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Installing the SunOS 4.0.3

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How to Use This Manual

How to Use This Manual

1.1. Purpose

This manual is a guide to help you take your Sun Workstation® from initial hardware power-up through SunOS™ installation. This manual breaks down the installation so that even if you are new to UNIX† and Sun architecture types, you can perform a basic installation.

This manual is intended for installing of SunOS 4.0.3, or upgrading to SunOS 4.0.3. For installing or upgrading other versions of the SunOS, see the installation manual for the specific release.

1.2. Intended Audience

SunOS is distributed to a wide customer base with a broad range of technical expertise. This manual provides information for beginning through advanced levels.

Beginning and intermediate level users should read through the major sections of this document before beginning the upgrade or installation process. Advanced level users should review this document for information on differences in upgrading to, or installing SunOS 4.0.3, as well as a basic reference document.

1.3. Document Structure

This manual is divided into the following nine chapters:

□ **Chapter 1. How to Use This Manual** gives you an overview of the entire document. It tells what to expect in the installation and where to locate certain types of information. It also refers you to related documents for more information in specified areas.

□ **Chapter 2. What You Should Know Before Installing SunOS** introduces the beginning user to local and remote installations and provides an *installation roadmap* that gives a *big picture* of the installation process. A definition of working terminology is provided to familiarize the beginning user with machine types, network terminology, operating system terminology, and SunOS device names.

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† UNIX is a registered trademark of AT&T.

Pay particular attention to the *Changes in SunOS* section of this chapter. This section discusses the significant changes from SunOS 3.x to 4.x. The changes mentioned here are system changes that resulted in changes to the installation process for SunOS 4.x.

Beginning and intermediate users should note the recommended pre-installation procedures listed at the end of this chapter.

□ **Chapter 3. Getting Started** discusses the importance of planning disk space and provides a list of issues to consider for customizing your disk. This chapter also covers pre-installation procedures and the abort sequence.

□ **Chapter 4. Beginning the Installation** leads you into the first of the installation procedures. You learn how to load the distribution tape and bootstrap program. You also learn how to format the disk, copy the miniroot, and boot the miniroot.

□ **Chapter 5. How suninstall Works** explains the *suninstall* program, its menus and menu options. This chapter is not meant to be used as a walk-through example.

□ **Chapter 6. Walkthrough Examples** gives you step-by-step walkthrough instructions for installing local and remote installations. Three walkthrough examples are provided for local installations; one for each configuration: standalone, server, and dataless. One remote installation walkthrough is provided to illustrate the basic differences from a local installation.

□ **Chapter 7. Post-installation Procedures** outlines post-installation procedures to re-customize the environment. How to boot a pre-configured kernel and how to configure your own kernel is also covered.

□ **Chapter 8. Advanced Installation Issues** covers the use of `setup_client` and `setup_exec`. These utilities allow you to add software after the installation is complete, covert a standalone system to a server, and add or delete clients.

□ **Chapter 9. Performing a System Upgrade** explains the differences between a system upgrade and a complete installation. It also covers background information necessary for performing a system upgrade, and provides walkthrough examples for four system configurations.

□ **Chapter 10. Reference** includes the `setup_client(8)`, `setup_exec` and `sunupgrade(8)` manual pages, as well as a glossary.

□ **Appendix A: SunOS 4.0.3 and 3.x Directory Structures** is a collection of tables representative of the SunOS 4.0.3 directory structure and 3.x directory structure respectively. By comparing the two directory structures you can obtain a visual image of the changes that occurred in the directory structure from SunOS 3.x to SunOS 4.0.3.

□ **Appendix B: Time Zones** gives a list of acceptable time zone names.

□ **Appendix C: SunOS 4.0.3 Upgrade Tape Layout** provides a list of software categories on the SunOS 4.0.3 Upgrade tape, the file sizes, and file types.

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□ **Appendix D: Installation Worksheets** are worksheets to help you gather information for the installation and execute the installation smoothly and efficiently.

□ **Appendix E:** *suninstall* **Forms** are sample forms in the *suninstall* program. Blank lines are provided so you can fill in these forms in advance and then start *suninstall.*

1.4. Document Conventions

Several Sun document conventions are used throughout this document to help make directions clear and consistent. The following is a list of the document conventions used in this manual.

Font Types

Various font types are used in this manual to distinguish between information you key in, the information displayed by the system, and items that either you or the system replace with a variable. These font type conventions are as follows:

□ **bold listing font**

This font represents characters you key in.

□ `listing font`

This font represents the response of the system that is displayed on the screen. It is also used for literal values such as program names, function names, procedure names, variable names, field types, file listings, and session output.

□ ***bold italic font***

This font represents a variable. It is up to you to make the proper substitution.

□ gray boxes

Gray boxes represent dialogues you have with the system. As mentioned above, the bold listing font represents the characters you key in and listing font is the response of the system.

```
# suninstall

Enter the local time zone name:

>>US/Pacific
```

□ plain boxes

Plain boxes represent screen displays or system responses. There is no user interaction in these displays.

```
SERVER:/export/exec/sun2    /usr   nfs ro,rsize=2048,wsize=2048 0 0
```

Icons

The following icons are used throughout this manual as visual signposts.

□   **Light Bulb**

The light bulb icon illuminates information that is nice to know. This is information that may answer questions as to why you are doing something, but is not critical to completing the installation.

□   **Pointing Hand**

The pointing hand icon points to information that requires close attention.

□   **Stop Sign**

The stop sign icon points to critical information that is essential for you to read.
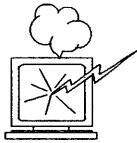
□   **Exploding Workstation**

The exploding workstation icon is placed by information that is *imperative* for you to read. If you skip over this material, it is possible that you can damage your system or cause the installation to fail.
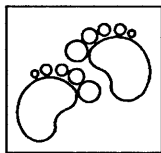
□   **Feet**

The feet icon marks the beginning of each walkthrough example.

Names of Manual Pages

The following notation is used throughout this manual for reference to commands and utilities:

```
passwd(1)
```

This notation indicates the passwd manual page in Section 1 of the *Commands reference Manual*.

Explanations for the noted commands and utilities can be found in one of the following documents:

□   *Commands Reference Manual*

□   *Systems Interface Manual*

These documents contain a total of eight sections. The following table lists each section number and its corresponding manual.

Section	Manual
1	Commands Reference
2	System Interface
3	System Interface
4	System Interface
5	System Interface
6	Commands Reference
7	Commands Reference
8	Commands Reference

The use of an appended letter after the command or utility indicates a specific category of command or a subsection. The following table lists examples of added notation.

Category/Subsection	Notation	Example
Graphics	G	spline(1G)
Math Library	M	title(3M)
Network Library	N	title(3N)

1.5. Related Manuals

The following manuals may be helpful as reference documents:

□   *System and Network Administration*

□   *SunOS Reference Manual*

2

What You Should Know Before You
Install SunOS

What You Should Know Before You Install SunOS

2.1. Introduction

This chapter covers the basics of the installation process and new enhancements to SunOS that affect installation. It also helps you determine if your system requires a *full installation* or a *system upgrade*. This issue is covered in the next section, *Installation or Upgrade*.

In the *Working Terminology* section, local and remote installations are defined and basic terminology is covered.

Changes to SunOS that affect installation are covered in the second part of this chapter. SunOS Release 4.x has many added enhancements that qualify it as significantly different from previous Sun releases. This section covers the SunOS 4.x features and the differences they incur in the installation process.

Installation roadmaps are presented at the end of this chapter. There is a road-map for a first-time installation and one for a re-installation of an existing system.

2.2. Installation or Upgrade?

The differences between an *upgrade* and a *full installation*, are as follows:

□ **Full Installation**

With a full installation, an entire operating system is installed; this overwrites the existing operating system and all filesytems. A full installation is typically required for a major release of the operating system; when there are too many significant changes to selectively replace files.

□ **System Upgrade**

With a system upgrade, only those files that are different between the release you are running and the new release are installed. `sunupgrade` preserves your current filesystem and customizable administrative files in the process of replacing the selected files. An upgrade is typically used for a minor release of the operating system where selective files can be replaced.

Methods for Installation and Upgrade

The methods available for implementing a full installation and a system upgrade differ. The full installation has a separate set of distribution tapes than does the upgrade. You can *only* perform a system upgrade if you have the SunOS Upgrade tape.

The following methods are available for performing a full installation of SunOS 4.0.3:

Full Installation:

□   SunOS 4.0.3 Full Install tape set

□   SunOS 4.0 Full Install tape set accompanied with a SunOS 4.0.3 Upgrade tape

The following method is available for performing a system upgrade to SunOS 4.0.3:

System Upgrade:

□   SunOS 4.0.3 Upgrade tape

When to Perform a Full Installation

You must perform a full installation under the following circumstances:

□   You want to bring up a new system that does not have a previous OS installed.

□   You want to migrate from a 3.x release to a 4.x release.

If either of these situations are reflective of your site, continue reading this chapter and the rest of the manual.

When to Perform a System Upgrade

You should *only* perform a system upgrade under the following condition:

□   You are currently running SunOS 4.x and want to migrate to SunOS 4.0.3.

If this is the situation at your site, go directly to Chapter 9, *Performing a System Upgrade*. This chapter covers the necessary information for performing a system upgrade, and provides walkthrough examples for four system configurations.

2.3. What Happens When You Install

Installation is the term used for loading the operating system software and bringing up your workstation. This document covers the following two installation types:

□   Install a new system

□   Re-install an existing system

The basic installation process consists of the following steps:

1.   Loading the `bootstrap` program.

2.   Copying and booting MUNIX.

3.   Formatting the disk

4.   Copying and booting the miniroot

5.   Running *suninstall*

6.   OPTIONAL: Install a small pre-configured kernel, if applicable. See the *Post-installation Procedures* chapter of this manual for more information.

7.   Booting the system

8. Configure a custom kernel, if you did not install a small kernel.

2.4. Working Terminology

The following terms are used in the installation procedures:

Local Installation

With a *local installation*, a disk and tape drive are connected to the machine on which you are installing SunOS. This machine may or may not be connected to a network.

Remote Installation

With a *remote installation*, the machine you are installing does not have a tape drive connected to it (local tape drive), but there is a local disk. Instead of using a local tape drive, you use the tape drive of another machine on a network to perform the installation. This type of installation, by definition, requires that the system you are installing be connected to the network.

The tapehost (remotehost) must be running SunOS 4.x before you can perform a remote installation of SunOS 4.x.

Machine Types

This section covers the four possible machine types. Your site may have one type or it may be a network with a combination of the following types.

Standalone
   A standalone system has a local disk. It may or may not be attached to a network. If attached to a network, it may or may not have a local tape drive. A standalone workstation is also self-sufficient in terms of storage, and has a complete root filesystem, user filesystem, and local swap on its disk. It does not require another machine or network to boot UNIX.

Server
   A server system on a local network provides resources such as network services and disk storage for other machines, which are called "clients". For installation purposes, the term "server" means "network file server". A server uses the NFS ("Network File System" — see nfs(4P)) protocols to provide filesystem services to its clients.

Homogeneous Server
   A homogeneous server is a server that serves clients *only* of its own architecture. For example, a Sun-3 server that serves only Sun-3 clients is a homogeneous server.

Heterogeneous Server
   A heterogeneous server is a server that serves clients of different architectures that itself. For example, a Sun-4 server that serves Sun-2 and Sun-3 clients is a heterogeneous server.

Diskless Client
   A client workstation on a local network relies on a server for disk storage.

Installing a diskless client workstation requires that you complete the installation on its server and then power on the workstation. The things you need to know about the client for server installation include the following:

□   client name

□   hardware Ethernet address of client machine

See the *Networking Terminology* section that follows.

□   Internet or IP address of client machine

See the *Networking Terminology* section that follows.

□   yellow pages type

("client" or "none") diskless machines are usually not a YP server

□   pathname of the root directory for client:
`/export/root/clientname`

□   pathname of swap for client: `/export/swap/clientname`

□   pathname of the home directory for client: `/home`

□   pathname to executables of client architecture type:
`/export/exec/sun2,sun3,sun3x,sun4 or sun4c`

□   amount of disk space to reserve for client swap area

Dataless Client
A dataless client workstation on a local network relies on a server for its `/usr` partition, but has a local disk where it stores its `root` and `swap` partitions. A dataless client can boot the operating system from its local disk, however, it requires the `/usr` filesystem from a remote machine to come up single user and multi-user. In other words, some of its files are local, and others are remote. The remote files can be obtained from any machine running NFS which supports the dataless client's architecture.

Networking Terminology

This section defines the basic network terminology relevant to configuring your network.

For additional information on networking, see *Determining Network Information* in the next chapter or the *System and Network Administration* manual.

Hostname or Machine Name
Name of the workstation. Each machine in the network is assigned a unique hostname. A machine with more than one interface (i.e. a router which has an interface on each of two different networks) requires a unique hostname for each interface.

Ethernet Address
Refers to the address permanently assigned to each workstation.

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Internet Address
A unique number assigned to each machine; also known as the IP address. It consists of two parts: the network number followed by the host number.

Domain Name
The domain name identifies a group of workstations on a single local network that share some administrative files.

Remotehost
The remotehost is the machine that supplies both the server and tape drive capabilities during a remote installation.

Tapehost
A tapehost is a machine which has the tape drive that is used during a remote installation.

Target Machine
During a remote installation, the target machine is the machine you are installing.

Operating System Terminology

This section covers basic operating system terminology applicable to installing SunOS.

SunOS
SunOS is the Sun UNIX based operating system that incorporates Berkeley 4.2 and System V. It is referred to in this manual as the SunOS or the operating system.

miniroot
The miniroot is a very small version of the operating system temporarily loaded into the swap partition. The miniroot gives you just enough functionality to install the overall operating system.

`format`
`format` is a SunOS utility that enables you to format, label, repair and analyze disks on your Sun system. For more information, see the *System and Network Administration* manual.

`MUNIX`
`MUNIX` is a small version of the operating system that is loaded from tape or over the network into memory rather than onto disk. It is a useful tool when format operation must be run on your local system disk.

SunOS Device Names

This section covers the various device names used by the operating system. These names can be arbitrary, such as the user-defined hostname, but are often based on abbreviations for the controllers used to connect the devices.

During installation, you are prompted for the *tape*, *disk*, and *ethernet* names. The following is a list of possible device names and Ethernet types with their

appropriate notations. Check your system to verify your device names and Ethernet type and make note of them for the upcoming installation.

Table 2-1   *Tape Devices*

Name	Device Description
ar	Archive 1/4" tape cartridge
mt	Nine-track magnetic 1/2" tape-Tapemaster controller
st	SCSI 1/4" tape cartridge
xt	Nine-track magnetic 1/2" tape-Xylogics 472 controller

Table 2-2   *Disk Devices*

Name	Device Description
xy	Xylogics 450/451 SMD disk controller
sd	SCSI disk controller
xd	Xylogics 7053 disk controller
fd	Integrated floppy controller
sf	SCSI floppy controller

Table 2-3   *Ethernet Types*

Name	Type Description
ec	3COM ethernet controller, some Sun-2 machines
ie	most Sun-2, Sun-3/75, Sun-3/100, Sun-3/200 and Sun-4 ethernet contrc
le	Sun-3/50, Sun-3/60 and Sun-3/Eurocard ethernet controller Sun-3/80, Sun-4/330

2.5. SunOS 4.x Server Information

As with previous releases, it is recommended that networks be configured with servers at least as powerful as their clients, especially for diskless operation. For example, it is preferred to have a Sun-4 server serving Sun-2, Sun-3, and/or Sun-4 clients. **It is NOT recommended to have a Sun-2 server serving Sun-3 and Sun-4 clients.**

All Sun-2, Sun-3, and Sun-4 clients of a server can be upgraded to SunOS 4.0.3. For more information on system upgrades for server configurations, see the *Performing a System Upgrade* chapter in this manual.

Installing From Mixed Types of Distribution Tapes

suninstall does not currently support installation of different architectures on a heterogeneous server *from different tape drives.* An example of this would be installing a Sun-3 heterogeneous server by loading the Sun-3 software from a local 1/2" tape drive and the Sun-2 software from a remote 1/4" tape drive.

If it is necessary to perform such an installation, install the machine as a homogeneous server being sure to select `Install` optional software. Bring up the system and use `setup_exec` and `setup_client` to add the heterogeneous software and clients.

Supporting Sun386i Diskless Clients

A server kit is available with the Sun386i SunOS 4.0.1 distribution which allows Sun-3 and Sun-4 servers running SunOS 4.x to support Sun386i diskless clients. If you are interested in running 386i diskless clients on a Sun-3 or Sun-4 server, contact your Sun Sales Representative. The server kit uses the same tape media as the standard 386i SunOS 4.0.1 distribution.

Special Server Installation Issues

The following issues are specific to selected configurations and/or architecture types.

Upgrading Dataless Clients

As a safety feature when upgrading dataless clients, `sunupgrade` does not upgrade a dataless client to the new operating system release unless the server is already running the new release. For example, `sunupgrade` would not upgrade a dataless client to SunOS 4.0.3 unless the server was already running SunOS 4.0.3.

Booting From Fast Servers

Diskless Sun-2 machines and Sun 100U machines with 3Com Ethernet interface (`ec0`) will have trouble booting from fast servers such as a Sun-3 or Sun-4. To correct this, use the following steps.

1. On the machine named SERVER, do the following for the client named CLIENT:

```
SERVER# cd /export/root/CLIENT
SERVER# echo 'nfstsize+0x22??w800' | adb -w vmunix
SERVER#
```

2. Be sure the client's `/etc/fstab` entries have the `rsize` and `wsize` options set to 2K for any fast servers. For example, the entry for `/usr` should look similar to the following:

```
CLIENT:/export/exec/sun2 /usr nfs ro,rsize=2048,wsize=2048 0 0
```

An alternate approach would be to upgrade the `ec` board to a Sun multibus Ethernet board (`ie0`). To do this, see your sales representative for details.

2.6. Server Support of Sub-architectures

The SunOS 4.0.3 product line includes support for new hardware architectures that are largely compatible with existing Sun architectures, except for a slightly different kernel layout. This new type of architecture is called a *sub-architecture*. For example, a 68030 based Sun-3/80 is a sub-architecture of a Sun-3 and is called a Sun-3x.

Hosts which share the same architecture but differ in their sub-architectures, can share *most*, but not all, of the executables. Due to the differences in the kernel structure for sub-architectures, programs that depend on a particular kernel layout must be located in a directory that is not shared across sub-architectures.

The sub-architecture dependent files are located in /export/exec/kvm. Programs that need to access the kernel while it is running need this file. Every diskless client must mount /export/exec/kvm, as well as, /usr. mounted/usris /export/exec/kvm is mounted on top of /usr. kvm files are mounted as a single point.

The major-architecture is always the directory with the data and the sub-architecture is a symbolic link. The /export/exec/kvm directories are all actual directories, not symbolic links.

As a result of sub-architecture kernel differences, you must specify the following two paths when installing a client on SunOS 4.0.3:

❏   Path for the architecture dependent executables

❏   Path for the sub-architecture dependent executables

The path for the architecture dependent executables is called the exec path and is unchanged from SunOS 4.0. The default exec path is:

/export/exec/*client_ARCH* .

The path for the sub-architecture dependent executables is called the kvm path and is new in SunOS 4.0.3. The default kvm path is:

/export/exec/kvm/*client_ARCH* .

You define both the exec path and the kvm path on the Host Form, Software Form, and Client Form in *suninstall*.

2.7. Small Pre-configured Kernels

A small pre-configured kernel is now available for installation on smaller systems. With the added enhancements to 4.0.3, a small kernel is required for optimum performance. The small pre-configured kernel is eliminates the extra steps required for configuring a custom kernel. For information on the systems that support the small pre-configured kernel, as well as steps for installation, see the *Post-installation Procedures* chapter of this manual.

Even with a smaller system, you still have the option of customizing your own kernel. For information on how to configure a custom kernel, see the *Post-installation Procedures* chapter of this manual.

2.8. Changes to SunOS from 3.x to 4.x

This section covers the major operating system changes from SunOS 3.x to 4.x. These changes have influenced the installation process for SunOS 4.x.

Filesystem Reorganization

Two major features of SunOS 4.x are the elimination of the Network Disk System partitioning and the reorganization of the filesystem. This new filesystem layout makes it easier for a single server to support clients of different architectures, while still maintaining most of the familiar filesystem layout.

The Sun Network File System (NFS) allows a computer with a local disk to act as a server by exporting its filesystems to clients on a network. The client computers may themselves be servers of other local filesystems. When a client and server have the same architecture they can share executable programs or utilities.

The New Layout

In changing the layout of the filesystem for SunOS 4.x, the basic goals included the following:

□   Easier maintenance of servers and clients

□   Easier mixing of remote and local filesystems

□   Cleaner support of multiple architectures

□   Minimal disruption to existing programs

□   Minimal symbolic link confusion

Major Changes

The following items highlight the major changes in the filesystem layout for SunOS 4.x. For more information on changes made to the system in SunOS Release 4.x, see the *SunOS 4.x Change Notes*.

□   The directories /usr/adm, /usr/spool, and /usr/tmp have been moved into /var and symbolic links point from the old names to the new location.

/usr	*Symbolic Link*	/var
/usr/adm	⇒	/var/adm
/usr/spool	⇒	/var/spool
/usr/tmp	⇒	/var/tmp

□   The sendmail configuration file has been moved from the /usr/lib directory to /etc. There is no symbolic link pointing from the old location to the new location.

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/usr	Symbolic Link	/etc
/usr/lib/sendmail.cf		/etc/sendmail.cf

□ The entire contents of /bin and /lib were moved to /usr/bin and
/usr/lib respectively. The executables from /etc were moved to
/usr/etc, leaving /etc exclusively containing system configuration
files. Symbolic links are left behind for the directories /bin and /lib and
for the individual files moved out of /etc.

Old Location	Symbolic Link	/usr
/bin	⇒	/usr/bin
/lib	⇒	/usr/lib
/etc/*name*	⇒	/usr/etc/*name*

□ A new directory, /usr/share, was added for files that can be shared
across all architectures. It currently holds the manual pages (moved from
/usr/man), the kernel build directory (moved from /usr/sys), the
SunView Programmers' Source, and a few other files. Symbolic links were
left behind in the original locations for most files and directories moved into
/usr/share.

Old Directory	Symbolic Link	New Directory
/usr/man	⇒	/usr/share/man
/usr/sys	⇒	/usr/share/sys
/usr/src	⇒	/usr/share/src

□ The mount points for home directories in the old filesystem layout were
sub-directories of /usr. These have been moved to a new directory,
/home. This allows the /usr filesystem to be mounted read-only, if
desired. As with 3.x, you must mount each subdirectory on a client
corresponding to a separate filesystem. The owner of a client machine can
either have a local /home directory which is personally maintained, or
mount the standard /home directory which is updated by an administrator.

/usr	Moved To	New Location
home directory mount points	⇒	/home

□ SunOS 4.0.3 brings the introduction of sub-architectures. With this intro-
duction, a server which now serves multiple architectures must also supply
architecture dependent executables for each client architecture configuration
is serves. These export directories are kept in
/export/exec/kvmARCH and are named according to the respective
architectures. The path for each of these architecture dependent executable
files is called the kvm path.

Architecture	kvm Path
Sun-2	/export/exec/kvm/sun2
Sun-3	/export/exec/kvm/sun3
Sun-3x	/export/exec/kvm/sun3x
Sun-4	/export/exec/kvm/sun4
Sun-4c	/export/exec/kvm/sun4c

□ A server which supports multiple architectures or sub-architectures supplies multiple copies of the clients' executables; one for each supported architecture. The exported filesystems are kept in the /export/exec directory and named according to the architecture supported. The path for each of these filesystems is called the exec path. When a server is sharing executables with one or more of its clients the /export/exec entry for the shared executables will be a symbolic link to /usr.

Architecture	exec Path
Sun-2	/export/exec/sun2
Sun-3	/export/exec/sun3
Sun-3x	/export/exec/sun3x
Sun-4	/export/exec/sun4
Sun-4c	/export/exec/sun4c

Using the New Filesystem

It is recommended that you follow the rules listed below when writing or modifying programs that use the new filesystem layout.

□ In general, /usr should be considered read-only and shared. It should contain only executables and libraries for a particular architecture.

□ The directory /etc contains the identity of a particular machine. You can think of it as the home directory of the machine. It contains all of the text files that make up the administrative databases of the machine. It also contains directories that are used for per-machine files.

□ There are two directories that are used for temporary files: /tmp and /var/tmp. The /tmp directory should be used for small files and quick access. These files are removed when the machine is rebooted. The /var/tmp directory should be used for larger and longer-lived files.

2.9. Changes to *suninstall* in SunOS 4.x

setup_client **and**
setup_exec

setup_client and setup_exec were commands introduced in *suninstall* in SunOS 4.x. setup_client allows you to add and delete clients.
setup_exec allows you to install executable files for a specified architecture.

You can no longer use the extract_release command to extract additional
software. You must use setup_exec to extract software from the same or
other architectures or return to *suninstall*.

Standalone/Server Conversion

You can now turn a 4.x standalone system into a 4.x server without taking down
or rebuilding the system. The setup_client command allows you to create a
diskless client while the system is running in multiuser mode. This command
also allows you to remove a client while the system is running in multiuser
mode.

For more information on adding and deleting clients, see Chapter 8, *Advanced
Installation Issues.*

**Standalone and Homogeneous
Server Conversion**

You can now turn a 4.x standalone system or a 4.x homogeneous server into a 4.x
heterogeneous server while the system is running in multiuser mode. The
setup_exec command allows you to specify the executables of the architec-
ture to be loaded on the system.

For more information on converting a standalone system to a server, see the
Advanced Installation Issues of this manual.

Installation Priority

It is important that the first 4.x installation at a site be a local installation. You
cannot perform a remote installation as the first 4.x installation at a site. This is
due to the fact that the tapehost must be running SunOS 4.x before a remote
installation can be performed.

**2.10. SunOS 4.x and 3.x
Directory Structures**

For a clearer picture of the file system changes between 4.x and 3.x, compare the
directory structures listed in the *Appendix*. Wherever an arrow (⇒) appears
after a directory name, this indicates a symbolic link to the directory following
the arrow (eg.: /bin ⇒ usr/bin).

2.11. Booting Issues

Originally, the operating system executables were of a size so that all could fit in
the root partition. Over time, however, executables have expanded in size and
made it difficult to keep all executables in root.

With the new filesystem boot procedures, the executables that used to reside in
the root partition have moved to /usr. This change makes it necessary to
alter booting in single-user mode.

In the previous filesystem layout, root contained the executable programs
needed to repair a damaged system. This included programs such as fsck,
dump and restore for patching filesystems and the C compiler and C library.
root was kept to a minimum size (usually about 8 Megabytes) so the chances of
corrupting it were small. However, even with minimal sizing, it contained
enough utilities to rebuild a corrupted machine.

By moving nearly all of the executables to /usr and mounting /usr automatically at boot time, the problem of choosing which executables should be available in single-user mode has been solved.

However, to mount the /usr filesystem, a few executables are needed in the root partition. The /sbin directory holds the necessary executables to mount /usr at boot time. The rc.boot shell script, which is executed at boot time by init, mounts the /usr filesystem, then checks both the root and /usr filesystems.

The following table lists the executables that have been moved from /etc to /usr/etc. The *Symbolic Link* category shows if there is a symbolic link between the original name and the new name by the use of an arrow (⇒). If there is no arrow, there is not a symbolic link between the old and the new name.

Table 2-4   *Executables Moved From* `/etc` *to* `/usr/etc`

Original Name	Symbolic Link	New Name
/etc/arp	⇒	/usr/etc/arp
/etc/biod		/usr/etc/biod
/etc/chown	⇒	/usr/etc/chown
/etc/clri	⇒	/usr/etc/clri
/etc/chroot	⇒	/usr/etc/chroot
/etc/cron	⇒	/usr/etc/cron
/etc/dkinfo	⇒	/usr/etc/dkinfo
/etc/dmesg	⇒	/usr/etc/dmesg
/etc/dump	⇒	/usr/etc/dump
/etc/fastboot	⇒	/usr/etc/fastboot
/etc/fasthalt	⇒	/usr/etc/fasthalt
/etc/fsck	⇒	/usr/etc/fsck
/etc/fsirand		/usr/etc/fsirand
/etc/getty		/usr/etc/getty
/etc/halt	⇒	/usr/etc/halt
/etc/ifconfig	⇒	/usr/etc/ifconfig
/etc/in.rlogind		/usr/etc/in.rlogind
/etc/in.routed		/usr/etc/in.routed
/etc/in.rshd		/usr/etc/in.rshd
/etc/inetd		/usr/etc/inetd
/etc/init		/usr/etc/init
/etc/in.rexecd		/usr/etc/in.rexecd
/etc/link	⇒	/usr/etc/link
/etc/mkfs	⇒	/usr/etc/mkfs
/etc/mknod	⇒	/usr/etc/mknod
/etc/mount	⇒	/usr/etc/mount
/etc/ncheck	⇒	/usr/etc/ncheck
/etc/newfs	⇒	/usr/etc/newfs
/etc/nfsd		/usr/etc/nfsd
/etc/portmap		/usr/etc/portmap
/etc/pstat	⇒	/usr/etc/pstat
/etc/reboot	⇒	/usr/etc/reboot
/etc/renice	⇒	/usr/etc/renice
/etc/restore	⇒	/usr/etc/restore
/etc/rpc.lockd		/usr/etc/rpc.lockd
/etc/rpc.statd		/usr/etc/rpc.statd
/etc/shutdown	⇒	/usr/etc/shutdown
/etc/umount	⇒	/usr/etc/umount
/etc/update	⇒	/usr/etc/update
/etc/unlink	⇒	/usr/etc/unlink
/etc/ypbind		/usr/etc/ypbind
/etc/ypserv		/usr/etc/ypserv

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The following table lists the new names of other files and directories. It states whether or not they have a symbolic link from the original name to the new name, and whether it is a file or directory.

Table 2-5   *Other Files and Directories*

Type	*Original Name*	*Symbolic Link*	*New Name*
directory	/usr/adm	⇒	/var/adm
directory	/usr/preserve		/var/preserve
directory	/usr/tmp	⇒	/var/tmp
directory	/usr/spool	⇒	/var/spool
file	/usr/lib/sendmail.cf		/etc/sendmail.cf
file	/usr/lib/aliases		/etc/aliases
file	/usr/lib/crontab		/var/spool/cron/crontab/root **
directory	/usr/boot	⇒	/usr/kvm/boot
directory	/usr/stand	⇒	/usr/kvm/stand
directory	/usr/mdec	⇒	/usr/kvm/mdec
			** Can also have: /etc/spool/cron/crontabs/username

2.12. Installation Roadmaps

The type of installation roadmap you follow depends on whether or not you have a customized environment that you want to preserve. If you are installing a system for the first time, then you do not have a customized environment to save. If you are re-installing a system, you will want to save your customized environment.

The following *roadmaps* list the recommended installation procedures in sequential order. It is advised that you adhere to this sequence for a successful installation.

ROADMAP: Installing a New System

Pre-installation Procedures

1. Plan disk space (number of clients, services offered etc.). This information is covered in the next chapter, *Getting Started.*

Installation Procedures

2. Load the bootstrap program.
3. Copy MUNIX.
4. Boot MUNIX.
5. Format disk using `format`.
6. Copy the miniroot.
7. Boot the miniroot.
8. Run *suninstall.*
9. OPTIONAL: Install a small pre-configured kernel, if applicable. See the *Post-installation Procedures* chapter for more information.
10. Boot the system.

Post-installation Procedures

1. Install patch tapes if applicable.
2. Configure a custom kernel, if you did not install a small kernel.

    See the *Post-installation Procedures* chapter for more information.

3. Edit system specific files such as `/etc/passwd`.

ROADMAP: Re-installing an Existing System

Pre-installation Procedures

1. Obtain hardcopy of the disk layout and appropriate network information.

    See, *Getting Started* for more information.

2. Preserve the customized environment.

    See, *Getting Started* for more information.

3. Halt all clients.

4. Immediately before beginning the installation, shutdown the machine to single-user mode.

5. Perform full dumps of all filesystems.

Installation Procedures

1. Load the bootstrap program.

2. Copy MUNIX.

3. Boot MUNIX.

4. **OPTIONAL:** Format disk using `format`.

5. Copy the miniroot.

6. Boot the miniroot.

7. Run *suninstall*.

9. OPTIONAL: Install a small pre-configured kernel if applicable. See the *Post-installation Procedures* chapter for more information.

10. Boot the system.

Post-installation Procedures

1. Install patch tapes if applicable.

2. Configure a custom kernel, if you did not install a small kernel.

    See the *Post-installation Procedures* chapter for more information.

3. Edit `host` or `passwd` files.

4. Recustomize the environment.

    See the *Post-installation Procedures* chapter for more information.

3

Getting Started

3

Getting Started

3.1. Introduction

In the previous chapter, you were given the necessary background information for an overview of an installation. This chapter covers the following procedures:

1. Determining network information necessary for the installation.

2. Planning disk space.

3. Completing pre-installation procedures.

4. Copying MUNIX.

5. Formatting the disk.

6. Copying and booting the miniroot.

Read through the entire chapter before beginning the procedures. Completing the tasks in sequence will help insure a smooth and successful installation.

3.2. Planning Disk Space

Planning disk space prior to starting the installation is essential for creating the proper environment. Due to the filesystem reorganization in 4.0, you may want to partition the disk differently than the 3.x layout. In SunOS 4.x, the client `root` and `swap` areas have changed so they are treated as regular NFS filesystems. To accommodate this change, it is suggested that you arrange the disk to provide areas for client `root` and `swap`. For more information, see the *System and Network Administration* manual.

For an example of SunOS disk partitioning see the *Disk Structure* section that follows.

The following table is an example of the allocation of space on an 840 cylinder disk. This table is **only an example**. Your system may require different space allocations.

Table 3-1   *Space Allocation For an 840 Cylinder Disk*

Partition	Cylinders	Description
xy0a	25 cyls	/
xy0b	49 cyls	(swap)
xy0c	840 cyls	(entire disk)
xy0d	137 cyls	/export/root
xy0e	173 cyls	/export/swap
xy0f	161 cyls	/export/exec
xy0g	195 cyls	/usr
xy0h	100 cyls	/home

Disk Structure

The basic unit of the disk is the *sector*. Sun disk sectors contain 512 bytes of data space. Sectors radiate outwards from the center of the disk. The data space is further divided into concentric circles, called *tracks*, which pass through all the sectors on the disk surface. On drives with multiple disk platters, tracks which occupy the same location on two or more disk surfaces are referred to as cylinders.

Each disk has a maximum of eight hard partitions. By convention, they are labelled "a" through "h". These hard partitions create separate physical sections on the disk. Note that disks do not have to use all of the available hard partitions.

Figure 3-1   *Disk Diagram: Plan View*
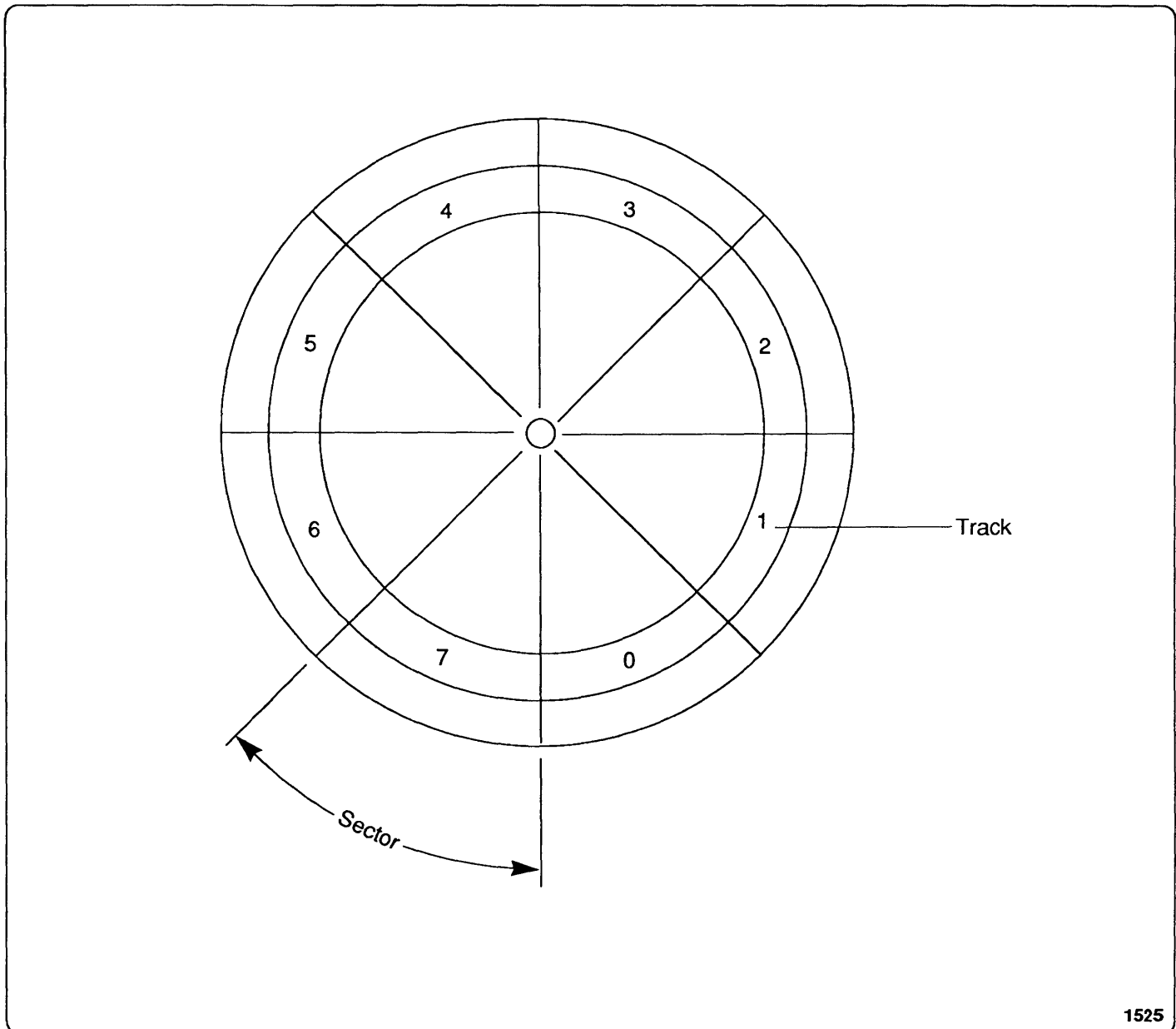
Figure 3-2   *Disk Diagram: Cylinder*
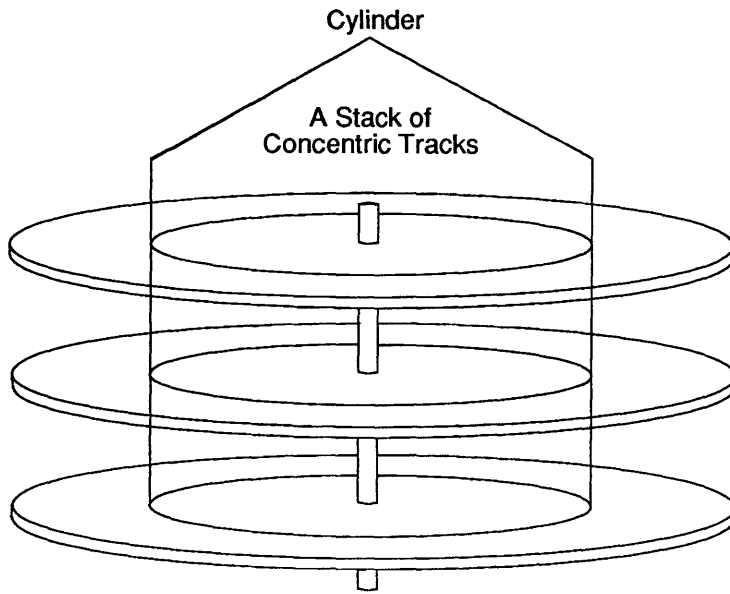
The following table illustrates the SunOS standard for disk partitioning. You have the option of changing all but the `root` partition in suninstall. To change the size of the `root` you must use `format`.

If you are installing a Sun-4 workstation, you will need to increase the size of the "b" partition. The "b" partition can be increased using *suninstall* but not decreased. By Sun standard, "b" is normally the `swap` partition. For more information, see *Why Format?* in Chapter 4 of this manual.

Table 3-2   *Standalone Disk Partitioning Standards*

Partition	Description	Type
a	/ (root)	suninstall default
b	swap	suninstall default
c	entire disk	suninstall default
d	--	unassigned
e	--	unassigned
f	--	unassigned
g	/usr (system level files)	suninstall default
h	/home (home directory, free hog space)	suninstall default

Table 3-3   *Server Disk Partitioning Standards*

Partition	Description	Type
a	/ (root)	suninstall default
b	swap	suninstall default
c	entire disk	suninstall default
d	/export/root (client root area)	suninstall default
e	/export/swap (client swap area)	suninstall default
f	/export/exec (executable files)	user select
g	/usr (system level files)	suninstall default
h	/home (home directory, free hog space)	suninstall default

Disk Planning Issues

This section covers issues you should be familiar with before planning your disk space. The following section covers recommendations for size and usage of various disk partitions.

□   SunOS 4.x requires the following disk space for storage:

   Sun-4: Minimum - 19.1 Mb, Maximum - 65.93 Mb

   Sun-3: Minimum - 18.1 Mb, Maximum - 60.71 Mb

   Sun-2: Minimum - 18.1 Mb, Maximum - 59.62 Mb

   The *minimum* disk usage is the sum of `root` and `usr` files. The *maximum* disk usage is when all optional software is selected during installation.

□   As a standalone system, you will need enough space for the basic operating system software plus any application software for your site. This space is

located in the partition mounted as /usr. The *Read This First* that accompanies the tapes includes a list of available software packages and their respective sizes.

□   As a server, the space required depends on the number of clients served and the resources provided to each (i.e. boot, root, /home, etc.).

□   It is strongly recommended that you allocate a separate disk partition for /var. Allocate space to this partition based on your experience with adm, tmp, and spool requirements in previous releases. If you do not create a partition for /var, all spooling will occur in the root filesystem. For more information on the /var partition, see the *Sizing Disk Partitions* section that follows.

□   The free hog partition is the partition whose size is reduced when /usr and /export/exec run out of space. *suninstall* automatically takes space from the free hog partition if /usr and /export/exec run out of space while you are selecting software categories. The default for the free hog partition is /home, which is typically the "h" partition.

□   The root / partition is no longer available as an option for the free hog partition. You must select from partitions [d], [e], [f], and [g]. Remember, that the /usr and /export/exec partitions cannot be used as the free hog partition.

□   By Sun convention, every disk drive *must* have a 'c' partition which starts at sector zero (0) and is the full size of the disk. All format default labels follow this convention. Please note that if the 'c' partition is not designated correctly on a drive, *suninstall* will not recognize it and it will not be displayed on the Disk Form.

□   It is permissible to *expand* the size of the 'b' (swap) partition in *suninstall*. If you want to *reduce* the size of the 'b' partition, you must use format running from MUNIX.

The first five steps in the *Pre-installation Procedures* section that follows help you with planning disk space for your system.

Sizing Disk Partitions

This section gives usage and recommendation for size of the following disk partitions.

All Systems:

/ (root)

> The default `root` filesystem size is approximately 8 megabytes. This should be sufficient for most applications.

swap

> The default `swap` partition size is approximately 16 megabytes. This is sufficient for general applications. Certain applications, such as use of a color monitor or having extra memory installed, will require more swap space.

> Some installations running non-memory intensive applications configure swap as twice the size of physical memory or 16 megabytes, whichever is greater.

> You can increase the size of the `swap` partition using *suninstall*, but it *cannot* be decreased. For more information, see the *Why Format?* section in Chapter 4 of this manual.

usr

> The `/usr` partition is automatically expanded by *suninstall* to accomodate the optional software selected from the Disk Form. The extra space is taken from the free hog partition.

> When *suninstall* automatically sizes the `/usr` partition stealing from the free hog partition, it results in an *extremely full* `/usr` partition. It is advised that you allow *suninstall* to size the partition, and then return to the Disk Form and add 8 megabytes or 10%, whichever is greater. This added space is necessary to allow room for configuring a kernel. If you plan on adding any custom or unbundled software to the `/usr` partition, you must also allocate the required space to accomodate the added software at this time. This is in addition to the 8 megabytes (or 10%) already allocated.

Recommended:

/var

> The `/var` directory tree is intended as a repository for files that vary in size. The following files are links to `/var` in SunOS 4.x: `/usr/adm`, `/usr/tmp`, `/usr/spool`. Database files on Yellow Pages servers are kept in `/var/yp`.

> As installed by default, `/var` is a plain directory in the `root` (`/`) filesystem. This design risks the possibility of rapidly filling the `root` filesystem during normal system operation. For this reason, it is suggested that you allocate a separate disk partition for `/var`. Size this partition on your prior experience with `/usr/adm`, `/usr/tmp`, and `/usr/spool` requirements in previous releases.

Servers:

`/export`

> `/export` is the default name on a server for the directory tree used to support diskless clients. It includes the following three primary subdirectories:

> □   `/export/exec`: This directories' partition is expanded by *suninstall* as optional software is selected for client systems of architectures different from that of the server itself. As in the case of `/usr`, it is recommended that you add additional space to the partition to accommodate kernel configuration and any additional software.
> Every server has a symbolic link (`/export/exec/`*ARCH*) to its own `/usr` partition.

> □   `/export/root`: This is the default name on a server for the directory used to hold diskless client `root` partitions. Allow a minimum of 2 megabytes for each diskless client.

> □   `/export/swap`: This is the default name on a server for the directory used to hold diskless client `swap` partitions. The suggested size for a client swap area is 16 megabytes. **This is only a suggestion,** requirements are system and application dependent." To estimate the size requirement for this partition, add together the swap sizes required for the diskless clients that are supported by the server and then add 6% more to this total to accommodate filesystem overhead.

> □   When installing a heterogeneous server, it is suggested that `/export/root` and `/export/swap` each be made a disk partition. Additionally, heterogeneous servers should have an `/export` partition which will hold the `/usr` files for the heterogeneous clients.

3.3. Determining Network Information

A *network* is a group of machines connected together so they can transfer information. Machines attached to the network are called *hosts*.

Network Classifications

Networks are typically categorized according to the physical distance that they cover. The local area network (LAN) covers a medium range and the wide area network (WAN) covers a wide range.

Sun Workstations use the Internet Protocol (IP) family for communication. Each workstation must have its own unique *IP address* in order to communicate. IP addresses are composed of a *network number* and a *host number* on the affiliated network.

IP network numbers are assigned by the DDN Network Information Center at SRI International, 333 Ravenswood Avenue, Menlo Park, California 94025. You, or your system administrator, can assign the hostnumbers on your network.

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Choosing a Network Number
Class

When you apply for an official network number, you will be asked what class of network number you need. The type of class you choose determines how much of the 32 bit IP address space you will have to assign addresses to your hosts.

IP addresses are expressed in the general form of four octets: *p.q.r.s*, for example: 192.9.101.22.

The possible network number classes are:

Class A
    Network numbers are one byte (8 bits) long.

Class B
    Network numbers are 2 bytes (16 bits) long.

Class C
    Network numbers are 3 bytes (24 bits) long.

There are quite a few more class C network numbers than class A network numbers, but the class C network numbers don't allow for many hosts. The original plan was that there would be few very large networks, a moderate number of medium-size networks, and a lot of small businesses with small networks. The following table illustrates the distinctions:

Table 3-4   *Network Classifications*

Class	Range of First Octet	Network	Host	Addresses Per Network
A	1 - 126	p	q.r.s	16777214
B	128 - 191	p.q	r.s	65534
C	192 - 223	p.q.r	s	254

In general, you are expected to choose the lowest class that you anticipate will provide you with enough addresses to handle your growth over the next few years. Organizations that have computers in many buildings probably need a class B address, assuming they are going to use subnetting. If an organization is going to require many separate network numbers, a class C address is advised. Class A networks are normally used only for large public networks and for a few very large corporate networks.

Required Network
Information for Installation

If you are installing several machines linked by a local network, part of the installation process includes basic network configuration. This section covers the required basic information regarding the configuration of your network. For more information, see the *System and Network Administration* manual.

Hardware configuration must be completed first: each machine must have Ethernet controller hardware, and be 'plugged in' via a transceiver to a common Ethernet cable. For Ethernet hardware configuration instructions see the *Hardware Installation* manual for your machine model.

Before proceeding with the installation, you must obtain basic information about your system's place in the network. Some of the information items, like machine name, are arbitrary, and others are determined by hardware.

Gathering Network Information

Prepare a sheet of paper with the following information. See *Appendix D* for an installation worksheet to help with this task.

The following items are requested during installation. It is recommended that you gather this information now.

□ Internet Address

The full Internet (IP) address for each workstation you are setting up whether it is a server or a client. A machine's IP address consists of the network number followed by the host number.

You obtain your network number from the DDN Network Informatihon Center (NIC) and assign host numbers uniquely to machines on your network. IP addresses for installed machines are located in the YP hosts map or the local /etc/hosts file. See the *System and Network Administration* manual for more information.

□ Ethernet Address

The hardware Ethernet address of each client machine if you are installing a server/clients configuration of machines. This address is a 6-byte hexadecimal value with bytes separated by colons. Your Ethernet address is displayed when you turn on your workstation.

□ Hostname or Machine Name

The hostname of each workstation you are installing. Hostnames are allowed up to 32 alpha/numeric characters, however, it is recommended that they be as brief as possible. All alphabetical characters in a hostname must be lower case. The hostname cannot begin with a digit. The use of special characters should be avoided. Each machine in a network is assigned a hostname.

On an installed machine, you can use the hostname command to determine the hostname.

□ Domain Name

If you are running yellow pages, you need to know the yellow pages domain name of the group of workstations you are installing.

A Yellow Pages domain is typically made up of a group of machines administered in common. The domainname command can be used to discover the domain name of installed machines. You must have a domain name if you plan to use the Yellow Pages.

Items of Note

□ You must have distribution tape sets for server and client architectures if you are installing a heterogeneous server. If you want this server to support Sun-2 Sun-3, and Sun-4 hardware, you must have Sun-2, Sun-3, and Sun-4 distribution tapes.

□ Clients of a different architecture can be added at a later date.

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□   On systems with more than one Ethernet interface, you must configure the second Ethernet interface manually.

□   The domain name is *always* necessary if you are running the yellow pages.

□   To obtain each client's machine hardware Ethernet address use the following steps:

1.   If the system is running, bring it down in the following way:

```
maddog% su
password: root password
# /etc/halt
```

2.   At the > prompt, type the following:

```
> kb
[ Return ]
```

3.   The system responds in the following way.

```
Self Test completed successfully.

Sun Workstation, model_type, keyboard_type
ROM Rev N, some_number_MBytes memory installed
Serial #some_number, Ethernet address xx:xx:xx:xx:xx:xx

>
```

Copy down the six-byte Ethernet address that is displayed. You will need it for the installation.

3.4. Pre-installation Issues

If you are going to install a heterogeneous server or are define multiple swap partitions in your installation, pay close attention to this section.

Installing a Heterogeneous Server

When you install a heterogeneous server, you will have to define an /export partition for the client architecture executable files that are different from that of the server architecture.   /export/exec*client_ARCH* is mounted by the clients as /usr. You define this partition in the Disk Form in *suninstall*. When software is selected later in the installation, *suninstall* expands the /export partition as needed.

If you do not define the /export partition in the Disk Form, *suninstall* will place /export/exec*client_ARCH* in the root partition. In this case, *suninstall* automatically expands the root partition to accomodate the heterogeneous client binaries. Changing the size of the root partition is not allowed during *suninstall* and the installation will fail.

Multiple Swap Partitions

If you are going to define multiple swap partitions during installation, be aware of the following critical issues:

□   **Do not use the 'a' partition of any disk for swap**

The label information for each disk is located on cylinder 0. Filesystem structures follow this rule and preserve the disk label when when they are created with newfs(8) or mkfs(8). Partitions designated for swap, however, do not preserve the contents of their first cylinder. For this reason, if a swap partition is designated to begin at cylinder 0 (typically the 'a' partition), the disk label information is destroyed. You can prevent this in one of the following ways:

1)   Use the 'a' partition of each disk for a filesystem and designate another partition for swap.

2)   Define partition 'a' as a single cylinder that is an unused partition (starting cylinder 0, length of 1 cylinder). Then start the swap partition beginning at cylinder 1.

□   **Defining multiple swap partitions to the kernel**

To build a 4.x kernel with its root partition on partition *xy0a* and swap partitions on *xy0b* and *xy1b*, use the following config line:

```
config vmunix root on xy0a swap on xy0b swap on xy1b
```

For more in-depth information on configuring multiple swap partitions and files, see the *System and Network Administration* manual and the swapon(8) manual page.

3.5. Pre-installation Procedures

If you are installing 4.x on a system running 3.x, the following list of procedures prepare you for starting the installation. These steps help return your environment to the state it was in prior to installation:

These procedures are applicable *only* if you are re-installing an existing system.

1.   Obtain hardcopy of the following:

□   Output from mount -p. This serves as a guide for customizing /etc/fstab after installation is complete.

□   Output from dkinfo command as a *starting point* in planning disk layout. dkinfo output shows existing disk layout. Due to the new filesystem in 4.x, you will not be able to use this information directly.

□   List of clients and their IP addresses which are mounting their root and swap, or booting from this server.

□   Amount of swap space for each client mounting its swap from this server.

□   Architecture for each client mounting its root or booting from this server.

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     □   Current kernel configuration files for each client for when the kernels are built after installation.

A GENERIC kernel is provided for each workstation architecture. These kernels include support for all Sun peripherals and for all kernel services. As a result, the GENERIC kernels are larger than necessary for any particular workstation, resulting in decreased workstation performance. It is highly recommended that you either use a small pre-configured kernel or that you configure a custom kernel to support only those devices and services required for your workstation. See the *Post-installation Procedures* chapter of this manual for more information on small pre-configured kernels and custom kernel configuration.

     □   Copy of old `/etc/fstab`, `/etc/crontab`, and `/etc/passwd` for integration into new files created by the installation.

     □   The name and IP address of the machine being upgraded.

     □   The name and IP address of the second Ethernet interface if applicable.

2. Fix YP master `passwd` map. Home directories in 4.x changed from `/usr/servername/username` to `/home/servername/username`, though this can vary by site.

3. Make a list of all the mount points and links that have been added to `/` and `/usr`. This allows you to re-create them after the installation.

4. **Optional:** Copy files from `/usr/local`, `/usr/spool/mail`, and other locally created directories under `/usr` to tape or another disk. This facilitates re-customization after installation.

   Note: You have the option of restoring the environment from dumps to tape instead of performing this step, but this may require more work.

5. **Optional:** Save copies of `/etc/passwd`, `/etc/licenses`, `/etc/printcap`, `/usr/lib/aliases` (3.x) and `/etc/aliases` (4.x), and other customized files.

6. Halt clients.

7. Run `fsck -p`. This program cleans up the filesystem and assures its integrity.

8. Perform full dumps of filesystems that will be changed by the installation. For example **but not limited to,** `/`, `/usr`, client `root`.

3.6. The Abort Sequence

During the course of an installation, you may want to terminate a procedure. It is always good to know about an escape mechanism for a situation before it arises. For this reason, the *abort sequences* are listed below. Familiarize yourself with the one that pertains to your environment. Your keyboard type is displayed when you power up your system.

To return to the PROM monitor at any time during installation, you can type what we call an *abort sequence* on your keyboard. The abort sequence usually consists of two keys typed in sequence; the first key is **held down** while the second key is typed. The keys vary with Sun Workstation model and keyboard type:

□   If your Sun-1 keyboard has a ⌈SET-UP⌋ key, the abort sequence is ⌈SET-UP-a⌋ (hold down the ⌈SET-UP⌋ key while typing 'a').

□   If your Sun-1 has an ⌈ERASE-EOF⌋ key, the abort sequence is ⌈ERASE-EOF-a⌋ (hold down the ⌈ERASE-EOF⌋ key while typing 'a').

□   On a Type 2 keyboard, type ⌈L1-a⌋ (hold down the ⌈L1⌋ key in the upper-most left-hand corner while typing 'a').

□   On a Type 3 keyboard, type ⌈L1-a⌋ (This is the same as the Sun-2 keyboard.)

□   On a Type 4 keyboard, type ⌈L1-a⌋

□   On a standard terminal (if it is the console) the ⌈BREAK⌋ key generates an abort.

Pressing ⌈CTRL-C⌋ stops the installation and returns to the miniroot. The installation can then be restarted without having to reload the miniroot.

4

Beginning the Installation

Beginning the Installation

4.1. Introduction

This section covers the following procedures. These procedures are the first steps of the installation. After you have completed the following procedures, you will be ready to start *suninstall*.

1. Loading the bootstrap program.

2. Copying MUNIX.

3. Booting MUNIX.

4. Formatting the disk.

5. Copying the miniroot.

6. Booting the miniroot.

The following *terminology* section explains each of these programs and what you accomplish by running them.

4.2. Terminology

□ bootstrap program

Is a program that gives the system enough intelligence to find, load, and execute a program. You must load the bootstrap program first in order to load MUNIX, standalone copy, or vmunix.

□ format

Is a program that allows you to format, label, repair, and analyze disks on your system.

□ miniroot

Is a small UNIX kernel and filesystem that when in place, allows you to use basic filesystem commands and install the comprehensive UNIX using *suninstall*.

□ Copying the miniroot

When you *copy the miniroot*, you copy a reduced size UNIX filesystem from tape to the swap area of the disk.

□   Booting the miniroot

When you *boot the miniroot*, you boot its vmunix. Once vmunix is running, you can run *suninstall*.

□   Swapping an area on the disk that SunOS uses as a scratch pad.

□   MUNIX

MUNIX is a small version of the operating system that is loaded from tape or over the network directly into memory rather than onto disk. It is used when major disk operations such as formatting the disk or changing the size of the root or swap partitions.

4.3. Loading the Bootstrap Program

This section covers mounting the distribution tape on your tape drive, and using the PROM Monitor to load the bootstrap program from tape. As mentioned above, the bootstrap program is used to load other programs from tape into memory.

The steps for this procedure are tailored for a basic system structure. Read through this entire section before starting; this precaution allows you to determine if these steps match your system needs.

The Distribution Tape

The software needed to load the operating system is contained on a set of half-inch magnetic tape reels or quarter-inch tape cartridges. The number of tapes in the set varies with each release. See the READ THIS FIRST document which accompanies the tapes for a complete listing of the files on the distribution tape.

To Mount the Tape:

If you are re-installing an existing system, you need to shut down the machine to single user, do a full dump of all filesystems, and then halt the system. To halt the system, become super-user and type the command: /etc/halt. Remember to halt all diskless clients first if the system is a server.

A full dump of all filesystems is strongly recommended before you halt the system.

Use the following steps to mount the distribution tape.

Step 1: *Turning on the Workstation*

Turn on the Sun Workstation you are installing.

The PROM monitor displays its power-up banner, something like the example below. The machine begins to auto-boot.

```
Sun Workstation, model_type, keyboard_type
ROM Rev N, some_number_MBytes memory installed
Serial #some_number, Ethernet address xx:xx:xx:xx:xx:xx
Auto-boot in progress . . .
(L1-a)
(or appropriate abort sequence)
Abort at some_address
>
```

See *Chapter 3* in this manual for the appropriate abort sequence for your system.

Step 2: Stopping Auto-boot

Stop the auto-boot immediately by typing the appropriate abort sequence for your machine (abort sequences are described in the previous chapter). When you abort the auto-boot, you return control to the monitor, and it displays its prompt (>).

Step 3: Mounting the Tape

Mount tape 1 of your full installation tape set.

Before mounting the tape, check your tape drive hardware manual. With some tape drives, if you insert the tape incorrectly, it becomes jammed and is difficult to remove.

If you have any questions about your tape drive, see the subsystems chapter in the *Hardware Installation* manual for your machine.

Remember to substitute the proper device abbreviation for your tape controller for *tape*. The following table provides a list of possible tape device abbreviations.

Table 4-1   *Tape Controller Abbreviations*

Abbreviation	*Tape Controller*
ar	Archive 1/4"
st	SCSI
mt	Tapemaster 1/2"
xt	Xylogics 472 1/2"

For more information on device abbreviations or conventions, see the *SunOS Device Names* section in Chapter 2.

To Load the Bootstrap Program:

To install SunOS using a local tape drive, boot the bootstrap program from the tape. The following example uses the *st0* tape device.

```
>b st0(0,0,0)
```

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When you type the command, the monitor echoes it back to you. If you load the boot program from *st*, you receive the following display:

```
>b st(0,0,0)
Boot: st(0,0,0)
Boot:
```

4.4. Formatting the Disk

Why Format?

`format` is the program you run to format, label, repair, and analyze your disk. In particular, it is necessary to run `format` if your target system disk has been corrupted or if it was purchased from a third party vendor. In both cases, you need to format and label the drive before installing SunOS.

If your disk was purchased from Sun, it was formatted and labelled at the factory. However, it is still recommended that you reformat the entire drive as it insures that any head movement that occurred during shipping will not affect the performance of the new disk.

If you want to change the `root` partition, or decrease the size of the `swap` partition, you need to create a partition table and relabel the disk using `format` before you copy the miniroot. Other partition sizes can be changed in *suninstall*. For information on how to create a partition table, see the *System and Network Administration* manual.

If you are re-installing a system that is already running SunOS, you do not need to run `format`.

Follow the procedures in this section with extreme care. Using `format` to restructure your disk partitions, in certain cases, can cause all existing data to be erased. Before proceeding, complete the following steps:

1. Make *at least one* backup of the disk you intend to format if the disk was previously in use.

2. Make sure there is a minimum of four megabytes (4 Mb) of memory. This is the amount required for `MUNIX`.

What is `MUNIX`?

`MUNIX` is a version of the SunOS that can be loaded from tape and resides entirely in virtual memory. It is not loaded or swapped from a disk and therefore is a useful tool if your local system disk is unformatted, corrupted, or requires reformatting or labeling.

If you do not need to format your disk, you can go directly to the *Copying the Miniroot* section.

MUNIX has the following optional argument for creating entries on the disk:

The [**-a**] option
allows you to define where `root` and `swap` reside. If you do not specify this argument, the Sun default is used.

If you need to modify and save files under MUNIX, you must perform the additional step of saving the files to a scratch tape before exiting MUNIX. This is required due to the fact that MUNIX stores all its "files" in volatile storage (i.e. ramdisk).

Copying MUNIX and Running `format`

The following example shows how to copy MUNIX and run `format` to format your disk.

Example Variables

The following variables are used in the following example. All the variables are displayed in italics. When performing this procedure on your own system, substitute the proper device names for your environment.

- Installing *xy0* (Xylogics 451) as your system disk.
- The target disk is a *Fujitsu 2333*
- Loading from a 1/4" tape, *st* device type.
- You have mounted the tape and loaded the bootstrap program. See the *Loading the Bootstrap Program* section for more information.

Step 1: Copying MUNIX

To copy MUNIX, use the following method:

```
Boot:st(0,0,4)
Size:some number + some number bytes
SunOS Release 4.0.3 (MUNIX)#1: Thurs Mar 2 20:54:17 PST 1989
Copyright(c) 1989 Sun Microsystems, Inc.
mem = 4096K (0X400000)
avail mem = 3186688
Ethernet address = 8:0:20:07a:55
      .
       .
   disk and tape drive information
       .
       .
   ethernet controller information
        .
       .
init ram disk from device (st%d[a-h] sd%d[a-h] ft%d[a-h]):st0
rd: reading 176,8192 byte blocks....................................
WARNING: clock gained 7 days - CHECK AND RESET THE DATE!
root on rd0a fstype 4.2
Tape file number? 5
swap on ns0a fstype spec size 1216K
dump on ns0a fstype spec
#
```

spec is a special partition type used for the swap partition.

4.2 is a UNIX filesystem structure type.

rd0a is a notation for ram disk.

ns0a is a notation meaning 'no swap'.

st0 is for either QIC-24 or QIC-11 tape formats.

st1 is for the second tape drive.

st2 is for the third tape drive.

st3 is for the fourth tape drive.

Step 2: Starting format

Start `format` and select the disk to format in the following way:

```
# format
Searching for disks...done


   AVAILABLE DISK SELECTIONS:
        0. xy0 at xyc0 slave 0
           xy0: <Fujitsu-M2333 cyl 821 alt 2 hd 10 sec 67>
Specify disk (enter its number): 0
selecting xy0 <Fujitsu-M2333> [disk formatted,
         defect list found]

Format Menu:
        disk         - select a disk
        type         - select (define) a disk type
        partition    - select (define) a partition table
        current      - describe the current disk
        format       - format the disk
        repair       - repair a defective sector
        show         - show a disk address
        label        - label the disk
        analyze      - surface analysis
        defect       - defect list management
        backup       - search for backup labels
        quit
format>
```

The displayed DISK SELECTIONS reflect those disks installed on your system. Choose the disk that you want to format.

If the "AVAILABLE DISK SELECTIONS" field does not display one or more of the disks physically installed on your system, make the disk device in /dev in the following way.

```
# cd /dev
# MAKEDEV device
```

See *SunOS Device Names* in Chapter 2 of this manual for a list of possible device names.

The screen should respond that the disk is formatted and a defect list is present. Disks from Sun should ALWAYS give you this response. If you do not see this message, something is wrong and you should immediately exit format and use diagnostics to locate the problem.

Step 3: Comparing the Defect List

Compare the defect list with the hard copy of the manufacturer's defect list. It should contain all the defects on the hard copy list. The manufacturer's defect list is typically paperwork shipped with the drive. If any of the defects are missing, use the add command to add them to the defect list before proceeding.

To print a working copy of the defect list and transfer it to a file, use the following method.

```
format> defect
      <CR>
      <CR>
DEFECT MENU:

      restore   - set working list = current list
      original  - extract manufacturer's list from disk
      extract   - extract working list from disk
      add       - add defects to working list
      delete    - delete a defect from working list
      print     - display working list
      dump      - dump working list to file
      load      - load working list from f
      commit    - set current list = working list
      quit
defect> print
      num      cyl     hd      bfi     len     sec
      1        11      6    31858     4
      2        21      4    14820     4
      3       106      7    27403     4
                    .
                    .
                    .
      41      811      0    27738     6
      42      820      4     4502     3
total of 42 defects.
defect> dump
Enter name of defect file: 2333_defs.033537
defect file updated, total of 42 defects.
defect> q
format> q
```

If your disk was purchased from a third-party or is missing its defect list, you can use the [extract] option of the defect subcommand within format to examine the disk and build the defect list based on the defects that have been repaired. If you have a third-party disk that's brand new, you can use the [original] option of the defect subcommand within format to read the manufacturer's defect list that comes with all SMD drives. For more information on these commands, see the *System and Network Administration* manual.

Step 4: Saving the Defect List   Save the defect list file using the tar utility.

Mount a writable scratch tape to which to save the defect list. DO NOT try to save the defect list on the boot tape. If you save the defect list with the boot tape still mounted, you will destroy the boot tape.

The defect list is saved as a precaution in case it is destroyed at some time in the future. This saves you from retyping it manually.

```
*** Load a scratch tape before entering ***
*** the next command.                     ***

# tar cvf /dev/rst0 2333_defs.033537
```

You may need to make the tape device, especially if you are using 1/2" tape device. To do this, use the following method.

```
# cd /dev
# MAKEDEV tape
```

See *SunOS Device Names* in Chapter 2 for a list of possible tape devices.

The defect file name in the example '2333_defs.033537' reflects the model of the disk (Fujitsu 2333) and the serial number of the disk (033537). This is a recommended procedure since it allows you to easily match the defect file with the correct disk. If the serial number of your disk is not readily available, you can use another unique identifier.

Step 5: Starting format

Start the `format` program.

If you want to change the size of the `root` or `swap` filesystems, it is recommended that you do it at this time. You cannot change the size of the `root` filesystem ("a") in *suninstall*. You can increase the size of the `swap` filesystem ("b") in *suninstall* but you cannot decrease it.

```
# format
Searching for disks...done
    <CR>
    <CR>
AVAILABLE DISK SELECTION:
    0. xd0 at xdc0 slave 0
Specify disk (enter its number): 0
selecting xy0 <type unknown>

Format Menu:
    disk        - select a disk
    type        - select (define) a disk type
    partition   - select (define) a partition table
    current     - describe the current disk
    format      - format the disk
    repair      - repair a defective sector
    show        - show a disk address
    label       - label the disk
    analyze     - surface analysis
    defect      - defect list management
    backup      - search for backup labels
    quit

format> type
    0. Fujitsu-2351 Eagle
    1. Fujitsu-M2333
    2. Fujitsu-2361 Eagle
    3. CMD EMD 9720
    4. Other
Specify disk type (enter its number): 1
selecting xd0 <Fujitsu-M2333>
```

Step 6: Running format

Run `format`.

```
format> format
Ready to format. Formatting cannot be interrupted
and takes a long while. Continue? y
Beginning format. The current time is
    Wed Sep  2 16:58:05 1987

Formatting...done

Verifying media...
    pass 0 - pattern = 0xc6dec6de
    pass 1 - pattern = 0x6db6db6d
Total of 0 defective blocks repaired.
```

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The verification of the format can take up to one hour depending on the architecture of your system. It is recommended that you allow this analysis to complete to verify the integrity of the media.

Once the verification is complete, the disk is formatted. The default values for the bounds of the `format` command cause the entire drive to be reformatted. Also, by leaving the surface analysis parameters in their default state, 2 passes of analysis are automatically run on the disk when `format` completes.

Step 8: Relabelling the Disk

Relabel the disk using the `label` command.

The disk label describes the sizes and boundaries of the disk's partitions. If you are satisfied with the default partitioning of the disk, you can continue with the next step of the installation in the following section: *Copying the Miniroot.*

```
format> label
Ready to label disk, continue? y
format> q
```

If any defects are found during surface analysis, they are automatically repaired if possible. If the automatic repair does not succeed, you need to repair them manually using the 'repair' menu option in the `format` menu. See the *System and Network Administration* manual for more information.

If you want to change the partitioning of the disk, use the *partition* menu option in the `format` main menu to create a table. After creating a partition table, make sure to run the `label` command afterwards to label the *current disk*. For more information on how to create a partition table, see the *System and Network Administration* manual.

4.5. Copying the Miniroot

How to Copy the Miniroot to Disk

This example shows how to copy the miniroot onto disk from a local tape drive.

If you are installing a SPARCsystem 300 or a Sun-3/80, your internal disk device is *sd6.*

Example Variables

The following variables are used in the following example:

□   Local tape drive.

□   *st0* is the tape device. See, *SunOS Device Names* in Chapter 2 of this manual for information on device name selections.

□   *sd0* is the disk device. See, *SunOS Device Names* in Chapter 2 of this manual for information on device name selections.

Step 1: Halting the System

Halt your system using the following method:

```
#  /etc/halt
```

*Step 2: Booting the copy
Program*

Boot the standalone copy program from tape using the following method.

```
>b  st0(0,0,0)
Boot:st0(0,0,0)
Boot:st(0,0,2)
Size:some_number+some_number+some_number bytes
Standalone Copy
```

The '2' in (0,0,2) is the file on the tape that is being copied.

Step 3: Copying the Miniroot

Use the copy program to copy the miniroot from the distribution tape to your
disk.

Refer to the following table for the proper number sequence for the **To: disk**
command line:

Disk Device	To: disk Command Line
sd0	sd(,0,1)
sd1	sd(,1,1)
sd2	sd(,8,1)
sd3	sd(,9,1)
sd4	sd(,10,1)
sd6	sd(,18,1)

```
From:st0(0,0,3)
To:sd0(0,0,1)
```

The '3' in (0,0,3) is the file on the tape that is being copied.

The '1' in (0,0,1) is the partition on the disk where the file is being copied to.

At the end of the copy, the `copy` program returns control to the bootstrap program:

```
Copy completed   some_number bytes
Boot:
```

4.6. Booting the Miniroot

Now that there is an operable miniroot on the disk, the bootstrap program can boot the miniroot, vmunix, from the disk.

In the following example, *sd0* is the disk device being installed.

If you are installing a SPARCsystem 300 or a Sun-3/80, your internal disk device is *sd6*. See, *SunOS Device Names* in Chapter 2 for a selection of possible device names.

Boot Miniroot Example:

The following example shows you how to boot vmunix using the boot process.

Booting the miniroot

Refer to the following table for the proper sequence that relates to your disk device:

Disk Device	Command Line Sequence
sd0	sd(,0,1)
sd1	sd(,1,1)
sd2	sd(,8,1)
sd3	sd(,9,1)
sd4	sd(,10,1)
sd6	sd(,18,1)

```
Boot:sd0(0,0,1)vmunix
```

You can specify the `-a` argument after **vmunix** if you want to specify the location of the `root` and `swap` partitions. Without the use of the `-a` argument, the Sun standard default is used.

```
Boot:  sd0(0,0,1)vmunix
Size:  some_number+some_number+some_number bytes
SunOS Release 4.0.3 (MUNIX)#1: Thurs Mar 2 20:54:17 PST 1989
Copyright(c) 1989 by Sun Microsystems, Inc.
mem=4096k (0X400000)
avail mem = 3186688
Ethernet address = 8:0:20:0:7a:55

        .

        .

        disk and tape drive information

        .

        .

        ethernet controller information
```

The '1' in (0,0,1) means booting from partition 1, which is actually the second partition or swap partition.

Designating the root
Filesystem

When the miniroot is invoked, it displays some messages about the configuration of the system on which it is running, and displays the root filesystem location and type.

```
root on rd0a fstype 4.2
```
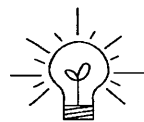
4.2 is a UNIX filesystem structure type. In SunOS 4.0, this is the only filesystem type available for the root filesystem.

Designating the Swap Partition

You will receive the following display that tells you the location of the swap filesystem and its type.

```
swap on ns0a fstype spec size 1216k
dump on ns0a fstype spec
```
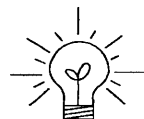
spec is a special type of partition used for the swap space. It does not have the structure of the partition used for the 4.2 filesystem and allows for more flexibility.

Now you are ready to run *suninstall*. Go to the next chapter for a complete explanation of *suninstall*. Read the next chapter carefully before you continue with the installation.

5

How *suninstall* Works

How *suninstall* Works

5.1. Introduction

This chapter introduces the features of *suninstall* and provides an explanation of it's menus and menu options.

This chapter **IS NOT** meant to be used as a walkthrough example. For walkthrough examples, see the next chapter.

This chapter is meant *only* as an explanation of the `suninstall` program. It covers the following procedures and information:

1. Understanding *suninstall* and its structure.

2. How to start *suninstall*.

3. How to enter your terminal type.

4. How to enter the correct time zone.

5. An explanation of the following `suninstall` menus.

   □ Main Menu

   □ Host Form

   □ Disk Form

   □ Software Form

   □ Client Form

5.2. What is *suninstall*?

suninstall is the replacement for *Setup*, the Sun Microsystems system installation tool for 3.x releases. *suninstall* is a tool that helps you install and maintain the 4.x Operating System on Sun Workstations. The new *suninstall* features include the following:

□ re-entrance

   You no longer need to re-enter all the information if you exit from the program. By restarting *suninstall*, the information saved before exiting from the program is displayed for your review and editing.

□   Installation-interrupt

If for any reason you need to stop the installation or change the information you entered, you can type (CTRL-C) to abort *suninstall* and then restart it. The information entered is retained.

□   Mixed types of distribution tapes.

suninstall allows you to install SunOS from any combination of distribution tapes. However, when installing a server, you cannot mix local and remote drives. For example, you can install a heterogeneous server with a set of 1/2" Sun-2 tapes, a set of 1/4" Sun-3 tapes and a set of 1/2" Sun-4 tapes. This makes the installation procedure more flexible and convenient.

□   Dataless configuration

suninstall can build a standalone, server, or dataless configuration. See, Section 2.2 for definitions of these system configurations.

□   Mixed architectures

Now you can install as many architecture types as disk space allows. In SunOS 4.x, a heterogeneous server can support Sun-2, Sun-3, Sun-3x, Sun-4, and Sun-4c if there is enough disk space available for the executables of all these architectures.

□   Standalone/server conversion

You can now turn a 4.x standalone system into a 4.x server providing there is adequate disk space. You can also turn a server into a standalone without taking down or rebuilding the system.

5.3. *suninstall* Structure

suninstall can be divided into two stages:

1.   information gathering

2.   installation

suninstall displays five different information gathering forms. Each form requests data pertaining to a specific aspect of system configuration.

When you start *suninstall* , it prompts you for the local time zone name and your system terminal type. The *suninstall* Main Menu is then displayed and you are in the information gathering stage of the installation.

It is important that you edit the forms in the order in which they are listed in the main menu. Interdependencies exist between forms; information from the forms build on each other. *suninstall* will not allow you to fill out certain forms without a previous form being filled out.

When all of the information needed by *suninstall* is entered, select [start the installation], from the main menu. This begins the automated portion of the installation.

On-line Forms

suninstall's on-line forms are similar to questionnaires. Each form contains items that ask for a particular types of information. There are two types of information:

□ **Text**

Some menu items prompt you for information that requires you to type in the response.

□ **Choice**

Some menu items present a list of choices and ask you to select one element from the list.

Each form consists of three regions:

□ The top region consists of the title of the form and help guides for Text items.

□ The middle region consists of the prompts.

□ The bottom region consists of the message Are you finished with this form? [y/n].

Depending on the selection you choose, you either exit the form or revisit choice items on it.

5.4. Starting *suninstall*

To start *suninstall*, type **suninstall** on the command line. The *suninstall* program is invoked. Verify that you wish to continue with the installation, and you are prompted for your local time zone.

There is no default for the time zone name. For a list of time zone name options, see *Appendix B* of this manual.

```
# suninstall

Welcome to SunInstall

You are about to install a new version of the SunOS on
your system.  If this is not a first-time installation
and you are upgrading from a previous version of the
operating system, then it is strongly recommended that
you perform a full backup of each of your filesystems
which contain user data.  Be advised that as this program
runs, it will re-label each of the disk drives and it will
initialize a complete new set of filesystems.  After this
installation process is complete, you may restore your
user data from backup copies.

Do you wish to continue with the installation [y/n]? y


Enter the local time zone name:
>>  US/Pacific
```

US/Pacific is the time zone name for Pacific Standard time in the United States of America.

Once you have entered the correct time zone name, the screen displays the date and time. You are prompted to verify that the displayed date and time are correct. You can respond in one of the following ways:

□   y- means that the displayed date and time is correct.

□   n- means that is not correct. If the date and time is not correct, you must fill in the date and time based on the prompt format which is explained below.

Date/Time Format

The following two examples explain the date/time format.

1.   dd/mm/yy

     dd stands for day of the month, mm stands for the month, yy stand for the year.

2.   hh:mm:ss am/pm

     hh stands for hour, mm stands for minutes, ss stands for seconds, and am/pm stands for morning or afternoon.

     Once corrected, the system displays the corrected date and time. If this is satisfactory, type y. If not, type n and repeat the procedure.

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The following is an example of entering the correct date and time:

```
Enter the local time zone name:
>> US/Pacific


Is this the correct date and time [y/n]:
>> Fri Jul 1 21:30:11 PST 1988


>> n


Enter the current date and local time.
The date may be in one of the following formats:
        dd/mm/yy
        dd/mm/yyy
        dd.mm.yyy
        dd-mm-yyy
        dd-mm-yy,
        month dd, yyy
        dd month yyy
and the time may be in one of the following formats:
        hh am/pm
        hh:mm am/pm
        hh.mm
        hh:mm am/pm
        hh.mm
        hh:mm:ss am/pm
        hh:mm:ss
        hh.mm.ss am/pm
        hh.mm.ss
>> 03/09/88 12:20:30


Is this the correct date/time [y/n]:
    Wed Mar 9 12:20:30 PST 1988


>> y
```

5.5. Entering Your Terminal Type

After you have entered the correct time zone, or the correct date and time, you are prompted for your terminal type. A list of possible selections is displayed. If you select **Other**, you are prompted to type in your terminal type.

The name of the terminal must correspond to a name in the TERMCAP database. To find a valid entry, do the following:

```
% cat /etc/termcap

    regent        ADDS Regent series
    vt100         Digital Equipment VT100
    vt50          Digital Equipment VT50
    vt132         Digital Equipment VT132
    h1000         Hazeltine 1000
    h1500         Hazeltine 1500
    h2000         Hazeltine 2000
    h19-a         Heathkit (Zenith) 19
    hp2645        Hewlett Packard 2645
    hp2621        Hewlett Packard 2621
    hp2626        Hewlett Packard 2626
    ibm3101       IBM 3101
    adm3a         Lear Siegler ADM 3A
    adm31         Lear Siegler ADM 31
    adm3          Lear Siegler ADM 3
    adm20         Lear Siegler ADM 20
    adm42         Lear Siegler ADM 42
    adm5          Lear Siegler ADM 5
    pe550         Perkin Elmer Bantam 550
    tek4012       Tektronix 4012
    tvi925        Televideo 925
    tvi912        Televideo 912
    tvi950        Televideo 950
    wyse-50       Wyse 50
```

The following example shows how to set the terminal type.

```
Select your terminal type:
    1) Televideo 925
    2) Wyse Model 50
    3) Sun Workstation
    4) Other
>> 3
```

5.6. Using the Main Menu

The *Main Menu* is displayed after you enter the correct time zone name, date/time, and terminal type. This marks the beginning of the information gathering stage of *suninstall*. Below is an illustration of the main menu followed by explanations of each of the menu items.

```
              Sun Microsystems System Installation Tool

                            Main Menu

     On-line help information prints summary of cursor usage
              + means the data file(s) exist(s)

                    assign host information

                    assign disk information

                    assign software information

                    assign client information

                    on-line help information

                    start the installation

                    exit from suninstall



     [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

MENU ITEMS	DESCRIPTION
assign host information	Gather system specific information. The Host Form is displayed if you select this choice. A "+" is displayed in front of this item if the data file(s) required by this form already exist.
assign disk information	Gather partition sizes for attached disk device(s). The Disk Form is displayed if you select this choice. A "+" is displayed in front of this item if the data file(s) required by this form already exists. This occurs when you return to the form. If you exit the form without defining all attached disks, the "+" is not displayed.
	Additional external disk devices may be switched off if you want to exclude them from *suninstall*.

assign software information

List software categories to be extracted for the architecture type(s) specified. If you are installing a dataless configuration, you are not allowed to select any software since the system is sharing /usr with the server. Only required software categories are loaded in this case. A "+" is displayed in front of this item if the data file(s) required by this form already exist.

assign client information

Gather client information. The Client form is displayed if you select this choice.

If you are NOT installing a server, you do NOT edit this form. Type (Ctrl-F) to skip this form.

A "+" is displayed in front of this item if the data file(s) required by the form already exist.

start the installation

Start installation.

on-line help information

Produces the following help screen:

```
ON-LINE HELP


           KEYS                        PURPOSE

         CONTROL F                 move cursor forward
         CONTROL N                 move cursor forward
         CONTROL B                 move cursor backward
         CONTROL P                 move cursor backward
         CONTROL U                 erase word
         <DELETE>                  erase one character
         CONTROL C                 abort
         <RETURN>                  end of input string
         x or X                    select a choice
         <SPACE>                   next choice


  Are you finished with this form [y/n] ?
```

exit suninstall

Leave the *suninstall* program.

When you exit from *suninstall*, it saves a copy of everything you have completed up to that point. Later, if you re-invoke *suninstall*, you continue where you left off and do not have to re-enter information you input previously.

If you reboot after you exit *suninstall*, all suninstall input is lost. A copy of your input is only retained as long as you remain in the miniroot.

5.7. Using the Host Form

Below is an illustration of the Host form followed by explanations of the listed prompts.

This should be the first form you fill out. The form below illustrates a *dataless* host. A * has been inserted in this illustration to show the prompts that are only displayed when a dataless configuration is selected. A ** has been inserted in this illustration to show the prompt that is only displayed when you have a yp type.

The [upgrade] option on the Host Form is not supported in this release. To perform a system upgrade, you must use the SunOS 4.0.3 Upgrade tape. For more information, see the *Performing a System Upgrade* chapter in this manual.

```
HOST FORM        [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------------
Workstation Information :
     Name :
     Type :   [standalone]   [server]   [dataless]
   * Server Name :
   * Server Internet Address :
   * Path of the executables on server:
   * Path of the sub-arch dependent execs on server:

Network Information :
     Ethernet Interface :   [none]  [interface0]   [interface1]
     Internet Address   :   192.9.200.1
     YP Type            :   [none]  [master]  [slave]   [client]
  ** Domain name        :

Misc Information :
     Reboot after completed :   [y]   [n]



Are you finished with this form [y/n] ?
     [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

MENU ITEMS	DESCRIPTION
Name	Hostname of the system. Each machine on a network has a unique hostname that is user defined. For more information on hostnames, see the *Determining Network Information* section in *Chapter 3*.
Type	See *Chapter 2* in this manual for if you are not familiar with the differences between listed types.
Server Name	Name of the system that is serving /usr to this system. This prompt is displayed only when installing a DATALESS configuration.
Server Internet Address	Internet address of the system that is serving /usr to the dataless system. For information on Internet addresses, see the *Determining Network Information* section in *Chapter 3*.
Path of the executables on server	For DATALESS configurations, this is the path for the executables on the server.
Path of the sub-arch dependent executables on server	This path name is unique for a DATALESS configuration on the Host Form. It is the path for the sub-arch dependent executables on the server. For more information, see the *Server Support of Sub-architectures* section of Chapter 2 in this manual.

Select [*none*] if you do not want the system to be on a network. If you want the system to be on a network, you should go through all the Ethernet interfaces and assign the appropriate Internet addresses and name for each interface. For information on Ethernet addresses, see the *Determining Network Information* section in *Chapter 3*.

Internet Address

This is the internet address of the first Ethernet interface. The displayed internet address is a *default* and should be replaced with your system internet address. **Do not use the displayed default address.** It can cause severe problems when you hook up to the Internet. For information on how to obtain an Internet address, see the *Determining Network Information* section in *Chapter 3*.

YP Type

YP master server, yp slave server, yp client or not using yp.

Domain name

YP domain name. For more information on domain names, see the *Determining Network Information* section in *Chapter 3*.

Reboot after completed

y reboots after installation is completed.   n leaves in the miniroot environment after installation is completed.

If you want to install a pre-configured kernel after suninstall is complete, select [n] in this field. For information on pre-configured kernels, see the *Post-installation Procedures* chapter of this manual.

Are you finished with this form [y/n] ?

Entering y saves the input information and returns you to the Main Menu. Entering n returns you to the top of the form.

5.8. Using the Disk Form

Below is an illustration of the Disk form, followed by explanations of the listed prompts.

During the installation, suninstall reports "ALL YOUR DISKS WILL BE RELABELED". This is misleading. *ONLY* the disks on which the filesystems are being installed will be relabeled.

If you select [edit default] or [edit existing] from the Disk Form, *suninstall* will call format to rewrite the existing label. If the existing label contains partitions that are not in ascending order (a before b, etc), the partitions will be resorted and the existing data overwritten. To avoid losing all previous information, back up all filesystems before beginning the installation.

Also, if you select [editexisting] for the Disk Label, you will have to input the path names for root, swap, home, etc. *suninstall* gives the sizes of each of these partitions, but not the path names.

[Mbytes] is the preferred selection in the Display Unit category in the Disk Form.

If you are installing a heterogeneous server, you must select and label a /export/exec partition using this form. See the *Remote Installation: Server* in Chapter 6 of this manual for an example.

```
DISK FORM        [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------
Attached Disk Devices :
    [disk0] [disk ]      [disk ].......


Disk Label:   [edit default]  [edit existing]   [use data file]
Free Hog Disk Partition :  [d]  [e]  [f]  [g]  x[h]
Display Unit           :  [Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]


PARTITION START_CYL BLOCKS     SIZE      MOUNT PT               PRESERVE(Y/N)
=========================================================================
    a        0        16048     8        /                         n
    b       59        33456     17
    c        0       276896     141
    d        0           0      0
    e        0           0      0
    f        0           0      0
    g      570        87856     44        /usr                      n
    h        0           0      0


Ok to use this partition table [y/n]  ?
Are you finished with this form [y/n]  ?
    [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

MENU ITEMS

DESCRIPTION

Attached Disk Devices

Attached disk devices are displayed in this area.

Disk Label

[edit default]= uses a default partition table.
[edit existing]= uses the existing disk label.
[use data file]= uses information saved from the previous edit of the disk form.

Creating or changing disk labels should be done with caution. If the disk label needs to be changed after the operating system is installed, all of the information on the disk should be saved *before* modifying the label. Changing a hard partition's size, or offset, effectively destroys all of the information contained on that partition, and possibly other partitions as well.

If changes are required, the first three partitions on the first disk must be labeled using the format program. **This is necessary for the first disk (disk0) only.** As the root and swap partitions reside on the first disk (disk0), the remaining disks (disk1,...) are available for other purposes and therefore not affected by this restriction. The sizes of partitions "a" and "b" can be changed in *suninstall* on all disks *other* than disk0.

> Partition a: / root partition for the server
> Partition b: swap partition
> Partition c: the entire disk

Partitions "d" through "h" can have their sizes changed using *suninstall*.

Free Hog Disk Partition

The h partition is the default for the free hog partition, however, you can select another partition to hold unallocated disk space. The free hog partition is the partition disk space is taken from when another partition requires a size increase.

suninstall will take space from the free hog partition if /usr is too small to accommodate the requested software selection. If /usr is larger than the requested amount of disk space, however, *suninstall* does not reduce its size. For more information on the free hog space, see the *Planning Disk Space* section in *Chapter 3*.

Display Unit

All numbers under the SIZE column are converted and displayed in the units specified.

PARTITION

This menu item is where you actually partition your disk.

Each partition has an offset and size. format expects partition offsets to be in cylinders, but size can be specified to *suninstall* in cylinders, blocks, Mbytes, or Kbytes. *suninstall* rounds to the nearest cylinder for purposes of formatting the disk. Overlapping hard partitions cannot be used by Unix simultaneously and so are not allowed by *suninstall*.

The configuration of the partitions are encoded within the disk label. The label is written to special locations on the disk by format(8) which is called by *suninstall*. The label is read from the disk by the SunOS at boot time to determine the disk configuration. You can see the existing label by using the format current command, or the command dkinfo(8).

The "b" partition, typically the swap partition, can be increased but *not* decreased using *suninstall*. If you are installing a Sun-4 workstation, you will have to increase the "b" partition.

START_CYL	The starting cylinder for each partition. *suninstall* calculates this depending on the size value.
BLOCKS	The size of the partition in blocks. The system automatically fills in this information.
SIZE	The size of the partition in the units specified by the user. The user fills in the size of the partition in the units specified. When the number of blocks the partition requires is specified, the system changes the BLOCK size automatically.
MOUNT PT	File system mount point for the first disk. This applies only to the first disk.

                      Partition a: should have /
                      Partition b: has none
                      Partition c: has none

PRESERVE (Y/N)	PRESERVE, specifies preserving the original filesystem. Type y if you want to preserve the original filesystem on the disk partition.

Type n if you made changes to disk partition sizes and want to use these changes. This creates a new filesystem.

If you alter the starting point of a cylinder block, you cannot preserve the original disk state because you wrote over the starting point of another cylinder. **When you create a new file system, you destroy all existing data in the partition.** In some cases, you cannot preserve the free hog partition.

OK to use this partition table [y/n] ?	The data will be saved and used to label the disk when the installation is started.
Are you finished with this form [y/n] ?	Type y to exit from this form.
	Type n to specify labels for additional disks on the system. The cursor returns to the top of the form to specify the next disk.

5.9. Using the Software Form	The Software form is illustrated below with explanations of the listed prompts. This form is required for all system configurations.

When performing a full installation, if you select own choice on the Software Form, *suninstall* automatically selects all **required** software categories and then allows you to select any **optional** software. If you add software after the installation is completed using the setup_exec utility, you are allowed to add *only* selected optional software.

If you press ⌈CTRL-C⌋ when the tape is reading or rewinding, your system will core dump.

If you have not allocated enough space for the choices you make in the software form, *suninstall* automatically goes to the free hog partition and takes what is required to load the selected software choices. This decreases the free hog partition, and increases the partition you have chosen for the software. You will notice that there are considerable pauses between categories.

The following table lists the available software categories for you to choose from on the Software Form, the category type, and a description of each category. The following terms are used to describe the software category *Type*:

required
> A software category that is necessary for you to bring up your system.

desirable
> A software category that is recommended for optimal system use, but not essential to bringing up the system.

optional
> A software category selection at the discretion of the user.

common
> An *optional* software category that is generally selected.

See the *Read This First* Document for the release for exact sizes of each of the following software categories.

Table 5-1   *Software Categories*

Category	Type	Description
root	required	root filesystem
usr	required	user files
kvm	required	kernel dependent files
Sys	desirable	system files
Networking	desirable	networking files
Debugging	optional	debugging programs
SunView_Users	common	suntools
SunView_Programmers	optional	libraries to write window system interface
SunView_Demo	optional	demo programs
Text	optional	text formatting
Install	required	suninstall
User_Diag	optional	self-test programs
Graphics	optional	graphics package
uucp	optional	modem communications
System_V	optional	System V UNIX
Manual	optional	manual pages
Demo	optional	demonstration programs
Games	optional	user games
Versatec	optional	Versatec interface
Security	optional	C2 security features

Software Category Interdependencies

Be aware of the following interdependencies between software categories when selecting software on the Software Form.

□   If you select *Manual* for the man pages, you must also select *Text*. Without selecting *Text*, the man pages will not format for display.

□   You must select *Networking* if you are installing a server.

□   If you select *SunView_Demo*, you must also select `SunView_Programmers`, `SunView_Users`, and `Graphics` software categories.

A * is inserted in the following form to show menu options that are only displayed when *remote* is selected.

sun microsystems

```
SOFTWARE FORM    [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------
Architecture Information :
     Type         :  [sun2]    [sun3]   [sun3x]    [sun4]    [sun4c]
     Path where executables reside :
     Path where sub-arch dependent executables reside:

Media Information:
     Device Type :  [st0]   [st1]   [st2]   [ar0]   [mt0]   [xt0]
     Drive Type  :  [local]   [remote]
   * Tapehost    :
   * Tapehost's Internet Address :

Choice          :  [all]    [default]   [own choice]   [required]   [quit]


     CATEGORY       NAME        BYTES      AVAIL BYTES    Y/N
     ======================================================
     required      root         181248      8216576       y
     required      usr          20971520    4498227217    y
     required      Kvm          2620416     24010752      y
     desirable     Sys          2720768     21289984      y
     desirable     Networking   953344      20336640      y

              .
            .
            .

Are you finished with this form [y/n] ?
     [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

MENU ITEMS	DESCRIPTION
Type	Architecture type of the executables.
Path where executables reside	The directory location of executable files. /export/exec/*client_ARCH* is the the default assumption for the path name.
Path where sub-arch dependent executables reside	The directory location of the executable files which vary according to the sub-architecture. /export/exec/kvm/*client_ARCH* is the default assumption for the path name. For more information, see the *Server Support of Sub-architectures* section of Chapter 2 in this manual.
Device Type	The media device type.
Drive Type	Local or remote tape drive.
Tapehost	In the case of a remote installation, the system with the tape drive.

Tapehost's Internet Address	In the case of a remote installation, the internet address of the tapehost.
Choice	[all] loads all of the software categories from the distribution tape(s).

[default] loads all of the common software categories from the distribution tape(s).

[own choice] loads all of the required software categories from the distribution tape(s), and prompts you for the optional software categories.

[required] loads only the required software categories from the distribution tape(s).

[quit] exits the form.

If you are installing a heterogeneous server, you are prompted to select the architectures from the Architecture Information Type field. You must go through separate Software Form for each architecture type you are installing and answer the questions to suit its requirements.

CATEGORY, NAME, BYTES, AVAILABLE BYTES, Y/N	Each software category is displayed in this area. All required categories have **y** under Y/N and required under CATEGORY. If the category is optional, optional is displayed under CATEGORY. If the category is desirable, desirable is displayed under CATEGORY. You have to answer **y** or **n** under Y/N for these optional categories. When you select a category, its size is automatically displayed under BYTES. AVAILABLE BYTES also displays the amount of free space that remains. If you run out of available space, *suninstall* automatically increases the size of the partition by taking space from the free hog partition. "from free hog" is displayed under the field AVAIL BYTES.

When you have selected all the optional software, *suninstall* lists the items you selected and prompts you to verify their correctness.

Are you finished with this form? y/n	Entering **y** returns you to the main menu. Entering **n** leaves you in the current form.
5.10. Using the Client Form	Below is an illustration of the Client form followed by explanations of the menu items. This form is only required when installing a machine as a server for a diskless client.

The Client Form does not automatically fill out the default for the client /home path and swap size. You must fill in this information yourself.

```
┌─────────────────────────────────────────────────────────────────────────┐
│ CLIENT FORM      [DEL=erase one char of input data] [RET=end of input data] │
│ -------------------------------------------------------------------------  │
│ Architecture Type :    [sun2]  [sun3]  [sun3x]  [sun4]   [sun4c]           │
│ Choice            :    [create]  [delete]   [display]    [next arch]       │
│                                                                           │
│ Client(s) :                                                               │
│                                                                           │
│                                                                           │
│ Client Information :                                                      │
│    Name                                              :                    │
│    Internet Address                                  :                    │
│    Ethernet Address                                  :                    │
│    YP Type :      [none]   [master]   [slave] [client]                    │
│    Domain name                                       :                    │
│    Path of Client's Root                             :                    │
│    Path of Client's Swap                             :                    │
│    Path of Client's Executables                      :                    │
│    Path of Client's Sub-Arch Dependent Executables   :                    │
│    Path of Client's Home                             :                    │
│    Swap size (e.g. 8M,8m,8K,8k,8B or 8b)             :                    │
│                                                                           │
│                                                                           │
│ Are you finished with this form [y/n] ?                                   │
│    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward] │
└─────────────────────────────────────────────────────────────────────────┘
```

MENU ITEMS	DESCRIPTION
Architecture Type	Architecture type of the client.
Choice	[create] displays default client data and allows you to assign the client hostname.
	[display] displays information for the specified client or an error message if the client does not exist. You specify the client by typing the client name in the Client: field.
	[delete] deletes the specified client or displays an error message if the client does not exist. You specify the client by typing the client name in the Client: field.
Client(s)	Client(s) of specified architecture type are displayed in this area as they are entered.
Name	Client hostname.

Internet Address	Client IP address.
Ethernet Address	Client Ethernet address.
YP Type	YP master server, YP slave server, YP client or not using YP. A diskless client usually is not a YP server.
Domain Name	YP domain name.
Path of Client's Root	If specified, `/path/clientname` is the root directory of the specified client. Automatically appends the client hostname to the path of the client's root. The default is: `/export/root/clientname`.
Path of Client's Swap	If specified, `/path/clientname` is the swap file of the specified client. The default is: `/export/swap/clientname`.
Path of Client's Executables	If specified, `/path` on the server is mounted on `/usr` on the client. The default is: `/export/exec/client_ARCH`. These are the client's architecture-dependent executables.
Path of Client's Sub-arch Dependent Executables	If specified, `/path` is the directory where the client's sub-architecture dependent executable files reside. The default is: `/export/exec/kvm/`*client_ARCH* . For more information, see the *Server Support of Subarchitectures* section of Chapter 2 in this manual.
Path of Client's Home	If specified, `/path` is the directory where the client's home directories reside. The default is: `/home`.
Swap Size	Swap reserved for the specified client. These sizes are specified in megabytes, kilobytes, or blocks. The default is 16 megabytes. (e.g. 16M, 16m, 16000K, 16000k,or 16000000b)
Are you finished with this form? [y/n]	**y** allows you to exit from the form. **n** returns you back to the top of the form to add, modify, or delete clients.

5.11. The Installation

How Long Will it Take?   Time estimates for an installation vary according to the equipment used. It is also affected by the number of clients and the number of disks involved.

The 1/4 inch tape now has a no-rewind capability under *suninstall* which cuts installation times drastically. The type of Sun workstation you are installing on also makes a difference. The Sun-4 is the highest performance workstation and therefore is the quickest to install. The Sun-3 is the next fastest, followed by the Sun-2.

While it is difficult to give an exact time estimate for an installation, there are rule-of-thumb estimates that are listed below:

These are *estimates* for installing a system using only the *selected* software.

Table 5-2   *Installation Time Estimates*

Workstation	Tape	SunOS Release	Selected Software	Time Estimate
Sun-2	1/4"	4.0	text, install, SystemV	1.5 hours
Sun-3	1/2"	4.0	text, install, SystemV, Man	2 hours
Sun-4	1/4" SCSI	4.0.3	All	1/2 hour
Sun-4	1/2" SCSI	4.0.3	All	1/2 hour

When you select [start the installation] from the main menu in *suninstall*, the installation begins. You will be prompted when the tape needs to be changed.
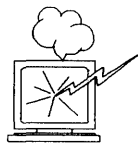
You can abort the installation any time by using [Ctrl-C] except during the creation of the filesystem. If you abort the installation within the first five minutes after selecting [start the installation] , the miniroot is destroyed.

Before you restart *suninstall*, you should make sure no disk partitions are mounted. You can re-assign information by starting *suninstall*. The information you entered the first time is displayed. You have the option of changing any portion of the information without re-entering it over again, or you can change all the information. You do not have to abort the system, reload miniroot, and re-enter all previous information if you need to stop the installation.

When you start the installation from the [start the installation] option in the main menu, the system is built using the information entered from the *suninstall* menu forms. If you select the reboot option in the Host Form, the system is rebooted after the installation is complete. The system is then in multiuser mode with the following prompt on the screen when ready for use.

```
hostname login:
```

If you do not select the reboot option in the Host Form, the system remains in the miniroot after installation is completed and the following messages are displayed on the screen.

sun
microsystems

```
System Installation Complete.

If you do not wish to install a smaller
generic kernel, you may reboot the system
now and configure a kernel for your system.
#
```

You can then bring up the system to multiuser mode by aborting and then booting the system. Refer to *Chapter 3* for the abort sequence. Boot the system by typing the following:

```
> b
```

If the system is either a YP master server or YP slave server, you need to set up the YP database after the system comes up in multiuser mode. Details for installing and maintaining YP databases are in the *System and Network Administration* manual.

5.12. Installing a root password

After you bring up your new system for the very first time, you may want to add a root password.

REMEMBER!!!! ONCE A PASSWORD IS GIVEN TO ROOT, YOU CAN NOT LOGIN AS ROOT AGAIN WITHOUT GIVING THE CORRECT PASSWORD.

If you forget the password, boot single user and redefine the root password. See the *System and Network Administration* manual for more information.

To add a root password do the following:

```
login: root
# passwd
[The system will prompt you for your new password ]

New Password: (password not displayed)
[The system will prompt you to verify the new password]

Verify Password: (password not displayed)
```

If you are upgrading or reinstalling an existing system, there is probably an existing root password in the /etc/passwd file. This file will be restored as part of the upgrade reinstallation. Again, if there isn't one, just do the above after you reboot the system.

6

Walkthrough Examples

Walkthrough Examples

6.1. Introduction

This chapter provides walkthrough examples for installing with a local tape drive and a remote installation.

Local Installation Examples

The walkthrough examples for a local installation provide a separate example for each of the following system configurations:

□ Standalone Configuration

□ Homogeneous Server Configuration

□ Dataless Configuration

Remote Installation Examples

There is one remote installation walkthrough example to show the basic differences from the local installation. The remote installation example illustrates the following system configuration:

□ Standalone Configuration

Preparatory Local Installation Steps

The first steps of each local installation configuration are the same. In an attempt to decrease the bulk of the walkthrough examples, these steps are consolidated into the *Preparatory Local Installation Steps* section preceding the walkthrough examples, instead of repeating them in each example. Complete these steps *before* beginning the local installation walkthrough of your choice.

System Assumptions for the Walkthrough Examples

Each walkthrough example is based on a list of *system assumptions*. The assumptions define the equipment and network information for the installation. The assumptions are listed at the beginning of the example.

You do not have to configure your system exactly as shown. *These are simply examples* to help you design your own system configurations. Read the example of your choice completely BEFORE you begin to install or modify your system.

6.2. On-Line Help

If you need help at any time during the installation, you can call up the On-Line Help screen for *suninstall* specific information by using the following steps:

1. Go the bottom of the form, answer **y** to `Are you finished with this form [y/n] ?`. This brings you back to the Main Menu.

2. Select `on-line help information`. The following screen is displayed:

```
ON-LINE HELP
-----------------------------------------------------------------


-----------------------------------------------------------------
          KEYS                          PURPOSE
-----------------------------------------------------------------
          CONTROL F                     move cursor forward
          CONTROL N                     move cursor forward
          CONTROL B                     move cursor backward
          CONTROL P                     move cursor backward
          CONTROL U                     erase word
          <DELETE>                      erase one character
          CONTROL C                     abort
          <RETURN>                      end of input string
          x or X                        select a choice
          <SPACE>                       next choice

Are you finished with this form [y/n] ?
```

3. When you are finished, exit and return to the form you were in prior to entering the help screen.
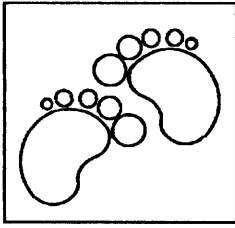
6.3. Preparatory Local Installation Steps

The following steps are required *before* starting *suninstall*. Complete these steps *before* beginning the local installation walkthrough of your choice.

Step 1: Becoming Super User

Become super user by typing su and then your super user password.

Step 2: Making Full Dumps

Make full dumps of all filesystems. For information on how to do this, see the *System and Network Administration* manual.

Step 3: Halting the System

Halt the system in the following way:

```
boomer#/etc/halt
```

Step 4: Labeling the Disk

If you are installing this release on a new disk that does not have a label yet; or if you wish to change the size of the root partition or the swap partition, copy MUNIX and run format to label your disk as shown in the following example.

For more information, see *Chapter 4*. If you do not wish to change the existing disk label, go to the next step.

```
>b tape ()
Boot:tape(0,0,4)
Size:some number + some number bytes
SunOS Release 4.0.3 (MUNIX)#1: Thurs Mar 2 20:54:17 PST 1989
Copyright(c) 1989 Sun Microsystems, Inc.
mem = 4096K (0X400000)
avail mem = 3186688
Ethernet address = 8:0:20:07a:55
        .
        .
    disk and tape drive information
        .
        .
    ethernet controller information
        .
        .
init ram disk from device (st%d[a-h]  sd%d[a-h]  ft%d[a-h]): tape0
rd: reading 176,8192 byte blocks................................
root on rd0a fstype 4.2
tape file number?5
swap on ns0a fstype spec size 1216K
dump on ns0a fstype spec
        .
# format

( L1-a )
(or proper abort sequence to exit format)
```

Step 5: Copying the miniroot

Copy the miniroot using the following method. In the To: disk command line below, replace the # sign with the appropriate number for your disk device. Refer to the following table for the proper command line sequence.

Disk Device	To: disk Command Line
sd0	sd(,0,1)
sd1	sd(,1,1)
sd2	sd(,8,1)
sd3	sd(,9,1)
sd4	sd(,10,1)
sd6	sd(,18,1)

For more in-depth information, see the *Copying the Miniroot* section in Chapter 4 of this manual.

```
>b tape()
Boot:tape(0,0,2)
From:tape(0,0,3)
To:disk(0,#,1)

                       .
Boot:disk(0,0,1)vmunix

                         .
          .
root on rd0a fstype 4.2

                  .
        .
swap on ns0a fstype spec size 1216k
dump on ns0a fstype spec
#
```
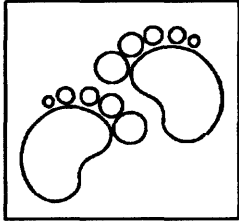
6.4. Local Installation: Standalone

Example Variables: The following variables are used in this walkthroug example. If you are using this example as a guide to install your own system, use the device names and network information applicable to your system.

□   hostname: *trigger*

□   architecture: *sun3*

□   ethernet interface: *ie0*

□   system type: standalone

□   internet address: *192.9.90.64*

□   local SCSI tape drive: *st0*

□   1 Xylogics 451 controller with Eagle disk: *xy0*

□   yp client of domain: *home.on.the.range*

□   software categories: *all*

Installation Steps:

Step 1: Completing Preparatory   Complete the preparatory local installation steps at the beginning of this chapter.
Local Installation Steps

Step 2: Starting suninstall   Start *suninstall* and enter the proper time zone name and terminal type.

```
# suninstall

Welcome to SunInstall

You are about to install a new version of the SunOS on your system.
If this is not a first-time installation and you are upgrading from
a previous version of the operating system, then it is strongly recom-
mended that you perform a full backup of each of your filesystems
which contain user data.  Be advised that as this program runs, it may
re-label some of the disk drives and in some cases initialize new
filesystems.  After this installation process is complete, you may
restore your user data from backup copies.

Do you wish to continue with the installation [y/n]? y


Enter the local time zone name:
  >> US/Pacific

Is this the correct date/time [y/n]:
        Mon Mar 14 08:08:57 PST 1988
>> y

Select your terminal type:
    1) Televideo 925
    2) Wyse Model 50
    3) Sun Workstation
    4) Other

>> 3
```

The *suninstall* Main Menu is displayed.

```
                Sun Microsystems System Installation Tool

                             Main Menu

      On-line help information prints summary of cursor usage
                   + means the data file(s) exist(s)

                     assign host information

                     assign disk information

                     assign software information

                     assign client information

                     on-line help information

                     start the installation

                     exit from suninstall



   [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

Step 3: Assigning Host Information

To assign host information, select assign host information from the *suninstall* Main Menu. The following Host Form is displayed.

Enter the hostname of the machine and put an **X** next to standalone.

If you are going to install a pre-configured kernel after suninstall has completed, answer **n** to the question: Reboot after completed. For more information on pre-configured kernels, see the *Post-installation Procedures* chapter of this manual.

```
HOST FORM       [DEL=erase one char of input data] [RET=end of input data]
--------------------------------------------------------------------------
Workstation Information :
      Name [Internet Name 0]: trigger
      Type : x[standalone]   [server]   [dataless]



Network Information :
      Ethernet Interface :   [none] x[ie0]
      Internet Address 0 :   192.9.90.64
      Internet Name 0: trigger

      YP Type             :   [none]  [master]   [slave] x[client]
      Domainname          :   home.on.the.range



Misc Information :
      Reboot after completed : x[y]   [n]



Are you finished with this form [y/n] ? y
   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The main menu is displayed when you answer y to the last prompt: Are you
finished with this form [y/n]?.

*Step 4: Assigning Disk
Information*

To assign disk information, select assign disk information from the
suninstall Main Menu.

The displayed Disk Form is different depending on the type of system selected
on the Host Form. The following Disk Form is displayed for a standalone
configuration.

```
DISK FORM         [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------------
Attached Disk Devices :
  x[ xy0]


Disk Label        : x[edit default]  [edit existing]  [use data file]
Free Hog Disk Partition :  [d]  [e]  [f] [g]  x[h]
Display Unit      : x[Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]


PARTITION START_CYL BLOCKS     SIZE     MOUNT PT          PRESERVE(Y/N)
=============================================================================
    a        0       16048      8       /                     n
    b       59       33456      17
    c        0      276896     141
    d        0          0       0
    e        0          0       0
    f        0          0       0
    g      570       87856      44       /usr                 n
    h      893       34000      17       /home                n


Ok to use this partition table [y/n]  ? y
Are you finished with this form [y/n] ? y
   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The numbers under the columns START_CYL, BLOCKS, and SIZE are for this
example only. The numbers are different for each disk and depend on the exist-
ing label on the specified disk and what you select for partitions d-h.

PRESERVE (Y/N)

PRESERVE, specifies preserving the original disk state. If you answer Y to
this, you preserve the original filesystem. If you answer N to this you create
a new filesystem and the data from the original filesystem is destroyed.

If you alter the starting point or size of a partition, you cannot preserve its
original state, or any other partition's state that is forced to be relocated as a
result of re-partitioning.

The main menu is displayed when you are finished with the form.

Step 5: Assigning Software
Information

To assign software information, select `assign software information` from the *suninstall* Main Menu. The Software Form is displayed on the screen.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------------
Architecture Information :
       Type          :[sun2]  x[sun3]  [sun3x]  [sun4]  [sun4c]
       Path where executables reside :/usr
       Path where sub-arch dependent executables reside: /usr/kvm


Media Information:
       Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
       Drive Type  : x[local]  [remote]




Choice          : x[all]   [default]   [own choice]   [required]   [quit]



    CATEGORY       NAME          BYTES       AVAIL BYTES    Y/N
    ==========================================================
    required       root          181248      8216576        y
    required       usr           20971520    44982272       y
    required       Kvm           2620416     24010752       y
    required       Install       1153024     9558037        y
    desirable      Sys           2720768     21289984       y
    desirable      Networking    953344      20336640       y
                      .
                      .
                      .
Are you finished with this form [y/n] ?
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The list of categories to be extracted for the Sun-3 architecture are displayed on the Software Form after you make your selection.

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```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------
Architecture Information :
      Type          :[sun2]  x[sun3]   [sun3x]   [sun4]   [sun4c]
      Path where executables reside :/usr

Media Information:
      Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
      Drive Type  : x[local]   [remote]



Choice             : x[all]    [default]   [own choice]   [required]    [quit]


    Extract list:

        root
        usr
        Kvm
        Install
        Sys
        Networking
        Debugging
            .
            .
            .
OK to use the extract list [y/n] ? y
Are you finished with this form [y/n] ? y
    [x/X=select choice] [space=next choice] [^B/^P=backward]  [^F/^N=forward]
```

The *suninstall* Main Menu is displayed when you exit this form.

Step 6: Adjusting the /usr Partition

After you select the software, return to the Disk Form. Add approximately 5 - 10 Mb to the /usr partition to allow for customizing the kernel.

Step 7: Starting the Installation

To start the installation, select `start the installation` from the *suninstall* Main Menu.

You are prompted when the tape needs to be changed. If any information is missing, the installation will not start. You can go back and assign missing information and start again.

The following messages are displayed after the installation begins:

```
System Installation begin :

Label disk(s)  :
        xy0

Create/Check Filesystems:
/dev/rxy0a:      140624 sectors in 752 cylinders of 11 tracks, 17 sectors
        72.0Mb in 47 cyl groups (16 c/g, 1.53Mb/g, 640 i/g)
super-block backups (for fsck -b#) at:
 32, 3056, 6080, 9104, 12128, 15152, 18176, 21200, 24224, 27248,
 30272, 33296, 36320, 39344, 42368, 45392, 47904, 50928, 53952, 56976,
 60000, 63024, 66048, 69072, 72096, 75120, 78144, 81168, 84192, 87216,
        .
        .
        .
Sun3 Installation Begin:
Creating "root" filesystem
        .
Extracting "usr" files from "/dev/nrst0" release tape
        .
Extracting "kvm" files from "/dev/nrst0" release tape
        .
Extracting "install files from "/dev/nrst0" release tape
        .
        .
        .
Sun3 installation completed.
System installation continues..
        .
File systems check:
        .
        .
        .
If you do not wish to install a small pre-configured
kernel, you may reboot the system now and
configure a kernel for your system.
#
```

If you install a SPARCsystem 300 or a Sun-3/80, see the *Post-installation Procedures* chapter of this manual for information on how to boot the internal disk and modify the boot prom.

Step 8: Review /suninstall.log File

Review the `/usr/etc/install/files/suninstall.log` file. Errors from utilities, such as `tar`, will appear in this file even if they scroll off the screen during installation.

Step 9: Aborting the System

Abort the system using `L1-A` for Sun monitors or `BREAK` for tty terminals.

See the *Abort Sequence* section of *Chapter 3* of this manual for more information.

Step 10: Booting the System

You selected `automatic reboot` once the installation was complete. If for some reason the system does not reboot automatically, boot the system in the following way:

```
>b
```

Step 11: Completing Post-installation Procedures

Complete post-installation procedures as necessary. See *Chapter 7* of this manual for a list of post-installation procedures.

If you want to set a root password, see *Chapter 5* of this manual.

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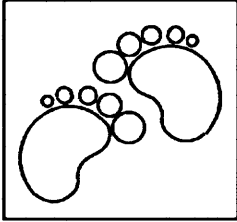
6.5. Local Installation: Homogeneous Server

Example Variables:

The following variables are used in this walkthrough example. If you are using this example as a guide to install your own system, use the device names and network information applicable to your system.

- hostname: *trigger*
- architecture: *sun3*
- ethernet interface: *ie0*
- system type: server
- internet address: *192.9.90.64*
- client: *tonto*
- client architecture: *sun3*
- client internet address: *192.9.1.1*
- local SCSI tape drive: *st0*
- 1 Xylogics eagle disk: *xy0*
- yp client of domain: *home.on.the.range*
- software categories: *all*

Installation Steps:

Step 1: Completing Preparatory Local Installation Steps

Complete the preparatory local installation steps at the beginning of this section.

Step 2: Starting suninstall

Start *suninstall* and enter the proper time zone name and terminal type.

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```
# suninstall

Welcome to SunInstall

You are about to install a new version of the SunOS on your system.
If this is not a first-time installation and you are upgrading from
a previous version of the operating syste, then it is strongly recom-
mended that you perform a full backup of each of your filesystems
which contain user data.  Be advised that as this program runs, it may
re-label some of the disk drives and in some cases may initialize new
filesystems.  After this installation process is complete, you may
restore your user data from backup copies.

Do you wish to continue with the installation [y/n]? y

Enter the local time zone name:
>> US/Pacific

Is this the correct date/time [y/n]:
     Mon Mar 14 08:08:57 PST 1988
>> y

Select your terminal type:
     1) Televideo 925
     2) Wyse Model 50
     3) Sun Workstation
     4) Other

>> 3
```

The *suninstall* Main Menu is displayed.

```
        Sun Microsystems System Installation Tool

                         Main Menu

    On-line help information prints summary of cursor usage
       + means the data file(s) exist(s)

                    assign host information

                    assign disk information

                    assign software information

                    assign client information

                    on-line help information

                    start the installation

                    exit from suninstall


   [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

Step 3: Assigning Host
Information

To assign host information, select assign host information from the *suninstall* Main Menu. The Host Form is displayed.

Enter the hostname of the machine and put an **X** next to server.

If you are going to install a pre-configured kernel after suninstall has completed, answer **n** to the question: Reboot after completed. For more information on pre-configured kernels, see the *Post-installation Procedures* chapter of this manual.

```
HOST FORM        [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------
Workstation Information :
      Name [Internet Name 0]: trigger
      Type : [standalone]   x[server]   [dataless]



Network Information :
      Ethernet Interface :   [none] x[ie0]
      Internet Address 0 :   192.9.90.64
      Internet Name 0: trigger


      YP Type              :   [none]   [master]   [slave]   x[client]
      Domainname           :   home.on.the.range



Misc Information :
      Reboot after completed :  x[y]   [n]



Are you finished with this form [y/n] ? y
   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The main menu is displayed when you answer y to the last prompt: `Are you finished with this form [y/n]?`.

Step 4: Assigning Disk Information

To assign disk information, select `assign disk information` from the *suninstall* Main Menu.

The displayed Disk Form is different depending on the type of system selected on the Host Form. The following Disk Form is displayed for a server configuration.

```
DISK FORM        [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------------
Attached Disk Devices :
  x[ xy0]



Disk Label            : x[edit default]  [edit existing]   [use data file]
Free Hog Disk Partition : [d]  [e]  [f]  [g]  x[h]
Display Unit          : x[Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]


PARTITION START_CYL BLOCKS    SIZE    MOUNT PT              PRESERVE(Y/N)
==============================================================================
     a       0      16048     8       /                     n
     b       59     133456    17
     c       0      276896    141
     d       182    11696     5       /export/root          n
     e       225    93840     48      /export/swap          n
     f       0      0         0       /export/exec
     g       570    87856     44      /usr                  n
     h       893    34000     17      /home                 n


Ok to use this partition table [y/n]  ? y
Are you finished with this form [y/n] ? y
  [x/X=select choice] [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

The numbers under the columns START_CYL, BLOCKS, and SIZE are for this
example only. The numbers are different for each disk and depend on the exist-
ing label on the specified disk and what you select for partitions d-h.

If you are installing a heterogeneous server, you must designate a separate par-
tition for /export/exec. This partition is used for exported software which is
unique to the client architecture type. This is shown above as partition 'f' (in
listing font). /export/exec should not be defined for homogeneous servers.
Because the server and client share the same architecture, the client executable
files are located in the server /usr partition.

PRESERVE (Y/N)

PRESERVE, specifies preserving the original disk state. If you answer Y to
this, you preserve the original filesystem. If you answer N to this you create
a new filesystem and the data from the original filesystem is destroyed.

If you alter the starting point or size of a partition, you cannot preserve its
original state, or any other partition's state that is forced to be relocated as a
result of re-partitioning.

The main menu is displayed when you are finished with the form.

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Step 5: Assigning Software
Information

To assign software information, select `assign software information` from the *suninstall* Main Menu. The Software Form is displayed on the screen.

For a *homogeneous* server installation, only fill out a Software Form for the server architecture configuration. On homogenous servers, the server and the clients share the selected software; therefore, only one copy is needed.

For a *heterogeneous* server installation, fill out a Software Form for the server architecture configuration first. When completed, answer **n** to the question: `Are you finished with this form [y/n]`? Then fill out a Software Form for each client architecture type that is different from the server architecture type. This selects the additional software necesary for the client's differing architecture.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
----------------------------------------------------------------------------
Architecture Information :
      Type          :[sun2]  x[sun3]   [sun3x]   [sun4]   [sun4c]
      Path where executables reside  :/usr
      Path where sub-arch dependent executables reside  :/usr/kvm


Media Information:
      Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
      Drive Type  : x[local]  [remote]


Choice            : x[all]    [default]   [own choice]   [required]   [quit]


      CATEGORY      NAME          BYTES       AVAIL BYTES     Y/N
      ==============================================================
      required      root          181248      8216576         y
      required      usr           20971520    44982272        y
      required      Kvm           2620416     24010752        y
      required      Install       1153024     9558037         y
      desirable     Sys           2720768     21289984        y
      desirable     Networking    953344      20336640        y
            .
                  .
            .
Are you finished with this form [y/n] ? x
      [x/X=select choice] [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

The list of categories to be extracted for the server (sun3) architecture are displayed after you make your selection.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------
Architecture Information :
      Type            :[sun2]  x[sun3]  [sun3x]  [sun4]  [sun4c]
      Path where executables reside :/usr
      Path where sub-arch dependent executables reside :/usr/kvm

Media Information:
      Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
      Drive Type  : x[local]  [remote]

Choice            : x[all]   [default]  [own choice]   [required]   [quit]


   Extract list:

         root
         usr
         Kvm
         Install
         Sys
         Networking
         Debugging
               .

         .
         .
OK to use the extract list [y/n] ? y
Are you finished with this form [y/n] ? y
   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The *suninstall* Main Menu is displayed when you exit from this form.

Step 6: Assigning Client
Information

To assign client information, select `assign client information` from the *suninstall* Main Menu. The Client Form is displayed on the screen.

Create a client form for each client.

For a *heterogeneous* server, the software for all client architectures must be assigned *before* installing the clients.

```
CLIENT FORM    [DEL=erase one char of input data] [RET=end of input data]
---------------------------------------------------------------------------
Architecture Type : [sun2] x[sun3]   [sun3x]   [sun4]   [sun4c]
Choice            :   x[create]   [delete]   [display]   [next arch]


Client(s) :
    tonto



Client Information :
    Name                                      : tonto
    Internet Address                          : 192.9.1.1
    Ethernet Address                          : 8:0:20:1:00:00
    YP Type :    [none]   [master]   [slave] x[client]
    Domain name                               : home.on.the.range
    Path of Client's Root                     : /export/root
    Path of Client's Swap                     : /export/swap
    Path of Client's Executables              : /export/exec/sun3
    Path of Client's Sub-arch Dependent Execs : /export/exec/kvm/sun3
    Path of Client's Home                     : /home
    Swap size (e.g. 8M,8m,8K,8k,8 or 8b)      : 16M



Are you finished with this form [y/n] ? y
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

Step 7: Adjusting the /usr
Partition

After you have selected the software for the server and all clients, return to the Disk Form. Add approximately 5 - 10 Mb to the /usr partition of the server to allow for customizing the kernel.

Step 8: Starting the Installation

To start the installation, select start the installation from the *suninstall* Main Menu.

You are prompted when the tape needs to be changed. If any information is missing, the installation will not start. You can go back and assign missing information and start again.

The following messages are displayed after the installation begins:

```
System Installation begin :

Label disk(s) :
    xy0

File systems check :
/dev/rxy0a:       140624 sectors in 752 cylinders of 11 tracks,  17 sectors
    72.0Mb in 47 cyl groups (16 c/g, 1.53Mb/g, 640 i/g)
super-block backups (for fsck -b#) at:
 32, 3056, 6080, 9104, 12128, 15152, 18176, 21200, 24224, 27248,
 30272, 33296, 36320, 39344, 42368, 45392, 47904, 50928, 53952, 56976,
 60000, 63024, 66048, 69072, 72096, 75120, 78144, 81168, 84192, 87216,
         .
         .
              .
Sun3 Installation Begin:
         .
Creating "root" filesystem
         .
Extracting "usr" files from "/dev/nrst0" release tape
         .
Extracting "kvm" files from "/dev/nrst0" release tape
         .
Extracting "install" files from "/dev/nrst0" release tape
         .
Sun3 installation completed.
System installation continues...
File systems check:
         .
         .
         .
If you do not wish to install a small pre-configured
kernel, you may reboot the system now and
configure a kernel for your system.
#
```

If you install a SPARCsystem 300 or a Sun-3/80, see the *Post-installation Procedures* chapter of this manual for information on how to boot the internal disk and modify the boot prom.

Step 9: Review /suninstall.log File

Review the /usr/etc/install/files/suninstall.log file. Errors from utilities, such as tar, will appear in this file even if they scroll off the screen during installation.

Step 10: Aborting the System

Abort the system using (L1-A) for Sun monitors or (BREAK) for tty terminals.

See the *Abort Sequence* section of *Chapter 3* of this manual for more information.

Step 11: Booting the System

To boot the system do the following:

This example shows the installation of a YP master server and therefore must be booted single-user.

```
>b -s
```

The -s argument boots the system in single-user mode. You must boot single user before running ypinit when installing a YP master server.

Step 12: Running ypinit

While still logged in as root, run ypinit to set up the YP databases.

```
# /usr/etc/yp/ypinit -m
```

Even if a machine is chosen as a YP server during *suninstall*, it is still necessary to run /usr/etc/yp/ypinit on the server before booting clients. After doing this, edit /etc/rc.local and remove the comment symbols from the lines of code referring to ypbind. If you do not do this, the Yellow Pages will not work on the server.

For information on how to run ypinit and maintain yp databases, see the *System and Network Administration* manual.

Step 13: Completing Post-installation Procedures

Complete post-installation procedures as necessary. See *Chapter 7* of this manual for a list of post-installation procedures.

If you want to set a root password, see *Chapter 5* of this manual.
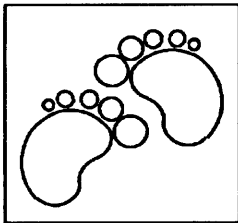
6.6. Local Installation: Dataless

Example Variables:

The following variables are used in this walkthrough example. If you are using this example as a guide to install your own system, use the device names and network information applicable to your system.

□   hostname: *trigger*

□   architecture: *sun3*

□   ethernet interface: *ie0*

□   system type: dataless

□   client internet address: *192.9.90.64*

□   server name: *nellibell*

□   server architecture: *sun4*

□   server internet address: *192.9.90.55*

□   local SCSI tape drive: *st0*

□   1 Xylogics eagle disk: *xy0*

□   yp client of domain: *home.on.the.range*

□   software categories: *all*

Installation Steps:

Step 1: Completing Preparatory Local Installation Steps

Complete the *Preparatory Local Installation Steps* at the beginning of this chapter.

Step 2: Starting suninstall

Start *suninstall* and enter the proper time zone name and terminal type.

```
# suninstall

Welcome to SunInstall

You are about to install a new version of the SunOS on your system.
If this is not a first-time installation and you are upgrading from
a previous version of the operating system, then it is strongly recom-
mended that you perform a full backup of each of your filesystems
which contain user data.  Be advised that as this program runs, it may
re-label some of the disk drives and in some cases may initialize new
filesystems.  After this installation process is complete, you may
restore your user data from backup copies.

Do you wish to continue with the installation [y/n]? y

Enter the local time zone name:
>> US/Pacific

Is this the correct date/time [y/n]:
    Mon Mar 14 08:08:57 PST 1988
>> y

Select your terminal type:
    1) Televideo 925
    2) Wyse Model 50
    3) Sun Workstation
    4) Other

>> 3
```

The *suninstall* Main Menu is displayed.

```
         Sun Microsystems System Installation Tool

                        Main Menu

     On-line help information prints summary of cursor usage
       + means the data file(s) exist(s)

                  assign host information

                  assign disk information

                  assign software information

                  assign client information

                  assign client information

                  on-line help information

                  start the installation

                  exit from suninstall


    [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

Step 3: Assigning Host
Information

To assign host information, select `assign host information` from the *suninstall* Main Menu. The Host Form is displayed.

Enter the hostname of the machine and put an **X** next to `dataless`.

If you are going to install a pre-configured kernel after suninstall has completed, answer **n** to the question: `Reboot after completed`. For more information on pre-configured kernels, see the *Post-installation Procedures* chapter of this manual.

```
HOST FORM        [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------------
Workstation Information :
      Name [Internet Name 0]: trigger
      Type : [standalone]   [server]   x[dataless]
      Server Name:nellibell
      Server Internet Address:192.9.90.55
      Path of the executables on server:/export/exec/sun3
      Path of the sub-arch dependent executables on server:/export/exec/kvm/sun3


Network Information :
      Ethernet Interface :  [none] x[ie0]
      Internet Address 0 :  192.9.90.64
      Internet Name 0: trigger
      Server Information :


      YP Type              :  [none]  [master]  [slave] x[client]
      Domainname           : home.on.the.range


Misc Information :
      Reboot after completed : x[y]   [n]


Are you finished with this form [y/n] ? y
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The *suninstall* Main Menu is displayed when you answer y to the last prompt:

```
Are you finished with this form [y/n]?.
```

Step 4: Assigning Disk
Information

To assign disk information, select `assign disk information` from the *suninstall* Main Menu.

The displayed Disk Form is different depending on the type of system selected to install when filling out the Host Form. The following Disk Form is displayed for a Dataless configuration.

```
DISK FORM          [DEL=erase one char of input data] [RET=end of input data]
---------------------------------------------------------------------------
Attached Disk Devices :
   x[ xy0]



Disk Label                   :  x[edit default]   [edit existing]   [use data file]
Free Hog Disk Partition :    [d]   [e]   [f]   [g]   x[h]
Display Unit                 :  x[Mbytes]   [Kbytes]   [bytes]   [blocks]   [cylinders]

PARTITION START_CYL BLOCKS      SIZE       MOUNT PT              PRESERVE(Y/N)
===========================================================================
     a       0       16048       8         /                     n
     b      59       33456      17
     c       0      276896     144
     d       0          0        0
     e       0          0        0
     f       0          0        0
     h       0          0        0


Ok to use this partition table [y/n]  ? y
Are you finished with this form [y/n] ? y
     [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

For a dataless configuration, you need only specify / and `swap`. You can specify other partitions as desired except /`usr`. This is because the server stores the `usr` files for dataless clients.

The numbers under the columns START_CYL, BLOCKS, and SIZE are for this example only. The numbers are different for each disk and depend on the existing label on the specified disk and what you select for partitions d-h.

PRESERVE (Y/N)
    PRESERVE, specifies preserving the original disk state. If you answer Y to this, you preserve the original filesystem. If you answer N to this you create a new filesystem and the data from the original filesystem is destroyed.

If you alter the starting point or size of a partition, you cannot preserve its original state, or any other partition's state that is forced to be relocated as a result of re-partitioning.

The main menu is displayed when you exit this form.

Step 5: Assigning Software Information

To assign software information, select `assign software information` from the *suninstall* Main Menu. The Software Form is then displayed.

Make sure to select the `Install` software category. This allows you to convert a standalone system to a server at a later date. The `Install` software contains the utilities needed to convert a standalone system to a server and add clients and hardware.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------------
Architecture Information :
      Type          : [sun2] x[sun3] [sun3x] [sun4] [sun4c]
      Path where executables reside :/export/exec/sun3
      Path where sub-arch dependent executables reside :/export/exec/kvm/sun3

Media Information:
      Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
      Drive Type  : x[local]   [remote]


Choice            : x[all]    [default]    [own choice]    [required]    [quit]


    CATEGORY        NAME          BYTES        AVAIL BYTES      Y/N
    ============================================================
    required        root          181248       8216576          y
    required        usr           20971520     44982272         y
    required        Kvm           2620416      24010752         y
    required        Install       1153024      9558037          y
    desirable       Sys           2720768      21289984         y
    desirable       Networking    953344       20336640         y
                       .
                       .
                       .
Are you finished with this form [y/n] ?
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The list of categories to be extracted for the selected architecture are displayed on the following Software Form after you make your selection.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------
Architecture Information :
        Type           : [sun2] x[sun3] [sun3x] [sun4] [sun4c]
        Path where executables reside :/export/exec/sun3
        Path where sub-arch executables reside :/export/exec/sun3/kvm


Media Information:
        Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
        Drive Type  : x[local]  [remote]



Choice          : x[all]    [default]   [own choice]    [required]    [quit]



    Extract list:


            root
        usr
        Kvm
        Install
        Sys
        Networking
        Debugging
            .
                .

        .
OK to use the extract list [y/n] ? y
Are you finished with this form [y/n] ? y
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The *suninstall* Main Menu is displayed when you exit from this form.

Step 6: Adjusting the /usr Partition

After you select the software, return to the Disk Form. Add approximately 5 - 10 Mb to the /usr partition to allow for customizing the kernel. Do this by changing the numbers using the editor.

Step 7: Starting the Installation

To start the installation, select start the installation from the *suninstall* Main Menu.

You are prompted when the tape needs to be changed. If any information is missing, the installation will not start. You can go back and assign missing information and start again.

The following messages are displayed after the installation begins:

```
System Installation begin :

Label disk(s) :
    xy0

File systems check :
/dev/rxy0a:       140624 sectors in 752 cylinders of 11 tracks, 17 sectors
     72.0Mb in 47 cyl groups (16 c/g, 1.53Mb/g, 640 i/g)
super-block backups (for fsck -b#) at:
 32, 3056, 6080, 9104, 12128, 15152, 18176, 21200, 24224, 27248,
 30272, 33296, 36320, 39344, 42368, 45392, 47904, 50928, 53952, 56976,
 60000, 63024, 66048, 69072, 72096, 75120, 78144, 81168, 84192, 87216,

         .
         .
Sun3 Installation Begin:
         .
Creating root fileystem
              .
Extracting "usr" files from "/dev/nrst0" release tape
         .
Extracting "kvm" files from "/dev/nrst0" release tape
         .
Extracting "install" files from "/dev/nrst0" release tape
         .
         .
Sun3 installation complete.
System installation continues...
File systems check:
         .
         .
         .
If you do not wish to install a small pre-configured
kernel, you may reboot the system now and
configure a kernel for your system.
#
```

If you install a SPARCsystem 300 or a Sun-3/80, see the *Post-installation Procedures* chapter of this manual for information on how to boot the internal disk and modify the boot prom.

Step 8: Review /suninstall.log File

Review the `/usr/etc/install/files/suninstall.log` file. Errors from utilities, such as `tar`, will appear in this file even if they scroll off the screen during installation.

Step 9: Aborting the System

Abort the system using `L1-A` for Sun monitors or `BREAK` for tty terminals.

See the *Abort Sequence* section of *Chapter 3* of this manual for more information.

Step 10: Booting the System

To boot the system do the following:

```
>b
```

Step 11: Completing Post-installation Procedures

Complete post-installation procedures as necessary. See *Chapter 7* of this manual for a list of post-installation procedures.

If you want to set a root password, see *Chapter 5* of this manual.
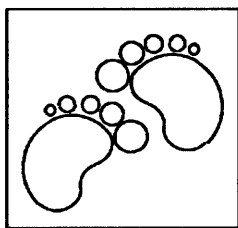
6.7. Remote Installation: Standalone

Introduction

The major differences between a remote installation and a local installation arise in the method for formatting a disk and copying the miniroot. There are only minor differences once you are in *suninstall*.

Remote installation is required when a workstation with a local disk(s) does not have a local tape drive. Two major tasks must be performed, and each of these requires the services of another system.

I. Executing `format`, copying the miniroot filesystem onto the system disk drive, and booting the miniroot filesystem. This task primarily uses the client supporting capabilities of the server.

II. Executing *suninstall* to install the SunOS. This task primarily uses the tape drive capabilities.

Task I is performed by temporarily making the target system a diskless client. To make the target system a diskless client, the services of a temporary server are required. The temporary server is known as the *remotehost*.

Task II requires the services of a system with a local tape drive which will be referred to as the *tapehost*. The tapehost provides the services of its tape drive to copy the miniroot and execute *suninstall*.

In most cases, task I and task II utilize the services of same host. It is possible, however, for the *remotehost* and the *tapehost* capabilities to be taken from two different systems.

I. Primarily uses the diskless client server capabilities.

II. Primarily uses the tape drive capabilities.

The *tapehost* and the *remotehost* must be running at least SunOS 4.0 before you can perform a remote installation of SunOS 4.0.3.

If you are installing a tapeless system with a variant sub-architecture, such as a Sun-3/80 (Sun-3*x*), the *tapehost* and *remotehost* must also be running SunOS 4.0.3 or the remote system will not find its proper sub-architecture dependent executables.

Tapeless Sun-2, Sun-3, and Suns-4 workstations can access any server running SunOS 4.0 or later which exports the executables for their architectures.

Example Variables:

The following variables are used in this walkthrough example. If you are using this example as a guide to install your own system, use the device names and network information applicable for your system.

□   hostname (target machine): *trigger*

□   architecture: *sun4*

□   system type: standalone

□   internet address: *192.9.101.64*

□   remote SCSI tape drive: *st0*

□   ethernet interface: *ie0*

□   sun4 remotehost: *royrogers*

□   remotehost internet address: *192.9.101.22*

□   1 Xylogics eagle disk: *xy0*

□   YP client of domain: *home.on.the.range*

□   software categories: *all*

In the following walkthrough example, *Executing format and Booting the Miniroot* covers task I. Task II covers *Executing suninstall*; the execution of *suninstall* utilizing a remote tape drive.

Before beginning the remote installation, verify the available disk space of the remotehost. It is recommended that you have 20 Mb of available space (miniroot+root+swap).

sun microsystems

I. EXECUTING `format` AND BOOTING THE MINIROOT

Step 1: Copying the Miniroot from Tape

Copy the miniroot from the SunOS release tape set into
`/export/exec/client_`*client_ARCH*`/local/miniroot` on the
remotehost.

To do so, mount tape 1 of the SunOS release tape set and do the following:

```
# mt -f /dev/nrst0 rew
# mt -f /dev/nrst0 fsf 3
# dd if=/dev/rst0 bs=1200b of=/export/exec/sun4/local/miniroot
```

Another suitable directory, such as `/home/remotehost`, can be used if disk space is a problem.

Select the blocksize that is appropriate for your tape device from the following table.

Table 6-1   *Blocksize Values*

Tape Device	Blocksize
st0	126b
mt0	20b
mt8	20b

Step 2: Setting /etc/hosts and /etc/ethers

If the remotehost (tapehost) is running yellow pages, the YP master `/etc/hosts` and YP master `/etc/ethers` should contain the target machine's addresses. If the tapehost is not running yellow pages, its local `/etc/hosts` and `/etc/ethers` should contain the target machine's addresses.

Step 3: Executing setup_client

cd to `/usr/etc/install/script`. Then execute `setup_client` to create the target machine as a diskless client of the remotehost.

If the remotehost is running yellow pages, make sure the information added to `/etc/bootparams` on the remotehost is duplicated on the YP master, and the `bootparams` database is remade.

Depending on the content of the *suninstall* utilities of the release, you may need to create an `/etc/exports` file if one does not already exist.

For information on executing setup_client, see the *Adding and Deleting a Client* section in the *Advanced Installation Issues* chapter of this manual.

Step 4: Booting from the Remotehost

Boot from the remotehost in the following way:

```
****For Sun-3 and Sun-4 do the following:

>b ie(,remotehosthex#)-a

****For Sun-2 do the following:

>b ie()-a

****Then, for all:

root filesystem type (spec 4.2 nfs):nfs
root name:<CR>
Boot:vmunix
      .
      .
      .
root filesystem type (spec 4.2 nfs):nfs
root name:<CR>
      .
      .
      .
swap filesystem type (spec 4.2 nfs):nfs
swap name:<CR>
login: root
```

To determine your remotehost (server) number, do the following:

```
maddog% ypmatch server hosts
      192.9.101.22
```

The last digit group of the IP address is the remotehost number. The following table depicts the location of the remotehost number in several IP addresses.

IP Address	Remotehost Number
192.9.101.8	8
192.9.101.22	22
192.9.101.102	102

To translate the remotehost number into hexadecimal, do the following:

```
maddog% adb
0thex#=x




For remotehost 22, it would be:

maddog% adb
0t22=x


        16 (hex of 22)

^D
maddog%
```

Step 5: Creating the Disk Devices

Create the disk devices in the following way:

```
# cd /dev
# MAKEDEV Ixy0
```

Step 6: Changing Disk Partition Sizes

If you want to change the `root` partition size, decrease the `swap` partition size, or you have a new disk, execute `format` to format and label the target machine's disk.

Step 7: Copying the Miniroot to Disk

Copy the miniroot to disk in the following way:

```
# dd if=/usr/local/miniroot bs=200b of=/dev/rxy0b
```

Select the blocksize that is appropriate for your tape device from the following tables.

Table 6-2   *Blocksize Values*

Tape Device	Blocksize
st0	126b
st8	200b
mt0	20b
mt8	20b

`/usr/local/miniroot` is the same as `/export/exec/`*client_ARCH*`/local/miniroot` because the target machine mounts the remotehost `/export/exec/`*client_ARCH* on `/usr`.

Step 8: Booting the Miniroot   Boot the miniroot in the following way:

```
# /etc/halt

****For Sun-3 and Sun-4 do the following:

>b ie(,remotehosthex#)-asw

****For Sun-2 do the following:

>b ie()-a


****Then, for all:

root filesystem type (spec 4.2 nfs): 4.2
root device:xy0b
Boot: vmunix
         .
         .
         .
root filesystem type (spec 4.2 nfs): 4.2
root device: xy0b
         .
         .
         .
swap filesystem type (spec 4.2 nfs): spec
swap device [xy5d[a-h]: xy0b
Swapping on root device, OK? y
         .
         .
#
```

To determine your remotehost (server) number, see *Step 4. Booting From the Remotehost* in this walkthrough.

II. EXECUTING *suninstall*

Step 1: Editing /.rhosts   Add the target machine's name to / . rhosts on the remotehost, creating the file if it does not already exist.

Step 2: Starting suninstall   Invoke *suninstall* and enter the proper time zone name and terminal type.

```
# suninstall

Welcome to SunInstall

You are about to install a new version of the SunOS on your system.
If this is not a first-time installation and you are upgrading from
a previous version of the operating system, then it is strongly recom-
mended that you perform a full backup of each of your filesystems
which contain user data.  Be advised that as this program runs, it may
re-label some of the disk drives and in some cases may initialize new
filesystems.  After this installation process is complete, you may
restore your user data from backup copies.

Do you wish to continue with the installation [y/n]? y

Enter the local time zone name:

 >> IUS/Pacific

Is this the correct date/time [y/n]:

     Mon Mar 14 08:08:57 PST 1988
 >> y

Select your terminal type:
     1) Televideo 925
     2) Wyse Model 50
     3) Sun Workstation
     4) Other
 >> 3
```

The *suninstall* Main Menu is displayed:

```
            Sun Microsystems System Installation Tool

                           Main Menu

     On-line help information prints summary of cursor usage
              + means the data file(s) exist(s)

                    assign host information

                    assign disk information

                    assign software information

                    assign client information

                    on-line help information

                    start the installation

                    exit from suninstall

  [x/X=select choice]  [space=next choice]  [^B/^P=backward]  [^F/^N=forward]
```

Step 3: Assigning Host Information

To assign host information, select assign host information from the *suninstall* Main Menu. The following Host Form is displayed.

Select [standalone] by putting an **x** in front of the selection.

If you are going to install a pre-configured kernel after suninstall has completed, answer n to the question: Reboot after completed. For more information on pre-configured kernels, see the *Post-installation Procedures* chapter of this manual.

```
HOST FORM      [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------
Workstation Information :
      Name : trigger
      Type : x[standalone]   [server]   [dataless]


Network Information :
      Ethernet Interface :    [none] x[ie0]
      Internet Address 0 :    192.9.101.64


      YP Type             :   [none]   [master]   [slave] x[client]
      Domainname          :   home.on.the.range

Misc Information :
      Reboot after completed : x[y]   [n]


Are you finished with this form [y/n] ? y
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

You are returned to the *suninstall* Main Menu when you exit the Host Form.

Step 4: Assigning Disk Information

To assign disk information, select assign disk information from the *suninstall* Main Menu.

The following Disk Form is displayed for a server configuration.

```
DISK FORM        [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------------
 Attached Disk Devices :
   x[ xy0]

 Disk Label               : x[edit default]  [edit existing]  [use data file]
 Free Hog Disk Partition  : [d]  [e]  [f]  [g]  x[h]
 Display Unit             : x[Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]


PARTITION START_CYL BLOCKS    SIZE      MOUNT PT               PRESERVE(Y/N)
===============================================================================
     a       0       16048     8        /                          n
     b      59       33456     17
     c       0      276896    141
     d       0           0     0
     e       0           0     0
     f       0           0     0
     g     570       87856    44        /usr                       n
     h       0           0     0

Ok to use this partition table [y/n]  ? y
Are you finished with this form [y/n] ? y

[x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The numbers under the columns START_CYL, BLOCKS, and SIZE are for this example only. The numbers will be different for each disk and they depend on the existing label on the disk specified. The *suninstall* Main Menu is displayed when you exit from this form.

PRESERVE (Y/N)

PRESERVE, specifies preserving the original disk state. If you answer Y, you preserve the original filesystem. If you answer N, you create a new filesystem and the data from the original filesystem is destroyed.

If you alter the starting point or size of a partition, you cannot preserve its original state, or any other partition's state that is forced to be relocated as a result of re-partitioning.

You are returned to the main menu when you have finished with the Disk Form.

Step 5: Assigning Software Information

To assign software information, select `assign software information` from the Main Menu. The following Software Form is displayed:

STOP   You must select **mt0** for 1/2" tape and **st0** for 1/4" tape no matter what your actual tape device is.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
---------------------------------------------------------------------------
Architecture Information :
      Type           :   [sun2] [sun3] [sun3x] x[sun4] [sun4c]
      Path where executables reside :/usr
      Path where sub-arch dependent executables reside :/usr/kvm

Media Information:
      Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
      Drive Type  :   [local]  x[remote]
      Tapehost    :  royrogers
      Tapehost's Internet Address :192.9.101.22

Choice             : x[all]   [default]   [own choice]   [required]   [quit]


      CATEGORY        NAME        BYTES       AVAIL BYTES        Y/N


      ==========================================================
      required        root        181248      8216576            y
      required        usr         20971520    44982272           y
      required        Kvm         2620416     24010752           y
      required        Install     1153024     9558037            y
      desirable       Sys         2720768     21289984           y
      desirable       Networking  953344      20336640           y
             .
             .
        .
OK to use this extract list [y/n] ? y
Are you finished with this form [y/n] ? y

   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

The list of categories extracted for the selected architecture are displayed on the form below.

The form below lists the categories extracted for the Sun-4 architecture.

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------------
Architecture Type Information :
     Type          :    [sun2] [sun3] [sun3x] x[sun4] [sun4c]
     Path where executables reside :/usr
     Path where sub-arch dependent executables reside :/usr/kvm

Media Information:
     Device Type : x[st0] [st1] [st2] [ar0] [mt0] [xt0]
     Drive Type  :    [local] x[remote]
     Tapehost    : royrogers
     Tapehost's Internet Address :192.9.101.22

Choice           : x[all]  [default]  [own choice]  [required]   [quit]


         Extract list:

              root
              usr
              Kvm
              Install
              Sys
              Networking
              .
              .
              .

Are you finished with this form [y/n] ? y
   [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

Step 6: Adjusting the /usr Partition

After you select the software, return to the Disk Form. Add approximately 5 - 10 Mb to the /usr partition to allow for customizing the kernel. Do this by changing the numbers using the editor.

Step 7: Starting the Installation

To start the installation, select start the installation from the Main Menu.

You are prompted when the tape needs to be changed. If any information is missing, the installation will not start. You can abort the installation at any time by using (CTRL-C) and either restart using the existing information or reassign information before restarting.

The following messages are displayed after the installation begins:

```
System Installation begin :

 Label disk(s) :
      xy0

 File systems check :
 /dev/rxy0a:       140624 sectors in 752 cylinders of 11 tracks, 17 sectors
          72.0Mb in 47 cyl groups (16 c/g, 1.53Mb/g, 640 i/g)
 super-block backups (for fsck -b#) at:
  32, 3056, 6080, 9104, 12128, 15152, 18176, 21200, 24224, 27248,
  30272, 33296, 36320, 39344, 42368, 45392, 47904, 50928, 53952, 56976,
  60000, 63024, 66048, 69072, 72096, 75120, 78144, 81168, 84192, 87216,

     .
     .
     .
Sun4 Installation Begin:
     .
Creating root filesystem
     .
Extracting "usr" files from "/dev/nrst0" release tape
     .
Extracting "kvm" files from "/dev/nrst0" release tape
     .
Extracting "install" files from "/dev/nrst0" release tape
     .
     .
     .
Sun4 installation completed.
System installation continues...
File systems check:
     .
     .
     .
If you do not wish to install a small pre-configured
kernel, you may reboot the system now and
configure a kernel for your system.
```

If you install a SPARCsystem 300 or a Sun-3/80, see the *Post-installation Pro-cedures* chapter of this manual for information on how to boot the internal disk and modify the boot prom.

Step 8: Reviewing suninstall.log   Review the /usr/etc/install/files/suninstall.log file. Errors from utilities, such as tar, will appear here.

Step 9: Removing the Client Partition

Once the installation is complete, remove the client partition created for the target machine. **cd** to `/usr/etc/install/script` and execute `setup_client` using the `remove` option.

For more information, see the *Adding and Deleting a Client* section of the *Advanced Installation Issues* chapter.
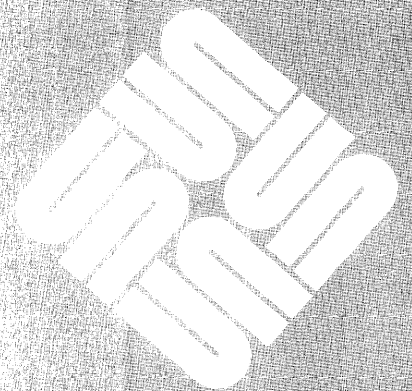
It is recommended that you also remove the client hostname from the `.rhosts` file for security purposes.

Step 10: Completing Post-installation Procedures

Complete post-installation procedures, as necessary. See *Chapter 7* for a list of post-installation procedures.

7

Post-Installation Procedures

7

Post-Installation Procedures

7.1. Introduction

This chapter is divided into the following sections:

□ Booting your SPARCsystem 300 or Sun-3/80

Directions on booting the internal disk and modifying the boot prom.

□ Post-installation issues

Issues you should be aware of before you begin the post-installation procedures

□ Post-installation procedures

Post-installation procedures are used to fine tune your system once it is installed. Even though a number of the following steps are only applicable to systems restoring a customized environment, you should review the entire list of procedure steps to determine what you need to do to optimize system performance. The procedures in this chapter are *suggested* for restoring customization of the environment.

□ The Small Pre-configured Kernel

Explains the small pre-configured kernel and the install_small_kernel script. It also defines the configurations supported by the small pre-configured kernel.

□ Installing the Small Pre-configured Kernel

Gives the steps for installing a small pre-configured kernel while in the miniroot and while in multi-user mode.

□ Standard Kernel Configuration Files

Explains the standard kernel configuration files and their uses.

□ Configuring a Custom Kernel

Gives the steps for configuring a custom kernel for a local disk and for diskless and dataless clients.

7.2. Booting Your SPARCsystem 300 or Sun-3/80

The internal disk in both the SPARCsystem 300 and the Sun-3/80, require a special booting procedure after `suninstall` is completed. When `suninstall` is completed, you have the # prompt. The following steps walk you through the boot process and the modification of the boot prom.

Boot Procedure

Step 1: Halting the System

Halt the system using the following method.

```
L-1a
```

Step 2: Booting the Internal Disk

Boot the internal disk using the following method.

```
> b sd(0,18,0)
```

This will return you to the login prompt.

Step 3: Logging in as root

Log in as `root` using the following method.

```
login: su
Password: type your password
#
```

Step 4: Modifying the Boot Prom

Type the following commands to modify the boot prom. These commands need to be executed to change the values so you can boot off the internal **sd6** device.

```
# eeprom bootdev=`'"(0,18,0)"''
# eeprom default_boot=`'true''
```

You can check the values of the eeprom by typing **eeprom** and checking the results of the two values changed above.

7.3. Post-installation Issues

Before proceeding to the post-installation procedure steps, read the following post-installation issues relating to

- □ Shared libraries
- □ Freeing disk space
- □ New kernel object files

Shared Libraries

If you receive an error message such as the following after installation, it indicates that the program executed was compiled using a library of a newer minor revision level (in this case `libc.so.1.2`) than can be found on the system at execution time (`libc.so.1.1.1`).

```
ld.so: warning: /usr/lib/libc.so.1.1.1 has older revision \
than expected 1.2
```

This warning is harmless and can be ignored. New minor releases (i.e. 4.0.3) of libraries differ from older ones due to software problem modifications. A major release number (i.e. 4.0) indicates a change in interface or functionality, and `ld.so` does not allow a program to execute if a library of the same major revision cannot be found. For more information, see the *Programming Utilities and Libraries* manual.

Freeing Disk Space

When `sunupgrade` installs updated shared libraries, it does not overwrite the older versions since the file names differ due to the revision number changes. The existence of the old libraries does not cause complications as `ldconfig` and `ld.so` automatically choose the highest revision of libraries available. You may, however, whish to free the disk space used by the obsolete libraries. The following example illustrates a method for removing the outdated libraries.

```
# cd /usr/lib
# ls libc.s*
libc.sa.1.1*      libc.sa.1.2*      libc.so.1.1.1*
libc.sa.1.1.1*    libc.so.1.1*      libc.so.1.2*
# rm libc.s?.1.1 libc.s?.1.1.1
```

New Kernel Object Files

The relationship between the modification dates of the new kernel object files shipped with a release and the date that a kernel was last made on a system can cause the `make` utility to incorporate the new object files when a new kernel is made. To avoid this potential problem, do the following when configuring a custom kernel:

```
# cd /sys/ARCH/conf
# rm -rf ../SYS_NAME
```

Then type the following immediate before execution:

```
# config SYS_NAME
```

The procedure described above ensures that the newest kernel objects are included in the new kernel.

7.4. Post-installation Procedure Steps

Step 1: Installing Patch Tapes

Install patch tapes, if applicable. Follow the instructions that accompany each tape. Make sure the patch tapes are for the appropriate SunOS and architecture.

Step 2: Restoring Customized Files to /usr

If you copied customized files as part of the pre-installation procedures, restore them now. For example, files from `/usr/local` and `/usr/spool/mail` may need restoration.

Step 3: Defining the Correct Terminal Type

Edit `/etc/ttytab` so it has the correct terminal type for the console.

The default terminal type is Sun. If you are using another terminal type, you must edit `/etc/ttytab` to reflect the correct terminal. The terminal type must be known in the termcap database.

Step 4: Adjusting Ordering of fsck Passes

OPTIONAL: Adjust the ordering of entries in `/etc/fstab` to alter the order of `fsck` passes. If you have more than one disk, you may want to re-order the `fsck` passes on the partitions to allow for simultaneous passes. For more information, see the *System and Network Administration* manual.

Step 5: Verifying ifconfig

Verify the `ifconfig` lines in `/etc/rc.local` or `/etc/rc.boot` to make sure they reflect the proper installation of the network.

For example, make sure the second interface has the correct name.

Step 6: Customizing /etc/exports

Customize and secure `/etc/exports` as desired.

For users upgrading from 3.x, this file changed format in 4.x. For more information, see the *System and Network Administration* manual.

Step 7: Integrating fstab Entries

Integrate old `fstab` entries into `/etc/fstab`. Mount the desired filesystems.

Step 8: Merging crontab Files

Run the `crontab` command. See the `crontab(1)` man page for more information.

This merges the old `crontab` entries into the new `crontab` files. The new `crontab` file is located in `/var/spool/cron/crontab/root`. Entries from the old file can be merged in. They do not include `at` and `syslog` entries.

Step 9: Configuring a Custom Kernel

If you did not install a small pre-configured kernel, configure a custom kernel to replace the default GENERIC kernel. See the *Installing a Small Pre-configured Kernel* section in this chapter for information on installing a small pre-configured kernel. See the *Configuring a Custom Kernel* section in this chapter for more information on customizing a default GENERIC kernel.

Step 10: Running ypinit	For YP servers, run `ypinit`. For more information, see the *System and Network Administration* manual.
Step 11: Creating a bootparams Map	If a YP bootparams map does not exist on the YP master, and if you will be serving diskless clients on the network, create a bootparams map. For more information on creating a bootparams map, see the *System and Network Administration* manual.
Step 12: Checking Desired Modes in Files	Check for desired modes on `/etc/dumpdates`, or other files used by locally developed system administration tools.
Step 13: Checking System Scripts	**REMEMBER:** Disk partitions may have changed. Any system scripts that referred to old partitions (i.e. `dump` and `restore` scripts, etc.) may need to be modified. This is especially relevant for software that used to affect `client` and `nd` partitions.
Step 14: Running catman	**OPTIONAL:** If man pages were selected during installation, and there is enough disk space, run `catman`. This program preformats the man pages.
Step 15: Backing Up the System	Make a complete backup of the system following post-installation customization. For more information, see the *System and Network Administration* manual.
Step 16: Rebooting Clients	Reboot all clients.

7.5. The Small Pre-configured Kernel

Why Install a Small Pre-configured Kernel?

The default GENERIC kernel vmunix is automatically installed on your system upon the completion of *suninstall* or sunupgrade. Because of the new peripherals and software options supported by the default GENERIC kernel in SunOS 4.x, it is recommended that you replace the default kernel with a small pre-configured kernel, or a customized kernel to optimize system performance.

If you are installing one of the systems listed below and do not want to build a customized kernel, consider using a small pre-configured kernel. With the added enhancements to 4.x, smaller systems using the default GENERIC kernel will not perform well. A small pre-configured kernel, called the GENERIC_SMALL kernel, eliminates the step of configuring a kernel yourself.

Architectures That Support the Small Pre-configured Kernel

One version of the pre-configured kernel for smaller systems is available for each architecture: Sun-2, Sun-3, Sun-3x, and Sun-4. These files are located in /usr/boot/vmunix_small. They are based on the configuration files named GENERIC_SMALL located in /usr/sys/*ARCH*/conf. Each stripped-down version of the default GENERIC kernel, supports approximately four users as applicable by architecture for the following configurations:

Sun-2:

□   Diskless Sun-2/50

□   Sun-2/50 with up to two SCSI disks, one SCSI tape

Sun-3:

□   Diskless Sun-3/50 and Sun-3/60

□   Sun-3/50 and Sun-3/60 with up to two SCSI disks, one SCSI tape

Sun-3x:

□   Diskless Sun-3/80

□   Sun-3x/80 with up to four SCSI disks

Sun-4:

□   Diskless Sun-4/110 and SPARCsystem 300

□   Sun-4/110 with up to two SCSI disks, one SCSI tape

□   SPARCsystem 330 with up to four SCSI disks, one SCSI tape

For All Servers:

□   For a server, you should install a small pre-configured kernel for each applicable client. If the server has a SCSI disk, you can install a small pre-configured kernel on its root filesystem, as well as for each applicable client.

The following table lists the options available in a default GENERIC configuration file. More information about individual configurations can be found in

sun
microsystems

/usr/sys/*ARCH*/conf in the files corresponding to the architecture.

Table 7-1   *Small Pre-configured Kernel Files*

Configuration Options	Included in GENERIC_SMALL	Description
INET	Yes	Basic networking support
QUOTA	Yes	Disk quotas for local disks
UFS	Yes	Filesystem code for local disk
NFSCLIENT	Yes	NFS client side code
NFSSERVER	Yes	NFS server side code
LOFS	No	Loopback filesystem needed by NSE
SYSACCT	Yes	Process accounting
SYSAUDIT	Yes	C2-level auditing
IPCMESSAGE	No	Sys V IPC messaging facility
IPCSEMAPHORE	No	Sys V IPC semaphore facility
IPCSHMEM	No	Sys V IPC shared memory facility
TCPDEBUG	No	TCP debugging see trpt(8)
CRYPT	Yes	Software encryption
SP	No	Streams pipe

The install_small_kernel Script

To install a small pre-configured kernel, the install_small_kernel script is supplied to overwrite the default GENERIC kernel with a smaller version which is tailored to a selected architecture. The install_small_kernel script supports standalone, diskless, and server configurations. Dataless configurations are only supported if the script is run following the completion of sunupgrade.

The install_small_kernel script should only be run from the miniroot, after suninstall is completed. It can also be run from the miniroot or in single-user mode after sunupgrade is completed. In both cases, it is important that the system not be rebooted *before* running the install_small_kernel script.

Instructions for using this script are given in the following section: *Installing a Small Pre-configured Kernel*. This section contains instructions for installing the small pre-configured kernel in the miniroot, as well as in multi-user mode.

7.6. Installing a Small Pre-configured Kernel

The installation procedure for installing a small pre-configured kernel can be performed in the following ways:

☐ From the miniroot, following the completion of suninstall or sunupgrade using the install_small_kernel script.

☐ From single-user mode, following the completion of sunupgrade

sun microsystems

□   In multi-user mode, manually.

From the Miniroot: The script used to install a *small pre-configured kernel* is the `install_small_kernel` script. You start it from the miniroot after `suninstall` or `sunupgrade` is completed.

To install a small pre-configured kernel, DO NOT immediately boot the system after `suninstall` or `sunupgrade` is completed. For `suninstall`, this means that you must answer **no** to the following question in the Host Form: `Reboot after completed?` For `sunupgrade`, the script prompts you when the upgrade is complete and tells you that one of your options is to install a small pre-configured kernel.

Step 1: Starting the   Start the `install_small_kernel` script in the following way:
install_small_kernel Script

```
# cd /usr/etc/install
# install_small_kernel.
```

Step 2: Rebooting Your System   Reboot your system when you receive the completion message. If the small pre-configured kernel is successfully installed on a system, you receive the following completion message:

```
The small pre-configured kernel has been installed on
list of systems installed

You may reboot your system now.

[ L1-a ]
>b
```

If the small pre-configured kernel was not installed after running the script (e.g.none of the questions were answered or an error occurred), you receive the following message:

```
The small pre-configured kernel has not been installed.
```

In this case, you can either reboot your system or run the `install_small_kernel` script again.

Step 3: Removing the Default GENERIC Kernel File

Once your system is fully operational, you can remove the default GENERIC kernel that is saved by the script.

For a Full Installation:
If you performed a full installation, use the following command to remove the default GENERIC kernel file:

```
# rm -f /vmunix.orig
```

Make sure your system is running without complications *before* you remove the default GENERIC kernel or the sunupgrade temporary files. If you have problems with the small pre-configured kernel once you reboot your system, you will want to re-install the default GENERIC kernel and then try another installation of the small pre-configured kernel.

For an Upgrade:
To remove the files created by sunupgrade for the small pre-configured kernel installation, use the following command:

```
# rm -rf /usr/tmp/files
```

In Multi-User Mode:

There are two methods for installing a small pre-configured kernel in mutli-user mode:

□   For standalone, dataless, and server configurations

□   For diskless client configurations

Standalone, Dataless, and Server Configurations:

To install a small pre-configured kernel for standalone, dataless, server and client configurations while in multi-user mode, you must login as root and follow the steps listed below.

Hardware support for the small pre-configured kernel is limited to the configurations listed in the *Architectures That Support the Small Pre-configured Kernel* section of this chapter.

Step 1. Saving the Existing Kernel

Save the existing kernel using the following method:

```
# cp -p /vmunix /vmunix.orig
```

Step 2. Copying the Small Pre-configured Kernel

Copy the small pre-configured kernel using the following method:

```
# cp -p /usr/boot/vmunix_small /vmunix
```

Step 3. Rebooting the System

Reboot the system using the following method:

```
# sync
# sync
# reboot
```

Step 4. Removing the Original Kernel

Once your system is fully operational, you can remove the default GENERIC kernel that is saved by the script.

Make sure your system is running without complications *before* you remove the default GENERIC kernel or the sunupgrade temporary files. If you have problems with the small pre-configured kernel once you reboot your system, you will want to restore the default GENERIC kernel and then try another installation of the small pre-configured kernel.

```
# rm -f /vmunix.orig
```

Diskless Client Configurations:

To install a small pre-configured kernel on a server, for its clients, use the following steps.

Step 1. Gathering Client Information

Gather the following information for each client:

□   Name of directory on the server containing the root path for the clients. The default is /export/root which is used in the example below.

□   Name of directory on the server containing the kvm path for the client. The default is /export/exec/kvm which is used in the example below.

□   Hostname and architecture of the client which will receive the small kernel. For this example, assume client's hostname is *clientname* and its architecture is *ARCH*

Step 2. Saving the Original Kernel

Save the original kernel located in client's root path:

```
# cp -p /export/root/clientname/vmunix \
/vmunix/export/root/clientname/vmunix.orig
```

Step 3. Copying the Small Pre-configured Kernel

Copy the small pre-configured kernel from client kvm path to the root path in the following way:

```
# cp -p /export/exec/client_ARCH/boot/ \
/vmunix_small /export/root/clientname/vmunix
```

Repeat steps 1 through 3 for each client.

Step 4. Rebooting the Server

Reboot the server in the following way:

```
# sync
# sync
# reboot
```

Step 5. Removing the Original Kernel

Once your system is fully operational, you can remove the default GENERIC kernel that is saved by the script.

Make sure your system is running without complications *before* you remove the default GENERIC kernel or the sunupgrade temporary files. If you have problems with the small pre-configured kernel once you reboot your system, you will want to restore the default GENERIC kernel and then try another installation of the small pre-configured kernel.

```
# rm -f /export/root/clientname/vmunix.orig
```

7.7. Standard Kernel Configuration Files

Standard kernel configuration files for most systems are also available to help eliminate some of the steps of configuring a custom kernel. These files are designed for minimum editing on selected architectures with typical hardware configurations. One of these may be suitable for your system with little or no editing.

On your installed system, the directories /usr/sys/*ARCH*/conf contain a number of configuration files which are stripped-down versions of the default GENERIC kernel configuration file. The files are named according to the hardware configurations used; for example, those in /usr/sys/sun3/conf, are listed as follows:

```
DL
DL110
DL50
DL60
DL75
GENERIC
SDST110
SDST160
SDST260
SDST50
XDMT160
XDMT260
XYMT160
XYMT260
```

Files beginning with **DL** are for diskless systems; **SDST** files are tailored to SCSI disk and tape interface; and **XD** and **XY** files support Xylogics equipment.

Select one that most closely matches your system configuration and build your kernel, following the procedure described in the section *Configuring a Custom Kernel*.

If you need more information on the functions or requirements of each group of entries in the file, read the comments provided in the default GENERIC kernel file for each architecture.

Sun-2 Standard Kernel Configuration Files

The Sun-2 standard kernel configuration files are located in `/usr/sys/sun2/conf`. **DL** configuration files for diskless Sun-2/50, Sun-2/120, and Sun Model 100 (DL100, DL120, DL50) support up to four users, offer a choice between VME bus and Multibus, and support monochrome only.

The configuration file named **DL** is a more general configuration file for diskless Sun-2s; it includes all DLxx and DLxxx file entries.

Color and graphics processing are provided in selected SCSI- and Xylogics-support files (**XY** and **SD** prefixes), as well in the total-support GENERIC file.

Sun-3 Standard Kernel Configuration Files

The Sun-3 standard kernel configuration files are located in `/usr/sys/sun3/conf`. The **DL** configuration file for diskless Sun-3 systems supports all four CPUs, a VME bus, cg4 color graphics, and up to four users. Other DLxx and DLxxx files offer various combinations of the above, some with color graphics, some monochrome. The DL50 kernel file, for example, could be specific for a Sun-3/50 diskless client.

SDST files support SCSI disk and SCSI tape equipment for the various architectures.

XDMT and **XYMT** files are customized for Xylogics controllers and 1/2-inch tape, plus SCSI disk and tape.

Sun-3x Standard Kernel Configuration Files

Sun-3x standard kernel configuration files are located in /usr/sys/sun3x/conf. **DL** configuration files for diskless Sun-3x architectures support up to eight users. System V IPC, graphics processing and color frame buffer boards are supported. The DL80 file supports an Intel floppy disk controller, cg4 color board, keyboard and mouse.

The Sun-3x GENERIC kernel configuration file includes all the features found in the separate **DL, XD, SD,** and **XY** kernel files. The GENERIC file provides a floppy disk choice of either SCSI (sf0) or Intel (fd0) standard interface.

SDST and **XYXT** kernel files are also provided.

Sun-4 Standard Kernel Configuration Files

The Sun-4 standard kernel configuration files are located in /usr/sys/sun4/conf. The **DL**, diskless, configuration file is the more general configuration file for all Sun-4 architectures and includes the contents of DL110 and DL330.

Supporting up to eight users, each configuration file is designed to work with a particular hardware configuration; for example, the **XYXT260** provides options and functions generally considered likely and suitable for a Sun-4/260 with up to two Xylogics controllers and 1/2" tape, plus one or two SCSI disks and one SCSI tape.

As with the other Sun architectures, there are files for all-SCSI devices, and for various combinations of SCSI/nonSCSI.

The GENERIC kernel configuration file supports all hardware configurations. Before you use the GENERIC kernel configuration file, you should always edit it.

7.8. Configuring a Custom Kernel

This section contains instructions for configuring a custom kernel. Configuring a custom kernel tailors the kernel to fit your environment and significantly improves performance.

The kernel provided with SunOS 4.x supports many more devices than previous releases and is therefore larger than previous kernels. To minimize the amount of memory occupied by the kernel, you must comment out unnecessary kernel entries.

The two main reasons for reconfiguring the kernel are:

1. To free memory that would otherwise be consumed by the unused kernel modules.

2. To tell the kernel about hardware you added after the installation, or software packages that require kernel modification and support.

Configuring a kernel is not a complex task. The GENERIC kernel configuration files contain instructions that help you determine which kernel entries are necessary for your system.
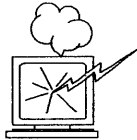
Custom Kernel Configuration Procedures

There are two custom kernel configuration procedures presented in this section:

Procedure I:

  Builds a kernel on a workstation with a local disk.

Procedure II:

  Builds a kernel on a diskless or dataless client.

In ALL cases, a kernel must be compiled on a system of the same architecture as the system on which it will be installed.

The kernel used by a diskless client can be built on its server *only* if the diskless client is of the same architecture as the server. If a diskless client is a different architecture than that of the server (heterogeneous), its kernel must be made on the client.

Procedure I:

Procedure I is simpler to perform than Procedure II, however, it requires write privileges for the /usr filesystem of the workstation you are configuring. You can use Procedure I to build a kernel for any of the following:

□   A standalone workstation

□   A server

□   A diskless client; the same architecture as the server

□   A dataless client; the same architecture as the server

Procedure II:

Procedure II is more complex than Procedure I, however, it allows you to build a kernel without having write privileges for the /usr filesystem of the workstation you are configuring. You can use Procedure II to build a kernel for any of the following:

□   A diskless client; different architecture from the server

□   A dataless client; different architecture from the server

□   Diskless or dataless client without root privileges on the server

Background Information:

Before you configure a custom kernel, you must have installed SunOS 4.x using *suninstall*, or upgraded to SunOS 4.0.3 using sunupgrade. All custom kernel configuration procedures are performed when logged in as root, or superuser.

SYS_NAME, as shown in the following example screens, represents the name given to the custom kernel configuration file. It is typically chosen to match the hostname of the workstation that will run the kernel. The name is automatically compiled into the kernel and is announced when the kernel is booted. For example, a kernel made from a configuration file named MADDOG announces itself when booted as follows:

```
SunOS Release 4.0.3 (MADDOG) #1: Wed Sep 14 15:33:16 PDT 1988
```

A kernel used by several client workstations of a server might be called
MADDOG_CLIENT.

CONFIG_FILE, as shown in the following example screens, represents the name
of the configuration file that you edit for customizing your kernel. While GEN-
ERIC is the default configuration file (i.e. contains all possible hardware and
software supported by the operating system), it is easier to start by using a file
similar to your hardware configuration needs. For example, use DL for diskless
clients. See the *Standard Pre-configured Kernel Files* section in the *Small Pre-
configured Kernel* section of this chapter.

The *ARCH* variable in the example screens which follow show you where to
enter your appropriate workstation architecture: **sun2**, **sun3**, **sun3x**,
sun4 or **sun4c**. Use the workstation architecture for the workstation on which
you are building the kernel.

If you are not sure of the architecture of your system, type the following com-
mand. The architecture of your system will be displayed.

```
% ARCH -k
  sun3
```

If you are configuring a server, you must also configure the kernels for each disk-
less and dataless client.

Procedure I: For a Local Disk

The following procedure shows you how to build a custom kernel for a local
disk.

*Step 1: Creating a Kernel
Configuration File*

Log in as root and execute the following:

```
# cd /usr/sys/ARCH/conf
# cp CONFIG_FILE SYS_NAME
# chmod +w SYS_NAME
# vi SYS_NAME

(Comment out unneeded kernel modules)

# config SYS_NAME
# cd ../SYS_NAME
# make
```

When the make is complete, install the kernel using the next step.

Step 2: Installing the
Configured Kernel

The method for installing a configured kernel depends on the configuration of the workstation the kernel was built on. The following three methods are presented for installing a configured kernel.

□   Standalone or server workstation

□   Diskless client of the same architecture as the server

□   Dataless client of the same architecture as the server

Standalone or Server:

To install the kernel on a standalone or server workstation, use the following method.

```
# mv /vmunix /vmunix.orig
# cp vmunix /vmunix
```

Diskless Client:

To install the kernel on a diskless client workstation of the same architecture as the server, use the following method.

```
# mv /export/root/SYS_NAME/vmunix /export/root/ \
SYS_NAME/vmunix.orig
# cp vmunix /export/root/SYS_NAME/vmunix
```

Dataless Client:

To install the kernel on a dataless workstation of the same architecture as the server, log onto the dataless workstation as root and use the following method.

```
# mv /vmunix /vmunix.SV
# cp /usr/sys/ARCH/SYS_NAME/vmunix /vmunix
```

Step 3. Halting and Rebooting the System

Once you have installed the kernel, halt and reboot the system in using the following method.

```
# /etc/halt
>b
```

Procedure II: For Diskless or Dataless Clients

The following procedure shows you how to build a kernel for a diskless or dataless client.

The following example makes the kernel in the /sys directory of the client. The client's /sys file is located in the /export/root filesystem of the server.

You must have at least two megabytes (2 Mb) of disk space available to make a kernel. If the space is not available in the /export/root filesystem, the procedure can be done in any other filesystem which has sufficient space *and* is writable by the client.

Step 1. Creating the Configuration File

Log in as root and execute the following.

```
# mkdir /home/hostname
# cd /home/hostname
# ln -s /usr/sys/* .
# rm ARCH
# mkdir ARCH
# cd ARCH
# ln -s /usr/sys/ARCH/* .
# rm conf
# mkdir conf
# cd conf
# ln -s /usr/sys/ARCH/conf/* .
```

Step 2. Configuring and Making the Kernel

Configure and make the kernel using the following method.

```
# cp CONFIG_FILE SYS_NAME
# chmod +w SYS_NAME
# vi SYS_NAME

(Comment out unneeded kernel modules)

# config SYS_NAME
# cd ../SYS_NAME
# make
```

Step 3. Installing the Kernel

When the make completes successfully, install the kernel using the following method.

```
# mv /vmunix /vmunix.orig
# cp vmunix /vmunix
```

Step 4. Halting and Rebooting the System

Once you have installed the kernel, halt and reboot the system in the following way.
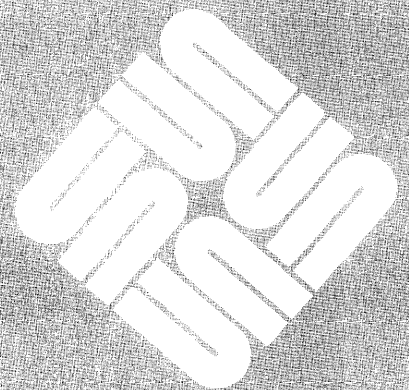
```
# /etc/halt
>b
```

Step 5. Cleaning Up the Filesystem

After the client has successfully booted, save a copy of your customized configuration file and then clean up /sys using the following method.

```
# rm -rf /sys
```

8

Advanced Installation Issues

8

Advanced Installation Issues

8.1. Introduction

This chapter covers installation issues for the advanced user. You can consider yourself an *advanced* user if you have a basic understanding of system administration issues and have installed several system configurations.

This chapter covers the following information:

□ The /export Filesystem

□ The setup_exec and setup_client utilities

8.2. The /export Filesystem

The /export filesystem is the Sun standard filesystem for the location of the executable files for diskless clients. When converting a standalone system to a server, you must allow for enough space in this filesystem for all clients. You can provide for an /export filesystem in *suninstall* on the Disk Form.

It is important to allow enough disk space for the /export filesystem. For each new architecture, allow approximately 75-100 Mb for /usr files and between 28-75 Mb for each workstation client. LISP requires approximately 40 Mb swap area for each client.

If you did not define an /export filesystem when installing your system, you can do so later by using the setup_exec utility. When using setup_exec in this case, do not indicate that you want an execpath or a kvmpath attached to /export. If you do, setup_exec will place /export in the root filesystem and create a disfunctional situation. In this case, select another directory to attach the new files to. Use the same process for setup_client.

Remember to review the files in /etc/exports and the client /etc/fstab files to make sure the server files can be mounted by their clients and that the clients are making the correct mounts. Client /fstab file is normally found in /export/root/*clientname*/etc.

**Adding a Second Disk for an
/export Filesystem**

If you are planning on expanding your system with another disk drive, you may want to consider allocating an entire disk for the /export filesystem. Do this using the format utility and repartition the second disk into one partition.

It is advised that you only use a Sun disk system for this purpose due to the special peripheral files that scan for Sun specific products.

The following steps illustrate how to add a second disk for an /export filesystem, to make the conversion to a server from a standalone system.

Step 1: Making the Device

Make the device for your disk drive in the /dev directory using MAKEDEV.

Step 2: Formatting the Disk

Start the format utility and repartition the new disk. Make a note of the partitions for their relative sizes.

For more information on how to use format, see *Beginning the Installation*, Chapter 4 in this manual.

Step 3: Running newfs

Run newfs for each partition using the following method.

```
# newfs -v disk
```

*Step 4: Entering the Mount
Point*

Enter the mount for new drive in /etc/fstab.

Step 5: Mounting the New Drive

Mount the new drive using the following method.

If you need a mount point, make the directory *before* mounting the drive.

```
# mount -a disk
```

*Step 6: Adding Architecture
Dependendent Files*

If you are adding a client that is a sub-architecture of the server (i.e. adding a Sun-3x client to a Sun-3 server), only to add the kvm and sys files.

If you are building a heterogeneous system, you need to run setup_exec to construct links create an /etc/exports file. You do not need to select software, local/remote, or tape type.

```
host# cd /usr/etc/install
host# setup_exec sun4 /export/exec/sun4 /export/exec/kvm/sun4
host# setup_exec sun3x /export/exec/sun3 /export/exec/kvm/sun3x
```

8.3. The `setup_exec` and `setup_client` Utilities

`setup_exec` and `setup_client` are the main utility commands used throughout the rest of this chapter. The following sections explain each of these utilities and their uses.

setup_exec

`setup_exec` is a utility that allows you to install additional software *after* an installation is completed. It is specifically used when converting a standalone system to a server by adding the client architecture executable files if they are different from that of the server.

For example, if you have a Sun-4 standalone system running SunOS 4.x and you want to convert it to a server that supports both Sun-3 and Sun-4 clients running SunOS 4.x, run `setup_exec` to install the Sun-3 executable files on the system. You do not need to install Sun-4 executable files since the system you are converting to a server is a Sun-4 and is running SunOS 4.x, in which case, the Sun-4 executable files are already in place.

Beginning with SunOS 4.0, `extract_release` is no longer available as a method to extract additional software. You must use `setup_exec`.

The following example illustrates the usage of `setup_exec`.

```
host# setup_exec
usage: setup_exec arch execpath kvmpath [-s]
where arch       = sun2, sun3, sun3x, sun4, sun4c
    execpath     = full pathname of client executables
                   (e.g. /export/exec/sun3)
    kvmpath      = full pathname of sub-arch dependent executables
                   (e.g. /export/exec/kvm/client_arch)
    [-s]         = optional; rewind tape every time
host#
```

OPTIONS

□ arch

The architecture of the client executable files you want to install.

□ execpath

The location of the client executable files. The Sun standard is
/export/exec/*client_ARCH*.

□ kvmpath

The location of the client sub-architecture dependent executable files. The
Sun standard is /export/exec/kvm/*client_ARCH*.

When the you add the first client to a standalone system you must add /usr and
the client's "home" filesystem to /etc/exports. After this is completed,
execute exportfs -a or reboot the server.

The following example shows the addition of the executable files and kvm files
for a Sun-3 client.

```
host# setup_exec sun3 /export/exec/sun3 /export/exec/kvm/sun3
```

You are then prompted for tape drive information, much in the manner of the
suninstall Software Form. See the setup_exec manual page in the *Reference*
chapter of this manual for more information.

setup_client

setup_client is a utility that allows you to create or remove diskless clients.
The setup_client utility is located in

/usr/etc/install/script/setup_client

If you are not already in the directory, do the following before running
setup_client.

```
# cd /usr/etc/install/script
```

See the setup_client man page in the *Reference* chapter of this manual for
more information.

You must add the client to the /etc/hosts and /etc/ethers files on the
server or the YP master before to running setup_client. The YP maps
must also be *pushed*, or distributed to all YP slave servers.

For the first client added to a standalone system converted to a server, start
bootparamd after running setup_client. This can be done by either exe-
cuting /usr/etc/rpc.bootparamd or rebooting the server. The

commands for both a local taped drive and a remote tape drive are exactly the same.

The following example illustrates the usage of `setup_client`.

```
host# setup_client
setup_client: incorrect number of arguments.
usage:
setup_client op clientname yp_type size rootpath swappath homepath execpath arch
where:
    op          = "add" or "remove"
    name        = name of the client machine
    yp_type     = "master" or "slave" or "client" or "none"
    size        = size for swap
                  (e.g. 16M or 16m ==> 16777216 bytes
                        16K or 16k ==> 16384000 bytes
                        16B or 16b ==> 31250 blocks
    rootpath    = parent pathname of client root (e.g. /export/root)
    swappath    = parent pathname of client swap (e.g. /export/swap)
    homepath    = parent pathname of client home (e.g. /home, remotehost:/home)
    execpath    = full pathname of client executables
                  (e.g. /export/exec/sun2, /export/exec/sun3, etc)
    kvmpath     = full pathname of client sub-arch dependent executables
                  (e.g. /export/exec/kvm/sun3x)
    arch        = "sun2" or "sun3" or "sun3x" or "sun4" or "sun4c"

host #
```

Options

□ `add` or `remove`

   Add or remove a client from the server.

□ `name`

   The hostname of the client.

□ `yp`

   The yp type of the client.

□ `size`

   The size of the swap space in bytes reserved for the client.

□ `rootpath, swappath, homepath`

   The locations of the client directories.

□   execpath

The location of the client architecture dependent executables
(/export/exec/*client_ARCH*).

□   kvmpath

The location of the client sub-architecture dependent executables
(/export/exec/kvm/*client_ARCH*).

□   arch

The client's architecture type.

If you are adding a client, setup_client sets up client information under
the directories you specify.

If you are removing a client, setup_client removes the client information
under the directories you specify.

The following table illustrates the Sun standard entries for setup_client.

Table 8-1   *Client Pathnames*

Pathname Created on Server	Pathname Entered in setup_exec
/export/root/*clientname*	/export/root
/export/swap/*clientname*	/export/swap
/export/home/*clientname*	/home
/export/exec/*client_ARCH*	/export/exec/*client_ARCH*
/export/exec/kvm/*client_ARCH*	/export/exec/kvm/*client_ARCH*

setup_client **Examples**   The following examples illustrate the use of setup_client for adding and
removing a client.

Adding a Sun-4 Client   The following examples illustrates the use of setup_client in adding a Sun-
4 client named *astro*.

```
host# setup_client add astro client 16K /export/root \
/export/swap /home /export/exec/sun4 \
/export/exec/kvm/sun4 sun4
```

Removing a Sun-3 Client

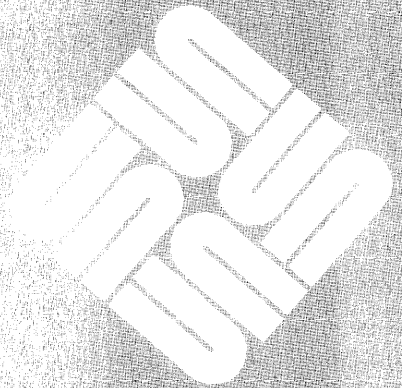The following example illustrates the use of `setup_client` in removing a Sun-3 client named *fred*.

```
host# setup_client remove fred client 16 /export/root \
/export/swap /home /export/exec/sun3 \
/export/exec/kvm/sun3 sun3
```

9

Performing a System Upgrade

9

Performing a System Upgrade

9.1. Introduction

You must use the OS 4.0.3 Upgrade tape to perform a system upgrade. It is the *only* tape that provides the files for a system upgrade.

The `sunupgrade` utility is the program used to perform a system upgrade. A system *upgrade*, selectively replaces the files that have changed between the release you are running and the new release to which you are migrating.

`/usr/etc/sunupgrade` exists in the miniroot on the OS 4.0.3 Upgrade tape. Once these files are copied over to disk, you can run the `sunupgrade` utility to perform a system upgrade. The `sunupgrade` utility provides the necessary files to upgrade your system from SunOS 4.0 or later. The upgrade process is straight forward with a user interface that requires a minimum of input information. It automatically saves user-customized files in a special directory so you can translate your customizations to the new files.

During the upgrade process, `sunupgrade` prompts you for the following information:

□ Tape controller type

□ Local or remote installation

□ Disk device of the `root` partition

□ Any changed directory names, if you are upgrading a server

□ Other information, particularly if performing a remote installation

If you are currently running SunOS 3.x and want to migrate to SunOS 4.0.3, you must perform a *full installation*. See Chapters 2, 3, 4, and 5 in this manual for information on performing a full installation.

As in previous releases, it is strongly recommended that a server be of an equal or more powerful architecture than its clients.

9.2. Upgrade Features

The `sunupgrade` utility contains the following features:

□ The `sunupgrade` utility is available for all configurations on the following architectures: Sun-2, Sun-3, and Sun-4. All Sun-2, Sun-3, and Sun-4 clients of a server are upgraded to SunOS 4.0.3.

□ Checks the existing software files installed on your system against the new upgrade files and automatically installs the new files.

□ Automatically saves and labels user-customized files.

□ Allows for client files and directories that do not conform to Sun standards.

□ The `/sbin/config` and `/usr/etc/upgrade` files are unique to the OS Upgrade.

□ `sunupgrade` now runs in a "no rewind" mode by default, greatly speeding system upgrades.

□ When upgrading a dataless client, `sunupgrade` checks to see whether the server has already been upgraded to the same release. If not, `sunupgrade` will not let you upgrade the dataless client.

□ The `sunupgrade` utility automatically builds data files for the `install_small_kernel` script.

□ The 1/4" tape device is `st0`. This takes advantage of the auto-density selection in the st driver.

9.3. Which Files Are Replaced During an Upgrade?

When you migrate to SunOS 4.0.3, `sunupgrade` checks the software categories you have installed on your system and replaces those files that are different between the release you are running and the *upgrade* release.

To create a log of the files extracted an overlaid during the upgrade process, use the `-l` option when running `sunupgrade`. The log of files you create is saved in the `/usr/etc/upgrade/save` directory. For more information on this option, see the `upgrade(8)` manual page in the *Reference* chapter of this manual.

Only those optional software categories which were previously installed on your system are affected by the upgrade.

Upgrading User-Customized Files

User-customized files, such as those in `/etc` and `/var` are preserved during the upgrade. `sunupgrade` checks the software installed on your system and installs the new files in their respective directories with a trailing suffix so they are clearly distinguishable from the existing files. A list of these files is maintained in the directory `/usr/etc/upgrade/save` in the following files:

□ `special_files` for standalone, server, and dataless clients

□ `<clientname>.special_files` for diskless clients

□ /home/upgrade/special_files for dataless clients

You must copy the customizations from your existing files to the new files. Then, rename the old files to filename.old and the new files to filename.

For example, a new /etc/rc.local file is installed as /etc/rc.local-4.0.3. The old rc.local file remains unchanged. You should inspect the differences between the two files and change the new rc.local file to reflect the site or user-specific changes of the old rc.local file. After editing the new files, rename rc.local to rc.local.old, and rc.local-4.0.3 to rc.local.

The diff(1) utility is useful for comparing the old and new files.

9.4. Background Information

The following information is *essential* to understanding the upgrade process. Review this information carefully *before* you begin the upgrade procedure.

Planning for Disk Space

Upgrading your system requires the temporary use of additional disk space. If the required disk space is not available when you run sunupgrade, it can cause the upgrade to fail.

sunupgrade

As a general rule of thumb, allow 2-3 Mb of free disk space for each partition that it writes into.

Verify that there is 2-3 Mb of free disk space on the /, /usr, /var, /export, /root, and /exec partitions. Also verify that any client root and /usr, /export/root, and /export/share partitions have 2-3 Mb of available space.

sunupgrade uses disk space in the following ways:

□ Disk space is used temporarily when sunupgrade replaces old files with new files. The old files are not removed until the new files are in place and labeled with the correct names, thus creating a temporary demand for disk space equal to the size of the new files. This is important to note, since many executable files exceed 1 Mb thus creating a temporary demand for storage in excess of 1 Mb.

□ Disk space is used when sunupgrade saves old versions of files in addition to the new versions. In particular, the old kernel, *vmunix*, is renamed and a new GENERIC kernel is installed in its place. This alone consumes approximately 1 Mb of disk space. To a lesser degree, old versions of /etc and /var require disk space when saved.

□   Disk space may be used to create working files and append log entries to `special_files`.

□   `sunupgrade` extracts software categories from the distribution tape based on the existence of certain representative files. If you have previously installed a software category, and not completely deleted its component files, `sunupgrade` may re-extract the entire software category, therefore using up free disk space.

If your upgrade fails due to lack of disk space, allocate more disk space in the required areas and re-run `sunupgrade`. If restarted, `sunupgrade` simply overwrites any files it wrote in the first attempt.

`sunupgrade` Assumptions

SunOS 4.x allows considerable flexibility in naming and locating important partitions and directories when configuring clients and servers. Sun recommends certain conventions in these areas, however, some sites choose to differ from Sun conventions.

`sunupgrade` makes important assumptions about the location and use of key directories listed below. If your site does not follow Sun conventions in these cases, you must implement the suggested work arounds.

Assumptions for Servers

All client `root` directories are assumed to be in one directory. The Sun convention for client `root` directories is `/export/root`. `sunupgrade` prompts you for the pathname to this directory during the upgrade process. If your client root directories are not organized in one directory, use the work around in the next section when upgrading. `sunupgrade` assumes that all client `root` directories can be reached from one client `root` pathname to be upgraded: either directly or via symbolic link.

All client `/usr` directories are assumed to be under one directory. The Sun convention for client `/usr` directories is `/export/exec`. `sunupgrade` prompts you for the pathname to this directory during the upgrade process. If your client `/usr` directories are not organized in one directory, use the work around in the next section when upgrading. `sunupgrade` assumes that client `/usr` directories can be reached from one client `/usr` pathname to be upgraded; either directly or via symbolic link.

Assumptions for Dataless Clients

All `/usr` directories are assumed to be resident on the server and mounted from the server on the client over NFS. All other `root` partitions are assumed to be local to the dataless client.

Sun-2 Support

All Sun-2 clients of a server can be upgraded to SunOS 4.0.3 for all server configurations.

On a heterogeneous server, Sun-2 clients now mount /export/share onto their /usr/share partitions, and not /export/share.sunos4.0. sunupgrade automatically updates the /etc/fstab files of all existing Sun-2 clients on a server that was upgraded to SunOS 4.0.2 using sunupgrade.

Work Around: Client Files Not in One Directory Tree

This section explains how to create links to client root and exec directories that do not conform to Sun conventions. Sites which do not adhere to the Sun convention of placing client root and exec files in one directory tree should do the following *before* running sunupgrade.

For Client exec *Directories:*

Select the partition which contains most of the client executables as the primary exec directory. Then, create a symbolic link in the primary exec directory for every exec directory not in the primary directory.

For example, if /export/exec is your primary client exec directory and the server is a Sun-3, the following example shows how to verify the existence of the /export/exec/sun3 directory.

```
toots% file /export/exec/*
sun3:          symbolic link to /usr
lost+found:    directory
```

If you previously installed exec files for a Sun-4 client in /home/somedir, you need a symbolic link from the primary client exec directory. The following example shows how to verify the existence of the /home/somedir/sun4 directory.

```
toots% ls /home/somedir
sun4
toots% file /home/somedir/sun4
sun4:  directory
```

The following example shows how to set up a symbolic link. This guarantees that sunupgrade will be able to find the client executables by following the symbolic link.

```
toots% cd /export/exec
toots% ln -s ../../home/somedir/sun4
toots% file *
sun3:          symbolic link to /usr
sun4:          symbolic link to ../../home/somedir/sun4
```

Unless you are in multi-user mode, pathnames should be preceded by the mount point (/a).

For Client root *Directories:*   Select one directory as your primary client root directory and set up links for entries that are not in the primary directory. Use the same method as described above for the exec files. This guarantees that sunupgrade will be able to find the client by following the symbolic links.

For example, if /export/root is your primary client root directory and contains clients *whammo* and *zappo*, while client *glitchy* is in directory /someother, your primary client root directory should look as follows:

```
toots% file /export/root/*
whammo:   directory
zappo:    directory
glitchy:  symbolic link to ../../someother/glitchy
```

9.5. Before You Begin

□ sunupgrade runs in a no rewind mode by default, greatly speeding system upgrades. Running sunupgrade from the SunOS 4.0.3 miniroot always allows for the no rewind operation. However, a remote installation from a tapehost running a release prior to SunOS 4.0.3, disables the no rewind operation. You can explicitly disable the no rewind operation by starting sunupgrade using the -n flag:

```
# sunupgrade -n
```

□ The sunupgrade utility automatically builds data files for the install_small_kernel script. This script can be run after sunupgrade is completed and before rebooting the system. The install_small_kernel script installs a small pre-configured kernel on your system. For more information on which systems support the small pre-configured kernel and how to install it, see the *Post-installation Procedures* chapter in this manual.

For All Installations: Gather the following information *before* you begin the upgrade.

□ The Disk Device of the root Partition

Know the disk device that the root (/) partition resides on. The following table lists the available disk device types supported by this upgrade.

Device	Description
xy	Xylogics 450/451 SMD disk controller
xd	Xylogics 7053 disk controller
sd	SCSI disk controller

□ Tape Controller Type

Know the system's tape controller type. The following table lists the supported tape controller types.

Controller	Description
mt	Tapemaster Nine-track 1/2" tape
xt	Xylogics Nine-track 1/2" tape
st	SCSI 1/4" cartridge tape

For Remote Tape Installations:

If you are performing an installation over the network from a remote tape drive, gather the following information *before* you begin the upgrade:

☐ Tapehost Hostname

Know the hostname of the machine with the tape drive (the tapehost).

☐ /etc/hosts

Ensure that the /etc/hosts file of the machine that you are updating includes the Internet address and hostname of the tapehost.

☐ /.rhosts

Ensure that the /.rhosts file on the tapehost machine includes the hostname of the system you are updating.

☐ Ethernet controller type.

Know the ethernet type and number of the system you are updating. Common ethernet number/types are ie0 and le0.

☐ Sys category files

For a remote installation with a tapehost running SunOS 4.0.2 or later, you must have Sys software category files installed on the tapehost. If the tapehost does not have the Sys category files installed, the upgrade will be significantly slower if using a 1/4 inch tape drive.

If you do not have Sys files installed on the remotehost, do the following on the tapehost/server *before* beginning the upgrade:

```
astro% mkdir /usr/share/sys
astro% mkdir /usr/share/sys/conf.common
astro% cd /usr/share/sys/conf.common
astro% strings /vmunix | grep Release | awk '{print $3}' > RELEASE
```

Adding Additional Software After Upgrading

There are two methods for adding additional sofware *after* you have completed an upgrade or installation:

1. Use setup_exec in conjunction with the SunOS 4.0.3 Beta full installation tapes selecting the desired software.

2. Use setup_exec in conjuction with the SunOS 4.0 Rev. A full installation tapes selecting the desired software. Then re-run sunupgrade using the OS 4.0.3 Upgrade tape.

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9.6. Upgrade Summary

This is a summary of the necessary steps for upgrading your system. For specific configuration examples, see the following section, *Upgrade Walkthrough Examples*

1.   Become super-user and back up all filesystems.

2.   Verify the available disk space. Approximately 2-3 Mb free disk space is required for each disk partition that is updated. See the *Planning Disk Space* section in this chapter for more information on these requirements.

3.   Halt the system.

4.   Copy the miniroot.

5.   Run `sunupgrade`.

    `sunupgrade` interactively prompts you for the following information:

    □   Tape controller type

    □   Local or remote installation

    □   The disk device of the `root` partition

    □   Changed directory names of client partitions, if you are upgrading a server

6.   OPTIONAL: Install a small pre-configured kernel. See the *Post-installation Procedures* chapter in this manual for more information.

7.   Boot the system in single-user mode.

8.   Mount all local filesystems.

9.   Reconcile customized files with their new default versions.

10.   **If upgrading a server,** examine the `fstab` file entries for client partitions.

11.   If you did not install a small pre-configured kernel, configure a custom kernel.

12.   Boot in multi-user mode.

9.7. Upgrade Walkthrough Examples

Introduction

This section contains upgrade walkthrough instructions for the following system configurations:

□   Local Upgrade: Standalone

□   Local Upgrade: Heterogeneous Server

□   Remote Upgrade: Dataless

□   Remote Upgrade: Standalone

Local Upgrade refers to an upgrade that utilizes a local tape drive. *Remote Upgrade* refers to an upgrade that uses a remote tape drive and disk device.

Each walkthrough example has a list of *Example Variables*. The variables define the system configuration for the upgrade, and are listed at the beginning of the example.

Following the example variables is a *Before You Begin* section that gives information important to the specific upgrade configuration.

You do not have to configure your system exactly as shown. *These are simply examples* to help you design your own system configurations. Read the example of your choice completely BEFORE you begin the upgrade procedures.
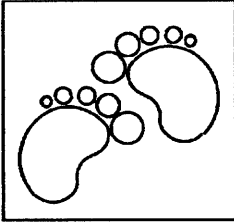
9.8. Local Upgrade: Standalone

Example Variables:

The following variables are used in this walkthrough. If you are using this example as a guide to upgrade your own system, use the device names and partition names applicable for your system.

- architecture: *sun3*
- hostname: *birdwatch*
- upgrade type: *local*
- system type: standalone
- tape device: (1/4" scsi) *st*
- root disk partition: *sd0a*

Before You Begin:

During the upgrade, the old kernel (`vmunix`) is renamed and a new GENERIC kernel is installed in its place. For instance, the old kernel is renamed `vmunix.pre4.0.3`.

You can use either a pre-configured small kernel or you create a new kernel that reflects your exact system configuration. Read the *Post-installation Procedures* chapter of *Installing the SunOS 4.0.3* for more information on configuring a kernel.

Installation Steps:

Step 1: Backing Up All Filesystems

Become super-user and back up all filesystems. For more information, see the *System and Network Administration* manual.

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Step 2: Verifying Disk Requirements

Verify that there is at least 2-3 Mb of free disk space for each disk partition. The actual amount depends on the software you have installed. This includes the
`/`, `/usr`, `/var`, `/export`, `/root` and `/exec` partitions, as well as any client
`root`, `/usr` and `/export/share` partitions.

See the *Planning Disk Space* section at the beginning of this chapter for more information on determining your requirements.

Use the following method to display the available space for each partition.

```
birdwatch# df

Filesystem       Kbytes       Used      Avail      Capacity      Mounted On
/dev/sd0a          7608       2700       4147          39%      /
/dev/sd0g        276550      32709     216186          13%      /usr
```

In the case that you do not have sufficient disk space available to proceed with the upgrade, contact your system administrator. It is imperative that you have the available disk space *before* proceeding with the upgrade.

Step 3: Halting the System

After you have determined there is sufficient disk space, halt the system using the following method.

```
birdwatch# /etc/halt
```

Step 4: Copying the Miniroot

Mount the release tape, and copy the miniroot from tape to disk. For more information, see the *Copying Miniroot* section of Chapter 4 in this manual.

Step 5: Starting the Upgrade

Once the miniroot is u invoke `sunupgrade` using the following method. Answer the series of prompts shown in the following example.

```
# cd /usr/etc/upgrade
# sunupgrade

Enter root disk partition for sun3 architecture: sd0a
Wait ..

Is this a file-server (as opposed to standalone /
dataless-client)? (y/n): n

Where is the tape drive located? (local | remote): local

Enter controller type ( st | mt | xt ): st

Extracting TOC (Table of Contents)

0+1 records in
0+1 records out

Starting to upgrade now. Continue? (y/n): y

This is going to take some time.


Extracting "root" files

Extracting "usr" files


    ...........
    ...........

Installing bootblock to root partition /dev/rsd0a ..

Installing /sbin files ..

Doing file system checks

sunupgrade: Done installing upgrade 4.0.3
```

Once sunupgrade is completed, it summarizes the steps required to finish the upgrade.

```
NEXT STEPS
----------


  * OPTIONAL: Install a smaller generic kernel
    install_small_kernel
  * Reboot and come up single-user
  * Check and install special_files
    (look in /usr/etc/upgrade/save)
  * Reconfigure your kernel, and if successful
  * Come up in multi-user mode
```

You have the option of installing a pre-configured kernel after sunupgrade is completed and before you reboot, if the system you are upgrading is a diskless client, or has a SCSI device. The small kernel is only configured for SCSI devices.

See the *Post-installation Procedures* chapter of this manual for more information on installing a small kernel.

Step 6: Rebooting the System

Halt and reboot the system coming up single-user. Use the following method.

```
 L1-a

>b vmunix -s

 .. messages ..

# csh

# setenv TERM sun
```
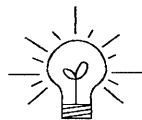
The **csh** command puts you into the C shell. Setting the TERM variable allows you to use vi in visual mode when reconciling the user-customized files.

Step 7: Mounting Local Filesystems

Mount all local filesystems using the following method:

```
birdwatch# mount -at 4.2
```

Step 8: Checking Special Files

Check special files using the following method.

```
birdwatch# cd /usr/etc/upgrade/save
birdwatch# ls
RELEASE special_files
birdwatch# cat special_files

Release 4.0.3
Processing started for server on Tues Jan 10 12:10:44 PST 1989
Special files - will be installed with the "4.0.3" as suffix

/etc/format.dat
/etc/rc.local

birdwatch# cd /etc
birdwatch# ls -l *4.0.3
format.dat-4.0.3
rc.local-4.0.3

birdwatch# diff rc.local rc.local-4.0.3
.. differences ..
```

The `special_files` listed will vary from system to system in accordance with the software installed.

Step 9: Customizing and Installing Special Files

Customize the special files, and then install them using the following method.

```
birdwatch# mv rc.local rc.local.old
birdwatch# mv rc.local-4.0.3 rc.local
birdwatch# vi rc.local

  <customize rc.local on the basis of rc.local.old>

birdwatch# mv format.dat format.dat.old
birdwatch# mv format.dat-4.0.3 format.dat

  <customize files as necessary>
```

Step 10: Configuring a Custom Kernel

If you did not install a small kernel after step 5, it is recommended that you configure a custom kernel. For information on configuring a custom kernel, see the *Post-installation Procedures* Chapter of this manual.

Step 11: Booting in Multi-User Mode   Halt the system and boot in multi-user mode using the following method.

```
birdwatch# /etc/halt
>b
```
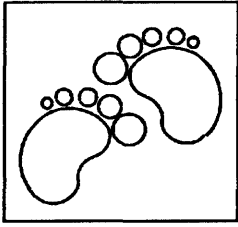
9.9. Local Upgrade: Heterogeneous Server

Example Variables:

The following variables are used in this walkthrough. If you are using this example as a guide to upgrade your own system, use the device names and partition names applicable for your system.

□   server architecture: *sun4*

□   hostname: *boomer*

□   sun3 client name: *toots*

□   sun4 client name: *whoopie*

□   upgrade type: *local*

□   system type: heterogeneous server

□   tape device: (1/2") *xt*

□   root disk partition: *xy0a*

Before You Begin:

The old kernel (vmunix) is renamed and a new GENERIC kernel is installed in its place. For instance, the old kernel is renamed vmunix.pre4.0.3 if SunOS 4.0.3 is the current upgrade revision.

You will have to configure the new kernel for customization. Read the *Post-installation Procedures* chapter of *Installing the SunOS 4.0.3* for more information on configuring a kernel.

For Server Configurations:
Once you have started sunupgrade you must select 1. Upgrade all from the sunupgrade menu at the beginning of a server upgrade. The remaining options are available if the upgrade is halted during execution. You can then re-start sunupgrade and continue the upgrade from the place where it halted by choosing the appropriate option: 2, 3, 4, or 5.

sunupgrade makes the assumptions that all clients' root directories cdan be reached from one directory pathname, as can all client /usr directories. For instance, your client root partitions may be renamed /foobar instead of /export/root, and your client usr partitions may be renamed /maddog instead of /export/exec.

sun
microsystems

Users who have not followed Sun conventions in this regard must create symbolic links to link together all client and client /usr directories.

For information on creating symbolic links for client files not in one directory, see the *Work Around: Client Files Not in One Directory* section at the beginning of this chapter.

On a heterogeneous server, Sun-2 clients now mount /export/share onto their /usr/share partitions, instead of /export/share.sunos4.0.

In SunOS 4.0.3, /export/exec/sun2 is a directory instead of a symbolic link to directory /export/exec/sun2.sunos4.0.

NOTE: If you have a heterogeneous server without any diskless clients, sunupgrade only updates the /usr partition files for the server architecture type.

Installation Steps:

Step 1: Halting All Clients

Halt all clients. For more information, see the *System and Network Administration* manual.

Step 2: Backing Up All Filesystems

Become super-user and back up all filesystems. For more information, see the *System and Network Administration* manual.

Step 3: Verifying Disk Requirements

Verify that there is at least 2-3 Mb of free disk space for each disk partition. The actual amount depends on the software you have installed. This includes the /, /usr, /var, /export, /root and /exec partitions, as well as any client root, /usr and /export/share partitions.

See the *Planning Disk Space* section at the beginning of this chapter for more information on determining your requirements.

Use the following method to display the available space for each partition.

```
boomer# df

Filesystem     Kbytes     Used     Avail     Capacity     Mounted On
/dev/xy0a      7511       4032     2727      60%          /
/dev/xy0g      69540      58586    4000      94%          /usr
/dev/xy0e      55616      15649    34405     31%          /export/swap
/dev/xy0d      18325      6032     10460     37%          /export/root
/dev/xy1g      260874     9        234777    0%           /spare0
/dev/xy0h      76303      9898     58774     14%          /home
```

In the case that you do not have sufficient disk space available to proceed with the upgrade, contact your system administrator. It is imperative that you have the available disk space *before* proceeding with the upgrade.

Step 4: Halting the System

After you have determined there is sufficient disk space, halt the system using the following method.

```
boomer# /etc/halt
```

Step 5: Copying the Miniroot

Mount the release tape, and copy the miniroot from tape to disk. For more information, see the *Copying Miniroot* section of Chapter 4 in this manual.

Step 6: Starting the Upgrade

Once the miniroot is up, invoke sunupgrade using the following method. Answer the series of prompts shown in the following example.

```
# cd /usr/etc/upgrade
# sunupgrade

Enter root disk partition for sun4 architecture: xy0a
Wait ..

Is this a file-server (as opposed to standalone /
dataless-client)? (y/n): y

WARNING! If you are not sure of any of the answers to the
    questions below, exit the miniroot, come up in multi-user
    mode, obtain necessary information and restart the whole
    process.  Refer to the Read This First documentation for
    details.

The following assumptions are being made for this upgrade:

1. You have not changed your file system from the Sun standard

2. If sunupgrade finds that this is a server without any client
   root partitions (Ex: A server serving dataless clients only),
   it will upgrade only the client usr areas. If yours is such
   a case, it does not matter what you answer in response to the
   query on client root partition name.

3. If this is a server, the client partitions are assumed to
   be as follows:

    All client usr file partitions are under: /export/exec
    All client root file partitions are under: /export/root
    All client swap file partitions are under: /export/swap
```

Hit (Return) to continue.

```
4. All client usr partitions MUST be in one directory. Similarly
   for client root partitions (if they exist).

   If you have client usr (or root) partitions scattered in more
   than one location, exit now and do the following:

      Select one of the directories containing the most number
      of exec directories as your primary exec directory, and
      one of the client root directories as your primary client
      root directory. Set up symbolic links bearing the same names
      (with relative pathnames) in your primary directory to the
      entries wherever they may be and restart sunupgrade. When
      you come to this menu, enter the primary directory names
      at the prompt.

      Refer Installation Instructions for details.
```

Continued in the following:

```
Continue (y/n/q) : y

Change clients usr file partitions from /export/exec (y/n): n

Change clients root file partitions from /export/root (y/n): n

Change clients swap file partitions from /export/swap (y/n): n

Where is the tape drive located? (local | remote): local

Enter controller type ( st | mt | xt ): xt

        1. Upgrade all

        2. Upgrade Server only

        3. Upgrade all clients

        4. Upgrade clients of same architecture only

        5. Upgrade clients of other architecture only

Select one of the above. The default is 1. Enter choice: 1
```

You should select 1. Upgrade all from the sunupgrade menu at the beginning of a server upgrade. sunupgrade will first upgrade the server's executables then cycle through the clients updating each in turn. This may take a while.

The remaining options are available if the upgrade is halted during execution. You can then re-start sunupgrade and continue the upgrade from the place where it halted by choosing the appropriate option: 2, 3, 4, or 5.

```
Extracting TOC (Table Of Contents)

0+1 records in
0+1 records out

Starting upgrade now. Continue ? (y/n): y

This is going to take some time.

Extracting "root" files

Extracting "usr" files

        . . . . . . . . . .
        . . . . . . . . . .
```

Continued in the following:

```
Upgrading sun3 clients

Upgrading sun3 client toots

Extracting "root" files

Upgrading sun4 clients

Insert tape for sun4

Continue (y/n/q) : y

Extracting "usr" files

        . . . . . . . . . . .
        . . . . . . . . . . .

Upgrading sun4 clients

Upgrading sun4 client whoopie

Extracting "root" files


Installing bootblock to root partition /dev/rxy0a ..

Installing /sbin files ..

Doing file system checks

sunupgrade: Done installing upgrade 4.0.3
```

Once `sunupgrade` is completed, it summarizes the steps required to finish the upgrade.

```
NEXT STEPS
_____


   * OPTIONAL: Install a smaller generic kernel using
     install_small_kernel
   * Reboot and come up single-user
   * Check and install special_files
     (look in /usr/etc/upgrade/save)
   * Reconfigure your kernel, and if successful
   * Come up in multi-user mode
```

You have the option of installing a pre-configured kernel after `sunupgrade` is completed. The small pre-configured kernel supports common configurations with up to two SCSI devices. It also supports dataless configurations. The small kernel is only configured for SCSI devices.

See the *Post-installation Procedures* chapter of this manual for more information on installing a small kernel.

Step 7: Rebooting the System

Halt and reboot the system coming up single-user. Use the following method.

```
( L1-a )

>b vmunix -s

  .. messages ..

# csh

# setenv TERM sun
```

The `csh` command puts you into the C shell. Setting the `TERM` variable allows you to use `vi` in visual mode when reconciling the user-customized files.

Step 8: Mounting Local Filesystems

Mount all local filesystems using the following method:

```
boomer# mount -at 4.2
```

Step 9: Checking Special Files

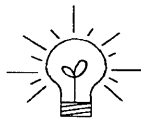Check special files using the following method.

```
boomer# cd /usr/etc/upgrade/save
boomer# ls
RELEASE        toots.upgrade_files  toots.special_files
upgrade_files      whoopie.upgrade_files  whoopie.special_files
special_files
boomer# cat special_files

Release 4.0.3
Processing started for server on Tues Jan 10 12:15:12 PST 1989
Special files - will be installed with the "4.0.3" as suffix

/etc/format.dat
/etc/rc.local

boomer# cd /etc
boomer# ls -l *4.0.3
format.dat-4.0.3
rc.local-4.0.3

boomer# diff rc.local rc.local-4.0.3
  .. differences ..
```

The `special_files` listed will vary from system to system in accordance with the software installed.

Step 10: Re-Customizing Local Files

Edit the files affected by the upgrade, and then rename them using the following method.

```
boomer# mv rc.local rc.local.old
boomer# mv rc.local-4.0.3 rc.local
boomer# vi rc.local

 <customize rc.local on the basis on rc.local.old>

boomer# mv format.dat format.dat.old
boomer# mv format.dat-4.0.3 format.dat

 <Similarly inspect clientname.special_files for all clients.>
 <Then cd to /export/root/clientname/etc and do the same.    >
 <Repeat for all clients.                                     >
```

Step 11: Examining Client fstab Entries

Examine the /etc/fstab entries for client partitions to make sure they are mounted. Mount entries as necessary.

*Step 12: Configuring a Custom Kernel*

If you did not install a small kernel after step 6, it is recommended that you configure a custom kernel. For information on how to configure your kernel, see the *Post-installation Procedures* Chapter of this manual.

Step 13: Booting in Multi-User Mode

Halt the system and boot in multi-user mode using the following method.

```
boomer# /etc/halt
>b
```
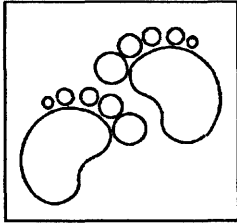
9.10. Remote Upgrade: Dataless

Example Variables:

The following variables are used in this walkthrough. If you are using this example as a guide to upgrade your own system, use the device names and partition names applicable for your system.

- architecture: *sun3*

- hostname: *groucho*

- server name: *zeppo*

- server internet address: *192.9.101.29*

- tapehost name: *gummo*

- tapehost internet address: *192.9.101.44*

- ethernet type: *ie0*

- upgrade type: *remote*

- system type: dataless

- tape device: (1/4" scsi) *st*

- root disk partition: *sd0a*

Before You Begin:

During the upgrade, the old kernel (`vmunix`) is renamed and a new GENERIC kernel is installed in its place. For instance, the old kernel is renamed `vmunix.pre4.0.3`.

You can use either a pre-configured small kernel or you create a new kernel that reflects your exact system configuration. Read the *Post-installation Procedures* chapter of *Installing the SunOS 4.0.3* for more information on configuring a kernel.

For Dataless Clients:
When upgrading dataless clients be aware of the following items:

- All `usr` partition files (files under `/usr`) are assumed to be resident on the server and mounted from the server on the client over NFS. All other `root` partition files are assumed to be local to the dataless client.

□   You should include the server name and internet number in the
     /etc/hosts file of the machine you are updating. If this information is
     not included in the /etc/hosts file before starting the upgrade, you will
     be prompted for the information during the upgrade procedure.

□   The hostname of the system you are updating must be included in the
     /.rhosts file of the server.

□   The server must have the Sys software category files installed on it or
     sunupgrade will not let you upgrade the client.

For Remote Installations:
When performing an installation over the network from a remote tape drive, note
the following items:

□   Tapehost Hostname
          Know the hostname of the machine with the tape drive (the tapehost).

□   /etc/hosts
          Ensure that the /etc/hosts file of the machine that you are updat-
          ing includes the internet number and hostname of the tapehost.

□   /.rhosts
          Ensure that the /.rhosts file on the tapehost machine includes the
          hostname of the system you are updating.

□   ethernet controller type.
          Know the ethernet type and number of the system you are updating.
          Common ethernet number/types are ie0 and le0.

□   Sys category files
          For a remote installation with a tapehost running SunOS 4.0.2 or later,
          you must have Sys software category files installed on the tapehost. If
          the tapehost does not have the Sys category files installed, the upgrade
          will be significantly slower if using a 1/4 inch tape drive.

          If you do not have Sys files installed on the remotehost, do the following
          on the tapehost/server I. before beginning the upgrade:

```
gummo% mkdir /usr/share/sys
gummo% mkdir /usr/share/sys/conf.common
gummo% cd /usr/share/sys/conf.common
gummo% strings /vmunix | grep Release | awk '{print $3}' > RELEASE
```

Installation Steps:

*Step 1: Backing Up All
Filesystems*

Become super-user and back up all filesystems. For more information, see the
System and Network Administration manual.

Step 2: Verifying Disk Requirements

Verify that there is at least Verify that there is at least 2-3 Mb of free disk space for each disk partition. The actual amount depends on the software you have installed. This includes the

`/, /usr, /var, /export, /root` and `/exec` partitions, as well as any client

`root, /usr` and `/export/share` partitions. *Planning Disk Space* section at the beginning of this chapter for more information on determining your requirements.

Use the following method to display the available space for each partition.

```
groucho# df

Filesystem       Kbytes     Used     Avail     Capacity     Mounted On
/dev/sd0a          7608     2700      4147          39%     /
/dev/sd0g        276550    32709    216186          13%     /home
```
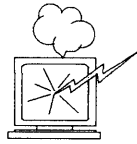
In the case that you do not have sufficient disk space available to proceed with the upgrade, contact your system administrator. It is imperative that you have sufficient disk space *before* proceeding with the upgrade.

Step 3: Halting the System

After you have determined there is sufficient disk space, halt the system using the following method.

```
groucho# /etc/halt
```

Step 4: Copying the Miniroot

Mount the release tape, and copy the miniroot from tape to disk. For information on copying the miniroot from a remote tape drive, see the *Remote Installation: Standalone* example in Chapter 6 of this manual.

Step 5: Starting the Upgrade

Once the miniroot is running, invoke `sunupgrade` using the following method. Answer the series of prompts shown in the following example.

sun
microsystems

```
# cd /usr/etc/upgrade
# sunupgrade

Enter root disk partition for sun3 architecture: sd0a
Wait ..

Is this a file-server (as opposed to standalone /
dataless-client)? (y/n): n

Where is the tape drive located? (local | remote): remote

Enter host name of the remote tape drive: gummo

Enter ethernet type of this system  [ec | ie | le] : ie

Using ie0 or ie1 ? [ 0 | 1] : 0

Enter remote host's internet number (Ex: 192.9.101.22): 192.9.101.44

Enter server name: zeppo

Extracting TOC (Table Of Contents)

0+1 records in
0+1 records out

Starting upgrade now. Continue ? (y/n): y

This is going to take some time.

Extracting "root" files

Doing file system checks

sunupgrade: Done installing upgrade 4.0.3
```

Once `sunupgrade` is completed, it summarizes the steps required to finish the upgrade.

```
NEXT STEPS
_____

   * OPTIONAL: Install a smaller generic kernel using
     install_small_kernel
   * Reboot and come up single-user
   * Check and install special_files
     (look in /usr/etc/upgrade/save)
   * Reconfigure your kernel, and if successful
   * Come up in multi-user mode
```

You have the option of installing a pre-configured kernel after `sunupgrade` is completed. The small pre-configured kernel supports common configurations with up to two SCSI devices. It also supports dataless configurations. The small kernel is only configured for SCSI devices.

See the *Post-installation Procedures* chapter of this manual for more information on installing a small kernel.

Step 6: Rebooting the System

Halt and reboot the system coming up single-user. Use the following method.

```
 L1-a

>b vmunix -s

  .. messages ..

# csh

# setenv TERM sun
```

The `csh` command puts you into the C shell. Setting the `TERM` variable allows you to use `vi` in visual mode when reconciling the user-customized files.

Step 7: Mounting Local Filesystems

Mount all local filesystems using the following method:

```
# mount -at 4.2
```

Step 8: Reconciling User
Customized Files

Use the following method to reconcile previously customized files with their new installed revisions. The names of files requiring reconciliation are written into the file /usr/etc/upgrade/save/special_files by sunupgrade.

```
groucho# cd /home/upgrade
groucho# ls
RELEASE special_files
groucho# cat special_files

Release 4.0.3
Processing started for standalone on Tues Jan 10 15:15:10 PST 1989
Special files - will be installed with the "4.0.3" as suffix

/etc/format.dat
/etc/rc.local

groucho# cd /etc
groucho# ls -1 *4.0.3
format.dat-4.0.3
rc.local-4.0.3
groucho# diff rc.local rc.local-4.0.3
.. differences ..
```

The user customized files needing reconciliation will vary somewhat from system to system in accordance with the software installed.

Step 9: Re-Customizing Local
Files

Edit the files affected by the upgrade, and then rename them using the following method.

```
groucho# mv rc.local rc.local.old
groucho# mv rc.local-4.0.3 rc.local
groucho# vi rc.local

  <customize rc.local on the basis of rc.local.old>

groucho# mv format.dat format.dat.old
groucho# mv format.dat-4.0.3 format.dat

  <customize files as necessary>
```

Step 10: Configuring a Custom
Kernel

If you did not install a small kernel after step 5, it is recommended that you configure a custom kernel. For information on configuring a custom kernel, see the *Post-installation Procedures* Chapter of this manual.

Step 10: Booting in Multi-User Mode

Halt the system and boot in multi-user mode using the following method.

```
groucho# /etc/halt
>b
```
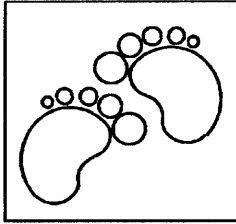
9.11. Remote Upgrade: Standalone

Example Variables:

The following variables are used in this walkthrough. If you are using this example as a guide to upgrade your own system, use the device names and partition names applicable for your system.

- architecture: *sun3*

- hostname: *yahoo*

- tapehost name: *whammo*

- tapehost internet address: *192.9.101.44*

- ethernet type: *ie0*

- upgrade type: *remote*

- system type: standalone

- tape device: (1/4" scsi) *st*

- root disk partition: *sd0a*

Before You Begin:

During the upgrade, the old kernel (`vmunix`) is renamed and a new GENERIC kernel is installed in its place. For instance, the old kernel is renamed `vmunix.pre4.0.3`.

You can use either a pre-configured small kernel or you can create a new kernel that reflects your exact system configuration.

Read the *Post-installation Procedures* chapter of *Installing the SunOS 4.0.3* for more information on configuring a kernel.

For Remote Installations:
When performing an installation over the network from a remote tape drive, note the following items:

- Tapehost Hostname
  Know the hostname of the machine with the tape drive (the tapehost).

- `/etc/hosts`
  Ensure that the `/etc/hosts` file of the machine that you are updating includes the internet number and hostname of the tapehost.

□   /.rhosts

Ensure that the /.rhosts file on the tapehost machine includes the hostname of the system you are updating.

□   ethernet controller type.

Know the ethernet type and number of the system you are updating. Common ethernet number/types are ie0 and le0.

□   Sys category files

When doing a remote installation with a tapehost running SunOS 4.0.2 or later, the Sys software category files must be installed on the tapehost. If not, an upgrade using a 1/4" tape drive will be significantly slower.

If you do not have the Sys category files installed on the tapehost, do the following on the tapehost *before* you begin the upgrade:

```
whammo% mkdir /usr/share/sys
whammo% mkdir /usr/share/sys/conf.common
whammo% cd /usr/share/sys/conf.common
whammo% strings /vmunix | grep Release | awk '{print $3}' > RELEASE
```

Installation Steps:

Step 1: Backing Up All Filesystems

Become super-user and back up all filesystems. For more information, see the *System and Network Administration* manual.

Step 2: Verifying Disk Requirements

Verify that there is at least Verify that there is at least 2-3 Mb of free disk space for each disk partition. The actual amount depends on the software you have installed. This includes the
/, /usr, /var, /export, /root and /exec partitions, as well as any client
root, /usr and /export/share partitions.

Planning Disk Space section at the beginning of this chapter for more information on determining your requirements.

Use the following method to display the available space for each partition.

```
yahoo# df

Filesystem      Kbytes    Used     Avail    Capacity    Mounted On
/dev/sd0a         7608    2700      4147       39%       /
/dev/sd0g       276550   32709    216186       13%       /usr
```
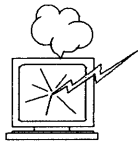
In the case that you do not have sufficient disk space available to proceed with the upgrade, contact your system administrator. It is imperative that you have the available disk space *before* proceeding with the upgrade.

Step 3: Halting the System

After you have determined there is sufficient disk space, halt the system using the following method.

```
yahoo# /etc/halt
```

Step 4: Copying the Miniroot

Mount the release tape, and copy the miniroot from tape to disk. For information on how to copy the miniroot from a remote tape drive, see the *Remote Installation: Standalone* example in Chapter 6 of this manual.

Step 5: Starting the Upgrade

Once the miniroot is up, invoke sunupgrade using the following method. Answer the series of prompts shown in the following example.

```
# cd /usr/etc/upgrade
# sunupgrade

Enter root disk partition for sun3 architecture: sd0a
Wait ..

Is this a file-server (as opposed to standalone /
dataless-client)? (y/n): n

Where is the tape drive located? (local | remote): remote

Enter host name of the remote tape drive: whammo

Enter ethernet type of this system  [ec | ie | le] : ie

Using ie0 or ie1 ? [ 0 | 1] : 0

Ethernet connects to ie0

Enter remote host's internet number (Ex: 192.9.101.22): 192.9.101.44

Extracting TOC (Table Of Contents)

0+1 records in
0+1 records out

Starting upgrade now. Continue ? (y/n): y

This is going to take some time.

Extracting "root" files


        ...........
        ...........

Installing bootblock to root partition /dev/rsd0a ..

Installing /sbin files ..

Doing file system checks

sunupgrade: Done installing upgrade 4.0.3
```

Once `sunupgrade` is completed, it summarizes the steps required to finish the upgrade.

```
NEXT STEPS
-----------

   * OPTIONAL: Install a smaller generic kernel using
     install_small_kernel
   * Reboot and come up single-user
   * Check and install special_file
     (look in /usr/etc/upgrade/save)
   * Reconfigure your kernel, and if successful
   * Come up in multi-user mode
```

You have the option of installing a pre-configured kernel after `sunupgrade` is completed. The small pre-configured kernel supports common configurations with up to two SCSI devices. It also supports dataless configurations. The small kernel is only configured for SCSI devices.

See the *Post-installation Procedures* chapter of this manual for more information on installing a small kernel.

Step 6: Rebooting the System

Halt and reboot the system coming up single-user. Use the following method.

```
L1-a

>b vmunix -s

.. messages ..

# csh

# setenv TERM sun
```

The `csh` command puts you into the C shell. Setting the `TERM` variable allows you to use `vi` in visual mode when reconciling the user-customized files.

Step 7: Mounting Local Filesystems

Mount all local filesystems using the following method:

```
# mount -at 4.2
```

Step 8:Reconciling User Customized Files

Use the following method to reconcile previously customized files with their new installed revisions. The names of files requiring reconciliation are written into the file /usr/etc/upgrade/save/special_files by sunupgrade.

```
yahoo# cd /usr/etc/upgrade/save
yahoo# ls
RELEASE special_files
yahoo# cat special_files

Release 4.0.3
Processing started for standalone on Wed Jan 11 14:12:15 PST 1989
Special files - will be installed with the "4.0.3" as suffix

/etc/format.dat
/etc/rc.local

yahoo# cd /etc
yahoo# ls -l *4.0.3
format.dat-4.0.3
rc.local-4.0.3
yahoo# diff rc.local rc.local-4.0.3
  .. differences ..
```

The user customized files needing reconciliation will vary somewhat from system to system in accordance with the software installed.

Step 9: Re-Customizing Local Files

Edit the files affected by the upgrade, and then rename them using the following method.

```
yahoo# mv rc.local rc.local.old
yahoo# mv rc.local-4.0.3 rc.local
yahoo# vi rc.local

  <customize rc.local on the basis of rc.local.old>

yahoo# mv format.dat format.dat.old
yahoo# mv format.dat-4.0.3 format.dat

  <customize files as necessary>
```

Step 10: Configuring a Custom Kernel

If you did not install a small kernel after step 5, it is recommended that you configure a custom kernel. For information on configuring a custom kernel, see the *Post-installation Procedures* chapter of this manual.

Step 11: Booting in Multi-User Mode   Halt the system and boot in multi-user mode using the following method.
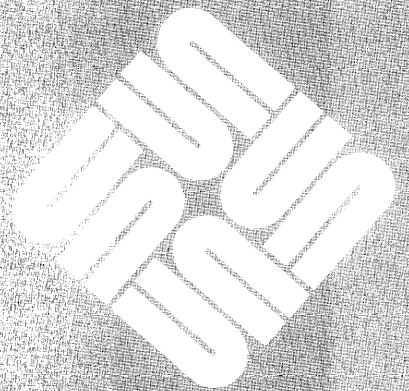
```
yahoo# /etc/halt
>b
```

10

Reference

10

Reference

10.1. Introduction

This chapter is a reference section and is made up of the following sections:

- Manual Pages
- Glossary

10.2. MANUAL PAGES

The following manual pages are included in this section:

suninstall

```
setup_client(8)

setup_exec
```
sunupgrade

```
sunupgrade(8)
```

NAME
>   setup_client – create or remove an NFS client

SYNOPSIS
>   **/usr/etc/install/script/setup_client** *op clientname yp_type swapsize rootpath swappath homepath execpath*
>   *kvmpath arch*

DESCRIPTION
>   **setup_client** adds an NFS client to a server, or removes one. It can only be run by the super-user. It is also
>   used by **suninstall(8)**.
>
>   The *op* argument indicates which operation to perform; it can be either **add** or **remove**, to indicate whether
>   to add or remove a client. *clientname* is the hostname of the client. *yp_type* indicates the type of Yellow
>   Pages server or service to provide to the client, if any; it can be one of **master, slave, client** or **none**.
>   *swapsize* is the number of bytes reserved for client's swap file. *rootpath* is the pathname of parent direc-
>   tory in which various client root directories reside; *rootpath/clientname* is the pathname of the client's root
>   directory. *swappath* is the pathname of parent directory in which various client swap files reside;
>   *swappath/clientname* is the pathname of the client's swap file. *homepath* is the pathname of the (parent)
>   directory in which the various home directories are to reside; it is the pathname of the directory that the
>   client is to mount as **/home**. *execpath* is the full pathname of the directory in which the executables for the
>   architecture specified by the *arch* argument. This is the directory that the client mounts as **/usr**. *kvmpath* is
>   the full pathname of the directory in which the sun-architecture executables reside for the architecture
>   specified by the architecture argument. This is the directory that the client mounts as **/usr/kvm**. *arch*
>   specifies the client's architecture (for instance, **sun4, sun3**...). **setup_client** with no arguments displays a
>   usage message that includes the proper *arch* argument for each supported architecture.

USAGE
>   Before you add or remove a client, you must first make sure that the Internet and Ethernet addresses for
>   *clientname* are listed in the YP hosts database (if the server is running the YP), or in the server's **/etc/hosts**
>   and **/etc/ethers** databases, respectively (otherwise). Then, run **setup_client** with the **add** or **remove** opera-
>   tion. When adding a client, you must then bootstrap that client machine.
>
>   You cannot add a client to a server that does not support the specified architecture. The executable direc-
>   tory for that client's architecture must be present on the server. If this file is absent, an error results.
>
>   **setup_client** updates the **/etc/bootparams** file. If the server is a YP master, it updates local YP database. It
>   *does not* propagate the local update to other YP servers. To propagate the updates, use the following com-
>   mands:
>
>   **example# cd /var/yp**
>   **example# make**
>
>   If the server is running YP but is not a YP master, **setup_client** issues a warning to indicate that the data-
>   base is out of date.
>
>   When *arch* is given as **sun2**, **suninstall** issues a reminder to run the **/usr/etc/ndbootd** daemon for booting
>   Sun-2 systems.
>
>   **setup_client** creates *swappath/clientname* with the *size*, (number of bytes) you specify. You can append
>   one of **K** or **k** to indicate kilobytes, **M** or **m** to indicate megabytes, or **B** or **b** to indicate 512-byte blocks, to
>   *size*. Otherwise, *size* is taken to indicate an exact byte count.
>
>   **suninstall** updates the **/etc/export** file to allow root access to each client's root file system. It exports the
>   client's swap and dump partitions only to the client. Note: the system administrator should verify that the
>   **/etc/exports** file contains correct information, and that file systems are exported to the correct users and
>   groups. Refer to **exportfs(8)** for details on exporting file systems.

EXAMPLES

This example shows how to add a Sun-4 system NFS client to a server.

> **example# setup_client add frodo client 16M /export/root /export/swap /home **
> **/export/exec/kvm/sun4 sun4**

To remove this client, you would merely substitute **remove** for **add** in the above example.

FILES

/etc/hosts
/etc/ethers
/usr/etc/ndbootd
/etc/bootparams
/etc/exports

SEE ALSO

exportfs(8), **setup_exec(8) suninstall(8)**

Installing the SunOS

DIAGNOSTICS

incorrect number of arguments
> Check number and order of the arguments.

must be run as root (super-user).
> You must be root to use **setup_client**.

invalid operation type "*xx*".
> Valid operations are **add** and **remove**.

ATTENTION: *xxxxxxxx* -> boot.sun? not created.
> (Sun-3 systems only.) A symbolic link can not be created because the boot file does not exist.

ATTENTION: *xxxxxxxx*.SUN? -> boot.sun? not created.
> (Other than Sun-3 systems.) A symbolic link can not be created because the boot file does not exist.

ATTENTION: /usr/etc/ndbootd needs to be running on server before bringing up "*client*".
> The Sun-2 system boot daemon must be running in order to bootstrap a Sun-2 system.

NAME
     setup_exec – install architecture-dependent executables on a heterogeneous file server

SYNOPSIS
     /usr/etc/install/setup_exec *arch execpath kvmpath*

DESCRIPTION
     setup_exec installs architecture-dependent executables from either a local tape drive or a remote host. It is
     used to convert a standalone system or homogeneous file server to a heterogeneous file server. **setup_exec**
     is a forms-based utility that can be invoked directly, but it is also used by **suninstall**(8). It can only be
     invoked by the super-user.

     The *arch* argument specifies the machine archictecture to install (for instance, **sun4, sun3**...). When run
     with no arguments, **setup_exec** displays a usage line that includes the proper format of the *arch* argument
     for each supported architecture. *execpath* is the full pathname of the directory in which to install the exe-
     cutables. *kvmpath* is the full pathname of the directory in which to install the sub-architecture dependent
     executables. When **setup_exec** is done, the *execpath* and *kvmpath* directories are ready to mount as /usr
     and /usr/kvm by the server's NFS clients of the indicated *arch*.

     setup_exec also updates the /etc/export file (see **exportfs**(8)) to export the executable directories it has
     installed. The system administrator should verify this file to make sure that the directory has been exported
     to the correct groups.

EXAMPLE
     This example shows how to install a directory of executables for Sun-4 system clients.

          example# setup_exec sun4 /export/exec/kvm/sun4

FILES
     /etc/hosts   hosts database
     /etc/ethers   database of hostnames and Ethernet addresses
     /etc/export   database of exported file systems
     /usr/etc/install/files/extractlist.*arch*   record of extracted categories for the indicated architecture

SEE ALSO
     exportfs(8), **setup_client**(8), **suninstall**(8)

     Installing the SunOS

DIAGNOSTICS
     incorrect number of arguments
          Check the number and the order of arguments.

     invalid architecture type "*arch*".
          You supplied a value for *arch* that is not supported.

     invalid tape drive type "*drive*".
          Valid tape drive types are **local** and **remote**.

     invalid tape type "*tape*".
          Valid tape types are **ar, st, mt,** and **xt.**

     can't reach tapehost "*tapehost*".
          The IP address of *tapehost* is not in the hosts database, that is, the hosts YP database if the Yellow
          Pages are running, or the /etc/hosts file otherwise.

     Load release tape *n*
          Mount the release tape specified on the screen and type RETURN to continue.

NAME

sunupgrade – upgrade the Sun Operating System

SYNOPSIS

/usr/etc/sunupgrade [–l] [–d] [–n]

AVAILABILITY

This command is available on sun2, sun3 and sun4 architectures running SunOS version 4.0 only. Refer to *Installing the SunOS 4.0.3* for more information.

DESCRIPTION

sunupgrade is an interactive utility that is used to upgrade the Sun Operating System (SunOS) to a higher revision level on sun2, sun3, and sun4 architectures. The current SunOS level must be at least SunOS 4.0.

sunupgrade lets you upgrade any system configuration. The following are the valid configuration types:

- Standalone
- Homogeneous server
- Heterogeneous server
- Dataless clients
- Diskless clients

Both local and remote installation modes are supported.

sunupgrade overlays the newer executable files on top of existing ones. For files in and if the new file names and old file names conflict and the files are not identical in content, then the new file is installed with a trailing suffix that is the release name. The differences between the old and the new versions of the files must be resolved by the user. All such files are logged in the log file **/usr/etc/upgrade/save/special_files** for servers, standalone systems, or in **/usr/etc/upgrade/save/***clientname***.special_files** for diskless clients. For dataless clients, they are shared under **/home/upgrade/special_files** .

After **sunupgrade** completes execution you must come up in single-user mode, inspect all special files and propogate your older administrative files to the newer ones and rename them without the suffixes.

OPTIONS

–l   Create log of all files extracted and overlaid. Performance will deteriorate slightly. Log files are saved in **/usr/etc/upgrade/save**. Special files are called

–d   Work in debugging mode. Not recommended for normal operation.

–n   Switch off "no-rewind" operation. The no-rewind operation available only on systems running SunOS 4.0.2 or 4.0.3.

FILES

/usr/etc/upgrade/EXCLUDELIST
/usr/etc/upgrade/README
/usr/etc/upgrade/checksums
/usr/etc/upgrade/chk_ok
/usr/etc/upgrade/chk_release
/usr/etc/upgrade/chkextract
/usr/etc/upgrade/config_host
/usr/etc/upgrade/extract
/usr/etc/upgrade/extract_client
/usr/etc/upgrade/extract_clntroot
/usr/etc/upgrade/extract_stand
/usr/etc/upgrade/include
/usr/etc/upgrade/includefile
/usr/etc/upgrade/get_arch
/usr/etc/upgrade/get_clientinfo
/usr/etc/upgrade/get_machtype
/usr/etc/upgrade/get_tapeinfo

/usr/etc/upgrade/get_toc
/usr/etc/upgrade/get_upgradeinfo
/usr/etc/upgrade/mop_up
/usr/etc/upgrade/mount_ufs
/usr/etc/upgrade/mount_usr
/usr/etc/upgrade/start_log
/usr/etc/upgrade/setup_kvm
/usr/etc/upgrade/small_kernel_files
/usr/etc/upgrade/sun2_cp_share
/usr/etc/upgrade/sun2_ln_exec
/usr/etc/upgrade/sunupgrade
/usr/etc/upgrade/tar_clntroot
/usr/etc/upgrade/verify_clntpart
/usr/etc/upgrade/xdrtoc

SEE ALSO

suninstall(8)

Installing the SunOS 4.0.3

10.3. GLOSSARY

architecture	The specific components of a computer system and the way they interact with one another. From a Sun kernel perspective, *architecture* refers to the type of CPU chip in the computer. A Sun-2 machine is said to have 68010 architecture, because it contains this CPU chip. A Sun-3 has 68020 architecture. A Sun-4 is considered to have SPARC architecture, because it contains a SPARC chip.
`auto-boot`	An automatic booting process for a system. `auto-boot` is controlled by parameters, such as the name of the boot device, stored in the system EEPROM.
binding	The process during which a client finds out where a server is so that the client can receive services. NFS binding is explicitly set up by the user and remains in effect until the user terminates the bind, for example by modifying the `/etc/fstab` file. YP binding occurs when a client's request is answered by a server and is terminated when the server no longer responds.
boot block	Booting information stored in the first 8 Kbyte block on a disk. It contains the disk label, and a small program which is the first step in the boot process.
booting	The process of powering up the computer, testing to determine which attached hardware devices are running, and bringing the operating system kernel into memory and operation.
bootparams	Values used by a server to boot a diskless client. The location of the client root and swap are the minimum required parameters. These parameters are located in the `/etc/bootparams` file.
bootstrap program	The program(s) which brings a system to an operational state by loading the operating system from disk or over the network.
bus	A cable or circuit used for the transfer of data or electrical signals among devices.
configuration, equipment	The combination of CPU, peripherals, and software, and the way they are interconnected to form a system.
controller	A circuit board that controls the operation of another device or system, such as a graphics board that controls a graphics color monitor.
copy program	A program used to copy the miniroot from the distribution tape to the disk.
daemon	A process that handles system-wide functions, such as network administration or line printer spooling operations. Typically, a daemon remains inactive (sleeps) until called upon to perform a given task.

dataless client   A dataless client relies on the server for its home directory, and on a local disk for its root directory and swap file.

defect list   A list of defects on a disk that the disk manufacturer supplies in hard copy. An on-line version of the defect list is stored in a reserved area on the disk drive. The `format` program allows you to update the defect list if more defects are discovered.

device   A hardware component acting as a unit that performs a specific function, such as formatting and printing output (a printer) or reading and writing information on a disk (a disk drive). SunOS treats all devices as files.

device driver   A routine, or set of routines, within the kernel that controls the operation of a device. For example, the operation of the SCSI disk controller is handled by a disk device driver.

diagnostics   Sets of performance tests run on a system to verify that it is performing properly in various areas. The system automatically runs a set of diagnostics, or self tests, when the system boots.

diskless client   A diskless client relies on the server for all resources, specifically, for its:

                                     □   root directory: `/root`

                                     □   swap file: `/swap`

                                     □   home directory: `/home`

                                     □   directory of architecture dependent executables: `/export/exec/`*ARCH*

                                     □   directory of sub-architecture dependent executables: `/export/exec/kvm/`*ARCH*

distribution tapes   A set of half-inch magnetic tape reels or quarter-inch tape cartridges that contain the software needed to load the operating system.

domain   A name given to a group of workstations on a single local network that share administrative files. The workstations belonging to a domain access the same YP maps.

dump   The process of copying filesystems onto a tape for offline storage, using the `dump` command.

Ethernet   A commonly-used local area network technology originally developed by Xerox Corporation.

Ethernet address   The address permanently assigned to each workstation. The address is a 6-byte hexadecimal value with bytes separated by colons. A typical Ethernet address is: 8:0:20:0:14:76

sun
microsystems

exec path	The pathname on a server used by a client to find its architecture-dependent executables.
export	
filesystem	A hierarchical arrangement of directories and files.
`format`	`format` is a SunOS utility that formats, labels, repairs, and analyzes disks on a Sun system.
free hog disk partition	A disk partition that is a holding place for un-needed disk space. The space is held in the free hog disk partition until you allocate the space to another area. This partition is where disk space is taken from when you increase a partition size.
gateway	A machine that enables different networks to communicate with each other.
GENERIC kernel	The version of the UNIX kernel that is shipped on the release tape. It contains entries for all devices and software available for a specific architecture of a specific release. It is advised that the GENERIC kernel be edited to suit the configuration of the installed system.
global file	A file containing information such as user, host, and network names, that is network wide in scope.
head	The mechanism on a disk drive that reads and writes information on a disk.
heterogeneous server	An NFS server that has clients of its own architecture and other architectures. For example, a Sun-4 server that has Sun-2 and Sun-3 clients is a heterogeneous server.
homogeneous server	An NFS server that has clients only of its own architecture.
host	A computer attached to a network.
hostname	The name of a workstation. Also known as a *machine name*. Hostnames are allowed up to 32 alpha/numeric characters. All alphabetical characters must be lower case.
`ifconfig`	A command used to enable a network. The `ifconfig` command assigns an Internet (IP) address to the network being configured.
inode	An entry in a pre-designated area of a disk that describes where a file is located on that disk, the file's size, when it was last used, and other identification information.
installation	Loading the operating system software and bringing up a workstation.

installation roadmap	An outline of the steps required to complete an installation.
interface	A connection to a network.
internetwork	A group of networks interconnected with routers, which uses the IP protocol.
Internet	A nation wide area network using internet protocol (IP) that was originally sponsored by the Defense Advanced Research Project Agency (DARPA).
Internet address	A machine's Internet address (IP) is a unique number that consists of two parts: the network number followed by the host number.
kernel	The master program set of SunOS software that manages all the physical resources of the computer, including file system management, virtual memory, reading and writing files to disks and tapes, scheduling of processes, printing, and communicating over a network.
kvm path	The pathname on the server used by a client to find its sub-architecture dependent executables.
label	Information written by the `format` program on sector 0 of a disk. The disk label describes the size and boundaries of the disk's partitions.
library routine	A series of SunOS functions that can be called by user programs written in C and other compatible programming languages.
local file	A file containing information specific to the machine where it resides. When using YP, the local file is checked first before a corresponding global file is checked.
local installation	An installation where a disk and tape drive are connected to the machine on which you are installing SunOS. This machine may or may not be connected to the network.
local tape drive	A tape drive located at your Sun Workstation.
machine name	The name of a workstation. Also known as the *hostname*. A machine name is allowed up to 32 alpha/numeric characters. All alphabetical characters in the machine name must be lower case.
map	A file used by the Yellow Pages service that holds information of a particular type, for example, the password entries of all users on a network or the names of all host machines on a network.
makefile	A file used by the `make` command, which describes files that `make` must process and programs that `make` must run.

miniroot	A small version of the operating system that is loaded into the swap partition. The miniroot provides just enough functionality to install the overall operating system.
	When you *load the miniroot*, you copy it from tape to disk.
	When you *boot the miniroot*, you make it active. Once the miniroot is activated, you can run *suninstall*.
modem	An electronic device that you can use to connect a Sun workstation to a telephone line.
mount	The process of accessing a directory from a disk attached to the machine making the mount request (4.2 mount) or remote disk on a network (NFS mount).
mount point	An empty directory within a client directory hierarchy through which the client mounts remote directories that it receives from a server in an NFS or RFS mount. Machines with disks use a mount point to mount directories from a local disk.
MUNIX	MUNIX (Memory-resident UNIX) is a small version of the operating system that is loaded from tape, or over the network, into memory rather than on disk. It is a useful tool when the local system disk is either corrupted or unformatted, as it allows you to run `format`.
netgroup	A network-wide group of machines granted identical access to certain network resources for security and organizational reasons.
network (local area)	A network consisting of a number of machines that share resources such as files and mail. The network covers a physically limited area no greater than two miles.
network (wide area)	A network consisting of one or more large computers providing services such as file transfer, and a large number of client computers that use the services. This network may cover a large physical area, sometimes spanning the globe.
`newfs`	A Sun command that is used to make a filesystem. Typically, `newfs` is run before restoring a filesystem from tape. `newfs` calls the `makefs` command to make a filesystem on a device.
NFS	The Sun Network File System (NFS) is a service that is a networking protocol which enables clients to receive files across a network from a file server.
packet	A group of information in a fixed format that is transmitted as a unit over communications lines.
platter	A flat disk made of magnetic media that is mounted on a spindle. A disk such as those used by Sun computers actually is composed of a number of platters.

page	A standard unit of memory with an architecture-dependent size that is the smallest entity manipulated by the kernel's virtual memory system.
partition	A discrete portion of a disk, configured during installation, and assigned to a specific file system.
post-installation procedures	A set of procedures performed after the installation to re-customize the environment. Post-installation procedures are used when re-installing an existing system. They restore the environment after the installation is completed.
pre-installation procedures	A set of procedures performed prior to the installation to preserve an existing environment. Pre-installation procedures are used when re-installing an existing system.
process	A program in operation. For example, a daemon is a system process that is always running on the system. (If it stops running, you have to start it up.)
protocol	A set of formal rules explaining how hardware and software on a network should interact in order to transmit information.
pseudo-device	Software subsystems or drivers with no associated hardware.
ramdisk	The use of virtual memory to replace a disk for applications that require intensive disk access.
re-installation, system	A re-installation is a full installation of an existing system. Procedures for preserving and restoring the existing environment must be performed in this type of installation. A re-installation is required when adding the functionality of a major release.
remote installation	An installation in which the machine you are installing does not have a tape drive connected to it, but there is a local disk. Instead of using a local tape drive, you use the tape drive of another machine on the network to perform the installation. This type of installation requires that the system you are installing be connected to the network.
remote procedure calls	Routines that enable communication between two remote programs.
root partition	The disk space (partition) allocated for the root filesystem.
root user name	SunOS user name that grants special privileges to the person who logs in with that ID. If the user can supply the correct password for the root user name, he or she is given superuser privileges for the particular machine.
router	A program that forwards information of a certain protocol type from one network to another.

sector	A segment of a disk track, which, on Sun systems, holds 512 bytes of data.
server	A machine that provides a network service, such as disk storage and file transfer, or a program that handles such a service.
software categories	Available software on the distribution tape. There are approximately 20 categories (e.g. Programming, Accounting, SunView1) to select from when using the Software Form in suninstall.
standalone machine	A workstation with its own disk and tape drives that does not rely on a server in order to boot.
sub-architecture	A variant within a hardware architecture where the layout of the kernel is slightly dissimilar. For example, a 68030-based Sun-3/80, a Sun-3x, is a sub-architecture of the Sun-3 family. To find the sub-architecture of a machine, type **arch -k**.
subnet	A networking scheme that divides a single logical network into smaller networks to simplify routing.
suninstall	A tool to install and maintain the 4.x operating system on Sun Workstations. suninstall replaces Setup, the 3.x installation tool.
SunOS	SunOS is the Sun UNIX based operating system incorporating Berkeley 4.2 and System V.
superblock	A block on the disk that contains information about particular file systems, such as the file system name, size in blocks, and so on.
superuser	A user with special privileges granted if he or she supplies the correct password when logging in as root or using the su command. For example, only the superuser can change the password file and edit major system administration files in /etc.
swap	A disk partition or a remote file which the kernel uses in cases of memory overflow.
symbolic link	A file that consists of a reference to the name of another file. The kernel translates accesses to the symbolic link into accesses to the file it refers to.
tapehost	A machine which has a tape drive that is used by another machine during a remote installation.
`tar` **utility**	A program that you use for backing up and restoring files to tape.
target machine	A target machine is the machine you are installing during a remote installation.

system administrator	The person responsible for setting up and maintaining a computer system and/or network of computer systems.
time-sharing system	A standalone Sun workstation with dumb terminals attached to its serial ports. The terminals rely on the workstation for processing power as well as file service and disk storage.
track	A concentric ring on a disk that passes under a single stationary disk head as the disk rotates.
upgrade, system	A system upgrade is installing the functionality of a minor release. In a standard upgrade, files in each architecture are selectively replaced.
virtual memory	A memory management technique used by SunOS for programs that require more space in memory than can be allotted to them. The kernel moves only pages of the program currently needed into memory, while unneeded pages remain on the disk.
yellow pages	A network service provided by Sun which allows you to maintain certain global information for an entire network. For example, one yellow pages password file lists all the accounts on a network.
yp database	A set of files containing global information that the yp programs access for information.
`ypinit`	A yp program that is used to install a yp database.

A

SunOS 4.0.3 and 3.x Directory Structures

A
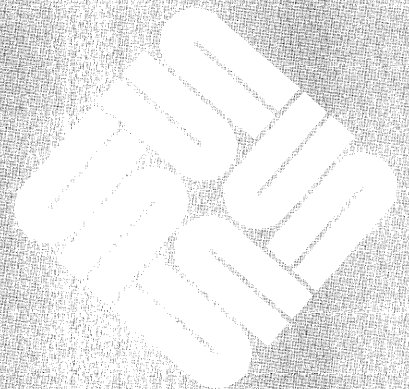
SunOS 4.0.3 and 3.x Directory
Structures

For a clearer picture of the filesystem changes between 4.0.3 and 3.x, compare
the following directory trees. Wherever an arrow (⇒) appears after a directory
name, this indicates a symbolic link to the directory following the arrows (eg.:
/bin ⇒ usr/bin).

Figure A-1   *SunOS 4.0.3* root *Filesystem Directory*

```
root ─── /
         │
         ─── /bin ──────► usr/bin
         │
         ─── /dev
         │
         ─── /etc
         │
         ─── /lib ──────► usr /lib
         │
         ─── /local
         │
         ─── /sbin
         │
         ─── /sys ──────► usr/share/sys ─── adm
         │                                  ─── crash
         ─── /tmp                           ─── log
         │                                  ─── preserve
         ─── /var ─────────────────────────── spool
                                            ─── tmp
                                            ─── yp
```

1607
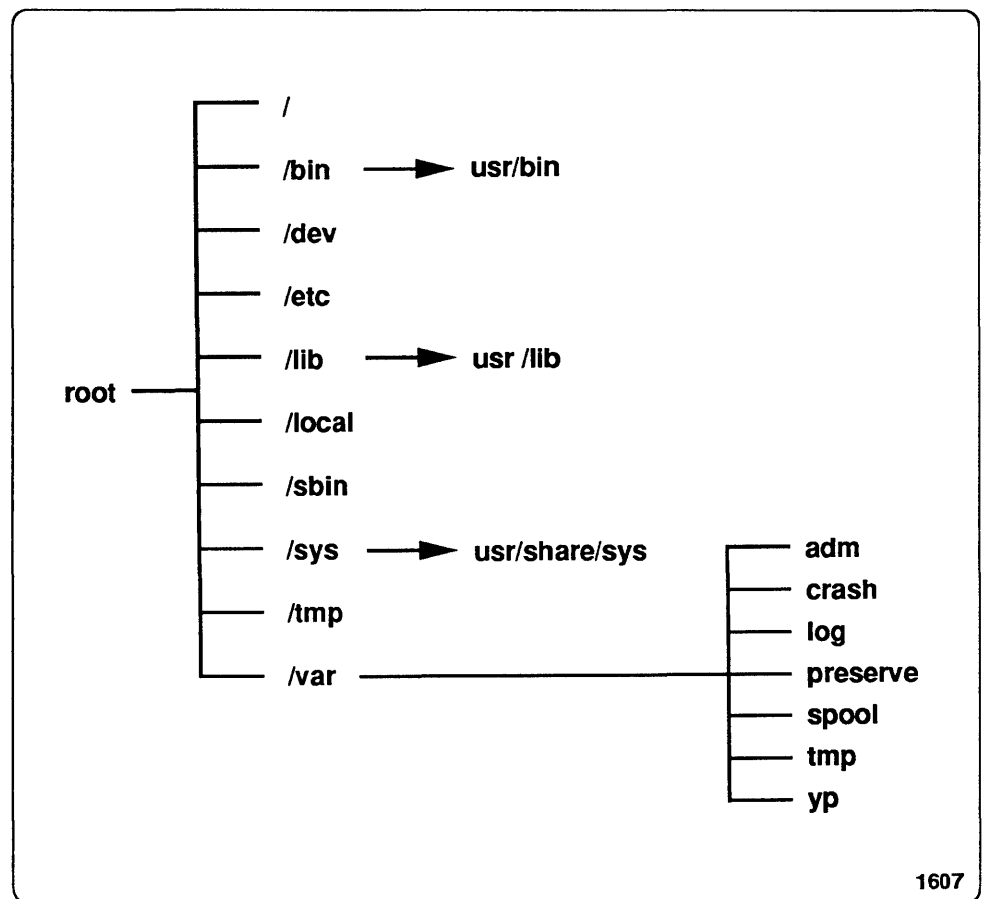
Figure A-2   *SunOS 4.0.3* /usr *Filesystem Directory*
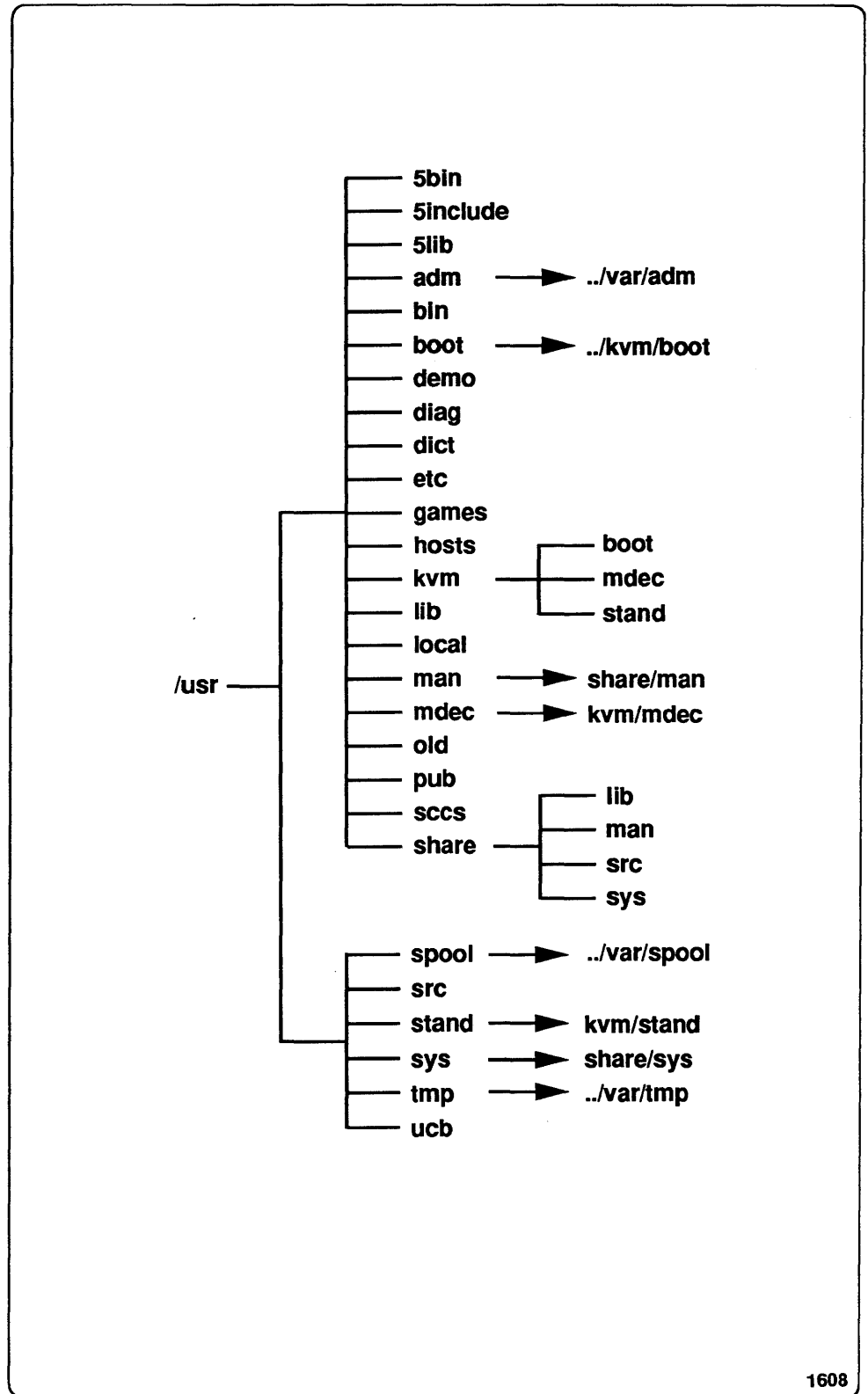
Figure A-3   *SunOS 4.0.3* /export *Filesystem Directory for Servers*
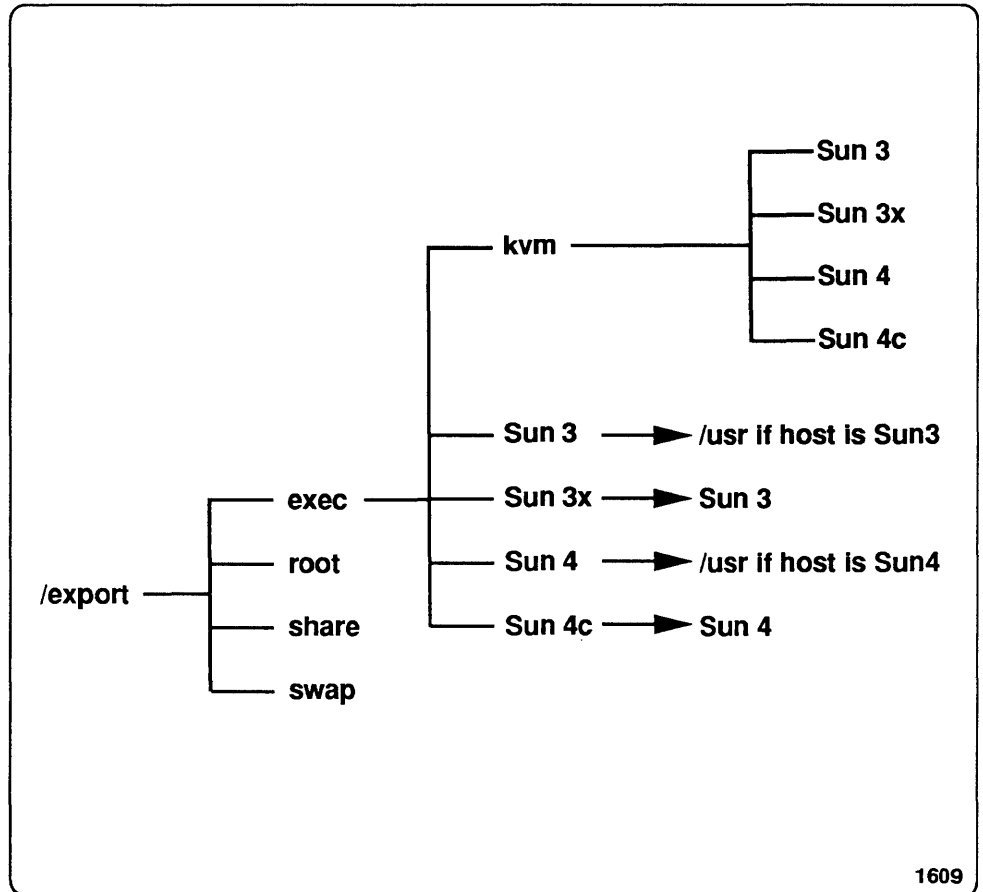
**SunOS 3.X Directory
Structure**

Figure A-4   *SunOS 3.X* `root` *Directory*

1610
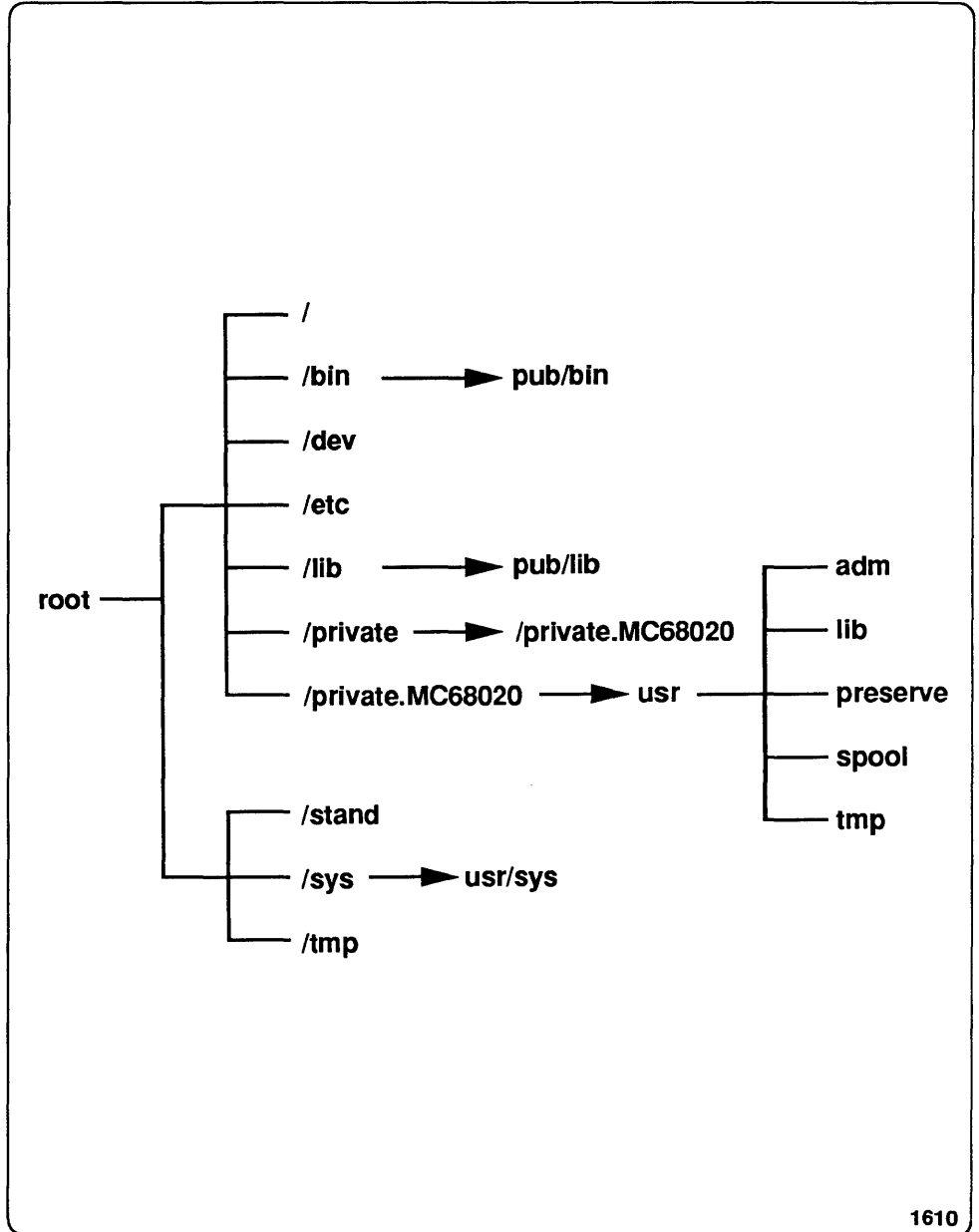
Figure A-5   *SunOS 3.x* /pub *Directory*
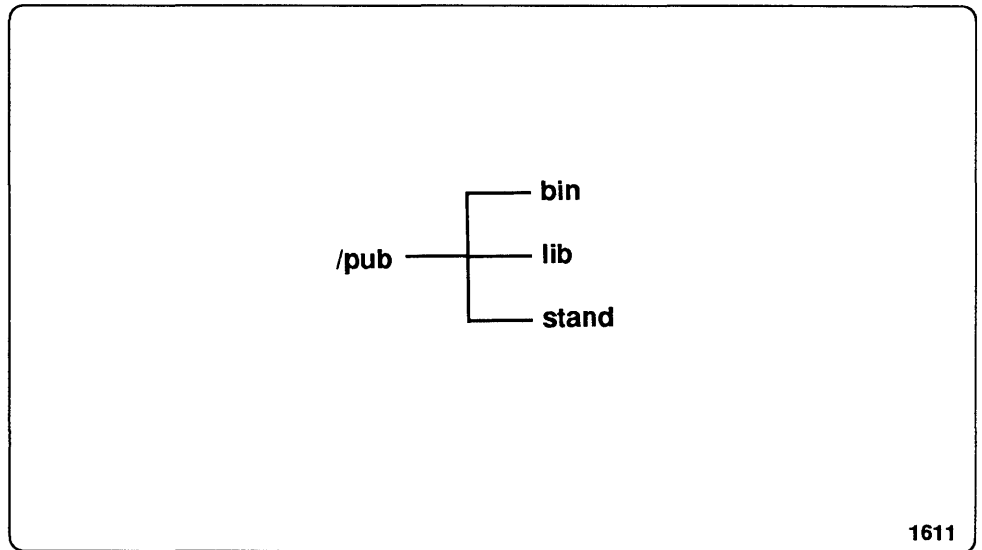
Figure A-6   *SunOS 3.x* /usr *Directory*

B
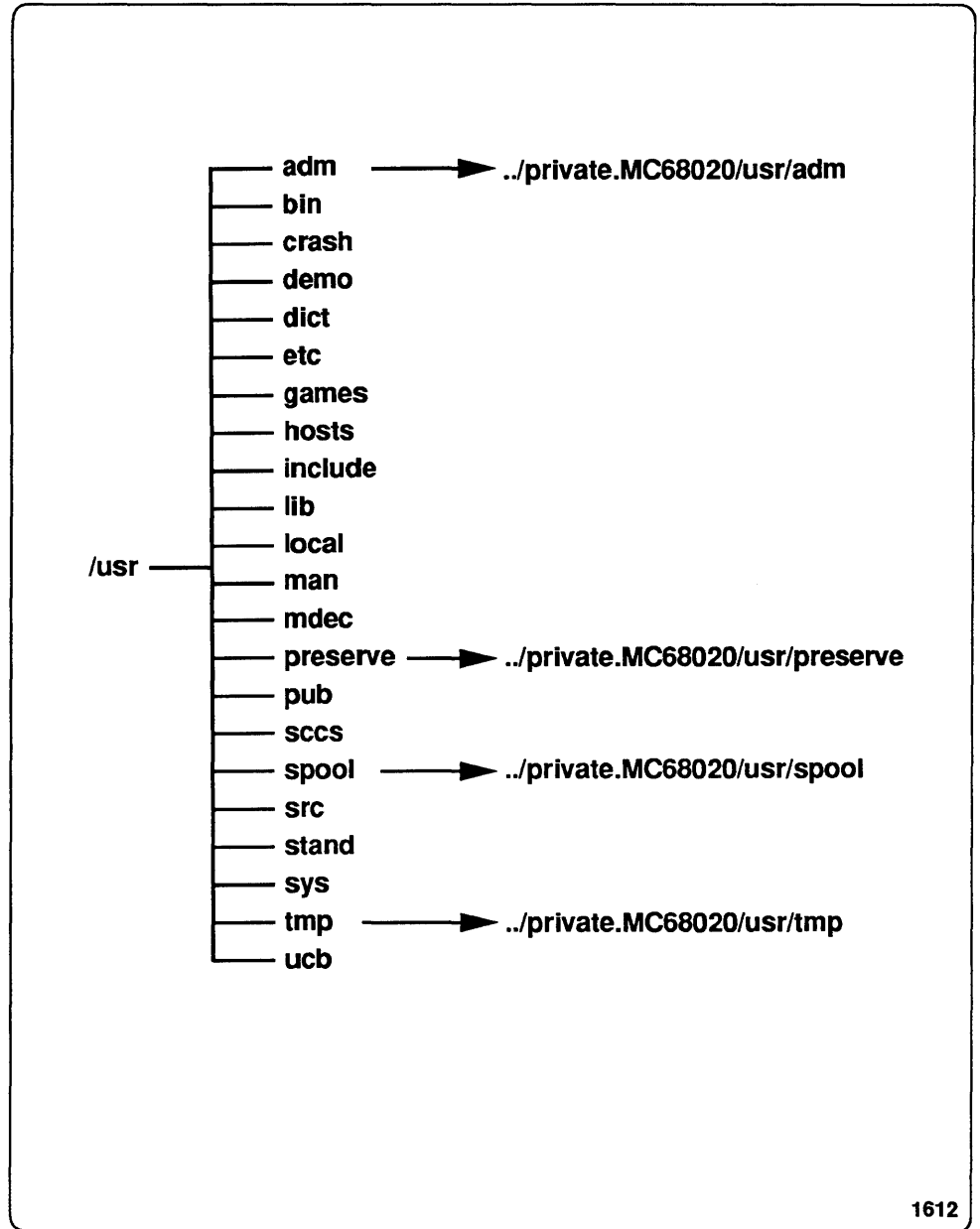
Time Zones

B

Time Zones

TIME ZONE NAME:	TIME ZONE AREA:
North America:	
US/Eastern	Eastern time zone, U.S.A.
US/Central	Central time zone, U.S.A.
US/Mountain	Mountain time zone, U.S.A.
US/Pacific	Pacific time zone, U.S.A.
US/Pacific-New	Pacific time zone, U.S.A., with proposed changes to Daylight Savings Time near election time in Presidential election years
US/Yukon	Yukon time zone, U.S.A.
US/East-Indiana	Eastern time zone, U.S.A., no Daylight Savings Time
US/Arizona	Mountain time zone, U.S.A., no Daylight Savings Time
US/Hawaii	Hawaii
Canada/Newfoundland	Newfoundland
Canada/Atlantic	Atlantic time zone, Canada
Canada/Eastern	Eastern time zone, Canada
Canada/Central	Central time zone, Canada
Canada/East-Saskatchewan	Central time zone, Canada, no Daylight Savings Time
Canada/Mountain	Mountain time zone, Canada
Canada/Pacific	Pacific time zone, Canada
Canada/Yukon	Yukon time zone, Canada
Europe:	
GB-Eire	Great Britain and Eire
WET	Western European time
Iceland	Iceland
MET	Middle European time (also known as Central European time)
Poland	Poland
EET	Eastern European time

Turkey   Turkey
W-SU   Western Soviet Union

Asia (including Australia and New Zealand):

PRC   People's Republic of China
Korea   Republic of Korea
Japan   Japan
Singapore   Singapore
Hongkong   Hong Kong
ROC   Republic of China

Australia/Tasmania   Tasmania, Australia
Australia/Queensland   Queensland, Australia
Australia/North   Northern Territory
Australia/West   Western Australia
Australia/South   South Australia
Australia/Victoria   Victoria, Australia
Australia/NSW   New South Wales, Australia

NZ   New Zealand

Other (if the locale isn't listed above); none of these have Daylight Savings
Time:

GMT   Greenwich Mean time
GMT-1   1 hours west of Greenwich Mean Time
GMT-2   2 hours west of Greenwich Mean Time
GMT-3   3 hours west of Greenwich Mean Time
GMT-4   4 hours west of Greenwich Mean Time
GMT-5   5 hours west of Greenwich Mean Time
GMT-6   6 hours west of Greenwich Mean Time
GMT-7   7 hours west of Greenwich Mean Time
GMT-8   8 hours west of Greenwich Mean Time
GMT-9   9 hours west of Greenwich Mean Time
GMT-10   10 hours west of Greenwich Mean Time
GMT-11   11 hours west of Greenwich Mean Time
GMT-12   12 hours west of Greenwich Mean Time
GMT+13   13 hours east of Greenwich Mean Time
GMT+12   12 hours east of Greenwich Mean Time
GMT+11   11 hours east of Greenwich Mean Time
GMT+10   10 hours east of Greenwich Mean Time
GMT+9   9 hours east of Greenwich Mean Time
GMT+8   8 hours east of Greenwich Mean Time
GMT+7   7 hours east of Greenwich Mean Time
GMT+6   6 hours east of Greenwich Mean Time
GMT+5   5 hours east of Greenwich Mean Time
GMT+4   4 hours east of Greenwich Mean Time
GMT+3   3 hours east of Greenwich Mean Time

GMT+2   2 hours east of Greenwich Mean Time
GMT+1   1 hours east of Greenwich Mean Time

C

SunOS 4.0.3 Upgrade Distribution Tape Layout
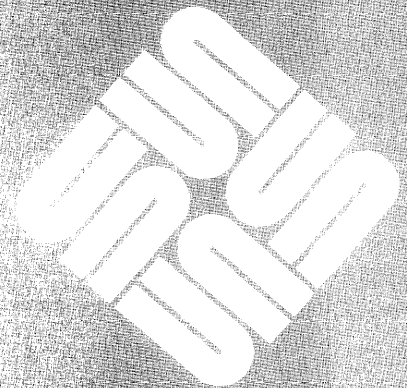
SunOS 4.0.3 Upgrade Distribution Tape Layout

The following table is representative of the files contained on the OS Upgrade 4.0.3.

To display a list of exact files and file sizes that are contained on your OS 4.0.3 Upgrade tape, see the next page.

4.0.3 Upgrade Tape * Sun-4 1/2"

Tape/File	Name	Description	Size	Format
1/0	boot	A general purpose bootstrap program.	49152	image
1/1	XDRTOC	Table of Contents in xdr(3N) format.	4096	toc
1/2	copy	Standalone copy.	49664	image
1/3	mini-root	An image of a mini version of SunOS.	6154240	image
1/4	munix	Memory UNIX.	1040896	image
1/5	munixfs	The MUNIX initialization file.	2105344	image
1/6	root	The complete root file system for SunOS.	1228800	tar
1/7	usr	Required /usr files.	9512960	tar
1/8	Kvm	Kernel executable files.	3143680	tar
1/9	Install	Installation and system administration tools.	983040	tar
1/10	Sys	/usr/share/sys files for making custom kernels.	1853440	tar
1/11	Networking	Networking tools and programs.	317440	tar
1/12	Debugging	Debugging tools.	4157440	tar
1/13	SunView_Users	SunWindows for users.	1198080	tar
1/14	SunView_Programmers	SunWindows files for programmers.	1372160	tar
1/15	SunView_Demo	SunWindows demo programs source.	51200	tar
1/16	User_Diag	Sysdiag.	4055040	tar
1/17	Graphics	Graphics programmer's files.	1474560	tar
1/18	uucp	uucp files.	61440	tar
1/19	System_V	System V compatibility files.	3952640	tar
1/20	Manual	On-line man pages.	71680	tar
1/21	Demo	Assorted graphics demonstrations including Graphics Processor source.	256000	tar
1/22	Games	Game programs.	1372160	tar
1/23	Versatec	Versatec raster printer/plotter support.	20480	tar
1/24	Security	C2 security support.	102400	tar
1/25	Copyright	The copyright file.	1024	image

Determining Exact Distribution Tape Information

To determine the exact files and file sizes contained on your distribution tapes, type the following commands:

```
scuzzy# mt -f /dev/nrst0 asf 1
scuzzy# dd if=/dev/nrst0 | /usr/etc/install/xdrtoc
```

You will receive a display similar to the following reflecting the files for your architecture type:

```
11+0 records in
11+0 records out
SunOS 4.0.2 of Thu Feb 9 18:14:00 PST 1989 from
Sun Release Engineering
ARCH sun4
VOLUME 1
 Vol File              Name        Size   Type
  1    0               boot       40960   image
  1    1              XDRTOC        4096   toc
  1    2                copy       49664   image
  1    3           mini-root     6246400   image
  1    4               munix      958976   image
  1    5             munixfs     1638400   image
  1    6                root     1228800   tar
  1    7                 usr    10649600   tar
  1    8                 Sys     9625600   tar
  1    9           Copyright        1024   image
  2    0               boot       40960   image
  2    1              XDRTOC        4096   toc
  2    2          Networking      409600   tar
  2    3           Debugging     4198400   tar
  2    4        SunView_Users     1228800   tar
  2    5   SunView_Programmers   1433600   tar
  2    6         SunView_Demo      102400   tar
  2    7             Install      921600   tar
  2    8           User_Diag     3788800   tar
  2    9             SunCore     1433600   tar
  2   10                uucp      102400   tar
  2   11            System_V    12492800   tar
  2   12              Manual      102400   tar
  2   13                Demo      204800   tar
  2   14               Games     1433600   tar
  2   15             Versatec      102400   tar
  2   16            Security      102400   tar
  2   17           Copyright        1024   image
```

Extracting Information on
Individual Software Category
Files

To extract information on individual files that comprise a Software Category, use
the following procedure:

1. Load the distribution tape which contains the desired Software Category.

2. Skip to the correct file.

3. Extract the tar table of contents.

For example, to see the files included in the uucp category, referring to the tape
Table of Contents above and assuming 1/4" tape:

1. Mount Tape 2 of the distribution.

2. Execute the following:

```
scuzzy# mt -f /dev/nrst0 asf 10
scuzzy# tar tvf /dev/nrst0
rwxrwxr-x  4/10        0 Feb  9 14:46 1989 ./lib/uucp/
rwx-------  4/10      648 Feb  3 14:47 1989 ./lib/uucp/uuck
---x-------  4/10    16384 Feb  3 14:47 1989 ./lib/uucp/uusub
--s--x--x  4/10    32768 Feb  3 14:47 1989 ./lib/uucp/uuxqt
scuzzy#
```

D

Installation Worksheets

D

Installation Worksheets

D.1. Introduction

The following worksheets are provided as a checklist for gathering information and performing installation procedures. They are divided into four categories:

□ Network Information

□ Disk and Client Information

□ Pre-installation Procedures

□ Installation Procedures

□ Post-installation Procedures

For more information on any of these categories, see the appropriate chapter in this manual.

D.2. Network Information Worksheets

For more information on gathering network information, see the *Getting Started* chapter of this manual.

Installation Network Information

Yellow Pages Domain Name:

Hostname	Internet Address (IP)	Ethernet Address	

D.3. Disk and Client Information Worksheets

The following worksheets are for disk and client information when performing server installations.

Disk and Client Information

Server name:
Server Internet address:

Disk 1:

Disk Information			
Partition	Size	Mount Pt.	Preserve

Disk 2:

Disk Information			
Partition	Size	Mount Pt.	Preserve

sun
microsystems

Client Information					
Name	Arch	IP Address	Swap	Ethernet	Halted Y/N

D.4. Pre-installation Checklist

Pre-installation procedures are used to preserve the customized environment when re-installing an existing system. For more detailed information, see *Getting Started* in this manual.

Hardcopy of the Following:

_____ Output from `mount -p`

_____ Output from `dkinfo` command

_____ List of clients and IP addresses

_____ Swap space for each client

_____ Architecture for each client

_____ Unusual kernel requirements for clients

_____ Hardcopy of configuration files

_____ Copy old `/etc/exports`, `/etc/fstab`, `/etc/crontab`, `/etc/passwd` files.

_____ IP address of machine being upgraded

_____ IP address of second Ethernet interface

If Running YP:

_____ Edit YP master bootparams map.

_____ Fix YP `passwd` master.

Mount Points:

_____ Make a list of all mount points and links added to `/` and `/usr`.

Copy Files:

Copy files from the following:

_____ /usr/local

_____ /usr/spool/mail

_____ /home directories

_____ Other locally created directories:

_____

_____

_____

Save Files:

Save copies of the following files:

_____ /etc/passwd

_____ /usr/lib/aliases

_____ /etc/aliases

_____ /sendmail.cf

_____ /etc/hosts

_____ kernel configuration files

Other customized files:

_____

_____

_____

_____

Halt Clients:

Halt the following clients:

_____

_____

_____

_____

_____

_____

Clean Up the Filesystem:

_____ Run `fsck -p`.

Full Dumps

Perform full dumps of all system partitions for the following clients:

_____

_____

_____

_____

_____

_____

D.5. Installation Checklist

The following checklist is for the procedures leading up to running *suninstall*. For more detailed information, see *Beginning the Installation* in this manual.

_____ Mount the distribution tape

_____ Load the bootstrap program

_____ Copy MUNIX

_____ Boot MUNIX

_____ Format and label the disk

_____ Copy the miniroot

_____ Boot the miniroot

_____ Run *suninstall*

D.6. Post-installation Checklist

The following checklist is for the procedures you perform after running *suninstall* to re-customize the environment. For more detailed information, see the *Post-installation Procedures* chapter in this manual.

_____ Install patch tapes

_____ Move the following saved files back to /usr:

      _____ /usr/local

      _____

      _____

      _____

      _____

_____ Edit /etc/ttytab

_____ Adjust ordering of fsck

_____ Verify ifconfig lines in /etc/rc.local or rc.boot

_____ Customize /etc/exports

_____ Integrate old fstab entries

_____ Merge old crontab entries

_____ Configure the kernel

_____ Check modes in /etc/dumpdate

_____ Check system scripts for reference to old partitions:

_____ dump

_____ restore

_____

_____

_____

_____ Run catman.

_____ Back up the system

_____ Reboot clients

E

suninstall Forms

E
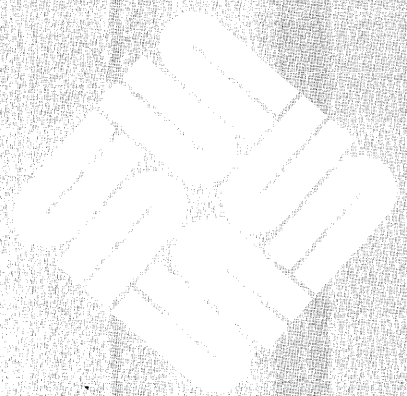
suninstall Forms

Introduction

The following set of *suninstall* forms are worksheets to help you prepare for your installation.

1. Time zone and terminal type

2. Host Form

3. Disk Form

    Fill out one for each disk drive.

4. Software Form

    Fill out one for each architecture type.

5. Client Form

    Fill out one for each client.

Once you have filled out all the forms required for your environment, collate them into numerical order and then execute *suninstall*.

E.1. Time Zone and Terminal Type

```
# cd /usr/etc/install
# suninstall

Enter the local time zone name:

 >> _____

Is this the correct date/time [y/n]:


     _____
 >> ___

Select your terminal type:
     1) Televideo 925
     2) Wyse Model 50
     3) Sun Workstation
     4) Other
 >> ___
```

E.2. Host Form

```
HOST FORM     [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------
Workstation Information :
     Name :  _____
     Type : [standalone]  [server]  [dataless]


Network Information :
     Ethernet Interface :  [none] [ie0]
     Internet Address 0 :  _____

     YP Type             :  [none]  [master]  [slave] [client]
     Domainname          :  _____

Misc Information :
     Reboot after completed : [y]  [n]


Are you finished with this form [y/n] ? ____
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

E.3. Disk Forms

**Disk Form: Standalone
Configuration**

```
 DISK FORM        [DEL=erase one char of input data] [RET=end of input data]
 ----------------------------------------------------------------------------
 Attached Disk Devices :
    [____]

 Disk Label             :   [default]  [existing]  [label in data file]
 Freehog Disk Partition :   [d]  [e]   [f] [g]  [h]
 Display Unit           :   [Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]

 PARTITION START_CYL BLOCKS    SIZE       MOUNT PT                PRESERVE(Y/N)
 ===========================================================================
       a      _____  _____  _____  _____                  _____
       b      _____  _____  _____  _____                  _____
       c      _____  _____  _____  _____                  _____
       d      _____  _____  _____  _____                  _____
       e      _____  _____  _____  _____                  _____
       f      _____  _____  _____  _____                  _____
       g      _____  _____  _____  _____                  _____
       h      _____  _____  _____  _____                  _____


 Ok to use this partition table [y/n]  ? ___
 Are you finished with this form [y/n]  ? ___

 [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

**Disk Form: Server
Configuration**

```
DISK FORM       [DEL=erase one char of input data] [RET=end of input data]
----------------------------------------------------------------------------
 Attached Disk Devices :
    [____]

 Disk Label               :  [default]   [existing]   [label in data file]
 Freehog  Disk Partition  :  [d]   [e]   [f]  [g]   [h]
 Display Unit             :  [Mbytes]   [Kbytes]   [bytes]   [blocks]   [cylinders]

PARTITION START_CYL BLOCKS    SIZE      MOUNT PT                  PRESERVE(Y/N)
============================================================================
    a       _____   _____   _____   _____                    ____
    b       _____   _____   _____   _____                    ____
    c       _____   _____   _____   _____                    ____
    d       _____   _____   _____   _____                    ____
    e       _____   _____   _____   _____                    ____
    f       _____   _____   _____   _____                    ____
    g       _____   _____   _____   _____                    ____
    h       _____   _____   _____   _____                    ____

Ok to use this partition table [y/n]  ? ____
Are you finished with this form [y/n] ? ____

[x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

Disk Form: Dataless
Configuration

```
DISK FORM        [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------------
Attached Disk Devices :
   [___]


Disk Label              :  [default]   [existing]   [label in data file]
Freehog Disk Partition  :  [d]   [e]   [f] [g]   [h]
Display Unit            :  [Mbytes]  [Kbytes]   [bytes]   [blocks]   [cylinders]

PARTITION START_CYL BLOCKS    SIZE      MOUNT PT               PRESERVE(Y/N)
=============================================================================
     a     _____  _____  _____   _____              ___
     b     _____  _____  _____   _____              ___
     c     _____  _____  _____   _____              ___
     d     _____  _____  _____   _____              ___
     e     _____  _____  _____   _____              ___
     f     _____  _____  _____   _____              ___
     g     _____  _____  _____   _____              ___
     h     _____  _____  _____   _____              ___


 Ok to use this partition table [y/n]  ? ___
 Are you finished with this form [y/n] ? ___

 [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

Disk Form: Generic

```
DISK FORM       [DEL=erase one char of input data] [RET=end of input data]
-------------------------------------------------------------------------
 Attached Disk Devices :
    [___]

 Disk Label             :  [default]  [existing]  [label in data file]
 Freehog Disk Partition :  [d]  [e]  [f] [g]  [h]
 Display Unit           :  [Mbytes]  [Kbytes]  [bytes]  [blocks]  [cylinders]

PARTITION START_CYL BLOCKS    SIZE    MOUNT PT                PRESERVE (Y/N)
==========================================================================
       a      _____    _____    ____    _____              ____
       b      _____    _____    ____    _____              ____
       c      _____    _____    ____    _____              ____
       d      _____    _____    ____    _____              ____
       e      _____    _____    ____    _____              ____
       f      _____    _____    ____    _____              ____
       g      _____    _____    ____    _____              ____
       h      _____    _____    ____    _____              ____

Ok to use this partition table [y/n]  ? ___
Are you finished with this form [y/n] ? ___

[x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

E.4. Software Form

```
SOFTWARE FORM   [DEL=erase one char of input data] [RET=end of input data]
------------------------------------------------------------------------
Architecture Information :
      Type           : [sun2]  [sun3]  [sun3x]  [sun4]  [sun4c]
      Path where executables reside :_____
      Path where sub-arch dependent executables reside :_____

Media Information:
      Device Type :   [ar0]  [ar8]  [st0] [mt0]  [xt0]
      Drive Type  :   [local]  [remote]
      Tapehost    :  _____
      Tapehost's Internet Address :_____                         ↳

Choice             : [all]  [default]  [own choice]  [required]  [quit]


      CATEGORY        NAME        BYTES   AVAIL BYTES        Y/N


      ====================================================================

      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____
      _____    _____    _____    _____       ____

OK to use this extract list [y/n] ? ___
Are you finished with this form [y/n] ? ___

    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

E.5. Client Form

```
CLIENT FORM     [DEL=erase one char of input data] [RET=end of input data]
-----------------------------------------------------------------------
Architecture Type :     [sun2]  [sun3]  [sun3x]  [sun4]   [sun4c]
Choice            :     [create]  [delete]  [display]   [next arch]

Client(s) :
     _____

Client Information :
    Name                                     :  _____
    Internet Address                         :  _____
    Ethernet Address                         :  _____
    YP Type :     [none]  [master]  [slave] [client]
    Domain name                              :  _____
    Path of Client's Root                    :  _____
    Path of Client's Swap                    :  _____
    Path of Client's Home                    :  _____
    Path of Client's Executables             :  _____
    Path of Client's Sub-arch Dependent Execs :  _____
    Swap size (e.g. 8M,8m,8K,8k,8 or 8b)     :  _____


Are you finished with this form [y/n] ? ___
    [x/X=select choice] [space=next choice] [^B/^P=backward] [^F/^N=forward]
```

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