Tru64 UNIX

Release Notes for Version 5.1A

This manual provides information on new and changed features for the Compaq Tru64™ UNIX operating system. It also provides information on restrictions to the software and documentation.

You can also view the Tru64 UNIX Version 5.1A *Technical Update* for any additional information not included in these notes. You can access the *Technical Update* from the following URL:

http://www.tru64unix.compaq.com/docs/pub_page/update_list.html

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About This Manual

This manual contains release notes for the Compaq Tru64™ UNIX Version 5.1A operating system software.

This manual also describes significant new and changed features in this version of the Tru64 UNIX operating system and lists features and interfaces scheduled for retirement in future releases.

Audience

These release notes are for the person who installs the product and for anyone using the product following installation.

Organization

This manual is organized as follows:

Chapter 1   Contains an overview of new and changed features in this version of the operating system software

Chapter 2   Contains information about features that have been retired in this release of Tru64 UNIX and that are scheduled to be removed in future versions

Chapter 3   Contains installation notes

Chapter 4   Contains processor-specific information

Chapter 5   Contains information about the base operating system software

Chapter 6   Contains information about the development environment

Chapter 7   Contains information about the window system software

Chapter 8   Contains information about the documentation

Appendix A Contains the disk space requirements for the individual subsets included on the kit

Appendix B Contains information about clearing persistent reservations on disks behind HSZ80 and HSG80 controllers

Related Documents

You will find it helpful to have the following documentation available during the installation of this product:

- The hardware documentation for your system

- The *Installation Guide*

- The *Installation Guide — Advanced Topics*

- The online or hardcopy reference pages

- The HTML files provided on the Software Documentation CD–ROM, especially *New and Changed Features from Previous Releases*

You can also view the Tru64 UNIX Version 5.1A *Technical Update* for any additional information not included in these notes. You can access the *Technical Update* from the following URL:

http://www.tru64unix.compaq.com/faqs/publications/pub_page/update_list.html

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

The following conventions are used in this manual:

`%` `$`	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.
`file`	Italic (slanted) type indicates variable values, placeholders, and function argument names.
`[ | ]` `{ | }`	In syntax definitions, brackets indicate items that are optional and braces indicate items that are required. Vertical bars separating items inside brackets or braces indicate that you choose one item from among those listed.
`...`	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
`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

New and Changed Features

This chapter describes features that are new to the Tru64 UNIX operating system and describes features that have changed significantly from previous releases.

Tru64 UNIX Version 5.1A is a functional release that includes the following enhancements:

- The ability to perform online addition and removal of CPUs on Compaq AlphaServer™ GS160 and GS320 systems

- The ability to configure mixed-speed CPUs on AlphaServer GS80, GS160, and GS320 systems

- Conformance to the UNIX 98 Product Standard

- The ability to combine two or more physical Ethernet Network Interface Cards (NICs) to create a link aggregation group

- Support for ARMTech active resource management software

- Support for Compaq Secure Web Server software

- An upgrade to Netscape Communicator Version 4.76

- An update of the X Window System from X11R6.3 to X11R6.5

- Support for the iPlanet Directory Server software

- Support for Windows 2000 Single Sign-On software

1.1 CPU Online Add and Remove

CPU Online Add and Remove (OLAR) technology provides the ability to add and remove CPUs on the AlphaServer GS160 and GS320 systems. This feature can be used replace defective CPUs or to upgrade the number of CPUs in a system. The addition or replacement of CPU is preformed while the operating system and applications continue to run.

Compaq Analyze now includes the ability to notify the operating system that it has identified a specific CPU that it suggests be replaced. The operating system can be configured to automatically request that the CPU go off line. Customer-tunable options are used to process that request. This allows the customer to define when to honor these automatic offline requests. This feature keeps the system running longer because it can disable faulty CPUs

before they cause the entire system to stop. See `olar.config`(4) for more information and see Section 4.3.2 and Section 4.3.1 for restrictions to OLAR.

1.2 Support for Mixed-Speed CPUs

Support for mixed-speed CPUs allows you to run CPUs of different speeds on AlphaServer GS80, GS160, and GS320 systems. Customers can now purchase additional processors for their systems with limited regard for the speed of the processors that they currently have.

Unless all of the CPUs in a quad building block (QBB) are of the same speed, then all of the CPUs run at the speed of the slowest CPU. In addition, all of the CPUs in a QBB are configured with B cache the size of the smallest B cache in the QBB. See Section 5.1.3 for software restrictions in a mixed-speed CPU environment.

1.3 UNIX 98 Branding

This version of the operating system complies with the UNIX 98 Product Standard, a significantly enhanced version of the UNIX 95 Product Standard. Mandatory UNIX 98 enhancements include the following:

- Threads interfaces
- Multibyte support extension (MSE)
- Large file support
- Dynamic linking
- Changes to remove hardware data-length dependencies and restrictions
- Year 2000 changes

Optional enhancements include software administration facilities and a set of APIs for realtime support. Tru64 UNIX does not support the optional enhancements to the UNIX 98 Product Standard.

This version of the operating system also complies with the UNIX 98 Workstation Product Standard. This is the same as the UNIX 98 Product Standard, but with the addition of the requirement to also conform to the Common Desktop Environment Product Standard. The Common Desktop Environment Product Standard defines the X/Open Common Desktop Environment, a common graphical user interface environment for use on systems supporting the X Window System. It defines a standard set of functional capabilities and supporting infrastructure, and the associated standard application programming interfaces, command line actions, data interchange formats and protocols, that must be supported by a conformant system. It provides standard forms of the facilities normally found in a graphical user interface environment, including windowing and window management, session management, file management, electronic mail, text

editing, calendar and appointments management, calculator, application building and integration services, print job services, and a help service.

1.4 Link Aggregation Support

_____ **NOTE** _____

Link aggregation is not supported in the initial release of the Version 5.1A operating system. Support for this feature will be provided with Patch Kit 1 for Tru64 UNIX Version 5.1A.

_____

This release supports network link aggregation, or trunking. Administrators can combine two or more physical Ethernet Network Interface Cards (NICs) to create a link aggregation group. The upper-layer software sees this link aggregation group as a single logical interface. Link aggregation provides the following capabilities:

* Increased network bandwidth, depending on the number and type of NICs

* Load distribution across all ports of a link aggregation group

* Failure detection and and failover for DEGPA and DE60x NICs

Link aggregation is supported only on server-to-server and server-to-switch point-to-point connections.

See the *Network Administration: Connections* manual for information on configuring link aggregation groups. See `lag`(7) for additional information about link aggregation.

1.5 ARMTech Active Resource Management Software

Aurema's ARMTech ShareExpress is bundled with this release of the operating system, and can be installed from the *Associated Products Volume 2* CD–ROM.

ShareExpress is the entry-level product in Aurema's ARMTech family of Active Resource Management products. It can be upgraded to ShareExtra and ShareEnterprise. ShareExpress offers fair CPU resource allocation for all users on a Tru64 UNIX server. See ARMTech's *User's Guide* for installation and start-up information.

Standard Tru64 UNIX supports timeshare CPU scheduling of processes, with all high-demand processes treated equally and receiving the same prioritization for CPU cycles. If a user runs more high-demand processes than other users, he or she may receive commensurately more CPU cycles.

With ShareExpress running, all users receive equal allocations of CPU cycles, and irrespective of the number of processes a user has spawned, the CPU is fairly allocated among all active users. ShareExpress offers the following benefits:

- Effective equal distribution of the CPU among all active system users

- Simple operation through one command

- Reporting on CPU usage of the top users and processes

- Protection against runaway processes

- Simple upgrading to the more advanced ShareExtra and ShareEnterprise products

See ARMTech's *User's Guide* for more information. The ShareExpress software is located in the ARMTech_Active_Resource_Management directory of the *Associated Products Volume 2* CD–ROM.

ShareExtra is also included on the *Associated Products Volume 2* CD–ROM. It must be installed and activated with a license key available from **http://www.aurema.com/**. See the *User's Guide* for installation and start-up information.

ShareExtra gives an administrator additional control of the CPU, allowing fair sharing by users, groups of users, or applications (an application is a user-defined group of processes that ARMTech treats as a single resource consumer). ShareExtra can be used to precisely and reliably allocate CPU resources to resource consumers as either a fixed percentage (reservation) or as a share (relative allocation — suitable for offering Platinum, Gold, and Silver levels of service).

ShareExtra offers the following benefits:

- Hierarchical allocation of CPU resources by user, group of users, or application

- Prioritization of CPU resource allocation

- Dynamic reallocation of resources

- Full-featured reporting, including extraction of resource usage data for accounting

- Comprehensive command line interface for scripting resource allocation policies to meet specific requirements

- Server management and control via a remote GUI

ShareEnterprise gives an administrator effective control over all critical system resources for processes, users, groups of users, and applications (where an application can be any arbitrary collections of processes). ShareEnterprise can be used to precisely and reliably allocate all system

resources as a fixed percentage (reservation) or as a share (relative allocation). The number of processes an application or user is allowed to spawn can also be limited.

ShareEnterprise offers:

- Hierarchical allocation of resources across users, groups and applications
- Resource management for CPU and number of processes (for additional modules, see `http://www.aurema.com/ARMTech/`)
- Persistent data storage of all resource usage and policies across boots
- Configurable GUI and report generator for displaying resource consumption

See the ARMTech *User's Guide* for more information.

1.6 Compaq Secure Web Server

Compaq Secure Web Server is included with this release of the operating system. It replaces the Netscape FastTrack web server. Compaq Secure Web Server is based on the industry-standard Apache Software Foundation (ASF) code base. Compaq has improved the base ASF product by including SSL capability, allowing for encryption up to and including 156 bits. It also includes support for Java Servlets, Java Server Pages, and PHP.

1.7 Netscape Communicator 4.76

This release of the operating system contains Netscape Communicator Version 4.76. For information on using Netscape Communicator to display the online documentation, see the *Installation Guide*. To obtain the latest fixes to the Netscape Communicator problems described in Chapter 5 of these release notes, it is recommended that you download and install the latest version available of Netscape Communicator for Tru64 UNIX from the Netscape Netcenter's Download World Wide Web site at the following URL: `http://home.netscape.com/download/index.html#clients`

For more information on Netscape, see Chapter 5.

1.8 Upgrade to X11R6.5

This version of operating system includes an upgrade to X11R6.5 of the X Window System. The X11R6.5 release is a major release consisting of more than 60 bug fixes and the following new extensions:

- Extended Visual Information (EVI) extension — This extension allows a client to determine information about core X visuals beyond what the core protocol provides.

- Colormap Utilization Policy — This extension provides a mechanism for a special application (a colormap manager) to discover any special colormap requirements, to encourage colormap sharing to reduce colormap flashing on low-end 8-bit frame buffers, and to define a behavior in the X server color allocation scheme that reduces colormap flashing in a configuration using nonshared colormaps.
- Easy Resource Configuration extension — This extension is used for setting and changing resources in X applications.

1.9 iPlanet Directory Server

This release of Tru64 UNIX includes the iPlanet Directory Server. The Directory Server may be used as a general-purpose corporate directory or as the primary directory for Tru64 UNIX applications or any other application that needs access to a directory. The software license for this bundled version of iPlanet Directory Server is included with the UNIX base license. The directory license is valid for up to 200,000 users. If more than 200,000 users are required, an additional license for iPlanet Directory will need to be purchased.

1.10 Windows 2000 Single Sign-On

Tru64 UNIX allows Windows users to authenticate to Tru64 UNIX using their Windows 2000 user name and password. Secure authentication between the Tru64 UNIX system and Active Directory occurs using Kerberos technology. UNIX user account information can be stored in the LDAP-enabled Active Directory, to give administrators a single user account directory spanning Tru64 UNIX and Windows 2000. Administrators can also manage the additional Tru64 UNIX attributes using the Microsoft Management Console (MMC) snap-in extensions provided with this kit.

1.11 Additional New Features

In addition to the new features described in the previous sections, the following enhancements have been added to the Tru64 UNIX operating system.

1.11.1 Collect GUI Update

The `collect` GUI is a graphical user interface for the `collect` system monitoring tool.

For this release, the `collect` GUI is now available on the base operating system CD–ROM. In addition, `collect` has been updated to support CPU Online Add and Remove (OLAR).

1.11.2 Logical Storage Manager Storage Administrator (lsmsa) Update

The Logical Storage Manager Storage Administrator (lsmsa) is a graphical user interface for the Logical Storage Manager (LSM).

For this release, analysis and performance capabilities of the old LSM GUI have been added to lsmsa. In addition, lsmsa can now be launched from SysMan Station.

1.11.3 AdvFS fixfdmn File System Repair Utility

The fixfdmn utility performs in-place repair of AdvFS file system metadata. This is a first-generation offline, in-place, AdvFS metadata repair tool. The goal of this tool is to be able to mount a damaged file system after it has been repaired.

1.11.4 AdvFS Fileset Data Logging

AdvFS fileset data logging provides the the ability to specify that the entire fileset must log data as well as metadata. This enables the files stored under the fileset to be consistent across accidental restarts.

Prior to this release, AdvFS provided data logging on a per-file basis.

2

Features and Interfaces Scheduled for Retirement

This chapter provides information on features that have been retired from the operating system or that are scheduled to be removed from, or changed in, future major functional releases. This information is provided so that users and developers can migrate away from these features in the near future.

2.1 Retired in This Release

The following notes provide information on features that have been retired in this release. These changes were announced in previous releases.

2.1.1 Netscape FastTrack Server

The Netscape FastTrack Server web server has been retired. The Compaq Secure Web server replaces the retired software.

2.1.2 POSIX Threads CMA Interface

The CMA interface of POSIX Threads (formerly DECthreads) has been retired and is no longer supported in the operating system. We recommend that you port your CMA-based application to the IEEE Std 1003.1-1996, POSIX System Application Program Interface provided by the POSIX Threads Library.

2.2 Features and Interfaces Scheduled for Retirement in Future Releases

The following notes contain information on features and interfaces that will be retired in future releases. This information is provided so you can begin planning for the time when these features are retired.

2.2.1 COM for Tru64 UNIX

COM for Tru64 UNIX, Version 2.0.1, is the last feature release of the product. Compaq will retire COM for Tru64 UNIX in a future release of the operating system, but not before Q2 2002.

2.2.2 Performance Manager CDE GUI

The Performance Manager CDE GUI will be retired in a future release of the operating system. Performance management functions are available using the `collect` utility. The `collect` utility includes a command line interface and a graphical user interface.

2.2.3 DECmigrate

DECmigrate will be retired in a future release of the operating system. This retirement includes the removal of the `mxr` command, the `libmxr.so` library, and the `mxr(1)` reference page.

2.2.4 The automount Utility

The `automount` utility will be retired in a future release of the operating system. This utility is being replaced by the `autofs` utility. Instructions for migrating from `automount` to `autofs` are provided in the *Network Administration: Services* manual. Instructions for migrating from `automount` to `autofs` in a TruCluster environment are provided in the *Cluster Release Notes*.

2.2.5 POSIX Threads Metering

The metering features of the POSIX Threads Library will be retired in a future release of the operating system. These features are described in the *Guide to the POSIX Threads Library*. If you want to collect statistical and historical information on synchronization objects, use Visual Threads, which is a tool that you can use to analyze and debug multithreaded programs.

2.2.6 SCSI Device Names

Support for rz and tz SCSI device names will be retired in a future release. Any code that derives knowledge about a device from the ASCII name or minor number might be impacted.

All code that uses the current name space will be compatible until the retirement because a mechanism that ensures binary compatibility has been provided.

The compatibility name space can be used to access devices in only the old, limited address space, and the new names can be used to access devices in only the new extended address space.

2.2.7 XIE Version 3.0 X Client Extension

Version 4.0G of the operating system supports XIE Version 5.0. Support for XIE Version 3.0 server extensions was removed in Version 4.0 of the operating system. Client support will be removed in a future release.

2.2.8 The installupdate -i Option

The `-i` option to the `/sbin/installupdate` command will be retired in a future release of the operating system.

The `-i` option currently allows you to interactively select kernel components after the new software subsets have been installed. Starting with the next major release, this flag will be unnecessary because you will be able to interactively select optional kernel components at the beginning of the update installation process, prior to software installation. These kernel components will be built into the kernel automatically during the kernel build phase at the end of the update installation; therefore, you need not be present at that time.

2.2.9 The pixstats Program-Analysis Command

The `pixstats` program-analysis command will be retired in a future release of the operating system. The `pixstats` command will be replaced by the `prof -pixstats` command, which became available in Version 4.0D and which provides a more complete and correct implementation of the same capabilities and flags.

2.2.10 ATM IP Switching

The operating system provides limited support for IP switching over ATM, based on the Ipsilon Networks Inc. reference model (RFC 1953 and 1954). This support will be retired in a future release.

IP switching support is provided in this release for backward compatibility only. Do not use it to develop new applications. Other methods of carrying IP over ATM, including classical IP and LAN emulation, will continue to be supported.

2.2.11 The ogated Routing Daemon

The `ogated` daemon (the old version of the `gated` routing daemon) will be retired in a future release of the operating system. If you use the `ogated` routing daemon, you should migrate to the `gated` routing daemon, which supports a superset of functionality in the `ogated` daemon.

2.2.12 DEC Ada RTL

DEC Ada (UPI - 0HM) and DEC Ada PDO (UPI - 0VS) will be retired in a
future release of the operating system.

2.2.13 Replacement of hiprof, pixie, and third Interfaces

The atom-tool interfaces documented in `hiprof`(5), `pixie`(5), and `third`(5)
will be retired in a future release. For compatibility with earlier releases,
the interfaces remain in this release; however, the reference pages have
been removed.

The interfaces have been superseded by the new `hiprof`, `pixie`, and `third`
commands. The new commands are documented in `hiprof`(1), `pixie`(1),
and `third`(1).

2.2.14 Default fork Support in hiprof and pixie

In a future release, the `hiprof` and `pixie` profilers will no longer default to
using the `-fork` option when `libc` is instrumented. If the program being
profiled will fork, the `-fork` option should be specified on the `hiprof` or
`pixie` command line. Explicitly using the `-fork` option lets the profilers
employ a more reliable algorithm for handling the fork. See `hiprof`(1) and
`pixie`(1) for more information.

2.2.15 The feedback Command

The `feedback` command will be retired in a future release. The `pixie`
command provides all the same features more consistently, more reliably,
and more effectively. In particular, the `pixie` command's `-update` option
helps the compiler achieve significantly better optimizations than the
`feedback` command's `-feedback` option, though `pixie` continues to
support the `-feedback` option. See `pixie`(1).

2.2.16 Event Report Formatter (uerf)

The Event Report Formatter (`uerf`) will be retired in a future release. The
`uerf` command is not certified to be Y2K compliant. Depending on your
system, use either Compaq Analyze or DECevent.

2.2.17 Ladebug to Replace dbx As the Default Debugger

In a future release, Ladebug will replace `dbx` as the default debugger.

When this change is implemented, the Ladebug debugger will be invoked
by the `dbx` command and the `dbx` debugger will be invoked with the `dbx`
`-old` command.

Despite efforts to make the two debuggers compatible, differences exist in the syntax accepted and the output produced by the debuggers. You might have to edit scripts that use `dbx` when this change occurs.

2.2.18 AdvFS Subsystem Attributes

The following AdvFS subsystem attributes will be retired in a future release:

- `AdvfsCacheHashSize`
- `AdvfsCacheMaxPercent`
- `AdvfsMinFreeAccess`
- `AdvfsMaxFreeAccessPercent`
- `AdvfsFavorBlockingQueue`
- `AdvfsMaxDevQLen`

In this release, setting these attributes does not affect kernel operations. Instead, their functionality has been replaced by new dynamic kernel algorithms. These algorithms aim to optimize system performance. Additionally, information on these attributes has been removed from the documentation.

2.2.19 AdvFS Fragment Attributes

The AdvFS subsystem attributes `AdvfsMinFragGrps` and `AdvfsMaxFragGrps` will be removed in a future release. Information on these attributes has been removed from the documentation.

2.2.20 Tcl Version 7.6 and Tk Version 4.2

Tcl Version 7.6 and Tk Version 4.2 will be retired in a future release. This release contains Tcl/Tk Version 8.2.

Tcl Version 7.6 and Tk Version 4.2 have been moved to the optional subsets `OSRETIREDTCL76510` and `OSRETIREDTK42510`. These subsets will install under the `/usr/opt/obsolete` directory and only contain the run-time environment. Header files and reference pages are no longer included.

2.2.21 The dxlsm Interface

The CDE/X11 graphical Logical Storage Management tool, `dxlsm`, will be retired in a future release. The `dxlsm` interface is superseded by the new LSM Storage Administrator, `lsmsa`, which was introduced in Version 5.0 of the operating system.

Both the `dxlsm` and the `lsmsa` interfaces are installed from the `OSFLSMX11510 or higher` subset.

We recommend you begin using the `lsmsa` interface to manage your LSM configurations.

2.2.22 C++ Run-Time Libraries libtask and libcomplex

The `libtask` and `libcomplex` C++ run-time libraries will be retired in a future release of the operating system. If you have code that uses the nonstandard complex class in the library, we recommend that you use the template complex class defined in the C++ Standard Library. If you have code that uses the `libtask`, we recommend that you use the POSIX Threads Library.

The `libtask` and `libcomplex` libraries will continue to be part of the compiler kit as archived libraries. If you cannot migrate to the recommended libraries, you can relink applications that depend on these libraries using the archived versions. If you have an application that linked against the shared versions and cannot relink, contact the Compaq C++ Compiler team at **compaq_cxx@compaq.com**.

2.3 Hardware Support Retirement Notices

To allow for future growth and enhancements to the operating system, it is necessary to retire support for some of the existing hardware. This section provides information on hardware support that has been retired in this release and hardware support that will be retired in future releases.

2.3.1 Hardware Support Retired in This Release

The following note provides information on hardware support that has been retired in this release of the operating system.

2.3.1.1 XMI Bus Retirement

Support for the XMI bus and all XMI bus options has been removed in this release of the operating system.

2.3.2 Hardware Support Scheduled to Be Retired in Future Releases

The following sections provide information on hardware support that will be retired in future releases.

2.3.2.1 VME Bus Retirement

Support for the VME bus will be retired in a future release of the operating system. This includes retirement of systems and options that use this bus technology.

2.3.2.2 Disk Devices

In a future release of the operating system, support for the following disk devices will be retired:

- RZ55
- RZ56
- RZ57
- RZ58
- RZ73
- RZ74

2.3.2.3 Array Controllers

Support for the following storage array controllers will be retired in a future release of the operating system:

- HSZ10
- HSZ20
- HSZ40
- HSZ50
- HSZ70

2.3.2.4 Network Adapters

Support for the following network adapters will be retired in a future version of the operating system:

- DE500-FA — PCI to 100 BASE-FX (Fast Ethernet) network interface card
- DE500-BA — Single-port Ethernet, copper
- DE450–CA — Single-port Ethernet, twisted pair
- DE435 — PCI Ethernet
- DE425 — EISA Ethernet
- DE422 — EISA Ethernet
- DEFEA — EISA FDDI

2.3.2.5 FDDI Adapter for Futurebus

In a future release of the operating system, support for the DEFAA FDDI adapter will be retired.

3

Installation Notes

The notes in this chapter discuss the following topics:

- General information about installation (Section 3.1)
- Layered product considerations (Section 3.2)
- Full installation (Section 3.3)
- Update installation (Section 3.4)
- RIS installation (Section 3.5)
- Dataless Server installation (Section 3.6)

Do not attempt to install the operating system without first reading the notes in this chapter and in Chapter 4 that are appropriate to your processor. Failure to read these notes can result in installation problems. Also, before you start your installation process, be sure to review the hardware documentation that came with your system.

3.1 General Information About Installation

The following notes apply to the installation process in general.

3.1.1 Disk Space Requirements

The minimum disk size requirement for single-disk installations is now 1 GB. It is possible to perform single-disk installations on disks with less than 1 GB of disk space, however, performance may be degraded and it is not recommended. If you attempt a single-disk installation on a disk smaller than 1 GB, you will receive a warning message.

Although the minimum disk space for installing the operating system is a 1 GB disk, we recommend that systems have at least two 2 GB disks to ensure sufficient disk space for swap, patches, and storage.

For more information about disk space requirements, see Appendix A, which lists the size requirements for each subset.

3.1.2 Firmware Revision

The proper firmware for your system is included on the *Alpha Systems Firmware Update* CD–ROM that came with your kit. The *Release Notes*

Overview included with the firmware CD–ROM provides all the information you need to install the proper firmware.

Alternatively, you can obtain this information from the Internet by using the following URL with a web browser:

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

You can also obtain this information from the Internet by using the following address to access the firmware using FTP:

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

On most systems, you can determine the current level of the firmware entering the following command:

```
# consvar -v -l | grep "Firmware Rev"
```

If this command is not supported on your system, you can use the following command:

```
# uerf | grep "Firmware revision:" | tail -1
```

3.1.2.1 HSZ Firmware Requirements

The following list provides the minimum firmware requirements for HSZ controllers:

- HSZ40 - Version 3.7 or higher firmware
- HSZ50 - Version 5.7 or higher
- HSZ70 - Version 7.7 or higher
- HSZ80 - Version 8.3–1 or higher
- HSG80 - Version 8.5 or higher

You cannot put the HSZ40A controller on a multi-initiator bus in a cluster or multi-initiator from the same host. You must put these controllers on a bus with a single-host adapter. If you need to put them on a shared bus, you can upgrade them to HSZ40B, HSZ40C, or HSZ50 controllers and then put them on a shared SCSI bus.

3.1.3 Install Hangs If Disk Has Disk Label Generated by Linux

Do not attempt to install Tru64 UNIX Version 5.1A onto a disk that has a disk label written by a Linux system.

3.1.4 Nonconfigured Subsets and the setld Menu Restriction

The setld -D command manages software in an alternate root directory. You can use this feature to install software onto a disk and then move the disk to a different system. When you use the -D option, the software

is loaded onto the disk; however, it is not configured. The software is configured later by using `setld -c` command.

If you use the `setld -D` command, name the subsets to load on the `setld` command line. Do not use the interactive software selection menu provided with `setld` to choose the subsets. If you use the software selection menu to choose the subsets, failures similar to the following can occur:

```
5 OSFJAVADEV510 Java 1.1.8-7 Development Environment
cannot be installed as one of the required subsets is not available.
PLEASE BEGIN YOUR SELECTIONS AGAIN.
```

3.1.5 Reloading Subsets with setld

Some layered product subsets check when they are installed to see if the subsets are already on the system. If they are, they prevent you from reinstalling them. This introduces an error into the software management database after which the `setld -i` command reports that the subset is not installed, even though all of its files are present on the system.

To avoid this problem, use the `setld -d` command to delete a subset before using the `setld -l` command to reinstall it.

If you accidentally have the situation where you want to delete a subset but you cannot, you can correct the problem by using the `touch` command and then the `setld -d` command. For example, if the situation occurred with the `DFARTL388` subset, you would do the following:

```
# touch /usr/.smdb./DFARTL388.lk
# setld -d DFARTL388
```

Afterwards, you can reinstall the subset using the `setld -l` command.

3.1.6 IMAP and POP

In order to use the Internet Message Access Protocol (IMAP) and Post Office Protocol (POP) servers after performing an update installation or installing the `OSFINET (Additional Networking Services)` subset, you need to do the following:

1. Make sure that the `/etc/passwd` file (local, yp, or NIS) contains entries for the IMAP and POP users. If it does not, create them. For example:

    ```
    pop:*:13:6:POP Mail Service Account:/:
    imap:*:14:6:IMAP Mail Service Account:/:
    ```

    Substitute the values 13 and 14 with a user ID that is appropriate for your system. For more information, see `passwd`(4). Also, substitute the value 6 with the group ID of the `mail` group on your system; see `group`(4).

2. Enter the following command as root so that the IMAP and POP files and directories have the correct permission, owner, and group:

```
# setld -c OSFINET500 MAILSERVERSETUP
```

3.1.7 Initial sendmail Warning Message

The first time you boot the system after a full installation, the following warning message is displayed as a result of starting `sendmail`:

```
warning: local host name (hostname) is not qualified;
fix $j in config file.
```

This indicates that the system does not have a qualified name because neither DNS (BIND) nor mail has been configured. However, `sendmail` will continue to operate.

3.1.8 The autopush Message Displayed During Boot

The following message is displayed on the console while booting:

```
/usr/sbin/autopush: Can't push requested modules on STREAM for entry 39
/usr/sbin/autopush: Device (6,-1) already configured
```

You can ignore this message.

3.1.9 I/O Error Message

After the installation process has completed installing all of the requested subsets, you might see the following benign error message:

```
I/O error (errno 5) for block ( xxx , xxx ) on device xxx , x
```

You can ignore this message. The installation will complete successfully.

3.1.10 Ignore the error writing output file Message

During the installation of software subsets, ignore the `error writing output file` message. The error is harmless.

3.1.11 Persistent Reservation Errors

Under certain circumstances, you can encounter persistent reservation errors. If this problem occurs, see Appendix B.

3.2 Layered Product Considerations

The following notes apply to layered products for Tru64 UNIX.

3.2.1 Mounting the Associated Products CD–ROM

You can mount the Associated Products CD–ROMs (APCDs) with the `mount` command on Tru64 UNIX systems running Version 4.0E or higher, as follows:

```
# mount -r /dev/disk/cdrom0c /mnt
```

On releases prior to Version 4.0E, you must mount the APCDs with the following options:

```
# mount -r -t cdfs -o rrip /dev/rz4c /mnt
```

On versions prior to Version 4.0D, you might receive the following error message, indicating that compact disc file system (CDFS) support is not built in to the kernel that is currently running:

```
# mount -r -t cdfs -o rrip /dev/rz4c /mnt
/dev/rz4c on /mnt: No valid filesystem exists on this partition
```

If you receive this error, you need to build your kernel with the following option:

```
ISO 9660 Compact Disc File System (CDFS)
```

3.3 Full Installation

To perform a full installation on your system, see the instructions in the *Installation Guide*.

3.4 Update Installation

Version 5.1A supports update installations from Versions 5.0A and Version 5.1.

To update your operating system software to Version 5.1A, you must use the `installupdate` utility or the full installation procedure as described in the *Installation Guide*.

The `-i` flag for the `installupdate` command will be retired in a future version of the operating system. See Section 2.2.8 for more information.

The `installupdate` procedure checks to see if there is enough space on the disk you have selected to do the installation. If there are any conflicts, the `installupdate` procedure enables you to remove unecessary files to create space. For more information, see the *Installation Guide*.

The following sections apply to the update installation procedure.

3.4.1 Update Installation of UFS File System on LSM Volumes Will Fail

Due to a problem setting the FSTYPE of LSM volumes on Version 4.0 systems, systems with UFS file systems on LSM volumes might experience problems during the update installation process when booting Version 5.0 and higher. If the /usr or /var file system is an encapsulated LSM volume, then the system will not come up to multiuser mode. Two workarounds exist for this problem, depending on whether you determine if there are any LSM volumes containing UFS file systems on your system before or after performing an update installation process.

To determine if any of the LSM volumes on your system contain UFS file systems, run the following command:

```
# mount -t ufs | grep /dev/vol/
```

If you determine prior to the update installation that one or more LSM volumes contain UFS file systems, run the following command to work around the problem:

```
# voledit set fstype=4.2BSD UFSVOLUMES
```

The *UFSVOLUMES* variable is the list of LSM volumes containing UFS file systems. For example, suppose the mount -t ufs | grep /dev/vol/ command returns the following information:

```
# mount -t ufs | grep /dev/vol/
/dev/vol/rootdg/rootvol on / type ufs (rw)
/dev/vol/rootdg/vol-rz8g on /usr type ufs (rw)
/dev/vol/rootdg/vol-rz8h on /var type ufs (rw)
/dev/vol/rootdg/vol-rz9c on /mnt type ufs (rw)
```

You would issue the following voledit command:

```
# voledit set fstype=4.2BSD rootvol vol-rz8g vol-rz8h vol-rz9c
```

If you cannot determine prior to the update installation that one or more LSM volumes contain UFS file systems, or if you have already performed the update installation, do the following:

1. Boot the system to single-user mode, as follows:

    ```
    >>> boot -fl s
    ```

2. Mount the root directory as read/write:

    ```
    # mount -u /
    ```

3. Restart LSM:

    ```
    # vold -k
    ```

4. Manually set the volume file system types (fstype):

```
# voledit set fstype=4.2BSD UFSVOLUMES
```

The *UFSVOLUMES* variable is the list of LSM volumes containing UFS
file systems.

5. Either continue to bring the system up to multiuser mode or reboot the
    system as normal.

3.4.2 Update Installation Might Exit While Removing the System V Environment (SVE)

If the update installation procedure detects that the System V Environment
(SVE) product is installed on the system, it asks for that product to be
removed. If the SVEADM subset is installed, the update installation process
terminates while attempting to remove the SVEADM subset. The cause of
this is an init command present in the SVEADM subset control program
(.scp file).

To avoid this problem, remove the SVEADM subset prior to running the
update installation by performing the following steps:

1. Determine the exact subset name by issuing the following command:

    ```
    # setld -i | grep SVEADM | grep installed
    ```

2. Remove the subset by using the setld -d command and the name of
    the subset.

3.4.3 Reconfigure Mail After an Update Installation

After performing an update installation on any system running an earlier
version of the operating system, you must reconfigure mail by using either
/usr/sbin/mailconfig or /usr/sbin/mailsetup. The new sendmail
configuration ensures that all mail leaving your system has a fully qualified
return address and your mail configuration is cluster-ready.

When you reconfigure mail, you must use the application that was used
to create the current sendmail.cf file; otherwise, you will lose your
previously saved configuration.

If you use the /usr/sbin/mailsetup program, the following message
might be displayed:

```
An m4 configuration file has been found and it is different
from the default produced by mailsetup.  Mailsetup does not
support a /var/adm/sendmail/sendmail.m4 file which has been
modified.  Use this file at your own risk.  Do you wish to
use this file (y/[n]) ?
```

If you want `sendmail` to fully qualify the return address when leaving the system, and to be cluster-ready, answer no. If you do not want these features, answer yes.

3.4.5 Restriction to Using the Graphical Update Installation Interface

This release of the operating system contains a restriction that interferes with the ability to use the update installation's graphical user interface (GUI). The restriction only applies if the system you are updating is running Tru64 UNIX Version 5.0A, the system has the Worldwide Language Support (WLS) subsets installed, and you are performing the update from a CD–ROM.

If you use the update installation GUI under these circumstances, the text-based interface will be displayed instead of the GUI.

3.4.6 Additional Disk Space Needed

If your system does not have enough free disk space to complete the update installation, you are presented with a list of three options for recovering disk space.

If you remove software subsets belonging to the Operating System (OSF) or Worldwide Language Support (WLS) products to recover disk space, the update installation process must recalculate the disk space amount listed in the Total Needed category. Allow the update to continue so it can recalculate the disk space based upon the currently installed software subsets.

3.5 RIS Installation

This following notes pertain to Remote Installation Services (RIS).

3.5.1 Time Zone Restriction

New time zones were added in Version 5.1 of the operating system. Therefore, servers that might have indicated the US-Eastern time zone while running an earlier version of the operating system now indicate a time zone such as America-New York.

When you install a prior version of the operating system on a client from a RIS server running Version 5.1 or higher, the prior version of the operating system does not recognize the time zone and does not automatically set the time zone during the installation procedure. This occurs because the new time zones do not match those in the prior versions. Therefore, you must set the time zone manually after the installation.

3.5.2 Serving the Worldwide Language Support Product from a RIS Server

You cannot extract the Worldwide Language Support (WLS) product into a RIS area. Therefore, if you need to serve WLS to your RIS clients, create a symlink for this product into the RIS area. For more information on this procedure, see the *Sharing Software on a Local Area Network* manual.

3.5.3 Future Location of Unsupported Kernel Object Subsets

The following kernel object subsets will be moved to the Tru64 UNIX Retired product directory on the Associated Products CD–ROM in a future release of the operating system.

OSFBINOBJECT520	Main kernel objects
OSFHWBINOBJECT520	Hardware kernel objects
OSFADVFSOBJECT520	AdvFS kernel objects
OSFLSMOBJECT520	LSM kernel objects
OSFATMOBJECT520	ATM kernel objects

3.6 Dataless Server Installation

The following note pertains to Dataless Server installations.

3.6.1 Restriction Using TruCluster Server

TruCluster Server Version 5.0A or higher does not support Dataless Management Services (DMS).

4

Processor-Specific Notes

This chapter contains general notes that apply to all processors and specific notes that apply to the following systems:

- AlphaServer 1000 and 1000A systems (Section 4.2)
- AlphaServer GS systems (Section 4.3)
- Personal Workstation 433au, 500au, and 600au systems (Section 4.4)
- Alpha VME and PCI/ISA (DMCC) Modular Single-Board Computers (Section 4.5)

Do not attempt to install this release of the operating system without first reading the notes appropriate to your processor. Failure to read these notes can result in installation problems. Also, before you start your installation, be sure to review the hardware documentation that came with your system.

4.1 General Notes on Processors

The following notes apply to more than one processor type.

4.1.1 Upgrading Your Hardware

You can follow the instructions in the *Installation Guide* and those provided by your hardware and firmware documentation when you add new options or change your system hardware. However, if the new option is supported only in the newest version of the operating system, you must perform the upgrade in the following sequence:

1. Update your operating system software.
2. Upgrade your firmware.
3. Upgrade your hardware or install the new option.
4. Follow the instructions in Chapter 2 of the Tru64 UNIX *Installation Guide* to rebuild your system kernel.

4.1.2 Future Enhancements for Expanded Block Size

Most applications accessing storage devices (such as disk, CD–ROM, floppy drives, and so on) currently assume each block of data contains 512 bytes of data. In the future, for applications using raw access to these devices, this

assumption will not necessarily be valid. Applications using file systems (such as UFS, AdVFS, CDFS, and DVDFS) will not be impacted. Applications using raw access should be modified to use the DEVGETGEOM ioctl call to determine a device's sector size and adjust accesses appropriately.

4.1.3 Floppy Disk Drives

Some of the software documentation states to use the floppy disk drive for certain procedures. However, some systems do not include floppy disk drives. If your system does not include a floppy disk drive, you must find an alternative to the documented procedure.

4.1.4 KZPSA Behind the PCI-to-PCI Bridge

On AlphaServer 1000A and 2100A class systems, updating the firmware on a KZPSA SCSI adapter is not supported when the adapter is behind the PCI-to-PCI bridge. See your hardware installation manual for further information. A later version of the console firmware will support this feature.

4.1.5 Qlogic ISP1040B CAM Errors

On systems with a Qlogic ISP1040B option, CAM errors like the following might occur when you boot the system:

```
pci2000 at pci0 slot 8
isp0 at pci2000 slot 0
isp0: QLOGIC ISP1020A
cam_logger: CAM_ERROR packet
cam_logger: bus 0
isp_probe
NVRAM parameters invalid, using driver Fast10 defaults
```

To correct the error, you must use the eeromcfg utility to program the NVRAM with the proper set of parameters. The eeromcfg utility is provided in the */mnt-pnt*/utility directory of the *Alpha Systems Firmware Update* CD–ROM. Consult the readme.txt file in that directory for information about how to use the utility.

4.1.6 DJ-ML200-xx PCI NVRAM Hardware Revision

The revision of the ML200-xx 2/4/8MB PCI NVRAM adapter must be revision E01.

4.1.7 Managing HSZ and HSG Hardware

You must use the StorageWorks Command Console (SWCC) Version 2.3 or higher to manage HSZ or HSG controllers. Versions prior to Version 2.3 are not supported for use on Tru64 UNIX Version 5.0, or higher.

4.1.8 No Console-Level Multipath Support for Some Older Systems

The console firmware on the AlphaServer 1000, AlphaServer 1000A, and AlphaServer 2x00 systems does not support selecting multiple boot or dump devices for storage units located behind HSZ70, HSZ80, or HSG80 RAID Array controllers that are enabled for multiple-bus failover mode.

The console must have a visible path to the storage unit that it is booting from or to which it is dumping. If a controller, in multiple-bus failover mode, fails over to the other controller, all devices served by the failed controller are now visible on alternate paths. Therefore, before booting the system, reset the `bootdef_dev` console environment variable to a path that is visible to the boot device.

After the operating system has been booted, multipath support is fully functional.

4.2 AlphaServer 1000 and 1000A Systems

The following notes are specific to AlphaServer 1000 and 1000A systems.

4.2.1 EISA Configuration Utility Version 1.10

This note applies to users of the onboard Cirrus VGA graphics controller.

The default setting for the VGA graphics controller when running the EISA Configuration Utility (ECU) Version 1.10 is `Disabled`. For previous versions, the default is `Enabled`.

When you run the ECU Version 1.10 for the first time on a system that was previously configured with an earlier version of the ECU, the setting for the onboard VGA graphics controller is automatically set to `Disabled`. To change the default value, run the ECU, select Step 3: View and edit details, and set the VGA graphic controller to `Enabled` before exiting. If you do not set the VGA graphic controller to `Enabled` prior to booting the operating system, your X server will not start and your system will have generic console support when you boot the operating system.

4.2.2 Graphics Resolution

The default graphics resolution for AlphaServer 1000A systems that contain built-in Cirrus video with 1 MB of video RAM is 1024x768. If the optional 512 KB of video RAM is not present, the operating system supports resolutions of 640x480 (by default) or 800x600 only.

The default graphics resolution for AlphaServer 1000 systems that contain built-in Cirrus video with 512 KB of video RAM is 640x480. This configuration also supports 800x600 resolution.

To use 800x600 resolution, edit the following line in the
`/usr/lib/X11/xdm/Xservers` file:

```
:0 local /usr/bin/X11/X
```

Change the line to:

```
:0 local /usr/bin/X11/X "-screen0 800x600"
```

To use 800x600 resolution for the CDE Session Manager, edit the following
line in the `/usr/dt/config/Xservers` and `Xservers.conf` files:

```
:0 Local local@console /usr/bin/X11/X :0
```

Change the line to:

```
:0 Local local@console /usr/bin/X11/X :0 -screen0 800
```

Before editing these files for XDM or CDE, be sure that your system's
monitor supports 800x600 resolution.

4.3 AlphaServer GS Systems

The following notes are specific to AlphaServer GS systems.

4.3.1 Possible OLAR Errors on Primary CPU

Starting with Version 5.1A of the operating system, the primary CPU is
capable of being taken off line and removed on AlphaServer GS80, GS160,
and GS320 systems. When you take the primary CPU off line, another CPU
is automatically delegated the role of primary CPU. Due to intermittent
problems with this operation,we strongly recommend that you do not take
the primary CPU off line at this time. The primary CPU is normally CPU0.
To verify which CPU is currently the primary, use the `pset_info` command:

```
# pset_info
number of processor sets on system = 1

pset_id  # cpus   # pids   # threads  load_av    created
   0         4       89        453       0.13     07/12/2001 17:25:28


total number of processors on system = 4

cpu #    running  primary_cpu  pset_id  assigned_to_pset
 0          1          1           0     07/12/2001 17:25:28
 1          1          0           0     07/12/2001 17:25:28
 2          1          0           0     07/12/2001 17:25:28
 3          1          0           0     07/12/2001 17:25:28
```

This output denotes that CPU0 is the primary CPU.

When you attempt to take the primary CPU off line, the operation will likely
succeed, and a new primary CPU (for example CPU1) is automatically
selected. However, when subsequently attempting to bring the previously
assigned primary CPU back on line, you may encounter the following error:

```
Processor X failed to start
 console callback PARTITION, POWER-HW timed_out.
 wf_hal_pwr_ctl: call to prom_power failed with status [fffffe6]
```

To clear this condition, you must initialize the system using the SRM console. This action requires shutting down the operating system. This problem will be fixed in a future release of the console firmware.

4.3.2 Do Not Repetitively Power Cycle CPUs

The use of OLAR management commands in continuous test loops can degrade the reliability of the CPU. These commands remove the DC power source from the CPU module. We recommend that you do not power cycle CPUs repetitively with shell scripts.

The CPU module's DC to DC converter is specified to have a maximum of 1000 power cycles. Do not exceed his number of power cycles for a CPU.

4.3.3 Hot Add Restriction

This release of the operating system supports GS80, GS160, and GS320 CPU hot additions with the following restriction: A Quad Building Block (QBB) booted without memory and without at least one CPU cannot have CPUs hot added to that QBB. Doing so will result in a system panic. If the target QBB is booted with memory and at least one CPU, additional CPUs can be hot added as desired. This is a software restriction that will be lifted in a future kernel update.

4.4 Personal Workstation 433au, 500au, and 600au Systems

The following notes are specific to Personal Workstation class systems.

4.4.1 64-Bit PCI Option Cards

The 64-bit PCI slots, slots 4 and 5, are intended only for those cards listed in the *Systems and Options Catalog* as supported for slots 4 and 5. The console prevents system operation and displays the following error if an unsupported card is present in one of these slots (*n*):

```
Illegal device detected on primary bus in physical slot n
Power down the system and remove the unsupported
device from slot n
```

4.4.2 Incorrect Default Keyboard Mappings

If you use a PCXLA-NA keyboard on a Compaq Personal Workstation 433au, 500au, or 600au class system, the keys will not map properly unless you reconfigure the keyboard driver to use the correct keymaps.

You can do this by executing the following command:

```
# sysconfig -r gpc_input kbd_scancode=2
```

If you prefer, you can use the sysconfigdb command to add the following entry to the /etc/sysconfigtab file:

```
gpc_input:
kbd_scancode = 2
```

If you use the sysconfig command to reconfigure the driver, you must execute the command each time you reboot the system. Using the sysconfigdb utility to make the change preserves the information across reboots, and no other user intervention is required.

4.5 Alpha VME and PCI/ISA (DMCC) Modular Single-Board Computers

For information about configuring the operating system on Alpha VME single-board computers (SBCs) and PCI/ISA EBMnn modular SBCs, see the *System Configuration Supplement: OEM Platforms* manual. (The PCI/ISA modular systems and components product family was formerly known as DIGITAL Modular Computing Components, or DMCC.)

5

Base Operating System Software Notes

This chapter contains notes about issues and known problems with the base operating system and, whenever possible, provides solutions or workarounds to those problems.

The following topics are discussed:

- Commands and utilities (Section 5.1)
- SysMan system management applications (Section 5.2)
- System administration (Section 5.3)
- Network and communications (Section 5.4)
- Local Area Transport (LAT) (Section 5.5)
- File systems (Section 5.6)
- Logical Storage Manager (LSM) (Section 5.7)
- Printing (Section 5.8)

5.1 Commands and Utilities

The following notes apply to commands and utilities.

5.1.1 The diskconfig Restriction

You cannot select disk partitions with an offset of zero and a size of zero using the Disk Configuration Manager utility (`diskconfig`). You must use the `disklabel` command to assign an offset and size to these partitions.

5.1.2 The vdump Restriction with Clone Filesets and NFS

If you mount a clone AdvFS fileset on a Version 4.*x* system across NFS to a Version 5.*x* system (the NFS server is Version 4.*x* and the NFS client is Version 5.*x*), you cannot use the 5.*x* version of `vdump` to back up the clone fileset. The resulting saveset from the `vdump` utility may not contain all of the data in the clone fileset. If both the NFS client and the NFS server are running 4.*x* or are running 5.*x*, a backup works correctly. If the NFS server is running 5.*x* and the NFS client is running 4.*x*, this also works correctly.

5.1.3 APIs and Commands Affected by Mixed-Speed CPUs

This release of the operating system supports CPUs of different speeds
on some hardware platforms. Several existing APIs and commands may
return incorrect information in a mixed-speed CPU environment. See
getsysinfo(2) and psrinfo(1) for more information.

5.1.4 Replacing a Failed HSZ40, HSZ50, or HSZ70 Controller

This section describes how you replace a failed dual redundant controller
for the following dual unit models:

- HSZ40 and HSZ50, which can be in either single or transparent failover
  mode. They cannot be in multibus mode.

- HSZ70, which can be in single, transparent, or multibus failover mode.
  Configurations that are not dual redundant use the same procedure
  as described for single-spindle disks in Section 5.4 of the *System
  Administration* manual.

If a controller fails, use the following procedure to replace the failed
component and restart your configuration.

_____ **Caution** _____

Several cautions are specified in the documentation for the
controller's HSOF commands. To avoid the risk of data loss,
familiarize yourself with the following CLI commands before
proceeding:

- SET FAILOVER COPY=configuration-source

- SET NOFAILOVER

- SET MULTIBUS_FAILOVER COPY=configuration-source

_____

The Tru64 UNIX operating system must be running when the following
procedure is applied. It must not be halted and at the console prompt (>>>).

1. Using the HSOF CLI on the good (functioning) controller, enter the
    following command to stop the failed controller:

    HSZ21> **set nofailover**

2. Verify that the failed controller has stopped by ensuring that the green
    LED status light is no longer blinking.

3. Physically remove the failed controller as described in the hardware
    documentation.

4. At the UNIX command prompt, enter the following command:

    # **hwmgr -scan scsi -bus** *N*

The `-scan` option is asynchronous. When you issue this command, the prompt returns immediately, although the scan can still be working in the kernel, particularly if many devices are connected to the system. To test for completion of a scan, use the Event Manager (EVM) `evmwatch` command to monitor for an event with the following event name: `sys.unix.hw.scan_completed`. For example:

```
# evmwatch -A -f '[name sys.unix.hw.scan_completed]'
A hardware scan has just completed
```

The presence of tape devices increases the delay to complete the scan. Use the `-bus` qualifier to specify the bus you want to scan. Determine the correct bus number by examining the location field of the output from the following command:

```
# hwmgr -view devices
```

Messages printed at the console will show the HSZ units going from dual to single configuration.

5. Install a replacement controller as described in the hardware documentation.

6. Start the replacement controller as described in the hardware documentation.

7. Repeat the `hwmgr -scan scsi` command described in Step 4.

8. At the good controller, issue either of the following HSOF CLI commands:

```
> set failover copy=this
> set multibus_failover copy=this
```

This will return the controllers to dual redundant mode in the appropriate failover mode.

Messages printed at the console will verify that the operation was successful and will show the HSZ units going from single to dual configuration.

5.1.5 Root Permissions Are Required to Use the Bootable Tape (BT) Application

If you attempt to run either the `btcreate` or `btextract` command from an account that does not have root privileges, it might produce a TCL dump script.

To avoid this problem, ensure that you always run the bootable tape commands from an account with root privileges.

5.1.6 Escaped Comment Symbols in a Makefile

The `make` command does not recognize escaped comment symbols as literal characters in a Makefile. Comment lines that begin with a number sign (#)

and all text following this symbol up to the end of the line are considered
part of a comment. This is true even if the symbol is preceded with a
backslash (\).

5.1.7 Editing an HTML File with XEmacs

If you use XEmacs to edit an HTML file, the editor looks for an entry
corresponding to the e-mail ID in an `.emacs` file. If this file does not exist or
if the entry is not found, XEmacs prompts the user for the e-mail ID, and
this information is updated in the `.emacs` file.

5.1.8 Change in the Default root crontab File

In previous releases, the `cron` daemon periodically cleaned files such as
`/var/adm/cron/log` and `/var/adm/messages` by default.

The programs that performed these tasks have been removed from the
`/var/spool/cron/crontabs/root` file. Therefore, the `cron` daemon does
not clean up these files by default.

If you want to clean up these files manually, you must first stop the `cron`
daemon and truncate the files. You can stop and restart the `cron` daemon by
using the `/sbin/init.d/cron` script. If you stop the `cron` daemon and you
have `cron` jobs scheduled to run during that time, they will not be executed.

5.1.9 Change to the sh, ksh, and csh Shells

The Bourne, Korn, and C shells generate random file names when opening
files created using the `<<` construct. In this release, the following changes
have been implemented:

- More randomness is used in generated file names
- File protection defaults to 0600
- Existing files will never be overwriten on a name collision

If a shell-generated file name conflicts with an existing file, the shell will
retry with a different random name. After 100 failed attempts, the shell
returns the error `Unable to create temporary file`.

5.1.10 Netscape Communicator

The following notes apply to the Netscape Communicator product.

5.1.10.1 Netscape Communicator Dumps Core Running in CDE

Netscape Communicator dumps core when the application posts a file
selection dialog (`XmFileSelectionBox`). Typically, this occurs when you

run the application in the Common Desktop Environment (CDE) and select the Save As option in the File pulldown menu of the Navigator browser. It can also occur when you select a link to download a file or save an attachment to a mail message in the Messenger Mailbox component.

To avoid this problem, invoke Netscape using the following script:

`/usr/bin/X11/netscape`

If you use this script to start Netscape Communicator, the application displays the file selection dialog within CDE without dumping core. Use the `-xrm '*nsMotifFSBCdeMode:   True'` command line option if you start Netscape Communicator using some other means.

For more information, see the Communicator on UNIX release notes at the Netscape Web site:

http://home.netscape.com/eng/mozilla/4.0/relnotes/unix-4.0.html

5.1.10.2 Deleting Multiple Mail Messages Causes Netscape Communicator to Dump Core

Deleting multiple mail messages in Netscape Communicator's Messenger Mailbox component sometimes causes Communicator to dump core. Usually, it requires several multiple deletions of mail to make Communicator dump core. If Communicator does not dump core immediately, deleted messages might reappear in the mail folder from which they were deleted.

5.1.10.3 Netscape Communicator Dumps Core Intermittently

Netscape Communicator intermittently dumps core and returns the following error in the terminal window from which it is started:

```
Memory Fault - (core dumped)
```

This core dump occurs with different hardware and software configurations and under different circumstances. Sometimes it hangs for a time, taking most of the CPU time, then it crashes. At other times, you must kill the process and restart the application. Numerous problems of this nature have been reported. None are resolved at this time and no workaround is available. In all cases, the behavior cannot be reproduced consistently.

5.1.10.4 Cannot Delete Mail Messages from Inbox to Trash When Using IMAP Server

After upgrading from a previous version of Communicator, an IMAP mail user cannot move messages to the Trash folder in the Messenger component. All Delete options in the user interface are insensitive (greyed-out). Setting the Move it to trash folder option in the IMAP mail server preferences

window does not work. This behavior is the result of a new feature in Netscape Communicator that might require user customization after upgrading to the latest version.

Starting with Netscape Communicator Version 4.5, the Namespace extension to the standard IMAP protocol is used to locate the users' folders on the IMAP mail server. This feature does not work if you are using an older IMAP server that does not support the Namespace extension to the protocol. Use the following procedure to customize Netscape Communicator to be able to locate a user's Trash folder on an old IMAP server:

1. Choose the Preferences option in the Edit pulldown menu and choose the Mail and News Servers option in the Preferences window.

2. Choose the Mail Servers option from the list of Mail and News Servers options.

3. Choose the IMAP server from the list of servers and click on the Edit button to edit the server configuration.

4. Choose the Advanced tab in the pop-up dialog box.

5. Ensure that the Namespace field in the tab reads as follows (quotes and period included):

    ```
    Namespace: "INBOX."
    ```

6. Click on the OK button in the pop-up window and again in the Preferences window to save the settings.

7. Exit and restart Communicator.

You can now move messages to the Trash folder and use all the Delete options. Because IMAP mail server configurations differ (including the location of the user's folders on the server), check with your IMAP mail server administrator if the preceding procedure fails to resolve the problem.

5.1.10.5 Netscape Communicator Returns sh: /usr/bin/X11/showps: not found

When you select a link to a PostScript file in the Navigator component of Communicator, the following error message might be displayed:

```
sh: /usr/bin/X11/showps: not found
```

The showps helper application has been retired from the operating system as a result of licensing changes to Adobe Display PostScript. The user might have customized the PostScript Document MIME type to use the showps helper application in $HOME/.mailcap and $HOME/.mime.types files.

To resolve this problem, you must obtain a new PostScript viewer and reconfigure the helper application for the PostScript Document MIME type in Communicator. Use the Edit option in

the Edit->Preferences->Navigator->Applications pulldown menu of Communicator to edit your PostScript Document helper application and replace `/usr/bin/X11/showps` with the path to your new PostScript viewer.

5.1.10.6 Netscape Communicator Returns X Authorization Error

When logged in as root, if you start Netscape Communicator on display ":0.0", and your current working directory is not "/" (root), the following X authorization error is returned:

```
lib: connection to ":0.0" refused by server
Xlib: Client is not authorized to connect to Server
Error: Can't open display: :0.0
```

To work around this problem, set the XAUTHORITY environment variable to point to the root user's `.Xauthority` file (Bourne shell syntax):

```
# XAUTHORITY=/.Xauthority
# export XAUTHORITY
# /usr/bin/X11/netscape
```

5.2 SysMan System Management Applications

The following notes apply to restrictions on using the SysMan system management applications.

5.2.1 Possible Loss of Data When the root File System Is Full

When the root file system is full, Sysman applications might not be able to update the system files. This might lead to loss of data or truncated files. We recommend that you ensure that the root file system is not full or nearly full, prior to running Sysman applications.

Also, the `/tmp` directory usually resides on the root file system. Therefore, do not run applications that create large temporary files while you are running Sysman applications.

5.2.2 SysMan Account Manager

You cannot delete a user account by using the SysMan Account Manager application while the `dxaccounts` application is running. If `dxaccounts` is running and you try to delete a user account by using the SysMan Account Manager application, the following warning message is displayed:

```
/etc/.AM_is_running existing
```

If you continue the delete operation, the Account Manager displays the following error message and the application hangs:

```
Error: key userName UID not found in /account_management/local
_passwd_table
```

If this occurs, kill the following process:

```
sysmansh /usr/share/sysman/menu/tasks/account_management
```

5.2.3 Tcl Error Can Occur During DNS (BIND) Configuration

During the DNS client configuration, the following steps might result in an
Out Of Order Hide Tcl error:

1. Enter a domain name in Local Domain.

2. Add DNS servers.

3. Click OK in the main window.

4. Choose Yes to update the system host name to reflect the host name
    with new domain name.

5. Choose Yes to add "localhost" to access control list? option.

At this point a Tcl Stack Error can occur. However, the data is not lost.

Because all the data entered by the user is committed by the DNS
client application, kill the DNS client application and restart the DNS
configuration using the SysMan DNS to avoid this problem.

5.2.4 Large Integer Values in Configuration Applications

Entering a very large integer value (on the order of 10^{19}) in numeric fields in
some system configuration applications can cause a stack trace. Such large
integers are not appropriate values for these applications. Therefore, this
problem is not expected to impede you from configuring your system.

5.2.5 Error Message When Using sysman -cli -set values Command

If you use the sysman -cli -set values command to change specific
values for an existing row in the table defined by the staticRoutes group,
you might receive an error message. For example:

```
# sysman -cli -set values -comp routing -group staticRoutes\"

 -attr gateway=1.2.3.4 -key1 "dummy system 1.1.1.1"
Error: "SYSMAN_NO_DATA"
No row exists with the specified key: 'dummy system 1.1.1.1'
```

If a row with the defined key is present in the staticRoutes group, you
can ignore this message. In any case, to verify that the row was modified
properly, issue the following command:

```
# sysman -cli -list values -comp routing -group staticRoutes
```

5.2.6 Problem When Reconfiguring Network Interface Cards

If you use a SysMan application to reconfigure a network interface card (NIC) and you change the host name, the HOSTNAME variable in the /etc/rc.config file is not updated.

If the system has a single network interface card, you can correct this problem by performing the steps in the following procedure. If the system has more than one network interface card and you changed the host name of the primary card (that is, the card with the same host name as the system's host name), do the following to correct the problem:

1. Use the rcmgr set HOSTNAME command to set the HOSTNAME to the correct name. For example:

   ```
   #  rcmgr set HOSTNAME abcxyz.com
   ```

2. Use the hostname command to change the host name to the correct value in the kernel. For example:

   ```
   #  hostname abcxyz.com
   ```

3. Use the xhost command to add localhost to the access control list of the local X server, as follows:

   ```
   #  xhost + localhost
   ```

5.2.7 SysMan Command Line Interface

The -mib option of the SysMan command line interface does not work properly. The /usr/sbin/sysman -cli -mib command generates a Management Information Base file for use by SNMP applications. If you use this command, the following error message is displayed:

```
ERROR: inrange longer than outrange
```

5.2.8 SysMan Web Page Does Not Display or Work Properly

If you navigate to the SysMan web page from the default web page /usr/doc/netscape/Welcome.html, the SysMan page may not display or function correctly. (For example, downloads may not work.)

A workaround for this problem is to navigate to this page by opening http://localhost:2301 and selecting the Tru64 UNIX SysMan icon.

5.2.9 SysMan Configuration and Administration Restriction

The sysman configuration and administration utility does not work on hardware configurations within the following locales:

- tr_TR.ISO8859-9

- `tr_TR.ISO8859-9@ucs4`

To avoid this problem, set the `LC_ALL` and `LANG` environment variables to C when you run the `sysman` utility.

5.2.10 NTP Configuration Restriction

If you edit the `/etc/ntp.conf` file manually and subsequently run the SysMan NTP client configuration utility, your changes might be lost.

The SysMan NTP client configuration utility understands only a small subset of the commands that can be used in the `ntp.conf` file. When the NTP client configuration utility reads the `/etc/ntp.conf` file, it ignores commands it does not understand and it does not output those commands when rewriting the file. It also does not allow you to enter commands it does not understand. For example, it does not allow you to enter commands using the `sysman -cli` command.

If you want to configure your system as an NTP sever or your configuration requires a more complex `ntp.conf` file than SysMan can produce, edit the `ntp.conf` file manually and do not use the SysMan utility to modify it. For more information, see the *Network Administration: Services* manual, `ntp.conf`(4), and `ntp.conf`(4).

5.2.11 Configuring an NFS Server

When configuring an NFS server, you cannot leave the Number of TCP server Threads field and the Number of UDP Server Threads field blank. If you leave either field blank, the configuration application will stack trace. You must specify a number for each field so that the combined sum is greater than 0 and less than or equal to 128.

5.2.12 Display Problems on Systems with Low-Resolution Graphics Cards

If your system has a low-resolution graphics card and you use large fonts, the images of some graphical applications might be displayed longer than the display area on the monitor. Images that are larger than the display area are truncated at the bottom, often resulting in the buttons being cut off. Some windows in Quick Setup have exhibited this behavior.

To avoid this problem, reduce the size of the font. See the documentation for the window manager you are using. Also, applications with a curses (character) mode fit the screen better than graphical applications using large fonts.

For more information, see X(1X), `dtstyle`(1), `curses`(3), and `sysman_intro`(8).

If you are running these applications in Asian locales, see Section 5.2.13.

5.2.13 SysMan Applications Do Not Work Properly at VGA Resolution

If your monitor is set to VGA resolution (640x480), Quick Setup and other SysMan applications might not work correctly. The problem is that the large fonts used by some locales (for example, Asian locales such as Chinese and Japanese) cause dialog boxes to be larger than 640x480, and control buttons such as OK and Cancel are no longer accessible. This is a more specific problem than that described in Section 5.2.12, and the workarounds in that note do not work for this problem.

To avoid this problem, you have the following options:

- Set the language option to C or other English locales and reenter the desktop before starting the SysMan applications.

- Invoke the SysMan applications in terminal mode using a terminal emulator.

  If you have DISPLAY set, use the `sysman -menu -ui cui` command.

  If you do not have DISPLAY set, use the `sysman` or `sysman -menu` command.

- 3D-capable graphics cards, such as PowerStorm 300/350 and 4D40T/50T/60T/51T, support increased display resolutions when used with the appropriate subsets from the Associated Products CD–ROM.

5.2.14 SysMan Menu

The following notes apply to the SysMan Menu application. Also see Section 8.8.1 for information related to online help.

5.2.14.1 Installation Branch Hangs When Run in Background

The Install software, List installed software, and Remove installed software tasks in the Installation branch of the SysMan Menu hang if you run the SysMan Menu in the background. Do not run the SysMan Menu in the background if you plan to use these tasks in Installation branch.

5.2.14.2 Installation Branch Is Not Supported for Clusters

Do not run the SysMan Menu Installation branch in a cluster environment. The Install software, List installed software, and Remove installed software tasks in the Installation branch of the SysMan Menu do not work on a cluster system.

5.2.14.3 Running the SysMan Menu Standalone on a PC Fails to Launch Tasks

When you run the SysMan Menu from a PC, you might encounter the
following problems:

- Sometimes multiple logins are required. You are asked for your
  username and password each time you launch a task.

- Sometimes tasks fail to run. No error is displayed. The task window is
  not displayed.

To avoid these problems, run the SysMan Menu from within the SysMan
Station by doing the following:

1. Start the SysMan Station either from the Start menu or from a web
   browser.

2. Choose the Hardware view.

3. Right click on a host icon and choose the SysMan Station.

5.2.14.4 Manage Local and NIS Users

The Manage local users and Manage NIS users tasks on the SysMan Menu
are front ends for the `useradd`, `usermod`, and `userdel` commands. If
you use the Manage local users and Manage NIS users tasks to change
the `/etc/passwd` file, a warning message is displayed, even though the
operation completes successfully. However, the changes do not display in the
Manage local users and Manage NIS users tasks dialog boxes. This happens
in the following cases:

- When you are adding or modifying a user and specifying a primary or
  secondary group that does not exist

- When you are adding a user with Create Home Directory enabled but the
  user's home directory already exists

To correct this problem, exit the task and restart it. The correct attributes
for the user will be displayed.

5.2.14.5 Display Currently Mounted File Systems

The SysMan Menu Display Currently Mounted File Systems option works
only in the English version of the operating system. (You can access the
Display Currently Mounted File Systems option from the SysMan Menu by
selecting Storage → File Systems Management Utilities → General File
System Utilities.)

To avoid this problem, set the `LC_ALL` environment variable to C before
running the `sysman` command. This forces the SysMan Menu to work in
English. Restore the `LC_ALL` environment variable to its prior setting when
you are done using the SysMan Menu.

5.2.15 SysMan Station

The following notes apply to the SysMan Station. Also see Section 8.8.2 for information related to online help.

5.2.15.1 Incorrect Launch Status

SysMan Station checks the status returned by all the applications that it launches. A few applications incorrectly exit with nonzero (failure) status returns even though the tool has launched successfully.

5.2.15.2 Objects Might Not Display Properly with Internet Explorer

Objects might not display properly in SysMan Station View windows when you run SysMan Station from a PC using the Internet Explorer web browser. Sometimes objects are overlayed in the upper left corner of the display window.

To correct this problem, choose the Show All option from the Action menu to redraw the display properly.

5.2.15.3 Cannot Restart the Client in a Web Browser

When you run the SysMan Station client from a web browser, if you exit the SysMan Station and attempt to restart it by returning to the URL (`http://your_machine:2301`), the client will not restart.

You can correct the problem by restarting the browser. The client will load properly from the URL.

5.2.15.4 Client 5-Minute Timeout

If you restart the SysMan Station daemon (`smsd`) while there are active SM Station clients, the clients will keep an active network connection that times out after 5 minutes have elapsed. Attempts to use the `/sbin/init.d/smsd start` command during this 5-minute interval will fail to restart the server because it cannot access the required network port. You must wait for the 5-minute timeout to elapse before you can restart the SysMan Station server.

You can use the following command to see if any clients are using the network port:

```
# /usr/sbin/netstat -a | grep 596
```

If no matches are found, you can restart the SysMan Station daemon.

5.2.15.5 Physical_Filesystems View Displays Two Disk Objects for LSM

Two disk objects are displayed in the Physical_Filesystems view for each file system that uses LSM. One disk object represents the LSM private region, the other represents the LSM public region.

5.2.15.6 Icons Indicating Warning or Failed States

Objects in a failed or warning state are depicted in the SysMan Station's Hardware view using a red or yellow highlight for the object's icon. A small number of objects do not have warning or failed icons. In this case, the object's label correctly indicates that it is in a warning or failed state.

5.2.15.7 Group Icons Are Not Available for Some Objects

When objects are grouped together, a special group icon is used to represent the grouping. A small number of objects do not display a group icon when an object group is formed. In these instances, the group's label correctly indicates that the icon represents a group.

5.2.15.8 Multiple AdvFS Volumes Might Not Appear Properly

When multiple volumes are added to AdvFS file domains, the new AdvFS volume objects might not appear in the SysMan Station AdvFS Filesystem and Physical Filesystem view windows.

You can correct this problem by restarting the SysMan Station daemon (smsd). To restart the smsd daemon, exit all connected SysMan Station client sessions and issue the following command:

```
# /sbin/init.d/smsd restart
```

5.2.15.9 SysMan Station Does Not Update Changes to Device base_name Dynamically

If you use the dsfmgr utility to change the base_name of a device while the SysMan Station daemon (smsd) is running, any clients connected to the running daemon will continue to reflect the old base_name in their views.

To obtain a correct view, close all open SysMan Station sessions and restart the SysMan Station daemon with the following command:

```
# /sbin/init.d/smsd restart
```

If the system is a member of a cluster, perform these steps on all affected cluster members.

5.2.15.10 Some Tools Might Fail When Launched From a Group Object

If you launch a tool from a SysMan Station group object, the SysMan Station attempts to invoke an instance of the tool for each object contained in the group. For certain tools, not all instances of the application will launch successfully. An application error or SysMan Station Authentication server core dump might result.

To work around this problem, do the following:

1. Close all open SysMan Station sessions.

2. Enter the following commands:

   ```
   # /sbin/init.d/smauth restart
   # /sbin/init.d/smsd restart
   ```

On a cluster, perform these steps on all affected cluster members.

5.2.15.11 Unable to Expand the Host Object in a Cluster

The Sysman Station client might occasionally encounter a Java class exception error when a user attempts to expand a Host object.

If you encounter this problem, restart the SysMan Station client and retry the expand operation.

5.2.15.12 Unable to Select Other Objects After a Vertical Bus Is Selected

If you select a vertical bus within the SysMan Station Hardware view, you are unable to select any other object in the view. If this problem occurs, exit the view and then return to it, or restart the client.

5.2.16 Configuring Tru64 UNIX from Linux Systems

You can now configure Tru64 UNIX from systems running Linux using Java. The following procedure describes how to install the SysMan client on these systems:

1. Download the /usr/share/sysman/web/classLib/suit.jar file from the Tru64 UNIX system to your Linux system and add the full path of that file to your CLASSPATH environment variable.

   If you use csh and you downloaded the suit.jar file to /usr/local/lib, use the following syntax:

   ```
   setenv CLASSPATH $CLASSPATH:/usr/local/lib/suit.jar
   ```

   If you use ksh and you downloaded the suit.jar file to /usr/local/lib, use the following syntax:

```
CLASSPATH=$CLASSPATH:/usr/local/lib/suit.jar
export CLASSPATH
```

2. Run SysMan Menu with the following command, substituting the name
    or IP address of your Tru64 UNIX computer for *HOST*:

    # **java suit** *HOST* **sysman**

    Alternatively, you can run a SysMan task directly by substituting the
    accelerator for sysman. For example:

    # **java suit** *HOST* **ntp_config**

You can redirect the standard output to /dev/null if you do not want to see
the diagnostic messages that SysMan prints when run in this fashion.

SysMan has been tested on RedHat Linux Version 6.0 and SuSE Linux
Version 6.0 on Intel using Version 1.1.7 of the Java Run-time Engine (JRE).
Other versions of Linux and Java might also work.

5.3 System Administration

The following notes apply to system administration.

5.3.1 Binary Error Log Event May Be Incorrectly Reported As Double Error Halt

A binary error log (binlog) event with type 113 is reported as a Double Error
Halt event when reported by the Event Manager (EVM), but is reported as a
Console Data Log event by Compaq Analyze. EVM might report this event
by mailing it to the root user and by displaying it on the system console.

The event is actually a Console Data Log event. This event type is posted
when any of several different errors occur, including double error halts,
uncorrectable environmental errors, and platform-specific system faults.
See the the Compaq Analyze translation of the event for information about
its cause.

5.3.2 Boot Sequence Stops in Single-User Mode After Core Dump

A problem exists that causes the boot sequence to stop in single-user mode
and display the following message:

```
/sbin/dn_setup: 1048647 Memory fault - core dumped
bcheckrc: Device Naming failed boot configure or verify.
Please correct the problem and continue or reboot

INIT: SINGLE-USER MODE
#
```

This problem is most likely to occur every time you boot systems with Fibre Channel devices or once if you have changed the hardware configuration between boots.

The problem occurs after the `dsfmgr` command successfully completes during the exit cleanup routines.

Data integrity is not compromised and no corrective action is required, except to remove the core file from the root directory (`/core` or `/core.dsgmgr*`).

You can continue the boot process by pressing Ctrl/d to exit single-user mode or by initiating multiuser mode with the `init 3` command. Alternatively, you can reboot the system, provided no Fibre Channel devices are connected to the system.

5.3.3 Account Manager

The following notes apply to the Account Manager (`dxaccounts`) applications.

5.3.3.1 General Restrictions

The Account Manager has the following restrictions on both base security and enhanced security (C2) systems:

- Leading and trailing white space is not stripped from text entry areas. This can lead to confusion. For example, if a field in the Find dialog box contains a space character before the desired search string, the search string will not match because of the spurious space character.

- Using mouse button 1 (MB1) to drag and drop user accounts, groups, or templates does a copy operation, not a move operation. This is different from the CDE/Motif default, in which MB1 performs a drag-and-drop move operation and Shift/MB1 performs a copy operation. For example, if you use MB1 to drag a user account from the Local Users view and drop it in the NIS Users view, you create a copy of that user account in NIS. To avoid this problem, delete the original icon after the copy has been completed.

- If you change a user's UID with the Account Manager, the ownership of the user's files and subdirectories does not change and, under certain circumstances, the home directory ownership might not change, either. For example, if you change the UID of user `johndoe` from 200 to 201, the files and subdirectories under his home directory still belong to UID 200. Furthermore, if `johndoe` does not own his home directory, the ownership of that directory does not change. To avoid this problem, use the `chown` command to change the directory and files, if applicable.

- You cannot drag and drop items across different instances of the Account Manager. For example, if the Account Manager A on system 1 and the Account Manager B on system 2 are displayed on the same workstation, then you cannot drag and drop between Account Manager A and B. To avoid this problem, use the copy/paste feature to copy users, groups, or templates from Account Manager A to B. After paste operations, the Paste Errors dialog box might be displayed. You can ignore the error message and click OK to dismiss the dialog box.

- Although the Account Manager correctly allows two or more system administrators to work on the same password files simultaneously, only one system administrator can use the Account Manager at a time. If multiple instances of the Account Manger are run concurrently, the proper file locking occurs and new accounts can be added or modified. However, the local groups file, /etc/group, and the NIS groups file, /var/yp/src/group, are written out after modification of each group. Therefore, if more than one system administrator is working on the same file, the last one to change a group's view window overwrites any prior changes from a different system administrator. For this reason, running multiple, concurrent Account Manager instances is not recommended.

- Use caution when editing the /etc/passwd, /etc/yppasswd, and /etc/group files. The accidental insertion of a blank line will cause Account Manager to dump core.

5.3.3.2 Account Manager and Enhanced Security

The following problems apply to the Account Manager application when running on systems with enhanced security:

- The Lock/Unlock Toolbar and Menu Options are inactive for the Template views. To avoid this problem, change the template lock setting on the Add/Modify Template dialog box after selecting the template by double-clicking on the template icon in the Template view icon box.

- The Account Manager does not enforce the minimum and maximum password length limitations when setting passwords. To avoid this problem, set passwords by using the /usr/tcb/bin/dxchpwd or the /usr/bin/passwd command if the minimum and maximum password length limitation is necessary.

- When you rename a user account by changing the Username field of the Add/Modify User dialog box in Modify mode, the protected password database entry for the old name does not change. To avoid this problem, use the following command to remove the dangling protected password database entry:

```
# /usr/tcb/bin/edauth -r user name
```

- Do not rename a template by changing the Template name field of the Add/Modify Template dialog box in Modify mode. The Account Manager creates a new template without removing the old template, but renames the old template's icon from the Icon Box. To avoid this problem, restart the Account Manager to restore the former template icon. Use the Delete Toolbar icon or the Edit->Delete... option from the Template view to delete the undesired template.

- Accounts and templates inherit their settings either from locally defined values in their protected password database entry or from the templates that they reference. All accounts and templates implicitly reference a default template that is not served by the Network Information Service (NIS). This creates an inconsistency for the Account Manager when displaying NIS user accounts and templates on a NIS master. The user and template values displayed might be the default template values of the NIS master. When a NIS user logs in to a NIS client, the NIS client's default template might be different from the NIS master's default template. The client's default template is used to establish the user's account settings.

- When you use drag and drop to copy a user account on a different view, the user's template references are copied by value. This means that the template itself is no longer referenced by the new account. Instead, the template's values are contained directly in the new user's protected password database entry. For example, assume the local user Joe has an account based on the developers template. If you drag and drop Joe's account from the Developers view into the NIS Users view, the attributes from the developers template are placed into the protected password database entry for Joe's account. This preserves Joe's developer attributes and overrides any corresponding attributes from the default template for NIS users. To avoid this problem, modify the copied user's account and change the template from the default to the desired template. The template reference is maintained if the user account is dropped within the same view.

- After deleting a template, the NIS maps are not remade. Therefore, you must manually remake the NIS maps or perform an Account Manager function (for example, Account Modification) that will remake the maps. To manually remake the maps, do the following:

```
# cd /var/yp
# make all
```

5.3.4 EISA Configuration Utility Revision Requirements

For Tru64 UNIX and its software supplements, the supported version of the EISA Configuration Utility (ECU) is Version 1.10 or higher. If your system is configured with an EISA bus, update the ECU to this supported version.

5.3.5 Alternate Root Installation May Change Host File Dates

During an alternate root installation of base operating system subsets, such as is done using the `dmu` utility to set up a Dataless Management Services environment, the file access dates on some of the files in the host server's file system might be changed to correspond to those from the subset's file inventory. When the release installed into the alternate root is different from that installed on the host system, these changed dates appear invalid because they may be newer (or older) than the actual file dates from the host system's installation kit.

This occurs when the `pax` utility is invoked by the `setld` utility to copy symbolic links from the kit subsets, and the symbolic links target absolute paths that correspond to actual files in the host system's file system. The `pax` utility attempts to adjust the dates for the symbolic link, but the file system actually adjusts the dates for the target of the symbolic link.

The changed dates have no operational impact on the host system. The content of the affected files is not changed. However, because the dates have changed, the behavior of utilities that examine file dates (such as the `find` command or archivers) might be affected.

5.3.6 Prestoserve Restriction on Devices Larger Than 1 TB

The Prestoserve product has a restriction in its ability to cache blocks on a device that is larger than 1 TB. This applies both to physical devices (RAID) and logical devices (LSM). Any device that is larger than 1 TB can be cached via the Prestoserve product but blocks with an address that exceeds the 1 TB boundary will not be cached.

5.3.7 Possible Error Updating /etc/doprc

If you use the `dop -W` command and the following error occurs, unset the DISPLAY variable:

```
Error occurred trying to update /etc/doprc:
        Dop_write_actions verbose ; Dop_update_binary /etc/doprc
        child process exited abnormally
```

5.3.8 Persistent Reservation Error

Under certain circumstances, you can encounter persistent reservation problems. If this occurs, see Appendix B.

5.3.9 Security

The following notes have to do with system management and security.

5.3.9.1 Authentication Problem with Multihreaded Applications

Third-party applications that perform user authentication or impersonation from multiple threads, such as PMDF, will correctly verify a user's group membership only from the first thread. All other threads that call the `sia_get_groups` routine receive a failure status. This can lead to seemingly random behavior, in which a user's membership in a group of which the user is a legitimate member is sporadically denied.

5.3.9.2 Security and Compaq Management Agents

The Compaq Management Agents for Tru64 UNIX is configured by default when you install the operating system. Anonymous login to WebAgent applications, enabled by default, allows nonprivileged users to invoke the Management Agents and view details of any connected devices in the local area network, although users cannot perform any operations unless authorized. Many site security policies strongly discourage such anonymous access. To disable these agents, use the Compaq Management Agents Configuration icon on the Monitoring/Tuning menu.

5.3.9.3 Behavior of useradd, usermod, and userdel Commands

The `useradd` command correctly honors the default administrative lock value found in the `/.sysman/Account_defaults` file. If the `Account_defaults` file does not exist, the internal default for the `useradd` command is to create locked accounts. Use the `administrative_lock_applied` extended command line option to override the default. In the following example, the `useradd` command creates a locked account for `foo` regardless of the default value for administrative lock:

```
useradd -x administrative_lock_applied=1 foo
```

For base security, a locked account has the text `Nologin` in the password field in the `/etc/passwd` file. If an account is unlocked and has no password, that account has no value in the password field. The account is open and accessible to anyone. A warning is displayed if an unlocked account with no password is created.

For enhanced security, all accounts have an asterisk (`*`) in the password field in the `/etc/passwd` file, but the lock flag in the protected password database is correctly set to reflect the lock status. As with base security, an unlocked account with no password is accessible to anyone.

The `usermod` command correctly sets the lock flags for enhanced security when the `administrative_lock_applied` option is given on the command line. If you use the `usermod` command to unlock a locked account with no password, a warning is displayed.

The `userdel` command will either retire or remove accounts on a system running enhanced security.

5.3.9.4 Prevent IP Spoofing Attacks

To detect and prevent an IP spoofing attack that can potentially result in a denial of service, configure the `ifaccess.conf` file to disable `localhost` as a source address.

For all adapters except the local loopback adapter (`lo0`), disable incoming packets with a source address of `localhost` (127.0.0.1). For example, add the following entry to the `/etc/ifaccess.conf` for `tu0`:

```
tu0     127.0.0.1   255.255.255.255  denylog
```

Then enable access filtering on `tu0`:

```
# ifconfig tu0 filter
```

Note that `localhost` is now disabled by default for new installations.

5.3.9.5 Use db_checkpoint for Log Trimming

A customized version of the Berkeley Database (Berkeley DB) is embedded in this version of the operating system to provide high-performance database support for critical security files. The database includes full transactional support and database recovery, using write-ahead logging and checkpointing to record changes.

The `secconfig` utility enables you to create a `cron` job to perform log file trimming; that is, to delete log files no longer involved in active transactions.

The `db_archive` utility requires a log file checkpoint to determine when a log file is no longer in use. Under some circumstances, security activity may not generate checkpoints for long intervals. Therefore, add the following line to the `/var/spool/cron/crontabs/root` before the `db_archive` entry:

```
 /usr/tcb/bin/db_checkpoint -1 -h /var/tcb/files
```

5.3.10 OSFJAVA Subsets Are Required for Bundled Applications

Java Version 1.1.8-7 is included with this version of the operating system. Other versions of Java are available, however, SysMan Station and other system components will fail to operate if Java Version 1.1.8-7 is removed. Therefore, do not remove Java Version 1.1.8-7 from your system.

5.3.11 Argument Size Limit for the exec System Call

The amount of memory used by the arguments to the `exec` system call is limited by `sysconf(_SC_ARG_MAX)`, which is about 38 KB. You can exceed

this limit systemwide by setting the `exec_disable_arg_limit` argument in the `sysconfigtab` file to 1, as follows:

```
# sysconfig -r proc exec_disable_arg_limit=1
```

When you set this argument to 1, the limit becomes an amount that is slightly less than the maximum stack size for the process, which is typically 8 MB or more. When you set the `exec_disable_arg_limit` argument to 1, `sysconf(_SC_ARG_MAX)` incorrectly reports that the limit is 38 KB. However, programs that rely on this value will not be limited to 38 KB and will function normally.

It is unlikely that programs will require more than 38 KB of memory; however, test suites that test this limit and expect an error return when `sysconf(_SC_ARG_MAX)` is exceeded will not obtain their expected result. If you are running test suites that expect an error return when this limit is exceeded, leave the `exec_disable_arg_limit` argument set to 0. Otherwise, we recommend that you set this argument to 1.

5.3.12 Hardware Manager Incorrectly Reports the Presence of the Keyboard and Mouse

If you boot a system with no keyboard and no mouse, the system incorrectly registers default keyboard and mouse information with the hardware manager, and displays keyboard0 and mouse0 when you view the hardware hierarchy. This information is not correct and will not match the correct information reported by the `sizer` command.

To view the correct information, use the `sizer -wk` and `sizer -wm` commands.

5.3.13 Compaq Management Agents for Tru64 UNIX (Compaq Insight Manager)

The following notes provide information on the Compaq Management Agents for Tru64 UNIX (formerly, Insight Manager). Version 2.1B agents are provided with this release of the operating system.

5.3.13.1 Software Notes

The following notes apply to the Compaq Management Agents for Tru64 UNIX software:

- The configuration of SNMP for Threshold Set Operations is described in the Best Practice document titled *Configuring SNMP for Threshold Set Operations on the Compaq Management Agents*, which is available from the following URL:

  http://www.tru64unix.compaq.com/faqs/publications/best_practices//

- Threshold Subagent Support for Alarm Types

  The Compaq Management Agents Threshold subagent supports SNMP Set operations, but they are not supported by the other Compaq Management Agents subagents.

  In this release, the Threshold subagent supports the following alarm configurations:

cpqMeAlarmSampleType	cpqMeAlarmStartupAlarm
absoluteValue	risingAlarm
absoluteValue	fallingAlarm
absSuppressRisingTrap	fallingAlarm
absSuppressFallingTrap	risingAlarm

  The following alarm types are not supported:

cpqMeAlarmSampleType	cpqMeAlarmStartupAlarm
absoluteValue	risingOrFalling
deltaValue	rising
deltaValue	falling
deltaValue	risingOrFalling

- The Compaq Management Agents System Board web page displays CPU cache and memory module information from AlphaServers supporting FRU Version 4.0 and Version 5.2 configuration tables only.

- The bus information displayed by the Compaq Management Agents System Information and System Board web pages might be incorrect or incomplete. Some system bus types supported by AlphaServer platforms are not currently supported by Compaq Management Agents.

5.3.13.2 Known Problems

The following problems exist in the current version of the Compaq Management Agents:

- SysMan, the Configuration Report Management Modules, or the Compaq Management Agents might not complete their initialization. Therefore, their respective icons might not be displayed on the Device Home Page.

  Another possible result is that the icons might be displayed correctly, but clicking on them results in an HTTP Server 404 (Not Found) error.

To remedy either of these situations, log in as root to stop and then restart the Compaq Management Agents daemon, `insightd`, manually, as follows:

```
#  /sbin/init.d/insightd stop
#  /sbin/init.d/insightd start
```

- The Compaq Management Agents Device Discovery web page (`http://machine:2301/cpqdev.htm`) might show inconsistent or incorrect data on some platforms, as active discovery is not fully functional. The Compaq Management Agents XE Servers might not be displayed on the Device Discovery Page.

  The HTTP Auto-Discovery option has been disabled by default. In addition, the default discovery interval has been changed from 1 minute to 15 minutes. To change these settings, log in as the administrator and use the Options link on the 2301 home page.

- On some browsers, the login dialog box, which consists of text fields for Name and Password, opens with the initial focus on the Password text field.

- Using Netscape to set File System usage thresholds for Compaq Management Agents from Tru64 UNIX might result in visual display problems. Dragging the triangle-shaped indicators leaves a trace on the bar graphs. You can correct this problem by reloading the frame.

- The Compaq Management SCSI agent does not support RAID arrays.

- The Compaq SCSI subagent might not return the total capacity for SCSI RAID arrays.

- Compaq Management Agents software does not support partitioned memory on the AlphaServer GS140 platform. The System Board web page displays information about all hardware memory modules, instead of only those modules configured for the partition in which Compaq Management Agents software is running.

5.3.14 Event Manager

The notes in this section apply to the Event Manager.

5.3.14.1 Event Viewer and evmget Display a Message When the binlog File Is Invalid

If the binary error log file, `/var/adm/binary.errlog`, contains invalid log entries, an error message similar to the following is displayed when you run `evmget`:

```
binlog2evm: Invalid event data encountered at offset 80216
binlog2evm: Error occurred while reading from
"/.local../usr/var/adm/binary.errlog"
```

```
binlog2evm: Skipped invalid data - restarted at offset 85248
```
If you see this message, follow your normal investigation and reporting procedures to determine the source of the corruption.

A short-term solution to prevent the message from being displayed is to redirect `stderr` to `/dev/null`.

If you are certain that the error log is properly backed up and does not contain required event information, you can permanently remove the invalid data by cleaning up the log file as described in the directions in `binlogd`(8). This operation removes the log file and creates a new one. Because two generations of the error log are held, the message continues to be displayed until you run the cleanup procedure twice.

5.3.14.2 Event Manager Reports Kernel Messages with Critical Priority

Event Manager reports all messages that are posted from the kernel through the `syslog` event facility as having critical priority. This incorrectly includes many informational messages that are posted when you start the system.

5.3.14.3 Event Manager Fails to Detect syslogd and binlogd During Boot

Occasionally, Event Manager displays either or both of the following messages on the console:

```
S97evm: Communication with syslogd is not functioning
S97evm: Communication with binlogd is not functioning
```
In most cases, communication with `syslogd` and `binlogd` works correctly. The `S97evm` script subscribes to `binlog` and `syslog` events and then posts a `syslog` and `binlog` event. The `S97evm` script expects to see the events it just posted, but a synchronization issue in the script might cause the posted events to be missed. As a result, the script times out and displays the error messages.

You can correct this problem by modifying the sleep time-out parameter in the `/sbin/rc3.d/S97evm` script by changing `sleep 1` to `sleep 3`. Then rerun the script by executing the `/sbin/rc/3.d/S97evm start` command.

5.4 Network and Communications

The following notes apply to network and communications software.

5.4.1 Performance Tuning for Gigabit Ethernet Adapters

The following attributes are available for tuning the performance of driver software for Gigabit Ethernet adapters. These attributes are included in the `alt` kernel subsystem even though they are not visible through the `sysconfig` utility or the `dxkerneltuner` application:

minimal_isr

> A value that enables (1) or disables (0) the awakening of separate
> threads by the driver's interrupt service routine to handle completion
> of transmit and receive operations. When separate worker threads
> are enabled, the system load of the Gigabit Ethernet driver can be
> spread over multiple CPUs. When separate worker threads are
> disabled, the master system CPU (or the master CPU in each RAD of a
> NUMA system) services all the transmit and receive operations for the
> system's Gigabit Ethernet adapters.

> Default: 1 (multiple threads enabled)

> A 0 setting improves the performance of the driver software itself.
> However, overall system performance is likely to suffer during times of
> high network load because kernel applications other than the driver
> can have difficulty accessing the master CPU. Furthermore, the
> likelihood of overall system performance degradation goes up with each
> additional Gigabit Ethernet adapter supported by the system. For
> this reason, the default setting (1) is recommended for most systems
> and applications.

recv_coal

> The number of packets that are sent before an interrupt is generated
> (assuming that the recv_ticks timer does not expire first).

> Default: 32 (packets)

> Minimum: 0

> Maximum: 511

> This attribute can be modified at run time.

* recv_ticks

> The number of microseconds (usec) that elapse after receipt of the last
> packet before an interrupt is generated (assuming that the recv_coal
> threshold is not reached first).

> Default: 200 (usec)

> Minimum: 0

> Maximum: 888,888

> This attribute can be modified at run time.

send_coal

> The number of packets that are sent before an interrupt is generated
> (assuming that the send_ticks timer does not expire first).

> Default: 32 (packets)

Minimum: 0

Maximum: 511

This attribute can be modified at run time.

send_ticks

The number of microseconds (usec) that elapse after transmission of the last packet before an interrupt is generated (assuming that the send_coal threshold is not reached first).

Default: 125,000 (usec)

Minimum: 0

Maximum: 888,888

This attribute can be modified at run time.

The default value of the send_ticks attribute might have a negative performance impact on applications using NFSv3. For these applications, it is recommended that send_ticks be lowered to 10. Depending on the results from continued testing with a wide variety of applications and systems, 10 might be the default value for send_ticks in a future release.

5.4.2 The autofsd Utility

The following problems can occur when you use the autofsd utility:

- A problem can occur with certain busy file systems if you stop and restart the autofsd utility without bringing the system to a halt.

  Hierarchical direct map entries specify file systems to be mounted and unmounted together; however, the autofsmount program currently does not enforce this rule. If the hierarchy is only partially unmounted, when the autofsd utility starts, these unmounted subentries are not automatically available again.

  To avoid this problem, unmount the rest of the submounts (those that were busy), unmount the intercept point, and run the autofsmount program again to reinstall the intercept points.

- Local and remote mounts do not always work together in a hierarchical map entry. For example, in the following direct map entry, lcl represents the local system and remote represents a remote system:

  ```
  /dir1      /         remote:/a/b      /subdir1  lcl:/c/d
  ```

  The intention of this direct map is to mount remote:/a/b on /dir1, and to mount lcl:/c/d on /dir1/subdir1. The remote:/a/b/subdir1 directory should already exist, but the autofsd utility serves local file systems by using symbolic links. In this example, the autofsd utility

needs to convert `remote:/a/b/subdir1` to a symbolic link, which it cannot do.

To avoid this problem, move the data of `lcl:/c/d` to `remote:/a/b/subdir1` and delete the last line from the map entry.

5.4.3 The rcinet stop inet Command Stops IPv6 Communications

Issuing the `/usr/sbin/rcinet stop inet` command marks all network interfaces as down. Therefore, applications that use IPv6 will be unable to transmit messages through the interfaces.

5.4.4 Mail

This following notes provide information on problems that can occur when configuring and running mail on your systems.

5.4.4.1 The mailcv -I -t and -M -t Commands Do Not Work As Expected

If you are converting a `dtmail` folder hierarchy to IMAP, or if you are converting a single folder that does not already exist in the IMAP hierarchy, you receive the following error message and the conversion of the hierarchy stops:

```
Mailcv: Can't create output file {foldername}, ignoring conversion.

foldername is the new name of the folder.
```

Use Netscape to migrate your folders to IMAP, as follows:

1. Set the Local Mail folder to point to the directory that contains the `dtmail` folder hierarchy.

2. From the Preferences menu, choose the Mail & Newsgroup subtree, then choose Mail Servers.

3. Choose the Local Mail Directory and change the directory to the UNIX folder directory you want to convert.

4. Click OK and restart Netscape.

5. Choose the Netscape Messenger window to display your mail folders. Drag and drop the mail folders from the local folders to the IMAP folders or select all the messages in a folder and use the move command to move all the messages to the IMAP folder.

If you are converting `dxmail` or MH mail to IMAP folders, you receive the following error message:

```
Mailcv: Can't create output file {foldername}, ignoring conversion.

foldername is the new name of the folder.
```

To migrate folders from `dxmail` or MH mail folders to IMAP, do the following:

1. Migrate the folders to UNIX style by using the `mailcv` command with the `-A` option.

2. Use Netscape, as described in the previous procedure, to migrate the UNIX mail folders to your IMAP folders.

5.4.4.2 IMAP Server: Preserving Uppercase User Names

If your system is configured as an IMAP server and you want to preserve uppercase for user names, do the following:

1. Add the `F=u` flag for IMAP mailer in your `sendmail` configuration file.

2. Edit the `/var/adm/sendmail/sendmail.cf.pd` file and `/var/adm/sendmail/sendmail.m4` file (if it exists) before you run either the `mailsetup` script or `mailconfig` application.

   Search for the line with `Mimap` and add the `u` flag to its `F=` option. The original line appears as follows:

   ```
   Mimap,   P=/usr/bin/deliver, F=nsmFDM, S=10, R=20/50, A=deliver $u
   ```

   After you update the line, it should appear as follows:

   ```
   Mimap,   P=/usr/bin/deliver, F=nsmFDMu, S=10, R=20/50, A=deliver $u
   ```

If you have already configured `sendmail` using either the `mailsetup` script or the `mailconfig` application, apply these changes to the `/var/adm/sendmail/sendmail.cf` file in addition to the `/var/adm/sendmail/sendmail.cf.pd` and `/var/adm/sendmail/sendmail.m4` files.

5.4.4.3 The sendmail Warning Message

The permissions on the `/var` directory do not satisfy the checks by the `sendmail` binary. The `sendmail` utility expects the permissions on the `/var` directory to be 755. However, the permissions are 775. Therefore, `sendmail` logs the following warning message in the `syslog` file every time it checks the mode of the `/var` directory:

```
WARNING: writable directory /var/adm/sendmail
```

This does not impact the functionality of `sendmail`, so you can ignore this warning. If you want, you can change the permissions on the directory to 755 by logging in as root and entering the following command:

```
# chmod go-w /var
```

5.4.4.4 Problem Starting the sendmail Daemon

If you manually edit the `/var/adm/sendmail/sendmail.cf` file and the file contains errors, the Sendmail startup script might display a message that the daemon started when it has not.

To verify whether the `sendmail` daemon has actually started, issue the following command:

```
# ps -aef | grep sendmail
```

If the `sendmail` process is not present, check the `/var/adm/syslog.dated/current/mail.log` file for any errors associated with the start of the daemon. Correct any errors recorded in this file before starting the `sendmail` daemon again with the following command:

```
# /sbin/init.d/sendmail start
```

5.5 Local Area Transport

The following notes apply to Local Area Transport (LAT).

5.5.1 Duplicate Minor Numbers and latsetup

The `latsetup` utility sometimes creates devices with duplicate minor numbers. If you manually create LAT BSD devices that do not match the valid BSD `tty` name space convention, `latsetup` can create devices with duplicate minor numbers. For example, creating device `tty0` with a minor number 2 instead of 1 can cause this problem.

5.5.2 Simultaneous llogin Connections

When doing a number of simultaneous `llogin` connections, use `llogin` with the `-p` option. To speed up an `llogin` connection, add the target host name as a reserved service.

5.6 File Systems

The following notes apply to file systems.

5.6.1 Advanced File System (AdvFS)

The following notes discuss features, problems, and restrictions of the Advanced File System (AdvFS).

5.6.1.1 New AdvFS Mount Option Activates Data Logging on All Files in a Fileset

A new AdvFS mount option, `-o adl`, causes all files in the mounted fileset to use atomic write data logging for the duration of the mount. See `chfile`(8)

for an explanation of atomic write data logging. This data logging is not persistent across mounts, unlike the data logging provided by chfile(8).

Additionally, files using temporary (-o adl) data logging may be mmapped(), unlike files that have had persistent data logging activated on them. The temporary data logging is suspended until the last thread using the mmaped file unmaps it. The use of chfile on a file that is using temporary data logging causes the chfile command to override the temporary data logging provided by the new mount option, and the file's I/O mode is changed persistently according to the arguments given to the chfile command.

5.7 Logical Storage Manager

The following notes describe problems and restrictions of the Logical Storage Manager (LSM).

5.7.1 The diskconfig LSMnopriv Option Does Not Work

The LSMnopriv partition type in diskconfig does not work and will generate an error when used. To create this type of partition, invoke the disklabel command directly with an fstype of LSMnoprv.

5.7.2 Cannot Enable Logging on RAID 5 Volumes Using the LSM Bottom-Up Commands

You can create RAID 5 volumes using either the LSM top-down or bottom-up commands. However, you cannot enable logging using the bottom-up commands, such as volsd aslog, to associate a log subdisk to a plex or volplex att to attach a logging plex to a RAID 5 volume.

The volassist top-down command does work. Therefore, use the volassist addlog command to add logging to RAID 5 volumes. Note that if you create a RAID 5 volume using the volassist make command, logging is configured and enabled automatically.

5.7.3 LSM Dirty Region Logging (DRL) Cannot Be Used with rootvol

LSM Dirty Region Logging (DRL) cannot be used with a mirrored rootvol. If a system with a mirrored rootvol is not brought down cleanly, the system automatically recovers the rootvol by doing a complete resynchronization. Attaching a logging subdisk might degrade the rootvol write performance with no benefit in recovery time.

5.7.4 LSM Initialization Hangs When Accessing Failed Fibre Channel Devices

Due to a problem with error recovery on failed Fibre Channel devices, systems might block for long periods of time while booting during the LSM startup. The system might appear to be deadlocked during the boot after the starting LSM message, but the system will complete the boot process after the device driver error recovery times out. This might take some time and will take longer on clusters with more members or more failed Fibre Channel devices.

A similar delay might occur when attempting to operate on failed devices, for example, importing a diskgroup with a failed disk.

If this problem occurs, either remove (delete) or replace and recover the failed Fibre Channel devices so that all Fibre Channel units are available at boot time. There should be no unreasonable delays during normal operations or LSM I/O, only booting (LSM initialization) and other operations on failed disks are affected. If you cannot remove the failed units from the system prior to booting, the system will boot; however, it will take longer than expected.

5.8 Printing

The notes in this section apply to BSD printing and Advanced Printing Software.

5.8.1 Advanced Printing Software GUI Dialogs Appear on All Workspaces

A subtle difference in behavior in the X11R6.5 software, distributed with this version of the operating system, causes some Motif and CDE applications to display windows on all CDE workspaces. The `pdprintinfo` and `pdprintadmin` programs supplied with Advanced Printing Software exhibit this behavior.

For example, if you use the `pdprintadmin` program to display attributes of a logical printer in your environment, and then switch to a different CDE workspace on your CDE console, the `pdprintadmin` tool displays the printer property sheet on the new workspace.

5.8.2 Printing Entries in the syslog Now Log at info Priority

In this release of the operating system, the `lpr` facility in the `/etc/syslog.conf` file is set to report messages at the *info* level. In previous releases, it was set to the *error* level. By setting the level to *info*, generally informative system logging occurs for both the lpr/lpd subsystem

and Advanced Printing Software. You can change the `syslog` setting of
this and other facilities by modifying the `/etc/syslog.conf` file and then
restarting the `syslog` daemon.

6

Development Environment Notes

This chapter contains notes about issues and known problems with the development environment software and, whenever possible, provides solutions or ways to avoid the problems. The following topics are discussed:

- General programming (Section 6.1)
- POSIX Threads Library (Section 6.2)
- Kernel programming (Section 6.3)

6.1 General Programming

The following notes apply to general programming.

6.1.1 Change to bcopy, bcmp, and bzero

The argument types for the `bcopy`, `bcmp`, and `bzero` system functions have been changed to conform to the ANSI specification. The new interface prototypes are as follows:

```
int bcmp __((const void *, const void *, size_t);
int bcopy __((const void *, void *, size_t);
int bzero __((void *, size_t);
```

You can access the old prototype definitions by compiling applications using the `-D__V40_OBJ_COMPAT` compile flag. For example:

```
> cc -D__V40_OBJ_COMPAT test.c
```

6.1.2 Change to struct utmp, struct utmpx, and struct lastlog

To bring them into compliance with several UNIX and Internet standards, the `struct utmp`, `struct utmpx`, and `struct lastlog` structures were updated in Version 5.0. These changes affect the `/usr/include/utmp.h`, `/usr/include/utmpx.h`, and `/usr/include/lastlog.h` file.

6.1.3 The getaddrinfo() Routine Might Return the Incorrect Return Status

Under the following circumstances, the `getaddrinfo()` routine returns an incorrect status to the application:

- If the address family in the hints is not specified (`PF_UNSPEC`) or the parameter is NULL, the `getaddrinfo()` routine incorrectly returns the status as `EAI_FAMILY`.

- The `getaddrinfo()` routine incorrectly returns the status as `EAI_SERVICE` under the following circumstances:

  - The `servname` parameter is specified as the name of the service that exists in the `/etc/services` file.

  - The `ai_socktype` and `ai_protocol` addrinfo structure members are not specified.

  - The service, specified in the `servname` parameter, only has TCP protocol listed in the `/etc/services` file.

To avoid these problems, check the `res` pointer to make sure that it is valid.

6.1.4 Time Zone Environment Variable Setting

If the `TZ` environment variable is set to `:` (colon), as in `TZ=:`, either on the command line or via a `putenv()` call, the data for the default time zone (GMT), used by time-related `libc` functions (such as `tzset()`, `mktime()`, and `localtime()`), is not loaded as it should be. A setting of `TZ=:` might result in programs producing empty time zone abbreviations or using time zone data that is erroneously consistent with a previous time zone used by the same program. It might also lead to errors from the `mktime()` function when valid input is supplied.

The `TZ=:pathname` syntax and other `TZ` formats continue to work correctly. Only the `TZ=:` syntax is affected.

In this release, setting the `TZ` environment variable to either `TZ=:Etc/GMT` or `TZ=GMT0` produces the same behavior as the `TZ=:` setting.

6.2 POSIX Threads Library (pthreads)

DECthreads has been renamed the POSIX Threads Library. Compaq has made enhancements to the library to improve the performance of some classes of threaded applications.

The following notes apply to the POSIX Threads Library.

6.2.1 pthread_mutex_destroy() Can Return EBUSY for Unlocked Mutex

One of the possible return status values of the POSIX Threads Library routine `pthread_mutex_destroy()` is EBUSY. Normally, this indicates

that the mutex to be destroyed is currently locked or in use. Attempting to destroy a locked or in-use mutex is an application error.

Under certain timing conditions, `pthread_mutex_destroy()` can erroneously return EBUSY when the mutex is unlocked or unused. In such cases, the mutex is not destroyed. If the application detects the EBUSY return status, the call can be repeated. Subsequent call may succeed, or may fail with EBUSY again. Eventually the call should succeed. If the call is not successfully repeated, a small amount of memory will be leaked.

6.2.2 Problems with Use of the stackaddr Thread Creation Attribute

Using the `stackaddr` thread creation attribute, which allows you to allocate your own stack for a thread, is not recommended. The semantics of this attribute are poorly defined by POSIX and the Single UNIX Specification, Version 2. As a result, code using the attribute is unlikely to be portable between implementations. The attribute is difficult to use reliably, because you must, by intimate knowledge of the machine architecture and implementation, know the correct address to specify relative to the allocated stack. The implementation cannot diagnose an incorrect value because the interface does not provide sufficient information. Using an incorrect value might result in program failure, possibly in obscure ways.

Alternatively, if you want to supply your own thread stacks, consider using the `pthread_attr_setstackaddr_np()` routine. Callers specify the thread stack using a base address and size, which avoids the worst problems with the standard interface.

6.2.3 Memory Alignment Issue

Although older Alpha processors (prior to the 21264 chip) can only access memory in units of at least a quadword (8 bytes), multiple variables, each of which is less than 8 bytes, can occupy the same quadword in memory. In such cases, multithreaded programs might experience a problem if two or more threads read the same quadword, update different parts of it, then independently write their respective copies back to memory. The last thread to write the quadword overwrites any data previously written to other parts of the quadword. This can happen even though each thread protects its part of the quadword with its own mutex.

The Tru64 UNIX C compiler protects scalar variables against this problem by aligning them in memory on quadword (8-byte) boundaries. However, in composite data objects such as structures or arrays, the compiler aligns members on their natural boundaries. For example, a 2-byte member is aligned on a 2-byte boundary. Because of this, any adjacent members of the composite object that total 8 bytes or less could occupy the same quadword in memory.

Inspect your multithreaded application code to determine if you have a composite data object, in which adjacent members could share the same quadword in memory. If you do and if your project allows, it is recommended that you force alignment of each such member variable to a quadword boundary by redefining the variable to be at least 8 bytes, or by defining sufficient padding storage after the variable to total 8 bytes.

Alternatively, you can create one mutex for each composite data object in which adjacent members can share the same quadword in memory. Then use this single mutex to protect all write accesses by all threads to the composite data object. This technique might be less desirable because of performance considerations.

For more information, see the Granularity Considerations section in the *Guide to the POSIX Threads Library*.

6.2.4 POSIX Threads Library pthread_debug() and pthread_debug_cmd() Routines

In order to allow for the possibility of a more comprehensive and robust threads debugging environment, it has become necessary to remove the `pthread_debug()` and `pthread_debug_cmd()` routines. To prevent existing binaries from failing, the routines will continue to be recognized. However, a call to either routine now results in an immediate return to the calling program. The `pthread_debug_cmd()` routine returns a 0 (zero) indicating success. Debuggers such as Ladebug and TotalView provide functionality formerly provided by these routines.

6.2.5 Process-Shared Synchronization Objects and Debugging

The POSIX Threads Library (pthread) interface now supports the sharing of certain synchronization objects (mutexes, condition variables, and read-write locks) among threads running in multiple cooperating processes. Such objects are termed process-shared objects.

For this release, process-shared objects are not visible to the Ladebug debugger. For example, the `show mutex` Ladebug command lists process-private mutexes but not process-shared mutexes.

6.2.6 Use of errno

The initial or default thread in a multithreaded application uses the global `errno` cell instead of a perthread `errno`.

Starting in Version 5.1, use of the global `errno` cell by threads other than the initial thread (for example, by calling nonthreadsafe or incorrectly compiled code that uses an `errno` symbol) will corrupt the initial thread's value.

Properly compiled or existing binaries using the POSIX Threads Library will not be affected by this change.

6.3 Kernel Programming

The following notes apply to kernel programming.

6.3.1 System Call Funneling

If you are a kernel developer who implements or maintains a third-party kernel module that "patches in" its own system call handler, and if that handler needs to be funneled (have its execution restricted to the primary CPU), then you will need to add the funneling hooks into the handler function. Add a call to `unix_master()` at the start of the handler and a call to `unix_release()` at the end of the handler.

6.3.2 Changes to the ATM Kernel Programming Interface

To support features needed for point-to-multipoint virtual circuits (VCs) and to provide for future enhancements, the parameters to the `atm_cmm_register_cvg()` and `atm_cmm_register_sig()` routines have been changed.

Binary compatibility with previously compiled modules has been maintained. Convergence and signaling modules require minor source code changes when recompiled under Tru64 UNIX Version 5.1A.

See the *Asynchronous Transfer Mode* manual for more information.

6.3.3 Changes to the Internal Kernel Exception Frame

The kernel's exception frame format has been reduced in size from 264 to 256 bytes by eliminating an unused 8-byte quadword that had been used to save the stack pointer register value. Because this register layout is used solely for exceptions taken on a kernel stack, this change causes no impact to applications. However, if you need to display the contents of an exception frame when debugging a kernel crash dump, you now will need to interpret the data in its new 32-register format.

6.3.4 Changes to the VFS Programming Interface

The VFS namecache is now replicated across processors to provide lower overhead and better scalability. If you are developing third-party file systems, you must be aware of the synchronization requirements with the VFS namecache. Specifically, if you are going to delete or rename files, use the `cache_purge()` kernel call on the file. The `namei()` kernel call removes the entry from its own namecache only (when called with

the `DELETE` or `RENAME` flag). The `cache_purge()` kernel call invalidates
the entry in all namecaches. Additionally, when renaming files, use the
`cache_purge()` kernel call on the existing target entry before you add
the new name entry to the directory.

7

Window System Software Notes

This chapter contains notes about issues and known problems with the windowing software and, whenever possible, provides solutions or workarounds to those problems. The following topics are discussed in this chapter:

- Hardware notes and restrictions (Section 7.1)
- X servers (Section 7.2)
- CDE clients (Section 7.3)
- Internationalization (Section 7.4)

7.1 Hardware Notes and Restrictions

The following notes apply to graphics hardware restrictions.

7.1.1 PowerStorm Graphics Support

Support for the following 3D graphics adapter families is included on the Associated Products CD–ROM:

- PowerStorm 4D51T
- PowerStorm 300
- PowerStorm 350

The base operating system provides only VGA mode support for these devices. Drivers for these devices are available at the following URL:

http://www.support.compaq.com/open3d/

7.1.2 Qvision Graphics Display Error

Different versions of Qvision graphics boards demonstrate `fillsolid` drawing problems, leaving a line at the bottom of the screen, which is evident when you run the CDE blank lock screen. The line varies in color and intensity depending on the version of the Qvision board.

7.2 X Servers

The following notes apply to X servers.

7.2.1 Limited Multiscreen Display Support with CDE

CDE provides limited support for X servers with more than one screen. While a multiscreen environment is possible, a number of inconsistencies are noticeable. For example, colors in secondary screens may not be correct, icons may not display properly, and applications may not appear on the screen where they are invoked. Using the PanoramiX extension mitigates some of these inconsistencies.

7.2.2 Pixmap Color Errors with PanoramiX

Some pixmap color corruption has been seen when using the PanoramiX extension. Background pixmaps can be corrupted when a client is displayed on any screen other than the physical screen 0. The corruption is most frequently seen when using Netscape and loading pages with background pixmaps.

To avoid this problem, check the "Always use my colors, overriding document." box under the color section of Netscape preferences.

7.2.3 Colons Missing from Display

In a few instances, colons are seen as spaces in a display after you create a cluster. This problem is rare and does not affect the files. To correct the problem, log out and log back in to the session.

7.2.4 X Print Server Extension Library Restriction

Programmers who may be using the X Print extension library in combination with the X Print Server shipped as a subset of the base operating system should be aware that the library calls `XpCancelDoc()` and `XpCancelPage()` are currently not functional. Their use triggers no operation to be performed.

7.2.5 Multimedia Services AlphaVCR Utility Problem

There is a known problem with the Multimedia Services Version 3.3 for Compaq Tru64 UNIX Version 5.1A product on the Associated Products CD–ROM. The AlphaVCR utility, used to play AVI and MPEG files, may fail at start and report a segmentation fault when an 8-bit PseudoColor visual is not available on the display.

An updated Multimedia Services kit with this problem corrected will be made available on the following web site:

http://www.support.compaq.com/open3d/multimedia_drivers.htm

7.3 CDE Clients

The following notes apply to CDE clients.

7.3.1 Inaccessible Dialog Buttons

When you use low resolution graphics, the buttons in a dialog box, such as OK, Apply, Cancel, and Help, might not display. For CDE and Motif based applications, set the `DXmfitToScreenPolicy` resource to `as_needed` in the application's resource file under your home directory or, to make it effective systemwide, in the `/usr/dt/config/$LANG/sys.resources` file.

For non-Motif based Sysman applications, such as those launched from SysMan Menu, see Section 5.2.13.

7.3.2 Screen Savers Prevent Efficient Power Management

When Monitor Power Management and Screen Saver are simultaneously enabled, DPMS-capable monitors are placed in active power-off mode. In addition, on Energy-Star compliant platforms, the disk spin down feature may also be activated. While these energy-saving features are active, the X server may override them so that it can continue to run the screen saver. To minimize power consumption, stop using active screen savers by doing any of the following:

- In the Screen Saver panel of the Screen dialog box, under the Style Manager, select Blank Screen and deselect any active screen savers that might be running.

- Click the Off button in the same dialog box.

- Execute the `xset s off` command from a terminal client window.

7.3.3 Remote Invocation of CDE File Manager dtfile

File Manager, Application Manager, and Trash Manager are different views supported by the `dtfile` application. Avoid invoking `dtfile` from a remote system with the `DISPLAY` environment variable set appropriately. This restriction is necessary because of the client-server model used by the `dtfile` application and its close interaction with the ToolTalk messaging system.

In the event of unexpected behavior from any of these utilities, close all windows associated with the File Manager, Application Manager, and Trash

Manager. Then kill all processes associated with the dtfile application. You can obtain the pid for each process by using the following command:

```
# ps -aef | grep dtfile
```

7.3.4 Possible Failure in the XOpenDisplay Call

When a user logs in to the CDE desktop, some applications might not restart. The X server process might not be able to handle all of the requests for new open connections, causing some to fail in the XOpenDisplay call. Some applications, like xterm, log startup errors such as the following in the dxconsole window:

```
xterm error: can't open display :0
```

To avoid this problem, add the following resource to your $HOME/.Xdefaults file:

```
Dtsession*contManagement:   2
```

This resource enables a handshake protocol between the CDE Session Manager and Window Manager during the login phase to control the appearance of new windows. While it might marginally increase the time before the login completes, it better assures that all applications will restart.

You can add the resource to the /usr/dt/app-defaults/C/Dtsession file to make the change for all users automatically.

7.3.5 Login to CDE_SESSION Restriction

Login to CDE_SESSION is restricted to machines with host names that are not greater than 31 characters. This is because CDE and the X libraries use the uname command to get the system name to process the user credentials.

7.3.6 Possible Problem with CDE ToolTalk Messaging

The $HOME/.TTauthority file contains a key that ToolTalk clients read and send to the ttsession message server along with each message. The ttsession message server compares this key with the key it placed in the user's $HOME/.TTauthority file when the user logged in to CDE. If, for some reason, the $HOME/.TTauthority file becomes corrupted, clients are not able to send a valid key to the ttsession message server. As a result, CDE cannot function normally and might not start at all.

You can use the /usr/dt/bin/ttauth list command to examine the contents of your $HOME/.TTauthority file. A corrupted file might contain null values that might cause the ttsession message server to dump core while trying to read the file. The $HOME/.dt/errorlog file contains the following error message if the ttsession message server could not start:

```
dtsession: Unable to start message server - exiting.
```

If this problem occurs, remove the `$HOME/.TTauthority` file and restart CDE by becoming the root user and executing the `/sbin/init.d/xlogin stop` and then the `/sbin/init.d/xlogin start` commands.

When you log back in to CDE, a new `$HOME/.TTauthority` file is created that contains a valid key.

If the home directory is shared with other users, the other users must also restart CDE and log out and log in again.

7.4 Internationalization

The following notes apply to restrictions on use of internationalization features in the windowing environments.

7.4.1 Japanese Keyboard Support in Console Mode

When running in single-user or console mode, Tru64 UNIX now supports two new Japanese keyboard types (JIS and ANSI) on AlphaStation and AlphaServer systems. (Japanese keyboard support is not available on TURBOchannel-based machines.)

To use JIS-type Japanese keyboards, like the PCXAJ-AA and LK411-JJ, set the `language` console environment variable to 50, as follows:

```
>>> set language 50
```

To use ANSI-type Japanese keyboards, like the LK411-AJ, set the `language` console environment variable to 52, as follows:

```
>>> set language 52
```

7.4.2 Default Keyboard Setting Might Prevent User Login

When a user logs in to a system, the default keyboard setting must be appropriate for the keys that the user presses when entering characters in the user name and password fields. Otherwise, characters that are correct from the user perspective, given the keyboard being used, might be treated as invalid. In this case, the user cannot log in to the system. This situation most often arises when a keyboard is being used in one language and the default keyboard setting is another language. You can change the default keyboard setting at the console prompt or, if the required language is not available at the console level, by editing the `Xserver.conf` file to change the keymap used by the X server. See `keyboard`(5) for more detailed information about changing keyboard settings.

8

Documentation Notes

This chapter contains release notes that apply to the operating system documentation. It provides information on the following:

- Changes to the SPD (Section 8.1)
- Netscape problem with the Search by Keyword feature (Section 8.2)
- AltaVista search (Section 8.3)
- *Command and Shell User's Guide* (Section 8.4)
- *Security* (Section 8.5)
- *Logical Storage Manager* (Section 8.7)
- *Kernel Debugging* (Section 8.6)
- Online help (Section 8.8)

8.1 Software Product Description (SPD) Replaced by QuickSpec

With this release of the operating system, the Software Product Description (SPD) has been replaced by the Tru64 UNIX QuickSpec. For a description of this release of Tru64 UNIX and information about its capabilities and the hardware it supports, see the QuickSpec.

8.2 Netscape Problem with the Search by Keyword Feature

Netscape on Tru64 UNIX does not handle JavaScript forms correctly. When you use the Reference Pages Search by Keyword feature on the Documentation CD–ROM, the search can fail.

To work around the problem, click in any other window and return to the search window.

This problem does not occur with Netscape or Microsoft Internet Explorer on a Windows PC or Macintosh.

8.3 AltaVista CD–ROM Search Might Not Work Correctly with Netscape Communicator

When the Tru64 UNIX *Software Documentation* CD–ROM is used on a PC for which Internet Explorer is the default browser, the CD–ROM search capability works as documented in the instructions window. This window automatically pops up when you click on the Search button that is available from the main page of the documentation library. The instructions tell you to open Windows Explorer, double click on the icon for the CD–ROM drive, and then double click on `search.exe`, which automatically loads the search query entry form into the Internet Explorer window.

When the documentation CD–ROM is used on a PC for which Netscape Communicator is the default browser, these instructions might work, but sometimes do not. Problems observed when trying to use AltaVista CD–ROM Search with Netscape Communicator (Version 4.5 or higher) include the following:

- An attempt to load the search query entry form (`InitPage.html`) results in a "browser not found" error.

- The search query entry form comes up in a window different from the Netscape browser window.

- If the search query entry form does come up in the Netscape browser window, the first search query consistently hangs.

If you encounter one or more of these problems, use the following procedure to work around them:

1. After launching the AltaVista Search Dispatcher (`search.exe`), invoke Netscape manually if it is not already running.

2. Use the `File Open` option in the Netscape window to find and open the `InitPage.html` file on the CD–ROM drive. Alternatively, you can type the URL to this file in the Netscape browser's Location: field.

3. If your first search query takes more than 30 seconds to execute, click on the Stop icon and re-enter the query.

8.4 Command and Shell User's Guide

Table 3-1 in the *Command and Shell User's Guide* contains an error for the `ls` command option. The following description for the `-R` option is incorrect:

`-R`   Lists all entries including hidden files. Without this flag, the `ls` command does not list the names of entries that begin with a dot (.), such as `.profile`, `.login`, and relative pathnames.

This is the description of the -a option. Therefore, the line in Table 3–1 should read as follows:

-a
Lists all entries including hidden files. Without this flag, the ls command does not list the names of entries that begin with a dot (.), such as .profile, .login, and relative pathnames.

8.5 Security

The information in Section 19.10.2 of the *Security* manual describing the binary audit log record format is incomplete and potentially misleading. Do not use this information as a basis for any code.

8.6 Kernel Debugging

The *Kernel Debugging* manual was not updated for this release. Therefore, the following text replaces the existing text in Section 2.2.3.17, Displaying the Namecache Structures:

The namecache extension displays the per-processor namecache structures on the system, and has the following format:

namecache [-h │ -help] | [-neg │ -all -p *cpu*] [-v *pid* │ -d *dvpid* │ -n *name*]

In the following example, the -h flag displays a list of flags, with brief explanations, and it also provides some usage tips:

```
(kdbx) namecache -h
namecache - print the namecache                                          \
   Usage : namecache [options]                                           \
     (no options) print the namecache entries on primary cpu             \
     -h           prints help message including tips                     \
     -p <cpu>     show namecache entries on processor <cpu>              \
     -v <v_id>    search for a vnode with <v_id>                         \
     -d <v_id>    show all the directory entries in directory <v_id>     \
     -n <name>    search for a namecache entry with <name>               \
     -neg         prints negative hit in global negative namecache       \
     -all         show ALL namecache entries including negative hits     \
                                                                         \
   The Hash # column has three numbers:                                  \
     1st: hash chain (bucket) number                                     \
     2nd: namecache entry position within the hash chain                 \
     3rd: index of namecache array of the namecache entry               \
                                                                         \
   To see an actual namecache entry, specify the 1st and 3rd numbers: \
   kdbx> p processor_ptr[<cpu>].namecache[<1st>*NCHSIZE+<3rd>]           \
   Currently, NCHSIZE is set to 15.                                      \
                                                                         \
   To see all the negative entries, use "namecache -v 0 -all".          \
```

The following example shows the default output of the namecache extension:

```
(kdbx)

Namecache entries on processor    0
Number of hash chains:         4096

  Hash #          vp       vpid     dvpid     time    ln name
=========== =========== ======== ========= ======== == ==================
    3   0   0 k0x0ff03440     3681     1025p      89t  7 lat.mod
    4   0   0 k0x8581fd40     4229     3249p     135t 13 secconfig.mcl
    8   0   0 k0x9a1ccd80      526      253p      96t  6 dsk16b
   11   0   0 k0x040c3440     1026        5p      89t  3 sys
   12   1   0 k0x1afd4000     4030      209p     134t  7 console
   15   1   0 k0x0daa3200     2936     2926p     137t  8 updadmin
   17   0   1 k0x04d75d40     1520      580p      93t  5 crash
        1   0 k0x9a192480       20        6p      30t  7 inittab
   18   0   0 k0x0da998c0     3011     2934p     137t 16 secconfig.cb.tcl
   22   0   0 k0x0d688480     2831     2818p      78t  8 CQMGHOST
   27   0   0 k0x04d57680     1434     1423p      47t  7 sys.evt
   32   0   0 k0x051c4000     1812      218p     142t  6 routes
   38   0   0 k0x0daa2000     2931     2926p     137t  9 mailsetup
   39   0   0 k0x04c5a480      216     1087p      44t  2 ..
   42   0   1 k0x044af680      660      618p      64t  1 6
        1   0 k0x044aad80      684      618p      64t  2 30
   43   0   0 k0x0d675b00     3025     2940p     137t 11 auditconfig
   55   0   0 k0x24d886c0     6353     2696p     411t  6 master
   58   0   0 k0x044aab40      685      618p      64t  2 31
   60   0   0 k0x04516b40     1052     1051p    2854t  7 libc.so
        1   1 k0x04d64900     1393     1423p      47t  2 ..
   67   0   1 k0x0dab2fc0     3237     3073p     137t 13 setldd.cb.tcl
   69   0   0 k0x1f0ae480     5020     2890p     143t  9 xlate.tcl
   72   0   0 k0x05873b00      231        5p    2794t  3 tmp
   79   0   1 k0x87448000     4524      218p     140t 12 printcap.bak
   .
   .
   .
```

The following example displays all directory entries on processor 1 in
directory 253:

```
(kdbx) namecache -p 1 -all -d 253

Searching for all entries in directory with v_id 253 ...
 Namecache entries on processor    1
 Number of hash chains:         4096

  Hash #          vp       vpid     dvpid     time    ln name
=========== =========== ======== ========= ======== == ==================
    8   0   0 k0x9a1ccd80      526      253p      39t  6 dsk16b
   25   0   0 k0x9a1cdb00      528      253p      96t  6 dsk16c
   41   1   0 k0x9a1cd680      530      253p      39t  6 dsk16d
   57   0   0 k0x9a1cdd40      532      253p      39t  6 dsk16e
   63   0   0        NULL        0      253p      39t  8 floppy0g
   73   0   0 k0x9a1ce900      534      253p      39t  6 dsk16f
   89   1   0 k0x9a1ce480      536      253p     106t  6 dsk16g
  105   0   0 k0x9a1cf200      538      253p     106t  6 dsk16h
  222   1   0 k0x06432d80      316      253p      39t  5 dsk2h
        2   1 k0x9a1bdd40      420      253p      39t  5 dsk9e
  224   3   0 k0x06433d40      322      253p      39t  5 dsk3c
  231   1   0 k0x9a1b6d80      372      253p      39t  5 dsk6d
  233   1   1 k0x06061200      272      253p      39t  5 dsk0b
  249   0   0 k0x9a1ced80      540      253p     106t  6 dsk17a
  265   0   0 k0x9a1cfb00      542      253p      39t  6 dsk17b
  281   0   0 k0x9a1cf680      544      253p      39t  6 dsk17c
```

```
         297  0  0 k0x9a1cfd40    546     253p      39t  6 dsk17d
         313  0  0 k0x9a1d0900    548     253p      39t  6 dsk17e
         319  0  0        NULL      0     253p      39t  8 floppy0h
         329  0  0 k0x9a1d0480    550     253p      39t  6 dsk17f
    .
    .
    .
```

8.7 Logical Storage Manager

The following sections in Chapter 6 of the *Logical Storage Manager* manual
contains errors in the steps that describe the voldisk -f init <disk>
command:

* 6.4.3—Recovering Unstartable Nonredundant Volumes, step f

* 6.4.5.1—Recovering a RAID 5 Plex from Multiple Disk Failures, step f

* 6.4.5.2—Recovering a RAID 5 Log Plex, step f

* 6.5.5.1—Replacing a Failed Disk, step 6

In these sections, the steps involving the voldisk command do not cover
the case of simple disks, sliced disks with a puboffset, or simple disks with
a privoffset. This release note contains the revisions to the relevant
step in these sections.

The *Logical Storage Manager* manual will be corrected for the next release
of Tru64 UNIX.

Step f in sections 6.4.3, 6.4.5.1, and 6.4.5.2, and step 6 in section 6.5.5.1
should read:

[f. | 6.] Label and initialize the new disk.

* To use the default values for a new disk, do the following:

    1. Apply a default disk label to the new disk:

       # **disklabel -rwn *disk_access_name***

    2. Initialize the new disk for LSM:

       # **voldisksetup -i *disk***

* If you have a customized disk label (Section 4.1.3) that you want to apply
  to the new disk, do the following:

    1. Apply the disk label to the new disk:

       # **disklabel -R *disk_access_name file***

    2. Initialize the disk for LSM, using the disk access name in the form of
       either dsk*n* (for the entire disk) or dsk*np* (for a partition of the disk).

        – For a nopriv disk, enter:

```
                        # voldisk -f init disk_access_name
```

      – For a standard sliced disk, enter:

```
                        # voldisk -f init disk_access_name puboffset=16
```

Make sure the puboffset you specify is the same as it was on the failed disk.

      – For a simple disk that occupies a partition that begins at block 0 of the disk (for example the a or c partition), enter:

```
                        # voldisk -f init disk_access_name \
                        privoffset=16
```

      – For a simple disk that occupies a partition that does not begin at block 0 of the disk (for example the b or d partition), enter:

```
                        # voldisk -f init disk_access_name
```

8.8 Online Help

The following notes apply to the online help.

8.8.1 SysMan Menu

The notes in this section apply to the online help for the SysMam Menu application.

8.8.1.1 Title Bar Is Incorrect

When you use the SysMan Menu's online help in the Common Desktop Environment (CDE), the title bar for the help window always displays the name of the first application for which you requested help.

Ignore the title bar. The correct help volume is displayed in the help window and the Volume label at the top of the window correctly identifies the help volume.

8.8.1.2 Help on Item Sometimes Fails

The SysMan Menu's Help On Item buttons provide online help for the selected menu item. When running the SysMan Menu from a PC, from a web browser, or from the SysMan Station, Help On Item for certain tasks fails with an error when trying to access a URL such as the following:

```
http://your_machine:2301/SYSMAN/suitlet_help/html/en_US.ISO-8859-1/help_application/help_task.html
```

To avoid this problem, launch the specific task and select the online help within the task itself. You can also run the SysMan Menu on a terminal or on an X11 display (for example, sysman -display host:0.0) and the help is displayed properly.

8.8.2 System Management Station

The notes in this section apply to the online help for the System Management Station (SMS).

8.8.2.1 Online Help Window Does Not Maximize Automatically

If you open an SMS online help window and minimize it, it does not automatically maximize when you reselect Help from the SMS session. You must manually maximize the Help window to view the new help information.

8.8.3 Insight Manager

The introductory paragraph in the online help for the Compaq Insight Manager Configuration is incorrect; it should read as follows:

```
Use Compaq Insight Manager Configuration to enable or disable
the Compaq Insight Manager agent daemon on your system.
```

The additional sentence currently in the online help regarding specifying passwords is not appropriate in this release.

A

Software Subset Information

This appendix provides information on the disk space required to install this release of the operating system, including information on software subsets for full and RIS installations.

A.1 Disk Space Required for Software Subsets

Table A–1, Table A–2, and Table A–3 show disk space as the number of 512-byte blocks required in the root, /usr, and /var file systems to install each Tru64 UNIX software subset. The figures for each group of files within a subset have been rounded up to the next-highest 512-byte increment; this means that the total space requirements listed are slightly greater than the space actually required.

To determine the subset size in megabytes (MB), divide the size in blocks by 2048.

For information on the contents of each subset, see the *Installation Guide*. If you want to add optional subsets after you install the operating system, use the df command to determine free disk space in blocks.

Table A–1: Disk Space Requirements – Base Operating System

Tru64 UNIX V5.1A Operating System

Subset	root	/usr	/var	Total
OSFACCT520	9.28	1096.96	99.53	1205.76
OSFADVFS520	7804.79	3104.63	—	10909.42
OSFADVFSBIN520	2543.46	3.06	—	2546.51
OSFADVFSBINOB-JECT520	—	4767.96	—	4767.96
OSFADVFSDAEMON520	10.88	1678.06	139.18	1828.12
OSFAFM520	—	2160.73	—	2160.73
OSFATMBASE520	261.74	1359.22	—	1620.96
OSFATMBIN520	5443.51	21.40	—	5464.91
OSFATMBINCOM520	—	284.96	—	284.96
OSFATMBINOBJECT520	—	22201.54	—	22201.54

Table A–1: Disk Space Requirements – Base Operating System (cont.)

Tru64 UNIX V5.1A Operating System

Subset	root	/usr	/var	Total
OSFBASE520	43056.01	104948.34	1583.27	149587.62
OSFBIN520	20353.60	1589.52	—	21943.12
OSFBINCOM520	39.41	28600.90	75.03	28715.34
OSFBINOBJECT520	—	32709.49	—	32709.49
OSFC2SEC520	414.93	1223.25	160.22	1798.40
OSFCDEAPPS520	—	11790.07	—	11790.07
OSFCDEDEV520	—	26181.00	—	26181.00
OSFCDEDT520	—	51889.62	—	51889.62
OSFCDEMAIL520	—	3585.09	—	3585.09
OSFCDEMANOP520	—	2039.42	—	2039.42
OSFCDEMANOS520	—	1442.02	—	1442.02
OSFCDEMIN520	—	15663.57	79.05	15742.62
OSFCLINET520	1102.60	19188.19	47.12	20337.90
OSFCMPLRS520	—	33155.84	—	33155.84
OSFDCMT520	—	1158.97	—	1158.97
OSFDCMTEXT520	—	4402.79	—	4402.79
OSFDECW520	—	2974.06	60.99	3035.04
OSFDMS520	—	95.63	73.34	168.98
OSFDOSTOOLS520	—	3407.67	—	3407.67
OSFEMACS520	—	174648.76	—	174648.76
OSFENVMON520	21.48	147.86	—	169.34
OSFEURLOC520	—	1526.38	—	1526.38
OSFEXAMPLES520	—	1688.06	—	1688.06
OSFEXER520	—	5428.00	—	5428.00
OSFFONT15520	—	3160.99	—	3160.99
OSFFONT520	—	2432.85	—	2432.85
OSFHWBASE520	27510.58	2917.62	34.40	30462.59
OSFHWBIN520	30541.49	2459.85	6.10	33007.44
OSFHWBINCOM520	19.00	3157.16	—	3176.16

Table A–1: Disk Space Requirements – Base Operating System (cont.)

Tru64 UNIX V5.1A Operating System

Subset	root	/usr	/var	Total
OSFHWBINOBJECT520	—	30051.00	—	30051.00
OSFIMXE520	40.27	4573.17	7100.64	11714.08
OSFINCLUDE520	—	5948.94	—	5948.94
OSFINET520	2067.72	26948.28	748.83	29764.83
OSFJAVA122520	—	48350.63	—	48350.63
OSFJAVA520	—	22633.23	—	22633.23
OSFJAVADEV122520	—	34885.84	—	34885.84
OSFJAVADEV520	—	17571.60	—	17571.60
OSFJAVADOC122520	—	20324.19	—	20324.19
OSFJAVADOC520	—	35545.66	—	35545.66
OSFKBDLK411520	—	134.33	—	134.33
OSFKBDPCXAL520	—	273.11	—	273.11
OSFKTOOLS520	—	1698.38	8328.06	10026.44
OSFLAT520	683.12	991.96	7.83	1682.90
OSFLDBBASE520	—	32779.45	—	32779.45
OSFLDBDOC520	—	2093.56	—	2093.56
OSFLEARN520	—	3100.53	—	3100.53
OSFLIBA520	—	9495.29	—	9495.29
OSFLSMBASE520	7651.16	6774.49	—	14425.65
OSFLSMBIN520	1614.05	9.16	—	1623.22
OSFLSMX11520	—	17083.44	61.54	17144.99
OSFMANOP520	—	19507.96	—	19507.96
OSFMANOS520	—	16007.05	—	16007.05
OSFMANWOP520	—	8812.28	—	8812.28
OSFMANWOS520	—	1264.93	—	1264.93
OSFMH520	—	4297.65	—	4297.65
OSFMITFONT520	—	18793.97	104.01	18897.99
OSFNETCONF520	—	1377.04	—	1377.04
OSFNETSCAPE520	—	53579.68	—	53579.68

Table A–1: Disk Space Requirements – Base Operating System (cont.)

Tru64 UNIX V5.1A Operating System

Subset	root	/usr	/var	Total
OSFNFS520	57.57	1660.55	—	1718.12
OSFNFSCONF520	—	69.05	—	69.05
OSFOBSOLETE520	—	2243.45	—	2243.45
OSFOEMBASE520	—	564.82	—	564.82
OSFOLDDECW520	—	342.42	—	342.42
OSFPERL520	—	59565.94	—	59565.94
OSFPGMR520	—	11192.88	—	11192.88
OSFPRINT520	114.83	8636.94	44.13	8795.90
OSFRCS520	—	2100.06	—	2100.06
OSFRIS520	—	225.25	144.03	369.28
OSFSCCS520	—	16104.73	—	16104.73
OSFSDE520	—	25699.80	—	25699.80
OSFSDECDE520	—	314.93	—	314.93
OSFSER520	—	16334.31	53.11	16387.42
OSFSERPC520	—	4396.78	—	4396.78
OSFSERVICETOOLS520	15.93	4104.48	3.08	4123.50
OSFSVID2520	30.00	638.90	—	668.89
OSFSYSMAN520	171.53	79514.79	39.56	79725.88
OSFTCLBASE520	—	24943.11	—	24943.11
OSFTERM520	—	3702.49	—	3702.49
OSFTKBASE520	—	16154.67	—	16154.67
OSFTRUETYPE520	—	420.20	—	420.20
OSFUUCP520	119.63	18699.08	272.15	19090.87
OSFX11520	22.30	37149.92	694.32	37866.54
OSFXADMIN520	—	6914.46	68.38	6982.84
OSFXADVFS520	—	21218.92	655.22	21874.13
OSFXC2SEC520	—	495.07	—	495.07
OSFXDEMOS520	—	2096.62	—	2096.62
OSFXDEV520	—	2867.13	—	2867.13

Table A–1: Disk Space Requirements – Base Operating System (cont.)

Tru64 UNIX V5.1A Operating System

Subset	root	/usr	/var	Total
OSFXEXAMPLES520	—	9425.89	—	9425.89
OSFXIEDOC520	—	3249.65	—	3249.65
OSFXINCLUDE520	—	7452.45	—	7452.45
OSFXLIBA520	—	16517.18	—	16517.18
OSFXMIT520	—	6414.99	47.91	6462.90
OSFXNEST520	—	411.06	18.46	429.53
OSFXOEM520	—	—	965.52	965.52
OSFXPRINT520	—	720.58	—	720.58
OSFXPRT520	—	1323.34	318.93	1642.28
OSFXSYSMAN520	66.73	15931.15	242.82	16240.70
OSFXVFB520	—	251.47	18.45	269.92
Totals	**151787.57**	**1455267.77**	**22295.23**	**1629350.57**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	151787.57	**1455267.77**	**22295.23**	**1629350.57**

Table A–2: Disk Space Requirements – Associated Products Vol. 1

Advanced Printing Software

Subset	root	/usr	/var	Total
APXADMIN110	—	4558.97	—	4558.97
APXBASE110	—	7536.11	95.00	7631.11
APXGUI110	—	14196.02	—	14196.02
APXGW110	—	1053.96	—	1053.96
APXSVR110	—	2420.56	—	2420.56
Totals	**—**	**29765.62**	**95.00**	**29860.62**

DEC C++ Class Libraries Version 4.0 for Tru64 UNIX

Subset	root	/usr	/var	Total
CXLLIBA520	—	224.93	—	224.93

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

DEC C++ Class Libraries Version 4.0 for Tru64 UNIX

Subset	root	/usr	/var	Total
CXLSHRDA520	—	283.37	—	283.37
Totals	**—**	**508.29**	**—**	**508.29**

Compaq Decimal RTL V2.6-46 for Tru64 UNIX

Subset	root	/usr	/var	Total
DCARTL270	—	2598.09	—	2598.09

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Compaq Decimal RTL V2.6-46 for Tru64 UNIX

Subset	root	/usr	/var	Total
O2ABASE270	—	1749.24	—	1749.24
Totals	**—**	**4347.32**	**—**	**4347.32**

Compaq Fortran RTL #394 for Compaq Tru64 UNIX Alpha Systems (f90 and f77)

Subset	root	/usr	/var	Total
DFARTL394	—	5045.49	—	5045.49
Totals	**—**	**5045.49**	**—**	**5045.49**

Compaq Pascal RTL V5.8-23 for Tru64 UNIX Systems

Subset	root	/usr	/var	Total
DPORTL580	—	1420.60	—	1420.60
Totals	**—**	**1420.60**	**—**	**1420.60**

Sort Library

Subset	root	/usr	/var	Total
SORLIB400	—	2521.32	—	2521.32
Totals	**—**	**2521.32**	**—**	**2521.32**

MERANT DataDirect

Subset	root	/usr	/var	Total
DAUDOC200	—	—	7207.04	7207.04
DAUJDBCODBC200	—	—	720.95	720.95
DAUODBCCON200	—	—	12305.73	12305.73
DAUSQLNKJAVA200	—	—	4738.95	4738.95
DAUSQLNKODBC200	33.32	—	20473.91	20507.23

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

MERANT DataDirect

Subset	root	/usr	/var	Total
DAUSQLNKSVR200	—	—	41444.28	41444.28
Totals	**33.32**	**—**	**86890.88**	**86924.20**

Development Enhancement Tools for Tru64 UNIX

Subset	root	/usr	/var	Total
CMPDEVENH520	—	274.18	—	274.18
Totals	**—**	**274.18**	**—**	**274.18**

Multimedia Services V3.3 for Compaq Tru64 UNIX

Subset	root	/usr	/var	Total
MMEDEV303	—	3428.22	—	3428.22
MMEDOC303	—	254.98	—	254.98
MMEDOCDEV303	—	4.00	—	4.00
MMEDRVEN-SONIQ303	—	755.03	—	755.03
MMEDRVMMSESS303	—	920.08	—	920.08
MMEDRVMSB303	—	1223.29	—	1223.29
MMEMANDEV303	—	1620.74	—	1620.74
MMEMANRT303	—	262.01	—	262.01
MMERELNOTES303	—	37.46	—	37.46
MMERT303	23.93	34099.78	11.23	34134.94
MMERTCDE303	—	446.34	—	446.34

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Multimedia Services V3.3 for Compaq Tru64 UNIX

Subset	root	/usr	/var	Total
MMERTSMPLDAT303	—	12390.19	—	12390.19
Totals	**23.93**	**55442.11**	**11.23**	**55477.27**

Netscape Directory Server

Subset	root	/usr	/var	Total
IAENDIR546	27.89	317553.38	140.39	317721.67
Totals	**27.89**	**317553.38**	**140.39**	**317721.67**

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSAACMENU520	—	—	—	—
IOSCABASE520	—	351.77	—	351.77
IOSCACDEAPPS520	—	2163.74	5.64	2169.38
IOSCACDEDEV520	—	321.19	—	321.19
IOSCACDEDT520	—	1214.21	—	1214.21
IOSCACDEMAIL520	—	90.00	—	90.00
IOSCACDEMIN520	—	587.83	—	587.83
IOSCADECW520	—	27.00	11.17	38.17
IOSCAX11520	—	435.76	41.30	477.06
IOSCAXDEV520	—	111.77	—	111.77
IOSCAXSYSMAN520	—	111.90	13.15	125.05
IOSCSBASE520	—	267.98	19.00	286.98
IOSCSCDEAPPS520	—	2087.60	5.58	2093.18
IOSCSCDEDEV520	—	157.87	—	157.87
IOSCSCDEDT520	—	1376.23	—	1376.23
IOSCSCDEMAIL520	—	83.71	—	83.71
IOSCSCDEMIN520	—	4015.83	—	4015.83
IOSCSDECW520	—	39.86	5.51	45.37
IOSCSX11520	—	1387.25	3.30	1390.55
IOSCSXDEV520	—	111.71	—	111.71

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSCSXSYSMAN520	—	110.68	6.41	117.09
IOSDEBASE520	—	370.54	—	370.54
IOSDECDEAPPS520	—	292.30	5.63	297.94
IOSDECDEDEV520	—	328.55	—	328.55
IOSDECDEDT520	—	1580.45	—	1580.45
IOSDECDEHLP520	—	20114.47	—	20114.47
IOSDECDEMAIL520	—	92.01	—	92.01
IOSDECDEMIN520	—	590.27	—	590.27
IOSDECHX11520	—	387.56	—	387.56
IOSDEDECW520	—	27.00	10.91	37.91
IOSDEX11520	—	1324.88	41.30	1366.18
IOSDEXDEV520	—	111.78	—	111.78
IOSDEXSYSMAN520	—	112.64	12.95	125.59
IOSELBASE520	—	161.67	—	161.67
IOSELCDEDT520	—	34.96	—	34.96
IOSELCDEMIN520	—	79.76	—	79.76
IOSELFONT100M520	—	1092.72	—	1092.72
IOSELFONT100P520	—	1080.35	—	1080.35
IOSELFONT75M520	—	933.73	—	933.73
IOSELFONT75P520	—	926.07	—	926.07
IOSELOLFONT520	—	2011.26	37.23	2048.49
IOSELX11520	—	105.84	3.30	109.14
IOSESBASE520	—	380.70	—	380.70
IOSESCDEAPPS520	—	280.66	5.63	286.29
IOSESCDEDEV520	—	325.20	—	325.20
IOSESCDEDT520	—	1580.91	—	1580.91
IOSESCDEHLP520	—	23991.44	—	23991.44
IOSESCDEMAIL520	—	91.19	—	91.19

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSESCDEMIN520	—	569.63	—	569.63
IOSESDECW520	—	27.00	11.14	38.14
IOSESX11520	—	1333.03	41.30	1374.33
IOSESXDEV520	—	111.80	—	111.80
IOSESXSYSMAN520	—	112.54	13.17	125.70
IOSFRBASE520	—	364.68	—	364.68
IOSFRBEX11520	—	393.38	—	393.38
IOSFRCAX11520	—	393.34	—	393.34
IOSFRCDEAPPS520	—	283.62	5.77	289.39
IOSFRCDEDEV520	—	312.71	—	312.71
IOSFRCDEDT520	—	1580.57	—	1580.57
IOSFRCDEHLP520	—	20426.95	—	20426.95
IOSFRCDEMAIL520	—	94.31	—	94.31
IOSFRCDEMIN520	—	570.44	—	570.44
IOSFRCHX11520	—	393.39	—	393.39
IOSFRDECW520	—	27.00	11.16	38.16
IOSFRX11520	—	1324.63	41.30	1365.94
IOSFRXDEV520	—	111.85	—	111.85
IOSFRXSYSMAN520	—	112.75	13.12	125.87
IOSHUBASE520	—	271.13	19.00	290.13
IOSHUCDEAPPS520	—	2101.33	5.62	2106.95
IOSHUCDEDEV520	—	174.58	—	174.58
IOSHUCDEDT520	—	1349.66	—	1349.66
IOSHUCDEMAIL520	—	86.40	—	86.40
IOSHUCDEMIN520	—	4063.31	—	4063.31
IOSHUDECW520	—	39.81	5.49	45.30
IOSHUX11520	—	1393.37	3.30	1396.67
IOSHUXDEV520	—	111.75	—	111.75

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSHUXSYSMAN520	—	111.12	6.35	117.48
IOSITBASE520	—	364.73	—	364.73
IOSITCDEAPPS520	—	2167.15	5.64	2172.79
IOSITCDEDEV520	—	324.26	—	324.26
IOSITCDEDT520	—	1492.74	—	1492.74
IOSITCDEHLP520	—	14543.11	—	14543.11
IOSITCDEMAIL520	—	94.21	—	94.21
IOSITCDEMIN520	—	576.85	—	576.85
IOSITDECW520	—	27.00	11.02	38.02
IOSITX11520	—	1356.90	41.30	1398.20
IOSITXDEV520	—	111.84	—	111.84
IOSITXSYSMAN520	—	112.79	13.37	126.16
IOSIWBASE520	—	462.94	3.30	466.24
IOSIWCDEDT520	—	132.30	—	132.30
IOSIWCDEMIN520	—	139.46	—	139.46
IOSIWFONT100M520	—	664.17	—	664.17
IOSIWFONT100P520	—	2157.05	—	2157.05
IOSIWFONT75M520	—	439.21	—	439.21
IOSIWFONT75P520	—	1901.38	—	1901.38
IOSIWOLFONT520	—	3038.24	62.44	3100.68
IOSIWX11520	—	1430.60	—	1430.60
IOSIWXDEV520	—	951.02	—	951.02
IOSJPABASE520	—	3573.46	—	3573.46
IOSJPAMANOS520	—	35.49	—	35.49
IOSJPAPXBASE520	—	894.53	—	894.53
IOSJPAPXGUI520	—	4370.98	—	4370.98
IOSJPBASE520	—	51723.05	89.16	51812.21
IOSJPBIN520	689.74	96.04	6.10	791.88

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSJPCDEAPPS520	—	709.79	—	709.79
IOSJPCDEDEV520	—	959.32	—	959.32
IOSJPCDEDT520	—	3292.29	—	3292.29
IOSJPCDEHLP520	—	32111.31	—	32111.31
IOSJPCDEHLP-SJIS520	—	32991.57	—	32991.57
IOSJPCDEMAIL520	—	298.32	—	298.32
IOSJPCDEMIN520	—	2132.68	104.13	2236.81
IOSJPDECW520	—	96.71	22.05	118.76
IOSJPDOSTOOLS520	—	666.00	—	666.00
IOSJPFONT100M520	—	12368.96	—	12368.96
IOSJPFONT100P520	—	12187.89	—	12187.89
IOSJPFONT75M520	—	8748.14	—	8748.14
IOSJPFONT75P520	—	8525.84	—	8525.84
IOSJPFONTM520	—	13715.83	—	13715.83
IOSJPLDBBASE520	—	2434.23	—	2434.23
IOSJPLSMX11520	—	2566.41	26.19	2592.60
IOSJPMANOS520	—	7460.34	—	7460.34
IOSJPMANWOS520	—	109.16	—	109.16
IOSJPNETSCAPE520	—	6140.54	—	6140.54
IOSJPPGMR520	—	2223.52	—	2223.52
IOSJPSDECDE520	—	27.88	—	27.88
IOSJPSYSMAN520	—	16494.47	—	16494.47
IOSJPTCRMAN520	—	794.10	—	794.10
IOSJPWNN520	9.57	20361.75	95.00	20466.32
IOSJPWNNPGMR520	—	1321.55	—	1321.55
IOSJPWNNSRC520	—	10789.49	—	10789.49
IOSJPX11520	—	2440.93	—	2440.93

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSJPXADMIN520	—	3675.97	—	3675.97
IOSJPXADVFS520	—	265.88	1986.47	2252.35
IOSJPXDEV520	—	142.54	—	142.54
IOSJPXSYSMAN520	—	17408.76	—	17408.76
IOSKOBASE520	—	14388.34	25.59	14413.92
IOSKOCDEAPPS520	—	204.91	5.60	210.51
IOSKOCDEDEV520	—	319.67	—	319.67
IOSKOCDEDT520	—	4754.60	—	4754.60
IOSKOCDEHLP520	—	11097.10	—	11097.10
IOSKOCDEMAIL520	—	137.24	—	137.24
IOSKOCDEMIN520	—	883.08	—	883.08
IOSKODECW520	—	48.22	5.49	53.71
IOSKOFONTM520	—	3896.31	—	3896.31
IOSKOFONTP520	—	9568.90	—	9568.90
IOSKOOLFONT520	—	6157.34	3.07	6160.42
IOSKOPGMR520	—	173.55	—	173.55
IOSKOX11520	—	2164.79	—	2164.79
IOSKOXDEV520	—	117.25	—	117.25
IOSKOXSYSMAN520	—	110.77	6.48	117.25
IOSLTX11520	—	182.64	3.30	185.94
IOSPLBASE520	—	271.10	19.00	290.10
IOSPLCDEAPPS520	—	2164.72	5.67	2170.40
IOSPLCDEDEV520	—	186.93	—	186.93
IOSPLCDEDT520	—	1278.66	—	1278.66
IOSPLCDEMAIL520	—	89.16	—	89.16
IOSPLCDEMIN520	—	4087.36	—	4087.36
IOSPLDECW520	—	39.81	5.55	45.36
IOSPLX11520	—	1407.32	3.30	1410.62

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSPLXDEV520	—	111.81	—	111.81
IOSPLXSYSMAN520	—	111.98	6.57	118.55
IOSRUBASE520	—	145.55	—	145.55
IOSRUCDEAPPS520	—	1954.42	—	1954.42
IOSRUCDEDT520	—	266.02	—	266.02
IOSRUDECW520	—	39.86	—	39.86
IOSRUX11520	—	1426.56	3.30	1429.86
IOSRUXDEV520	—	111.90	—	111.90
IOSSKBASE520	—	271.03	19.00	290.03
IOSSKCDEAPPS520	—	2147.96	5.58	2153.53
IOSSKCDEDEV520	—	275.63	—	275.63
IOSSKCDEDT520	—	1274.90	—	1274.90
IOSSKCDEMAIL520	—	86.22	—	86.22
IOSSKCDEMIN520	—	4053.73	—	4053.73
IOSSKDECW520	—	39.86	5.50	45.37
IOSSKX11520	—	1375.70	3.30	1379.00
IOSSKXDEV520	—	111.64	—	111.64
IOSSKXSYSMAN520	—	110.85	6.42	117.27
IOSSLCDEDT520	—	32.41	—	32.41
IOSSLX11520	—	193.75	3.30	197.05
IOSSVBASE520	—	364.67	—	364.67
IOSSVCDEAPPS520	—	283.13	5.56	288.69
IOSSVCDEDEV520	—	316.68	—	316.68
IOSSVCDEDT520	—	1523.08	—	1523.08
IOSSVCDEHLP520	—	14538.14	—	14538.14
IOSSVCDEMAIL520	—	86.24	—	86.24
IOSSVCDEMIN520	—	543.92	—	543.92
IOSSVDECW520	—	27.00	10.98	37.98

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSSVX11520	—	1332.54	41.30	1373.84
IOSSVXDEV520	—	111.59	—	111.59
IOSSVXSYSMAN520	—	109.08	12.71	121.78
IOSTHBASE520	—	884.16	22.29	906.45
IOSTHBIN520	565.72	12.20	6.10	584.01
IOSTHCDEAPPS520	—	159.14	5.67	164.82
IOSTHCDEDEV520	—	269.69	—	269.69
IOSTHCDEDT520	—	1027.15	—	1027.15
IOSTHCDEMAIL520	—	82.59	—	82.59
IOSTHCDEMIN520	—	481.34	—	481.34
IOSTHDECW520	—	39.69	5.65	45.34
IOSTHFONTM520	—	196.30	—	196.30
IOSTHOLFONT520	—	7382.06	123.70	7505.76
IOSTHPGMR520	—	132.45	—	132.45
IOSTHPRINT520	—	173.39	—	173.39
IOSTHX11520	—	1339.31	—	1339.31
IOSTHXDEV520	—	120.21	—	120.21
IOSTHXSYSMAN520	—	112.41	6.64	119.05
IOSTRBASE520	—	183.51	—	183.51
IOSTRCDEDT520	—	34.90	—	34.90
IOSTRCDEMIN520	—	79.76	—	79.76
IOSTRFONT100M520	—	1097.05	—	1097.05
IOSTRFONT100P520	—	4112.34	—	4112.34
IOSTRFONT75M520	—	944.16	—	944.16
IOSTRFONT75P520	—	3467.88	—	3467.88
IOSTROLFONT520	—	5455.58	102.34	5557.92
IOSTRX11520	—	130.47	3.30	133.77
IOSWWBASE520	23.70	69265.30	194.00	69483.00

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSWWBIN520	1229.00	130.22	12.20	1371.42
IOSWWBINCOM520	17.52	70.61	3.08	91.20
IOSWWBINUCS520	1679.51	6.09	3.05	1688.65
IOSWWEURLOC520	—	1499.38	—	1499.38
IOSWWFGC520	—	1500.93	—	1500.93
IOSWWFONTM520	—	702.40	—	702.40
IOSWWFONTP520	—	502.56	—	502.56
IOSWWLAT2FONT100M520	—	1178.66	—	1178.66
IOSWWLAT2FONT100P520	—	4363.28	—	4363.28
IOSWWLAT2FONT75M520	—	871.17	—	871.17
IOSWWLAT2FONT75P520	—	3805.77	—	3805.77
IOSWWLAT2OL-FONT520	—	5573.38	102.34	5675.71
IOSWWLAT4FONT100M520	—	1183.15	—	1183.15
IOSWWLAT4FONT100P520	—	4386.89	—	4386.89
IOSWWLAT4FONT75M520	—	885.65	—	885.65
IOSWWLAT4FONT75P520	—	3828.26	—	3828.26
IOSWWLAT9FONT100M520	—	2258.76	—	2258.76
IOSWWLAT9FONT100P520	—	3035.54	—	3035.54
IOSWWLAT9FONT75M520	—	1907.39	—	1907.39
IOSWWLAT9FONT75P520	—	2566.77	—	2566.77
IOSWWLAT9LOC520	—	1301.93	—	1301.93
IOSWWLATC-FONT100M520	—	1159.46	—	1159.46
IOSWWLATC-FONT100P520	—	2420.13	—	2420.13
IOSWWLATC-FONT75M520	—	985.95	—	985.95

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSWWLATC-FONT75P520	—	2029.76	—	2029.76
IOSWWLATCOL-FONT520	—	3660.26	62.14	3722.40
IOSWWMULE520	—	78813.57	—	78813.57
IOSWWMULESRC520	—	26973.76	—	26973.76
IOSWWOBSOLETE520	37.38	757.72	—	795.10
IOSWWPGMR520	—	301.89	—	301.89
IOSWWPHRASE520	517.90	586.35	6.10	1110.35
IOSWWPRINT520	—	1896.51	44.15	1940.66
IOSWWSVEDEV520	—	428.69	—	428.69
IOSWWSYSMAN520	—	716.84	4.78	721.62
IOSWWUDCOS520	532.70	2106.07	6.10	2644.87
IOSWWUDCWOS520	—	123.10	—	123.10
IOSWWX11520	—	3394.05	—	3394.05
IOSWWXDEV520	—	2470.82	—	2470.82
IOSWWXFR520	14.98	1221.74	3.49	1240.21
IOSZHBASE520	—	127972.94	—	127972.94
IOSZHBIG5520	169.86	250.41	3.05	423.31
IOSZHCNBASE520	—	4911.08	66.87	4977.95
IOSZHC-NCDEAPPS520	—	164.23	16.60	180.83
IOSZHCNCDEDEV520	—	327.53	—	327.53
IOSZHCNCDEDT520	—	11566.50	—	11566.50
IOSZHCNCDEHLP520	—	18520.48	—	18520.48
IOSZHCNCDE-MAIL520	—	95.91	—	95.91
IOSZHCNCDEMIN520	—	599.65	—	599.65
IOSZHCNLOC520	—	796.01	—	796.01

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSZHCONV520	82.17	75.51	3.05	160.73
IOSZHHKBASE520	—	4549.01	13.16	4562.17
IOSZHPGMR520	—	2495.57	—	2495.57
IOSZHSDECW520	—	131.48	16.30	147.78
IOSZHSFONTM520	—	3449.72	—	3449.72
IOSZHSFONTP520	—	27595.29	—	27595.29
IOSZHSOLFONT520	—	15013.72	6.19	15019.91
IOSZHSSYSMAN520	—	7905.03	19.12	7924.15
IOSZHSTCRBASE520	—	51.65	—	51.65
IOSZHSTTFONT520	—	117704.77	—	117704.77
IOSZHSTTFONTP520	—	85052.05	—	85052.05
IOSZHSX11520	—	2770.58	—	2770.58
IOSZHSXADMIN520	—	132.82	—	132.82
IOSZHSXDEV520	—	231.08	—	231.08
IOSZHSXSYSMAN520	—	120.82	—	120.82
IOSZHTDECW520	—	122.50	—	122.50
IOSZHTELEX520	135.98	6.10	3.05	145.13
IOSZHTFONTM520	—	9272.73	—	9272.73
IOSZHTFONTP520	—	25532.25	—	25532.25
IOSZHTOLFONT520	—	28158.10	6.20	28164.30
IOSZHTWBASE520	—	7526.92	9.86	7536.78
IOSZHTWCDEAPPS520	—	432.33	—	432.33
IOSZHTWCDEDEV520	—	624.00	—	624.00
IOSZHTWCDEDT520	—	10590.90	—	10590.90
IOSZHTWCDEHLP520	—	11918.55	—	11918.55
IOSZHTWCDE-MAIL520	—	221.17	—	221.17
IOSZHTWCDEMIN520	—	1373.69	—	1373.69

Table A–2: Disk Space Requirements – Associated Products Vol. 1 (cont.)

Tru64 UNIX Worldwide Language Support V5.1A

Subset	root	/usr	/var	Total
IOSZHTWLOC520	—	5579.95	—	5579.95
IOSZHTX11520	—	4920.26	—	4920.26
IOSZHTXDEV520	—	1030.30	—	1030.30
IOSZHX11520	—	5191.42	—	5191.42
Totals	**5705.72**	**1339233.72**	**3958.06**	**1348897.50**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	5790.86	**1756112.03**	**91095.56**	**1852998.46**

Table A–3: Disk Space Requirements – Associated Products Vol. 2

ARMTech Active Resource Management 1.0

Subset	root	/usr	/var	Total
ARMTBASE107	105.27	21978.16	194.48	22277.91
ARMTCPU107	3.05	150.07	—	153.12
ARMTDMN107	12.44	10171.94	—	10184.38
ARMTDOC107	3.05	11584.05	—	11587.11
ARMTGUI107	28.73	2480.86	—	2509.59
ARMTMAN107	3.05	849.51	—	852.56
ARMTPDB107	3.05	—	12357.07	12360.12
Totals	**158.64**	**47214.60**	**12551.55**	**59924.79**

Advanced Server for UNIX V5.1A

Subset	root	/usr	/var	Total
ASUADM510	—	27720.54	—	27720.54
ASUADMJP510	—	26249.39	—	26249.39
ASUBASE510	16.67	40047.81	—	40064.48
ASUMANJP510	—	543.25	—	543.25
ASUMANPAGE510	—	535.33	—	535.33
ASUSIA510	3.96	83.00	—	86.96

Table A–3: Disk Space Requirements – Associated Products Vol. 2 (cont.)

Advanced Server for UNIX V5.1A

Subset	root	/usr	/var	Total
ASUTRAN510	108.15	4199.61	3200.14	7507.90
Totals	**128.78**	**99378.94**	**3200.14**	**102707.86**

COM for Tru64 UNIX V2.0.1

Subset	root	/usr	/var	Total
CUEDEV201	—	10976.72	75.71	11052.44
CUEDOC201	—	5833.22	—	5833.22
CUEMAN201	—	83.07	—	83.07
CUERTS201	—	17531.46	3678.44	21209.90
Totals	**—**	**34424.47**	**3754.16**	**38178.63**

Collect for Tru64 UNIX

Subset	root	/usr	/var	Total
COLUTIL200	—	14758.26	—	14758.26
Totals	**—**	**14758.26**	**—**	**14758.26**

DECevent

Subset	root	/usr	/var	Total
DIABASE330	21.60	73736.47	606.00	74364.07
Totals	**21.60**	**73736.47**	**606.00**	**74364.07**

Extended System V Functionality

Subset	root	/usr	/var	Total
ESVFBIN200	—	21380.05	22.06	21402.12
ESVFMAN200	—	1993.31	—	1993.31
Totals	**—**	**23373.37**	**22.06**	**23395.43**

Free Software Foundation GNU Source for Tru64 UNIX

Subset	root	/usr	/var	Total
FSFEMACS520	—	65896.53	—	65896.53
FSFGZIPSRC520	—	1894.79	—	1894.79
FSFINDENTSRC520	—	1238.49	—	1238.49
FSFM4V14520	—	2739.14	—	2739.14

Table A–3: Disk Space Requirements – Associated Products Vol. 2 (cont.)

Free Software Foundation GNU Source for Tru64 UNIX

Subset	root	/usr	/var	Total
FSFPERL520	—	48052.74	—	48052.74
FSFRCSSRC520	—	1907.55	—	1907.55
Totals	**—**	**121729.24**	**—**	**121729.24**

Motif Version 2.1.30

Subset	root	/usr	/var	Total
DSKMOTIF21510	—	39406.44	—	39406.44
Totals	**—**	**39406.44**	**—**	**39406.44**

Legato NetWorker

Subset	root	/usr	/var	Total
LGTOCLNT601	—	90589.36	—	90589.36
LGTOMAN601	—	2181.55	—	2181.55
LGTONODE601	—	42481.00	—	42481.00
LGTOSERV601	—	57941.09	—	57941.09
Totals	**—**	**193193.00**	**—**	**193193.00**

Performance Manager for Tru64 UNIX

Subset	root	/usr	/var	Total
PMGRAPP520	—	411.37	—	411.37
PMGRGUI520	—	27149.46	5.65	27155.11
PMGRMAN520	—	53.77	—	53.77
PMGRUTIL520	—	3748.58	2293.77	6042.35
Totals	**—**	**31363.18**	**2299.42**	**33662.60**

Compaq Porting Assistant V3.0-1 for Tru64 UNIX

Subset	root	/usr	/var	Total
PRTBASE301	—	50552.06	—	50552.06

Table A–3: Disk Space Requirements – Associated Products Vol. 2 (cont.)

Compaq Porting Assistant V3.0-1 for Tru64 UNIX

Subset	root	/usr	/var	Total
PRTMAN301	—	18.45	—	18.45
Totals	**—**	**50570.51**	**—**	**50570.51**

PowerStorm 3x0 Support

Subset	root	/usr	/var	Total
3X0CONFIG521	—	—	—	—
3X0DEVICE521	—	49835.12	—	49835.12
3X0GLBASE521	—	9478.00	—	9478.00
Totals	**—**	**59313.12**	**—**	**59313.12**

PowerStorm 4D40T/4D50T/4D51T/4D60T Support

Subset	root	/usr	/var	Total
4DTCONFIG510	—	—	—	—
4DTGLBASE510	—	8725.06	—	8725.06
4DTGLEXAM510	—	13996.47	—	13996.47
4DTGLMAN510	—	2050.56	—	2050.56
4DTZE3510	—	27106.99	—	27106.99
Totals	**—**	**51879.09**	**—**	**51879.09**

Graphical Program Analysis Tools V3.1 for Compaq Tru64 UNIX

Subset	root	/usr	/var	Total
GPABASE314	—	47324.66	—	47324.66
GPALCLCLIENTS314	—	18172.43	—	18172.43
JAVJRE118	—	6629.07	—	6629.07
JAVJREOPT118	—	6068.14	—	6068.14
Totals	**—**	**78194.30**	**—**	**78194.30**

Secure Web Server and Administration Utility

Subset	root	/usr	/var	Total
IAEAPAD552	8.09	5648.34	—	5656.43
IAEAPCH552	11.83	21121.51	—	21133.34
IAEAPDOC552	—	9380.73	—	9380.73

Table A–3: Disk Space Requirements – Associated Products Vol. 2 (cont.)

Secure Web Server and Administration Utility

Subset	root	/usr	/var	Total
IAETOMCAT552	10.04	5193.27	7.71	5211.01
Totals	**29.95**	**41343.85**	**7.71**	**41381.51**

SysMan Software Manager

Subset	root	/usr	/var	Total
OSPSWMGR510	115.04	26217.87	—	26332.90
OSPSWMGRDOC510	44923.09	—	—	44923.09
OSPSWMGRMAN510	—	832.08	—	832.08
Totals	**45038.12**	**27049.95**	**—**	**72088.07**

Tru64 UNIX Retired Components

Subset	root	/usr	/var	Total
OSRETIREDTCL76520	—	3548.02	—	3548.02
OSRETIREDTK42520	—	3962.99	—	3962.99
Totals	**—**	**7511.01**	**—**	**7511.01**

Tru64 UNIX TruCluster(TM) Server Software T5.1A-8

Subset	root	/usr	/var	Total
TCRBASE520	956.63	79049.25	13469.54	93475.42
TCRMAN520	—	1884.01	—	1884.01

Table A–3: Disk Space Requirements – Associated Products Vol. 2 (cont.)

Tru64 UNIX TruCluster(TM) Server Software T5.1A-8

Subset	root	/usr	/var	Total
TCRMIGRATE520	—	2169.13	—	2169.13
Totals	**956.63**	**83102.38**	**13469.54**	**97528.55**

UniCensus

Subset	root	/usr	/var	Total
UNICEN448	—	—	2076.25	2076.25
Totals	**—**	**—**	**2076.25**	**2076.25**

Java JRE 1.1.8-10

Subset	root	/usr	/var	Total
DVTBASE210	—	39508.66	—	39508.66
JAVJRE118	—	6629.07	—	6629.07
Totals	**—**	**46137.73**	**—**	**46137.73**

Web-Based Enterprise Service

Subset	root	/usr	/var	Total
WEBESBASE400	—	136131.16	—	136131.16
Totals	**—**	**136131.16**	**—**	**136131.16**

Single Sign On for Windows 2000

Subset	root	/usr	/var	Total
SSODOC200	—	74.92	—	74.92
SSOW2K200	35.67	5995.93	—	6031.60
Totals	**35.67**	**6070.84**	**—**	**6106.51**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	46369.39	**1265881.91**	**37986.83**	**1350238.13**

A.2 Disk Space Required for RIS Areas

The Remote Installation Services (RIS) area for this release of the operating system requires approximately 3 MB of disk space. The space requirements are identified by product area in Table A–4.

Table A–4: Disk Space Required for RIS Areas

Product Area	512-Byte Blocks
Tru64 UNIX	1520760
Advanced Printing	29860
COM for Tru64 UNIX	38150
DEC C++ Class Libraries	73670
Compaq COBOL RTL	4317
Compaq Fortran RTL	4544
Compaq Pascal RTL	1421
Sort Library	2522
MERANT DataDirect	75141
Development Enhancement Tools	252
Multimedia Services 49213	49213
Netscape Directory Server	307670
Netscape FastTrack	172956
Worldwide Language Support	1170659
Advanced Server	101310
DECevent	74365
Extended System V Functionality	20334
GNU Source	106605
Motif	39407
Legato NetWorker	111861
Performance Manager	33660
Porting Assistant	50650
PowerStorm 3x0 Support	51348
PowerStorm 4DxxT Support	60541
Graphical Program Analysis Tools	75797
SysMan Software Manager	72089
Tru64 UNIX Retired Components	7287
TruCluster Server	92607
UniCensus	2225
Java JRE	39908

Table A–4: Disk Space Required for RIS Areas (cont.)

Product Area	512-Byte Blocks
Web-Based Enterprise Service	55986
Windows 2000 Single Sign On	5353
Total	2858534

A.3 Disk Space Required for Documentation

The Tru64 UNIX documentation set is provided in HTML and PDF format on the Tru64 UNIX *Software Documentation* CD–ROM. It requires approximately 127 MB of disk space, as follows:

- 89 MB for the HTML files
- 38 MB for the PDF files

B

Clearing Persistent Reservations on Disks Behind HSZ80 and HSG80 Controllers

TruCluster Server cluster members use persistent reservations to coordinate access to shared storage. These persistent reservations control access to devices and logical volumes, and are used to erect a barrier against any system that is not a member of the current cluster.

The base operating system does not know how to manage these persistent reservations. Attempts by the base operating system to access a disk that has a persistent reservation will return I/O error messages. All I/O attempts will fail.

If you boot (or reinstall) the base operating system on a system that attempts to access disks that were previously used by a cluster behind an HSZ80 or HSG80 controller, the base operating system might not be able to see the disks. This is most likely because the disk participated previously in a cluster, and one of the cluster members set a reservation on the disk to prohibit any other hosts (or noncluster members) on this shared bus from accessing the disk. The problem is that the reservation was not cleared when the cluster member or the cluster was shut down.

To remove the reservations, use the /usr/sbin/cleanPR clean command. The cleanPR script finds and clears all persistent reservations from the attached HSZ80 and HSG80 devices.

_____ **Caution** _____

Do not run the cleanPR script on a system that is in a cluster. You do not want to remove reservations that the running cluster is using to actively control disk access. Doing so can result in data corruption.

_____

There are two scenarios to consider. In the first scenario, you can boot a disk containing the base operating system and run the cleanPR command. In the second scenario, you are trying to install the base operating system on a disk

that is behind an HSG80 or HSZ80 controller, has a persistent reservation on it, and does not have an installed version of the base operating system.

For the first scenario, if you encounter persistent reservations when attempting to access storage that was previously used in a cluster, boot the operating system and enter the `/usr/sbin/cleanPRclean` command to clear the reservations.

The second scenario is more complex because you do not have a running version of the operating system from which you can run the `cleanP` script. However, the `cleanPR` script is on the Tru64 UNIX Operating System CD–ROM. Therefore, you can start the installation from CD–ROM, get to the single-user shell, and enter the `/usr/sbin/cleanPR clean` command to clear the reservations.

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