



Sun StorageTek™ Common Array Manager Software Installation Guide

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Preface

The *Sun StorageTek Common Array Manager Software Installation Guide* is a combined software installation and initial configuration guide. This guide describes how to install management and configuration software, and how to perform initial storage planning and configuration. Consult the hardware installation guide for your array for information about the initial physical installation of an array.

Before You Read This Book

Before you begin to install the Sun StorageTek Common Array Manager software, review late-breaking and release-specific information in the following books:

- *Sun StorageTek Common Array Manager Software Release Notes*
- Release Notes for your array

The books are available from:

<http://www.sun.com/documentation>

How This Book Is Organized

Chapter 1 provides an overview of the Sun StorageTek Common Array Manager software and installation process.

Chapter 2 describes how to install the Common Array Manager software and the local and remote host management software.

Chapter 3 describes how to sign up for Auto Service Registration, register the array, upgrade the array firmware, and add initial array information.

Chapter 4 provides an overview of the concepts behind planning a storage configuration.

Chapter 5 steps you through the basic configuration of storage on the array.

Appendix A provides worksheets to help you gather the information you need to complete the installation.

Appendix B describes how to configure IP addressing.

Appendix C describes how to navigate through the browser interface.

Using UNIX Commands

For Solaris and Linux versions of the software, this document contains information on UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. For more information on Solaris or Linux, refer to the following:

- Software documentation that you received with your operating system
- Solaris™ Operating System documentation, which is available from <http://docs.sun.com>

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output.	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>% You have mail.</code>
AaBbCc123	What you type, when contrasted with on-screen computer output.	<code>% su</code> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

Application	Title	Part Number
Late-breaking information not included in the information set	<i>Sun StorageTek Common Array Manager Software Release Notes</i>	820-2935- <i>nn</i>
	Release Notes for your array	Various
Quick reference information for the CLI	<i>Sun StorageTek Common Array Manager sscs(1M) CLI Quick Reference</i>	820-2932- <i>nn</i>

In addition, the Sun StorageTek Common Array Manager includes the following online documentation:

- Sun StorageTek Common Array Manager online help
Contains system overview and configuration information.
- Service Advisor
Provides guided, FRU-replacement procedures with system feedback. You can access Service Advisor from the Sun StorageTek Common Array Manager software.
- *sscs* man page commands
Provides help on man page commands available on a management host or on a remote CLI client.

Accessing Sun Documentation

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Sun StorageTek Common Array Manager Software Installation Guide, part number 820-2934-10.

Overview

This chapter provides an overview of the Sun StorageTek Common Array Manager. It contains the following sections:

- [“Software Overview”](#) on page 1
- [“Overview of the Installation Process”](#) on page 3
- [“Next Steps”](#) on page 5

Software Overview

The Sun StorageTek Common Array Manager software is delivered on CD and consists of the tools described in the following topics:

- [“Management Software”](#) on page 1
- [“Remote Command-Line Interface Client”](#) on page 2
- [“Data Host Software”](#) on page 3

Management Software

The Sun StorageTek Common Array Manager software is a web-based management software that provides both a browser interface and a command-line interface (CLI) for configuring and managing arrays on an external management host. Management host platforms can be:

- a Sun system running the Solaris 8, 9, or 10 Operating System (OS)
- an x86 or x64 system running:
 - Solaris 10

- Linux (Red Hat Enterprise Linux AS Release 4 update 2 or higher; SuSE Linux 10)
- Windows 2000, 2003, or XP.

Common Array Manager provides management support for the following arrays:

- Sun StorageTek 6130
- Sun StorageTek 6140
- Sun StorageTek 6540
- Sun StorageTek 2500 Series
- FlexLine 240
- FlexLine 280
- FlexLine 380

Note – Sun StorageTek Common Array Manager now supports the Flexline arrays listed above. For hardware information, use the documentation that came with your array. For software functions, substitute the equivalent Common Array Manager function listed in this guide, the online help, or the Service Advisor hardware replacement software available from the Common Array Manager software.

The Sun StorageTek Common Array Manager enables you to use a web browser to manage an array from any host that can communicate with the management host. For a list of supported browsers, see the *Sun StorageTek Common Array Manager Release Notes*.

For information about navigating and using the browser interface, see:

- [“Using the Browser Interface” on page 115](#)
- The online help

Remote Command-Line Interface Client

You can also manage and configure storage using the Sun StorageTek Common Array Manager software’s command-line interface. The CLI provides the same control and monitoring capability as the web browser, and it is scriptable for running frequently performed tasks.

The CLI is available by telnetting to the management host or from a remote CLI client that you install on the remote host. It is available for Solaris OS, Windows, Linux, and several other operating systems. See the *Sun StorageTek Common Array Manager Software Release Notes* for a list of supported operating system platforms.

For more information about CLI commands, see:

- `sscs` man page
- *Sun StorageTek Common Array Manager sscs(1M) CLI Quick Reference*

Data Host Software

Data host software controls the data path between the data host and the array.

Note – Some management hosts can also be used as data hosts.

The data host software contains tools that manage the data path I/O connections between the data host and the array. This includes drivers and utilities that enable hosts to connect to, monitor, and transfer data in a storage area network (SAN).

The type of data host software you need depends on your operating system. You must obtain the data host software from the Sun Download Center or other source. See the *Sun StorageTek Common Array Manager Software Release Notes* for more information.

Overview of the Installation Process

Before you install the Common Array Manager software, you must do the following:

- Read the *Sun StorageTek Common Array Manager Software Release Notes* for any late-breaking information related to the installation of the array.
- Install the array hardware per the hardware installation documentation that came with your array.

The following checklist ([TABLE 1-1](#)) outlines all of the tasks required for installing the Sun StorageTek Common Array Manager software and tells you where you can find detailed procedures. To ensure a successful installation, perform the tasks in the order in which they are presented.

TABLE 1-1 Sun StorageTek Common Array Manager Installation Checklist

Step	Installation Task	Where to Find Procedure
1.	Verify that you have the license certificates for storage domains and other premium features.	You will use these in Chapter 5, “Enabling Premium Features” on page 93
2.	Install the management software.	Chapter 2 “Installing the Common Array Manager Software” on page 7
3.	If you have not already done so with DHCP or the serial interface, configure the IP addresses of the array controllers, as described in Appendix B.	Appendix B “Configuring the IP Address of the Array Controllers” on page 107
4.	Start and log in to the management software.	Chapter 3 “Starting the Management Software” on page 45
5.	Enter the site and contact information.	Chapter 3 “Providing Site Information” on page 49
6.	Decide on In-Band or Out-of-Band Management	Chapter 3 “Deciding on In-Band or Out-of-Band Management” on page 49
7.	Sign up for the Auto Service Request service.	Chapter 3 “Subscribing to Auto Service Request” on page 50
8.	Register the array.	Chapter 3 “Registering the Array” on page 52
9.	Upgrade the array firmware.	Chapter 3 “Registering the Array” on page 52
10.	Enter the array administration information.	Chapter 3 “Configuring Array Administration Functions” on page 65
11.	Set up notifications for site management.	Chapter 3 “Setting Up Notification for Fault Management” on page 69
12.	Add users and assign roles (admin, storage, guest).	Chapter 3 “Adding Users And Assigning Roles” on page 71
13.	Review the concepts you will need to plan your storage.	Chapter 4 “Planning Your Storage Configuration” on page 87

TABLE 1-1 Sun StorageTek Common Array Manager Installation Checklist *(Continued)*

Step	Installation Task	Where to Find Procedure
14.	Activate your premium licenses.	Chapter 5 “Enabling Premium Features” on page 93
15.	Plan whether you want the default storage or custom storage capabilities.	Chapter 5 “Planning Storage Before Using the New Volume Wizard” on page 95
16.	Configure the storage using the New Volume Wizard and related functions.	Chapter 5 “Using the New Volume Wizard to Create and Map Volumes” on page 100

Next Steps

You are now ready to install the Common Array Manager software and the local and remote management host software.

Installing the Common Array Manager Software

This chapter describes how to install the management software using a graphical interface or the command line interface. It contains the following sections:

- “Installation and Upgrading to a New Release” on page 7
- “About the Software Installation CD” on page 8
- “About Installing From a Downloaded File” on page 8
- “Checking the Installation Requirements” on page 9
- “Locating Files and Logs” on page 12
- “Installation Command Summary” on page 13
- “Installing on Solaris OS” on page 15
- “Installing on Linux OS” on page 23
- “Installing on Windows OS” on page 31
- “Uninstalling Software” on page 39
- “Installation Troubleshooting” on page 43
- “Next Steps” on page 44

Installation and Upgrading to a New Release

This chapter, and this whole document, describe installation of Common Array Manager on a new management host. These procedures apply equally to installing a new release of the software on a host already running an earlier version of the software. When you proceed to upgrade an existing management host to a new release, you run the install program exactly as described for a fresh installation. The install script searches to see if there is an earlier version of the software present on

the system and if so, updates and adds only those files that require change. Existing settings and other data are preserved, and after the upgrade normal operations can resume. It is not necessary to manually run an uninstall or to re-register devices, redefine users, or reset other system parameters.

Any release-specific considerations, including those pertaining to upgrades, are provided in the *Sun StorageTek Common Array Manager Software Release Notes*.

About the Software Installation CD

The Sun StorageTek Common Array Manager Installation Software CD provides three installation-related wizards:

- GUI software installer – Enables you to use a graphical user interface wizard to install a selection of applications to support a local or remote management host.
 - CLI software installers – Enables you to use either a command-line interface (CLI) script to install a selection of applications to support a local or remote management host.
 - Uninstaller – Enables you to uninstall the management and remote host software from a host.
-

About Installing From a Downloaded File

You can also download the latest version of the Common Array Manager software from System Administration/Storage Management category on:

<http://www.sun.com/download>.

The current URL is: <http://www.sun.com/download/index.jsp?cat=Systems%20Administration&tab=3&subcat=Storage%20Management>

Solaris and Linux Downloads

If installing from a downloaded file on Solaris or Linux, you must do the following to unpack the file and run the install program:

- 1. Unpack the file:**

```
untar xvf filename.tar
```

2. Change to the directory where the install files are unpacked, for example:

```
cd /install_dir/Host_Software_6.x.x.x
```

3. Begin the applicable installation procedure at the “Review the README.txt file” step.

Windows Downloads

1. Unzip the `host_sw_windows_6.x.x.x` file using a Windows zip application.

2. Change to the directory where the install files are unpacked, for example:

```
Host_Software_6.x.x.x
```

3. Begin the Windows installation procedure at the “Review the README.txt file” step.

Checking the Installation Requirements

Before installing the management software, do the following:

- The `README.txt` file on the CD contains the latest information and instructions for the software installation CD. Before unpacking the compressed installation files on the target host, be sure to review the `README.txt` file on the CD.
- Read the entire installation instructions.
- Locate the license certificates for premium features sent to the contact at the array site.
- Complete the array hardware installation, including the assigning of IP addresses to the controller. For more information, see Appendix B “[Configuring the IP Address of the Array Controllers](#)” on page 107.
- Check the installation space requirements.

Before unpacking the compressed installation files, check that the following requirements are met. (The installation script verifies these requirements. If a requirement is not met, the script informs you.)

TABLE 2-1 Installation Space Requirements

OS	Total Space	Directory Space
Solaris	625 megabytes	root – 5 megabytes
		/tmp – 120 megabytes
		/usr – 15 megabytes
		/var – 80 megabytes
		/opt – 405 megabytes
Linux	705 megabytes	root – 5 megabytes
		/tmp – 120 megabytes
		/usr – 155 megabytes
		/var – 80 megabytes
		/opt – 345 megabytes
Windows	620 megabytes	On system drive (usually C:)

Note – These space requirements are for a full installation, including Java Web Console. If Java Web Console Version 3.02 and JDK are pre-installed on the system, the required space is smaller by approximately 150 megabytes. On Solaris this is /opt; on Linux, this is /usr; on Windows this is on the system drive.

- Check to see if previous versions of the management software are installed.
Solaris and Linux: Uninstall all versions of the Sun StorageTek Configuration Service management software prior to the Common Array Manager 5.0.1.1 release. Later versions do not have to be removed.
Windows: Uninstall all versions of the Sun StorageTek Configuration Service management software prior to the Common Array Manager 5.1.0.10 release. Later versions do not have to be removed.
- Check that previously installed services, such as the Storage Automated Diagnostic Environment, are not performing a function on the array over the Ethernet port of either array controller.

Note – If a version of Sun Java Web Console prior to 2.2.5 is installed on the management host, the script prompts you to upgrade to the current version of the Sun Java Web Console. If you choose not to upgrade, the script exits and you cannot install the software.

- Check RAM Memory Requirements

- Solaris: 1 GB (for browser interface use)
- Linux: 512 MB
- Windows: 512 MB
- On Windows systems, Windows Installer 3.1 and the following service packages are required:

TABLE 2-2 Windows Service Pack Requirements

Windows OS	Required Service Pack Version
Windows 2000	SP4 or higher
Windows 2003	SP1 or higher
Windows XP	SP2 or higher

Locating Files and Logs

The following tables show the location of the files and logs for the Sun StorageTek Common Array Manager software by Operating System.

TABLE 2-3 Solaris Software File Locations

File Type	Directory
Unpacked install files	/var/opt/CommonArrayManager/Host_Software_6.x.x.x/bin
Installation logs	/var/sadm/install/se6000
Program files are in various directories.	Example: /opt/SUNWsefms
Firmware	/opt/SUNWstkcamlshare/fw
CLI program files	/opt/se6x20
Sun copyright notice	/var/opt/CommonArrayManager/Host_Software_6.x.x.x/bin
ThirdPartyReadme.txt	doc directory on Common Array Manager CD

TABLE 2-4 Linux Software File Locations

File Type	Directory
Unpacked install files	/var/opt/CommonArrayManager/Host_Software_6.x.x.x
Installation logs	/var/opt/cam
Program files are in various directories.	Example: /var/opt/SUNWse6130ui/local_data
Firmware	/opt/sun/cam/share/fx
CLI program files	/opt/sun/cam/se6x20/cli/bin/sscs
Sun copyright notice	/var/opt/CommonArrayManager/Host_Software_6.x.x.x/bin
ThirdPartyReadme.txt	doc directory on Common Array Manager CD

TABLE 2-5 Windows Software File Locations

File Type	Directory
Unpacked install files	<system drive>:\Sun\CommonArrayManager\Host_Software_6.x.x.x\bin
Installation logs	\Program Files\Common Files\Sun Microsystems\se6000
Program files are in various directories.	Example: \Program Files\Sun\Common Array Manager\
Firmware	\Program Files\Sun\Common Array Manager\Component\SunStorageTekArrayFirmware
Sun copyright notice	<system drive>:\Sun\CommonArrayManager\Host_Software_6.x.x.x\bin
ThirdPartyReadme.txt	doc directory on Common Array Manager CD

Installation Command Summary

[TABLE 2-6](#) summarizes the commands you need to install the management software using either a GUI wizard or a CLI script.

If you are using the Solaris or Linux operating system and a path is not defined, use `./` to run the commands (`./RunMe.bin`).

If you are using a Windows platform, if the command alone does not work, add `.\` to run the commands (`.\RunMe.bat`).

TABLE 2-6 Common Array Manager Software Installation Commands

Installation Task	Graphical Interface	Command Line Interface
Install or upgrade the management software.	RunMe.bin (Solaris, Linux) RunMe.bat (Windows)	RunMe.bin -c (Solaris, Linux) RunMe.bat -c (Windows)

TABLE 2-6 Common Array Manager Software Installation Commands (*Continued*)

Installation Task	Graphical Interface	Command Line Interface
Uninstall the management software. Note: In Windows you can also remove the software with the Add/Remove Programs feature in Control Panel.	uninstall	uninstall -c
Force a complete cleanup and removal of an installation. Note: Reboot the system after issuing the command in Windows.	Not Available	uninstall -f
Install the array firmware.	Common Array Manager: Upgrade Firmware button on the Storage System Summary page	-

Installing Via Telnet From a Remote Terminal (Solaris and Linux)

Many people prefer to install software by telnetting from a terminal remote to the server that will perform as the actual management host. If this is your case and you are planning to use the graphic installation wizard in Solaris or Linux, you must set the X Windows `DISPLAY` setting so the wizard pages will display locally on the remote terminal.

The set up will depend on the shell you use.

The following shows an example of setting up the local terminal display:

1. **On the local terminal, enter the following to enable display from the Common Array Manager host:**

```
$ xhost +
```

2. **Telnet to the Common Array Manager host (where the Common Array Manager Installation CD or download file is located, and where the Common Array Manager will be installed):**

```
telnet n.n.n.n
```

3. **After logging in, switch user to root:**

```
$ su -
```

```
Password:
```

4. Enter and export the following `DISPLAY` variable:

```
# DISPLAY=mgt_server.your_net:0.0; export DISPLAY
```

where `mgt_server.your_net` is the IP address of the local terminal from which you are telnetting.

5. Confirm that the remote display is working by entering the following command to see if it displays to your local terminal:

```
/usr/openwin/bin/xclock
```

Installing on Solaris OS

The following covers installing the management software on a host running the Solaris Operating System as described in the following sections:

- [“Using a GUI to Install on the Solaris OS” on page 15](#)
- [“Using a CLI to Install on the Solaris OS” on page 21](#)

Using a GUI to Install on the Solaris OS

You can use a wizard to install the Common Array Manager software on a SPARC system running the Solaris 8, 9, or 10 Operating System, or on an X86 or X64 System running the Solaris Operating System.

The array installation files and installers are provided in a compressed `.bin` file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in [“Check the installation space requirements.” on page 9](#).

▼ To Install the Software (Solaris):

You can install from a CD or from a download of the install files from the Sun Software Download Center. If installing from a download, run `untar filename` to unpack the file, then change to the `Host_Software_6.x.x.x` directory and begin the following procedure at [Step 3](#).

1. Log in to the management host Solaris OS as `root`.

2. Insert the host software installation CD into a drive on the management host.

If the compressed installation files do not appear in a directory window:

a. Change to the `/cdrom/cdrom0` directory:

```
cd /cdrom/cdrom0
```

b. Display the contents of the CD:

```
ls -l
```

3. Review the `README.txt` file for the latest information on the product and the installation process.

4. To begin unpacking the contents of the compressed installation file, enter the following command or click the `RunMe` icon if using a file manager:

```
./RunMe.bin
```

The files are unpacked in the default directory - `/var/opt/CommonArrayManager`.

The `Host_Software_6.x.x.x` directory is unpacked into the default directory.

The unpacking process takes a couple of minutes. The contents of this directory includes:

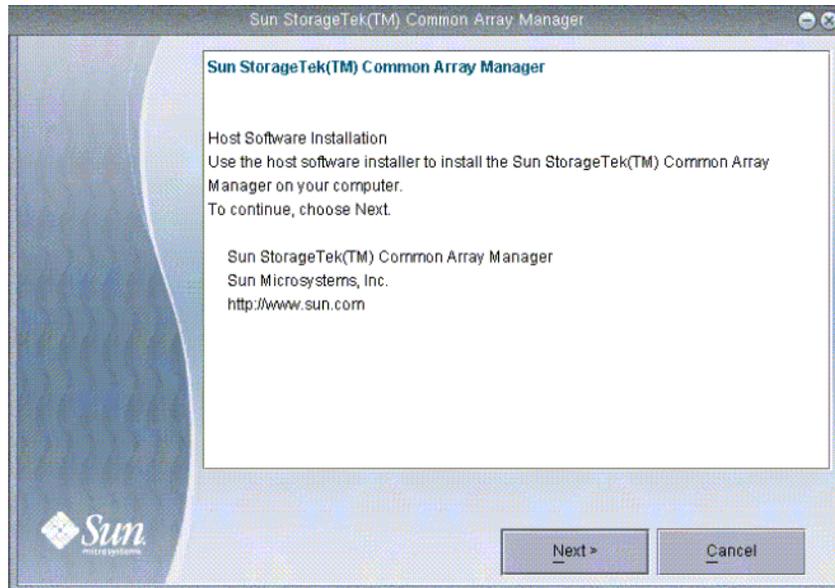
- `bin/tools`
- `bin/iam`
- `bin/uninstall`
- `components/`
- `util/`

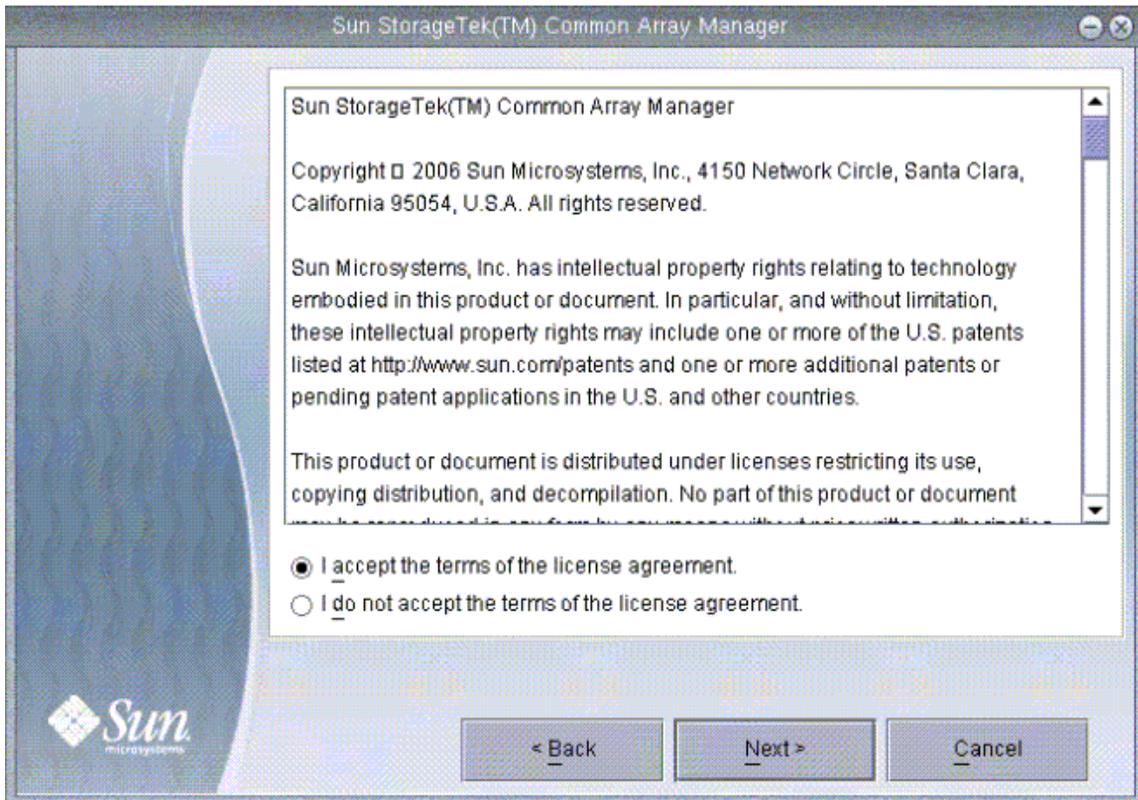
If the wizard screen is not redisplayed or if you receive an error message, recheck that the host requirements in [“Check the installation space requirements.”](#) on page 9 are met.

5. Click Next.

Summary information about the installation is displayed.

6. Click Next to display the license agreement screen.



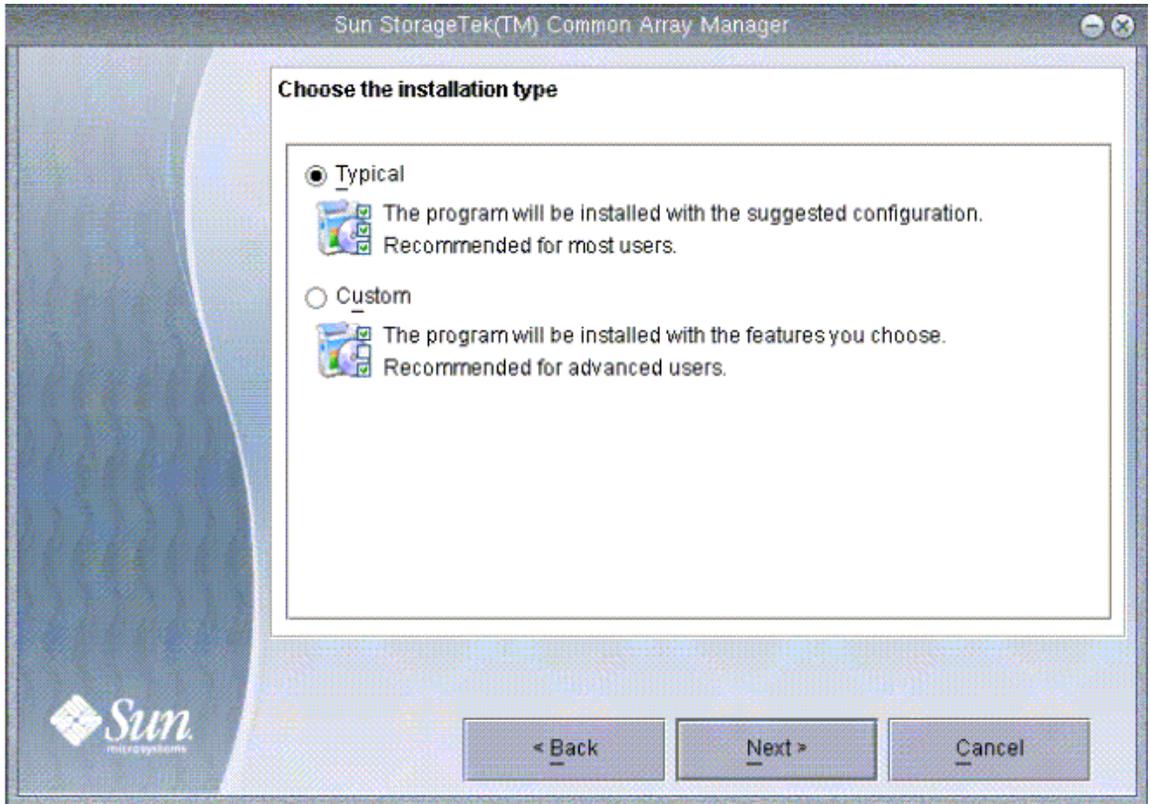


7. Click the radio button to accept the license agreement, and then click Next to continue the host installation.

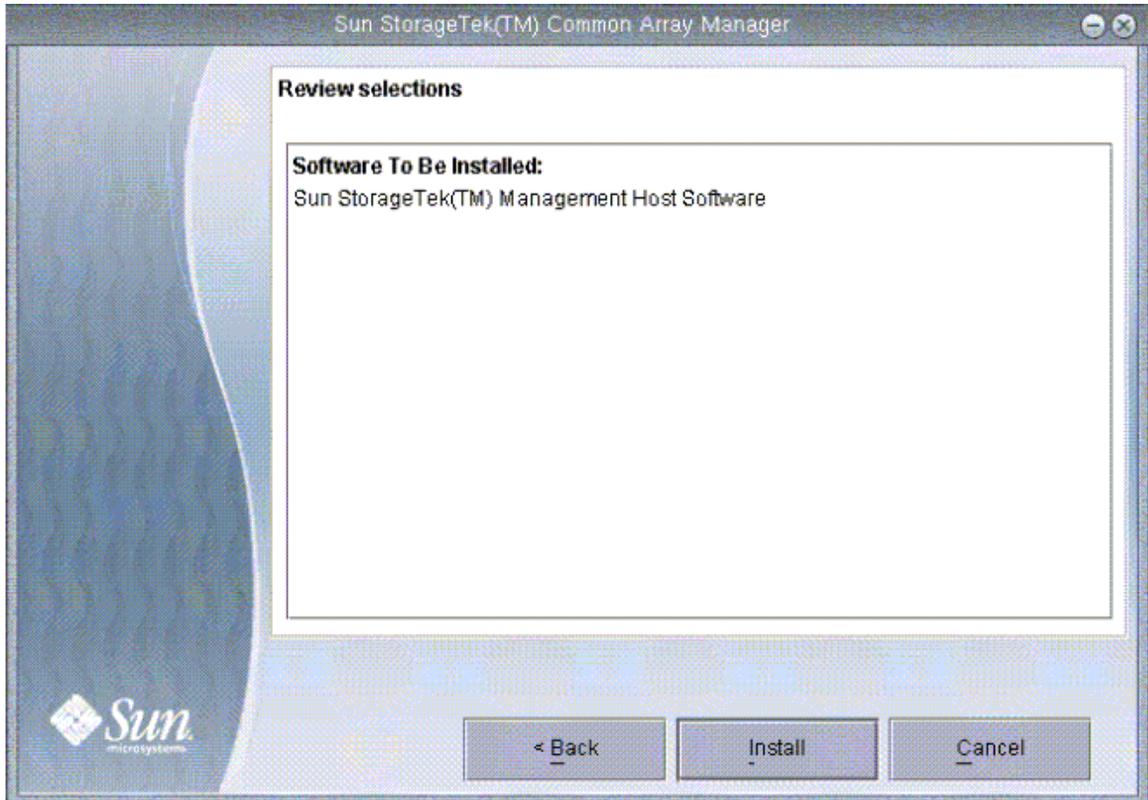
8. When prompted to select the installation type, do one of the following:

- To install the entire software package, select Typical, then click Next.
- To install individual software, select Custom, and click Next.

If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

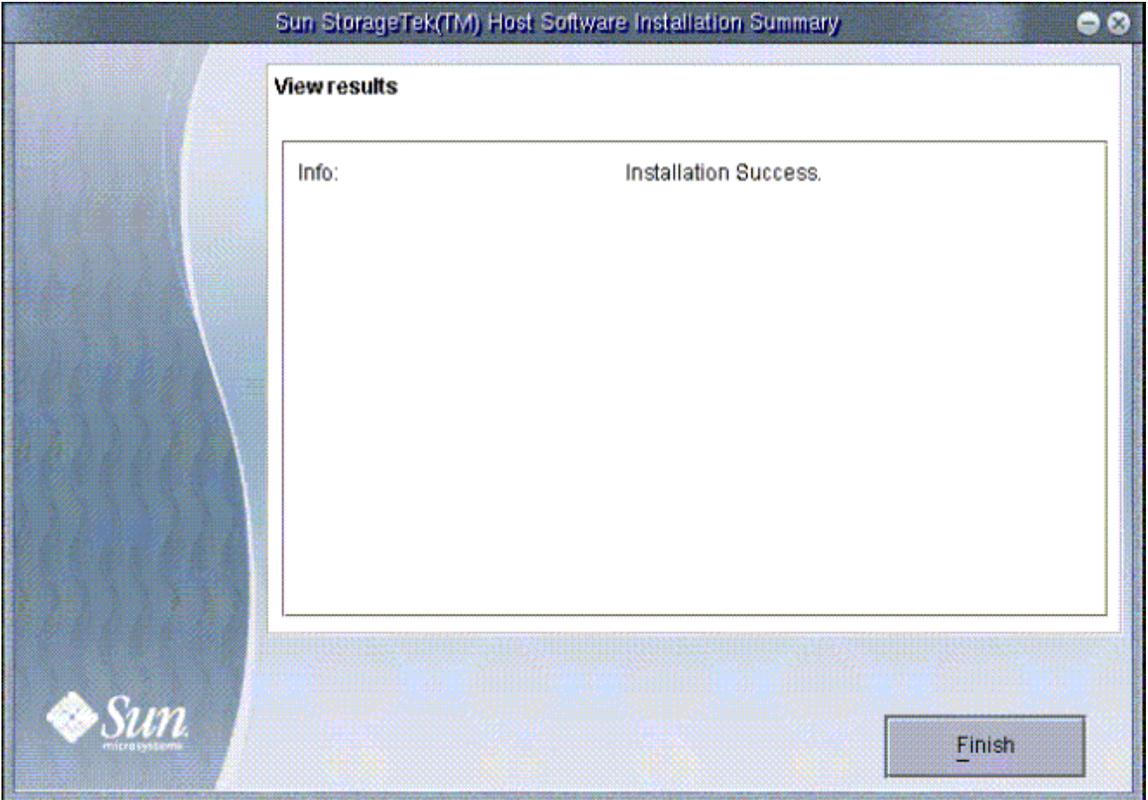


9. When prompted to review your selection, check it and click the Install button.



Note – During the software installation, the progress indicator reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the host installation is complete, the View results screen is displayed.



10. Click Finish.

11. Eject the CD and remove it from the drive.

Using a CLI to Install on the Solaris OS

You can use the CLI to install the Common Array Manager software on a SPARC system running the Solaris 8, 9, or 10 Operating System, or on an X86 or X64 System running the Solaris OS.

The array installation files and installers are provided in a compressed `.bin` file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in “Check the installation space requirements.” on page 9.

▼ To Install the Software Using a CLI (Solaris):

You can install from a CD or from a download of the install files from the Sun Software Download Center. If installing from a download, run `untar filename` to unpack the file, then change to the `Host_Software_6.x.x.x` directory and begin the following procedure at [Step 3](#).

1. Log in to the management host Solaris OS as `root`.
2. Insert the host software installation CD into a drive on the management host.

If the compressed installation file does not appear in a directory window:

- a. Change to the `/cdrom/cdrom0` directory:

```
cd /cdrom/cdrom0
```

- b. Display the contents of the CD:

```
ls -l
```

3. Review the `README.txt` file for the latest information on the product and the installation process.
4. To unpack the contents of the compressed installation file, enter the following command:

```
RunMe.bin -c
```

The files are unpacked in the default directory - `/var/opt/Common Array Manager`.

The `Host_Software_6.x.x.x` directory is unpacked into the default directory. To use a different directory, enter the following command:

```
RunMe.bin -c /path-to-new-directory
```

The following message is displayed:

```
Initializing InstallShield Wizard
```

```
Launching InstallShield Wizard
```

The host software installer is launched automatically after the installation files are unpacked and the initial host installer prompt is displayed.

5. When prompted about the license agreement, accept the agreement and press **Return**.
6. When prompted to select the installation type, do one of the following:
 - To install the entire software package, select **Typical**.

- To install individual software, select Custom.

If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

Note – During the software installation, the progress indicator reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the installation is complete, the host software installer Installation Summary screen is displayed.

7. Press **Return** to complete the installation.
8. Eject the CD and remove it from the drive.

Installing on Linux OS

The following covers installing the management software on a host running a Linux Operating System as described in the following sections:

- [“Using a GUI to Install on the Linux OS” on page 23](#)
- [“Using a CLI to Install on the Linux OS” on page 29](#)

Using a GUI to Install on the Linux OS

You can install the Common Array Manager software on a host system running the Red Hat or SUSE Linux Operating System.

The array installation files and installers are provided in a compressed `.bin` file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in [“Check the installation space requirements.” on page 9](#).

▼ To Install the Software (Linux):

You can install from a CD or from a download of the install files from the Sun Software Download Center. If installing from a download, run `untar filename` to unpack the file, then change to the `Host_Software_6.x.x.x` directory and begin the following procedure at [Step 3](#).

1. **Log in to the management host Linux OS as root.**
2. **Insert the host software installation CD into a drive on the management host.**

If the compressed installation files do not appear in a directory window:

- a. **Change to the `/media/cdrom` directory:**

```
cd /media/cdrom
```

- b. **Display the contents of the CD:**

```
ls -l
```

3. **Review the `README.txt` file for the latest information on the product and the installation process.**
4. **To begin unpacking the contents of the compressed installation file, enter the following command or click the `RunMe` icon if using a file manager:**

RunMe.bin

The files are unpacked in the default directory - `/var/opt/CommonArrayManager`.

The `Host_Software_6.x.x.x` directory is unpacked into the default directory.

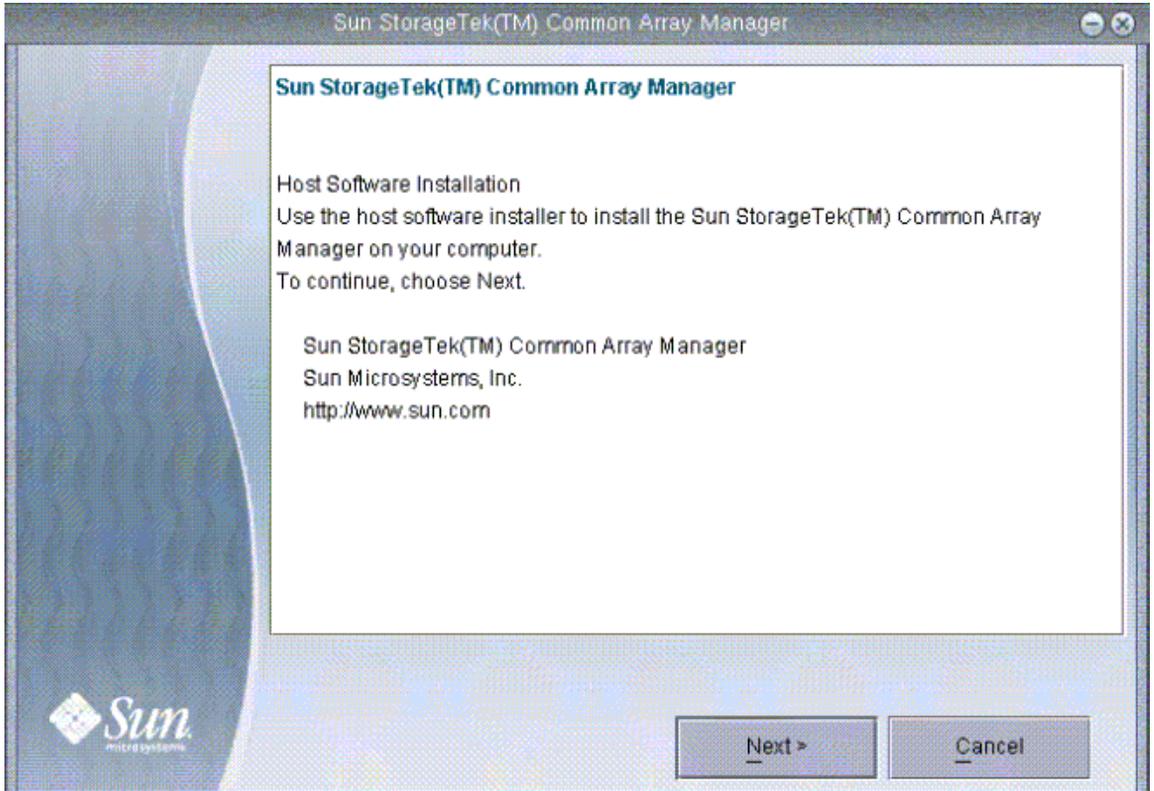
The contents of this directory includes:

- `bin/tools`
- `bin/iam`
- `bin/uninstall`
- `components/`
- `util/`

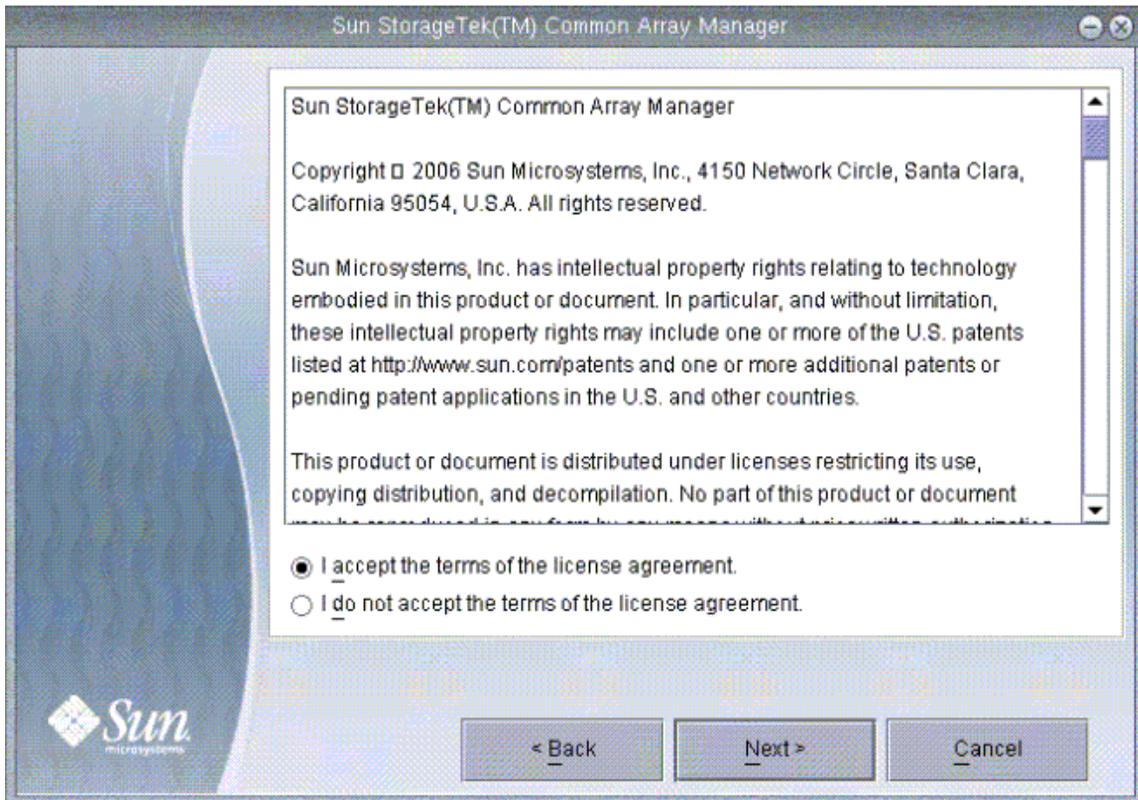
If the wizard screen is not redisplayed or if you receive an error message, recheck that the host requirements in [“Check the installation space requirements.”](#) on page 9 are met.

5. **Click Next.**

Summary information about the installation is displayed.



6. Click Next to display the license agreement screen.

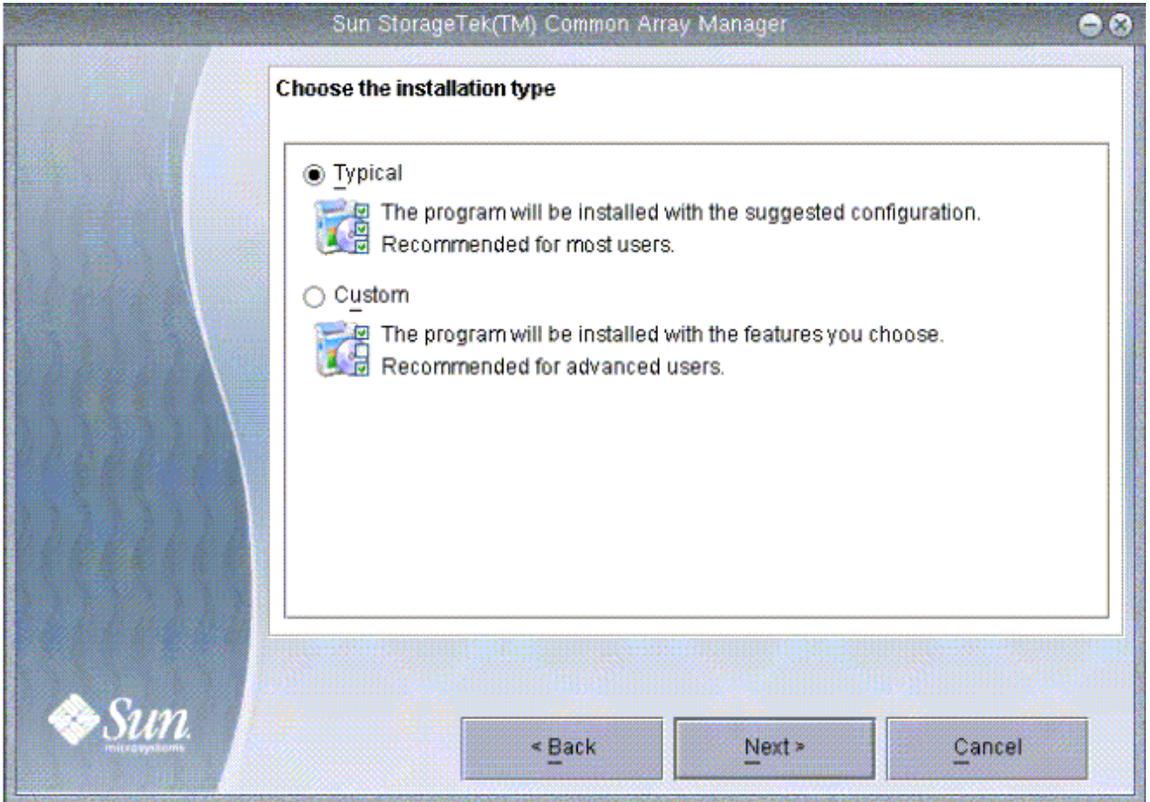


7. Click the radio button to accept the license agreement, and then click Next to continue the host installation.

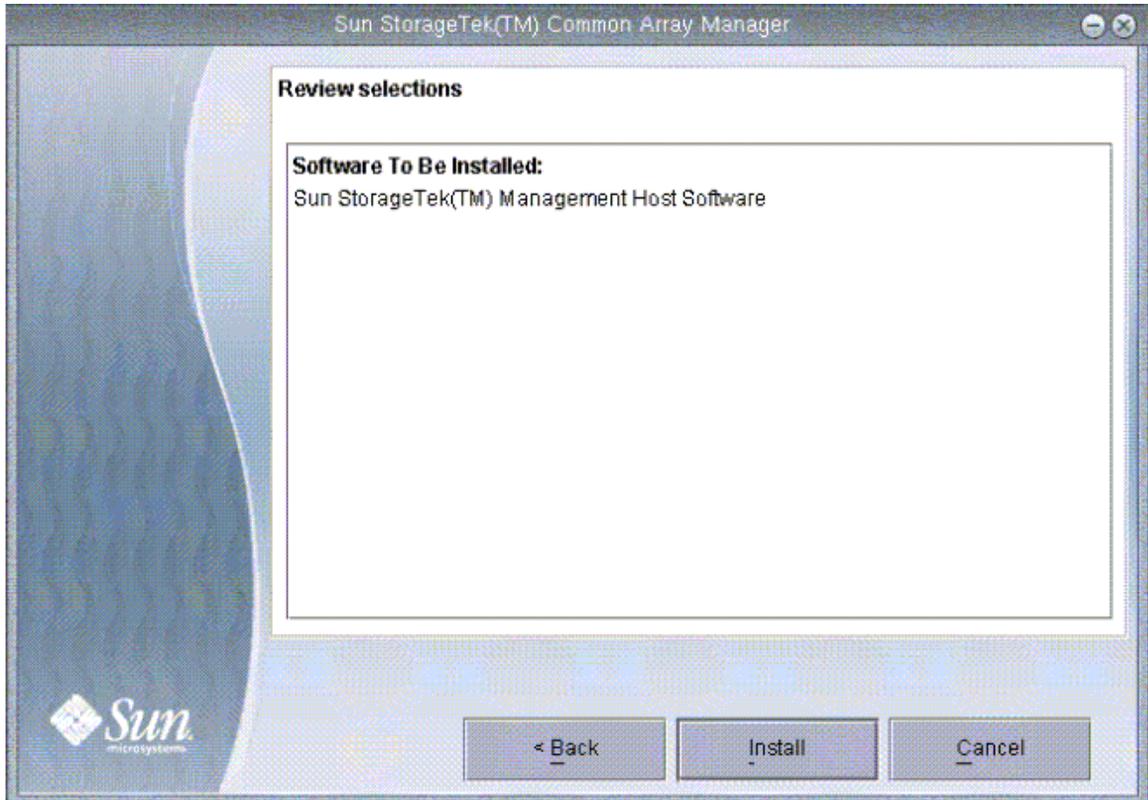
8. When prompted to select the installation type, do one of the following:

- To install the entire software package, select Typical, then click Next.
- To install individual software, select Custom, and click Next.

If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

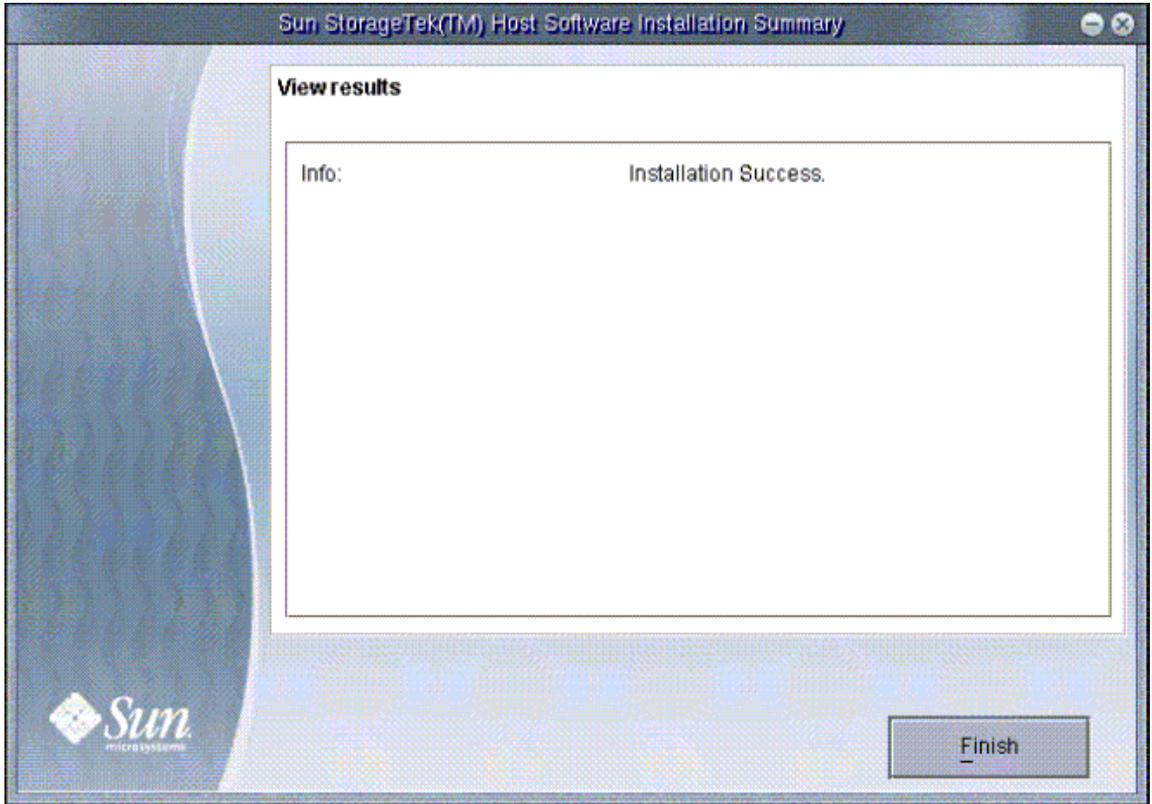


9. When prompted to review your selection, check it and click the Install button.



Note – During the software installation, the progress indicator reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the host installation is complete, the host software installer Installation Summary screen is displayed.



10. Click Finish.

11. Eject the CD and remove it from the drive.

Using a CLI to Install on the Linux OS

You can use the CLI to install the Common Array Manager software on a host system running the Red Hat or SUSE Linux Operating System.

The array installation files and installers are provided in a compressed `.bin` file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in “[Check the installation space requirements.](#)” on page 9.

▼ To Install the Software Using a CLI on a Linux OS:

You can install from a CD or from a download of the install files from the Sun Software Download Center. If installing from a download, run `untar filename` to unpack the file, then change to the `Host_Software_6.x.x.x` directory and begin the following procedure at [Step 3](#).

1. **Log in to the management host Linux OS as root.**
2. **Insert the host software installation CD into a drive on the management host.**
If the compressed installation file does not appear in a directory window:

- a. **Change to the `/media/cdrom` directory:**

```
cd /media/cdrom
```

- b. **Display the contents of the CD:**

```
ls -l
```

3. **Review the `README.txt` file for the latest information on the product and the installation process.**
4. **To unpack the contents of the compressed installation file, enter the following command:**

```
RunMe.bin -c
```

The files are unpacked in the default directory:
`/var/opt/CommonArrayManager/Host_Software_6.x.x.x`

The `Host_Software_6.x.x.x` directory is unpacked into the default directory. To use a different directory, enter the following command:

```
RunMe.bin -c /path-to-new-directory
```

The following message is displayed:

```
Initializing InstallShield Wizard
```

```
Launching InstallShield Wizard
```

The host software installer is launched automatically after the installation files are unpacked and the initial host installer prompt is displayed.

5. **When prompted about the license agreement, accept the agreement and press Return.**

6. When prompted to select the installation type, do one of the following:

- To install the entire software package, select Typical.
- To install individual software, select Custom.

If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

Note – During the software installation, the progress indicator reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the installation is complete, the host software installer Installation Summary screen is displayed.

- 7. Press Return to complete the installation.**
- 8. Eject the CD and remove it from the drive.**

Installing on Windows OS

The following covers installing the management software on a host running a Microsoft Windows Operating System as described in the following sections:

- [“Using a GUI to Install on a Windows OS” on page 31](#)
- [“Using a CLI to Install on a Windows OS” on page 37](#)

Using a GUI to Install on a Windows OS

You can use a wizard to install the Common Array Manager software on a system running Windows 2000, 2003, or XP. The system must have Windows Installer 3.1 already installed. If not, download it from the Microsoft Download site.

You must be logged in to the Windows system as an administrative user. For information on setting up administrative users and root users on Windows, see [“Adding a Administrator User” on page 101](#).

The array installation files and installers are provided in a compressed file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in [“Check the installation space requirements.”](#) on page 9.

▼ To Install the Software (Windows):

1. Insert the host software installation CD into a local drive.

If the compressed installation file does not appear in a directory window, click on the CD drive (example: D:).

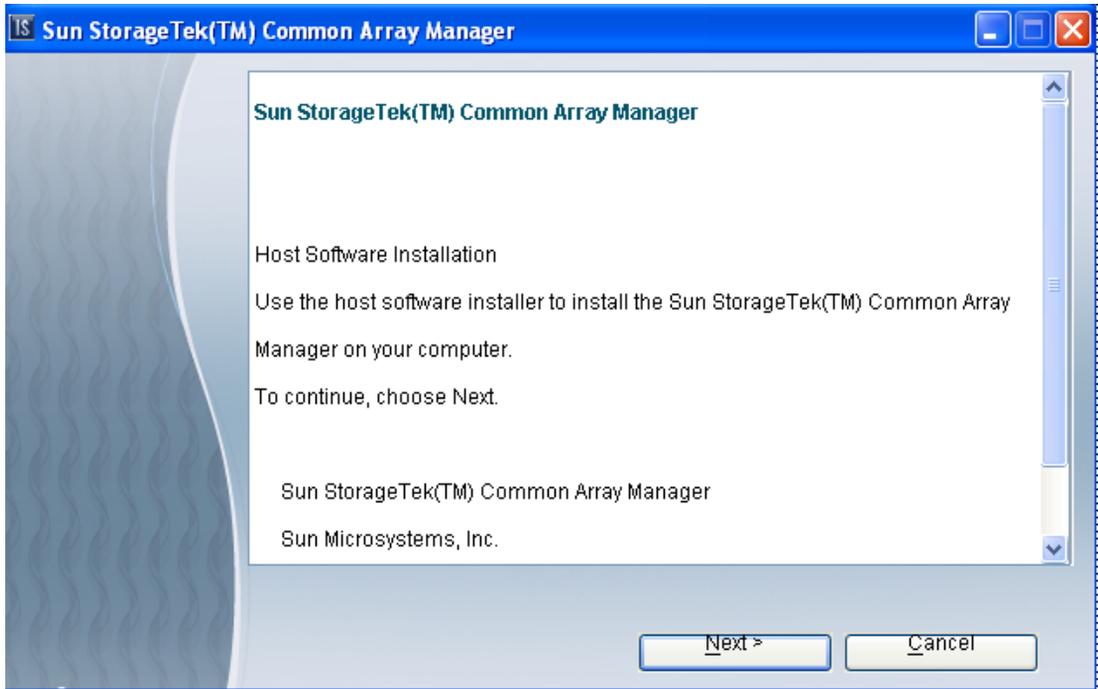
2. To begin unpacking the contents of the compressed installation file, double click on the following icon:

RunMe

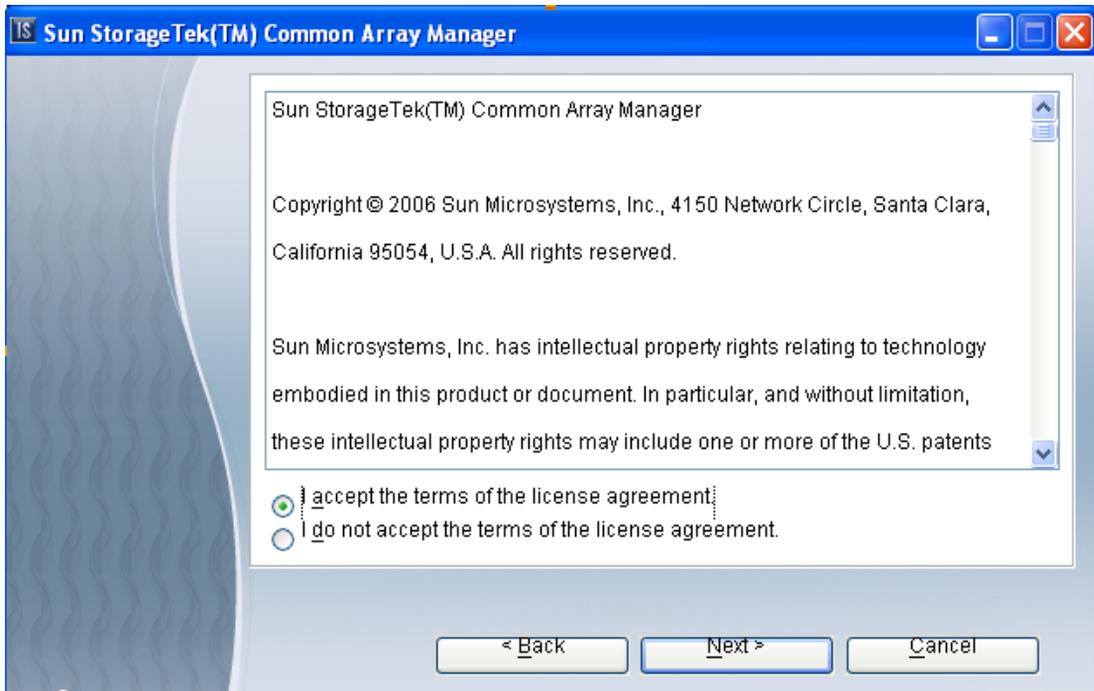
The files are unpacked in the default directory path <system drive>:\Sun\CommonArrayManager\Host_Software_6.x.x.x\bin. When the unpacking is complete, the host software installer begins automatically.

If the wizard screen is not redisplayed or if you receive an error message, check that the host requirements in [“Check the installation space requirements.”](#) on page 9 are met.

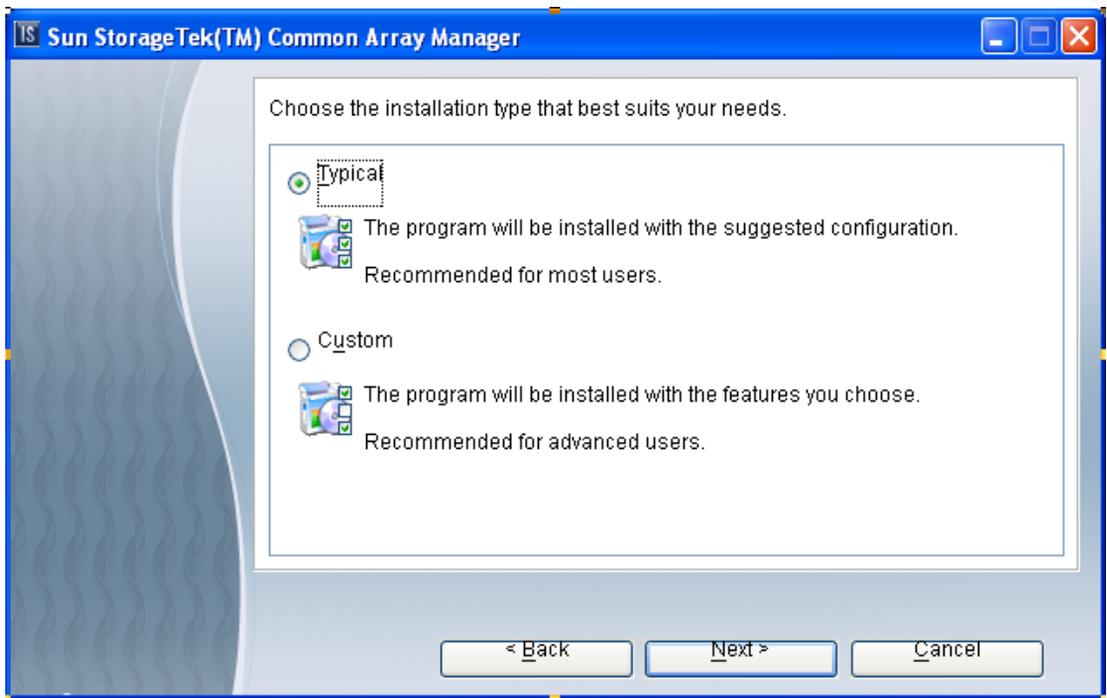
Summary information about the installation is displayed.



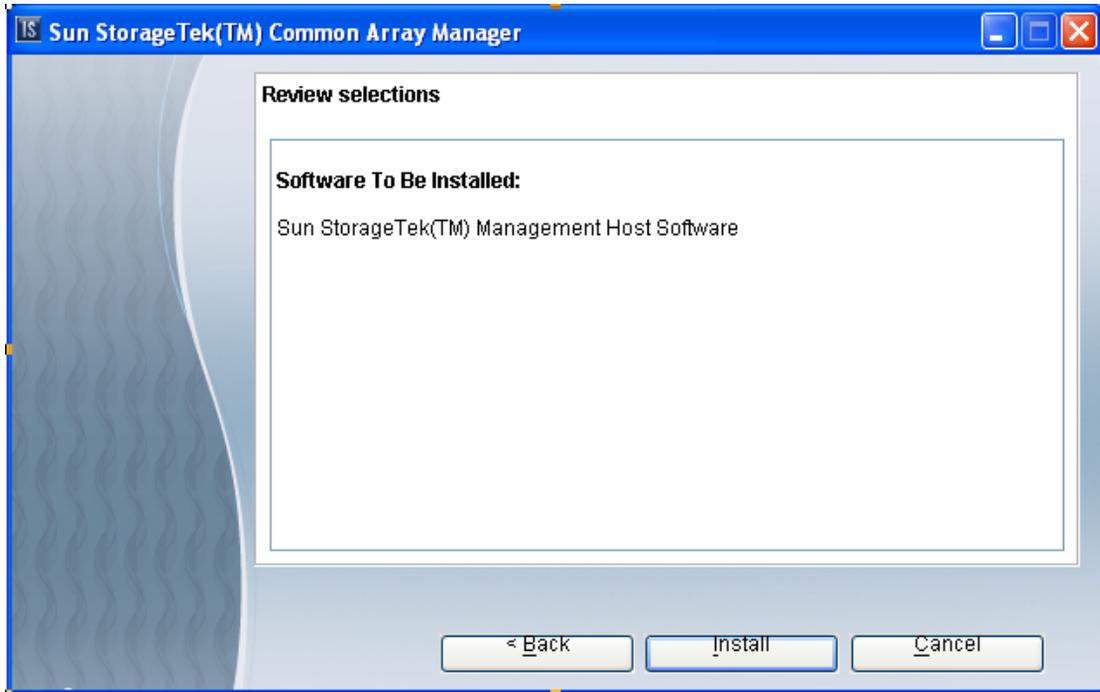
3. Click Next to begin the installation of the software.
The license agreement screen is displayed.



4. Click the radio button to accept the license agreement, and click Next to continue the host installation.
5. When prompted to select the installation type, do one of the following:
 - To install the entire software package, select Typical, and click Next.
 - To install individual software, select Custom, and click Next.If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

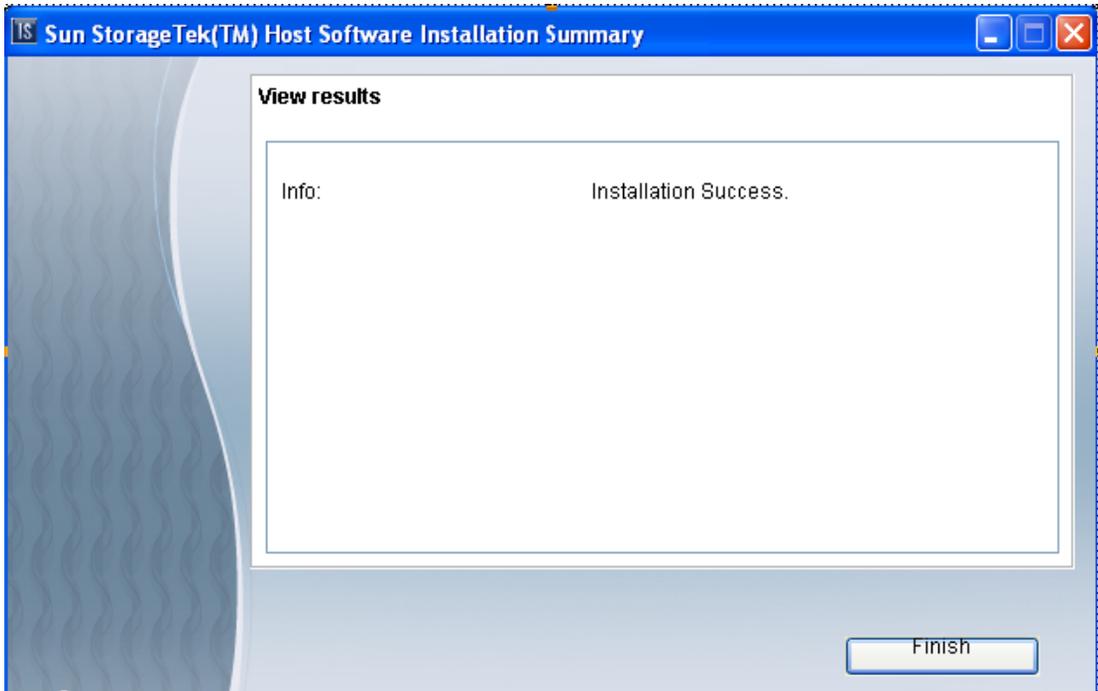


6. When prompted to review your selection, check it and click the Install button.



Note – During the host software installation, the progress indicator initially reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the installation is complete, the View Results screen reports the installation status.



7. **Click Finish.**
8. **Eject the CD and remove it from the drive.**
9. **After the installation on a Windows platform, you will need to configure the Windows firewall.**

Set the Windows firewall to allow an exception for port 6789. Some firewall programs prompt for your agreement to allow new programs to communicate through the firewall, and set the port for you. Refer to your firewall documentation for instructions on how to open a port through the firewall.

Using a CLI to Install on a Windows OS

You can use the CLI to install the Common Array Manager software on a system running Windows 2000, 2003, or XP.

The array installation files and installers are provided in a compressed file on the CD.

The process unpacks the contents of the file on the host and then proceeds with the installation.

Note – Before you continue, check that all of the requirements are met, as listed in [“Check the installation space requirements.”](#) on page 9.

▼ To Install the Software Using a CLI (Windows):

1. Log into Windows as Administrator.

2. Insert the host software installation CD into a local drive.

If the compressed installation file does not appear in a directory window, access the CD drive (example: D:).

3. Review the `README.txt` file for the latest information on the product and the installation process.

4. To unpack the contents of the compressed installation file in the default directory, enter the following command:

```
RunMe.bat -c
```

The following message is displayed:

```
Initializing InstallShield Wizard
```

```
Launching InstallShield Wizard
```

The files are unpacked in the default directory:

```
<system drive>:\Sun\CommonArrayManager\Host_Software_6.x.x.x
```

When the unpacking is complete, the host software installer begins automatically.

5. When prompted about the license agreement, accept the agreement and press Return.

6. When prompted to select the installation type, do one of the following:

- To install the entire software package, select Typical.
- To install individual software, select Custom.

If you select Custom, you will be prompted to choose either the management software or the remote CLI client to install.

Note – During the software installation, the progress indicator initially reflects 0% for a significant portion of the installation process. This is the expected progress indication for the typical installation process.

When the installation is complete, the host software installer Installation Summary screen is displayed.

7. **Press Return.**
8. **Eject the CD and remove it from the drive.**
9. **After the installation on a Windows platform, you will need to configure the Windows firewall.**

Set the Windows firewall to allow an exception for port 6789. Some firewall programs prompt for your agreement to allow new programs to communicate through the firewall, and set the port for you. Refer to your firewall documentation for instructions on how to open a port through the firewall.

Uninstalling Software

If you need to remove the Common Array Manager software from your system, there are wizards and scripts to uninstall the software and its baseline firmware. Also refer to [“Backing Out of Firmware Upgrades” on page 63](#).

▼ To Uninstall the Management Software on Solaris or Linux Using the GUI

1. **Log in to the management host as root.**
2. **Change to the bin directory in the installation directory as described in [“Locating Files and Logs” on page 12](#).**

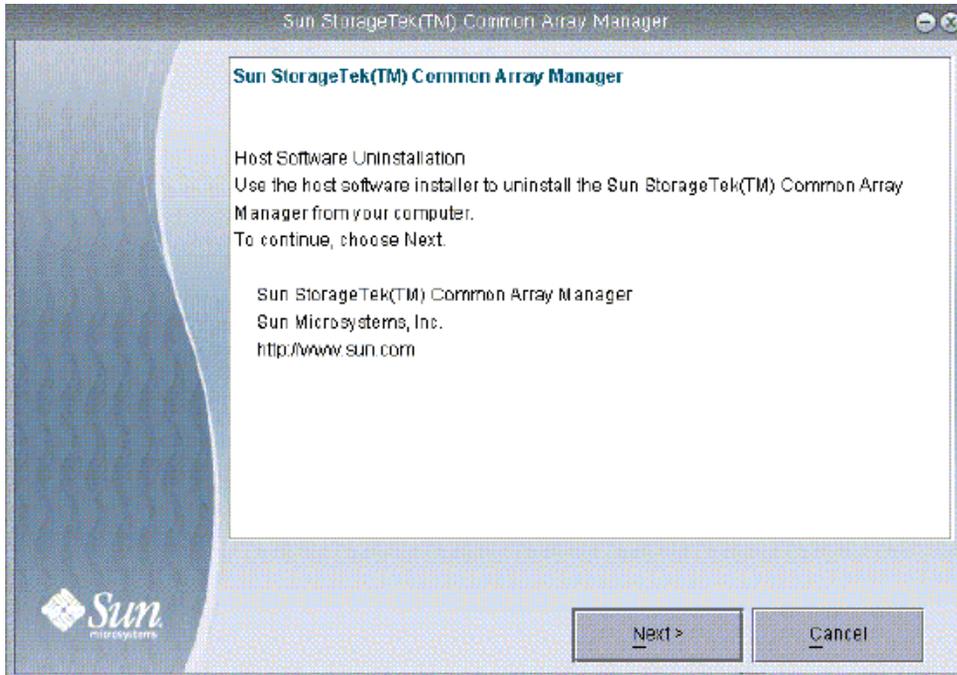
Example:

```
cd /var/opt/CommonArrayManager/Host_Software_6.x.x.x/bin
```

3. **Run the uninstall command.**

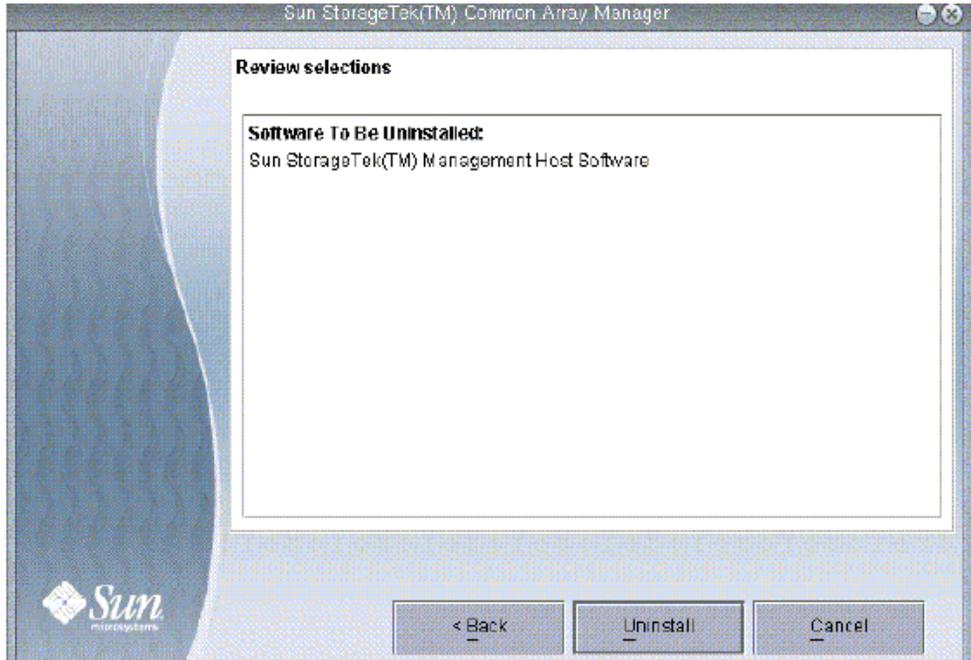
```
./uninstall
```

The uninstall GUI opens.

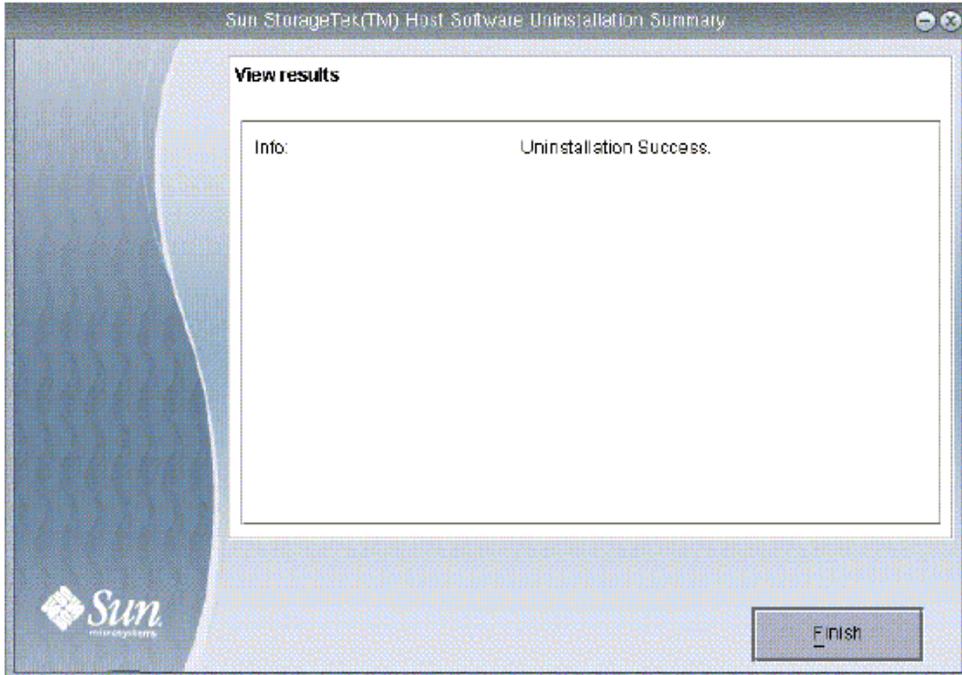


4. Click Next.

The Review Selections window is displayed.



5. **Select the software to be uninstalled, and click the Uninstall button.**
When the uninstall completes, the View Results screen is displayed.



6. Click Finish.

▼ To Uninstall the Management Software on Solaris or Linux Using the CLI

1. Log in to the management host as `root`.
2. Change to the `bin` directory in the installation directory as described in [“Locating Files and Logs”](#) on page 12.

Example:

```
cd /var/opt/CommonArrayManager/Host_Software_6.x.x.x/bin
```

3. Execute the `uninstall` command

```
./uninstall -c
```

4. Follow the prompts in the install console dialog.

If for any reason the uninstallation has failed, run the `uninstall` script with the `-f` option:

```
./uninstall -f
```

▼ To Uninstall the Management Software on a Windows System

1. Navigate to the host CD bin directory:

```
<system drive>:\Sun\CommonArrayManager\Host_Software_6.x.x.x\bin
```

2. Click on the `uninstall.bat` icon.

To run the uninstaller in console mode, enter: `uninstall.bat -c`

To clean up (remove all associated files), enter: `uninstall.bat -f`

Alternatively, you can remove the Common Array Manager using the Control Panel - Add/Remove Programs.

3. Follow the uninstall wizard steps as described in the [“To Uninstall the Management Software on Solaris or Linux Using the GUI”](#) on page 39.

Installation Troubleshooting

You can verify the installation by bring up the Sun StorageTek Common Array Manager browser or CLI prompt, as discussed in [“Starting the Management Software”](#) on page 45 of the next chapter.

In the browser, you can click the Version button to verify the release version information.

At the CLI prompt, enter:

```
sccs list mgmt-sw
```

Reviewing the Installation Logs

You can also verify the success of the installation by reviewing the installation logs. Note that the installation logs are mainly intended for debugging by developers. By scrolling to the end of the installation log, you can verify the successful installation message or any error messages.

If an error occurs, review the requirements in [“Check the installation space requirements.”](#) on page 9. Also, review the `Readme.txt` file located in the installation directory (see [“Locating Files and Logs”](#) on page 12) for late-breaking information and attempt a reinstallation.

The installation logs are located:

- Solaris:

`/var/sadm/install/se6000`

- Linux:

`/var/opt/cam/`

- Windows:

`\Program Files\Common Files\Sun Microsystems\se6000`

For Windows, verify that you made the firewall and registry changes after you finished the installation.

Next Steps

You are now ready to log in to the browser interface, discover the array, upgrade the array firmware, and set up an array.

Registering, Upgrading, and Initially Setting Up the Array

This chapter provides an overview of the management software and the steps required for first time you log in. It contains the following sections:

- “Starting the Management Software” on page 45
- “Setting Up the Initial Common Array Management Software Information” on page 49
- “Providing Site Information” on page 49
- “Subscribing to Auto Service Request” on page 50
- “Registering the Array” on page 52
- “Upgrading the Array Firmware” on page 57
- “Configuring Array Administration Functions” on page 65
- “Setting Up Notification for Fault Management” on page 69
- “Adding Users And Assigning Roles” on page 71
- “Setting Up Auto Service Request” on page 78
- “Configuring In-Band Management” on page 82
- “Next Steps” on page 85

Starting the Management Software

The Sun StorageTek Common Array Manager provides two interfaces for accessing the configuration software and the monitoring software for the array:

- A remote scripting command-line interface (CLI) that enables you to run commands interactively from an out-of-band management station, or write scripts to automate certain administrative tasks.

Note – For initial installations, Sun recommends using the browser interface. Advanced users can use CLI commands equivalent to the steps presented in this document.

For access instructions, see [“Logging In and Out Using the CLI” on page 46](#).

- A browser interface for running the graphical user interface on any management host that is connected to the site LAN. The web-based browser interface is the primary interface for configuring, managing, and monitoring the system.

For access instructions, see [“Logging In Using the Browser Interface” on page 47](#).

When you register an array in Common Array Manager, the wizard analyzes the firmware installed on the array. If the firmware placed on the host is newer than the firmware installed on the array, the wizard performs an array firmware upgrade.

Logging In and Out Using the CLI

The following explains how to log in to and out of a remote host using the CLI. Do so either by remotely logging in to a management software station or by using the Solaris remote client on a remote host.

1. Access the CLI directory:

```
cd /opt/SUNWsesscs/cli/bin
```

Note – Be sure to add the `/opt/SUNWsesscs/cli/bin` directory to your path.

2. Log in by typing the following command:

```
% sscs login -h cam-hostname -u username
```

where:

- *cam-hostname* is the management host machine where you installed the software.
- *username* is one of the defined users in the management host software. See [“Adding Users And Assigning Roles” on page 71](#).

You can now use CLI commands to perform the same software operations as those available in the browser interface. For more information:

- For Solaris, see the `sscs(1M)` man page, located in `/opt/SUNWsesscs/cli/man`.
- For Linux, see the `sscs(1M)` man page, located in `/opt/sun/cam/se6x20/cli/man/man1m/sscs.1m`.

- For Windows, see *Sun StorageTek Common Array Manager sscs(1M) CLI Quick Reference*.

Note – To locate the `sscs(1M)` man page, you must update your `MANPATH` variable or use the `-m` option with the `man` command.

3. Log out by typing the following command:

```
# sscs logout
```

Logging In Using the Browser Interface

You can start the management software on any system that is connected to the user LAN. Before you log in, you need to set up a storage role or group in your OS and assign users to it. See [“Adding Users And Assigning Roles” on page 71](#)

1. Open a supported web browser.

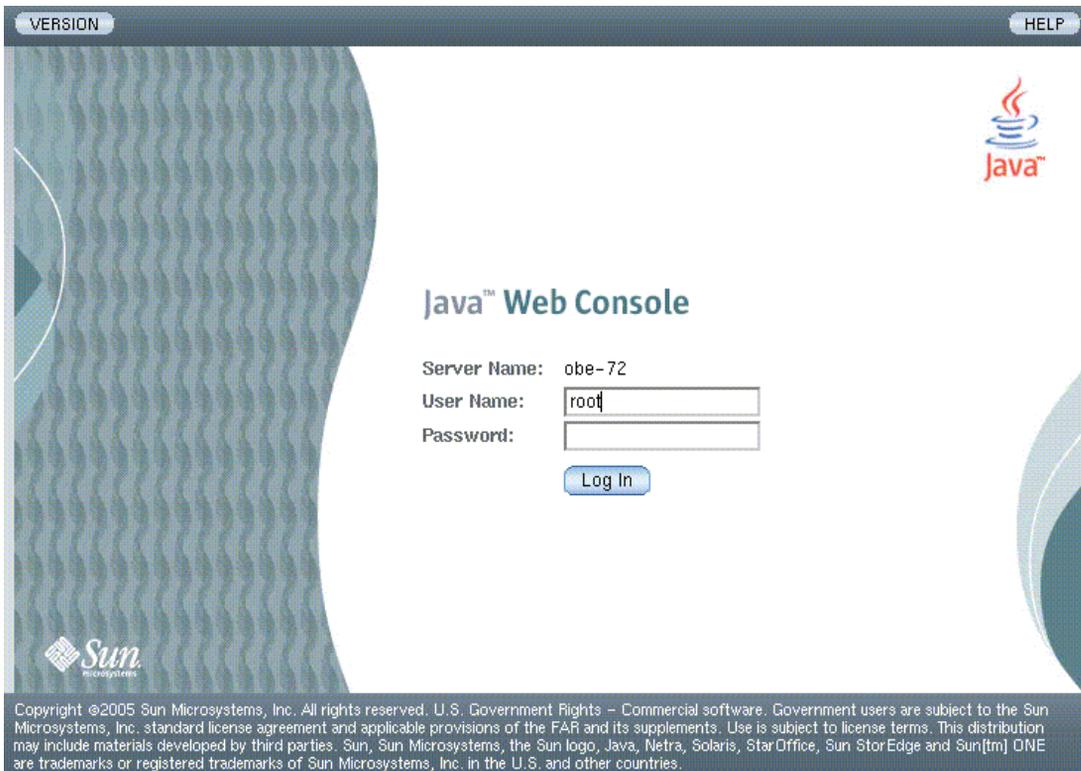
Note – For information about supported web browsers, see the *Sun StorageTek Common Array Manager Release Notes*.

2. Enter the IP address of the management host using this format:

```
https://cam-management-host:6789
```

cam-management-host is the IP address of the host where you installed the Sun StorageTek Common Array Manager software.

The login page is displayed.



3. Login with the root or storage user name.

You need root and storage users on the system. For more information about user names and roles, see [“Adding Users And Assigning Roles” on page 71](#).

For Solaris and Linux, `root` already exists for the machine on which you installed the software.

For Windows, you will have to create a root user name with Windows administrative privileges. For more information about adding users and roles to Windows, see [“Adding User Roles and New Users to Windows” on page 101](#).

4. Click Log In.

The Java Web Console page is displayed.

At this point, you are logged in to the system.

Note – The connection closes automatically if there is no activity for approximately 15 minutes.

5. Select Sun StorageTek Common Array Manager from the Storage section of the Sun Java Web Console page.

Deciding on In-Band or Out-of-Band Management

By default, the management host communicates with the arrays out-of-band over Ethernet. You can also configure in-band management to travel over the data path (using Fibre Channel, etc.) between data host and the array instead. You can configure in-band management either before beginning to configure the array or after registering the array using out-of-band management.

For information about in-band management, see [“Configuring In-Band Management” on page 82](#).

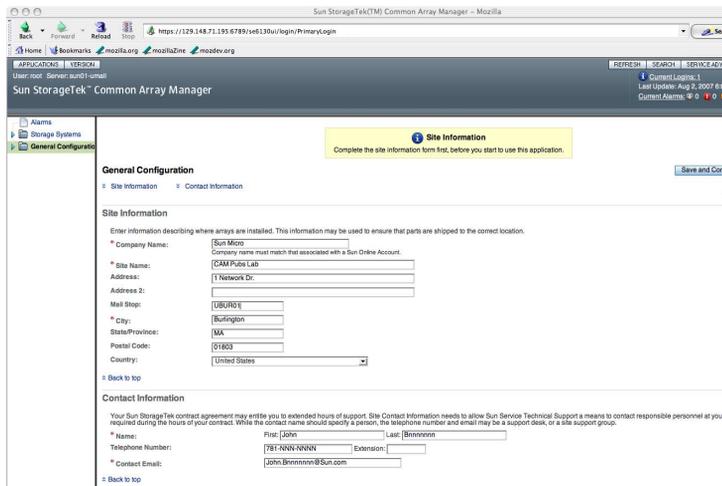
Setting Up the Initial Common Array Management Software Information

This section describes the operations you need to perform the first time you open the management software after installing it. The sections include:

- [“Providing Site Information” on page 49](#)
- [“Subscribing to Auto Service Request” on page 50](#)
- [“Registering the Array” on page 52](#)
- [“Finding and Registering Arrays” on page 53](#)
- [“Unregistering an Array” on page 56](#)
- [“Upgrading the Array Firmware” on page 57](#)

Providing Site Information

The first time you open the Common Array Manager after a first-time installation, the Site Information page displays.



The General Configuration page contains information about the site, rather than the array, and differs from the Administration page.

6. Enter the following information for your site:

- Company Name
- Contract Number
- Site Name
- Address
- Mail Stop
- City, State, Zip Code and Country
- Contact Name

The required fields are indicated by an asterisk: (*).

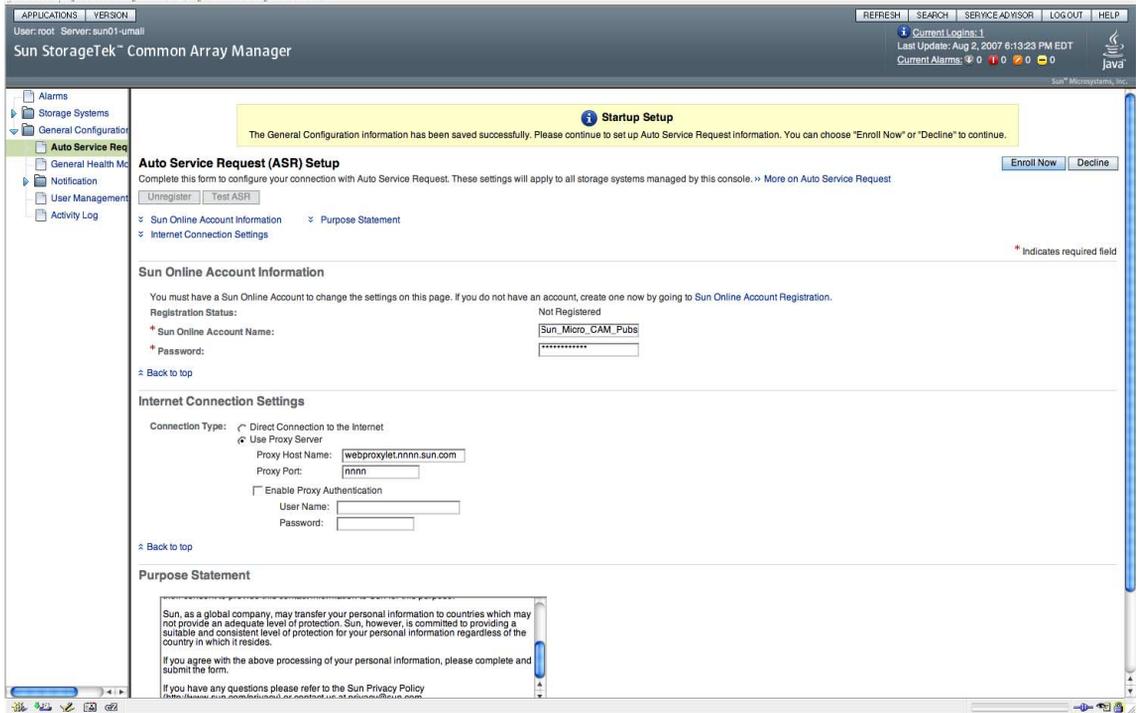
7. Click Save and Continue Setup.

Once you have saved the Site Information page, the Auto Service Request page displays during initial installations.

Subscribing to Auto Service Request

During the initial Common Array Manager installation, the software prompts you to register with the Auto Service Request service by displaying the Auto Service Request (ASR) Setup page.

Auto Service Request (ASR) monitors the array system health and performance and automatically notifies the Sun Technical Support Center when critical events occur. Critical alarms generate an Auto Service Request case. The notifications enable Sun Service to respond faster and more accurately to critical on-site issues.



For more information on Auto Service Request, see [“Setting Up Auto Service Request” on page 78](#).

After you register with ASR, you can choose which arrays you want to be monitored.

To register with the Auto Service Request service during the Common Array Manager installation, on the Auto Service Request Setup page:

1. Provide the following information:
 - Sun online account username and password
 - Type of internet connection to be used
2. Choose to accept or defer Auto Service Request.
 - a. To accept Auto Service Request, click OK.
 - b. To defer ASR service registration until later, click Decline.

The Storage System Summary page is displayed blank with no arrays listed.

On all subsequent logins to the Common Array Manager the Storage System Summary page is displayed with the arrays you registered with the software.

The screenshot shows the Sun StorageTek Common Array Manager web interface. The top navigation bar includes 'APPLICATIONS', 'VERSION', 'REFRESH', 'SEARCH', 'SERVICE ADVISOR', 'LOG OUT', and 'HELP'. The user is logged in as 'root' on server 'sun01-umail'. The main content area is titled 'Storage System Summary' and contains a table of registered storage systems. The table has the following data:

Name	Health	Type	Firmware Version	Total Capacity	Available Capacity	Network Address
pubs	Degraded	6140	06.16.73.10	752.025 GB	681.920 GB	10.8.88.242 (Out-of-band)
Ruby	Degraded	2540	96.17.62.14	2.274 TB	1.337 TB	10.8.87.187 (In-band)

From here, you can carry out the setup tasks described in the following sections, including registering arrays with this software, upgrading the array firmware, renaming arrays, setting the array password, setting the system time, and adding new users.

If you need help navigating the software or the online help, refer to [“Using the Browser Interface”](#) on page 115.

Note – By default, the arrays are managed out-of-band over Ethernet. You can install in-band management, over the data path. To install in-band management, see [“Configuring In-Band Management”](#) on page 82.

Registering the Array

When you first log into the array’s management software, select Storage Systems in the left navigation pane and on the Storage Summary page, click Register. The Array Registration wizard starts and you can choose to either search the subnet for arrays that are not already registered or manually register an array.

Registering arrays are documented in the following sections:

- [“Finding and Registering Arrays” on page 53](#)
- [“Unregistering an Array” on page 56](#)

Finding and Registering Arrays

The registration wizard will automatically discover arrays that are on the same subnet as the management host, or you can point the wizard to the array if it is not on the same subnet as the management host.

If searching for arrays on a subnet, the discovery process displays the percentage of completion while the array management software polls devices in the network to determine whether any new arrays are available. When complete, a list of discovered arrays is displayed.

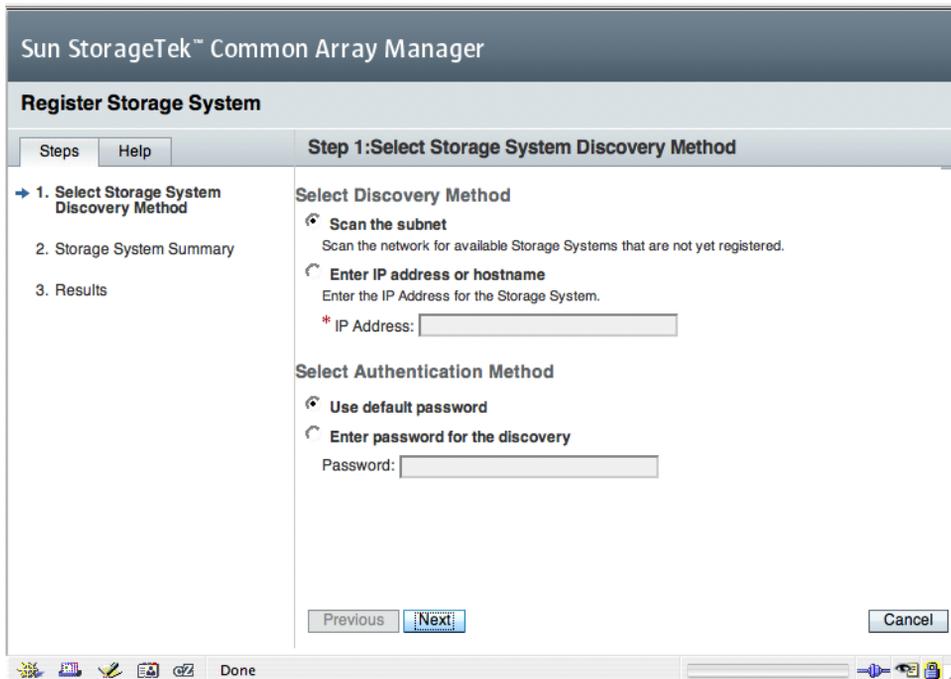
▼ To Register an Array:

- 1. Click Storage Systems.**

The Storage System Summary page is displayed.

- 2. Click Register.**

The Register Storage System wizard is displayed.



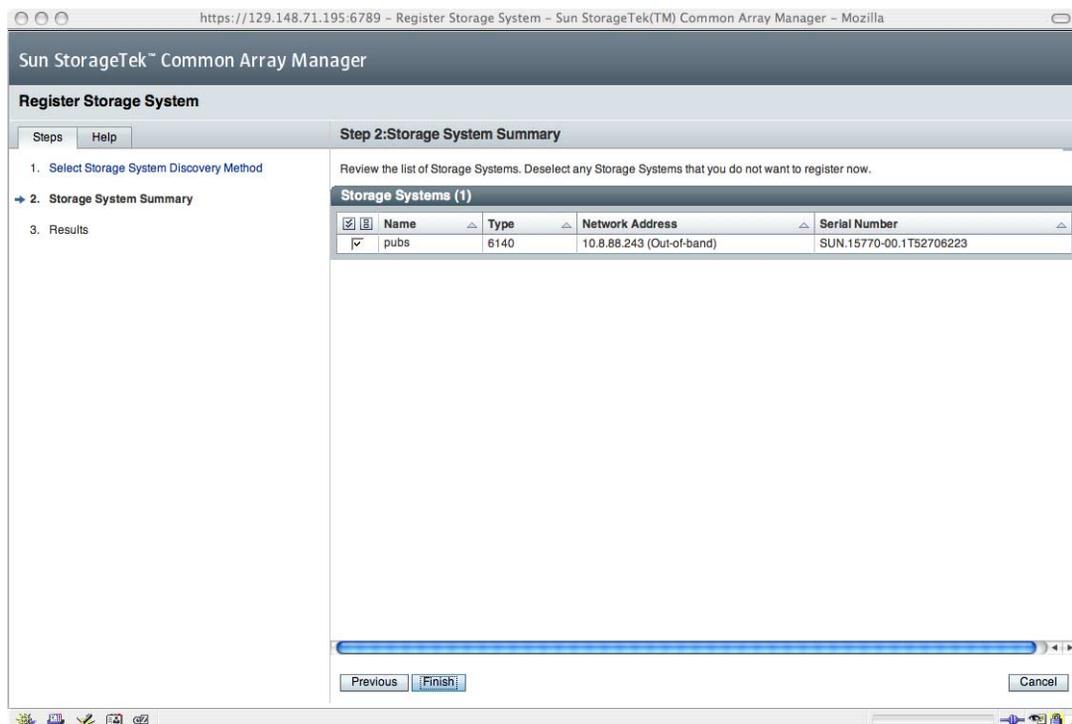
3. In the Register Storage System wizard, select the storage system discovery method you want to use and click Next.

The management software will scan the subnet it is on for unregistered arrays, or you can specify a specific IP address for the array if the array is outside of the storage system subnet. Additionally, you can have it use the default password for arrays or you can enter a password if you have already changed the password on the array.

Note – The password of the array is not a required entry. No array is shipped with a default password. This field is used only if the array being registered is one that was previously managed and had a set password. To give the array a password, see [“Setting an Array Password” on page 67](#).

The wizard then find the array you defined or finds one or more unregistered arrays and adds it to the Storage System Summary page. The following figure is an example Summary page.

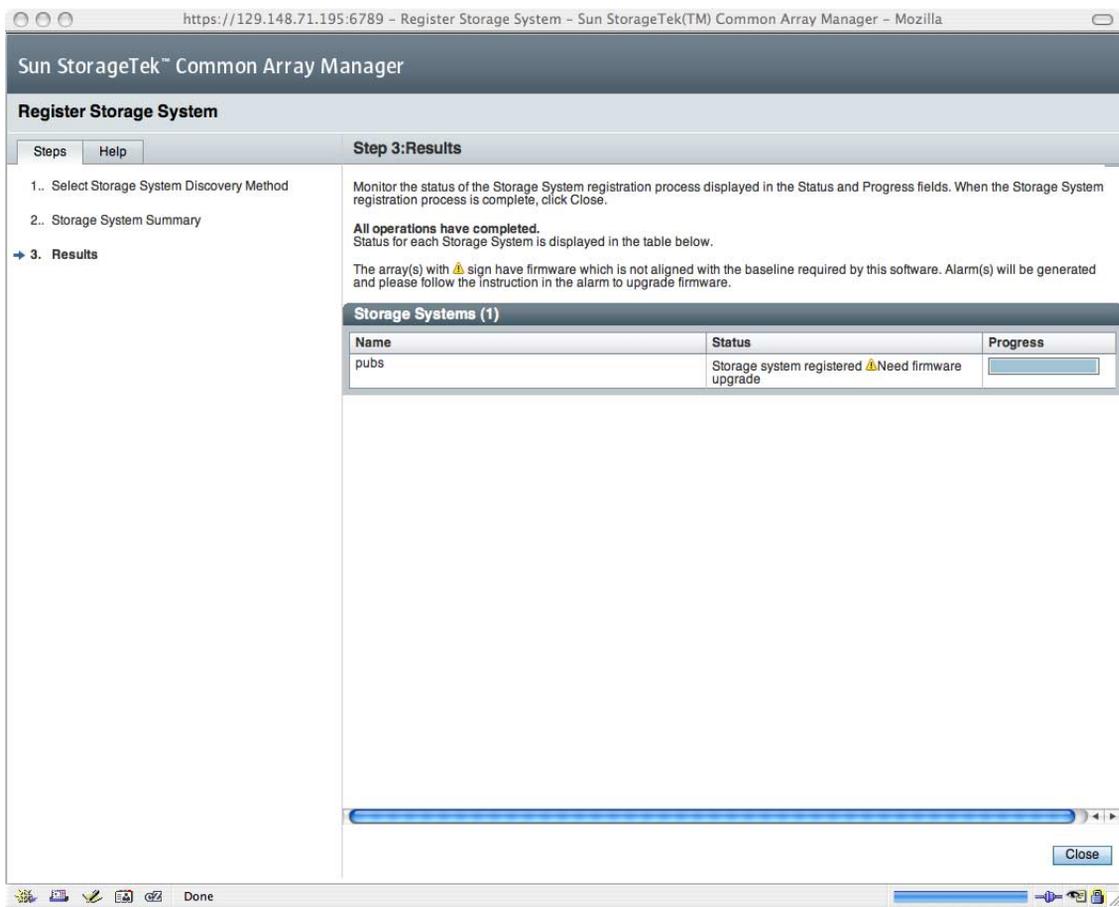
Note – It takes approximately 2 minutes for the software to discover each array.



4. Click finish

The Results page displays, showing whether the array was successfully registered with the software.

The Results page also displays a message if your firmware is not at the baseline to match this version of Common Array Manager software. To upgrade to the baseline firmware, see [“Upgrading the Array Firmware” on page 57](#)



Unregistering an Array

You remove an array from the management software by unregistering the array.

▼ To Unregister an Array:

1. Click Storage Systems.

The Storage System Summary page is displayed.

2. Select the check box to the left of the array you want to remove from the list of registered arrays.

This enables the Remove button.

3. Click Remove.

The array is unregistered and removed from the Storage System Summary.

Upgrading the Array Firmware

You can upgrade your array firmware by clicking the Upgrade Firmware button on the Storage System Summary page or the array's Administration page.

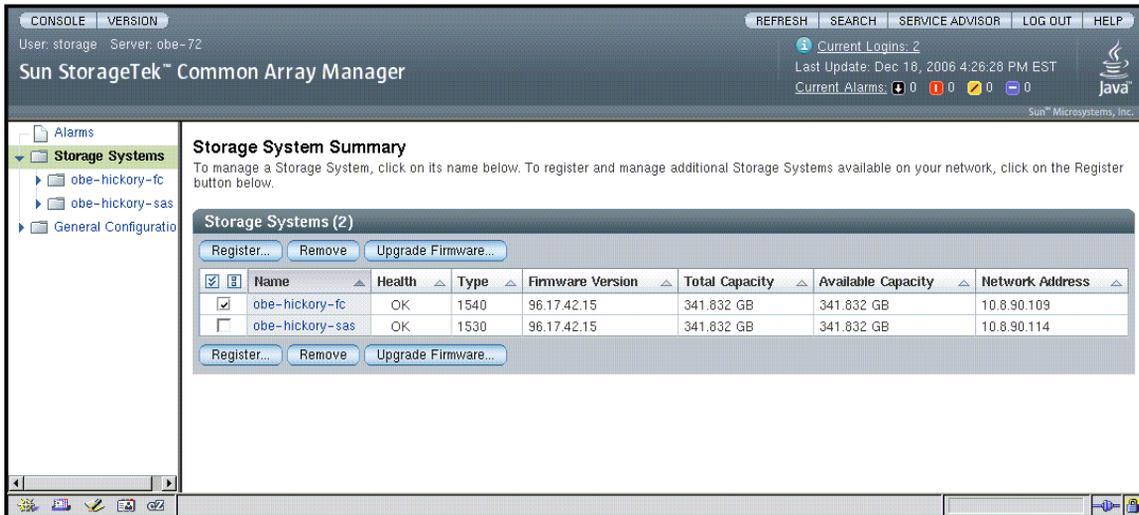
As part of the installation of the Common Array Manager software, the script puts the array firmware files in a directory on the management host (`/var/sadm/swimages/`). When you upgrade the firmware, the software analyzes the firmware installed on the array. If the baseline firmware on the host is newer, and you choose to upgrade, the software performs an array firmware upgrade.

Note – For optimal performance, Sun Microsystems recommends that the firmware on all arrays be at the level of the current firmware baseline. New features are not supported with non-baseline firmware.

Always check the latest Common Array Manager and array Release Notes for release-specific information about firmware and other features.

▼ To Upgrade the Array Firmware:

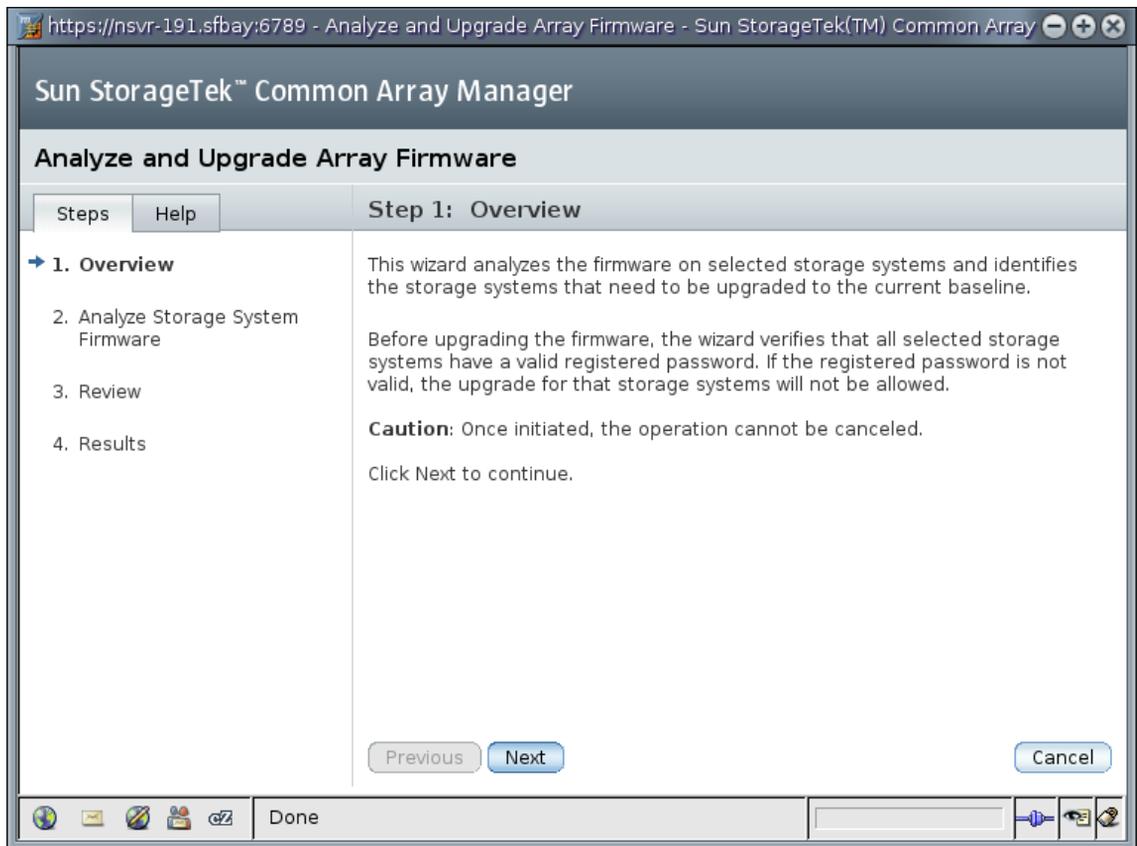
1. **On the Storage System Summary page, click the checkbox of the array you want to upgrade.**



The Upgrade Firmware button is enabled.

2. Click Upgrade Firmware.

The management software launches the Analyze and Upgrade Array Firmware wizard. Step 1, the Overview, is displayed.



3. Click the Next button.

Step 2, Analyze Arrays, is displayed.

https://nsvr-191.sfbay;6789 - Analyze and Upgrade Array Firmware - Sun StorageTek(TM) Common Arra

Sun StorageTek™ Common Array Manager

Analyze and Upgrade Array Firmware

Steps Help

Step 2: Analyze Arrays

Firmware information for each array is displayed as the analysis is completed. The action column displays the recommended action to bring each array up to the current firmware baseline. For optimal performance, all arrays should have the same firmware version installed.

1. Overview
 → 2. Analyze Storage System Firmware
 3. Review
 4. Results

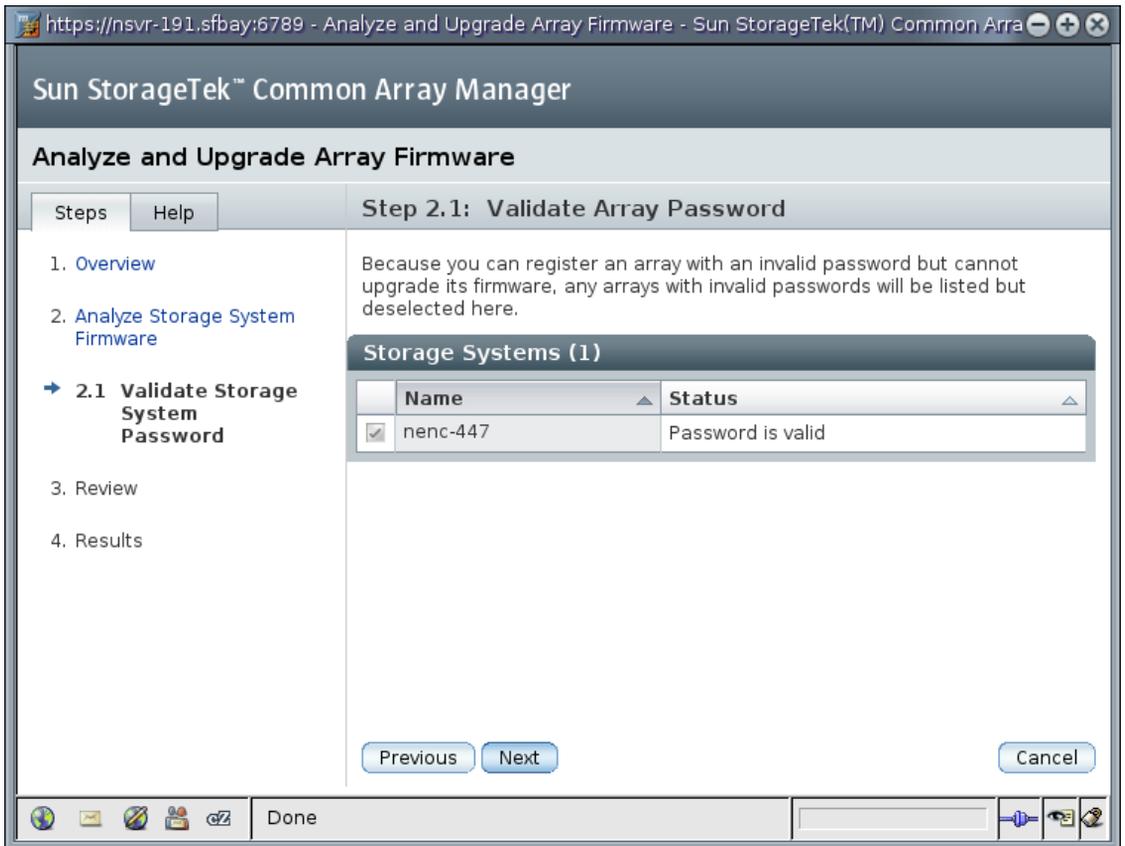
Storage Systems (1)

Name	Action	Current Firmware	Baseline
nenc-447	Upgrade, no disks ⚠ Forced upgrade	Controller: 06.16.81.10 NVS RAM: N399X-616843-010 Disk Types: HUS1014FASUN146G: 2A08 MAU3147FCSUN146G: 1003 ST314695FSUN146G: 0409 ST373453FSUN72G: 0449 STN7250SASUN500G: LP1140-3.AZA	Controller: 06.1 NVS RAM: N399 Disk Types: HUS1014FAS MAU3147FC ST314695FSU ST373453FSU STN7250SAS

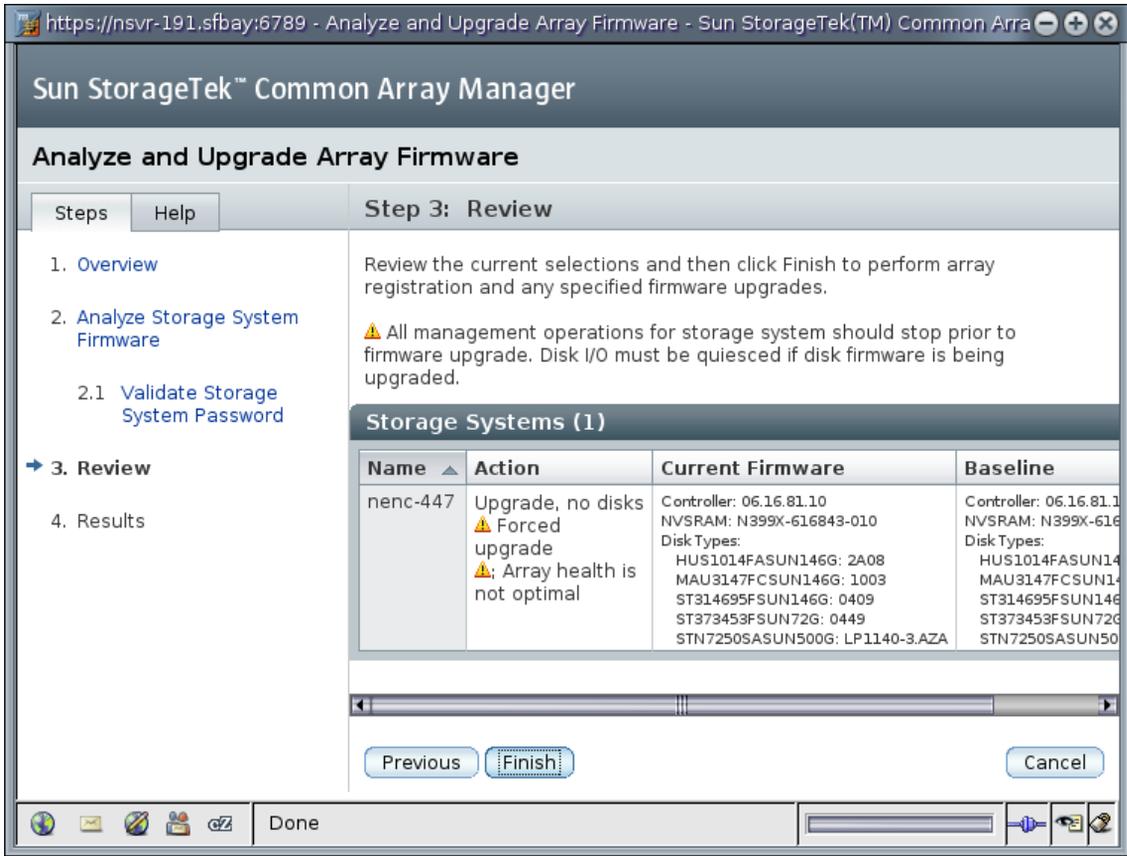
Previous Next Cancel

Done

4. In the Action field, specify the type of upgrade, and click Next.
Step 2.1 verifies that the array password is correct.

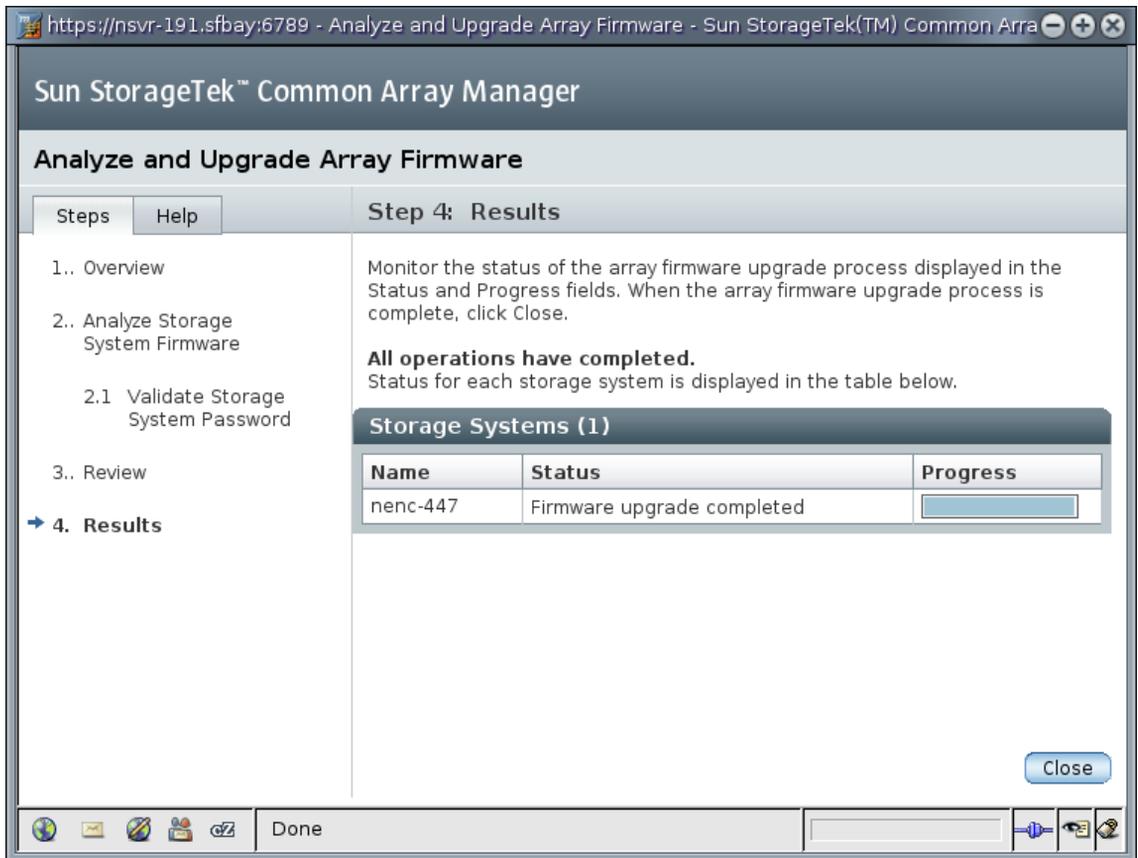


5. Click Next.



Caution – All management operations for the array should stop prior to the firmware upgrade. Disk I/O must be quiesced.

6. Review the current selections, and click Finish.



7. When the upgrade is complete, click Close.

Backing Out of Firmware Upgrades

Each release or patch of the Sun StorageTek Common Array Manager software spools the latest firmware on the management host during the software or patch installation. When you upgrade firmware from the management software, the software determines the firmware upgrades needed to reach the firmware baseline for that release. It then installs the new firmware on the array from the spooled firmware on the host.

In the unlikely event that updating the firmware on an array results in a performance or operational issue, you can revert back to a previous version of the array firmware using the methods described in the following sections:

- [“Uninstalling Firmware Upgrades” on page 64](#)
- [“Rollback Using Operating System Features” on page 64](#)

Uninstalling Firmware Upgrades

If you wish to return to an earlier version of the Sun StorageTek Common Array Manager software and its baseline firmware, proceed as follows:

- 1. Determine the version of the software that you wish to install.**

The Common Array Manager software comes with baseline firmware to install. The software is available on CD or by download as described in [“About Installing From a Downloaded File” on page 8](#).

- 2. Uninstall the current software and firmware as described in [“Uninstalling Software” on page 39](#).**

- 3. Install the desired version of the Common Array Manager software as described in the Installation Guide in the doc directory of the software installation CD or download.**

Note – The procedure will be similar to [“Installing the Common Array Manager Software” on page 7](#), but the prior release may have differences.

- 4. In the Common Array Manager software, select the Upgrade Firmware button to run the Firmware Upgrade wizard.**

The Firmware Upgrade wizard installs the baseline firmware for that version of the management software. In this case, the wizard will install a previous version of the firmware.

Rollback Using Operating System Features

Each host platform that supports the Sun StorageTek Common Array Manager software offers its own facilities and methods (some by third party) for applying and backing out updates to installed software. On Solaris, for example, Live Upgrade can be used to perform upgrades of installed software such that the user can revert back to the previous version of the software by re-activating the previous environment and rebooting. Solaris also can apply and backout patches through the use of the `patchadd` and `patchrm` commands.

Refer to the operating system documentation for more information about implementing software rollback features. Such practices should be part of comprehensive software lifecycle management procedures and policies for your production environment.

Configuring Array Administration Functions

To set up the array for basic operation, perform the procedures outlined in the following sections:

- [“Opening the Administration Page” on page 65](#)
- [“Setting an Array Password” on page 67](#)
- [“Naming an Array” on page 68](#)
- [“Creating a Hot-Spare Drive” on page 68](#)
- [“Setting the System Time” on page 68](#)

The Administration page contains other features that you may decide to configure. See the online help for more information before you change any default settings.

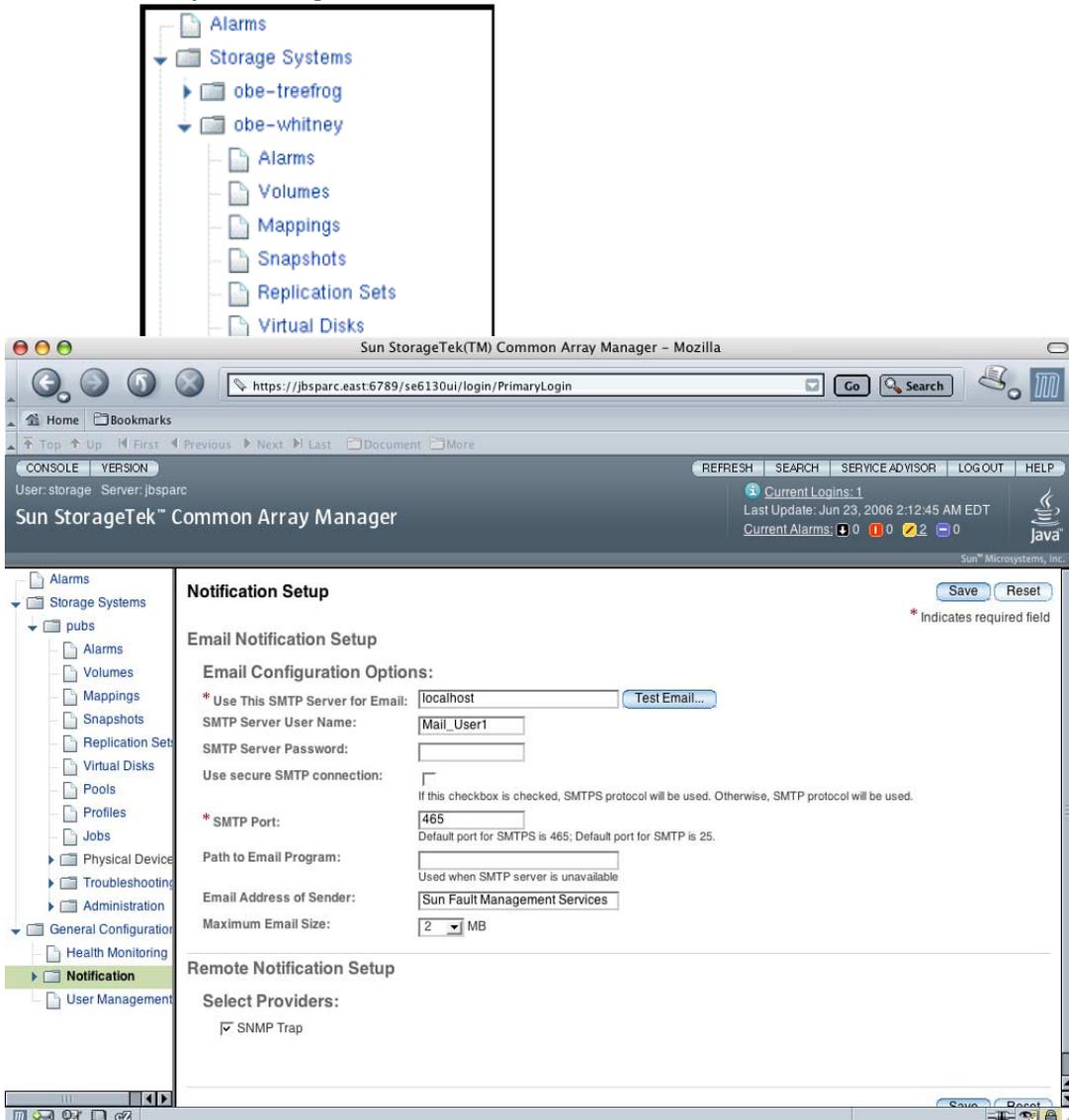
Opening the Administration Page

Open the Administration page to perform array administration functions.

▼ To Open the Administration Page

1. In the navigation pane, click on the array you want to work with to expand the navigation tree.

The navigation tree expands to display the configuration options for the selected array, including Administration.



2. Click on Administration, under the array you have selected.

The Administration page for that array is displayed.

Administration on Storage System obe-whitney
Save Reset

Manage Passwords...
Redistribute Volumes
Reset Configuration
Upgrade Firmware...

Details
System Time

* Indicates required field

Details

* Name:

Type: 6140

Network Address: 10.8.90.96

Serial Number: SUN.18502-00.1T54402200

Array WWN: 60:0A:0B:80:00:11:2B:7C:00:00:00:00:43:E7:70:0B

Node WWN: 20:04:00:A0E0:11:2B:7C

Array Hot-Spares : 2 FC, 0 SATA, 0 SAS
Change:

Health: OK

Firmware Version: 06.16.81.10

Default Host Type:

Cache Block Size: 16,000 KB

Cache Start % :

Cache Stop % :

Disk Scrubbing Enabled: Enable Background Disk Scrubbing
Interval (in days):

Failover Alert Delay (in minutes):

Total Capacity: 4,385 TB

Available Capacity: 3,545 TB

[Back to top](#)

System Time

After making any changes on the Administration page, click Save to save the changes.

Setting an Array Password

A new Sun StorageTek array is shipped with a blank, or empty, password field. Sun recommends that you establish an array password during initial setup for security purposes. The password prevents other management hosts from unauthorized access to the configuration of the array.

▼ To Set an Array Password on a New Array:

1. **On the Administration page, click Manage Passwords.**
The Manage Passwords page is displayed.
2. **Select Change Array Password.**

3. Leave the Old Password field blank.

This is the only time you can leave this field blank, when you establish a password for a new array.

4. Enter a new password consisting of up to 30 characters for the array.

5. Enter the password again to confirm the new password.

6. Click OK.

The Administration page is redisplayed.

The management software stores an encrypted copy of the array password, known as the local password, on the management host.

Naming an Array

Each array requires a unique name to be identified on the subnet.

▼ **To Name an Array:**

In the Name field on the Administration page, enter a unique name consisting of up to 30 characters.

Creating a Hot-Spare Drive

Hot spare drives are used by a controller to replace a disk that has failed. It is a good practice to define a hot spare before initiating storage on the array.

▼ **To Create a Hot Spare Drive**

From the drop-down menu on the Administration page, select a drive to serve as a hot spare drive to provide alternative drive space in case of a failure. Refer to the online help for information about this and other advanced configuration features.

Setting the System Time

You can also update the system time and date on the Administration page for the array in the browser interface. When you set the time and date for a selected array, the values are updated for all arrays registered with this management software.

There are two ways in which you can update the system time and date:

- Click Synchronize with Server to synchronize the time on the array with your management host
- Set the time manually

▼ To Set the Time Manually:

1. On the Administration page, scroll down to the System Time section.
2. Select the current hour and minute according to a 24-hour clock.
3. If the date is incorrect, change the month, day, and year to the current date.
4. Click Save to save your changes.

The Administration page is refreshed, and Success message is displayed at the top of the page.

For more information about the fields and buttons on the Administration page that you can use after you set up your system, see the online help.

Setting Up Notification for Fault Management

The fault management features of the Sun StorageTek Common Array Manager software enables you to monitor and diagnose your arrays and storage environment. Alarm notification can be provided by:

- Email notification
- Simple Network Management Protocol (SNMP) traps

You can also set up Auto Service Request as described in [“Setting Up Auto Service Request” on page 78](#).

1. In the navigation pane, under General Configuration, choose Notification.

The Notification Setup page is displayed:

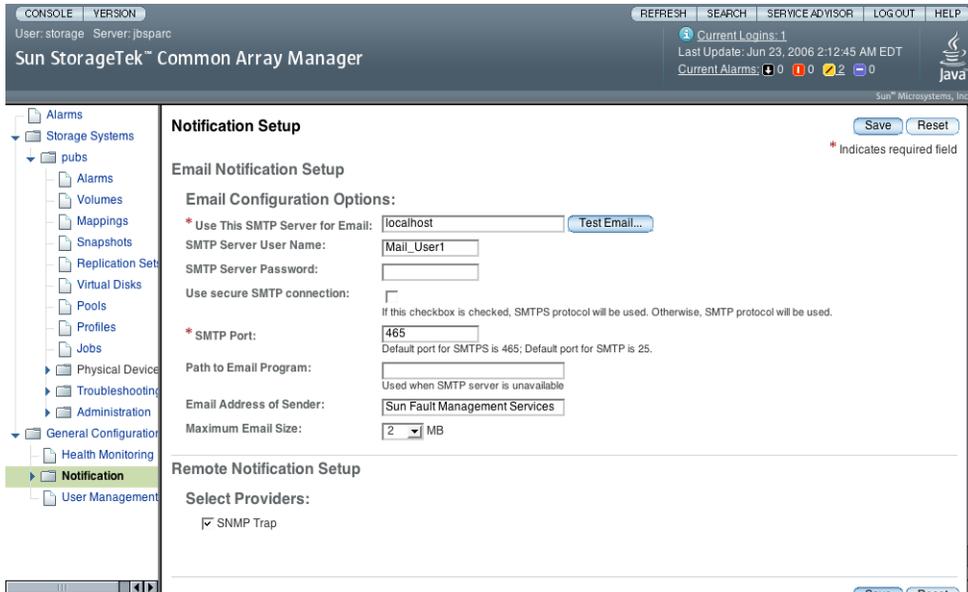


FIGURE 3-1 Email Fault Notification Setup

2. Enable local email.

a. Enter the name of the SMTP server.

If the host running this software has the `sendmail` daemon running, you can accept the default server, `localhost`, or the name of this host in the required field.

b. Specify the other optional parameters, as desired.

c. If you have changed or entered any parameters, click Save.

d. (Optional) Click Test Local Email to test your local email setup by sending a test email.

If you need help on any of the fields, click the Help button.

3. Set up local email notification recipients.

a. Click Administration > Notification > Email.

The Email Notification page is displayed.

b. Click New.

The Add Email Notification page is displayed.

c. Enter an email address for local notification. At least one address is required to begin monitoring events. You can customize emails to specific severity, event type, or product type.

- d. Click Save.
4. (Optional) Set up remote notifications by SNMP traps to an enterprise management application.
 - a. Select SNMP as the provider.
 - b. Click Save.
 5. Perform optional fault management setup tasks:
 - Confirm administration information.
 - Add and activate agents.
 - Specify system timeout settings.
-

Adding Users And Assigning Roles

To set up the array for basic operation, perform the procedures outlined in the following sections:

- [“Using Initial Administrative Roles” on page 71](#)
- [“Assigning Roles to Users” on page 72](#)
- [“To Add New Users in Solaris or Linux” on page 73](#)
- [“Adding New Users in Windows” on page 74](#)

Using Initial Administrative Roles

The first time that you access your array software, you sign on as an administrator:

- root in Solaris or Linux.
- an administrator user in Windows.

You then assign a user role of storage or guest to each user of the software. The storage role allows a user access to all of the software features related to storage device configuration and array management.

The storage and guest roles must be added to the management host using its OS software. For Solaris OS, consult system administration documentation. For Windows, add groups for storage and guest and assign members to those groups. Refer to [“Adding User Roles and New Users to Windows” on page 101](#) for additional information about adding roles in Windows.

Assigning Roles to Users

The user role assigned to a user determines that user's access to the management functions for the array. [TABLE 3-1](#) describes the valid user names and user role functions and the requirements for each.

TABLE 3-1 Valid User Names and User Roles

User Role/Group	Description	User Name	Required Password
storage (initial administrator)	Use the root or administrative user name to initially add other users. A storage user can use all of the software features related to storage device configuration and array management.	Solaris - root Linux - root Windows - administrator user, including root if so set up.	Root or administrator password on the management host
storage	A storage user can use all of the software features related to storage device configuration and array management.	Any valid user on the management host	Password assigned to the user on the management host
guest	A guest user has read-only privileges and can only view information. This user cannot modify any settings or features.	Any valid user on the management host	Password assigned to the user on the management host

Best Practices - User Roles and Names

1. Setting up with an administrative role.

In Solaris or Linux, by default, root has a storage role that allows full privileges. Before you can add other user and assign that user a user role, the user name must be defined in the Linux or Solaris Operating System `/etc/passwd` file or network information server (NIS).

In Windows, you can set up an administrative role with full privileges. You can even call it root, as noted in [“Adding User Roles and New Users to Windows” on page 101](#).

2. Restrict use of the administrator role.

To maintain security on the server running the management host software, the root or administrator user name and password should be used only the first time you log in. At that time, create at least one user with a storage user role. Thereafter, that created user can perform all available management functions, including adding or modifying users.

3. Make rules for multiple users with storage roles.

Multiple instances of the same user name can be logged in concurrently. However, because users with the `storage` user role have write privileges, there is a risk that the changes of one logged-in user will overwrite previous changes of another logged-in user. Therefore, you should develop policies about who can make changes and how to notify others.

Adding New Users in Solaris or Linux

This section describes how to add new users in Solaris or Linux.

▼ To Add New Users in Solaris or Linux

1. **To view the list of defined users, choose General Configuration > User Management in the navigation pane.**

The User Summary page is displayed.

2. **To add a new user, click the Add button.**

The Add New User page is displayed.

User Summary > Add Users

Add New User OK Cancel

* Indicates required field

New User

* User Name:
Valid characters for username consist of characters from the set of alphabetic characters, numeric characters, period (.), underscore (_), and hyphen (-)

* User Role:

OK Cancel

3. **In the User Name field, enter a valid user name.**

The user name must be defined in the `/etc/passwd` file or NIS.

4. **From the User Role list, select the role you want to assign for this user.**

You can assign a user to one of the user roles identified in [TABLE 3-1](#).

5. Click OK.

The User Summary page is displayed with a success message, and the name is added to the list.

Note – Newly added users should enter the same password for the Sun Java Web Console that they use in their Linux or Solaris accounts.

Adding New Users in Windows

This section provides the information you need to create users in Windows and assign them to groups for privileges. The created users can sign into the Java Web Console to access the Sun StorageTek Common Array Manager software.

This appendix contains the following section:

- [“Adding a Administrator User” on page 74](#)
- [“Adding New Users in Windows” on page 77](#)

Adding a Administrator User

When you first log into the Java Web Console Sun StorageTek Common Array Manager software requires that the user have Windows administrative privileges.

These instructions show you an example of how to configure an administrative user in standard Windows XP. Other versions of Windows software may vary slightly. Consult the Windows documentation.

Note – Administrative user names for Windows cannot have a space character.

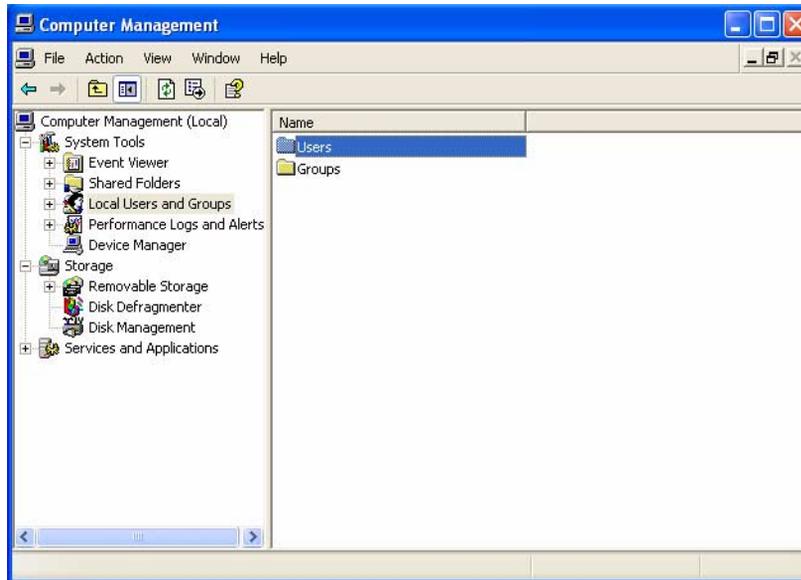
This example sets up a root user with Windows administrator privileges. Normally root is a role associated with Unix. By using the root user concept with Windows you can have a common storage administrator’s role across platforms.

▼ To Add an Administrative User in Windows

1. Click Start and select Administrative Tools -> Computer Management.

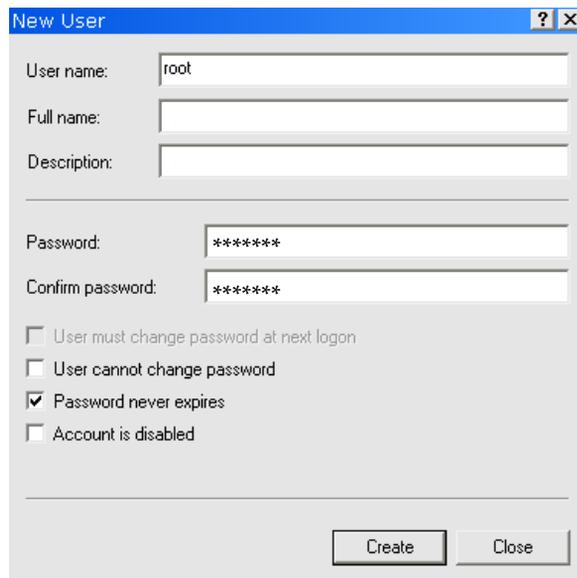
The Computer Management window displays.

2. In the Computer Management window, select Local Users and Groups -> Users.



3. Right click and select New User.

The New User window displays.



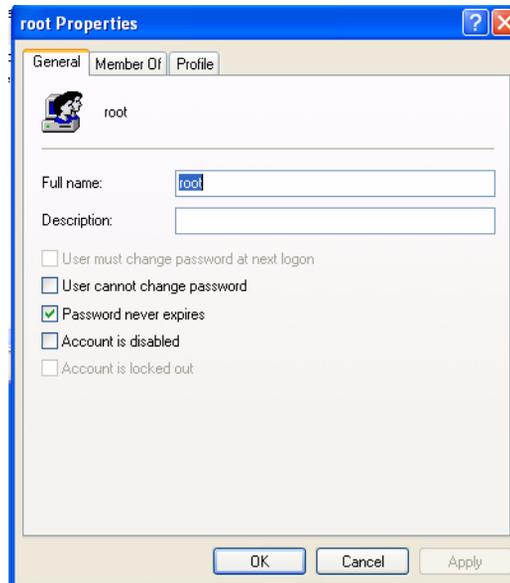
4. Complete the New User window as follows:

- a. Enter `root` in the User name box.
- b. Create a password and confirm it.
- c. Uncheck the box labeled User must change password at next login.
- d. Check Password never expires.
- e. Click Create.

The Computer Management window displays.

- f. Select Users, right click on root, and select Properties.

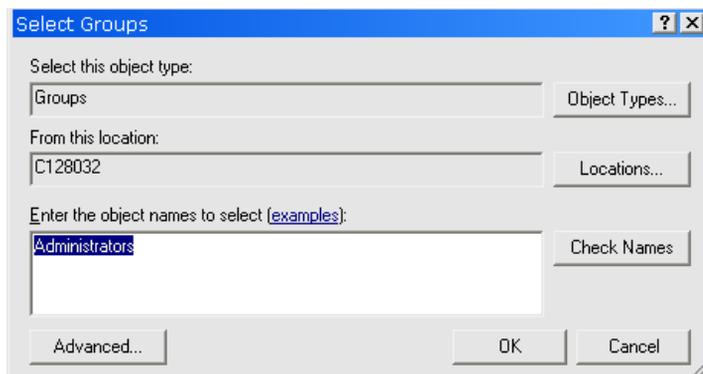
The Root Properties window displays.



5. Select the Member Of tab.

6. Select Add.

The Select Groups window displays.



7. In the Enter the object names box, type Administrators and click Check Names.

The system displays the *computer-name*\Administrator group in the box labeled “Enter the object names to select.”

8. Click OK.

The root Properties window shows that root is a member of the Users and Administrators groups. The root user now has Windows Administrator privileges.

Note – To maintain security on the server running the management host software, only use the root user name and password the first time you log in. After the first login, create at least one user and assign it to the storage group. The storage role can perform all available management functions, including adding or modifying users.

Adding New Users in Windows

You will need a storage user and other users in Windows. To set up subsequent users, follow the same steps as “[Adding a Administrator User](#)” on page 74, but substitute a *user name* for root and storage for the Administrator role.

When done, check the *user* Properties window and Member of tab to verify that the user is assigned to the Users and storage groups.

Setting Up Auto Service Request

During the initial storage array registration process, Common Array Manager prompts you to register with the Auto Service Request service by displaying the Auto Service Request (ASR) Setup page. This page continues to display until you either fill out the page and click OK, or click Decline to either decline or defer ASR service registration.

To set up the array for Auto Service Request, perform the procedures outlined in the following sections:

- [“About Auto Service Requests \(ASR\)” on page 78](#)
- [“Subscribing to and Editing Properties of Auto Service Request” on page 79](#)
- [“Unregistering From Auto Service Request Service” on page 80](#)
- [“Configuring Auto Service Request for an Array” on page 81](#)
- [“Testing Auto Service Request Registration” on page 80](#)

About Auto Service Requests (ASR)

Auto Service Request (ASR) monitors the array system health and performance and automatically notifies the Sun Technical Support Center when critical events occur. Critical alarms generate an Auto Service Request case. The notifications enable Sun Service to respond faster and more accurately to critical on-site issues.

The Common Array Manager provides the interface to activate Auto Service Request on behalf of the devices it manages. It also provides the fault telemetry to notify the Sun service database of fault events on those devices.

To use ASR, you must provide account information to register devices to participate in the ASR service. After you register with ASR, you can choose which arrays you want to be monitored and enable them individually.

ASR uses SSL security and leverages Sun online account credentials to authenticate transactions. The service levels are based on contract level and response times of the connected devices.

ASR is available to all customers with current StorageTek Warranty or StorageTek Spectrum Contracts. The service runs continuously from activation until the end of the warranty or contract period.

Event Information Collected Using Auto Service Requests (ASR)

Only the event information listed in the following table is collected. Your stored data is not read and remains secure.

The event information is sent by secure connection to <https://cns-services.sun.com>.

TABLE 0-1 Event Information Collected by ARS

Information	Purpose
Activation Event	Static information collected for purpose of client registration and entitlement.
Heart Beat Event	Dynamic pulse information periodically collected to establish whether a device is capable of connecting.
Alarm Event	Critical events trigger Auto Service Request and generate a case. Additional events are collected to provide context for existing or imminent cases.

Subscribing to and Editing Properties of Auto Service Request

During the initial storage array registration process, the Common Array Manager prompts you to register with the Auto Service Request service by displaying the Auto Service Request (ASR) Setup page. This page continues to display until you either fill out the page and click OK, or click Decline to either decline or defer ASR service registration.

After you register with ASR, you can choose which arrays you want to be monitored.

To register with the Auto Service Request service:

1. Click Sun StorageTek Common Array Manager.
The navigation pane and the Storage System Summary page are displayed.
2. In the navigation pane, expand General Configuration and choose Auto Service Request.
The Auto Service Request Setup page displays.

3. Provide the following information:
 - Sun online account username and password
 - Type of internet connection to be used
4. Click OK.

Testing Auto Service Request Registration

You can test the Auto Service Request service connection to ensure that communication between the email address specified on the General Configuration page and Sun Online Account services is successful.

To test the Auto Service Request registration:

1. Click Sun StorageTek Common Array Manager.

The navigation pane and the Storage System Summary page are displayed.
2. In the navigation pane, expand General Configuration and choose Auto Service Request.

The Auto Service Request Setup page displays.

3. Click Test ASR.

The Sun Online Account service will send a confirmation email to the email address on record for your Sun Online Account, which is specified on the General Configuration page. If you do not receive a confirmation email within approximately 30 minutes, contact the Sun Online Account personnel.

Unregistering From Auto Service Request Service

When you unregister from Auto Service Request service, ASR will stop monitoring array health for your system.

To unregister from the Auto Service Request service:

1. Click Sun StorageTek Common Array Manager.

The navigation pane and the Storage System Summary page are displayed.
2. In the navigation pane, expand General Configuration and choose Auto Service Request.

The Auto Service Request Setup page displays.

3. Click Unregister.

Configuring Auto Service Request for an Array

After registering with ASR, you can choose which arrays to monitor using ASR. In order for an array to be monitored using ASR, the following settings must be in effect:

- the health monitoring agent must be active
- health monitoring must be enabled for the array type
- health monitoring must be enabled for this array
- ASR must be enabled for this array

While ASR is enabled by default, the following settings must be configured to use ASR to monitor an array:

1. Click Sun StorageTek Common Array Manager.

The navigation pane and the Storage System Summary page are displayed.

2. In the navigation pane, expand the array you want to monitor using ASR.
3. In the navigation pane, expand Administration and click on Array Health Monitoring

The Array Health Monitoring Setup page is displayed.

4. In the Health Monitoring section, ensure that the Health Monitoring Agent Active and the Device Category Monitored fields are set to Yes. If either are set to No, go to the General Health Monitoring Setup page and change the settings.
5. In the Monitoring this Array section, select the checkbox next to both Health Monitoring and Auto Service Request.
6. Click OK.

Configuring In-Band Management

By default, the management host communicates with the arrays out-of-band over Ethernet. You can also configure in-band management for communication to travel over the data path (using Fibre Channel (FC), etc.) between a data host and the array.

Setting up the array for in-band management is outlined in the following sections:

- [“Understanding In-Band Management” on page 82](#)
- [“Installing In-Band Management” on page 83](#)
- [“Copying Configuration Files and In-Band Management.” on page 84](#)

Understanding In-Band Management

In-band management uses a proxy agent running on a data host to communicate with a managed array. Sun StorageTek Common Array Manager software discovers the proxy agents on the subnet and then queries arrays registered with the software. The proxy agent receives the queries over Ethernet and passes them on to the array over the data path between the data host and the array.

New arrays can be registered with the software using the registration wizard. The wizard can auto-discover the array via the proxies or you can specify the IP address of the proxy agent. Once an array is registered, management of the array appears the same as does management with an out-of-band connection. Volume creation, deletion, and mapping are accomplished in the same manner.

In-band management uses a special access LUN mapping to facilitate communications between the management software and the storage array. You can view all mappings on the array on the Mapping Summary Page in the Sun StorageTek Common Array Manager software. For in-band communication, an access volume is mapped to LUN 31. This special access LUN (also called the UTM LUN) is mapped to the default domain. (All arrays have a default domain for volumes not registered with a storage domain.)

With new arrays, the mapping of the access LUN to the default domain is installed at the factory. If you lose this mapping, before installing in-band, use out-of-band management and the Common Array Manager software to re-map the access LUN to the default domain. See the online help in the software for more information about mapping.

This release supports Solaris and Linux for in-band management. The following packages are available to install from the CD:

- Solaris:
 - SMagent-SOL-90.00.00.06.pkg
 - SMruntime-SOL-10.10.02.00.pkg
- Linux:
 - SMagent-LINUX-90.00.A0.06-1.i386.rpm
 - SMagent-LINUX-90.00.A0.06-1.ia64.rpm
 - SMagent-LINUX-90.00.A0.06-1.ppc64.rpm
 - SMruntime-LINUX-90.10.A0.02-1.ia64.rpm
 - SMruntime-LINUX-90.10.A0.02-1.i586.rpm

▼ Installing In-Band Management

1. **Connect two in-band (FC, etc.) cables between HBAs on the data host where the proxy is to be installed and the array (one cable to each controller).**
2. **Install the SMruntime and SMagent packages on the proxy host, using the pkgadd command in Solaris and rpm command in Linux.**

- Installation example on Solaris

```
pkgadd -d <directory or disk-directory> SMruntime-SOL-xx.xx.xx.xx.pkg
```

```
pkgadd -d <directory or disk-directory> SMagent-SOL-xx.xx.xx.xx.pkg
```

- Installation example on Linux

```
rpm -ivh SMruntime.xx.xx.xx.xx-xxxx.rpm
```

```
rpm -ivh SMagent-LINUX-xx.xx.xx.xx-xxxx.rpm
```

3. **Solaris only - to verify that the host sees the access LUN to manage the array via the in-band path, perform the following commands on the data host:**

```
setenv LD_LIBRARY_PATH /opt/SMgr/agent
```

```
java -classpath /opt/SMgr/agent/SMagent.jar
```

```
devmgr.versioned.agent.DeviceIdentifier | grep "Volume Access"
```

The arrays with access LUNs visible to the agent will display as follows:

```
/dev/rdisk/c5t200600A0B82458D4d31s2 [Storage Array fms-lca1, Volume  
Access, LUN 31, Volume ID <600a0b80002458d20000000000000000>]
```

```
/dev/rdisk/c5t200700A0B82458D3d31s2 [Storage Array fms-lca1, Volume  
Access, LUN 31, Volume ID <600a0b80002fc07400000000000000000>]
```

4. **Verify that the Proxy Agent is running. If necessary, check the SMagent process and restart in /opt/SMgr/agent/SMagent.**

5. To start the agent, perform this command in Solaris or its equivalent:

```
/opt/SMgr/agent/SMagent start
```

If the agent was running, it will stop and then restart after a status check.

6. Check the process status:

```
# ps -ef | grep SMagent | grep -v grep
/opt/SMgr/agent/jre/bin/java -classpath
/opt/SMgr/agent/SMagent.jar devmgr.launch
```

Sign in to the software and begin configuring as listed in [“Starting the Management Software” on page 45](#). After the registration process discovers arrays, they display on the Storage System Summary page. The Network Address field displays whether the connection with each array is in-band or out-of-band. The Common Array Manager software can manage arrays with either in-band and out-of-band connections at the same time.

Copying Configuration Files and In-Band Management.

If you are going to copy a configuration file to a management host that will have in-band communication with the array, you need to preserve the mapping between the access LUN and the management host using the `import array` command with the `-n` (noclear) option.

```
import -x <XML-location> [ -L <list> ] [ -n ] array <array-name>
```

The `import` command typically applies an array configuration file to the specified array. The `-n` option preserves the current array configuration, including the mapping between the access LUN (LUN 31) and the default domain of the management host. This mapping is required for in-band management of the array.

OPTIONS

```
-x, --xml <XML-location>
```

Specifies the location of the XML file to be imported. The XML location can be in the form of a URL (`http://...` or `file:///...`) or a file name.

```
-L, --list
```

Specifies that no import take place. Instead, the array is checked against the XML file to ensure that it is compatible.

```
-n, --noclear
```

Specifies that the current array configuration will not be cleared.

```
array <array-name>
```

Specifies the array to which the configuration file is applied.

Next Steps

You are now ready to review the planning concepts that will help you to configure storage. If you are familiar with the concepts, you can proceed to [“Configuring Basic Storage” on page 93](#).

Planning Your Storage Configuration

This chapter introduces you to the Sun StorageTek Common Array Manager storage components. It contains the following sections:

- [“Storage Array Configuration Components” on page 87](#)
- [“Partitioning Storage Using Storage Domains” on page 88](#)
- [“Best Practices - Storage Configuration” on page 91](#)

For more information about the concepts introduced in this chapter, see the appropriate topic in the online help.

Storage Array Configuration Components

The array management software configures both physical and logical storage components. The components of a storage array configuration are as follows.

- **Initiator** – A port on a Fibre Channel (FC) host bus adapter (HBA) that allows a host to gain access to the storage array. The initiator has a World Wide Name (WWN) that is globally unique.
- **Host** – A data host, or server with one or more initiators, that stores its data on arrays. You can define volume-to-logical unit number (LUN) mappings to an individual host or assign a host to a host group.
- **Host group** – A collection of hosts that share access to the same volumes.
- **Storage domain** – A logical entity used to partition storage. You need to purchase a license for the number of domains you need, depending on your array.
- **Storage profile** – A defined set of characteristics for a storage pool. You can choose from the set of preconfigured profiles or create a new one.

- **Storage pool** – A collection of volumes that share a profile defining a common configuration.
- **Volumes** – A division of a storage pool, consisting of virtual disks, representing the storage space that is used by the data hosts in the environment.
- **Disk** – A non-volatile, randomly addressable, rewriteable data storage device. Physical disks are managed as a pool of storage space for creating volumes.
- **Virtual disks** – Also called a redundant array of independent disks (RAID) set, a collection of locations in the memory of more than one physical disk. The storage array handles a virtual disk as if it were an actual disk.
- **Tray** – An enclosure that contains a varying number of disks, depending on your array.

In addition to the basic elements of your storage configuration covered in this guide, you can add advanced, premium features to your configuration. These features require the purchase of licenses. The following premium features are described in the online help and user guide:

- **Snapshots** are copies of the data in a volume. They offer a high-availability alternative to backups because you do not need to take the array offline to create the snapshot, and you can store the snapshots in less space than the original data.
- **Volume copies** are copies of the complete contents of one data volume that are located on another data volume on the same array.
- **Replication sets** are the association between primary and secondary volumes. The secondary volume contains a complete copy of the data on the primary volume. The data replication software continuously replicates the data between volumes in a replication set.

Partitioning Storage Using Storage Domains

Storage domains, also called sets or storage partitions, enable you to partition storage to allow hosts or host groups access to specific volumes. Data hosts, such as a data base server, initiate data to store in volumes through the physical host ports (or initiators), residing on host HBAs. Volume-to-LUN mapping enables you to specify the host or host group that can access a specific volume on your storage array.

Note – Storage domains for LUN-mapping require the purchase and activation of a license. (Exception - the Sun StorageTek 6130 array includes some free storage domains to start.) The role of the free default domain is discussed below.

There is a free default domain with limited functions noted below. But to map specific initiators to specific volumes, you need to activate a premium license for a storage domain. Usually your need for premium licenses will be determined at the time you order your array.

The Default Domain

A non-premium, default storage domain exists to include the following:

- All host groups and hosts that are not explicitly mapped to a volume.
- All volumes that have a default volume-to-LUN mapping assigned.
- All unmapped, automatically detected initiators.

Any volumes within the default storage domain can be accessed by all hosts and host groups within that storage domain.

Note – If you only use the default domain, you cannot configure software features such as profiles, pools, initiators, host groups, LUN-mapping, and virtual disks.

Premium Storage Domains

Premium storage domains define a volume-to-logical unit number (LUN) mapping, which will allow you to specify the host or host group that will have access to a particular volume in your storage array. The storage domain designates that only the selected host or host group has access to that particular volume through the assigned LUN.

When the storage domain consists of a volume mapped to a host group, it can enable hosts with different operating systems (heterogeneous hosts), to share access to a storage volume. A host within a host group can be mapped separately to a different volume.

A storage domain can contain up to 256 volumes. A volume can be included in only one storage domain and each LUN, from 0 to 255, can only be used once per storage domain.

Note: Not all operating systems support up to 256 LUN IDs. See the documentation for your operating system for more information.

FIGURE 4-1 shows how storage domains can be used to partition storage. It depicts a storage array configured with three storage domains, Storage Domain 1, Storage Domain 2, and Storage Domain 3.

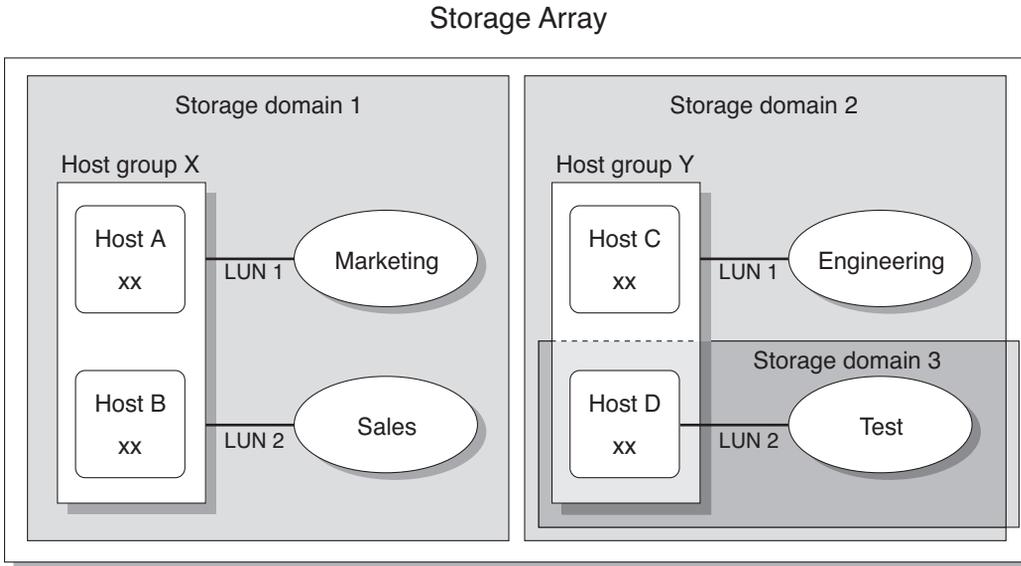


FIGURE 4-1 Storage Array With Three Domains and Four Data Hosts

Storage Domain 1 consists of two volumes, Marketing and Sales, that are mapped to Host Group X. Host Group X contains two hosts, Host A and Host B. All initiators associated with Host A and Host B, within Host Group X, have access to volume Marketing by way of LUN ID 1 and to volume Sales by way of LUN ID 2.

Storage Domain 2 consists of one volume, Engineering, that is mapped to Host Group Y. Host Group Y contains two hosts, Host C and Host D. By virtue of being associated with any host within Host Group Y, all initiators associated with Host C and Host D have access to volume Engineering by way of LUN ID 1.

Storage Domain 3 consists of one volume, Test, that is mapped to Host D. All initiators associated with Host D have access to volume Test by way of LUN ID 2. Note that Host D is a member of Host Group Y; however, since volume Test is mapped directly to Host D and not to Host Group Y, Host D is the only member of Host Group Y that can access volume Test.

Note – LUN IDs must be unique within a storage domain.

For more information about storage domains and LUN mapping, see the online help.

Best Practices - Storage Configuration

When configuring a storage array, you need to determine how to organize and allocate the total storage capacity into volumes and share those volumes among your data hosts. As you plan your storage configuration, it is important that you consider the following requirements for your site:

- **Performance requirements** – You can optimize I/O activity by selecting a predefined storage profile with different characteristics or by creating a custom profile.
- **Access requirements** – You can use storage domains to organize and allocate storage so that only certain hosts have access to volumes. Volumes in a storage domain can be accessed only by hosts and host groups that are in the same storage domain. You can associate a storage domain with individual hosts or with a host group.
- **Combination of redundancy with performance** – To maximize both performance and redundancy, a combination of RAID levels is necessary. The data striping provided by RAID 0 is a cost-effective way to create high levels of performance in a disk array, and having multiple copies of data through data mirroring provided by RAID 1 is the best way to create redundancy. By combining RAID 1 with RAID 0, you can take advantage of both features.

To combine disk mirroring with disk striping, configure RAID 1 with more than five drives. The firmware automatically creates a RAID 1+0 virtual disk.

- **Storage defaults** - The default storage profile, storage pool, and storage domain are configured as follows:
 - The default storage profile configures associated volumes with a RAID-5 level, default segment size, enabled read-ahead mode, FC disk type, and a variable number of drives.
 - The default storage pool uses the default profile (RAID-5) and groups all volumes with the same storage characteristics, as defined by the storage profile.
 - The default domain has no restrictions and allows all hosts and host groups to share access to the same volumes. If you want to restrict access to volumes from certain hosts, you should use storage domains and not the default domain.

- **Using profiles and pools** - You must plan your configuration to determine what storage profile and storage pool to use. For more information, see Planning Volumes and related topics in the online help.

Configuring Basic Storage

This chapter describes how to configure basic storage on the array. It guides you through the following steps:

- [“Enabling Premium Features” on page 93](#)
- [“Configuring Basic Storage” on page 94](#)
- [“Planning Storage Before Using the New Volume Wizard” on page 95](#)
- [“Using the New Volume Wizard to Create and Map Volumes” on page 100](#)

For more information about the configuration introduced in this chapter, see the appropriate topic in the online help.

Note – Before you configure storage, be sure to understand the concepts presented in [“Planning Your Storage Configuration” on page 87](#)

Enabling Premium Features

License certificates are issued when you purchase premium services and contain instructions for obtaining license information from the Sun Licensing Center.

Premium features that are available with the Sun StorageTek Common Array Manager software include:

- Storage Domains
- Volume Copy
- Volume Snapshot
- Data Replication

Refer to your license certificate and contact the Sun License Center for license key information. Go to <http://www.sun.com/licensing> for your local Sun License Center phone number.

Note – Adding Storage Domains Licenses to Partition Storage.
If you want to create storage domains to partition storage with other than the default domain, you must activate the storage domain licenses.

▼ To Add a License and Enable a Premium Feature:

1. **Click Sun StorageTek Common Array Manager.**
The navigation pane and the Storage System Summary page are displayed.
2. **In the navigation pane, expand the array for which you want to display license information.**
The navigation tree is expanded for that array.
3. **Expand Administration and choose Licensing.**
The Licensable Feature Summary page is displayed.
4. **Click Add License.**
The Add License page is displayed.
5. **Select the type of license you want to add, and specify the version number and key digest supplied by Sun.**
6. **Click OK.**

Configuring Basic Storage

The following sections guide you through configuring storage.

The New Volume wizard, available from the Volume Summary page, guides you through the steps for creating a volume and other basic storage configuration.

Note – If you only use the default domain and do not activate premium storage domains, all hosts in the domain will have access to the volume and you will not be able to change the default domain's storage characteristics in the wizard.

When you create a volume, the wizard prompts you to enter or select the following information:

- Volume name and capacity
- A storage pool, which is associated with a storage profile.
Unless you create new pools, only the default pool with the default RAID-5 profile will be available.
- The mode in which virtual disks will be created (automatically or other options)
- Optionally, a mapping from the volume to a host or host group and LUN to partition storage.

You can also map to the default domain.

Before beginning the New Volume wizard in [“Using the New Volume Wizard to Create and Map Volumes” on page 100](#), review the next section to decide if there are non-default storage elements that you want to configure. If so, you can either configure the elements before you begin the New Volume wizard or you can open a second browser window and configure them as you need to during the wizard.

Planning Storage Before Using the New Volume Wizard

Before you create a volume, you should plan the allocation of your storage. This section will tell you if you need to use the following sections before using the New Volume wizard:

- [“Selecting Additional Profiles” on page 96](#)
- [“Creating Storage Pools” on page 98](#)
- [“Creating Hosts and Host Groups” on page 98](#)
- [“Creating Initiators to Assign to Hosts” on page 99](#)

Before using the New Volume wizard, you should know

- If you want to define default RAID characteristics with the default pool and its RAID-5 profile.

If so, you can select the defaults in the wizard.

If not, you will need to define a new pool as described in [“Creating Storage Pools” on page 98](#) and assign it a pre-defined or new profile, as described in [“Selecting Additional Profiles” on page 96](#).

- Whether you will partition storage through storage domains.

If so, you need to activate the domain licenses as described in “[Enabling Premium Features](#)” on page 93. Then you need to define hosts or host groups before or after the New Volume wizard as described in “[Creating Hosts and Host Groups](#)” on page 98. Otherwise you will be using the default domain.

- How you will configure the storage capacity from initiators between volumes, hosts and host groups.

Selecting Additional Profiles

The StorageTek Common Array Manager software provides several storage profiles that meet most storage configuration requirements. By default, the New Volume wizard will allow you to select a default pool with its default profile of RAID-5 characteristics. The profiles that display are specific to the model of the array and the drives it supports.

Profiles are selected from pools. If the default profile does not meet your performance needs, before entering the New Volume wizard, you can create a pool and select one of several other predefined profiles, or you can create a custom profile.

▼ To View the Predefined Storage Profiles:

1. **Click Sun StorageTek Common Array Manager.**

The navigation pane and the Storage System Summary page are displayed.

2. **In the navigation pane, expand the array you want to work with and choose Profiles.**

The Storage Profile Summary page for the array model is displayed.

[TABLE 5-1](#) shows an example of the predefined storage profiles for an array. Refer to the Storage Profile Summary page in the software for your array to see the available predefined profiles.

TABLE 5-1 An Example of Predefined Storage Profiles

Name	RAID Level	Segment Size	Read-Ahead Mode	Drive Type	Number of Drives
Default	RAID-5	512 KB	Enabled	ANY	Variable
High_Capacity_Computing	RAID-5	512 KB	Enabled	SATA	Variable
High_Performance_Computing	RAID-5	512 KB	Enabled	SAS	Variable
Mail_Spooling	RAID-1	512 KB	Enabled	SAS	Variable
Microsoft Exchange	RAID-5	32 KB	Enabled	SAS	4

TABLE 5-1 An Example of Predefined Storage Profiles (Continued)

Name	RAID Level	Segment Size	Read-Ahead Mode	Drive Type	Number of Drives
Microsoft_NTFS	RAID-5	64 KB	Enabled	ANY	4
Microsoft_NTFS_HA	RAID-1	64 KB	Enabled	2500: SAS Others: FC	Variable
NFS_Mirroring	RAID-1	512 KB	Enabled	SAS	Variable
NFS_Striping	RAID-5	512 KB	Enabled	SAS	Variable
Oracle_10_ASM_VxFS_HA	RAID-5	256 KB	Enabled	SAS	5
Oracle_VxFS	RAID-5	128 KB	Enabled	SAS	4
Oracle_VxFS_HA	RAID-5	128 KB	Enabled	SAS	Variable
Oracle_DSS	RAID-5	512 KB	Enabled	SAS	Variable
Oracle_OLTP	RAID-5	512 KB	Enabled	SAS	Variable
Oracle_OLTP_HA	RAID-1	512 KB	Enabled	SAS	Variable
Random_1	RAID-1	512 KB	Enabled	SAS	Variable
Sequential	RAID-5	512 KB	Enabled	SAS	Variable
Sun_SAM-FS	RAID-5	128 KB	Enabled	ANY	4
Sun_ZFS	RAID-5	128 KB	Enabled	ANY	4
Sybase_DSS	RAID-5	512 KB	Enabled	SAS	Variable
Sybase_OLTP	RAID-5	512 KB	Enabled	SAS	Variable
Sybase_OLTP_HA	RAID-1	512 KB	Enabled	SAS	Variable
VxFS	RAID-5	128 KB	Enabled	ANY	4

3. Select a profile that matches your storage requirements.

You will need the name of the storage profile later, when you create a storage pool.

Note – If you want to create a custom profile, click **New** on the Storage Profile Summary page. If you need information about any of the fields, click **Help**.

Creating Storage Pools

A storage pool is a collection of volumes with the same configuration. By default, you can select a pool with a default profile of RAID-5 characteristics. You can create new pools and assign other profiles to them.

▼ To Create Storage Pools:

- 1. In the navigation pane, under the array you want to work with, choose Pools.**
The Storage Pool Summary page is displayed.
- 2. Click New.**
The Create New Storage Pool page is displayed.
- 3. Enter a name for the new storage pool, using a maximum of 30 characters.**
- 4. Enter a description of the new storage pool.**
- 5. Select Default or another predefined storage profile that meets your storage needs.**
For information about the characteristics of the predefined storage profiles, see [TABLE 5-1](#).
- 6. Click OK.**
The new storage pool is displayed on the Storage Pool Summary page.

Creating Hosts and Host Groups

By default, the New Volume wizard assigns a default storage domain if no other hosts or host groups have been created.

Most storage users will want to create additional storage domains and host groups to partition storage. You typically create host groups to group hosts that share the same storage characteristics and so that they can share access to a volume.

You can map volumes to a host group or to individual hosts that have a LUN.

You can create the host and host groups either before or after the New Volume wizard. (If afterwards, you will have to manually complete the steps equivalent to the New Volume wizard to configure initiators for each host, assign hosts to host groups, if needed, and complete the volume-to-LUN-mapping.)

If you have many hosts to create, you may find it easier to create the hosts first and then to add the hosts to a host group.

Note – Lun-mapping requires storage domain licenses. While you can create hosts and host groups without a storage domain license, you will not be able to map them.

▼ To Create Hosts

1. **In the navigation pane, under the array you want to work with, expand Physical Devices and choose Hosts.**
The Host Summary page is displayed.
2. **Click New.**
The Create New Host page is displayed.
3. **Type a name for the new host, using a maximum of 30 characters.**
Use a name that will allow you to recognize the data host on your network.
4. **(Optional) If host groups have already been created, assign the new host directly to a host group.**
5. **Click OK.**
The host is created and added to the Host Summary page.

▼ To Create a Host Group

1. **In the navigation pane, under the array you want to work with, choose Physical Devices > Host Groups.**
The Host Group Summary page is displayed.
2. **Click New.**
The New Host Group page is displayed.
3. **Enter a name for the new host group, using a maximum of 30 characters.**
4. **Double-click the names of the available hosts you want to add to the group. You can also click Select All or Remove All to add or remove all of the available hosts.**
5. **Click OK.**
The new host group is created and added to the Host Group Summary page.

Creating Initiators to Assign to Hosts

To make non-default storage available to a data host or host group, you create an initiator and associate it with a host. An initiator is an FC port that is identified by a unique WWN of an HBA installed on the data host.

▼ To Create An Initiator and Assign It To a Host:

1. **In the navigation pane, under the array you want to work with, choose Physical Devices > Initiators.**

The Initiator Summary page is displayed.

2. **Click New.**

The New Initiator page is displayed.

3. **Enter a name for the new initiator, using a maximum of 30 characters.**

4. **Specify a new WWN for the initiator, or select an existing WWN from the drop-down list of unassigned WWNs.**

If you specify a new WWN, the delimiting colons (:) of the 16-character hexadecimal WWN are optional.

5. **Select the host name for the new initiator.**

6. **Select the host type for the new initiator.**

7. **Click OK.**

The Initiator Summary page displays the initiator name, host name, host type, and WWN of the new initiator.

Using the New Volume Wizard to Create and Map Volumes

A volume is a “container” into which applications, databases, and file systems can store data. A volume is created from virtual disks that are part of a storage pool. Based on your selections, the array automatically allocates storage from different disks to meet your volume configuration requirements.

As mentioned in [“Planning Storage Before Using the New Volume Wizard” on page 95](#), you may want to configure new profiles, pools, host, host-groups, or initiators before or during the wizard if the defaults do not match your storage needs.

When you are ready to begin, the New Volume wizard guides you through the steps for creating a volume.

▼ To Use the New Volume Wizard to Create Volumes

1. **In the navigation pane, under the array you want to work with, choose Volumes.**
The Volume Summary page is displayed.

2. **Click New.**

The New Volume wizard is displayed.

Note – After the initial installation, you will be unable to select New if there is not enough disk space for a new volume or if no existing virtual disks match the selected profile.

3. **Enter a name and capacity for the volume, and select the storage pool with which you want it to be associated.**

- The storage pool you select is associated with a storage profile, which determines the volume's storage characteristics.
- Only the default pool with a default RAID-5 profile will display until you create new pools.
- The volume name can consist of a maximum of 30 characters.
- The volume capacity equals the amount of virtual disk space to be used.

4. **Click Next.**

You are prompted to select the method by which virtual disks will be selected:

5. **Select the method you want to use to create a virtual disk:**

- **Automatic** – The software assigns the physical disks to be used based on the profile.
- **Create Volume on an Existing Virtual Disk** – Follow the wizard steps to select virtual disks.
- **Create Volume on a New Virtual Disk** – Follow the wizard steps to specify disks.

6. **Follow the rest of the wizard to configure the virtual disks.**

You are prompted to map the volume to a host or host group and to select a LUN. If you have not created additional hosts or host groups, only the default storage domain will display. You map the volume to new hosts or host groups later.

7. **Select a host or host group select a LUN number.**

After you click Finish, the new volume is displayed on the Volume Summary page.

About Volumes and the Default Domain or Partitioned Storage Domains.

After the New Volume wizard completes, your volumes will belong to:

- The default domain if you did not activate premium storage domains.
All hosts in the domain will have access to the volume and you will not be able to change storage characteristics within the domain.
- A storage domain that partitions storage and allows you to define the storage characteristics such as the profile.

Configuration Worksheets

Use the worksheets in this appendix to help you collect the information that you will need to configure the arrays and data hosts you are managing with the Sun StorageTek Common Array Manager software. Two worksheets are provided:

- [“Sun StorageTek Common Array Manager Configuration Worksheet” on page 104](#)
- [“Sun StorageTek Common Array Manager Data Host Information” on page 105](#)

TABLE A-2 lists the information you need to configure the array.

TABLE A-1 Sun StorageTek Common Array Manager Configuration Worksheet

Controller A MAC address:	
Controller B MAC address:	
Controller A, Ethernet Port 1 IP address:	
Controller B, Ethernet Port 1 IP address:	
Management host IP address:	
Network mask:	
Name server domain name:	
IP address of the domain name server (DNS):	
Gateway IP address:	
Email notification address:	
Notes:	

TABLE A-2 lists the information you need to collect for each data host connected to Sun StorageTek Common Array Manager.

TABLE A-2 Sun StorageTek Common Array Manager Data Host Information

Host name:	
Vendor:	
Model:	
Operating system:	
Patch/Service pack:	
Number of HBAs:	
HBA World Wide Name (WWN):	
HBA model:	
HBA driver:	
Notes:	

Configuring the IP Address of the Array Controllers

In order for there to be an out-of-band Ethernet connection between the local management host and the array controllers, the management host and the array controllers must have valid IP addresses. There are three methods for adding the IP address:

- Dynamic Host Configuration Protocol (DHCP), for assigning IP addresses dynamically
- The serial port for assigning static IP addresses
- The Sun StorageTek Common Array Manager software for assigning static IP addresses

The first two methods are documented in your array installation guide.

This appendix describes how to use Common Array Manager software to substitute a static IP address for the default internal IP address. It contains the following sections:

- [“Overview” on page 107](#)
- [“Establishing Temporary IP Connectivity Between the Management Host and Array Controllers” on page 108](#)
- [“Assigning IP Addresses to the Controllers” on page 112](#)
- [“Restoring the Management Host IP Configuration” on page 113](#)

Overview

Use static IP addressing to assign a specific IP address to Ethernet port 1 of each array controller. Static IP addresses remain in effect until you modify or remove them.

Note – Some array models, such as the Sun StorageTek 2500 Series, have only one Ethernet port on the controllers. In that case “Ethernet Port 1” applies to that single port.

Sun array controllers are shipped with the following default IP addresses:

- Ethernet port 1 of Controller A is assigned IP address 192.168.128.101
- Ethernet port 1 of Controller B is assigned IP address 192.168.128.102

The controller IP address configuration tasks are listed in [TABLE B-1](#).

TABLE B-1 IP Addressing Configuration Tasks

Step	Task	Section
1	Establish temporary IP connectivity between the management host and the array controllers	“Establishing Temporary IP Connectivity Between the Management Host and Array Controllers” on page 108
2	Assign static IP addresses to the controllers	“Assigning IP Addresses to the Controllers” on page 112
3	Restore the original host IP configuration	“Restoring the Management Host IP Configuration” on page 113

Establishing Temporary IP Connectivity Between the Management Host and Array Controllers

In order to assign IP addresses to the controllers, you must establish temporary IP connectivity between the management host and Ethernet port 1 of each controller.

There are two methods by which to do that, depending on the method by which the management host and controller’s Ethernet ports are physically connected to the Ethernet, and the availability of an Ethernet interface on the management host.

The two methods of establishing temporary IP connectivity are as follows:

- Assigning a temporary IP address to a management host Ethernet interface in the same subnet as the default IP addresses of the controller’s Ethernet ports (for example, IP address 192.168.128.100).

Use this method if the following conditions are true:

- You have an available Ethernet interface on the management host or you can temporarily reassign the IP address of an Ethernet interface on the management host.
- Ethernet port 1 of each controller can be directly connected to an Ethernet interface on the management host by an Ethernet crossover cable, or Ethernet port 1 of each controller and an Ethernet interface of the management host are connected to the same Ethernet hub.

For information on changing the IP address of an Ethernet interface on the management host, see [“Configuring the IP Address of the Management Host” on page 109](#).

- Creating a temporary virtual subnet on the management host.

Use this method if there is not an available Ethernet interface on the management host or if Ethernet port 1 of each controller is connected to a subnet on the local area network (LAN) that is not the subnet of the management host.

For information on creating a temporary virtual subnet on the management host, see [“Creating a Temporary Virtual Subnet on a Management Host” on page 111](#).

Configuring the IP Address of the Management Host

To configure IP addressing for the array, you may have to temporarily change the IP address of the management host.

The method you use to configure the IP address on the host depends on the platform you are using. Follow the instructions in one of the following sections, depending on your platform:

- [“To Configure the IP Address on the Management Host for the Solaris or Linux Operating System” on page 109](#)
- [“To Configure the IP Address for Windows 2000 Advanced Server” on page 110](#)
- [“To Configure the IP Address for Windows Server 2003” on page 110](#)

▼ To Configure the IP Address on the Management Host for the Solaris or Linux Operating System

For information about changing the IP address on a Solaris or Linux server, see the `ifconfig` man page.

▼ To Configure the IP Address for Windows 2000 Advanced Server

1. From the Control Panel, select Network and Dial-Up Connections.
2. Select Local Area Connection > Properties > Internet Protocol (TCP/IP).
3. Make sure that a static IP address is configured, and click Advanced.
4. In Advanced TCP/IP Settings, select the IP address you want to configure, and click Add directly below the IP addresses listing.
5. Type the IP address and subnet mask, and click Add.

The new IP address is added to the IP addresses listing.

6. Open a command window and try to ping the IP addresses of the controller's Ethernet ports, as shown in the following example:

```
> ping 192.188.128.101
```

If the ping is unsuccessful, try rebooting the server and entering the ping command again.

▼ To Configure the IP Address for Windows Server 2003

1. From the Control Panel, select Network and Dial-Up Connections.
2. Select Local Area Connection > Properties > Internet Protocol (TCP/IP).
3. Make sure a static IP address is configured, and click Advanced.
4. In Advanced TCP/IP Settings, click Add directly below the IP addresses listing.
5. Type an IP address that is on the same subnet as Controller A (192.168.128.101) and Controller B (192.168.128.102).

For example, you can use 192.168.128.100 because it is on the same subnet and does not conflict with the controller IP addresses.

6. Click Add.

The new IP address is added to the IP addresses listing.

Creating a Temporary Virtual Subnet on a Management Host

To configure static IP addressing for an array, you might have to establish a virtual subnet in order to temporarily access the array from the management host. You should delete the virtual subnet after you configure static IP addressing for the array (see [“To Delete a Temporary Virtual Subnet on a Management Host” on page 114](#)).

Note – The following procedure applies to Solaris or Linux management hosts only. On Linux hosts, the syntax of the commands shown may vary slightly, depending on the Linux version used.

▼ To Create a Temporary Virtual Subnet on a Management Host

1. To display the Ethernet ports that are in use on the server, type the following:

```
ifconfig -a
```

The Ethernet ports that are in use are displayed, as shown in the following example:

```
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232
index 1
    inet 127.0.0.1 netmask ff000000
bge0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index 2
    inet 10.4.30.110 netmask fffffff0 broadcast 10.4.30.255
    ether 0:3:ba:32:4d:f1
```

2. As `root`, configure a temporary virtual subnet by typing the following:

```
# ifconfig ethernet-port:1 plumb
# ifconfig ethernet-port:1 192.168.128.100 up
```

For example:

```
# ifconfig bge0:1 plumb
# ifconfig bge0:1 192.168.128.100 up
```

3. Type the following command to view the changes and thereby verify that you have established IP connectivity between the management host and the array controllers:

```
ipconfig -a
```

Assigning IP Addresses to the Controllers

After you have established temporary IP connectivity between the controller's Ethernet ports and the management host, you can use the Sun StorageTek Common Array Manager software to assign a static IP address to Ethernet port 1 of each controller.

▼ To Assign an IP Address to Each Ethernet Port

1. Access the Sun StorageTek Common Array Manager software:

a. Open a web browser and enter the IP address of the management host:

https://management-host:6789

management-host is the IP address of the machine where you installed the management software.

The login page is displayed.

b. Log in as `root`:

Login: **root**

Password: *root-password*

root-password is the root password of the machine where you installed the management software.

c. From the Sun Java Web Console page, click Sun StorageTek Common Array Manager.

The Storage System Summary page is displayed.

2. Temporarily register the array with the default Ethernet port IP addresses.

See ["Registering the Array"](#) on page 52 for instructions.

3. Assign a static IP address to Ethernet port 1 on each controller.

a. In the navigation pane, expand Storage Systems and choose the array to which you want to assign an IP address.

The Administration page is displayed. (This procedure assumes that you previously set the array general information.)

b. Enter the array name and click OK.

- c. In the navigation pane, under the array you want to work with, expand **Physical Devices** and choose **Controllers**.

The Controller Summary page is displayed.

- d. First for Controller A's (Controller 1) Ethernet port 1 and then for Controller B's (Controller 2) Ethernet port 1, select **Specify Network Configuration** and then enter the IP address, gateway address, and netmask. Click **OK**.

You might see an error message indicating that contact has been lost with the array as a result of the changed IP address. You can ignore this message.

4. Delete the array to remove the default IP addresses:

- a. Log out of the console and then log in again.

The Storage System Summary page is displayed.

- b. On the Storage System Summary page, click the check box next to the original array with the original IP address, and click the **Remove** button to remove the old IP address.

5. Reregister the array with the static IP addresses.

To register the array, see [“Registering the Array” on page 52](#) for instructions.

6. If you are configuring multiple arrays, use the following Solaris OS commands to clear the Address Resolution Protocol (ARP) table entry for each controller:

```
arp -d ip-address-controller-A
arp -d ip-address-controller-B
```

Restoring the Management Host IP Configuration

If you changed the IP address of the management host, once you have configured static IP addresses for the controllers you must restore the original IP address of the management host.

To restore the original IP address of an Ethernet interface on the management host, see [“Configuring the IP Address of the Management Host” on page 109](#).

If you established a virtual subnet to assign IP addresses, you should delete it. To delete the temporary virtual subnet on the management host, see [“To Delete a Temporary Virtual Subnet on a Management Host” on page 114](#).

▼ To Delete a Temporary Virtual Subnet on a Management Host

1. Enter the following commands as `root`:

```
# ifconfig ethernet-port:1 down
```

```
# ifconfig ethernet-port:1 unplumb
```

2. View the changes:

```
ifconfig -a
```

Using the Browser Interface

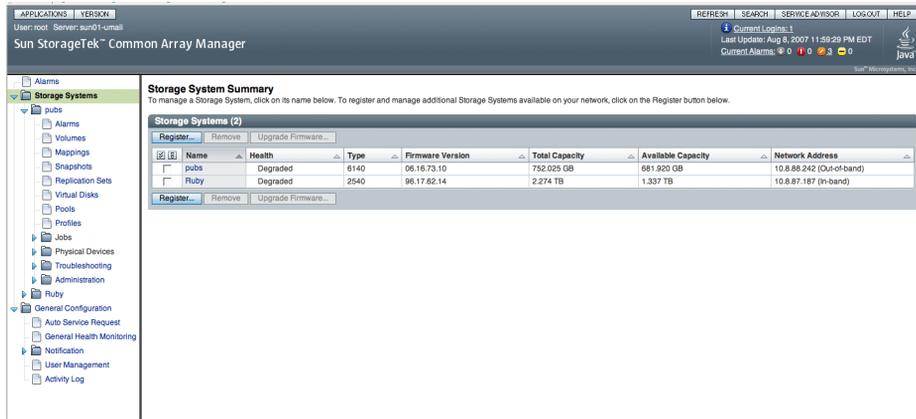
This section describes navigating the browser interface:

- [“Navigating the Common Array Manager Interface” on page 116](#)

For more information about the management software, you can click the Help button at the top right corner of any window.

Navigating the Common Array Manager Interface

The browser interface provides you with an easy-to-use interface to configure, manage, and monitor the system. You navigate through the browser interface as you would a typical web page. You use the navigation tree to move among pages within an application. You can click a link to get details about a selected item. You can also sort and filter information displayed on a page. When you place your pointer over a button, tree object, link, icon, or column, a tooltip provides a brief description of the object.



Navigating the Common Array Manager Interface

The browser interface provides you with an easy-to-use interface to configure, manage, and monitor the system. You navigate through the browser interface as you would a typical web page. You use the navigation tree to move among pages within an application. You can click a link to get details about a selected item. You can also sort and filter information displayed on a page. When you place your pointer over a button, tree object, link, icon, or column, a tooltip provides a brief description of the object.

Each page uses a form or table format to display data.

The following sections describe the main elements of the browser interface:

- “Page Banner” on page 116
- “Page Content Area” on page 118
- “Controlling the Display of Table Information” on page 119
- “Status Icons” on page 120
- “Using Forms” on page 121
- “Searching for System Elements” on page 122
- “Using Help” on page 123

Page Banner

Across the top of each page, the banner displays buttons, links, system information, alarm status, and the name of the application. TABLE C-1 displays the contents of the banner.

TABLE C-1 Contents of the Banner

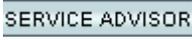
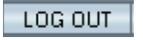
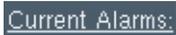
Button	Description
	Returns you to the Java Web Console page, where you can navigate between the configuration software and the diagnostic software.
	Displays the software version and copyright information.
	Refreshes the current page.
	Enables you to quickly locate logical and physical elements defined in the system. You select a component and enter a name or World Wide Name (WWN) for the component you want to locate. An asterisk (*) searches for all instances of the selected component. For example, you can search for all initiators or only those initiators that match a specified name or WWN.
	Launches Service Advisor.
	Logs you out of the Java Web Console and the current application.
	Opens the online help in a separate window.
System Information and Status	
	Displays the name of the user who is currently logged in to the system.
	Displays the name of the system.
	Displays the number of users currently logged in to the system. Click the link to open the Active User Summary, which displays the user name, role, client type, and IP address for each logged-in user.
	Displays the latest date and time that data was retrieved from the server that you are administering. The latest data is collected and displayed each time you refresh the browser window or perform an action in the browser.

TABLE C-1 Contents of the Banner (*Continued*)

Button	Description
	Displays the current number of each type of alarm. There are four alarm types:  Down,  Critical,  Major, and  Minor. To get more information about the alarms, click the Current Alarms link. The Alarms Summary page is displayed.

The top level of the navigation pane displays the following links:

- Alarms
Clicking the Alarms link displays the Alarms page, from which you can view current alarms for all storage systems and gain access to alarm detail information.
- Storage Systems
Clicking the Storage Systems link displays the Storage System Summary page, from which you can select an array to manage.
- General Configuration
Clicking the General Configuration link displays the Site Information page, where you enter company, storage site, and contact information.

Page Content Area

The content section of each page displays storage or system information as a form or table. You click a link in the page to perform a task or to move among pages. You can also move among pages by clicking an object in the navigation tree.

Controlling the Display of Table Information

Tables display data in a tabular format. [TABLE C-2](#) describes the objects you can use to control the display of data on a page.

TABLE C-2 Table Objects

Control/Indicator	Description
	<p>Enables you to display only the information that interests you.</p> <p>When filtering tables, follow these guidelines:</p> <ul style="list-style-type: none">• A filter must have at least one defined criterion.• A filter applies to the current server only. You cannot apply a filter to tables across multiple servers. <p>To filter a table, choose the filter criterion you want from the table's Filter drop-down menu.</p>
	<p>Enable you to toggle between displaying all rows and displaying 15 or 25 rows one page at a time. When the top icon is displayed on a table, click the icon to page through all data in the table. When the bottom icon is displayed in a table, click the icon to page through 15 or 25 rows of data.</p>
	<p>Enable you to select or deselect all of the check boxes in the table. Use the icon on the left to select all of the check boxes on the current page. Use the icon on the right to clear all of the check boxes on the current page.</p>
	<p>Indicates that the column in the table is sorted in ascending order. The ascending sort order is by number (0-9), by uppercase letter (A-Z), and then by lowercase letter (a-z).</p> <p>Click this icon to change the sort order of the column to descending.</p> <p>A closed icon indicates the column by which the table is currently sorted.</p>

TABLE C-2 Table Objects (*Continued*)

Control/Indicator	Description
	Indicates that the column in the table is sorted in descending order. The descending sort order is by lowercase letter (z-a), by uppercase letter (Z-A), and then by number (9-0). Click this icon to change the sort order of the column to ascending. A closed icon indicates the column by which the table is currently sorted.
	Enables you to select the entries that you want to display. Click the button on the left to display the first 25 table entries. Click the button on the right to display the previous 25 table entries.
	Click the button on the left to display the next 15 or 25 table entries. Click the button on the right to display the last 15 or 25 table entries.
	Indicates how many pages are in the table, and displays the page you are currently viewing. To view a different page, type the page number in the Page field and click Go.

Status Icons

Icons are displayed to draw your attention to an object's status. [TABLE C-3](#) describes these status icons.

TABLE C-3 Status Icons

Control/Indicator	Description
	Identifies a critical error. Immediate attention to the failed object is strongly recommended.
	Identifies a a minor error. The object is not working within normal operational parameters.

TABLE C-3 Status Icons (*Continued*)

Control/Indicator	Description
	Identifies an unknown condition. A report on the status cannot be supplied at this time.

Using Forms

Forms have menus, buttons, links, and text fields that allow you to select available options and enter information on a page. [TABLE C-4](#) describes these elements.

TABLE C-4 Form Controls

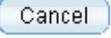
Control/Indicator	Description
	Indicates that you must enter information in this field.
	Lists options from which you can make a selection.
	Displays the part of the form that is indicated by the text next to this icon.
	Returns you to the top of the form.
	Saves the selections and entries that you have made.
	Sets all page elements to the original selections that were displayed when the page was first accessed.
	Cancels the current settings.

TABLE C-4 Form Controls (*Continued*)

Control/Indicator	Description
	Causes the current settings to take effect.

Searching for System Elements

You can easily locate logical and physical elements of the system by using the search feature located in the banner of any page.

You can search for all elements of a selected type for particular elements that match a specified term. For example, you can search for all initiators or you can search for only the initiators that contain a specific World Wide Name (WWN).

▼ To Use the Search Feature:

1. **Click Sun StorageTek Common Array Manager.**

2. **In the banner, click Search.**

The Search window is displayed.

3. **Select the type of component you want to locate. You can search for arrays, disks, initiators, storage pools, storage profiles, trays, virtual disks, hosts, host groups, volumes, replication sets, snapshots, or all system elements.**

4. **If you want to narrow your search, enter a term in the text field.**

- All elements that contain the specified term in the name or description field will be located. For example, the term “primary” will locate elements with the name of primary, demoprimary, primarydemo, and firstprimarylast.
- The search feature is not case-sensitive. For example, the term “primary” will locate elements that contain primary, Primary, PRIMARY, priMARY, and any other case combination.
- Do not embed spaces or special characters in the search term.
- Use the wildcard (*) only to search for all elements of a selected type. Do not use the wildcard with the search term. If you do, the system will search for the asterisk character.

5. **Click Search.**

The result of your search is displayed.

6. **Click Back to return to the previous page.**

Using Help

To view additional information about the configuration software, click Help in the banner of the web browser. The help window consists of a navigation pane on the left and a topic pane on the right.

To display a help topic, use the Navigation pane's Contents, Index, and Search tabs. Click the Search tab and click Tips on Searching to learn about the search feature. [TABLE C-5](#) describes the help tabs.

TABLE C-5 Help Tabs

Tab	Description
Contents	Click a folder icon to display subtopics. Click a page icon to display the help page for that topic in the Topic pane.
Index	Click an index entry to display the help page for that topic.
Search	Type the words for which you want to search and click Search. The Navigation pane displays a list of topics that match your search criteria in order of relevancy. Click a topic link to display the help page for that topic. Click the Tips on Searching link for information about how to improve your search results. To search for a particular word or phrase within a topic, click in the Topic pane, press Ctrl+F, type the word or phrase for which you are searching, and click Find.

Glossary

Definitions obtained from the Storage Networking Industry Association (SNIA) Dictionary are indicated with "(SNIA)" at the end. For the complete SNIA Dictionary, go to www.snia.org/education/dictionary.

agent

The component of the system monitoring and diagnostic software that collects health and asset information about the array.

alarm

A type of event that requires service action. See also [event](#).

alert

A subtype of an event that requires user intervention. The term *actionable event* often describes an alert. See also [event](#).

array

Multiple disk drives that function as a single storage device. A high-availability (HA) array configuration has redundant controllers and expansion trays of disk drives.

array hot-spare

A disk that serves as a hot-spare within an array as part of the storage pool; a reserve disk that can be made available to all virtual disks within an array. See also [hot-spare](#).

block

The amount of data sent or received by the host per I/O operation; the size of a data unit.

capacity

The amount of storage you must allocate to storage elements, including volumes, pools, and virtual disks. Capacity planning should include allocations for volume snapshots and volume copies.

control path

The route used for communication of system management information, usually an out-of-band connection.

customer LAN

See [site LAN](#).

DAS

See [direct attached storage \(DAS\)](#).

data host

Any host that uses the system for storage. A data host can be connected directly to the array (direct attach storage, or DAS) or can be connected to an external switch that supports multiple data hosts (storage area network, or SAN). See also [host](#).

data path

The route taken by a data packet between a data host and the storage device.

direct attached storage (DAS)

A storage architecture in which one or two hosts that access data are connected physically to a storage array.

disk

A physical drive component that stores data.

event

A notification of something that happened on a device. There are many types of events, and each type describes a separate occurrence. See also [alarm](#) and [alert](#).

extent

A set of contiguous blocks with consecutive logical addresses on a physical or virtual disk.

failover and recovery

The process of changing the data path automatically to an alternate path.

fault coverage

The percentage of faults detected against all possible faults or against all faults of a given type.

FC

See [Fibre Channel \(FC\)](#).

Fibre Channel (FC)

A set of standards for a serial I/O bus capable of transferring data between two ports at up to 100 megabytes/second, with standards proposals to go to higher speeds. Fibre Channel supports point to point, arbitrated loop, and switched topologies. Fibre Channel was completely developed through industry cooperation, unlike SCSI, which was developed by a vendor and submitted for standardization after the fact. (SNIA)

Fibre Channel switch

A networking device that can send packets directly to a port associated with a given network address in a Fibre Channel storage area network (SAN). Fibre Channel switches are used to expand the number of servers that can connect to a particular storage port. Each switch is managed by its own management software.

HBA

See [host bus adapter \(HBA\)](#).

host

A representation of a data host that is mapped to initiators and volumes to create a storage domain. See also [data host](#), [initiator](#).

host bus adapter (HBA)

An I/O adapter that connects a host I/O bus to a computer's memory system. (SNIA) See also [initiator](#).

host group

A group of hosts with common storage characteristics that can be mapped to volumes. See also [host](#).

hot-spare

The drive used by a controller to replace a failed disk. See also [array hot-spare](#).

in-band traffic

System management traffic that uses the data path between a host and a storage device. See also [out-of-band traffic](#).

initiator

A system component that initiates an I/O operation over a Fibre Channel (FC) network. If allowed by FC fabric zoning rules, each host connection within the FC network has the ability to initiate transactions with the storage array. Each host in the FC network represents a separate initiator, so if a host is connected to the system through two host bus adapters (HBAs), the system identifies two different initiators (similar to multi-homed, Ethernet-based hosts). In contrast, when multipathing is used in round-robin mode, multiple HBAs are grouped together, and the multipathing software identifies the group of HBAs as a single initiator.

IOPS

A measure of transaction speed, representing the number of input and output transactions per second.

LAN

Local area network.

logical unit number (LUN)

The SCSI identifier for a volume as it is recognized by a particular host. The same volume can be represented by a different LUN to a different host.

LUN

See [logical unit number \(LUN\)](#).

MAC address

See [media access control \(MAC\) address](#).

management host

A Solaris host serving the configuration, management, and monitoring software for the Sun StorageTek Common Array Manager. The software on the station can be accessed with a browser to run the browser interface or with a remote scripting command-line interface (CLI) client to access the SCS CLI commands.

master / alternate master

A design for reliability that uses redundant configuration. Array configurations share master/alternate master configurations: each array configuration has two controller trays that are grouped as one host. In each case, the master component uses the IP address and name. If the master fails, the alternate master assumes the IP address and name and takes over the master's functions.

media access control (MAC) address

The physical address identifying an Ethernet controller board. The MAC address, also called an Ethernet address, is set at the factory and must be mapped to the IP address of the device.

mirroring

A form of storage – also called RAID Level 1, independent copy, and real-time copy – whereby two or more independent, identical copies of data are maintained on separate media. Typical mirroring technologies enable the cloning of data sets to provide redundancy for a storage system.

multipathing

A design for redundancy that provides at least two physical paths to a target.

out-of-band traffic

System management traffic outside of the primary data path that uses an Ethernet network. See also [in-band traffic](#).

pool

See [storage pool](#).

profile

See [storage profile](#).

provisioning

The process of allocation and assignment of storage to hosts.

RAID

An acronym for Redundant Array of Independent Disks, a family of techniques for managing multiple disks to deliver desirable cost, data availability, and performance characteristics to host environments. (SNIA)

remote monitoring

Monitoring of the functions and performance of a hardware system from a location other than where the hardware resides.

remote scripting CLI client

A command-line interface (CLI) that enables you to manage the system from a remote management host. The client communicates with the management software through a secure out-of-band interface, HTTPS, and provides the same control and monitoring capability as the browser interface. The client must be installed on a host that has network access to the system.

SAN

See [storage area network \(SAN\)](#).

site LAN

The local area network at your site. When the system is connected to your LAN, the system can be managed through a browser from any host on the LAN.

snapshot

An copy of a volume's data at a specific point in time.

SSCS

Sun Storage Command System. The command-line interface (CLI) that can be used to manage the array.

storage area network (SAN)

An architecture in which the storage elements are connected to each other and to a server that is the access point for all systems that use the SAN to store data.

storage domain

A secure container that holds a subset of the system's total storage resources. Multiple storage domains can be created to securely partition the system's total set of storage resources. This enables you to organize multiple departments or applications into a single storage management infrastructure.

storage pool

A container that groups physical disk capacity (abstracted as virtual disks in the browser interface) into a logical pool of available storage capacity. A storage pool's characteristics are defined by a storage profile. You can create multiple storage pools to segregate storage capacity for use in various types of applications (for example, high throughput and online transaction-processing applications).

storage profile

A defined set of storage performance characteristics such as RAID level, segment size, dedicated hot-spare, and virtualization strategy. You can choose a predefined profile suitable for the application that is using the storage, or you can create a custom profile.

storage tray

An enclosure containing disks. A tray with dual RAID controllers is called a controller tray; a tray without controllers is called an expansion tray.

stripe size

The number of blocks in a stripe. A striped array's stripe size is the stripe depth multiplied by the number of member extents. A parity RAID array's stripe size is the stripe depth multiplied by one less than the number of member extents. See also [striping](#).

striping

Short for data striping; also known as RAID Level 0 or RAID 0. A mapping technique in which fixed-size consecutive ranges of virtual disk data addresses are mapped to successive array members in a cyclic pattern. (SNIA)

target

The system component that receives a SCSI I/O command. (SNIA)

thin-scripting client

See [remote scripting CLI client](#).

tray

See [storage tray](#).

virtual disk

A set of disk blocks presented to an operating environment as a range of consecutively numbered logical blocks with disk-like storage and I/O semantics. The virtual disk is the disk array object that most closely resembles a physical disk from the operating environment's viewpoint.(SNIA)

volume

A logically contiguous range of storage blocks allocated from a single pool and presented by a disk array as a logical unit number (LUN). A volume can span the physical devices that constitute the array, or it can be wholly contained within a single physical disk, depending on its virtualization strategy, size, and the internal array configuration. The array controller makes these details transparent to applications running on the attached server system.

volume snapshot

See [snapshot](#).

WWN

World Wide Name. A unique 64-bit number assigned by a recognized naming authority such as the Institute of Electrical and Electronics Engineers (IEEE) that identifies a connection (device) or a set of connections to the network. The World

Wide Name (WWN) is constructed from the number that identifies the naming authority, the number that identifies the manufacturer, and a unique number for the specific connection.

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