Sun StorageTek™ 5220 NAS Appliance Getting Started Guide

Sun Microsystems, Inc.
www.sun.com

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Preface

The *Sun StorageTek 5220 NAS Appliance Getting Started Guide* is a combined installation, configuration, and getting started guide for the Sun StorageTek™ 5220 NAS Appliance. This guide describes how to install the appliance and its back-end storage, how to connect the appliance and storage, and how to configure the system.

Product Documentation

In addition to this guide, the product includes the following documents. The documents listed as online are available at http://www.sun.com/hwdocs/Network_Storage_Solutions/nas

TABLE P-1 Product Documentation

Subject	Title	Part Number	Format	Location
Regulatory and safety information for the appliance	*Sun StorageTek 5220 NAS Appliance Regulatory and Safety Compliance Manual*	819-7366-10	PDF	Online
Regulatory and safety information for the back-end storage	*Sun StorageTek 5220 NAS Array Regulatory and Safety Compliance Manual*	819-7367-10	PDF	Online
Installation poster	*Sun StorageTek 5220 NAS Appliance Setup*	819-7166-10	Print PDF	Ship kit Online
Recent information not included in the other documents	*Sun StorageTek NAS OS Software Release Notes, Release 4.20*	819-6652-nn	PDF, HTML	Online

Related Documentation

The product relies on information found in the following documents. The documents listed as online are available at http://www.sun.com/hwdocs/Network_Storage_Solutions/nas

TABLE P-2 Related Documentation

Subject	Title	Part Number	Format	Location
Printed version of online Help	*Sun StorageTek NAS OS Administration Guide*	819-4284-10	PDF	Online
Installation and configuration procedures	*Sun Rack Installation Guide*	816-6386-10	Print	Ship kit

Documentation, Support, and Training

Sun Function	URL
Documentation	http://www.sun.com/documentation/
Support	http://www.sun.com/support/
Training	http://www.sun.com/training/

Third-Party Web Sites

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Please include the title and part number of your document with your feedback:

Sun StorageTek 5220 NAS Appliance Getting Started Guide, part number 819-7167-10.

CHAPTER 1

System Overview

This chapter describes the components and terminology of the Sun StorageTek 5220 NAS Appliance. It includes the following sections:

System Features

The Sun StorageTek 5220 NAS Appliance is the Sun Microsystems modular, scalable, network-attached storage (NAS) solution. Its configuration uses a single appliance, with controller unit and optional expansion units available for back-end storage. TABLE 1-1 lists the features of the product and their descriptions.

TABLE 1-1 Features of the Sun StorageTek 5220 NAS Appliance

Feature	Description
File Access Protocols	• Microsoft networks (CIFS /SM B) • UNIX® (NFS V2 and V3) • File Transfer Protocol (FTP)
Block Access Protocol	iSCSI
Network Security and Protocol Integration	• Network Logon (Netlogon) client • Microsoft Windows Domain support • Multiple Master Domain (MMD) support • CIFS Security Descriptors (SD) on files and directories • Discretionary Access Control Lists (DACL) on files and directories • NIS • NIS+ • Unicode • Microsoft Windows Active Directory Service (ADS) support • Microsoft Windows Dynamic DNS support • Microsoft Windows-compatible Kerberos (v5) security • Microsoft Windows-compatible Lightweight Directory Access Protocol (LDAP) • LDAP authentication for NFS • Network Time Protocol (NTP) • Rdate command • `syslogd` Remote Logging • Simple Network Management Protocol (SNMP)
Supported Clients	A client is any computer on the network that requests file services from the Sun StorageTek 5220 NAS Appliance. In general, Sun StorageTek 5220 NAS Appliance supports any client implementation that follows the NFS version 2 or 3 protocol or the CIFS specifications.
Network Connection	• Autosensing 10/100/1000BASE-TX RJ-45 network connectors • Optional dual-port optical Gigabit Ethernet network interface cards (NIC) • Optional dual-port copper 10/100/1000 Ethernet NIC cards
IP Address Automatic Assignment	Supports Dynamic Host Configuration Protocol (DHCP) and Address Resolution Protocol (ARP) for automatic assignment of IP address
RAID Controllers	Controller unit contains one controller configured for Serial ATA (SATA) disk drives

TABLE 1-1 Features of the Sun StorageTek 5220 NAS Appliance *(Continued)*

Feature	Description
Data Management	• Sun StorageTek File Checkpoint facility enables users to recover accidentally damaged or deleted data with a simple file copy operation • Directory tree quotas • User and group quotas
Setup and Configuration	• Web-based user interface for system configuration and administration • A command-line and console menu interface. See the *Sun StorageTek NAS OS Administration Guide*
Client Data Backup	• Network Data Management Protocol (NDMP), V2 and V3 • Enterprise Backup Software, version 7.2 minimum • Veritas NetBackup 5.*x* minimum • Compatible with BakBone NetVault 7 minimum, supported by BakBone

Hardware Overview

The following sections describe the system components of the Sun StorageTek 5220 NAS Appliance with back-end storage.

Sun StorageTek 5220 NAS Appliance

The Sun StorageTek 5220 NAS Appliance is the basic unit. FIGURE 1-1 shows the front of the appliance. You need the software serial number for any calls for service and for adding licenses and you need the hardware serial number if you decide to expand the system.

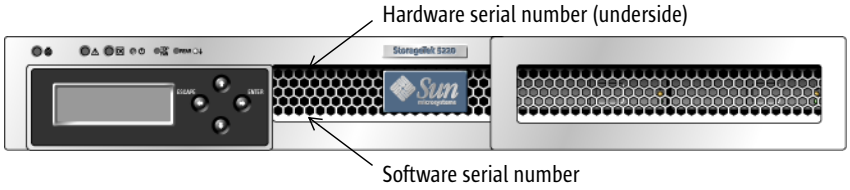

FIGURE 1-1 Sun StorageTek 5220 NAS Appliance, Front

FIGURE 1-2 shows the back of the appliance. The appliance contains a dual-port fibre channel (F C) host bus adapter (HBA) card in PCI slot 1. The other slot, PCI slot 0, can be empty or contain one of the optional cards, listed in "Appliance Options" on page 4.

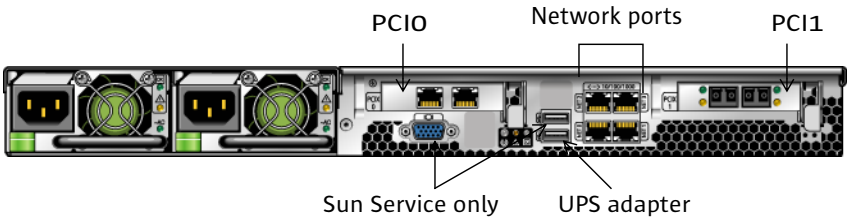

FIGURE 1-2 Sun StorageTek 5220 NAS Appliance With Single HBA Card, Back

Appliance Options

One of the ports on the HBA card in PCI slot 1, HBA Port 2, can be used for connecting to tape backup. Its other port, HBA Port 1, is dedicated to connecting to the controller unit, as shown in FIGURE 3-1.

PCI slot 0 can contain the following options:

- A dual-port copper 10/100/1000 Gigabit Ethernet card
- A dual-port optical Gigabit Ethernet card
- A FC HBA card for tape backup
- A SCSI HBA card for tape backup

An uninterrupted power supply device (UPS), using the USB-to-Serial Port Adapter/Convert Cable included in the ship kit. If a power outage occurs, the UPS maintains the operation of the system. If the battery in the UPS loses power, the UPS performs a graceful shutdown of the system. Connecting the UPS adapter cable to a supported local UPS device enables the appliance to monitor the state of the UPS.

Back-End Storage

The RAID controller unit provides direct-attached back-end storage for the Sun StorageTek 5220 NAS Appliance. At a minimum, the system has an appliance and one controller unit containing SATA disk drives.

FIGURE 1-3 shows the front of the controllers unit.

FIGURE 1-3 RAID Controller Unit, Front

FIGURE 1-4 shows the back of the controller unit.

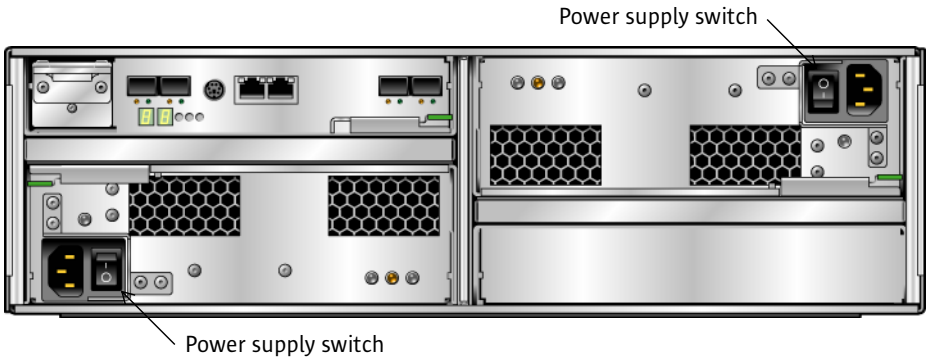

FIGURE 1-4 RAID Controller Unit, Back

In addition to the appliance and controller unit, you can set up additional back-end storage by connecting one or two expansion units to the controller unit. Each expansion unit must contain only SATA disk drives. FIGURE 1-5 shows the front of the expansion unit.

FIGURE 1-5 Expansion Unit, Front

FIGURE 1-6 shows the back of the expansion unit.

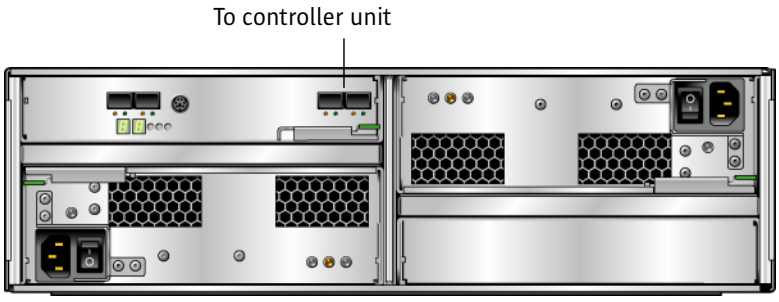

FIGURE 1-6 Expansion Unit, Back

Software Overview

The appliance and its back-end storage are configured and managed through the following software components, described in the following sections:

- "Web Administrator" on page 7
- "Administrator Console" on page 7
- "Licensed Software Options" on page 8

Web Administrator

The Sun StorageTek 5220 NAS Appliance ships with the Web Administrator software installed. Other than a standard web browser, you do not need to install any software to manage your system.

The Web Administrator graphical user interface (GUI) lets you configure system parameters through a series of menus and screen panels. These settings are discussed in the *Sun StorageTek NAS OS Administration Guide*

To access the Web Administrator, your system must be running Microsoft Windows 98/NT/2000/XP/2003, Sun Solaris™ Operating System (Solaris OS) 5.7 (minimum version), or Red Hat Linux software.

Microsoft Windows users require one of these browsers:

- Internet Explorer 5.5 (minimum version) on systems using Microsoft Windows 98/NT/2000/XP/2003
- Netscape™ software 4.77 (minimum version) on systems using Microsoft Windows 98/NT/2000/XP/2003 and Solaris OS. *Netscape 6.0 and 6.01 are not supported.*

Solaris OS and Red Hat Linux users require one of the following browsers:

- Netscape™ software 4.77 (minimum version) on systems using Microsoft Windows 98/NT/2000/XP/2003 and Solaris OS. *Netscape 6.0 and 6.01 are not supported.*
- Mozilla™ browser.
- Java™ platform-enabled browser with Java Plug-in 1.4 (minimum version).

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

Administrator Console

An alternative to the Web Administrator is the administrator console. You can use a number of protocols such as Telnet, SSH, or RLogin to connect to the administrator console as long as the application you use has an ANSI-compatible terminal emulator. The administrator console is described in Appendix A in the *Sun StorageTek NAS OS Administration Guide*.

Licensed Software Options

You can purchase additional software for the system:

- Sun StorageTek File Replicator duplicates data from one volume onto a mirrored volume on a different Sun StorageTek 5220 NAS Appliance or Sun StorageTek 5320 NAS Appliance.
- Sun StorageTek Compliance Archiving Software enable volumes to follow advisory or mandatory enforcement of compliance archiving guidelines for data retention and protection.

The options and how to activate them are described in Chapter 9 in the *Sun StorageTek NAS OS Administration Guide*.

CHAPTER 2

Installing the Appliance and Back-End Storage

This chapter describes the process of installing the Sun StorageTek 5220 NAS Appliance, a controller unit, and expansion units. It contains the following sections:

The installation procedures in this chapter require the following items:

- No. 2 Phillips screwdriver
- No. 3 Phillips screwdriver
- Antistatic protection

Caution – Electrostatic discharge can damage sensitive components. Touching the array or its components without using a proper ground might damage the equipment. To avoid damage, use proper antistatic protection before handling any components.

Cabinets, Racks, and Rail Kits

The Sun StorageTek 5220 NAS Appliance can be installed in the Sun™ Rack 900, the Sun™ Rack 1000, or third-party racks that comply with the requirements. Although the system is installed in a single cabinet or rack, the appliance and the back-end storage units require different rails to support them.

Note – A cabinet is a rack with a door and the two terms are used interchangeably.

Requirements for Racks and Cabinets

Requirements to support installation of the storage system:

- The rack's horizontal opening and unit vertical pitch must conform to ANSI/EIA 310-D-1992 or IEC 60927.
- Rack must have four-post structure to allow mounting at both front and back.
- Distance between front and back mounting planes must be between 61 cm and 92 cm (24 to 36 inches).
- Clearance depth at front (distance between front cabinet door and front mounting plane) must be at least 2.6 cm (1 inch).
- Clearance depth at back (distance between front mounting plane to the back cabinet door) must be at least 80 cm (31.5 inches).
- Clearance width (distance between the left and right structural supports, cable troughs, and so on within the front and back mounting planes) must be at least 46 cm (18 inches).

Rack density varies widely based on systems installed, power distribution installation (in-cabinet, external), power source (single-phase, three-phase), and whether redundant power is required. Some rack vendors do not support a fully-loaded rack because of the amount of power required. For power specifications, refer to Appendix A.

Requirements for Rail Kit

Note – Not all third-party racks are compatible with these slide rail kits.

Slide Rail Kit for the Appliance

The Sun StorageTek 5220 NAS Appliance is supported with the slide rail kit (370-7669-02) and cable management arm (370-7668-02). The slide rail kit contains four-point mounted slide rails and is designed to enable the Sun StorageTek 5220 NAS Appliance to be installed in the Sun Rack™ 900, the Sun Rack 1000, and other ANSI/EIA 310-D-1992 or IEC 60927 compliant racks. No other kits are available to allow two-point, front-mount, or mid-mount installation.

The slide kit includes hardware that enables mounting to any of the following types of rails:

- 6-mm threaded holes
- No. 10-32 threaded holes
- No. 10 clearance holes
- Square unthreaded holes compliant with EIA and IEC standards

Universal Rail Kit for Back-End Storage

Use the universal rail kit to mount the controller and expansion units in any standard Sun cabinet, such as the Sun Rack 900/1000 cabinet.

Preparing for the Installation

Use the following procedures to prepare for installation:

- "Preparing the Cabinet" on page 12
- "Proper Grounding Technique" on page 13
- "Checking the Slide Rail Kit" on page 14
- "Checking the Universal Rail Kit" on page 14
- "Checking the Controller and Expansion Units" on page 15
- "Checking the Appliance" on page 15
- "Preparing the Cabinet" on page 12

Preparing the Cabinet

Note – The rack must have an AC power disconnect. This power source disconnect must be easily accessible, and it must be labeled as controlling power to the entire rack, not only to the appliance

Be sure the location of the cabinet or rack complies with the following requirements and that it has been installed as described in its installation instructions:

- Check that the rack or cabinet has unrestricted air flow for the cooling fans.
- Check that the maximum ambient operating temperature in the rack does not exceed 95˚F (35˚C).
- Make sure that the rack will not tip over, even when the controller and expansion units are fully extended from the rack.
- Make sure the rack has two power sources connected to two separate power circuits.
- Make sure the power outlets are close enough to the units for the power cords to reach the cabinet properly.
- Make sure the power cables are grounded.

Before you begin mounting the rail kits, do the following:

1. **Stabilize the cabinet as described in the cabinet documentation.**
2. **If the cabinet has casters, make sure the casters are locked to prevent the cabinet from rolling.**
3. **Remove or open the front panel.**
4. **Remove or open the vented back panel.**

Note – Sun Microsystems makes no warranties or guarantees as to fit, form, or function of the Sun StorageTek 5220 NAS Appliance system installed in third-party racks or cabinets. It is the customer's responsibility to ensure that the rack or cabinet can house the Sun StorageTek 5220 NAS Appliance system in all conditions that might exist. All racks and cabinets must comply with local building and construction codes.

Proper Grounding Technique

You must maintain reliable grounding of this equipment. Review specifications in Appendix A to determine the appropriate AC branch circuit size for the quantity of units in your configuration and your operating voltage. Always follow your local electrical codes for loading circuits.

Caution – The controller unit and expansion units contain several components sensitive to static-electrical discharge. Surges of static electricity (caused by shuffling your feet across a floor and touching a metallic surface, for example) can cause damage to electrical components. It is important that proper grounding techniques be observed.

- Transport products in static-safe containers.
- Cover workstations with approved static-dissipating material.
- Wear a wrist strap, and always be grounded when touching static-sensitive equipment or parts.
- Use only grounded tools and equipment.
- Avoid touching pins, leads, or circuitry.

Avoiding Damage to Internal Components

- For the controller unit and expansion units, make sure that the power switch is turned off and that both power cables are plugged in.
- Wear a wrist strap, and always be grounded when touching static-sensitive equipment or parts. If a wrist strap is not available, touch any unpainted metal surface on the back panel of any unit to dissipate static electricity. Repeat this procedure several times during installation.
- Avoid touching exposed circuitry, and handle components by their edges only.

Caution – Do not power on any units until after you have connected the Sun StorageTek 5220 NAS Appliance to the network.

Grounding the Rack During Installation

The safe ground conductor provides proper grounding only for the Sun StorageTek 5220 NAS Appliance. You must provide additional proper grounding for the rack and other devices installed in it.

- Include a third-wire safety ground conductor with the rack installation to avoid the potential for an electrical shock hazard.

- Use a minimum 14 A WG connected to the earth ground stud on the back of the appliance.
- Connect the safety ground conductor to the chassis stud with a two-hole crimp terminal with a maximum width of 0.25 inch.
- Install the nuts on the chassis with a 10 in/lb torque.

Review specifications in Appendix A to determine isolation and continuous power requirements.

Checking the Slide Rail Kit

When you unpack the shipping box, verify that you have all of the parts:

- Two slide rail assemblies, one for installing on the right side of the rack and one for the left. Each slide rail assembly has two parts:
  - Slide rail that attaches to the rack posts
  - Mounting brackets that attach to the appliance chassis
- Package of screws and nuts in assorted sizes to fit various types of racks and cabinets
- Cable management arm with six preinstalled cable clips
- Manufacturer's instruction sheet for the cable management arm

Checking the Universal Rail Kit

When you unpack the shipping box, verify that you have all the parts:

- Two cabinet rail adapter plates (used for unthreaded cabinet rails only)
- Mounting hardware as listed below:

Type	Quantity	Use
10-32 panhead screw	8	Assemble main and extender sections of left and right rails (Typically, left and right rails are shipped pre-assembled)
10-32 panhead screw	4	Mount left and right rails to front of cabinet rails
Metric M6 panhead screw	4	Mount left and right rails to back of cabinet rails
Metric M6 panhead screw	4	Secure front of tray to left and right cabinet rails
6-32 flathead screw	2	Secure back of tray to left and right side rails

Checking the Appliance

When you unpack the shipping box, verify that you have all of the parts:

- Sun StorageTek 5220 NAS Appliance
- Ship kit for the appliance, containing documentation and cables

Make sure you have the two power cords for your location, shipped separately.

Checking the Controller and Expansion Units

Caution – Two people are needed to lift and move the controller unit and expansion units. Use care to avoid injury. A unit can weigh up to 95 pounds (43 kg). Do not lift by the front of the unit; this can cause damage to the drives.

When you unpack the shipping box, verify that you have all of the parts.

For the controller unit:

- Sun StorageTek 5220 RAID Controller Unit
- Setup poster

For the expansion unit:

- Sun StorageTek 5220 Expansion Unit
- One 2-meter optical Fibre Channel (FC) LC-to-LC cable to connect the expansion unit to the controller unit or to a second expansion unit
- Two SF P FC transceiver modules
- *Accessing Documentation* guide

The power cords are shipped separately.

Planning the Installation

At a minimum, the system has an appliance and the controller unit. Your system can have one or two expansion units, installed now or at a later date. Plan the placement of the rails carefully because they are spaced differently, depending on whether you are installing a unit or an appliance.

In general, the installation is accomplished in the following order:

1. **Install the universal slide rail kit for the controller unit, starting at the bottom of the rack.**
2. **Install the universal slide rail kit for each expansion unit, starting above the controller unit.**
3. **Mount the controller unit at the bottom of the cabinet.**
4. **Mount each expansion unit, from the bottom up.**
5. **Install the slide rails for the appliance.**
6. **Install the cable management kit.**
7. **Mount the appliance.**
8. **Install the power cords.**

Caution – The controller and expansion units must be installed in the cabinet starting from the bottom up to distribute the weight correctly in the cabinet. The appliance is installed last. Uneven loading of the rack can cause dangerous instability.

Note – Some procedures require two people to complete.

FIGURE 2-1 shows the cabinet with a controller unit, an expansion unit, an additional expansion unit, and an appliance.

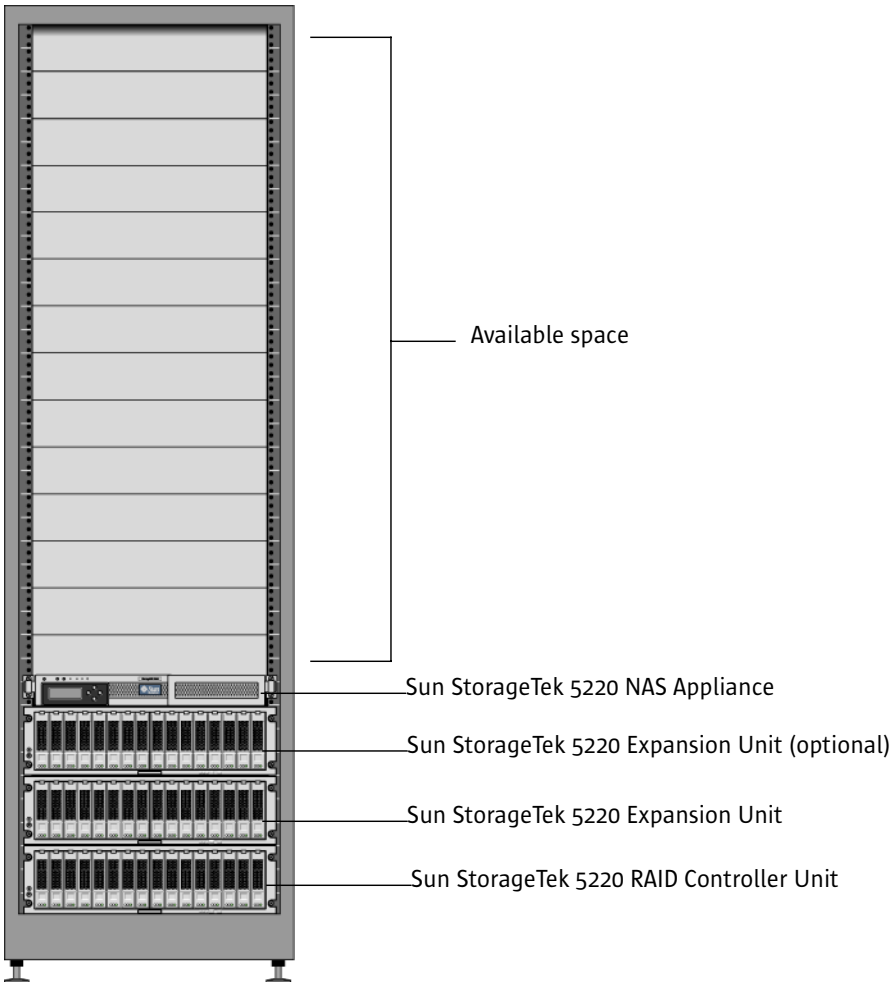

FIGURE 2-1 Appliance, Controller Unit, and Expansion Units in a Rack

FIGURE 2-2 shows a cabinet with two complete but separate storage systems.

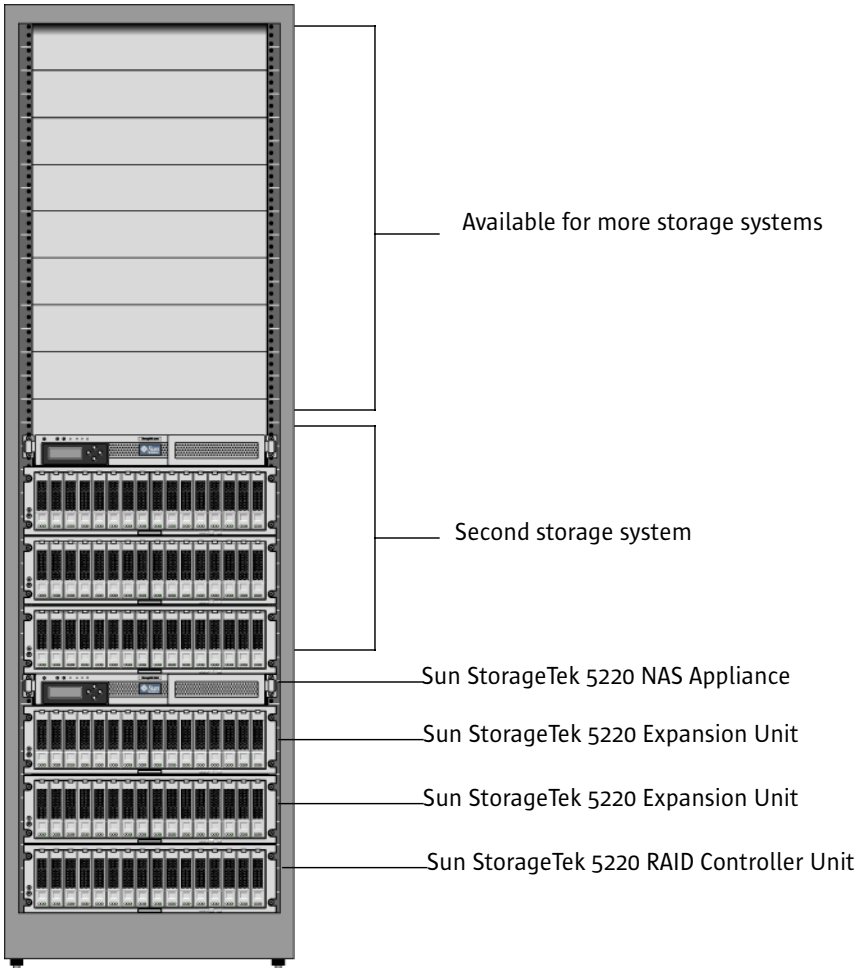

FIGURE 2-2 Rack With Two Complete Storage Systems

Attaching the Universal Rail Kit

This procedure describes the steps to attach the universal rail kit to all standard Sun cabinets.

▼ To Attach the Universal Rail Kit to a Cabinet

1. **Position the front of the left rail behind the left front cabinet rail (**FIGURE 2-3**).**

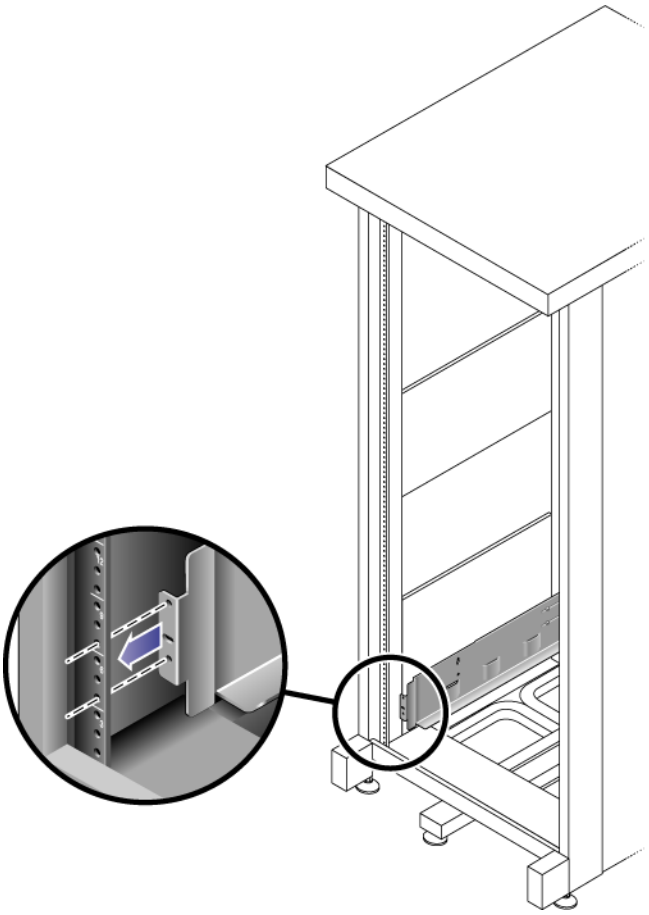

FIGURE 2-3 Positioning the Front of the Left Rail Behind the Left Front Cabinet Rail

2. **Use the No. 2 Phillips screwdriver to insert and tighten two 8-32 screws to secure the left rail to the front of the cabinet (**FIGURE 2-4**).**

   Each controller and expansion unit requires three standard mounting units (3U) of vertical space in the cabinet. Each standard mounting unit (U) has three mounting holes in the left and right cabinet rails. Insert the screws into the lowest holes in the top two mounting units of the 3U slot in which the tray is to be mounted.

   These screws pass through the cabinet rail holes and screw into threaded holes in the left rail.

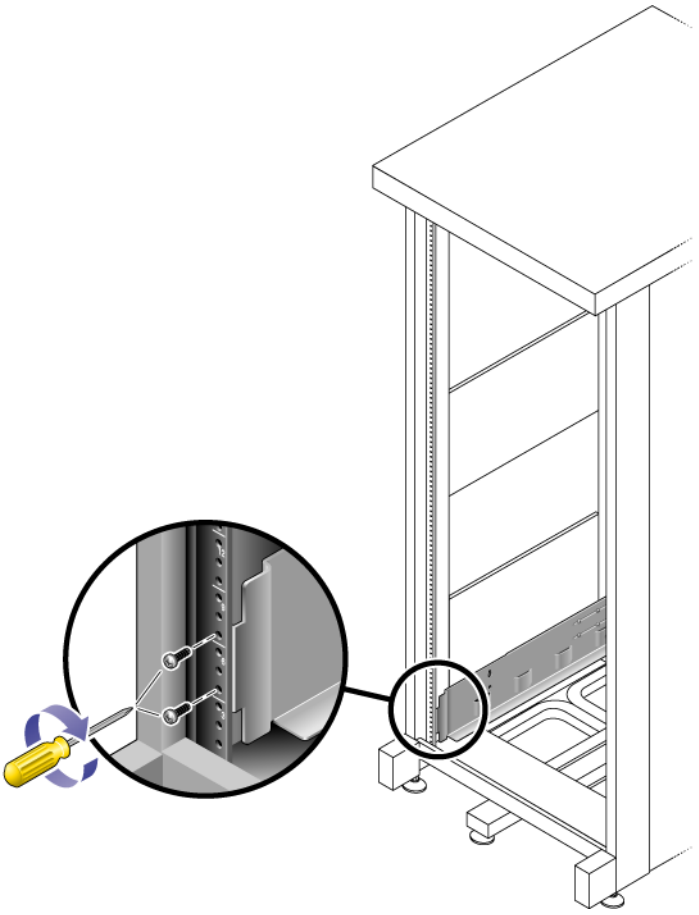

FIGURE 2-4 Securing the Left Rail to the Front of the Cabinet

3. **Repeat** Step 1 **and** Step 2 **for the right rail.**

4. **At the back of the cabinet, adjust the length of the left rail as needed to fit the cabinet, and position the rail flange over the face of the cabinet rail (FIGURE 2-5).**

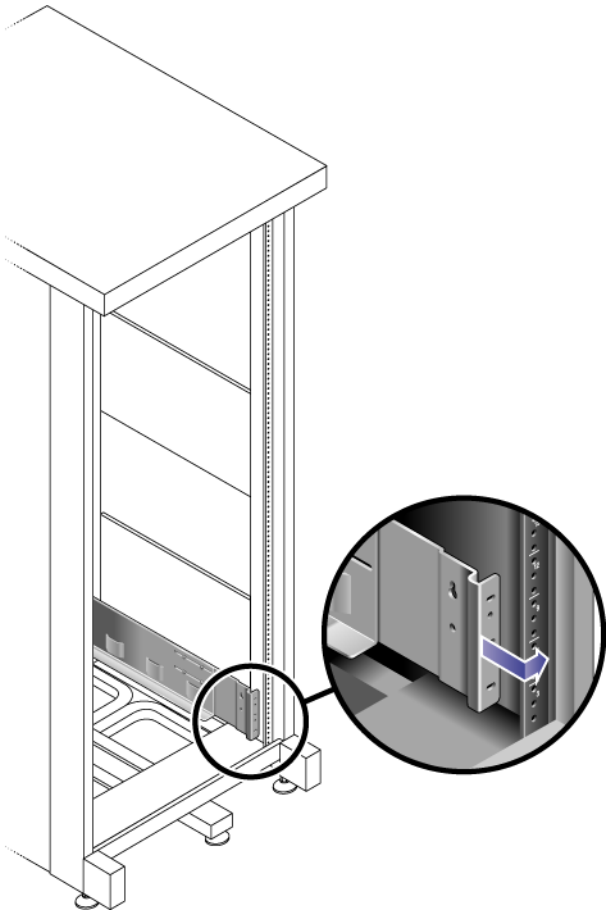

FIGURE 2-5 Adjusting the Length of the Left Rail at the Back of the Cabinet

5. **Align the rail flange so that the mounting holes correspond to those at the front of the cabinet.**

6. **Use the No. 3 Phillips screwdriver to insert and tighten four metric M6 screws (two per side) at the back of the rail (FIGURE 2-6).**

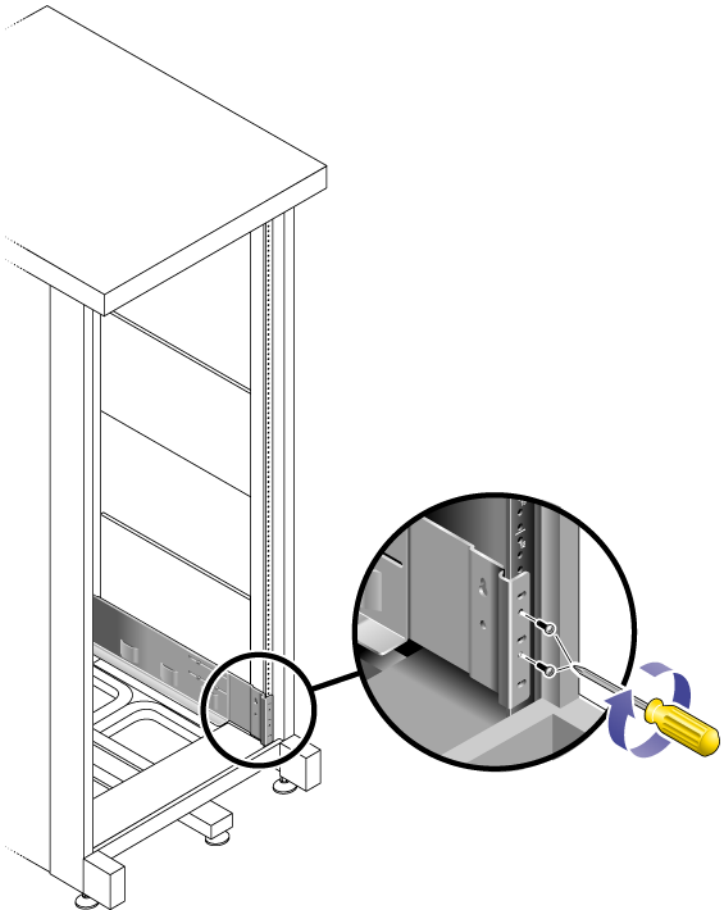

FIGURE 2-6 Securing the Left Rail to the Back of the Cabinet

7. **Repeat Step 4, Step 5, and Step 6 for the right rail.**

8. **Using the No. 2 Phillips screwdriver, tighten the eight adjustment screws (four on each side) toward the back of each rail (FIGURE 2-7).**

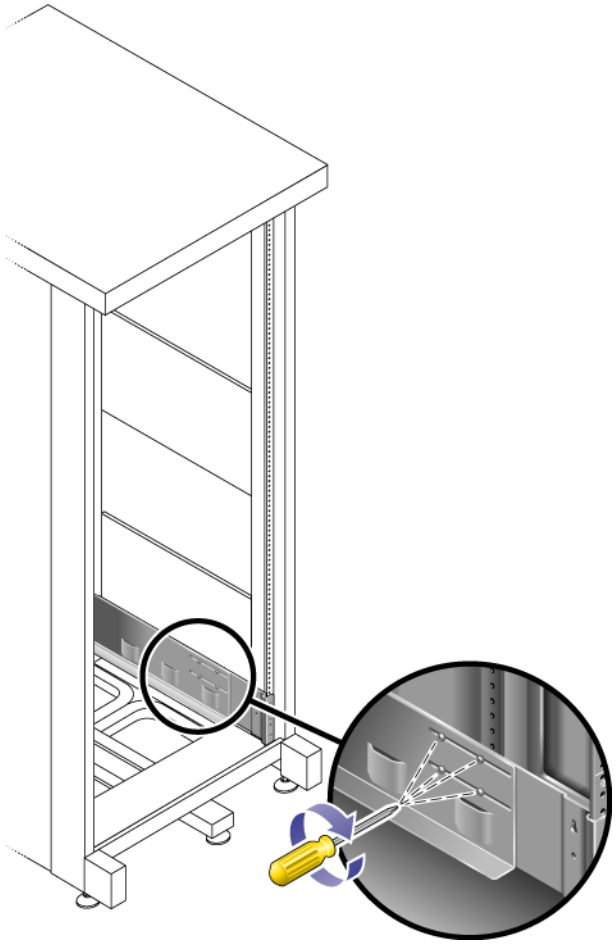

FIGURE 2-7 Tightening the Rail Adjustment Screws

Installing a Unit in a Cabinet

Install the controller unit in the first empty 3U slot at the bottom of the cabinet. Install expansion units above the controller unit, from the bottom upward.

▼ To Install a Controller or Expansion Unit

1. **Using two people, one at each side of the unit, carefully lift and rest the unit on the bottom ledge of the left and right rails (**FIGURE 2-8**).**

Caution – Use care to avoid injury. A unit can weigh up to 95 pounds (45 kg).

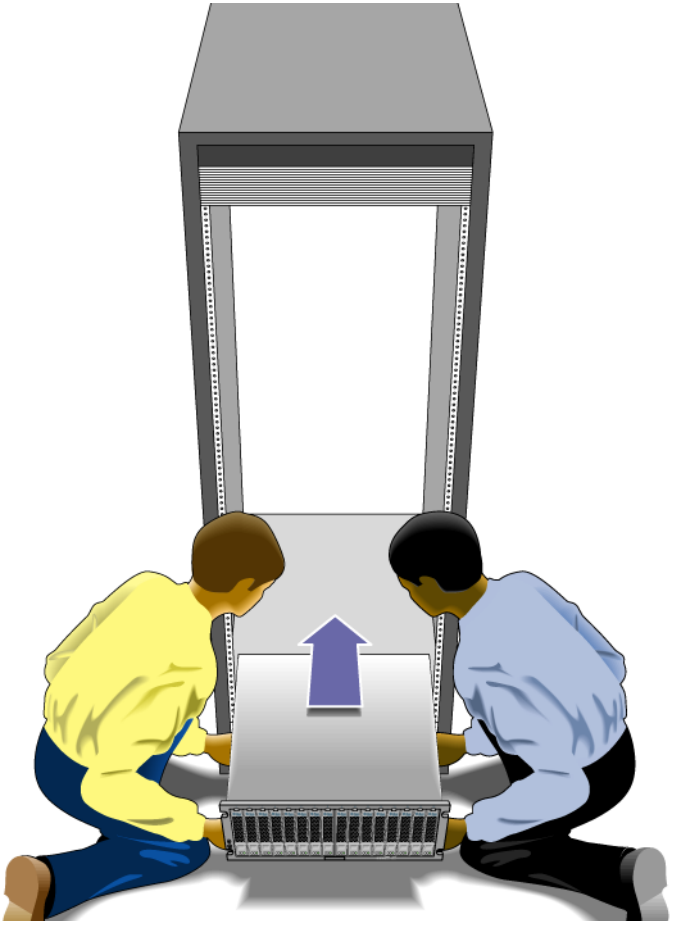

FIGURE 2-8 Positioning the Unit in the Cabinet

2. **Slide the unit carefully into the cabinet until the front flanges of the unit touch the vertical face of the cabinet (**FIGURE 2-9**).**

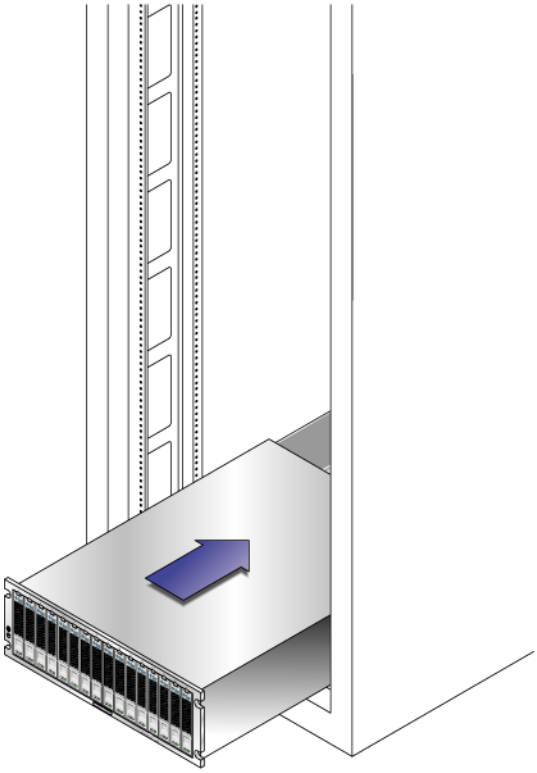

FIGURE 2-9 Sliding the Unit Into the Cabinet

3. **Use the No. 3 Phillips screwdriver to install and tighten four M6 screws (two per side) to secure the tray to the front of the cabinet (FIGURE 2-10).**

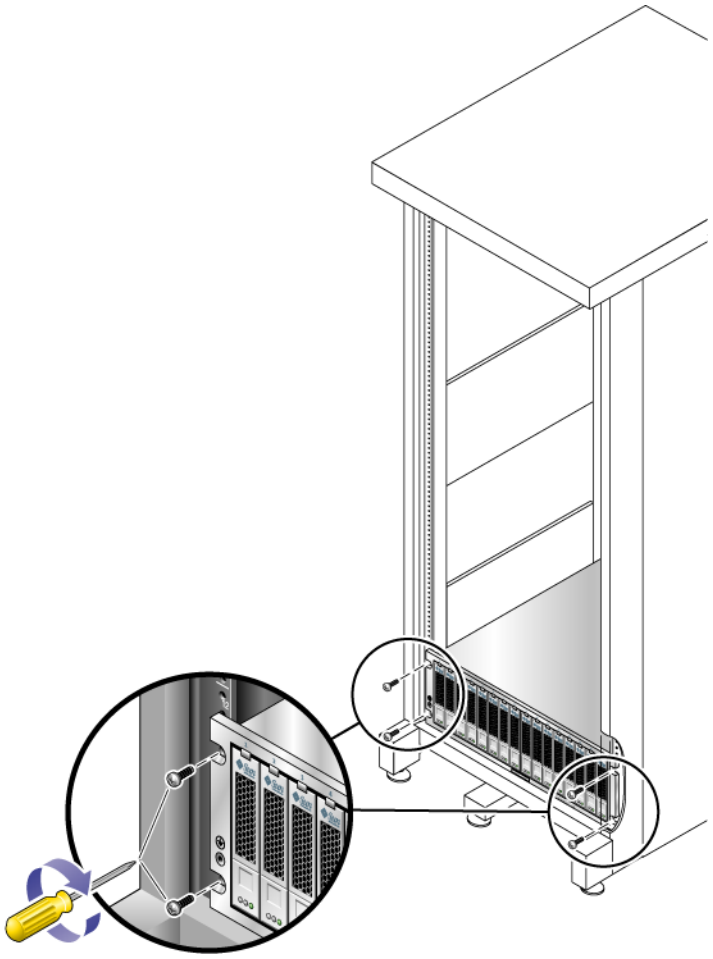

FIGURE 2-10 Securing the Unit to the Front of a Cabinet

4. **Install and tighten two 6-32 screws (one per side) at the back of the unit, to secure the back of the unit to the cabinet (FIGURE 2-11).**

Note – The two upper holes on the back of the unit are not used.

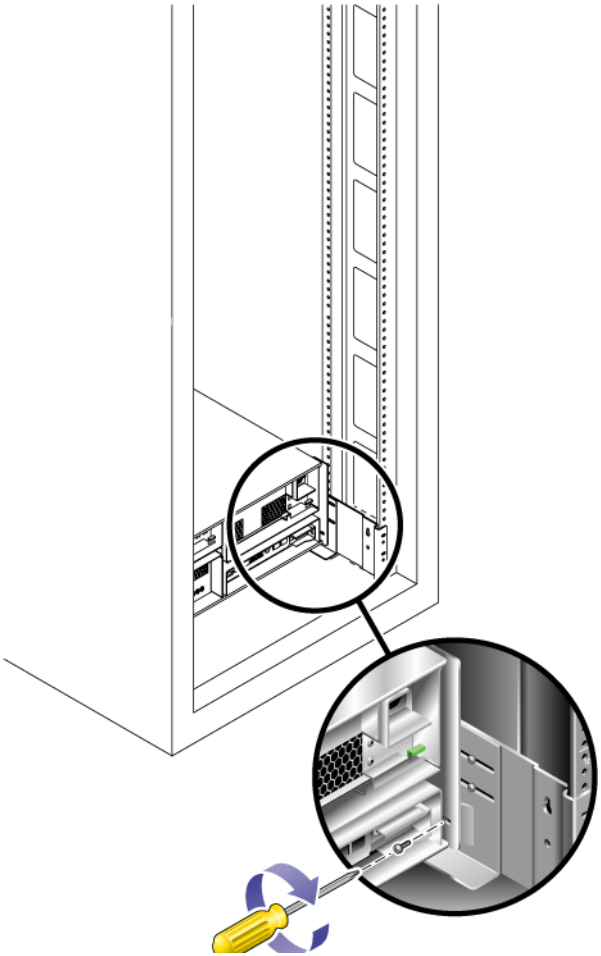

FIGURE 2-11 Securing the Unit to the Back of the Cabinet Rail

Installing the Appliance in a Cabinet

Installing a appliance takes three step:

1. "To Install the Slide Rails" on page 28
2. "To Install the Cable Management Kit" on page 35
3. "To Verify the Operation of the Slide Rails and the CMA" on page 39

▼ To Install the Slide Rails

1. **Pull both mounting brackets completely out of their respective slide rails:**

   a. **Press and hold simultaneously the upper and lower lock buttons of the slide rail lock (**FIGURE 2-12**).**

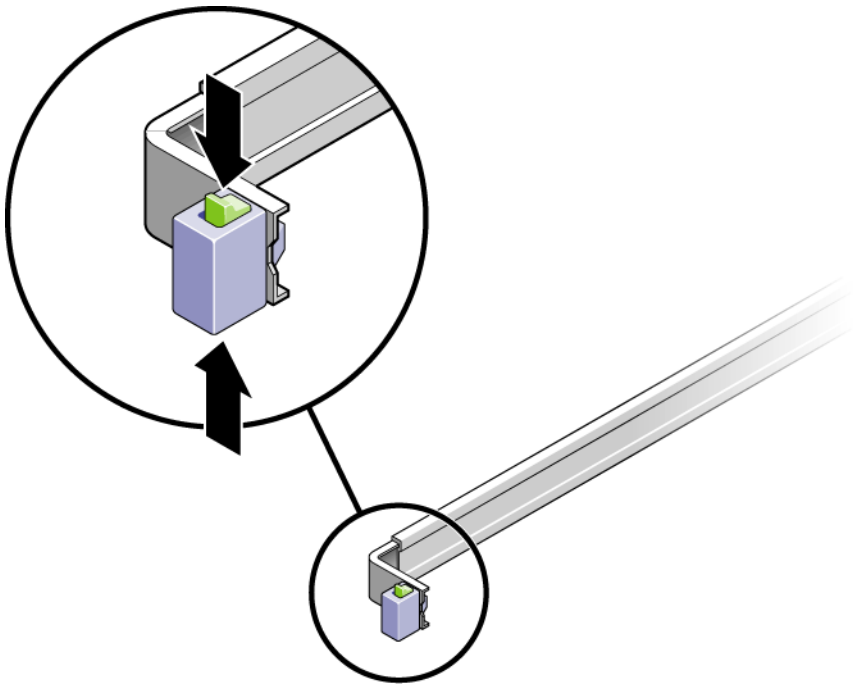

FIGURE 2-12 Unlocking the Slide Rail Assembly

   b. **Pull the mounting bracket out until it locks in the extended position.**

c. **Slide the mounting bracket release button in the direction shown in FIGURE 2-13, and then slide the mounting bracket out of the slide rail.**

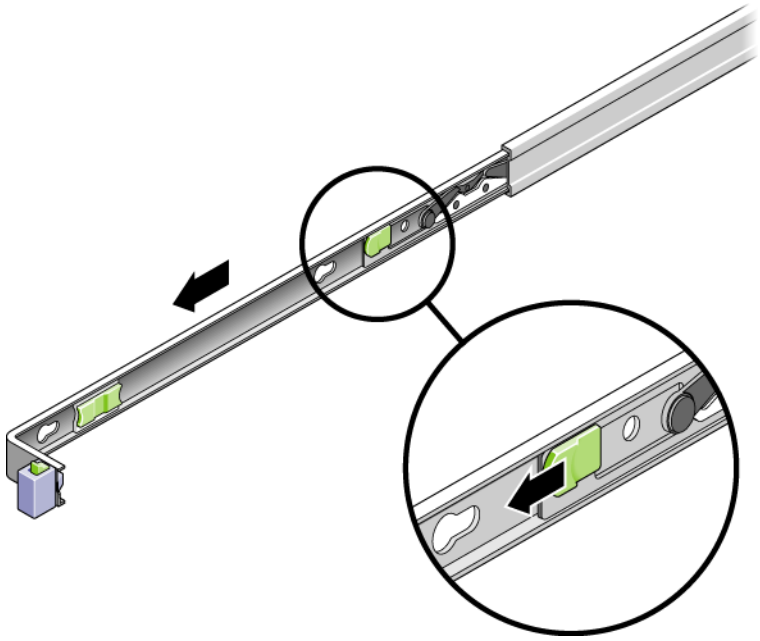

FIGURE 2-13 Sliding the Mounting Bracket Release Button

d. Press the metal lever labeled Push on the middle section (FIGURE 2-14) of the sliding rail, and then push the middle section back into the rack.

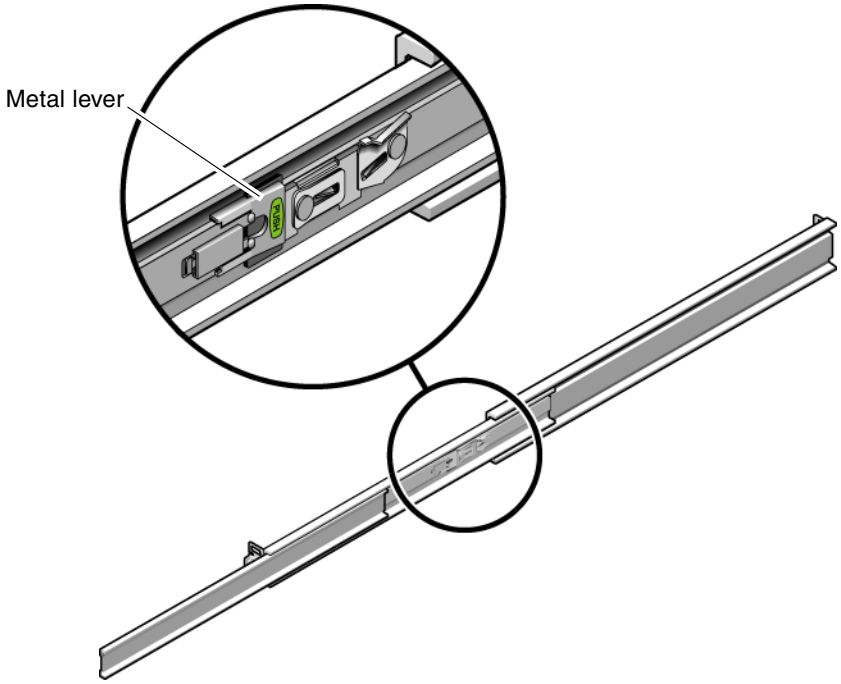

FIGURE 2-14 Unlocking the Slide Rail Middle Section

2. **Attach a mounting bracket to the right side of the appliance chassis.**

   a. **Position the mounting bracket against the appliance chassis (FIGURE 2-15) so that the bracket's slide rail lock is at the front and its three keyed openings align with the three locating pins on the side of the chassis.**

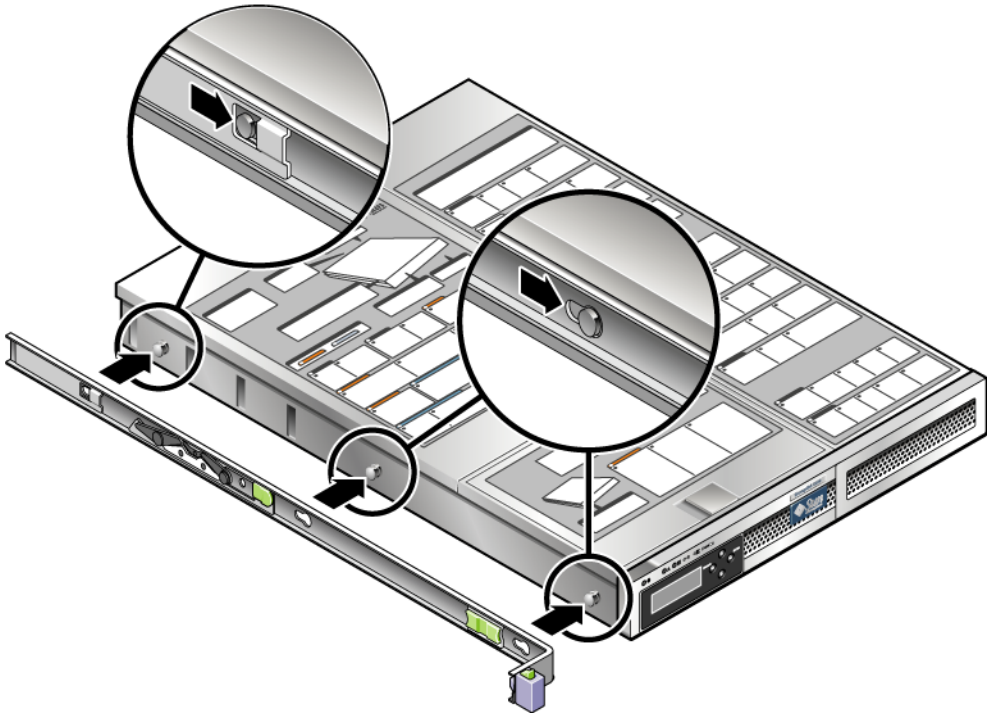

FIGURE 2-15 Attaching a Mounting Bracket to the Chassis

   b. **With the three pins protruding though the openings in the mounting bracket, pull the bracket toward the front of the chassis until it locks into place with an audible click.**

   c. **Verify that the three pins are trapped in their openings and that the back pin has engaged the mounting bracket lock, as shown in FIGURE 2-15.**

3. **Attach the second mounting bracket to the left side of the appliance chassis.**

4. **On the rack posts, determine which hole numbers to use for the slide rails. The appliance requires one rack unit (1U).**

5. **Determine which screws to use to mount the slide rails.**

   - If the rack posts have threaded holes, determine whether the threads are metric or standard and use the appropriate screws from the mounting kit.

- If the rack posts do not have threaded holes, secure the screws with a caged nuts.

6. **Attach a slide rail to the right front rack post.**

   a. **Attach the front of a slide rail to the right front rack post (**FIGURE 2-16**) using two screws. Do not tighten the screws yet.**

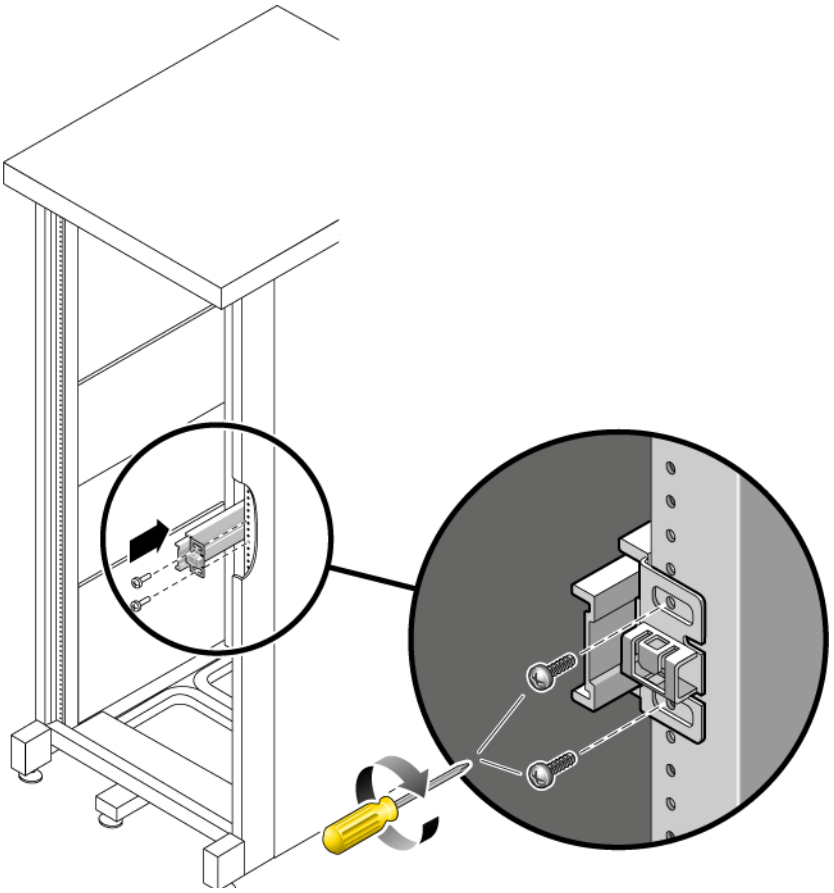

FIGURE 2-16 Mounting a Slide Rail

   b. **Adjust the length of the slide rail by sliding the back mounting flange to reach the outside edge of the back rack post.**

   c. **Use two screws to attach the back of the slide rail to the back rack post loosely.**

7. **In the same way, attach the second slide rail to the left rack posts. Do not tighten the screws.**

8. **Use the slide rail spacing tool to adjust the distance between the slide rails:**

   a. **At the front of the rack, insert the left side of the tool into slots at the end of the left rail (**FIGURE 2-17**).**

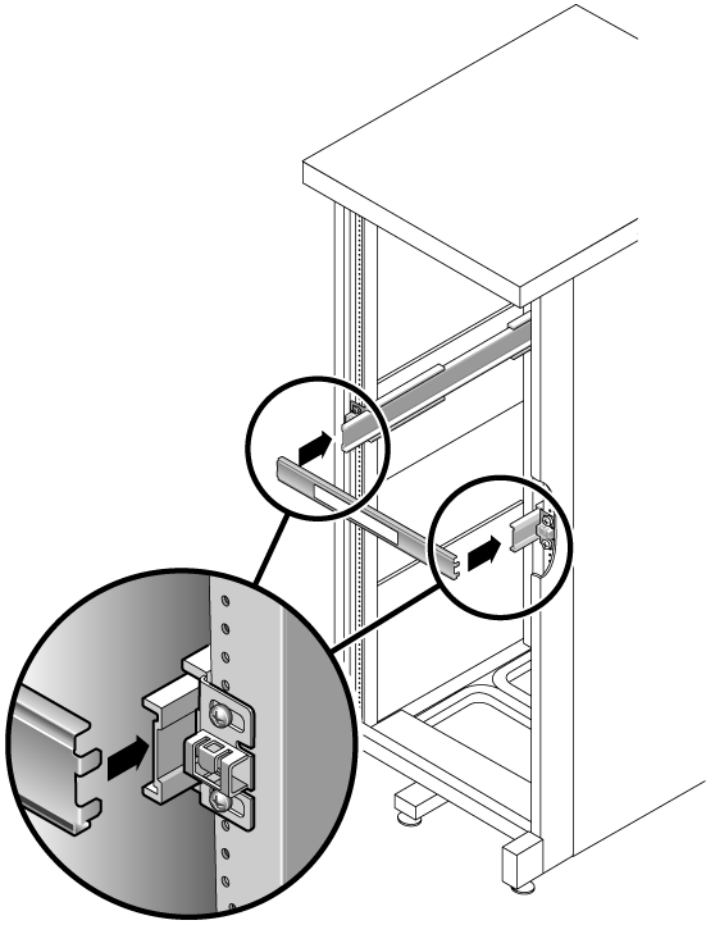

FIGURE 2-17 Adjusting the Distance Between the Slide Rails

   b. **Insert the right side of the tool into the front end of the right rail, while sliding the end of the rail to the right or left as needed to allow the ends of the tool to enter the ends of both rails. The distance between the rails is now equal to the width of the appliance with its mounting brackets.**

   c. **Tighten the screws to lock the ends of the rails in place.**

   d. **At the back of the rack, repeat** Step a **through** Step c **for the back ends of the rails.**

9. **Deploy the anti-tilt bar, if the chassis or rack is so equipped.**

Caution – The weight of the appliance on extended slide rails can be enough to overturn a cabinet.

10. **With a partner, lift the appliance and insert the ends of its mounting brackets into the sliding rails (**FIGURE 2-18**).**

Caution – The appliance weighs approximately 52 pounds (24 kg). Two people are required to lift and mount the system into a cabinet.

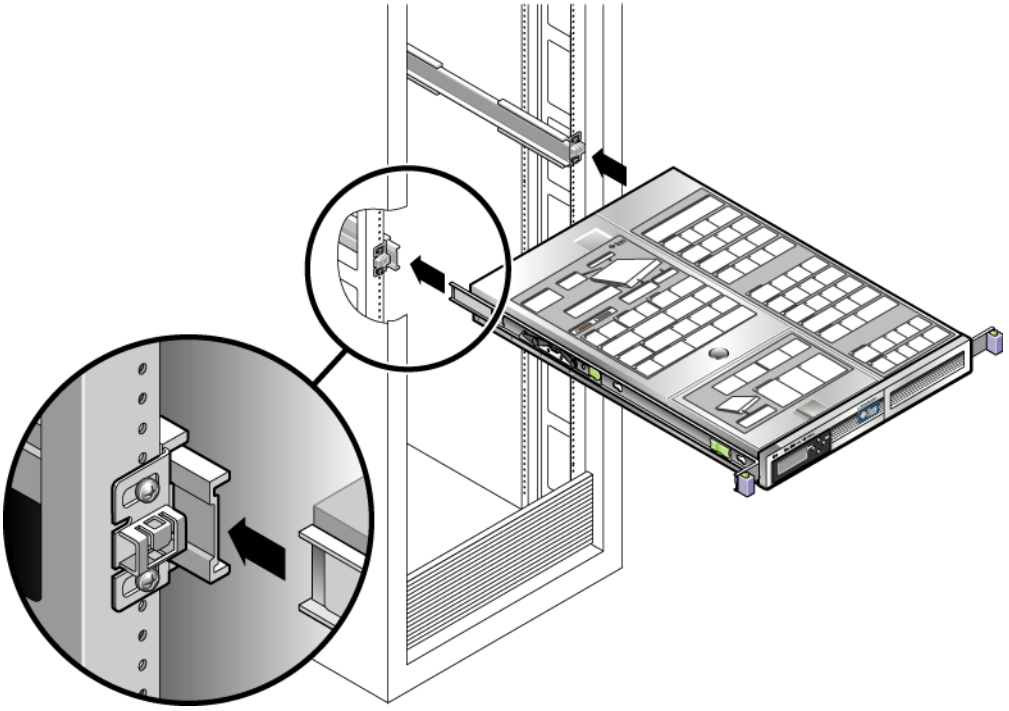

FIGURE 2-18 Mounting the Chassis on the Slide Rails

11. **Simultaneously release the rail locks on each side of the sliding rails, and guide the chassis into the rack.**

Caution – Verify that the appliance is securely mounted in the rack, and that the slide rails are locked to the mounting brackets.

▼ To Install the Cable Management Kit

The.cable management assembly (CMA) clips into the ends of the left and right sliding rail. No screws are necessary for mounting the CMA.

Caution – Support the CMA during this installation. Do not allow the assembly to hang by its own weight until it is secured by all three attachment points.

1. **At the back of the rack, plug the CMA rail extension into the end of the left sliding rail assembly (**FIGURE 2-19**).**

   The tab at the front of the rail extension clicks into place.

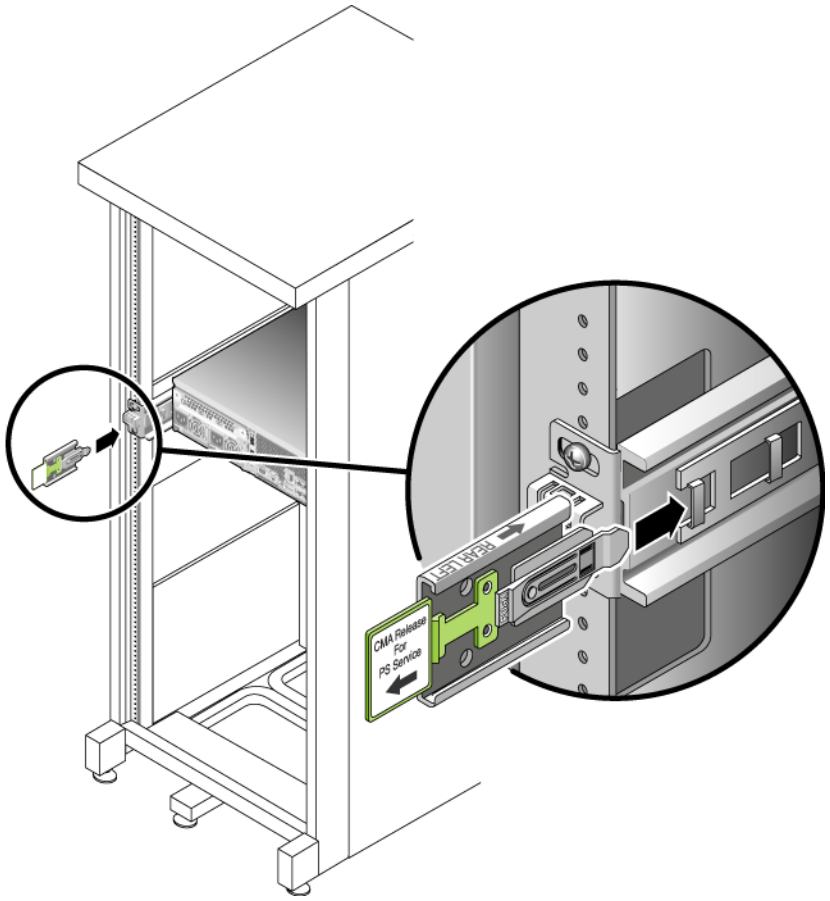

FIGURE 2-19 Inserting the CMA Rail Extension Into the Back of the Left Slide Rail

The right sides of the two CMA arms have hinged extensions. On the manufacturer's instruction sheet, the smaller extension is called the CMA Connector for Inner Member. It attaches to the right mounting bracket. The larger extension is called the CMA Connector for Outer Member, and attaches to the right sliding rail.

2. **Insert the smaller extension into the clip located at the end of the mounting bracket (**FIGURE 2-20**).**

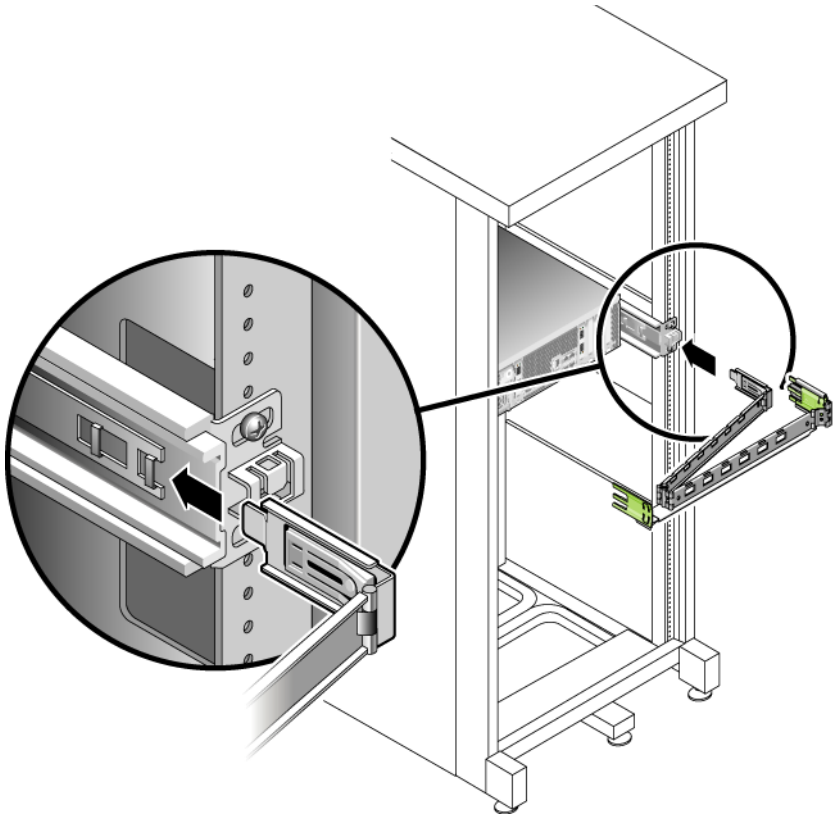

FIGURE 2-20 Mounting the Inner CMA Connector

3. **Insert the larger extension into the end of the right sliding rail (FIGURE 2-21).**

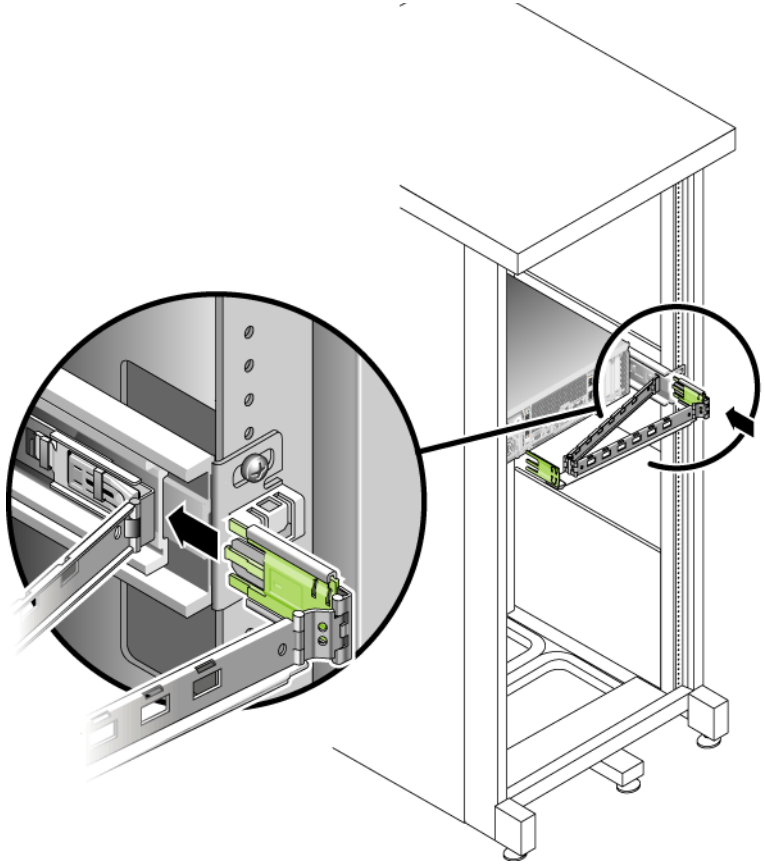

FIGURE 2-21 Attaching the Outer CMA Connector

4. **Insert the hinged plastic connector at the left side of the CMA fully into the CMA rail extension (**FIGURE 2-22**).**

   The plastic tab on the CMA rail extension locks the hinged plastic connector in place.

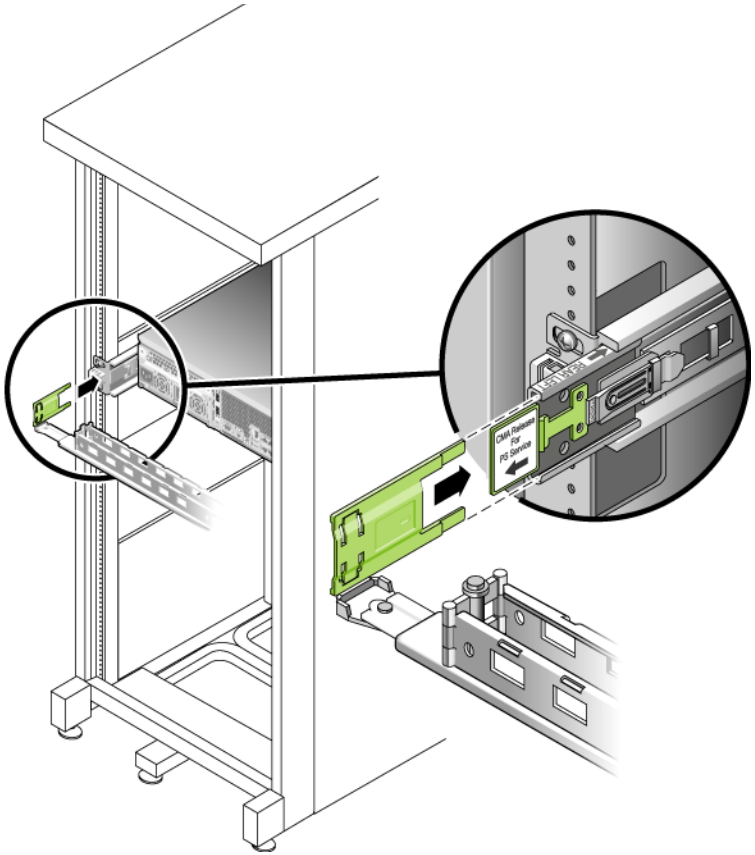

FIGURE 2-22 Mounting the Left Side of the Slide Rail

▼ To Verify the Operation of the Slide Rails and the CMA

Tip – Two people are needed for this procedure: one to move the appliance and one to observe the cables and CMA.

1. **Deploy the cabinet's anti-tilt bar, if it has one.**
2. **Unlock the slide lock buttons (FIGURE 2-23) at the right and left sides of the appliance chassis, and slowly pull the appliance out of the rack until the slide rails reach their stops.**

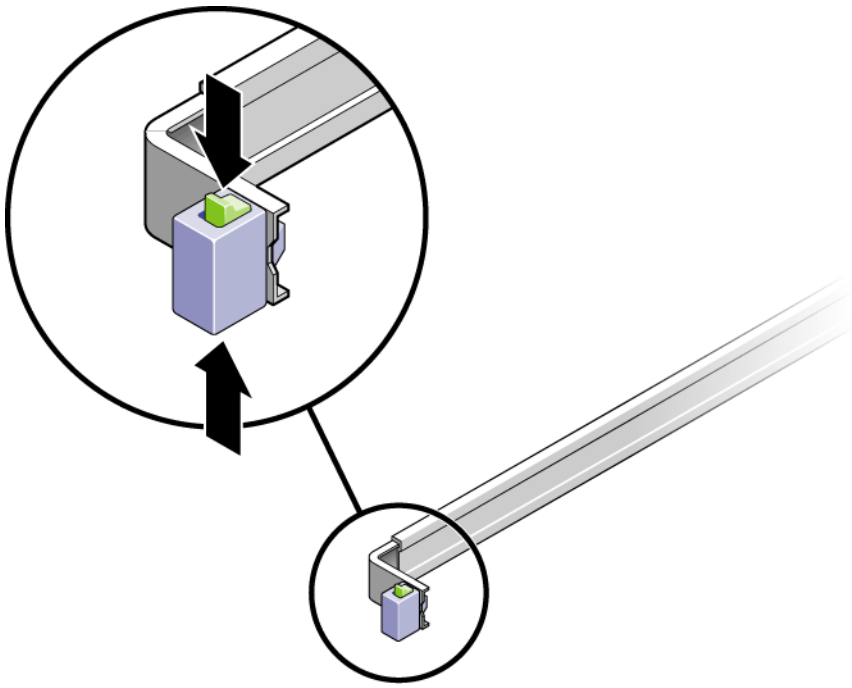

FIGURE 2-23 Unlocking the Slide Rail Assembly

3. **Inspect the attached cables for any binding or kinks.**
4. **Verify that the CMA extends fully and does not bind in the slide rails.**

5. **When the appliance is fully extended, release the slide rail lever stops (**FIGURE 2-24**).**

   Push both levers simultaneously and slide the appliance back into the rack.

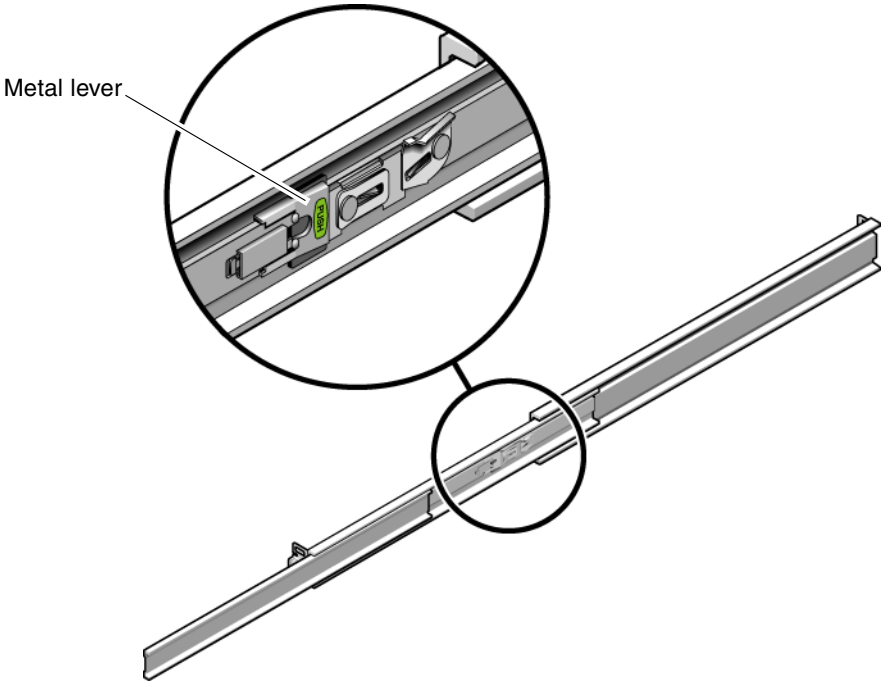

FIGURE 2-24 Unlocking the Slide Rail Lever Stops

6. **Simultaneously unlock both slide rail release buttons (FIGURE 2-25), and push the appliance completely into the rack.**

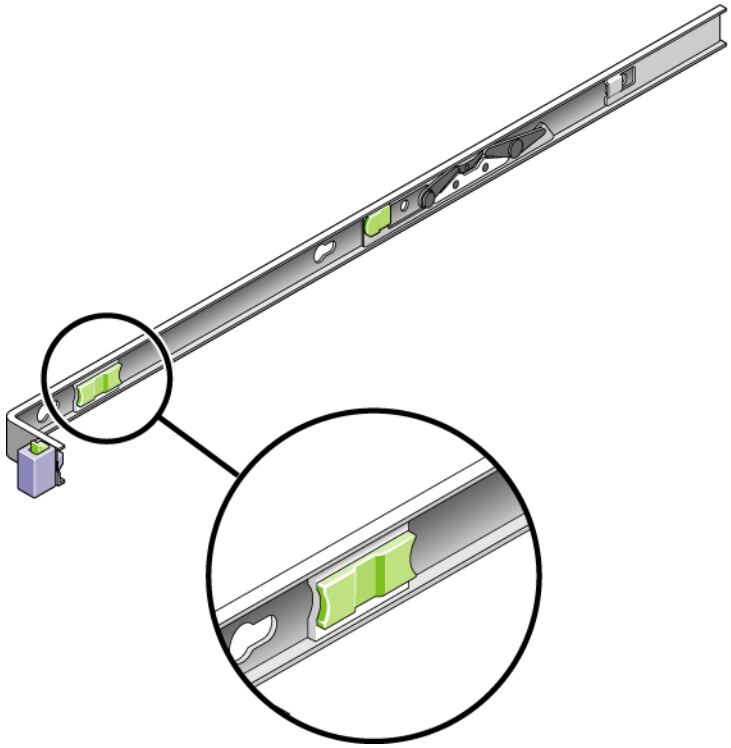

FIGURE 2-25 Locating the Slide Rail Release Button

The appliance stops after approximately 15 inches (40 cm) of travel.

7. **Verify that the cables and the CMA retracted without binding.**
8. **Adjust the cable hangers and CMA as required**

Connecting the Power Cables

This section describes how to connect the power cables.

Note – Do not power on the units until you complete the installation procedures for your system. The power-on sequence is described in detail in "Powering On the System" on page 51.

▼ To Connect the Power Cables

1. **Verify that both power switches are off for each controller unit and expansion unit in the cabinet. The toggle switch must be set to 0.**
2. **Connect each power supply in each unit to a separate power source in the cabinet.**

Caution – The cabinet must have two power sources connected to two separate power circuits.

---

3. **Connect each power supply in the Sun StorageTek 5220 NAS Appliance to a separate power source in the cabinet.**

   As soon as you connect the appliance's power cords to the cabinet, the AC LE D on the front lights, indicating standby power mode.

4. **Connect the primary power cables from the cabinet to the external power source.**

Next Steps

When you have installed the appliance and its units and have connected their power cables, you are ready to connect the appliance to the controller unit and connect the controller unit to any expansion units, as described in Chapter 3.

CHAPTER 3

Connecting the Sun StorageTek 5220 NAS Appliance

This chapter provides instructions for connecting the Sun StorageTek 5220 NAS Appliance, the Sun StorageTek 5220 RAID Controller unit, and the optional Sun StorageTek 5220 expansion units. It also provides initial configuration instructions for the system. This chapter contains the following sections:

Connecting the Appliance to Back-End Storage

This section describes how to cable the Sun StorageTek 5220 NAS Appliance to back-end storage, for several different configurations. This section includes the following tasks:

Connecting the Appliance to the Controller Unit

The connection from the appliance to the controller unit is made from Port 1 of the HBA card in PC slot 1 of the appliance to the controller unit's Ch1 port. The other HBA port can be used for tape backup. The Ch 2 port is not used.

FIGURE 3-1 shows the port locations on the HBA card and on the controller unit.

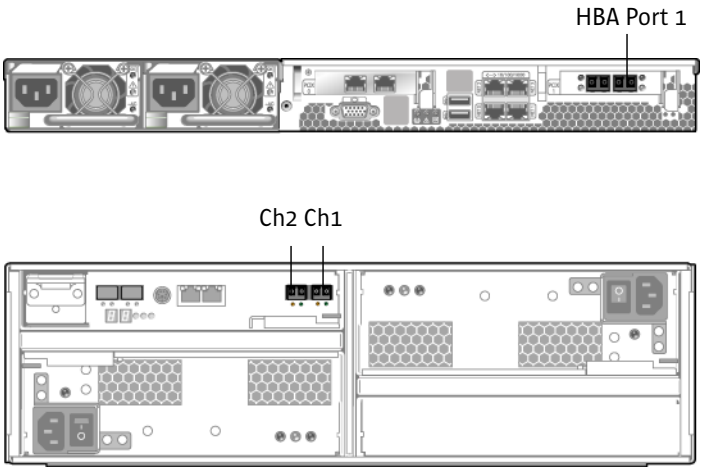

FIGURE 3-1 Ports for HBA Cards and Controller Unit

▼ To Connect a Controller Unit

Use the LC-to-LC fiber optic cables from the appliance's ship kit to connect the appliance to the controller unit, as shown in FIGURE 3-2.

- **Connect the HBA port 1 on the appliance to the controller unit's Ch 1 port.**

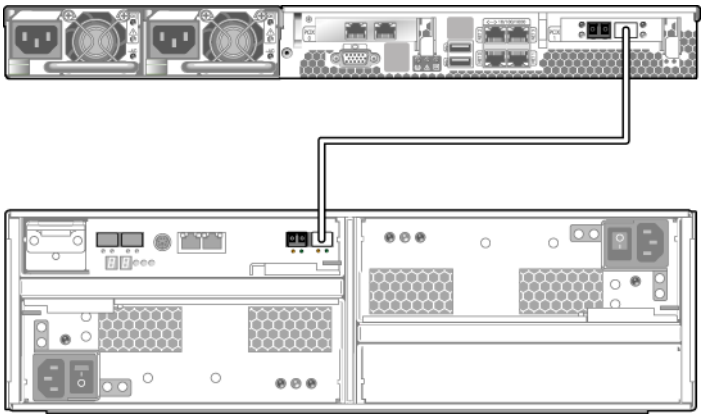

FIGURE 3-2 Connecting the Appliance to the Controller Unit

Connecting a Controller Unit to Expansion Units

The connection between the controller unit and an expansion unit is made from the controller unit's ports (P1 and P2) to the expansion unit's 1B port. FIGURE 3-3 shows the locations for the ports.

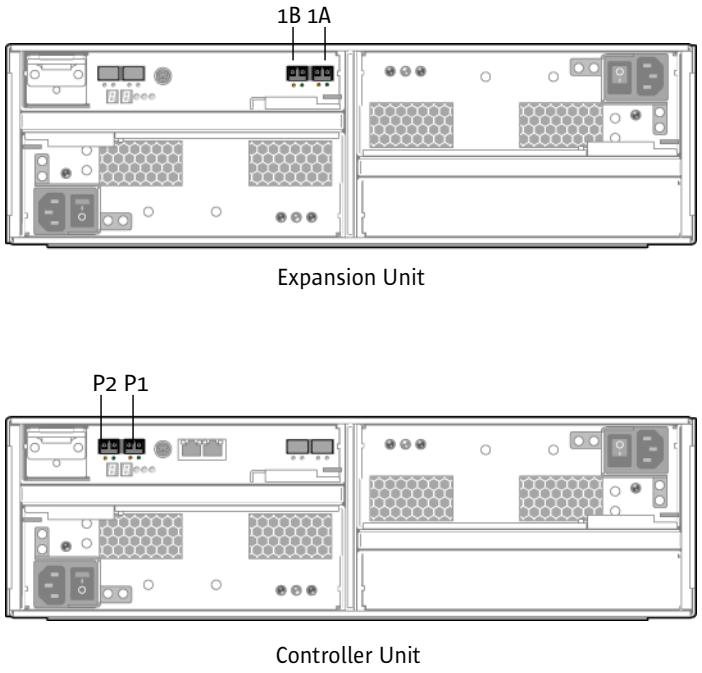

FIGURE 3-3 Ports on the Controller Unit and Expansion Unit

You can cable one expansion unit or two expansion units to a controller unit:

- For one expansion unit, see "To Cable a Controller Unit to One Expansion Unit" on page 47.
- For two expansion units, see "To Cable a Controller Unit to Two Expansion Units" on page 48.

▼ To Cable a Controller Unit to One Expansion Unit

Use the 2-meter LC-to-LC fibre optic cable to connect a controller unit to an expansion unit, as shown in FIGURE 3-4.

- **Connect one cable between the P1 port of the controller unit and the 1B port of the expansion unit.**

The other ports in the units remain empty.

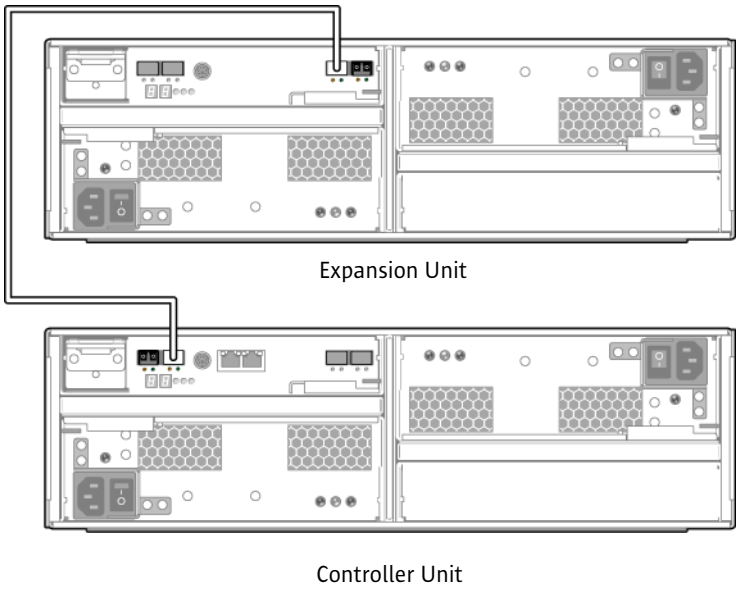

FIGURE 3-4 Connecting the Controller Unit and One Expansion Unit

▼ To Cable a Controller Unit to Two Expansion Units

Use two 2-meter LC-to-LC fibre optic cables to connect a controller unit and two expansion units, as shown in FIGURE 3-5.

1. **Connect one cable between the P1 port of the controller unit and the 1B port of an expansion unit.**
2. **Connect one cable between the P2 port of the controller unit and 1B port of the second expansion unit.**

   The other ports in the units remain empty.

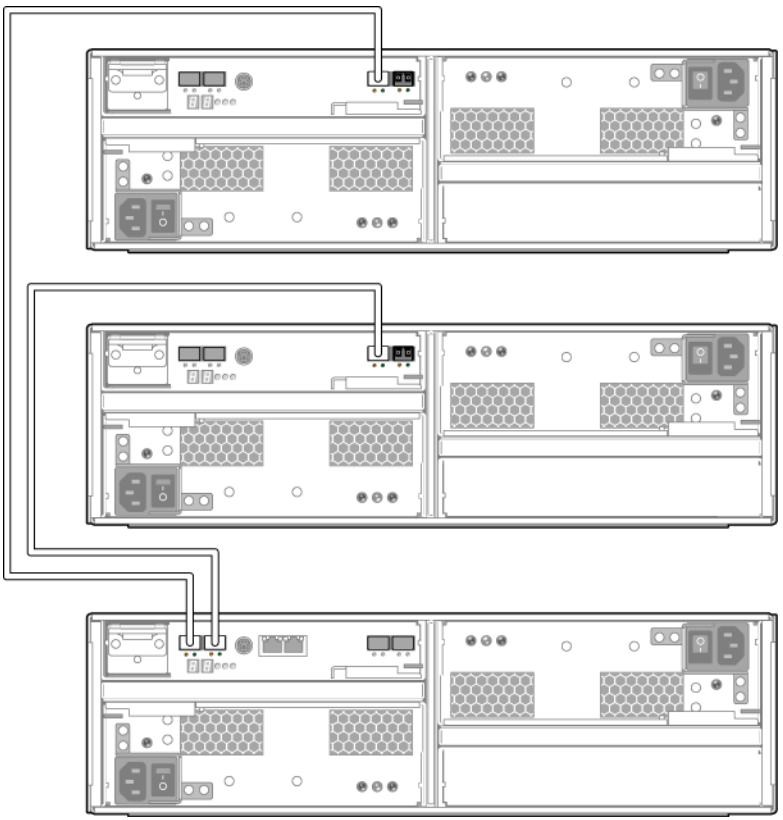

FIGURE 3-5 Connecting a Controller Unit to Two Expansion Units

Connecting to the Network

Use the following procedures to connect the Sun StorageTek 5220 NAS Appliance to your network, either Fast Ethernet or optical Gigabit Ethernet, depending on your site's configuration. The cables are provided in the ship kit. Each configuration is described in the following sections.

▼ To Connect to Copper Fast Ethernet or Gigabit Ethernet Networks

FIGURE 3-6 shows the locations of the network ports for connecting **the appliance** to a 100BASE-T Fast Ethernet network or to a 1000BASE-T Gigabit Ethernet network**.**

1. **Connect an RJ-45 CAT5E shielded Ethernet cable from your local area network to port NET0 on the back of the appliance.**
2. **For additional network connections, use the ports in this order: NET1, NET2, and NET3. If PCI slot 0 contains a** copper 10/100/1000 Gigabit **Ethernet card, you can make additional network connections, using the cables shipped with the card.**

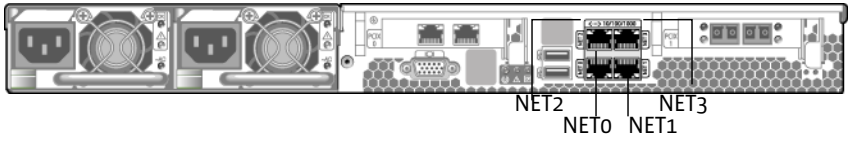

FIGURE 3-6 Connecting to a Fast Ethernet or Gigabit Ethernet Network

▼ To Connect to Optical Gigabit Ethernet Networks

To connect the appliance to an optical Gigabit Ethernet network, the appliance must have the optional optical Gigabit Ethernet card installed in PCI0.

FIGURE 3-7 shows the locations of the ports and the optical Gigabit Ethernet connectors.

1. **Connect a fiber optic cable from the network to the A connector on the card.**
2. **Connect a second fiber optic cable from the network to the B connector on the card.**

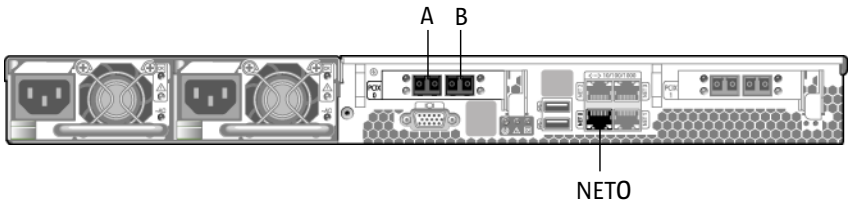

FIGURE 3-7 Connecting to an Optical Gigabit Network

Network ports have different identifiers in hardware and software. When you configure the system (see "Configuring the Appliance" on page 56), the ports are identified as described in the following table:

TABLE 3-1 Identifiers for Network Ports

	Hardware Identifier	Software Identifier
Appliance	NET0	emc1
	NET1	emc2
	NET2	emc3
	NET3	emc4
optical Gigabit Ethernet card	A	emf5
	B	emf6

Powering On the System

This section describes how to power on the appliance, controller units, and expansion units for the first time and how to power on the devices after the first time.

Caution – Use the correct initial power-on sequence for your configuration. Failure to follow the correct procedure will result in an inoperative system.

- If you have an appliance and a controller unit only, see "To Power On the Appliance and Controller Unit Initially" on page 52.
- If you have an appliance, a controller unit, and one or more expansion units, see "To Power On the Appliance, Controller Unit, and Expansion Units Initially" on page 54.
- If you are powering on a system again after initially powering it on, see "To Power On the System After a Shutdown" on page 55.

Note – If you are using a UPS, connect all units to the UPS.

Note – To achieve fault tolerance, units with two power supplies must receive power from two different AC circuits.

▼ To Power On the Appliance and Controller Unit Initially

Note – If you also have one or more expansion units, you must use the procedure described in "To Power On the Appliance, Controller Unit, and Expansion Units Initially" on page 54.

---

1. **Verify that all cables between the Sun StorageTek 5220 NAS Appliance and the controller unit are secured according to the instructions in** "Connecting the Appliance to the Controller Unit" on page 44**.**
2. **Power on the controller unit by toggling the two power supply switches to the On position.**
3. **Wait for all LEDs on the controller unit's front panel to turn solid green, indicating good operation. This takes about four minutes.**
4. **Verify that the Sun StorageTek 5220 NAS Appliance is connected to the network by checking that the green LED on the appliance's network connection is lit.**

5. **Using a pen tip or similar implement, press the recessed Power button on the appliance's front panel, as shown in** FIGURE 3-8**.**

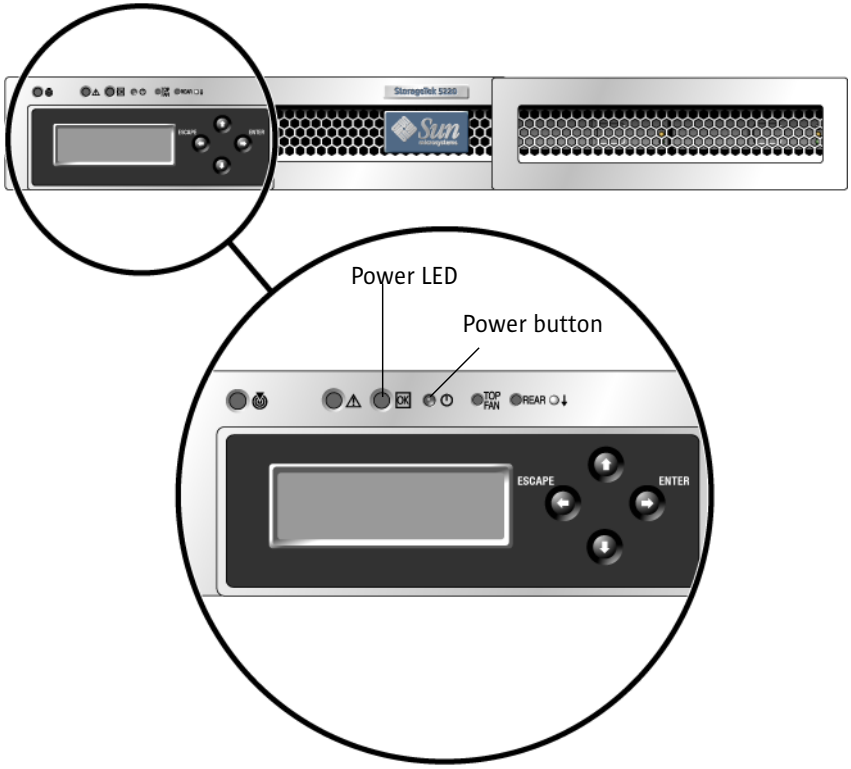

FIGURE 3-8 Detail of Power Button and Front Panel

▼ To Power On the Appliance, Controller Unit, and Expansion Units Initially

---

Note – If you have one or more expansion units, you must use this initial power-on sequence. If you do not have any expansion units, you must use the procedure described in "To Power On the Appliance and Controller Unit Initially" on page 52.

---

1. **Verify that all cables between the Sun StorageTek 5220 NAS Appliance, controller unit, and expansion units are secured according to the instructions in** "Connecting the Appliance to the Controller Unit" on page 44 **and** "Connecting a Controller Unit to Expansion Units" on page 46**.**
2. **Power on the controller unit by toggling the two power supply switches to the On position.**
3. **Wait for all LEDs on the controller unit's front panel to turn solid green, indicating good operation. This takes about three minutes.**
4. **Power on the first expansion unit by toggling the two power supply switches to the On position.**
5. **Wait for all LEDs on the expansion unit's front panel to turn solid green, indicating good operation.**
6. **If you have a second expansion unit, set both of its power supply switches to the On position. Wait for all LEDs on the front panel to turn solid green.**
7. **After you have powered on the expansion units, wait 5 minutes for all units to be identified and mounted and then proceed.**
8. **Verify that the appliance is connected to the network by checking that the green LED on the appliance's network connection is lit.**
9. **Power on the appliance by pressing the recessed Power button located on the front panel. Using a pen tip or similar implement, press the recessed Power button on the appliance's front panel, as shown in** FIGURE 3-8**.**

▼ To Power On the System After a Shutdown

Use this procedure to power the system on again after it has been running and then powered off. If the system has never been powered on before, use the procedure described in "To Power On the Appliance and Controller Unit Initially" on page 52 or "To Power On the Appliance, Controller Unit, and Expansion Units Initially" on page 54.

Note – When you power off the controller units and expansion units, wait five seconds before you power them back on. If you power the units off and on too quickly, unexpected results can occur.

---

1. **Verify that all cables between the Sun StorageTek 5220 NAS Appliance, controller units, and expansion units are secured according to the instructions in** "Connecting the Appliance to the Controller Unit" on page 44 **and** "Connecting a Controller Unit to Expansion Units" on page 46**.**
2. **Power on each expansion unit by setting the two power supply switches to the On position. Wait at least 30 seconds after powering on the second expansion unit, if your system has one.**
3. **Power on the controller unit by setting the two power supply switches to the On position.**
4. **Check that all LEDs on the controller unit's front panels have turn solid green, indicating good operation.**
5. **Check that all LEDs on the expansion unit's front panels have turn solid green, indicating good operation.**
6. **Verify that the appliance is connected to the network by checking that the green LED on the appliance's network connection is lit.**
7. **Power on the appliance by pressing the recessed Power button located on the front panel. Using a pen tip or similar implement, press the recessed Power button on the appliance's front panel, as shown in** FIGURE 3-8**.**

Configuring the Appliance

The Sun StorageTek 5220 NAS Appliance ships with the operating system installed. To configure the appliance for the first time, complete the following tasks:

- Provide an IP address
- Use the Web Administrator's Configuration Wizard.

Assigning the IP Address

You can assign an IP address in either of the following ways:

- Using a Dynamic Host Configuration Protocol (DHCP) server to assign the IP address automatically. Your network must have either a DHCP server or a DHCP relay agent, which has access to a DHCP server on another network. The DHCP server or agent assigns an IP address to the Sun StorageTek 5220 NAS Appliance whenever it is powered on while connected to the network. If a DHCP server is not available, you must assign the IP address manually.
- Using the controls and liquid crystal display (LCD) panel on the Sun StorageTek 5220 NAS Appliance to enter the IP address manually.

▼ To Prevent an Address Assignment

If a DHCP server is available on your network but you prefer to assign the IP address manually, you must prevent the appliance from acquiring an IP address automatically by using the following procedure:

1. **During the power-on sequence, wait for the following message to display in the LDC panel: "DHCP Discovery NIC X"**
2. **Press any key on the LCD panel.**
3. **When the panel displays the message, "Abort DHCP?" press the ENTER button on the panel to confirm.**
4. **Follow the instructions in** To Assign the IP Address Manually**.**

▼ To Assign the IP Address Manually

If a DHCP server is not available or if you prefer to assign a permanent IP address to the appliance, configure the IP address using the LCD panel.

1. **Turn on the Sun StorageTek 5220 NAS Appliance and wait for the power-on sequence to complete.**

Note – If you have a DHCP server, skip the discovery step. When the LCD panel displays "DHCP Discovery NIC X" status message, press any key on the LCD panel to display the "Abort DHCP?" message. Press the ENTER button.

The LCD panel displays the following:

```
A: Set IP Number
B: Retry DHCP
```

2. **Press the ENTER button to select A.**
3. **Enter the values for the IP address.**

   To enter data, use the up and down arrow buttons to change the value of the digits and press the ENTER button to confirm the value you want. The cursor moves to the next digit. After you set the last digit, press the ENTER button again to proceed to the next setting.

   You can enter values for the following settings or you can accept the default:

   - IP address
   - Subnet mask
   - Broadcast address

4. **At the prompt about having a gateway, press Enter to accept the default of Yes.**

   The gateway indicates the network gateway.

   After the gateway address is set, press the ENTER button to return to the Network Config menu.

▼ To Display the IP Address

- **At the main menu of the LCD panel, press the ENTER button. At the prompt for Network Config settings, press the up arrow to A. Press the up or down arrow keys to select the network port and press the ENTER button to see the IP address.**

Accessing the Web Administrator

Note – To use the Web Administrator, the appliance must be connected to your network, you must know its current IP address, and you must be logged into a client on the same network as the appliance.

When you connect to the Web Administrator for the first time, the Configuration Wizard launches automatically.

▼ To Connect to the Web Administrator

1. **From a client system on the same network as the appliance, open a web browser and type the IP address of the Sun StorageTek 5220 NAS Appliance in the address or location field, for example:**

   `http://123.111.78.99`

   Press Enter.

   Note – If the client system uses a proxy server and does not locate the appliance, change the browser's option to bypass the proxy server for local addresses. See your browser's online help or documentation for more information.

   Your browser displays the Web Administrator's login screen. For your convenience, bookmark this location or add it to your Favorites list so that you do not have to enter the IP address in future sessions.

2. **At the login screen, click Apply.**

   You can set the password at a later time, using the procedure in the *Sun StorageTek NAS OS Administration Guide*.

   The Systems Operations, Set Time and Date panel is displayed.

3. **Select the date, the time, and the time zone, and then click Apply.**

   This is the only time when the Web Administrator prompts for the date and time. If these values must be changed, use the Administrator Console.

4. **Click Yes to confirm the date and time you set.**

   The Web Administrator displays the license agreement. Read the license agreement before you accept it. If you decline, Web Administrator displays the login screen.

5. **Accept the license agreement.**

   The Web Administrator's Configuration Wizard starts. The wizard guides you through the process of configuring the Sun StorageTek 5220 NAS Appliance.

6. **At each panel of the wizard, enter the information it requests. For descriptions of the panels, see the *Sun StorageTek NAS OS Administration Guide*.**

   If your system uses DHCP to assign DNS, WINS, or IP and gateway addresses, the fields for these values for port-emc1 (NET0) are configured automatically and you do not need to enter information. Verify the information or add information for other network ports and continue with the wizard.

Note – At the panel that requests the information for your DNS server, be sure to click the Add button on the panel before you continue with the wizard.

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7. **On the Confirmation screen, review the configuration you have set up. To change information, use the back arrow to return to a panel.**
8. **Click Finish on the Confirmation screen.**

   The system configures the settings and displays the Save Configuration screen.
9. **Click Close on the Save Configuration screen.**

   The wizard checks that all mandatory information is complete and then reboots the appliance.

Next Steps

At this point, the storage system is running on your network but before it can store data, you need to set up your file system and to configure your users' access. Setting up a file system includes defining any logical unit numbers (LUNs), partitions, file volumes, or segments. When your file system is complete, set up user access rights and any other system management features such as setting up a local log file. For information on all these tasks and their concepts, see the *Sun StorageTek NAS OS Administration Guide*.

Note – The boot sequence log file is located in the bootlog, under `/cvol/log`. The file that the Web Administrator displays is a running log that can overflow. To save the entire log, set up a local log according to the instructions in the *Sun StorageTek NAS OS Administration Guide*.

APPENDIX **A**

Hardware Specifications

This appendix describes the characteristics and requirements of the Sun StorageTek 5220 NAS Appliance, the Sun StorageTek 5220 RAID Controller unit, and the Sun StorageTek 5220 Expansion unit.

TABLE A-1 Environmental Specifications

Specifications		Operating	Non-Operating/Storage
Temperature			
	Appliance	+10˚C to +35˚C (+50˚F to +95˚F)	-40˚C to +65˚C (-40˚F to +149˚F)
	Controller/Expansion Units	+10˚C to +35˚C (+50˚F to +95˚F)	-10˚C to +45˚C (+14˚F to +113˚F)
Humidity			
	Appliance	10% to 90%, non-condensing	10% to 93%, non-condensing
	Controller/Expansion Units	20% to 80%, non-condensing	10% to 90%, non-condensing

TABLE A-2 Physical Characteristics

Specification		Value
Dimensions (HxWxD)		
	Appliance	4.38 cm x 44.5 cm x 64.0 cm (1.72 in. x 17.52 in x 25.2 in.)
	Controller/Expansion Units	13.0 cm x 48.3 cm x 57.2 cm (5.1 in. x 19 in. x 22.5 in.)
Height in Rack		
	Appliance	1U
	Controller/Expansion Units	3U
Weight		
	Appliance	18.6 kg (41.1 lb)
	Controller Unit	37.2 kg (82 lb)
	Expansion Unit	36.7 kg (81 lb)

TABLE A-3 Power Requirements

Specification		Value
Voltage		90-264VAC
Frequency		47-63 Hz
AC current input (maximum)		
	Appliance	3.6A (115V~) or 1.8A (230V~)
	Controller Unit	4.2A (115V~) or 2.1A (230V~)
	Expansion Unit	4.1A (115V~) or 2.0A (230V~)
Power consumption		
	Appliance	418VA (from AC source), maximum 251W (from power supply), maximum Power availability: 550W maximum (from power supply)
	Controller Unit	340VA, 204W (8x500 GB SATA drives) 485VA, 291W (16x500 GB SATA drives) Power availability: 600W maximum (from power supply)
	Expansion Unit	325VA, 195W (8x500 GB SATA drives) 470VA, 282W (16x500 GB SATA drives) Power availability: 600W maximum (from power supply)
	Hard drive (500 GB)	13.6W Power availability: 600W maximum (from power supply)
Power cord		SJT or SVT 18 SWG min, 3 conductor with 250V and 10A plug and socket
Heat dissipation (typical)		
	Appliance	857 BTU/hr
	Controller Unit	994 BTU/hr (16 x 500 GB SATA drives)
	Expansion Unit	963 BTU/hr (16 x 500 GB SATA drives)
	Hard drive (500 GB)	48 BTU/hr

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ISP2300 Initiator/Target Firmware
with Fabric (Public Loop), Point-point, and
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Documentation and source code may be found at
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26 Open source http client library
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IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Glossary

array (n.) Multiple disk drives that function as a single storage element and is managed by the NAS appliance. The array consists of one controller unit and, optionally, up to two expansion units.

AWG (American wire gauge) (n.) A unit for measuring the thickness of wire.

back-end storage The trays of disk drives. A tray with a RAID controller is called a controller unit; a tray without a controller is called an expansion unit. See also controller unit and expansion unit.

configuration (1) (n.) The manner in which the software and hardware of an information processing system are organized and interconnected. (2) (n.) The physical and logical arrangement of programs and devices that make up a data processing system. (3) (n.) The devices and programs that make up a system, subsystem, or network.

controller unit A RAID controller and up to 16 disk drives. See also expansion unit.

CIFS Common Internet File System

driver (n.) A software program that enables a computer to communicate with a peripheral device.

DNS Domain Name Service

expansion unit A tray with up to 16 disk drives but no RAID controller. This type of unit expands the capacity of an array and must be attached to a controller unit to function. See also controller unit.

Fast Ethernet (n.) A high-speed version of Ethernet transmitting data at 100 Mbps. Fast Ethernet networks use the same media access control method that 10BASE-T Ethernet networks use but achieve 10 times the data transmission speed.

FC See Fibre Channel

Fibre Channel (FC) A set of standards for a serial I/O bus capable of transferring data between two ports at up to 100 MBytes/second. Fibre Channel supports point to point, arbitrated loop, and switched topologies.

GB (gigabyte) (n.) A unit of information equal to 1024 megabytes.

Gigabit Ethernet (n.) An Ethernet technology that enables data transfer rates of up to 1 Gbps using optical fiber cable or unshielded twisted-pair cable.

hot-swap (v.) To replace a failed component without interruption of system service.

HBA See host bus adapter.

host bus adapter(HBA) An I/O adapter than connects a host I/O bus to a computer's memory system. (SNIA)

KB (kilobyte) (n.) A unit of information equal to 1024 bytes.

LAN (local area network) (n.) A data communications network that is limited geographically limited (about 1 km radius).

LCD (liquid crystal display) (n.) A low-power display technology that uses rod-shaped crystal molecules that change their orientation when an electrical current flows through them.

LED (light-emitting diode) (n.) A semiconductor device that converts electrical energy into light.

LUN logical unit number

MB (megabyte) (n.) A unit of information equivalent to 1,048,576 bytes or 1024 kilobytes. Most uses of "megabyte," however, refer to exactly 1 million bytes.

MHz (megahertz) (n.) A measure of frequency equivalent to 1 million cycles per second.

MTBF (Mean Time Between Failures) (n.) The estimated time a device operates before a failure occurs.

NAS (network-attached storage) (n.) A storage appliance that connects directly to the network. NAS does not usually perform network directory services or function as an application server; instead, it augments storage capacities. Quick and easy to set up, NAS appliances also typically provide cross-platform file sharing.

NFS Network File System

NIC (network interface card) (n.) An adapter that lets you connect a network cable to a microcomputer. The card includes encoding and decoding circuitry and a receptacle for a network cable connection.

NIS Network Information Service

patch A software or firmware update for a storage device or device component.

RAID (Redundant Array of Independent Disks) (n.) A group of hard disks under the control of management software that work together to improve performance and decrease the odds of losing data to mechanical or electronic failure by using techniques such as data striping.

RAID-5 (n.) The most common RAID implementation. RAID-5 uses striping methods to store data.

SAN (storage area network) (n.) A network that includes various storage devices shared by multiple servers.

SCSI (Small Computer Systems Interface) (n.) A standard interface for personal computers that enables you to connect up to 15 peripheral devices, such as CD-ROM drives.

SCSI bus (n.) A pathway between SCSI hardware devices.

SCSI host adapter (n.) A printed circuit board (also called an interface card) that enables the computer to use a peripheral device for which it does not already have the necessary connections or circuit boards.

SCSI ID (n.) Priority number (address) of a SCSCI device in a SCSI device chain. Only one device at a time can transmit through a SCSI connection (port), and priority is given to the device with the highest priority address. SCSI IDs range from 0 to 15, and each SCSI device must be given a unique and unused SCSI ID.

SFP (Small form-factor pluggable) (n). A specification for optical transceivers. Devices are designed for use with small form factor (SFF) connectors, and offer high speed and physical compactness.

SMB (server message block) (n.) A Microsoft-compatible network protocol for exchanging files. SMB is typically used by Microsoft Windows for Workgroups, OS/2 Warp Connect, and DEC Pathworks.

striping (n.) A method for data storage in which a defined amount of data is written to the first drive in an array. The next amount of data is written to the second drive in the set, and so on. The primary advantage of striping the data is the ability for all drives to process read and write operations simultaneously.

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