9176 and D173 Disk Subsystems

Planning Guide

MO9113Ae, Second Edition

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This document describes version 7.10 of LSI Logic Corporation's StorageTek Object Manager and will remain the official reference source for all revisions/releases of this product until rescinded by an update.

Trademark Acknowledgments

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Chapter 1

Introduction

About This Book

This book contains technical information and planning worksheets to help you prepare for software installation.

Intended Readers

System administrators and others responsible for installing hardware and software.

Book Contents and Organization

This book provides preparation guidelines and instructions that you should perform before installing hardware, the StorageTek™ Object Manager, version 7.10 software and controller firmware version 4.01. Here is a brief look at what you will find in each chapter.

- Chapter 1, "Introduction" provides an overview of this book, a list of terminology used in this book, and the documentation set to which it belongs.
- Chapter 2, "Planning the Installation" provides a process for planning the installation of controller trays and drive trays.
- Chapter 3, "Planning the Management Station Software Installation" provides a process for planning the installation of StorageTek Object Manager 7.10 on storage management stations.
- Chapter 4, "Planning the Host Software Installation" provides a process for planning the installation of StorageTek Object Manager 7.10 on hosts.
- Appendix A, "Installation Profiles - Master Copies" provides master copies of the disk subsystem, storage management station, and host installation profiles, which you can remove and photocopy for use in planning your Object Manager software installation.
- Appendix B, "Setting Up a BOOTP Server" provides specific instructions for setting up a BOOTP server as required for directly managing a disk subsystem.

Documentation Set

The *Storage System Planning Guide* is part of a documentation set that provides planning, installation, operation, and servicing information for StorageTek Object Manager 7.10 software, controller trays (4766, 4774), drive trays (StorageTek 9170 Disk Array, StorageTek 9170-001 Disk Array), and storage systems (StorageTek D173 Disk Subsystem, StorageTek 9176 Disk Subsystem). The documentation set includes:

General Documentation

- *Quick Start Guide* contains descriptions of all Adobe® Portable Document Format (PDF) files that are stored on the software compact disk (CD). The PDFs are electronic versions of this document set.
- *Product Release Notes for StorageTek™ Object Manager* (when available) contain important information about the CD contents, known restrictions and workarounds, and updates to the product documentation.

Hardware Documentation

- *Controller Tray Site Preparation Guide* contains site requirements and other technical information for preparing the building for a controller tray installation.
- *Drive Tray Site Preparation Guide* contains site requirements and other technical information for preparing the building for a drive tray or storage system installation.
- *Controller Tray and Drive Tray Installation Guide* contains step-by-step instructions for installing deskside and rackmount controller trays and drive trays, and storage systems, including switch setting information and cabling routing examples.
- *Controller Tray User Guide* contains model specifications and step-by-step instructions for operating, upgrading, maintaining, and servicing the controller tray and its components.
- *Drive Tray User Guide* contains technical specifications and step-by-step instructions for operating, upgrading, maintaining, and servicing drive trays, storage systems, and their components.

Software Documentation

- *StorageTek™ Object Manager Installation Guide for Version 7.10* contains step-by-step installation and upgrade instructions for the storage management software.
- *StorageTek™ Object Manager Concepts Guide for Version 7.10* contains explanations of the storage management software terminology, concepts, and features.

- *Enterprise Management Window Help* contains information and procedures for working with the entire management domain. This is one of two online Help systems supporting StorageTek Object Manager 7.10.
- *Array Management Window Help* contains information and procedures for managing individual disk subsystems. This is one of two online Help systems supporting StorageTek Object Manager 7.10.

Planning Process Overview

This book provides a series of worksheets that you will use to help ensure proper installation of the disk subsystem hardware and storage management software. The worksheets, which you will fill out as you go through the procedures in this book, will help you determine which type of hardware and software you will need to install on your system and in which sequence. You will then use the completed worksheets as a guide during the storage management software installation process.

During the planning process, you will fill out the following worksheets:

- Disk Subsystem Installation Profile
- Storage Management Station Installation Profile
- Host Installation Profile

Navigation Aids

Graphics are used in the margins of the planning and installation publications to indicate specific planning and installing tasks. Graphics will indicate a specific worksheet used to enter information obtained during the planning process. In the *StorageTek Object Manager Installation Guide for Version 7.10*, these graphic images will indicate when to obtain recorded information from a specific worksheet to perform an installation procedure.

Table 1-1 Navigation Aid Icons

Icon	Represents
	**Disk Subsystem**
	**Storage Management Station**
	**Host or Server in a Cluster**

What's New

This section describes the major new features in this version of the software. The following features have been added with release 7.10:

- Event Monitoring – gives you the ability to monitor disk subsystems, even when the Enterprise Management Window is not open. A new toolbar button and option, Tools >> Update Monitor, have been added to the interface to allow updates to the monitor if changes have occurred to your disk subsystem configuration.
- Heterogeneous Hosts – with Storage Partitioning, this feature gives you the ability to connects hosts running different operating systems to a single disk subsystem. The host types can be different operating systems (like Solaris and Windows NT) or variants of the same operating systems (like Windows NT, clustered, and Windows NT, non-clustered).
- Configuration Replication – allows you to save the logical configuration of a disk subsystem and then load it on an identical disk subsystem. This feature can be used to replicate a logical configuration from one disk subsystem to another, or to save a disk subsystem configuration for backup purposes.
- Auto-Volume Transfer – through the latest firmware version, allows individual volumes on a disk subsystem to be owned by different controllers in the disk subsystem. Previous versions had ownership at the volume group-level only. Now, if a problem occurs along a path between a host and a volume, the multi-path driver can move that volume to the other active controller.
- Command Line – supports the use of a command line to issue commands to the disk subsystems. The Command Line Interface is based upon the script engine commands found in the Script Editor. Refer to the OMcli.txt file on the installation CD for usage information.
- Controller Diagnostics – available from the controller menu in the storage management software, these diagnostics are used to test the host- and drive-side Fibre Channel loops.
- Access Volume Mapping Allowed – gives you the ability to assign and change the logical unit number (LUN) assignment for the Access Volume. The Access Volume is used with disk subsystems connected via an Ethernet connection on a host.

Chapter 2

Planning the Installation

Overview

This chapter directs you through the tasks required to plan and prepare your disk storage subsystem hardware installation.

A disk subsystem is an entity that is managed by the storage management software and consists of physical components (such as drives, controllers, fans, and power supplies) and logical components (such as volume groups and volumes).

To plan your disk subsystem installation, you will complete a Disk Subsystem Installation Profile for each disk subsystem (Table 2-1 on page 2-3).

During the installation process, you will refer to the Installation Activity column to determine which procedure to perform and in which order. You will perform only those procedures that you have selected, based on your responses in the Configuration Information column for each task. After you have completed the specific installation activity, select the box next to “Completed.”

Disk Subsystem Installation Profile

Make a photocopy of the Disk Subsystem Installation Profile (Table 2-1) for each disk subsystem that you will manage with the new storage management software. (Refer to Appendix A for master copies.)

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Enter the Disk Subsystem Name" on page 2-4.

Table 2-1 Disk Subsystem Installation Profile

Planning Task	Configuration Information	Installation Activity
1 Enter the disk subsystem name (page 2-4).	Disk subsystem name:_____	No action required. Go to Task 2.
2 Identify the installation type (page 2-4).	❑ Storage management software installation only. ❑ Storage management software and hardware installation.	No action required. Go to Task 3.
3 Select a management method (page 2-5).	❑ Host-agent management: **Controller A** Name:_____ **Controller B** Name:_____	No action required. Go to Task 4.
	❑ Direct-management: **Controller A** Ethernet address:_____ Controller host name:_____ **Controller B** Ethernet address:_____ Controller host name:_____	❑ Set up a BOOTP server on your network. ❑ Add IP addresses and controller host names to the DNS or host table. ❑ Completed.
4 Identify the hardware components (page 2-9).	❑ Controller tray: ___4774 ___4766 ❑ Storage system: ___StorageTek D173 Disk Subsystem ___StorageTek 9176 Disk Subsystem ❑ Drive tray: ___StorageTek 9170 Disk Array ___StorageTek 9170-001 Disk Array ___StorageTek 9170-002 Disk Array	❑ Identify controller or drive tray model. ❑ Verify hardware specifications. ❑ Install and configure new hardware, if applicable. ❑ Completed.

Task 1: Enter the Disk Subsystem Name

Use Task 1 on the Disk Subsystem Installation Profile to enter a disk subsystem name. For more information, see "Learn About Naming Disk Subsystems," below.

1. Enter the name of the disk subsystem in the Configuration Information column.
2. When finished, go to "Task 2: Identify the Installation Type."

Learn About Naming Disk Subsystems

You can rename individual disk subsystems using the storage management software. Initially, all disk subsystems will be displayed as <unnamed> after you have installed StorageTek Object Manager 7.10. If you are upgrading the storage management software from Object Manager 7.0, any previously named disk subsystems will display under their existing names.

Use the following tips for devising disk subsystem names:

- StorageTek Object Manager 7.10 allows a name up to 30 characters. All leading and trailing spaces will be deleted.
- Use unique, meaningful names that will be easy to understand and remember.
- Avoid arbitrary names or names that would quickly lose their meaning in the future.
- StorageTek Object Manager 7.10 displays disk subsystem names with the prefix “Disk Subsystem.” Therefore, if you rename a disk subsystem “Engineering,” it will display as “Disk Subsystem Engineering.”

Task 2: Identify the Installation Type

Use Task 2 to identify what you are installing.

1. Select the box next to the installation type in the Configuration Information column, based on whether you are installing storage management software only, or storage management software and hardware.
2. Go to "Task 3: Select a Management Method."

Task 3: Select a Management Method

Use Task 3 to select a method for managing the disk subsystem. For more information, refer to "Learn About Disk Subsystem Management Methods" on page 2-6.

1. Select the box next to the method you will use to manage either or both disk subsystem controllers (Controller A and Controller B) in the Configuration Information column. Note that you can manage the disk subsystem using either or both methods.
2. Choose one of the following, based on how you will manage at least one of the controllers:
   - **Host-agent management –** Go to step 3.
   - **Direct-Management –** Go to step 5.

NOTE The controller IP address is automatically generated after you have installed the storage management software and have completed post-installation configuration tasks.

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3. Enter the host name for Controller A or Controller B (or both) in the Configuration Information column. (Obtain the host name from your network administrator.)
4. Choose one of the following:
   - **Each controller will be managed via the host-agent method –** You are finished with this task. Go to "Task 4: Identify the Hardware Components" on page 2-9.
   - **At least one controller will be managed via the direct-management method –** Go to step 5.
5. Enter the Ethernet address for Controller A or Controller B (or both) in the Configuration Information column.

   To find the Ethernet address, locate the controller canisters on the controller tray. (If necessary, remove the access panel from the controller tray. Refer to the hardware documentation for instructions.) Look on the controller canister label for the hardware Ethernet address, which will be a hexadecimal (for example, 00a0b80000d8).
6. Enter the host name for Controller A or Controller B (or both) in the Configuration Information column. (Obtain the IP address from your network administrator.)
7. Select the boxes next to “Set up a BOOTP server on your network” and “Add IP addresses and controller host names to the DNS or host table” in the Installation Activity column.
8. Go to "Task 4: Identify the Hardware Components" on page 2-9.

Learn About Disk Subsystem Management Methods

You manage the disk subsystems directly from a storage management station, using the direct-management method, or from a host that is acting as a storage management station, using the host-agent management method. Depending upon how your disk subsystem is connected to the network, you can manage the disk subsystem using either or both methods. For more information, see "Direct-Management Method" on page 2-7 below and "Host-Agent Management" on page 2-8.

Direct-Management Method With the direct-management method, you manage the disk subsystem directly over the network through an Ethernet connection to either or both controllers (Figure 2-1). The direct-management method offers the following advantages:

- You can use a storage management station to manage disk subsystems connected to a host that is running an operating system not supported by the storage management software. Contact your customer support representative for more information.
- You can configure the maximum number of LUNs supported by your operating system and host adapters. This method does not require an Access Volume, and therefore, does not require the use of a LUN.

The disadvantages of using the direct-management method are:

- An Ethernet cable is required to connect each controller to the network.
- You must specify a host name and IP address for each controller whenever adding disk subsystems.
- A BOOTP server is required to configure the controller on the network.

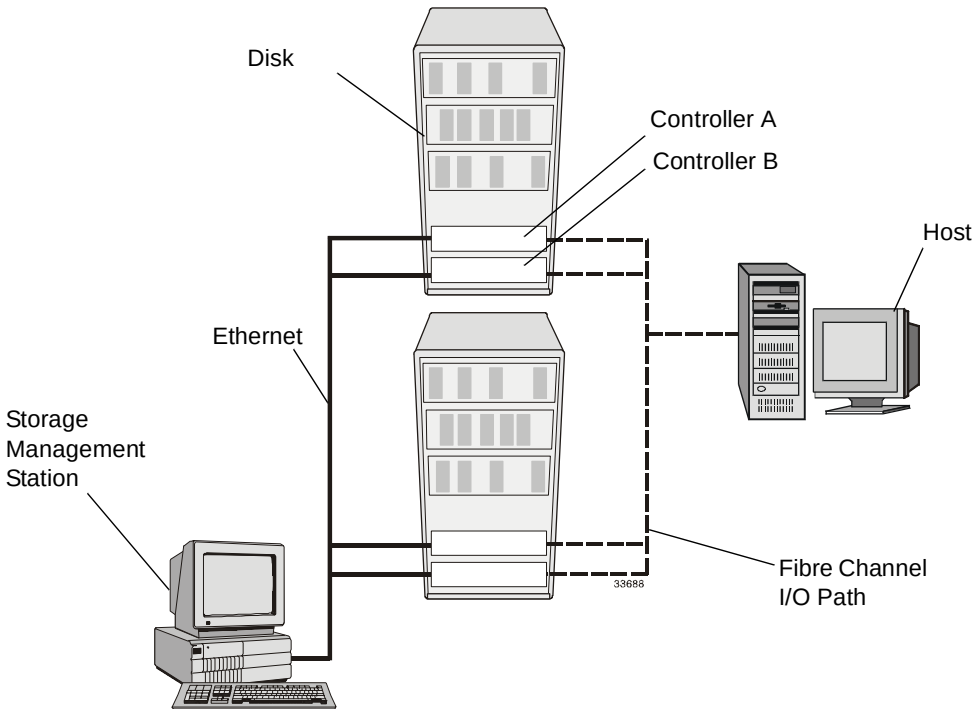

Figure 2-1 Direct-Management Method

Host-Agent Management With the host-agent management method, you use the storage management client software to manage disk subsystems through an Ethernet connection to a host (Figure 2-2). The host-agent software receives communication from the storage management client software and passes it to the disk subsystem controllers via a Fibre Channel I/O path.

The host-agent management method offers the following advantages:

- Ethernet cables are not used to connect each controller to the network.
- A BOOTP server is not required to configure the controller on the network.
- Network configuration tasks for each controller are not required.
- Only the host name or IP address must be specified when adding disk subsystems. After you add the specific host name or IP address, the host-agent software automatically detects any disk subsystems connected to that host.

The disadvantage of using the host-agent method is that the host-agent requires a special Access Volume to communicate with the disk subsystem controllers. The default Volume-to-LUN mapping assigned to the Access Volume is 7. When a default Volume-to-LUN mapping is assigned, then the total Volume-to-LUN mappings available are one less than the maximum allowed by the operating system and host adapters.

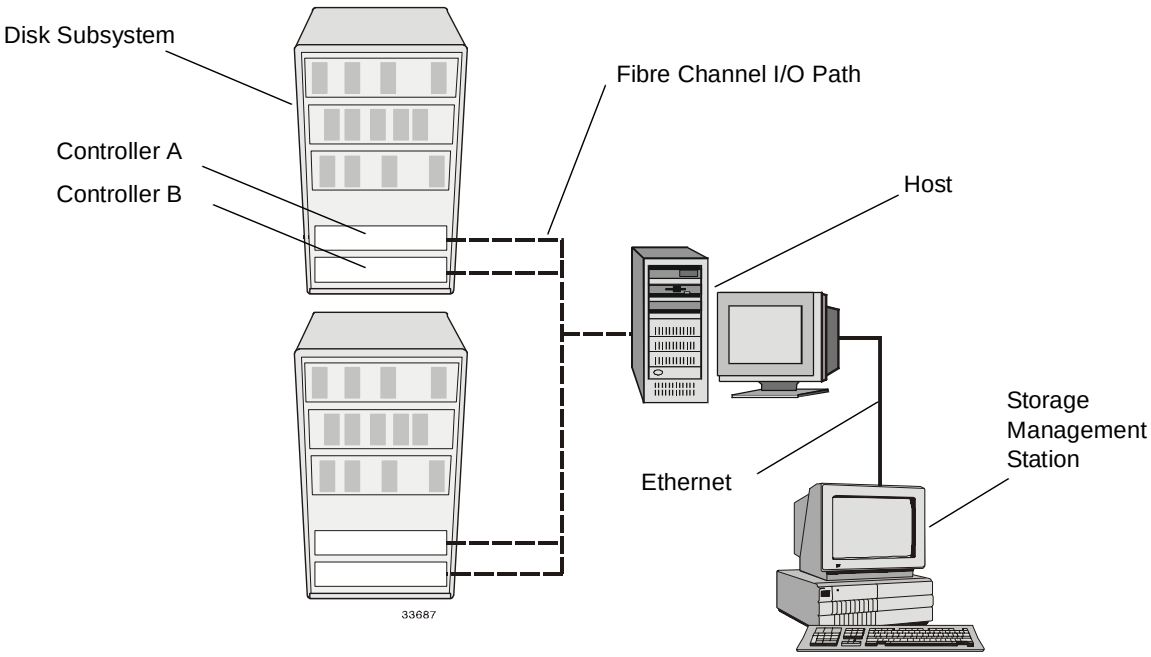

Figure 2-2 Host-Agent Management Method

Task 4: Identify the Hardware Components

Use Task 4 to identify the hardware components on the disk subsystem.

1. Select either “Controller tray,” “Drive tray,” or “Storage system” in the Configuration Information column and select the model you will use with the storage management software.
2. Select “Identify controller or drive tray model,” “Verify hardware specifications,” and “Install and Configure new hardware if applicable” in the Installation Activity column.
3. Refer to the Product Release Notes for information on host adapters requirements.
4. Install any new hardware you have identified in this task. Refer to the site preparation and installation guides of the respective hardware for instructions on installation requirements and installation procedures.
5. As necessary, complete a Disk Subsystem Installation Profile for each host by repeating the procedures in this chapter, starting with "Task 1: Enter the Disk Subsystem Name" on page 2-4.
6. You are finished with the Disk Subsystem Installation Profile. Go to Chapter 3, "Planning the Management Station Software Installation."

Chapter 3

Planning the Management Station Software Installation

Overview

This chapter directs you through the tasks required to plan the installation of the storage management station software.

A storage management station typically is a personal computer or workstation, connected to an Ethernet network, that you use to manage one or more disk subsystems. However, a storage management station also can be a host connected to the disk subsystem via a Fibre Channel I/O path by which you will manage the disk subsystems. Although you can install the storage management software on a host, the host will communicate with the disk subsystem controllers via the TCP/IP protocol.

To plan your storage management station software installation, you will complete a Storage Management Station Installation Profile (Table 3-1 on page 3-3) for each storage management station.

During the installation process, you will refer to the Installation Activity column to determine which procedure to perform and in which order. You will perform only those procedures that you have selected, based on your responses in the Configuration Information column for each task. After you have completed the specific installation activity, select “completed.”

Completing the Management Station Installation Profile

Make a photocopy of the Storage Management Station Installation Profile (Table 3-1) for each machine onto which you are installing the storage management software. (Refer to Appendix A for master copies.)

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Identify the Storage Management Station and Disk Subsystems" on page 3-4.

Table 3-1 Storage Management Station Installation Profile

Planning Task	Configuration Information	Installation Activity
1 Identify the storage management station and disk subsystems (one or more)(page 3-4).	Storage Management Station:_____ Disk Subsystems: _____ _____	No action required. Go to Task 2.
2 Identify the operating system (page 3-4).	❑ AIX® ❑ NetWare™ ❑ HP-UX® ❑ Solaris® ❑ IRIX® ❑ Windows® 2000 ❑ Linux® ❑ Windows® NT® or 98	No action required. Go to Task 3.
3 Identify Microsoft Virtual Machine requirements (page 3-4).	Is this a Windows NT machine that will be used for event monitoring? ❑ Yes ❑ No	❑ Install Microsoft® Virtual Machine.[1] ❑ Completed.
4 Select the client software package (page 3-6).	Does this machine use Tivoli® IT Director? ❑ Yes ❑ No	❑ Install Tivoli IT Director Client Integration. ❑ Completed.
	Does this machine use HP OpenView® Node Network Manager? ❑ Yes ❑ No	❑ Install OMclient. ❑ Install HP OpenView Client Integration. ❑ Completed.
	❑ No Frameworks application.	❑ Install OMclient.
5 Verify system specifications (page 3-8).	Ensure that this machine meets the specifications of its operating system.	❑ Verify specifications. ❑ Completed.

[1] Windows NT requires Microsoft Virtual Machine in order to run the event monitor.

Task 1: Identify the Storage Management Station and Disk Subsystems

Use Task 1 on the Storage Management Station Installation Profile to identify the storage management station and one or more disk subsystems that you will manage with it.

1. Enter the name of the storage management station in the Configuration Information column.
2. Enter the name of the disk subsystems that you will manage from this storage management station in the Configuration Information column (refer to the completed, corresponding Disk Subsystem Profile, Task 1), and then go to "Task 2: Identify the Operating System."

Task 2: Identify the Operating System

Use Task 2 to identify the operating system running on the storage management station. Select the operating system running on this machine from the choices provided in the Configuration Information column and go to "Task 3: Identify Microsoft Virtual Machine Requirements."

Task 3: Identify Microsoft Virtual Machine Requirements

Use Task 3 to indicate whether this machine will be used for event monitoring and whether it requires the Microsoft Virtual Machine software. For more information refer to "Learn About the Event Monitor" and "Learn About Microsoft Virtual Machine."

IMPORTANT Windows NT requires Microsoft Virtual Machine in order to run the Event Monitor feature.

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1. Select “Yes” or “No” in the Configuration Information column, based on whether this storage management station is a Windows NT machine that you will use for event monitoring.
2. Choose one of the following, based on your response in step 1:
   - **Yes –** Select “Install Microsoft Virtual Machine” in the Installation Activity column and go to "Task 4: Select the Client Software Package" on page 3-6**.**
   - **No –** Go to "Task 4: Select the Client Software Package" on page 3-6.

Learn About the Event Monitor

The Event Monitor, which is packaged with the client software, monitors disk subsystems and handles error notification (through email or SNMP traps) when the storage management software is not actively running on the host. To provide continuous monitoring, use the Event Monitor on a host that normally runs 24 hours a day.

IMPORTANT If you install the Event Monitor on more than one machine, you will receive duplicate event messages. To prevent receipt of duplicate messages, install the Event Monitor on only one machine — either a storage management station or a host acting as a storage management station.

Learn About Microsoft Virtual Machine

Microsoft Virtual Machine is required only on Windows NT storage management stations. The StorageTek Object Manager 7.10 installation CD provides the version of Microsoft Virtual Machine tested for use with the storage management software. The *StorageTek Object Manager 7.10 Installation Guide* provides information on when and how to install this package.

Task 4: Select the Client Software Package

Use Task 4 to identify which client software you will install on the storage management station. For more information, refer to "Learn About Frameworks Options" and "Learn About the Client Software."

1. Select “Yes” or “No” in the Configuration Information column, based on whether this machine uses Tivoli IT Director.
2. Choose one of the following, based on your selection in step 1:
   - **Yes –** Select “Install Tivoli IT Director Client Integration” in the Installation Activity column and go to "Task 5: Verify System Specifications" on page 3-8.
   - **No –** Go to step 3.
3. Select “Yes” or “No” in the Configuration Information column, based on whether this machine uses “HP OpenView Node Network Manager.”
4. Choose one of the following, based on your selection in step 3.
   - **Yes –** Select “HP OpenView Node Network Manager” in the Configuration Information column, select “Install OMclient” and “Install HP OpenView Client Integration in the Installation Activity column, and go to "Task 5: Verify System Specifications" on page 3-8.
   - **No –** Select “No frameworks application” in the Configuration Column, select “Install OMclient” in the Installation Activity column, and go to "Task 5: Verify System Specifications" on page 3-8.

Learn About Frameworks Options

Which client package you select depends on whether you will use a frameworks (network management) application, and if so, which one. Optionally, you can launch StorageTek Object Manager 7.10 from within the following supported frameworks applications:

- **Tivoli IT Director Client Integration –** You can run Tivoli IT Director on a Windows storage management station. If the machine uses the Tivoli IT Director network management application, you will install IT Director Client Integration.
- **HP OpenView Client Integration –** You can run the HP Openview Client Integration on an HP-UX, Solaris, or Windows storage management station. If the machine uses the HP OpenView Node Network Manager application, you will install OMclient package first and then install the HP OpenView Client Integration.

IMPORTANT Tivoli IT Director and HP OpenView Node Network Manager are third-party utilities and are not included on the storage management software installation CD. If you plan to use either frameworks option, make sure you have installed the applicable network management application on the storage management station.

Learn About the Client Software

The Object Manager Client is required on all storage management stations. It provides the graphical user interface for managing disk subsystems and features two main components:

- **Enterprise Management Window –** Use this window to add, remove, and monitor disk subsystems within the management domain.
- **Array Management Window –** Use this window to manage individual disk subsystem components.

Task 5: Verify System Specifications

Use Task 5 to verify that the storage management station meets the specifications of its operating system.

1. Select “Verify specifications” in the Installation Activity column.
2. Go to "Storage Management Station Specifications" and ensure that the storage management station meets the specifications of its operating system.

CAUTION Do not proceed with the planning process or with any installation procedures until the machine meets the specifications of its operating system.

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3. After you have verified the system specifications, select “Completed” in the Installation Activity column and go to "Using the Profile" on page 3-19.

Storage Management Station Specifications

The storage management station specifications are organized by operating system as given in the following list. Refer to this section when completing Task 5 on the Storage Management Station Installation Profile.

AIX

An RS/6000® processor is required with:

- Minimum 43P (375 MHz PowerPC™ processor). A 44P (333 MHz Power3-II 64-bit processor) model 170 or faster is recommended.
- CDROM drive
- Mouse or similar pointing device
- 128 MB system memory (minimum)

  For OMclient, at least 60 MB system memory must be available on /usr and root-level or root-equivalent permission is required for installation.
- Ethernet network interface card
- AGP PCI video card
- Ensure the storage management station, or the host acting as a storage management station, is running on the AIX Version 4.3.3 operating system.

  The current level of bos.rte.libc can be checked by using the following command:
  `lslpp -ah bos.rte.libc`

The Java_dev2.rte package requires the following AIX base level filesets for all locales:

- x11.adt.lib 4.3.3.0
- x11.adt.motif 4.3.3.0
- bos.adt.include 4.3.3.0
- bos.adt.prof 4.3.3.0

NOTE If they are not already installed, the first three files can be found on the AIX 4.3.3 installation media. The bos.adt.prof file can be found through the IBM® web site.

The following APARS (Table 3-2) must be applied to your AIX system after the base filesets have been installed:

Table 3-2 APARS Specifications

PTF#	APAR#	Fileset	VRMF
U467183	IY03993	bos.adt.include	4.3.3.1
U467290	IY06365	bos.net.tcp.client	4.3.3.3
U467478	IY04069	bos.sysmgt.serv_aid	4.3.3.2
U467572	IY05690	X11.base.lib	4.3.3.2
U467473	IY05697	X11.adt.motif	4.3.3.1
U467558	IY05741	X11.base.rte	4.3.3.2
U467459	IY05989	X11.Dt.rte	4.3.3.3
U467557	IY05989	X11.motif.mwm	4.3.3.1
U467458	IY05990	X11.motif.lib	4.3.3.2
U467616	IY05990	X11.compat.lib.X11R5	4.3.3.2
U467283	IY06171	bos.rte.libpthreads	4.3.3.3
U467444	IY06171	bos.adt.prof	4.3.3.3
U467222	IY06121	X11.Dt.lib	4.3.3.2
ONE of the following two APARs is required, depending on whether your system is a Uniprocessor (bos.up) or a Multiprocessor (bos.mp):			
U467275	IY06625	bos.up	4.3.3.3
U467531	IY06625	bos.mp	4.3.3.3

HP-UX

An HP 9000 series server is required with:

- 180MHz or faster
- 128 MB system memory (256 MB or more preferred)
- 12.5 MB available on /opt and root (or root-equivalent) privileges
- Ethernet network interface card
- CDROM drive
- Mouse or pointing device

Ensure the storage management station is running one of the following operating systems. The storage management software installation program will not verify this for you. Some patches might be superseded by other patches. Refer to the operating system documentation or contact your operating system supplier for more information

- HP-UX Version 11.0 (32-bit or 64-bit version) with the following patches:
  - December 1999 Extension Software (patch bundle) and the latest available revision of the Y2K-1100 patch bundle.
  - PHCO_20765 PHKL_20202 PHCO_19666 PHKL_20016 PHKL_18543 PHCO_20882 (PHKL_21024, PHCO_19047, PHKL_20079, and PHKL_20674 are dependencies of PHKL_18543).
  - For applications that use AWT, we require that you use: PHSS_20275 PHSS_17535 PHSS_20716 PHSS_20865 (PHNE_20094 and PHSS_20145 are dependencies of PHSS_20716).
  - To run HP-UX SDK for the JavaTM 2 Platform applications and applets using GUIs, you also need to ensure that HP aC++ runtime libraries are installed on your system (the latest version is available as patch PHSS_1658).

Ensure the following maximum kernel parameters are configured as shown in Table 3-3:

Table 3-3 HP-UX Kernel Configuration Requirements

Parameter	Description	Configuration
max_thread_proc 64	Maximum threads per process	1024
maxfiles	Soft file limit per process	2048
maxuser	Influences other parameters	256 or greater
ncallout	Number of pending timeouts	4144

IRIX

A 64-bit MIPS RISC R12000 (300 MHz) is required with:

- CDROM drive
- Mouse or similar pointing device
- 128 MB system memory (256 MB recommended)
- Ethernet network interface card

For OMclient, at least 53 MB of available on /opt is required.

Ensure the storage management station or the host acting as a storage management station is running on an IRIX Version 6.5.9m or greater operating system.

Linux

An Intel® x86 compatible processor is required with:

- CDROM drive
- Mouse or similar pointing device
- 128 MB system memory (minimum)
- Ethernet network interface card
- AGP (preferred) or PCI video card (ISA cards not supported)

IMPORTANT Many PC-based servers are not designed to run graphic-intensive software. If your server has difficulty running the storage management software smoothly without video problems, you may need to upgrade the server's video card.

The following processors are recommended for the optional use of laptop computers as management stations:

- Pentium® II CPU (350 MHz or faster)
- Celeron® CPU (366 MHz or faster)
- AMD-K6®-2 CPU (400 MHz or faster)
- AMD-K6-III (350 MHz or faster)

For OMclient, the following is required:

- At least 37 MB available on /tmp
- At least 50 MB available on /opt

The total space requirement for storage management stations is 180 MB of available disk space.

Ensure the storage management station or the host acting as a storage management station is running on the following Linux operating system with appropriate Linux kernel, C Library, and X11R6 distribution:

- Linux (Red Hat) 6.2:
  - Kernel 2.2.14-5.0
  - glibc 2.1.2
- X11 display server - most users run an XFree86™ X11 display server. See <http:www.xfree86.org/> for details on this distribution.
  - XFree86-3.3.5-3
  - XFree86-xfs-3.3.5-3 (for Java 2 TrueType font support)

NetWare

You can run the NetWare client software only on a Windows NT or 2000 storage management station or on a NetWare host.

If running client software on a Windows storage management station, see "Windows 98/NT" on page 3-15 or "Windows 2000" on page 3-17 for specifications.

If running the client software on a NetWare host, see "Windows 2000" on page 3-17 for specifications. If running the client software on a NetWare server, verify that the server has 70 MB on SYS. If running the utility software on a NetWare server, verify that the server has 15 MB on SYS.

Solaris

The minimum requirement is a Sparc™ S20 with:

- 256 MB system memory
- Ethernet network interface card
- CDROM drive
- Mouse or similar pointing device

For OMclient, at least 28 MB of available on /opt and root-level (superuser) permission is required for installation.

Ensure the storage management station or the host acting as a storage management station is running one of the following operating systems:

- Solaris 2.6 with the following patches (minimum versions):
  - 105181-21 Kernel jumbo patch
  - 105600-19 SunOS 5.6 /kernel/drv/isp patch
  - 105797-07 SunOS 5.6/kernel/drv/sd patch
- Solaris 7 with the following patch (minimum versions):
  - 106541-11 Kernel jumbo patch
  - 107078-18 (or later) OpenWindows patch
- Solaris 8 requires the 06 Jumbo Patch.

Windows 98/NT

The following specifications apply to storage management stations running Windows 98/NT and to hosts running NetWare.

A Pentium or Pentium equivalent CPU (133 MHz or faster) is required with:

- CDROM drive
- Mouse or similar pointing device
- 64 MB system memory (128 MB recommended)
- Ethernet network interface card
- AGP (preferred) or PCI video card (ISA cards not supported)

NOTE The recommended display setting is 1024 x 768 pixels with 64K colors. The minimum display setting allowed is 800 x 600 pixels with 256 colors.

If the display setting is 256 colors, you may experience display problems when scrolling up or down in the online Help screens. To scroll the online Help screens, use the Page Up and Page Down keys or click on the up or down scroll buttons. Do not use the up or down arrow keys or click on the scroll bar to scroll the online Help screens.

Hardware-based Windows acceleration: Desktop computers that use system memory for video memory are not recommended for use with the storage management software.

IMPORTANT Many PC-based servers are not designed to run graphic-intensive software. If your server has difficulty running the storage management software smoothly without video problems, you may need to upgrade the server's video card.

To improve a server's graphics performance, go to the Control Panel and display the Plus tab. At the Plus tab window, de-select the "Show Window Contents While Dragging" checkbox and click OK.

The following processors are recommended for the optional use of laptop computers as management stations:

- Pentium II CPU (350 MHz or faster)
- Celero CPU (366 MHz or faster)
- AMD-K6-2 CPU (400 MHz or faster)
- AMD K6-III (350 MHz or faster)

For OMclient, at least 60 MB of disk space must be available.

Optionally, for OMmigrate, at least 10 MB of disk space must be available. Administrator privileges are required for installation.

Ensure the storage management station or the host acting as a storage management station is running one of the following operating systems:

- Windows NT Workstation 4.0 with Service Pack 5 or 6.a
- Windows NT Server 4.0 with Service Pack 5 or 6.a
- Windows NT 4.0 Enterprise Edition with Service Pack 5 or 6.a
- Optionally for OMclient only, Windows 98 (or Windows 98 Second Edition)

If you want to install the client software on a standalone host and manage disk subsystems through the Fibre Channel I/O path, using a configuration similar to that supported by Storage Manager 6.22, then you will need to install the TCP/IP Protocol software on the host and assign a static IP address to the host.

Windows 2000

The following specifications apply to storage management stations running Windows 2000 and to hosts running NetWare.

A Pentium or Pentium equivalent CPU (133 MHz or faster) is required with:

- CDROM drive
- Mouse or similar pointing device
- 128 MB system memory (256 MB recommended)
- Service Pack (SP) 1
- Ethernet network interface card
- AGP (preferred) or PCI video card (ISA cards not supported)

NOTE The recommended display setting is 1024 x 768 pixels with 64K colors. The minimum display setting allowed is 800 x 600 pixels with 256 colors.

If the display setting is 256 colors, you may experience display problems when scrolling up or down in the online Help screens. To scroll the online Help screens, use the Page Up and Page Down keys or click on the up or down scroll buttons. Do not use the up or down arrow keys or click on the scroll bar to scroll the online Help screens.

Hardware-based Windows acceleration – Computers that use system memory for video memory are not recommended for use with the storage management software.

IMPORTANT Many PC-based servers are not designed to run graphic-intensive software. If your server has difficulty running the storage management software smoothly without video problems, you may need to upgrade the server's video card.

To improve a server's graphics performance, go to the Control Panel and display the Plus tab. At the Plus tab window, unselect the "Show Window Contents While Dragging" checkbox and click OK

The following processors are recommended for the optional use of laptop computers as management stations:

- Pentium II CPU (350 MHz or faster)
- Celeron CPU (366 MHz or faster)
- AMD-K6-2 CPU (400 MHz or faster)
- AMD K6-III (350 MHz or faster)

For OMclient, at least 35 MB of disk space must be available.

The total space requirement for storage management stations is 100 MB of available disk space.

Ensure the storage management station or the host acting as a storage management station is running one of the following operating systems:

- Windows 2000 Server (including SP1)
- Windows 2000 Professional (including SP1)
- Windows 2000 Advanced Server (including SP1); required for a cluster environment.

If you want to install the client software on a standalone host and manage disk subsystems through the Fibre Channel I/O path, using a configuration similar to that supported by Object Manager 7.02, then you will need to install the TCP/IP Protocol software on the host and assign a static IP address to the host.

Using the Profile

When you have completed the Storage Management Station Installation profile, you can complete other installation planning activities or use the profile to install the storage management station software.

Choose one of the following:

- **You need to complete additional Storage Management Station Installation Profiles:** Complete a Storage Management Station Installation Profile for each storage management station by repeating the procedures in this chapter, starting with "Task 1: Identify the Storage Management Station and Disk Subsystems" on page 3-4.
- **You have completed all Storage Management Station Installation Profiles:** Go to Chapter 4, "Planning the Host Software Installation."

Chapter 4

Planning the Host Software Installation

Overview

This chapter directs you through the tasks required to plan the installation of the host software.

Hosts are computers that access the disk subsystem over a Fibre Channel I/O data connection. In this section, “host” refers to a stand-alone computer or a server in a cluster. A cluster is a group of servers that run clustering software and access the disk subsystem over a Fibre Channel I/O data connection.

To plan your host software installation, you will complete a Host Installation Profile for each host (see Table 4-1 on page 4-3). During the installation process, you will be referred to the Installation Activity column to determine which procedure to perform and in which sequence.

You will perform only those procedures that you have selected, based on your responses in the Configuration Profile column for each task. After you have completed the specific installation activity select “Completed.”

Completing the Host Installation Profile

Make a photocopy of the Host Installation Profile for each machine onto which you are installing the storage management software. (Refer to Appendix A for master copies.)

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Identify the Host Name or IP Address" on page 4-5.

Table 4-1 Host Installation Profile (1 of 2)

Planning Tasks	Configuration Information	Installation Activity
1 Identify the host name or IP address (page 4-5).	Name _____ IP Address _____	No action required. Go to Task 2.
2 Identify the operating system (page 4-5).	❑ AIX® ❑ Linux® ❑ Windows® NT ❑ HP-UX® ❑ NetWare® ❑ Windows 2000 ❑ IRIX® ❑ Solaris®	No action required. Go to Task 3.
3 Identify coexistence requirements (page 4-5).	Do you want this host to coexist with hosts that are running SYM 7.10? ❑ Yes ❑ No	Determine if host meets coexistence requirements.
	Does this host *lack* one or more coexistence requirements? ❑ Yes ❑ No	❑ Uninstall SYM 6.22. ❑ Completed. Go to Task 4.
4 Identify a cluster environment (page 4-8).	Is this host running HP-UX, Solaris, or Windows in a cluster environment? ❑ Yes ❑ No	No action required. Go to Task 5.
5 Identify Microsoft Virtual Machine requirements (page 4-10).	Is this a Windows NT host that you will use *either* for event monitoring *or* as a host-agent, *or* for both purposes? ❑ Yes ❑ No	❑ Install Microsoft® Virtual Machine.[1] ❑ Completed. Go to Task 6.
6 Identify failover driver requirements (page 4-11).	Is this host running Solaris or Windows? ❑ Yes ❑ No	❑ Install RDAC. ❑ Completed. Go to Task 7.
7 Select the utility software (page 4-12).	The OMutil software is required on all hosts, with all operating systems.	❑ Install OMutil. ❑ Completed. Go to Task 8.
8 Identify agent software requirements (page 4-12).	Will you use this host as a host-agent for host-agent management? ❑ Yes ❑ No Storage management station:_____	❑ Install OMagent. ❑ Completed. Go to Task 9.

[1] Windows NT requires Microsoft Virtual Machine in order to run the event monitor.

Table 4-1 Host Installation Profile (2 of 2)

Planning Tasks	Configuration Information	Installation Activity
9 Identify client software requirements (page 4-13).	Will you use this host *either* as a storage management station *or* for event monitoring, *or* for both purposes? ❑ Yes ❑ No Disk subsystems:_____ _____	Select a client software package.
	Does this host use Tivoli® IT Director? ❑ Yes ❑ No	❑ Install IT Director Client Integration. ❑ Completed. Go to Task 10.
	Does this host use HP OpenView® Node Network Manager? ❑ Yes ❑ No	❑ Install OMclient. ❑ Install HP OpenView Client Integration. ❑ Completed. Go to Task 10.
	❑ No frameworks application.	❑ Install OMclient. ❑ Completed. Go to Task 10.
10 Identify upgrade requirements (page 4-14).	Do you need to upgrade the controller firmware? ❑ Yes: ❑ No Controller Tray IP Address:_____ Upgrade firmware to version_____	❑ Install Field Tool (Windows lap top only). ❑ Completed. Go to Task 11.
11 Identify a boot device installation (page 4-16).	Is this an HP-UX, Solaris, or Windows host that you will use to install the boot device on a disk subsystem? ❑ Yes ❑ No	No action required. Go to Task 12.
12 Verify system specifications (page 4-16).	Ensure that this machine meets the specifications of its operating system.	❑ Verify specifications. ❑ Completed.

Task 1: Identify the Host Name or IP Address

Use Task 1 on the Host Installation Profile to identify the name or IP address of the host or cluster of servers for which you are completing this profile.

1. Enter the host name or IP address in the Configuration Information column. (Obtain the host name and IP address from your network administrator.)
2. Go to "Task 2: Identify the Operating System."

IMPORTANT HP-UX, Solaris, Windows NT, and Windows 2000 have been certified to use the StorageTek Object Manager 7.10 in a cluster environment.

Task 2: Identify the Operating System

Use Task 2 to identify the operating system running on the host.

1. Select the operating system running on the host machine from the choices provided in the Configuration Information column.
2. Go to "Task 3: Identify Coexistence Requirements."

Task 3: Identify Coexistence Requirements

Use Task 3 to identify coexistence requirements. For more information, refer to "Learn About Coexistence Environments" on page 4-6.

1. Select “Yes” or “No” in the Configuration Information column, based on whether you want the host to operate in a coexistence environment.
2. Choose one of the following, based on your selection in step 1.
   - **Yes –** Determine if the host meets all three coexistence requirements and go to step 3. (Refer to "Learn About Coexistence Environments".)
   - **No –** Go to "Task 4: Identify a Cluster Environment" on page 4-8.
3. Select “Yes” or “No” in the Configuration Information column, based on your determination in step 2.
4. Choose one of the following, based on your selection in step 3.
   - **Yes –** Select “Uninstall SYM 6.22" in the Installation Activity column and go to "Task 4: Identify a Cluster Environment" on page 4-8.
   - **No –** Go to "Task 4: Identify a Cluster Environment" on page 4-8.

Learn About Coexistence Environments

A coexistence environment is one in which you are installing StorageTek Object Manager 7.10 in an environment with existing disk subsystems that you will not upgrade (Figure 4-1).

IMPORTANT If you are running SYMplicity Storage Manager 6.x, you will need to upgrade your existing storage manager software to Storage Manager 6.22 in order to coexist with StorageTek Object Manager 7.10. To do so, contact your customer service representative.

A coexistence environment requires that the host meets *all* of the following conditions:

- Both Storage Manager 6.22 and StorageTek Object Manager 7.10 are installed on this host.
- SYMplicity Storage Manager 6.x is used to manage one or more disk subsystems via this host with controllers running firmware version 3.1.3 or later.
- StorageTek Object Manager 7.10 is used to manage one or more disk subsystems via this host with controllers running firmware version 4.x.

IMPORTANT If your operating system uses a StorageTek Object Manager 7.10 RDAC driver, both Storage Manager 6.22 and StorageTek Object Manager 7.10 will share the RDAC driver installed with StorageTek Object Manager 7.10.

If using the Networked RAID Manager (NRM) 6.22 to connect through the Ethernet to controllers running firmware version 3.x (from a Windows client), the StorageTek Object Manager 7.10 RDAC driver will overwrite the RDAC portion of NRM.

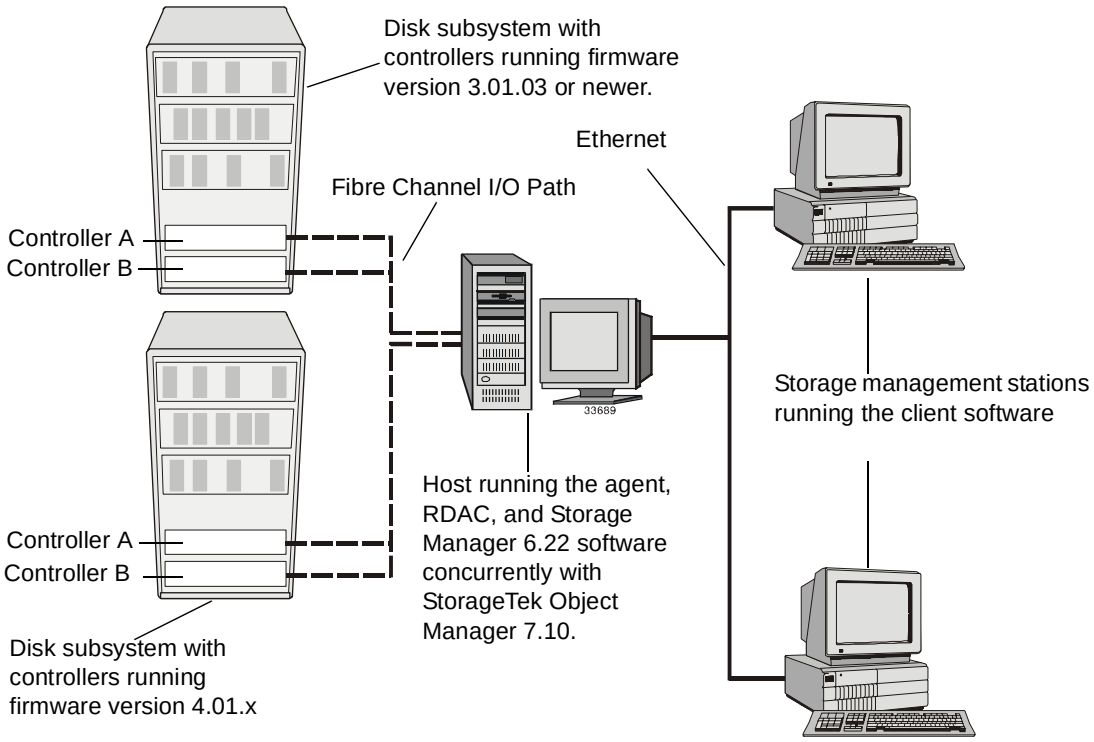

Figure 4-1 An Example of a Coexistence Environment

Task 4: Identify a Cluster Environment

Use Task 4 to indicate if you want to install the storage management software on a cluster of servers. For more information, refer to "Learn About Cluster Environments."

1. Select “Yes” or “No” in the Configuration Information column, based on whether the host is running either HP-UX, Solaris, or Windows in a cluster environment.
2. No action is required at this time. You will be referred to your selection in Task 4 during the installation process. Go to "Task 5: Identify Microsoft Virtual Machine Requirements" on page 4-10

IMPORTANT If the host is running HP-UX or Solaris, you will install the selected storage management software on a second host when instructed to do so during the installation process.

If the host is running Windows, you must complete specific post-installation tasks before installing any storage management software on a second host. You will be instructed when to complete the post-installation procedures during the installation process.

Learn About Cluster Environments

A cluster environment is a collection of interconnected computers used as a single computing resource. A cluster environment lets you share a computing load over several systems without either the users or system administrators needing to know that more than one system is involved.

If any hardware or software component in the system fails, the user may see degraded performance, but will not lose access to the service. Although several systems in the cluster may have access to a device or resource, the cluster is effectively owned and managed by a single system at a time.

Figure 4-2 shows both direct-management and host-agent-management methods used to manage the disk subsystem. In a cluster configuration, either management method can be used separately or in combination.

When installing StorageTek Object Manager 7.10 in a cluster environment, you will install storage management software components on each server in the cluster.

IMPORTANT Solaris, Windows NT, and Windows 2000 have been certified to use the storage management software in a cluster environment. If you are installing the storage management software on a host that is running a different operating system, it is recommended that you do so only in a standard (non-cluster) environment.

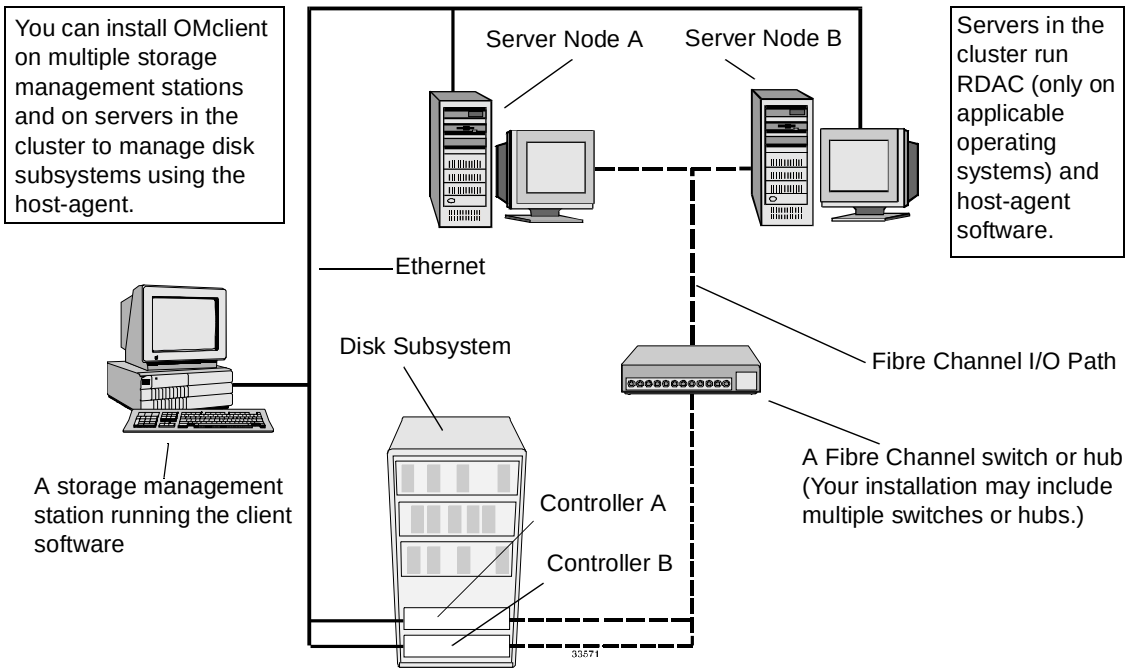

Figure 4-2 A Cluster Configuration

Task 5: Identify Microsoft Virtual Machine Requirements

Use Task 5 to identify whether you will use the host *either* for event monitoring *o*r as a host-agent, *or* for both purposes, and to identify Microsoft Virtual Machine software requirements For more information refer to "Learn About the Event Monitor" and "Learn About Microsoft Virtual Machine" below.

IMPORTANT Windows NT requires the Microsoft Virtual Machine software in order to run the event monitor.

---

1. Select “Yes” or “No” in the Configuration Information column, based on whether this is a Windows NT host that you will use *either* for event monitoring *o*r as a host-agent, *or* for both purposes.
2. Choose one of the following, based on your selection in step 1:
   - **Yes –**Select “Install Microsoft Virtual Machine” in the Installation Activity column and go to "Task 6: Identify Failover Driver Requirements."
   - **No –** Go to "Task 6: Identify Failover Driver Requirements."

Learn About the Event Monitor

The Event Monitor, which is packaged with the client software, monitors disk subsystems and handles error notification (through email or SNMP traps) when the storage management software is not actively running on the host. To provide continuous monitoring, use the Event Monitor on a host that normally runs 24 hours a day.

IMPORTANT If you install the Event Monitor on more than one machine, you will receive duplicate event messages. To prevent receipt of duplicate messages, install the Event Monitor on only one machine — either a storage management station or a host acting as a storage management station.

Learn About Microsoft Virtual Machine

Microsoft Virtual Machine is required only on Windows NT storage management stations. The StorageTek Object Manager 7.10 installation CD provides the version of Microsoft Virtual Machine tested for use with storage management software. The *StorageTek™ Object Manager Installation Guide* provides information on when and how to install this package.

Task 6: Identify Failover Driver Requirements

Use Task 6 to identify whether the host is using a failover driver. For more information, refer to "Learn About Controller Failover Protection" below.

1 Select “Yes” or “No” in the Configuration Information column based on whether the host is running Solaris or Windows.

2 Choose one of the following, based on your selection in step 1:

- **Yes –** Select “Install RDAC” in the Installation Activity column and go to "Task 7: Select the Utility Software" on page 4-12.
- **No –** Go to "Task 7: Select the Utility Software" on page 4-12.

Learn About Controller Failover Protection

A multi-path driver transfers I/O requests from one controller to the other when a component failure or some other error occurs on the data path to the first controller. Using a failover protection method to reroute these I/O requests will maintain I/O access while you correct the error.

Failover Protection Methods Following are the failover protection methods supported by the storage management software. Depending on the host operating system, you may have a choice of failover methods for a disk subsystem. You may need to install controller failover software (RDAC) from the StorageTek Object Manager 7.10 installation CD:

- **Redundant Dual Active Controller (RDAC).** RDAC is a multi-path failover driver provided by StorageTek Object Manager 7.10 to Windows NT, Windows 2000, and Solaris operating systems. You will install RDAC on host machines that are running one of these operating systems.
- **Third-party multi-path driver.** Some operating systems have built-in, multi-path failover drivers and do not require the RDAC driver. A multi-path driver is an I/O path failover drive installed on a host computer that accesses the disk subsystem. For information on multi-path failover protection, see your specific operating system documentation.
- **No failover.** No failover protection means there is no multi-path driver installed to transfer the volumes of a failed controller to its alternate controller in a disk subsystem with dual, active controllers. Although each volume on the disk subsystem may be assigned a preferred owner, the volumes will not move to the alternate controller if a component on that controller’s I/O path fails. When a component fails, such as a cable or the controller itself, I/O cannot get to the disk subsystem and data may be lost. The component failure must be corrected before I/O can resume.

Task 7: Select the Utility Software

All hosts require the OMutil software package. Select “Install OMutil” in the Installation Activity column and go to "Task 8: Identify Agent Software Requirements".

Task 8: Identify Agent Software Requirements

Use Task 8 to identify how you will use this host and to identify its associated storage management station.

1. Select “Yes” or “No” in the Configuration Information column, based on whether you will use the host for host-agent management of disk subsystems.
2. Choose one of the following, based on your selection in step 1:
   - **Yes – Do the following:**
     - **a** Identify the storage management station connected to this host in the Configuration Information column.
     - **b** Select “Install OMagent” in the Installation Activity column.
     - **c** Go to "Task 9: Identify Client Software Requirements."
   - **No –** Go to "Task 9: Identify Client Software Requirements."

Task 9: Identify Client Software Requirements

Use Task 9 to identify whether you need to install the client software, and if so, which type.

1. Select “Yes” or “No” in the Configuration Information column, based on whether the host will be used *either* as a storage management station *or* for event monitoring, *or* for both purposes.

2. Choose one of the following, based on your selection in step 1.

   - **Yes –** Identify the disk subsystems that you will manage with this host in the Configuration Information column, and go to step 3.
   - **No –** Go to "Task 10: Identify Upgrade Requirements" on page 4-14.

3. Select “Yes” or “No” in the Configuration Information column, based on whether this host uses Tivoli IT Director.

4. Choose one of the following, based on your selection in step 3.

   - **Yes –** Select the “Install IT Director Client Integration” in the Installation Activity column and go to "Task 10: Identify Upgrade Requirements" on page 4-14.
   - **No –** Go to step 5.

5. Select the “Yes” or “No” in the Configuration Information column, based on whether this host uses HP OpenView Node Network Manager.

6. Choose one of the following, based on your selection in step 5.

   - **Yes –** Select “Install OMclient” and “Install HP OpenView Client Integration” in the Installation Activity column and go to "Task 10: Identify Upgrade Requirements" on page 4-14.
   - **No –** Select “No frameworks application” in the Configuration Information column, select “OMclient” in the Installation Activity column, and go to "Task 10: Identify Upgrade Requirements" on page 4-14.

Task 10: Identify Upgrade Requirements

Use Task 10 to identify whether you need to upgrade the controller firmware. For more information, refer to "Learn About Controller Firmware Upgrades."

1. Select “Yes” or “No” in the Configuration Information column, based on whether you need to upgrade the controller firmware. (Refer to Table 4-2 and to your controller tray selection in Task 4 on the completed, corresponding Disk Subsystem Installation Profile.)

2. Choose one of the following, based on your selection in step 1:

   - **Yes – Do the following:**

     a. Enter the IP Address of the controller tray physically connected to the host in the Configuration Information column.

     b. Identify the firmware version to which you will upgrade in the Configuration Information column.

     c. Go to "Task 11: Indicate a Boot Device Installation" on page 4-16.

   - **No –** Go to "Task 11: Indicate a Boot Device Installation" on page 4-16.

Learn About Controller Firmware Upgrades

If you have a 4766 controller running firmware version 3.x, you must upgrade the controller to at least firmware version 4.00.x in order to manage the disk subsystem with StorageTek Object Manager 7.10.

To upgrade 4766 controllers, you will need to install the migrate utility during the installation process. If you will use StorageTek Object Manager 7.10 to manage existing disk subsystems running firmware version 4.00.x and do not upgrade to firmware version 4.01, then some features provided by StorageTek Object Manager 7.10 may not be available for these disk subsystems.

To check the firmware version, do the following: Open the Array Management Window and select the disk subsystem on which you are checking the controller firmware. Right-click on either Controller A or Controller B, then left click on Properties).

Table 4-2 Controller Firmware Upgrades

Existing Level	Upgrade To:	Controller Model
4.00.x	**4.01**	**4774**
	4.01	**2772**
4.00.x	**4.01**	**4766**

Task 11: Indicate a Boot Device Installation

Use Task 11 to indicate whether you want to install the boot device on a disk subsystem.

1. Select “Yes” or “No” in the Configuration Information column, based on whether this is an HP-UX, Solaris, or Windows host that you will use to install the boot device on the disk subsystem.
2. No action is required. You will be referred to your selection in Task 11 when starting the installation process. Go to "Task 12: Verify System Specifications."

Task 12: Verify System Specifications

Use Task 12 to verify that the host meets the specifications of its operating system.

1. Select “Verify specifications” in the Installation Activity column.
2. Go to "Host Specifications" and ensure that the host meets the specifications of its operating system.

CAUTION Do not proceed until the host meets the operating system requirements.

---

3. After you have verified the specifications, select “Completed” in the Installation Activity column and go to "Using the Profile" on page 4-24.

Host Specifications

The host specifications are organized by operating system as given in the following list.

AIX

An RS/6000® processor is required with:

- F50 (332 MHz 604e3 processor) or higher. Also, SMP system with 2-way or more is supported.
- CDROM drive
- Mouse or similar pointing device
- 128 MB system memory (minimum)

  For OMagent, at least 50 MB of available memory on /usr and root-level or root-equivalent permission is required for installation.
- Ethernet network interface card
- GXT110P or greater PCI video card

Ensure your host is running the AIX Version 4.3.3 operating system.

NOTE The current level of bos.rte.libc can be checked by using the following command:

```
lslpp -ah bos.rte.libc
```

The Java_dev2.rte package requires the following AIX base level filesets for all locales:

- x11.adt.lib 4.3.3.0
- x11.adt.motif 4.3.3.0
- bos.adt.include 4.3.3.0
- bos.adt.prof 4.3.3.0

NOTE If they are not already installed, the first three files can be found on the AIX 4.3.3 installation media. The bos.adt.prof file can be found through the IBM web site.

The following APARS (Table 4-3) must be applied to your AIX system after the base filesets have been installed:

Table 4-3 APARS Specifications

PTF#	APAR#	Fileset	VRMF
U467183	IY03993	bos.adt.include	4.3.3.1
U467290	IY06365	bos.net.tcp.client	4.3.3.3
U467478	IY04069	bos.sysmgt.serv_aid	4.3.3.2
U467572	IY05690	X11.base.lib	4.3.3.2
U467473	IY05697	X11.adt.motif	4.3.3.1
U467558	IY05741	X11.base.rte	4.3.3.2
U467459	IY05989	X11.Dt.rte	4.3.3.3
U467557	IY05989	X11.motif.mwm	4.3.3.1
U467458	IY05990	X11.motif.lib	4.3.3.2
U467616	IY05990	X11.compat.lib.X11R	4.3.3.2
U467283	IY06171	bos.rte.libpthreads	4.3.3.3
U467444	IY06171	bos.adt.prof	4.3.3.3
U467222	IY06121	X11.Dt.lib	4.3.3.2
ONE of the following two APARs is required, depending on whether your system is a Uniprocessor (bos.up) or a Multiprocessor (bos.mp):			
U467275	IY06625	bos.up	4.3.3.3
U467531	IY06625	bos.mp	4.3.3.3

HP-UX

An HP 9000/800 series server with the following minimum requirements:

- 180MHz processor or faster
- Multiple CPUs (tested server models include: D370, D380, R390, K460, K570, K580, L2000, and N4000)
- 0.7 MB available on /opt. Root (or root-equivalent) privileges for OMutil and OMagent installation
- 2.7 MB available disk space on /opt. Root (or root-equivalent) privileges for more installation
- For installation in a Java™ Runtime Environment, 47.5 MB available disk space on /opt and at least 95 MB available on /tmp

Ensure your host is running one of the following operating systems. The storage management software installation program will not verify patches. Some patches might be superseded by other patches. Refer to the operating system documentation or contact your operating system supplier for more information:

- HP-UX Version 11.0 (32-bit or 64-bit version) with the following patches:
  - December 1999 Extension Software (patch bundle) and the latest available revision of the Y2K-1100 patch bundle.
  - PHCO_20765, PHKL_20202, PHCO_19666, PHKL_20016, PHKL_18543, PHCO_20882. (PHKL_21024, PHCO_19047, PHKL_20079, and PHKL_20674 are dependencies of PHKL_18543)
  - For applications that use AWT, we require that you use: PHSS_20275, PHSS_17535, PHSS_20716, PHSS_20865. (PHNE_20094 and PHSS_20145 are dependencies of PHSS_20716.)
  - To run HP-UX SDK for the Java® 2 Platform applications and applets using GUIs, you also need to ensure the HP aC++ runtime libraries are installed on your system. (The latest version is available as patch PHSS_1658.)
- For high availability clusters of HP 9000/Series 800 computers, install the HP® MC/ServiceGuard software package.

Ensure the following maximum kernel parameters are configured as shown in Table 4-4:

Table 4-4 HP-UX Kernel Configuration Requirements

Parameter	Description	Configuration
max_thread_proc 64	Maximum threads per process	1024
maxfiles	Soft file limit per process	2048
maxuser	Influences other parameters	256 or greater
ncallout	Number of pending timeouts	4144

IRIX

For OMagent, at least 42.5 MB of available on /opt is required.

Ensure that your host is running the IRIX Version 6.5.9m operating system.

Linux

The following Linux operating system is required with appropriate Linux kernel, C Library, and X11R6 distribution:

- Linux (Red Hat) 6.2:
  - Kernel 2.2.14-5.0
  - glibc 2.1.2
- X11 display server - most users run an XFree86™ X11 display server. See <http:www.xfree86.org/> for details on this distribution.
  - XFree86-3.3.5-3
  - XFree86-xfs-3.3.5-3 (for Java 2 TrueType font support)

NetWare

Each host must be configured with Novell NetWare 5.1 with Service Pack (SP) 1.

NOTE It is recommended that equipment used for the NetWare 5.1 operating system be on the Novell® "Yes, Tested and Approved" Solutions list.

NetWare Clustering Services has not been certified for use with the storage management software.

For OMagent, at least 10 MB of disk space must be available.

Ensure your host is running one of the following operating systems:

- Windows NT Server 4.0 with Service Pack 5 or 6a
- Windows NT 4.0 Enterprise Edition with Service Pack 5 or 6a
- Windows NT Workstation 4.0 with Service Pack 5 or 6a

Solaris

The minimum requirement is a Sparc™ S20 processor with:

- 256 MB system memory
- CDROM drive
- Mouse or similar pointing device
- Ethernet network interface card

For RDAC, at least 1 MB of available on /opt. Root-level (superuser) permission is required for installation.

For OMagent, at least 24 MB of available on /opt. Root-level (superuser) permission is required for installation.

Ensure your host is running one of the following operating systems:

- Solaris 2.6 with the following patches (minimum versions):
  - 105181-21 Kernel jumbo patch
  - 105600-19 SunOS 5.6 /kernel/drv/isp patch
  - 105359 (replaces obsolete 105797-07 SunOS 5.6/kernel/drv/sd patch)
- Solaris 7 with the following patches (minimum versions):
  - 106541-11 Kernel jumbo patch
  - 107078-18 (or later) OpenWindows patch
- Solaris 8

  For high availability clusters of Sparc S20 computers, the VERITAS Cluster Server™ software package should be installed.

Windows NT

For RDAC, at least 6 MB of disk space must be available. Administrator privileges are required.

For Microsoft Virtual Machine, at least 1 MB of disk space must be available. Administrator privileges are required.

NOTE You will need to install Microsoft Virtual Machine only if you are not running a supported version (5.00.3186 or greater).

For OMagent, at least 1 MB of disk space must be available. Administrator privileges are required for installation.

Ensure your host is running one of the following operating systems:

- Windows NT Server 4.0 with Service Pack 5 or 6a
- Windows NT 4.0 Enterprise Edition with Service Pack 5 or 6a
- Windows NT Workstation 4.0 with Service Pack 5 or 6a

Windows 2000

For RDAC, at least 1MB of disk space must be available.

For OMagent, at least 1 MB of disk space must be available. Administrator privileges are required for installation.

Make sure that your host is running one of the following operating systems:

- Windows 2000 Server (including SP1)
- Windows 2000 Professional (including SP1)
- Windows 2000 Advanced Server (including SP1); required for a cluster environment.

Using the Profile

When you have completed the Host Installation Profile, you can complete other installation planning activities or use the completed profile to install the host software. Use the following procedure to determine your next course of action:

1 Choose one of the following:

- **You need to complete additional Host Installation Profiles:** Complete a Host Installation Profile for each host by repeating the procedures in this chapter, starting with "Task 1: Identify the Host Name or IP Address" on page 4-5.
- **You have completed all Host Installation Profiles:** Collect all completed Disk Subsystem Installation Profiles, Storage Management Station Installation Profiles, and Host Installation Profiles and go to the *StorageTek™ Object Manager Installation Guide for Version 7.10* to start the storage management software installation.

End Of Procedure

Appendix A

Installation Profiles - Master Copies

This appendix provides master copies of the Disk Subsystem Installation Profile, Storage Management Station Installation Profile, and Host Installation Profile, which you will use for planning the installation of your storage management software.

Use the master copies to make a photocopy of each profile for each respective disk subsystem, storage management station, or host on which you are installing the storage management software.

Completing the Disk Subsystem Installation Profile

Make a photocopy of the Disk Subsystem Installation Profile (Table A-1) for each disk subsystem that you will manage with the new storage management software.

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Enter the Disk Subsystem Name" on page 2-4.

Table A-1 Disk Subsystem Installation Profile

Planning Task	Configuration Information	Installation Activity
1 Enter the disk subsystem name (page 2-4).	Disk subsystem name:_____	No action required. Go to Task 2.
2 Identify the installation type (page 2-4).	❑ Storage management software installation only. ❑ Storage management software and hardware installation.	No action required. Go to Task 3.
3 Select a management method (page 2-5).	❑ Host-agent management: **Controller A** Name:_____ **Controller B** Name:_____	No action required. Go to Task 4.
	❑ Direct management: **Controller A** Ethernet address:_____ Controller host name:_____ **Controller B** Ethernet address:_____ Controller host name:_____	❑ Set up a BOOTP server on your network. ❑ Add IP addresses and controller host names to the DNS or host table. ❑ Completed.
4 Identify the hardware components (page 2-9).	❑ Controller tray: ___4774 ___4766 ❑ Storage system: ___StorageTek D173 Disk Subsystem ___StorageTek 9176 Disk Subsystem ❑ Drive tray: ___StorageTek 9170 Disk Array ___StorageTek 9170-001 Disk Array ___StorageTek 9170-002 Disk Array	❑ Identify controller or drive tray model. ❑ Verify hardware specifications. ❑ Install and configure new hardware, if applicable. ❑ Completed.

Completing the Management Station Installation Profile

Make a photocopy of the Storage Management Station Installation Profile (Table A-2) for each machine onto which you are installing the storage management software.

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Identify the Storage Management Station and Disk Subsystems" on page 3-4.

Table A-2 Storage Management Station Installation Profile

Planning Task	Configuration Information	Installation Activity
1 Identify the storage management station and disk subsystems (one or more)(page 3-4).	Storage Management Station:_____ Disk Subsystems: _____ _____	No action required. Go to Task 2.
2 Identify the operating system (page 3-4).	❑ AIX® ❑ NetWare™ ❑ HP-UX® ❑ Solaris® ❑ IRIX® ❑ Windows® 2000 ❑ Linux® ❑ Windows® NT® or 98	No action required. Go to Task 3.
3 Identify Microsoft Virtual Machine requirements (page 3-4).	Is this a Windows NT machine that will be used for event monitoring? ❑ Yes ❑ No	❑ Install Microsoft® Virtual Machine.[1] ❑ Completed.
4 Select the client software package (page 3-6).	Does this machine use Tivoli IT Director? ❑ Yes ❑ No	❑ Install Tivoli® IT Director Client Integration. ❑ Completed.
	Does this machine use HP OpenView® Node Network Manager? ❑ Yes ❑ No	❑ Install OMclient. ❑ Install HP OpenView Client Integration. ❑ Completed.
	❑ No Frameworks application.	❑ Install OMclient.
5 Verify system specifications (page 3-8).	Ensure that this machine meets the specifications of its operating system.	❑ Verify specifications. ❑ Completed.

[1] Windows NT requires Microsoft Virtual Machine in order to run the event monitor.

Completing the Host Installation Profile

Make a photocopy of the Host Installation Profile for each machine onto which you are installing the storage management software.

Complete each profile as instructed in this chapter, one at a time. During the planning process, you will select specific choices in the Installation Activity column, based on your selections in the Configuration Information column.

IMPORTANT A “Completed” box appears in the Installation Activity column. During the installation process, you will select “Completed” after you have successfully performed the selected installation activity.

To start the planning process, go to "Task 1: Identify the Host Name or IP Address" on page 4-5.

Table A-3 Host Installation Profile (1 of 2)

Planning Tasks	Configuration Information	Installation Activity
1 Identify the host name or IP address (page 4-5).	Name _____ IP Address _____	No action required. Go to Task 2.
2 Identify the operating system (page 4-5).	❑ AIX ❑ Linux ❑ Windows NT ❑ HP-UX ❑ NetWare ❑ Windows 2000 ❑ IRIX ❑ Solaris	No action required. Go to Task 3.
3 Identify coexistence requirements (page 4-5).	Do you want this host to coexist with hosts that are running OM 7.10? ❑ Yes ❑ No	Determine if host meets coexistence requirements.
	Does this host *lack* one or more coexistence requirements? ❑ Yes ❑ No	❑ Uninstall downlevel software. ❑ Completed. Go to Task 4.
4 Identify a cluster environment (page 4-8).	Is this host running HP-UX, Solaris, or Windows in a cluster environment? ❑ Yes ❑ No	No action required. Go to Task 5.
5 Identify Microsoft Virtual Machine requirements (page 4-10).	Is this a Windows NT host that you will use *either* for event monitoring *or* as a host-agent, *or* for both purposes? ❑ Yes ❑ No	❑ Install Microsoft Virtual Machine.[1] ❑ Completed. Go to Task 6.
6 Identify failover driver requirements (page 4-11).	Is this host running Solaris or Windows? ❑ Yes ❑ No	❑ Install RDAC. ❑ Completed. Go to Task 7.
7 Select the utility software (page 4-12).	The OMutil software is required on all hosts, with all operating systems.	❑ Install OMutil. ❑ Completed. Go to Task 8.
8 Identify agent software requirements (page 4-12).	Will you use this host as a host-agent for host-agent management? ❑ Yes ❑ No Storage management station:_____	❑ Install OMagent. ❑ Completed. Go to Task 9.

[1] Windows NT requires Microsoft Virtual Machine in order to run the event monitor.

Table A-3 Host Installation Profile (2 of 2)

Planning Tasks	Configuration Information	Installation Activity
9 Identify client software requirements (page 4-13).	Will you use this host *either* as a storage management station *or* for event monitoring, *or* for both purposes? ❑ Yes ❑ No Disk subsystems:_____ _____	Select a client software package.
	Does this host use Tivoli IT Director? ❑ Yes ❑ No	❑ Install IT Director Client Integration. ❑ Completed. Go to Task 10.
	Does this host use HP OpenView Node Network Manager? ❑ Yes ❑ No	❑ Install OMclient. ❑ Install HP OpenView Client Integration. ❑ Completed. Go to Task 10.
	❑ No frameworks application.	❑ Install OMclient. ❑ Completed. Go to Task 10.
10 Identify upgrade requirements (page 4-14).	Do you need to upgrade the controller firmware? ❑ Yes: ❑ No Controller Tray IP Address:_____ Upgrade firmware to version_____	❑ Install Field Tool (Windows laptop only). ❑ Completed. Go to Task 11.
11 Identify a boot device installation (page 4-16).	Is this an HP-UX, Solaris, or Windows host that you will use to install the boot device on a disk subsystem? ❑ Yes ❑ No	No action required. Go to Task 12.
12 Verify system specifications (page 4-16).	Ensure that this machine meets the specifications of its operating system.	❑ Verify specifications. ❑ Completed.

Appendix B

Setting Up a BOOTP Server

In order to manage a disk subsystem using the direct-management method, you first must set up a BOOTP server. Use the procedures in this section to set up a BOOTP server, based on your BOOTP server type. If you have a:

- **UNIX BOOTP –** Go to "Using the UNIX BOOTP Server" on page B-2.
- **Microsoft BOOTP-compatible DHCP –** Go to "Using Microsoft DHCP as a BOOTP-Compatible Server" on page B-4.
- **NetWare BOOTP-compatible DHCP –** Go to "Using the NetWare DHCP Service as a BOOTP-Compatible Server" on page B-16.

Using the UNIX BOOTP Server

Use the worksheets from Appendix A to make the required entries in the BOOTP table to support the controllers in the disk subsystems. Use a text editor to edit the bootptab file in the /etc directory.

Table B-1 Sample—Required Entries for Setting Up the UNIX BOOTP Server

Entry	Description	Sample Format in BOOTP Server
subnet mask	Mask used to route packets to defined subnets	dot notation (sm=255.255.255.0)
router (when applicable)	IP address of machine that routes packets between networks	dot notation (gw=192.168.1.1)
host name	Host name associated with the controller	host name (Denver_a)
IP address	IP address of the controller	dot notation (ip=192.168.1.13)
Ethernet address	Controller's hardware Ethernet address	Hexadecimal notation (ha=00a0b8020420)

NOTE The Remote Management Station (RMS) and NMS entries are not required when using Object Manager 7.02 or greater to manage disk subsystems with controllers running firmware version 4.00.x or greater.

Example of a UNIX BOOTP Server Configuration

The following is an example of configuring a UNIX BOOTP server.

- The `s4.default:\` entry denotes settings that are common to all controllers.

```
s4.default:\ (common settings)
    ht=ether:\
    sm=255.255.255.0:\
    gw=192.168.1.1:\
    hn:
```

- The `tc=s4.default:\` entry associates this common setting group to a specific controller.

```
denver_a:\
    tc=s4.default:\ (refers to common settings)
    ip=192.168.1.13:\
    ha=00a0b8020420:
denver_b:\
    tc=s4.default:\
    ip=192.168.1.14:\
    ha=00a0b80000d8:
```

Completing UNIX BOOTP Server Configuration

Once you have edited and saved the bootptab file, you must cycle the power to the disk subsystems before the parameters in the BOOTP table can take effect.

1. Turn off the power to the disk subsystems. Wait at least 60 seconds for all drives to spin down before restoring the disk subsystem power.
2. Turn on the power to the disk subsystems.
3. Go to "Setting Up the DNS or Host Table" on page B-18.

Using Microsoft DHCP as a BOOTP-Compatible Server

To configure your operating system as a Dynamic Host Configuration Protocol (DHCP) server, you must have the DHCP Manager installed. The DHCP Manager can be installed on any machine that is on the same subnet as the controllers that will be configured.

To install the DHCP Manager, choose one of the following:

- **Windows® 98/NT or NetWare™ –** Go to "Windows 98/NT: Installing the DHCP Manager" on page B-5.
- **Windows 2000 –** Go to "Windows 2000: Installing the DHCP Manager" on page B-13.

Windows 98/NT: Installing the DHCP Manager

If the DHCP Manager is already installed on the appropriate server, go to "Windows 98/NT: Setting Up a DHCP Server" on page B-6. If not, install it now using the following instructions:

1. Select Start >> Settings >> Control Panel.
2. Select the Network icon.
3. When the Network screen appears, select the Services tab.
4. From the Services tab, select Add.
5. Highlight Microsoft DHCP Server, then select OK.
6. Specify the path to the NT Install file, then select Continue.

   You will see a dialog box display stating that a static IP address is required.
7. Click OK.
8. When the Network screen appears, select the Protocols tab.
9. Highlight TCP/IP Protocol and select Properties.
10. Ensure that the IP address information is correctly defined, then click OK.

NOTE Make any necessary corrections from this screen. If each field contains less than three characters, press the period key to advance to the next field.

---

11. When the Network screen appears, click Close.
12. Wait for the Network Settings Change dialog box to complete and close.
13. Ensure any diskettes and CDs are removed, then select Yes to restart.
14. Re-install Service Pack 4, 5, or 6.x, whichever is currently on your host, to pick up any new DHCP settings or information associated with the respective service pack.

NOTE After installing the DHCP Manager, you may want to refer to its online Help.

---

15. Go to "Windows 98/NT: Setting Up a DHCP Server" on page B-6.

Windows 98/NT: Setting Up a DHCP Server

Use the following procedure to set up the DHCP server. Use the Storage Management Station Installation Profile, which you should have completed in Chapter 2, to obtain information required when installing the BOOTP server.

1 Select Start >> Programs >> Administrative Tools >> DHCP Manager.

The DHCP Manager Screen appears.

2 Create a scope using step 2a, below, through step 2g on page B-7. A scope defines a group of controllers you want to configure using the DHCP server.

a Ensure that Local Machine is highlighted, then double-click it.

You should see a small minus (-) sign on the left side of Local Machine.

NOTE With some configurations, you may need to double-click twice in step 2a before you can perform step 2b.

b Select Scope >> Create.

The Create Scope screen appears (Figure B-1).

If you enter fewer than three characters in each field, you will need to press the period key to advance to the next field. If you have only one controller, enter its address for both the starting and ending addresses.

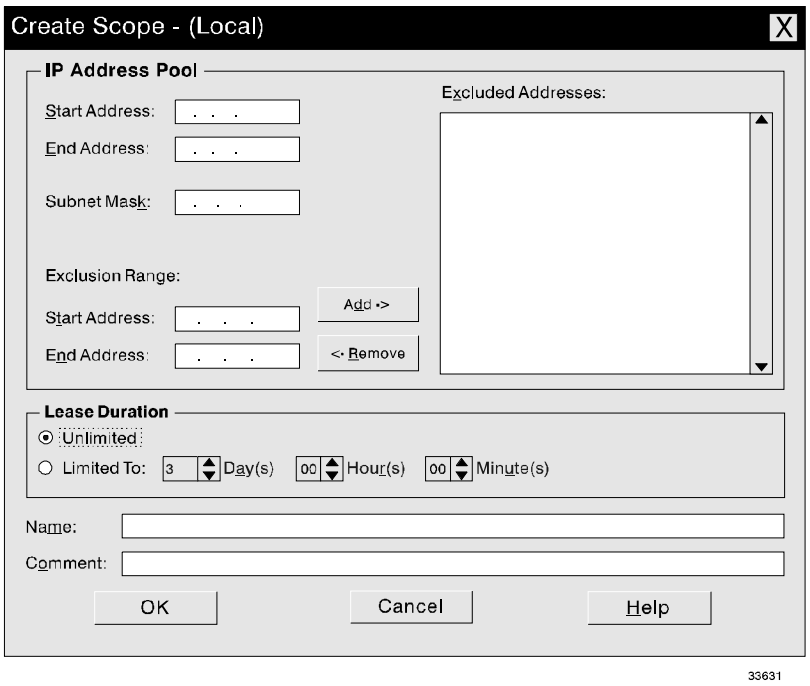

Figure B-1 Create Scope Screen

c Enter the starting and ending IP addresses of the controllers you are configuring on the network, using the following as an example:

If the subnet is 192.168.1.0 and you are configuring 50 controllers, the starting address should be set to 192.168.1.1 and the ending address should be set to 192.168.1.50.

IMPORTANT If you have only one controller, enter its address for both the starting and ending addresses in step 2b. If you two controllers, their IP addresses may not be consecutive numbers. Nonetheless, enter the beginning (lower number) and ending (higher number) IP addresses. Any IP addresses within that range can be excluded when the New Scope Wizard prompts you for that information in step 2d.

---

d Enter the subnet mask obtained from the network administrator.

e Set the Lease Duration to Unlimited to make the connection permanent.

f If desired, add a Scope Name and Comment then click OK.

g When the scope has been successfully completed, select Yes to activate it.

You return to the DHCP Manager screen. The scope should appear on this screen.

3 Configure global scope options, starting with step 3a, below, through step 3h on page B-8.

a Highlight the scope you want to configure, then select DHCP Options >> Global.

The DHCP Options – Global screen appears (Figure B-2).

b Highlight the router in the Unused Options list and click Add to move it to the Active Options list.

c Select Value to assign an IP address to the active option.

The Edit Array option box appears in the lower part of the screen.

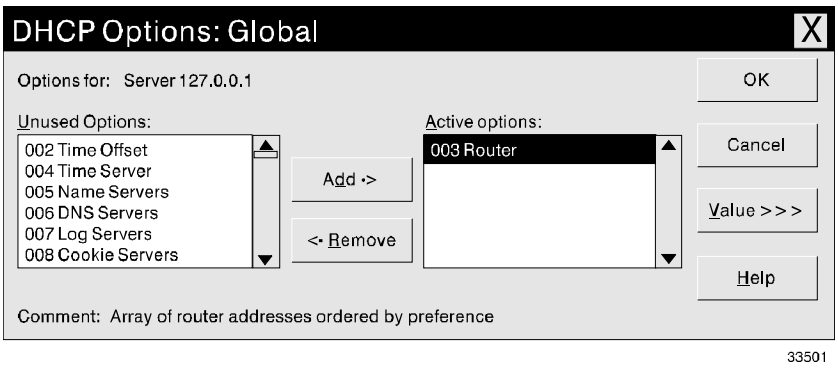

Figure B-2 Global Options Screen

d Select Edit Array to add the IP address of your router.

The IP Address Array Editor screen appears (Figure B-3).

e Enter the unique IP address for the router you added.

For example, the router IP address shown in Figure B-3 is 192.168.1.1.

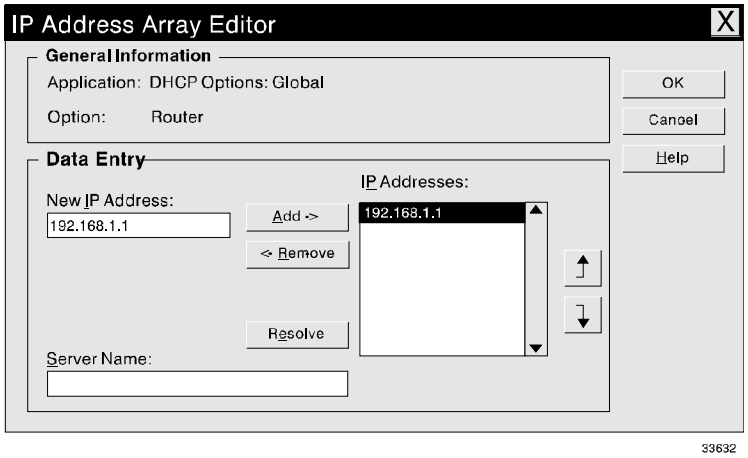

Figure B-3 IP Address Array Editor Screen

f Select Add to move it to the IP Address list.

g Click OK.

You return to the DHCP Options – Global screen.

h Click OK.

You return to the DHCP Manager screen.

4 Create a reservation for each controller, using step 4a through step 4f. Refer to the controller information you recorded on the Disk Subsystem Installation Profile (Configuration Information, Task 4, Direct Management section) to ensure you have included each controller that will be managed directly through the Ethernet connections.

a Select Scope >> Add Reservations.

The Add Reserved Clients screen appears (Figure B-4).

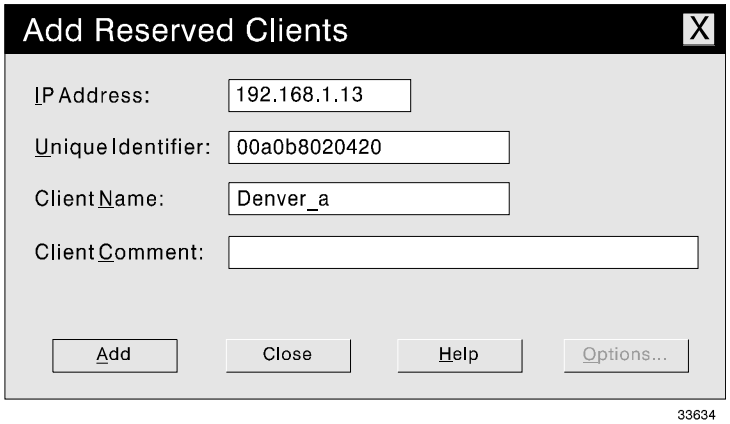

Figure B-4 Add Reserved Clients Screen

b In the IP Address field, enter the IP address for the first controller listed in the completed worksheets from Appendix A.

As you enter information in step 4c, do not enter decimal points or spaces; only enter the numbers.

c In the Unique Identifier field, enter the controller's hardware Ethernet address.

d In the Client Name field, enter the controller's host name entered in the completed worksheets from Appendix A, then click Add.

Optionally, you can add comments in the Client Comment field.

The screen is reset and ready for the next entry.

e Repeat step 4b through step 4d for each controller in the completed worksheets from Appendix A.

f When you have entered all of the controllers, click Close.

You will return to the DHCP Manager screen.

5 Assign the host name in the controller-specific options, starting with step 5a below. Assigning a host name allows it to be displayed in the Active Leases list when the reservation is in use.

NOTE If the controller-specific host name option is not set, the controller's host name is not displayed in the Active Leases list when the reservation is in use.

---

a Ensure the scope you want to configure is highlighted, then select Scope >> Active Leases.

The Active Leases screen appears (Figure B-5).

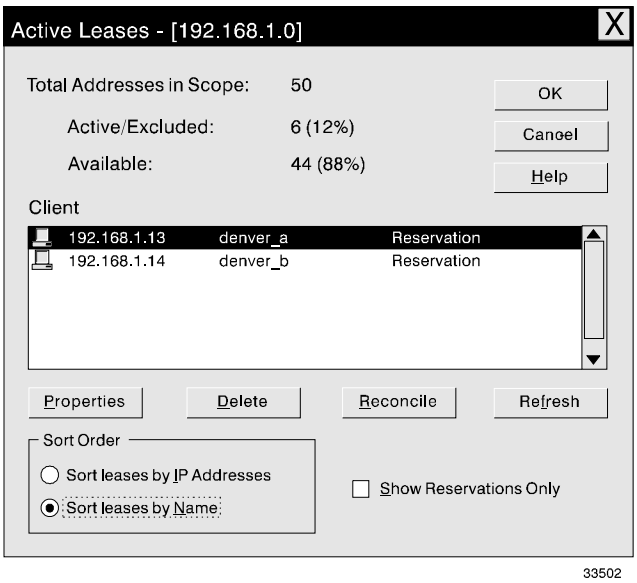

Figure B-5 Active Leases Screen

b Highlight the first controller in the list, then click Properties.

The Client Properties screen appears (Figure B-6), displaying the information that you have already added. To correct any of this information, do so from this screen.

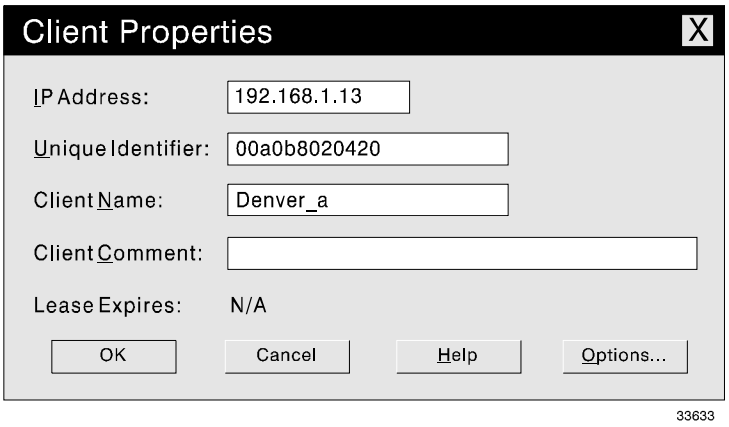

Figure B-6 Client Properties Screen

c Click Options.

The DHCP Options – Reservations screen appears.

d Highlight the 012 host name entry in the Unused Options list and click Add to move it to the Active Options list.

e Click Value to assign a host name to the active option.

f Enter the host name in the String field at the bottom of the screen for the controller that you have selected.

g Click OK.

You return to the Client Properties screen.

h Click OK.

You return to the Active Leases screen.

i Repeat step 5b through step 5h until you have added the host names for every controller.

j When you have selected all the controllers you want and have added their host names, click OK at the Active Leases screen.

You return to the DHCP Manager screen.

6 Restart the disk subsystems for the parameters in the BOOTP table to take effect.

a Turn off the power to the disk subsystems. Wait at least 60 seconds for the all drives to spin down.

b Turn on the power to the disk subsystems.

7 Go to "Verifying the TCP/IP Protocol and the Controller Host Name" on page B-19.

Windows 2000: Installing the DHCP Manager

If the DHCP Manager is already installed on the appropriate server, go to "Windows 2000: Setting Up a DHCP Server." If not, install it now using the following instructions.

1. Select Start >> Settings >> Control Panel >> Add/Remove Programs.
2. Click Add/Remove Windows Components on the left side of the screen.

   The Windows Components Wizard screen appears.
3. Under Components, scroll to and select Networking Services >> Details.
4. Under Subcomponents of Networking Services, check the box next to Dynamic Host Configuration Protocol >> and click OK.
5. If prompted, type the full path to the Windows 2000 distribution files and click Continue.

   The required files are copied to your hard disk. The server software can be used after restarting the system.
6. Go to "Windows 2000: Setting Up a DHCP Server" on page B-14.

NOTE After installing the DHCP Manager, you may want to refer to its online Help for additional information.

Windows 2000: Setting Up a DHCP Server

IMPORTANT Before proceeding, read through these instructions and contact your network administrator for any required information.

Use the following procedure to create a scope and to set up the DHCP server. A *scope* defines a group of controllers by their IP addresses. You must create and configure a scope so that dynamic IP addresses can be assigned to controllers on your network. Use the Storage Management Station Installation Profile, which you should have completed in Chapter 2, to obtain required information as necessary.

1 Select Start >> Programs >> Administrative Tools >> DHCP.

The DHCP Screen appears.

2 Ensure that the server you want to configure is selected.

The Add a Scope window appears on the right side of the screen and displays instructions. As you follow these instructions, the New Scope Wizard directs you through the remaining procedures, which are summarized for your review in the step 2a, below, through step 2j on page B-15:

a Enter a scope name and description.

As you enter information in step 2b, if each field contains fewer than three characters, press the period key or space bar to advance to the next field.

b Enter the starting and ending IP addresses of the controllers you are configuring on the network, using the example shown below.

IMPORTANT If you have only one controller, enter its address for both the starting and ending addresses in step 2b.

If you have more than one controller, their IP addresses may not be consecutive numbers. In that case, still enter the beginning (lower number) and ending (higher number) IP addresses. Any IP addresses in that range of numbers can be excluded when the New Scope Wizard prompts you for that information.

For example, if the subnet is 192.168.1.0 and you are configuring 50 controllers, set the starting address to 192.168.1.1 and the ending address to 192.168.1.50.

c Enter the subnet mask obtained from the network administrator.

d Using the Add Exclusions screen, enter IP addresses that need to be excluded from the beginning and ending addresses that you just entered in step 2b, then click Add.

e Set the Lease Duration obtained from the network administrator.

f Configure the DHCP Options.

NOTE We recommend that you configure these options now, although you can choose to configure them later.

To configure them later, go to the DHCP screen and open the directory structure for the Scope that you created in step 2a on page B-14. In the Scope directory, right-click on Scope Options, select Configure Options, and follow the on-screen directions.

---

g To configure the DHCP options, begin by adding an IP address for a router.

h Add the domain name and DNS servers.

i Enter the server name and IP address in the WINS Servers screen.

j Either activate the scope now that all the information has been entered, or choose to activate it later.

You return to the DHCP screen. The scope name that you previously entered, in step 2a should be added to this screen.

3 At the DHCP screen, open the directory structure below the Scope that you created in step 2a.

4 Right-click on Reservation, select New Reservation, and follow the on-screen instructions.

IMPORTANT At the bottom of the New Reservations screen, you need to make a selection under Supported Type. We recommend that you select Both.

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a At the next screen, ensure that the General Tab is selected, then scroll through the list until you see Host Name.

b Check the Host Name box and enter a specific host name for each controller. You may want to name this the same as the Reservation name.

c Repeat step 4 until you have added the host names for all the controllers that you need to add, then click Close.

5 When you have finished setting up the DHCP server, you must recycle the power for any modifications in the DHCP server to take effect:

a Turn off the power to the disk subsystems.

b Turn on the power to the disk subsystems.

6 Go to "Verifying the TCP/IP Protocol and the Controller Host Name" on page B-19.

Using the NetWare DHCP Service as a BOOTP-Compatible Server

The Dynamic Host Configuration Protocol (DHCP) enables TCP/IP-based client workstations to receive local and network configuration information automatically when the TCP/IP transport is loaded. When a DHCP client workstation boots, it broadcasts a DHCP request for its IP address and network configuration. When the DHCP server receives the message, it checks its database to determine which configuration information to return. The DHCP server replies by sending a DHCP reply message that includes all TCP/IP configuration information required by the specific client that sent the request.

This chapter provides procedures for setting up the NetWare DHCP service. Prior to the installation of the DNS/DHCP service, you must complete the following tasks:

1. Extend the NDS schema and create the default DNS/DHCP objects.
2. Install the Novell® Client on the machine that is going to run the DNS/DHCP Management Console.
3. Install the DNS/DHCP Management Console and NetWare Administrator snap-in files.

Some of these tasks are outlined below in order to simplify the installation of the DHCP service.

Extending the Schema Using the NetWare 5 Installation Program

Perform the following steps to extend the DNS schema and create the three default DNS/DHCP objects using the NetWare 5 installation program at the server console:

1. Select the NetWare GUI screen at the server console.
2. Select Novell >> Install.

   The Install Products dialog box appears.
3. Select Add and follow the instructions on the screen.

   The Source Path window is displayed.
4. Enter the path to the Install directory in the Source Path window. You can use the Browse button to find the NetWare 5.1 installation files. Click OK after entering the path.
5. Mark the Novell DNS/DHCP Services box in the Additional Products and Services window.

6 Authenticate yourself to NDS as a user with rights to extend the NDS schema. You must have supervisor rights to the root of the NDS tree.

7 Enter your fully distinguished name in the User Name field and enter your password in the Password field.

8 Click OK.

9 Enter the NDS context where you want to create the DNS-DHCP locator, DNSDHCP-GROUP group, and RootServerInfo Zone objects. When finished, click Next.

10 Click Finish in the Summary Window.

11 When the installation is complete, the Installation Complete dialog box appears. Select Yes to reboot the server.

Installing the DNS/DHCP Management Console

You must install the DNS/DHCP Management Console and NetWare Administrator snap-in files before you can see and manage the new DNS/DHCP objects in the NDS tree. Perform the following procedures to install the management files.

NOTE Perform the Novell Client installation on your client workstation before installing the DNS/DHCP Management Console.

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1 Run the SYS:PUBLIC\DNSDHCP\SETUP.EXE program from a client workstation.

2 Install the DNS/DHCP Management Console on the local hard disk.

3 Install the NetWare Administrator snap-in files in the YS:PUBLIC\WIN32 directory.

4 Restart the workstation.

Configuring the NetWare DNS/DHCP Service

You must assign a NetWare server as a DHCP server, configure several NDS objects, and initialize the DNS/DHCP service before you can use BOOTP services on the network. Consult your Novell NetWare 5.1 documentation for a more detailed explanation of how to configure the DHCP parameters.

When finished, go to "Verifying the TCP/IP Protocol and the Controller Host Name" on page B-19.

Setting Up the DNS or Host Table

Use the following procedure to set up the Domain Name Service (DNS) or host table. Ensure the controller host names correspond to the appropriate controller IP addresses.

1 Edit either the DNS or the host table (/etc/hosts) to add the IP address and host name for each network controller.

For example, to set up the host table for the Network A controllers, use a text editor to create the following controller IP address and name entries:

IP Address	Controller Host Name
127.0.0.01	localhost
192.168.1.13	denver_a
192.168.1.14	denver_b

2 If you plan to manage disk subsystems through a firewall, configure your firewall to open port 2463 to TCP data.

CAUTION Potential security risks occur when you open ports to your network.

End Of Procedure

Verifying the TCP/IP Protocol and the Controller Host Name

Use the following procedure to:

- Verify that the TCP/IP Protocol software is installed on all storage management stations. If using the host-agent management method, also verify that the TCP/IP Protocol software is installed on the host.
- If you are managing the disk subsystems directly, use the Domain Name Service (DNS) or host table to verify that each controller's host name corresponds to its appropriate IP address.

NOTE Optionally, you can use the Windows Internet Name Service (WINS) rather than DNS.

Ask your Network Administrator to set up the DNS or WINS if it is not already installed and running.

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1 Choose one of the following, based on your operating system, to verify that the TCP/IP Protocol software has been installed

- **Windows 98 –** Select Start >> Settings >> Control Panel >> Network.

  The window should have the TCP/IP protocol listed in the network components window. If the TCP/IP protocol software has not been installed, load it from the Microsoft Windows CDROM, then select Start >> Settings >> Control Panel >> Network >> Protocol.

- **Windows NT –** Select Start >> Settings >>Control Panel >> Network >> Protocols.

  The window should have the TCP/IP protocol listed in the network components window. If the TCP/IP protocol software has not been installed, load it from the Microsoft Windows CDROM, then select Start >> Settings >> Control Panel >> Network >> Protocol >> Add.

- **Windows 2000 –** Select Start >> Settings >> Network and Dial-up Connections >> Local Area Connection >> Properties.

  In the list of components, the Internet Protocols (TCP/IP) should have been selected.

  If the TCP/IP Protocol software is not installed, load it from the Microsoft Windows CDROM, then select Start >> Settings >> Network and Dial-up Connections >> Local Area Connection >> Properties >> Install >> Protocols >> Add.

2 Update either the DNS or host table to associate a host name with an IP address. If you do not have a DNS (or WINS), edit the two host tables found in the following directories:

Windows 98
c:\windows\hosts
c:\windows\hosts\lmhosts
Windows NT
c:\winnt\system32\drivers\etc\hosts
c:\winnt\system32\drivers\etc\lmhosts
Windows 2000
c:\winnt\system32\drivers\etc\hosts
c:\winnt\system32\drivers\etc\lmhosts

For example, to set up the host tables for the controllers connected to network A, use a text editor to create the following controller IP address and name entries:

IP Address	Controller's Host Name
127.0.0.01	localhost
192.168.1.13	denver_a
192.168.1.14	denver_b

CAUTION Potential security risks occur when you open ports to your network.

3 If you plan to manage disk subsystems through your network's firewall, configure your firewall to open port 2463 to TCP data.

End Of Procedure

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