, depending on the server settings.**
7. **Click Apply to save the settings.**

# Setting Up WINS

For instructions on setting up WINS, refer to "Setting Up WINS" on page 22.

# Setting Up DNS

For instructions on setting up DNS, refer to "Setting Up DNS" on page 23.

# Setting Up NIS

For instructions on setting up NIS, refer to "Setting Up NIS" on page 25.

# Setting Up NIS+

For instructions on setting up NIS+, refer to "Setting Up NIS+" on page 27.

# Changing Name Service Lookup Order

The Name Service (NS) lookup order controls the sequence in which the Sun StorEdge 5210 NAS searches the name services to resolve a query. These name services can include LDAP, NIS, NIS+, DNS, and Local. You must enable the services to use them for name resolution.

To set the order for user, group, netgroup, and host lookup:

1. **In the navigation panel, select UNIX Configuration > Configuring Name Services.**

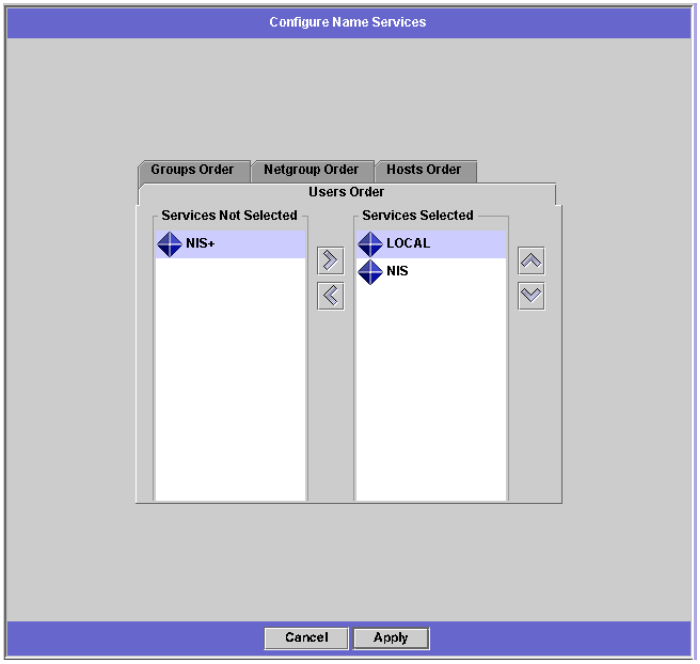


**FIGURE 7-7** The Configure Name Services Panel

2. **Click on the Users Order tab to select the order of user lookup.**
   a. **Select a service from the Services Not Selected box.**
   b. **Click**  **to move it to the Services Selected box. To remove a service from user lookup, select it and click**  **.**
   c. **Arrange the order of lookup services in the Services Selected box by selecting each service and clicking**  **and**  **to move it up or down. The service at the top of the list is used first in user lookup.**
3. **Click on the Groups Order tab to select the services to be used for group lookup, following the procedure in step 2.**
4. **Click on the Netgroup Order tab to select the services to be used for netgroup lookup, following the procedure in step 2.**

5. **Click on the Hosts Order tab to select the services to be used for hosts lookup, following the procedure in step 2.**

6. **Click Apply to save your changes.**

CHAPTER 8

# Group, Host, and File Directory Security

This chapter describes the various settings for local groups, hosts, user and group mapping, and file directory security on the Sun StorEdge 5210 NAS system.

To configure Windows security, refer to "Configuring Windows Security" on page 20.

# Sun StorEdge 5210 NAS Local Groups

## About Sun StorEdge 5210 NAS Local Groups and Privileges

The requirements for Sun StorEdge 5210 NAS built-in local groups are different from those of a Windows NT system. As a NAS appliance, there are no locally logged on NT users. All NT users attach through the network and are authenticated through a domain controller, so there is no need for local groups such as Users or Guests.

**Note –** Local groups apply only to CIFS networking.

Sun StorEdge 5210 NAS local groups are primarily used to manage NAS resources and to perform backup related operations. There are three Sun StorEdge 5210 NAS local groups: administrators, power users, and backup operators.

- **Administrators—**Members of this group can fully administer files and directories on the system.
- **Power Users—**Members of this group take ownership of files and directories on the system, backup, and restore files.

- **Backup Operators—**Members of this group can bypass file security to backup and restore files.

The Sun StorEdge 5210 NAS also supports the *Authenticated Users* and *NETWORK* built-in groups: all logged on users are automatically made members of both of these internally managed built-in groups. You can add any valid primary or trusted domain user as a member of any Sun StorEdge 5210 NAS built-in local group.

# Configuring Privileges for Sun StorEdge 5210 NAS Local Groups

Privileges provide a secure mechanism to assign task responsibility on a system wide basis. Each privilege has a well-defined role assigned by the system administrator to a user or a group. On the Sun StorEdge 5210 NAS, since there are no local NT users, privileges are only assigned to groups.

Unlike access rights, which are assigned as permissions on a per-object basis through security descriptors, privileges are independent of objects. Privileges bypass object-based access control lists to allow the holder to perform the role assigned. For example, members of the backup operators group must bypass the normal security checks to backup and restore files to which they would normally not have access.

The difference between an access right and a privilege is illustrated in the following definitions:

- An access right is explicitly granted or denied to a user or a group. Access rights are assigned as permissions in a discretionary access control list (DACL) on a per-object basis.
- A privilege is a system wide role that implicitly grants members of a group the ability to perform pre-defined operations. Privileges override or bypass object-level access rights.

The privileges supported on the Sun StorEdge 5210 NAS are shown in Table 8-1. You can assign any of these privileges to any of the built-in groups. Because you can make any domain user a member of the built-in groups, you can assign these privileges to any domain user.

**TABLE 8-1** Sun StorEdge 5210 NAS Privileges

| Privilege | Description |
|---|---|
| Backup files and directories | Lets the user perform backups without requiring read access permission on the target files and folders. |
| Restore files and directories | Lets the user restore files without requiring write access permission on the target files and folders. |
| Take ownership of files/folders | Lets the user take ownership of an object without requiring take ownership access permission. Ownership can only be set to those values that the holder may legitimately assign to an object. |

The default privileges assigned to the Sun StorEdge 5210 NAS local built-in groups are shown in Table 8-2. Thus members of the local administrators group may take ownership of any file or folder and members of the Backup Operators can perform backup and restore operations.

**TABLE 8-2** Default Group Privileges

| Group | Default Privilege |
|---|---|
| Administrators | Take ownership |
| Backup Operators | Backup and restore |
| Power Users | None |

## Ownership Assignment

By default, the domain administrator group is a member of the local administrators group. Thus, when a member of the domain administrator group (including the domain administrator) creates or takes ownership of a file or folder, ownership is assigned to the local administrators group. This ensures maximum portability if the system is moved from one domain to another: objects owned by the local administrators group are still accessible to members of the new domain administrator group.

The ownership assignment rules described above are also true for regular users who are members of the local administrators group. If any member of the local administrators group creates or takes ownership of an object, ownership is assigned to the local administrators group rather than the member.

On Windows NT systems, the domain administrator membership of the local administrator group can be revoked. In such cases, members of the domain administrator group are treated as regular users. On the Sun StorEdge 5210 NAS, however, the domain administrator is always assigned membership of the local administrators group—however, the domain administrator is not listed as a member of this group, so you cannot revoke its membership. This difference between NT and Sun StorEdge 5210 NAS is due to the nature of the NAS appliance. Because there are no local users, and thus no local NT administrators, the domain administrator group must have administrative control on the Sun StorEdge 5210 NAS.

## Adding and Removing Group Members and Configuring Privileges

The **Configure Groups** panel lets you add any domain user to any of the three Sun StorEdge 5210 NAS local groups.

To add or remove a member of a group:

1. **In the navigation panel, select Windows Configuration > Configure Groups.**

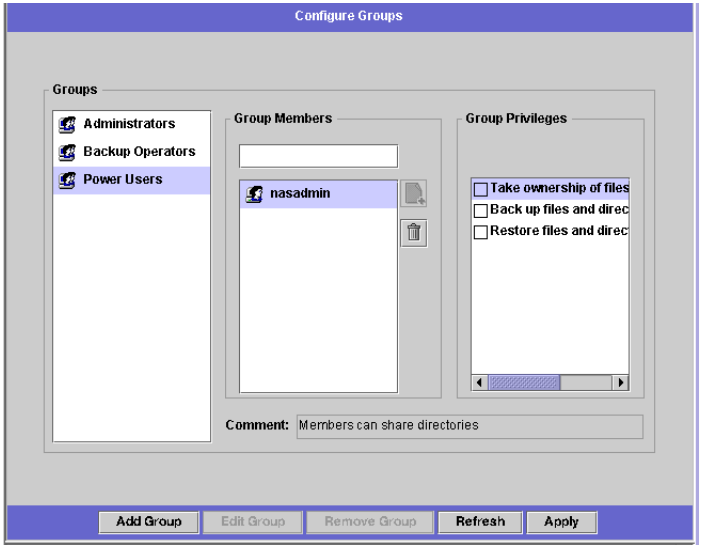


**FIGURE 8-1** The Configure Groups Panel

Existing members of the selected group are listed in the Groups box.

2. **To add a group, do the following:**

   a. **Click Add Group.**


**FIGURE 8-2** The Add Group Dialog Box

   b. **In the Group field, enter the name of the group.**

   c. **In the Comment field, enter a description of or comments about the group.**

   d. **Click Apply to save your changes.**

3. **To remove a group, do the following:**

   a. **Select the group you want to remove.**

   b. **Click Remove Group.**

   c. **Click Apply to save your changes.**

4. **To add or remove a group member, do the following:**

   a. **Highlight the group to which you want to add or from which you want to remove members. Existing members for the selected group are listed in the Group Members box.**

**b. To add a member to the group, click Add Member.**


**FIGURE 8-3** The Add Member to Group Dialog Box

**c. In the Member field, type the domain and user name in the following format: `domain\user name`. The domain name is the domain where the system can verify the user name.**

---

**Note –** Specifying the domain name is optinal. If you do not specify the domain, Sun StorEdge 5210 NAS assumes it is the configured domain by default.

---

**d. To remove a member from the selected group, select the member in the Group Members list and click Remove Member.**

**e. Click Apply to save your changes.**

## Configuring Privileges

The **Configure Privileges** panel allows administrators to view, grant, and revoke privileges from Sun StorEdge 5210 NAS groups.

To configure NT privileges:

1. **In the navigation panel, select Windows Configuration > Configure Groups.**

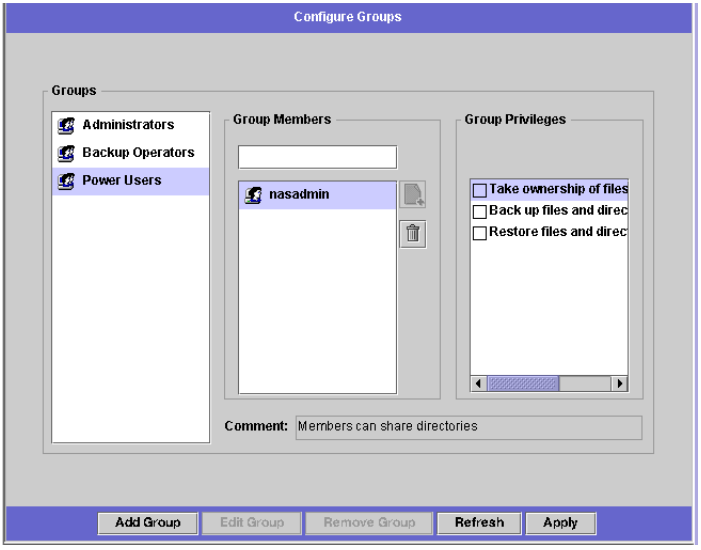


**FIGURE 8-4** The Configure Groups Panel

2. **In the Groups box, select the group for which you want to assign privileges.**
3. **In the Group Privileges box, click the check box for the privilege you want to grant to the group.**
4. **To revoke the privileges for a group, clear the check box for the privilege you want to revoke.**
5. **Click Apply.**

# Configuring Hosts

The **Set Up Hosts** panel lets you add, edit, or remove entries from the system host file. The table shows current host information, including host name, host IP address, and whether or not the host is trusted.

**Caution –** Exercise caution in granting **trusted** status to hosts. Trusted hosts have root access to the Sun StorEdge 5210 NAS file system, and can therefore perform administrative functions in that file system.

# Adding a Host

The **Set Up Hosts** panel lets you view host information and designate whether a host is trusted. A **root user** on an NFS client has root privileges on the Sun StorEdge 5210 NAS if that client was defined as a **trusted host** and has access to all files regardless of file permissions.

To manually add a host to the Sun StorEdge 5210 NAS server:

1. **In the navigation panel, select UNIX Configuration > Configure NFS > Set Up Hosts.**

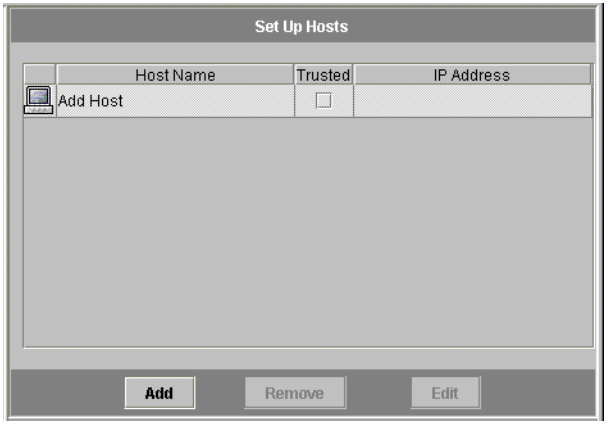


**FIGURE 8-5** The Set Up Hosts Panel

2. **Click Add.**

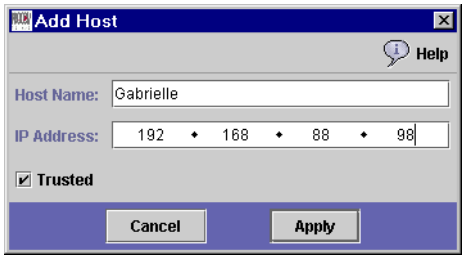


**FIGURE 8-6** The Add Host Dialog Box

3. **Enter the Host Name. This is the name by which the host is known on the system. The host name can include alphanumeric (a–z, A–Z, 0–9), "-" (dash) and "." (period) characters only. The first character must be alphabetical (a–z or A–Z only).**
4. **Enter the new host's IP Address.**
5. **If necessary, select the checkbox to assign the host Trusted status. A trusted host has root access to the network server.**
6. **Click Apply to save your changes.**

# Editing Host Information

To change the name, IP address, or trust status of a particular host:

1. **In the navigation panel, select UNIX Configuration > Configure NFS > Set Up Hosts.**
2. **Select the host for which you want to edit information and click Edit.**

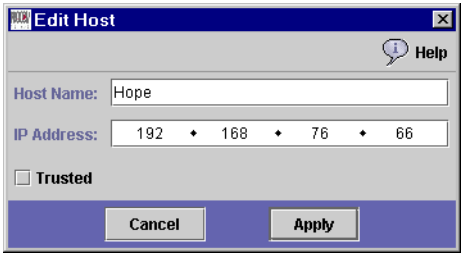


**FIGURE 8-7** The Edit Host Dialog Box

3. **Revise the following information as needed:**
   - **Host Name—**This is the name by which the host is known on the system. Use upper- or lower-case alphabetical characters, numbers, periods (“.”) or a hyphen (“-”) only. The first character must be an alphabetic character.
   - **IP Address—**This is the host’s IP address.
   - **Trusted—**Select this checkbox to assign the host trusted status. Exercise caution in assigning trusted status to hosts.
4. **Click Apply to save your changes.**

## Removing a Host

To remove access to the Sun StorEdge 5210 NAS system for a particular host:

1. **In the navigation panel, select UNIX Configuration > Configure NFS > Set Up Hosts.**
2. **Select the host that you want to remove by clicking on the entry in the host list.**
3. **Click Remove.**
4. **Click Apply.**

# Mapping User and Group Credentials

Sun StorEdge 5210 NAS servers are designed to reside in a multi-protocol environment and provide an integrated model for sharing data between Windows and UNIX systems. Although files may be accesses simultaneously from both Windows and UNIX systems, there is no industry standard mechanism to define a user in both Windows and UNIX domains. Objects can be created using either domain, but the access control semantics in each domain are vastly different.

User and group mapping is a mechanism to establish credential equivalence on the Sun StorEdge 5210 NAS to provide common access using either environment.

To define the mapping policy:

1. **In the navigation panel, select Windows Configuration > Manage SMB/CIFS Mapping > Configure Mapping Policy.**

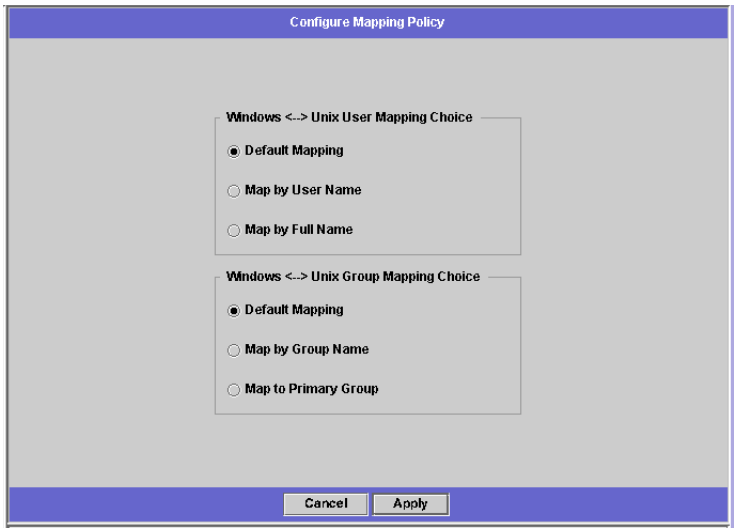


**FIGURE 8-8** The Configure Mapping Policy Panel

2. **The Windows <--> UNIX User Mapping Choice section lets you determine the user mapping settings on the Sun StorEdge 5210 NAS. Select one of the following:**
   - **Default Mapping—**Select this option if there is no pre-defined mapping rule between Windows and UNIX users. New users will be assigned a newly-generated, unique ID by the system.
   - **Map by User Name—**Select this option to let the system map UNIX and Windows users who have identical user names, allowing the same user to access the Sun StorEdge 5210 NAS from both environments.
   - **Map by Full Name—**Select this option to map UNIX and Windows users who have identical full names.

3. **The Windows <--> UNIX Group Mapping Choice section lets you determine the group mapping settings. Select one of the following:**
   - **Default Mapping—**Select this option if there is no pre-defined mapping rule between Windows and UNIX groups. New groups will be assigned a newly-generated, unique ID by the system.
   - **Map by Group Name—**Select this option to map UNIX and Windows groups that have identical group names.
   - **Map to Primary Group—**Select this option to map to the NFS group in the primary group field in the configured `passwd` file.

4. **Click Apply to save your changes.**

# Adding a Map

To map Windows groups and users to UNIX groups and users:

1. **In the navigation panel, select Windows Configuration > Manage SMB/CIFS Mapping > Configure Maps.**

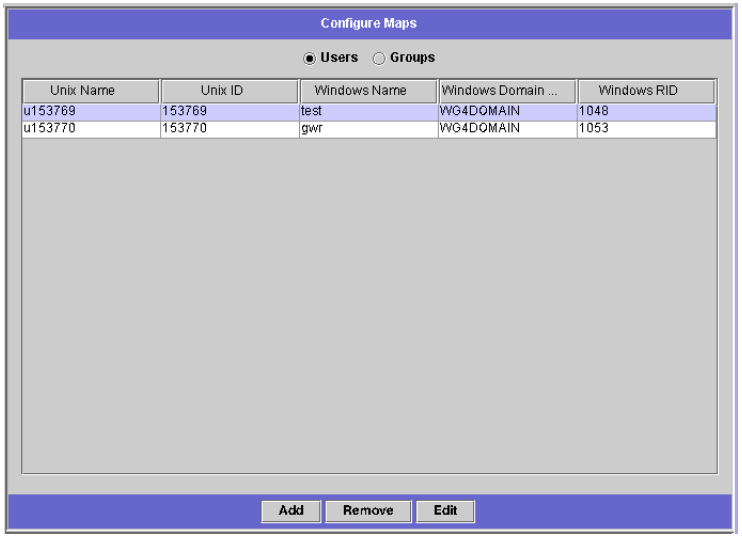


**FIGURE 8-9** The Configure Maps Panel

2. **Click Add.**

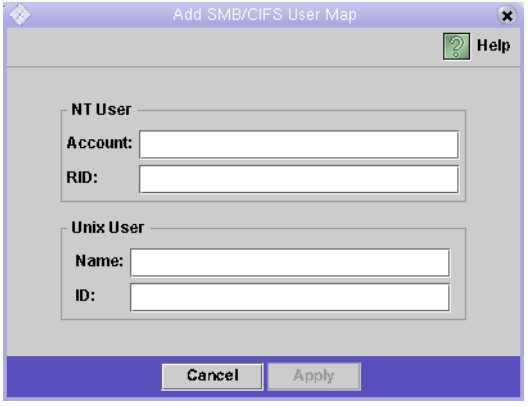


**FIGURE 8-10** The Add SMB/CIFS User Map Dialog Box

3. **In the NT User box, enter the following information:**
   - **Account—**Enter the NT account name of the user or group you want to map.
   - **RID**—Enter the relative identifier that uniquely identifies the NT user or group within the NT domain.
4. **In the UNIX User box, enter the following information:**
   - **Name—**Enter the UNIX user or group name to which you want to map the specified NT user or group.
   - **ID**—Enter the identifier that uniquely identifies the UNIX user or group within the UNIX domain.
5. **Click Apply to save your changes.**

# Setting File Directory Security

## Setting File Directory Security in Workgroup Mode

In Workgroup/Secure Share mode, all security is set on the share itself (share-level security) using Web Administrator.

In workgroup mode, the Sun StorEdge 5210 NAS assumes that no authentication is performed on the client and explicitly asks for permission requiring a password with every share-connection request.

See "Creating Static Shares" on page 99 for instructions on setting share-level security while adding a share. See "Editing Shares" on page 103 for instructions on setting share-level security while editing shares.

# Setting File Directory Security in Domain Mode

You can manage access rights from Windows 2000 or Windows XP only.

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**Note –** When the Sun StorEdge 5210 NAS server is configured in Domain mode, the setting of object permissions is handled the same as object permissions on a standard Windows Domain controller. There is more than one right way to locate servers and map drives in order to set and manage share permissions. Only one example of this process is shown below.

---

**Note –** The Sun StorEdge 5210 NAS supports security on files and directories only, and setting security on a share will pass that security assignment to the underlying directory.

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To set security:

1. **Open Windows Explorer.**
2. **Click Tools > Map Network Drive.**

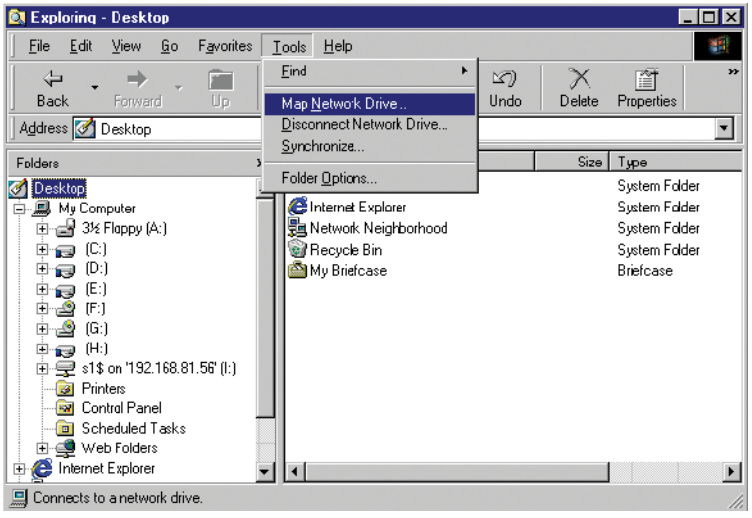


**FIGURE 8-11** Mapping a Network Drive

3. **In the Map Network Drive dialog box, select a drive letter from the Drive drop-down list box.**

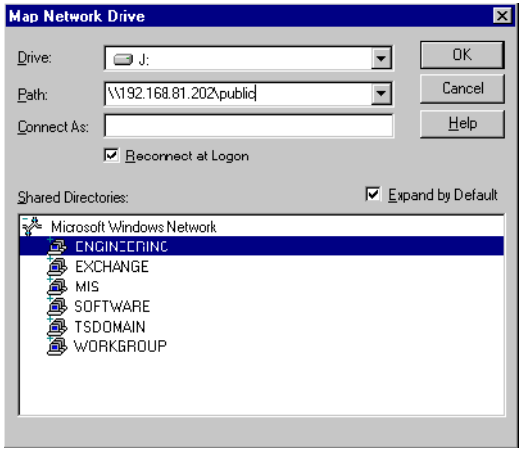


**FIGURE 8-12** The Map Network Drive Dialog Box

4. **Locate and select the Sun StorEdge 5210 NAS server.**
5. **Click OK.**
6. **From the Windows Explorer window, right-click on the Sun StorEdge 5210 NAS server share for which you want to define user-level permissions.**
7. **Select Properties from the drop-down menu.**
8. **Select the Security tab in the Properties dialog box.**

9. **Click the Permissions button.**

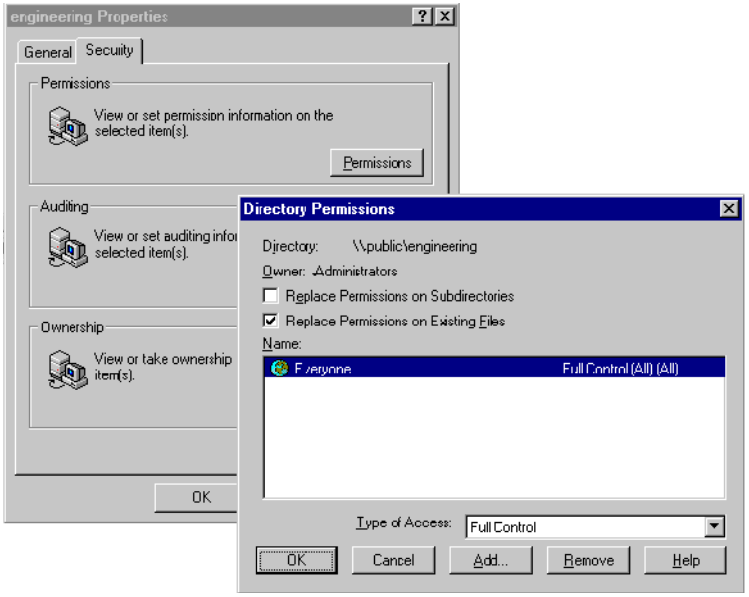


**FIGURE 8-13** The Directory Permissions Dialog Box

10. **Set the desired permissions. (See your Windows documentation for more information on setting permissions.)**

11. **Click OK.**

CHAPTER 9

# Shares, Quotas, and Exports

This chapter describes the various methods of controlling user access to the files and volumes on the Sun StorEdge 5210 NAS system.

## Shares

Common Internet File System (CIFS) is an enhanced version of the Microsoft Server Message Block (SMB) protocol. SMB/CIFS allows client systems of Windows environments to access files on the Sun StorEdge 5210 NAS.

There are two types of shares; **static** SMB/CIFS shares and **autohome** SMB/CIFS shares. Static shares are persistent shares that remain defined regardless of whether or not users are attached to the server. Autohome shares are temporary shares created when a user logs on to the system and removed when the user logs off.

### About Static Shares

A shared resource, or **share**, is a local resource on a server that is accessible to Windows clients on the network. On a NAS server, it is typically a file system volume or a directory tree within a volume. Each share is identified by a name on the network. To clients on the network, the share appears as a complete volume on the server and they do not see the local directory path directly above the root of the share.

**Note –** Shares and directories are independent entities. Removing a share does not affect the underlying directory.

Shares are commonly used to provide network access to home directories on a network file server. Each user is assigned a home directory within a file volume. A static share is created to allow that user to map their home directory as a network drive on a client workstation. For example, a volume **vol1** may contain a home directory named **home**, and subdirectories for users **bob** and **sally**. The shares are defined as follows:

**TABLE 9-1** Share Path Examples

| Share Name | Directory Path |
|---|---|
| bob | /vol1/home/bob |
| sally | /vol1/home/sally |

If defining and maintaining a static home directory share for each Windows user that has access to the system is inconvenient, you can use the autohome feature. Autohome shares are temporary shares created when a user logs on to the system and removed when the user logs off. See "About Autohome Shares" on page 105 for more information.

# Configuring Static Shares

The **Configure Shares** panel allows you to add, view, and update static SMB shares.

The table at the top of the **Configure Shares** panel shows information about all existing SMB shares in the Sun StorEdge 5210 NAS. This information includes the share name and directories shared, as well as information concerning Windows Workgroups only (user and group information, Read/Write password, and Read/Only password).

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**Note –** After creating a volume, you must first create a share for the entire volume. Then users can access the volume and create directories. Once directories exist on the volume, you can create individual shares for them.

---

## Creating Static Shares

You must create a file volume before you can create a share. For more information, see "Creating a File Volume or a Segment" on page 43.

To add a new SMB share:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**

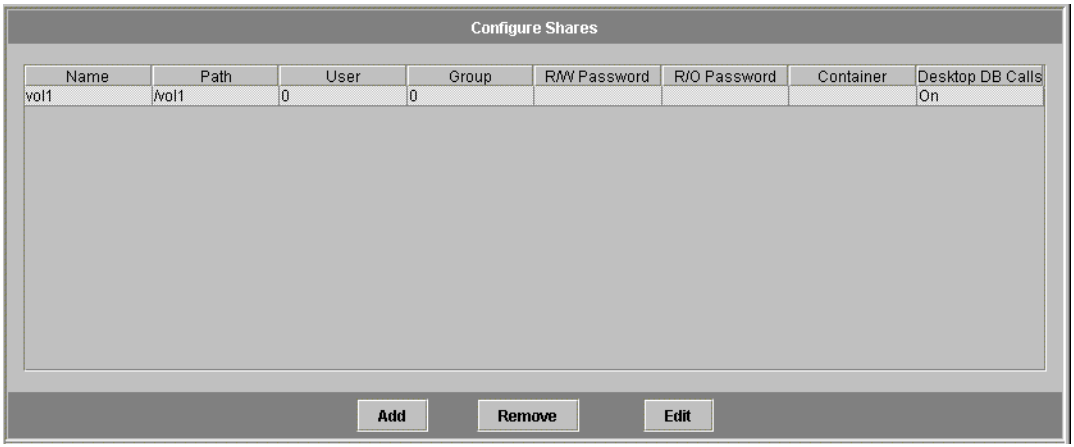


**FIGURE 9-1** The Configure Shares Panel

2. **Click Add.**

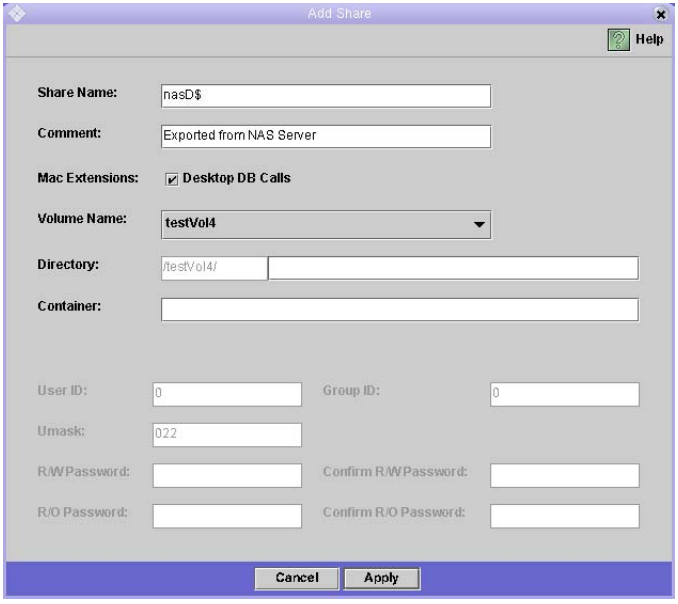


**FIGURE 9-2** The Add Share Dialog Box

3. **Type the name of the share you want to add in the Share Name field. This is the name that users see on the network. The name cannot be longer than fifteen characters. The following characters are invalid:**

   = | : ; \ " ? < > * /

4. **Optionally, add a Comment to describe the share. You can enter up to 60 alphanumeric characters.**

5. **Select the Desktop DB Calls checkbox in the Mac Ext. section to allow the Sun StorEdge 5210 NAS to access and set Macintosh desktop database information. This speeds up Macintosh client file access and allows non-Macintosh clients to access Macintosh files on the Sun StorEdge 5210 NAS.**

6. **Select the volume to share from the list of available volumes in the Volume Name drop-down list.**

7. **Enter an existing directory in the Directory field. You cannot create a directory in this field.**

---

**Note –** Directory names are case-sensitive.

---

8. **The Container field (optional) specifies the ADS container in which to publish the share. If you enabled ADS in the Set Up ADS panel, this field is available. However, even if ADS is enabled you are not required to specify an ADS container. To specify the container, enter the ADS path location for the share in LDAP DN notation. See "Publishing Shares in ADS" on page 75 for more information.**

9. **The User ID, Group ID, and Password fields are only available if you enabled Windows Workgroup mode (not NT Domain mode) on the Sun StorEdge 5210 NAS. Refer to "Configuring Windows Security" on page 20 for information on enabling Windows security models.**

   Windows Workgroup uses share-level security. The User ID (UID), Group ID (GID), and password fields in this screen represent the sole means of security for Sun StorEdge 5210 NAS file ownership and access by Windows Workgroup users. In other words, the rights to a directory are determined by the share definition rather than by the user. The Sun StorEdge 5210 NAS assumes that the client performs no authentication and explicitly asks for permission through the use of a password with every share-connection request.

   You can create multiple shares for the same directory with different UIDs, GIDs, and passwords. You can then give each user a password for a specific share. You can also manage individual user and group limitations on the amount of file volume space or number of files used through quotas. For more information about quotas, refer to "Managing Quotas" on page 107.

**Caution – User ID—**Enter the UID of the user accessing the specified directory through this share. The default value for this field is **0** (zero), which is the value of the UNIX root user. However, use caution in assigning this value. In Windows Workgroup mode, entering zero in this field disables all security on all files and directories in that share.

**Caution – Group ID—**Enter the GID of the group accessing the specified directory through this share. The default value for this field is **0** (zero), which is the value of the UNIX root group. However, use caution in assigning this value. In Windows Workgroup mode, entering zero in this field disables all security on all files and directories in that share.

- **R/W Password—**Enter the password for Windows Workgroup users who have read/write access to the directories specified for this share.
- **Confirm R/W Password—**Re-enter the R/W password for confirmation.
- **R/O Password—**Enter the password for Windows Workgroup users who have read-only access to the share.
- **Confirm R/O Password—**Re-enter the R/O password for confirmation.

10. **In the Umask field, enter the file creation mask, if any, you want to apply to this share. The umask defines the security policy for files and directories created in Share mode. It specifies the permission bits to turn off when a file is created.**

    The umask is defined in octal because octal numbers comprise three bits, which maps easily to the UNIX file permission representation. The umask is applied using standard UNIX rules, except for the DOS read-only attribute. If the DOS read-only attribute is set when the file is created, all write bits will be removed from the file's permissions after the umask has been applied.

    The following table shows umask to permission examples, including the effect of the DOS read-only attribute.

**TABLE 9-2** Umask Permission Examples

| Umask | New Directory Permissions | | New File Permissions | |
|---|---|---|---|---|
| | DOS R/W | DOS R/O | DOS R/W | DOS R/O |
| 000 | 777 (rwxrwxrwx) | 555 (r-xr-xr-x) | 666 (rw-rw-rw) | 444 (r--r--r--) |
| 777 | 000 (---------) | 000 (---------) | 000 (---------) | 000 (---------) |
| 022 | 755 (rwxr-xr-x) | 555 (r-xr-xr-x) | 644 (rw-r--r--) | 444 (r--r--r--) |
| 002 | 775 (rwxrwxr-x) | 555 (r-xr-xr-x) | 664 (rw-rw-r--) | 444 (r--r--r--) |

11. **Click Apply to save your changes.**

## Editing Shares

To update the attributes of an existing SMB share:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**
2. **Select the share you want to update.**
3. **Click Edit.**

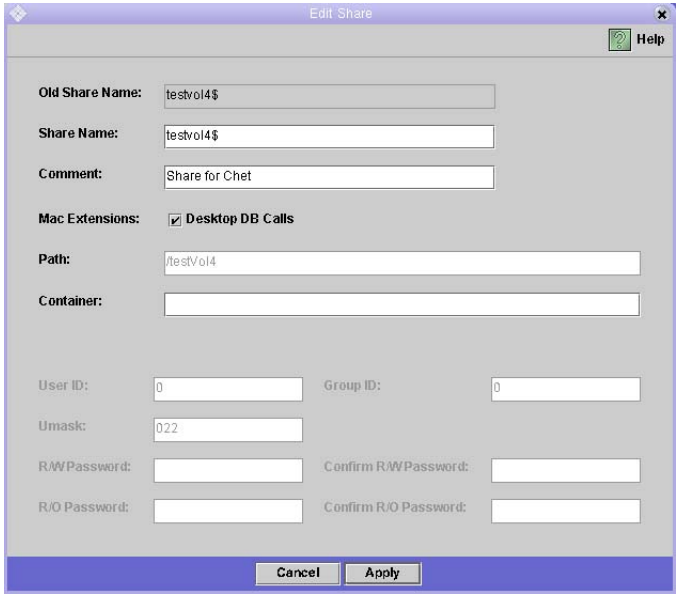


**FIGURE 9-3** The Edit Share Dialog Box

4. **The Old Share Name field displays the current name of the share. If you want to change it, enter the new name in the Share Name field. The following characters are invalid for the share name:**

   = | : ; \ " ? < > * /

5. **You can change the description of the share in the Comment field. You can enter up to 60 alphanumeric characters.**
6. **Select the Desktop DB Calls checkbox in the Mac Extensions section to let the Sun StorEdge 5210 NAS access and set Macintosh desktop database information. This speeds up Macintosh client file access and allows non-Macintosh clients to access Macintosh files on the Sun StorEdge 5210 NAS.**
7. **To change the share path, enter an existing directory name in the Path field. You cannot create a directory in this field. Directory names are case-sensitive.**

8. **Enter the new Container, if necessary. The container specifies the ADS container in which the share is published. This field is available only if you have enabled ADS for the Sun StorEdge 5210 NAS in the Set Up ADS panel. Enter the ADS path location for the share in LDAP DN notation. See "Setting Up ADS" on page 70 for more information.**
9. **The User ID, Group ID, and Password fields are only available if you enable Windows Workgroup mode (not NT Domain mode) on the Sun StorEdge 5210 NAS. Refer to "Configuring Windows Security" on page 20 for information on enabling Windows security models. See step 9. on page 101 for detailed information on these fields.**
10. **You can change the Umask setting using the rules specified for the Umask field under “Creating Static Shares” in step 10. on page 102.**
11. **Click Apply to save your changes.**

### Removing Shares

To remove an SMB/CIFS share:

1. **In the navigation panel, select Windows Configuration > Configure Shares.**
2. **Select the share you want to remove from the shares table.**
3. **Click Remove.**
4. **Click Yes to remove the share.**

## Configuring SMB/CIFS Clients

After you have configured the security and network settings, the Sun StorEdge 5210 NAS becomes visible to SMB/CIFS clients by automatically registering with the master browser on its local network.

Clients may connect in any of the following ways:

### Windows 98, XP, and Windows NT 4.0

Users connect either by mapping the network drive from Windows Explorer, or by clicking the Sun StorEdge 5210 NAS icon in the **Network Neighborhood** window.

If they map the network drive, they need the Universal Naming Convention (UNC) path for the Sun StorEdge 5210 NAS, which consists of a computer name and share name as follows: **\\computer_name\share_name**. If they connect through **Network Neighborhood**, they need the system name used to identify the Sun StorEdge 5210 NAS on the network.

### Windows 2000, XP, and 2003

If ADS is not installed, users connect either by mapping the network drive from Windows Explorer, or by clicking the Sun StorEdge 5210 NAS icon in the **My Network Places** window.

If they map the network drive, they need the UNC path for the Sun StorEdge 5210 NAS, which consists of a computer name and share name as follows: **\\computer_name\share_name**. If they connect through **Network Neighborhood**, they need the system name used to identify the Sun StorEdge 5210 NAS on the network.

If ADS is installed, users can connect to the Sun StorEdge 5210 NAS by clicking on a Sun StorEdge 5210 NAS share published in ADS.

### DOS

Users must type the **net use** command to map a share to a drive letter on the command line. They need the UNC path for the Sun StorEdge 5210 NAS, which consists of a computer name and share name as follows: **\\computer_name\ share_name**.

## About Autohome Shares

The SMB/CIFS autohome share feature eliminates the administrative task of defining and maintaining home directory shares for each Windows user accessing the system. The system creates autohome shares when a user logs on and removes them when the user logs off. This reduces the administrative effort needed to maintain user accounts and increases the efficiency of server resources.

To configure the autohome feature, enable it and provide an autohome path. The autohome path is the base directory path for the directory shares. For example, if a user's home directory is **/vol1/home/sally**, the autohome path is **/vol1/home**. The temporary share is named **sally**. The user's home directory name must be the same as the user's logon name.

When a user logs on, the server checks for a subdirectory that matches the user's name. If it finds a match and that share does not already exist, it adds a temporary share. When the user logs off, the server removes the share.

Windows clients may automatically log a user off after fifteen minutes of inactivity, which results in the autohome share disappearing from the list of published shares. This is normal CIFS protocol behavior. If the user clicks on the server name or otherwise attempts to access the Sun StorEdge 5210 NAS (for example, in an Explorer window), the share automatically reappears.

---

**Note –** All autohome shares are removed when the system reboots.

---

# Configuring Autohome Shares

Because autohome shares are created and removed automatically, configuring them is largely a matter of enabling the feature.

To enable autohome shares on the Sun StorEdge 5210 NAS:

1. **In the navigation panel, select Windows Configuration > Configure Autohome.**

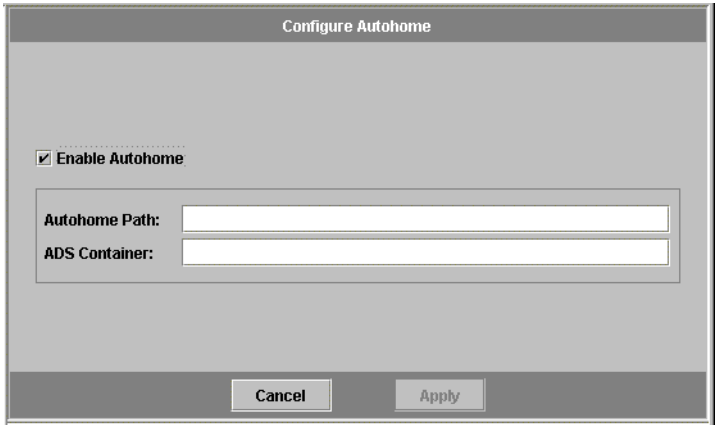


**FIGURE 9-4** The Configure Autohome Panel

2. **Select the Enable Autohome checkbox.**
3. **Enter the Autohome Path. For more information on the path, see "About Autohome Shares" on page 105.**

4. **Enter the ADS Container. For more information, see "Active Directory Services" on page 70.**

5. **Click Apply to save your changes.**

# Managing Quotas

The **Manage Quotas** panels let you administer quotas on Sun StorEdge 5210 NAS file volumes and directories. User and group quotas determine how much disk space is available to a user or group and how many files a user or group can write to a volume. Directory tree quotas determine how much space is available for a specific directory and/or how many files can be written to it.

See "Adding a User or Group Quota Setting" on page 108 to set space and file limits for users and groups. Refer to "Configuring Directory Tree Quotas" on page 112 to set space and file limits for specific Sun StorEdge 5210 NAS directories.

## Configuring User and Group Quotas

The **Configure User and Group Quotas** panel lets you administer quotas on volumes for NT and UNIX users and groups. It displays root, default, and individual quotas for the volume selected. The **root user** and **root group** are automatically set to have no hard or soft limits for space or files. The settings for the **default user** and **default group** are the settings used for all users and groups that do not have individual quotas.

### About Hard and Soft Limits

A **hard limit** is the absolute maximum amount of space available to the user or group.

Reaching a **soft limit**, which is equal to or lower than the hard limit, triggers a grace period of seven days. After this grace period is over, the user or group cannot write to the volume until the amount of space used is below the soft limit.

The hard limit must be equal to or higher than the soft limit. For disk space, it can be no more than approximately 2 TB. For the number of files, the hard limit can be no more than four billion files.

The **root user** and **root group** are automatically set to have no hard or soft limits for space or files.

## Adding a User or Group Quota Setting

To enable quotas for the file volume:

1. **In the navigation panel, select File Volume Operations > Edit Properties.**
2. **Select the file volume for which you are enabling quotas from the Volume Name drop-down list.**
3. **Be sure there is a check mark( ☑ ) in the Enable Quotas box. If not, select the box.**
4. **Click Apply.**

To add a user or group quota:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure User and Group Quotas.**

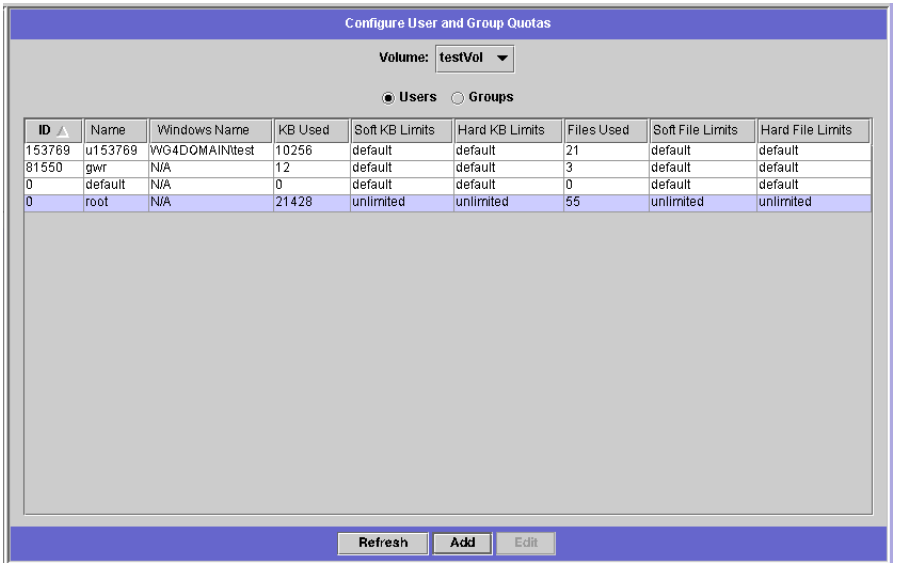


**FIGURE 9-5** The Configure User and Group Quotas Panel

2. **Click Users if you are configuring a user quota, or Groups if you are configuring a group quota.**
3. **Select the name of the file volume for which you are adding a quota from the drop-down Volume list.**

   The table on this screen shows the root, default, and individual user or group quotas for the file volume selected.

4. **To add a quota for a user or group, click Add.**

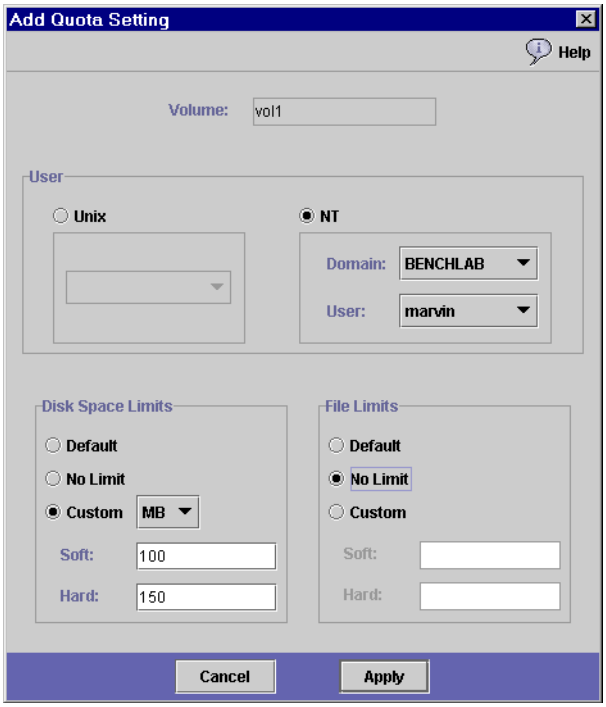


**FIGURE 9-6** The Add Quota Setting Dialog Box

5. **Select whether the designated user or group belongs to a UNIX or NT environment by clicking on the appropriate option button.**

6. **Select the appropriate user or group name (and Domain name for NT users or groups).**

7. **Set the disk space limits for the selected user or group. Choose among the following three options:**
   - **Default**—Choose this option to set the hard and soft limits to be the same as that of the default user or group.
   - **No Limit**—Choose this option to allow unlimited space to the user or group.
   - **Custom**—Choose this option to set a particular limit. Select whether the quota is displayed in **KB**, **MB**, or **GB**. Then enter the **Soft** and **Hard** space limits for the user or group.

---

**Note –** When defining user quotas you must set both hard and soft limits.

---

8. **Set limits on the number of files a user or group can write to the file volume. Choose among the following three options:**
   - **Default—**Choose this option to set the hard and soft limits to be the same as that of the default user or group.
   - **No Limit—**Choose this option to let the user or group write an unlimited number of files to the file volume.
   - **Custom—**Choose this option to set a particular file limit. Then enter the **Soft** and **Hard** limits for the number of files.
9. **Click Apply to save your changes.**

## Editing a User or Group Quota Setting

To edit a user or group quota:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure User and Group Quotas.**

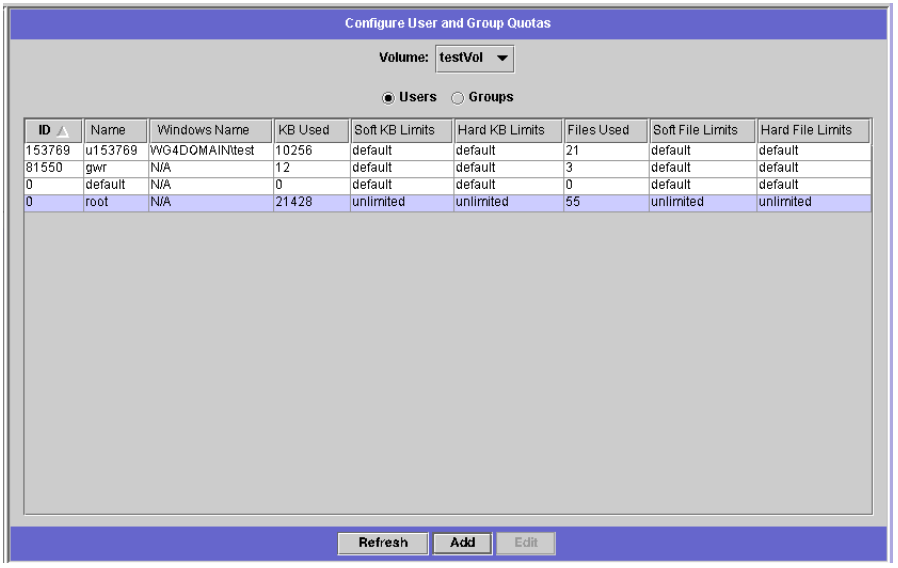


**FIGURE 9-7** The Configure User and Group Quotas Panel

2. **Click Users to edit a user quota or Groups to edit a group quota.**
3. **Select the name of the file volume for which you are editing quotas from the drop-down Volume list. The table on this screen shows the root, default, and individual user or group quotas for the file volume.**

4. **Select the user or group for whom you are editing a quota, and click Edit.**

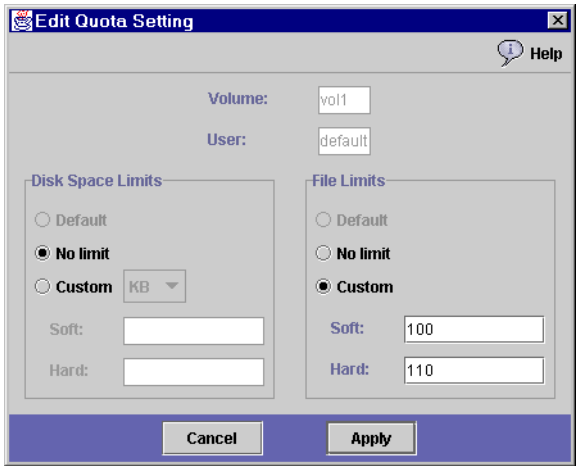


**FIGURE 9-8** The Edit Quota Setting Dialog Box

5. **Edit the disk space limits for the selected user or group. Choose among the following three options:**
   - **Default—**Choose this option to set the hard and soft limits to be the same as that of the default user or group.
   - **No Limit—**Choose this option to allow unlimited space usage by the user or group.
   - **Custom—**Choose this option to set a particular limit. Select whether the quota is reported in **KB**, **MB**, or **GB**. Then enter the **Soft** and **Hard** space limits for the user or group.

6. **Edit the limits on the number of files a user or group can write to the file volume. Choose between the following three options:**
   - **Default—**Choose this option to set the hard and soft limits to be the same as those of the default user or group.
   - **No Limit—**Choose this option to let the user or group write an unlimited number of files to the file volume.
   - **Custom—**Choose this option to set a particular file limit. Then enter the **Soft** and **Hard** limits for the number of files.

7. **Click Apply to save your changes.**

## Deleting a User or Group Quota

Root and default quotas cannot be deleted. You can remove an individual quota by setting it to disk space and file defaults.

To delete a user or group quota:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure User and Group Quotas.**
2. **In the Configure User and Group Quotas panel, select Users to remove a user quota or Groups to remove a group quota.**
3. **Select the quota you want to remove in the table and click Edit.**
4. **In the Edit Quota Setting dialog box, click the Default option in both the Disk Space Limits and File Limits sections.**
5. **Click Apply to remove the quota setting.**

# Configuring Directory Tree Quotas

The **Configure Directory Tree Quotas** (DTQ) panel lets you administer quotas for specific directories in the Sun StorEdge 5210 NAS file system. Directory tree quotas determine how much disk space is available for a directory and how many files can be written to it. You can only configure quotas for directories created in this panel, not for previously existing directories.

## Adding a Directory Tree Quota

To create a directory tree with a DTQ:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure Directory Tree Quotas.**

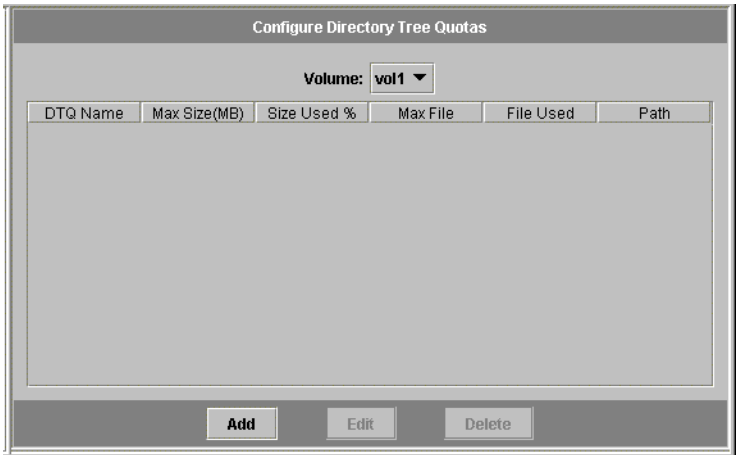


**FIGURE 9-9** The Configure Directory Tree Quotas Panel

2. **Select the file volume for which you are configuring a directory tree quota from the drop-down list.**

3. **Click Add.**

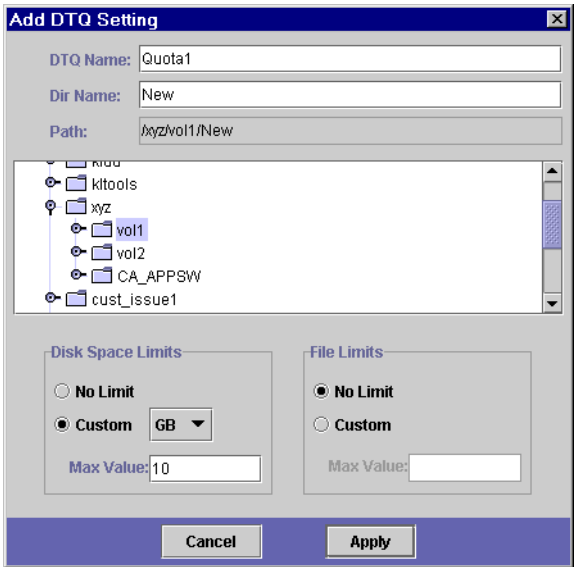


**FIGURE 9-10** The Add DTQ Setting Dialog Box

4. **In the DTQ Name field, enter a name to identify this directory tree quota.**
5. **In the DirName field, enter a name for the new directory.**
6. **Underneath the Path field, there is a box that shows the directory tree structure for the file volume you selected. To view the contents of a folder, click the symbol next to the folder to the position, or double-click the folder icon. Then select the directory that will contain the new directory that you are creating. Continue until the full path of the directory is shown in the Path field.**
7. **Select the disk space limit for the directory in the Disk Space Limits section, selecting either No Limit or Custom. Selecting No Limit allows unlimited disk space for the directory. Select Custom to define the maximum disk space that the directory can occupy.**
8. **Choose whether the quota is reported in MB or GB and enter the disk space limit in the Max Value field. Entering a Custom value of 0 (zero) is equivalent to choosing No Limit.**

9. **In the File Limits field, select the maximum number of files that can be written to this directory, either No Limit or Custom. Selecting No Limit allows an unlimited number of files to be written to this directory. Select Custom to assign a maximum number of files. Then enter the file limit in the Max Value field.**

10. **Click Apply to add the quota.**

## Editing a Directory Tree Quota

To edit an existing directory tree quota:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure Directory Tree Quotas.**

2. **Select the quota you want to edit from the table, then click Edit.**

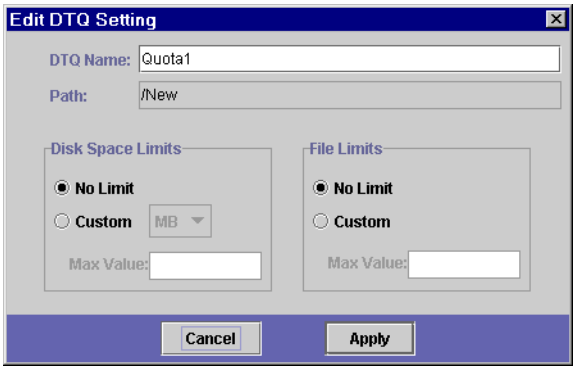


**FIGURE 9-11** The Edit DTQ Setting Dialog Box

3. **Edit the name that identifies this directory tree quota in the DTQ Name field.**

   The **Path** is a read-only field that shows the path of the directory.

4. **In the Disk Space Limits section, select the disk space limit for the directory; either No Limit or Custom. Selecting No Limit allows unlimited disk space usage for the directory. Select Custom to assign a maximum amount of disk space.**

5. **Choose whether the quota is reported in MB or GB, and enter the disk space limit in the Max Value field. Entering a Custom value of 0 (zero) is equivalent to choosing No Limit.**

6. **In the File Limits section, select the maximum number of files to be written to this directory; either No Limit or Custom. Selecting No Limit lets you write an unlimited number of files to this directory. Select Custom to assign a maximum number of files.**

7. **Enter the file limit in the Max Value field.**
8. **Click Apply to save your changes.**

---

**Note –** When you move or rename a directory that contains a directory tree quota (DTQ) setting, the system automatically updates the DTQ's path specification.

---

## Deleting a Directory Tree Quota

To delete a directory tree quota:

1. **In the navigation panel, select File Volume Operations > Manage Quotas > Configure Directory Tree Quotas.**
2. **Select the quota you want to remove from the table.**
3. **Click Delete to remove the quota setting.**

Deleting a directory tree quota (DTQ) removes the quota setting; however, it does not delete the directory itself or the files in the directory.

---

**Note –** If you delete a directory that contains a DTQ setting, both the directory and the DTQ setting are deleted.

---

# Setting Up NFS Exports

Network File System (NFS) exports let you specify access privileges for UNIX users. The table in the **Configuring Exports** panel shows the current NFS export information, including the accessible directories, host name, and access level (Read/Write or Read/Only) for each export.

Any host name beginning with "@" identifies a group of hosts. For example, a host name of **@general** includes all hosts, and a host name of **@trusted** includes all trusted hosts. Refer to "Configuring Hosts" on page 87 for information about trusted hosts.

# Creating Exports

To specify access privileges for a particular UNIX host:

1. **In the navigation panel, select UNIX Configuration > Configure NFS > Configure Exports.**

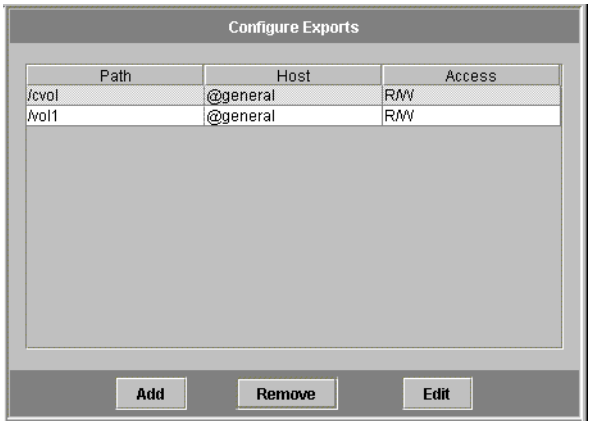


**FIGURE 9-12** The Configure Exports Panel

The table in this panel shows the current export information. If you have not created any exports, this space is blank.

2. **Click Add.**

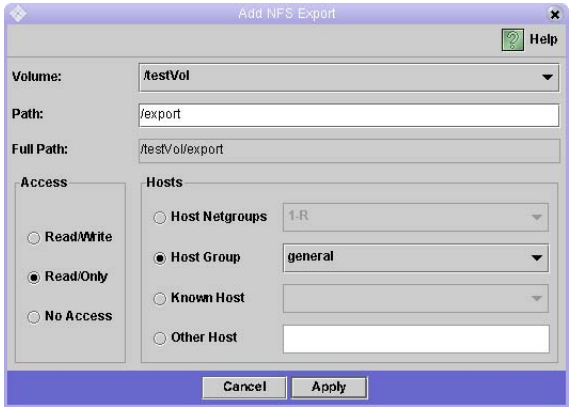


**FIGURE 9-13** The Add NFS Export Dialog Box

3. **In the Volume box, select the volume for which you want to grant UNIX NFS host access.**

4. **In the Path box, select the directory for which you want to grant UNIX NFS host access. Leaving this field blank selects the entire volume.**

5. **In the Access box, specify whether the host(s) have Read/Write, Read/Only, or No Access privileges on the selected volume.**

6. **In the Hosts section, select the host or hosts for which you are defining an NFS export. Choose from the following:**
   - **Host Netgroups—**To select a netgroup of hosts, select this option button. From the drop-down list, select the netgroup for which you are defining this export.
   - **Host Group—**To select all hosts or all trusted hosts, select this option button. From the drop-down list, select either **general** (all hosts) or **trusted** (all trusted hosts).
   - **Known Host—**To assign the export to a host added through the **Set Up Hosts** panel, select this option. From the drop-down list, select the host for which you are defining this export.
   - **Other Host—**To assign the export to an individual host that you have not added through the **Set Up Hosts** panel, select this option and type in the name of the host.

7. **Click Apply to save the export.**

8. **In the Configure Exports panel, verify that the correct path, host, and access rights are shown for the export you created.**

# Editing Exports

To change the access rights for a particular volume:

1. **In the navigation panel, select UNIX Configuration > Configure NFS > Configure Exports.**
2. **Select the export you want to change, and click Edit.**

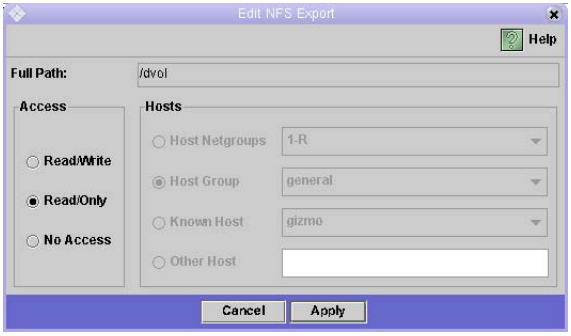


**FIGURE 9-14** The Edit NFS Export Dialog Box

3. **To change the Access rights, click Read/Write, Read/Only, or No Access.**

   The **Hosts** section is read only.
4. **Click Apply to save your changes.**
5. **In the Configure Exports panel, verify that the correct path, host, and access rights are shown for the export you edited.**

# Removing Exports

To remove an NFS export, click on the export in the **Configure Exports** panel, and click **Remove**.

CHAPTER 10

# Sun StorEdge 5210 NAS Options

You have the option of setting up mirroring by ordering File Replicator for the Sun StorEdge 5210 NAS system. This chapter describes mirroring and how to set up File Replicator.

## Mirroring

### About Sun StorEdge 5210 NAS Mirroring

Mirroring allows you to duplicate any or all of the file volumes of one Sun StorEdge 5210 NAS server onto another Sun StorEdge 5210 NAS server. The source server is called the *active server* and the target server is called the *mirror server*. The image below illustrates this relationship:

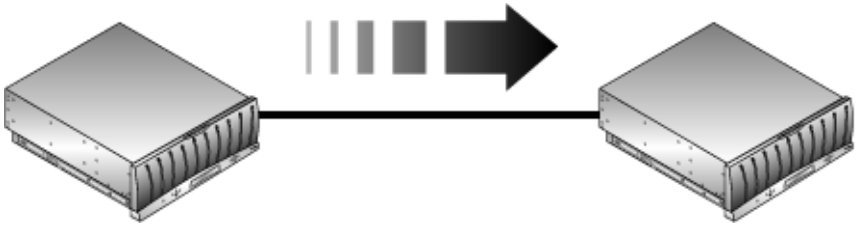


**FIGURE 10-1** The Mirror Relationship

In the event that the active server fails, you can break the mirror on the active server, then *promote* the mirrored file volume (make it available for users) on the mirror server.

The mirroring method used in the Sun StorEdge 5210 NAS is an asynchronous transaction-oriented mirror. Mirroring is accomplished through a large *mirror buffer* to queue file system transactions for transfer to the mirror system. In practice, the mirror server lags the active server by a short time period and the performance impact on the active server is minimal. Because the mirror is transaction-oriented, the integrity of the mirror file system is guaranteed, even during network interruptions or system outages.

# Before You Begin Mirroring

Before you begin, make sure you have the following:

- Two Sun StorEdge 5210 NAS servers are required for mirroring. The Sun StorEdge 5210 NAS servers may be of any model and can be of differing models.
- The mirror server must contain an equal or larger amount of storage space than the file volumes to be mirrored.
- There must be a reliable, continuously available network connection with sufficient capacity between the active and mirror Sun StorEdge 5210 NAS servers. The interface type connecting these two servers can be 100Mb Ethernet or 1000Mb Ethernet. The servers may be directly connected using a cross-over cable, or connected through a switch or router. If you are connecting the servers to a router, be sure to configure the static route setting to ensure that the mirroring data is directed through the private route. If you are connecting the servers to a switch, create a virtual LAN (VLAN) for each server to isolate network traffic.
- Both servers must have the same version of the operating system installed.
- The active file volumes to be mirrored must be at least 1GB.

---

**Note –** Once a file volume is mirrored, the original file volume cannot be renamed.

---

# Configuring Active and Mirror Systems

When setting up your systems, designate the roles of the ports connecting the mirroring Sun StorEdge 5210 NAS servers to one another (see "Configuring the Dedicated Network Ports" on page 123). Then configure mirroring on the active and mirror systems using the Web Administrator interface (see "Configuring Mirrored File Volumes" on page 124). Configure each system independently.

## Configuring the Dedicated Network Ports

To configure the dedicated network ports:

1. **In the navigation panel of the active server, select Network Configuration > Configure TCP/IP > Configure Network Adapters.**

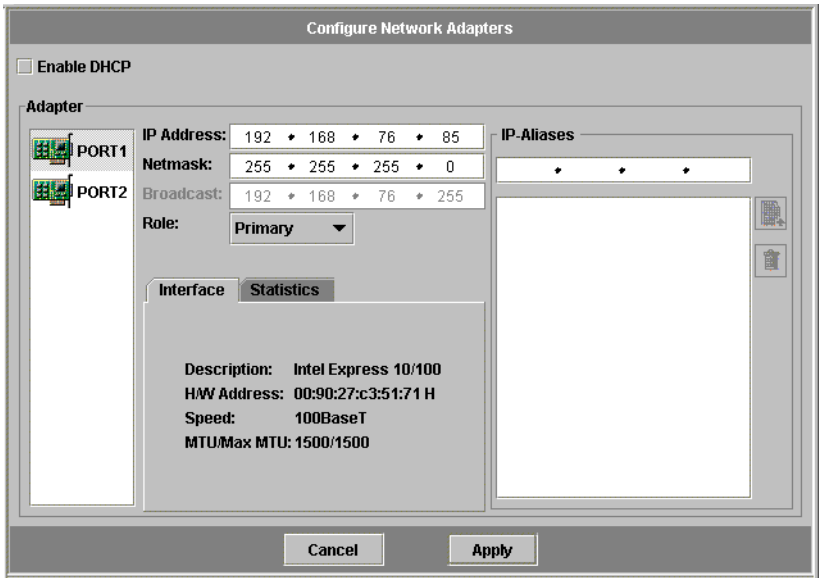


**FIGURE 10-2** The Configure Network Adapters Panel

2. **If you have not done so already, assign the IP addresses and a port role of Primary for the ports that are connected to a local network or subnet. The active and mirror systems' ports can be on different local subnets. For more information about configuring TCP/IP, see "Configuring the Network Ports" on page 16.**

3. **Assign the IP address for the port used for the mirroring connection between the active and mirror systems.**

   If you have created an isolated network to carry the mirroring traffic, you should use addresses in the range reserved for private use, such as 192.168.x.x. For example, assign the active system's mirror link interface to 192.168.1.1, and assign the mirror system's mirror link interface to 192.168.1.2.

4. **In the Role field of the port used for the connection between the active and mirror servers, select Mirror.**

5. **If the active and mirror systems are not connected on the same subnet, you must set up a static route between them using the command line interface. This enables the Sun StorEdge 5210 NAS servers to communicate with each other over networks that are not directly connected to their local interfaces. For more information about completing this process, see "Managing Routes" on page 189.**
6. **Click Apply to save changes.**

## Configuring Mirrored File Volumes

Mirroring is performed on a per-volume basis. You may choose to mirror some or all of your volumes.

---

**Note –** Only file volumes equal to or larger than 1 GB can be mirrored.
Once a file volume is mirrored, the original file volume cannot be renamed while the mirroring connection is maintained.

---

There can be no I/O activity to the file volume being mirrored from the active server during initial mirror synchronization.

# Activating File Replicator

To activate File Replicator you must enter an activation key in the **Activate Options** panel. If you have purchased this option, contact your Sun Microsystems customer service representative for the activation key.

To activate File Replicator:

1. **In the navigation panel, select System Operations > Activate Options and click Add to add the license.**

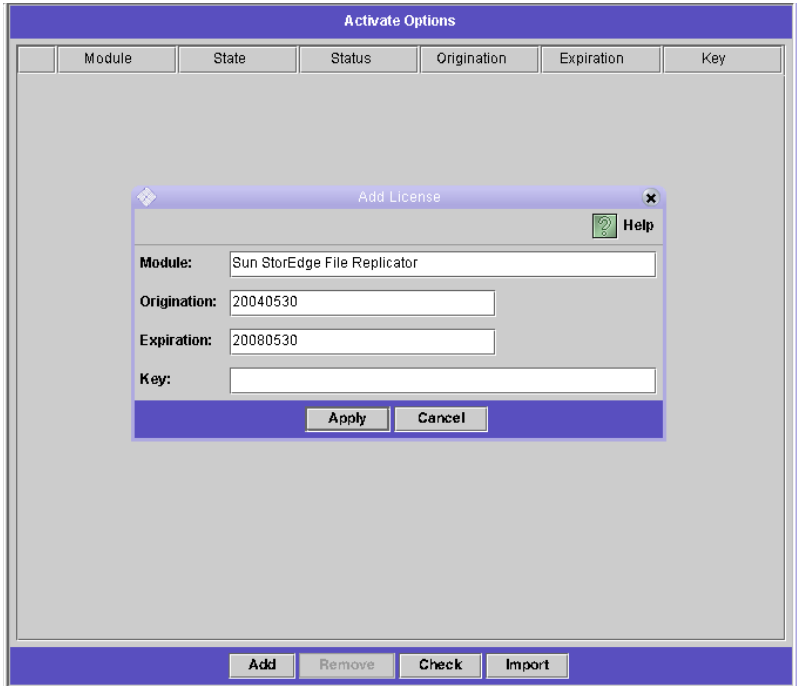


**FIGURE 10-3** The Activate Options Panel

2. **In the Add License dialog box enter the Module name provided by Sun (`File Replicator`).**
3. **Enter the Origination date provided by Sun in the format YYYYMMDD. This is the date on which the license becomes active starting at 0000:00 hours. The date 00000000 means the license is active immediately.**
4. **Enter the Expiration date provided by Sun in the format YYYYMMDD. This is the date on which the license expires at 2359:59 hours. The date 00000000 means the license does not expire.**
5. **Enter the license Key provided by Sun.**
6. **Click Apply to activate File Replicator.**
7. **Log into Web Administrator on the active server (the server containing the file volume(s) you want to mirror).**
8. **Repeat steps 2. - 6. on the active server.**

9. **Select File Replicator > Manage Mirrors from the navigation panel.**
10. **Click Add.**

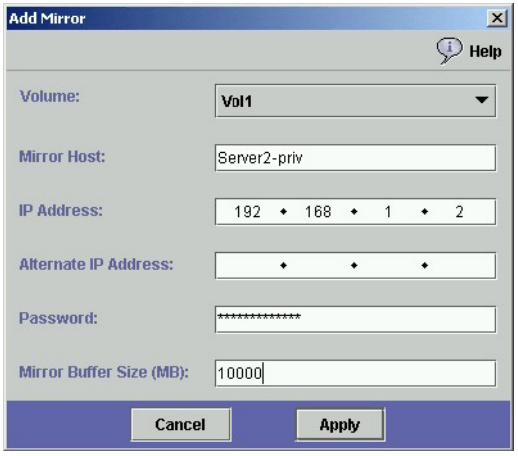


**FIGURE 10-4** The Add Mirror Dialog Box

11. **Select the file volume to be mirrored from the Volume drop-down list. The file volume to be mirrored must be equal to or larger than 1 GB.**
12. **Enter the name of the target (mirror) server that will host the mirrored file volume in the Mirror Host field.**
13. **Enter the IP Address of the mirror system. This should be the IP address chosen for the mirroring NIC on the mirror system.**
14. **Enter the Alternative IP Address, optional.**

    In the event that the first IP address becomes unavailable, the server uses the alternative IP address to maintain the mirror.
15. **If an administrative password is required to access the mirror server, enter it in the Password field. If there is no administrative password, leave this field blank. Always protect your servers with passwords.**
16. **Enter the size (in MB) of the Mirror Buffer.**

    The mirror buffer stores file system write transactions while they are being transferred to the mirror server. The size of the mirror buffer depends on a variety of factors, but must be at least 100 MB. You may want to create a mirror buffer that is approximately 10% of the size of the file volume you are mirroring. The size you choose should depend on how much information is being written to the file volume rather than the size of the file volume. The file volume free space on the active server is reduced by the allocation size of the mirror buffer.

17. **Be sure there is no I/O activity to the source file volume on the active server during mirror synchronization. Click Apply to create the mirror.**

    The mirror creation process begins. When the mirror reaches an **In Sync** status in the **Manage Mirrors** panel (Figure 10-5), the mirrored file volume is mounted as read-only.

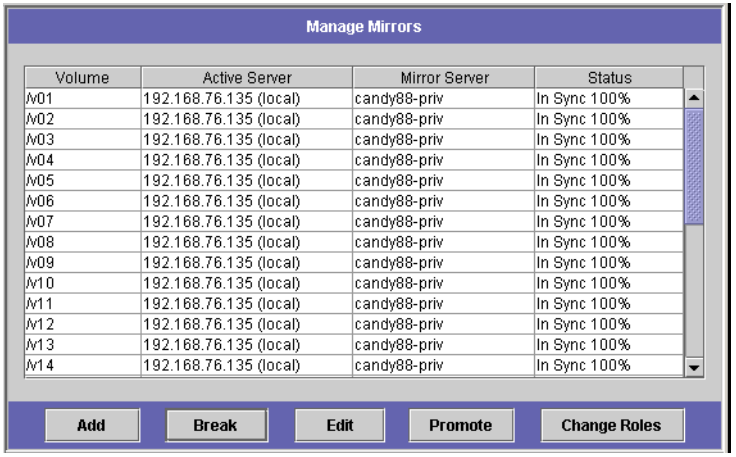


**FIGURE 10-5** The Manage Mirrors Panel

# Editing a Mirror

This section allows you to edit the alternate IP address(es) or mirror server administrator password of an existing mirror.

To edit a mirror:

1. **In the navigation panel, select File Replicator > Manage Mirrors.**
2. **Select the mirror that you want to edit from the table.**
3. **Click Edit.**

   The file volume name and mirror host are read-only fields.

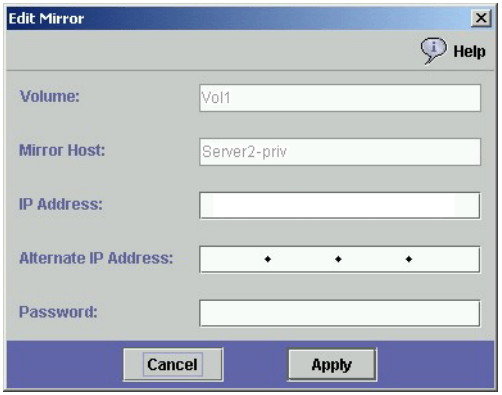


**FIGURE 10-6** The Edit Mirror Dialog Box

4. **Edit the IP Address you want to use for the mirror connection, and then edit the Alternative IP Address in the next field.**
5. **If necessary, enter the new administrator password required for accessing the mirror host server. If there is no administrative password, leave the Password field blank.**
6. **Click Apply to save your changes.**

## Setting Warning Thresholds

In the **File Replicator > Set Threshold Alert** panel you can set the threshold alert for all mirrored file volumes. The threshold alert is the percentage of mirror buffer use at which a warning is sent to designated recipients.

The mirror buffer stores file system write transactions while they are being transferred to the mirror server. Increases in write activity to the active server or a damaged network link can cause the transference of write transactions to the mirror server to “back up” in the mirror buffer. If the mirror buffer overruns because of this process, the mirror is cracked and no further transactions occur between the active server and the mirror server until the mirror is re-established. Once full communication is restored, the system automatically begins the mirror resync process until the mirrored file volume is back in sync.

To prevent this situation, the Sun StorEdge 5210 NAS automatically sends warnings through e-mail notification, the system log file, SNMP traps, and the LCD panel when the mirror buffer is filled to certain threshold percentages.

To set up the threshold alert:

1. **In the navigation panel, select File Replicator > Set Threshold Alert.**

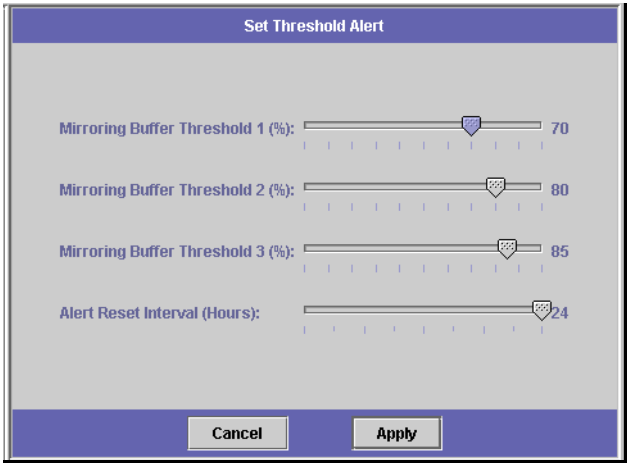


**FIGURE 10-7** The Set Threshold Alert Panel

2. **Select the Mirroring Buffer Threshold 1. This is the percentage of mirror buffer usage that triggers the first alert. The default value is 70%. This means that when the mirror buffer is 70% full, an alert is automatically issued.**

3. **Select the Mirroring Buffer Threshold 2. This is the percentage of mirror buffer usage that triggers the second alert. The default value is 80%.**

4. **Select the Mirroring Buffer Threshold 3. This is the percentage of mirror buffer usage that triggers the third alert. The default value is 90%.**

5. **Select the Alert Reset Interval (Hours). This is the amount of time the Sun StorEdge 5210 NAS waits before re-issuing an alert if the condition re-occurs within the interval.**

   For example, if you set the **Mirroring Buffer Threshold 1** to be 10% and the **Alert Reset Interval** to two hours, the first alert is issued when the mirror buffer is 10% full. The Sun StorEdge 5210 NAS will not issue the Threshold 1 alert again for the next two hours. If at that time the mirror buffer usage is still beyond the 10% threshold (but not beyond Thresholds 2 or 3), the Threshold 1 alert is issued again.

   The default value for this field is 24 hours.

6. **Click Apply to save your changes.**

# Breaking the Connection between Mirror Servers

To promote a file volume on the mirror server (for example, the file volume on the active server is unavailable), you must first break the mirror connection. Break the mirror connection on the active server rather than on the mirror server as described in the following procedure. However, if the active server is down and you cannot access it to break the connection, you can break the mirror connection from the mirror server instead.

To break a mirror connection:

1. **In the navigation panel of the active server, select File Replicator > Manage Mirrors.**

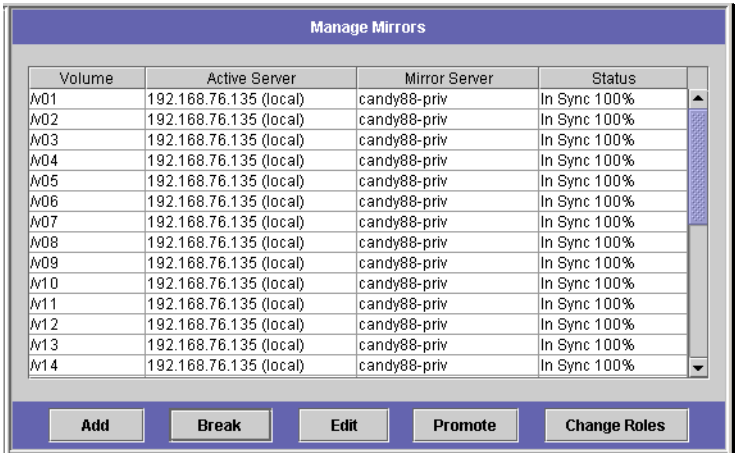


**FIGURE 10-8** The Manage Mirrors Panel

2. **Select the mirror from the table and click Break.**

   You are prompted to confirm that you want to break the mirror connection. Once the mirror connection is broken, it disappears from the mirroring table in this panel. To promote the file volume, you must access the **Manage Mirrors** panel on the mirror server. For more information, see "Promoting a Mirrored File Volume" on page 130.

# Promoting a Mirrored File Volume

In the event that the active server fails, the mirror server provides fault tolerance for mirrored file volumes. To make a mirrored file volume available to network users, you must **promote** the file volume. You must first break the mirror connection, then

promote the mirrored file volume and configure its access rights. Once a mirror connection is broken and the mirrored file volume promoted, the original and mirrored file volumes are completely independent.

To promote a file volume on the mirror server, you must first break the mirror connection. See "Breaking the Connection between Mirror Servers" on page 130 for instructions.

To promote a file volume on the mirror server:

1. **In the navigation panel of the mirror server, select File Replicator > Manage Mirrors.**

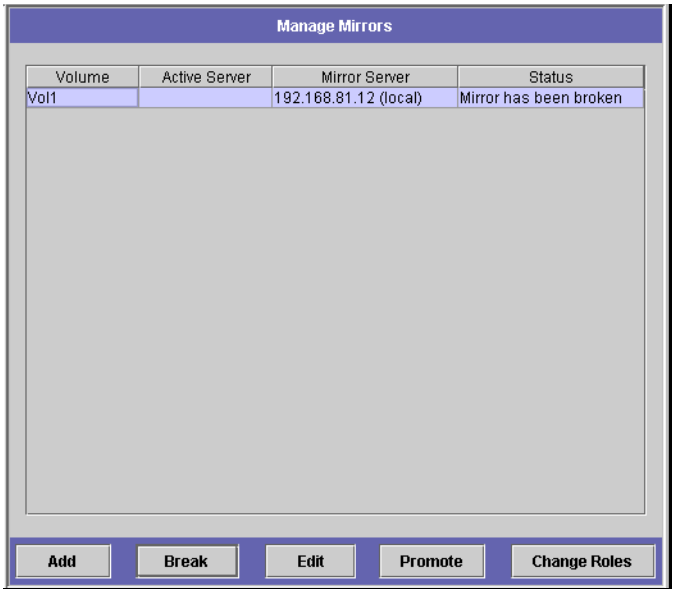


**FIGURE 10-9** The Manage Mirrors Panel

2. **The formerly mirrored file volume is shown in the mirror table. Select it.**

3. **Click Promote.**

   It may take several minutes to complete this process. To promote a mirrored file volume, the volume must have reached an **In Sync** state at some point. If the mirrored file volume was out of sync when it is successfully promoted, the volume will be mounted as a read-only volume. Before write-enabling the volume, run the "fsck" command to make any necessary repairs.

After you break the mirror connection, the system performs a file system check. If the system finds errors during this check, the file volume promotion process could take longer to complete. Data integrity is not guaranteed if the mirror is out of sync during the promote process.

After you promote the file volume, you might need to reconfigure access rights. SMB share information is carried over automatically, but you must configure any NFS file volume access and NFS exports for this file volume again. For more information on setting up NFS exports, see "Setting Up NFS Exports" on page 116.

# Re-establishing a Mirror Connection

This procedure describes how to re-establish a mirror connection after the active server fails and you promote the file volume on the mirror server. The promoted file volume is now the most up-to-date version and functions completely independently of the out-of-date file volume on the active system. To recreate the mirror connection, you must mirror the up-to-date file volume back to the active server, and then mirror the file volume back to the mirror server as you did originally.

---

**Note –** If the mirrored file volume was not promoted, do not follow these instructions. The active system automatically brings the mirror back to an **In Sync** state when it is back online.

---

In the examples that follow, *Server 1* is the active server, and *Server 2* is the mirror server.

To re-establish a mirror connection:

- Make sure the mirror on *Server 1 is broken*, see "Breaking the Mirror Connection on Server 1" on page 133.
- Delete the out-of-date file volume on *Server 1*, see "Deleting the Out-of-Date File Volume on Server 1" on page 133.
- Mirror the up-to-date file volume from *Server 2* back to *Server 1*, see "Mirroring the Up-to-Date Volume from Server 2 to Server 1" on page 134.
- Change role on Server 2, see "Changing Volume Roles" on page 136. At this point Server 1 would be active again and Server 2 would be the mirroring target.

## Breaking the Mirror Connection on *Server 1*

The connection between the active and mirror servers is illustrated below.

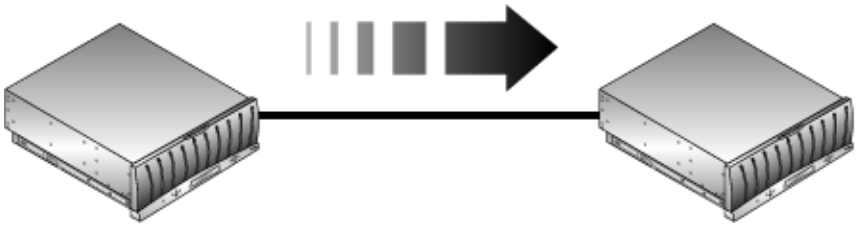


**FIGURE 10-10** The Mirror Relationship

When the active server is brought online, it may attempt to re-establish the mirror connection. Therefore you must break the mirror connection on the active server.

To break the mirror connection on the active server (if you did not already do so):

1. **Open a Web browser window to *Server 1*.**
2. **In the navigation panel, select File Replicator > Manage Mirrors.**
3. **Select the mirror connection you want to break.**
4. **Click Break.**

## Deleting the Out-of-Date File Volume on *Server 1*

To delete the out-of-date file volume from *Server 1*:

1. **In the navigation panel of *Server 1*, select File Volume Operations > Delete File Volumes.**

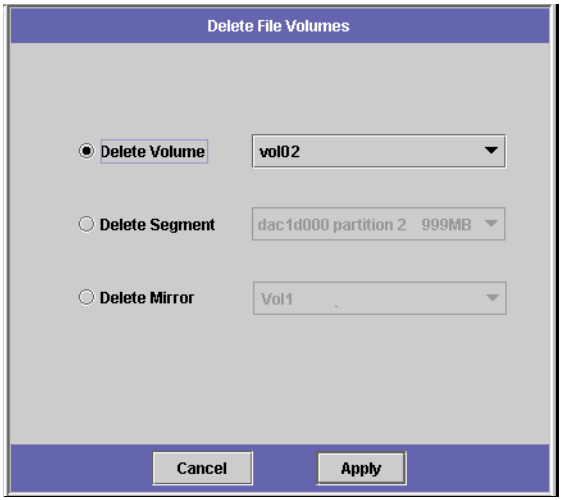


**FIGURE 10-11** The Delete File Volumes Panel

2. **Select the Delete Volume option box.**
3. **Select the file volume that was being mirrored. Since the file volume on the mirror server has been promoted and is now the current version, the file volume on the active server is out of date and must be deleted.**

**Caution –** Before completing the following step, be sure you are deleting the out-of-date source file volume on the **active server**. Also, be sure that the up-to-date file volume on the mirror server is verified and promoted first.

4. **Click Apply to delete the out-of-date file volume.**

## Mirroring the Up-to-Date Volume from *Server 2* to *Server 1*

This section describes how to mirror the up-to-date file volume on the former mirror server (*Server 2*) back to the former active server (*Server 1*).

To mirror the file volume from *Server 2* to *Server 1*:

1. **Open a Web browser window to *Server* 2.**
2. **In the navigation panel, select File Replicator > Manage Mirrors.**
3. **Click Add.**

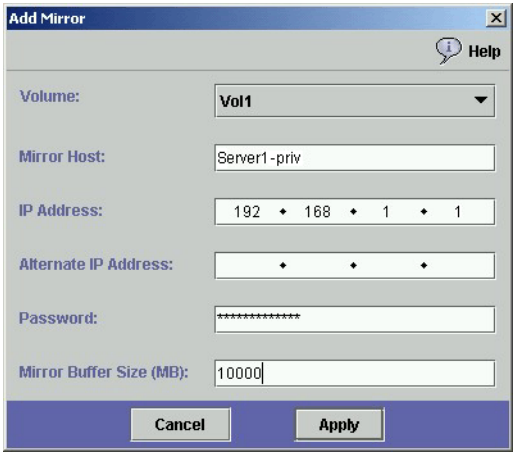


**FIGURE 10-12** The Add Mirror Dialog Box

4. **Select the file volume to be mirrored from the Volume drop-down list.**
5. **Enter the mirroring name of *Server 1* in the Mirror Host field.**
6. **Enter the IP Address of the *Server 1* port used for the mirroring connection.**
7. **Enter the Alternative IP Address in the next blank.**
8. **If you need an administrative password to access *Server 1*, enter it in the Password field. If there is no administrative password, leave this field blank.**
9. **Enter the size of the Mirror Buffer. For more information about the mirror buffer, see "About Sun StorEdge 5210 NAS Mirroring" on page 121.**

   Be sure there is no I/O activity to the source file volume on *Server 2* during mirror synchronization.
10. **Click Apply to create the mirror.**

    The mirror creation process begins. When the mirror reaches an **In Sync** state, an identical copy of the file volume exists on both *Server 1* and *Server 2*.
11. **In the Manage Mirrors panel on Server 1, select the promoted file volume then click Change Roles. See "Changing Volume Roles" on page 136 for more information.**

    You have re-established the original mirroring connection.

# Changing Volume Roles

An administrator can switch roles between an active volume and the mirror volume. Changing volume roles allows the active volume to function as the mirror volume and vice versa; however, the original configuration on each volume remains unchanged. Changing roles is not a disaster recovery function.

Changing roles can be initiated in the Manage Mirror panel from the active or mirror server.

To change roles:

1. **In the navigation panel click File Replicator > Manage Mirrors.**

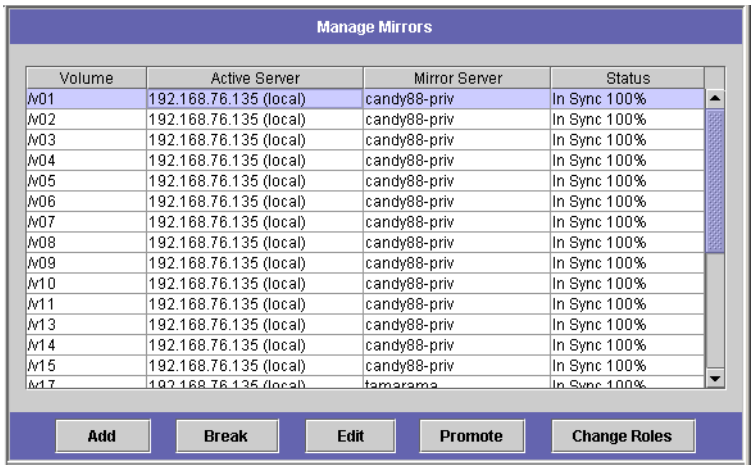


**FIGURE 10-13** The Manage Mirrors Panel

2. **Select a volume in the Volume column.**
3. **Click Change Roles.**

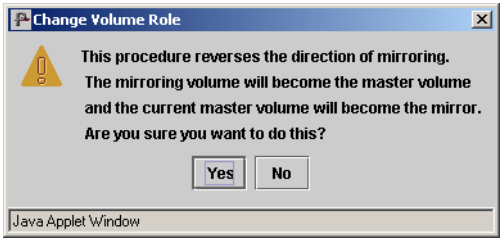


**FIGURE 10-14** The Change Volume Role Dialog Box

4. **Click Yes to confirm.**

CHAPTER 11

# Monitoring

This chapter describes the monitoring functions of the Sun StorEdge 5210 NAS system. System monitoring is closely related to maintenance functions and many of the monitoring functions described here refer to other chapters where action can be taken to alleviate issues shown by the monitoring functions. The monitoring functions also show the completion or status of management or maintenance activities.

## Monitoring Functions

### Configuring SNMP

The **Configure SNMP** panel lets you enable or disable SNMP (Simple Network Management Protocol) communications, which let you conduct SNMP monitoring. The Sun StorEdge 5210 NAS supports SNMP monitoring only (not SNMP management).

To interpret Sun StorEdge 5210 NAS Message Information Blocks (MIB), you must copy the MIB files included in the "MIB Files" folder on the documentation CD to your network management system. (If you have updated the Sun StorEdge 5210 NAS software, copy updated MIB files from the same location.) Refer to your network management application documentation for information about how to use these files.

To set up SNMP:

1. **In the navigation panel, select Monitoring and Notification > Configure SNMP.**

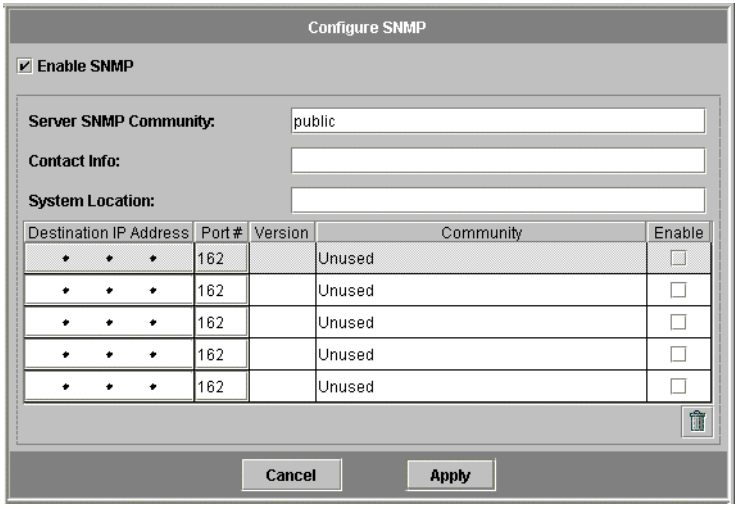


**FIGURE 11-1** The Configure SNMP Panel

2. **Select the Enable SNMP checkbox to enable SNMP.**
3. **Enter the SNMP community to which the Sun StorEdge 5210 NAS belongs in the Server SNMP Community field.**
4. **The Contact Info and System Location fields are description fields. In the Contact Info field, enter the name of the person who is responsible for this Sun StorEdge 5210 NAS system.**
5. **In the System Location field, enter the network location. This location can be physical or logical.**
6. **To add a new target address, enter the following information in an unused line of the SNMP table:**
   - **Destination IP Address—**Enter the TCP/IP address for the server you want to designate as an SNMP trap destination in the event of system errors.
   - **Port number—**Enter the port to which the Sun StorEdge 5210 NAS sends traps. The default value is port **162**.
   - **Version—**Choose the SNMP protocol version (either 1 or 2) from the pull-down menu.
   - **Community—**Enter the community string for the trap destination.
   - **Enable—**Select the checkbox in this column to enable this target address to become a trap destination.

7. **To remove a target address, select the line you want to remove and click**  **.**

8. **Click Apply to save your changes.**

# Viewing Sun StorEdge 5210 NAS Status

Web Administrator displays basic system status when you first access it. The status screens vary somewhat from one model to another, based on the functions and physical characteristics of the model.

The information provided on this screen is helpful when calling Customer Support and can provide the first indication of what has failed in some cases.

When you first log in to Web Administrator, the Sun StorEdge 5210 NAS **System Status** panel displays the model and operating system information.


**FIGURE 11-2** The System Status Panel

This screen provides a read-only display of the following data:

- **Name—**The Sun StorEdge 5210 NAS server name
- **Model—**The Sun StorEdge 5210 NAS server model
- **Serial #—**The unique serial number of the Sun StorEdge 5210 NAS server
- **Up Time—**The amount of time elapsed since the system was last turned on

- **CPU Load—**The current and peak processor load
- **OS Version—**The version of the operating system on the server
- **Web Admin Version—**The version of the Web Administrator on the system

To return to this screen at any time, click the  button in the toolbar.

# System Logging

The system log provides basic information in regard to all system events. The log provides essential information when you are trying to determine what errors occurred and when.

## Displaying the System Log

The **Display System Log** panel displays all system events, warnings, and errors, including the date and time they occurred. This panel automatically displays the most recent system events. Use the scroll bar to view earlier events.

**Note –** Changes to drive configuration (such as removing or inserting a drive) may take up to 30 seconds to appear on the event log. As such, if there are multiple changes within that time frame, some events may not be reported.

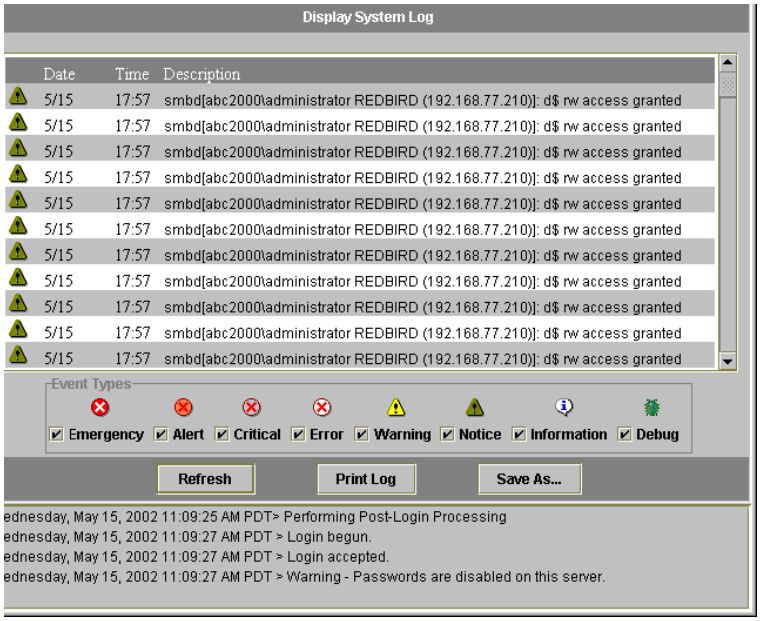


**FIGURE 11-3** The Display System Log Panel

To view the log:

1. **In the navigation panel, select Monitoring and Notification > View System Events > Display System Log.**
2. **Check all Event Types you want to view. (See "System Events" on page 142 for more information.)**
3. **Click Refresh.**

# System Events

The system log (see "Displaying the System Log" on page 140) logs eight (8) types of system events. Each event is represented by an icon.

**TABLE 11-1** System Event Icons

| | |
|---|---|
|  | **Emergency—**Specifies emergency messages. These messages are not distributed to all users. Emergency priority messages are logged into a separate file for reviewing. |
|  | **Alert—**Specifies important messages that require immediate attention. These messages are distributed to all users. |
|  | **Critical—**Specifies critical messages not classified as errors, such as hardware problems. Critical and higher-priority messages are sent to the system console. |
|  | **Error—**Specifies any messages that represent error conditions, such as an unsuccessful disk write. |
|  | **Warning—**Specifies any messages for abnormal, but recoverable, conditions. |
|  | **Notice—**Specifies important informational messages. Messages without a priority designation are mapped into this priority message. |
|  | **Information—**Specifies informational messages. These messages are useful in analyzing the system. |
|  | **Debug—**Specifies debugging messages. |

# Environmental Status

## Viewing Fan Status

To view the operational status and Revolutions Per Minute (RPM) of all fans in the Sun StorEdge 5210 NAS head unit, in the navigation panel, select **Monitoring and Notification > View Environmental Status > View Fan Status**.

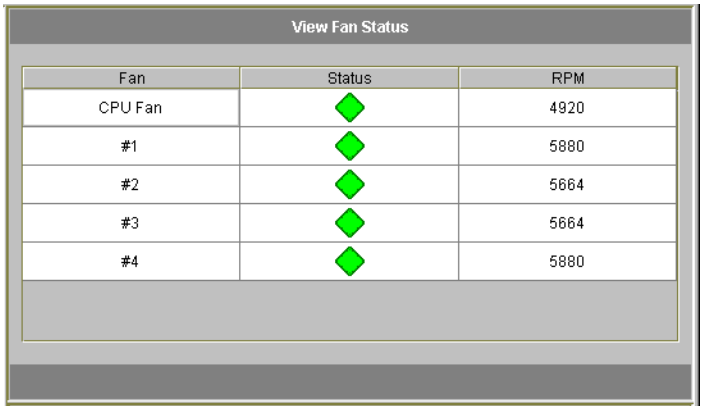


**FIGURE 11-4** The View Fan Status Panel

The table shows the current status of each fan. A green diamond in the **Status** column indicates that the fan RPM are normal. A red diamond indicates that the RPM have exceeded the acceptable range. If the RPM of any fan falls below 1800 or if a fan has failed, an e-mail is sent to the designated recipients. For more information on setting up e-mail notification, see "Setting Up E-mail Notification" on page 30.

# Viewing Temperature Status

To view temperature status in the Sun StorEdge 5210 NAS, in the navigation panel, select **Monitoring and Notification > View Environmental Status > View Temperature Status**.

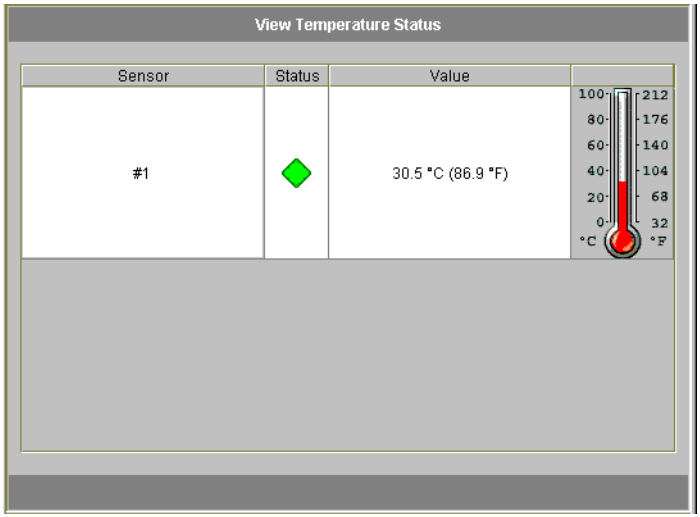


**FIGURE 11-5** The View Temperature Status Panel

This screen displays the temperature of the sensors in the head unit. A green diamond in the **Status** column indicates that the Sun StorEdge 5210 NAS is operating within the normal temperature range. A red diamond indicates that the temperature has exceeded the acceptable range. If the temperature rises above 55° Celsius (131° Fahrenheit), an e-mail message is sent to the designated recipients.

---

**Note –** You cannot change the temperature thresholds.

---

# Viewing Power Supply Status

The **View Power Supply Status** panel displays the current status of all Sun StorEdge 5210 NAS power supplies.

To display power supply status for the Sun StorEdge 5210 NAS, in the navigation panel, select **Monitoring and Notification > View Environmental Status > View Power Supply Status**.

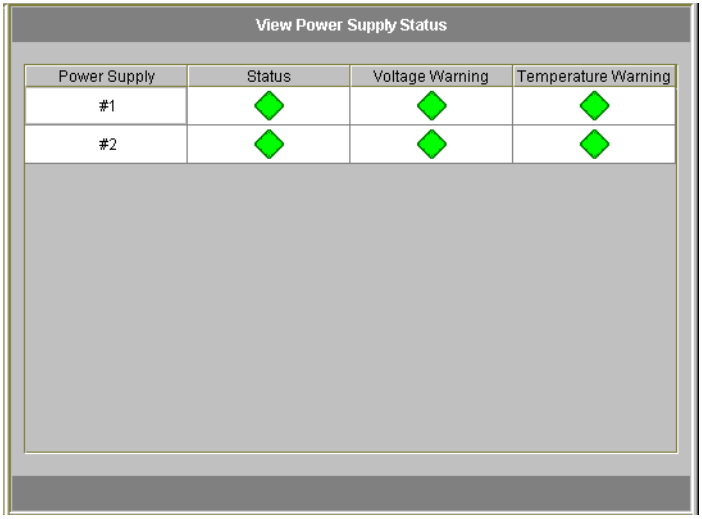


**FIGURE 11-6** The View Power Supply Status Panel

There are three columns showing power supply status. The **Status** column shows whether the power supply is functioning normally. The **Voltage Warning** and **Temperature Warning** columns show whether the voltage and temperature are at acceptable levels.

A green diamond in any of these columns indicates that the voltage or temperature levels are normal. A red diamond indicates that the voltage or temperature have exceeded the acceptable range. In this case, an e-mail notification is sent to designated e-mail notification recipients. For more information about e-mail notification, see "Setting Up E-mail Notification" on page 30.

# Viewing Voltage Status

To display the current voltage readings in the Sun StorEdge 5210 NAS, in the navigation panel, select **Monitoring and Notification > View Environmental Status > View Voltage Regulator Status**.

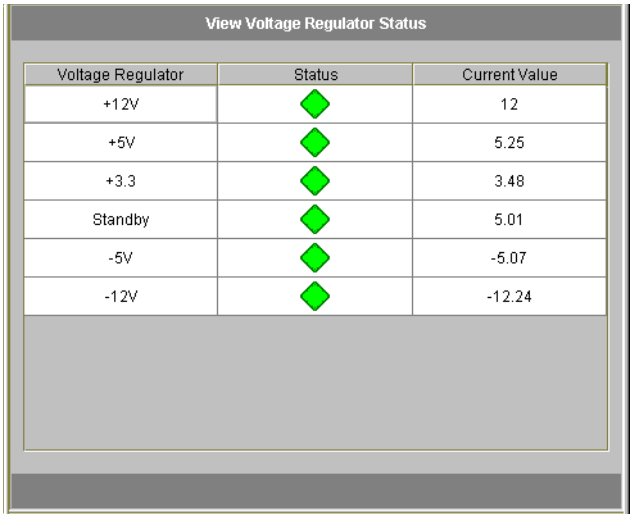


**FIGURE 11-7** The View Voltage Regulator Status Panel

See Table 11-2 for the acceptable range for each voltage.T

**TABLE 11-2** Acceptable Voltage Ranges

| Voltage Value | Acceptable Range |
|---|---|
| +12V | 11.4 to 12.6 |
| +5V | 4.7 to 5.25 |
| 3.3V | 3.13 to 4.465 |
| STB 5V (Standby) | 4.75 to 5.25 |
| -5V | -5.25 to -4.74 |
| -12V | -12.6 to -11.4 |

# Usage Information

## Viewing File Volume Usage

To view the used and free space of file volumes in the Sun StorEdge 5210 NAS, select **Monitoring and Notification** in the menu panel. Then select **View File Volume Usage** to display file volume capacity and usage.

If usage of a file volume exceeds 95%, an e-mail is sent to designated recipients.

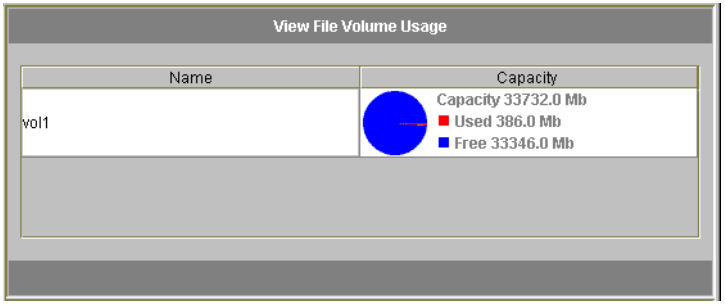


**FIGURE 11-8** The View File Volume Usage Panel

## Viewing Statistics

### Viewing Network Activity

To display the number of I/O requests per second for all Sun StorEdge 5210 NAS clients, select **System Activity > View Networking Activity** from the menu panel.

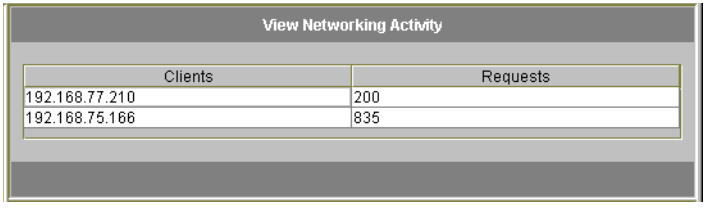


**FIGURE 11-9** The View Networking Activity Panel

## Viewing System Activity

The Sun StorEdge 5210 NAS monitors the activity and load of several devices throughout the storage system. Note that the names and number of devices being monitored varies based on your hardware configuration.

To display the I/O requests per second for system devices, in the navigation panel, select **System Activity > View System Activity**.

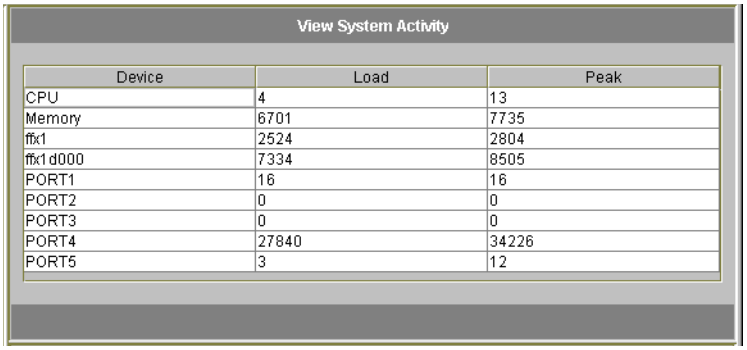


**FIGURE 11-10** The View System Activity Panel

The system and network devices in the **View System Activity** panel are displayed as follows:

- **CPU—**Sun StorEdge 5210 NAS Central Processing Unit (CPU)
- **Memory—**Sun StorEdge 5210 NAS system Random Access Memory (RAM)
- **Port Aggregation x—**Port bond *x*
- **Controller x—**RAID controller *x*
- **dac010xx—**Logical Unit Numbers (LUNs) *xx*
- **PORTx—**Port *x*
- **Host Adapter x—**SCSI host adapter *x* (for tape backup device)

# Viewing Network (Port) Statistics

To view statistics about Sun StorEdge 5210 NAS network ports:

1. **In the navigation panel, select Network Configuration > Configure TCP/IP > Configure Network Adapters.**

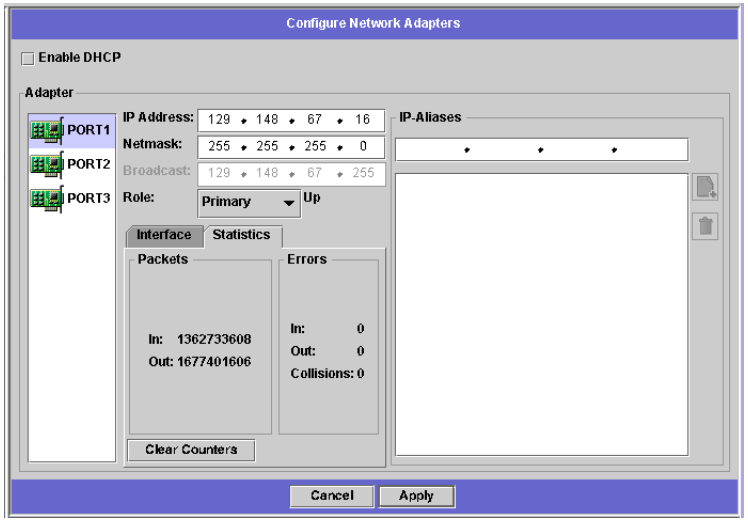


**FIGURE 11-11** Viewing Network Statistics

2. **Select the port from the Adapter list.**

The **Interface** tab displays the following information:

- **Description—**Provides a description of the selected port.
- **H/W Address—**Shows the Hardware (H/W) or Media Access Control (MAC) address which is a unique address, in hexadecimal notation (hex), used by network software to distinguish this network card from other cards on the network. This address is encoded on the network card at the factory.
- **Speed—**Specifies the speed (Mb data/sec) at which data is transmitted over the network.
- **MTU—**Specifies the current MTU (Maximum Transmission Unit) of the selected adapter. MTU is the largest frame length that can be sent on a physical medium. The highest possible MTU value is the default value of 1500. The minimum value you should use is 552.

  The TCP Max segment size is the IP Maximum datagram size minus 40. The default IP Maximum Datagram Size is 576. The default TCP Maximum Segment Size is 536.

3. **Click the Statistics tab to display the following input/output information about the selected port:**
   - **Packets In/Out—**The number of packets in/out (received/sent) by this port.
   - **Errors In/Out—**The number of errors in/out for this port.
   - **Collisions—**The number of transmission collisions for this port.

# Viewing Network Routes

The **View the Routing Table** panel allows you to view the routes by which packets are sent to the network and hosts. These routes consist of a destination network and a route entry reference.

## About Routing

There are two different kinds of routes: **network routes** and **host routes**. Network routes are used to send packets to any host on a particular network. Host routes are rarely used and are implemented to send packets to a host that is not attached to any known network only to another host or gateway.

The following are some examples of route flags shown in the routing table:

- **0x1—**Indicates that the route is usable.
- **0x2—**Indicates that the destination is a gateway.
- **0x4—**Indicates that the destination is a host entry.
- **0x8—**Indicates that the host or network is unreachable.
- **0x10—**Indicates that the destination was created dynamically.
- **0x20—**Indicates that the destination was modified dynamically.

Some flags may be the sums of individual indicators. For example, **0x3** would represent the route as being usable (**0x1**) and a gateway (**0x2**), as the sum of these two values.

## Displaying Routes

To view the status of all routes in the local network, in the navigation panel, select **Network Configuration > View the Routing Table**.

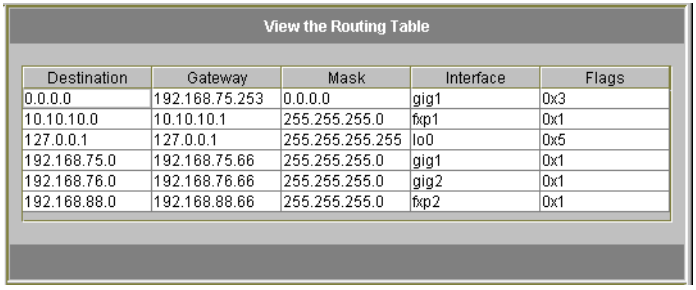


**FIGURE 11-12** The View the Routing Table Panel

This screen displays the following information about each network route:

- **Destination—**This is the IP address of the route destination, and can refer to either a network or host. There should be one default route (for example, 0.0.0.0), one loop-back route (for example, 127.0.0.1), at least one network route, and at least one host route.
- **Gateway—**This is the gateway address through which the packets travel to the destination.
- **Mask—**This is the netmask for the destination network.
- **Interface—**This designates the interface type used to send packets over the network.
- **Flags—**The flags indicate the status of the route. Each type of status indication is represented by a number, in hexadecimal notation. See "About Routing" on page 150 for more information.

# Monitoring System Components

## UPS Monitoring

Use an Uninterruptible Power Supply (UPS) for your Sun StorEdge 5210 NAS unit. A properly sized UPS provides enough power for the Sun StorEdge 5210 NAS to log users off and shut down gracefully in the event of a power outage. It also serves to regulate or condition power coming into the unit, smoothing out power fluctuations.

**Note –** You must connect the UPS to the Sun StorEdge 5210 NAS system before you enable UPS monitoring. Otherwise, the monitoring system notifies you that there is a UPS failure. Also, the Sun StorEdge 5210 NAS does not support UPS management, only UPS monitoring. Refer to the *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* for a picture showing the UPS port.

## UPS Monitoring Capability

Sun StorEdge 5210 NAS UPS monitoring provides notification in the event of the following occurrences:

- **Power failure—**Indicates that a power failure occurred and the system is operating on battery power.
- **Power restoration—**Indicates that power was restored.
- **Low battery—**Indicates that the battery is low on power.
- **Recharged battery—**Indicates that the UPS has charged the battery to a normal level.
- **Battery replacement—**Indicates that the UPS has detected a battery defect such that replacement is necessary.
- **UPS alarms—**Indicates that the UPS has detected an ambient temperature or humidity outside of safe thresholds.
- **UPS failure—**Indicates that the system is unable to communicate with the UPS.

You are notified of all errors (except “recharged battery”) through an error notification e-mail, notification to the SNMP server, display on the LCD panel, and display in the system log. The “recharged battery” notification is sent through email, SNMP notification, and system log display only (not LCD panel notification).

## Enabling UPS Monitoring

To enable UPS monitoring:

1. **In the navigation panel, select Monitoring and Notification > Enable UPS Monitoring.**

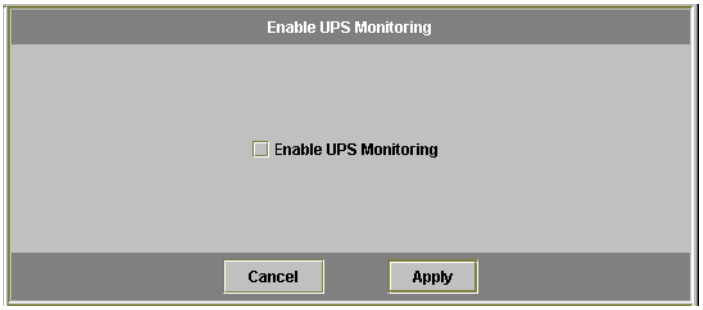


**FIGURE 11-13** The Enabling UPS Monitoring Panel

2. **Select the Enable UPS monitoring.**
3. **Click Apply to save your change.**

# Viewing Controller Information

The read-only **View Controller Information** panel displays controller vendor, model, and firmware release.

To view controller vendor, model, and firmware release, select **RAID > View Controller Information** in the navigation panel.

# Viewing Mirroring Status

## Viewing Mirror Statistics

The Sun StorEdge 5210 NAS maintains a variety of network statistics for mirrored file volumes. These statistics are only available on the active server for each mirrored file volume.

1. **From the navigation panel, select File Replicator > View Mirror Statistics.**

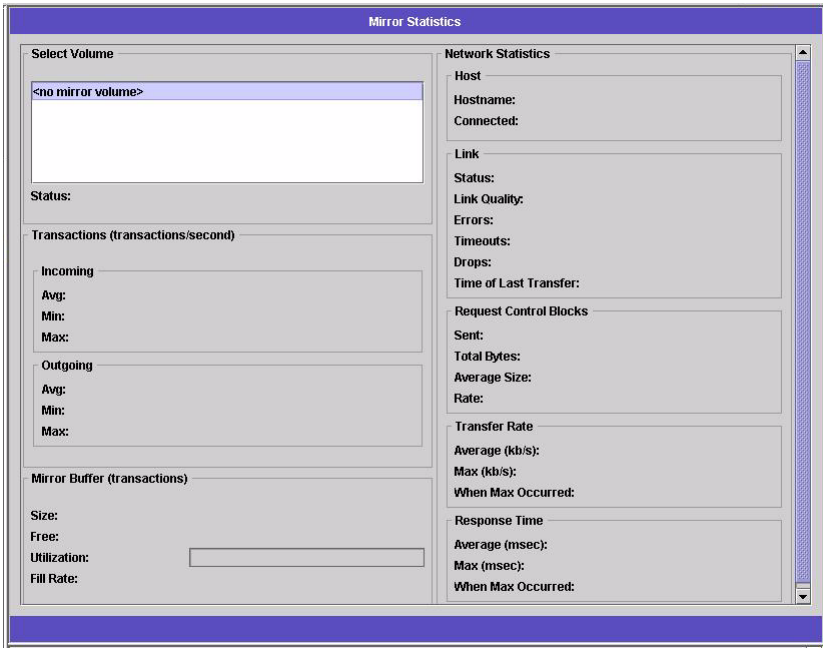


**FIGURE 11-1** The Mirror Statistics Panel

2. **Select the file volume you want from the Select Volume list. The Sun StorEdge 5210 NAS displays the following information for that mirrored file volume:**
   - **Status—**This field shows the status of the mirror. For definitions of status indicators, please refer to "Mirror Status States" on page 155.
   - **Incoming Transactions—**This section shows the following statistics for the selected file volume:
     - **Average—**The average number of transactions per second traveling into the active server.
     - Minimum—The lowest number of transactions per second that has traveled into the active server. The date and time this minimum occurred is shown on the right.
     - Maximum—The highest number of transactions per second that has traveled into the active server. The date and time this maximum occurred is shown on the right.
   - **Outgoing Transactions—**This section shows the following statistics for the selected file volume:
     - Average—The average number of transactions per second traveling from the active server to the mirror server.

    - Minimum—The lowest number of transactions per second that has traveled from the active server to the mirror server. The date and time this minimum occurred is shown on the right.
    - Maximum—The highest number of transactions per second that has traveled from the active server to the mirror server. The date and time this maximum occurred is shown on the right.
- **Mirror Buffer—**This section shows the status of the mirror buffer as follows:
    - **Size—The size of the mirror buffer.**
    - **Free—The number of transactions left in the mirror buffer.**
    - **Utilization—The percentage of transactions used in the mirror buffer.**
    - **Fill Rate—The rate at which the mirror buffer is filling, in terms of transactions per second. If the fill rate is greater than zero, you should check to make sure that all network links are functioning properly. This means that transactions are travelling into the active system faster than they are travelling into the mirror system, thus filling up the buffer.**
- **Network Statistics—**This section shows the network statistics of the mirror buffer as follows:
    - **Host—The hostname and connection status for the mirror buffer.**
    - **Link—The status, quality, and other link statistics for the mirror buffer.**
    - **Request Control Blocks—The number of control blocks sent, the total bytes sent, and the average size and rate.**
    - **Transfer Rate—The average rate at which transfers occur, the maximum, and the time when the maximum transfer occurred.**
    - **Response Time—The average response time, the maximum response time, and the time when the maximum response time occurred.**

## Mirror Status States

The status of a mirror is displayed in the **Manage Mirrors** panel and the mirror status states including the following:

- **New—**A new mirror is being created.
- **Creating mirror log—**The mirror buffer is being initialized.
- **Connecting to host—**The active server is connecting to the remote mirror server.
- **Creating extent—**The mirror server is creating disk partitions.
- **Ready—**The system is ready and waiting for the other system to be ready.
- **Down—**The network link is down.
- **Cracked—**The mirror is cracked.
- **Syncing Volume—**The mirror server is synchronizing the file volume.
- **In Sync—**The mirror is in sync.
- **Out of Sync—**The mirror is out of sync.
- **Error—**An error has occurred.

# Viewing Backup Job Status

## Viewing the Backup Log

The backup log displays a complete list of events that have occurred in system backup processes and includes the date, time, and a description of each event. Scroll upwards to view earlier backup events.

To view the log, select **System Backup > Manage Backup Jobs > View Backup Log**.

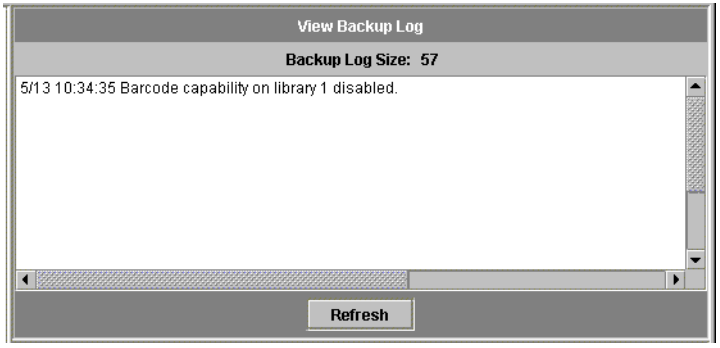


**FIGURE 11-2** The View Backup Log Panel

The total size of the file is shown at the top of the screen. Click **Refresh** to refresh the log file display.

# Viewing Job Status

To display the status of system backup processes, select **System Backup > Manage Backup Jobs > View Backup Status**.

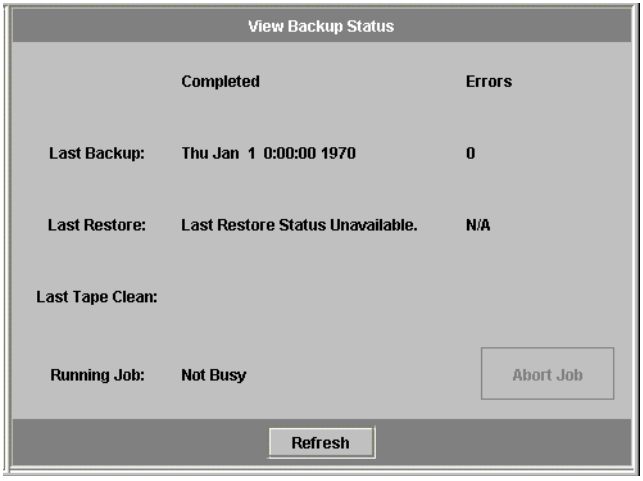


**FIGURE 11-3** The View Backup Status Panel

This screen shows the most recent backup, restore, and cleaning processes. If a backup or restore process is running, the **Abort Job** button is enabled. Click this button to halt a running process and check the system events panel for confirmation that the job was canceled. Allow several minutes for the cancellation to take effect.

# Viewing Tape Status

The **View Tape Status** panel provides information about backup tapes in the tape device. You cannot view this data when a backup, restore, or head cleaning process is in progress.

To display the status of tapes in the local backup device:

1. **In the navigation panel, select System Backup > Manage Backup Jobs > View Tape Status.**

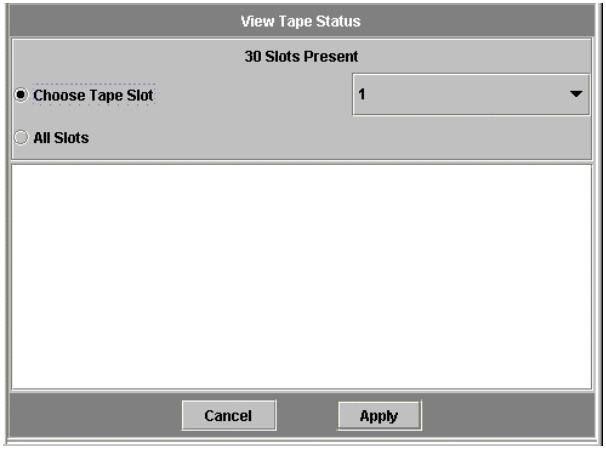


**FIGURE 11-4** The View Tape Status Panel

2. **Select the tape information you want to view.**

   - To view information about a particular tape, select the **Choose Tape Slot** option. Then select the slot corresponding to the tape you want to view from the list.

     Slot numbering in this screen starts with 1. However, individual tape backup device slot numbering may vary. If the slot numbering in your tape device starts with 0 (zero), select slot 1 in this screen to view information about slot 0 in your tape device.

   - To view information about all tapes in the tape device, select **All Slots**.

     The system takes 1-2 minutes per slot to retrieve tape information, which is displayed in the area at the bottom of the screen. Selecting **All Slots** greatly increases the time it takes to get the information. The tape device cannot retrieve slot information while a backup, restore, or head cleaning process is in progress.

3. **Click Apply to start the tape discovery.**

CHAPTER 12

# System Maintenance

This chapter describes maintenance functions.

## Setting Remote Access Options

Sun StorEdge 5210 NAS security features include the ability to set remote access options. You can enable or disable network services used to remotely access the Sun StorEdge 5210 NAS. You can run the system in Secure Mode for maximum security or you can specifically enable certain remote access features such as Telnet, Remote Login, and Remote Shell.

The secure services are Secure Web Admin, which uses the Secure Socket Layer (SSL) over http, and Secure Shell (ssl).

To set remote access security:

1. **In the navigation panel, select System Operations > Set Remote Access.**

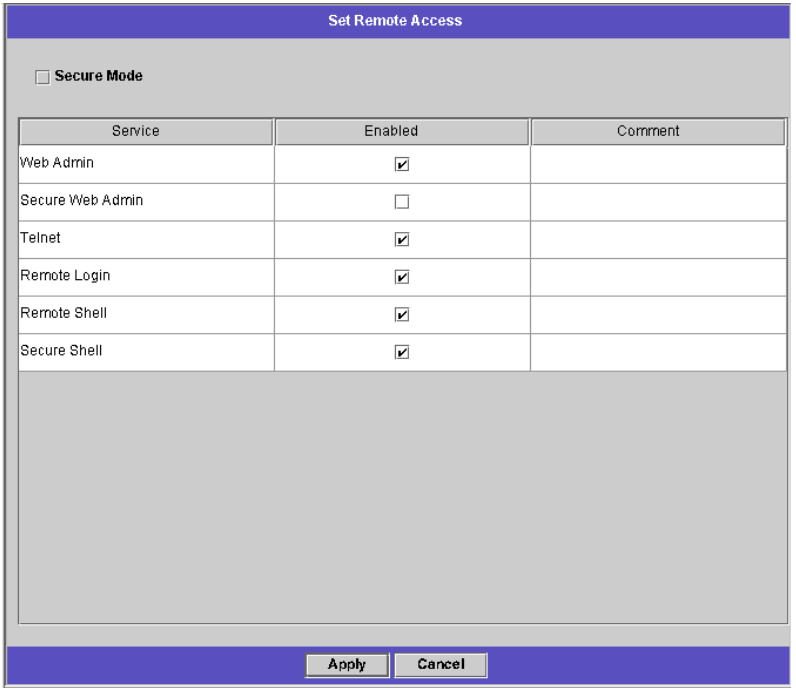


**FIGURE 12-1** The Set Remote Access Panel

2. **Check the Secure Mode checkbox for maximum security. In secure mode you can enable only Secure Web Admin and Secure Shell by checking the associated checkbox.**
3. **If you are not using Secure Mode, check the checkbox for each service you want to enable:**
   - Web Admin
   - Telnet
   - Remote Login
   - Remote Shell
4. **Click Apply.**
5. **If you have selected Secure Mode, you must restart the server for the settings to go into effect. Refer to "Shutting Down the Server" on page 162.**

# Configuring File Transfer Protocol (FTP) Access

FTP is an Internet protocol used to copy files between a client and a server. FTP requires that each client requesting access to the server must be identified with a username and password.

---

**Note –** FTP requires access to the command line interface. Remote access security settings may need to be altered to access the command line interface. Refer to "Setting Remote Access Options" on page 159 for remote access details.

---

**Note –** FTP is not loaded by default. For instructions on loading FTP, refer to "Loading FTP" on page 228 and "Configuring FTP to Load Automatically" on page 229.

---

To set up FTP users, you must use the command line interface. This interface is described in detail in Appendix A. To set up FTP, refer to "Configuring File Transfer Protocol (FTP) Access" on page 227.

# Shutting Down the Server

The **Shut Down the Server** panel allows you to shut down, halt, or reboot the server (See "Shutting Down the System" on page 229 for information on shutting down the system using Telnet.)

To shut down, halt, or reboot the server:

1. **In the navigation panel, select System Operations > Shut Down the Server.**

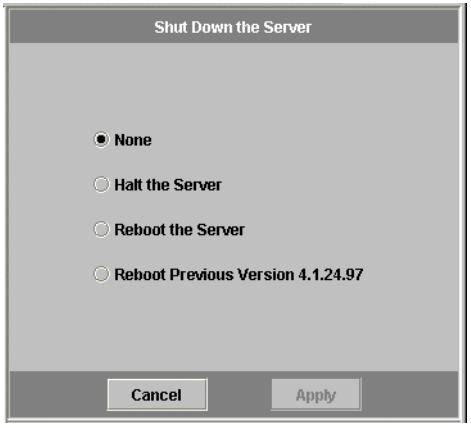


**FIGURE 12-2** The Shut Down the Server Panel

2. **Select one of the following three options:**
   - **Halt the Server—**Click this option to shut down the server.
   - **Reboot the Server—**Click this option to shut down and restart the server.
   - **Reboot Previous Version—**Click this option to shut down and restart the server with the previously loaded version of software. Use this option if, for example, you encountered problems while upgrading the software. This option lets you restart with the last software used before the upgrade.
3. **Click Apply.**

# File Checkpoints

## About File Checkpoints

A *checkpoint*, otherwise known as a *consistency spot* (or *c-spot*), is a virtual read-only copy of a primary file volume. While the file volume remains in read/write operation, all data existing at the time the checkpoint was created remains available. Checkpoints are used to retrieve mistakenly modified or deleted files and to stabilize backups.

---

**Note –** A checkpoint is a virtual, or imaginary, copy of the file volume. It is not an online backup. If the file volume is lost, so are all the checkpoints.

---

An enormous amount of space and system memory is required for checkpoints. The more checkpoints there are on a system, the more they affect system performance.

To use File Checkpoints, you must first go to the **Edit Properties** panel (in the **File Volume Operations** folder) to enable checkpoints. Then create individual checkpoints in the **Manage Checkpoints** panel (in the **File Volumes > Configure Checkpoints** folder), or make a schedule in the **Schedule Checkpoints** panel.

# Creating File Checkpoints

You can choose whether to schedule a checkpoint or create one immediately. Refer to "Scheduling File Checkpoints" on page 165 for information on setting up a regular checkpoint schedule.

In the **Manage Checkpoints** panel, you can create immediate checkpoints as well as rename and remove existing ones. Unlike scheduled checkpoints, which are created at a pre-determined day and time, you can create immediate checkpoints in this screen at any time.

## Creating a Checkpoint

Using the **Manage Checkpoints** panel, you may configure a checkpoint to occur immediately instead of on a time schedule. There is no maximum number of checkpoints that you can schedule.

To create a new checkpoint manually:

1. **In the navigation panel, select File Volume Operations > Edit Properties.**
2. **Select the volume for which you want to create a checkpoint in the Volume Name drop-down list.**
3. **Be sure there is a check mark ( ☑ ) in the Enable Checkpoints box. If not, select the box and click Apply.**
4. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Manage Checkpoints.**

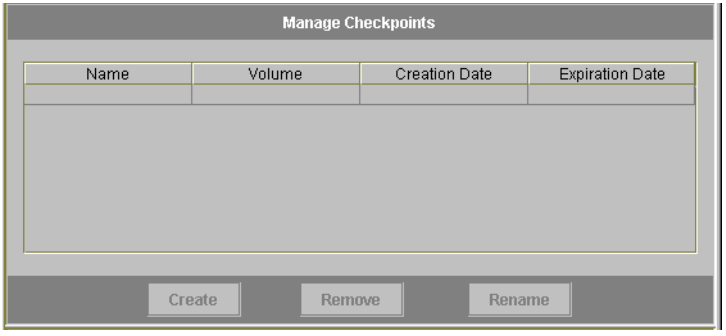


**FIGURE 12-3** The Manage Checkpoints Panel

5. **To create a new checkpoint, click Create.**

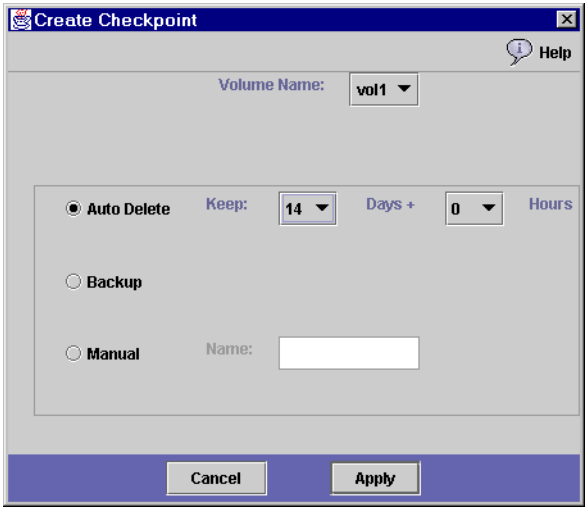


**FIGURE 12-4** The Create Checkpoint Dialog Box

6. **Select the Volume Name for which you want to create a checkpoint from the drop-down list.**

7. **Select one of the following checkpoint options:**
   - **Auto Delete—**Select **Auto Delete** to automatically remove the checkpoint after the number of **Keep Days** and **Keep Hours** have elapsed. In this option the name of the checkpoint is automatically assigned by the system. If you select this option, select the number of days and hours the checkpoint should be retained.
   - **Backup—**In this option, the default name of the checkpoint is **Backup**. The checkpoint is used for local backups of the Sun StorEdge 5210 NAS file system. The checkpoint is not automatically deleted after a specific time period.
   - **Manual—**If you want to name the checkpoint something other than **Backup**, select this option. Then enter the name in the **Name** field. The checkpoint is not automatically deleted after a specific time period.

8. **Click Apply to create the checkpoint.**

# Scheduling File Checkpoints

The **Schedule Checkpoints** panel displays the current checkpoint schedule and lets you add, edit, and remove scheduled checkpoints. For each scheduled checkpoint, this screen displays the file volume name, a description, the scheduled time(s) and day(s), and the amount of time the checkpoint is retained. The **Keep** time is expressed as the number of days plus the number of hours.

## Adding an Entry to the Checkpoint Schedule

The **Schedule Checkpoints** panel displays a table of all scheduled checkpoints for the system. Adding a schedule line causes the system to automatically set up a checkpoint for the times and dates requested. There is no maximum number of checkpoints that you can schedule.

To add a checkpoint to the schedule:

1. **Enable checkpoints for the file volume.**
   a. **In the navigation panel, select File Volume Operations > Edit Properties.**
   b. **Select the volume for which you want to add a checkpoint in the Volume Name drop-down list.**
   c. **Be sure there is a check mark ( ☑ ) in the Enable Checkpoints box. If not, select the box and click Apply.**
2. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Schedule Checkpoints.**

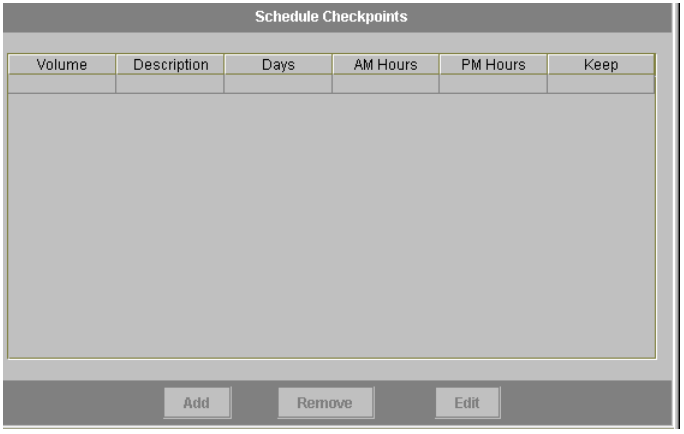


**FIGURE 12-5** The Schedule Checkpoints Panel

3. **To add a checkpoint to the schedule, click Add.**


**FIGURE 12-6** The Add Checkpoint Schedule Dialog Box

4. **Select the file volume for which you are scheduling checkpoints.**
5. **Enter a Description for the checkpoint. This is a mandatory field. You may want to enter information like the time between checkpoints, such as "weekly" or "daily."**
6. **Select the number of days and hours to retain the checkpoint in the Keep Days + Hours drop-down boxes.**
7. **Select the Days on which you want the checkpoint to be created. To select more than one day from this list, hold the Ctrl key while clicking additional days with the mouse.**
8. **In the AM Hours list, select the time(s) of day in the morning when the checkpoint is to be created. To select more than one item in this list, hold the Ctrl key while clicking additional items with the mouse.**

9. **In the PM Hours list, select the time(s) of afternoon or night when the checkpoint is to be created. To select more than one item in this list, hold the Ctrl key while clicking additional items with the mouse.**
10. **Click Apply to save your changes.**

## Editing an Entry in the Checkpoint Schedule

To edit an existing checkpoint schedule:

1. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Schedule Checkpoints.**
2. **Select the schedule line you want to edit, and click Edit.**


**FIGURE 12-7** The Edit Checkpoint Schedule Dialog Box

3. **The information shown on this screen is identical to that in the Add Checkpoint Schedule dialog box, except that you cannot change the volume name. Edit the relevant information. For more information, see "Adding an Entry to the Checkpoint Schedule" on page 166.**

4. **Click Apply to save your changes.**

### Removing an Entry from the Checkpoint Schedule

To remove a schedule line:

1. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Schedule Checkpoints.**

2. **Select the schedule line you want to remove by clicking on it, and click Remove.**

## Renaming a Sun StorEdge File Checkpoint

To rename a checkpoint in the **Manage Checkpoints** panel:

1. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Manage Checkpoints.**

2. **Select the checkpoint you want to rename, and click Rename.**

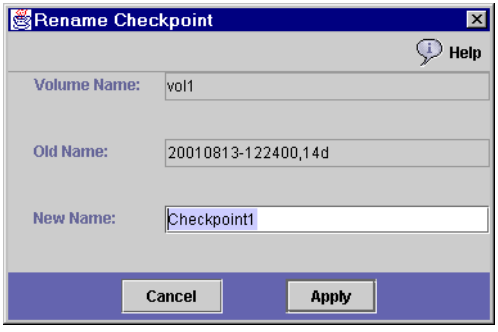


**FIGURE 12-8** The Rename Checkpoint Dialog Box

The **Volume Name** and **Old Name** fields are read-only.

3. **Enter the New Name for the checkpoint.**

4. **Click Apply to save your changes.**

# Removing File Checkpoints

To remove a checkpoint from the **Manage Checkpoints** panel:

1. **In the navigation panel, select File Volume Operations > Configure Checkpoints > Manage Checkpoints.**
2. **Select the checkpoint you want to remove, then click Remove.**

# Sharing File Checkpoints

Checkpoints can be shared, allowing users to access the data that was current when the checkpoint was created.

1. **In the navigation panel, select Windows Configurations > Configure Shares.**

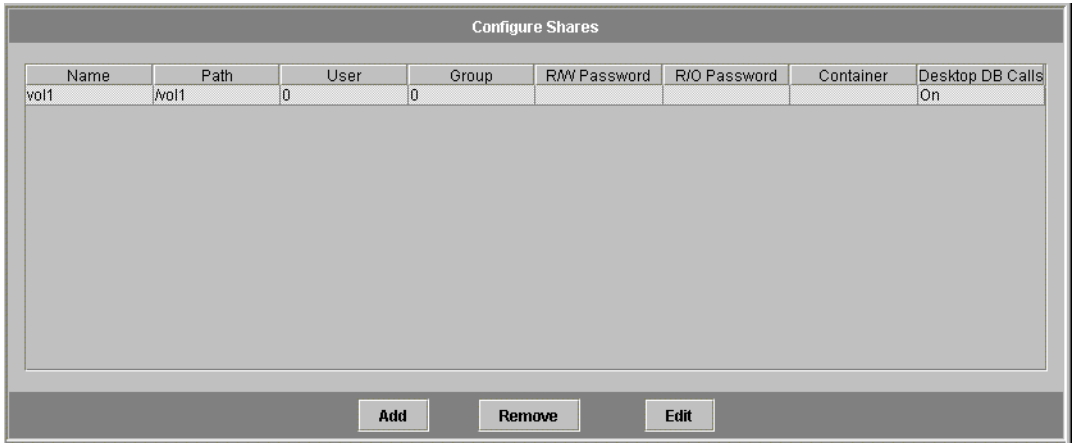


**FIGURE 12-9** The Configure Shares Panel

2. **Click Add.**

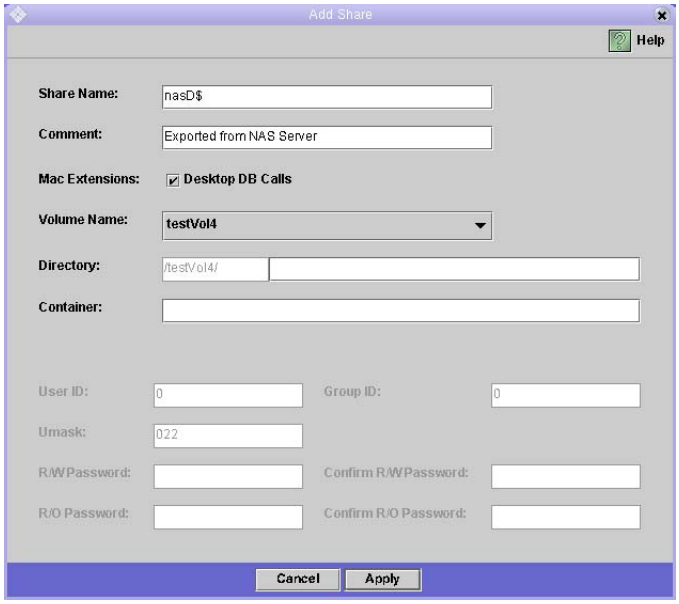


**FIGURE 12-10** The Add Share Dialog Box

3. **Type the new share name for the checkpoint in the Share Name box. The share name is used to access the checkpoint from the network.**
4. **The Mac Extensions option is checked by default.**
5. **Click the Volume Name drop-down list box and select the checkpoint volume from the list. Checkpoint volumes have the ".chkpnt" extension**
6. **Leave the Directory field blank.**
7. **If ADS is enabled and configured, type an ADS context in the Container text box.**
8. **The following fields and options are grayed out if Sun StorEdge 5210 NAS is configured for NT Domain mode. Otherwise complete them as follows:**
   a. **Type 0 in the User box.**
   b. **Type 0 in the Group box.**
   c. **Leave the R/W Password and R/O Password boxes blank. Checkpoint volumes are read only.**
9. **Click Apply. Notice the new checkpoint is listed as a share in the Configure Share panel.**

# Accessing File Checkpoints

Users can access checkpoints, allowing them to access the data that was current when the checkpoint was created.

1. **Using a network station, click the Windows Start menu.**

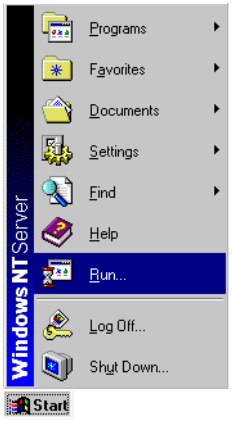


**FIGURE 12-11** The Windows Start Menu

2. **Select Run.**

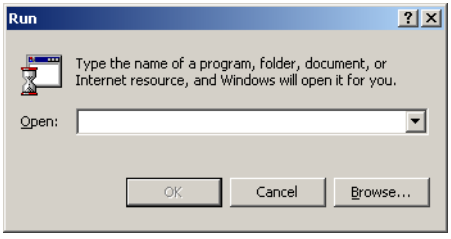


**FIGURE 12-12** The Run Dialog Box

3. **In the Run dialog box, type the Sun StorEdge 5210 NAS server IP address and checkpoint sharename. For example, type "`\\xxx.xxx.xxx.xxx\sharename`".**

4. **Click OK.**

# Backup and Restore

## Setting Up NDMP

The Network Data Management Protocol (NDMP) is an open protocol for network-based backup. NDMP architecture lets you use any NDMP-compliant backup administration application to backup your network attached storage device.

NDMP is not required to run local backups.

To set up NDMP:

1. **In the navigation panel, select System Backup > Set Up NDMP.**

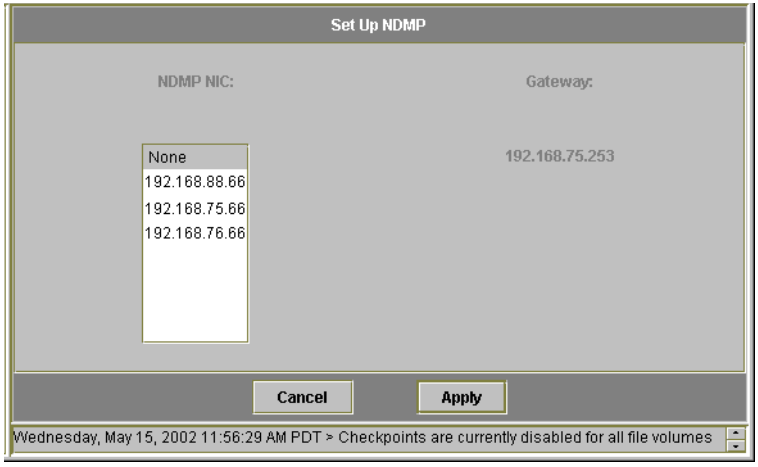


**FIGURE 12-13** The Set Up NDMP Panel

2. **Select the NDMP NIC to be used for data transfer to the backup tape drive.**
3. **The Gateway address is a read-only field and is displayed for each port. If the NDMP backup tape device is located on another network, be sure to select the port that connects to the correct gateway.**
4. **Click Apply.**

# Running a Head Cleaning

To view information about the last head cleaning or to set up the next head cleaning for the local tape device:

1. **In the navigation panel, select System Backup > Assign Cleaning Slot.**


**FIGURE 12-14** The Assign Cleaning Slot Panel

2. **Select the Slot Number that contains the cleaning tape for this head cleaning.**

   Slot numbering in this screen starts with 1. However, individual tape backup device slot numbering may vary. If the slot numbering in your tape device starts with 0 (zero), select slot 1 in this screen to view information about slot 0 in your tape device.

3. **Assign a Cleaning Count number to keep track of the number of times a cleaning tape is used for head cleaning.**

   Use a cleaning tape no more than 10 times before discarding it. This number incrementally increases every time a head cleaning takes place.

4. **To run the head cleaning job now, select the Run Immediately checkbox to begin the tape cleaning with the specified slot number and cleaning count.**

5. **Click Apply to save your changes. If you selected the Run Immediately checkbox, the cleaning job begins at this time.**

# Updating Sun StorEdge 5210 NAS Software

Contact Sun Microsystems Technical Support to obtain the appropriate update files for your Sun StorEdge 5210 NAS system and configuration. Once you have the files, use the **Update Software** panel to update the Sun StorEdge 5210 NAS software.

---

**Warning –** Do not update system software or RAID firmware when the RAID subsystem is in critical state, creating a new volume, or rebuilding an existing one.

---

To update software:

1. **In the navigation panel, select System Operations > Update Software.**

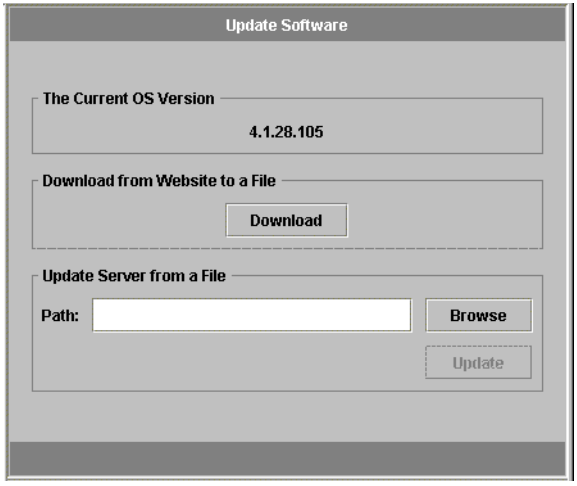


**FIGURE 12-15** The Update Software Panel

2. **In the Update Software panel, type the path where the update files are located. If you need to look for the path, click Browse.**
3. **Click Update to start the process.**
4. **When the update process is complete, click Yes to reboot, or No to continue without rebooting. The update does not take effect until the system is rebooted.**

APPENDIX **A**

# Console Administration

The console is the alternative method to Web Administrator for managing the Sun StorEdge 5210 NAS server. You may use a number of protocols such as Telnet, SSH, RLogin, etc. to connect to the Sun StorEdge 5210 NAS administrator console as long as the application you use has an ANSI-compatible terminal emulator. In this chapter we use the Telnet protocol because it is readily available in MS Windows.

**Note –** Remote access security settings may need to be altered to access the command line interface. Refer to "Setting Remote Access Options" on page 159 for remote access details.

## Accessing The Console Administrator

In this example Windows Telnet is used; however, you may use another protocol as long as it has an ANSI-compatible terminal emulator.

To access Windows Telnet:

1. **Click Start from your desktop taskbar.**
2. **Select Run.**

3. **In the Run window, enter `Telnet` and click OK.**

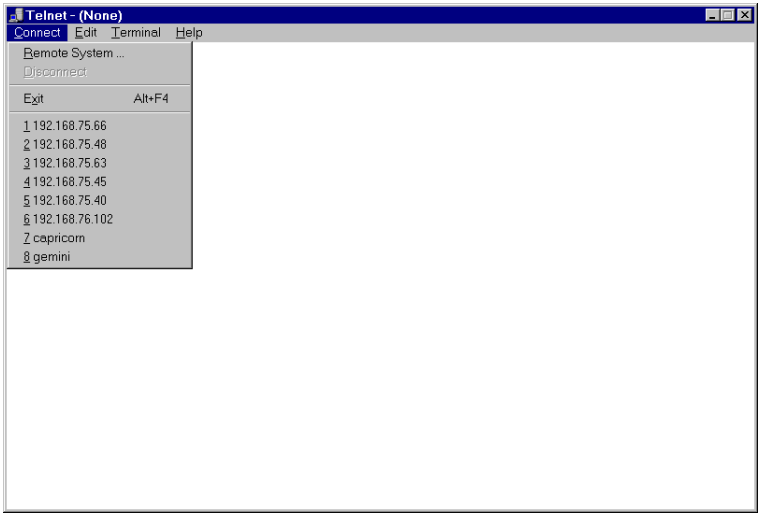


**FIGURE A-1** The Telnet Screen

4. **From the Connect menu, select Remote System.**

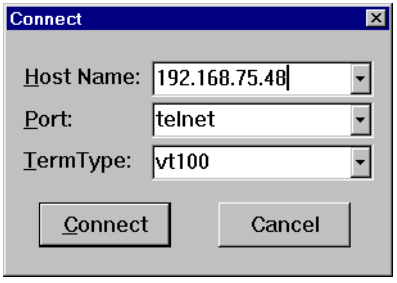


**FIGURE A-2** The Connect Dialog Box

5. **In Host Name, enter the server name or IP address.**
6. **In Port, select Telnet.**
7. **In TermType, enter vt100.**
8. **Click Connect. If administrative access is password-protected, you are asked for the password.**

Once connected, the Telnet screen displays the following prompt:

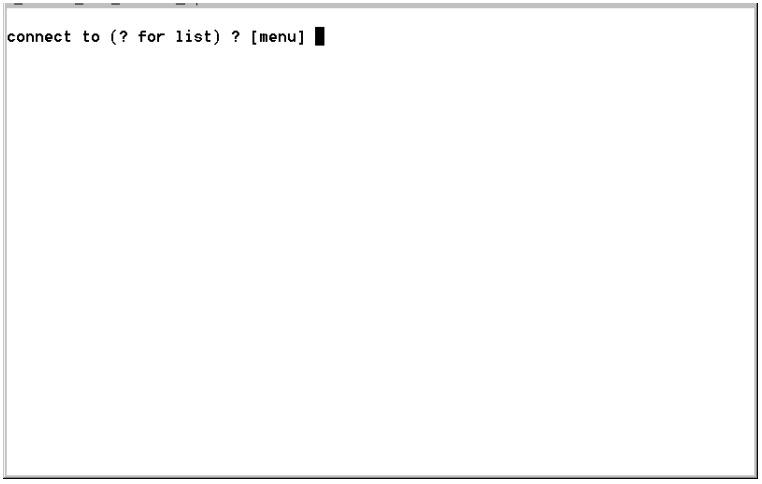


**FIGURE A-3** The Telnet Connection Prompt

9. **Press Enter to access the main menu.**

# Console Menu Basics

This section describes the components of the Telnet screen used for setting up and maintaining your system.

## Basic Guidelines

Here are a few basic guidelines for using the console:

- To select a menu, press the number or letter associated with the item. For example, press **1** to select **1. Activity Monitor** screen.
- The box at the bottom of every screen displays the tasks you can perform and which letter you need to select to perform the action.
- Use the **spacebar** to scroll through a list.

## Key Descriptions

The following keys are used to edit screen fields:

**TABLE A-1** Active Screen Keys

| | |
|---|---|
| Backspace, Delete, Ctrl+H | Deletes the previous character |
| Ctrl+U | Deletes the entire field |
| Enter, Ctrl+M, Ctrl+J, Ctrl+I, Tab | Entry is complete and the cursor proceeds to the next field |
| Esc | Exits the screen with no change |

If you do not want to change a field value, press **Enter** and the cursor moves to the next field without changing the information.

# Viewing the Main Menu

The main menu consists of the following sections:

- **Operations—**Press any number to perform the corresponding server operation.
- **Configurations—**Press any letter to perform the corresponding server configuration command.
- **Access Control—**Press any letter to set up access to the corresponding menu items.
- **Extensions—**Press any letter to select the corresponding extension. Use the space bar to scroll through the extension lists.

Select the menu item by pressing the corresponding letter or number.

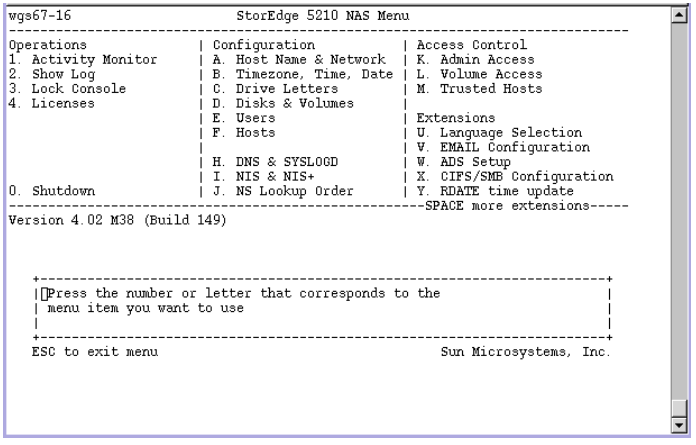


**FIGURE A-4** The Main Menu

Click the **spacebar** to view more options under the **Extension** lists.

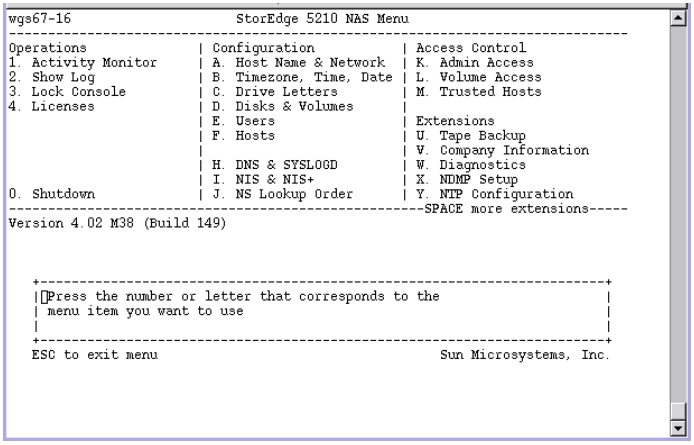


**FIGURE A-5** The Extensions List

# System Management

## Configuring TCP/IP

To setup the host server name, the IP address, and the transmit rate:

1. **From the Configuration menu, select Host Name & Network.**

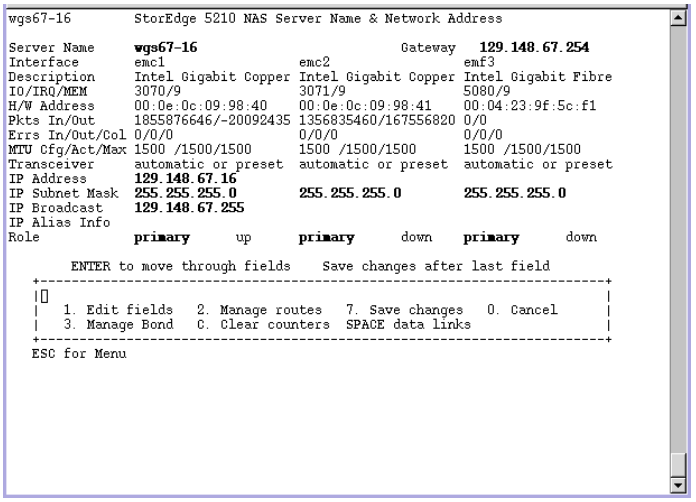


**FIGURE A-6** Configuring the Host Name and Network Information

2. **Select 1. Edit fields.**
3. **Enter server host name, then press Enter.**
4. **Enter the Maximum Transfer Unit (MTU), or press Enter to retain the default.**
5. **Enter the server IP Address, then press Enter.**
6. **Enter the network IP Subnet Mask, then press Enter.**
7. **Enter the network IP Broadcast, then press Enter.**
8. **Select 1. Setup to configure alias IP addresses, then press Enter.**
9. **Repeat steps 3. - 8. for all other ports. Press Enter to continue.**

**Note –** Use the spacebar to scroll down if additional ports are present.

10. **Enter the Gateway address, then press Enter.**
11. **Select 7. Save changes.**

# Modifying the Administrator Password

This screen allows you to change the administrator password. Always protect your servers with passwords.

To modify:

1. **From the Access Control menu, select Admin Access.**

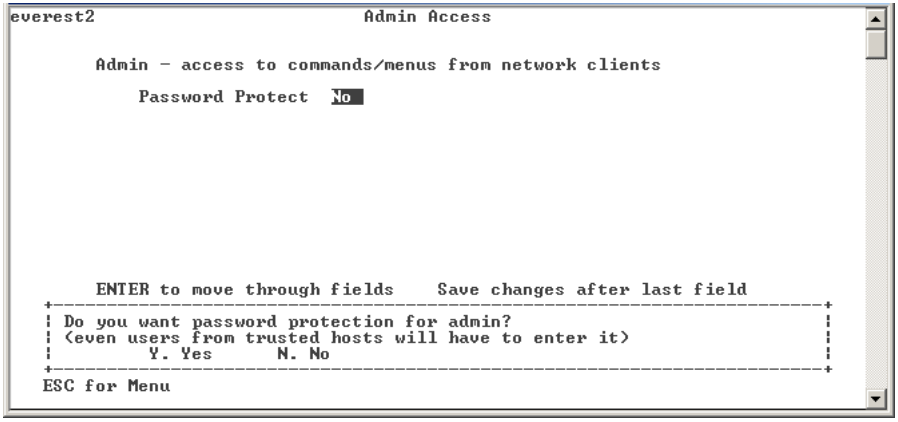


**FIGURE A-7** The Admin Access Screen

2. **Select Y. Yes to enable password protection, or N. No to disable it.**

**Note –** Always protect your Sun StorEdge 5210 NAS server with a password.

3. **If you select Yes, the system prompts you for a password. Enter the password for administrative access. Then type it again to confirm.**
4. **Select 7. Save changes to activate the new password.**

# Controlling the Time and Date

## Setting the Time Zone, Time, and Date

Use the **Timezone, Time, Date** menu option to change time zone, time, and date set on the Sun StorEdge 5210 NAS server. The real-time clock on the mainboard keeps track of local time.

To set up time:

1. **From the Configuration menu, select Timezone, Time, Date.**

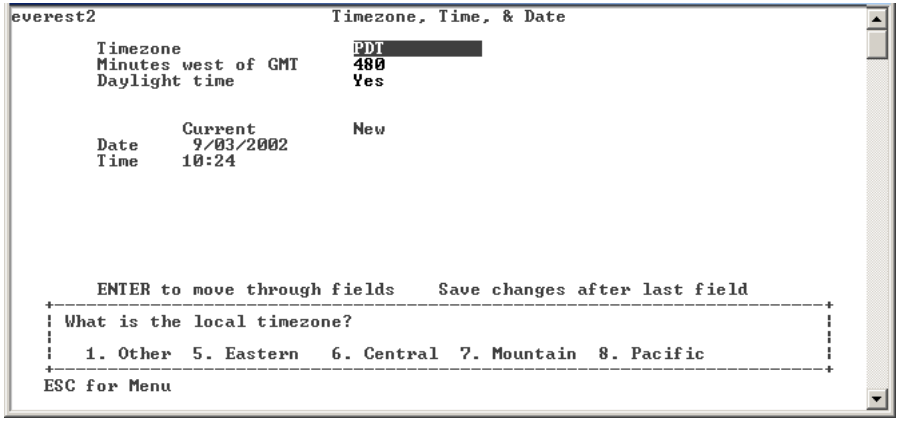


**FIGURE A-8** The Timezone, Time, Date Screen

2. **Select the appropriate timezone, then press Enter.**
3. **Select daylight savings time Y or N.**
4. **Type the new date, then press Enter. The format is YYYYMMDD, where YYYY is the year, MM is the month, and DD is the day. For example:**

   20021001 equals October 1, 2002
5. **Type the current time, then press Enter. The system uses a twenty-four hour clock:**

   1300 equals 1:00 p.m.
6. **Select 7. Save changes.**

## Setting Time Synchronization

You can configure the Sun StorEdge 5210 NAS to synchronize its time with either NTP protocol or an RDATE server.

### *Setting Up Network Time Protocol (NTP)*

NTP is an Internet protocol used to connect and synchronize the clocks of computers to a reference time source. Typical NTP configurations use multiple redundant servers and diverse network paths to achieve high accuracy and reliability.

To set up NTP:

1. **From the Extensions menu, select NTP Configuration.**

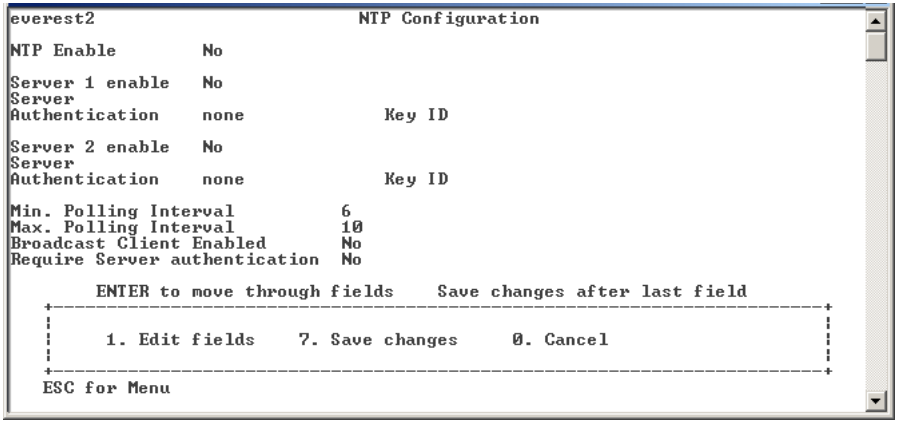


**FIGURE A-9** The NTP Configuration Screen

2. **Select 1. Edit fields to configure NTP settings.**
3. **Select Y. Yes to enable NTP.**
4. **You can configure up to two NTP servers. Select Y. Yes to enable the first NTP server.**
5. **Enter the name or IP address of the first NTP server the Sun StorEdge 5210 NAS polls for the current time, then press Enter.**
6. **Choose the type of Authentication to use, either 0. none and 1. symmetric-key. Symmetric key authentication support lets the Sun StorEdge 5210 NAS verify that the server is known and trusted by using a key and key ID. The NTP server and Sun StorEdge 5210 NAS must agree on the key and key ID to authenticate their messages.**

7. **If you select Symmetric Key as the authorization scheme in the previous field, enter the Key ID associated with the private key from the key file to be used with this NTP server. The valid range for this value is 1 to 65534.**

8. **To configure a second NTP server, repeat steps 4. - 7. for Server 2.**

9. **In the Min. Polling Interval field, enter the minimum polling rate for NTP messages. This value, raised to the power of two, is the minimum number of seconds of the polling interval. For example, entering 4 results in 16 seconds between polls. The valid range for this field is 4 to 17.**

10. **In the Max. Polling Interval field, enter the maximum polling rate for NTP messages. This value, raised to the power of two, is the maximum number of seconds of the polling interval. For example, entering 4 results in 16 seconds between polls. The valid range for this field is 4 to 17, but must be larger than the minimum polling interval.**

11. **In the Broadcast Client Enabled field, select Y. Yes for the Sun StorEdge 5210 NAS to respond to server broadcast messages received on any interface.**

12. **In the Require Server authentication field, select Y. Yes to require authentication for servers using the Broadcast client. NTP servers not using authentication will not be accepted.**

13. **Select 7. Save changes.**

## *Setting Up RDATE Time Synchronization*

RDATE servers are normally present on UNIX systems and allow you to synchronize Sun StorEdge 5210 NAS server time with RDATE server time.

To set up the RDATE server and tolerance window:

1. **From the Extensions menu, select RDATE time update.**

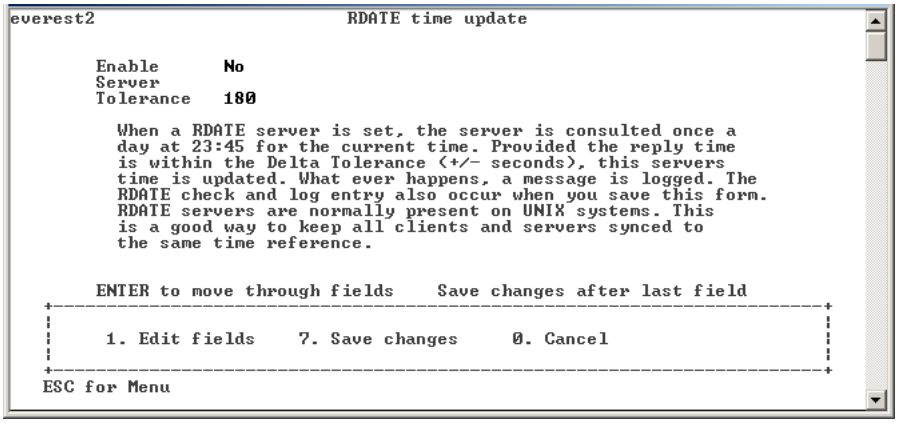


**FIGURE A-10** The RDATE Time Update Screen

2. **Select 1. Edit fields.**
3. **Enter the RDATE server name or IP address, and press Enter.**
4. **Enter the tolerance. If the Sun StorEdge 5210 NAS server time is different than RDATE server time by less than this number of seconds (+ or -), Sun StorEdge 5210 NAS server time is synchronized with RDATE server time. This check occurs every day at 11:45 PM. Press Enter.**
5. **Select 7. Save changes.**

# Selecting a Language

To select a language:

1. **From the Extensions menu, select Language Selection.**

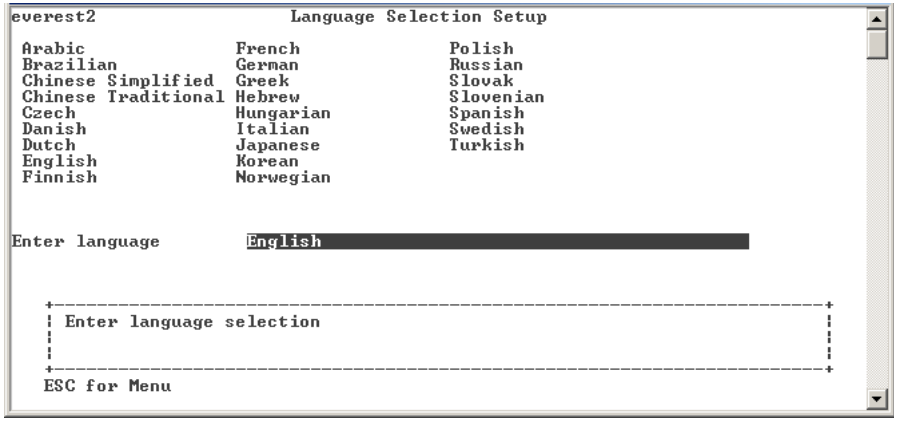


**FIGURE A-11** The Language Selection Screen

2. **Type the desired language then press Enter. Languages Sun StorEdge 5210 NAS supports are listed at the top of the screen.**

# Managing Routes

The routing table contains a list of network paths by which the system sends network packets to specified destinations. Each route entry consists of a destination address and a path. The destination is either a network or a host. The path is the gateway device through which the packet reaches its destination.

To manage static routes in the local network:

1. **From the Configuration menu, select Host Name & Network.**

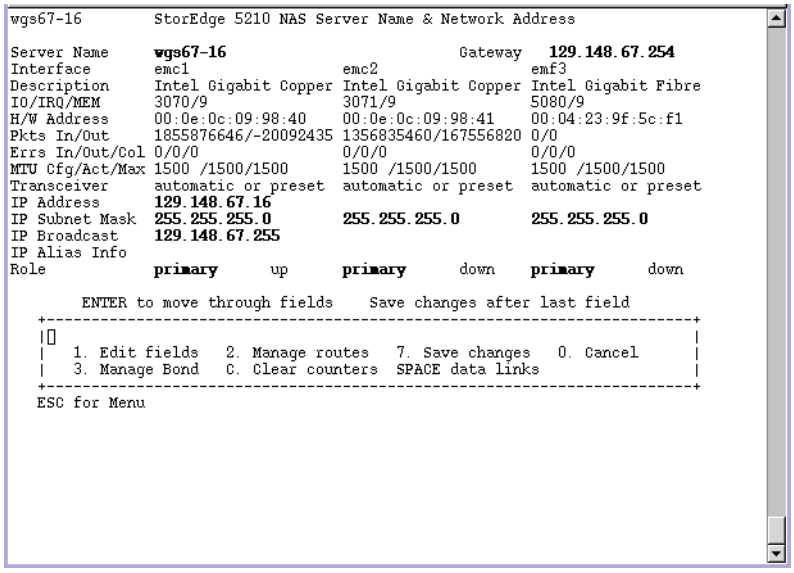


**FIGURE A-12** The Host Name and Network Screen

2. **Select 2. Manage Routes.**

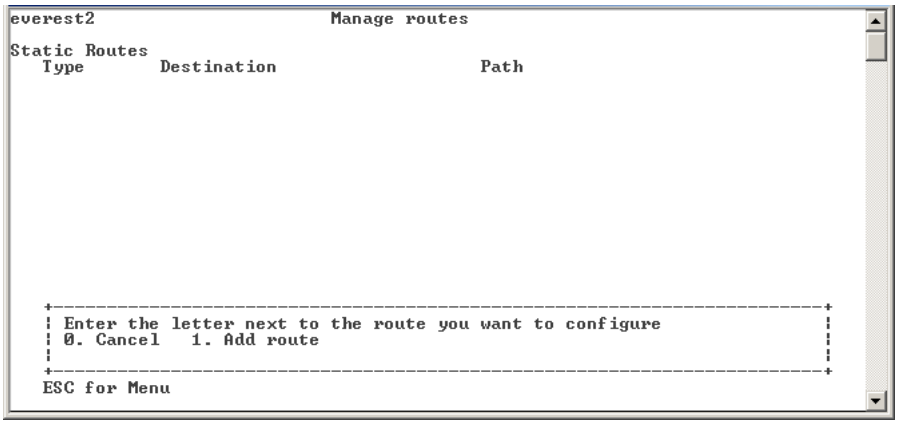


**FIGURE A-13** The Manage Routes Screen

3. **Select 1. Add route, then select 1. Edit.**

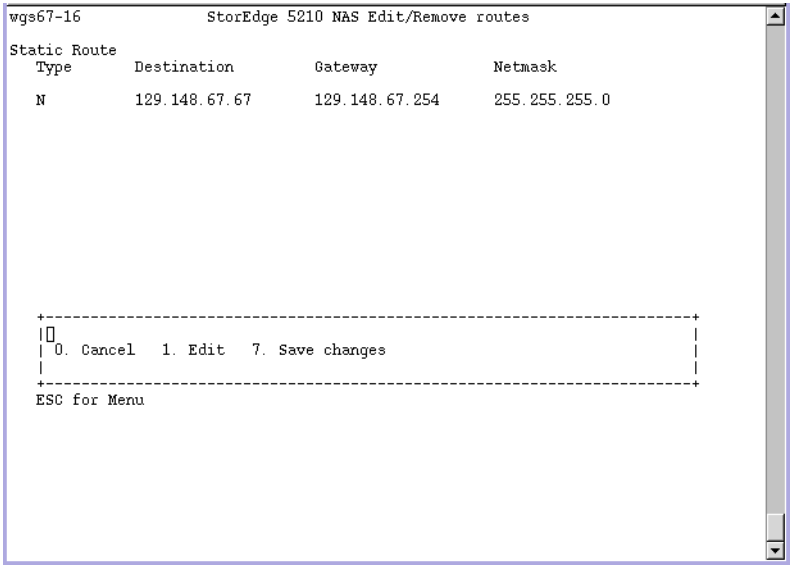


**FIGURE A-14** The Edit Routes Screen

4. **Select whether the route type is for a host, network, host through a gateway, or network through a gateway.**

5. **Enter the destination IP address, then press Enter.**

6. **Enter the path or gateway address used to connect the Sun StorEdge 5210 NAS with its destination, then press Enter. The gateway device must connect to the same subnet as the Sun StorEdge 5210 NAS.**

7. **Select 7. Save Changes.**

# Name Services

The name, services, and functions available through the console interface vary from those available through the GUI.

## Setting Up DNS, SYSLOGD, and Local Logging

DNS is a hierarchical name system that translates domain names into IP addresses. SYSLOGD is a utility that provides support for remote logging. You can only enable remote logging if you have a SYSLOGD UNIX server on the network that can receive the Sun StorEdge 5210 NAS system log. All of these functions are set up on the same screen.

After SYSLOG is set up, all log messages are sent to the selected server. This allows you to centralize a record of log messages from all the servers onto one system.

To set up DNS, Dynamic DNS, SYSLOGD, and local logging:

1. **From the Configuration menu, select DNS & SYSLOGD.**

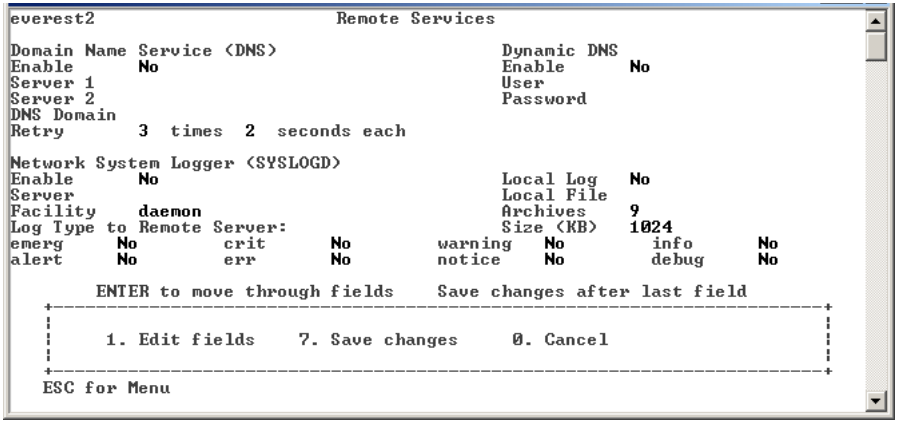


**FIGURE A-15** The DNS and SYSLOGD Screen

2. **Select 1. Edit fields.**
3. **Select Y. Yes to enable DNS.**
4. **Enter the IP address for the DNS server to be consulted first for name resolution, then press Enter.**
5. **Enter the IP address of the server to be consulted second for name resolution. If you do not have a secondary DNS server, leave this field blank. Press Enter.**
6. **Enter the domain name of the DNS server, then press Enter.**
7. **Enter the maximum number of times the Sun StorEdge 5210 NAS should attempt a DNS query for each DNS server, then press Enter.**
8. **Enter the number of seconds of delay between attempts to query each DNS server, then press Enter.**
9. **Select Y. Yes to enable remote logging. This feature lets the Sun StorEdge 5210 NAS send log messages to a remote SYSLOGD server. If there is no SYSLOGD server on the network, select N. No and skip to step 15.**
10. **Enter the SYSLOGD Server name or IP address, then press Enter.**
11. **Select the appropriate facility, then press Enter. The facility identifies the application or system component generating the messages. Facilities include:**
    - **Kern—**Messages generated by the kernel. These cannot be generated by any user processes.
    - **User—**Messages generated by random user processes. This is the default facility identifier if none is specified.
    - **Mail—**The mail system.
    - **Daemon—**System or network daemons.
    - **Auth—**Authorization systems, such as login.
    - **Syslog—**Messages generated internally by syslogd.
    - **Local0 – Local7—**Reserved for local use.
12. **Select the type of system events Sun StorEdge 5210 NAS logs:**

    a. **Select the appropriate event type.**

    b. **Select Y. Yes to enable reporting of events of that type. Event types include:**
    - **Emerg—**Specifies emergency messages. These messages are not distributed to all users. Emerg priority messages can be logged into a separate file for reviewing.
    - **Alert—**Specifies important messages that require immediate attention. These messages are distributed to all users.
    - **Crit—**Specifies critical messages not classified as errors, such as hardware problems. Crit and higher-priority messages are sent to the system console.
    - **Err—**Specifies any messages that represent error conditions, such as an unsuccessful disk write.

- **Warning—**Specifies any messages for abnormal, but recoverable, conditions.
- **Notice—**Specifies important informational messages. Messages without a priority designation are mapped into this priority message.
- **Info—**Specifies informational messages. These messages are useful in analyzing the system.
- **Debug—**Specifies debugging messages.

**c. Press Enter to move to the next event type.**

13. **Select Y. Yes to enable Dynamic DNS updates. These updates enable non-secure dynamic updates to occur during bootup.**
14. **To enable secure updates, enter the name of a Windows user with whom the dynamic DNS client can verify updates. This user must have administrative rights. Press Enter.**
15. **Enter the password of the Dynamic DNS user, then press Enter.**
16. **Enter Y. Yes to enable local logging.**
17. **Enter the log file path (directory) and filename in the Log File field.**
18. **Enter the maximum number of archive files in the Archives field. The allowable range is from 1 to 9.**
19. **Type the maximum file Size in kilobytes for each archive file in the Archives field. The allowable range is from 1000 to 999,999 kilobytes.**
20. **Select 7. Save changes.**

# Setting Up NIS and NIS+

---

**Note –** Once NIS is set up, periodically inspect the server to see if the master files have changed. When a file changes, it is copied from the NIS server to the local file. The **Enable** field allows you to disable NIS updates without losing the setup information, so it still exists when you re-enable it.

---

To enable NIS or NIS+:

1. **From the Configuration menu, select NIS & NIS+.**

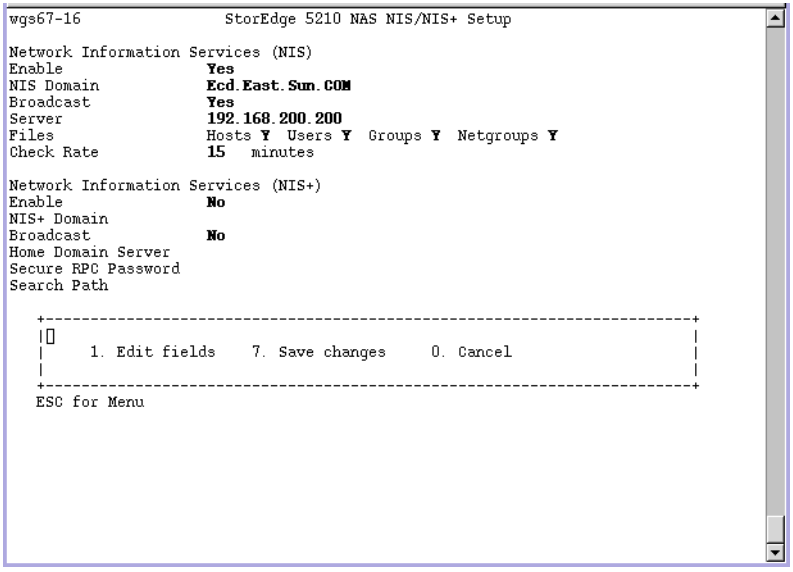


**FIGURE A-16** The Configure NIS and NIS+ Screen

2. **Select 1. Edit fields.**
3. **Select Y. Yes to enable the Sun StorEdge 5210 NAS to periodically update its hosts, users, and groups files through an NIS server.**
4. **Enter the NIS domain name, then press Enter.**
5. **Enter the NIS server name or IP address, then press Enter.**
6. **Select Y. Yes to update the hosts file through the NIS server.**
7. **Select Y. Yes to update the users file through the NIS server.**
8. **Select Y. Yes to update the groups file through the NIS server.**
9. **Select Y. Yes to update the netgroups file through the NIS server.**
10. **Enter the desired number of minutes between NIS updates, between 0 and 9, then press Enter.**
11. **Select Y. Yes to enable NIS+ for the Sun StorEdge 5210 NAS.**
12. **Enter the NIS+ home domain server address, then press Enter.**
13. **Enter the NIS+ home domain name, then press Enter.**

14. **Enter the secure RPC password for the NIS+ server. Press Enter.**
15. **Enter the search path as a list of domains, separated by colons. Leave this space empty to search only the home domain and its parents. Press Enter.**
16. **Select 7. Save changes.**

## Setting Name Service Lookup Order

This menu lets you choose which service is used first for user, group, and host lookup functions.

To set up lookup orders:

1. **From the Configuration menu, select Lookup orders.**

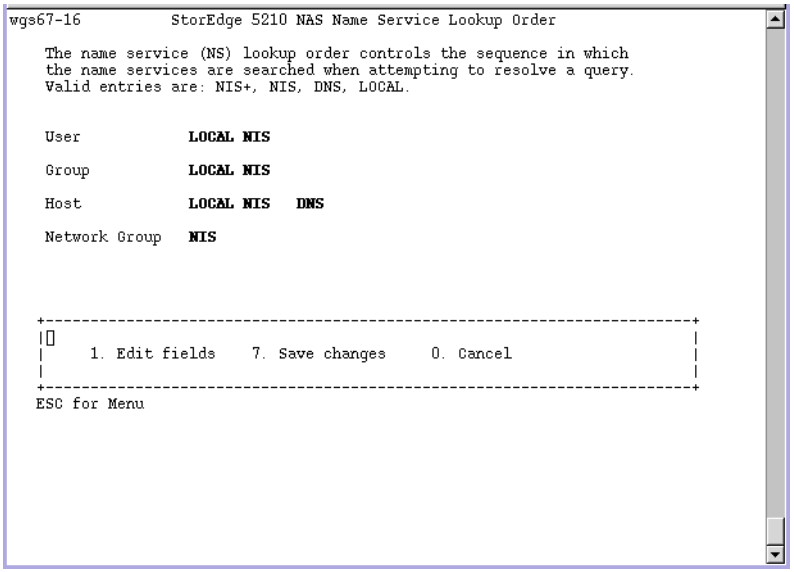


**FIGURE A-17** The Lookup Order Screen

2. **Select 1. Edit fields.**
3. **Select the order for resolving user information (between NIS and NIS+), then press Enter.**
4. **Select the order for resolving group information (between NIS and NIS+), then press Enter.**

5. **Select the first, second, third, and last services for resolving host information, then press Enter.**

6. **Select 7. Save changes.**

# Managing the Server File System

There are several procedures available through the console that let you manage the Server File System (SFS) volumes. The most common are:

- Configuring drive letters
- Configuring a new disk volume
- Verifying a volume
- Renaming a disk partition
- Attaching a segment to a primary volume
- Enabling and disabling quotas and checkpoints
- Deleting a disk volume

## Configuring Drive Letters

Drive letters are automatically assigned to file volumes available for sharing through SMB/CIFS. You can manually assign the drive letter mappings through the console, except for drive `C:`, which can only be assigned to `\cvol`.

To manually reassign a drive letter to a file volume:

1. **From the Configuration menu, select Drive Letters.**

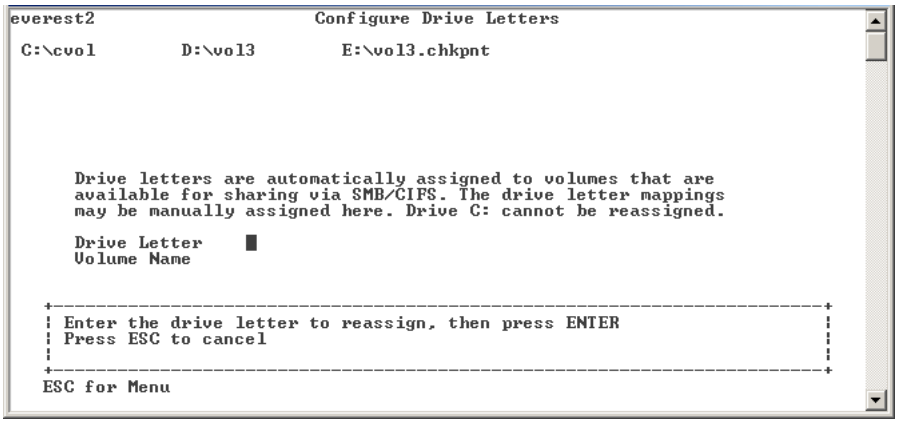


**FIGURE A-18** The Drive Letter Assignment Screen

2. **Enter the drive letter you want to change, then press Enter.**
3. **Enter the file volume name you want to assign to the new drive letter, then click Enter. You can only assign existing file volumes to drive letters.**
4. **Press Esc to exit this screen.**

# Creating a New File Volume

To create a new file volume:

1. **From the Configuration menu, select Disks & Volumes.**

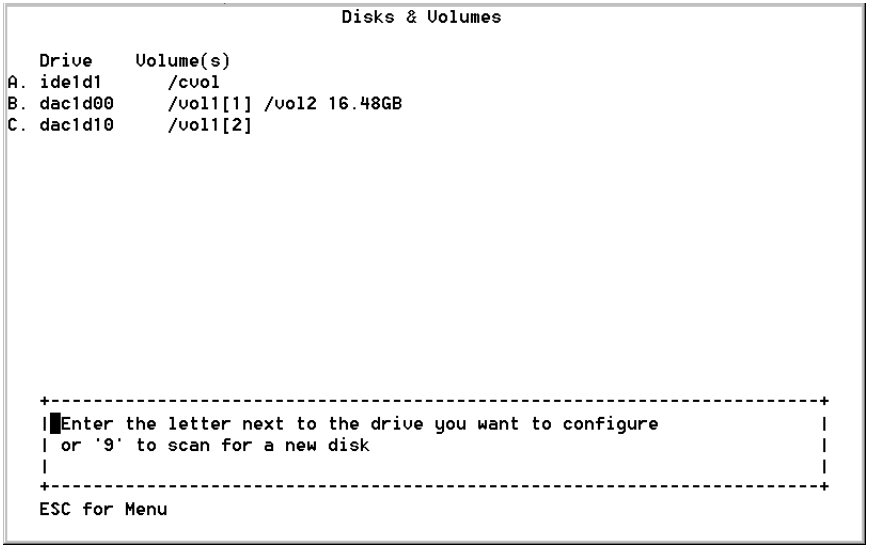


**FIGURE A-19** The Disks and Volumes Screen

2. **Select the letter next to the drive you want to configure.**

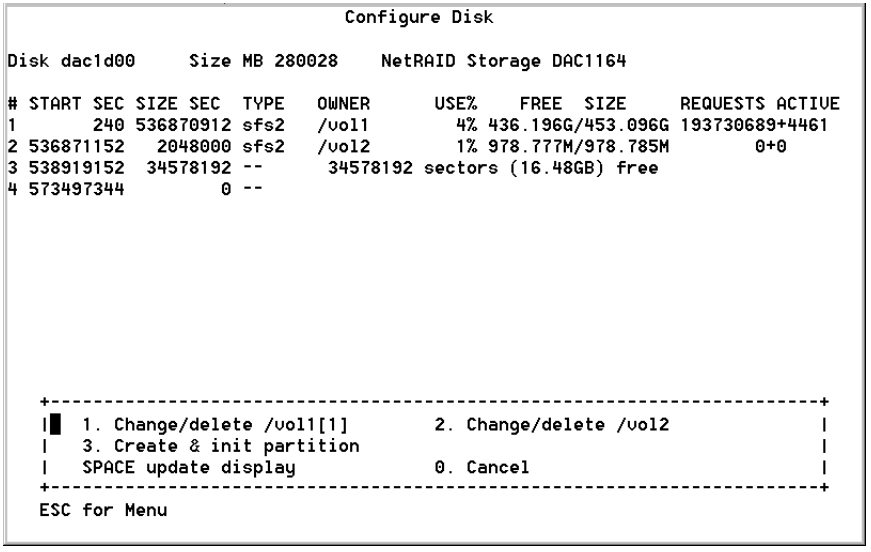


**FIGURE A-20** The Volume Creation Screen (1)

3. **Select 3. Create & init partition.**

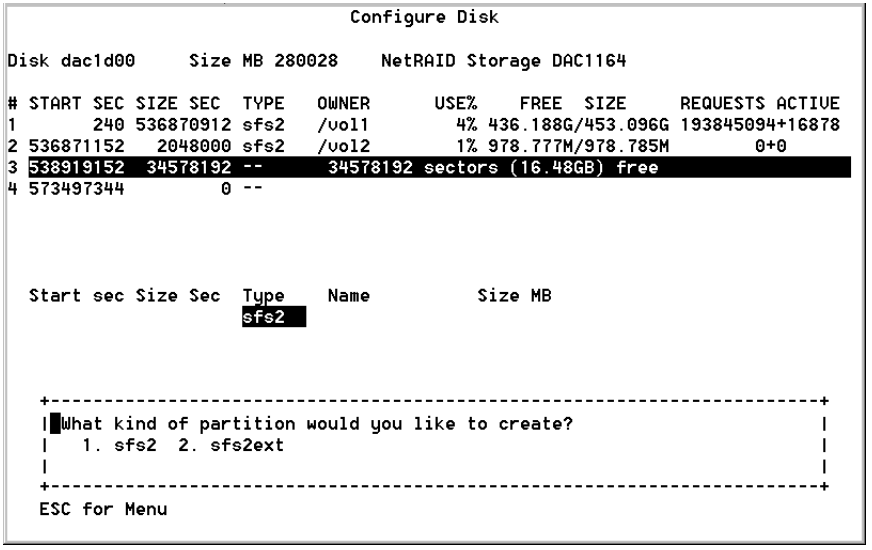


**FIGURE A-21** The Volume Creation Screen (2)

4. **Select the partition type for the drive.**

   Press **Enter** to accept the default, for example, sfs2 (primary volume) or sfs2ext (segment).

5. **Enter the disk volume label, then press Enter.**

6. **Press Enter to select the default size, or enter the disk volume size in MB and press Enter.**

7. **Select 7. Proceed with create.**

   Wait for the messages: "`Initialization OK`" and "`Mount OK`" then press **Esc** to return to the **Configure Disk** menu.

8. **When finished, press Esc until you are back to the main menu.**

## Renaming a Partition

To rename a partition:

1. **From the Configuration menu, select Disks & Volumes.**

2. **Type the letter next to the drive you are renaming.**

3. **Select 1. Change/delete.**

4. **Select 3. Rename.**

5. **Enter the new name of the partition and press Enter.**

## Adding an Extension Segment

To add an extension, you must first create an sfs2ext partition on that volume.

---

**Note –** Once the extension volume is attached to the sfs file volume, it cannot be detached. This is an irreversible operation. The only way to separate them is to delete the sfs file volume.

---

1. **From the Configuration menu, select Disks & Volumes.**

2. **Type the letter corresponding to the drive you are configuring.**

---

**Note –** If you have more than 26 disk drives (disk volumes), press the space bar to scan through them.

---

3. **Type the number next to the partition you are changing.**

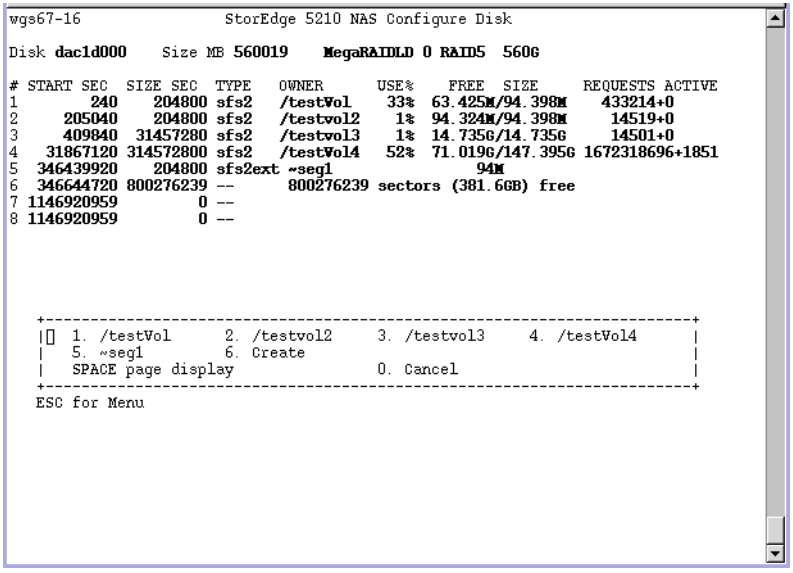


**FIGURE A-22** The Change/Delete Volume Screen

4. **Select 5. Segments.**

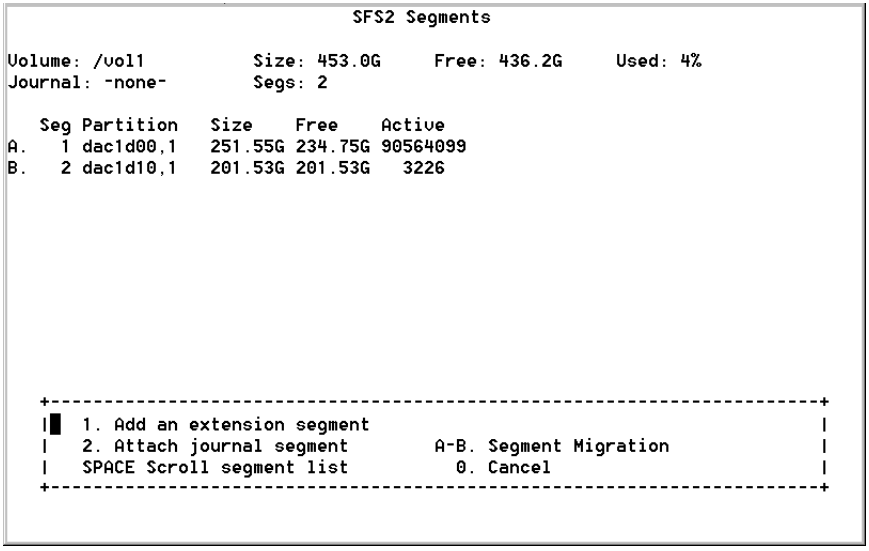


**FIGURE A-23** The Segments Screen

5. **Select 1. Add an extension segment.**

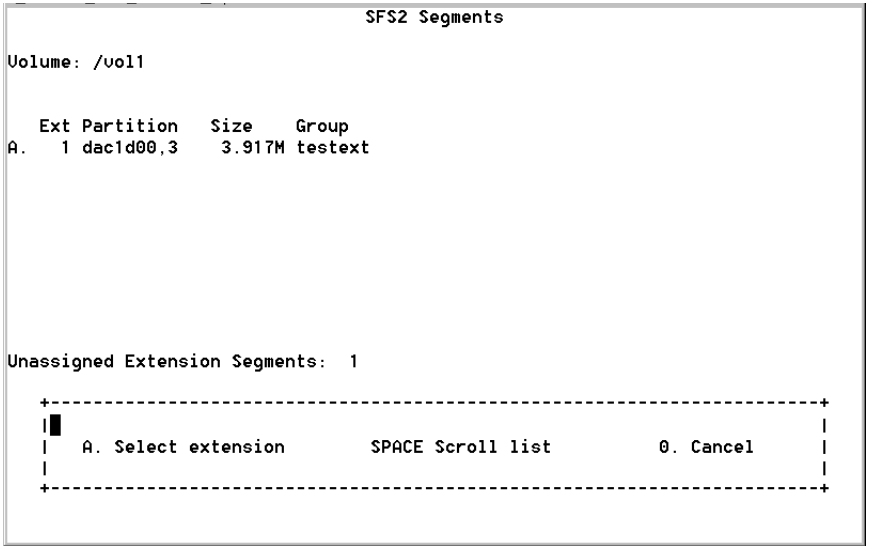


**FIGURE A-24** The Add an Extension Segment Screen (1)

6. **Select the letter next to the extension drive you want.**

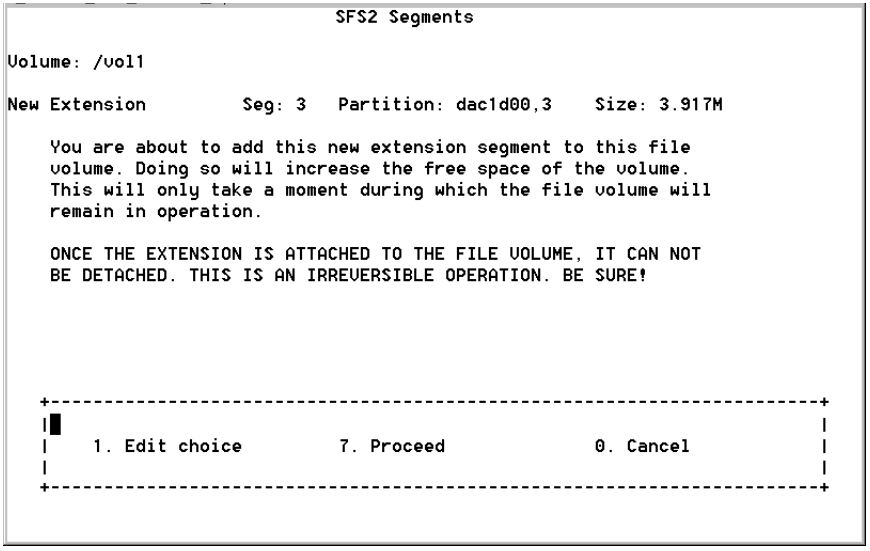


**FIGURE A-25** The Add an Extension Segment Screen (2)

7. **Select 7. Proceed.**

## Deleting a File Volume

**Warning –** All data in the volume is lost when you delete a volume.

To delete a disk volume:

1. **From the Configuration menu, select Disks & Volumes.**
2. **Select the letter next to the drive you want to reconfigure.**

**Note –** If you have more than 26 disk drives (disk volumes), press the space bar to scan through them.

3. **Select 1. Change/Delete <volume name>.**
4. **Select 8. Delete.**
5. **Enter the disk volume name and press Enter.**
6. **Select 7. Proceed with delete. Wait for the messages: "`Delete OK`" and "`Delpart OK`".**
7. **Press Esc to return to the Configure Disk menu.**
8. **Press Esc until you are back to the main menu.**

# Shares and Quotas

## SMB/CIFS Shares

CIFS is a Windows file-sharing service that uses the SMB protocol. CIFS provides a mechanism for Windows client systems to access files on the Sun StorEdge 5210 NAS.

### Setting up Shares

1. **From the Extensions menu, select CIFS/SMB Configuration.**

2. **Select A. Domain Configuration.**

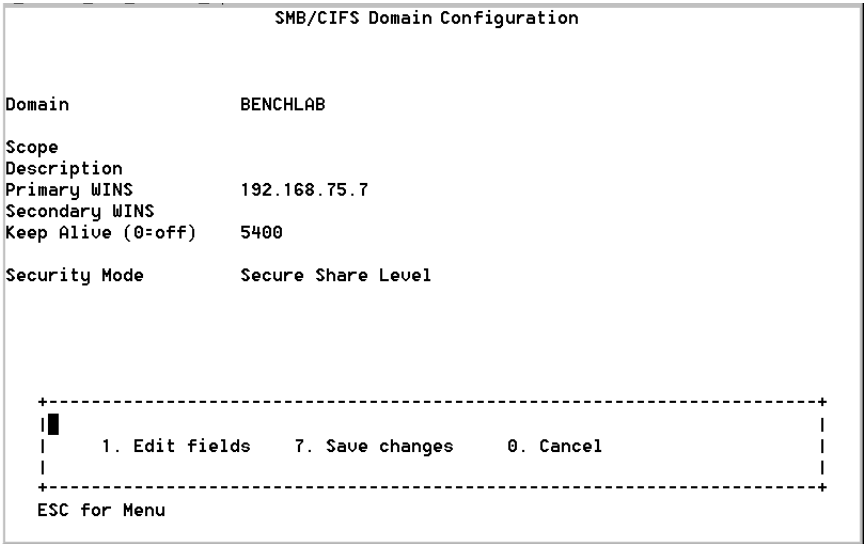


**FIGURE A-26** The SMB/CIFS Domain Configuration Screen

3. **Enter a workgroup or domain name in the Domain field.**
4. **Define the domain Scope, if applicable.**
5. **Enter a text Description of the Sun StorEdge 5210 NAS server.**
6. **Enter the IP address of the primary and secondary Windows Internet Naming Service (WINS) servers, if applicable.**
7. **Assign a Keep Alive parameter. This is the number of seconds after which the system drops inactive connections.**
8. **Assign a Security Mode from: Secure Share Level and NT Domain Auto UID.**
9. **If you are using NT Domain Auto UID mode, enter the administrative user name and password.**
10. **Select 7. Save changes. If you changed the security mode between Secure Share Level and NT Domain Auto UID, the Sun StorEdge 5210 NAS reboots.**

## Setting up SMB/CIFS Autohome Shares

Autohome shares are temporary shares created when a user logs on to the system and removed when the user logs off.

To enable autohome shares:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select F. Autohome Setup.**

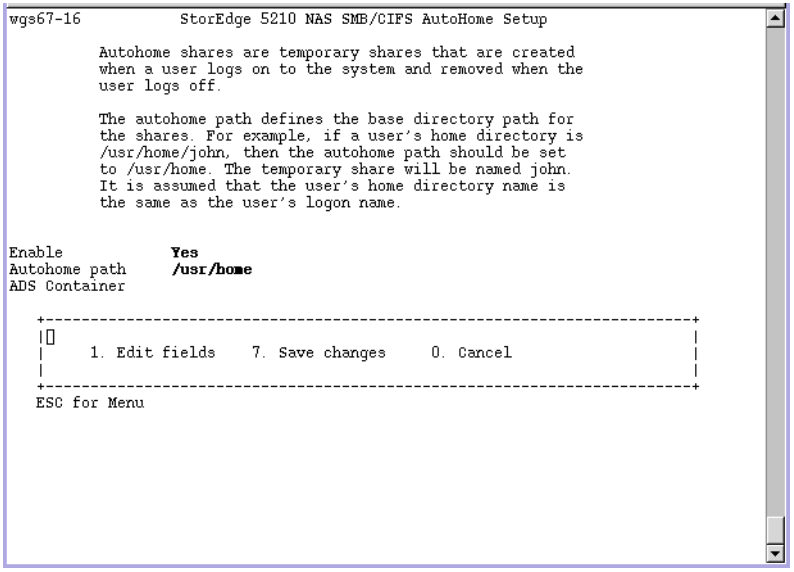


**FIGURE A-27** The SMB/CIFS Autohome Setup Screen

3. **Select 1. Edit fields.**
4. **Select Y. Yes to enable autohome shares.**
5. **Enter the autohome path. The autohome path defines the base directory path for the shares. For example, if a user's home directory is /usr/home/john, then set the autohome path to /usr/home. The temporary share is named john. The Sun StorEdge 5210 NAS assumes that the user's home directory name is the same as the user's logon name.**
6. **Select 7. Save changes.**

## Adding a Share

After the SMB/CIFS set up is complete, you must define SMB/CIFS shares. Shares allow Windows users to access directories in Sun StorEdge 5210 NAS.

To set up a share:

1. **From the Extensions menu, select CIFS/SMB Configuration.**

2. **Select E. Shares.**

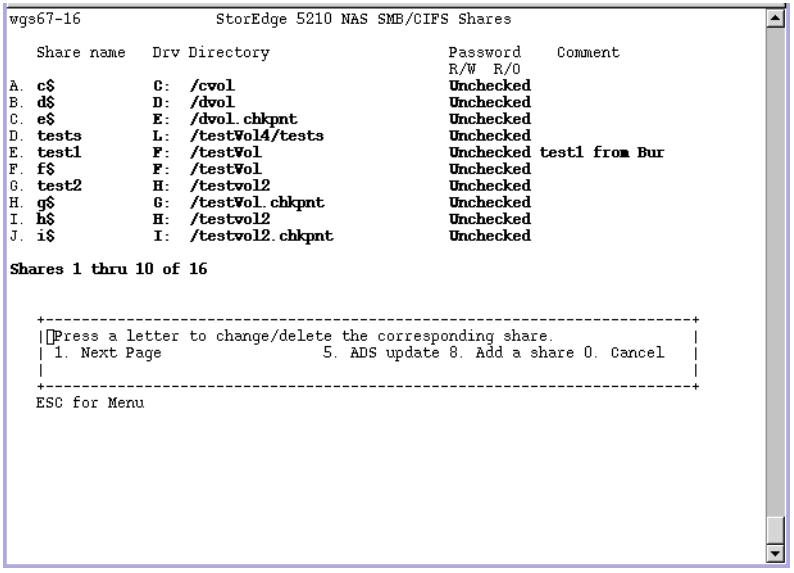


**FIGURE A-28** The SMB/CIFS Shares Screen

3. **Select 8. Add a share.**
4. **Enter a Share name.**
5. **Enter a path in the Directory, in the form volume/directory.**
6. **Enter a Comment about this directory, if applicable.**
7. **If your system is configured for Workgroup mode:**
   - In the **Password Protection** drop-down list, select **Yes** or **No**. If enabled, there is an option for either read/write or read-only.
   - Enter **User ID**, **Group ID**, and **Umask**.
8. **Select 7. Save changes.**

## Editing a Share

To edit a share:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select E. Shares.**
3. **Enter the letter corresponding to the share you are editing.**

4. **Select 1. Edit fields.**
5. **Enter the new Share name, Directory, Comment, Password information, User ID, and Group ID.**
6. **Enter the ADS container, as described in Step 7 of "Adding a Share" on page 205.**
7. **Select 7. Save changes.**

### Deleting a Share

To delete a share:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select E. Shares.**
3. **Enter the letter corresponding to the share you are deleting.**
4. **Select 8. Delete.**

## Setting Up Active Directory Services (ADS)

When ADS is enabled and set up on this screen, the Sun StorEdge 5210 NAS automatically performs ADS updates.

To enable ADS service:

1. **From the Extensions menu, select ADS Setup.**

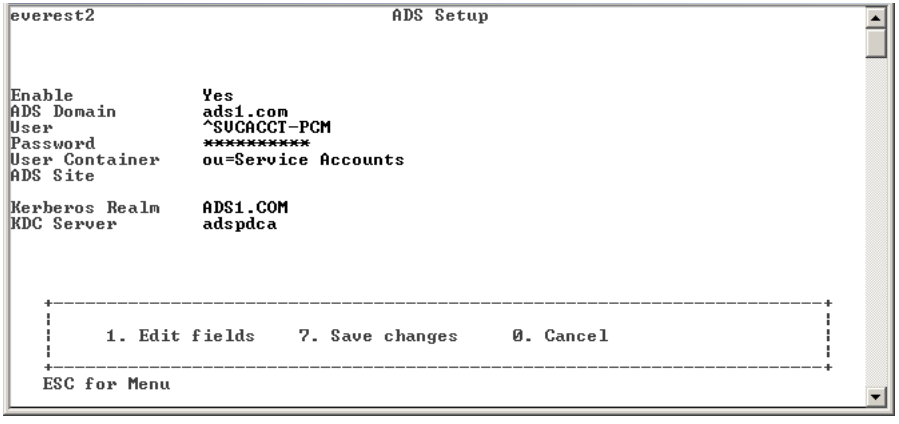


**FIGURE A-29** The ADS Setup Screen

2. **Select 1. Edit fields.**
3. **Select Y. Yes to let the ADS client publish Sun StorEdge 5210 NAS shares to ADS.**
4. **Enter the Windows domain on which ADS is running. The Sun StorEdge 5210 NAS must also belong to this domain. Press Enter.**
5. **Enter the name of a Windows user with administrative rights. The ADS client verifies secure ADS updates with this user. Press Enter.**
6. **Enter the Windows administrative user's password.**
7. **In the User Container field, enter the ADS path for the Windows administrative user in LDAP DN notation. For more information see "Setting Up ADS" on page 70.**

   Press **Enter** when you have entered the user container.
8. **Enter the name of the local ADS site in the Site field.**
9. **Enter, in upper-case letters, the Kerberos realm name used to identify ADS. This is normally the ADS domain. Press Enter.**
10. **Enter the host name of the Kerberos Key Distribution Center (KDC) server. This is usually the host name of the main domain controller in the ADS domain. You can leave this field blank if the ADS client or dynamic DNS client can locate the KDC server through DNS. Press Enter.**
11. **Select 7. Save changes.**

# Enabling and Disabling Quotas

Quotas track and limit the amount of disk space each user and group uses. You can turn the quota tracking function on and off. This function only enables and disables quotas. It does not set quota limits.

---

**Note –** Quota initialization takes several minutes, during which time the volume is locked and unavailable to users.

---

To enable or disable quotas:

1. **From the Configuration menu, select Disks & Volumes.**
2. **Type the letter next to the drive for which you are enabling quotas.**
3. **Select Change/delete <volume name>.**

4. **Select 4. Quotas on/off.**
5. **Select 1. Turn quotas on or 8.Turn quotas off.**

# Security

## Configuring Sun StorEdge 5210 NAS User Groups

The requirements for Sun StorEdge 5210 NAS built-in local groups are different from those of a Windows NT system. For a complete description of user groups, see "Sun StorEdge 5210 NAS Local Groups" on page 81.

### Adding a Group

To add a group:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select B. Local Groups.**

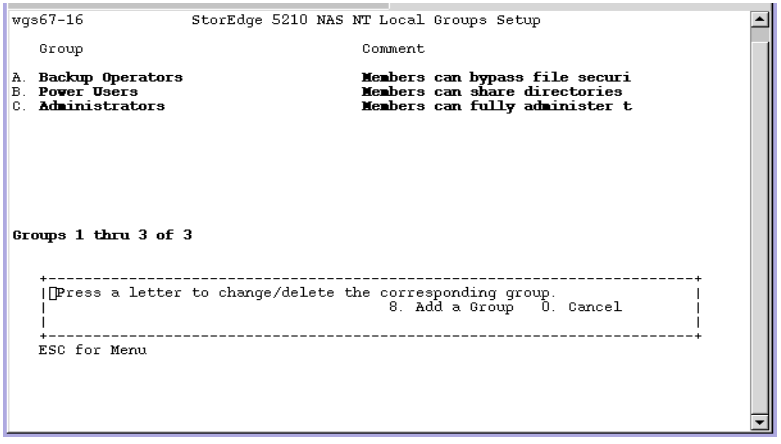


**FIGURE A-30** The Local Groups Setup Screen

3. **Press 8. Add a Group to add a local group.**
4. **Type in the name of the group and press Enter.**

5. **Type in a description of the group, if applicable, and press Enter.**
6. **Press 7. Save Changes to save the new group.**

## Adding a Group Member

To add a member to a group:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select B. Local Groups.**
3. **Press the letter of the group you want to modify.**
4. **Press 2. Members to change the membership of the group.**
5. **Press 8. Add to add a member.**
6. **Type in the domain and user name in the following format. "Domain\user name."**

   The domain identifies the domain where the user name can be authenticated. For example, typing "BENCHLAB\john" identifies the domain "BENCHLAB" where the user "john" can be authenticated.
7. **Press Enter.**
8. **Press 7. Save Changes to save the new member.**

# Removing a Group Member

To remove a member from a group:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select B. Local Groups.**
3. **Press the letter of the group you want to modify.**
4. **Press 2. Members to change the membership of the group.**
5. **Press the letter corresponding to the group member you want to remove.**
6. **Press Y in response to the prompt.**

# Group Privileges

A description of the user group privileges is provided in "Configuring Privileges for Sun StorEdge 5210 NAS Local Groups" on page 82.

## Modifying Local Group Privileges

To modify local group privileges:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select B. Local Groups.**
3. **Press the letter of the group you want to modify.**
4. **Press 3. Privileges to change the privileges of the group members.**

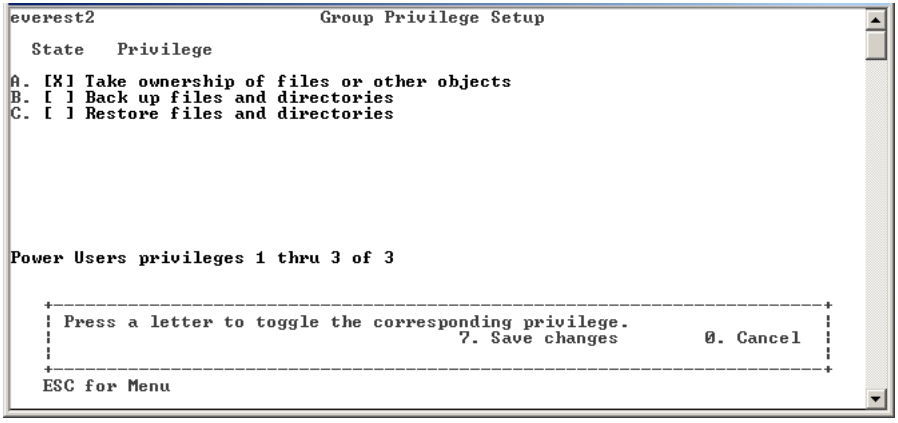


**FIGURE A-31** The Modify Group Privileges Screen

5. **Press the letter of the privilege that you want to add or remove.**
6. **Press 7. Save Changes to save the changes that you made.**

# Mapping User and Group Credentials

For a complete description of user and group credentials, see "Mapping User and Group Credentials" on page 90.

## Adding a User Map

To add a user map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select C. User Mapping.**
3. **Press 8. Add a map.**

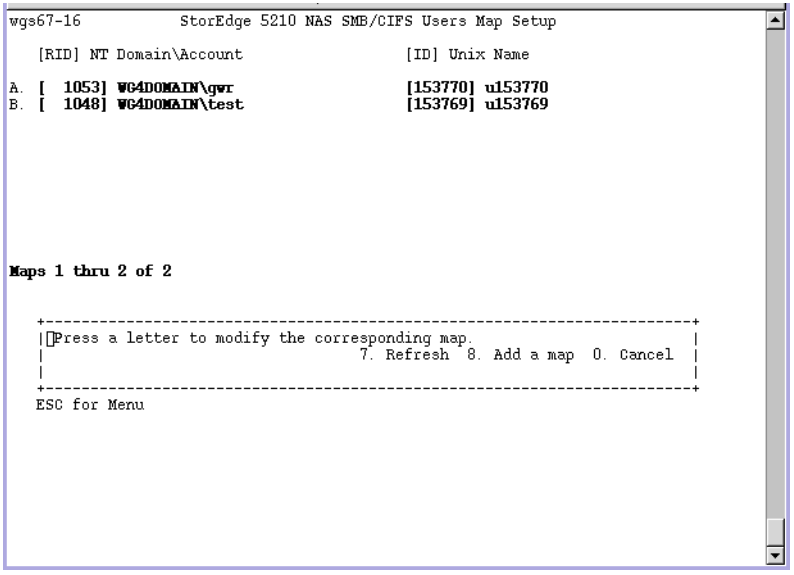


**FIGURE A-32** Users Map Setup Screen

4. **In the Account field, enter the domain and name of the NT user you want to map to a UNIX user. Use the format domain\username.**
5. **In the Name field, enter the name of the UNIX user you want to map to the NT user.**
6. **Press 7. Save Changes.**

## Editing a User Map

To edit a user map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select C. User Mapping.**
3. **Press the letter of the map you want to edit.**
4. **Press 1. Edit Fields.**
5. **Type your changes and press Enter.**
6. **Press 7. Save Changes.**

## Removing a User Map

To remove a user map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select C. User Mapping.**
3. **Press the letter of the user map you want to delete.**
4. **Press 8. Delete.**

## Adding a Group Map

To add a group map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select D. Group Mapping.**
3. **Press 8. Add a map.**

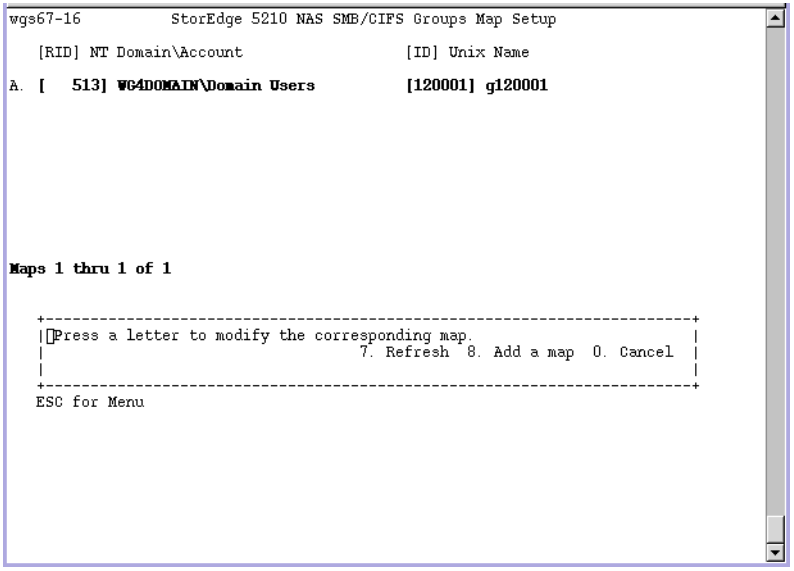


**FIGURE A-33** The Groups Map Setup Screen

4. **In the Account field, enter the domain and name of the NT group you want to map to a UNIX group. Use the format domain\username.**
5. **In the Name field, enter the name of the UNIX group you want to map to the NT group.**
6. **Press 7. Save Changes.**

## Editing a Group Map

To edit a group map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select D. Group Mapping.**
3. **Press the letter of the group map you want to edit.**
4. **Press 1. Edit Fields.**
5. **Type your changes and press Enter.**
6. **Press 7. Save Changes.**

## Removing a Group Map

To remove a group map:

1. **From the Extensions menu, select CIFS/SMB Configuration.**
2. **Select D. Group Mapping.**
3. **Press the letter of the group map you want to delete.**
4. **Press 8. Delete.**

# Hosts

## Configuring the Host List

The console allows you to configure host information. From the main menu, select **Hosts** to add, edit, or delete hosts.

### Adding a Host

To add a host:

1. **From the Configuration menu, select Hosts.**
2. **Type the new host name, then press Enter. The system verifies that the host name does not already exist.**

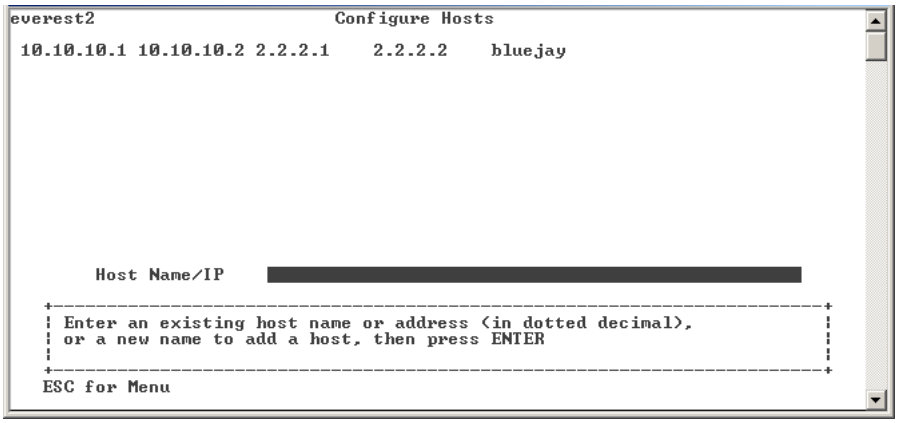


**FIGURE A-34** The New Host Screen

3. **Press Enter to add the host.**
4. **Enter the new host IP address.**
5. **Select 7. Save changes.**

## Editing a Host

To edit an existing host:

1. **From the Configuration menu, select Hosts.**
2. **Type the name of the host you are editing and press Enter.**
3. **Select 1. Edit.**
4. **Enter the new host name or IP address.**
5. **Select 7. Save changes.**

## Deleting a Host

To delete a host:

1. **From the Configuration menu, select Hosts.**
2. **Type the name of the host you are deleting and press Enter.**
3. **Select 8. Delete.**

# Managing Trusted Hosts

Use the **Trusted Hosts** menu option to manage hosts that have unrestricted access to all resources.

## Adding a Trusted Host

To designate a trusted host:

1. **From the Access Control menu, select Trusted Hosts.**

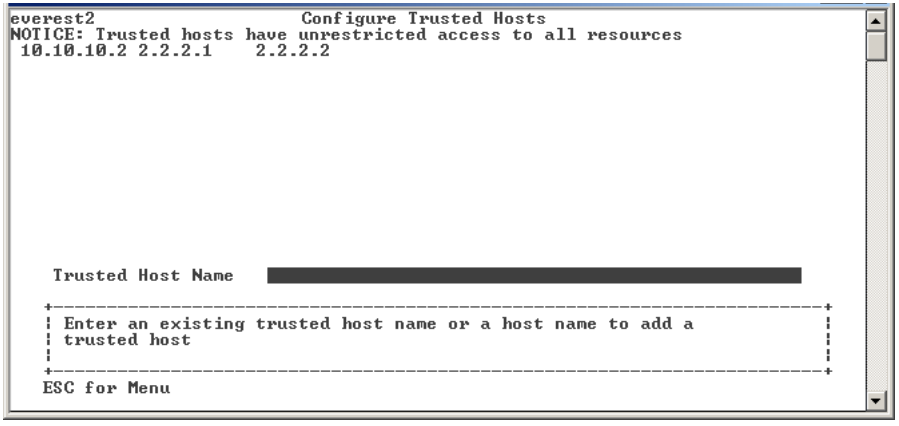


**FIGURE A-35** The Trusted Hosts Screen

2. **Type a new or existing host name, then press Enter.**

---

**Note –** To add a trusted host, the host must exist on the host list or NIS.

---

The system verifies that the trusted host name does not already exist. If the trusted host exists, the host information is displayed. If the host is not trusted, the system displays a warning.

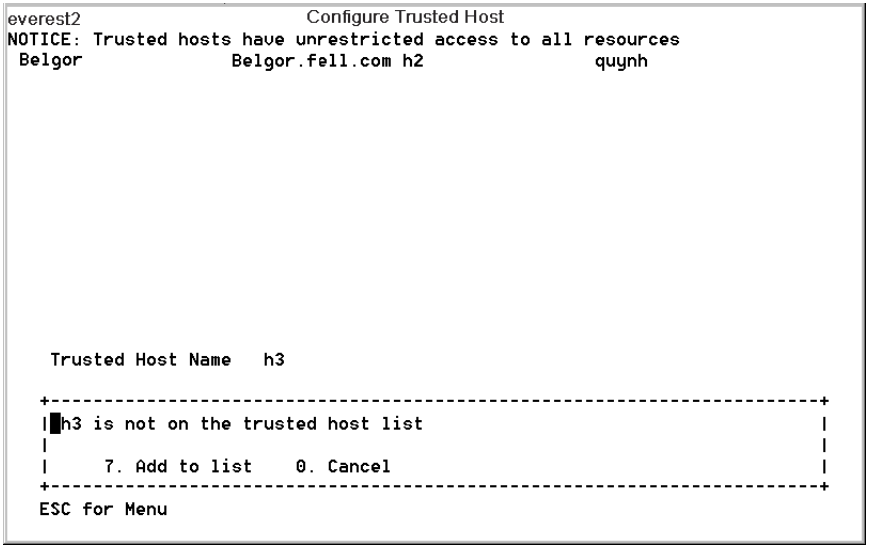


**FIGURE A-36** The Trusted Host Access Screen

3. **Select 7. Add to list.**

   The new trusted host is added and the system displays the name at the top of the screen.

## Deleting a Trusted Host

To delete a trusted host:

1. **From the Access Control menu, select Trusted Hosts.**
2. **Type in the name of the trusted host you are deleting and press Enter.**
3. **Select 8. Delete.**

   The trusted host is removed from the list.

# Managing Volume Access

Once you save the changes, the existing NFS mounts from clients are updated to reflect the new parameters.

Do not allow any access, either read nor write, to the **cvol** volume.

**Note –** Trusted hosts are automatically granted read/write access to file volumes regardless of the volumes' access settings.

To manage volume access for NFS clients:

1. **From the Access Control menu, select Volume Access.**

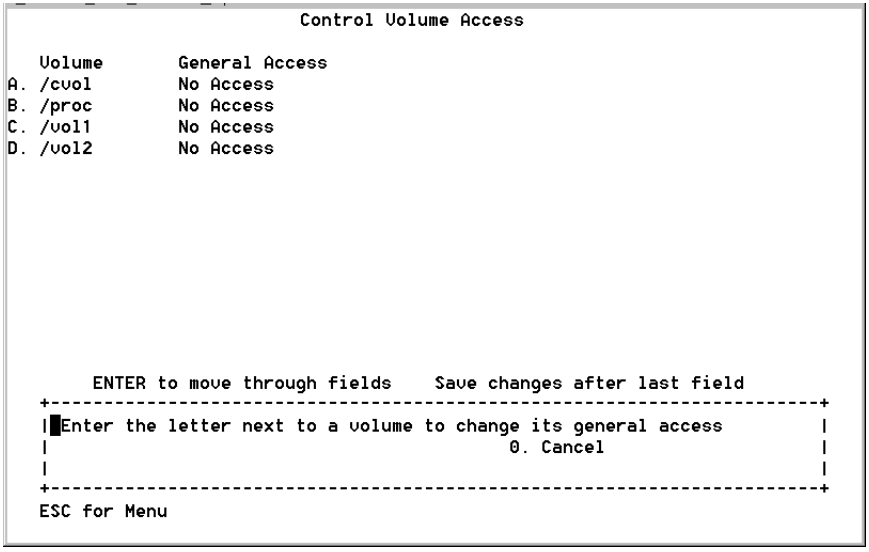


**FIGURE A-37** The Volume Access Screen

2. **Enter the letter corresponding to the volume to change its access.**
3. **Enter the number corresponding to the type of access you are assigning; read/write access, read-only access, or no access.**

**Note –** Hosts on the trusted list are allowed read/write access regardless of the volume access parameters.

4. **Select 7. Save changes.**

# Locking and Unlocking the Console

Use the **Lock Console** menu option to disable or enable most of the main menu options, preventing unauthorized use of the console. You must set the administrative password to secure the console.

### Locking the Console

To lock the console:

1. **From the Operations menu, select Lock Console.**
2. **Enter the administrative Password.**
3. **Select Y (Yes).**

### Unlocking the Console

To unlock the console:

1. **From the main menu, select Unlock Console.**
2. **Enter the administrative Password.**
3. **Select Y (Yes).**

# Monitoring

## Configuring SNMP

The SNMP menu lets you send messages to a remote SNMP monitor, as well as modify the community string, contact information, and the location of the SNMP monitor.

To configure SNMP:

1. **From the Extensions menu, select SNMP Configuration.**

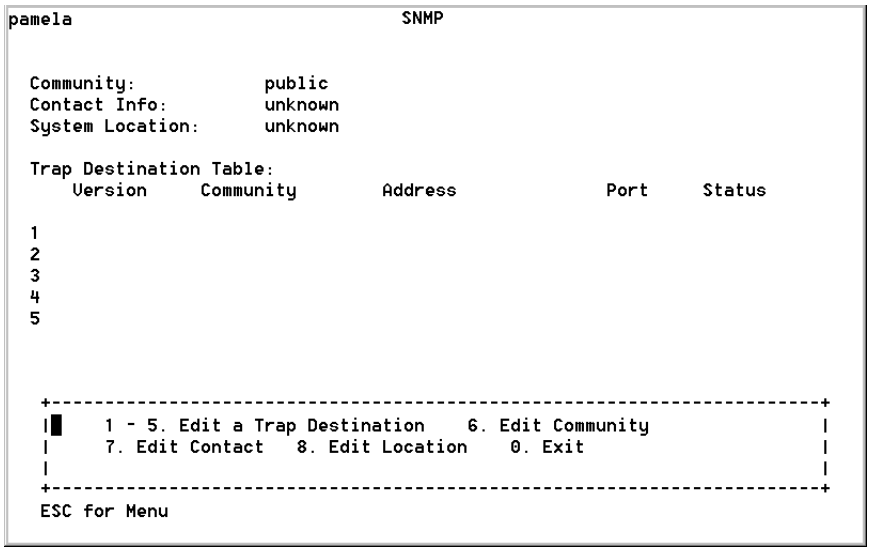


**FIGURE A-38** The SNMP Configuration Screen

Public is the default Community name. You can enter any name you want.

2. **Select 1-5. Edit a Trap Destination to add, edit, or delete a trap destination, 6. Edit Community to edit the community string, 7. Edit Contact to edit contact information, or 8. Edit Location to edit the location of the remote SNMP monitor.**
3. **Select Y. Yes to save your changes.**

# Configuring E-mail Notification

When there is a problem with your system, Sun StorEdge 5210 NAS sends e-mail messages to specific recipients.

---

**Note –** You must configure DNS for e-mail notification to function properly.

---

To configure e-mail notification:

1. **From the Extensions menu, select E-MAIL Configuration.**

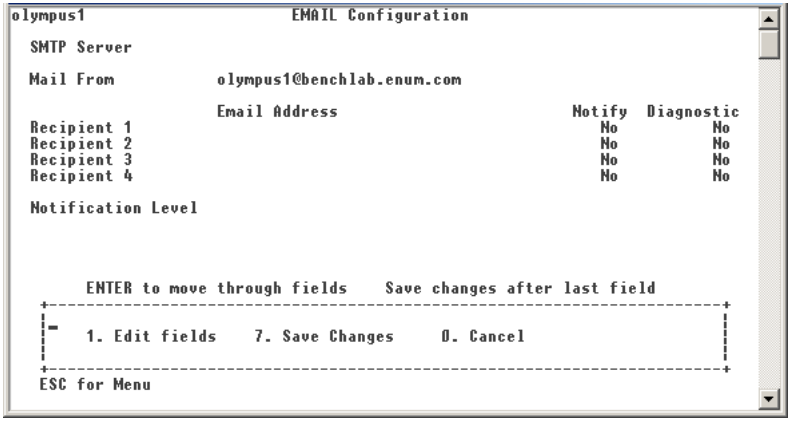


**FIGURE A-39** The Email Configuration Screen

2. **Select 1. Edit fields.**
3. **Type the information requested for each field. Press Enter to move between fields.**
   - **SMTP Server—**This is the mail server; all mail is directed here. The host file or the DOS server must include the server name.
   - **Recipient 1...4—**These are the e-mail addresses of the four people automatically notified in case of a problem.
   - **Notification Level—**The level a problem must be at before the recipients are notified through e-mail. Select one of the following:
     - **Errors—**Notifications sent only for errors
     - **Errors and warnings—**Notifications sent for errors and low priority warnings
     - **None—**No notifications sent
4. **Select 7. Save Changes to save the current configuration. Select 0. Cancel to cancel the operation.**
5. **Press Esc to return to the main menu.**

# Viewing the Activity Monitor

The activity screen continuously reports the status of your server.

To view the activity monitor:

1. **From the Operations menu, choose Activity Monitor.**

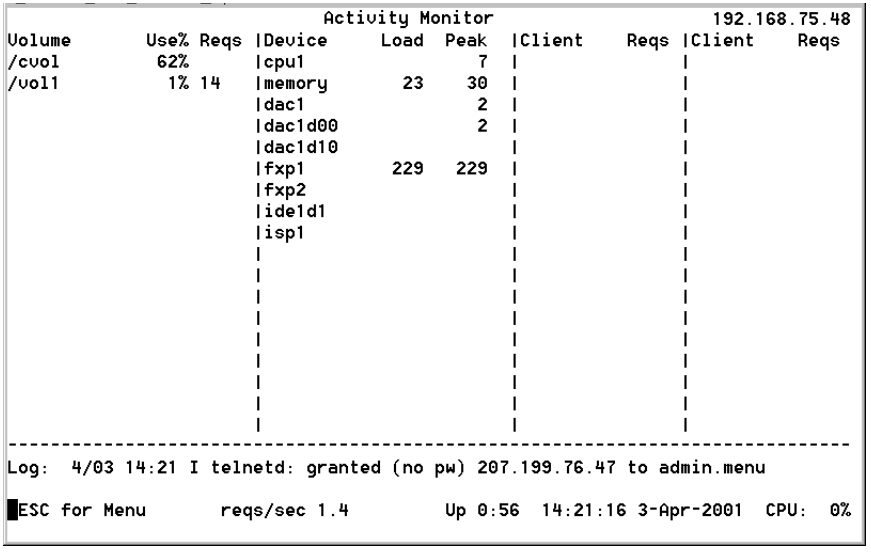


**FIGURE A-40** The Activity Monitor Screen

The Activity Monitor screen lists the following information:

- **Volume—**Displays the first 22 file volumes
- **Use%—**Displays the amount of space used on the volume
- **Reqs—**Displays the number of requests processed for the volume in the last 10 seconds
- **Device—**Displays the name of the device
- **Load—**Displays the percentage of CPU load
- **Peak—**Displays the highest usage per second in the last 10 minutes
- **Client—**Displays name or address of the user
- **Reqs—**Displays the number of requests processed for the volume in the last 10 seconds

2. **Press Esc to return to the main menu.**

# Viewing the System Log

Use the **Show Log** screen to display the most recent log entries.

To view the system log:

1. **From the Operations menu, select Show Log.**

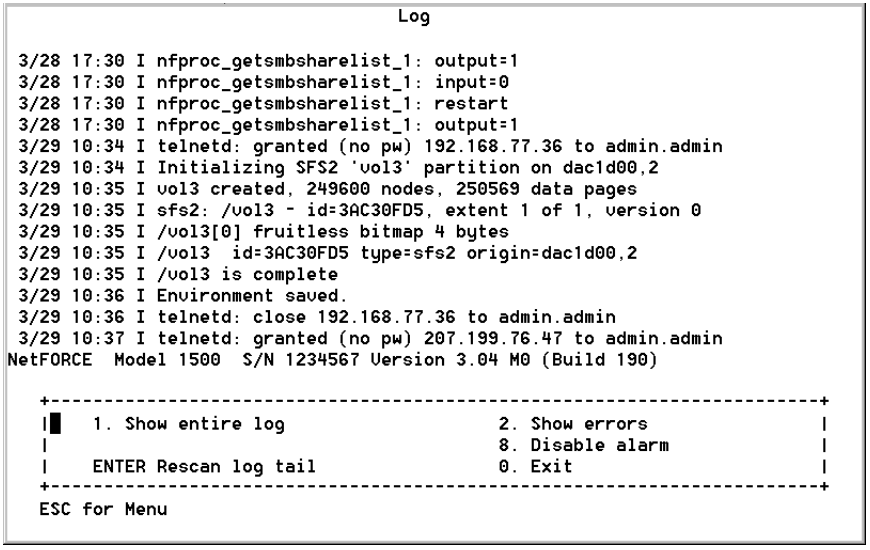


**FIGURE A-41** The Show Log Screen

The log displays two types of entries:

- **System Startup Log Entries—**Reports device configurations, volumes and other pertinent information
- **Normal Operation Log Entries—**Reports device errors, security violations, and other routing status information. The release number and software serial number are listed last.

# Viewing Port Bonding

Telnet does not support port bonding, but you can view port bond information in the **Host Name & Network** screen.

1. **From the Configuration menu, select Host Name & Network.**

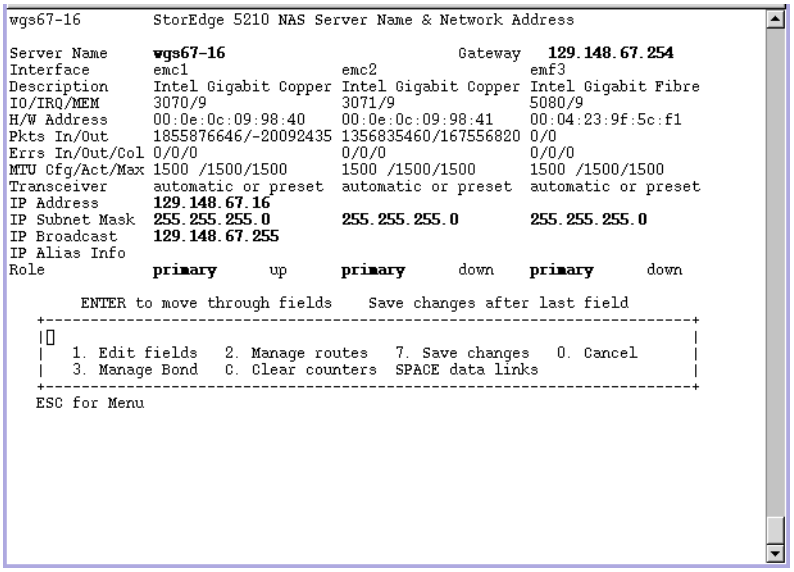


**FIGURE A-42** Viewing Port Bonding Information (page 1)

2. **Press the spacebar to scroll to the next page.**

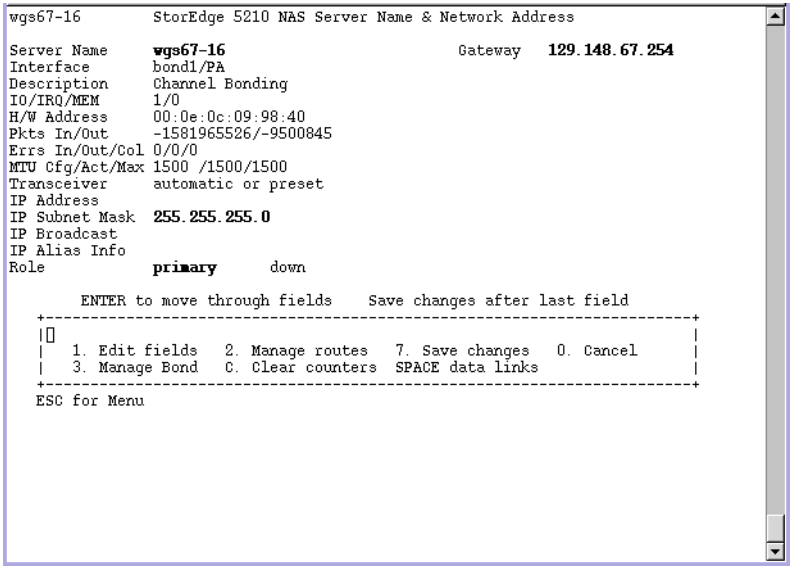


**FIGURE A-43** Viewing Port Bonding Information (page 2)

The **bond1** column shows the first port bond. The input/output information in this column is the sum of the input/output information in the two ports that you bonded.

# Viewing the Checkpoint Analysis

The checkpoint analysis shows the days and times that all checkpoints are created and removed.

To view the checkpoint analysis:

1. **From the Configuration menu, select Disks & Volumes.**
2. **Type the letter corresponding to the drive you are configuring.**
3. **Select Change/Delete <volume name>.**
4. **Select 6. Checkpoints.**

5. **Select 3. Analysis. Scroll through the analysis using the spacebar.**

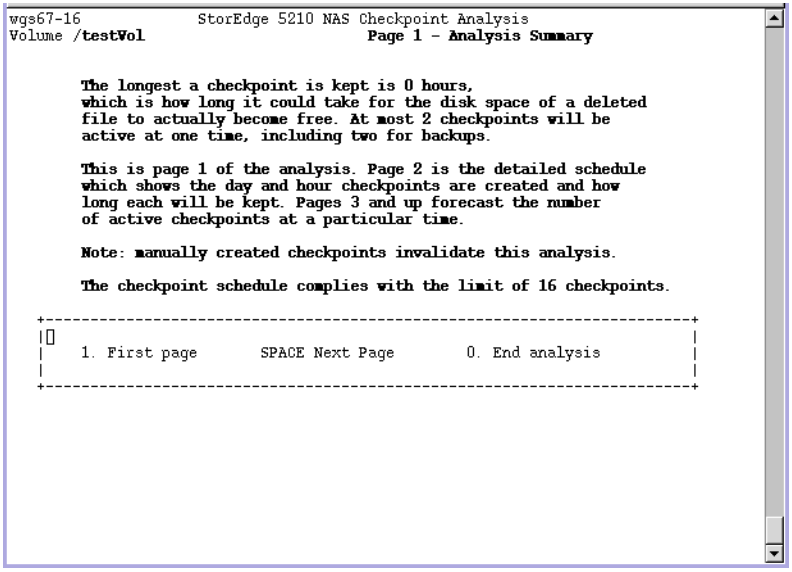


**FIGURE A-44** Checkpoint Analysis

6. **Select 0. End Analysis to exit this screen.**

# System Maintenance

## Configuring File Transfer Protocol (FTP) Access

FTP is an Internet protocol used to copy files between a client and a server. FTP requires that each client requesting access to the server must be identified with a username and password.

You can set up three types of users:

- **Administrators** who have the username “admin” and use the same password used by GUI clients.

  The administrator has “root” access to all volumes, directories, and files on the Sun StorEdge 5210 NAS. The administrator’s home directory is defined as “/”.

- **Users** who have a username and a password specified in the local password file or on a remote NIS or NIS+ name server.

  The user has access to all directories and files within the user's home directory. The home directory is defined as part of the user's account information and is retrieved by the name service.
- **Guests** who login with the username "ftp" or its alias "anonymous". A password is required but not authenticated. All guest users have access to all directories and files within the home directory of the "ftp" user.

---

**Note –** Guest users cannot rename, overwrite, or delete files; cannot create or remove directories; and cannot change permissions of existing files or directories.

---

## Loading FTP

The FTP service often is used only by administrators to perform system maintenance functions so is not normally loaded as part of default system startup. Before you can set up FTP, you need to load it.

To load the FTP service:

1. **At the command line enter `load ftpd`**
2. **Then type `menu` to access the menu.**
3. **Press the spacebar until FTP Configuration appears under Extensions in the lower right.**

   If you want to provide FTP as a service to users, you need to configure the FTP service to load automatically each time the system boots up. Refer to "Configuring FTP to Load Automatically" on page 229 for instructions.

## Setting Up FTP Access

To setup FTP access:

1. **From the Extensions menu, select FTP Configuration.**
2. **Select 1. Edit Fields.**
3. **Select Y. Yes to enable FTP or N. No to disable it.**

   If FTP service is enabled, the FTP server will accept incoming connection requests.
4. **In Allow guest access, select Yes to enable access to the FTP server by anonymous users or No to disable access.**

5. **In Allow user access, select Yes to enable access to the FTP server by all users or No to disable access.**

   This does not include the “admin” or “root” user.

---

**Note –** User names and passwords must be specified in the local password file or on a remote NIS or NIS+ name server.

---

6. **In Allow admin access, select Yes to enable access to the FTP server by all root users or No to disable access.**

---

**Note –** A “root” user is a user with UID equal to 0 and the special Sun StorEdge 5210 NAS user “admin”.

---

7. **In Enable logging, select Yes to enable logging or No to disable logging.**
8. **Select 7. Save changes.**

## Configuring FTP to Load Automatically

To provide FTP as a service to users, you need to configure the FTP service to load automatically each time the system boots up.

To configure the FTP service to load automatically when the system boots up:

1. **Create a text file named inetload.ncf.**

   The name must be all lower case, and the file must be plain text. The file should contain only the following two lines:

   ```
   # Load the FTP service

   ftpd
   ```

2. **Using NFS or SMB copy this file to the StorEdge 5120 NAS /dvol/etc directory.**

   On future system reboots, the `inetload` service will read and act on the file automatically at boot time.

# Shutting Down the System

The Sun StorEdge 5210 NAS system is designed for continuous operation.

To shut down the system:

1. **From the Operations menu, select Shutdown.**

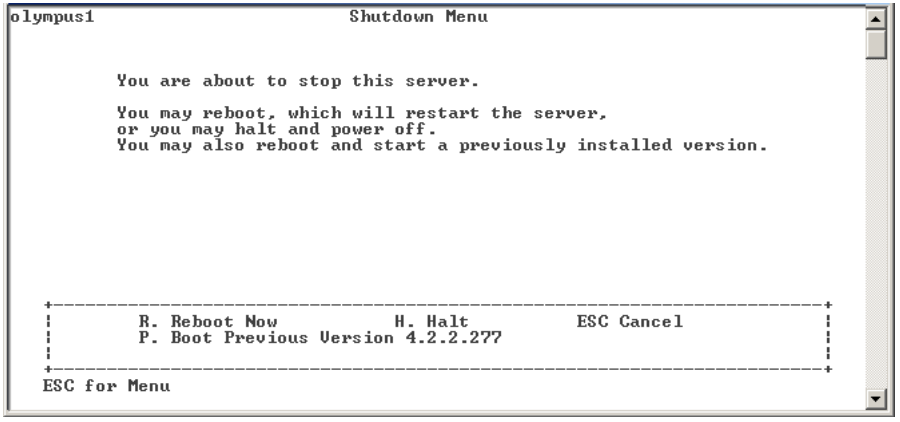


**FIGURE A-45** The Shutdown Screen

2. **Select the desired option by typing the appropriated letter option.**
   - **R. Reboot** - Type "R" to reboot the system
   - **H. Halt —** Type "H" to halt the system.
   - **P. Boot Previous Version 4.x.xx.xxx —** Type "P" to reboot the system using the available previous OS version. This option is available on systems that have more than one OS versions installed.
   - **ESC —** Press the Esc key to cancel and return to the main menu.

   If you choose to reboot, halt, or boot with the previous OS version, the server reboots or turns off after all the delayed writes to disks are completed.

# Scheduling File Checkpoints

To schedule checkpoints:

1. **From the Configuration menu, select Disks & Volumes.**
2. **Type the letter corresponding to the drive for which you are scheduling checkpoints.**

---

**Note –** If you have more than 26 drives (disk volumes), press the space bar to scan through them.

---

3. **Select Change/delete <volume name>.**

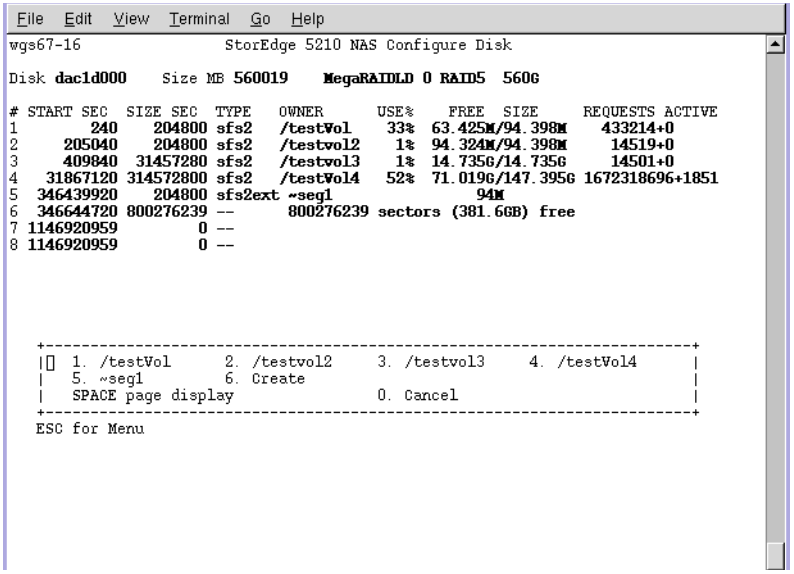


**FIGURE A-46** The Change/Delete Volume Screen

4. **Select 6. Create.**

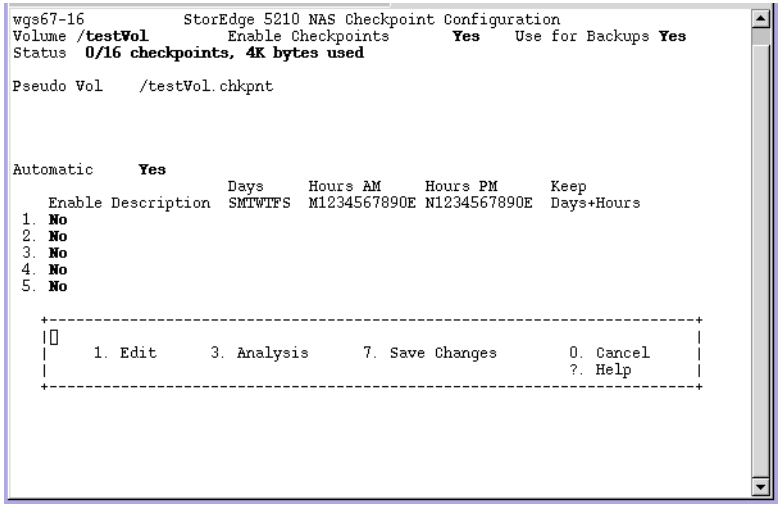


**FIGURE A-47** The Checkpoint Configuration Screen

5. **Follow the prompts at the bottom of the screen, pressing Enter to move through the fields.**

6. **When you have entered all checkpoint information, select 7. Save changes.**

APPENDIX **B**

# Sun StorEdge 5210 NAS Error Messages

This appendix details the specific error messages sent through e-mail, SNMP notification, the LCD panel, and the system log to notify the administrator in the event of a system error. *SysMon*, the monitoring thread in the Sun StorEdge 5210 NAS, monitors the status of RAID devices, UPSs, file systems, head units, enclosure subsystems, and environmental variables. Monitoring and error messages vary depending on model and configuration.

In the tables in this appendix, table columns with no entries have been deleted.

## About SysMon Error Notification

*SysMon*, the monitoring thread in the Sun StorEdge 5210 NAS, captures events generated as a result of subsystem errors. It then takes the appropriate action of sending an e-mail, notifying the SNMP server, displaying the error on the LCD panel, writing an error message to the system log, or some combination of these actions. E-mail notification and the system log include the time of the event.

## Sun StorEdge 5210 NAS Error Messages

The following sections show error messages for the Sun StorEdge 5210 NAS UPS, RAID devices, file system usage, and the PEMS.

# UPS Subsystem Errors

Refer to Table B-1 for descriptions of UPS error conditions.

**TABLE B-1** UPS Error Messages

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| Power Failure | **AC Power Failure:**<br>AC power failure. System is running on UPS battery.<br>Action: Restore system power.<br>Severity = Error | EnvUpsOn Battery | U20 on battery | UPS: AC power failure. System is running on UPS battery. |
| Power Restored | **AC power restored:**<br>AC power restored. System is running on AC power.<br>Severity = Notice | EnvUpsOff Battery | U21 power restored | UPS: AC power restored. |
| Low Battery | **UPS battery low:**<br>UPS battery is low. The system will shut down if AC power is not restored soon.<br>Action: Restore AC power as soon as possible.<br>Severity = Critical | EnvUpsLow Battery | U22 low battery | UPS: Low battery condition. |
| Normal Battery | **UPS battery recharged:**<br>The UPS battery has been recharged.<br>Severity = Notice | EnvUps Normal Battery | U22 battery normal | UPS: Battery recharged to normal condition. |
| Replace Battery | **Replace UPS Battery:**<br>The UPS battery is faulty.<br>Action: Replace the battery.<br>Severity = Notice | EnvUps Replace Battery | U23 battery fault | UPS: Battery requires replacement. |
| UPS Alarms - Ambient temperature or humidity outside acceptable thresholds | **UPS abnormal temperature/humidity:**<br>Abnormal temperature/humidity detected in the system.<br>Action: 1. Check UPS unit installation, OR<br>2. Contact technical support.<br>Severity = Error | EnvUps Abnormal | U24 abnormal ambient | UPS: Abnormal temperature and/or humidity detected. |

**TABLE B-1** UPS Error Messages

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| Write-back cache is disabled. | **Controller Cache Disabled:** Either AC power or UPS is not charged completely.<br>Action: 1 - If AC power has failed, restore system power. 2 - If after a long time UPS is not charged completely, check UPS.<br>Severity = Warning | | Cache Disabled | write-back cache for ctrl x disabled |
| Write-back cache is enabled. | **Controller Cache Enabled:** System AC power and UPS are reliable again. Write-back cache is enabled.<br>Severity = Notice | | Cache Enabled | write-back cache for ctlr n enabled |
| The UPS is shutting down. | **UPS shutdown:** The system is being shut down because there is no AC power and the UPS battery is depleted.<br>Severity = Critical | | | !UPS: Shutting down |
| UPS Failure | **UPS failure:** Communication with the UPS unit has failed.<br>Action: 1. Check the serial cable connecting the UPS unit to one of the CPU enclosures, OR<br>2. Check the UPS unit and replace if necessary.<br>Severity = Critical | EnvUpsFail | U25 UPS failure | UPS: Communication failure. |

# File System Errors

File system error messages occur when the file system usage exceeds a defined usage threshold. The default usage threshold is 95%.

**TABLE B-2** File System Errors

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| File System Full | **File system full:**<br>File system <name> is xx% full.<br>Action: 1. Delete any unused or temporary files, OR<br>2. Extend the partition by using an unused partition, OR<br>3. Add additional disk drives and extend the partition after creating a new partition.<br>(Severity=Error) | PartitionFull | F40 FileSystemName full | File system <name> usage capacity is xx%. |

# RAID Subsystem Errors

Table B-3 displays events and error messages for the Sun StorEdge 5210 NAS.

**TABLE B-3** RAID Error Messages

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| LUN Failure | **RAID LUN failure:**<br>RAID LUN *N* failed and was taken offline. Slot *n* is offline.<br>Action: Replace bad drives and restore data from backup.<br>Severity = Error | RaidLunFail | R10 Lun failure | RAID LUN *N* failed and was taken offline. Slot *n* is offline.<br>(Severity=Error) |
| Disk Failure | **Disk drive failure:**<br>Disk drive failure. Failed drives are: Slot#, Vendor, Product ID, Size<br>Severity = Error | RaidDiskFail | R11 Drive failure | Disk drive failure. Failed drives are: Slot#, Vendor, Product ID, Size<br>(Severity=Error) |
| Controller Failure | **RAID controller failure:**<br>RAID controller *N* has failed.<br>Action: Contact technical support.<br>Severity = Error | RaidController Fail | R12 Ctlr failure | RAID controller *N* failed. |

# PEMS Events

Sun StorEdge 5210 NAS employs the PEMS board to monitor environmental systems and to send messages regarding fan, power supply, and temperature anomalies.

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**Note –** Device locations are shown in the *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* included in your documentation CD.

---

Table B-4 describes the PEMS error messages for the Sun StorEdge 5210 NAS.

**TABLE B-4** PEMS Error Messages

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| CPU Fan Error | **Fan Failure:**<br>The CPU fan has failed. Fan speed = xx RPM.<br>Action: The system will shut down in 10 seconds to protect the CPU from damage. You should replace the CPU fan before turning the system back on.<br>Severity = Critical | envFanFail trap | P11 CPU fan failed | The CPU fan has failed! Better shut down. |
| Fan Error | **Fan Failure:**<br>Blower fan xx has failed. Fan speed = xx RPM.<br>Action: The fan must be replaced as soon as possible. If the temperature begins to rise, the situation could become critical. Severity = Error | envFanFail trap | P11 Fan xx failed | Blower fan xx has failed! |
| Power Supply Module Failure | **Power supply failure:**<br>The power supply unit xx has failed.<br>Action: The power supply unit must be replaced as soon as possible. Severity = Error | envPowerFail trap | P12 Power xx failed | Power supply unit xx has failed. |
| Power Supply Module Temperature | **Power supply temperature critical:**<br>The power supply unit xx is overheating.<br>Action: Replace the power supply to avoid any permanent damage. Severity = Critical | envPowerTemp Critical trap | P22 Power xx overheated | Power supply unit xx is overheating. |

**TABLE B-4** PEMS Error Messages

| Event | E-Mail Subject: Text | SNMP Trap | LCD Panel | Log |
|---|---|---|---|---|
| Temperature Error | **Temperature critical:**<br>Temperature in the system is critical. It is xxx Degrees Celsius.<br>Action: 1. Check for any fan failures, OR<br>2. Check for blockage of the ventilation, OR<br>3. Move the system to a cooler place.<br>Severity = Error | envTemperatue Error trap | P51 Temp error | The temperature is critical. |
| Primary Power Cord Failure | **Power cord failure:**<br>The primary power cord has failed or been disconnected.<br>Action: 1. Check the power cord connections at both ends, OR<br>2. Replace the power cord.<br>Severity = Error | envPrimary PowerFail trap | P31 Fail PWR cord 1 | The primary power cord has failed. |
| Secondary Power Cord Failure | **Power cord failure:**<br>The secondary power cord has failed or been disconnected.<br>Action: 1. Check the power cord connections at both ends, OR<br>2. Replace the power cord.<br>Severity = Error | envSecondary PowerFail trap | P32 Fail PWR cord 2 | The secondary power cord has failed. |

APPENDIX **C**

# Technical Support and Q&A

This appendix provides instructions for sending a diagnostic e-mail and contacting Sun Microsystems Technical Support team.

If you have problems with the physical components of the Sun StorEdge 5210 NAS, see the *Sun StorEdge 5210 NAS Hardware Installation, Configuration, and User Guide* on the documentation CD or *Setup Poster* included with your package.

## Sending a Diagnostic E-mail Message

The diagnostic e-mail feature allows you to send e-mail messages to the Sun Microsystems Technical Support team or any other desired recipient. Diagnostic e-mail messages include information about the Sun StorEdge 5210 NAS system configuration, disk subsystem, file system, network configuration, SMB shares, backup/restore processes, /etc. information, system log, environment data, and administrator information.

Every diagnostic e-mail message sent includes all of this information, regardless of the problem.

To set up diagnostic e-mail:

1. **In the toolbar at the top of the screen, select the button.**

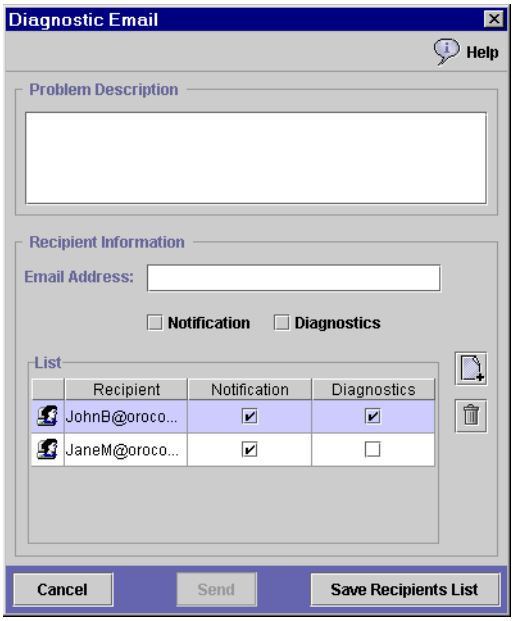


**FIGURE C-1** The Diagnostic Email Dialog Box

2. **Enter a description of the problem in the Problem Description field. This is a mandatory entry and is limited to 256 characters.**
3. **Enter at least one e-mail recipient by typing it in the E-mail Address field. To include Sun Microsystems Technical Support as a recipient, enter "support@sun.com".**
4. **Check the type of message you want to send: Notification, Diagnostic, or both.**
5. **Click the button to add the new recipient to the List of recipients. You can add a maximum of four e-mail addresses in the list.**

   To remove a recipient from the list, select the e-mail address and click the button.
6. **Click Send to send the message.**

# Contacting Technical Support

We hope the instructions provided in this user's guide are complete and clear enough to meet your needs. If you need further assistance, contact Sun Microsystems.

We take pride in providing highly responsive, world-class service to ensure the highest levels of on-going customer satisfaction with all of our products.

For technical problems requiring on-site service, Sun Microsystems provides professional, experienced field engineers, who work closely with our Technical Support Engineers for total solution support. For more information about purchasing an on-site service package for your system, contact your sales representative or reseller.

You can contact Sun Microsystems Technical Support Engineers in a variety of ways or obtain technical information (specifications, files, answers to frequently asked questions) by going to **http://www.sun.com/service/contacting/solution.html**.

# Glossary

**10Base-T** The IEEE 802.3 standard for Ethernet running over unshielded twisted pair wire.

**100Base-TX** The IEEE 802.3 standard for Ethernet running over the same wiring (Category 3, 4, or 5 UTP or STP), but ten times faster than its ancestor, 10BASE-T.

**Access Control** Limits user access to resources on a computer network, most commonly by requiring a user name and password. Usually a single logon is sufficient to *authenticate*, or *verify*, a user.

**Access Rights** Permissions granted to user accounts to allow access to such system resources as file systems, applications, and directories. For example, *read-only* access allows a user to open or list a file without being able to make changes to the file. Users who are granted access rights to a directory usually have the same access rights to all subdirectories.

**Action Button** An action button is a type of interface control that allows you to take an action. When you click the button, the action occurs.

**Address** See also *IP address*. An address is also known as location or URL in the Internet world.

**Admin** Refers to administrative access to the command interpreter and menus. Admin access gives complete control over server operation and configuration.

**ADS** Short for Active Directory Service. ADS is a Windows 2000 namespace that is integrated with the Domain Name System (DNS). ADS stores domain information such as users, groups, and shared resources and makes that information available to Active Directory clients.

**Alias IP Address** Multiple IP addresses assigned to a single port, in addition to the primary IP address. All IP aliases for a port must be on the same physical network and share the same netmask and broadcast address as the first or primary IP address. See "About Alias IP Addresses" on page 58.

**Alternate Gateway** A network server configured to function as a gateway if the primary gateway server is unavailable.

**Autohome Shares** Temporary SMB/CIFS shares that are created when a user logs on to the system and removed when the user logs off. See "About Autohome Shares" on page 105.

**Authentication** The process of validating that the user attempting to logon is truly the owner of the account.

**BIOS** Stands for basic input/output system. Built-in software that determines what a computer can do without accessing programs from disk.

**Boot Up** The process of starting a computer. Booting up involves checking all hardware components, initializing system components, and loading the operating system.

**Broadcast Address** The IP address used to send broadcast messages to the subnet. A broadcast message is sent to all nodes on the network.

**Browser** Software used for access to information on the World Wide Web. Microsoft Internet Explorer and Netscape Navigator are examples of browsers. See also *Web Browser*.

**CIFS** Stands for Common Internet File System. An enhanced version of the SMB file-sharing protocol that allows groups of users to work together and share documents over the Internet in the same way as in local area networks. The major features of CIFS include:

- The same multi-user read and write operations, locking, file sharing syntax, and SMB.
- Use of TCP/IP and DNS (Domain Name System).
- Support of multiple client access and updates of the same file without conflicts.
- Fault tolerant operation that reopens connections and reopens files that were open prior to interruption.
- Security features that support both anonymous transfers and secure authenticated access to named files.

File and directory security policies are easy to administer and use the same share-level and user-level security policies that are used in Windows.

**Configuration** (1) The manner in which the software and hardware of an information processing system are organized and interconnected. (2) The physical and logical arrangement of programs and devices that make up a data processing system. (3) The devices and programs that make up a system, subsystem, or network.

**Content Panel** One of the areas of the Web Administrator screen. The content panel displays settings, log information, and settings for the feature selected from the navigation panel.

**DACL** Stands for discretionary access control list. It is used to control access by restricting a user's access to a file. In this type of access control it is the owner of the file who controls other users' accesses to the file.

**DHCP** Stands for Dynamic Host Control Protocol. DHCP provides a mechanism by which a computer can acquire an IP address automatically when it connects to the network. DHCP allows more flexible and efficient use of network resources than static IP addresses.

**DN** Stands for distinguished name. A distinguished name uniquely identifies an entry in the directory. A DN is made up of relative distinguished names (RDNs) of the entry and each of the entry's parent entries, up to the root of the directory tree. RDNs are usually separated by commas and optional spaces. For example: 'uid=JohnDoe, ou=People, dc=company, dc=com'.

**DNS** Short for Domain Name System. A network service that translates domain names into IP addresses. If you have multiple DNS servers on your network, and one DNS server can't translate a domain name, it asks another one, and so on, until the IP address is found. *See also* Domain Name System.

**Domain** A group of computers and devices on a network that are administered as a unit with common rules and procedures.

**Domain Name** A name that identifies a domain. See also *Domain*. The domain name can be the company name, division name, facility name, department name, or other descriptive name.

**Domain Name System** The network server that maintains the list of all host names in a domain. Sun StorEdge 5210 NAS uses the name server to translate domain names to the corresponding IP address. *See also* DNS.

**DTQ** Stands for Directory Tree Quota. A directory tree quota is a quota, or limit, to the space or the number of files that a directory tree (a directory and its subdirectories) can occupy.

**Ethernet** A network communication system developed and standardized by DEC, Intel, and Xerox using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber optics, broadband, and unshielded twisted pair.

**Failback** The recovery process from a failover state. If one head, controller, or network link fails, failover automatically transfers all functions of the failed unit to the working unit. Once the failed unit is repaired and is online, failback returns all RAID volume ownership and network interfacing functions to their pre-failover configuration. *See also* Failover.

**Failover** A feature that allows system-wide data redundancy in the event of a head, controller, or link failure. **Head failover** occurs when one head suffers a hardware failure that renders a data path unavailable. The working head automatically takes ownership of all operations of the failed head, including RAID volume ownership and network interface addressing. **Controller failover** allows a working RAID controller to take ownership of RAID volumes

formerly managed by the failed controller. **Link failover** ensures that an alternate network link becomes active when an primary link fails. *See also* Failback.

**File Sharing** A feature that allows users of networked computers to make files available to other users.

**File Volume** File systems created from partitions that have available space. If the file volume does not use up all the available space in a partition, the remaining space is automatically allocated into the next partition. *See also* Partition.

**File Volume Extension** *See* Segment.

**Gateway** A combination of hardware and software that links two different types of networks. For example, the interconnection of an Ethernet network and a Token Ring network requires a gateway.

**Gateway Address** The gateway address is the IP address of one of the gateways or routers attached to the local network. Specifically, it is the IP address of a network server or host that functions as a gateway to other networks through communication lines or other network topologies.

**Gigabit Ethernet** An Ethernet standard that enables data transfer rates of up to 1 Gbps running over optical fiber cable.

**Group Membership** The list of groups to which a user belongs.

**GUI** Stands for Graphical User Interface. A GUI uses graphical elements to present information to a computer user rather than the traditional text-only command line interface still found in telnet and similar implementations.

**Head** In Sun StorEdge 5210 NAS a head is the server portion of the Sun StorEdge 5210 NAS system. A Sun StorEdge 5210 NAS consists of one or two heads and one or more RAID or drive units. The head controls the RAID or drive units and acts as a thin file server. See also *RAID* and *Thin File Server*.

**Hot Spare** A drive present in the system, but unused until another drive fails. At that time, the hot spare automatically takes over for the failed drive.

**HTTP** Stands for Hypertext Transmission Protocol. A protocol for exchanging HTML pages and forms.

**Hub** A physical layer device that restores the amplitude and timing of a signal. Also known as a concentrator.

**HTML** Stands for Hypertext Markup Language. HTML is a markup language used for creating Web pages. Markups, or commands, are embedded in a document and interpreted by a browser to format the document contents on the computer screen.

**Hyperlink** Also link. A reference from some point in one hypertext document to another document or another place in the same document. Links enable users to jump quickly to points of reference. Browsers display links in some distinguishable way—in different form, color, or style, for example. When a user activates a link, the browser displays the target on the link.

**Internet** The world's largest computer network.

**Intranet** A network internal to an organization, accessed through a browser but not necessarily connected to the Internet. The most common example is an information distribution network set up on Web servers within a company and providing only internal company access to the Web-based information.

**IP Address** A unique 32-bit value that identifies network hosts using TCP/IP. An IP address, or a block of addresses, is assigned upon application to organizations responsible for that function. No two network hosts can be assigned the same IP address. Each address consists of a network number, optional subnetwork number, and host number, written as four numbers separated by periods. Each number can be 0 to 255. See also *Address* and *URL*.

**Java programming language** Java is a programming language developed by Sun Microsystems to be portable to any type of computing device. In practice, java allows web browsers to do much more than display information. Java scripts allow much more flexibility and functionality in web access and they run on virtually any type of computer.

**Kerberos Realm** A kerberos realm is a secured network requiring access through a key. (See also *KDC*.) Each system or user with a key can access any services or systems that the key opens. The user does not have to enter a user name and password each time he requests a controlled service.

**KDC** Stands for Key Distribution Center. The KDC acts as the server and offers authentication to users, systems, and services (such as telnet, ftp, login, and e-mail) within its "realm". See also *Kerberos Realm*.

**LAN** Stands for Local Area Network. A communications network that provides high-speed (over 1 Mbps) data transmission and is limited to a specific physical area (up to about six miles). The basic components of a LAN are: adapter boards installed in each computer to provide a cable connector, cabling, server hardware, and network management software.

**LCD** Stands for Liquid Crystal Display. An LCD is a display device used primarily for displaying small amounts of textual information. On the Sun StorEdge 5210 NAS, the LCD is a two line display that shows basic information about system functions and, in conjunction with the control panel, allows you to perform certain system functions, like setting the IP address, directly on the unit, without access through the internet or intranet.

**LDAP** Stands for Lightweight Directory Access Protocol and is a directory service protocol that runs over TCP/IP.

**Login** Logging in is a security process designed to prevent access to system settings or other resources by those who should not have access. A login process usually requires a user name and password to verify, or authenticate, a user.

**LUN** Refers to Logical Unit Number for SCSI interface components and peripherals. Used to identify the logical representation of a physical or virtual device, addressable through a target. A logical unit can have more than one physical device. *See also* SCSI.

**Master Domain Model** One of several types of domain models. In the Master Domain Model, an account domain is trusted by a resource domain.

**NAS** Stands for Network Attached Storage.

**Name Service Lookup Order** The sequence in which the available name services are searched to resolve a query. These name services can include NIS, NIS+, DNS, and Local.

**Navigation Panel** The navigation panel is the region of the Web Administrator window that allows you to access the different functions of Web Administrator. The navigation panel is on the left side of the Web Administrator window. See also *Content Panel*.

**NDMP** Stands for Network Data Management Protocol.

**NetBIOS** NetBIOS is a BIOS used for networking. NetBIOS was designed to support communications between symbolically named stations and the transfer of arbitrary data. NetBIOS manages the use of node names and transport layer connections for higher layer protocols such as SMB.

**Netmask** Used to indicate which portion of an IP address identifies the network address and which portion identifies the host address.

**Network** A series of nodes such as terminals, computer systems, or other peripheral devices connected by a communications channel. *See also* LAN.

**Network Address** An IP address assigned to a network that permits access by other networks. Refers to a logical, rather than a physical, network device.

**Network Class** There are three network classes, identified as Type A, Type B, or Type C. The class type is determined by the number of network hosts in the network. Small networks are Type C and the largest networks are Type A. Type A networks can contain thousands of network hosts.

**Network Host** A network server or workstation.

**NIC** Stands for Network Interface Card. A NIC is an expansion card that provides access to a network.

**NIS** Short for Network Information Service. Along with NFS, NIS provides a distributed database system to centralize (i.e, store one copy, on a single computer) common configuration files, such as the password file (/etc/passwd) and the hosts file (/etc/hosts).

**NIS+** Short for Network Information Service Plus (NIS+). NIS+ was designed to replace NIS, and is the new default naming service for the Solaris OS. NIS+ can provide limited support to NIS clients, but was mainly designed to address problems that NIS cannot address.

**Node** A device connected to the network and capable of communicating with other network devices.

**NTP** Stands for Network Time Protocol. NTP provides a mechanism for synchronizing the time among a number of computers connected to a network.

**Option Button** An option button is a screen control that allows you to select one option out of a predefined group of mutually exclusive options. Option buttons are also called *Radio Buttons*.

**Packet** A piece of a message transmitted over a network. Contains the destination address in addition to the data. Once all packets arrive at the destination, they are recompiled into the original message.

**Partition** Sections on a LUN. Each partition can either have some space allocated to it, or can be empty. When a LUN is first created, all of the available space is located in the first partition, while the other partitions are empty. Each partition can have only one volume.

**Port Bonding** Otherwise known as "channel bonding." Port bonding allows you to scale network I/O by joining ports. This forms a single network channel of high bandwidth from two or more channels of lower bandwidth.

**Protocol** A set of standards or rules that enable computers to connect to one another and exchange data. Using a protocol helps reduce the possibility of errors during data transmission.

**Quota** A restriction on disk space or the number of files written to file volumes in the Sun StorEdge 5210 NAS. This limit can be determined for a user or group (user or group quota) or for a directory (directory tree quota).

**Radio Button** A radio button is a type of screen control that allows you to select one choice from a predefined group of mutually exclusive choices. See also *Option Button*.

**RAID** Stands for Redundant Array of Independent Disks.

**RDATE** RDATE is a time synchronization method that simply asks another computer on the network what the correct time is and resets itself accordingly. RDATE is not particularly accurate, but is adequate for most networks.

**Realm** See also *Kerberos Realm*. A realm is a secured portion of a network that uses the kerberos method for verifying users and access rights.

**RPC** Stands for remote procedure call. An easy and popular paradigm for implementing the client-server model of distributed computing. A request is sent to a remote system to execute a designated procedure, using arguments supplied, and the result is returned to the caller.

**Scope** Scope is a method used in Windows NT environments for subdividing workgroups into more manageable sections, without breaking up the ability of the workgroup to exchange information readily.

**SCSI** SCSI stands for Small Computer System Interface. SCSI is a standard interface for computers that allows connection of up to fifteen peripheral devices (such as disk drives or a tape backup device) to be interconnected in a daisy-chain configuration. The basic SCSI standard is twenty-five years old. However, it has been updated and expanded many times. The original 5 Mbps data transfer rate has been expanded to 320 Mbps and many features have been added. See also LUN.

**SCSI ID** Priority number (address) of a SCSI device in a SCSI device chain. Only one device at a time can transmit through a SCSI channel and priority is given to the device with the highest address. SCSI IDs range from 0 to 15 and each SCSI device must be given a unique and unused SCSI ID.

**Segment** Segments are available space that can be "attached" to a volume when the volume reaches its assigned capacity. This increases the volume's total capacity. The segment, after being attached, becomes part of the volume and cannot be removed. Otherwise known as volume extensions.

**Server** A network host that makes network resources, such as software applications and databases on hard disk or CD-ROM, available to network users. The server provides the centralized, multi-user functionality of the network application, such as data management, information sharing, network administration, or security.

**Server Name** Identifies a network server. Server names are used in addition to IP addresses. This allows a server to be advertised on a network with a recognizable name. For example, the first Sun StorEdge 5210 NAS server on a network could be identified as cdts0, the second as cdts1, and the third as cdts2 or they could be identified as Fred, Barney, and Wilma.

**SFS** Stands for Server File System.

**Shutdown** The multi-user operating system resident on the Sun StorEdge 5210 NAS server must be shut down in an orderly sequence prior to turning the power off. The shutdown sequence closes files and terminates running programs to prevent loss or corruption of data.

**Single Domain Model** Refers to a domain model in which the resource and account domains are on the same network with no trust relationship.

**SMB** Stands for Server Message Block. A Microsoft-compatible network protocol for exchanging files. SMB is typically used by Windows for Workgroups, OS/2 Warp Connect, and DEC Pathworks. *See also* CIFS.

**SNMP** Stands for Simple Network Management Protocol. SNMP is primarily used for network monitoring and notification of network errors and other events. In the Sun StorEdge 5210 NAS, SNMP also provides notification services through e-mail messages.

**Subnet** A portion of a network that shares a common address component. On TCP/IP networks, subnets are defined as all devices whose IP addresses have the same prefix. Dividing a network into subnets is useful for both security and performance reasons.

**System Events Panel** The system events panel is the bottom portion of the Web Administrator window. This panel displays information about system events at all times.

**TCP/IP** A commonly used networking protocol that allows interconnection of different network operating systems. Stands for Transmission Control Protocol/Internet Protocol.

**Telnet** A terminal emulation program for TCP/IP networks. The Telnet program runs on your computer and connects your PC to the Sun StorEdge 5210 NAS server on the network. You can then enter commands through the Telnet program and they run as if you were entering them directly on the server console.

**Thin File Server** A server designed for the specific function of serving files but not applications.

**Toolbar** The toolbar is the portion of the Web Administrator window directly beneath the title bar. It contains icons that access several common tools. For more information, see "The Toolbar" on page 9.

**UNC** Stands for Universal Naming Convention. The UNC refers to the standard method of defining the location of shares on a computer and consists of a computer name and share name. For example, \\acctng1\jeremy.

**Unicode** Unicode is a standard for representing letters that allows the language of computer messages and commands to be displayed in a variety of languages without rewriting the underlying programs.

**URL** Stands for Uniform Resource Locator. An address system used by servers and clients to request documents. See also *IP Address*.

**User Credentials** The information containing the user, account data, and the user's group membership.

**VLAN** Stands for Virtual Local Area Network. A VLAN acts like an ordinary LAN, but connected devices don't have to be physically connected to the same segment.

**WAN** Stands for Wide Area Network. A large (geographically disperse) network.

**Web Browser** A web browser is a software application designed to search for and retrieve information from the Internet and the world-wide web. See also *Internet*, *Intranet*, and *WWW*.

**WINS** Stands for Windows Internet Naming Service. A WINS server resolves NetBIOS names to IP addresses, allowing computers on a network to locate other NetBIOS devices more quickly and efficiently. WINS performs a similar function for Windows environments as DNS does for UNIX environments.

**Workgroup** A portion of a network identified by a workgroup name that is used to organize network hosts by function, department, or other designation. For example, workgroups can be created for departments such as accounting, shipping, and marketing.

**Workstation** A computer on a network intended for user access to network resources.

**WWW** Stands for World Wide Web. An Internet, client-server, hypertext-distributed information retrieval system.

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