Tru64 UNIX

Installation Guide

Part Number: AA-RH8SD-TE

June 2001

Product Version: Tru64 UNIX Version 5.1A

The manual describes the different installation procedures used to install
Version 5.1A of the Compaq Tru64 UNIX operating system on a single
system.

Contents

About This Manual

1 Operating System and Installation Technology

2 Update Installation Overview

3 Update Installation Procedure

4   Full Installation Overview

5   Full Installation Prerequisite Tasks

6 Full Installation Procedures

7   Configuring the System for General Use

8   Using Online Documentation

9 Software Management

A Device Naming Conventions

B Compact Disc Overview

C Software Subset Descriptions

D Installing Associated Products

E Update Installation Processing on Existing Files

F Installation Log Files

G Troubleshooting

Glossary

Index

Examples

Figures

Tables

About This Manual

This manual describes how to install Version 5.1A of the Tru64™ UNIX operating system on all supported systems. Topics include how to prepare your system for an installation, boot the system from the distribution media, and perform a Full or Update Installation.

Installation information is located in two manuals:

- This manual documents the Full Installation and Update Installation procedures and is designed to get most systems from zero to installed and operational quickly.

- The *Installation Guide -- Advanced Topics* documents advanced installation topics such as Installation Cloning, Configuration Cloning, invoking user supplied files to customize the installation process, and guidelines for planning disk space.

Section 1.7, Using This Manual, provides a navigational path to help you find the information that is relevant to the type of installation you want to perform.

Audience

The *Installation Guide* is intended for anyone who is installing or updating the operating system software or the Worldwide Language Support (WLS) software onto a single system.

New and Changed Features

The following changes have been made since the Version 5.1 release:

- *Table 2–1* shows the successive update paths to reach Version 5.1A if your system is running a version of the operating system other than Version 5.0A or Version 5.1. Your system must be running Version 5.0A or Version 5.1 of the operating system in order to update to Version 5.1A.

- *Section 9.3* lists the new values returned by the setld -i command, which describe the installation status of a sofware subset. The values are described in more detail in the setld(8) reference page.

- *Appendix G* includes recovery procedures for setld load and delete failures for single systems and clusters.

Previous versions of this manual are available on the World Wide Web at

`http://www.tru64unix.compaq.com/docs/`

See the New and Changed features section of those versions to learn the evolution of this manual.

Organization

This manual is organized as follows:

Chapter 1	Provides an overview of the operating system features and a summary of the Full, Update, and Cloned Installation processes. Use this information to decide which type of installation is best suited for you.
Chapter 2	Provides an introduction to the Update Installation process.
Chapter 3	Describes how to perform an Update Installation.
Chapter 4	Provides an introduction to the Full Installation process.
Chapter 5	Describes the preinstallation tasks you must complete before beginning a Full Installation.
Chapter 6	Describes how to perform a Full Installation of the base operating system and Worldwide Language Support (WLS) software.
Chapter 7	Provides information about how to set up the system for general use after installing the operating system. Pointers to more information are provided.
Chapter 8	Describes how to access, view, and copy to disk the manuals on the Documentation CD-ROM.
Chapter 9	Describes how to install and manage software after the initial installation.
Appendix A	Describes device naming conventions.
Appendix B	Describes how to determine CD-ROM device names, how to mount and unmount a CD-ROM, and how to remove a CD-ROM from a drive.
Appendix C	Provides descriptions of the base operating system and WLS software subsets.
Appendix D	Describes how to install an Associated Product onto the base operating system.
Appendix E	Describes how the Update Installation process merges user customizations from protected system files into the new versions of the files.
Appendix F	Describes the contents of the log files that are created after a Full or Update Installation.

Appendix G	Lists error messages and provides corrective action for errors that might be encountered during Full and Update Installations.
Glossary	Provides definitions of the installation-related terms used in this manual.

Related Documentation

The following documents may be useful references when you are installing the operating system and then are configuring the operating system for general use:

- The documentation for your hardware shows how to physically set up the processor and its additional devices, provides a list of supported console variables, and contains troubleshooting guidelines.

- The *Release Notes*, especially those sections that pertain to installations, may contain important undocumented information about firmware, software, or hardware that may affect your installation.

- The *Installation Guide -- Advanced Topics* manual contains information about advanced installation features, such as: using user-supplied files to further customize the installation process, Installation Cloning, Configuration Cloning, installing Worldwide Language Support (WLS) on a running system, and disk space planning.

- The *Sharing Software on a Local Area Network* manual contains information about Remote Installation Services (RIS) and Dataless Management Services (DMS). RIS lets you install software products over a network from a central server. DMS lets you set up an environment where the / and /usr file systems are exported from a central server onto a client system.

- The *System Administration* manual provides information about configuring, administering, and maintaining your system after it has been installed.

- The *AdvFS Administration* manual contains information about administering an Advanced File System (AdvFS).

- The *Network Administration: Connections* and *Network Administration: Services* manuals contain information about network configuration, administration, and troubleshooting.

- The *Software License Management* manual contains information about registering and loading software licenses.

- The *Documentation Overview* provides information on all of the manuals in the Tru64 UNIX documentation set.

The Tru64 UNIX documentation set is available on the World Wide Web at

`http://www.tru64unix.compaq.com/docs/`

Icons on Tru64 UNIX Printed Manuals

The printed version of the Tru64 UNIX documentation uses letter icons on the spines of the manuals to help specific audiences quickly find the manuals that meet their needs. (You can order the printed documentation from Compaq.) The following list describes this convention:

G   Manuals for general users

S   Manuals for system and network administrators

P   Manuals for programmers

R   Manuals for reference page users

Some manuals in the documentation help meet the needs of several audiences. For example, the information in some system manuals is also used by programmers. Keep this in mind when searching for information on specific topics.

The *Documentation Overview* provides information on all of the manuals in the Tru64 UNIX documentation set.

Reader's Comments

Compaq welcomes any comments and suggestions you have on this and other Tru64 UNIX manuals.

You can send your comments in the following ways:

- Fax: 603-884-0120 Attn: UBPG Publications, ZKO3-3/Y32

- Internet electronic mail: `readers_comment@zk3.dec.com`

  A Reader's Comment form is located on your system in the following location:

  `/usr/doc/readers_comment.txt`

Please include the following information along with your comments:

- The full title of the manual and the order number. (The order number appears on the title page of printed and PDF versions of a manual.)

- The section numbers and page numbers of the information on which you are commenting.

- The version of Tru64 UNIX that you are using.

- If known, the type of processor that is running the Tru64 UNIX software.

The Tru64 UNIX Publications group cannot respond to system problems or technical support inquiries. Please address technical questions to your local system vendor or to the appropriate Compaq technical support office. Information provided with the software media explains how to send problem reports to Compaq.

Conventions

`%` `$`	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells.
`#`	A number sign represents the superuser prompt.
`% `**`cat`**	Boldface type in interactive examples indicates typed user input.
`>>>`	The console mode prompt is three right angle brackets.
`file`	Italic (slanted) type indicates variable values, placeholders, and function argument names.
`cat(1)`	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, `cat(1)` indicates that you can find information on the `cat` command in Section 1 of the reference pages.
Ctrl/*x*	This symbol indicates that you hold down the first named key while pressing the key or mouse button that follows the slash. In examples, this key combination is enclosed in a box (for example, Ctrl/C).

1

Operating System and Installation Technology

This chapter contains the following information:

- A high level overview of the operating system (Section 1.1)

- What to do if the operating system was preinstalled at the factory (Section 1.2)

- A situation analysis to help you determine what kind of installation to perform (Section 1.3)

- A summary of cluster installation procedures (Section 1.4)

- A description of the two types of distribution media: CD-ROM or remote installation services (RIS) server (Section 1.5)

- A description of the two installation user interfaces: graphical and text-based (Section 1.6)

- How to use this manual to find the information you need (Section 1.7)

1.1 Overview of the Operating System

The operating system is a multiuser, multitasking, 64-bit advanced kernel architecture based on Carnegie Mellon University's Mach Version 2.5 kernel design with components from Berkeley Software Distribution (BSD) Versions 4.3 and 4.4, UNIX System Laboratories System V Release 4.0, other software sources, and the public domain.

A suite of comprehensive management solutions is built into the operating system, enhancing productivity and efficiency at every level from installing new software and monitoring performance to tuning the system dynamically for maximum availability. This version of the operating system provides more advanced management features, including simplified installations, system configuration and management, faster and easier problem diagnosis, and web-based management.

The operating system incorporates several performance enhancements either developed or extended by Compaq, including the wired memory, virtual memory, and unified buffer cache; cached writes over NFS; IP multicasting, path MTU discovery, and optimized TCP/IP; and quick started shared libraries.

The operating system supports loadable drivers and other kernel subsystems including loadable boot-path support for third-party disks and graphics cards and provides support for dynamic system configuration and dynamic system recognition of disks and tapes.

The Common Desktop Environment (CDE) is the desktop user interface. CDE provides a uniformed graphical user interface - portable across multiple platforms - to facilitate common end-user and system administration tasks. The CDE uniformed graphical interface makes the operating system appear more like a personal computer, a feature that makes it more accessible to the many end-users familiar with those systems.

Tru64 UNIX provides realtime support and symmetrical multiprocessing (SMP), dataless servers and clients, and numerous features intended to assist application programmers in developing applications that use shared libraries, threads, and memory mapped files. It is fully compliant to the Single UNIX Specification, to the X/Open UNIX brand, to POSIX 1003.1B (Realtime) and to POSIX 1003.1C (with DECthreads).

1.2 What to Do if the Operating System Is Preinstalled

Some brand new systems are preinstalled with the operating system before being shipped from the manufacturing facility. These systems are called factory installed systems (FIS). Typically, a FISed system is installed with all base operating system subsets as well as several associated products.

Included in the shipping carton with the hardware is the *Factory Installed Software Information Sheet*. This information sheet describes the software products that have been preinstalled for you and the disks and disk partitions that were used in the file system layout.

When you turn on the system and monitor for the first time, the FIS Startup Procedure begins, and you have two choices:

- If the preinstalled software and file system layout is not what you want, cancel the FIS Startup Procedure and perform a Full Installation where you can choose your own software and file system layout. See Chapter 4 and Chapter 6 for information about the Full Installation process.

- If you decide to keep the preinstalled software and file system layout, you will be asked to supply the following information:

  – A name for the system (Section 6.8)

  – The current local time and date (Section 6.9)

  – The geographic location and area where the system is located (Section 6.10)

  – A superuser password (Section 6.11)

When you supply the system-specific information and the kernel build process is complete, see Chapter 7 for information about setting up your system for general use with printer, mail, and networking services.

1.3 What Kind of Installation Should You Perform?

There are three ways you can install the operating system:

- An **Update Installation** operates on a system that is running Version 5.0A or Version 5.1 of the operating system and updates it to Version 5.1A. An Update Installation preserves disk partitions, file systems, file customizations, network and print environment, user accounts, user created files, and any other system setup you may have done on the system.

- A **Full Installation** installs a brand new operating system, in this case Version 5.1A. A Full Installation creates new file systems and swap space and overwrites existing system and user-created files on the disk partitions where the file systems and swap spaces are to be installed. After the installation, the system must be configured for general use.

- An **Installation Cloning** is a variation of a Full Installation that lets you replicate the installation from a model system that already is installed with Version 5.1A onto one or more systems with the same or similar hardware configuration. Installation Cloning is ideal for environments in which there are many systems of the same type to be installed. Cloning produces identical system installations and eliminates the need to go through the Full Installation tasks at each system. Installation Cloning procedures are documented in the *Installation Guide -- Advanced Topics*.

What is the Difference Between Installation Types?

The primary difference between an Update Installation and a Full Installation is that an Update Installation updates your system to the next version of the operating system with little or no disruption to your existing system configuration. When you perform a Full Installation, however, you lose all existing configuration data, layered products, and third party software. If user data exists in one of the standard UNIX file systems (for example, in /usr/users), that data must be backed up so it can be restored after the Full Installation is complete.

Use the situation analysis shown in Table 1–1 as a guideline to decide which type of installation to perform. Table 1–1 describes different installation scenarios and lists the installation type that is best suited for the situation.

Table 1–1: Situation Analysis - Which Installation Type Is Best For You?

Situation	Installation Type Best Suited for Your Needs	Start Here for Information
You want to install Version 5.1A onto a system currently running Version 5.0A or Version 5.1 but want to retain disk partitions, file system layout , and system configuration	Update Installation	Chapter 2
You want to install Version 5.1A onto a system currently running a version other than Version 5.0A or Version 5.1 but want to retain disk partitions, file system layout, and system configuration	Successive Update Installations to reach Version 5.1A	Chapter 2
You want to install Version 5.1A onto a system currently running Version 5.0A or Version 5.1 but need to change disk partitions sizes, file system layout, file system type, add more software, or add hardware	Full Installation	Chapter 4
You want to install Version 5.1A on a brand new system	Full Installation	Chapter 4
You want to install Version 5.1A on several similar systems	Full Installation on one system, then Cloned Installation on target systems	*Installation Guide -- Advanced Topics*; then Chapter 5 in this manual
You want to install a cluster	Full Installation on one member	Section 1.4
You want to duplicate the installation characteristics from one system to another similar system	Cloned Installation	*Installation Guide -- Advanced Topics*; then Chapter 5 in this manual
You want to customize the installation process by running a script or executable	All[a]	*Installation Guide -- Advanced Topics*; then Chapter 5 in this manual
You want to install additional optional software to a system already installed with Version 5.1A.	`setld` command	Chapter 9

Table 1–1: Situation Analysis - Which Installation Type Is Best For You? (cont.)

Situation	Installation Type Best Suited for Your Needs	Start Here for Information
You want to set up a remote installations server (RIS) to serve Version 5.1A over the network	All[a]	*Sharing Software on a Local Area Network*
You want to use the network as the distribution media rather than CD-ROM	All[a]	*Installation Guide -- Advanced Topics* (for network boot instructions); then Chapter 5 in this manual

[a] The term *All* refers to a Full Installation, Update Installation, and Cloned Installation.

1.4 Installing a Cluster

To install and configure a cluster, you perform a Full Installation of the operating system on one system that you plan to make a cluster member. You do not have to install the Tru64 UNIX operating system on each cluster member.

Follow this general procedure to install a cluster:

1. Read the TruCluster Server *Cluster Installation* manual first because it provides all the background information you need to know about cluster installations. This manual, the *Installation Guide*, is focused on single system installations.

   The TruCluster Server documentation set is available on the World Wide Web at

   http://www.tru64unix.compaq.com/docs/

2. Use the information in the TruCluster Server *Cluster Hardware Configuration* manual to configure the storage hardware and firmware.

3. Follow the Full Installation procedures described in Chapter 5 and Chapter 6 of this manual to install the operating system on a private or shared disk on the system that will become the first cluster member. Remember to select AdvFS as the file system type.

4. Follow the instructions in Chapter 7 and the TruCluster Server *Cluster Installation* manual to configure network and time services. Load and configure the applications you plan to use in the cluster.

5. Follow the instructions in the TruCluster Server *Cluster Installation* manual to load licenses, install the TruCluster Server software subsets, and run cluster specific configuration commands to create the cluster.

1.5 Installation Media: CD-ROM or Network Server

There are two types of distribution media you can use to install the operating system:

- The Version 5.1A *Operating System Volume 1* CD-ROM contains the operating system software subsets that are described in Appendix C. CD-ROM is the most commonly used installation media, and the boot instructions in this manual are targeted to CD-ROM installers.

- Over a network connection to a **Remote Installation Services** (RIS) server that is serving Version 5.1A of the operating system. Although the installation procedures are documented in this manual, the network boot commands are described in the *Installation Guide -- Advanced Topics* because the network is less commonly used.

Choosing which distribution media to use for the installation depends on the following:

- If you have a copy of the Version 5.1A operating system CD-ROM in your possession and your system has a CD-ROM drive, you can perform the installation from CD-ROM.

- If your site has a RIS server that is serving Version 5.1A of the operating system, ask the RIS server administrator if you should perform a RIS installation. The RIS server administrator performs the tasks necessary to register your system as a client of the RIS server.

  If you are the RIS server administrator and want to enable installations over the network, follow the instructions in *Sharing Software on a Local Area Network* to set up a RIS server and register client systems.

1.6 Installation User Interfaces: Graphical and Text-Based

Full and Update Installations have a graphical user interface and a text-based, menu-driven user interface. You have the option to view the user interface in one of three languages: United States English, Chinese, or Japanese.

The type of user interface presented during a Full or Update Installation is determined based on the hardware configuration. Systems equipped with graphics consoles present a graphical interface to the installation. Systems with consoles that do not have graphics capabilities present a text-based interface.

Both interfaces are task oriented in design, which means that each user decision is presented to you one at a time. You can go back and change your entries at any time.

Both installation interfaces have an online help system. The online help for the graphical interface was modeled after the CDE online help system and provides enough information for you to make intelligent decisions. Online help is available in the text-based interface by entering the word `help` at any prompt.

1.7 Using This Manual

After you have decided which type of installation to perform, follow these suggested paths to the information you may need:

Update Installation:

> *Read*: Chapter 2 $\Rightarrow$ Chapter 3

> *Suggested reading*: Appendix A, Appendix E, and Appendix F

Full Installation:

> *Read*: Chapter 4 $\Rightarrow$ Chapter 5 $\Rightarrow$ Chapter 6 $\Rightarrow$ Chapter 7

> *Suggested reading*: Chapter 8, Appendix A, and Appendix F

Cloned Installation:

> *Read*: The *Installation Cloning* chapter in the *Installation Guide -- Advanced Topics* $\Rightarrow$ then Chapter 6 in this manual

> *Suggested reading*: Appendix F

2

Update Installation Overview

This chapter includes the following information:

- A description of how the operating system is updated from the current version to the new version (Section 2.1)

- How to update a cluster to the next version of the operating system (Section 2.2)

- Supported update paths if your system is running a version of the operating system other than Version 5.0A or Version 5.1 (Section 2.3)

- A summary of the Update Installation features that you control and the features that already are built into the process (Section 2.4)

- The theory of operation behind an Update Installation (Section 2.5)

If you are not interested in reading about Update Installation features or the theory of operation behind an Update Installation; go directly to Chapter 3, which gives step-by-step instructions for performing anUpdate Installation.

2.1 Description of an Update Installation

An Update Installation updates the operating system from Version 5.0A or Version 5.1 to Version 5.1A. An Update Installation preserves disk partitions, file systems, file customizations, the network, print, and mail environments, user accounts, user created files, and any other system setup you may have done. For details about the affects an Update Installation has on existing files, see Appendix E.

If software patches have been applied to your current operating system, it is not necessary to remove the patches before you begin the Update Installation process. The Update Installation process is designed to detect patches and recommends that you install the latest patch kit for the new version of the operating system when the Update Installation is complete.

The software subsets that comprise the operating system are known as **base software subsets**. During an Update Installation, the base software subsets, Worldwide Language Support (WLS) software subsets, and TruCluster Server Software Support (TCR) software subsets that already are installed on the current version of the operating system are updated to Version 5.1A. In addition, any mandatory base, WLS, and TCR software subsets that are introduced in Version 5.1A are installed automatically.

You cannot install additional optional software subsets during an Update Installation. Additional optional software subsets can be installed by using the `setld` command when the Update Installation is complete. See Chapter 9 for more information about using the `setld` command to install base operating system software, and see the *Installation Guide -- Advanced Topics* for information about installing WLS software.

Layered products are not updated by the Update Installation process. To update layered products, it may be necessary to delete the existing version and reinstall the new version that is designed and qualified to operate with Version 5.1A. The Update Installation process notifies you accordingly.

Do not perform an Update Installation if you want to change the type, location, or size of file systems or if you want to install additional optional software because those features are not offered during an Update Installation.

2.2 Cluster Rolling Upgrades

An Update Installation is one of several stages in a cluster rolling upgrade. A rolling upgrade of a cluster is performed while the cluster is in operation. One member at a time is rolled and returned to operation while the cluster transparently maintains a mixed-version environment for the base operating system, cluster, and Worldwide Language Support (WLS) software. Clients accessing services are not aware that a rolling upgrade is in progress. A cluster currently installed with and running Version 5.1 can be rolled to Version 5.1A.

The cluster rolling upgrade procedure is documented in the TruCluster Server *Cluster Installation* manual, which is available on the World Wide Web at

`http://www.tru64unix.compaq.com/docs/`

After running several cluster-specific commands to prepare the cluster for the software upgrade, at some point in the process you are referred back to Chapter 3 of this manual to perform one Update Installation on the lead member of the cluster. The lead member is the cluster member that you choose to roll first.

See the TruCluster Server *Cluster Installation* manual for step by step instructions for performing a cluster rolling upgrade.

2.3 What Versions of the Operating System Can Be Updated to Version 5.1A?

The Update Installation process updates your operating system from Version 5.0A or Version 5.1 to Version 5.1A.

If your system is installed with a version other than Version 5.0A or Version 5.1, you must perform successive updates to reach Version 5.1A. The only other option to performing successive updates is to perform a Full Installation. Table 2–1 shows the successive update paths to reach Version 5.1A. The `installupdate` command invokes the Update Installation process.

To update a system from the current release to the next release in the update path, you must have in your possession the distribution media associated with the version to which you want to update.

Table 2–1: Supported Update Installation Paths

Current Installed Operating System Version	Can Be Updated Directly to This Version of the Operating System
Version 3.2 Version 3.2A Version 3.2B	Version 3.2C
Version 3.2E-1 Version 3.2E-2 Version 3.2F	Version 3.2G[a]
Version 3.2C (Rev. 214) Version 3.2D-1 Version 3.2D-2	Version 4.0
Version 3.2G (Rev. 62)	Version 4.0A
Version 4.0 (Rev. 386) Version 4.0A (Rev. 464)	Version 4.0B
Version 4.0B (Rev. 564) Version 4.0C (Rev. 564.32)	Version 4.0D
Version 4.0E[b] (Rev. 1089)	Version 4.0F
Version 4.0D[c] (Rev 878) Version 4.0E[b] (Rev 1089) Version 4.0F[d] (Rev 1229)	Version 4.0G
Version 4.0D[c] (Rev. 878) Version 4.0F[d] (Rev. 1229)	Version 5.0
Version 4.0F[d] (Rev. 1229) Version 5.0 (Rev. 910)	Version 5.0A
Version 4.0G (Rev. 1530) Version 5.0A (Rev. 1094)	Version 5.1
Version 5.0A (Rev. 1094) Version 5.1 (Rev. 732)	Version 5.1A

[a] Use the `setld -l` command to update to Version 3.2G because it is a hardware only release; the operating system itself was not revised.

Table 2–1: Supported Update Installation Paths (cont.)

b Version 4.0E can be updated directly to more than one version of the operating system.
c Version 4.0D can be updated directly to more than one version of the operating system.
d Version 4.0F can be updated directly to more than one version of the operating system.

If you do not have the version of the operating system distribution media you need, contact your support representative.

2.3.1 How to Determine the Version Number and Revision Level of the Operating System

To determine the operating system version number and revision level currently installed on your system, enter the following command:

```
# sizer -v
Compaq Tru64 UNIX V5.0A (Rev. 1094); Fri Aug 24 10:27:47 EST 2001
```

In the previous command output, 5.0A is the operating system version, and 1094 is the revision level.

2.4 Update Installation Features

An Update Installation can be invoked in either a graphical or text-based interface. When you invoke the Update Installation and your system has graphics capabilities, a graphical interface is presented. If your system does not have graphics capabilities, the text-based interface is presented. If your system has graphics capabilities, but you want to use the text-based interface, you can force the text-based interface by using the -nogui flag. However, the reverse is not true. See Section 3.3 for instructions about forcing the text-based interface.

The Update Installation features are classified into two types: the features you control and the features that are built into the Update Installation process:

- Table 2–2 lists the features and options that you control when you begin an Update Installation.

- Table 2–3 lists the features that are built into the Update Installation process.

Table 2–2 shows the Update Installation features that you can turn on or off.

Table 2–2: User-Controlled Features and Options of the Update Installation Process

User Option	Description	Documentation
Unattended Update Installation	If you do not need to select optional kernel components or archive obsolete files, you have the option to invoke the Update Installation with the -u flag to run the Update Installation without any user intervention.	Section 3.3
Kernel Component Options	You have the option to interactively select optional kernel components.	Section 3.5.3
Archive Obsolete Files	You have the option to archive obsolete files before they automatically are removed by the Update Installation.	Section 3.5.6

Table 2–3 describes the features that are built into the Update Installation process.

Table 2–3: Built-In Features of the Update Installation Process

Built-In Feature	Description	Documentation
Notification of conflicting layered products	Notifies you when an installed layered product may not be compatible with the new version of the operating system; this layered product may need to be reinstalled later.	Section 3.5.1
Removes layered products that prevent the Update Installation from continuing	Upon your confirmation, removes layered products that prevent the Update Installation from continuing.	Section 3.5.1.2
Updates base operating system, TCR, and WLS software to new version	Updates existing installed subsets and installs new mandatory subsets introduced in the new version of the operating system.	Section 3.5.2
Looks for changed file types	Looks for file types that have been changed. The Update Installation might not be able to proceed if certain conflicts are found.	Section 3.5.5

Table 2–3: Built-In Features of the Update Installation Process (cont.)

Built-In Feature	Description	Documentation
Disk space recovery	Provides the option to remove unnecessary software subsets and `.PreUPD`, `core` and extra kernel files to recover disk space if there is not enough file space to complete the Update Installation.	Section 3.5.7
Executes instructions provided in user-supplied files	You can customize an Update Installation by creating and moving user-supplied scripts, programs, or executables to the right location. The files are executed if the Update Installation process finds properly named files that have been placed in predefined, supported locations.	*Installation Guide -- Advanced Topics*

2.5 Theory of Operation

Figure 2–1 shows the operational flow of an Update Installation.

Figure 2–1: Update Installation Theory of Operation
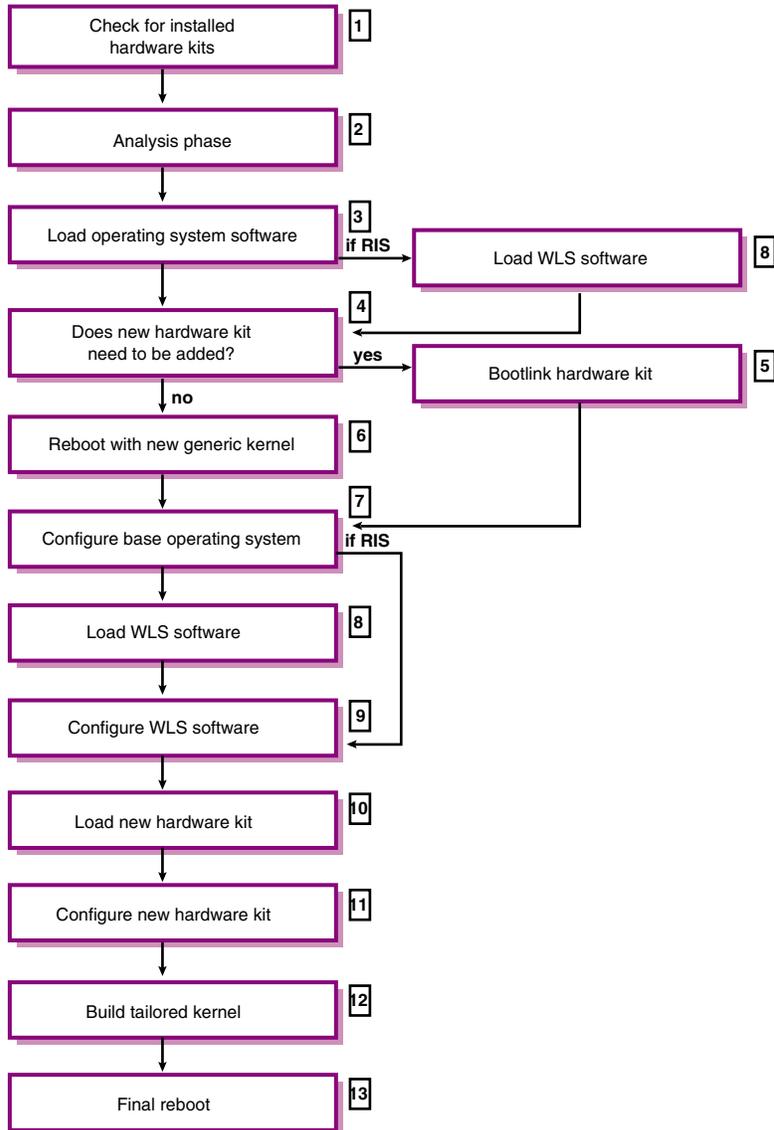
[1] If the Update Installation process detects an installed hardware product kit, the hardware product kit is checked for compatibility with the new version of the operating system. Hardware product kits and how they are updated is discussed in the *Installation Guide -- Advanced Topics*.

[2] During the analysis phase the Update Installation analyzes the system for the following items:

- Conflicting layered products
- Installed software
- Conflicting file types
- Obsolete files
- Disk space required for new software and update processing

During the analysis phase, there may be a situation where one or more actions may be taken to correct the situation. You make the decision as to which action is correct. If the Update Installation process discovers any problems during the analysis phase, you can correct them or exit the Update Installation without making any changes to the current system.

An Update Installation makes the following changes in real time:

- Removing blocking layered products
- Increased disk space caused by disk space cleanup activity
- Archiving and removing of obsolete files

For example, if conflicting software is detected and you choose to remove that software, when the analysis step is complete, the conflicting software has been removed, and it is no longer available in the current system even if the Update Installation is canceled.

③ An Update Installation installs the new version of the operating system software subsets that match the operating system software subsets already installed on your system. Additionally, all new mandatory software subsets that were introduced in the new version of the operating system are installed automatically. Optional software subsets are loaded only if they were installed previously. When all software subsets are installed successfully and verified, customized protected system files (files with a `.new..` prefix) from the previous version of the operating system are merged automatically with the files provided by the new version of the operating system.

④ If the Update Installation process found an installed hardware kit in Step 1, and it is not compatible with the new version of the operating system, the Update Installation process decides whether the next step is to bootlink the new hardware product or continue with the reboot of the new generic kernel. Refer to the *New Hardware Delivery Release Notes and Installation Instructions* for a detailed description of the hardware product kit bootlink process.

⑤ If a hardware product kit must be updated in order to function with the new version of the operating system, the hardware bootlink occurs (which is described in the *New Hardware Delivery Release Notes and Installation Instructions*).

6️⃣ The system reboots using a copy of the generic kernel (`/genvmunix`) that is shipped with the new version of the operating system.

7️⃣ The new version of the operating system that was loaded in Step 3 is configured.

8️⃣ If the previous version of the operating system was installed with WLS software, the new versions of WLS subsets are loaded here.

9️⃣ If new versions of the WLS software subsets were loaded, they are configured here.

🔟 The version of the hardware product kit that is compatible with the new version of the operating system is loaded here if the hardware kit was bootlinked in Step 5.

11 The new version of the hardware product kit is configured. Refer to the *New Hardware Delivery Release Notes and Installation Instructions* for more information.

12 A machine-specific kernel is built at this time. If you selected optional kernel components during the Analysis Phase, they are also built into this kernel.

13 The system reboots with the newly-built tailored kernel. The Update Installation is complete, and you can log in to the updated system.

2.6 Completion Time

Update Installations typically complete in 45 to 120 minutes. Newer, faster machines such as the DS and GS Series take significantly less time. Actual time depends on your processor type, the number of software subsets to be updated, the type of media used to perform the Update Installation (CD–ROM or remote server), the speed of your CD-ROM drive if you are using CD-ROM, and the volume of network traffic if you are using a remote server.

3

Update Installation Procedure

The information in this chapter assumes that you are updating the operating system on a single system from the CD-ROM distribution media. To invoke an Update Installation from a RIS server, see the *Installation Guide -- Advanced Topics* for instructions on using a remote server; then come back to this manual for the remainder of the procedure.

_____ **Note** _____

If the Update Installation you are about to perform is part of the installation stage of the cluster rolling upgrade process, make sure you have performed the preparation and setup stages of the rolling upgrade as described in the TruCluster Server *Cluster Installation* manual before performing the Update Installation on the lead cluster member. The TruCluster Server *Cluster Installation* manual is part of the TruCluster Server documentation kit, which is available on the World Wide Web at

`http://www.tru64unix.compaq.com/docs/`

_____

Summary of the Update Installation Procedure:

1. Complete prerequisite tasks to prepare the system for an Update Installation (Section 3.1).

2. Shut down the system to single-user mode to begin the Update Installation (Section 3.2).

3. Start the Update Installation from CD–ROM (Section 3.3).

4. Choose Update Installation options (Section 3.4).

5. Monitor the analysis phase of the Update Installation (Section 3.5).

6. Confirm the start of the Update Installation process (Section 3.6).

7. Log in as the user `root` when the Update Installation is complete (Section 3.7).

8. Review installation log files after the Update Installation is complete (Section 3.8).

9. Manually merge file customizations if necessary (Section 3.9).

10. Optionally run the Update Installation Cleanup utility to remove files left on the system as a result of the Update Installation (Section 3.10).

3.1 Step 1: Prepare for the Update Installation

Perform the following tasks before you begin an Update Installation:

1. Back up the user data on the current operating system.

   It is recommended that you back up user data before beginning an Update Installation. If there are any interruptions when the Update Installation process is loading software subsets, it is unlikely that the Update Installation will complete successfully, which will leave your system in an indeterminate state. Should this happen, you must restore the original version of the operating system before you can attempt another Update Installation. See the *System Administration* manual for information about backing up your current operating system.

2. Read the current version of the *Release Notes*, particularly any information about Update Installations.

   It is recommended that you read the *Release Notes* because it may contain changes to software, firmware, or hardware that are not documented in this manual. The *Release Notes* also contain a summary of the enhancements made in the new version of the operating system.

3. Make sure you know the CD-ROM device name that you will use to boot the distribution media to invoke the Update Installation.

   If you do not already know the device name, determine the CD-ROM device name while the system is still in multiuser mode by entering the following command:

   ```
   $ ls /dev/disk/cdrom*c
   /dev/disk/cdrom0c
   ```

4. If you have AdvFS file systems on your system, perform the following procedure to protect the data on AdvFS file domains. Otherwise, proceed to Step 6.

   a. Log in as `root` or use the `su` command to gain superuser privileges.

   b. Use the `shutdown` command to put your system into single-user mode.

   c. Use the `umount -A` command to unmount all local file systems.

   d. Run the `verify` utility on each domain (remember to use the `-a` flag if you are checking the root domain). If you find any problems, correct them before continuing. See `verify`(8) for more information.

e. Use the `mount` command to mount all of the verified local file systems.

f. Use the `quotacheck` command to fix the quotas on the mounted local file systems. If you have problems running the `quotacheck` command, you may have to edit your `/etc/fstab` file and try again. See `quotacheck`(8) for more information.

For more information about administering AdvFS file systems, see *AdvFS Administration*.

5. Look at the context dependent symbolic links (CDSL) inventory to make sure all links are intact.

If you have removed or broken a CDSL on a Version 5.0A or Version 5.1 system, the Update Installation overwrites the old CDSL with the new version, and you will lose customizations that you have made to the contents of the modified CDSL. Enter the following command to validate the CDSL inventory:

```
# /usr/sbin/cdslinvchk
```

Modified, missing, or replaced CDSLs are logged by default in the `/var/adm/cdsl_check_list` file. See the *System Administration* manual for information on how to recreate missing or broken CDSLs. See `cdslinvchk`(8) for more information.

6. Update the system firmware.

Firmware updates are located on the *Alpha Systems Firmware CD-ROM* that is included in the Software Distribution Kit you received. Follow this procedure to begin a firmware update:

a. Shut down the system to console mode:

```
# shutdown -h now
```

b. Determine the console device name of the CD-ROM device:

```
>>> show device
```

Depending upon your system type, a device information table similar to the following is displayed:

```
dka0.0.0.0.0          DKA0                      RZ28
dkb0.0.0.1.0          DKB0                      RZ28
dkc0.0.0.2.0          DKC0                      RZ26
dkc100.1.0.2.0        DKC100                    RZ26
dkc200.2.0.2.0        DKC200                    RZ26
dkc300.3.0.2.0        DKC300                    RZ26
dke100.1.0.4.0        DKE100                    RRD43    ⇐
mka500.0.0.0.0        MKA500                    TLZ04
mke0.0.0.4.0          MKE0                      TZ85
ewa0.0.0.6.0          EWA0           08-00-2B-2C-CE-DE
```

In the third column to the right, look for the line with the characters RRD or CD-ROM. These characters denote a CD-ROM device. The second column in the table shows the console device name assigned to each device on your system.

In this example, the RRD43 CD-ROM console device name is **DKE100**. You will enter this device name with the boot command in the next step.

c. Insert the firmware CD-ROM into the drive and boot from it:

```
>>> boot cdrom_console_device_name
```

The firmware update utility automatically identifies your system type and model and determines the correct firmware revision required for your system.

d. Follow the instructions on the screen. There is an automatic display of the READ-ME-FIRST file, which describes the firmware changes included in the update.

e. Power off the processor for at least 10 seconds when the firmware update is complete to initialize the new firmware.

The contents of the firmware CD-ROM are also available at the corporate Internet site through anonymous file transfer protocol (FTP):

http://ftp.digital.com/pub/Digital/Alpha/firmware/readme.html

Firmware updates are also available through anonymous file FTP from the ftp.europe.digital.com World Wide Web server.

3.2 Step 2: Shut Down the System to Single–User Mode

An Update Installation is performed from single-user mode. You can either log in as root or use the su command to gain superuser privileges. The following example shows how to become superuser and then shut down the system to single-user mode:

```
# su -
password:
# shutdown +10 Please log out--ready to update system
```

In the previous example, +10 shuts down the system in ten minutes and sends the message Please log out--ready to update system to all logged in users.

_____ **Caution** _____

> If your system is at the console mode prompt (`>>>`), you must boot to multiuser mode and then shut down to single-user mode. It is important that you do not boot the system to single-user mode.

_____

The following messages are displayed when the system is in single-user mode:

```
Halting processes ...

INIT: SINGLE-USER MODE
#
```

3.3 Step 3: Start the Update Installation

Before beginning the Update Installation, be aware that the process can take from 45 to 120 minutes to complete. Newer, faster machines such as the DS and GS Series take significantly less time. Actual time depends on your processor type, the speed of your CD-ROM drive, and the number of software subsets to be updated.

1. Mount the local file systems:

   # **/sbin/bcheckrc**

   The `bcheckrc` command invokes the `mount -a` command and mounts all file systems listed in the `/etc/fstab` file, not just the standard UNIX file systems (`/`, `usr`, and `var`). The `bcheckrc` command also runs `fsck` on UNIX file systems (UFS) and starts the Logical Storage Manager (LSM) if necessary. If `fsck` finds a problem with the `/` (root) partition, the system shuts down and reboots to correct the problem.

2. Insert the *Operating System Volume 1* CD–ROM into the drive.

3. Enter the `/sbin/installupdate` command with the following syntax to start the Update Installation:

   /sbin/installupdate [-u] [-nogui] {*location*}

   The following describes each option:

   - The optional `-u` flag runs the Update Installation in unattended mode. Unattended means that barring any problems with the Update Installation, there is no user interaction required. The only exception to this is the switching of CD-ROMs if WLS software is being updated. The `-u` flag builds a kernel with all kernel components and does not provide the chance to archive obsolete files.

     If no file type conflicts are found during the analysis phase, and your system has enough free disk space to complete the Update Installation, your next involvement is to log in to your updated

system as described in Section 3.7. See Section 3.11.1 if the Update Installation does not complete successfully.

- The optional `-nogui` flag runs the text-based interface if your system has graphics capability.

- The required *location* argument specifies the source of the software. The *location* can be:

  – A local disk or CD-ROM drive that contains the Version 5.1A distribution media (for example, `/dev/disk/cdrom0c`)

  – A local mount point where the operating system media is already mounted (for example, `/mnt`)

  – The name of the RIS server (appended with a colon) that is serving Version 5.1A of the operating system (for example, `server1:`)

The following sample commands can be used to start an Update Installation. Use the command that best suits your situation.

- To start an unattended Update Installation from CD-ROM device `cdrom0c`:

  # **/sbin/installupdate -u /dev/disk/cdrom0c**

- To start the Update Installation from a CD-ROM device that is already mounted on the `/cdrom` mount point:

  # **/sbin/installupdate /cdrom**

- To start the Update Installation from CD-ROM using the text-based rather than the graphical interface:

  # **/sbin/installupdate -nogui /dev/disk/cdrom0c**

- To start the Update Installation from a RIS server named `server1`:

  # **/sbin/installupdate server1:**

The Update Installation process continues as described in Section 3.4.

3.4 Step 4: Choose Update Installation Options

What you see after you start the Update Installation depends upon whether or not your system is capable of graphical displays:

- If your system has graphical display capabilities, the Update Installation dialog box shown in Figure 3–1 is displayed. The graphical interface contains online help, which describes each dialog box and field in the Update Installation process.

Figure 3–1: Update Installation Main Window
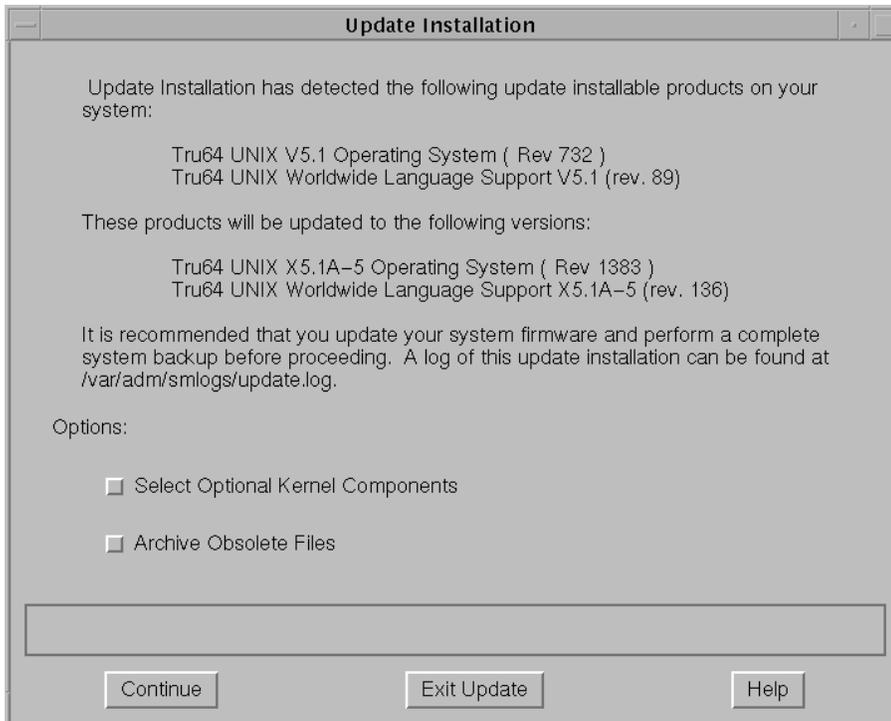
- If your system does not have graphical capabilities or you used the
  -nogui flag on the command line, a screen similar to this is displayed:

```
Update Installation has detected the following update
installable products on your system:

        Tru64 UNIX Operating System ( Rev nnn)

These products will be updated to the following versions:

Tru64 UNIX Version 5.1A Operating System (Rev nnn)

It is recommended that you update your system firmware
and perform a complete system backup before proceeding.
A log of this update installation can be found at
/var/adm/smlogs/update.log.

Do you want to continue the Update Installation?  (y/n) []:

Do you want to select optional kernel components?  (y/n) [n]:

Do you want to archive obsolete files?  (y/n) [n]:
```

Table 3–1 describes the decisions you have to make when you first invoke the Update Installation. You can choose one option, both options, or neither option.

Table 3–1: Update Installation Options on Initial Screen

Option	Description
Select Optional Kernel Components	Select this option if your current system is running a customized kernel that has been built with optional kernel components or if you want to customize the new kernel. If you select this option, you will have the opportunity to select which optional kernel components you want to build into the kernel (if any).
	If you do not select this option, the new kernel will be built with only the mandatory kernel components required to run the installed software.
Archive Obsolete Files	Choose this option to archive obsolete files before they are removed automatically by the Update Installation. Obsolete files are files that were shipped in Version 5.0A or Version 5.1 but are no longer required by Version 5.1A. If you select this option, later in the analysis phase of the Update Installation the list of obsolete files is presented, and you can select one or more files to archive and the file name you want to use for the archive. You can delete the archive at a later date.
	If you do not select this option, you will not have the opportunity to archive obsolete files before they are removed from the system.

_____ **Note** _____

The remainder of this chapter applies to the graphical and text-based user interfaces. Rather than showing examples from both interfaces, only the screens from the graphical interface were used to show the update process and user actions. The same steps in the same order occur for the text-based interface.

3.5 Step 5: Monitor the Analysis Phase

After you have selected the Update Installation options, the Update Installation process begins to analyze the current system.

If your system has graphics capabilities, the analysis phase begins with the dialog box shown in Figure 3–2.

Figure 3–2: Update Installation Preload Analysis Dialog Box


```
┌─────────────────────────────────────────────────┐
│  ─            PreLoad Analysis          ◢  □     │
│                                                   │
│    The following system analysis is performed automatically: │
│                                                   │
│   ✓   Checking for Conflicting Software          │
│                                                   │
│   ✓   Determining Installed Base Operating System Software │
│                                                   │
│   ▭   Determining Kernel Components               │
│                                                   │
│   ▭   Checking for File Type Conflicts            │
│                                                   │
│   ▭   Checking for Obsolete Files                 │
│                                                   │
│   ▭   Checking File System Space                  │
│                                                   │
│        ┌───────────────────────────────┐         │
│        │███████████████████████████████│         │
│        └───────────────────────────────┘         │
│                      100%                         │
│        ┌───────────────────────────────┐         │
│        │                               │         │
│        └───────────────────────────────┘         │
│                                                   │
│        ┌──────────────┐      ┌──────────┐         │
│        │  Exit Update │      │   Help   │         │
│        └──────────────┘      └──────────┘         │
└─────────────────────────────────────────────────┘
```
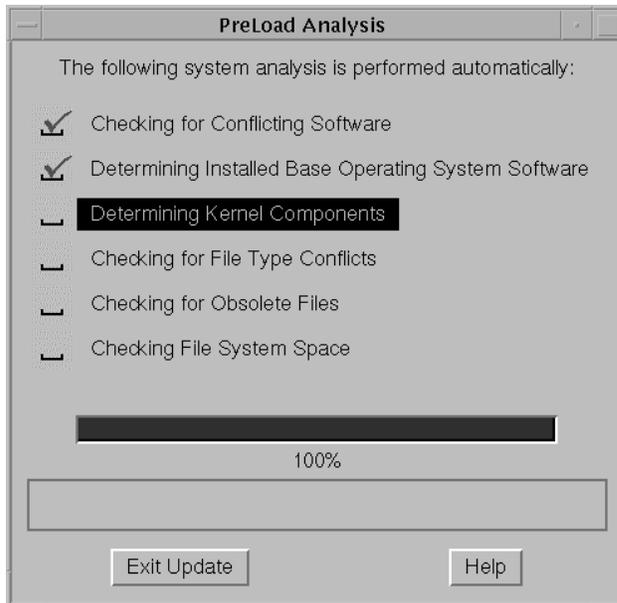
A check (tick) mark indicates when an analysis step is complete. The progress indicator at the bottom of the dialog box applies to the currently highlighted analysis step.

The following sections describe each analysis step in detail and the required user interaction if one or more conditions require your attention:

- Search for conflicting layered software (Section 3.5.1)

- Determine installed software (Section 3.5.2)

- Determine kernel components and optional selection process (Section 3.5.3)

- Search for file type conflicts (Section 3.5.5)

- Search for obsolete files and the opportunity to archive them (Section 3.5.6)

- Determine availability of sufficient file system space (Section 3.5.7)

3.5.1 Search for Conflicting Software

There are two types of layered products that affect the Update Installation: layered software products that allow the Update Installation to proceed but may have to be reinstalled later, and layered software products that must be deleted before the Update Installation can continue.

3.5.1.1 Software Reinstallation Warning

The dialog box shown in Figure 3–3 is displayed if the Update Installation detects a layered software product that may require reinstallation after updating to the new version of the operating system. You can choose to exit the Update Installation and manually remove this software or you can continue the Update Installation.

If you decide to continue without removing the layered software product or products, test the software when the Update Installation is finished. It is recommended that you reinstall any layered software products that are critical to the use of the operating system with a version that is compatible with and is supported on the new version of the operating system.

Figure 3–3: Software Reinstallation Warning Dialog Box

3.5.1.2 Conflicting Software Found: Update Installation Cannot Proceed

The dialog box shown in Figure 3–4 is displayed if the Update Installation detects a conflicting layered software product that halts the Update Installation. You can instruct the Update Installation to delete the product and continue, or you can exit the Update Installation. You cannot update your system to the new version of the operating system until you remove this conflicting software. If you choose to exit the Update Installation at this point, no changes are made to your system. If the conflicting software is not supported under the new version of the operating system, and the software is critical to your system, it is recommended that you do not continue with the Update Installation.

_____ **Note** _____

Delete operations take effect immediately. Any software you remove cannot be recovered even if the Update Installation is canceled later.

_____

Figure 3–4: Conflicting Software Found Dialog Box

3.5.2 Determine Installed Software

During this part of the analysis, the Update Installation process determines the software that is installed so that it knows what has to be updated.

If you have installed Worldwide Language Support (WLS) software, an additional analysis step, Determining Installed Worldwide Language Support Software, is displayed as part of the Preload Analysis dialog box shown in Figure 3–2.

When you are performing the Update Installation from a CD-ROM and the system has WLS software installed, you will be asked to provide the location of the Version 5.1A WLS software media (either local disk, RIS server, or CD-ROM device name). The Update Installation knows when to prompt you to insert the WLS media after the system reboots.

_____ **Note** _____

If you are performing this Update Installation on the lead cluster member as part of the rolling upgrade process, there is no need to have the TruCluster Server software in a RIS area or on a CD-ROM because the `clu_upgrade -preinstall` command already copied the kit to the `/var/adm/update/TruClusterKit` area on the lead member so the software is available to the Update Installation process.

_____

3.5.3 Select Kernel Components

If you chose the option to include optional kernel components in the kernel (as described in Table 3–1, use the Kernel Configuration dialog box shown in Figure 3–5 to select the optional kernel components to build into the kernel. If you had previously built optional kernel components into the kernel, you have to select them again here. The Update Installation process

has no knowledge of the contents of the current kernel. To select kernel components, click on the components you want and click on Select. After you have made all selections, click on OK.

If you cancel kernel component selection at this time, the Update Installation builds a kernel with only the mandatory kernel components that are associated with the installed software subsets.

Figure 3–5: Kernel Configuration Dialog Box
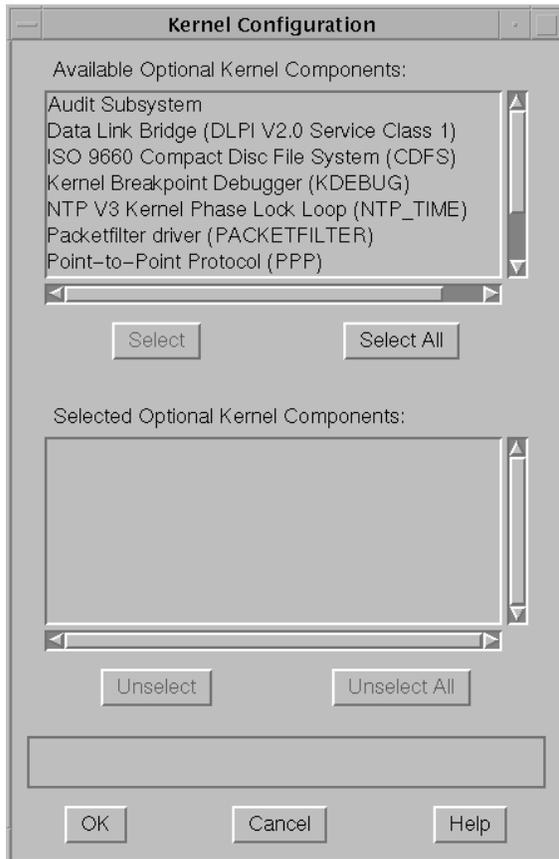
3.5.4 Manually Adding Special Configuration Options to the Kernel

The Update Installation provides a basic kernel configuration file that includes support for all mandatory kernel components plus any optional components you have just selected. The Update Installation does not propagate any special or custom configuration options that you may have added into the kernel configuration file.

If your kernel configuration file has been edited manually or edited as a result of layered product installations to include nonstandard kernel options, psuedodevices, controllers, or other changes, you will need to include those options, psuedodevices, controllers, or other changes into your new kernel configuration file (`/sys/conf/`*host_name*).

If you are using the text-based interface, you will be given the option to edit the kernel configuration file during the Update Installation. Otherwise, you can edit the file after the Update Installation is complete, and then rebuild the kernel using the `doconfig`(8) command.

3.5.5 Search for File Type Conflicts

An Update Installation searches for file types that will be incompatible with the updated version of the operating system. Files that are shipped with the operating system, also known as system files, are classified into one of several different file types. A file can be classified as a `file`, a `directory`, a `hard link`, a `symbolic link`, a `block device`, or a `pipe`. The Update Installation procedure expects to find system file types the same as when they were shipped with the previous version of the base operating system. When a file type has changed, it is known as a **file type conflict**.

There are two types of file type conflicts:

- Some file conflicts cause the Update Installation to exit, and you must resolve the conflict before you can continue or restart the Update Installation.

- Other file conflicts are not as serious, and you have the option to continue the Update Installation without resolving the conflict.

This feature is intended to preserve the integrity of the software product about to be installed. In both cases, the Update Installation identifies the conflict and informs you of the action required to resolve the conflict.

3.5.5.1 File Type Conflicts That Halt the Update

A serious file type conflict may require the Update Installation to exit without updating the system. If the Update Installation were to continue, it would result in a corrupt system. When a conflict of this severity is encountered, you must resolve it manually before restarting the Update Installation. The following types of file type conflicts prevent the Update Installation from continuing:

- Files shipped originally as type `directory` are changed to type `file`.

- Files shipped originally as type `directory` are changed to type `symbolic link`.

- Files shipped originally as type `symbolic link` are changed to type `directory`.

For example, if a file is shipped as a directory in Version 5.0A or Version 5.1 and you later change it to be a symbolic link, when the same file ships as a directory in Version 5.1A, the Update Installation detects the difference and the dialog box shown in Figure 3–6 is displayed.

Figure 3–6: File Type Conflict Dialog Box
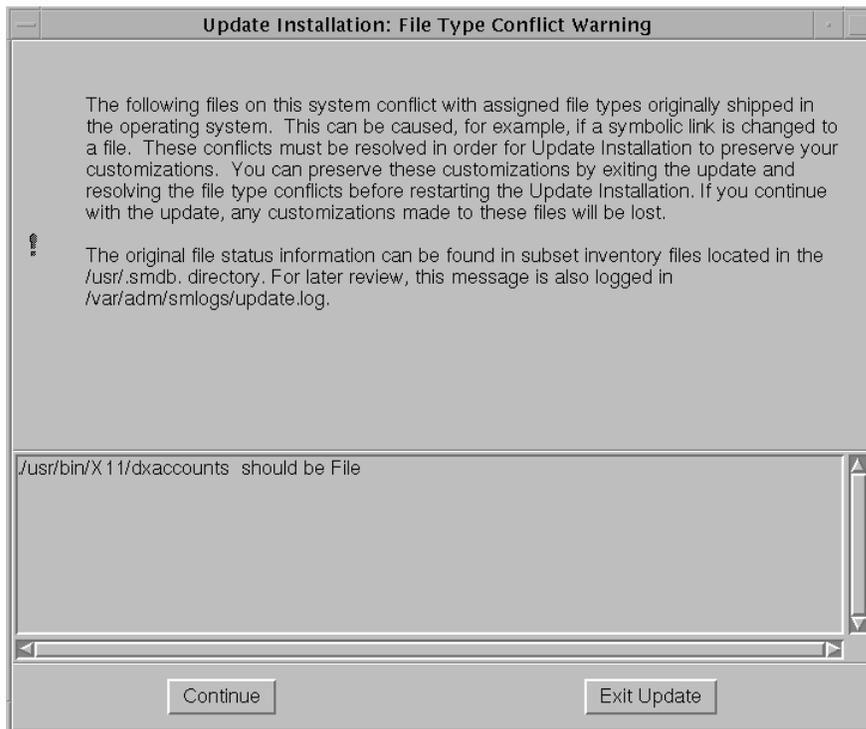
3.5.5.2 Less Serious File Type Conflicts

A less serious file type conflict is any file type conflict other than the ones shown in Section 3.5.5.1. The Update Installation automatically resolves these conflicts by saving a copy of the modified file type to a file with a `.PreUPD` extension, for example `/etc/hosts.PreUPD`. When the new version of the operating system is loaded, the original file (for example, `/etc/hosts`) is replaced by the new version that is shipped with the operating system. This means that the file will change type to the file type that is shipped with the new version of the operating system. Any customizations that were in the modified file type must be manually merged from the `.PreUPD` version into the new version of the file after the Update

Installation is complete. Figure 3–7 shows the dialog box that is displayed when a less serious file type conflict is detected.

Figure 3–7: File Type Conflict Warning Dialog Box
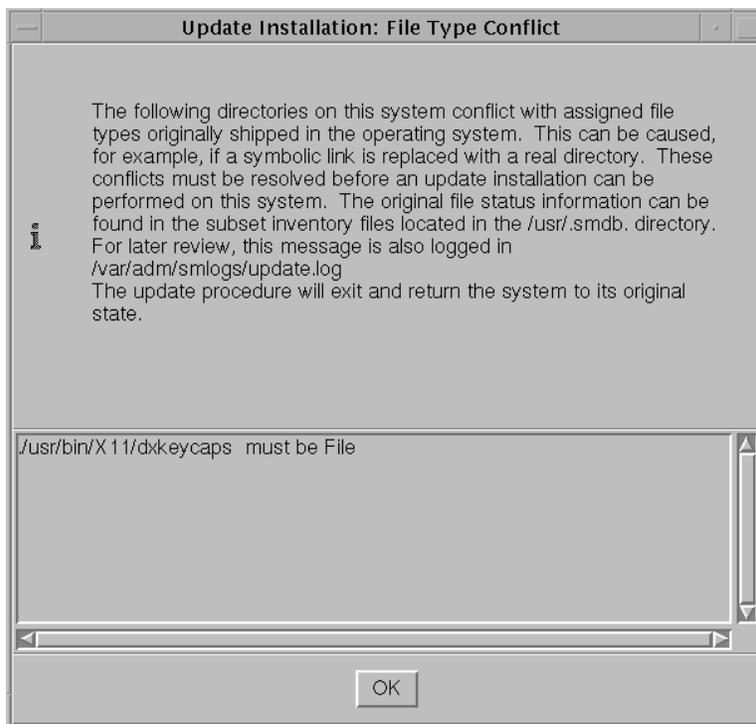
3.5.6 Search for Obsolete Files

Obsolete files are files that were shipped in Version 5.0A or Version 5.1 of the operating system but are no longer part of Version 5.1A. The Update Installation automatically searches for and removes obsolete files. If you chose the option to archive obsolete files as described in Table 3–1, you can save obsolete files to a `.tar` file and have the option to compress the `tar` file with the `gzip` utility. The default file name is `/var/adm/update/backup.tar`.

_____ **Note** _____

Whether or not you archive the files, the Update Installation deletes obsolete files after the analysis phase is complete. The dialog box that you use to select and archive obsolete files is shown in Figure 3–8.

_____

.

Figure 3–8: Archive Obsolete Files Dialog Box
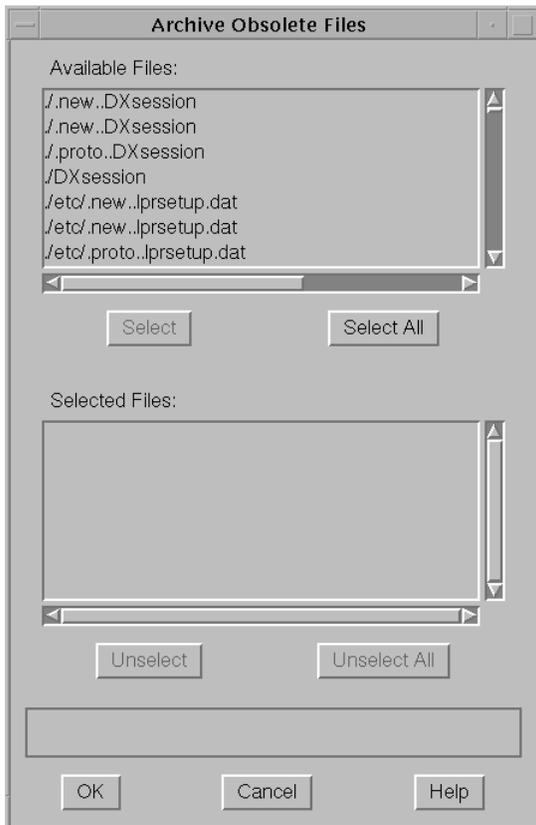
3.5.7 Determine File System Space

Version 5.1A of the operating system requires more disk space than Version 5.0A or Version 5.1. The Update Installation determines whether or not there is enough space for the new version of the software and that there is enough temporary space for processing.

If the Update Installation determines that there is not enough disk space, disk space status and options for recovering disk space are presented. The dialog box that you use to recover disk space is shown in Figure 3–9.

Figure 3–9: Recover Disk Space Dialog Box
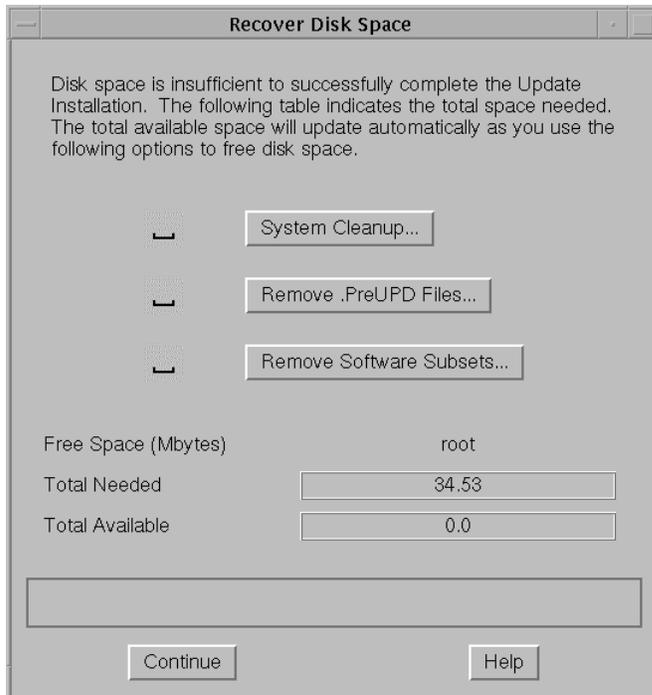
It is recommended that you pursue disk space recovery in this order:

1. Perform **System Cleanup** by removing `core files` and extra kernel files.

    Whenever an application or the system crashes, a crash file named `core` is created. These files tend to be large, and if not removed after each crash, they can occupy a considerable amount of disk space. If you are not in the habit of cleaning up files after system or application crashes, you may be able to recover the disk space from this operation.

    The Update Installation procedure looks for extra kernel files (files named `vmunix.*`) in the `/sys/`*HOST_NAME* and `/var/adm/crash` directories and looks for `core` files in the `/`, `/usr`, and `/var` file systems.

2. **Remove .PreUPD files**

    The Update Installation looks for customized system files and protects them by copying them into files with the suffix `.PreUPD`. If removing `core` and extra `vmunix` files do not recover enough disk space, remove the `.PreUPD` files as necessary. Clicking on `Remove .PreUPD Files` displays a dialog box where you can select the files to remove.

3. **Remove software subsets**

   If there are software subsets that are not being used, remove them. Software subsets removed at this point will not be updated. Clicking on `Remove Software Subsets` displays the dialog box shown in Figure 3–10.

Figure 3–10: Remove Subsets Dialog Box


```
                    Update: Remove Subsets
    1. French CDE Online Help    (IOSFRCDEHLP425)
    2. French Netscape Navigator Gold V3.04   (IOSFRNETSCAPE425)
    3. French X Window Software Development   (IOSFRXDEV425)
    4. Worldwide MULE    (IOSWWMULE425)
    5. Worldwide Software Development    (IOSWWPGMR425)
    6. Worldwide SVE MNLS Migration Tools    (IOSWWSVEDEV425)
    7. Worldwide Configuration Tool    (IOSWWSYSMAN425)
    8. Worldwide X Window Software Development   (IOSWWXDEV425)
    9. Worldwide Two-Byte Outline Font Renderer   (IOSWWXFR425)
   10. System Accounting Utilities    (OSFACCT425)
   11. POLYCTR advfs    (OSFADVFS425)
   12. POLYCTR advfs Kernel Modules    (OSFADVFSBIN425)
   13. Adobe Font Metric Files    (OSFAFM425)
   14. ATM Commands    (OSFATMBASE425)
   15. ATM Kernel Modules    (OSFATMBIN425)
   16. ATM Kernel Header and Common Files    (OSFATMBINCOM425)
   17. C2-Security    (OSFC2SEC425)
   18. CDA(tm) Software Development    (OSFCDAPGMR425)
   19. CDE Additional Applications    (OSFCDEAPPS425)
   20. CDE Software Development and Programming Examples  (OSFCDEDEV425)

------------------------------------------------
Enter your selection (e.g: 1 3 or 1,3 or 4-6)
or Press <RETURN> for more selections: []
```

Use the various options until the disk space available in each file system is greater than the disk space needed. If these options do not produce the necessary free space, you may need to change the file system layout or use disk partitions large enough to accommodate the installed software by

performing a Full Installation using the disk partition sizes recommended
by the Full Installation procedure.

3.6 Step 6: Confirm the Start of the Update Installation Process

When the Analysis Phase is complete, you must confirm the start of the
Update Installation. If you are using the graphical user interface, the
confirmation is made using the dialog box shown in Figure 3–11.

Figure 3–11: Ready to Begin Update Dialog Box
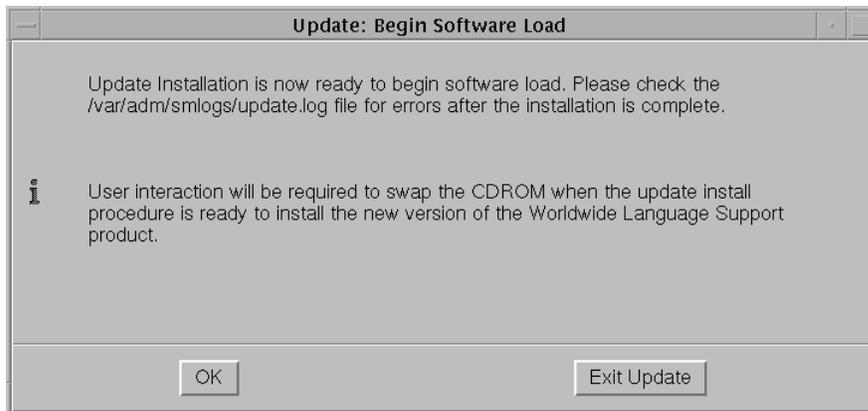
You have the following options:

- If you are satisfied with all your selections and choices, click on OK
  to save your choices and start the update of your system. After you
  confirm the start of the update, system modification begins that cannot
  be reversed.

  _____ **Caution** _____

  Stopping the Update Installation in any way (including
  pulling out the power cord or pressing the halt button) while
  software subsets are loading can cause serious operating
  system corruption that can render the operating system
  unusable. You may have to restore the backed-up version of
  the operating system before you can attempt another Update
  Installation.

  To protect against accidental halting of the Update
  Installation process, the Ctrl/c key sequence, which is used

to stop an operation, is disabled during the software subset
load phase.

- If you do not want to proceed with the Update Installation at this time,
  select Exit Update. When you select Exit Update, you have the option to
  transition the system back to multi-user mode. Your system returns to
  its preupdate state (except for files that you may have removed during
  disk space recovery tasks).

An Update Installation typically completes in 45 to 120 minutes. Newer,
faster machines such as the DS and GS Series take significantly less time.
Actual time depends on your processor type, the number of software subsets
to be updated, the type of media used to perform the Update Installation
(CD–ROM or remote server), the speed of your CD-ROM drive if you are
using CD-ROM, and the volume of network traffic if you are using a remote
server.

3.7 Step 7: Log in to the System

After the Update Installation is complete, log in to the system as the
user `root` to perform the postinstallation tasks shown in Section 3.8 and
Section 3.9, which can be done only by the user `root`.

What happens when you log in for the first time depends upon whether you
have a graphics workstation or a terminal without graphics capabilities:

- If you have a graphics workstation, a Common Desktop Environment
  (CDE) login window displays.

- If you do not have a workstation with graphics capabilities, log in as the
  user `root` at the `login` prompt and enter the `root` password at the
  `password` prompt.

_____ **Note** _____

Starting with Version 5.0 of the operating system, naming
conventions for device special file names for disks and tapes are
different from previous versions of the operating system. The unit
numbers may be reordered as a result of the Update Installation
process. If you want to review a mapping of old-to-new device
names for your system, review the `/etc/dfsl.dat` file.

For a description of device naming conventions and how the
Update Installation process operates with them, see Section A.5.

_____

3.8 Step 8: Review Update Installation Log Files

Information about the Update Installation is stored in log files for your
reference. Installation and configuration data is appended to any log files
left over from previous Update Installations. It is recommended that you
examine the log files when the update is complete to ensure that there were
no errors during the update and that all files merged successfully. Log files
are located in the following locations:

Table 3–2: Update Installation Log Files

Description	File Name
Log of the Update Installation	`/var/adm/smlogs/update.log`
Information about the software configuration	`/var/adm/smlogs/it.log`
List of customized files	`/var/adm/smlogs/upd_custom_files`
List of failed merges	`/var/adm/smlogs/upd_mergefail_files`

Appendix F describes the contents of all logs files that are created as part of
an Update Installation. If no customized or failed merge files are detected
during the Update Installation, the relevant log files do not contain any data.

3.9 Step 9: Merge Customizations if Necessary

An Update Installation may not be able to merge certain customizations
automatically and may require that file customizations be added to the new
files manually. Manual merging involves editing the new versions of system
files with a text editor to include your own customizations. The following
information is saved so that you can merge your customizations into the
new versions:

- Unprotected system files

  When the Update Installation is complete, look for any saved file names
  in the `/var/adm/smlogs/upd_custom_files` file. Edit the new
  version of each logged file to include your customizations. Previous
  versions of each file are saved as *filename*.`PreUPD`.

- Kernel configuration file

  Edit the kernel configuration file at `/sys/conf/`*HOSTNAME* if you
  customized this file in the previous version of the operating system. The
  saved version is located in `/sys/conf/`*HOSTNAME*.`bck`. You then will
  need to rebuild a tailored kernel in order for the newly-made changes
  to take effect. See `doconfig`(8) for more information about building
  tailored kernels.

- Failed merges

If any files failed to merge during the Update Installation, an error
message is displayed on your screen. A log of failed merge files is located
in the `/var/adm/smlogs/upd_mergefail_files` file. Look at the
`update.log` file and the `it.log` file to identify any merge errors.
Manually edit any files that failed to merge and add your customizations.
Your customized, preupdate version of these files is always preserved for
your reference with the file naming convention *filename*.`PreMRG`.

When all manual merges are complete, your system is ready to use. At
this time you can install additional optional software subsets provided on
the Version 5.1A distribution media. See Chapter 9 for information about
installing optional software subsets.

3.10 Optional Step 10: Run the Update Installation Cleanup Utility

Use the Update Installation Cleanup utility to remove or archive the
`.PreMRG` and `.PreUPD` backup files created by an Update Installation. If
there were failed file merges during the Update process, you use these files
as a reference to merge your customizations into the new versions of the
files. When all manual merges are complete, the `.PreMRG` and `.PreUPD`
files are no longer needed.

Running the Update Installation Cleanup utility is an optional step after
performing an Update Installation, but it is recommended to use this utility
if you want to recover disk space being consumed by these backup files. If
you decide to archive the files, the archive destination can be any archive
destination supported by the `tar` command (that is file, tape device, or disk).

When you perform a cluster rolling upgrade, you have the option to run the
Update Administration Cleanup Utility as part of the clean stage. Do not
run the Update Installation Cleanup utility until all cluster members have
rolled, and the rolling upgrade is complete. The utility issues a message if
you try to run the cleanup utility while a rolling upgrade is still in progress.

Invoke the Update Installation Cleanup utility using any of the following
methods:

- From the **SysMan Menu** (`/usr/sbin/sysman`), select the following:

  1. **Software** branch
  2. **Installation** branch
  3. **Cleanup after an OS update (updadmin)** task

- From the CDE front panel, select Software Management from the
  SysMan Applications icon. Use the online help provided with the
  graphical user interface if you need more information.

- From the command line, enter `/usr/sbin/updadmin`. See `updadmin`(8) for more information.

3.11 Error Recovery

There are certain types of error conditions that cause the Update Installation process to stop and require user intervention. These errors may occur at the following points in the Update:

- Analysis phase
- Subset load
- Kernel build

3.11.1 Analysis Phase Failure

You can recover if the Update Installation fails any time during the preload analysis phase. You can bring your system back to multiuser mode by issuing the following command:

```
# init 3
```

Fix the errors reported by the error messages and restart the Update Installation process.

3.11.2 Software Subset Load Failure

Individual software subsets can fail to load if a network interrupt, hardware problem, or file verification error occurs during the load process:

- If an optional software subset fails to load, you can install it later by using the `setld` command after the Update Installation is complete.

- If a mandatory software subset fails to load, the Update Installation procedure exits. Your system may be rendered unusable and you may have to restore the backed up version of the operating system before attempting another Update Installation. If the `OSFBASE520` mandatory software subset was installed successfully, you may be able to retry the Update Installation without first restoring the backed up version of the operating system.

3.11.3 Kernel Build Failure

The tailored kernel build can fail at the end of the Update Installation because of an incompatibility of a kernel layered product with the new version of the operating system.

In this case, the system will rebuild a kernel without layered product support. Follow this procedure to rebuild a kernel with layered product support:

1. Look at the `/var/adm/smlogs/it.log` file, which contains the reasons for the kernel build failure.

2. Use the `setld` command to remove the layered product that caused the failure.

3. Use the `setld` command to reinstall the most recent version of the layered product.

4. Use the `/usr/sbin/doconfig` command to build a new customized kernel with support for the layered product.

4

Full Installation Overview

This chapter contains an overview of Full Installation features and options, which give you the ability to:

- Dynamically partition disks (Section 4.1.1)

- Install the base operating system and Worldwide Language Support (WLS) software at the same time (Section 4.1.2)

- Install and configure the Logical Storage Manager (LSM) during a Full Installation (Section 4.1.3)

- Identify physical disks by blinking the disk input/output light (Section 4.1.4)

- Automatically resolve software dependencies during optional software selection (Section 4.1.5)

- Invoke user-supplied files at predefined invocation points to further customize the installation process (Section 4.1.6)

- Clone the installation characteristics of one system to other similar systems (Section 4.1.7)

- Clone the services configured (network, internet, mail, and print services) on one system to other similar systems (Section 4.1.8)

- Access a UNIX shell to perform file system and disk management tasks (Section 4.1.9)

If you are not interested in reading about the features of a Full Installation, go directly to Chapter 5, which describes the preinstallation tasks to perform before beginning a Full Installation.

4.1 Full Installation Features

The Full Installation can be invoked with a graphical or text-based interface. The interface presented depends upon the graphics capabilities of your system. The interfaces can be displayed in the United States English, Chinese, or Japanese languages. Both interfaces enable you to quickly and easily complete a Full Installation of the operating system. Both interfaces have a task oriented design, which steps you through each task of the setup process and lets you go backward and forward at any time. Section 6.7

summarizes the information you are required to supply and the decisions you have to make during the Full Installation.

A Full Installation creates new file systems and swap space on the disks and partitions you decide to use for the installation. Existing system and user-created files are overwritten on the disk partitions where the file systems and swap spaces are to be installed. You have the option to use default values for the disk layout and swap space allocation or to completely customize the locations of file systems and swap space.

_____ **Note** _____

If your system currently is installed with a version of the operating system and was using the Advanced File System (AdvFS) as a file system type, you must run the advscan utility to reconstruct the /etc/fdmns directory after the Full Installation is complete. See Section 7.6 for more information.

_____

4.1.1 Dynamic Disk Partitioning

The Full Installation process determines the file system layout based on your software selections. You do not need to calculate in advance the size of the file systems, nor do you need to repartition your disks in advance of the installation process to ensure a successful installation.

Unless you specify otherwise, the Full Installation process defaults to the following file system layout:

- Installs the operating system on a single disk (the default is dsk0) with the following layout:

    - The / (root) file system is on the a partition.

    - The /usr file system is on the g partition.

    - The var area is a directory in the /usr file system.

    - If WLS is installed, the i18n (internationalization) area is a directory on the g partition in the /usr file system.

    - A single swap area is on the b partition.

- All file systems are the Advanced File System (AdvFS) type.

The size of each disk partition depends on the size of the disk chosen for the installation and the number of subsets you chose to install. The option to customize your disk layout and partitions is always available during a Full Installation.

4.1.2 Installing Worldwide Language Support (WLS) Software

Tru64 UNIX is an internationalized operating system. The WLS software subsets provide support for various native languages and countries. Installing the WLS software subsets lets users work in their native language, and enables software developers to develop internationalized software. WLS software subsets are located on the *Associated Products Volume 1* CD-ROM.

United States English is mandatory and is installed during every Full Installation. You have the option to install support for one or more additional languages. It is recommended to install WLS during a Full Installation to ensure that enough disk space is available. The following occurs when you select to install software for one or more additional countries and languages:

- Mandatory software subsets for every country you select are installed automatically.

- All subsets for every country you select are installed if you install all base operating system subsets.

- All WLS base subsets (that is, those prefixed with IOSWW) that correspond to selected base operating system subsets are installed for every country you select.

- Optional subsets for every country you select can be installed with the wwinstall script or the setld utility after the Full Installation completes.

WLS software is installed in the /usr/i18n (internationalization) directory, which can be a separate file system. By default it is part of the /usr file system.

WLS software subsets can be installed after a Full Installation by using the wwinstall command or the setld -l command. See the *Installation Guide -- Advanced Topics* for instructions.

4.1.3 Configuring the Logical Storage Manager (LSM)

You can install and configure the Logical Storage Manager (LSM) during the Full Installation process. LSM is a software product for host-based disk storage management that provides a powerful set of disk management tools and features for configuring and monitoring disk storage subsystems and for enhancing their availability and performance. These tools give system administrators the flexibility to manage storage space according to the needs of applications, databases, and users, without the limitations of standard UNIX partitions and physical devices. LSM offers the following features:

- Online storage management provides the ability to manage a system's disks as a pool of storage space for creating LSM logical volumes.

- Concatenation (disk spanning) enables the combination of multiple physical disks into a single, larger virtual disk (called a volume) for use by large file systems or databases.

- Striping (RAID 0) improves a system's disk I/O performance by interleaving the data within a volume across several physical disks.

- Mirroring (RAID 1) protects against data loss due to hardware malfunction by creating a mirror (duplicate) image of the data on another disk.

- Root and swap mirroring enables mirroring of critical system disk partitions used for booting and running the system to ensure that no single disk failure leaves the system unusable.

- Dirty region logging tracks regions on a mirrored volume that have changed due to I/O writes. Provides fast resynchronization of a mirrored volume after a system failure.

- Encapsulation enables migration of existing data on disk partitions to LSM volumes.

Some of the advanced LSM features such as mirroring and striping require a separate software license. For more information on the benefits and configuration and management of LSM, see the *Logical Storage Manager* manual.

4.1.4 Disk Identification

To help you associate a disk device name with the physical disk, both installation interfaces provide a way to determine which physical disk has a particular device name by repeatedly blinking the input/output light on the disk. The blinking light can be used to identify the majority of disks. However, due to hardware limitations, not all disks can be identified in this manner.

If you need information about device naming conventions, see Appendix A.

4.1.5 Automatic Detection and Installation of Software Dependencies

If you decide to install optional software during a Full Installation, software dependencies automatically are checked. Dependency checking ensures that software required for the proper operation of the optional software also is installed. If such a relationship is detected, the dependent software is installed automatically and you are notified accordingly.

4.1.6 Invoking User-Supplied Files to Perform Customizations

User-supplied files can be invoked during a Full Installation to further customize the system beyond what is possible during a regular Full Installation. User-supplied files can contain scripts, executables, or programs.

The Full Installation process looks for the files at three different process points:

- Before the installation interface is displayed

- After software is installed

- After the system reboots, but before the tailored kernel build and configuration phase

When a user-supplied file is found, it is executed. With these hooks in the installation process, you have the potential to fully automate the Full Installation process, perform customizations on the system and handle special installation situations. If you want to take advantage of this feature, see the *Installation Guide -- Advanced Topics* for file naming conventions, example scripts, and instructions for preparing and moving the files to the right locations so the Full Installation process can find them.

4.1.7 Installation Cloning

Installation Cloning lets you duplicate the installation characteristics from a model system onto one or more systems with the same or similar hardware configuration.

When you install the operating system, the Full Installation process automatically generates a configuration description file (CDF) named `install.cdf` that contains installation setup data you specified. The CDF is located in the `/var/adm/smlogs` directory. The `install.cdf` file contains all the installation information required to duplicate the Full Installation on another system.

_____ **Note** _____

Installation Cloning is not supported between different releases of the operating system. CDFs created by earlier versions of the operating system are not compatible with the current version.

_____

See the *Installation Guide -- Advanced Topics* for information about acceptable differences between hardware configurations and for instructions about preparing and moving the `install.cdf` file to the right location so that it can be invoked during a Full Installation.

4.1.8 Configuration Cloning

Configuration Cloning lets you duplicate the network, printer, and mail
services (among other configuration items) from an already configured
system onto one or more systems. Configuration Cloning is practical
when more than one system has to be configured in a similar fashion.
To achieve a fully automated installation and configuration of another
system, Configuration Cloning can be combined with Installation Cloning
to completely eliminate the need to manually perform configuration tasks
after the system is installed.

When a system that is designated to be a model system has been configured
the way you want it, you manually use the `sysman -clone -save`
command to save a snapshot of the system configuration data in a CDF
called `config.cdf`. The CDF is saved by default in the `/var/adm/smlogs`
directory.

_____ **Note** _____

Configuration Cloning is not supported between different releases
of the operating system. Configuration CDFs created from older
versions of the operating system are not supported for use on
the current and future releases.

_____

See the *Installation Guide -- Advanced Topics* for information about creating,
editing, and moving the `config.cdf` file to the right location so that it can
be invoked during a Full Installation.

4.1.9 Access to a UNIX Shell for Experienced Administrators

Both Full Installation interfaces provide access to a UNIX shell in
single-user mode with superuser privileges. The UNIX shell provides a
way to recover from serious problems such as / (root) file system corruption
and enables you to perform general file system and disk maintenance tasks
during the installation. It is recommended that only experienced users
choose the UNIX shell option.

When you start the Full Installation process using the text-based interface,
the UNIX shell is presented as an option from the first menu. Choosing the
UNIX shell option exits the installation procedure. Be aware that if you
already have navigated through the text-based interface and then invoke
the UNIX shell, any selections you have made are lost and you have to
start again.

If you are using the graphical interface, you access the UNIX shell from
the File menu. The graphical installation procedure remains available and
you can go back and forth between the Full Installation procedure and the

UNIX shell as necessary. Any installation selections you have made up to this point are retained.

The distribution media contains file systems that are laid out just as the software would be installed on the system and contains directly accessible /, /usr, and /var areas. This format makes many commands and utilities available in the UNIX shell even if your operating system is not yet fully functional. In effect, the mounted distribution media is a functional file system.

_____ **Caution** _____

Any changes you make to the system from the UNIX shell affect the live system and the subsequent installation. For instance, if you have already assigned file systems to certain disks and partitions and then use the UNIX shell to edit a disk label, you may adversely affect your choices.

_____

See the *Installation Guide -- Advanced Topics* for more information about the various maintenance procedures that can be performed from the UNIX shell environment.

4.2 Full Installation: Defaults and User Options

Table 4–1 shows the Full Installation default settings along with the choices you have for each feature.

Table 4–1: Custom Option Selections

Installation Item	Choices Offered to the User	Default Setting
Base operating system software subsets	You choose between mandatory software subsets only, mandatory plus your choice of optional software subsets, or all software subsets.	Installs mandatory base operating system software subsets only.
Worldwide Language Support (WLS) subsets	You can install support for one or more languages in addition to United States English.	Installs support for United States English only.
Disk selection	You can distribute the /, /usr, and /var file systems and up to two swap areas on a single disk or across multiple disks.	Places the / and /usr file systems and one swap area are on the same disk; var and i18n (if needed) are directories under /usr[a].

Table 4–1: Custom Option Selections (cont.)

Installation Item	Choices Offered to the User	Default Setting
Partition table	You can create a custom partition table (for one or more disks)	Creates a recommended partition table for a single disk based on software subset selection and disk size.
File system locations	You can create a customized file system layout. Although the / file system is always on the a partition, all other file systems and swap areas can be located on any disk partitions on any disk.	Creates a default file system layout which puts the / file system on the a partition; the /usr file system on the g partition, and swap space on the b partition.
File system types	You can choose between UFS or AdvFS[b] as the file system type for /, /usr, /var and i18n.	Allocates one file system type for all file systems. AdvFS[b] is the default file system type. There is no default in the text based interface.
Swap space	You can allocate up to two swap areas on any disk or partition.	Allocates one swap area on the b partition.
Logical Storage Manager (LSM)	You can install into LSM volumes at the time the system is installed. The LSM private region is created automatically if you decide to install LSM.	Does not install into LSM volumes.
Kernel Component Options	You decide what type of kernel components to build into the kernel: mandatory kernel components only, mandatory plus some optional, or all kernel components.	Builds mandatory kernel components into the kernel.

[a] Only disks 1 GB or larger are supported for single disk installations.
[b] If you are installing a system that will eventually become a member of a cluster, you must use AdvFS as the file system type.

5

Full Installation Prerequisite Tasks

This chapter describes the preinstallation tasks to be performed before starting a Full Installation.

Summary of Prerequisite Tasks:

1. Examine the hardware to make sure it meets the requirements for a Full Installation (Section 5.1).

2. Look at the Software Distribution Kit to make sure you have the right CD-ROMs and documents (Section 5.2).

3. Read the *Release Notes*, especially the chapters about installations and hardware, for important software, firmware, or hardware changes that are not documented in this manual (Section 5.3).

4. Optionally switch console types if you are migrating your system from Windows NT for Alpha to Tru64 UNIX (Section 5.4).

5. Optionally prepare and position CDFs or user-supplied files to invoke during the Full Installation or to clone the installation or configuration from another system (Section 5.5).

6. Back up the user data on the operating system as a safety precaution. This step does not apply for brand new systems (Section 5.6).

7. Shut down or turn on the system to the console mode to prepare to update the firmware and then boot the system from the distribution media (Section 5.7).

8. Update the firmware to the version that is compatible with the new version of the operating system (Section 5.8).

9. Optionally run hardware configuration utilities depending upon the type of hardware you have (Section 5.9).

10. Optionally connect peripheral devices if you intend to add new devices to your system (Section 5.10).

5.1 Task 1: Verify Hardware

Ensure that you have the hardware needed for an installation. You must know the location and function of the controls and indicators on your hardware. Verify that all cables and connectors are hooked up and that

the system is plugged in. Refer to your hardware owner's documentation for more information.

Table 5–1 lists the minimum hardware and memory requirements to install the operating system software.

Table 5–1: Hardware and Memory Required for a Full Installation

Item	Description
CD-ROM disk drive	Most Full Installations are invoked from CD-ROM. If your system does not have a CD-ROM drive, contact your sites network administrator to determine if your system can be installed from a server using Remote Installation Services (RIS).
Memory	Your system must have at least 64 megabytes (MB) of memory to install and run this version of the operating system. To determine the memory on your system, use the `show mem` command when the system is in console mode.
A disk with partition `a` at least 128 MB in size	The / (root) file system always is installed on partition `a`, and partition `a` must be at least 128 MB in size. During the installation setup, you have the option to use the default file system layout on a single disk, which automatically creates disk partitions of the right size.
A disk that is 1 gigabyte (GB) or greater in size for single disk installations	If you have to install the operating system onto a single disk because your system is equipped with only one disk, the disk must be 1 GB or greater in size. The *Software Product Description* provides a list of disks that can support a single-disk installation.

_____ **Caution** _____

While possible, a Full Installation to a single 1 GB disk is not advisable if you have more than one disk. Apart from degraded performance, you cannot install additional software or patches, it is not possible to store crash dumps, and it may be difficult to recover the root disk in the event of a disk crash.

The recommended strategy is to place the / (root) file system on one disk and place the /usr file system and swap area on another disk. User accounts and files should be located on other disks and mounted under /usr.

Table 5–1: Hardware and Memory Required for a Full Installation (cont.)

Item	Description
Console terminal	The console terminal communicates with your system during the installation. The console terminal may be a graphics or text only terminal. The type of terminal you have determines the installation interface that is presented.

In addition to these required items, you may want an additional disk or disks for data storage that is separate from the disk on which file systems reside. This arrangement lets you add additional storage space without changing the system disk configuration.

5.2 Task 2: Make Sure You Have These Items

You should have received a Software Distribution Kit that contains the CD-ROMs and documents you need to perform a Full Installation. A *Part Listing* information sheet is included in the box and lists the contents of the Software Distribution Kit.

Before beginning any installation, you should have in your possession the items shown in Table 5–2 and Table 5–3. If you are missing any one of the items listed in Table 5–2 or Table 5–3, contact your support representative.

If your system is connected to an EISA bus, you must run the EISA Configuration Utility (ECU) before installing the operating system. The ECU is third-party software that is shipped on diskette. You should have received the ECU diskette with the original receipt of your hardware. If you do not have a current ECU diskette in your possession, contact your support representative or an authorized vendor for a replacement before beginning the installation.

The Software Distribution Kit contains the following CD-ROMs:

Table 5–2: CD-ROMs Shipped in the Software Distribution Kit

CD-ROM Title	Contents
Operating System Volume 1	Base operating system software
Associated Products Volume 1	Worldwide Language Support (WLS) software and layered product software
Associated Products Volume 2	Additional layered products
Documentation Volume 1	Documentation set in viewable HTML and PDF format
Alpha Systems Firmware CD-ROM	Firmware revision levels for all systems

The Software Distribution Kit contains the following documents:

Table 5–3: Documents Shipped in the Software Distribution Kit

Document Title
READ ME FIRST letter
This manual, the *Installation Guide*
Installation Guide -- Advanced Topics
Full Installation Quick Reference Card
Update Installation Quick Reference Card
Release Notes
Technical Overview
Alpha AXP Systems Firmware Update Release Notes Overview

5.3 Task 3: Read the Release Notes

It is recommended that you read the *Release Notes* before beginning any software installation procedure, particularly the Installation and Hardware chapters. The *Release Notes* describe important changes to the software, firmware, and hardware that are not covered in standard documentation. This information might be required for a successful installation.

The *Release Notes* also describe new features of the Version 5.1A operating system or features that have changed significantly from previous releases.

A printed version of the *Release Notes* is included in the Software Distribution Kit you received.

5.4 Optional Task 4: Migrating Your System from Windows NT for Alpha to Tru64 UNIX

If your system is currently running the Windows NT for Alpha operating system and you want to install the Tru64 UNIX operating system, you have to switch from the Advanced RISC Computing (ARC) console to the System Reference Manual (SRM) console before beginning the installation.

Follow this procedure to prepare your system to migrate from Windows NT for Alpha to Tru64 UNIX:

1. Verify your existing hardware configuration against the list of supported hardware in the *Software Product Description*. Obtain replacements for any unsupported boards, device drivers, and disks with those listed in the *Software Product Description*.

2. Make sure you have the latest version of the EISA Configuration Utility (ECU) diskette in your possession.

3. Back up the user data on the current operating system as a safety precaution.

4. Shut down the NT operating system to the console mode.

5. Reconfigure and replace unsupported hardware with supported hardware, if necessary.

6. Insert the ECU diskette into the diskette drive.

7. Follow the instructions on the screen to display the Main Menu from which all setup is done.

8. Select the following menu items from the Main Menu:

   a. CMOS setup

   b. Advanced CMOS setup

   c. Console Selection: Digital UNIX Console (SRM)

9. Press the F10 key to save your selections.

10. Run the EISA Configuration Utility (ECU) (as described in your hardware owner's guide) only if the hardware configuration has changed. If the devices are recognized and supported, then the ECU updates itself.

11. Turn off and then turn on the power to the system.

    The console is now running the SRM console.

12. Update the system firmware as described in Section 5.8.

5.5 Optional Task 5: Prepare CDFs or User-Supplied Files

If you want to perform an Installation Cloning or Configuration Cloning on the system you are about to install, read the chapters about Installation and Configuration Cloning in the *Installation Guide -- Advanced Topics*. Prepare a configuration description file (CDF) or files as described in that document and move them to the right locations so the Full Installation process can find them.

If you want to have the Full Installation automatically execute user-supplied scripts, programs, or executables, review the chapter about user-defined files in the *Installation Guide -- Advanced Topics*. Prepare `preinstall`, `postload`, or `postreboot` files as instructed and move them to the right location so the Full Installation process can find them.

5.6 Task 6: Back Up the System

If your system already is installed with the operating system, it is recommended that you perform a full backup of the user data on the system before you begin any software installation procedure. See the *System Administration* manual for information about backing up your system.

5.7 Task 7: Shut Down or Turn On the Processor

To prepare to update system firmware, do one of the following depending upon the current state of the system:

- If the system is turned off, turn it on. The console subsystem prints various start up and diagnostic messages and ends with the console mode prompt (`>>>`).

- If your system is up and already running a version of the operating system, shut down and halt the processor using a command similar to the following :

  ```
  # shutdown -h +5 Please log out
  ```

  In the previous example, the system is shut down and halted in 5 minutes and sends the message `Please log out` to all logged in users. See the *System Administration* manual or `shutdown`(8) if you need more information about shutting down a system.

5.8 Task 8: Update Firmware

Firmware is the software stored within the system (for example, ROM or EPROM) on a system's CPU board. Firmware is the first software that runs when a system is turned on, and it directly controls the hardware. Each hardware platform uses a different set of firmware. The firmware on a platform is the same regardless of the operating system installed on the platform. Thus, firmware is platform dependent, but is operating system independent.

Your system might require a firmware update to run the new version of the operating system. Console firmware is backward compatible with respect to hardware and operating system revision. Therefore, to assure that your system has the latest in terms of PAL code, boot device support, and bug fixes, upgrading firmware to the latest revision is recommended. The firmware *Release Notes* for your system model will note any exceptions to this general recommendation.

_____ **Note** _____

It is also recommended that you review the base operating system *Release Notes* or the *Cluster Release Notes* (if you are installing

a cluster member) for information about the minimum required firmware versions for specific situations (especially for clusters).

Firmware updates are located on the *Alpha Systems Firmware CD-ROM* that is included in the Software Distribution Kit you received.

Follow this basic procedure to begin a firmware update:

1. Shut the system down to console mode if you have not already done so:

    # **shutdown -h now**

2. Determine the console device name of the CD-ROM device:

    >>> **show device**

    Depending upon your system type, a device information table similar to the following is displayed:

    ```
    dka0.0.0.0.0            DKA0                        RZ28
    dkb0.0.0.1.0            DKB0                        RZ28
    dkc0.0.0.2.0            DKC0                        RZ26
    dkc100.1.0.2.0          DKC100                      RZ26
    dkc200.2.0.2.0          DKC200                      RZ26
    dkc300.3.0.2.0          DKC300                      RZ26
    dke100.1.0.4.0          DKE100                      RRD43   ⇐
    mka500.0.0.0.0          MKA500                      TLZ04
    mke0.0.0.4.0            MKE0                        TZ85
    ewa0.0.0.6.0            EWA0           08-00-2B-2C-CE-DE
    ```

    In the third column to the right, look for the line with the characters RRD or CD-ROM. These characters denote a CD-ROM device. The second column in the table shows the console device name assigned to each device on your system.

    In this example, the RRD43 CD-ROM console device name is **DKE100**. You will enter this device name with the boot command in the next step.

3. Insert the firmware CD-ROM into the drive and boot from it:

    >>> **boot** *cdrom_console_device_name*

    The firmware update utility automatically identifies your system type and model and determines the correct firmware revision required for your system.

4. Follow the instructions on the screen. There is an automatic display of the READ-ME-FIRST file, which describes the firmware changes included in the update.

5. Power off the processor for at least 10 seconds when the firmware update is complete to initialize the new firmware. Then, turn on the processor.

The contents of the firmware CD-ROM are also available at the corporate Internet site through anonymous file transfer protocol (FTP):

```
ftp://ftp.digital.com/pub/Digital/Alpha/firmware
```

Firmware updates are also available through anonymous FTP from the `ftp.europe.digital.com` worldwide web server.

5.9 Optional Task 9: Configure Hardware

This section describes optional preinstallation tasks you may have to perform depending upon the type of hardware you have. In all cases, look in your hardware documentation for more information.

The following hardware-dependent tasks are described in this section:

- Configuring the network adapter to match the network environment at your site Section 5.9.1
- Configuring Integrated System Architecture (ISA) Devices (Section 5.9.2)
- Installing ATM adapters before the Full Installation (Section 5.9.3)
- Configuring the RAID subsystem (Section 5.9.4)
- Running the EISA Configuration Utility (ECU) (Section 5.9.5)

5.9.1 Setting the Network Adapter Mode

If you have a brand new system that you plan to connect to a network, you may need to change the value of a console variable to enable the network interface; not doing so will prevent you from executing remote installations, configuring network services, or running any network-aware software.

By default, your network adapter is configured to operate on twisted-pair (10BaseT) networks. If this is compatible with your network environment, you do not need to do anything. If this is not compatible, you may need to configure the adapter to suit the environment by resetting one or more console environment variables.

Refer to the documentation that was shipped with the network adapter for complete configuration instructions. Also see tu(7), `inet.local`(8), and `lan_config`(8) for more information.

5.9.2 Configure Integrated System Architecture (ISA) Devices

To connect ISA devices to your system (for example, floppy controllers, graphics cards), use the `isacfg` console command to supply the correct configuration information.

The `isacfg` console command is available on systems that have an ISA bus. There is information about the command in the hardware documentation for each of the systems that support ISA bus devices. If you need to know more about the format of the command, enter:

```
>>> help isacfg
```

The System Reference Manual (SRM) console firmware provides information about the ISA bus devices that come configured with systems as well as the device handles that are set up. Use the following console firmware command to view this information:

```
>>> isacfg -all
```

When you specify a device with the `isacfg` command, you must use a handle as the name of the device. Table 5–4 lists the handles for optional ISA devices that you can configure for your system.

Table 5–4: Optional ISA Device Handles

Device	Handle
Ethernet LeMAC (DE203, DE204, DE205)	DE200-LE
Sound board	PCXBJ
ATI Mach64 SVGA graphics[a]	MACH64
Generic VGA graphics	ISA--VGA[b]
Any other kernel device driver kit	Handle defined by vendor[c]

[a] An address conflict occurs between ISA serial devices configured as COM4 and ATI Mach64 graphics controllers. Both ISA GX and PCI ATI Mach64 CX/GX/CT products use the address range of 2EC-2EF. This is the same address range assigned to COM4 devices. Consult the hardware documentation for more information.
[b] If you configure generic VGA graphics, you must reset the graphics device handle (via isacfg) as defined by the vendor, when the system halts after loading the subsets. This allows the X server to recognize the device.
[c] A kernel device driver kit is any graphics kit that is not supplied by the base operating system kit. If you are performing a RIS installation from a RIS area that has the required graphics kit already installed, the handle for `isacfg` should be set to the handle specified by the vendor.

Use the `-handle handle-name` flag to specify the device handle. The following example sets the parameters for configuring the DE205 Ethernet controller. When you issue such a command, let the input line wrap; do not press the Return key in the middle of the line:

```
>>> isacfg -slot 1 -dev 0 -mk -handle DE200-LE -irq0 5
   -iobase0 300 -membase0 d0000 -memlen0 10000
   -etyp 1 -enadev 1
```

See your hardware documentation for more information about ISA configuration.

5.9.3 Install Asynchronous Transfer Mode (ATM) Adapters

Install the DGLTA ATM adapter before installing the operating system so that the installation procedure properly detects the presence of the ATM adapter and automatically installs the ATM software subsets.

If you install the ATM adapter after installing the operating system, you must boot the system using the generic kernel /genvmunix, install the ATM software subsets from the CD-ROM or RIS server, and then run the doconfig command to rebuild your system kernel to enable the added ATM support.

Use the following command if you need to boot the system with the generic kernel after the installation:

```
>>> boot -fi "/genvmunix"
```

5.9.4 Configure RAID Subsystem

If your system has a redundant array of independent disks (RAID) subsystem, refer to your hardware owner's guide for configuration instructions before you attempt to install software.

5.9.5 Run the EISA Configuration Utility (ECU)

Before installing the operating system onto a system with an Extended System Integrated Architecture (EISA) bus, you must run the EISA Configuration Utility (ECU).

This utility updates EISA nvram, and its use is important for configuring a dual-boot system (with NT, UNIX, or OpenVMS) or if you have to add very new devices to older systems before the installation. Follow the instructions for running this utility in your hardware owner's guide.

If your system has an EISA bus, you received the ECU diskette with the original hardware shipment. If you do not have a current version of this diskette in your possession, contact your support representative for a replacement.

5.10 Optional Task 10: Connect Peripheral Devices

If you have any new peripheral devices you want to connect, do so before you start the installation:

1. Power off your system. Then, connect the peripheral devices while your system is turned off.

_____ **Note** _____

Depending upon the device or devices you add, you may need to run hardware configuration utilities such as the EISA Configuration Utility (ECU) and RAID Configuration Utility

(RCU), as well. Refer to your hardware documentation for more information.

2. Restore power to the console terminal and all additional peripheral devices.

   If you connect additional peripherals or controllers after the installation, refer to the *System Administration* guide for instructions about how to reconfigure your system.

3. Restore power to the system. When the system is turned on, the peripheral devices automatically are recognized by the system.

5.11 You Are Ready to Begin

When all preinstallation tasks have been completed, proceed to Chapter 6; you are ready to begin a Full Installation of the operating system.

6

Full Installation Procedures

This chapter includes step by step instructions for invoking the Full Installation and supplying all information required by the Full Installation setup process.

Summary of Full Installation Procedures:

Make sure you have performed all prerequisite tasks and are ready to begin before starting this procedure:

1. Set processor-specific console environment variables (Section 6.2).

2. Set standard console environment variables for all processors (Section 6.3).

3. Boot the system from the distribution media (Section 6.4).

4. Provide the information requested by the Full Installation interface (Section 6.7).

5. Examine your selections to make sure they are what you want; go back and change your answers if necessary (Section 6.15).

6. Give your final confirmation to apply your installation selections and start installing software (Section 6.16).

7. Switch CD-ROMs if you are installing Worldwide Support Software (WLS) software from CD-ROM (Section 6.17.3).

8. Optionally select kernel components to build into the kernel (Section 6.18).

9. Log in to the newly installed system (Section 6.19).

10. Review installation log files (Section 6.20).

11. Set up and configure the system for general use; the Full Installation is complete (Chapter 7).

6.1 Are You Ready to Begin?

Before beginning the Full Installation, perform all prerequisite tasks described in Chapter 5. The last prerequisite task is to update the system firmware, so your system should be in console mode (at the `>>>` prompt). If your system is not in console mode, use the `shutdown -h now` command.

_____ **Caution** _____

A Full Installation does not preserve user or data files on disks
that you are installing onto, so make sure your current operating
system has been backed up before you begin. If errors occur that
prevent a successful installation of the operating system, you may
need to restore the previous version of the operating system.

_____

6.2 Step 1: Set Processor-Specific Console Environment Variables

Some system types require one or more special console environment
variables to be set in addition to the standard console variables that are set
for all processors (that are shown in Section 6.3).

Follow this procedure to determine whether or not your processor type
requires special console environment variable settings:

1. Look for the corporate logo on the front panel of your hardware to
   determine what kind of processor you have.

2. Look for your processor type in Table 6–1. If you find your processor,
   proceed to Step 3. If your processor does not appear in Table 6–1, do not
   execute any of the commands and go directly to Section 6.3.

3. Execute the commands shown in Table 6–1 for your processor.

_____ **Note** _____

Every attempt was made to make the information in
Table 6–1 complete and accurate for every supported
system. However, it is recommended that you also check
the hardware documentation to make sure your system
type does not require any other variables to be set before
beginning a Full Installation. The hardware documentation
is customized for each system type and is the definitive
source for supported console environment variables.

_____

Table 6–1: Processor-Specific Console Variables

Processor	Commands to Set Console Variables
• AlphaServer 800 • AlphaServer 1200 • AlphaServer 2100/2100A • AlphaServer 4000/4100A • AlphaServer 4100A	`>>> ` **`show bus_probe_algorithm`** `bus_probe_algorithm old` `>>> ` **`set bus_probe_algorithm new`** `>>> ` **`init`**
AlphaServer 1000, 1000A	`>>> ` **`show bus_probe_algorithm`** `bus_probe_algorithm old` `>>> ` **`set bus_probe_algorithm new`** `>>> ` **`init`** `>>> ` **`set boot_file ""`**
• AlphaStation 500 • AlphaStation 600/600A • EB64+, EB66+, EB164 Single Board Computers • Personal Workstation XP1000	`>>> ` **`set boot_file ""`**
• Personal Workstation 433au, 500au, 600au • Ultimate Workstation 533–au2	`>>> ` **`set os_type unix`** `>>> ` **`init`**
• AlphaServer 8200 • AlphaServer 8400	`>>> ` **`set boot_reset on`** `>>> ` **`set os_type unix`** `>>> ` **`set console serial`**

6.3 Step 2: Set Standard Console Environment Variables for All Processors

Set the following console environment variables for all processors:

1. Clear and reset the `boot_osflags` variable:

   `>>> ` **`set boot_osflags ""`**

2. Enter the following command to ensure that your system returns to the console prompt (`>>>`) after a system crash or power failure during installation:

   `>>> ` **`set auto_action halt`**[1]

---

[1] After the installation is complete, you may want to reset the `auto_action` variable to `restart` to allow your system to reboot automatically after a power or processor failure. See Section 7.9 for instructions.

_____ **Note** _____

Most processors reboot automatically after the software is loaded.
If you are installing the operating system on behalf of another
user or customer, you may want to disable this feature. Disabling
automatic reboot lets you run the installation interface, load the
software, then hand the system to the eventual user thus allowing
the user to boot it and enter host and site specific information.

Enter the following command to disable automatic reboot:

>>> **set boot_osflags h**

The AlphaServer 8400 processors do not support automatic
reboots.

_____

6.4 Step 3: Boot the System

The procedure in this section applies to all supported systems and describes
how to boot from CD-ROM. If you are performing the installation over
the network from a remote installation services (RIS) server, see the
Installation Guide -- Advanced Topics for network boot instructions. If you
have problems booting your system, see the hardware documentation for
your particular processor. If the problem is not hardware related, see the
System Administration guide. The _System Administration_ guide provides
information about booting a generic kernel (/genvmunix) or booting an
alternate custom kernel.

Use this procedure to boot your system from the operating system CD-ROM:

1. Insert the CD–ROM labeled _Operating System Volume 1_ into the disk
    drive.

2. If you have not already done so, enter the init command:

    >>> **init**

3. Determine the console device name of your CD-ROM drive by entering
    the following command:

    >>> **show device**

    Depending upon your system type, a device information table similar to
    the following is displayed:

    ```
    dka0.0.0.0.0            DKA0                    RZ28
    dkb0.0.0.1.0            DKB0                    RZ28
    dkc0.0.0.2.0            DKC0                    RZ26
    dkc100.1.0.2.0          DKC100                  RZ26
    dkc200.2.0.2.0          DKC200                  RZ26
    dkc300.3.0.2.0          DKC300                  RZ26
    dke100.1.0.4.0          DKE100                  RRD43    ⇐
    mka500.0.0.0.0          MKA500                  TLZ04
    ```

```
mke0.0.0.4.0              MKE0                              TZ85
ewa0.0.0.6.0              EWA0               08-00-2B-2C-CE-DE
p_d0.7.0.3.0                                          Bus ID 7
pka0.7.0.0.0              PKA0                    SCSI Bus ID 7
pkb0.7.0.1.0              PKB0                    SCSI Bus ID 7
pkc0.7.0.2.0              PKC0                    SCSI Bus ID 7
pke0.7.0.4.0              PKE0                    SCSI Bus ID 7
```

In the third column to the right, look for the line with the characters RRD or CD-ROM. These characters designate a CD-ROM device. The second column in the table shows the console device name assigned to each device on your system.

In this example, the RRD43 CD-ROM console device name is **DKE100**. You will enter this device name with the boot command in the next step.

4.   Enter the boot command with the following syntax:

boot *console_cdrom_device_name*

The console *cdrom_device_name* is the name obtained in Step 3. Using this example, you would enter the following command to boot the system from the CD-ROM device:

```
>>> boot dke100
```

Output similar to the following is displayed:

```
(boot dke100.1.0.4.0)
block 0 of dke100.1.0.4.0 is a valid boot block
reading 16 blocks from dke100.1.0.4.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1e0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

UNIX boot - Fri Aug 24 15:49:49 EDT 2001
            .
            .
            .
Starting installation from CD-ROM.  Please wait
```

_____ **Note** _____

The boot process can take several minutes. Several hardware-specific messages are displayed. The more complex the system (many peripheral devices, and so on), the longer the boot process takes.

_____

This completes system boot. The installation process continues as shown in Section 6.5.

6.5 Successful System Boot — Select a Language for the User Interface

Upon successful system boot on systems with graphical displays, you have the option to view the installation screens in one of three languages:

- United States English

- Chinese

- Japanese

After making this selection, the remaining installation windows and dialog boxes will be displayed in the language you choose. The installation process continues as shown in Section 6.6.

6.6 The Welcome Screen

After you select a language in which to view the installation user interface, a Welcome message is displayed:

- On systems capable of graphical display, the Installation Welcome dialog box shown in Figure 6–1. The graphical user interface steps you through each phase of the installation setup process. The user interface has a task-like design and lets you go backward and forward at any time. Except for setting the system date and time immediately when you enter it, your system is not changed in any way (unless you repartition a disk or disks) until the last dialog box where you confirm the start of the installation. Online help is available from the Help menu.

Figure 6–1: Installation Welcome Dialog Box
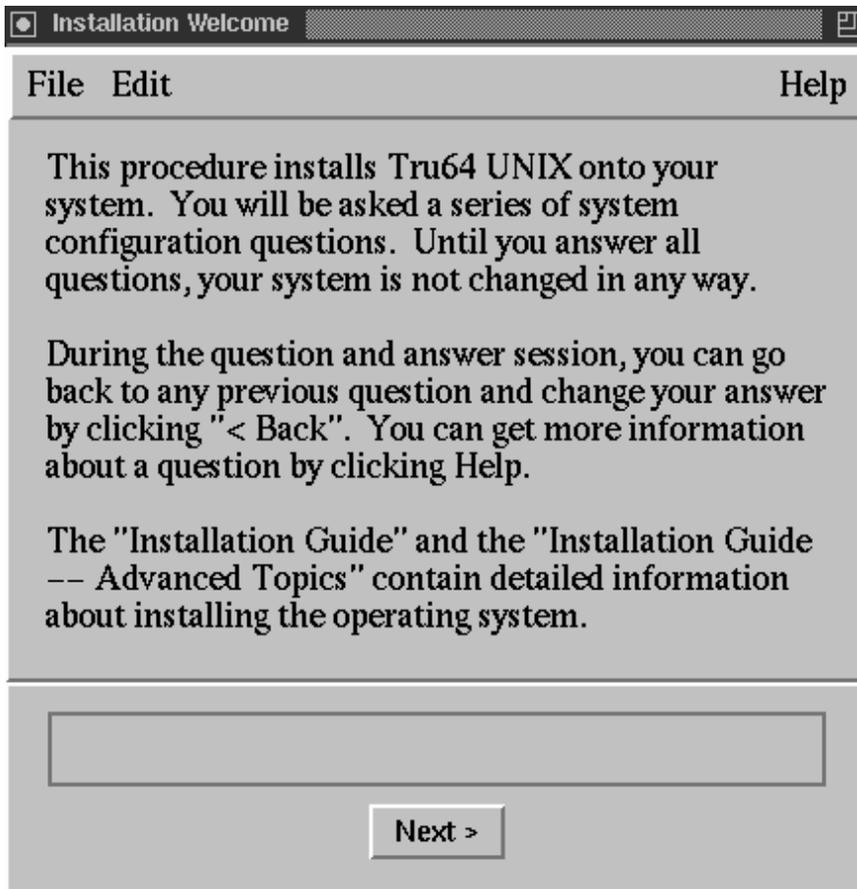
If your system presents the graphical user interface, but you would prefer to use the text-based interface, select the Quit option from the File menu to exit from the installation user interface. Then, enter the following command:

```
# restart nogui
```

- On systems without graphics capabilities, the following is displayed:

```
          Welcome to the Tru64 UNIX Installation Procedure

This procedure installs Tru64 UNIX onto your system.  You will be
asked a series of system configuration questions.  Until you answer all
questions, your system is not changed in any way.

During the question and answer session, you can go back to any
previous question and change your answer by entering:  "history"
You can get more information about a question by entering:  "help"

Refer to the "Installation Guide" and "Installation Guide -- Advanced
Topics" for more detailed information about installing Tru64 UNIX.
```

```
** This system is currently running firmware revision: n.n
   See the "Tru64 UNIX Release Notes" for information regarding the
   required firmware revision.

The following options are available:

o  The "U.S. English Installation" installs only the Tru64 UNIX base
   software onto your system.

o  The "Installation with Worldwide Language Support" (WLS) allows you
   to internationalize your system.  This option will allow you to install
   the Tru64 UNIX base software as well as WLS software.  The additional
   software subsets provide support for various countries and their native
   languages.

o  The "Exit Installation" option stops the installation, and puts your
   system in single-user mode with superuser privileges.  This option
   is intended for experienced UNIX system administrators who want to
   perform file system or disk maintenance tasks prior to the
   installation.  This option may also be used for disaster recovery
   on a previously installed system.

Remember, you can always get extra information by typing help.

1) U.S. English Installation
2) Installation with Worldwide Language Support
3) Exit Installation

Enter your choice:
```

Online help is available by entering the word `help` at any prompt.

You can change or review your selections by entering the word `history` at any time at any prompt, and a list of your previous selections similar to the following is displayed:

```
Enter your choice: history


Select the question you want to revisit.

1) Installation type  ( 1 )
2) Set root password  ( LSWNUMtIomZVg )
3) Confirm root password  ( LSWNUMtIomZVg )
4) Software selection type  ( custom )
5) Select software subsets  ( 34 items: OSFADVFSBIN520 OSFBASE520
   OSFBIN520 OSFBINCOM520 OSFCDEDT520 OSFCDEMAIL520...)
6) Confirm chosen subsets  ( 1 )
7) Select locales  (  )
8) DISMISS history menu

Enter your choice:
```

- If the Full Installation process finds an `install.cdf` file, which indicates that this system is to be installed using the Installation Cloning process, the following screen is displayed (regardless of the user interface):

```
Found file install.cdf on <location>

A Configuration Description File was specified for use during the
```

```
installation of this system.

The Configuration Description File can be used by the installation to
provide the information related to file system layout and software
selection.

If you choose to use the Configuration Description File, the installation
will proceed and you will not have to answer any questions.  If you decide
not to use the Configuration Description File, the installation will
continue interactively.

Would you like to use the Configuration Description File? (y/n) [y]:  y

In a few moments, the installation will begin.  However, the Configuration
Description File will first be validated for use on this system.  After the
validation completes, you no longer need to be present.
```

If CDF validation is successful, the installation procedure continues as
shown in Section 6.17.1. File systems and swap space are created as
specified in the CDF, and the software subsets defined in the CDF begin
loading after file system creation. Site-specific information such as host
name, location and area, and date and time is obtained from the RIS
server if a RIS installation is performed. If a CD-ROM installation is
performed, the host name, location, and area are all provided by fields in
the CDF. If the CDF variable `timeset` is blank or is set to `no`, the system
requests the date and time. If `timeset` is set to `yes`, the system time is
set when the first user logs in and sets it using the `date` command.

Later in the installation process, you will be required to boot from
the newly installed disks, as shown in Section 6.17.2 and to enter a
`root` password as shown in Section 6.11 (if a password is not already
contained in the CDF).

If you need more information about Installation Cloning, especially
if you encounter CDF validation errors, see the *Installation Guide --
Advanced Topics*.

6.7 Step 4: Supplying the Setup Information Required for a Full Installation

Table 6–2 describes the information you have to supply to the Full
Installation process.

The information you supply is the same regardless of the user interface,
but the order in which it is requested may be different. For instance, the
graphical interface begins by asking you to supply host-specific information;
the text-based interface begins by asking you if you intend to install
Worldwide Language Support software.

Table 6–2: Information You Supply for a Full Installation

Information Requested by Full Installation	User Action
Host Information	If you are installing from a CD-ROM, supply the following information: • Host Name • Current Date • Current Time • Geographic Area • Location If you do not enter this information during the installation setup, you will be prompted for it later in the configuration phase. Section 6.8, Section 6.9, and Section 6.10 provide guidelines for entering host– and site-specific information. When installing the operating system from a RIS server, the host and site information is obtained automatically from the server.
Root Password	Create a password for the `root` user. If you do not enter a password during installation setup, you will be asked to create and confirm a password before system configuration (after reboot). Guidelines for choosing an effective password are shown in Section 6.11.
Software Selection	Select the type of software subsets you want to install. The default is to install only mandatory software subsets. But, you have the opportunity to install optional software or to install all mandatory and all optional software subsets. Section 6.12 describes the subset selection options.
Worldwide Language Support	Specify whether or not you want to install software for additional languages. The text-based interface asks you to make this decision at the onset of the process; the graphical user interface asks you to select the languages you want during the software selection step.

Table 6–2: Information You Supply for a Full Installation (cont.)

Information Requested by Full Installation	User Action
File System Layout	You decide whether to use the default file system layout or to customize the file system layout for the / (root), /usr, /var, and i18n file systems and swap areas. You can accept the defaults if you are installing the operating system on a single disk and want to use the default file system layout. Section 6.14 describes your file system layout options. Section 6.14.4 describes the option to install into Logical Storage Manager (LSM) volumes on each disk you use for the installation.
Kernel Component Options	Select the type of kernel components to build into the kernel. You can choose the option to include mandatory kernel components only, mandatory plus your choice of optional components, or all mandatory and all optional components. Section 6.18 describes these kernel options. If you select the option to customize kernel component selection, you perform that task later after the first system reboot.

The Full Installation procedures start in Section 6.8 and end in Section 6.16. These sections more closely follow the sequence of the graphical interface, however, you should use the same guidelines for the text-based interface. Any difference in how you supply information is noted.

_____ **Note** _____

If you are installing the operating system on behalf of another user or customer, you may not want to supply any host or site-specific information. You can accomplish this by doing the following:

1. Set the console environment variable boot_osflags to halt (see Section 6.3).

2. Do not enter a host name, the date or time, location or area, or a root password; the Full Installation will halt after the software subsets load to request this information. This allows the eventual user of the system to boot the system and specify their own host- and site-specific information.

_____

6.8 Setting the Host Name

The host name is used to identify your system on the network.

For the graphical interface, a variety of host and site-specific information is supplied on the Host Information dialog box shown in Figure 6–2. See Section 6.9 and Section 6.10 for information about supplying information for the remaining fields on this dialog box.

Figure 6–2: Host Information Dialog Box

If you do not supply a host name, the Full Installation stops after the system reboots but before building the tailored kernel to prompt you for a host name.

6.8.1 Guidelines for Choosing a Host Name

The following are guidelines for choosing a host name:

- Host names may contain from 2 to 63 alphanumeric upper or lower case characters (`a-z, A-Z, 0-9`). Fully qualified host names (for example, `mysystem.boston.bigcorp.com`) can contain a maximum of 254 characters. Each component of the domain name can contain up to 63 characters and must be separated by a period.

- Host names must begin with a letter.

- Hyphens (`-`) and periods (`.`) are permitted in host names.

- Before deciding upon a host name, consult with the site administrator to make sure you choose a unique name and to determine if site-specific

restrictions (such as maximum length) or naming conventions have been defined.

- If your system is running a previous version of the operating system and is already connected to a network, you should keep the same host name because changing it would impact how your system is recognized on the network.

6.8.2 Host Name Samples

Table 6–3 shows samples of correct and incorrect host names:

Table 6–3: Samples of Correct and Incorrect Host Names

Correct Host Names	Incorrect Host Names
mysystem	generic or binary[a]
y2k1-system.com	2001-system.com
system1	1.system
xyz-college.edu	xyz_college.edu

[a] Do not use the words generic or binary for your host name because they have been reserved for use by the operating system.

6.9 Setting the Date and Time

To set the system date, enter today's date in the following order:

- mm is the current month.
- dd is the current day.
- [cc]yy is the current year in two (yy) or four (ccyy) digits. For example, 01 and 2001 are acceptable entries for the year 2001.

Digits entered in the format and order 07 06 2001 and 07 06 01 both represent July 6, 2001. The text-based interface requires that a hyphen (-) separate each set of digits, for example, 07-06-01.

To set the system time, enter the time in two sets of two digits (using the 24-hour clock format) in the following order:

- hh is the current hour in two digits.
- mm is the current minutes in two digits.

For example, the number 14 entered in the hh field represents 2 o'clock in the afternoon, and the number 06 entered in the mm field represents the sixth minute of the hour.

If you enter either a date or a time, you must enter the other. As soon as you enter a date and time, the system date and clock is set immediately.

If you do not supply a date and time, and did not set up your system to halt before system reboot, the Full Installation stops after the system reboots but before building the tailored kernel to prompt you for the current date and time.

6.10 Setting the Location and Area (Formerly Time Zones)

Starting with Version 5.0 of the operating system, the naming convention for time zones is the `Area/Location` format (for example, `Asia/Tokyo` or `Pacific/Honolulu`) where `Area` is the name of a continent or ocean, and `Location` is the name of a major city or locale within that area. Earlier versions of the operating system used the `Country/Time Zone` style (for example, `US/Eastern`). All `/etc/zoneinfo` directories and time zone files are still available for compatibility, however many of the files are now hard links to their renamed counterparts.

The location and area you specify sets the time zone. You should select the location and area that best describes your geographic location. The default location is `America/New_York`. You have the option to set the Location and Area to `none` if you are installing this system on behalf of another user.

If you do not supply a location and area, and did not set up your system to halt before system reboot (see Section 6.6), the Full Installation stops after system reboot and prompts you for location and area information.

6.11 Setting the Root Password

A UNIX operating system permits a superuser to have permissions that supersede those of ordinary users. This superuser is often referred to as the `root` user. The superuser is usually the person who is responsible for system administration tasks. This user has access to all files and all devices and is not restricted from changing anything on the operating system. For this reason, the `root` user (or `root` account), needs a special password. Section 6.11.1 contains guidelines for choosing an effective `root` password.

Figure 6–3 shows the Set Root Password dialog box.

Figure 6–3: Set Root Password Dialog Box
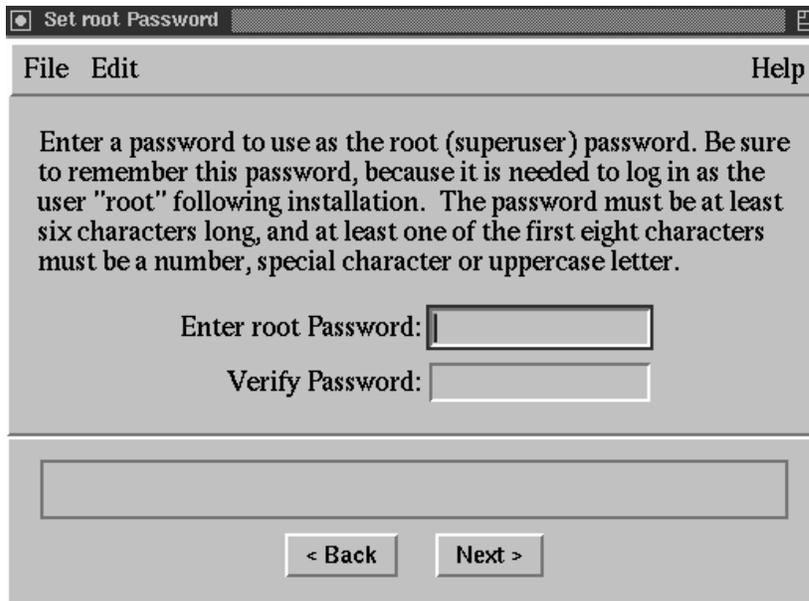
Choose a password that conforms to the following rules:

- Must have a minimum of 6 to a maximum of 16 characters.

- Should contain a combination of upper and lower case letters.

- At least one of the first six characters must be a number, a special character, or an upper case letter.

- It is recommended, but not mandatory, to use numbers and special characters such as the dollar sign ($), the percent sign (%), the number sign (#), the period (.), the hyphen (-), the underscore (_), or the at sign (@) in your password. If you do not use a special character or number in the password, at least one of the first six characters must be an upper case letter or a number.

When you enter the password, it is not displayed on your screen for security reasons. You must enter the new password again for verification. Remember this password because you will need it to log in as the `root` user the first time you log in to the system after the installation. You can change the `root` password at any time (using the `passwd` command) after the system is installed.

If you do not supply a root password, and did not set up your system to halt before system reboot, the Full Installation stops after the system reboots but before building the tailored kernel to prompt you for a `root` password.

6.11.1 Guidelines for Choosing Effective Passwords

When choosing a root password, you should *not* use:

- Words found in any dictionary (in any language)
- Personal information about you or your family such as first and last names, addresses, birth dates, telephone numbers, names of pets, and so on
- Any combination of words in the dictionary and personal information

Do not choose a password that can be guessed by someone who knows you. Because the root user has absolute power over the operating system, the root password should be carefully protected. The basic guideline is to make the password something that you can remember but difficult for someone else to guess.

6.11.2 Root Password Samples

Table 6–4 shows examples of passwords that adhere to suggested guidelines and some that do not. These passwords are shown for illustrative purposes only; do not use any of them for your password.

Table 6–4: Sample Root Passwords

Correct Root Passwords	Passwords That Are Not Recommended	Why Password Violates Guidelines
OhU8one2too	johnsmith	Proper name with all letters lower case
UrGr8t!!	123MainStreet	Home address
parTe2nite	MyDogLassie	Name of pet
99Pnt.99%	6July58	Birth date of family member

6.12 Choosing the Type of Software to Be Installed

After supplying host information, setting the date and time, and specifying a root password, the next step in the Full Installation is to select the type of software to install. If you are using the graphical user interface, the Software Selection dialog box is shown in Figure 6–4. The text-based interface displays the same information.

Figure 6–4: Software Selection Dialog Box

Table 6–5 describes the three classifications of software subsets. Appendix C provides descriptions of the individual software subsets.

Table 6–5: Description of Software Selection Options

Option	Description
Mandatory Only	This option installs the software subsets that are the minimum required to run the base operating system. Mandatory software subsets always are installed. This is the default choice for the graphical user interface.

Table 6–5: Description of Software Selection Options (cont.)

Option	Description
All Software	This option installs all base operating system mandatory software subsets and all optional software subsets, excluding Worldwide Language Support subsets (unless you select additional country support) and TruCluster Server (TCR) software, which is a separate kit.
Customize	This option lets you choose which optional software subsets to install in addition to the mandatory software. Section 6.12.1 provides hints for customizing the software selection process.
Country Support	This is where you select support for one or more additional languages if you are using the graphical user interface. Each country has a set of software subsets that is designed to allow localization of the operating system. The default is the United States English language. If you install all base operating system subsets plus one or more additional languages, all WLS subsets for each selected country are installed.

See Appendix C for a description of the mandatory, optional, and WLS software subsets.

6.12.1 Hints for Selecting Optional Software

Selecting the Customize option and clicking on the Edit List... button displays the Software Section: Edit List dialog box shown in Figure 6–5, which is where you select the optional software you want to install.

_____ **Note** _____

The legend at the bottom of the dialog box describes the current status of each software subset. Click on a plus sign (+) to view the individual software subsets contained in a software category; click on a minus sign (–) to close a category.

_____

Figure 6–5: Software Subsets: Edit List Dialog Box
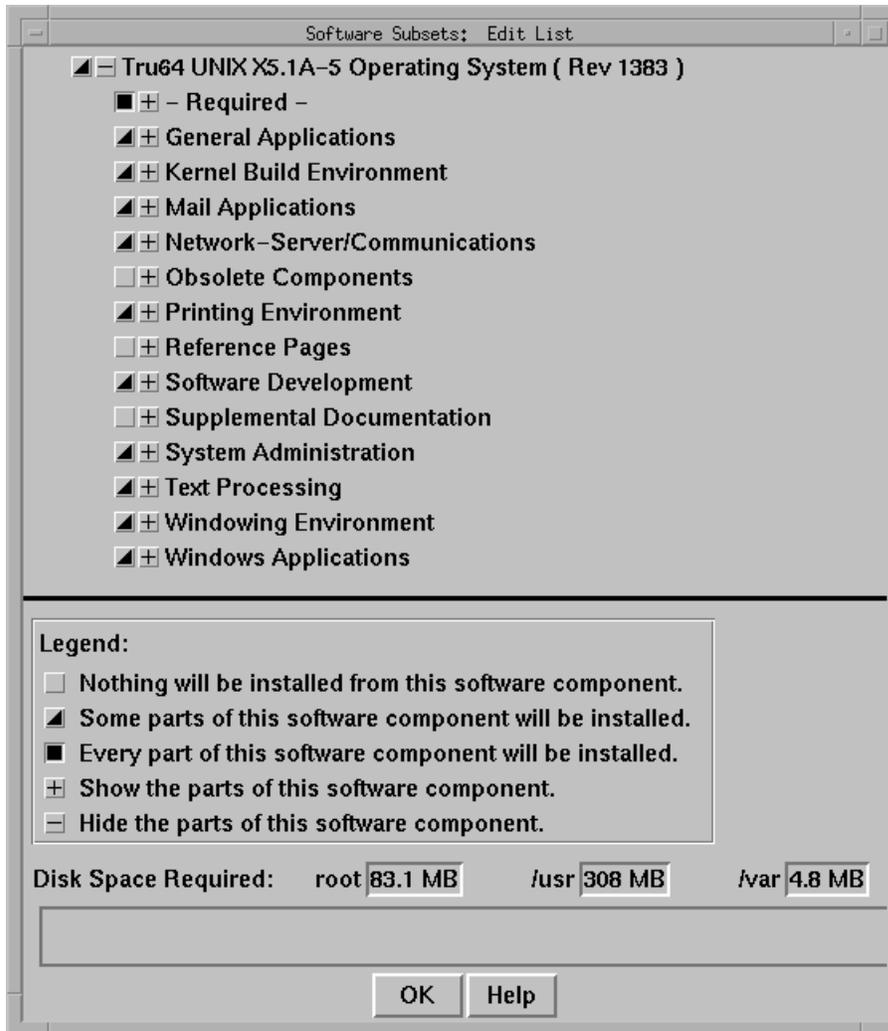
When making software subset selections, you can select a software subset category (such as General Applications), or an individual software subset within a category (such as DOS Tools). If you select a software subset that has a dependency with another subset that is not yet selected, the other subset is selected automatically. When a subset with dependencies is selected, a dialog box with a message similar to the following is displayed:

```
The chosen subset(s) require one or more additional subset(s)
which will be loaded automatically:
  * Doc. Preparation Tools  (OSFDCMT520)
```

An alternative to selecting one software subset (or category) at a time is to select the topmost category, Tru64 UNIX V5.1A Operating System, and then click on the categories or subsets you do not want. Adding all subsets results in more software than your system needs, so remember to remove all of the hardware-specific subsets related to keyboard types, X servers, and fonts. The user interface will not let you remove software subsets that are mandatory for your system's hardware configuration.

A suggested procedure for selectively choosing optional software to install:

1. Review Appendix C for a description of all software subsets.

2. In the Software Selection Dialog Box, select Customize, then click on the Edit List... button.

3. Select the optional software subsets you want. When you have completed selecting the subsets, note the Disk Space Required for the /, /usr, and /var file systems, which is shown at the bottom of the dialog box. Use this information to select disks and partitions that are large enough to hold the software you want to install

_____ **Note** _____

If you do not want to use the recommended partitions offered by the Full Installation process, see the *Installation Guide -- Advanced Topics* for information about partitioning disks, then use the Disk Space Required figures to select which disks to select later on in the Full Installation process.

_____

6.13 Choosing the Type of Kernel Components to Build into the Kernel

The next step in the Full Installation is to choose the type of kernel components to build into the kernel later in the configuration phase of the installation process. Regardless of the interface, you have three options for including kernel components into the kernel. The dialog box shown in Figure 6–6 is displayed if you are using the graphical user interface.

Figure 6–6: Kernel Options Dialog Box
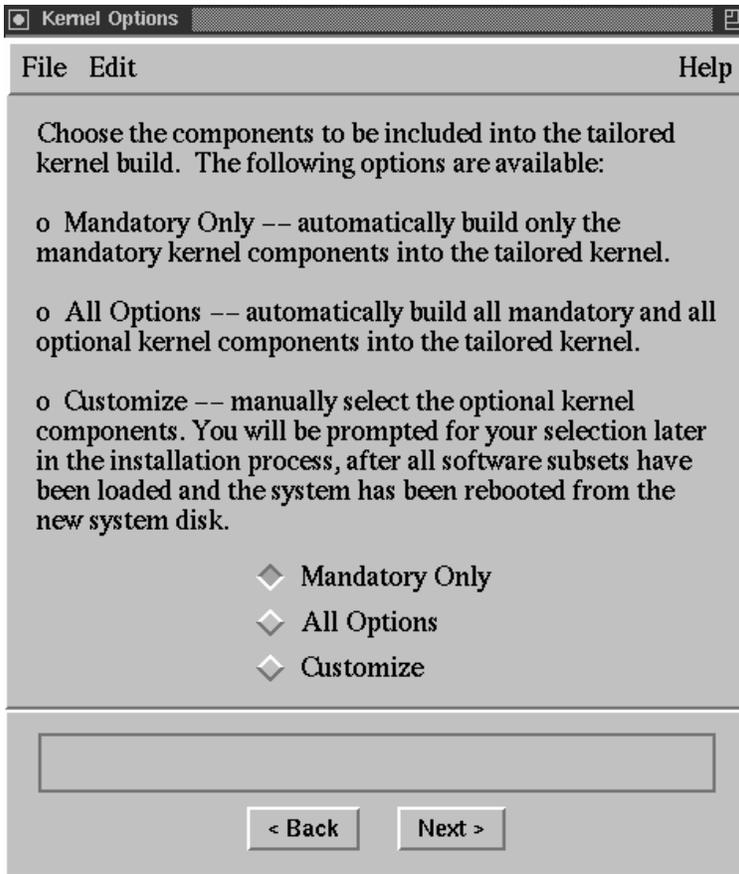
Table 6–6 describes the kernel component options:

Table 6–6: Description of Kernel Selection Options

Option	Description
Mandatory Only	This option builds into the kernel the minimum mandatory kernel components required for the proper operation of the software subsets you plan to install. This is the default option for the graphical user interface.

Table 6–6: Description of Kernel Selection Options (cont.)

Option	Description
All Options	This option builds all kernel components into the kernel. Each kernel component loads additional code into the kernel; therefore, selecting All Options can significantly and unnecessarily increase the size of the kernel and impact performance.
Customize	This option lets you select specific kernel components from a Kernel Options Selection menu that is presented after system reboot (see Section 6.17.2). The kernel components presented on the menu depend on the software subsets that were installed. See Section 6.18 for more information about selecting kernel components.

6.14 Selecting the Type of File System Layout

After selecting the software subsets to install, you have to decide where to install them. Selecting the file system layout involves selecting the disk or disks and disk partitions on which you want to install the standard UNIX file systems: /, /usr, /var, /usr/i18n (if you selected one or more additional languages), and swap space. You have to then decide whether you want to assign the Advanced File System (AdvFS), which is the default, or the UNIX File System (UFS) as the file system type for each file system. The Full Installation offers the option to choose a default file system layout or the option to completely customize the file system layout.

The dialog box shown in Figure 6–7 shows the file system layout choices.

Figure 6–7: Select File System Layout Dialog Box

Section 6.14.1 describes the situations when you should choose the default file system layout, and Section 6.14.2 describes the situations when you should choose to customize the file system layout.

6.14.1 When Should I Use the Default File System Layout?

You should use the default file system layout if any one of the following statements is true:

- When you do not have any data on the disk that you want to retain. The default file system layout rewrites the disk partition table and may overwrite existing data.

- Your system has only one disk, which must have 1 GB or greater capacity.

- You want to install the operating system on one disk even if your system has more than one.

>**Caution**
>
>While possible, a Full Installation to a single 1 GB disk is not advisable if you have more than one disk. Apart from degraded performance, you cannot install additional software or patches, it is not possible to store crash dumps, and it is very difficult to recover the root disk in the event of a disk crash.
>
>The recommended strategy is to place the / (root) file system on one disk and place the /usr file system and swap area on another disk. User accounts and files should be located on other disks and mounted under /usr.

- You do not need to create custom disk partitions.
- You only need one swap area.
- You only want one file system type for all file systems.

Regardless of the interface you are using, you have to make a few choices if you want to use the default file system layout:

1. **Choose one disk on which to install the operating system**.

   The disk you choose must be 1 GB or greater in size (see the previous Caution, which describes the restrictions that are imposed when you install onto a 1 GB disk). The recommended partition table is applied to the disk that you select. As shown in Table 6–7, the partition sizes vary depending upon the capacity of the disk.

   Table 6–7: Recommended Partition Table by Disk Capacity

File System Name and Location	File System Size Based on Disk Capacity		
	1 GB Disk	2 GB Disk	3 GB or Larger Disk
/ (root) partition a	128 MB	256 MB	384 MB
/usr partition g	745 MB	1490 MB	2235 MB
swap space partition b	128 MB	256 MB[a]	384 MB[a]

   [a] The swap space could be even greater depending on the size of the b partition in the default disk partition table

2. **Choose one file system type for all file systems**.

Your choices are the Advanced File System (AdvFS), which is the default, or the UNIX file system (UFS). For a description and comparison of UFS and AdvFS, see the *Installation Guide -- Advanced Topics*.

_____ **Note** _____

If the system is going to be a member of a cluster, you must select AdvFS as the file system type.

_____

3. **Decide whether or not to install into LSM volumes**.

   Section 6.14.4 provides more information about the Logical Storage Manager (LSM) to help you decide whether or not you want to install into LSM volumes.

What you see if you choose the default file system layout depends upon the interface you are using.

- If you are using the graphical user interface, choosing the Default File System Layout option opens the dialog box shown in Figure 6–8.

Figure 6–8: Default File System Layout Dialog Box
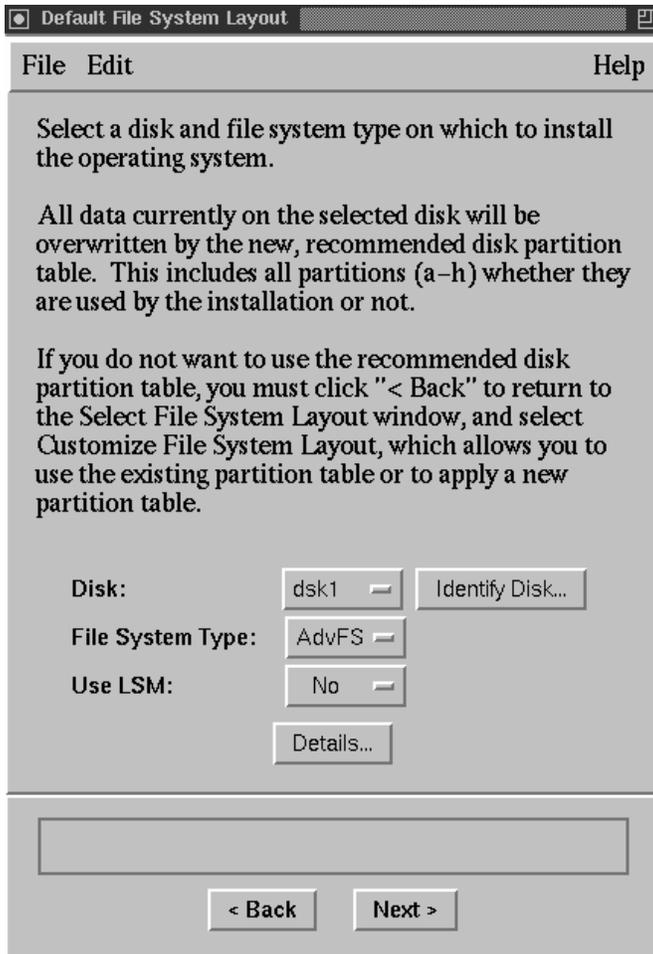
Hold the left mouse button down over the disk button labeled dsk1 to obtain a list of disks available on your system. Highlight the disk you want to use, then release the mouse button.

If you are using the graphical user interface, you can verify that you selected the correct disk by clicking on the Details... button to display the disk details shown in Figure 6–9. The partition sizes shown are for illustrative purposes only. The `/usr/i18n` file system contains the subsets required for *internationalization* (`i18n`) and is shown only if you selected support for one or more additional languages.

Figure 6–9: Default File System Layout: Details Dialog Box

	Disk	Partition	Type
root	dsk1	a (128 MB)	AdvFS
/usr	dsk1	g (700 MB)	AdvFS
/var	in /usr		
swap1	dsk1	b (196 MB)	
swap2	not used		

File System Layout: Details

OK   Help
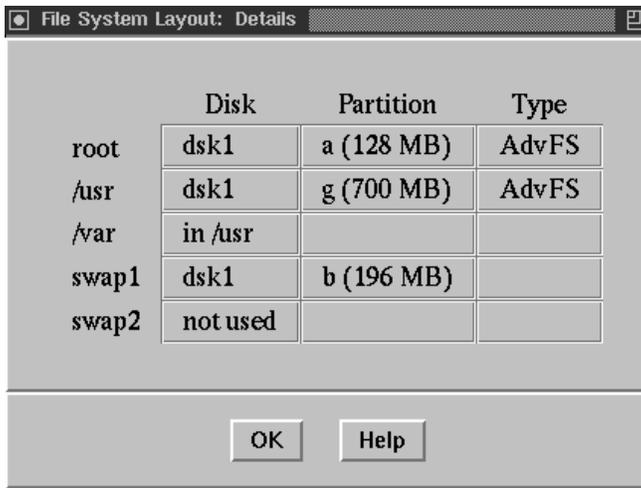
If after reviewing the disk details you are not satisfied with the disk
or file system type you chose, close the Details dialog box and choose
another disk or file system type. If you are still not satisfied, go back to
the File System Layout dialog box and select the option to customize the
file system layout to obtain a more suitable configuration.

If you are unable to determine which of the physical disks is associated
with a `dsk*` device name, click on the Identify Disk... button to open the
dialog box shown in Figure 6–10. Follow the instructions in the dialog
box to blink the input/output light on the disk.

Figure 6–10: Identify Disk Dialog Box
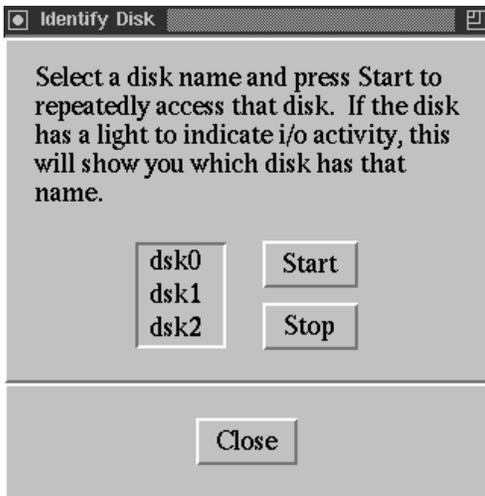
- Example 6–1 shows the disk selection dialog box for a default file system
  layout if you are using the text-based interface.

Example 6–1: Textual Interface: Default File System Layout

```
Select a disk for the root file system.  The root file system
will be placed on the "a" partition of the disk you choose.

To visually locate a disk, enter "ping <disk>", where <disk>
is the device name (e.g., dsk0) of the disk you want to
locate.  If that disk has a visible indicator light, it will
blink until you are ready to continue.
     Device   Size  Controller  Disk
     Name    in GB  Type          Model        Location
 1)   dsk0     8.5  SCSI          RZ1DF-BF   bus-0-targ-0-lun-0
 2)   dsk1     8.5  SCSI          HSZ70      bus-4-targ-0-lun-0
 3)   dsk2     8.5  SCSI          HSZ70      bus-4-targ-0-lun-1

Select the file system type.  All of the file systems will be
created with this type.

1) UFS -- UNIX File System
2) AdvFS -- Advanced File System

Enter your choice: 1

You have requested this file system layout:

  * root file system on dsk0a, type UFS
  * /usr file system on dsk0g, type UFS
  * var will be a directory in the /usr file system
```

Example 6–1: Textual Interface: Default File System Layout (cont.)

```
 * i18n will be a directory in the /usr file system
 * first swapping area (swap1) will be on dsk0b
 * no second swapping area (swap2)

Is this the correct file system layout (y/n)
```

Example 6–2 shows a default file system layout screen when the system has only one disk.

Example 6–2: Text—Based Interface: Default File System Layout with One Disk

```
Only one disk detected in this system (/dev/dsk0, SCSI RZ1DF-BF
type).  All file systems will be on that disk.

Select the file system type.  All of the file systems will be
created with this type.

1) UFS -- UNIX File System
2) AdvFS -- Advanced File System

Enter your choice:
```

If you are using the text-based interface and you are not sure which physical disk is associated with a particular dsk* name, you may be able to identify it by entering ping *disk_name* as shown in Example 6–3. If the disk has a visible input/output light, it will start blinking. Not all disks have an input/output light, so not all disks can be identified using this method.

Example 6–3: Identifying Disks in the Text-Based Interface

```
To visually locate a disk, enter "ping <disk>", where <disk>
is the device name (e.g., dsk0) of the disk you want to
locate.  If that disk has a visible indicator light, it will
blink until you are ready to continue.
     Device   Size  Controller  Disk
     Name     in GB Type        Model       Location
  1)   dsk0     8.5  SCSI         RZ1DF-BF   bus-0-targ-0-lun-0
  2)   dsk1     8.5  SCSI         HSZ70      bus-4-targ-0-lun-0
  3)   dsk2     8.5  SCSI         HSZ70      bus-4-targ-0-lun-1

Enter your choice: ping dsk0
```

Example 6–3: Identifying Disks in the Text-Based Interface (cont.)

```
** Identifying device dsk0
```

When you have made your decisions for the default file system layout, the Full Installation continues as described in Section 6.15.

6.14.2 When Should I Customize the File System Layout?

You should customize the file system layout if any one of the following statements is true:

- You want to install the standard UNIX file systems on more than one disk. Up to six different disks can be specified. Each file system and swap area can reside on its own disk.

  The recommended strategy is to place the / (root) file system on one disk and place the /usr file system and swap area on another disk.

  User data should be located on other disks. It is recommended that you mount a separate file system or file systems for user accounts so that user information is not overwritten during future Full Installations. It also makes disaster recovery less complicated because you can reinstall the operating system without losing user accounts.

- You want to use both AdvFS and UFS file system types.

- You want to create custom disk partition sizes.

- You need two swap areas.

- You want to preserve existing data on disks you are installing to as described in Section 6.14.5.

- You plan to use the system as a dataless server or a RIS server. The *Installation Guide -- Advanced Topics* provides details about the extra space needed in the /var file system for these types of servers.

You have to make a few choices if you want to use the Custom File System Layout:

1. **Decide whether or not to install into LSM volumes**.

   Section 6.14.4 provides more information about LSM to help you decide whether or not you want to use it.

2. **Choose a disk and disk partition for each file system**.

   You must choose a disk and disk partition to hold each of the following file systems: / (root), /usr, /var, and /usr/i18n (if you want /usr/i18n to be a file system rather than a directory). The /usr/i18n

file system contains the subsets required for *internationalization* (i18n) if you selected additional language support.

The / (root) file system must be on the `a` partition of the disk you choose to hold it; you cannot change this. You have the option to locate the `/var` and `/usr/i18n` file systems within the `/usr` file system instead of on their own disk partition.

If you are unable to determine which of your physical disks is associated with a `dsk*` device name, click on the Identify Disk... button to open the identify disk dialog box shown in Figure 6–10, or enter `ping` *disk_name* if you are using the text-based interface.

As shown in Figure 6–11, instead of the `rz*` device names you may have been accustomed to in previous versions of the operating system, you will see `dsk*` device names. See Appendix A for general information about device naming conventions. See Section A.4 for information about preserving your existing device name database during a Full Installation if your system already is running a previous version of the operating system.

3. **Choose a disk and disk partition for one or two swap areas**.

   You have the option to allocate two swap areas. It is recommended that you place swap areas on different disks and choose the fastest disks for swap areas. The *Installation Guide -- Advanced Topics* contains more recommendations for calculating the amount of swap space you need and where to place swap space.

   As a frame of reference, the recommended file system layout uses 128 MB as the default size of the swap partition on a 1 GB disk, 256 MB on a 2 GB disk, and 384 MB on disks that are 3 GB or larger.

4. **Choose a file system type for each file system**.

   You can choose between the Advanced File System (AdvFS), which is the default, or the UNIX file system (UFS) for each file system. For a description and comparison of UFS and AdvFS, see the *Installation Guide -- Advanced Topics*.
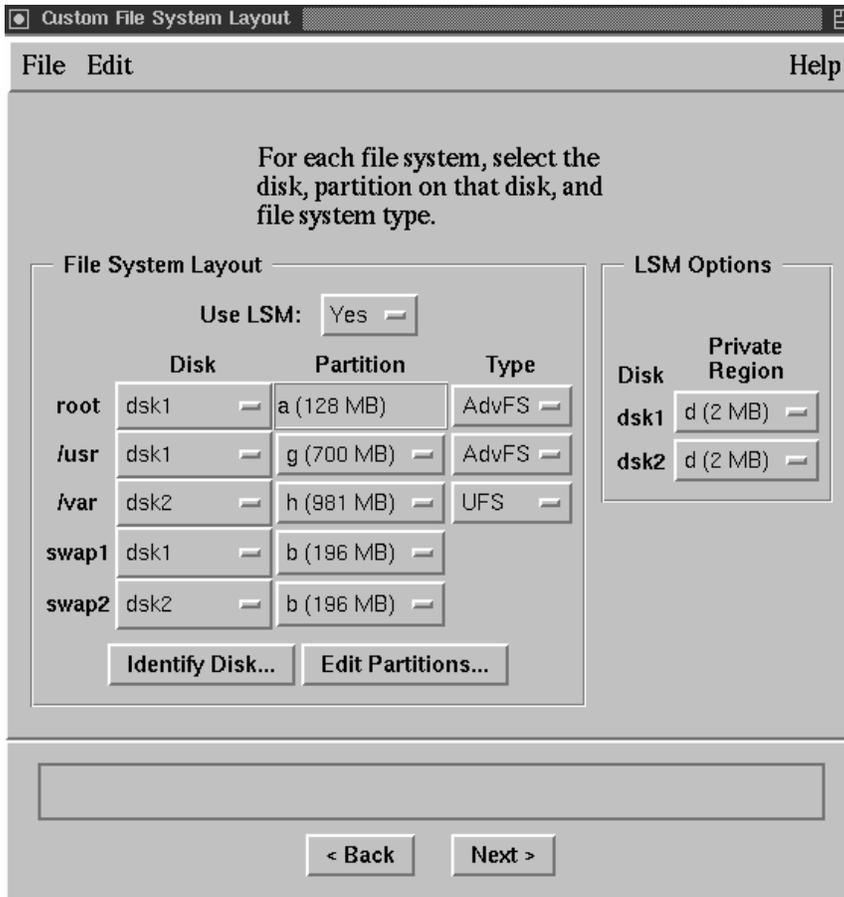
   _____ **Note** _____

   If this system is going to be a member of a cluster, you must use AdvFS as the file system type for all file systems.

   _____

What you see when customizing the file system layout depends upon the interface you are using:

- If you are using the graphical user interface, the Customize File System Layout option displays the dialog box shown in Figure 6–11.

Figure 6–11: Custom File System Layout Dialog Box

```
┌─────────────────────────────────────────────────────────────────────┐
│ ◉ Custom File System Layout ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒     回 │
├─────────────────────────────────────────────────────────────────────┤
│  File  Edit                                                    Help   │
│                                                                       │
│                      For each file system, select the                 │
│                      disk, partition on that disk, and                │
│                      file system type.                                │
│                                                                       │
│   ┌─ File System Layout ──────────────────────┐  ┌─ LSM Options ───┐  │
│                                                                       │
│               Use LSM:  Yes ▭                                         │
│                                                          Private      │
│            Disk         Partition       Type     Disk    Region       │
│                                                                       │
│    root  dsk1    ▭   a (128 MB)     AdvFS ▭    dsk1  d (2 MB) ▭       │
│                                                                       │
│    /usr  dsk1    ▭   g (700 MB) ▭   AdvFS ▭    dsk2  d (2 MB) ▭       │
│                                                                       │
│    /var  dsk2    ▭   h (981 MB) ▭   UFS   ▭                           │
│                                                                       │
│    swap1 dsk1    ▭   b (196 MB) ▭                                     │
│                                                                       │
│    swap2 dsk2    ▭   b (196 MB) ▭                                     │
│                                                                       │
│          │ Identify Disk... │  │ Edit Partitions... │                 │
│                                                                       │
│   └────────────────────────────────────────────┘  └─────────────────┘│
│                                                                       │
│   ┌───────────────────────────────────────────────────────────────┐  │
│   │                                                                 │  │
│   └───────────────────────────────────────────────────────────────┘  │
│                                                                       │
│                    │ < Back │   │ Next > │                            │
└─────────────────────────────────────────────────────────────────────┘
```

The Custom option lets you configure your disks and file systems any way you choose.

The a partition of the disk that contains the / (root) file system must be at least 128 MB in size or you will not be able to continue the installation.

For an idea of the recommended disk partition sizes for a single disk installation, see Table 6–7, which shows the recommended partition table for a default file system layout depending upon disk capacity.

- The disk selection screens of the text-based interface are similar to those shown in Example 6–4. The interface provides some guidelines for selecting partitions that are large enough to hold each file system. In this example, the user chose to install into LSM volumes, hence the 2 MB d partition to hold the LSM private region.

Example 6–4: Customized Disk Selection Using the Text-Based Interface

```
Select the dsk0 partition where the LSM private region
will reside. This partition must be larger than 2 MB in
order to accommodate the LSM configuration for this disk.

                        Start       End
     Partition   Size    Block      Block    Overlaps
1)       b       128MB   262144    524287    c
2)       d       2.0MB   524288    528383    c
3)       e       372MB   528384   1289621    c g
4)       f       372MB  1289622   2050859    c g
5)       g       743MB   528384   2050859    c e f

Enter your choice: 2

Select the dsk0 partition where the /usr file system
will reside. This partition must be larger than 269 MB in
order to fit the software that you have selected.  However,
a size of 700 MB or greater is recommended to allow for
additional layered software and future upgrade
considerations.
                        Start       End
     Partition   Size    Block      Block    Overlaps
1)       b       128MB   262144    524287    c
2)       e       372MB   528384   1289621    c g
3)       f       372MB  1289622   2050859    c g
4)       g       743MB   528384   2050859    c e f

Enter your choice: g

Select the file system type for the /usr file system.

1) UFS -- UNIX File System
2) AdvFS -- Advanced File System

Enter your choice: 2
```

Continue making disk and disk partition selections until all file systems and swap areas are assigned.

When you have made your decisions for the customized file system layout, the Full Installation continues as described in Section 6.15.

6.14.3 Partitioning Disks for a Custom File System Layout

Both user interfaces provide access to disk configuration tools if you need to repartition a disk to accommodate a customized file system layout:

- The Disk Configuration application, `diskconfig`, is invoked directly from the graphical user interface by clicking on the Edit Partitions... button on the Custom File System Layout dialog box. You cannot change the file system type from the Disk Configuration application. This feature is usually available when the application is invoked independent from an installation. Any changes you make to the existing disk label are not written until the actual installation process starts.

  After making your changes and exiting the Disk Configuration application, resume with the Full Installation tasks (all of your previous selections are intact).

- The `disklabel` command is accessed from the text-based interface by pressing Ctrl/c at any prompt to bring the system back to a UNIX shell. After making disk changes, restart the Full Installation. Any installation choices you have made up to this point are lost. Disk partition changes take effect immediately even if the installation is canceled. These changes may destroy existing data on the disk.

Because disk partitioning is considered a task that only experienced users should attempt, the Disk Configuration application, tasks that can be performed from the UNIX shell, and how to use the `disklabel` command are documented in the *Installation Guide -- Advanced Topics*.

6.14.4 Should I Install into LSM Volumes?

Whether you choose the default file system layout with one disk or decide to customize the file system layout on more than one disk, you have to decide whether or not to install into LSM volumes.

By selecting the LSM option, LSM automatically is configured and the `/`, `/usr`, and `/var` file systems and swap areas are directly configured within LSM volumes instead of disk partitions. LSM is an integrated, host-based disk storage management tool that protects against data loss, improves disk input/output performance, and customizes the disk configuration. LSM builds virtual disks, called volumes, on top of UNIX system disks. A volume is a special device that contains data used by file systems, databases, or other applications. LSM transparently places a volume between a physical disk and an application, which then operates on the volume rather than on the physical disk. The Full Installation automatically installs the software subsets required by LSM. Section 4.1.3 provides an overview of LSM features if you need more information to make the decision to use it. You need a separate license to use the mirroring and striping features of LSM. Section 6.14.4.1 contains information about selecting a partition to use for the LSM private region.

Installing into LSM volumes is not typical nor required during a Full Installation. But, if you have previous experience using this feature, it is

offered as an option now to eliminate the need to install LSM as a separate task.

_____ **Note** _____

Section 6.14.4.2 contains information about the special processing done by a Full Installation on a system that previously was configured to use LSM.

_____

6.14.4.1 Selecting a Partition for the LSM Private Region

If LSM is selected, you are required to select a private region partition for each disk being installed. LSM uses these private regions to hold configuration information for the entire system. Multiple private regions on multiple disks provide backup functionality in the unlikely event of a disk failure. The LSM private region requires 2 MB of disk space. As such, the partitions for the LSM private region need to be at least 2 MB in size. Partitions can be larger, but the excess space will not be available for any other use. The recommended disk partition layout provided by the Full Installation interface includes a 2 MB d partition on all disks. This partition should be used for the LSM private region whenever possible.

6.14.4.2 Special Processing for Systems Previously Configured with LSM

If you decide to install and configure LSM on a system with an existing LSM configuration, a clean up procedure prepares the system for the new LSM selections. This procedure removes LSM from the following partitions so that your Full Installation selections can be applied:

- Any sliced disk or simple disk partitions that have been selected for the new file systems (/, usr, var, /usr/i18n, or swap space).

- Any sliced disk or simple disk partitions that overlap those that were selected for the new file systems.

- Any sliced disk or simple disk partition that contains LSM information with one or more of the standard names that the Full Installation procedure will use to create the new LSM configuration. Table 6–8 lists the standard LSM names.

Table 6–8: LSM Standard Names

LSM Component	Standard Names
disk	root01, usr01, var01, swap01, sswap01, i18n01
volume	rootvol, usrvol, varvol, swapvol, sswapvol, i18nvol

Table 6–8: LSM Standard Names (cont.)

LSM Component	Standard Names
plex	rootvol-01, usrvol-01, varvol-01, swapvol-01, sswapvol-01, i18nvol-01
subdisk	root01-01, usr01-01, var01-01, swap01-01, sswap01-01, i18n01-01

This clean up procedure preserves all information (volumes, private regions, disks, and so on) from the existing LSM configuration that is not overwritten by your Full Installation selections. All existing LSM information that is not identified in the four LSM components listed in Table 6–8 will be preserved. This cleanup procedure is applied to any LSM partitions, even if you are installing to a different disk than your current boot disk.

If, for any reason, a component cannot be removed, the Full Installation exits to single user mode with an error message. From this point, various commands can be used to interrogate the existing LSM configuration and manually remove the source of the problem so that the installation can be restarted. See Section G.1.1.1 for more information about the commands that can be used to interrogate the existing LSM configuration and how to manually remove the source of the problem.

6.14.5 Preserving Data on Previously Used Disks

When you are installing the operating system onto a single disk and you want to preserve data on an existing partition, choose the Customize File System Layout option so that the existing partition sizes and offsets will not be changed.

By choosing the custom option, you can select the disk partitions on which the /, /usr, and /var file systems and swap areas will be installed. If the partitions you choose contain data or user files, the data is lost (overwritten) when the new file systems are built. Selecting a partition for one of these file systems that overlaps the partitions containing the data to be preserved has the same effect. Also, modifying the partition information in the disk label in such a way that the partitions containing data have their size and offset modified causes the data to be lost. However, if the partitions containing the data are undisturbed, their contents are preserved.

Assuming that the partitions to be preserved were undisturbed during the installation, the data in them can be used on the newly-installed system. If the partition contained a file system, it can be mounted and accessed again. See mount(8) for more information about mounting file systems.

_____ **Note** _____

The Full Installation procedure does not update the `/etc/fstab`
file with the partitions that contain user data or user file systems.
In order to mount these partitions to make the data available to
users, you manually add the entries for partitions with preserved
data to the new `/etc/fstab` file after the Full Installation is
complete.

_____

6.15 Step 5: Verify Your Selections

Except for the system date and time, your system has not been changed
in any way unless you have used the Disk Configuration application or
`disklabel` command to reconfigure disk partitions. This is the last chance
you have to verify your disk and software selections. If you are using the
graphical user interface, the Installation Summary dialog box shown in
Figure 6–12 is displayed after you make your disk and file system layout
selections. The summary data shown is based on a custom file system layout.
You can change any of the information directly from this dialog box. When
you are satisfied with all your selections, click on Finish. You will have
another opportunity to confirm the start of the installation.

If you are using the text-based interface, you are asked to confirm the file
system layout. Enter the word `history` to redisplay your entries and
change them.

Figure 6–12: Installation Summary Dialog Box

## 6.16 Step 6: Final Confirmation

After verifying all of your selections, you have one more chance to confirm the start of the installation process:

- If you are using the graphical user interface, the confirmation dialog box shown in Figure 6–13 is displayed after you click on Finish in the Summary dialog box. To begin the installation, click on OK.

Figure 6–13: Ready to Begin Installation Dialog Box
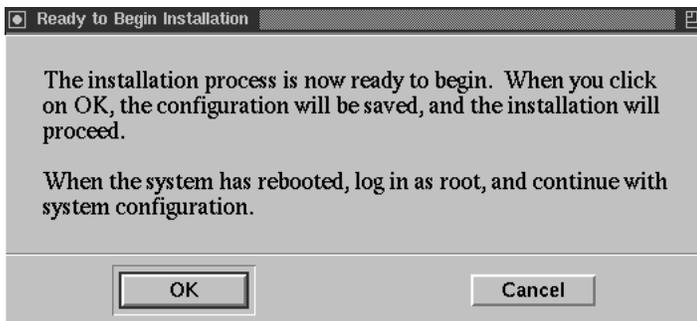
- If you are using the text-based interface, press the Return key at the following prompt to start the installation:

```
You have now answered all questions needed to install
Tru64 UNIX on this system.  Press Ctrl/c to cancel the
installation; or type "history" to modify your earlier
answers; or press RETURN to proceed with installation:
```

Section 6.16.1 describes how to cancel the installation.

6.16.1 Canceling and Restarting the Full Installation

If for any reason you do not want to start the installation at this point, you can cancel it:

- If you are using the graphical interface, click on Cancel in the Ready to Begin dialog box to return to the Installation Summary dialog box. Then, click on Quit in the Summary dialog box to put the system in single-user mode.

- If you are using the text-based interface, press Ctrl/c to put the system in single-user mode.

To restart the Full Installation setup process from single-user mode regardless of the interface you were using, enter the following commands:

```
# cd /
# restart
```

If your system has graphics capabilities but you prefer to restart the installation setup process in the text-based interface, enter the following commands:

```
# cd /
# restart nogui
```

6.17 What Happens Next?

After you click on OK in the Ready to Begin dialog box or press the Return key in the text-based interface, the Full Installation process starts making changes to your system. First, file systems are created and software is loaded followed by a system reboot and software configuration phase.

The user interaction at this point in the installation process is:

- Enter the boot commands that are displayed on the screen (Section 6.17.2) to reboot the system.

- Enter host- or site–specific information or a root password if you have not already done so after the software subsets are loaded and the system reboots. See Section 6.7 if you need help entering this information.

- Insert the CD-ROM labeled *Associated Products Volume 1* just before the software configuration phase to load WLS software if you selected support for additional languages.

6.17.1 File System Creation and Software Subset Load Phase

When the actual installation begins, the /, /usr, /var, and /usr/i18n file systems and swap areas are created on the disks and partitions you selected. The software subset load phase follows file system creation. A progress bar shows the percent complete of each phase to give you an indication of how far along the process is.

If you are using the text-based interface, messages similar to the following are displayed:

```
Continuing installation...

Applying the selected disklabel on device dsk0

Creating the root file system on device dsk0a

Creating the usr file system on device dsk0g

Creating the var area in the usr file system

Creating the swap1 file system on device dsk0b

The installation procedure will now load a total of 31 software subsets
on your disk partitions. This total includes the following products:

        * 31 Base Operating System subsets

This process will take from 45 to 120 minutes to complete depending on
your distribution media and processor type.

LOADING THE BASE OPERATING SYSTEM SOFTWARE SUBSETS
```

_____ **Note** _____

> The Full Installation process does not use the default inode
> density when creating UFS file systems for the /, /usr, and /var
> file systems. A lower density value is used to maximize available
> usable file system space.

_____

6.17.2 System Reboot Phase

The boot commands required to boot from the newly created system disk are
displayed on the screen. At the console mode prompt (>>>), enter the boot
command sequence shown on your screen. _Do not_ enter the boot variables
that are shown in Example 6–5.

Example 6–5: Sample Boot Command Sequence

```
Issue the following console commands to set your default bootpath
variable and to boot your system disk to multiuser:

        >>> set boot_osflags A
        >>> set bootdef_dev DKA0
        >>> boot

syncing disks... done
CPU 0: Halting... (transferring to monitor)

?05 HLT INSTR
  PC= FFFFFC00.0044CA90 PSL= 00000000.00000005
```

Write down your system's boot commands here for future reference:

```
>>>
>>>
>>>
```

Software configuration begins after the system boots, which is followed by
the kernel build procedure.

6.17.3 Software Configuration Phase

Software configuration occurs automatically after your system reboots from
the system disk and refers to the process of tailoring the software subsets,
setting the host name, root password, and time zone, system tuning, and
building a tailored kernel for use by the operating system and by your
hardware.

If you did not provide certain essential host- and site-specific information
(such as a root password, your system's host name, the date and time, and

location and time zone) earlier in the installation procedure, you will be prompted to enter that information now.

If you chose to install Worldwide Language Support (WLS) software, and you are installing from CD-ROM, you will see the dialog box shown in Figure 6–14 . Remove the CD-ROM labeled *Operating System Volume 1* from the drive and insert the CD-ROM labeled *Associated Products Volume 1*, which contains the WLS software.

If, for any reason, you do not have the second CD-ROM available, you can skip WLS installation at this time, and install it later using the `wwinstall` script. The *Installation Guide -- Advanced Topics* provides instructions for running the `wwinstall` script.

_____ **Note** _____

If you are performing the WLS installation from a RIS server, you are not prompted at all because the WLS software subsets are already available in the RIS area to which your system is registered. Furthermore, the WLS subsets were installed onto the system before the system rebooted.

_____

Figure 6–14: Software Installation Dialog Box
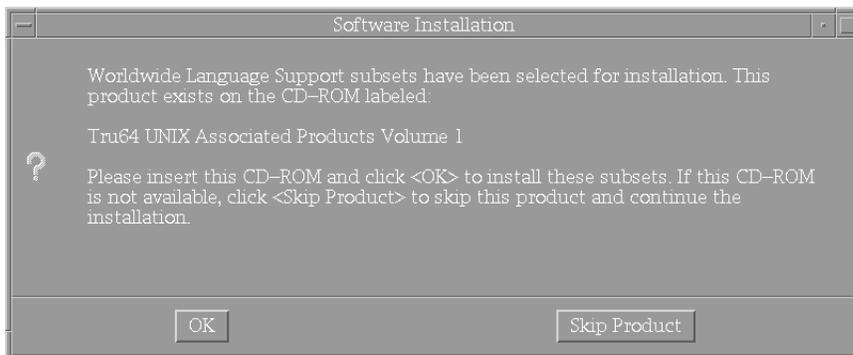
If you chose the option to select optional kernel components during the Full Installation setup, go to Section 6.18 to select kernel options.

6.18 Optional Step 7: Select Kernel Components

If you chose the option to install mandatory kernel components or all kernel components during the Full Installation setup, the kernel is built automatically with the required kernel components for your system configuration. After the kernel build, continue with Section 6.19, which shows you how to log in to your system for the first time. If you want to

build a kernel with optional components later, see `doconfig`(8) for more
information.

If you chose the option to customize kernel component selection during the
Full Installation setup, a Kernel Option Selection menu is displayed after
the system reboots.

The kernel components you see listed on the Kernel Option Selection
menu depend on the software subsets that were installed. The installation
procedure gives you the option to include or exclude the use of these
components in the kernel. If you need to install a kernel component after
Full Installation is complete, use the `doconfig`(8) command.

If you need a description of any kernel component, use the `Help` option to
display an online description.

The Kernel Option Selection menu is similar to the following:

```
    Kernel Option Selection
---------------------------------------------------------------
      1         System V Devices
      2         NTP V3 Kernel Phase Lock Loop (NTP_TIME)
      3         Kernel Breakpoint Debugger (KDEBUG)
      4         Packetfilter driver (PACKETFILTER)
      5         Point-to-Point Protocol (PPP)
      6         STREAMS pckt module (PCKT)
      7         Data Link Bridge (DLPI V2.0 Service Class 1)
      8         X/Open Transport Interface (XTISO, TIMOD, TIRDWR)
      9         ISO 9660 Compact Disc File System (CDFS)
      10        Audit Subsystem
      11        Alpha CPU performance/profiler (/dev/pfcntr)
      12        ACL Subsystem
      13        All of the above
      14        None of the above
      15        Help
      16        Display all options again
---------------------------------------------------------------

Enter your choices.

Choices (for example, 1 2 4-6) [14]: 5 9
```

Note

The `ISO 9660 Compact Disc File System` (CDFS) is a
dynamically loadable kernel module. You can build it into the
kernel by selecting it now, otherwise, it will be loaded on an as
needed basis.

After entering your choice of kernel components, the system verifies the list
of options you selected and asks you to confirm your choice. For example:

```
You selected the following kernel options:
```

```
         Point-to-Point Protocol (PPP)
         ISO 9660 Compact Disc File System (CDFS)

Is that correct? (y/n) [y]:
```

- If the displayed kernel components are the ones you want, enter `y` or press the Return key to accept the default response.

- If the displayed kernel components are not the ones you want, enter `n` at the prompt. The Kernel Option Selection menu is displayed for you to select kernel components again.

6.18.1 Optional Step: Edit the Kernel File if Necessary

After you select and confirm your kernel options, you have the option to edit the kernel file. The kernel configuration file is a text file that defines the components built into the kernel; it is located in the `/usr/sys/conf/`*SYSTEM_NAME* file.

Caution

Although you are given the option to edit this file, it is not recommended.

The *Command and Shell User's Guide* contains a tutorial that teaches you how to use the `ed` text editor (as well as the `vi` text editor).

You will see a prompt similar to the following:

```
Do you want to edit the configuration file? (y/n) [n]:
```

If you enter **n** or press the Return key (to enter the default response) to skip the edit of the configuration file, the kernel build process begins as shown in Section 6.18.2.

If you enter **y** to edit the file, the following message is displayed:

```
Using 'ed' to edit the configuration file.  Press return
when ready, or type 'quit' to skip the editing session:
```

Enter the word `quit` if you want to skip the editing session and start the kernel build process or press the Return key if you want to edit the file. The kernel build begins when you save and quit the editing session.

6.18.2 The Kernel Build Phase

When the subsets are configured, the installation procedure invokes the `doconfig` utility to automatically make the device special files needed by the hardware and build the kernel for your system. Messages similar to the following are displayed:

```
The system will now automatically build a kernel
and then reboot. This will take approximately 15
minutes, depending on the processor type.
When  the login prompt appears after the system
has rebooted, use 'root' as the  login name and
the SUPERUSER  password that was entered during
this procedure, to log into the system.


*** PERFORMING KERNEL BUILD ***
Working....Fri Aug 24 15:45:24 EST 2001
Working....Fri Aug 24 15:47:24 EST 2001
Working....Fri Aug 24 15:49:25 EST 2001
Working....Fri Aug 24 15:51:26 EST 2001
```

6.18.3 What to Do If Your System Boots to Single-User Mode

Your system may boot to single-user mode if the `boot_osflags` variable
was not set as described in Section 6.17.2. To bring the system to multiuser
mode, press Ctrl/d at the root prompt (`#`). You are prompted to enter the run
level. Four run levels are available:

- `0` specifies the halt state

- `S` or `s` specifies single-user mode

- `2` specifies multiuser mode without network services

- `3` specifies multiuser mode with network services

Use the `init` command to boot the system to multiuser mode:

init 3

6.19 Step 8: Log in to the System as the User root

After the final system reboot, the next step is to log in to the newly installed
system as the user `root`. On newly installed systems, the only user name
recognized by the system is `root`. When prompted, enter the root password
you set earlier.

6.20 Step 9: Review Installation Log Files

Before you configure the system for general use, it is recommended that you
review the installation log files to make sure the software was installed and
configured correctly. If any installation errors occurred, they will be listed in
the log files, which are described in Appendix F.

6.21 Full Installation Is Done

After reviewing the installation log files, the Full Installation is done. Go to
Chapter 7, which describes the SysMan (System Management) tools that
you use to configure the system for general use by yourself and other users.

7

Configuring the System for General Use

This chapter describes which system management applications to use to configure and set up services on a system after a Full Installation. The following topics are discussed:

- Initial system configuration and setup with the graphical System Setup application (Section 7.1)

- Post configuration system setup (Section 7.2)

- Initial system configuration and setup with the text-based interface to the System Setup application if your system does not have graphics capabilities (Section 7.3)

- An overview of additional system management and monitoring tools (Section 7.4)

- Pointers to system administration and configuration documentation (Section 7.5)

- Reconstructing the /etc/fdmns directory if your system was previously installed with the operating system and was using AdvFS as a file system type (Section 7.6)

- Enabling realtime preemption after the installation (Section 7.7)

- Enabling unattended reboots on multiprocessor systems (Section 7.8)

- Enabling automatic system reboots on single systems (Section 7.9)

7.1 Graphical User Interface: The System Setup Application

To enable communication between a newly installed system and other systems and users, software licenses, network services, printers, and mail delivery must be configured. Initial system configuration tasks are performed from the Quick Setup application or the Custom Setup application (in the previous releases, this application was called the Checklist).

_____ **Note** _____

Cluster configuration is described in *Cluster Administration*.

_____

When you log in to a newly-installed system as the user `root` for the first time, and your system has graphics capabilities, the System Setup window shown in Figure 7–1 is displayed:

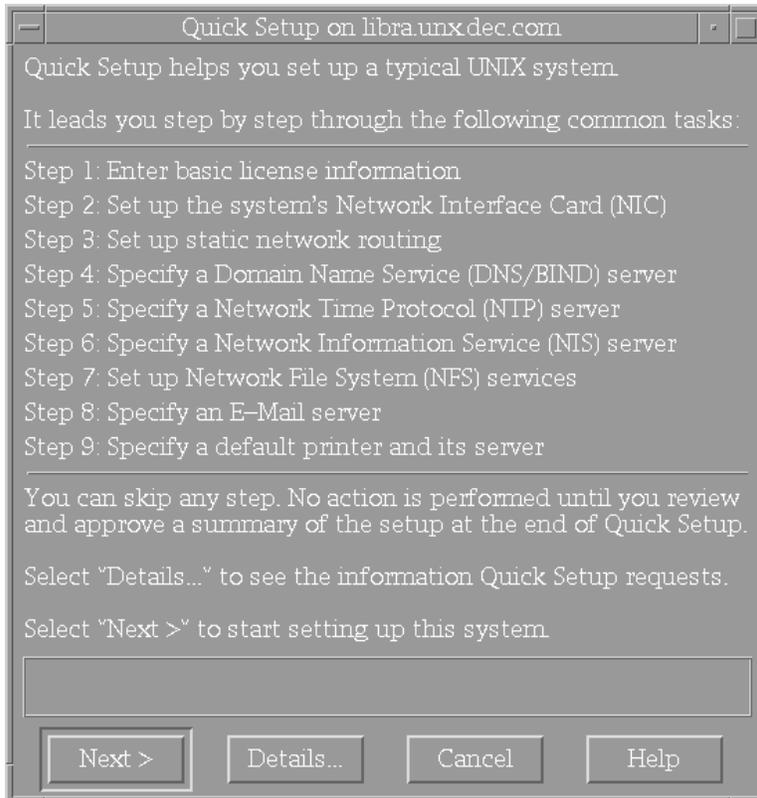**Figure 7–1: The Tru64 UNIX System Setup Window**
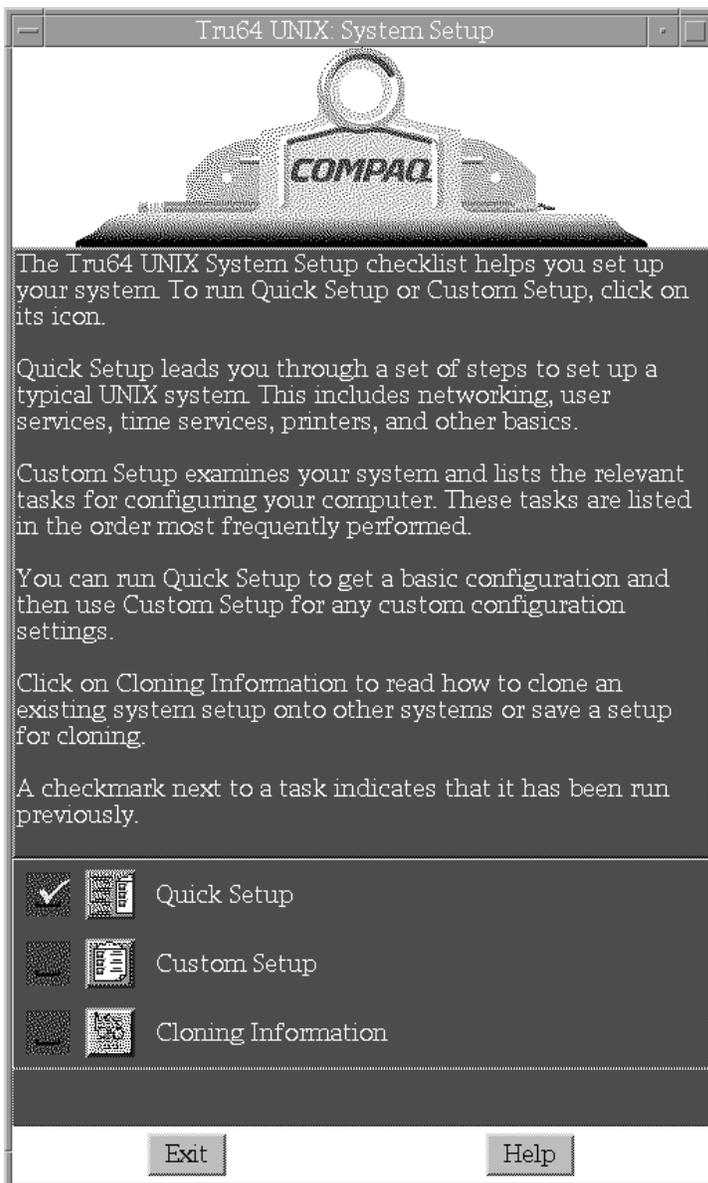
The System Setup window is the launch point for the following configuration tools:

- Quick Setup, which is a way to quickly configure a system with basic services, is described in Section 7.1.1.

- Custom Setup, which is a launch point for more advanced configuration tasks, is described in Section 7.1.2.

- Cloning Information provides basic information about Configuration Cloning. Configuration Cloning duplicates the configuration from an already configured system onto one or more systems to eliminate the need to perform configuration tasks at each system. Configuration Cloning procedures are documented in the *Installation Guide -- Advanced Topics*.

7.1.1 The Quick Setup Application

If your system does not use an asynchronous transfer mode (ATM) adapter for network connections, you quickly can set up your system for general use by using the Quick Setup application. As shown in Figure 7–2, Quick Setup requires you to answer a few simple questions about basic system configuration items. Quick Setup is a task–oriented application that leads you step by step through basic system configuration tasks. If your system configuration needs are not complicated, using Quick Setup is a way to quickly get your system up and running on the network. Quick Setup also has online help if you need assistance. If you need to configure additional items, you have the option to use the Custom Setup application later.

Figure 7–2: The Quick Setup Application

Quick Setup on libra.unx.dec.com

Quick Setup helps you set up a typical UNIX system.

It leads you step by step through the following common tasks:

Step 1: Enter basic license information
Step 2: Set up the system's Network Interface Card (NIC)
Step 3: Set up static network routing
Step 4: Specify a Domain Name Service (DNS/BIND) server
Step 5: Specify a Network Time Protocol (NTP) server
Step 6: Specify a Network Information Service (NIS) server
Step 7: Set up Network File System (NFS) services
Step 8: Specify an E–Mail server
Step 9: Specify a default printer and its server

You can skip any step. No action is performed until you review
and approve a summary of the setup at the end of Quick Setup.

Select "Details..." to see the information Quick Setup requests.

Select "Next >" to start setting up this system.

[Next >]   [Details...]   [Cancel]   [Help]

7.1.2 The Custom Setup Application

The Custom Setup application shown in Figure 7–3 is the launch point for
additional SysMan configuration applications. Use Custom Setup if your
system requires additional configuration or if you want to perform additional
system administration tasks such as adding users or groups. In previous
releases of the operating system, the Custom Setup application was known
as the Checklist.

Figure 7–3: The Custom Setup Application
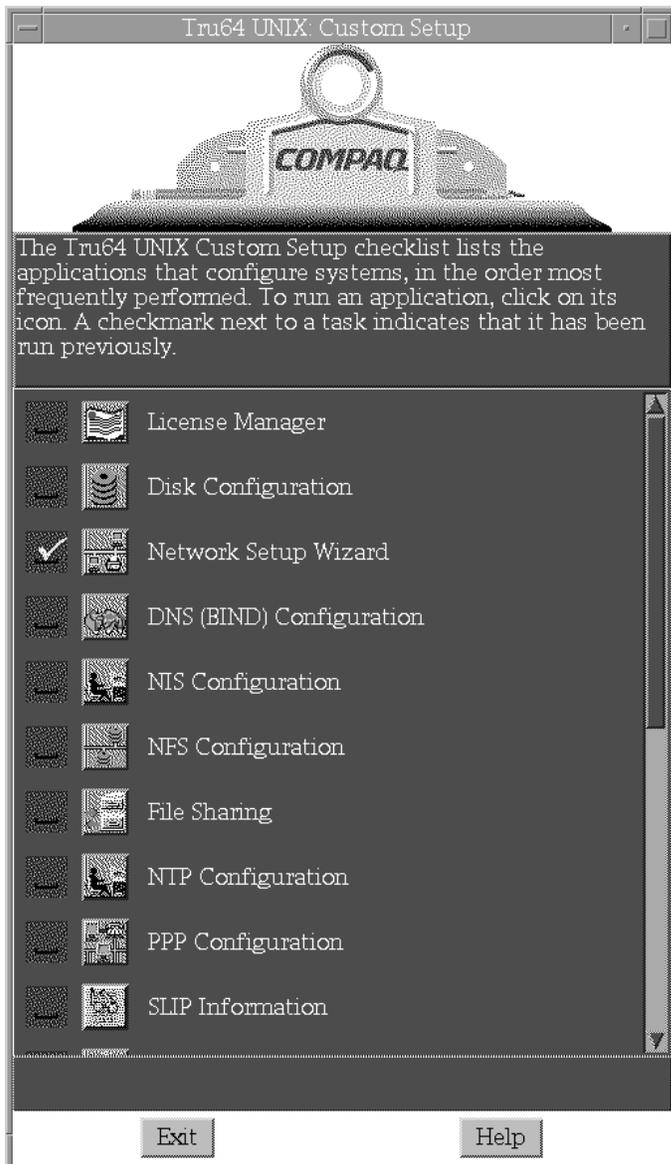
The applications on the Custom Setup application are listed in the
approximate order in which it is recommended they be run. For instance,
if you plan to connect or add the system to a network, the first task you
should perform is to set up the network by using the Network Configuration
application followed by the DNS (BIND) Configuration application, NIS -
Network Information Service, and the NFS Configuration application. If

you do not want to set up networking, the first task you should perform is to load and register your Product Authorization Keys (PAKs) by using the License Manager application.

After you open and exit an application on the list, a check mark appears in the box to the left of the icon. The date and time you last opened an application is shown under the application name. The time stamp does not mean that the application was executed; it only indicates that the application was opened. If an application is *dimmed*, it cannot be opened.

Online help is available for each application by clicking on the Help button or Help menu in the application. The online help describes the tasks that can be performed from the application and provides a description of all fields, buttons, and menus in each window or dialog box.

7.2 Invoking the System Setup Application After the Initial Configuration

Use one of the following methods to invoke the System Setup application after the initial system configuration:

- To start the Tru64 UNIX: System Setup application from the command line, as superuser or `root`, enter the following command:

  ```
  # /usr/sbin/checklist
  ```

  Either a graphical or text-based interface is displayed depending upon the type of hardware you have.

- To start the Tru64 UNIX: System Setup application from the Common Desktop Environment (CDE) front panel:

  1. Click on the application manager icon on the CDE front panel. The application manager icon looks like an open drawer of a typical filing cabinet.

  2. Double click on the System_Admin application group icon.

  3. Double click on the Tru64 UNIX: System Setup application icon.

7.3 Text-Based Interface: The System Setup Application

When you log in to a newly-installed system as the user `root` for the first time, and your system does not have graphics capabilities, the System Setup window shown in Example 7–1 is displayed.

Example 7–1: The Text-Based System Setup Application

```
                    Tru64 UNIX: System Setup

Tru64 UNIX System Setup helps you set up your system.
To run Quick Setup, press return, or enter one of the
numbered choices and press return.

Quick Setup leads you through a set of steps to set up
a typical UNIX system. This includes networking, user services,
time services, printers, and other basics.

Custom Setup examines your system and lists the relevant tasks
for configuring your computer. These tasks are listed in the
order most frequently performed.

You can run Quick Setup to get a basic configuration and then
use Custom Setup for any custom configuration settings.

Click on Cloning Information to read how to clone an existing
system setup onto other systems or save a setup for cloning.

1) Quick Setup
2) Custom Setup
3) Cloning Information
4) Exit

Please enter your selection [1]:
```

Refer to Section 7.1 for a description of the choices on this menu.

7.4 System Management and Monitoring

This section provides overview information about the SysMan (System Management) tools that are available to monitor and manage a system after it is installed and configured:

- The **SysMan Menu** provides a menu of system management tasks arranged in a tree-like hierarchy of general categories that cascade down to actual tasks. You can expand or contract a branch to show the subbranches and tasks within a main branch. Selecting a task opens a dialog box for performing the task. There are main branches for Accounts, Mail, Monitoring and Tuning, Networking, Printing, Security, Hardware, Software, File Systems, Storage, Support and Services, and General Tasks. To start the SysMan Menu from the command line, enter the following:

  # **/usr/sbin/sysman &**

- The **SysMan Station** provides a high profile view and status of a system's physical and logical objects. It is intended to be the central point from which to manage a system. SysMan Station launches other SysMan tools to perform system management tasks. The SysMan Station lets you monitor a system, group of systems, or an entire cluster

and administer system resources. It can run on a standard Java capable display (such as a UNIX workstation) or within a PC's browser, or it can be downloaded and run directly on a PC. To start the SysMan Station from a command prompt, enter the following command:

```
# /usr/sbin/sysman -station &
```

* The **Event Manager** provides a single point of focus for the multiple channels through which system components report event and status information by combining events from all sources into a single event stream. You can either monitor the combined stream in realtime or view historical events retrieved from storage. EVM's viewing facilities include a graphical event viewer, which is integrated with the SysMan application suite, and a full set of command line utilities, which allow events to be filtered, sorted, and formatted in a variety of ways. Enter the following command to start the Event Manager from the command line:

```
# /usr/sbin/sysman event_viewer &
```

* **Compaq Insight Manager** is a web based management utility that enables you to look across a heterogeneous computing services environment and access information about any entity connected to the network. Entities are referred to as devices and can be computer systems, networked printers, or network components such as routers. You can obtain information about the configuration of systems and their components or peripherals and in some cases, perform certain administrative tasks. For example, systems can be configured to enable remote booting and Insight Manager enables you to boot remote systems from their own local system. Insight Manager can facilitate other administrative tasks such as asset management, asset security, workload management, and event management.

  You can activate these Web browsing features from a dedicated HTTP port or from the Compaq Insight Manager CIM32 or CIMXE Management Consoles running on Compaq NT servers. Compaq Manager Agents for Tru64 UNIX includes SNMP based subagents and WBEM capabilities to present SNMP data in a format viewable by a Web browser. It provides a rich view of the data using HTML 2.0 and JavaScript in the form of Web pages.

  Compaq Management Agents for Tru64 UNIX and other systems are also distributed on the Compaq Management CD, which can be obtained by subscription. For more information, see the following web site:

  ```
  http://www.compaq.com/products/servers/SmartStart/ss_subscription.html
  ```

Section 7.5 provides pointers to system administration and configuration documents.

7.5 System Administration and Configuration Documents

If you need more information about configuring, administering, or monitoring your system, read the relevant sections of these manuals in the documentation set:

- The *Network Administration: Connections* and *Network Administration: Services* manuals provides information about configuring, administering, and troubleshooting a network.

- *System Administration* provides information about system administration tasks such as configuring printers, file system management, adding user accounts, backing up and restoring files, shutting down the system, event management, using the Insight Manager, SysMan invocation, and other topics pertaining to system administration.

- TruCluster Server *Cluster Installation* describes cluster-specific installation tasks.

- TruCluster Server *Cluster Administration* describes how to administer and manage a cluster.

- *Software License Management* provides information about loading and registering license PAKs.

- *AdvFS Administration* provides information about Advanced File System (AdvFS) administration.

- *Logical Storage Manager* provides information about administering the Logical Storage Manager (LSM).

- *System Configuration and Tuning* provides information about tuning the kernel to achieve optimum system performance.

To view the documentation set on line on a system that is capable of graphical display, mount the documentation CD-ROM as described in Chapter 8, then use Netscape or Acrobat Reader to view the manuals. If your system does not have online viewing capabilities, contact your support representative to order a printed copy of the documentation set.

7.6 Reconstructing the /etc/fdmns Directory

If your system was running a previous version of the operating system and was using the Advanced File System (AdvFS) type, the Full Installation overwrote the `/etc/fdmns` directory, which contained important AdvFS configuration data.

To reconstruct this directory, you must run the `advscan` utility with the `-r` flag for each disk on the system. Because of the device naming conventions that were introduced in Version 5.0, simply restoring the directory from

a backup copy is not sufficient. See *AdvFS Administration* for more information about using the `advscan` utility.

7.7 Enabling Realtime Preemption

The operating system kernel provides options to enhance the performance of realtime applications conforming to POSIX 1003.1b-1993 (formerly 1003.4 Draft 14). The realtime kernel makes it possible for the operating system to guarantee that an application has access to resources in a timely and predictable manner.

The realtime kernel that supports kernel preemption was previously an option during an installation. Now, the POSIX 1003.lb portions are included in the kernel automatically and a separate kernel is not needed. Preemption capabilities are disabled by default but can be selected and enabled when the kernel is configured and built.

To enable realtime preemption capabilities, follow this procedure to modify the `/etc/sysconfigtab` file:

1. Use the text editor of your choice to add the following lines to a temporary file (such as `/tmp/stanza`):

   generic:
   rt_preempt_opt=1

2. Use the `sysconfigdb` command to merge the temporary file with the existing `/etc/sysconfigtab` file:

   # **sysconfigdb -m -t /etc/sysconfigtab -f /tmp/stanza generic**

   _____ **Note** _____

   Never use a text editor to directly modify the `/etc/sysconfigtab` file.

   _____

7.8 Enabling Unattended Reboots on Multiprocessor Systems

To reduce system down time due to a processor failure on a multiprocessor system, an unattended reboot feature is available for multiprocessor platforms.

To enable unattended reboot functionality, log in as the user `root` and set the following console variables:

1.

   # **consvar -s boot_osflags a**

2.

    # **consvar -s boot_reset off**

3.

    # **consvar -s auto_action restart**

4.

    # **consvar -a**

When processor failures are detected on a multiprocessor platform, the
system marks the faulting processor as failed, and the entire system is
rebooted without any operator intervention. The faulting processor will
not be restarted when the reboot occurs. To restart the faulting processor,
corrective action must be taken. The system will not try to restart the failed
processor until the power has been recycled on the system or the console
init command is issued at the console prompt (>>>).

7.9 Enabling Automatic Reboot on Single Systems

If you want your system to automatically reboot after a processor or power
failure, shut down the system to console mode and set the following console
variable:

set auto_action restart

This console variable should be valid on most system types. If this variable
is not valid for your system type, refer to your hardware owner's guide for a
list of supported console environment variables.

8

Using Online Documentation

In addition to online help, which is already integrated into many applications, all other documentation associated with the operating system, including manuals and reference pages, can be viewed on line from the CD-ROM labeled *Documentation Volume 1*.

The following topics are discussed in this chapter:

- An overview of documentation file formats and online viewers (Section 8.1)

- Mounting the Documentation CD-ROM (Section 8.2)

- Using the Netscape Navigator application to view HTML versions of the online documentation set (Section 8.3)

- Netscape application integration (Section 8.4)

- Installing the Adobe Acrobat Reader application (Section 8.5)

- Using the Adobe Acrobat Reader application to view PDF versions of the documentation (Section 8.6)

- Copying the documentation set files to your system's hard disk (Section 8.7)

8.1 Documentation Formats and Online Viewers

The online documentation set is available in both Hypertext Markup Language (HTML) and Portable Document Format (PDF) versions. Two viewers are supported:

- You can use the Netscape Navigator application to view the HTML or PDF versions of the documentation. This version of the operating system is shipped with Netscape Communicator 4.75, which includes Netscape Navigator. The Netscape software subset is installed automatically if the installation process detects a graphics card on your system.

  After installing the operating system, you can invoke Netscape through the CDE front panel or from the command line in a terminal emulator window. Detailed online help for Netscape is available through the Help menu on the main window.

- You can use the Adobe Acrobat Reader application to view PDF versions of the documentation.

After installing the operating system, you can invoke Acrobat Reader either as a Netscape helper application or from the command line in a terminal emulator window. Detailed help for Acrobat Reader is available through the Help menu.

See the *Adobe Acrobat Reader Online Guide* for information about setting up Netscape Navigator to view PDF files. You can access this document from the Acrobat Reader Help menu.

8.2 Mounting the Documentation CD-ROM

The operating system documentation is shipped on the CD-ROM labeled *Documentation Volume 1*. Mount instructions also are included on the inside of the CD-ROM jacket.

Follow these steps to mount the CD-ROM so that you can view the online documentation set with Netscape Navigator or Acrobat Reader:

1. Log in as root or use the su command to gain root privileges.

2. Insert the CD-ROM into your system's CD-ROM drive.

3. Use the following command to mount the CD-ROM on /usr/share/doclib/online if you have only one CD-ROM attached to your system:

   ```
   # mount -r /dev/disk/cdrom0c /usr/share/doclib/online
   ```

   If you have more than one CD-ROM device, enter a command similar to the following to determine the CD-ROM devices connected to your system. Then, decide which CD-ROM device you want to use.

   ```
   # ls /dev/disk/cdrom*c
   /dev/disk/cdrom0c
   /dev/disk/cdrom1c
   ```

8.3 Viewing Online Documents with Netscape

Follow these steps to view the online documentation set with Netscape Navigator:

1. Mount the Documentation CD-ROM as described in Section 8.2.

2. Start Netscape Navigator by using one of the following methods:

   • From the CDE desktop:

      a. Click on the arrow above the Text Editor icon on the CDE Front Panel to display the Personal Applications subpanel.

      b. Click on the Netscape icon.

- Enter the following command to start Netscape Navigator from the command line in the background:

  # **/usr/bin/X11/netscape &**

  See `netscape(1)` for more information.

3. Click on the Documentation link to go to the Documentation home page.

4. Documentation categories are listed in the frame down the left side of the page. Click on a category to display links to HTML and PDF versions of the individual books in that category.

Section 8.5 describes how to install Acrobat Reader. The *Adobe Acrobat Reader Online Guide*, available from the Acrobat Reader Help menu, provides information about setting up Netscape Navigator to view PDF files.

8.4 Netscape Application Integration

The following information is provided to help you when you use Netscape applications on this operating system:

- A sample resource defaults file for Netscape Communicator is located in the `/usr/doc/netscape/Netscape.ad` file. Comments within this file indicate possible settings for each resource. This file is provided for informational purposes and need not be installed.

- The file `/usr/bin/X11/netscape` is actually a shell script that performs the following actions:

  – Creates a Communicator user configuration directory if `$HOME/.netscape` does not already exist.

  – Copies the Navigator preferences file from `/usr/doc/netscape/default-netscape-preferences` to `$HOME/.netscape/preferences.js` if it does not already exist in the `$HOME` directory.

  – Sets the MOZILLA_HOME environment variable to point to the Communicator installation directory `/usr/lib/netscape`. The Communicator Java class files, nethelp files, plugins, registry, and others are all installed under this directory. See the `/usr/lib/netscape/README` file for more information on MOZILLA_HOME and other environment variables.

  – Invokes the `/usr/bin/X11/real-netscape` file, which is the actual Communicator binary.

  This information may be important to know if you should download newer copies of Navigator from other sources (for example, the Netscape web site) and install the files from those kits over the links in `$HOME/.netscape`. If you want to use the previous version, you need

to remove these files so that the /usr/bin/X11/netscape script is
able to recreate the symbolic links described previously that point to
the older versions of these files.

8.4.1 Mosaic-to-Netscape Bookmark Conversion

If Mosaic was your previous browser, you need to convert your
Mosaic hotlist files to equivalent Netscape Communicator bookmark
files. To accomplish this conversion, invoke the shell script
/usr/doc/netscape/hot-convert.sh with no arguments.

It is recommended that you define the Global Types File and Global Mailcap
File used by Netscape as follows:

- Global Types File: /usr/lib/netscape/mime.types
- Global Mailcap File: /usr/lib/netscape/mailcap

These files allow Netscape to invoke the proper helper applications for
viewing file types not directly viewable in Netscape. You can do this by
selecting Preferences... from the Netscape Options menu. Then select Helper
Applications and enter the correct values.

For more information about using Netscape, refer to the *Netscape Navigator
Online Handbook*, which is available by clicking on the link to Other
documentation on the home page.

8.5 Installing Acrobat Reader

The PDF versions of the online documents are best viewed by using Acrobat
Reader as a Netscape Navigator helper application. This section tells you
how to install Acrobat Reader on your system.

Note

Acrobat Reader requires 16 MB of free disk space. Use the df
command to ensure that the file system where you install Acrobat
Reader has sufficient space before beginning this installation.

Follow these steps to install Acrobat Reader:

1. Log in as root or use the su command to gain root privileges.

2. Mount the Documentation CD-ROM as described in Section 8.2.

3. Change to this directory:

   # **cd /usr/share/doclib/online/ACROREAD**

4. View the following file to find the name of the directory that contains the Tru64 UNIX version of Acrobat Reader:

   # **more 00README.TXT**

5. Change to the directory that contains the Tru64 UNIX version of Acrobat Reader:

   # **cd** *tru64_unix_directory*

6. View the following file for information about uncompressing the installation file and running the installation script:

   # **more 00README.TXT**

7. Follow the instructions in the 00README.TXT file to uncompress the installation file and run the installation script.

8. After you read the license agreement, accept the license terms and continue.

9. Select an installation directory for Acrobat Reader. The default is /usr/local/Acrobat3. If you accept this default and the directory does not exist, it is created automatically.

   The installation completes and you see the command line prompt. Section 8.6 describes how to start and use Acrobat Reader once it is installed.

The *Adobe Acrobat Reader Online Guide*, which is available from the Acrobat Reader Help menu, provides information about setting up Netscape Navigator to view PDF files.

8.6 Viewing Online Documents with Acrobat Reader

The PDF versions of the online documents are best viewed by using Acrobat Reader as a Netscape Navigator helper application. You can, however, view them directly with Acrobat Reader. You should review the 00README.TXT file in the ACRO_DUX and ACRO_SUP subdirectories under the /usr/share/doclib/online/DOCS directory. These files map file names to document names so that you can locate specific documents.

Follow these steps to view the online documentation set with Acrobat Reader:

1. Mount the documentation CD-ROM as described in Section 8.2.

2. Install Acrobat Reader as described in Section 8.5.

3. Run Acrobat Reader in the background:

   # **/usr/local/Acrobat3/bin/acroread &**

   See the *Adobe Acrobat Reader Online Guide*, which is available from the Help menu, for information on how to use Acrobat Reader.

4. Select Open... from the File menu to open the Open dialog box, where you can select a PDF file.

The PDF versions of the documents are in the `/usr/share/do-clib/online/DOCS` directory on the documentation CD-ROM.

- The `ACRO_DUX` subdirectory contains the base operating system documentation set.

- The `ACRO_SUP` subdirectory contains the supplementary documentation set.

The `00README.TXT` file in both subdirectories maps file names to document names so that you can locate specific documents. You cannot use Acrobat Reader to view text files. To view this file you might consider using the `more` command. For example:

```
# more /usr/share/doclib/online/DOCS/ACRO_DUX/00README.TXT
```

8.7 Copying Online Documentation to Disk

Instead of reading the online documentation set from the CD-ROM, you can copy the documentation files to a disk on your system. Copying the documentation files to a disk eliminates the need to keep the CD-ROM permanently mounted. The entire set of online documentation files consumes about 218 MB of disk space in the `/usr` file system.

Follow these procedures to copy the documentation files to a disk on your system. Use the same directories shown in the examples so you will not have to modify library bookshelf files.

1. Log in as `root` or use the `su` command to gain `root` privileges.

2. Insert the Documentation CD-ROM into the drive (the remainder of these instructions assume the CD-ROM device name is `/dev/disk/cdrom0c`).

3. Mount the CD-ROM on `/mnt`:

```
# mount -r /dev/disk/cdrom0c /mnt
```

4. Enter commands similar to the following to copy HTML and PDF versions of the documents from the CD-ROM to subdirectories in the `/usr/share/doclib/online/DOCS` directory. These instructions illustrate the process with the CD-ROM mounted on the `/mnt` directory.

_____ **Note** _____

The backslashes (\) in the following examples represent line continuation characters; do not enter them on the command line.

_____

- To copy HTML versions of the entire documentation set, enter the following commands:

```
# cd /mnt/DOCS/HTML
# tar cpf - . |        \
(cd /usr/share/doclib/online/DOCS/HTML;tar xvpf -)
```

  The documentation HTML files consume about 86 MB of disk space.

- To copy PDF versions of the base operating system documentation set, enter the following commands:

```
# cd /mnt/DOCS
# tar cpf - ./ACRO_DUX |      \
(cd /usr/share/doclib/online/DOCS/ACRO_DUX;tar xvpf -)
```

  The PDF files consume about 29 MB of disk space.

- To copy the PDF versions of the supplemental documentation set, enter the following commands:

```
# cd /mnt/DOCS
# tar cpf - ./ACRO_SUP |  \
(cd /usr/share/doclib/online/DOCS/ACRO_SUP;tar xvpf -)
```

  The supplemental documentation set PDF files consume about 8 MB of disk space.

5. Unmount the CD-ROM:

```
# cd /
# umount /mnt
```

Follow the instructions in Section 8.3 if you want to start Netscape Navigator to view HTML files or the instructions in Section 8.6 if you want to start Acrobat Reader to read PDF files.

9

Software Management

This chapter discusses the following topics:

- An overview of software management tools (Section 9.1)

- Using the SysMan Menu to perform software management tasks (Section 9.2)

- Determining software subset status (Section 9.3)

- Displaying a list of files within a software subset (Section 9.4)

- Removing software subsets from a single system (Section 9.5)

- Removing software subsets from a cluster (Section 9.6)

- Installing optional software subsets on a single system (Section 9.7)

- Installing optional software subsets on a cluster (Section 9.8)

- Rebuilding the kernel after installing kernel build environment software subsets (Section 9.9)

9.1 Software Management Overview

Optional operating system software subsets, worldwide language support (WLS) software subsets, and layered product software subsets can be installed or removed from a system after a Full or Update Installation.

Software subsets can be installed from any CD-ROM shipped with the operating system, a Remote Installation Services (RIS) server, a mounted disk or file system, or a third-party software CD-ROM.

This chapter describes the two software management tools that can be used to perform software management tasks: the SysMan Menu and the setld utility. Both tools provide the same features. The difference between the two is that setld is strictly a command line utility, while the SysMan Menu can be invoked and run in three environments: X, text-based, or the Internet.

This chapter focuses on the setld command line utility because the SysMan Menu software management tasks have an online help system, which is available if you need assistance.

9.2 Software Management from the SysMan Menu

The SysMan Menu is a menu of system management tasks, which is organized in a tree-like hierarchy with main branches of general functionality. Selecting a leaf invokes a task, which opens a dialog box for performing the task.

Depending on the capabilities of your display device, the SysMan Menu provides either a graphical or text-based interface. The SysMan Menu can be invoked from the command line or from the CDE Application Manager if your system is running the CDE desktop.

Invoke the SysMan Menu from the command line by entering the following command:

/usr/sbin/sysman &

From the SysMan Menu, expand the Software and Installation branches to view the software management tasks as shown in Figure 9–1.

_____ **Note** _____

The SysMan Menu is not supported for software load and delete operations on clusters. Use the `setld` utility to install or remove software subsets on a cluster.

_____

Figure 9–1: SysMan Menu: Expanded Software and Installation Branches
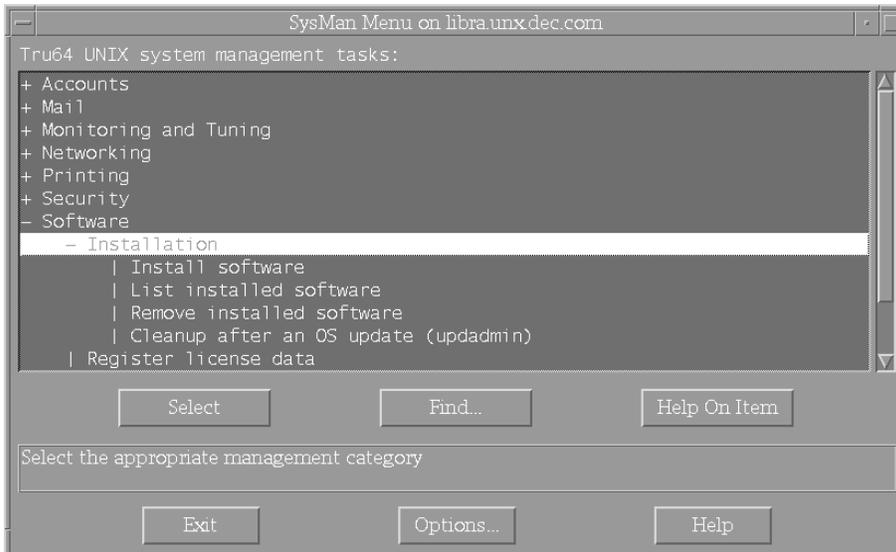
The following is a brief description of each software management task shown in Figure 9–1:

- Install software

  Installs additional optional software subsets after a Full or Update Installation of the operating system. Supported distribution media includes CD-ROM, RIS server, or mounted disk or file system.

- List installed software

  Lists the software subsets that are installed and displays a list of the system files contained within a particular software subset.

- Remove installed software

  Removes software already installed on the system. Dependencies between software subsets automatically are recognized and reported.

- Cleanup after an OS update

  Invokes the Update Administration Cleanup utility, which is used to remove the backup files created by an Update Installation. This utility is described in Section 3.10.

Each software management task has online help that is available by selecting `Help` from within the task. The online help describes the functions that can be performed as well as a detailed description of all windows, dialog boxes, and fields that require entries.

9.3 Determining Software Subset Status

Use the `setld -i` command to list the software subsets recognized by your system. Command output shows the state (or status) of each software subset.

Descriptions of the valid software subset states are located in the `setld`(8) reference page. A subset can be in any one of the following states: `not installed`, `deleting`, `pre-load failed`, `pre-load complete`, `load failed`, `load completed`, `post-load failed`, `post-load completed`, `c-install failed`, `installed`, `member load failed`, `member loaded`, or `unknown`.

Output from the `setld -i` command is similar to the following:

```
# /usr/sbin/setld -i
Subset          Status        Description
------          ------        -----------
OSFACCT520      not installed  System Accounting Utilities (System Administration)
OSFADVFS520     installed      AdvFS Commands (System Administration)
OSFADVFSBIN520  installed      AdvFS Kernel Modules (Kernel Build Environment)
   .
   .
   .
OSFXSYSMAN520   installed      Graphical Base System Management Utilities
                                   (System Administration)
OSFXVFB520      not installed  Virtual X Frame Buffer (Windows Applications)
```

9.4 Listing Files Contained in a Subset

If you enter the -i option and specify a software subset name, the setld
utility displays a list of the files in the specified software subset. This is
useful if you want to determine which software subset you need to reload or
delete if a particular file is damaged or deleted.

The following command displays the files in the OSFXSYSMAN520 software
subset:

```
# /usr/sbin/setld -i OSFXSYSMAN520
./.dt
./.dt/types
./.dt/types/sysmanfp.dt
./.dt/types/sysmanfp.fp
./etc/shortlist.desc
./usr/bin/X11/dxaccounts
        :
        :
```

9.5 Deleting Software Subsets from a Single System

Deleting a software subset requires that you know the subset name
(OSFACCT520 for example). See Appendix C for the name and description of
each software subset. To delete a software subset, log in as root, and use
the setld –d command with the following syntax:

/usr/sbin/setld [-D *root_path*] -d [-f] [*subset-id* [*subset-id*...]]

If you attempt to delete a software subset on which another subset depends,
a message similar to the following is displayed:

```
# setld -d OSFDCMT520

The following subsets need "Doc. Preparation Tools" (OSFDCMT520)
to operate correctly:

  Ref Pages: CDE Development (OSFCDEMANOP520)
  Ref Pages: CDE Admin/User (OSFCDEMANOS520)
  Doc. Preparation Tools Extensions (OSFDCMTEXT520)
  Ref Pages: Programming (OSFMANOP520)
  Ref Pages: Admin/User (OSFMANOS520)
  Ref Pages: Windows Programming (OSFMANWOP520)
  Ref Pages: Windows Admin/User (OSFMANWOS520)

Are you sure you wish to delete "Doc. Preparation Tools"
(OSFDCMT520)? (y/n): y

Deleting "Doc. Preparation Tools" (OSFDCMT520)
```

In the previous example, the reference page software subsets depend on the
Doc. Preparation Tools (OSFDCMT520) subset in order to operate properly.
If you do not delete the dependent subsets, the dependent subsets will not
function properly.

9.6 Deleting Software Subsets from a Cluster

Deleting one or more software subsets from a cluster is no different from deleting one or more software subsets from a single system; deleting a software subset from a cluster requires that you know the subset name.

To delete a software subset from a cluster, log in as root to any member in the cluster, and use the setld -d command with the following syntax:

/usr/sbin/setld -d [*subset-id* [*subset-id*...]]

The setld -d command can be invoked from any member in the cluster, and the delete operation takes place across all cluster members. If a cluster member is down at the time of a subset deletion, for each member that is down, run setld -Z once the member or members come up. If necessary, run setld -Z -f if the original setld -Z fails.

Subset deletion messages appear on the member on which the operation was initiated.

For a record of the software subset deletion activity for each cluster member, review the log file located at /var/adm/smlogs/setld.log on each cluster member.

9.7 Installing Software Subsets on a Single System

To install an optional software subset, log in as root, and use the setld -l command with the following syntax:

/usr/sbin/setld [-D *root_path*] -l *location* [*subset-id* [*subset-id*...]]

The *location* parameter specifies the location of the software subset that you want to install. The following are valid locations:

- *ris_server:* specifies the name of the remote host (RIS server) appended with a colon (:).

- *directory* specifies the disk distribution directory. The directory must be the parent of the instctrl directory.

The *subset-id* variable specifies the name of the software subset. If you do not specify a *subset-id* variable, a list of software subsets is displayed, which lets you choose the software subsets to install. If you specify one or more *subset-id* variables, only those software subsets are installed. See Appendix C for the names and descriptions of all software subsets.

Use the following procedure to install software subsets from a CD–ROM. The distribution path shown in the following examples is for the base operating

system CD–ROM. For other distribution kits, refer to the document supplied by your software vendor.

1. Insert the CD–ROM into the disc drive.

2. As superuser or `root` create a directory to be the mount point for the CD-ROM. This example creates a directory called `/cdrom`:

   # **mkdir /cdrom**

3. Mount the CD–ROM on `/cdrom`. See Appendix B if you do not know the CD-ROM device name. The following example assumes a single CD–ROM device is attached to the system:

   # **mount -r /dev/disk/cdrom0c /cdrom**

   After mounting the CD–ROM, you can change to the `/cdrom` (`cd /cdrom`) directory to view the directories located on the CD–ROM.

4. Enter a command similar to the following to install the base operating system software subsets:

   # **setld -l /cdrom/ALPHA/BASE**

   _____ **Note** _____

   If you are using a RIS server as the source of the software, make sure your system is registered as a client of the RIS server, then enter a command similar to the following:

   # **setld -l** *ris_server_name*:

   _____

5. The `setld` utility displays a numbered list of software subset descriptions and prompts you to enter the number of the software subsets you want to install.

   Enter the number or numbers associated with the software subsets you want to install. There may be more software subsets presented in the menu than can be displayed on a single screen. You either can select software subsets in each screen or select them all together on the last screen. If you select software subsets as each screen is displayed, all your choices are presented for you to confirm on the final screen. You also can change your choices or redisplay the software subset options.

   Only the software subsets not yet installed on your system are displayed. The software subset selection list looks similar to the following:

   ```
   The subsets listed below are optional:

   There may be more optional subsets than can be presented on a single
   screen. If this is the case, you can choose subsets screen by screen
   or all at once on the last screen. All of the choices you make will
   be collected for your confirmation before any subsets are installed.

    - General Applications :
   ```

```
    1) Additional Terminfo databases
    2) Computer Aided System Tutor
    3) DOS tools
    4) Local Area Transport (LAT)
    5) Perl Runtime
    6) UNIX(tm) SVID2 Compatibility
    7) UNIX(tm) to UNIX(tm) Copy Facility

 - Kernel Build Environment :

    8) Logical Storage Manager Kernel Modules
    9) POLYCTR advfs Kernel Modules

 - Kernel Software Development :

   10) Hardware Kernel Objects
   11) POLYCTR advfs Kernel Objects
   12) Standard Kernel Objects

 - Mail Applications :

   13) DECwindows Mail Interface
   14) RAND Corp. Mail Handler (MH)

 - Network-Server/Communications :

   15) ATM Commands
   16) Additional Networking Services
   17) Dataless Management Services
   18) Remote Installation Service

 - Printing Environment :

   19) Adobe Font Metric Files

--- MORE TO FOLLOW ---
Enter your choices or press RETURN to display the next screen.

Estimated free diskspace(MB) in root:62.3 usr:405.6

Choices (for example, 1 2 4-6): 11
```

At the bottom of each screen, the disk space available in the /, /usr,
var, and i18n file systems is shown. As you select additional subsets,
the amount of free disk space is reduced accordingly.

If you choose a subset that depends on another subset to be installed,
the setld utility automatically selects the dependent subset or subsets.
For example, if you choose POLYCTR advfs Kernel Objects, the
following is displayed:

```
The chosen subset(s) require one or more additional subset(s)
which will be loaded automatically:

 * 9 POLYCTR advfs Kernel Modules         (OSFADVFSBIN520)

 - Software Development :

   20) CDA(tm) Software Development
   21) CDA(tm) for X/Motif Development
```

```
        22) CDE Software Development and Programming Examples
        23) GNU Revision Control System
        24) Ladebug Debugger Version 4.0-43
        25) Ladebug Debugger Version 4.0-43 Release Notes
        26) Ladebug Debugger graphical user interface
        27) Ladebug Debugger remote server
        28) Programming Examples
        29) Software Development Desktop Environment
        30) Software Development Tools and Utilities
        31) Source Code Control System
        32) Standard Header Files
        33) Standard Programmer Commands
        34) Static Libraries
        35) X Window and X/Motif Header Files
        36) X Window and X/Motif Programming Examples
        37) X Window and X/Motif Software Development
        38) X Window and X/Motif Static Libraries

     - Supplemental Documentation :

        39) XIE Version 5 Online Documentation

     - System Administration :

        40) ATM Configuration Application
        41) Advanced File System Daemon
        42) Advanced File System Graphical User Interface
        43) C2-Security
        44) C2-Security GUI

    --- MORE TO FOLLOW ---

    Add to your choices or press RETURN to display the next screen.

    Estimated free diskspace(MB) in root:61.2 usr:403.9

    Choices (for example, 1 2 4-6):  11 40
```

6. After you enter all your choices, the following confirmation message is
   displayed:

   ```
   You are installing the following optional subsets:

    - Kernel Build Environment :
          POLYCTR advfs Kernel Modules

    - Kernel Software Development :
          POLYCTR advfs Kernel Objects

    - System Administration :
          ATM Configuration Application
          POLYCTR advfs

   Estimated free diskspace(MB) in root:56.6 usr:402.8

   Is this correct? (y/n): y
   ```

7. After you confirm your choices, messages similar to the following are
   displayed as the software subsets are loaded and configured:

```
Checking file system space required to install selected subsets:

File system space checked OK.

4 subset(s) will be installed.

Loading subset 1 of 4 ...

POLYCTR advfs Kernel Modules
   Copying from risserver1 (inet)
   Verifying

Loading subset 2 of 4 ...

POLYCTR advfs
   Copying from risserver1 (inet)
       Working....Fri Aug 24 14:48:02 EST 2001
   Verifying

Loading subset 3 of 4 ...

ATM Configuration Application
   Copying from risserver1 (inet)
   Verifying

Loading subset 4 of 4 ...

POLYCTR advfs Kernel Objects
   Copying from risserver1 (inet)
       Working....Fri Aug 24 14:48:34 EST 2001
   Verifying

4 of 4 subset(s) installed successfully.

Configuring "POLYCTR advfs Kernel Modules" (OSFADVFSBIN520)

Configuring "POLYCTR advfs" (OSFADVFS520)

Configuring "ATM Configuration Application" (OSFATMGUI520)

Configuring "POLYCTR advfs Kernel Objects" (OSFADVFSBINOBJECT520)
```

8. If you are installing from CD–ROM, unmount the CD–ROM after the software subsets are installed:

```
# cd/
# umount /dev/disk/cdrom0c
```

9.8 Installing Optional Software Subsets on a Cluster

Installing one or more optional software subsets onto a cluster is no different from installing one or more software subsets onto a single system.

To install optional software subsets onto a cluster, log in as root to any member in the cluster, and follow the step-by-step instructions for mounting the distribution media and invoking setld as shown in Section 9.7. The software load takes place across all cluster members. If a cluster member is

down at the time of a subset load, the load information is stored, and the load operation takes place as soon as the cluster member comes back online.

Subset load and configuration messages are displayed on the member on which the load operation was initiated. For example, if you initiate the load operation of the OSFDCMT520 subset on member2 of a three member cluster, messages similar to the following are displayed on member2:

```
Checking file system space required to install selected subsets:

File system space checked OK.

1 subset(s) will be installed.

Loading subset 1 of 1 ...

Doc. Preparation Tools
   Copying from risserver1 (inet)
        Working....Fri Aug 24 14:48:02 EST 2001
   Verifying

1 of 1 subset(s) installed successfully.

Configuring "Doc. Preparation Tools" (OSFDCMT520) on member 0.
Configuring "Doc. Preparation Tools" (OSFDCMT520) on member 1.
Configuring "Doc. Preparation Tools" (OSFDCMT520) on member 2.
Configuring "Doc. Preparation Tools" (OSFDCMT520) on member 3.
```

In a cluster, member0 is not a physical machine; it is a directory that serves as a general repository for cluster member specific information.

For a record of the software subset load activity for each cluster member, review the log file located at /var/adm/smlogs/setld.log on each cluster member.

9.9 Rebuilding the Kernel After Installing Kernel Build Environment Subsets

Certain base operating system products (such as the Logical Storage Manager, Advanced File System, and Asynchronous Transfer Mode) contain a kernel component. If you use setld to install one of these software subsets after the installation, you must run the doconfig utility to rebuild the kernel with the new kernel component; otherwise you will not be able to use the software product. After building a new kernel, move the new kernel to the / (root) file system, and reboot with the new kernel to make the product available for use.

See Appendix C for a list of the software subsets that contain kernel components for which you must run the doconfig utility to build a new kernel. See doconfig(8) for more information.

If you install the Asynchronous Transfer Mode (ATM) DGLTA adapter after installing the operating system, you must boot the system off the generic

kernel `genvmunix`, install the ATM software subsets from the CD-ROM, and then run the `doconfig` utility to rebuild your system kernel to enable the added ATM support. To configure the adapter, run the ATM configuration utility from the SysMan Menu.

A

Device Naming Conventions

This appendix discusses the following topics:

- The history of device naming from the old style device naming to the device naming conventions that were introduced in Version 5.0 of the operating system (Section A.1)

- Creating device special file names using the new naming conventions (Section A.2)

- How device names are assigned including an example of how device names are assigned after moving an existing disk and adding a new disk (Section A.3)

- Preserving device names during a Full Installation (Section A.4)

- How an Update Installation maps old and current device names (Section A.5)

- How to obtain more information about devices attached to your system (Section A.6)

A.1 History of Device Naming

In versions of the operating system earlier than Version 5.0, all devices resided in the /dev directory and were named as shown in Table A–1.

Table A–1: Old Device Naming Conventions

Device Type	Directory	Naming Convention
Generic	/dev	std, drum, kmem, mem, null, trace, tty, local
Disks	/dev	rz*, ra*, re*
Tapes	/dev	tz*, ta*
Terminals	/dev	pty
Printers	/dev	-

Starting with Version 5.0 of the operating system, each class of device has a separate subdirectory named for the class as shown in Table A–2.

Table A–2: Version 5.1A Device Naming Conventions

Device Type	Directory	Naming Convention
Generic	/dev/generic	
Disks	/dev/disk, /dev/rdisk	dsk, floppy, cdrom, worm, optical
Tapes	/dev/tape, /dev/ntape	9trk, qic, 8mm, 3480, dlt, dat
Terminals	/dev/term	serial, ptm, pts, ptm_v, pts_v
Printers	/dev/printer	lp
Logical Storage Manager (LSM)	/dev/vol , /dev/rvol	rootdg/root_vol, rootdg/swap_vol, rootdg/usr_vol

The directory and actual device names are self explanatory, with a few notable exceptions:

disk, rdisk	The disk subdirectory refers to block device nodes. The rdisk subdirectory refers to character device nodes.
tape, ntape	The tape subdirectory refers to rewind-on-close device nodes. The ntape subdirectory refers to no-rewind-on-close device nodes.

Table A–3 shows how old-style device names map to the current device names.

Table A–3: Mapping of Old Style and New Style Device Names

Device	Old Device Name	New Device Name
System disk, character device	/dev/rrz0a	/dev/rdisk/dsk0a
System disk, block device	/dev/rz0a	/dev/disk/dsk0a
Diskette drive	/dev/fd0c	/dev/disk/floppy0c
CD-ROM	/dev/rz4c	/dev/disk/cdrom0c

A.2 Creating Device Special Files

Every time the system is booted, the system hardware is scanned and any new device special files are created automatically. If you add a new device to the system and want to create the device special file without rebooting the system, use the hwmgr command. For example, the following command

scans the SCSI bus for any new devices and automatically creates the device
special files for any new devices.

hwmgr -scan scsi

_____ **Note** _____

Starting with Version 5.0 of the operating system, the
/dev/MAKEDEV command is no longer used to create device
special files.

_____

A.3 How Device Names Are Assigned

Each time a new device is created, it is assigned the next available device
name. When the system is installed for the first time, the hardware is probed
in order to determine the devices that exist on the system. The hardware
probe starts at bus 0/target 0 and probes each successive target on bus 0.
It then proceeds to probe bus 1 and all of its targets starting from target 0.
As each new device is discovered, it is assigned the next available device
number, starting from 0. Table A–4 shows a sample device naming scenario:

Table A–4: Sample Device Naming Scenario

Bus #	Target #	Old Style Device Name	New Device Name	Worldwide ID
0	0	rz0	dsk0	DEC100[a]
0	4	rz4	dsk1	DEC101
1	3	rz11	dsk2	DEC102
1	6	rz14	dsk3	DEC103
1	7	rz15	dsk4	DEC104

[a] The worldwide IDs (WWIDs) in this table are fabricated and have been shortened for purposes of
illustration. The WWIDs on your system will be different.

After a physical disk has been assigned to a device name, it retains that
device name, regardless of its position on the bus. Each physical device is
given a unique worldwide identifier at the time it is manufactured. It is
this worldwide identifier that is used to map the physical device to the new
device name. This means that a disk can be moved from slot to slot on the
bus without having to change the device name. So, if you move a disk from
one slot to another you would continue to refer to the disk using the same
device name. Using the example in Table A–4, if the disk known as dsk0
were to move from bus 0/target 0 to bus 1/target 4, the new device name
would remain the same. Under previous releases the device would need to
be accessed as rz12, but in the new release the device name remains dsk0.

This is because the device name is tied to the worldwide identifier and not to the position of the disk on the bus.

After a device is assigned a new device name, it retains that name whenever the system reboots. New devices are given the next available device name. Continuing the example used in Table A–4, assume that the DEC100 device (dsk0) has been moved from bus 0/target 0 to bus 1/target 4. Also assume that a new device (DEC099) has been added to the system on bus 0/target 0. Table A–5 shows the new device names when the system reboots:

Table A–5: Device Name Assignments After Moving and Adding a Device

Bus #	Target #	Old Style Device Name	New Device Name	Worldwide ID
0	**0**	**rz0**	**dsk5**	**DEC099**[a]
0	4	rz4	dsk1	DEC101
1	3	rz11	dsk2	DEC102
1	**4**	**rz12**	**dsk0**	**DEC100**
1	6	rz14	dsk3	DEC103
1	7	rz15	dsk4	DEC104

[a] The worldwide IDs (WWIDs) in this table are fabricated and have been shortened for purposes of illustration. The WWIDs on your system will be different.

Table A–5 shows that the DEC100 device still retains the dsk0 device name, even though it has moved to another bus/target. The new device (DEC099) has been assigned the next available device name (dsk5). See Section A.6 for information about obtaining device information from the operating system.

A.4 Preserving Device Names During a Full Installation

When you perform a Full Installation, the existing device naming databases are lost. This means that the new device names will be assigned based upon the order in which the devices are found. This new naming scheme may be different from the naming scheme used in older versions of the operating system. However, there is a way to save this information during a Full Installation. This feature is particularly useful if you have applications that use the existing device names and you intend to run those applications on the new version of the operating system. If you do not preserve the device naming databases, your applications may access the wrong devices. The device names can be preserved across Full Installations using the following steps:

1. Shut down the system to console mode:

   # **shutdown -h now**

2. Examine the bootdef_dev console variable:

```
>>> show bootdef_dev
```

If the value of the `bootdef_dev` variable is set to the disk containing the / (root) file system, the Full Installation procedure automatically preserves the hardware device database and there is no need to do anything. If not, proceed to the next step.

3. Set the value of the `bootdef_dev` variable if it is not set to the disk containing the / file system:

```
>>> set bootdef_dev dka0
```

4. Perform the Full Installation. The Full Installation preserves the device databases from the previous version of the operating system. It does this by mounting the device specified by the `bootdef_dev` variable and saving the necessary device database files. These files are then placed on the newly created system. This means the devices on the new system will be mapped exactly as they were from the previous installation.

If you do not want to preserve the device naming from the previous installation, set the `bootdef_dev` console variable to " " (double quotes).

A.5 Update Installation Device Names

The Update Installation maps the old device names to the new device names, so that the new system will have both the old `rz*` devices and the new `dsk*` devices. The mapping of the old device names to the new device names can be found in the `/etc/dfsl.dat` file. This mapping is determined dynamically each time the system is booted. This is because the old device name is based upon the bus and target location while the new device name remains constant. Therefore, if the disk moves from one bus to another bus, the old device name will change, but the new device name will not. See Table A–2 for details on device naming conventions.

Note

The `/etc/dfsl.dat` file should not be modified. This is a database used by the kernel to access system devices. Modifying this file may render devices inoperable.

As in releases earlier than Version 5.1A, the kernel does not mount the same device more than once. For example, in previous releases of the operating system, you could not mount `/dev/rz0a` on `/mnt` and then mount `/dev/rz0a` on `/mnt1`. This restriction still applies to Version 5.1A of the operating system. This means that if you have an old device name mounted and attempt to mount the same device using the new device name, the mount will fail. For example, if both `/dev/rz0a` and `/dev/disk/dsk0a`

map to the same physical disk, you cannot mount both `/dev/rz0a` and `/dev/disk/dsk0a` at the same time.

A.6 Obtaining More Device Information

Use the following to retrieve information regarding the state of the hardware.

- The SysMan Station lets you monitor one system or a group of systems and administer system resources. You can set the View to see all hardware connected to the system.

  If you are logged in as the `root` user, the SysMan Station is available from an icon on the CDE front panel. To open the SysMan Station from the command line, enter:

  ```
  # /usr/sbin/sysman -station &
  ```

- The Hardware Manager enables you to manage hardware components and the hardware subsystems that maintain information about hardware components. A hardware component can be a storage peripheral, such as a disk or tape, or a system component such as a CPU or a bus. Use the `hwmgr` utility to manage hardware components on either a single system or on a cluster.

  The `hwmgr` utility provides two types of commands, internal and generic. Internal commands do not contain a subsystem identifier on the command line. Generic commands are characterized by a subsystem identifier after the command name.

  The Hardware Manager uses the following generic command syntax:

  /sbin/hwmgr *command* [**subsystem**] [**parameters**]

  For example, use the following command to determine the worldwide IDs of the disks attached to your system:

  ```
  # hwmgr -get attribute -category disk
  ```

  See `hwmgr`(8) for more information about the utility and additional command line examples.

B

Compact Disc Overview

This appendix contains the following topics:

- A description of the CD-ROMs that are shipped with each release of the operating system (Section B.1)

- How to determine a CD-ROM device name (Section B.2)

- How to mount a CD-ROM (Section B.3)

- How to unmount a CD-ROM (Section B.4)

B.1 Operating System CD-ROMs

The operating system software is distributed on four read-only compact discs (CD-ROM):

- The CD-ROM labeled *Operating System Volume 1* contains the base operating system software subsets. The software subsets contained on this CD–ROM are described in Section C.1.

- The CD–ROM labeled *Associated Products Volume 1* contains the Worldwide Language Support (WLS) software and other layered products that are compatible with the operating system. WLS software subsets are described in Section C.4.1. Generic instructions for installing layered products are provided in Appendix D.

- The CD-ROM labeled *Associated Products Volume 2* contains additional layered products.

- The CD-ROM labeled *Documentation Volume 1* contains the documentation set in HTML and PDF formats. Chapter 8 describes how to mount this CD-ROM to view the documentation set.

B.2 CD-ROM Device Names

There are two types of device names that identify a CD-ROM drive. The first name is the regular device special file name, which is used to specify the CD-ROM drive when the system is in single-user or multiuser mode. The second name is the console device name, which is used when the system is in the console mode.

B.2.1 Determining the CD-ROM Device Name

Enter the following command to determine the device name of a CD-ROM drive:

```
$ ls /dev/disk/cdrom*c
/dev/disk/cdrom0c
```

Use this CD-ROM device name to boot from the CD-ROM drive when the system is in single-user mode, for instance, when starting an Update Installation of the operating system.

B.2.2 Determining the CD-ROM Console Device Name

To determine the CD-ROM console device name, the system must be shut down to the console mode as shown in the following example:

1. As superuser or root, shut down the system to console mode:

    ```
    # shutdown -h now
    ```

2. Display the table of device names:

    ```
    >>> show device
    ```

    Depending upon your system type, a device information table similar to the following is displayed:

    ```
    dka0.0.0.0.0              DKA0                    RZ28
    dkb0.0.0.1.0              DKB0                    RZ28
    dkc0.0.0.2.0             DKC0                     RZ26
    dkc100.1.0.2.0          DKC100                   RZ26
    dkc200.2.0.2.0          DKC200                   RZ26
    dkc300.3.0.2.0          DKC300                   RZ26
    dke100.1.0.4.0          DKE100                   RRD43    ⇐
    mka500.0.0.0.0          MKA500                   TLZ04
    mke0.0.0.4.0             MKE0                     TZ85
    ewa0.0.0.6.0             EWA0          08-00-2B-2C-CE-DE
    ```

    In the third column to the right, look for the line with the characters RRD or CD-ROM. These characters denote a CD-ROM device. The second column in the table shows the console device name assigned to each device on your system.

    In this example, the RRD43 CD-ROM is assigned to console device name DKE100.

Use the console device name to boot from the CD-ROM drive when the operating system is not running and the system is in console mode.

B.3 Mounting a CD-ROM

Before you can access the files and directories on a CD-ROM, it must be mounted on a mount point. Follow these steps to mount a CD-ROM:

1. Log in as `root` or become superuser.

2. Enter the following command to find the CD–ROM device name if necessary:

   ```
   # ls /dev/disk/cdrom*c
   /dev/disk/cdrom0c
   ```

3. Use the `mkdir` command to make a directory to be the mount point for the CD-ROM. Then mount the CD-ROM using the `mount` command with the following syntax, substituting the unit number of your CD-ROM drive for the *unit_number*.

   mount /dev/disk/cdrom<*unit_number*>c /*mount-point*

   For example, to mount the CD-ROM in drive `/dev/disk/cdrom0c` on the directory `/cdrom`, enter the following commands:

   ```
   # mkdir /cdrom
   # mount -r /dev/disk/cdrom0c /cdrom
   ```

4. To ensure that the CD-ROM is remounted in the event that your system crashes or is rebooted, add the following line to the `/etc/fstab` file:

   ```
   /dev/disk/cdrom0c          /cdrom   ufs   ro   0   0
   ```

   The system will mount the CD-ROM on the `/cdrom` mount point on every system reboot.

B.4 Unmounting a CD-ROM

You must unmount a CD-ROM from its mount point by using the `umount` command before you can eject it from the disc drive. To unmount a CD-ROM, you must be superuser or `root` and you must be at least one directory above the mount point of the CD-ROM. Use commands similar to the following to unmount a CD–ROM:

```
# cd /
# umount /cdrom
```

If you do not unmount the CD–ROM before trying to remove it, the CD-ROM will not eject from the drive when you press the EJECT button. If you are in the directory of the mount point of the CD-ROM when you execute the `umount` command, you will see the message `device busy`.

To remove the disc from the disc drive after it is unmounted, press the EJECT button on the disc drive.

If the EJECT button is disabled by software or if the drive does not eject the caddy after you press the EJECT button, see your *Optical Disc Drive Owner's Manual* for instructions.

C

Software Subset Descriptions

This appendix provides descriptions of all software subsets that are part of the current version of the operating system:

- Base operating system software subsets (Section C.1)
- Worldwide Language Support (WLS) software subsets (Section C.4)

C.1 Base Operating System Software Subset Descriptions

The software subsets described in this section are located on the CD-ROM labeled *Operating System Volume 1*.

Software subsets are divided into the following categories:

- Mandatory software subsets are installed automatically during Full Installations. These software subsets represent the minimum software needed to install and run the operating system on your hardware configuration.

- Optional software subsets represent a variety of applications that can be installed to enrich the features of the operating system. See Chapter 9 for information about using the setld command to install optional subsets after the installation.

- Conditionally mandatory software subsets are considered mandatory only when certain hardware or software is detected during the installation procedure, which makes the software mandatory. Table C–1 lists the software subsets that are conditionally mandatory. In Table C–1, a group of software subsets that contains the word or means that at least one of the software subsets is mandatory when the condition is met.

Table C–1: Conditionally Mandatory Software Subsets

Software Subset Name	What Makes It Mandatory?
DECwindows 75dpi Fonts DECwindows 100dpi Fonts	The resolution of the graphics adapter attached to the system.
X Servers for PCbus	The type of graphics adapter attached to the system.

Table C–1: Conditionally Mandatory Software Subsets (cont.)

Software Subset Name	What Makes It Mandatory?
Graphical Base System Management Utilities	A graphics adapter is attached to the system.
Graphical Print Configuration Application	
Graphical System Administration Utilities	
Netscape Communicator V4.75	
CDE Desktop Environment	
Basic X Environment	
X Servers	
X Fonts	
Adobe Font Metric Files	
CDE Mail Interface	
DECwindows Mail Interface	
AdvFS	Choosing AdvFS as the file system type
AdvFS Kernel Modules	for the /, /usr, or /var file systems during the Full Installation.
LSM Kernel Modules	Choosing to install into LSM volumes
LSM Kernel Objects	during the Full Installation.
LSM GUI	
ATM Kernel Header and Common Files	ATM hardware is detected by the
ATM Kernel Modules	Full Installation.
ATM Commands	

In this appendix, the conditionally mandatory software subsets are
described in the software category in which they would appear during an
installation if they were not mandatory for your system.

C.2 Mandatory Software Subsets

The mandatory software subsets shown in Table C–2 always are installed
automatically during a Full Installation.

The Base System and the Base System–Hardware Support subsets cannot
be deleted after they are installed.

The Standard Kernel Modules, the Kernel Header and Common Files, the
Hardware Kernel Modules, the Hardware Kernel Header and Common
Files, and the Compiler Back End subsets contain all the files needed to
build a standard kernel.

Table C–2 describes the mandatory subsets.

Table C–2: Description of the Mandatory Software Subsets

Subset Name	Title and Contents
OSFBASE520	**Base System** - This software subset includes fundamental utilities and data files for the base operating system. This software subset cannot be deleted.
OSFOEMBASE520	**Base for Original Equipment Manufacturers** - This software subset is a mandatory, non-deletable subset that contains all vendor and operating system name files.
OSFHWBASE520	**Base System–Hardware Support** - This software subset provides the hardware dependent portion of the OSFBASE subset. This subset cannot be deleted. This software subset also contains the Monitoring Performance History (MPH) utility that gathers information on the reliability and availability of the operating system and associated platforms.
OSFSYSMAN520	**Base System Management Applications and Utilities** - This software subset contains all files related to the base system management (SysMan) applications and utilities.
OSFCLINET520	**Basic Networking Services** - This software subset contains the software required to provide services over the network using the TCP/IP protocols. These services include remote login (`rlogin`) and Network Time Protocol (`xntp`).
OSFCMPLRS520	**Compiler Back End** - C Language Compiler. This software subset provides the minimum level of C language support required to build operating system kernels. The subset also contains the C compiler executables. This software subset must be used in conjunction with the Software Development Tools and Utilities subset. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.
OSFHWBIN520	**Hardware Kernel Modules** - This software subset provides hardware dependent kernel modules that together with the Standard Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.

Table C–2: Description of the Mandatory Software Subsets (cont.)

Subset Name	Title and Contents
OSFHWBINCOM520	**Hardware Kernel Header and Common Files** - This software subset provides the hardware dependent kernel header and data files that together with the Standard Kernel Modules and Hardware Kernel Modules let you configure and build the kernel. If you do not plan to build kernels on your system, this subset can be removed. This software subset supports uniprocessor, symmetric multiprocessing (SMP), and realtime configurations.
OSFJAVA520	**JAVA Version 1.1.8 Environment** - This software subset contains the class libraries, tools, and run-time libraries necessary for the JAVA Version 1.1.8 environment.
OSFBINCOM520	**Kernel Header and Common Files** - This software subset provides the common kernel header and data files that together with the Standard Kernel Modules and Hardware Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.
OSFNFS520	**NFS Utilities** - This software subset provides the software required to mount remote file systems using the Network File System (NFS).
OSFBIN520	**Standard Kernel Modules** - This software subset provides common kernel modules that together with the Hardware Kernel Modules let you configure and build the kernel. This software subset is mandatory during the initial system installation, but can be removed if you do not intend to build kernels on your system.

C.3 Optional Software Subsets

The following is a list of the optional software subset categories. Locate the category you are interested in and see the corresponding table for subset descriptions. The optional software subsets can be deleted after they are installed.

- General Applications – Table C–3

- Kernel Build Environment – Table C–4

- Kernel Software Development — Table C–5

- Mail Applications – Table C–6

- Network-Server/Communications – Table C–7

- Printing Environment – Table C–8

- Obsolete Components — Table C–9

- Reference Pages – Table C–10

- Software Development – Table C–11

- Supplemental Documentation – Table C–12

- System Administration – Table C–13

- Text Processing – Table C–14

- Windowing Environment – Table C–15

- Windows Applications – Table C–16

C.3.1 General Applications Software Subsets

Table C–3 describes the software subsets in this category.

Table C–3: Description of the General Applications Software Subsets

Subset Name	Title and Contents
OSFTERM520	**Additional Terminfo Databases** - This software subset contains the additional terminal information databases to support terminals from other vendors.
OSFLEARN520	**Computer Aided System Tutorial** - This software subset provides a simple, interactive online tutorial about subjects such as basic UNIX file handling, the `vi` text editor, the capabilities of the `ls` command, `ms` macros, editors in general, `eqn` (a language for typesetting mathematics), and the `C` Programming Language. See `learn`(1) for more information.
OSFDOSTOOLS520	**DOS Tools** - This software subset provides a collection of tools for manipulating MS-DOS files. The mtools commands are a public domain collection of programs that let you read, write, and manipulate files on an MS-DOS file system (typically a floppy disk) from a UNIX system. Each command attempts to emulate the MS-DOS equivalent command as closely as possible. The following commands are available: `mattrib`, `mcd`, `mcopy`, `mdel`, `mdir`, `mformat`, `mlabel`, `mmd`, `mrd`, `mread`, `mtype`, and `mwrite`.

Table C–3: Description of the General Applications Software Subsets (cont.)

Subset Name	Title and Contents
OSFJAVA122520	**JAVA Version 1.2.2** - This software subset contains the class libraries, tools, and run-time libraries necessary for the JAVA 1.2.2 environment. Installing this subset allows you to develop against the current version of JAVA without having to force the entire base operating system to change to a newer version.
OSFLAT520	**Local Area Transport (LAT)** - This software subset contains the Local Area Transport (LAT), which is a protocol that provides a means of logically connecting terminal servers to one or more nodes on the same local area network (LAN). LAT software has the features required for a host to function as a service node so requests for connections can be made by server users.
OSFPERL520	**PERL Runtime** - This software subset contains the run-time libraries needed to run PERL programs.
OSFTKBASE520	**Tk Toolkit Commands** - This software subset contains the Tool Command Language (TCL) graphical extensions package.
OSFTCLBASE520	**TCL Commands** - This software subset contains the binary distribution of the Tool Command Language (TCL) and the TCLX extension package without graphical components. TCL is a scripting language. The package consists of the TCL/TCLX shared libraries, the TCL/TCLSH shells, and script libraries. Install this software subset if you want to write or run TCL programs.
OSFSVID2520	**UNIX SVID2 Compatibility** - This software subset brings the operating system into compliance with the Base System and Kernel Extensions of the System V Interface Definition Issue 2 (SVID2). It also adds a higher degree of compatibility with the Basic Utilities Extensions of SVID2.
OSFUUCP520	**UNIX to UNIX Copy Facility** - This software subset provides programs and data files needed for a system to participate in a network of machines using the UUCP facility. This facility transmits files over serial communications lines.
OSFEMACS520	**xemacs Runtime** - This software subset contains the X Emacs editor.

C.3.2 Kernel Build Environment Software Subsets

Table C–4 describes the software subsets in this category.

Table C–4: Description of the Kernel Build Environment Software Subsets

Subset Name	Title and Contents
OSFADVFSBIN520	**AdvFS Kernel Modules** - This software subset contains the Advanced File System (AdvFS) kernel modules. AdvFS is a log based file system that allows for faster system restarts in case of system crashes.
OSFATMBINCOM520	**ATM Kernel Header and Common Files** - This software subset provides the ATM kernel header and data files and together with the ATM Kernel Modules subset lets you configure and build a kernel that supports the ATM hardware.
OSFATMBIN520	**ATM Kernel Modules** - This software subset contains the ATM kernel modules. This software subset is mandatory if ATM hardware is detected during the installation process. ATM technology is a connection-oriented wide area/local area technology based on the high-speed switching of 53-byte cells across a network.
OSFLSMBIN520	**Logical Storage Manager Kernel Modules** - This software subset provides the kernel modules to build the kernel with LSM drivers. This software subset supports uniprocessor, SMP, and realtime configurations.

C.3.3 Kernel Software Development Software Subsets

Table C–5 describes the software subsets in this category. These software subsets are optional after the installation. They will not appear on the optional software subset list during a Full Installation. Use the setld command if you want to install these software subsets.

Table C–5: Description of the Kernel Software Development Software Subsets

Subset Name	Title and Contents
OSFADVFSBINOBJECT520	**AdvFS Kernel Objects** - This software subset contains the AdvFS Kernel Objects needed for software development of code that is to be built into the kernel.
OSFATMBINOBJECT520	**ATM Kernel Objects** - This software subset contains the Asynchronous Transfer Mode (ATM) Kernel Objects needed for software development of code that is to be built into the kernel.
OSFHWBINOBJECT520	**Hardware Kernel Objects** - This software subset contains the Hardware Kernel Objects needed for software development of code that is to be built into the kernel.
OSFBINOBJECT520	**Standard Kernel Objects** - This software subset contains the Standard Kernel Objects needed for the software development of code that is to be built into the kernel.

C.3.4 Mail Applications

Table C–6 describes the software subsets in this category.

Table C–6: Description of the Mail Applications Software Subsets

Subset Name	Title and Contents
OSFCDEMAIL520	**CDE Mail Interface** - This software subset contains the Common Desktop Environment mail system. This software subset is mandatory on a system with graphics capabilities.
OSFMH520	**RAND Corp. Mail Handler (MH)** - This software subset provides programs that constitute the RAND Corporation MH mail reader interface.

C.3.5 Network-Server/Communications Software Subsets

Table C–7 describes the software subsets in this category.

Table C–7: Description of the Network-Server/Communications Software Subsets

Subset Name	Title and Contents
OSFINET520	**Additional Networking Services** - This software subset contains the software that provides the networking services IMAP4, Post Office Protocol (POP3), Berkeley Internet Name Domain (BIND), and Network Information Services (NIS).
OSFATMBASE520	**ATM Commands** - This software subset contains the software that provides the Asynchronous Transfer (ATM) mode commands. This software subset is mandatory if ATM hardware is detected during the installation process.
OSFDMS520	**Dataless Management Services** - This software subset provides the software needed to run Dataless Management Services (DMS). In a DMS environment, a server maintains the / (root), /usr, and /var file systems for client systems. Paging, swapping, and dumping is done on the clients local disks. The UNIX-SERVER product authorization key (PAK) must be loaded and registered to use DMS.
OSFRIS520	**Remote Installation Services** (RIS) - This software subset provides the ability to perform installations of the operating system and applications over a network. The UNIX-SERVER product authorization key (PAK), must be loaded and registered to use RIS.

C.3.6 Printing Environment Software Subsets

Table C–8 describes the software subsets in this category.

Table C–8: Description of the Printing Environment Software Subsets

Subset Name	Title and Contents
OSFAFM520	**Adobe Font Metric Files** - This software subset contains font metrics (character bounding box, width, name, ligature, kerning, and font properties) for PostScript outline fonts used by text formatting applications on PostScript output devices. This software subset is needed to view files.
OSFPRINT520	**Local Printer Support** - This software subset provides printer commands such as `lpr`, `lpq`, and `lpd` utilities; configuration files; filters; and PostScript printer support.

C.3.7 Obsolete Components Software Subsets

Table C–9 describes the software subsets in this category.

Table C–9: Description of the Obsolete Components Software Subsets

Subset Name	Title and Contents
OSFOBSOLETE520	**Obsolete Commands and Utilities** - This software subset contains the commands and utilities that are no longer supported in the current version of the operating system.

C.3.8 Reference Pages Software Subsets

Table C–10 describes the software subsets in this category.

Table C–10: Description of the Reference Pages Software Subsets

Subset Name	Title and Contents
OSFMANOS520	**Ref Pages: Admin/User** - This software subset provides the online reference pages for system administrators and general users.
OSFCDEMANOS520	**Ref Pages: CDE Admin/User** - This software subset contains the reference pages for Common Desktop Environment general users and system administrators.
OSFCDEMANOP520	**Ref Pages: CDE Development** - This software subset contains the Common Desktop Environment development reference pages.
OSFMANOP520	**Ref Pages: Programming** - This software subset provides the online reference pages for programmers. It also contains the online reference pages for the Realtime kernel.

Table C–10: Description of the Reference Pages Software Subsets (cont.)

Subset Name	Title and Contents
OSFMANWOS520	**Ref Pages: Windows Admin/User** - This software subset provides the online reference pages for windows administrators and users.
OSFMANWOP520	**Ref Pages: Windows Programming** - This software subset provides the online reference pages for windows programmers.

C.3.9 Software Development Software Subsets

Table C–11 describes the software subsets in this category.

Table C–11: Description of the Software Development Software Subsets

Subset Name	Title and Contents
OSFCDEDEV520	**CDE Software Development and Programming Examples** - This software subset contains the header files, static libraries, and tools needed for Common Desktop Environment (CDE) development.
OSFRCS520	**GNU Revision Control System** - This software subset contains programs that make up the UNIX Revision Control System (RCS), which provides a regulation mechanism for large software projects.
OSFJAVADEV520	**JAVA Version 1.1.8 Development Environment** - This software subset contains JAVA development tools, which allows you to compile and debug JAVA code.
OSFJAVADEV122520	**JAVA Version 1.2.2 Development Environment** - This software subset contains JAVA development tools, which allows you to compile and debug JAVA code.
OSFLDBBASE520	**Ladebug Debugger** - This software subset contains the command line interface for the Ladebug Debugger. The Ladebug Debugger is a symbolic source-level debugger that supports debugging of ADA, C/C++, Fortran, and Fortran 90 applications.
OSFLDBDOC520	**Ladebug Debugger Release Notes** - This software subset contains the Ladebug Debugger Release Notes. The release notes are located at `/usr/doc/ladebug/ladebug-relnotes.txt` when this subset is installed.
OSFEXAMPLES520	**Programming Examples** - This software subset contains programming examples.

Table C–11: Description of the Software Development Software Subsets (cont.)

Subset Name	Title and Contents
OSFSDECDE520	**Software Development Desktop Environment** - This software subset contains the Common Desktop Environment (CDE) files necessary to start the Ladebug Debugger and the Porting Assistant from the CDE desktop.
OSFSDE520	**Software Development Tools and Utilities** - This software subset provides additional software development environment extensions. This software subset includes the ATOM tools `hiprof`, `pixie`, and `third`. The OSF-DEV-USER Product Authorization Key (PAK), is required to use the tools and utilities included in this software subset.
OSFSCCS520	**Source Code Control System** - This software subset contains programs that make up the UNIX Source Code Control System (SCCS), which provides a regulation mechanism for large software projects.
OSFINCLUDE520	**Standard Header Files** - This software subset contains the standard header files for C programming.
OSFPGMR520	**Standard Programmer Commands** - This software subset contains libraries and utilities useful for software development. It includes the libraries for linking programs to be analyzed with the `dbx` debugger and `lex` and `yacc` parser packages. Also included in this software subset is the ATOM performance analysis and debugging tool kit.
OSFLIBA520	**Static Libraries** - This software subset contains the static libraries for linking programs that do not use shared libraries. Some software development tools work only with static linked programs.
OSFXINCLUDE520	**X Window and X/Motif Header Files** - This software subset contains the X window header files needed for X11 and Motif software development.
OSFXEXAMPLES520	**X Window and X/Motif Programming Examples** - This software subset contains examples of X and Motif programs.

Table C–11: Description of the Software Development Software Subsets (cont.)

Subset Name	Title and Contents
OSFXDEV520	**X Window and X/Motif Software Development** - This software subset provides the library and data files needed to produce X/Motif Window System client applications. This software subset also includes example programs demonstrating how to get started.
OSFXLIBA520	**X Window and X/Motif Static Libraries** - This software subset contains the X Window static libraries for linking programs that do not use shared libraries. Some software development tools only work with static linked programs.

C.3.10 Supplemental Documentation Software Subset

Table C–12 describes the software subset in this category.

Table C–12: Description of the Supplemental Documentation Software Subsets

Subset Name	Title and Contents
OSFJAVADOC520	**Online Documentation for JAVA Version 1.1.8** - This software subset contains online documentation for the JAVA Version 1.1.8 development tools.
OSFJAVADOC122520	**Online Documentation for JAVA Version 1.2.2** - This software subset contains online documentation for the JAVA Version 1.2.2 development tools.
OSFXIEDOC520	**XIE Version 5 Online Documentation** - This software subset provides compressed PostScript files of documents for the X Window System Image Extension (XIE) software.

C.3.11 System Administration Software Subsets

Table C–13 describes the software subsets in this category.

Table C–13: Description of the System Administration Software Subsets

Subset Name	Title and Contents
OSFADVFS520	**AdvFS** - The subset contains the system administration commands required for creating and managing the Advanced File System (AdvFS).
OSFADVFSDAEMON520	**Advanced File System Daemon** - This software subset contains the AdvFS daemon.
OSFXADVFS520	**Advanced File System GUI** - This software subset contains the graphical user interface for the AdvFS administration utility.
OSFNETCONF520	**Basic Networking Configuration Applications** - This software subset contains the network configuration applications.
OSFC2SEC520	**Enhanced Security** - This software subset provides additional configurable system security features such as identification, authentication and audit.
OSFXC2SEC520	**Enhanced Security GUI** - This software subset provides the graphical user interface for the C2 Security subset.
OSFENVMON520	**Environmental Monitoring** - This software subset provides a means of detecting the thermal state, fan status, and redundant power supply status of AlphaServer systems (specifically AlphaServer 1000A systems, AlphaServer 4100 systems, and AlphaServer 8200 systems) in enough time to prevent damage to the system itself. This subset contains the components needed to implement Environmental Monitoring.
OSFXSYSMAN520	**Graphical Base System Management Utilities** - This software subset contains the graphical system management Tool Command Language (TCL/TK) shell, some utility libraries, the configuration checklist application (for postinstallation use), and the Common Desktop Environment (CDE) application manager rules files for the creation of system management applications within the application manager. It also contains all the system management application icons. This software subset is mandatory on systems with graphics capabilities.
OSFXPRINT520	**Graphical Print Configuration Application** - This software subset contains all files relating to the graphical print configuration application, Print Configuration. This software subset is mandatory on systems with graphics capabilities.

Table C–13: Description of the System Administration Software Subsets (cont.)

Subset Name	Title and Contents
OSFXADMIN520	**Graphical System Administration Utilities** - This software subset contains all files relating to the following graphical system administration utilities: Account Manager, Archiver, File Sharing, Host Manager, System Info, Kernel Tuner, License Manager, and Process Tuner. This software subset is mandatory on systems with graphics capabilities.
OSFIMXE520	**Insight Manager** - This software subset contains agents that allow the system to be managed remotely by the Compaq Insight Manager system administration tool.
OSFKTOOLS520	**Kernel Debugging Tools** - This software subset provides tools for analyzing and debugging kernels.
OSFLSMBASE520	**Logical Storage Manager** - This software subset contains the LSM administrative commands and tools required to manage an LSM configuration. This subset is mandatory if you select to install LSM during a Full Installation.
OSFLSMX11520	**Logical Storage Manager Graphical User Interface** - This software subset contains the LSM Motif-based graphical user interface (GUI) management tool and related utilities.
OSFNFSCONF520	**NFS Configuration Application** - This software subset contains the files related to the Network File System (NFS), which allows you to export (share) local directories and import (mount) remote directories over the network.
OSFSERVICETOOLS520	**Service Tools** - This software subset contains the `syscheck` service tool, which is used to capture, print, and escalate system problems into reports to mail to corporate customer support representatives.
OSFEURLOC520	**Single-Byte European Locales** - This software subset provides basic internationalization and localization information for 21 Western European countries.
OSFACCT520	**System Accounting Utilities** - This software subset provides programs and data files needed to perform system accounting. This software subset contains log files that grow automatically.
OSFEXER520	**System Exercisers** - This software subset provides programs that help to diagnose problems with hardware and peripheral devices.

C.3.12 Text-Processing Software Subsets

Table C–14 describes the software subsets in this category.

Table C–14: Description of the Text Processing Software Subsets

Subset Name	Title and Contents
OSFDCMT520	**Doc. Preparation Tools** - This software subset provides tools to format, manage, and display reference pages, including the `nroff` formatter and required macros.
OSFDCMTEXT520	**Doc. Preparation Tools Extensions** - This software subset contains additional `nroff` macro packages, bibliography tools, and `roff` tools.

C.3.13 Windowing Environment Software Subsets

Table C–15 describes the software subsets in this category.

Table C–15: Description of the Windowing Environment Software Subsets

Subset Name	Title and Contents
OSFX11520	**Basic X Environment** - This software subset provides programs required for the following X window applications: `dxconsole`, `dxkeycaps`, and `dxterm`. This software becomes mandatory and is installed automatically on systems with graphics capabilities.
OSFCDEDT520	**CDE Desktop Environment** - This software subset contains the user interface (that is, the front panel, colors, and so forth) to the Common Desktop Environment (CDE). This subset is mandatory if graphics capabilities are detected on the system.
OSFCDEMIN520	**CDE Minimum Run-time Environment** - This software subset contains the Common Desktop Environment minimum run-time environment, which includes shared libraries and executables for new client development. This subset is mandatory if graphics capabilities are detected on the system.
OSFFONT520	**DECwindows 75dpi Fonts** - This software subset provides fonts for X11/DECwindows and is needed for specific layered products and low resolution (1024 x 768) monitors. This software subset becomes mandatory (instead of OSFFONT150520) when low resolution graphics are detected during the installation.

Table C–15: Description of the Windowing Environment Software Subsets (cont.)

Subset Name	Title and Contents
OSFFONT15520	**DECwindows 100dpi Fonts** - This software subset provides workstation font files for systems using either the VR160 15-inch monitor or higher resolution graphics (1280 x 1024). This software subset is mandatory when high resolution graphics are detected during the installation.
OSFKBDLK411520	**LK411 Keyboard Support** - This software subset provides support for the Model LK411 keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.
OSFTRUETYPE520	**TrueType Font Renderer** – This subset contains a TrueType font renderer as a plugin for the X server. This renderer enables the X server to rasterize the TrueType font and display it on the screen.
OSFKBDPCXAL520	**PCXAL Keyboard Support** - This software subset provides support for the Model PCXAL keyboard. A label affixed to the underside of your keyboard shows the model number of the keyboard. This software subset becomes mandatory if this keyboard type is detected during the installation.
OSFXOEM520	**X Customizations for OEM** - This software subset contains X Window customizations and special logo information for use by specific original equipment manufacturers (OEMs) when they install the operating system on their own hardware. This software subset is not intended for general use and should not be installed if your site is not an OEM.
OSFMITFONT520	**X Fonts** - This software subset provides X11 fonts from the X Consortium compiled for the X server. This software subset becomes mandatory and is installed automatically on systems with graphics capabilities.

Table C–15: Description of the Windowing Environment Software Subsets (cont.)

Subset Name	Title and Contents
OSFSER520	**X Servers Base** - This software subset provides X11/DECwindows server support. A DECwindows server is the software that provides windowing on a workstation. This software subset becomes mandatory and is installed automatically on systems with graphics capabilities.
OSFSERPC520	**X Servers for PCbus** - This software subset provides graphics support for systems using the PCI bus. This software subset is loaded automatically when the installation procedure detects a PCI bus. This software subset also provides graphics support for EISA and PCI based systems that support QVision. This software subset is loaded automatically when the installation procedure detects QVision.

C.3.14 Windows Applications Software Subsets

Table C–16 describes the software subsets in this category.

Table C–16: Description of the Windows Applications Software Subsets

Subset Name	Title and Contents
OSFDECW520	**Additional DECwindows Applications** - This software subset provides additional X11/DECwindows client applications such as `dxdiff` (a visual differences program) and `dxnotepad`.
OSFXMIT520	**Additional X Applications** - This software subset contains the additional X Consortium X11 R5 client applications such as: `appres`, `bitmap`, `bmtoa`, `atobm`, `bdftopcf`, `editres`, `ico`, `iconv`, `listres`, `lndir`, `maze`, `mkdirhier`, `oclock`, `puzzle`, `resize`, `showfont`, `showrgb`, `viewres`, `x11perf`, `x11perfcomp`, `x11perfcomp`, `xauth`, `xbiff`, `xcalc`, `xclipboard`, `xclock`, `xcmsdb`, `xcmstest`, `xcutsel`, `xdpr`, `xdpyinfo`, `xedit`, `xev`, `xeyes`, `xfd`, `xfontsel`, `xgc`, `xkill`, `xload`, `xlogo`, `xlsatoms`, `xlsclients`, `xlsfonts`, `xmag`, `xman`, `xmh`, `xmkmf`, `xon`, `xpr`, `xprop`, `xrefresh`, `xstdcmap`, `xwd`, `xwininfo`, and `xwud`. See the reference page for each of these applications for more information.

Table C–16: Description of the Windows Applications Software Subsets (cont.)

Subset Name	Title and Contents
OSFCDEAPPS520	**CDE Additional Applications** - This software subset contains the Common Desktop Environment additional applications such as: `dxkeyboard`, `dxkeycaps`, and `dxdiff`. This subset also provides access to the following binaries: `dximageview`, `dtcm`, `dticon`, `dtimsstart`, and `dxkeyboard`. This software subset is mandatory on systems with graphics capabilities.
OSFXDEMOS520	**Demo X Applications** - This software subset contains X window demonstration applications to provide examples of the capabilities of the X windowing software that can be developed for the operating system.
OSFXNEST520	**Nested X Server** - This software subset provides the Xnest server and contains the following: the Xnest server binary `/usr/bin/X11/Xnest`, the Xnest shared library `/usr/shlib/libxnest.so`, and the Xnest configuration file `/var/X11/Xnest.conf`. Xnest is a client and a server. Xnest is a client of the real Xserver and appears in a window no more than 3/4 the size of the real server. Xnest is also a server. Clients specify the Xnest server display; Xnest then manages graphics requests on behalf of the clients.
OSFNETSCAPE520	**Netscape Communicator V4.75** - This software subset contains the Netscape Communicator World Wide Web viewer that is used to view the documentation set on line and for browsing the Internet. This software subset is mandatory on systems with graphics capabilities.
OSFOLDDECW520	**Old Additional DECwindows Applications** - This software subset provides additional X11/DECwindows client applications such as `dxnotepad`. These applications will be retired in a future release of the operating system.
OSFXPRT520	**Print X Server** - This software subset provides X print services.
OSFXVFB520	**Virtual X Frame Buffer** - This software subset provides the Xvfb server and contains the following: Xvfb server binary `/usr/bin/X11/Xvfb`, the Xvfb shared library `/usr/shlib/libxvfb.so`, and the Xvfb configuration file `/var/X11/Xvfb.conf`. The Xvfb server can run on machines with no display hardware and no physical input devices. It emulates a dumb frame buffer using virtual memory.

C.4 Worldwide Language Support (WLS) Subsets

The WLS software subsets described in this section are located on the CD-ROM labeled *Associated Products Volume 1*.

When you install WLS software, a set of WLS base software subsets that is compatible with the current version of the operating system is installed automatically. These subsets are prefixed with IOSWW. When you choose a country, additional optional subsets as well as language- and country-specific subsets are installed. The language- and country-specific subsets provide localization (translation) support of language-specific libraries, tools, and utilities. With the exceptions noted in Section C.4.1.1, Section C.4.2.3, and Section C.4.2.2, all WLS software subsets have a United States English equivalent.

Table C–17 lists the countries for which software subsets are available.

Table C–17: Supported Countries and Languages

Country	Country
Belgium (French)	Korea
Canada (French)	Lithuania
China (Hong Kong)	Poland
China (Simplified)	Russia
China (Taiwan)	Slovakia
Czech Republic	Slovenia
France	Spain (Catalan)
Germany	Spain (Spanish)
Greece	Sweden
Hungary	Switzerland (French)
Israel	Switzerland (German)
Italy	Thailand
Japan	Turkey

C.4.1 Worldwide Language Support Base Subsets

Table C–18 lists the base subsets provided for Worldwide Language Support as well as the base subsets provided with specific languages. Included in the table is the United States English subset equivalent, as well as the table in Section C.2 or Section C.3 where you can get a description of the subset.

Table C–18: Worldwide Language Support (WLS) Base Subsets

Base WLS Subset	US English Equivalent	Description	Languages in Which Subset Is Available
IOSWWBASE520	OSFBASE520	Table C–2	All
IOSWWBIN520	OSFBIN520	Table C–2	Chinese, Japanese, Korean, Thai
IOSWWBINCOM520	OSFBINCOM520	Table C–2	Chinese, Japanese, Korean, Thai
IOSWWPGMR520	OSFPGMR520	Table C–11	All
IOSWWPRINT520	OSFPRINT520	Table C–2	Chinese, Greek, Japanese, Korean, Thai, Turkish
IOSWWSYSMAN520	OSFSYSMAN520	Table C–2	All
IOSWWXDEV520	OSFXDEV520	Table C–11	All
IOSWWX11520	OSFXII520	Table C–15	All

C.4.1.1 WLS Base Subsets with No United States English Equivalent

The following WLS subsets have no direct United States English equivalent. All subsets are prefixed with `IOSWW`.

BINUCS **Unicode Support Kernel Module** – This subset enables the Asian tty driver to handle the UTF-8 character set correctly.

EURLOC520 **Worldwide European Unicode Locales** – This optional subset contains European UTF-8 Unicode locales, which are required to support the display of European currency symbols. It is available for all languages.

FGC520 **Worldwide Composite Unicode Fonts** – This subset contains the renderer to display composite Unicode fonts for supporting the UTF-8 locales. It is available for all languages.

FONTM520 **Worldwide DECwindows Fonts (Windowing Environment)** – This software subset contains

workstation font files mandatory for Asian languages. It is available to Chinese (including Simplified Chinese), Japanese, Korean, and Thai languages.

FONTP520 **Worldwide DECwindows Fonts (Windowing Environment)** – This software subset contains some public domain Unicode fonts. It is part of the WLS base and is available to all languages.

FONT100M520 **Worldwide DECwindows 100dpi Fonts (Windowing Environment)** – This software subset contains mandatory workstation 100dpi font files. This software subset is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor. There are mandatory font files for `ISO-LATIN2` (`LAT2FONT100M`), `ISO-LATIN4` (`LAT4FONT100M`), `ISO-LATIN9` (`LAT9FONT100M`), and `ISO-LATIN Cyrillic` (`LATCFONT100M`).

FONT100P520 **Worldwide DECwindows 100dpi Additional Fonts (Windowing Environment)** – This optional software subset contains additional Workstation 100dpi font files. There are additional font files for `ISO-LATIN2` (`LAT2FONT100P`), `ISO-LATIN4` (`LAT4FONT100P`), `ISO-LATIN9` (`LAT9FONT100P`), and `ISO-LATIN Cyrillic` (`LATCFONT100P`).

FONT75M520 **Worldwide DECwindows 75dpi Fonts (Windowing Environment)** – This software subset contains mandatory workstation 75dpi font files. This software subset is mandatory for systems using either a VR160 15-inch monitor or a higher resolution graphics monitor. This software subset is optional for systems using a low resolution graphics monitor. There are mandatory font files for `ISO-LATIN2` (`LAT2FONT75M`), `ISO-LATIN4` (`LAT4FONT75M`), `ISO-LATIN9` (`LAT9FONT75M`), and `ISO-LATIN Cyrillic` (`LATCFONT75M`).

FONT75P520 **Worldwide DECwindows 75dpi Additional Fonts (Windowing Environment)** – This optional

software subset contains additional Workstation 75dpi font files. There are additional font files for `ISO-LATIN2` (`LAT2FONT75P`), `ISO-LATIN4` (`LAT4FONT75P`), `ISO-LATIN9` (`LAT9FONT75P`), and `ISO-LATIN Cyrillic` (`LATCFONT75P`).

LAT9LOC   **Single-Byte Latin-9 Locales** – This optional subset contains European Latin-9 (ISO8859-15) locales for supporting the new Euro currency sign.

MULE520   **Worldwide MULE (General Applications)** –This software subset contains MULE (Multilingual Emacs) software. MULE is a multilingual enhancement of GNU Emacs. MULE Version 1 was based on GNU Emacs Version 18 and MULE Version 2 is based on GNU Emacs Version 19. MULE Version 1 is no longer supported. This software subset is part of the WLS base, is optional, and is available to all languages.

MULESRC520   **Worldwide MULE Source Files (Public Domain Source)** – This software subset contains the source files for MULE. This software subset is part of the WLS base, is optional, and is available to all languages.

OBSOLETE   **Obsolete Commands and Utilities** – This optional subset contains obsolete printer filters and commands that will be removed in a future release.

OLFONT520   **Worldwide Outline Fonts (Windowing Environment)** – This optional software subset contains outline font files. This software subset requires the `OSFAFM520` software subset. There are outline font files for ISO-LATIN2 (`LAT2`), and ISO-LATIN Cyrillic (`LATC`). Table C–19 lists the outline fonts and the associated languages.

Table C–19: Font Subsets and the Language Association

Font Subset	Languages in Which the Subset Is Available
LAT2FONT100M, LAT2FONT100P, LAT2FONT75M, LAT2FONT75P, LAT2OLFONT	Czech, Hungarian, Polish, Slovak, Slovene
LAT4FONT100M, LAT4FONT100P, LAT4FONT75M, LAT4FONT75P	Lithuanian
LATCFONT100M, LATCFONT100P, LATCFONT75M, LATCFONT75P, LATCOLFONT	Russian
LAT9FONT75M520, LAT9FONT100M520, LAT9FONT75P520, LAT9FONT100P520	Euro-Support

PHRASE520   **Worldwide Phrase Input Support (Operating System)** – This software subset contains binary files for the Asian phrase input methods and daemons. This software subset is optional and requires the `IOSWWBASE520` software subset. It is available for the Chinese, Japanese, Korean, and Thai languages.

SVEDEV520   **Worldwide SVE MNLS Migration Tools (Software Development)** – This software subset contains the migration tools of SVE MNLS, System V Environment Multinational Languages Support. It is part of the WLS base, is optional, and is available to all languages.

UDCOS520   **Worldwide User Defined Character Support (Operating System)** – This software subset contains tools to create user-defined characters in OS level. It also contains kernel objects for on demand font loading for terminal drivers. This software subset is optional and requires `IOSWWBASE520` software subset. It is available for the Chinese, Japanese, Korean, and Thai languages.

UDCWOS520	**Worldwide User Defined Character Workstation Service (Windowing Environment)** – This software subset contains a tool to create user-defined character fonts for X11/DECwindows. It is optional and requires the `IOSWWX11520` software subset. It is available for the Chinese, Japanese, Korean, and Thai languages.
XFR520	**Worldwide Two-Byte Outline Font Renderer (Windowing Environment)** – This software subset contains the outline font renderer for two-byte outline fonts. It is part of the WLS base, is optional, and is available to all languages. This software subset requires the `IOSWWX11520` software subset.

C.4.2 Language-Specific Subsets

This section lists each supported language as well as the software subsets provided with each language. To reconstruct the actual software subset name, prefix each subset name with `IOSLL`, where `LL` is the two-letter language code. For example, the subset `CDEMAIL` for Germany (the prefix for German is `DE`) becomes `IOSDECDEMAIL`. Each subset also has a three-digit suffix that represents the software version number; so, `IOSDECDEMAIL` becomes `IOSDECDEMAIL520`.

Certain countries share a language; for example, Canada and France both can use the French language subsets. The resulting subset name would use both the country and language code (`IOSLLCC`: `LL`=language, `CC`=country). So, the French-Canada X11 subset name, for example, would be `IOSFRCAX11520`.

Table C–20 lists the mail application subset and the languages in which the subset is available. The United States English equivalent software subset is described in Table C–6.

Table C–20: Mail Application Subsets

Language	Mail Application Subset
	CDEMAIL
Catalan (CA)	×
Czech (CS)	×
German (DE)	×
Greek (EL)	
Spanish (ES)	×

Table C–20: Mail Application Subsets (cont.)

Language	Mail Application Subset
	CDEMAIL
French (FR)	×
Hebrew (IW)	
Hungarian (HU)	×
Italian (IT)	×
Japanese (JP)	×
Korean (KO)	×
Lithuanian (LT)	
Polish (PL)	×
Russian (RU)	
Slovak (SK)	×
Slovene (SL)	
Swedish (SV)	×
Thai (TH)	×
Turkish (TR)	

Table C–21 lists the software development subsets and the languages in which the subsets are available. The United States English equivalent software subsets are described in Table C–11.

Table C–21: Software Development Subsets

Language	Software Development Subsets	
	CDEDEV	XDEV
Catalan (CA)	×	×
Czech (CS)	×	×
German (DE)	×	×
Greek (EL)		
Spanish (ES)	×	×
French (FR)	×	×
Hungarian (HU)	×	×
Italian (IT)	×	×
Hebrew (IW)		×

Table C–21: Software Development Subsets (cont.)

Language	Software Development Subsets	
	CDEDEV	XDEV
Japanese (JP)	×	×
Korean (KO)	×	×
Lithuanian (LT)		
Polish (PL)	×	×
Russian (RU)		×
Slovak (SK)	×	×
Slovene (SL)		
Swedish (SV)	×	×
Thai (TH)	×	×
Turkish (TR)		

Table C–22 lists the system administration subsets and the languages in which the subset is available. The United States English equivalent software subset is described in Table C–13.

Table C–22: System Administration Subset

Language	System Administration Subset
	XSYSMAN
Catalan (CA)	×
Czech (CS)	×
German (DE)	×
Greek (EL)	
Spanish (ES)	×
French (FR)	×
Hebrew (IW)	
Hungarian (HU)	×
Italian (IT)	×
Japanese (JP)	×
Korean (KO)	×
Lithuanian (LT)	
Polish (PL)	×

Table C–22: System Administration Subset (cont.)

Language	System Administration Subset
	XSYSMAN
Russian (RU)	
Slovak (SK)	×
Slovene (SL)	
Swedish (SV)	×
Thai (TH)	×
Turkish (TR)	

Table C–23 lists the windowing environment subsets and the languages in which the subsets are available. The United States English equivalent software subsets are described in Table C–15.

Table C–23: Windowing Environment Subsets

Language	Windowing Environment Subsets			
	CDEDT	CDEMIN	X11	CDEHLP[a]
Catalan (CA)	×	×	×	
Czech (CS)	×	×	×	
German (DE)	×	×	×	×
German - Swiss (DECH)			×	
Greek (EL)	×	×	×	
Spanish (ES)	×	×	×	×
French (FR)	×	×	×	×
French - Belgian (FRBE)			×	
French - Canadian (FRCA)			×	
French - Swiss (FRCH)			×	
Hungarian (HU)	×	×	×	
Italian (IT)	×	×	×	×
Hebrew (IW)	×	×	×	

Table C–23: Windowing Environment Subsets (cont.)

Language	Windowing Environment Subsets			
	CDEDT	CDEMIN	X11	CDEHLP[a]
Japanese (JP)	×	×	×	×
Korean (KO)	×	×	×	×
Lithuanian (LT)			×	
Polish (PL)	×	×	×	
Russian (RU)	×		×	
Slovak (SK)	×	×	×	
Slovene (SL)	×		×	
Swedish (SV)	×	×	×	×
Thai (TH)	×	×	×	
Turkish (TR)	×	×	×	

[a] The CDEHLP subset contains the online help files for the Common Desktop Environment. This software subset is optional and requires the CDEDT subset.

Table C–24 lists the windowing applications subsets and the languages in which the subsets are available. The United States English equivalent software subsets are described in Table C–16.

Table C–24: Windowing Applications Subsets

Language	Windowing Application Subsets	
	CDEAPPS	DECW
Catalan (CA)	×	×
Czech (CS)	×	×
German (DE)	×	×
Greek (EL)		
Spanish (ES)	×	×
French (FR)	×	×
Hebrew (IW)		
Hungarian (HU)	×	×
Italian (IT)	×	×
Japanese (JP)	×	×
Korean (KO)	×	×

Table C–24: Windowing Applications Subsets (cont.)

Language	Windowing Application Subsets	
	CDEAPPS	DECW
Lithuanian (LT)		
Polish (PL)	×	×
Russian (RU)	×	×
Slovak (SK)	×	×
Slovene (SL)		
Swedish (SV)	×	×
Thai (TH)	×	×
Turkish (TR)		

Table C–25 lists the miscellaneous subsets and the languages in which the subsets are available.

Table C–25: Miscellaneous Subsets

Language	Miscellaneous Subsets					
	BASE	OLFONT	FONTM[a]	FONTP[b]	FONT100[c]	FONT75[c]
Catalan (CA)	×					
Czech (CS)	×					
German (DE)	×					
Greek (EL)	×	×			×	×
Spanish (ES)	×					
French (FR)	×					
Hungar-ian (HU)	×					
Italian (IT)	×					
Hebrew (IW)	×	×			×	×
Japanese (JP)	×		×		×	×

Table C–25: Miscellaneous Subsets (cont.)

Language	Miscellaneous Subsets					
	BASE	OLFONT	FONTM[a]	FONTP[b]	FONT100[c]	FONT75[c]
Korean (KO)	×	×	×	×		
Lithua- nian (LT)						
Polish (PL)	×					
Russian (RU)	×					
Slovak (SK)	×					
Slovene (SL)						
Swedish (SV)	×					
Thai (TH)	×	×	×			
Turkish (TR)	×	×			×	×

[a] The FONTM subset contains workstation fonts.
[b] The FONTP subset contains additional workstation fonts.
[c] Includes M (mandatory) and P (additional) fonts

C.4.2.1 Additional Subsets Provided for Asian Languages Other Than Chinese

Table C–26 shows the additional subsets that have United States English equivalents provided for Asian languages.

Table C–26: Additional Asian-Language Subsets

Subset Name	Japanese (JP)	Korean (KO)	Thai (TH)
BIN (see Table C–2)	×		×
DOSTOOLS (see Table C–3)	×		
LDBBASE (see Table C–11)	×		
LSMX11 (see Table C–13)	×		
MANOS (see Table C–10)	×		

Table C–26: Additional Asian-Language Subsets (cont.)

Subset Name	Japanese (JP)	Korean (KO)	Thai (TH)
MANWOS (see Table C–10)	×		
NETSCAPE (see Table C–16)	×		
PGMR (see Table C–11)	×	×	×
PRINT (see Table C–8)			×
SYSMAN (see Table C–13)	×		
XADMIN (see Table C–13)	×		
XADVFS (see Table C–13)	×		

C.4.2.2 Additional Subsets Provided for Japanese

The following subsets have no United States English equivalents, and are provided for the Japanese language only. All subsets are prefixed with `IOSJP`.

ABASE520	**Additional Japanese Software** – This software subset contains additional general applications. This software subset is optional and requires the `IOSJPBASE520` software subset.
AMANOS520	**Japanese Reference Pages for Additional Software** – This software subset contains the reference pages for the Japanese software in `IOSJPABASE520`. This software subset is optional and requires the `OSFDCMT520` software subset.
APXGUI	**Japanese Advanced Printing Software Base and Client Commands** - This software subset contains the graphical user interface for Advanced Printing.
CDEHLPSJIS520	**Japanese (SJIS) Online Help** – This software subset contains CDE online help in SJIS (Shift JIS), one of the Japanese character set encodings.

SDECDE520 **Japanese Software Development Desktop Environment** – This software subset is optional and requires the `IOSJPCDEDT520` and `OSFSDECDE520` software subsets.

WNN520 **Wnn Input Method** – This software subset contains Wnn, the Japanese input method for entering Japanese characters.

WNNPGMR520 **Wnn Software Development** – This software subset contains the header files and libraries for the Wnn input method development. It is optional and requires the `IOSJPBASE520` software subset.

WNNSRC520 **Wnn Source Files (Public Domain Source)** – This software subset contains the source file for the Wnn input method. This software subset is optional and has no other software subset dependencies.

C.4.2.3 Subsets Provided for Chinese

WLS provides Chinese language support for Traditional, Simplified, Hong Kong, and Taiwan. Subsets available in the Chinese Language group have prefixes that include `IOSZHT` (traditional Chinese), `IOSZHS` (simplified Chinese), `IOSZHTW` (Taiwan Chinese), `IOSZHCN` (Mainland China), and `IOSZHHK` (Hong Kong Chinese). Table C–27 shows the subsets with United States English equivalents in each Chinese language group.

Table C–27: Chinese Language Subsets with US English Equivalents

	Chinese Language					
Subset	Base Chinese (ZH)	Mainland (CN)	Simplified (S)	Hong Kong (HK)	Taiwan (TW)	Tradi-tional (T)
Mail Applications						
CDEMAIL (see Table C–6)		×			×	
Software Development						
CDEDEV (see Table C–11)		×			×	
PGMR (see Table C–11)	×					

**Table C–27: Chinese Language Subsets with US English Equivalents
(cont.)**

	Chinese Language					
Subset	**Base Chinese (ZH)**	**Mainland (CN)**	**Simplified (S)**	**Hong Kong (HK)**	**Taiwan (TW)**	**Tradi- tional (T)**
XDEV (see Table C–11)			×			×
System Administration						
SYSMAN (see Table C–13)			×			
XADMIN (see Table C–13)			×			
XSYSMAN (see Table C–13)			×			
Windowing Environment						
CDEDT (see Table C–15)		×			×	
CDEMIN (see Table C–15)		×			×	
CDEHLP (see Table C–15)		×			×	
X11 (see Table C–15)	×		×			×
Windowing Applications						
CDEAPPS (see Table C–16)		×			×	
DECW (see Table C–16)			×			×
Miscellaneous						
BASE	×	×		×	×	
TCRBASE			×			

The following Chinese language subsets have no United States English
equivalents and are provided for the Chinese language only. All of the
following subsets are unique to Chinese. All subsets are prefixed with IOSZH.

BIG5520

Big-5 Character Set Support – This software subset contains all the
BIG5 related libraries, charmaps, methods and terminal drivers. This
software subset is optional and requires the `IOSZHBASE520` software
subset.

CONV520

Traditional and Simplified Chinese Conversion – This software
subset contains the terminal drivers, kernel objects and services for
Traditional and Simplified Chinese conversion. This software subset is
mandatory and requires the `IOSZHBASE520` software subset.

FONTM520, FONTP520

Workstation Fonts – These sofware subsets contain the workstation
fonts for Traditional (T) and Simplified (S) Chinese.

LOC520

Additional Chinese Locales – This software subset contains the `@`
variant locales that have different collating rules for Mainland China
(CN) and Taiwan Chinese (TW). These software subsets are optional
and require the `IOSZHCNBASE520` software subset.

OLFONT520

Chinese Outline Fonts – These software subsets contain the Chinese
outline fonts for Simplified (S) and Traditional (T) Chinese.

TELEX520

Telecode Character Set Support – This software subset contains
all Telecode related methods and terminal drivers. This optional
software subset is available for Taiwan Chinese (TW) and requires the
`IOSZHBASE520` software subset.

TTFONT 520

TrueType Fonts – This software subset contains the TrueType
Fonts for Simplified Chinese (S). This software subset is optional and
requires the `IOSZHBASE520` software subset.

D

Installing Associated Products

This appendix describes how to install associated products. The following topics are discussed:

- General installation information for all associated products (Section D.1)

- Installing an associated product from CD-ROM (Section D.1.1)

- Installing an associated product from a remote installation services (RIS) server (Section D.1.2)

- Updating the whatis database after installing an associated product (Section D.1.3)

D.1 General Installation Information

Associated products are installed after the initial Full Installation by using the `setld` utility. The installation can be invoked from the Associated Products CD-ROM Volume 1 or 2 or from a remote installation services (RIS) server environment

Most of the product directories on the associated products CD-ROM contain a `doc` subdirectory, which contains the documentation (in HTML and text formats) for the product if it is available. A `README` file in each product directory provides a short description of the product.

Follow the instructions in Section D.1.1 or Section D.1.2 to install all associated products.

D.1.1 Installing Associated Products from the CD-ROM

Follow this procedure to install an associated product from the Associated Products CD-ROM:

1. Become superuser (or log in as `root`):

   ```
   # su -
   Password: root_password
   ```

2. Mount the Associated Products CD-ROM at the `/mnt` directory. See Section B.3 if you do not know how to mount a CD-ROM.

   If you mount the CD-ROM at a mount point other than `/mnt`, modify the remaining steps accordingly.

3. Change directory to the mounted CD-ROM:

   ```
   # cd /mnt
   ```

4. Examine the product directories to determine the directory name in which the product is located:

   ```
   # ls -cF
   ```

5. Change directory to the / (root) directory:

   ```
   # cd /
   ```

6. Invoke the `setld` utility :

   ```
   # /usr/sbin/setld -l /mnt/product_directory/kit
   ```

   Replace *product_directory* with the name of the directory where the product is located.

   The `setld` utility displays the list of software subsets that are available to install. Choose the software subsets you want from the list.

7. Repeat Steps 4 through 6 for each associated product you want to install.

D.1.2 Installing Associated Products from a Remote Server

Follow this procedure to install an associated product from a RIS server environment:

1. Ask your RIS server administrator to ensure that your system is a client of the RIS server and is registered for the right environment.

2. Ensure that your system can communicate with the RIS server:

   ```
   # /sbin/ping -c2 ris_server_name
   ```

   Successful communication between your system and the RIS server should result in a zero data packet loss. Command output looks similar to this:

   ```
   # ping -c2 system9
   PING system9 (16.59.124.96): 56 data bytes
   64 bytes from 16.59.124.96: icmp_seq=0 ttl=255 time=1 ms
   64 bytes from 16.59.124.96: icmp_seq=1 ttl=255 time=0 ms

   ----system9 PING Statistics----
   2 packets transmitted, 2 packets received, 0% packet loss
   round-trip (ms)  min/avg/max = 0/0/1 ms
   ```

   In the previous example, `system9` is the name of the RIS server. If your system is not connected to the network, open the System Setup application (by entering `/usr/sbin/checklist`), and use the `Quick Setup` application to configure basic network services.

3. Invoke the `setld` utility. Remember to append a colon (:) to the RIS
    server name :

    # **/usr/sbin/setld -l** *ris_server_name*:

    The `setld` utility displays the list of software subsets that are available
    to install. Choose the software subsets you want from the list.

D.1.3 Updating the whatis Database After Installing Reference Pages for Associated Products

The `apropos` and `man` commands access reference page entries in the whatis
database. The whatis database that is created in the `/usr/share/man`
directory when you initially install base operating system reference pages
includes entries only for those reference pages.

The whatis database provided as part of the operating system is not updated
automatically when an associated product, layered product, third party,
or site-specific reference pages are installed after the initial operating
system installation. If the whatis database exists on your system, you
should update the database by executing the `catman -w` command if you
install product-specific reference pages. For information about using the
`catman -w` command to rebuild the whatis database, see `catman(8)` for
more information.

E

Update Installation Processing on Existing Files

This appendix describes how the Update Installation process merges existing user customizations into the new, updated versions of the files. The following files and topics are described:

- Overview of file preservation during an Update Installation (Section E.1)

- What is a protected system file? (Section E.2)

- What is a `.new..` file? (Section E.2.1)

- What is a `.proto..` file? (Section E.2.2)

- What is a `.PreMRG` file? (Section E.2.3)

- How does a merge script work? (Section E.2.4)

- What is a configured file? (Section E.2.5)

- Merging protected system files (Section E.3)

- Successful file merges (Section E.3.1)

- Unsuccessful file merges (Section E.3.2)

E.1 Overview of File Preservation During an Update Installation

An Update Installation preserves all user-created files and accounts. It also attempts to preserve customizations made to system files, which are files shipped in the base operating system. To ensure that the customizations are never lost, an Update Installation process creates backup copies of the customized files before updating them. This appendix describes the files used by the update process to preserve file customizations.

E.2 Description of Protected System Files

A protected system file is an operating system file that can be customized by the user. Each protected system file is really three files on your system: the file itself, a `.new..` file, and a `.proto..` file. As shown in Table E–1, a protected system file that frequently is customized is the `/etc/hosts` file.

Table E–1: Protected System File: /etc/hosts

File Name	Description
/etc/hosts	Current Version 5.0A or Version 5.1 file with your customizations — the configured file.
/etc/.new..hosts	Current Version 5.0A or Version 5.1 file as originally shipped.
/etc/.proto..hosts	File created from the /etc/.new..hosts file during the initial Full or Update Installation.

E.2.1 What is a .new.. File?

An Update Installation prefixes system files with the .new.. prefix to avoid overwriting the configured system file. So, when the new version of the file is loaded, it is loaded as a .new.. file and does not overwrite the user-customized version. An Update Installation also compares the configured file against the .new.. file to determine whether or not you have customized the configured file.

_____ **Note** _____

The .new.. files play an important role in the Update Installation process. Do not modify or remove these files.

_____

E.2.2 What is a .proto.. File?

A file with a .proto.. prefix is a copy of the .new.. file that can be modified. Modify this file only if you are providing site-wide customizations and are using Dataless Management Services (DMS). Otherwise, you should modify the configured version of this file rather than the .proto.. version.

_____ **Note** _____

The .proto.. files play an important role in the Update Installation process. Do not remove these files.

The only time these files are modified is if you are using DMS. In that case, the .proto.. files in the dataless areas are modified, not the .proto.. files for the server's operating system. For more information on DMS, see *Sharing Software on a Local Area Network*.

_____

E.2.3 What is a .PreMRG File?

The Update Installation process makes copies of all protected system files
before updating the system. These copies have a `.PreMRG` suffix. This
ensures that all of your customizations can be restored if the automatic
merge operation fails. Using the `/etc/hosts` file from Table E–1 as an
example:

- The `/etc/hosts` file is copied to `/etc/hosts.PreMRG`

- The `/etc/.new..hosts` file is copied to `/etc/.new..hosts.PreMRG`

- The `/etc/.proto..hosts` file is copied to
  `/etc/.proto..hosts.PreMRG`

E.2.4 What is a .mrg.. File?

A file with a `.mrg..` prefix is a script file. This script merges any new
functionality added in the new version of the operating system file with
your existing configured file.

E.2.5 What is a Configured File?

The `/etc/hosts` file is the configured file, that is, the file that actually is
used and read by the system. This is the file where changes are made during
the course of normal system administration and management operations.

E.3 Merging Protected System Files

An updated operating system preserves all prior existing files and
customizations. Preserving customizations involves merging new file
modifications with existing custom modifications.

The merge script executes if both of the following conditions are true:

- You have customized a configured file, for example `/etc/hosts`.

- The new version of the operating system has modified the same file.

E.3.1 Successful Merges

After a successful merge, using the `/etc/hosts` file example, the files
shown in Table E–2 are left on your system. The Update Installation process
removes the `.PreMRG` files when the files merge successfully. The file
`/var/adm/smlogs/it.log` contains a log of the merge process.

Table E–2: Files Left on the System After Successful Merge: /etc/hosts File

File Name	Description
`/etc/#.mrg..hosts`	Version 5.1A merge script.
`/etc/.new..hosts`	Version 5.1A file as it was shipped.
`/etc/.proto..hosts`	Your customized Version 5.0A or Version 5.1 `/etc/.proto..hosts` file with new Version 5.1A functionality added by the merge script. Modify this file only if you are using DMS.
`/etc/hosts`	Your customized Version 5.0A or Version 5.1 file with new functionality added by the merge script.

E.3.2 Unsuccessful Merges

If the Update Installation is unable to merge your customized Version 5.0A or Version 5.1 file with the new Version 5.1A file, it will create a `.FailMRG` file and leave the `.PreMRG` file. In order to ensure that your system operates correctly, the Update Installation will also copy the Version 5.1A file to the configured file so that there is a working version of the file present on the system.

Because the working, configured version of the file is a copy of the Version 5.1A file, it will not contain any of your customizations. You will need to manually add any customizations to the file after the update is complete.

Any lines that exist in the backup copy of the configured file (`.PreMRG`) and do not exist in the backup of the originally shipped Version 5.0A or Version 5.1 file (`.new..file.PreMRG`) are your customizations. If the merge failed, using the `/etc/hosts` example, the files shown in Table E–3 will exist on your system. The file `/var/adm/smlogs/upd_mergefail_files` contains a list of failed merge files. If you want to determine why the merge failed, you can examine the log of the merge process in the `/var/adm/smlogs/it.log` and `/var/adm/smlogs/update.log` files.

Table E–3: Files Left on the System After a Failed Merge: /etc/hosts File

File Name	Description
`/etc/#.mrg..hosts`	Version 5.1A merge script.
`/etc/.new..hosts`	Version 5.1A file as originally shipped.
`/etc/.new..hosts.PreMRG`	Backup copy of Version 5.0A or Version 5.1 file as originally shipped.
`/etc/.proto..hosts`	Copy of Version 5.1A `/etc/.new..hosts` as originally shipped.

Table E–3: Files Left on the System After a Failed Merge: /etc/hosts File (cont.)

File Name	Description
/etc/.proto..hosts.PreMRG	Backup copy of Version 5.0A or Version 5.1 file with your customizations.
/etc/hosts	Copy of Version 5.1A file as originally shipped.
/etc/hosts.PreMRG	Backup copy of Version 5.0A or Version 5.1 file with your customizations.

F

Installation Log Files

Installation log files capture the screen output and processing of Full, Update, and Cloned installations and may provide valuable information for troubleshooting problems. This appendix contains the following information:

- A sample message of the day file (Section F.1)

- Reasons why you should review the installation log files (Section F.2)

- A description of Full Installation log files (Section F.3)

- A description of Update Installation log files (Section F.4)

F.1 The Message of the Day File

A list of the installation log files created during the installation is displayed on the screen each time you log in. Example F–1 shows a sample /etc/motd file. The /etc/motd file contains the *message of the day* that is displayed each time a user logs in. The installation log files are located in the /var/adm/smlogs directory.

Example F–1: Sample /etc/motd File Showing Location of Log Files

```
Tru64 UNIX V5.1A  (Rev. nnn); Fri Aug 24 11:44:35 EST 2001
****************************************************************************
The following files contain a record of the Update Installation session.

        /var/adm/smlogs/it.log            - log for it(8) utility
        /var/adm/smlogs/update.log        - update installation log file
        /var/adm/smlogs/upd_custom_files  - log of unprotected customized
                                            system files found during the
                                            update installation.
        /var/adm/smlogs/upd_obsolete_files - log of obsolete system files
                                            found during the update
                                            installation.
****************************************************************************
The installation software has successfully installed your system.
There are logfiles that contain a record of your installation.
These are:
        /var/adm/smlogs/install.cdf     - configuration description file
        /var/adm/smlogs/install.log     - general log file
        /var/adm/smlogs/install.FS.log  - file system creation logs
        /var/adm/smlogs/setld.log       - log for the setld(8) utility
        /var/adm/smlogs/fverify.log     - verification log file
```

F.2 Reviewing Installation Log Files

The installation log files contain useful information about problems that may have occurred during the installation process, and they should be examined for errors after the installation completes. All log files are located in the `/var/adm/smlogs` directory.

F.3 Full Installation Files

This section describes the following Full Installation log files:

- `install.FS.log`
- `install.log`
- `it.log`
- `setld.log`
- `fverify.log`
- `install.cdf`

F.3.1 The install.FS.log File

The `install.FS.log` file contains a log of the file system creation performed during a Full Installation. Any errors that occurred between the time you confirmed the start of the Full Installation and the completion of file system creation can be found here. This file is used only by a Full Installation.

F.3.2 The install.log File

The `install.log` file contains a log of all the output that was displayed to the screen from the time the file systems were created during the Full Installation until the system rebooted for the first time. This file contains information about file system creation, the operating system subsets that were loaded, and the configuration of any files that are needed to reboot the system for the first time. If the Full Installation was performed using Remote Installation Services (RIS), this file also contains a log of the load and configuration of the Worldwide Language Support subsets, if applicable. This file is used only by the Full Installation.

F.3.3 The it.log File

The `it.log` file contains a log of all the output that was displayed to the screen from the time the system was rebooted with the generic kernel until the time the system was rebooted for the final time with the newly built tailored kernel. Some of the information contained in this file is the configuration of the operating system software and the build of the tailored

kernel. If the installation was performed using CD-ROM, this file also contains the load and configuration of the Worldwide Language Support subsets, if applicable. This file is used by the Full Installation and Update Installation processes.

F.3.4 The setld.log File

The `setld.log` file contains a record of all of the software subset management actions. If there was a problem loading or removing a software subset, a log of the errors will be found here. This file is maintained by the `setld` command and information is appended to the file whenever the `setld` command is used, with the exception of the `setld -i` operation.

F.3.5 The fverify.log File

The `fverify.log` file is maintained by the `/usr/lbin/fverify` utility, and it is modified whenever a software subset is loaded. Every time a subset is loaded, the `setld` command executes the `fverify` utility to verify that all of the files in the subset were correctly loaded. If any files were not correctly installed, a record of the files can be found here along with the reason the files failed to pass verification.

F.3.6 The install.cdf File

The `install.cdf` file contains a record of the information supplied during the Full Installation from the time the installation starts until you confirm the start of the installation. The `install.cdf` file is used to perform an Installation Cloning, which is documented in the *Installation Guide -- Advanced Topics*. This file is used only by the Full Installation.

F.4 Update Installation Log Files

This section describes the following Update Installation log files:

- `update.log`
- `upd_custom_files`
- `upd_PreMRG_files`
- `upd_mergefail_files`
- `upd_obsolete_files`

F.4.1 The update.log File

The `update.log` file contains a log of all the output that was displayed to the screen from the time the `installupdate` command was invoked until the system is rebooted under the new operating system for the first time.

This log file is used only by the Update Installation process and should
be examined to determine if there were any errors during the Update
Installation.

F.4.2 The upd_custom_files File

The `upd_custom_files` file contains a list of all of the files that were
saved to a `.PreUPD` extension as part of the Update Installation. Files
saved to a `.PreUPD` extension are files that contained user customizations
that could not be merged automatically with the version of the file
shipped with the new operating system. The `.PreUPD` files can be used as
references when manually merging customizations into the new files. The
`upd_custom_files` file is created by the Update Installation and is used
by the Update Installation Cleanup (`/usr/sbin/updadmin`) utility. Never
modify this file.

F.4.3 The upd_PreMRG_files File

The `upd_PreMRG_files` file contains a list of all of the files that were saved
to a `.PreMRG` extension as part of the Update Installation. Files saved to
a `.PreMRG` extension are files that contained user customizations that the
update tried to automatically merge with the version of the file shipped with
the new operating system, but could not. The `.PreMRG` files can be used
as a reference when manually merging customizations into the new files.
This file is created by the Update Installation and is used by the Update
Installation Cleanup (`/usr/sbin/updadmin`) utility. Never modify this file.

F.4.4 The upd_mergefail_files File

The `upd_mergefail_files` file contains a list of all of the protected system
files that failed to automatically merge during the Update Installation.
Because the merge failed, the Update Installation saved your customized
file to a `.PreMRG` extension and then replaced the customized file with
the version shipped in the new operating system. For every file in the
`upd_mergefail_files` file, manually merge the customizations from the
`.PreMRG` file into the new file. Failure to do the merge of customizations
results in the loss of important customizations that may impact system
performance. This file is created by the Update Installation process.

F.4.5 The upd_obsolete_files File

The `upd_obsolete_files` file should be empty because obsolete files
and directories automatically are removed from the system by the Update
Installation. However, this file will contain a list of obsolete directories if
there are files present that were created by users or layered products. The

Update Installation does not remove a directory that contains files that
are not obsolete.

G

Troubleshooting

This appendix lists the error messages you might see if there is a problem during an installation along with possible corrective action. Every attempt was made to make the error list complete, however, it is possible you may encounter errors that are not described here.

This appendix is organized by topic rather than by error message:

- **Full Installation** error messages (Section G.1)

  - Disk label, file system and LSM configuration error messages (Section G.1.1)

  - LSM configuration errors (Section G.1.1.1)

  - Multiple `hostid` errors on existing LSM configurations (Section G.1.1.2)

  - Restarting LSM if it fails to restart when you reboot the system (Section G.1.1.3)

  - Configuration Description File (CDF) validation errors (Section G.1.2)

  - Software subset load errors (Section G.1.3)

- **Update Installation** error messages (Section G.2)

  - Startup error messages (Section G.2.1)

  - CD-ROM error messages (Section G.2.1.1)

  - RIS error messages (Section G.2.1.2)

  - Analysis phase error messages (Section G.2.2)

- **Software Configuration** error messages (Section G.3)

- **Post Installation** error messages (Section G.4)

  - Recovery procedures for `setld` software load and delete failures (Section G.4.1)

  - Recovering from software subset load and delete failures on a cluster (Section G.4.2)

G.1 Full Installation Error Messages

The following describes the general error messages that you might encounter during a Full Installation.

Broken pipe

> This is an erroneous message that sometimes is displayed during software loading or configuration. It is safe to ignore this message.

The firmware revision on this system could not be detected

> Some processor types do not allow the Full Installation technology to detect the current installed firmware level. See the *Alpha AXP Systems Firmware Update Release Notes Overview* for information regarding the recommended revision numbers and how to update your system firmware.

The following error occurred, causing the "ping" command to fail for *disk_name*: <*Specific error*>

> While using the text-based interface to the Full Installation, you entered the ping command to determine the device name associated with a physical disk by blinking the input/output light. For some reason, the ping command failed. Failure of the ping command does not mean that you cannot use this disk; it simply means the disk cannot be identified in this way.

No free partitions are remaining on this system, therefore the installation process cannot continue with this configuration. Either choose the "Default File System Layout", or choose a new "Custom File System Layout." If you cannot alter the layout, you may need to edit your disk partitions. Refer to the "Installation Guide – Advanced Topics" for more information about editing disk partitions from the UNIX shell.

> During the Full Installation, the system ran out of free, unused disk partitions. Perhaps a disk has a disk label where partition a consumes the entire disk, and there are no other disks available. In that case, you have to repartition the disk into individual segments of the right size. If you are using the graphical user interface, invoke the Disk Configuration utility to perform this task. If you are using the text-based interface, exit to the UNIX shell and use the disklabel command to repartition the disk.

> Some cases, however, might be more difficult to remedy. For example, if a system had two RZ25 disks (too small for the recommended disk label), and both disks have CD type labels on them (that is, partition a and partition c are the same large partition, and no other partitions are assigned), one disk could be used for the / file system , the other for /usr, and there is no place for anything else. The solution in this case is to edit the disk labels.

The partition you selected for [usr] takes up the entire disk, and leaves no space for the LSM private region. Therefore, you must choose a different partition.

You selected to install and configure the Logical Storage Manager (LSM). Each disk needs an LSM private region partition, and no room was left on the disk in question. You have to repartition the disk to make a partition at least 2 MB in size to hold the LSM private region. If that is not possible, select another disk.

Unable to get a list of software subsets available for installation.

This message would occur if you have a corrupted distribution media. Contact your support representative to obtain a new set of operating system CD-ROMs. If you are performing the installation from a RIS server, the RIS environment may have to be recreated. Contact your RIS administrator about the problem.

Unable to determine the available software due to the following error:
<Specific error>

This message would occur if you have a corrupted distribution media. Contact your support representative to obtain a new set of operating system CD-ROMs. If you are performing the installation from a RIS server, the RIS environment may have to be recreated. Contact your RIS administrator and notify them about the problem.

G.1.1 Disk Label, File System and LSM Configuration Error Messages

If errors are encountered during the configuration of a disk label, file system, or Logical Storage Manager (LSM) during a Full Installation, you will be instructed as follows:

```
Please inspect the file /var/tmp/install.FS.log to identify the
source of the failure
```

The `/var/tmp/install.FS.log` file is written in the `/var` memory file system (MFS) and is deleted when the system reboots. Use the `more /var/tmp/install.FS.log` command to view the contents of this file.

The corrective action depends upon the error message returned from the failed command. As a general procedure, ensure that the installation target disk is connected and is operating properly. If it is, restart the installation procedure and select a different disk (if possible). Contact your support representative to diagnose the problem with the disk.

Errors encountered during the LSM configuration phase also can be the result of specific problems with an existing LSM configuration. If possible, analyze the error message returned from the failing command, verify and correct the existing configuration, then restart the installation. If you need

more information about fixing LSM problems, refer to the *Logical Storage Manager* guide or the related LSM command reference pages.

The following topics are covered in this section:

- Fixing LSM configuration errors
- Fixing LSM multiple `hostid` errors
- Restarting LSM if it fails to restart when you reboot the system

G.1.1.1 Fixing LSM Configuration Errors

Details on any LSM installation error, including the actual error message, can be found in the `/var/tmp/install.FS.log` file. This file exists in the `/var` memory file system and will be available only until the system is rebooted. Typically, the source of the error will be the last entry in the log.

Additional information on the current state of the LSM configuration can be displayed by using the commands shown in Table G–1:

Table G–1: LSM Display Commands

Display Command	LSM Components Displayed
`voldisk list`	disk, disk media
`voldisk -s list`	expanded voldisk list output
`volprint`	volume, plex, subdisk, private region
`volprint -t`	expanded volprint output
`voldg list rootdg`	disk group, private region
`disklabel -r` *name*	partition fstype

The various components of an LSM configuration can be removed manually after the source of the problem has been identified. The commands to remove specific LSM components are shown in Table G–2:

Table G–2: LSM Remove Commands

Remove Command	LSM Components Removed
`voldisk rm` *name*	disk
`voldg rmdisk` *name*	disk media, private region
`voledit -rf rm` *name*	volume, plex, subdisk

The `voldisk rm` command removes the LSM disk and updates the partition fstype on the disk label to `unused`. If, for some reason, the disk label is not updated after executing this command, the fstype can be set manually to `unused` by entering the following command:

```
# disklabel -s unused /dev/disk/dsk0
```

After the source of the problem has been removed, the installation can be restarted by entering the `restart` command or by rebooting the installation media.

If you do not need to preserve any existing LSM information, LSM can be removed completely from the system by issuing the `disklabel -z` command against each disk on the system before starting the installation procedure. This method is suggested if you are unsure of the integrity of an existing LSM configuration.

_____ **Caution** _____

Be aware that the original configuration cannot be restored after the existing disk labels have been removed. All existing data on the system is lost.

_____

This information is specific to LSM Full Installations, and it is not intended to be an overview of general LSM topics. If you need more information, refer to the *Logical Storage Manager* guide or the related LSM reference pages.

G.1.1.2 Fixing Multiple hostids Error on Existing LSM Configurations

LSM requires that a single `hostid` be defined for the `rootdg` disk group. Due to various reasons, including swapping disks between LSM systems without properly exporting them from their original system and importing them into the new system, an existing LSM configuration can be left in a state where multiple `hostids` exist for the `rootdg` disk group.

The following message is displayed during a Full Installation if you attempt to install LSM on a system with an LSM configuration that has multiple `hostids`:

```
LSM could not be initialized on this system due to the
following error:
lsm:voldctl: ERROR: enable failed:
Multiple hostid's found for rootdg

o Choose "Continue" if you want the install process
  to create all file systems without LSM.  Refer
  to the Logical Storage Manager documentation for
  instructions on how to configure LSM after
  the installation.
o Choose "Exit Installation" if you would like to
  attempt recovery from the LSM failure.  You will
  be placed in single-user mode at the UNIX
  shell  with superuser privileges.  Refer to the
  Logical Storage Manager documentation for any
```

```
   additional information regarding the error.

   1) Continue
   2) Exit Installation

Enter your choice:
```

LSM cannot be selected during a Full Installation on a system where
multiple `hostids` are found for the `rootdg` disk group. This problem,
which is not specific to the installation environment, cannot be resolved
in an automated fashion by the Full Installation process. If you want to
install LSM, you must resolve the problem manually before restarting the
Full Installation.

You may have to try several different methods to fix the problem:

1. The first way to resolve the problem is to boot the existing system to
    determine the current state of LSM and remove the invalid `hostids`.
    On systems where multiple `hostids` exist, messages similar to the
    following are displayed when LSM is initialized during system boot:

    ```
    starting LSM in boot mode
    lsm:vold: WARNING: Disk dsk1d names group rootdg, but group ID differs
    lsm:vold: WARNING: Disk dsk2d names group rootdg, but group ID differs
    lsm:vold: WARNING: Disk dsk4h names group rootdg, but group ID differs
    lsm:vold: WARNING: Disk dsk5h names group rootdg, but group ID differs
    lsm:vold: WARNING: Disk dsk6h names group rootdg, but group ID differs
    ```

    In this example, the system has five LSM private regions located on
    partitions `dsk1d`, `dsk2d`, `dsk4h`, `dsk5h`, and `dsk6h`.

    After the system is running, use the `voldisk -s list` command
    to view detailed information on each disk under LSM control. This
    information will include the `hostid` for each private region listed. After
    the erroneous `hostids` have been identified, remove the private region
    containing these `hostids` and restart the Full Installation process.
    See Section G.1.1.1 for more information about the commands that
    can be used to interrogate the existing LSM configuration and how to
    manually remove sources of problems.

    _____ **Caution** _____

        LSM private regions contain information that is critical to the
        existing LSM configuration. Removing LSM private regions
        should be performed with the utmost care and only should be
        performed by someone who understands both LSM and the
        details of the existing configuration. If you are unsure about

> performing this task, please ask your system administrator
> for assistance or see the *Logical Storage Manager* manual.

2. If the system is in a state where it cannot be booted, or if the system boots but LSM cannot be enabled because the existing LSM configuration is corrupted, the problem will have to be rectified by attempting to physically remove the disk that contains the erroneous private region. In this case, a working knowledge of the system itself and what activities recently have been performed on it will help. There is a good chance that the erroneous private region exists on a disk that recently has been added to the system from another system. For example, an administrator might have swapped disks between systems without realizing that existing LSM information from the previous system was left on the disk.

3. If removing suspect disks fails to rectify the problem because the proper disk cannot be identified, your only recourse is to completely remove the existing LSM configuration from the system before restarting the Full Installation. This can be performed by booting the distribution media, exiting to the UNIX shell, and using the `disklabel -z` command to zero out the disk label of every disk on the system that contains an LSM private region.

   You can determine which disks contain an LSM private region by analyzing the partition fstype values from the disk label of each disk. See `disklabel`(8) for more information regarding LSM fstype values. If you cannot determine which disks contain an LSM private region, zero out the disk label of every disk on the system. If zeroing out the disk label of every disk on the system in not feasible, then you can cycle through a process of zeroing out the disk label of a single suspect disk and then restarting the Full Installation process until LSM can be selected. See Section G.1.1.1 for more information about using the `disklabel -z` command to remove an existing LSM configuration.

G.1.1.3 Restarting LSM

If the LSM daemons `vold` and `voliod` fail to restart when your system is rebooted or the LSM configuration database is corrupted, the LSM volume on which the / (root) file system exists will not be accessible. Under such circumstances your system cannot be brought up to multiuser mode. To repair possible problems in `/etc/vol/volboot` or the `rootdg` disk group, use LSM commands to rectify the problem.

Use this procedure to restart LSM if it fails to start during system boot:

1. Create LSM device special files:

   ```
   # volinstall
   ```

2. Start the LSM configuration daemon in `disable` mode:

   # **vold -k -r reset -m disable -x nohostid**

3. Initialize the `/etc/vol/volboot` file:

   # **voldctl init**

4. Put `vold` in the `enabled` mode and import all LSM diskgroups:

   # **voldctl enable**

5. Get a list of all disks known to LSM:

   # **voldisk list**

   Make sure that all disks have device special files in `/dev/disk`.

6. Execute the `volprint` command to obtain information about the LSM configuration:

   # **volprint -htA**

7. Start the LSM volumes:

   # **volume -g** *diskgroup* **start** *volume_name*

   The value of the `diskgroup` parameter is most likely `rootdg`, which represents the system disk.

8. To rectify problems in a file, the volume needs to be mounted. For example, the / file system may have to be mounted to fix a file such as `/etc/vol/volboot` or `/etc/inittab`.

   If the / file system was using AdvFS as the file system type, enter commands similar to the following to mount it:

   # **mkdir -p /etc/fdmns/root_domain**
   # **cd /etc/fdmns/root_domain**
   # **ln -s /dev/vol/rootdg/rootvol rootvol**
   # **mount root_domain#root /mnt**

   If the / file system was using UFS as the file system type, the LSM volume `rootvol` is mounted as follows:

   # **fsck /dev/rvol/rootdg/rootvol**
   # **mount /dev/vol/rootdg/rootvol /mnt**

   See the *Logical Storage Manager* manual for more information about how to correct problems encountered while enabling LSM or starting LSM volumes.

G.1.2 Configuration Description File (CDF) Validation Errors

The following message is displayed when the installation procedure encounters an error while validating an `install.cdf` file before beginning an Installation Cloning:

The Configuration Description File (CDF) validation procedure has found the following errors: *<List of specific errors>*

This error causes the Full Installation to stop. The list of CDF validation errors will include one or more messages that discuss the errors encountered in the CDF.

The corrective action depends on the validation errors returned from the install procedure. If you are performing the installation from a RIS server, you should confirm with your RIS server administrator that your system is registered for the proper CDF. To continue with the cloned installation, the RIS server administrator must either reregister the system with the correct CDF or correct the current CDF based upon the validation error messages.

After you have corrected the problem, restart the Full Installation by doing one of the following:

- Enter `restart` in the root directory

- Reboot the system

The error message is saved in the `/var/tmp/install.log` for your reference until you reboot this system.

G.1.3 Software Subset Load Errors

The software load procedure can fail for a number of reasons, including software inventory problems resulting from a corrupted distribution media, network errors during a RIS installation, and CD-ROM read errors during a CD-ROM install. To handle potential problems, the software load procedure makes two attempts to load software. If the initial attempt fails, a second attempt is made to load the specific software subsets that were not loaded during the first attempt.

The installation procedure was not able to correctly install the *product_name* **software subsets. This may be the result of a corrupted distribution. Another attempt will be made to install this software.**

This message is displayed if one or more subsets fail during the first load attempt. The subset load procedure will then attempt to reload the failed subsets. Look at the `/var/adm/smlogs/install.log` file for more information.

The installation procedure successfully installed the mandatory software subsets. One or more optional subsets did not install correctly. This may be the result of a corrupted distribution. The installation will continue.

This message is displayed if an optional subset fails to load after two attempts. The corrective action depends on the software load errors returned from the install procedure. You can find more information about the problem when the installation has completed. Use the `more` command to view the contents of the `/var/adm/smlogs/fverify.log`

and `/var/adm/smlogs/setld.log` log files to review the software load errors. After the problem had been resolved, use the `setld` utility to load the failed subsets. See Chapter 9 for more information about installing optional subsets after an installation.

The installation procedure was not able to correctly install the mandatory software subsets. This may be the result of a corrupted distribution. This error is fatal, and causes the installation procedure to stop. Additional information regarding this error can be found in the following log files: /var/tmp/install.log and /var/tmp/fverify.log

This message is displayed if a mandatory subset fails to load after two attempts. A failed mandatory subset load is a fatal error and the installation process will not be able to continue until the problem has been resolved. Use the `more` command to view the contents of the `/var/tmp/install.log` and `/var/tmp/fverify.log` log files to review the software load errors. The files are written in the `/var` memory file system and will be available only until the installation is restarted or the system is rebooted.

G.2 Update Installation Error Messages

The following sections describe error messages that you might encounter during an Update Installation.

G.2.1 Update Installation Startup

The following error messages may display after invoking the `installupdate` command, but before the Update Installation interface (graphical or text-based) is displayed.

You must have superuser privileges to run installupdate. You must be the user root to run the update install.

The `/sbin/installupdate` command must be run as the user `root` in single-user mode. Shut down the system to single-user mode using the procedures shown in Chapter 3 and restart the Update Installation.

*** WARNING: Incorrect system state detected. *** Please shut down system to single user mode before attempting an update installation.

The system must be in single-user mode in order for the update to run. Single-user mode can be reached by using the `shutdown` command. See Chapter 3 and `shutdown`(8) for more information.

G.2.1.1 Update Installations from a CD-ROM

The errors described in this section may occur during an Update Installation from a CD-ROM.

Please specify a block-special device file.

The argument to the `installupdate` command must be a block-special file. Block special file names in systems running operating system versions earlier than Version 5.1A begin with `rz`.

<mount point> is an invalid update installation mount point.

The Update Installation could not find the installation information at the specified location either because the location is incorrect or the media at that location is not the operating system media.

Cannot locate update information on /updmnt

The Update Installation script could not be found in the default location `/updmnt` due to invalid or incorrect media or location of media.

Update installation mount point already mounted: *<mount-point search listing>*
Please unmount /updmnt manually.

The Update Installation detected that there is already something at the Update Installation mount point. Enter the following command:

```
# cd /
# umount /updmnt
```

Reenter the `installupdate` command.

Could not unmount: *<umount attempt error listing>* Please unmount /updmnt manually.

If for any reason you exit the Update Installation before completion, the Update Installation may be unable to unmount the distribution media properly. Enter the following command:

```
# cd /
# umount /updmnt
```

Cannot mount *<media location supplied by user>* on /updmnt. Consult with the system manager of your host server.

The distribution media location given as an argument to `installupdate` is incorrect. Verify the location and retry installupdate.

G.2.1.2 Update Installations from Remote Installation Services (RIS)

The errors described in this section may occur during an Update Installation from a RIS server.

Cannot find <*RIS client*> in risdb file. Consult with the system manager of <*RIS server*>.

The client system is not registered on the RIS server. Register the client machine on the RIS server, then restart Update Installation.

Could not retrieve RIS area information on <*RIS_server*>. Exiting procedure...

Either the Update Installation could not start the network, or the targeted RIS area is no longer accessible. In the first case, verify the client machine's network settings. In the second case, consult with your RIS administrator.

Error starting <*inet route gateway*> Cannot continue with update installation.

The network daemons could not start and the distribution media was specified as a network file system (NFS) or RIS. Ensure that the network is accessible to the system you want to update, then restart the Update Installation.

G.2.2 Analysis Phase Error Messages

The following messages might be seen during the Update Installation analysis phases.

Cannot create directory /var/tmp/update/risupdinfo

The Update Installation makes local copies of the subset inventory files in the `/var/tmp/update/risupdinfo` directory to improve performance. This error may indicate that file system space is 99 percent or more full, and the update process could not create the directory. Perform disk space recovery procedures, such as deleting `core` files, extra kernel files, and all other unnecessary files to free up some disk space.

Cannot locate the product mapping file <RIS product directory/rp_mapping> on the RIS server <*RIS server name*>. Consult with the system manager of the RIS server.

The `rp_mapping` file maps a product name to a mount point. Without this file Update Installation cannot find the product for which it is registered. This message usually indicates a corrupt RIS area.

<*Operating system version*> is currently installed on this system.

This message indicates that you are attempting to update the operating system to the exact version of the operating system that is already installed. If you receive this message, you are given the option to continue the update or exit.

**You must have one of the following products loaded on your system
before you can update to *<new operating system version>*.
<List of products>
Please refer to the Installation Guide for additional information on these releases.**

The Update Installation cannot update the current version of the
operating system to the new version. To update to the new version, you
may need to perform successive updates or perform a Full Installation.

No installable subsets for this system found.

The Update Installation could not find installable software subsets on
the distribution media, which is most likely corrupted. If you are using
a CD-ROM, contact your support representative for another one. If you
are using a RIS server, notify the administrator who will have to create
another RIS environment for the product you want to install.

Error: Unable to retrieve the /tmp/updinfo file

This file contains data used by the installation scripts. Bring your
system back to multiuser mode, and restart the Update Installation
process.

**A non-zero return status *<actual return code>* has been detected after execution
of the *<user supplied script name>* program. This is fatal and causes the Update
Installation procedure to stop.**

If you supplied a script within an `update_preinstall` or
`update_postload` file, this message indicates that the script failed
with a value other than 0 (zero). Verify your script, and retry the
Update Installation.

Error opening file: updpblock.dat

The `updpblock.dat` file contains the blocking layered products
three-letter prefixes. This error resulted from a corrupt distribution
media. If you are using a CD-ROM, contact your support representative
for another one. If you are using a RIS server, notify the administrator
who will have to create another RIS environment for the product you
want to install.

The following errors may occur if your system does not have enough disk
space to complete an Update Installation:

The Update Installation cannot save your kernel option selections. The kernel will be built with all mandatory and all optional kernel components. Use the /usr/sbin/doconfig command to select the desired optional kernel components and rebuild the kernel after the Update Installation completes.

There is not enough space to save your optional kernel components selections. Use the `doconfig` command after the installation is complete to build optional components into the kernel.

An error occurred when attempting to write to the INIT_OPS_FILE. This is most likely due to insufficient disk space in the root file system

Look in the / (root) file system for `core` files, extra kernel files, and any unnecessary files that are taking up disk space and remove them to free up space. Perform any other disk space recovery steps that are appropriate for your site. When you have freed up enough space, restart the Update Installation.

An error occurred while trying to open the input or output files in the call to updmore.

This error message displays only from the text-based interface and indicates that either the input (list of available selections) or output (list of user selections) files could not be opened.

G.3 Software Configuration Error Messages

Software configuration occurs after system reboot and is a process common to both Full and Update Installation. The following error messages can display during software configuration.

c_install: Cannot find /sbin/it.d/data/cinst.data

The data file that contains the list of installed software subsets to be configured could not be found. This file is written by the `setld` utility and indicates a possible corruption of the `setld` utility or the system disk on which the software was installed, or that the system disk has run out of space. This error is fatal.

dn_fix: name database [/etc/dfsc.dat] does not exist

dn_fix: name database [/etc/dfsl.dat] does not exist

The `device file status [cluster,local]` file, which contains hardware device attributes including the mapping of old-style device names (for example, rz*) to new-style device names (for example, dsk*) could not be found. These files are created dynamically by the `dsfmgr` program, and indicates a possible corruption of the `dsfmgr` program or the system disk on which the software was installed, or that the system disk has run out of space.

dn_fix: cannot create copy of <file> for recovery purposes

>The dn_fix program was not able to create successfully backup copies
of the listed file prior to performing old-to-new device name conversions
on the devices contained in this file. This may be the result of a
corrupted system disk, or that the system disk has run out of space.

dn_fix: cannot create copy of *<directory>* for recovery purposes

>The dn_fix program was not able to create successfully a backup copy
of the directory prior to performing old-to-new device name conversions
on the devices contained in this directory. This may be the result of a
corrupted system disk, or that the system disk has run out of space.

**An error was encountered when trying to convert from the
old device names to the new device names in file: *<file_name>*. No
modifications have been made to the file. If you wish to use the new
device names the file will have to be converted manually.
The sed conversion script has been saved as: *<file_name>*.CNVTsed
The failed conversion file has been saved as: *<file_name>*.CNVTfail
The error which occurred was: *<specific_error>***

>The dn_fix program could not convert successfully all the references
to old device names in the listed file to the new device names. The error
that occurred is listed for reference. This error is not fatal, and the old
device names will continue to be used. After the installation process
completes, the conversion of the failing file should be reattempted
manually.

**An error was encountered when trying to convert from the old device names
to the new device names in directory: *<directory_name>*
No modifications have been made to this directory. If you wish to use the
new device names the directory will have to be converted manually.
The failed conversion file has been saved as: *<file_name>*.CNVTfail
The error which occurred was: *<error>***

>The dn_fix program could not convert successfully all the references
to old device names in the listed directory to the new device names.
The error that occurred is listed for reference. This error is not fatal,
and the old device names contained in this directory will continue to be
used. After the installation process completes, the conversion of the
failing directory should be reattempted manually.

**The merge routines which have failed are logged in /var/adm/smlogs/dncon-
vert.FailCNVT. To re-execute any of these routines, change directory to
<script_location> and re-execute all the routines in this directory.**

>This message is output upon any failure of a conversion script
to update the old device names to the new device names. The
/var/adm/smlogs/dnconvert.FailCNVT file contains a list of the
conversion scripts that failed and that should be reattempted manually

after the installation procedure completes and the source of failure identified.

The version switch from "active-version" to "new-version" could not be completed successfully. This error is not fatal, and the installation will continue.
The following message was received from /usr/sbin/versw -switch:
<details of error>

The command `/usr/sbin/versw -switch`, which sets the version identifier for the newly installed version of the operating system, has failed. The text of the failure message is included. After the installation completes and the source of failure is identified, this command should be manually reattempted.

Failed to configure one or more mailserver files.
Please verify that the 'pop' and 'imap' user accounts have been set up in either the local or NIS password database and run this command again to complete the installation phase of the mailserver setup.

This message indicates a failure in the attempt to update the modes, permissions, and inventory entries of POP and IMAP specific files. These files are shipped in the optional Additional Networking Services (`OSFINET520`) subset. This error is not fatal, and the following command should be reattempted after the installation process completes and you log in for the first time:

```
setld -c OSFINET520 MAILSERVERSETUP
```

G.4 Post Installation Error Messages

The following sections describe errors that you might encounter while doing post installation software load or delete operations.

G.4.1 Recovering from setld Software Load and Delete Failures

Recovering from software load and delete failures depends upon the current status of the software subsets in question. Recovery procedures are provided in the following tables:

- Table G–3 describes how to recover from a subset load failure
- Table G–4 describes how to recover from a subset delete failure

See `setld`(8) for a description of software subset states.

Some recovery procedures instruct you to determine whether or not the `setld` command is still executing before you begin the recovery procedure. All cluster members must be verified to ensure that the `setld` command is not running.

_____ **Caution** _____

Some recovery procedures in Table G–3 recommend using the `-f` (force) flag of the `setld` utility as part of the recovery procedure. Using the `-f` flag is a last resort because this flag ignores any errors produced by the subset's SCP phases during a delete operation. If an SCP phase is reporting an error, the error should be resolved and the `setld -d` operation attempted again. The only time the `-f` flag should be used is if the errors cannot be resolved and the subset must be removed from the system.

_____

Table G–3: Software Load Recovery Procedures

Subset State	Load Recovery Procedure
not installed	Execute the `setld -l` command to load the software subset.
deleting	Verify that the delete command (`setld -d`) is no longer executing. If it is still executing, let it finish. If it is not executing, complete the removal of the software using the `setld -d` command and adding the `-f` (force) flag if the delete will not complete successfully.
	After the software is completely removed (that is, it is in the not installed state), use the `setld -l` command to load the software.
	After running `setld -d -f` on a cluster, all cluster members except those members that are down will have the software removed. For each cluster member that is down, run the `setld -Z` command once the member or members come back up. If necessary, run `setld -Z -f` if the first `setld -Z` command fails.
pre-load failed	Examine the error message produced by the PRE_L phase of the SCP and resolve the error before attempting to load the software using the `setld -l` command.
pre-load complete	Verify that the `setld -l` command is not executing. If it is still running, let it finish. If it is not running, reexecute the `setld -l` command to restart the load.
load failed	After resolving errors logged in the `/var/adm/smlogs/fverify.log` file and any error messages on the screen, reexecute the load using the `setld -l` command.
load completed	Verify that the `setld -l` command is not executing. If it is still running, let it finish. If it is not running, reexecute the `setld -l` command to restart the load.
post-load failed	After examining the error messages and resolving the problem, restart the subset load using the `setld -l` command.

Table G–3: Software Load Recovery Procedures (cont.)

Subset State	Load Recovery Procedure
post-load completed	Verify that the `setld -l` command is not executing. If it is running, let it finish. If it is not running, execute the `setld -C` command to complete the installation.
	On a cluster, the `setld -C` command must be executed on every cluster member whose software is in the `post-load completed` state.
c-install failed	After examining the error messages and resolving the problem, execute the subset configuration using the `setld -C` command.
	On a cluster the `setld -C` command must be executed on every cluster member whose software is in the `c-install failed` state.
installed	No action required; the software subset is installed.
member load failed	On each cluster member that is in this state, examine the error messages on the individual member and resolve the problem. After the errors have been resolved on a member, execute the `setld -u` command to restart the population of the cluster member, including the `-m` flag to specify the cluster member ID.
member loaded	Verify that the `setld -l` and the `setld -u` commands are not executing. If the `setld -l` command is running on any member or the `setld -u` command is running on the current member, let the command finish. Otherwise, execute the `setld -C` command to complete the installation.
	On a cluster the `setld -C` command must be executed on every cluster member whose software is in the `member loaded` state.
unknown	The software subset is in a completely unknown state. To load the software onto the system, first remove the old software using the `setld -d` command.
	If the delete operation fails, attempt to resolve the errors.
	If the subset still cannot be removed after resolving the errors, use the `setld -d -f` command. The `-f` flag forces the subset removal. After the software has been removed (that is, it is in the `not installed` state), use the `setld -l` command to load the software.
	After running `setld -d -f` on a cluster, all cluster members except those members that are down will have the software removed. For each cluster member that is down, run the `setld -Z` command once the member or members come back up. If necessary, run `setld -Z -f` if the first `setld -Z` command fails.

Table G–4 describes how to recover from subset delete failures when the subset is in a particular state. Except where otherwise noted, the delete procedure is similar for almost every state.

Table G–4: Software Delete Recovery Procedures

Subset State	Delete Recovery Procedure
All states except those listed separately in this table	**Generic instructions for recovering from delete failures:** Execute the `setld -d` command again to run all of the necessary internal subset removal steps. The internal steps remove any files that were installed and execute the C_DELETE, PRE_D and POST_D phases of the subset's SCP that are responsible for reversing any changes made in the C_INSTALL, POST_L and PRE_L phases of the SCP respectively.
`not installed`	No action required; the software subset is already deleted.
`deleting`	Verify that the `setld` delete operation has finished executing. If it is not finished, let it finish. If it has finished, perform the delete operation again (`setld -d`) and resolve any errors that occur. If the delete operation continues to fail, use the `setld -d -f` command. The `-f` flag forces the subset removal.
	After running `setld -d -f` on a cluster, all cluster members except those members that are down will have the software removed. For each cluster member that is down, run the `setld -Z` command once the member or members come back up. If necessary, run `setld -Z -f` if the first `setld -Z` command fails.

Table G–4: Software Delete Recovery Procedures (cont.)

Subset State	Delete Recovery Procedure
	_____ **Caution** _____ Using the -f flag is a last resort because this flag ignores any errors produced by the subset SCP phases during the delete operation. If an SCP phase is reporting an error, the error should be resolved and the setld -d command attempted again. The only time the -f flag should be used is if the errors cannot be resolved and the subset must be removed from the system.
unknown	The software subset is in a completely unknown state. To remove the software, execute the setld -d command. If the delete operation fails, attempt to resolve the errors. If the subset still cannot be removed after resolving the errors, use the setld -d -f command. The -f flag forces the subset removal. See the Caution in this table for more information about forcing subset removal. After running setld -d -f on a cluster, all cluster members except those members that are down will have the software removed. For each cluster member that is down, run the setld -Z command once the member or members come back up. If necessary, run setld -Z -f if the first setld -Z command fails.

G.4.2 Recovering from Subset Load or Delete Failures on a Cluster Member

If a subset fails to load or is not removed from one or more members of a cluster, the installation status of that subset across the entire cluster is corrupted.

Load and delete operation failures from all cluster members will be displayed on the member on which the operation is initiated. After recovering from the failure, invoke the setld utility using the appropriate recovery option shown in Table G–5 to make the cluster installation status consistent among all members in the cluster.

After running setld -d -f on a cluster, all cluster members except those members that are down will have the software removed. For each cluster member that is down, run the setld -Z command once the member or members come back up. If necessary, run setld -Z -f if the first setld -Z command fails.

Table G–5 lists the setld flags that are used to recover from load or delete failures on individual cluster members.

Table G–5: Cluster Load and Delete Recovery Options of the setld Utility

Option	Description
-m	Specifies the cluster member ID to recover when a load or delete operation fails on one or more members in a cluster. This flag is used in conjunction with the -C and -Z flags.
	Use the clu_get_info command to determine the member ID for cluster members.

> _____ **Caution** _____
> Do not use this operand to install or remove software on a particular member. This flag is used for recovery purposes only, and it is not the intended nor supported method to install or remove software on a cluster.

Option	Description
-C	Runs the configure install phase of the named software subset's SCP on the named cluster member.
	For example, to recover from a load failure of the OSFDCMT520 subset on member1 of a three member cluster:
	`# setld -m member1 -C OSFDCMT520`
-Z	Runs the configure delete phase of the named software subset's SCP on the specified cluster member.
	For example, to recover from a delete operation failure of the OSFDCMT520 subset on member1 of a three member cluster:
	`# setld -m member1 -Z OSFDCMT520`

For a software subset load recovery operation, the command syntax is:

setld [-D *root-path*] [-m *member-ID*] -C [*subset-id* [*subset-id*...]]

For a software subset delete recovery operation, the command syntax is:

setld [-D *root-path*] [-m *member-ID*] -Z [*subset-id* [*subset-id*...]]

For more information about software subset control programs (SCPs) and the various phases of the setld utility, see the *Guide to Preparing Product Kits* manual.

Glossary

This glossary provides definitions for many of the terms you may see while using the installation documentation. Although the majority of terms are related to the installation environment, other terms related to system setup and configuration are included.

Special Characters

/
See *root*

A

Advanced File System
See *AdvFS*

AdvFS
(Advanced File System). A journaled, local file system that provides higher availability and greater flexibility than traditional UNIX file systems. Using transaction journaling, AdvFS recovers file system integrity in seconds, rather than minutes, after an unexpected restart such as a power failure.

AdvFS journaling also provides increased file system integrity. AdvFS provides greater flexibility by allowing filesets (file systems) to share a single storage pool and enabling hard and soft fileset quotas in addition to user and group quotas.

archive
1. To store programs, data files, text files, and other types of files for safekeeping. For instance, the Update Installation Cleanup application provides the option to archive the backup files created by an Update Installation.
2. A repository for such files.

associated product
See *layered product*

attribute-value pair
The method used to define data in a configuration description file (CDF). A CDF file is organized as groupings of attribute-value pairs. An equal sign (=) separates each attribute and its associated value.

See also *CDF*

available swap space

The amount of swap space not reserved by processes. In contrast, free swap space is everything except for the space actually in use. Available swap space is smaller than free swap space because it takes into account both the space that is in use and any reservations that processes may have made. Free swap space does not take reservations into account.

See also *swap space*

B

base operating system

The operating system without any additional third party or layered products installed. All software subsets that are located on the first CD-ROM comprise the base operating system.

Berkeley Internet Name Domain

See *BIND*

BIND

Berkeley Internet Name Domain. A distributed database name lookup service that lets you distribute the host database network wide. Also known as Domain Name Service (DNS).

See also *BIND client*, *BIND server*

BIND client

A computer that queries a BIND server for host name and host address information, interprets the responses, and passes the information to requesting applications.

See also *BIND*

BIND server

A computer that is an authoritative source for information about one or more zones. The BIND server either maintains the master copy of the host's database for the zone or obtains the information required to serve the hosts database from another server.

See also *BIND*

block device

A storage device that supports directory memory access (DMA) rather than character input/output.

block special file

A device special file that provides access to an input or output device and is capable of supporting a file system.

See also *device special file*

boot time

The time when the operating system is initializing. In the case of a cold boot, the hardware also is initialized.

bootable

Having the ability to load and initialize the operating system

bootp

Bootstrap Protocol. A protocol that provides a framework for passing configuration information to hosts on a TCP/IP network. The bootp protocol allows a client machine to discover its own IP address, the address of a server host, and the name of a file to be loaded into memory and executed. The bootstrap operation can be thought of as consisting of two phases. The first phase is address determination and bootfile selection and the second phase is file transfer.

Bourne shell

The command interpreter and interpreted programming language originally developed by Steve Bourne.

See also *shell*

C

C shell

A command interpreter and interpreted programming language developed at the University of California at Berkeley; so named because many of its constructs resemble the equivalent C language constructs.

See also *shell*

CDE

Common Desktop Environment. A graphical user interface for interacting with the operating system. The CDE interface was jointly developed and is based on industry standards, including the X Consortium's X Window System and the Open Software Foundation's Motif interface.

CDE front panel

On systems with graphics capabilities, a centrally located window on the CDE desktop, which contains icons for accessing system management applications and utilities. The Front Panel occupies all desktop workspaces.

CDF

Configuration Description File. A data file that is used to clone systems. Two separate CDFs store the installation and configuration characteristics of an installed and configured system. Installation information is stored in an `install.cdf` file, which is created automatically whenever a Full Installation is performed. Configuration information is stored in a `config.cdf` file, which is created manually using the `sysman -clone -save` command. Both of these files are located in the `/var/adm/smlogs` directory by default.

See also *Installation Cloning*, *Configuration Cloning*

CDSL

Context Dependent Symbolic Link. A special form of symbolic link that dynamically resolves to a member-specific file, depending upon the cluster member accessing the file. CDSLs make it possible to maintain system-specific configuration and data files on file systems shared by a cluster, but they are also resident on single systems. If CDSLs are removed by accident, your system will not function correctly in a cluster. While this is not a problem for stand-alone systems, you may not be able to add the system as a member of a working cluster at some future time.

See also *cluster*, *member specific file*

character device

A data storage or transfer device that manipulates data in increments of a single character; for example, a terminal.

character special file

A file through which processes can access either a character-stream oriented I/O interface or an unstructured (raw) device, such as a communication line or an unbuffered magnetic tape or disk.

checksum

A sum of bits or digits used primarily for verification purposes, summed according to an arbitrary set of rules. The checksum verifies the integrity of data.

client

A computer system that uses resources provided by another computer system called a server.

cloning

A process that uses the installation or configuration characteristics in a configuration description file (CDF) generated from one system to create an exact replica on another system.

See also *CDF*

cluster

A loosely coupled collection of servers that share storage and other resources that make applications and data highly available. A cluster consists of communications media, member systems, peripheral devices, and applications. The systems communicate over a high-performance interconnect.

See also *cluster member*

cluster member

The basic computing resource in a cluster. A member system physically must be connected to a cluster interconnect and at least one shared SCSI bus. The connection manager dynamically determines cluster membership based on communications among cluster members.

Common Desktop Environment

See *CDE*

conditional mandatory subset

A software subset that is required for the proper function of the operating system only when certain hardware or software is detected during the installation procedure which makes the software mandatory.

See also *mandatory software subset*

configuration

1. The machines, devices, and programs that make up a data processing system or network.
2. The act of making a subsystem, or a set of subsystems, or services available for use by a running operating system.
3. The set of configured subsystems in an operating system.

Configuration Cloning

The process that duplicates the configuration from a previously configured system onto one or more target systems, eliminating the need to perform the configuration tasks as a separate operation. Configuration information such as network setup and services, mail setup, printer setup, and internet access can be cloned from one system to another.

See also *Installation Cloning*, *CDF*

configuration description file

See *CDF*

console mode

When the system is halted, the operating system is no longer running, and the console subsystem is started. This state is also known as console mode and is recognizable by the console mode prompt, which is represented by

three right arrow characters (`>>>`). The console mode prompt is sometimes called *triple arrows* or *chevron prompt*.

core file

A file that is created when an application terminates abnormally or the system crashes. A `core` file may be useful to debug a problem with an application or system that crashed, but otherwise, `core` files should be deleted because they consume a large amount of disk space. A `core` file is created in the directory from which the application was invoked.

See also *crash file*

crash file

A file that is created when the system crashes. System crashes may be caused by a hardware malfunction, a kernel failure, a software error, or a variety of other reasons. The `core` file created by the crash may be useful to debug why the system crashed, but otherwise, core files should be deleted because they consume a large amount of disk space. Additional crash data is stored in the `/var/adm/crash` directory.

custom partition table

A disk partition table that differs from the recommended partition table. Systems that are shipped with factory installed software (FIS) typically use a custom partition table because of the many layered products that are installed in addition to the base operating system. Customizing a partition table lets you divide a disk in a fashion best suited to your needs.

See also *partition table*, *recommended partition table*

D

Dataless Management Services
See *DMS*

DCE

Distributed Computing Environment. A standard defined by The Open Group for distributed computing that defines a uniform set of services that share certain global properties for common naming, security, time synchronization, system availability, access to data, and system management. DCE enables applications and data on heterogeneous systems to work together.

default
Any value that is set automatically by an application or process.

default partition
1. The partition used by a system as the default boot partition.

2. The physical portion of a disk that usually is assigned by the installation process to hold a specific file system.

See also *partition*

default file system layout
When the `/` (`root`) and `/usr` file systems and a single swap area, `swap1`, are installed on the same disk in the `a`, `g`, and `b` disk partitions, respectively.

See also *file system layout*

default partition table
The disk partitions that are defined in the `/etc/disktab` file or, in the absence of an entry in that file, the disk driver itself. The default partition table varies with disk type because it depends upon the size of the disk itself. The `disklabel -p` command is used to view a disk's default partition table. Every supported disk has a preset default partition table, but it is not recommended to use it during a Full Installation.

See also *partition table*

dependent subset
A subset that requires the presence of other subsets in order to function properly. Dependencies between subsets are evaluated by a subset's software control program (SCP), which is controlled by the `setld` command.

See also *software subset*

device
1. The general name for any peripheral hardware connected to the processor that is capable of receiving, storing, or transmitting data. For example, card readers, line printers, and terminals are record-oriented devices. Magnetic tape devices and disks are examples of mass storage devices. Terminal line interfaces and interprocessor links are examples of communication devices.
2. The files in the `/dev` directory that are used to access physical devices are themselves sometimes called devices.

device name
The name or address used to access a physical disk. Device names are located in the `/dev` directory.

device special file
A file used by processes to access hardware devices. For example, a printer is accessed through a device special file.

See also *block special file*, *character special file*

disk label

The disk information, usually located in sector 0 (zero), that includes the disk geometry and partition divisions. This information is used by the system disk driver and the boot program to identify a drive, and to determine how to program a drive and where to find the file systems.

See also *partition*

disk partition

See *partition*

distribution media

The media that is used to make software kits available for installation. Typical media types on which to distribute software include CD-ROMs, RIS servers, or locally mounted disks.

DMS

Dataless Management Services. A service provided whereby a server computer system maintains the `/` (`root`), `/usr`, and `/var` file systems for client computer systems connected to the server through a local area network (LAN).

DMS area

A reserved disk area that physically is connected to a DMS server and that contains multiple copies of the DMS root area, one for each registered client.

DMS client

A computer system whose system disk area physically is connected to a DMS server rather than to the client itself and is accessed across the network by the client.

domain

1. Any single element of a domain name. Using `host1.nyc.bigcorp.com` as an example: `nyc.bigcorp.com` is the domain and `host1` is the unique host name.

2. Any qualified portion of a domain name. Qualified means that it is fully specified all the way to the root domain. Using `host1.nyc.bigcorp.com` as an example: `nyc.bigcorp.com`, `bigcorp.com`, and `.com` are qualified domains.

3. The domain, and all the subdomains beneath it, down to the leaf nodes of the domain space tree. Using `nyc.bigcorp.com` as an example: `nyc.bigcorp.com` is the name of the domain, and the domain encompasses all the hosts located in `nyc` (New York City).

E

ed editor

A line-oriented program for modifying the contents of text files. The program operates by accepting commands from the user. For example, issuing the command `s/Unix/UNIX/g` substitutes each instance of the string `Unix` on the current line with the string `UNIX`.

editor

A program for modifying the contents of text files. Full-screen editors, such as `vi`, use video display terminals to display several lines of the file being manipulated; they allow the user to move the cursor to a specific location and change the text there. Line editors, such as `ed`, work on a line-by-line basis. Stream editors, such as `sed`, work by applying commands from a previously prepared list (called a script) instead of by accepting commands from the user.

emacs

A text editor developed by the Free Software Foundation that is available for all UNIX systems, although it is not a standard part of Berkeley UNIX or System V. It is included with this UNIX operating system.

ex editor

A line-oriented program for modifying the contents of text files. The `ex` editor is an extended version of the `ed` editor.

F

factory installed software

See *FIS*

file system

The hierarchical structure of directories and files on a physical or logical mass storage device. The hierarchy starts with the `/` (`root`) directory. In this UNIX operating system, the standard UNIX file systems are `/`, `/usr`, and `/var`. The `/var` file system optionally can be created as an area under the `/usr` file system.

file system layout

The location of the basic UNIX file systems and swap areas: `/` (`root`), `/usr`, `/var`, `swap1`, and `swap2` on one or more disks.

file system type

Defines how a file system is structured and managed. The Full Installation process offers the Advanced File System (AdvFS) and UNIX File System (UFS) as supported file system types.

See also *AdvFS* , *UFS*

file type conflict

A file type that is different from the file type that was shipped in the previous version of the operating system that is detected by the Update Installation process. A file type conflict occurs when the file type of a file, directory, symbolic link, block device, or pipe was modified from the file type originally shipped. The Update Installation cannot install the new file type without overwriting the modified file type. This feature preserves the integrity of the software to be updated.

firmware

The software stored in silicon (for example, ROM or EPROM) on a system's CPU board. Firmware is also known as console code. Firmware is the first software that runs when a system is turned on, and it directly controls all hardware. Each hardware platform uses a different set of firmware. The firmware on a platform is the same regardless of the operating system installed on the platform. Thus, firmware is platform dependent, but is not operating system independent.

FIS

Factory Installed Software. A process that preinstalls the operating system at the factory before a computer is shipped from the manufacturing facility. Typically, FIS systems are installed with all mandatory and all optional operating system software and a variety of layered products. Included in the box with the preinstalled system is the *Factory Installed Software Information Sheet*, which describes the software products that have been installed and the disks and disk partitions that were used for the file system layout.

Full Installation

The process by which a brand new version of the operating system is installed onto a system. A Full Installation creates new file systems and swap space and overwrites existing system and user-created files on the disk partitions where the new file systems and swap spaces are to be installed. After the Full Installation, the system must be configured for general use.

fully qualified host name

A host name containing one or more labels separated by a period that uniquely defines a computer. A label is a string which begins with a letter and contains letters, digits, and hyphens and ends with a letter or a digit. A label can have between 2 and 63 characters, inclusive. A fully qualified host name can have a maximum of 254 characters. For example, `host1.nyc.bigcorp.com` is a fully qualified host name.

See also *domain*

G

generic kernel

The kernel image that includes kernel support for all system types, devices, and software options. The generic kernel file, /genvmunix, can be booted if the tailored kernel, /vmunix, is damaged.

See also *tailored kernel*

H

halt

A type of system shutdown that stops the processor but does not reboot the system. When the system is halted, the operating system is no longer running, and the console subsystem is started. This state is also known as console mode and is recognizable by the console mode prompt, which is represented by three right arrow characters (>>>). A system can be halted by using the shutdown -h now command.

host

1. The primary or controlling computer in a communications network.
2. Any computer system attached to a network.

host name

The name given to a computer. Lowercase and uppercase letters (a-z and A-Z), numbers (0-9), periods, and dashes are permitted in host names. Valid host names contain from 2 to 63 characters with the first character being a letter.

HTML

HyperText Markup Language. The coding (markup) inserted in a file intended for display on a World Wide Web browser that tells the browser how to display the words on a web page. The markup is done with *tags*, which are command words enclosed in angle brackets. For example, the tag **<P>** creates a new paragraph; the tag **<TABLE>** begins the formatting of a table. Although the World Wide Web Consortium (W3C) promotes the standardization of HTML, both Netscape and Microsoft browsers currently implement some features differently and provide nonstandard extensions.

HyperText Markup Language

See *HTML*

I

i18n

The abbreviation for *internationalization*. Worldwide Language Support (WLS) software is installed in the /usr/i18n directory, which can be

created as its own file system or can be created as a symbolic link to another file system.

See also *WLS*

init

A command that initializes the system by creating and controlling processes. This command also polls the hardware so that it is known to the Full Installation process. The processes run by the `init` command at each run level are defined in the `/etc/inittab` file.

init process

The root process created by the system that performs system administration tasks, such as spawning login processes and handling the orderly shutdown from multiuser to single-user mode.

inode

The internal structure that describes the individual files in the operating system. There is one inode for each file. An inode contains the node, type, owner, and location of a file. A table of inodes is stored in strategic locations of a file system.

inode number

A number specifying a particular inode file in the file system.

Installation Cloning

The process that duplicates the installation characteristics (that is, disk selection, file system layout, and installed software) from an installed system onto one or more systems with the same or similar hardware configuration. Installation cloning is performed directly from a Full Installation.

See also *CDF*

internet address

A unique 32-bit number that identifies a host's connection to an internet network. An internet address consists of a network number and a host number.

Internet Protocol

See *IP*

IP

Internet Protocol. The network layer protocol for the Internet protocol suite that provides the basis for the connectionless, best-effort packet delivery service. IP includes the Internet Control Message Protocol (ICMP) as an integral part. The Internet protocol suite is referred to as TCP/IP because IP is one of the two most fundamental protocols.

IP address

A 32-bit quantity used to represent a point of attachment in an Internet. Periods (.) delineate each portion of the address.

See also *IP*

K

kernel

The core part of the operating system that controls processes, system scheduling, memory management, input and output services, device management, network communications, and the organization of the file systems.

Korn shell

A command interpreter and interpreted programming language developed by David Korn. The Korn shell (`ksh`) is semantically an extended version of the Bourne shell, with constructs and commands to implement enhanced features, including job control and command history recall. The POSIX shell is a superset of the Korn shell.

See also *shell*

ksh

The command that invokes the Korn shell; the name of the executable file that is the shell.

See also *Korn shell*, *shell*

L

LAN

Local Area Network. A group of two or more computer systems (hosts) connected by a transmission medium, such as an Ethernet cable, token ring, or FDDI. Each host is connected to the transmission medium by a hardware interface. A LAN is a data communications network that spans a physically limited area, such as a single office building. It usually is owned by the organization it services and provides high-bandwidth communication over inexpensive media.

See also *network*

layered product

A software product that is compatible with the operating system but is not part of the base operating system. A layered software product is installed, or layered, along with the operating system. Layered software products are often shipped on the Associated Products compact discs (CD-ROMs) that can accompany a new release of the operating system. In most cases,

layered software products are installed from the SysMan Menu or by using the `setld` command.

See also *base operating system*, *setld*, *SysMan Menu*

local area network
See *LAN*

log in
To begin using a computer system, usually by entering a login name and password to gain access to and communicate with the operating system as an authorized user.

Logical Storage Manager
See *LSM*

LSM
Logical Storage Manager. An integrated, host-based disk storage management tool that protects against data loss, improves disk input/output performance, and customizes the disk configuration. LSM builds virtual disks, called volumes, on top of UNIX disks. A volume is a special device that contains data used by file systems, databases, or other applications. LSM transparently places a volume between a physical disk and an application, which then operates on the volume rather than on the physical disk.

LSM private region
The disk partition that contains LSM configuration information for the entire system. Multiple private regions on multiple disks provide backup functionality in the unlikely event of a disk failure. The LSM private region requires 2 MB of disk space.

See also *LSM*

M

mandatory kernel component
A portion of the kernel that is required for the proper operation of the base operating system.

See also *optional kernel component*, *base operating system*

mandatory software subset
A portion of software that is the minimum required to install and run a software product.

See also *base operating system*, *optional software subset*

member specific file

A file that contains data specific to a particular cluster member. The contents of a member-specific file differ for each cluster member, and each member has its own copy of a member-specific file.

merge file

A program used by the Update Installation process to automatically merge new functionality from the new version of the operating system into an existing customized file.

See also *protected system file*, *.PreMRG file*

mount

To attach a file system to an existing directory to make the file system available for use. File systems are mounted by the `mount` command.

See also *unmount*

mount point

A directory that is the name of a mounted file system.

multiprocessor

A system with two or more processors sharing common physical memory.

N

name service

The service provided to client processes for identifying peer processes for communications purposes.

network

Two or more computing systems that are linked for the purpose of exchanging information and sharing resources.

Network File System

See *NFS*

.new.. file

A system file with this prefix allows a new version of a protected system file be delivered to the system during an Update Installation without overwriting the existing, and possibly customized version of the file.

See also *protected system file*, *.proto.. file*

NFS

Network File System. A service that allows a system (the server) to make file systems available across a network for mounting by other systems (clients). When a client mounts an NFS file system, the client's users see the file system as if it were local to the client.

NFS mounted
Refers to a file system that is mounted over a network by NFS rather than being physically connected (local) to the system on which it is mounted.

See also *NFS*

O

obsolete file
A file that was shipped in a previous version of the operating system that is no longer shipped with the current version of the operating system. Removing obsolete files does no harm to the operating system and helps save disk space.

optional kernel component
A portion of the kernel that is not required for the proper operation of the mandatory portions of the base operating system but may be required for the proper operation of optional portions of the operating system or layered software products. Optional kernel components may also provide some additional functionality required by a user (for instance, the Packet Filter Driver).

See also *base operating system*, *kernel*, *layered product*

optional software subset
A variety of software applications that can be installed to enhance the base operating system but are not required for the proper operation of the operating system. A prime example of optional software subsets are the UNIX reference pages; they are not required, but are a useful addition.

See also *base operating system*, *mandatory software subset*

P

page
A fixed-size unit of physical memory.

partition
The physical portions of a disk that are named `a` through `h`. Disks are divided into sections that are then assigned to hold various file systems. By convention, the `/` (`root`) file system is always located on the first partition, named `a`. The `/usr` file system is on a different partition, often the `g` partition. The `c` partition usually represents the entire disk. Each partition may differ in size and can overlap other partitions. Two overlapping partitions cannot be used at the same time. Disks can have up to eight partitions. Partitions are sometimes known as *slices*.

partition table

The component of a disk label that specifies how a physical disk is divided or partitioned.

password

A string of characters that in conjunction with other information, such as the login name, uniquely confirms a user's identity to the system. Passwords should contain a combination of upper and lower case letters, numbers, and special characters and must be a minimum of six to a maximum of 16 characters in length.

path

An ordered list of the directories in which the shell searches for the executable files named by commands that are not entered with a pathname and are not shell built-in commands.

pathname

The name of a file, concatenated onto a list of the directories through which access to that file is achieved; hence, the complete name of the file. Absolute pathnames begin at the root directory and are written with an initial slash (for example, `/usr/users/rolf/myfile.txt`). Relative pathnames begin at the user's working directory and are written without the initial slash (for example, `rolf/myfile.txt`).

PDF

Portable Document Format. A file format that captures formatting information from a variety of desktop publishing applications, making it possible to send formatted documents and have them appear on the recipient's monitor or printer as they were intended. To view a file in PDF format, you need Adobe Acrobat Reader, a free application distributed by Adobe Systems.

PostScript

The registered trademark for a language developed by Adobe Systems, Inc., for specifying the formatting of typeset documents or displays. An encapsulated PostScript file is a file that follows a standard for embedding PostScript files into other PostScript files.

.PreMRG file

A backup copy of a protected system file as it existed before an Update Installation. These files are appended with a `.PreMRG` extension. If any system file customizations were not successfully merged, refer to the `*.PreMRG` version of the file to include those customizations in the postmerged file on the updated system.

See also *protected system file*

.PreUPD file

A backup copy of an unprotected customized file. Before an Update Installation takes place, unprotected system files that are found to have been customized are copied and saved to the same file name with a `.PreUPD` extension. If you have customized these files in any way, you manually add the customizations into the new version of the system file when the Update Installation is complete.

See also *unprotected system file*

protected system file

A customized system file whose customizations automatically are merged into the new version of the file on the updated system. A merge is performed only when the file previously has been customized by the user or the file has been modified by Compaq. The Update Installation process creates a backup `*.PreMRG` file for reference purposes in case of a merge failure. Protected system files are system files that are expected to be customized, for example, `/etc/passwd` and `/etc/host`.

See also *.PreMRG file*

.proto.. file

A file that is modified to deliver site-wide customizations of system files to DMS client systems. Performing this customization before registering clients to the DMS environment reduces the amount of customization required at each client. There are several files with `.proto..` extensions located in the DMS environment `/var/adm/dms/dmsN.alpha` in the `/etc`, `/bin`, `/var/adm/X11`, and `/` directories that can be modified.

See also *DMS*

Q

Quick Setup

A system management application with which you configure basic licensing, networking, printer, and mail services. The Quick Setup application is accessed from the System Setup checklist by entering `/usr/sbin/checklist` on the command line.

R

reboot

To bring the system down to console mode and restart the operating system.

recommended partition table

The way a disk is partitioned by the Full Installation process when the default file system layout is used. The recommended partition table is

designed to hold the entire operating system on one disk and allow room on the disk for some additional software as well as enough extra space for future Update Installations. On a 1 GB disk, the recommended partition table is:

- The `/` (`root`) file system is 128 MB on the `a` partition.

- The first swap area, `swap1`, is 128 MB on the `b` partition.

- The `usr` file system is 745 MB on the `g` partition. The `/var` file system is located in `/usr`.

On a 2 GB disk, the recommended partition table sizes are doubled; that is 256 MB for `/`, 1490 MB for `/usr`, and 256 MB for swap space. On disks that are 3 GB and larger, the recommended partition table sizes are tripled; that is, 384 MB for `/`, 2235 MB for `/usr`, and 384 MB for swap space.

See also *default file system layout*, *partition table*

reference page
One of a collection of files containing documentation on all commands, system calls, library routines, and so forth. Reference pages are often called manual pages or man pages.

RIS
Remote Installation Services. An application that is used to install software kits across a network instead of using locally mounted distribution media. If the RIS software subset is installed, the RIS application is invoked by entering `/usr/sbin/ris`.

See also *network*, *RIS*

RIS area
A reserved disk area physically connected to a RIS server, containing one or more installable software kits.

See also *RIS*

RIS client
A computer system that has permission to install software across the network by accessing kits stored in the server's RIS area. Client systems are registered on the RIS server to software kits through the use of the RIS application.

See also *RIS*

RIS server
A computer system that serves other computers by providing software kits for them to install. The software is stored on disks belonging to the server and is accessed across the network by the RIS clients.

See also *RIS*

root

1. The login name for the superuser (system administrator).

See also *superuser*

2. The name applied to the topmost directory in the UNIX system's tree-like file structure; hence, the beginning of an absolute pathname. The root directory is represented in pathnames by an initial slash (/); a reference to the root directory itself consists of a single slash.

See also *pathname*

root directory

See *root*

root file system

The topmost file system under which all other file systems are mounted. The root file system contains the operating system files that get the rest of the system running.

root login

See *root*

S

script

1. A nonbinary program that is interpreted and executed by a specified shell.
2. In the `sed` editor, a list of editing commands to be applied to the input file.

SCSI

Small Computer System Interface. An industry-standard bus for small systems such as personal computers, small multiuser systems, or workstations. SCSI-based devices can be configured in a series with multiple devices on the same bus.

server

A computer system that provides software or services to one or more other computers called clients.

See also *client*

setld

A command that is used to install, manage, and remove software subsets on a system that is already running the operating system.

See also *software subset*

sh

The command that invokes the Bourne shell.

shell

A program that interprets commands entered by the user, invoking programs and calling for system resources as needed.

See also *Bourne shell*, *C shell*, *Korn shell*

single-user mode

An operating system mode that prohibits user logins, stops system services and daemons (for networking and graphical windowing environments), stops any running processes, and unmounts file systems.

software subset

A software kit module that is installed or removed with the `setld` command. A subset usually consists of a collection of related files, such as an application and its support files.

See also *setld*

su

A command that substitutes another user's login for that of the user who invoked the command, logging in the invoking user under the substituted login. The invoking user must know the login password for the user whose login is being substituted. If no other user's login is specified, the command substitutes the root login.

subset dependency

The condition in which a given subset requires the presence, or lack thereof, of other subsets in order to function properly. Dependencies between subsets is evaluated by a subset control program (SCP) under control of the `setld` command.

superuser

A user possessing privileges to override the normal restrictions on file access, process control, and so forth. A user who possesses these privileges becomes a superuser by issuing the `su` command, or by logging into the system as the user `root.`

swap space

Disk space used to hold modified memory from an idle or low priority process in order to reclaim the physical memory that the process is using.

symbolic link

A file that contains the pathname of another file or directory and acts as a pointer to that file or directory. The symbolic link can occur within the same file system or across file systems; also called a soft link or sym link.

SysMan Menu

A menu of system management tasks organized in a tree-like hierarchy with branches of general functionality and leaves for actual tasks. Selecting

a leaf opens a dialog for performing the task. Depending on the user's display device, the SysMan Menu provides either a graphical or text-based interface. The SysMan Menu is invoked from the command line by entering `/usr/sbin/sysman` or from the CDE Application Manager if your system is running the CDE desktop.

system disk

The disk containing the `/` (`root`) file system is sometimes known as the system disk.

system file

A file that is resident on a system after an installation of the operating system. A system file contains information that is important for the proper operation of the operating system.

T

tailored kernel

The kernel image that is created for a system, which includes specific support for the hardware and software options installed on the system. A tailored kernel is automatically built for the system at the end of the installation process by the `/usr/sbin/doconfig` program, and includes mandatory only, all, or customized kernel components as part of the tailored kernel build.

See also *kernel*

tar (tape archive)

A command that makes portable copies of files for archiving or transfer to another system. By default, the `tar` command writes its archive files on the system's primary magnetic tape unit.

target system

In the cloning process, the system that is cloned from another system.

U

UFS

UNIX File System. The standard file system type that is characterized by a hierarchical structure, the ability to create and delete files, dynamic growth of files, protection of file data, and the treatment of peripheral devices.

See also *AdvFS* , *file system*

UNIX file system

See *UFS*

UNIX shell

An option that is offered during a Full Installation as a way to access the standard UNIX command line interface. Its primary purpose is to provide a way to perform disk and file system maintenance before or during a Full Installation. The UNIX shell provides a way to access all UNIX commands that help you recover from serious problems such as `/(root)` file system corruption and enables you to perform general file system and disk maintenance tasks.

unmount

The process that announces to the system that a file system previously mounted on a specified directory is to be removed. Only the person who mounted the particular file system or a superuser can unmount it. A file system is unmounted with the `umount` command.

See also *mount*

unprotected system file

A customized system file, usually binary, whose customizations are not merged automatically into the new version of the file on the updated system. Customizations are preserved in a file with a `*.PreUPD` extension. If unprotected system files are altered in any way, customizations must be merged manually into the new version of the system file when the Update Installation is complete by using the `*.PreUPD` version as a guide. Unprotected system files are system files that are not expected to be customized by a user, for example, `/usr/bin/X11/netscape`.

See also *.PreUPD file*

Update Installation

Updates a system running a previous version of the operating system to a more recent released version of the operating system. An Update Installation preserves disk partitions, file systems, file customizations, network and print environment, user accounts, user created files, and any other system setup that may have been done on the system.

URL (Uniform Resource Locator)

The address of a file or other resource accessible on the Internet. The type of file or resource depends on the Internet application protocol. For example, using the HyperText Transfer Protocol (HTTP), the file can be an HTML page, an image file, or a program such as a CGI application or Java applet. Such an address would look like this: `http://www.compaq.com`, which is the URL for the Compaq corporate web site.

user-supplied file

A file that is searched for and executed during a Full or Update Installation. User-supplied files can be used to extend the installation process by applying customizations either before, during, or after the installation. The file can

contain scripts, executables, or programs. The Full Installation and Update Installation processes always look for these files, and if the files are properly named and are put in the right location, they are executed when found.

/usr file system

A file system in which some components of the operating system and applications are stored. Users' home directories are sometimes also located in a subdirectory of `/usr`.

V

version

The number assigned to a particular release of the base operating system or to layered software products.

See also *base operating system*, *layered product*

vi editor

A full-screen text editor. The `vi` editor is a modal editor. In command mode, it accepts commands for cursor movement, text deletion, and so forth. To insert text into the file, the user gives the editor a command that places the editor in input mode, and all keystrokes thereafter are interpreted as input data until the Escape key is pressed.

W

WLS

Worldwide Language Support. The set of software subsets that provide support for various native languages and countries. Installing WLS software subsets enables software developers to develop internationalized software and lets users work in their native language.

Worldwide Language Support

See *WLS*

Index