Tru64 UNIX

Release Notes for Version 5.1

Part Number: AA-RH8WB-TE

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Product Version: Tru64 UNIX Version 5.1

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.

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About This Manual

This manual contains release notes for the Tru64™ UNIX Version 5.1 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

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 5.1 *Technical Update* for any additional information not included in these notes. You can access the *Technical Update* from the following URL:

http://www.unix.digital.com/faqs/publications/pub_page/update_list.html

Reader's Comments

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- The full title of the book and the order number. (The order number is printed on the title page of this book and on its back cover.)
- 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 guide:

`%` `$`	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 provides brief descriptions of features that are new to the Tru64 UNIX operating system in this release or that have changed significantly from previous releases. Tru64 UNIX Version 5.1 is a functional release that includes the following enhancements:

- Operating system software that is scalable to very large configurations
- Performance improvements in many areas including file systems, storage management, and networking
- Enhanced reliability, availability, and serviceability features

In addition to these features, this release also includes the following specific enhancements:

- Support for the AlphaServer™ GS series of computers (Section 1.1)
- Memory troller (Section 1.2)
- Compaq Capacity on Demand (Section 1.3)
- Enhanced support for TruCluster Server Software (Section 1.4)
- Tcl/Tk Version 8.2 (Section 1.5)
- Support for Internet Protocol Version 6 (IPv6) (Section 1.6)
- Extended System V functionality (Section 1.7)
- Information on recompiling device drivers (Section 1.8)

1.1 Support for the AlphaServer GS Series

This release provides support for the AlphaServer GS series of computers, which includes the AlphaServer GS80, AlphaServer GS160, and AlphaServer GS320 systems. These are highly reliable, highly available, and highly scalable systems that provide unparalleled computing power. The AlphaServer GS series of computers enables you to quickly scale from 1 to 32 CPUs with up to 256 gigabytes of memory and to run multiple instances of different operating systems.

1.2 Memory Troller

This release introduces memory trolling. Memory trolling is a process of reading the system's memory to proactively discover and handle memory

errors. Currently, memory trolling is supported only on AlphaServer GS80, GS160, and GS320 systems.

A new tuning attribute (`vm_troll_percent`) enables you to manage memory trolling. This parameter is part of the kernel's `vm` subsystem. For systems that support memory trolling, use the `vm_troll_percent` attribute to enable, disable, and tune the trolling rate. You can change the rate at any time.

For more information on the memory trolling feature, see the *System Administration* guide.

1.3 Compaq Capacity on Demand

This release supports Compaq Capacity on Demand (CCoD) on GS140E, GS160, and GS320 systems. CCoD allows you to enable additional processing capacity, subject to hardware availability.

CCoD kits are available on a CD-ROM and from the World Wide Web. You can find additional information and download the CCoD kit from the following URL:

http://www.compaq.com/alphaserver/cod

After you obtain the kit, use the `setld` command to install the following software subset:

```
CODBASE400    Capacity On Demand
```

See the *Installation Guide* for information on installing optional software. Instructions for configuring and using CCoD are included in the kit.

1.4 Support for TruCluster Server

TruCluster Server Version 5.1 is a separately licensed product that ships on the *Associated Products* CD-ROM Volume 2. It is a highly integrated synthesis of Tru64 UNIX software, Compaq AlphaServer systems, and storage devices that operate as a single system. A TruCluster Server cluster acts as a single virtual system, even though it is made up of multiple systems. Members of the cluster can share resources, data storage, and clusterwide file systems under a single security and management domain, yet they can boot or shut down independently without disrupting the cluster.

Like the TruCluster Available Server Software and Compaq TruCluster Production Server products available on the Version 4.0 stream of the operating system, TruCluster Server lets you deploy highly available services that can access their disk data from any member in the cluster. Any application that can run on Tru64 UNIX can run as a highly available,

single-instance application in a cluster. The application is automatically relocated (failed over) to another cluster member in the event that a required resource, or the current member itself, becomes unavailable.

Like the Compaq TruCluster Production Server Software product, TruCluster Server lets you run components of distributed applications in parallel, providing high availability while taking advantage of cluster-specific synchronization mechanisms and performance optimizations.

TruCluster Server Version 5.1 provides the following features:

- Support of the AlphaServer GS320, GS160, and GS80 systems.
- TruCluster Server Version 5.0A supports concurrent, asynchronous direct I/O from applications running locally on the member that is the cluster file system (CFS) server of the file systems the application uses. All remote direct I/O requests to these file systems went across the cluster interconnect to the CFS server.

  TruCluster Server Version 5.1 allows remote CFS clients, as well as applications local to the CFS server, to read and write directly to the file systems opened for direct I/O. That is, regardless of which member originates the I/O request, direct I/O to a file does not go through the cluster interconnect to the CFS server.
- Software infrastructure required to support rolling upgrades and patches. If you have TruCluster Server Version 5.0A installed on your system, you can perform a rolling upgrade to Version 5.1. You can also roll patches onto a Version 5.1 cluster.

See the TruCluster Server *Technical Overview* for more information on these features.

1.5 Tcl/Tk Version 8.2

This release contains Tcl/Tk Version 8.2 and TclX/TkX Version 8.1. See the `tcl`(1) reference page for Compaq's support policy. For information on older versions of Tcl/Tk, see Section 2.2.21.

1.6 Internet Protocol Version 6 Support

This release contains Internet Protocol Version 6 (IPv6) support for Transmission Control Protocol (TCP), User Datagram Protocol (UDP), and raw sockets, and IPv6 support for commands and utilities. This support is for those customers who want to start using IPv6 today and for those who want to test or experiment with IPv6. This support is in addition to the IPv4 support already in Tru64 UNIX.

The operating system supports the following:

- IPv6 base protocol and addressing specifications
- Internet Control Message Protocol (ICMP) for IPv6
- Path MTU Discovery for IPv6
- Stateless Address Autoconfiguration
- Neighbor Discovery
- RIPng for IPv6
- Transition mechanisms for IPv6 hosts and routers
- DNS extensions to support IPv6 and DNS dynamic updates
- Basic IPv6 application programming interfaces (APIs)
- Resource ReSerVation Protocol (RSVP)
- IPv6 over Ethernet, Fiber Distributed Data Interface (FDDI), and Point-to-Point Protocol (PPP)

See the *Network Administration* manual for IPv6 configuration instructions.

See the Software Product Description (SPD) for a list of supported Internet specifications, RFCs (Request for Comments), and Internet drafts (works in progress).

See the *Network Programmer's Guide* for information on using AF_INET6 sockets.

Not all components of the operating system support IPv6. See the *Technical Overview*for a list of commands that support IPv6. For layered products and third-party software, contact your vendor.

1.7 Extended System V Functionality

System V functionality in the operating system has been extended in some existing commands and library functions to include System V formatted output, and support for System V options. A number of new utilities are also supported, most notably the `sar` and `truss` utilities.

The Extended System V Functionality kits are provided in the following subsets on the Associated Products CD–ROM (APCD):

- `ESVFBIN100` - Binaries
- `ESVFMAN100` - Reference pages

If you choose to install the Extended System V Functionality kit, it is installed into the `/usr/opt/svr4` directory. The Extended System V Functionality kit will not conflict with the operating system software or documentation. For installation and configuration details, see the `ESVF_README.txt` file in the `/usr/opt/svr4/doc` directory.

1.8 Device Drivers Must Be Recompiled

The following changes were made to the buffer structure (`struct buf`) in `sys/buf.h` that require device driver developers to recompile their code under this release:

- Buffer `b_lblkno` and `b_blkno` structure elements were recast to `daddr64_t` (long) in `struct buf` to support future 64 bit block addressing.

  Note that this change may require recasting of device driver variables to be compatible with the above elements.

- Storage was added in `struct buf` for I/O statistics (feed back for file systems). The `drv_handle` field was added for storage and padded out to the next memory bucket.

1.9 Additional Changes

The following sections provide brief descriptions of additional changes included in this version of the Tru64 UNIX operating system software.

1.9.1 Change to pax, tar, and cpio for Standards Compliance

A minor change has been made to the `pax` command to maximize conformance with Version 2 of the X/Open System Interface. This change affects the `pax`, `tar`, and `cpio` commands.

When a user other than the root user extracts a file from an archive on top of a preexisting file of the same name, the existing file is no longer removed first.

1.9.2 Large Shared Memory Segments Support

This release supports System V shared memory segments greater than 2 GB as defined by the UNIX 98 branding standard. To make use of the full 64–bit shared-memory segment size, you must recompile applications with `_XOPEN_SOURCE` defined to be greater than or equal to 500. For example:

```
system> cc -D_XOPEN_SOURCE=500 ...
```

Without the `-D_XOPEN_SOURCE=500` flag the system defaults to the UNIX 95 branding standard, which supports only 2 GB of shared memory segments.

1.9.3 Event Management

This release provides many enhancements to the Event Manager (EVM) subsystem, including the following:

- Improvements to the filter syntax, including English keywords, such as `and` and `not`
- The ability to select events by age
- Easier selection of events to be logged, using new include and exclude keywords in the EVM logger's configuration file
- Support for filtering by age in the event viewer
- The new `-A` option that allows you to retrieve, sort, and display events with a single command rather than a pipeline
- Improvements in the programming interface and log file encapsulation tools

1.9.4 New Division of Privileges Capabilities

The SysMan Division of Privileges (DOP) facility allows a system administrator to authorize specific users or groups to perform system management operations (actions) that require root privilege.

Management actions are associated with specific privileges and the Configure Division of Privileges (DOP) application is used to grant these specific privileges to users and groups. DOP is discussed in more detail in the *Security* guide and the `dop`(8) reference page.

The Manage DOP Actions is a new facility. This application allows the administrator to define new actions and their required privileges.

You can start the Configure Division of Privileges (DOP) and Manage DOP Actions from the Security branch of the SysMan Menu or from the command line, as follows:

```
# sysman dopconfig
# sysman dopaction
```

Compaq recommends that you do not use the Manage DOP Actions facility to modify the DOP actions that are supplied with the operating system. If you do, the system management facilities integral to the Tru64 UNIX system might fail.

1.9.5 Bootable Tape Supports LSM

In this release, the bootable tape utility (`btcreate`) has been upgraded to support the Logical Storage Manager (LSM). For more information, see the `btcreate`(8) reference page and the *System Administration* guide.

1.9.6 FDDI Device Driver

The Fiber Distributed Data Interface (FDDI) driver has been modified to improve scalability and overall system performance. This modification might change performance characteristics for certain benchmark tests, depending on how the driver is used. You can restore previous driver behavior by modifying the FDDI `minimal_isr` system attribute. See the `sys_attrs_fta`(5) reference page for more information.

1.9.7 DNS/BIND Enhancements

The Domain Name System (DNS) has been upgraded to Version 8.2.2 of the Berkeley Internet Name Domain (BIND) service in this release.

This version of BIND includes support for dynamic updates of the master database, as well as support for private key encryption of dynamic updates and zone transfers. For more information about these new features, see the *Network Administration* guide.

1.9.8 NTP Enhancements

The Network Time Protocol has been upgraded to Version 4.98a in this release of the operating system. New features in this version of NTP include:

- A burst mode that results in better accuracy with the intermittent connections typical of PPP and ISDN services
- Two new association modes (`manycastserver` and `manycastclient`) based on multicast technology that provide for automatic discovery and configuration of servers and clients
- Improved logging support

For more information about these features, see the `ntp.conf`(4) reference page.

1.9.9 IMAP Server Enhancements

The IMAP mail server has been updated from Version 1.5.19 to Version 1.6.19 in this release of the operating system.

Starting with this release, the IMAP files in the `quota` and `user` configuration directories, and optionally, the users' mail directories in the IMAP mail spool, are stored in subdirectories `a` through `z`, sorted by the first character of each user name. This arrangement reduces the number of entries in a given directory and consequently increases performance and scalability.

If you are running the IMAP server from a previous version of the operating system, and you are upgrading to Tru64 UNIX Version 5.1, you must convert your `quota` and `user` configuration directories to the new format. Optionally, you can sort your IMAP mail spool in the same manner by enabling the `hashimapspool` option in the `/etc/imapd.conf` file before converting your configuration directories. See `imapd.conf`(4) for more information.

To convert your directories to the new format, use the `dohash` utility. See `dohash`(8) for more information.

1.9.10 Account Management Enhancements

This section provides information on enhancements to the Account Management applications.

1.9.10.1 Filtering Added to the SysMan Account Management Task

The Account Management task on the SysMan Menu has been enhanced to support filtering of user accounts. Now you can filter down to the accounts you are interested in viewing. For example, you can apply filters to show all accounts that match a pattern and to show all accounts in a specific group.

1.9.10.2 Enhanced Security Features

Previously you could not use Account Management tools (`dxaccounts` and `userdel`) to delete the user accounts under the enhanced security environment. Now you can delete user accounts, as well as retire them. When you delete an account, it is removed from the `/etc/passwd` file and from the enhanced security `authcap` (protected password) database.

In previous releases the Account Management tools (`dxaccounts`, `useradd`, and `usermod`) under the enhanced security environment supported only administratively locked accounts. Disabled accounts were not supported. Accounts could be disabled due to password expiration, number of login failures, and other causes when running under the enhanced security. There was no straightforward way to clear disabling conditions to enable login.

Now, on systems running enhanced security, the `dxaccounts` application displays a list of users with the disabled status, as well as the locked status. Additionally, an Enable menu item allows you to set the grace period to clear any disabling conditions.

1.9.11 File System Enhancements

This section provides information on enhancements to Tru64 UNIX file systems.

1.9.11.1 AutoFS

This release provides a new feature, AutoFS, that you can use to automatically and transparently mount and unmount NFS file systems on an as-needed basis.

AutoFS is similar to the existing Automount feature; however, it provides increased efficiency and higher availability, with certain restrictions. AutoFS is also supported by the TruCluster Server Software.

For more information about AutoFS, see Section 5.4.1of this manual, the *Network Administration* guide, and the `autofsd`(8) and `autofsmount`(8) reference pages.

1.9.11.2 Digital Versatile Disk File System

This release supports the Digital Versatile Disk File System (DVDFS), which enables the reading of disks formatted in the Universal Disk Format (UDF). These interfaces conform to the ISO/ITEC 13346:1995 and ISO 9660:1988 standards.

See the `dvdfs`(4) reference page for more information.

1.9.11.3 Changes to the mount and statfs System Calls

To support additional mount flags, the `mount` structure's `m_flag` field has changed from 32 bits to 64 bits. Applications that pass a 32–bit flag field using the `mount` system call will continue to work.

Additionally, the `statfs` structure, which is used to query a file system's mount flags, now uses one of its previously spare fields to report this information. The new field is the `f_flags2` field. The `f_flags` field will continue to report back 32–bits of data; the `f_flags2` field will report back the complete 64–bits of data.

Currently, attempts to set invalid mount flags via the `mount` system call are silently ignored.

1.9.11.4 UFS File System Extension

You can now extend UFS file systems to a larger size using the `extendfs` command for unmounted file systems and the `mount` command for mounted file systems. The file system extension functionality provided by these commands allows for easier file system growth than traditional tools, such as `dump`, `newfs`, and `restore`.

You can also extend UFS file systems that exist on Logical Storage Manager (LSM) volumes by first extending the LSM volume.

See the *System Administration* guide and the extendfs(8) and mount(8) reference pages for information.

1.9.12 Development Environment Enhancments

This section provides information on enhancements to the developement environment.

1.9.12.1 Enhancements to the acreate Function

The MEM_NONCONCURRENT flag has been added to the list of supported flags for the acreate() function. This flag can provide a performance enhancement for multithreaded applications that are willing to guarantee that no two threads will access the arena at the same time, for any purpose. See the acreate(3) reference page for more information.

The new nacreate() function is available for those applications that want to specify NUMA memory allocation attributes to be associated with an arena. See the nacreate(3) reference page for more information.

1.9.12.2 Spike Post-Link Optimizer

Spike is a new tool for performing code optimization after linking. It is a replacement for om and does similar optimizations. Because it can operate on an entire program, Spike can do optimizations that cannot be done by the compiler.

Some of the optimizations that Spike performs are code layout, deleting unreachable code, and optimization of address computations. Spike is most effective when it uses profile information to guide optimization.

Spike can process binaries linked on Tru64 UNIX Version 4.0 or later systems. Binaries that are linked on Version 5.1 or later systems contain information that allows Spike to do additional optimization.

Like om, Spike can be invoked as part of the compilation process, by specifying the -spike option with the cc (or the cxx, f77, or f90 command, if the associated compiler is installed). In addition, Spike can be invoked on the command line by applying the spike command to a binary file after compilation. For more information, see the spike(1) reference page.

1.9.12.3 Changes in the Assembly Process of the as and cc Commands

The assembler component that is invoked with the as and cc commands has been reimplemented in this release. No changes to the user environment or source code are necessary due to this change.

The following switches have been added to the as and cc commands:

- `-oldas` specifies to use the old assembler for this assembly
- `-newas` specifies to use the new assembler for this assembly

By default, both the `as` and `cc` commands use the new assembly process. You can invoke the old process by using the `-oldas` switch. If multiple switches are presented to the assembly process, both the `as` and `cc` commands use the last switch seen.

1.9.13 Advanced Printing Software Version 1.1

This release contains an updated version of the Advanced Printing Software, which includes the following enhancements:

- Support for configuring spoolers and supervisors as highly available applications in a TruCluster Server environment
- Support for the use of LDAP as a name service
- Support for new printers

See the online Technical Updates for TruCluster and LDAP configuration information and for a list of the newly supported printers.

1.9.14 Performance Manager

The Performance Manager agent (`pmgrd`) now ships on the base operating system as an SNMP subagent. The agent installs with the `snmpd` daemon and is started automatically with the SNMP agent.

1.9.15 New Options for Collect

You can configure the Collect utility to suspend and resume based on the amount of available free disk space. The Collect utility monitors free disk space with the `-M` option. The Collect utility suspends writing to disk when free disk space falls below a declared threshold and resumes when free space rises above the threshold.

You can also configure the Collect utility to flush buffered data to disk at a user-defined interval, using the `-W` option to set the number of write instances and the time interval.

For more information, see the `collect`(8) reference page.

1.9.16 Perl Upgraded to Version 5.005

Perl has been upgraded from Version 5.00404 to Version 5.00503. The Perl software consists of the minimum runtime subset (`BINPERL510`) and the runtime subset (`OSFPERL510`).

1.9.17 Windows System Software Enhancements

The following notes provide information on enhancements to the windows system software.

1.9.17.1 Change to X Server Behavior for Graphic Drivers

The X server has been modified to correctly handle the `-onlyScreen` and `-disableScreen` command line options. The `-onlyScreen` option now works with a screen other than 0 and the `-disableScreen` option now allows other screens to work when screen 0 is disabled. For more information on these command line options, see the `Xdec`(1X) reference page.

1.9.17.2 CDE and Motif Applications Can Run in UTF-8 Locales

CDE and Motif applications can run in UTF-8 locales, as well as traditional UNIX locales. In this release, UTF-8 locales have been added for Chinese, Japanese and Korean. See the `l10n_intro`(5) for a list of the UTF-8 locales available for other languages.

A restriction remains in effect for the `dxterm` application, which does not support UTF-8 locales for any language.

For existing CDE and Motif applications, the operating system supports UTF-8 locales through codeset conversion. That is, localization data files that already exist for the application in another locale (for example, a Latin-1 locale) are converted to UTF-8 when the user runs the application. Programmers creating new CDE and Motif applications can choose to use the codeset conversion strategy to support UTF-8. Alternatively, they can support UTF-8 directly by creating the following directories with corresponding localization data files:

- Message catalog files:

  `/usr/lib/nls/msg/`*`locale_name`*`/`*`file_name`*

- Reference pages:

  `/usr/share/`*`locale_name`*`/man/man`*`N`*`/`*`file_name`*

- Resource files:

  `/usr/lib/X11/`*`locale_name`*`/app-defaults/`*`file_name`*
  `/usr/dt/app-defaults/`*`locale_name`*`/`*`file_name`*

- The `uid` files:

  `/usr/lib/X11/`*`locale_name`*`/uid/`*`file_name`*

- CDE Action/Datatyping files:

  `/usr/dt/appconfig/types/locale_name/file_name`

- CDE Help files:

/usr/dt/appconfig/help/*locale_name*/*file_name*

- CDE Style Manager Backdrop and Pallet name files:

  /usr/dt/backdrops/desc.*locale_name*
  /usr/dt/palettes/desc.*locale_name*

- The mwm configuration file:

  /usr/lib/X11/locale_name/system.mwmrc

1.9.17.3 Improved Size 2 Terminal Font

This release includes an improved CDE Size 2 terminal font. If you use Font Size 2 as your default font size on a CDE-based workstation, you might notice a change in the fixed-width font.

The old font, 100dpi/lutRS08.pcf.Z, was not hand-tuned and is characterized by poorly formed characters and unintelligible diacritical marks (accents). The new font, 75dpi/lutRS12.pcf.Z, is one pixel taller per line and has the same width as the older font. Even though the new font was designed for 75dpi use, it is more regular and readable at all monitor resolutions because it was hand-tuned for use on display terminals.

Additionally, the 75dpi/lutRS12.pcf.Z font was improved for this release. Previously, the plus sign (+), hyphen (–), equal sign (=), underscore (_), division sign (÷), and plus-minus (±) characters ran together when placed next to one another. For this release, those characters have been modified so as to not run together.

Both the old and new fonts are present in previous and current releases. Both fonts are from the Lucida Typewriter family, which is a monospaced font. The old size 2 font (100/lutRS08.pcf) is 11 pixels tall, whereas the new size 2 font (75/lutRS12.pcf) is 12 pixels tall. Neither of these fonts is restricted to use with 75dpi or 100dpi monitors. They can be used with displays of any resolution.

If you prefer the older font and want to restore that behavior, save and restore a copy of the /usr/dt/config/xfonts/C/fonts.alias file from any Version 4.0 release. This file associates logically named CDE fonts with actual font files. After you restore the older version of this file, you must log out and log back in using the CDE Session Manager Dialog to restore the old font behavior.

1.9.17.4 Motif Version 2.1

Motif Version 2.1 is included on the Associated Products CD–ROM as an Advanced Developer's Kit (ADK). The new features available with Motif Version 2.1 include: thread-safe libraries, widget printing support, and internationalization enhancements. New widgets have also been added.

This version does not contain any of the Compaq enhancements that are present in the default Motif Version 1.2. This is particularly true in the area of internationalization enhancements and input method server support. Therefore, the two versions of Motif are not fully compatible with each other. Motif Version 2.1 is intended to coexist with Motif Version 1.2.

See the `README` file for more information.

1.9.18 GNU M4 Version 1.4

This release includes GNU M4 Version 1.4. You can invoke the GNU M4 preprocessor by using the `/usr/opt/alt/usr/bin/m4` command.

1.9.19 Netscape Communicator

This release of Tru64 UNIX contains Netscape Communicator Version 4.72. 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 Section 5.1.5.

2

Features and Interfaces Scheduled for Retirement

This chapter provides information on Tru64 UNIX 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 sections provide information on features that have been retired in this release. These changes were announced in previous releases. For information on features retired in previous releases, see the *New and Changed Features from Previous Releases* on the Version 5.1 *Software Documentation* CD–ROM.

2.1.1 DECwindows Applications

The following DECwindows utilities and tools have been retired from Tru64 UNIX. These dx* tools and utilities, commonly known as DECwindows, have been replaced by the dt* tools in Common Desktop Environment (CDE) that were introduced in Version 4.0. The replacement applications are listed in Table 2–1. Not all of the dx* applications that have been retired have a replacement due to the limited use or capability of that specific tool or utility.

Table 2–1: Retired DECwindows Applications

Retired Tools/Utilities	Replacement Option(s)
dxmail	dtmail
dxprint	None
dxcalendar	dtcm
dxcalc	dtcalc, xcalc
dxclock	Front Panel, xclock
dxpaint	dticon/dtstyle, bitmap
dxnotepad	dtpad

Table 2–1: Retired DECwindows Applications (cont.)

Retired Tools/Utilities	Replacement Option(s)
dxbook	dthelpview, Netscape
dxcardfiler	None
dxsession	xdm, dtsession
dxvdoc	ghostview
libids	None

It is recommended that you migrate to the dt* tools and utilities or other options as soon as possible.

The CDA applications in Table 2–2 have also been retired.

Table 2–2: Retired CDA Applications

caspar	cdoc	ctod
ddifanls	ddifps	ddiftext
dtifanls	dtifddif	dtoc
textddif	vdoc	libcapsar
libcda	libcda_be	libcda_fe
libddif	libddif_be	libddif_fe
libimg	libdvs	libids_nox

2.1.2 DEC C Compiler Default Changed from -std0 to -std

The default language mode for the Tru64 UNIX C compiler has changed from `-std0` to `-std`.

You can revert to the previous default language mode by adding the `-std0` flag to the `cc` command line, the `/usr/ccs/lib/cmplrs/cc/comp.config` file, or the `$DECC_CC` environment variable definition.

2.1.3 Sendmail Version 5.65

The `sendmail` Version 5.65 utility has been retired.

This version of the operating system includes `sendmail` Version 8.9.3. The `sendmail` Version 8.9.3 Server provides advanced features such as the following:

- Masquerading Virtual Domain Hosting
- Virtual Domain Hosting

- Restricted Relaying

These features can be configured using the web-based Mail Configuration Utility provided by Compaq's *Open Source Software Collection*, included with your kit.

For more information on `sendmail` Version 8, see the reference pages and documentation provided with the operating system, as well as *Sendmail* by Bryan Costales and Eric Allman, published by O'Reilly & Associates, Inc.

2.1.4 MH/POP

The Post Office Protocol (POP) service provided as part of the Rand Mail Handler (MH) subset (`OSFMH`) has been retired from the operating system. The following components were associated with this service:

- `/usr/lib/mh/spop`
- `/usr/lib/mh/popauth`
- `/usr/lib/mh/popd`
- `/usr/lib/mh/popaka`
- `/usr/lib/mh/popwrd`

The replacement for this functionality was provided in Tru64 UNIXVersion 5.0. This new service is an implementation based on Qualcomm's public domain POP3 service, known as `popper`. Its components are as follows:

- `/usr/sbin/pop3d`
- `/usr/bin/mailauth`
- `/usr/bin/popcv`

It is important that you migrate all your existing MH/POP users to this new service. If you do not, run-time errors will occur because the old service no longer exists. Use the existing `mailcv`(1) and `popcv`(8) utilities to migrate existing MH/POP information into the new service.

The new service is the default.

2.1.5 The cc.alt Compiler

Previous releases provided an Alternative C Compiler and associated development tools (known as the `cc.alt` compiler), which shipped in the CMPDEVALT subset on the *Associated Products Volume 1* CD–ROM. The `cc.alt` compiler was intended to deliver run-time performance improvements, using more recent compiler components than the corresponding Tru64 UNIX base operating system tools.

The cc.alt compiler is no longer provided with your kit. However, if you want a more recent compiler, you can download the Developers' Toolkit Supplement C compiler from the following URL:

http://www.unix.digital.com/dtk

Unlike the cc.alt compiler, after you install the DTK Supplement compiler, you invoke it using the cc command; it is documented in the cc(1) reference page.

After you install the DTK Supplement compiler, you invoke the regular base operating system C compiler using the cc -nodtk command; it is documented in the cc-notdk(1) reference page.

The DTK Supplement compiler is a fully supported, free upgrade for all users with an active Developers' Toolkit license. From time to time, the DTK web site might also include Advanced Development Kits, which will provide even more recent compiler components.

2.1.6 System V Environment

Tru64 UNIX provides 80 percent of the System V Interface Definition (SVID) standard, as verified by the SVVS 3 and SVVS 4 test suites. As a result, Tru64 UNIX contains a substantial number of System V Release 4 (SVR4) features and delivers the highest composite SVR4 conformance of any implementation. SVR4 functionality will be further expanded in the base operating system when the System V Environment reengineering is complete, eliminating the need for the layered product. A migration plan for upgrading to the appropriate version of the Tru64 UNIX base operating system has been developed to assist customers who currently use the System V Environment layered product. The System V Environment (SVE) product is not available as a separately licensed layered product with the Tru64 UNIX family. Instead, many of its features are being reengineered and will be merged into the operating system in future releases.

2.1.7 Assembler binasm Interface

The assembler component that is invoked from the as and cc commands has been reimplemented in this release. The new assembler component does not support the binasm interface that was utilized by the older assembler.

The binasm interface defined the contents of the intermediate file used to pass information from the first pass (as0) to the second pass (as1) of the old assembler. It was possible to produce this binasm interface file and to pass it to as1 as the input file. This interface was meant to be used by other compilers or language processors.

The identified users of the `binasm` interface are no longer using it. Therefore, the retirement of this support should not affect existing Compaq customers.

Note that in this release of the operating system, the old assembler is still distributed, even though it is no longer the default assembler.

2.1.8 NL*/NC* libc Interfaces

The NL*/NC* `libc` interfaces, which are a set of obsolete and undocumented internationalization-related APIs, have been retired in this release. This set of OSF/1 proprietary `libc` APIs are superseded by the Worldwide Portability Interface (WPI) based on the XPG4 standard that was introduced in DIGITAL UNIX Version 2.0.

The following table provides a list of the APIs that have been removed from the system:

NCchrlen	NCcollate	NCcoluniq	NCdec
NCdechr	NCdecode	NCdecstr	NCenc
NCencode	NCflatchr	NCencstr	NCisNLchar
NCisalnum	NCisalpha	NCiscntrl	NCisdigit
NCisgraph	NCislower	NCisprint	NCispunct
NCisspace	NCisupper	NCisxdigit	NCstrlen
NCtolower	NCtoupper		
NLasctime	NLcatgets	NLcatopen	NLchrlen
NLctime	NLflatstr	NLfprintf	NLgetamsg
NLisNLcp	NLprintf	NLsprintf	NLstrchr
NLstrcmp	NLstrcpy	NLstrdlen	NLstrlen
NLstrncpy	NLstrtime	NLvfprintf	NLvsprintf
NLyesno	_NLxcolu		

2.1.9 POSIX Threads CMA Interface

The CMA interface of POSIX Threads (formerly DECthreads) has been retired and is no longer supported in Tru64 UNIX. Compaq recommends that you port your CMA-based application to the IEEE Std 1003.1-1996, POSIX System Application Program Interface provided by POSIX Threads Library.

2.1.10 OSF/Motif Version 1.1.3

Motif 1.1.3, which previously installed under the `/usr/shlib/_null` directory, has been retired in this release. Motif 1.2.4 has been the default version of Motif since the Version 4.0 release.

2.2 Features and Interfaces Scheduled for Retirement in Future Releases

This section provides 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 POSIX 1003.4a (Draft 4) pthread Routines in the POSIX Threads Library

The POSIX 1003.4a, Draft 4 interface of POSIX Threads (formerly DECthreads) will be retired in a future release of Tru64 UNIX. Applications that were written using the POSIX 1003.4a, Draft 4 API should be migrated to the IEEE Std. 1003.1-1996, POSIX System Application Program Interface provided by POSIX Threads. The POSIX 1003.1c standard interface is the most portable, efficient, and powerful programming interface offered by POSIX Threads. A compatibility mode for the POSIX 1003.4a, Draft 4, API has been provided to ease migration. This compatibility mode will be removed in a future release.

2.2.2 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.

2.2.3 Asynchronous I/O Binary Compatibility

Data structures for asynchronous I/O, such as `aio_read()` and `aio_write()`, changed between Version 3.2 and Version 4.0 of the operating system. The kernel currently handles these differences so that applications built under Version 3.2 continue to run when executed on Version 4.0x.

In the next major release of the operating system, support for applications built under Version 3.2x using asynchronous I/O will be discontinued. You will need to recompile and relink these applications to run under Tru64 UNIX Version 4.0D or higher.

2.2.4 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.

Note that 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.

2.2.5 XIE Version 3.0 X Client Extension

Tru64 UNIX Version 4.0G 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.

2.2.6 The atmsetup Script

The `atmsetup` script introduced in Version 4.0D of the operating system has been superseded by a new application. The new application is part of the SysMan suite, and provides a full graphical user interface. The `atmsetup` command now invokes the new SysMan application.

You can access the `atmsetup` script by including the `-old` flag with the `atmsetup` command.

The `atmsetup` script will be retired in a future release of Tru64 UNIX.

For more information on how to use the new `atmsetup` application, see the `atmsetup`(8) reference page and the *Asynchronous Transfer Mode* guide.

2.2.7 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.

2.2.8 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.

2.2.9 ATM IP Switching Will Be Retired

Tru64 UNIX 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.

2.2.10 The ogated Routing Daemon

The `ogated` daemon (the old version of the `gated` routing daemon) will be retired in a future release of Tru64 UNIX. 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.

2.2.11 DEC Ada RTL

DEC Ada (UPI - 0HM) and DEC Ada PDO (UPI - 0VS) will be retired in a future release of Tru64 UNIX.

2.2.12 The /usr/include/userpw.h Header File

The `/usr/include/userpw.h` header file will be retired in a future release. This file was inadvertently shipped with earlier versions of the operating system. It contains prototypes for nonexistent functions and unused structures. It does, however, contain two definitions that you might have mistakenly used; password length, `PW_PASSLEN`, and user name length, `PW_NAMELEN`. These values are not appropriate for Tru64 UNIX.

The correct definition for password length is `SIAMXPASSWORD` in the `sia.h` file, or `PASS_MAX` in the `limits.h` file. The correct definition for user name length is `LOGIN_NAME_MAX` in the `limits.h` file, or `L_cuserid` in the `stdio.h` file.

It is recommended that you not use this file because it contains incorrect values.

2.2.13 Internationalized Print Filters dl1152wrof and dl5100wrof

The DEC Laser 1152 and 5100 printers are no longer being produced. Therefore, the corresponding internationalized print filters, `dl1152wrof`, and `dl5100wrof`, will be retired in a future release. The filters' functionality can be replaced by the new `wwpsof` print filter.

In this release, the `dl1152wrof` and `dl5100wrof` print filters have been moved to the IOSWWOBSOLETE subset within the Worldwide Language Support (WLS) software. The `printcap` entries for these print filters will be removed from the `/etc/lprsetup.dat` print filter in the next release.

In a future release, these print filters will be taken out of the kit and the installation procedure will convert the old `/etc/printcap` entries, which use the old print filters, to use the new `wwpsof` print filter.

2.2.14 Replacement of hiprof, pixie, and third Interfaces

The atom-tool interfaces documented in the `hiprof`(5), `pixie`(5), and `third`(5) reference pages 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 the `hiprof`(1), `pixie`(1), and `third`(1) reference pages.

2.2.15 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 the `hiprof`(1) and `pixie`(1) reference pages for more information.

2.2.16 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 the `pixie`(1) reference page.

2.2.17 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.

2.2.18 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.

Note that 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.

2.2.19 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.

2.2.20 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.

2.2.21 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 runtime environment. Header files and reference pages are no longer included.

2.2.22 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.

Compaq recommends you begin using the lsmsa interface to manage your LSM configurations.

2.2.23 Netscape FastTrack Server

The Netscape FastTrack Web Server, including all Application Programmer Interfaces (APIs) for customizing and extending the server, will be retired in a future Tru64 UNIX release. It will be replaced by the Compaq Secure Web Server, a Secure Socket Layer (SSL) capable Web server based on Apache.

This release contains the Netscape FastTrack Server 3.01 on the Associated Products CD-ROM Volume 1.

2.2.24 C++ Runtime Libraries libtask and libcomplex

The libtask and libcomplex C++ Runtime 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, Compaq recommends you use the template complex class defined in the C++ Standard Library. If you have code that uses the libtask, Compaq recommends 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 sections provide information on hardware support that has been retired in this release of the operating system.

2.3.1.1 KZESC and KZPSC Array Controllers

The KZESC and KZPSC storage array controllers have been retired.

The KZPAC storage array controller is still supported.

2.3.1.2 Systems

The following systems (all models) are not supported in this release:

- DEC 2000
- DEC 3000
- DEC 4000
- DEC 7000
- DEC 10000

2.3.1.3 TURBOchannel Adapters

Support for all TURBOchannel adapters for the DEC 3000, including the following, has been retired in this release of the operating system:

- KZTSA, PMZAB, and PMAZC — SCSI adapters
- PMAG (all models) and PMAD — Graphics adapters
- DETRA — Token Ring adapter
- DGLTA — ATM adapter
- DEFTA and DEFZA — FDDI adapters

2.3.1.4 XMI Adapters

Support for all adapters for XMI, including the following, has been retired in this release of the operating system:

- KZMSA — SCSI adapter

- DEMNA — Network adapter
- DEMFA — FDDI adapter

2.3.1.5 TGEC Network Adapter for the DEC 4000

Support for the TGEC network adapter for the DEC 4000 has been retired in this release of the operating system.

2.3.1.6 Legacy Storage Devices

Support for the following legacy storage devices has been retired in this release:

- HSC40, HSC50, HSC60, HSC65, HSC70, HSC90, and HSC95 — storage controllers for CI
- RA60, RA70, RA71, RA72, RA73, RA80, RA81, RA82, RA90, and RA92 — MSCP disks
- TA78, TA79, TA81, TA90, TA90E, and TA91 — TMSCP tapes
- CIXCD — CI adapter for XMI
- KDM70 — MSCP/TMSCP adapter for XMI

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 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

2.3.2.2 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

2.3.2.3 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

2.3.2.4 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 Tru64 UNIX Version 5.1 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, Compaq recommends 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 the current level of the firmware can be determined by 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 Additional Firmware Requirements

Systems that will run the TruCluster Server Version 5.1 software on Tru64 UNIX Version 5.1 require Alpha System Reference Manual (SRM) console firmware Version 5.7 or later. If you use Revision 5.6 or earlier console firmware, the cluster member might fail to boot with Reservation Conflict errors.

Systems that will run on Tru64 UNIX Version 5.1 and use *both* unit partitioning and multipathing on an HSG80 device require Alpha SRM console firmware Version 5.6 or later.

Systems that will run on Tru64 UNIX Version 5.1 and use Fibre Channel Arbitrated Loop require Alpha SRM console firmware Version 5.8.

3.1.2.2 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 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, in a separate step 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.
```

3.1.4 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.

3.1.5 The setld Utility Does Not Handle White Space in Directory Names

The `setld` utility does not handle directory names that contain white space.

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 the `passwd`(4) reference page. Also, substitute the value 6 with the group ID of the `mail` group on your system; see the `group`(4) reference page.

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 Version 5.1.

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 later, 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)
```

3.2.2 Open Source Internet Solutions

The notes in this section apply to the Open Source Internet Solutions (OSIS) product. The OSIS product was formerly called the Internet AlphaServer System Software (IASS). OSIS Version 5.2 and earlier versions, including IASS, are not supported on this version of the operating system. It is recommended that you upgrade to Open Source Internet Solutions (OSIS) Version 5.3 or higher.

3.2.2.1 Disable ASE Failover for OSIS Services Before Upgrade

If you intend to continue running an older version of OSIS and are upgrading to this version of the operating system, you must disable all ASE failover support of OSIS services before the upgrade. Use the OSIS Administration utility to disable ASE failover support.

ASE functionality is replaced by TruCluster Server Version 5.1.

3.3 Full Installation

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

3.4 Update Installation

Version 5.1 supports update installations from Versions 4.0G and 5.0A.

To update your Tru64 UNIX operating system software to Version 5.1, you must use the `installupdate` utility or full installation procedures as described in the *Installation Guide*.

Note that the `-i` flag for the `installupdate` command will be retired in a future version of Tru64 UNIX. See Section 2.2.7 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. There are two workarounds 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 workaround the problem:

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

The *UFSVOLUMES* variable is the list of LSM volumes containing UFS file systems. For example, isuppose 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 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.

3.4.4 Failure to Merge /var/adm/sendmail/sendmail.cf

If you have a client mail configuration created by mailsetup and perform an update installation from Tru64 UNIXVersion 4.0F, the /usr/adm/sendmail/sendmail.cf merge process fails to update IMAP rules. You can ignore this error.

If you want to use IMAP in a client configuration, rerun the configuration using either mailsetup or mailconfig.

3.4.5 Dangerous Write Permission Warning for the Sendmail Configuration File

If you are performing an update installation from any variant of Tru64 UNIX Version 4.0, you might get the following warning when you start the `sendmail` daemon or run the `newaliases` command:

```
/var/adm/sendmail/sendmail.cf: WARNING: dangerous write permissions
```

The permissions of the `/var/adm/sendmail/sendmail.cf` file should be 0644. If they are not, run the following command as root:

```
# chmod 644 /var/adm/sendmail/sendmail.cf
```

Then restart the `sendmail` daemon:

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

3.4.6 Restriction to Using the Graphical Update Installation Interface

There is a restriction that interferes with the ability to use the update installation's graphical user interface (GUI) in this release. The restriction only applies if the system you are updating is running Tru64 UNIX Version 5.0A, the system has the Wolrdwide 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 will be displayed instead of the GUI.

3.4.7 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 (IOS) 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.

3.4.8 Changes to /etc/doprc Are Not Preserved

After an update installation from Tru64 UNIXVersion 4.0G or 5.0A to Version 5.1, customizations to the `/etc/doprc` file are not preserved.

The existing `/etc/doprc` file on the system is copied to `/etc/doprc.PreUPD` and a new `/etc/doprc` file is installed on the system.

3.4.9 Ignore the /etc/doprc Error Message

When performing an update installation on a system with the Worldwide Language Support (WLS) software installed, the following error messages might appear when the system is trying to remove old WLS subsets:

```
Error occurred trying to update /etc/doprc:
Dop_delete_application i18nconfig /etc/doprc
can't read "action": no such variable
```

You can ignore these errors; they do not affect the operation of the update installation process or the removal of the subsets.

3.4.10 Ignore clu_get_info Warnings

If your system does not have enough free disk space to complete the update installation, you can use the Remove Software Subsets option from the Recover of Disk Space dialog box. While subsets are being deleted, the following message might be displayed:

```
Deleting subset_description_and_name/updmnt/isl/setld:
clu_get_info: not found
```

You can ignore these warnings; they do not affect the operation of the update installation process or the removal of the subsets.

3.4.11 Ignore grep Error on Worldwide Language Support

If the Worldwide Language Support (WLS) software is installed on the system and you an update installation, the following error message might appear during the update installation process:

```
Restoring Worldwide Support tty features configuration
grep: can't open /usr/sys/conf/.product.list
Loading I18N tty kernel modules ... done
```

You can ignore this message. It does not affect the update installation procedure. The procedure will continue and complete successfully.

3.4.12 Core Files Present After Update Install

Due to a change in the `stat` system call, it was necessary to modify the update installation process so that the new executables could be run on a previous release of the operating system during the update process. However, after the update completes, the modifications are no longer accessible and therefore some commands fail.

The `umount` command is one of the commands that fail. The core files for this command are placed in the root directory.

The failure of these commands does not impact the successful completion of the update installation process.

3.4.13 PanoramiX ADK

If you previously installed the Advanced Developers' Kit (ADK) for the PanoramiX extension to the X server, you must remove it before doing an update installation to Tru64 UNIX Version 5.1. If you do not, the X server will not start. If this happens, do the following:

1. Log in as root.
2. Remove the ADK.
3. Replace the X server configuration file with the original version of the Tru64 UNIX Version 5.1 file, `/var/X11/Xserver.conf`.
4. Run the `xlogin start` command.

3.5 RIS Installation

This section provides notes pertaining to Remote Installation Services (RIS).

3.5.1 Time Zone Restriction

New time zones have been added to this version 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 an earlier version of the operating system on a client from a RIS server running Tru64 UNIX Version 5.1, the earlier 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 earlier versions. Therefore, you must set the time zone manually after the installation.

3.5.2 Rolling Upgrade Restriction

If you are performing a rolling upgrade from a RIS server, you must register both the cluster alias and the lead cluster member as RIS clients before you execute the Install Phase of the rolling upgrade.

3.5.3 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.

3.6 Dataless Server Installation

This section provides notes pertaining to Dataless Server installations.

3.6.1 Restriction Using TruCluster Server

TruCluster Server Version 5.0A or higher does not support the 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 Tru64 UNIX Version 5.1 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 sections 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 Tru64 UNIX, you must perform the upgrade in the following sequence:

1. Update your operating system software to Tru64 UNIX Version 5.1.
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 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 will have to find an alternative to the documented procedure.

4.1.3 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 guide for further information. A later version of the console firmware will support this feature.

4.1.4 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.

4.1.5 DJ-ML200-xx PCI NVRAM Hardware Revision

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

4.1.6 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 later.

4.1.7 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 who utilize 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 Tru64 UNIX, your X server will not start and your system will have generic console support when you boot Tru64 UNIX.

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, Tru64 UNIX 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 800
```

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. For additional information on configuring an AlphaServer GS system in a cluster, see the TruCluster Server *Hardware Configuration* guide.

4.3.1 Offlining Certain CPUs Is Not Supported

Each quad building block (QBB) on an AlphaServer GS system has a processor that takes the interrupts for that QBB. At present, there is no mechanism to move interrupts to other processors, which means that you cannot take the processor off line. (See the `psradm`(8) and the `offline`(8) reference pages for more information).

If you attempt to take a processor off line, the following error occurs:

```
# offline xx
offline: processor xx: Invalid argument
```

The affected processor numbers are typically evenly divisible by 4. For example 0, 4, 8, 12, 16, and so on.

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
```

Note that 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 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)

5.1 Commands and Utilities

The following notes apply to commands and utilities.

5.1.1 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.

5.1.2 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 (\).

5.1.3 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.

5.1.4 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.

These 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. Note, if you stop the `cron` daemon and there you have `cron` jobs scheduled to run during that time, they will not be executed.

5.1.5 Netscape Communicator

The following notes apply to the Netscape Communicator.

5.1.5.1 Netscape Security

Versions of Netscape Communicator less than version 4.75 contain a security vulnerability that could potentially allow unauthorized users read only access to your file system. This vulnerability, known as Brown Orifice, exploits the Navigator components ability to run programs written in the Java Programming Language. If you are using a version of Netscape on Tru64 UNIX that is less than Version 4.75, Compaq highly recommends upgrading to Netscape Communicator 4.75 or later to avoid this security vulnerability.

You can determine which version of Netscape Communicator you are running by click on the Help button in the toolbar at the top of the Navigator component window, then choose the About Communicator option from the drop down menu.

You can download the latest version of Netscape Communicator for Tru64 UNIX from the Netscape Download World Wide Web site located at the following URL:

http://www.unix.digital.com/faqs/publications/pub_page/update_list.html

You can also obtain the latest version from the Compaq Tru64 UNIX World Wide Web site at the following URL:

http://www.tru64unix.compaq.com/internet/download.htm

If you are unable to upgrade to Netscape Communicator 4.75 or later, you can avoid this security vulnerability by disabling the browsers ability to run Java by performing the following steps:

1. Start Netscape Communicator using the following command:

   ```
   $ /usr/bin/X11/netscape
   ```

2. Using the mouse, click on the Edit button in the toolbar at the top of the Navigator component window.
3. Click on the Preferences... option on the drop down menu that appears. This displays the Netscape: Preferences dialog box.
4. In the window pane on the left of the Netscape: Preferences dialog box, click on the Advanced tab. This displays the Advanced Communicator preferences in the dialog box.
5. If the box next to the Enable Java preference has a check mark in it, click on the box to remove the check mark. This disables the Java Programming Language. Then click on the Okay button in the Advanced preferences dialog box. (Note: if there is not a check mark in the box, you do not need to take any action.)
6. Exit the Netscape Communicator by clicking on the Exit option in the drop down menu that appears when you click on the File button on the toolbar at the top of the Navigator window.

Disabling Java ensures Netscape Communicator is not vulnerable to the Brown Orifice security problem. Disabling JavaScript is not required to avoid this vulnerability.

If you are using the Japanese or Chinese interfaces provided in the Worldwide Language Support (WLS) software, you must update the Communicator version numbers in the `/usr/lib/X11/*/app-defaults/Netscape` file if you choose to upgrade to Netscape Communicator Version 4.75 or later.

If the version numbers in these files do not match the version of Netscape Communicator installed, it will not run in the Japanese or Chinese locales. You can download the updated files from the Compaq Tru64 UNIX World Wide Web site provided earlier in this note.

5.1.5.2 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

5.1.5.3 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.

5.1.5.4 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.

5.1.5.5 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.

5.1.5.6 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 Tru64 UNIX 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.

5.2 SysMan System Management Applications

The following sections contain notes that 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. Compaq recommends 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 you should 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 hung process. Look for the following entry in the process table:

```
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. Choose 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 Xserver, as follows:

   ```
   # xhost + localhost
   ```

5.2.7 SysMan Command Line Interface

The `-mib` option of the SysMan command line interface does note 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 Applications

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.

5.2.9 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* guide and the `ntp.conf`(4) and `xntp.conf`(8) reference pages.

5.2.10 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.

5.2.11 Display Problems on Systems with Low-Resolution Graphic 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`(8X).

If you are running these applications in Asian locales, see Section 5.2.12.

5.2.12 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 like Chinese and Japanese) cause dialog boxes to be larger than 640x480 and control buttons like OK and Cancel are no longer accessible. This is a more specific problem than that described in Section 5.2.11 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.
- Some graphics cards support increased display resolutions only after the appropriate PowerStorm subsets have been installed. Install the PowerStorm subsets and then run the sysman applications.

5.2.13 SysMan Menu

The notes in this section apply to the SysMan Menu application. Also see Section 8.10.1 for information related to online help.

5.2.13.1 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.

5.2.13.2 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.

5.2.13.3 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.

5.2.13.4 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.

5.2.13.5 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.

5.2.14 SysMan Station

The notes in this section apply to the SysMan Station. Also see Section 8.10.2 for information related to online help.

5.2.14.1 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.

5.2.14.2 Objects Might Not Display Properly with Internet Explorer

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

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

5.2.14.3 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.

5.2.14.4 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 also check to see if any clients are using the network port with the following command:

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

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

5.2.14.5 Physical_Filesystems View Displays Two Disk Objects for LSM File Systems

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.

5.2.14.6 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 very 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.

5.2.14.7 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.

5.2.14.8 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
```

5.2.14.9 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.

5.2.14.10 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 workaround 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.

5.2.14.11 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.

5.2.14.12 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.

5.2.15 Configuring Tru64 UNIX from Linux Systems

You can now configure Tru64 UNIX from Linux systems. The following section provides information on how to install the SysMan client on these systems.

5.2.15.1 Installing the SysMan Client on a Linux System

You can configure a system running Tru64 UNIX from a system that is running Linux using Java by performing the following steps:

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 Device Naming Changes

Tru64 UNIX Version 5.0 and higher releases provide full support for FibreChannel, SCSI-3, and wide SCSI devices. The implementation of this support required a major change to the Tru64 UNIX device naming scheme. This change has been implemented for all disk and tape devices.

For example, prior to Version 5.0, disks were named as follow:

- `/dev/rz2`*X*
- `/dev/rz3`*X*
- `/dev/rz4`*X*

This naming had encoded within it the bus and Logical Unit Number (LUN) of the SCSI disk. For example, disk 0 on bus 0 was `rz0`. Disk 0 in bus 1 was `RZ8`, and so on. As a result Tru64 UNIX was limited to supporting no more than eight devices per bus, because the name for any additional devices would collide with other devices.

Wide SCSI supports up to 16 devices per bus; within FibreChannel the number is in the thousands. FibreChannel also allows the LUNs to change dynamically, which the old device naming scheme could not support.

Therefore, in Version 5.0 disk names have the following format:

- `/dev/disk/dsk`*nx*

Tape drives have the following format:

- `/dev/tape/tape`*n_dx*

(For more information on the formats, see the *System Administration* guide.)

The new device name will use the world-wide identifier (WWID) of the disk. A disk's WWID is set by the manufacturer for devices that support it and is unique. Therefore, no two disks can have the same WWID.

Using the WWID to identify a disk has two implications:

- Once a disk is recognized by the operating system, the disk's `/dev/disk/dsk`*X* name will stay the same, even if its SCSI address changes.

- Tru64 UNIX can support multipathing to a disk where the disk is accessible through different SCSI controllers. Therefore, within a Tru64 UNIX Version 5.0 or higher cluster environment, as disks are moved from one node to another node, the disk names and how they are accessed remains the same.

Tapes devices will reside under the `/dev/tape` directory; no-rewind tape devices will reside under the `/dev/ntape` directory. This version of Tru64 UNIX supports the existing device names as a compatibility option, but the same device cannot be accessed through both the old and new name at the same time.

The following utilities have been added to enhance the support for device naming and hardware management:

- The Device Special File Manager (`dsfmgr`) for managing device special file names.
- The Hardware Manager (`hwmgr`) to assist in device management. This utility replaces the `scsimgr` utility.

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 notes in this section 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.

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 an NIS master. The user and template values displayed might be the default template values of the NIS master. When an NIS user logs in to an 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. Note that 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 will have to 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 Compressed Crash Dump Might Display Incorrect Byte Count

If you have full crash dumps enabled on a machine with more than 2 GB of memory, the compressed crash dump message will display the number of bytes as less than zero. If a machine has over 4 GB of physical memory, the displayed value will overflow. For example:

```
DUMP: Will attempt to compress -688128 bytes of dump
    : into 3927949296 bytes of memory.
```

This problem is an artifact of the 32-bit integer math used in the `printf()` code that generates the message. It does not affect the results of the crash dump.

5.3.7 The dxkerneltuner Application Dumps Core

The `dxkerneltuner` application dumps core if you select `vm` from the list of loadable kernel subsystems.

To avoid this problem, do not select `vm` from the list of loadable kernel subsystems. Instead, use the `sysconfig` command line interface to modify the `vm` subsystem. For more information see the `sysconfig`(8) reference page.

5.3.8 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.

5.3.9 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
```

5.3.10 Persistent Reservation Error

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

5.3.11 Security

The notes in this section have to do with system management and security.

5.3.11.1 Authentication Problem with Multi-Threaded 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.

5.3.11.2 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 suc h anonymous access. To disable these agents, use the Compaq Management Agents Configuration icon on the Monitor ing/Tuning menu.

5.3.11.3 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.

5.3.11.4 Prevent IP Spoofing Attacks

To detect and prevent an IP spoofing attack that can potentially result in a denial of service, configure theifaccess.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.

5.3.11.5 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
```

5.3.12 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.

5.3.13 Change in 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 files:

- The time field in the struct utmp structure has changed from a time_t structure to a struct __ut_timeval structure (to be consistent with the /usr/include/utmpx.h file).
- The ut_host field size (in the struct utmp and struct utmpx structures) has been increased to comply with relevant Internet RFCs.
- The ll_line and ll_host manifest constants in the/usr/include/lastlog.h file have changed to allow their sizes to correspond to the ut_line and ut_host fields in struct utmp and struct utmpx structures.

These changes also affect the format of the /var/adm/utmp, /var/adm/wtmp, and /var/adm/lastlog files. The following conversion programs are supplied:

- /usr/lbin/wtmpconvert
- /usr/lbin/llconvert

The programs enable you to convert your existing /var/adm/wtmp and /var/adm/lastlog files to the new format or convert new format files to the old format for use by existing programs. See the corresponding reference pages for more information.

5.3.14 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, it is recommended that you set this argument to 1.

5.3.15 Startup Messages Lost in Large Configurations

On systems that display a large number of console messages at system initialization (typically, systems configured with a large number of devices), some messages may be missing from the `/var/adm/messages` file. You can correct this problem by increasing the size of the kernel's message buffer.

Use either of the following procedures to change the buffer size. You must be root to make the change.

To change the buffer size using graphical administration tools, use the following steps:

1. Start the `dxkerneltuner` application.
2. Select the `generic` subsystem.
3. Set the Boot Time Value entry for the `msgbuf_size` attribute to the new value.
4. Apply the change before exiting.

To change the buffer size from the command line, use the following steps:

1. Create a temporary file, `/tmp/msgbufsize`, containing the following lines, but replacing the 32768 with the size appropriate for your system:

   ```
   generic:
   msgbuf_size = 32768
   ```

2. Enter the following command:

   ```
   % sysconfigdb -f /tmp/msgbufsize -m
   ```

   If a different entry is present in the database, `sysconfigdb` displays a warning message to advise you of the change in size.

The increase takes effect at the next system reboot. After rebooting, you can verify the change by entering the following command:

```
% sysconfig -q generic | grep msgbuf_size
```

Note

The default size of the message buffer is 4 KB, and the example above sets it to 32 KB. Because the space used by the buffer is not returned for general use after initialization, set the size only high enough to correct the problem.

See the *System Administration* guide for information on changing the buffer size.

5.3.16 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.

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

This section provides information on the Compaq Management Agents for Tru64 UNIX (formerly, Insight Manager).

5.3.17.1 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-unix.zk3.dec.com:8083/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.

5.3.17.2 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.
- 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 SCSI subagent returns incorrect values for disk read and write statistics. The statistics are calculated once, when the subagent is started.
- 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.
- The introductory paragraph for the Compaq Management Agents Configuration application's online help should read:

  > Use Compaq Management Agents Configuration to enable or disable the Compaq Management Agents agent daemon on your system.

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

5.3.18 Event Manager (EVM)

The notes in this section apply to the Event Manager (EVM).

5.3.18.1 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 the `binlogd`(8) reference page. Note that 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.

5.3.18.2 EVM Reports Kernel Messages with Critical Priority

EVM 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.

5.3.18.3 EVM Fails to Detect syslogd and binlogd During Boot

Occasionally, EVM 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 outputs 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 The autofsd Utility

The following problems can occur when using 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.

5.4.2 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.

5.4.3 Mail

This section provides information on problems that can occur when configuring and running mail on your systems.

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

If you are converting a `dtmail` folder hierarchy to IMAP, or 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 select Mail Servers.
3. Choose the Local Mail Directory and change the directory to the UNIX folder directory you want to convert.
4. Choose 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.

5.4.3.2 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.

5.4.3.3 sendmail Warning Message

The permissions on the /var directory do not satisfy the checks by the sendmail binary. The sendmail utility expects the permission of 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
```

5.4.3.4 Problem Starting the sendmail Daemon

If you manually edit the /var/adm/sendmail/sendmail.cf file and there are errors in the file, 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/sys-log.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 notes in this section 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 AdvFS Clones Cannot Be Opened for Direct I/O

AdvFS clones cannot be opened for direct I/O (`O_DIRECTIO`). If you attempt to open AdvFS clones for direct I/O, the `open`(2) system call returns an `EINVAL` error code.

5.7 Logical Storage Manager

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

5.7.1 Using LSM rootvol Requires sysconfigtab Parameters

If you use the LSM `rootvol` volume for the root file system and the `swapvol` volume is in use as a primary swap volume, LSM adds the following entries to the `/etc/sysconfigtab` file to enable it to become root:

```
lsm:
lsm_rootdev_is_volume=1
```

If these entries are deleted or if the `/etc/sysconfigtab` file is deleted, the system will not boot. If this happens, you can boot the system interactively as follows:

```
>>> boot -fl i
.........
.........
Enter kernel_name option_1 ... option_n: vmunix
lsm_rootdev_is_volume=1
```

Use the `sysconfigdb` utility to add the LSM entries as shown previously to the `/etc/sysconfigtab` file after the system boots. Then, reboot the system for the changes to take effect.

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.

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 in 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. For more information, see Section 5.3.13.

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 a 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 incorrect errors from the mktime() function when valid input is supplied.

Note that 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 expected 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 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.

6.2.2 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*.

6.2.3 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.

6.2.4 Process-Shared Synchonization 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.

6.2.5 POSIX Threads Does Not Support the Addition or Removal of Processors

Currently, any runtime change in the number of processors available to a running process can cause user process contention scope (PCS) threads to never run again or hang. The situation persists even if the processors are returned to the process. Therefore, offline/online and add/remove of processors from processor sets (`psets`) should not be done on a running process.

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 (i.e., 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 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 5.1.

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

6.3.2 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.

6.3.3 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 4D40T
- PowerStorm 4D50T
- PowerStorm 4D51T
- PowerStorm 4D60T
- PowerStorm 300
- PowerStorm 350

The base operating system provides only VGA mode support for these devices.

Please refer to the following URL for the necessary drivers and more information:

http://www.service.digital.com/open3d

Note also that Open3D is no longer supported.

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 running 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 Using LBX Clients

This note provides information for using LBX clients:

- On systems without DECnet, you must start the `lbxproxy` utility with the `-pn` option.
- Do not use the X server's node-based access control (`xhost +`*`host_name`*) for LBX clients.
- XDM-AUTHORIZATION-1 authorization works for LBX clients only if the client is running on the same system as the `lbxproxy` that it is using and if the client specifies a network connection to `lbxproxy` (`lbxproxy -display` *`host_name`*`:1`) instead of a local connection (`lbxproxy -display :1`).

  Note that the restrictions on LBX client authorization are part of the standard implementation of LBX from The Open Group.

You can use the following methods to authorize an LBX client to display on an X server:

- Use MIT-MAGIC-COOKIE-1 authorization by including the MIT-MAGIC-COOKIE-1 entries in the LBX client's XAUTHORITY file.
- Use XDM-AUTHORIZATION-1 authorization and run a separate `lbxproxy` on each client system that is used by the clients on that system. Also, set the clients' display specifications to use a network connection to `lbxproxy` process (`lbxproxy` *`host_name`*`:1`).
- Disable access control in the X server by starting the X server with the `-ac` options or by using the `xhost +` command. These methods are insecure and are not recommended.

If you use the MIT-MAGIC-COOKIE-1 or XDM-AUTHORIZATION-1 authorization methods with an LBX client, the client's XAUTHORITY file entries must specify the display name for the `lbxproxy` utility and the authorization key for the target X server.

The following are some examples of using LBX. In these examples, server is the system running the X server, client1 is one system running LBX clients, and client2 is a second system running LBX clients.

- If the following command is executed on client1, the `lbxproxy` listens for connections on client1:1 and displays information on server:0.

  # **lbxproxy -pn -display server:0 :1**

  LBX clients running on client1 that are not using XDM-AUTHORIZATION-1 authorization should set their display to :1. For example:

  # **xterm -display :1**

  LBX clients running on client1 that are using XDM-AUTHORIZATION-1 authorization should set their display to client1:1. For example:

  # **xterm -display client1:1**

  All LBX clients on client2, regardless of whether they are using XDM-AUTHORIZATION-1 authorization, should set their display to client1:1.

- To use the MIT-MAGIC-COOKIE-1 or XDM-AUTHORIZATION-1 authorization mechanisms, set up your XAUTHORITY files as follows:
  - The X server's XAUTHORITY file:

    ```
    server:0  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcdef
    server/unix:0  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcdef
    ```

  - The XAUTHORITY file for `lbxproxy`:

    ```
    server:0  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcdef
    server/unix:0  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcde
    ```

– The LBX clients' XAUTHORITY files (on both client1 and client2):

```
client1:1  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcdef
client1/unix:1  MIT-MAGIC-COOKIE-1  0123456789abcdef0123456789abcdef
```

7.2.4 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.

7.3 CDE Clients

The following notes apply to CDE clients.

7.3.1 Inaccessible Dialog Buttons

When using 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 5.2.12.

7.3.2 Screen Savers Prevent Efficient Power Management

When the screen on a DPMS-capable monitor is switched to standby, suspend, or off mode, the X server continues to run the screen saver. In CDE, which has a number of active screen savers, this might defeat the CPU slowdown features for power management on certain Energy Star-compliant platforms. To minimize power consumption, you should 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 on 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 Tru64 UNIX Version 5.1 documentation. It provides information on the following:

- Hardware Product Kit and New Hardware Delivery information (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)
- *Kernel Debugging* (Section 8.6)
- *Sharing Software on a Local Area Network* (Section 8.7)
- *Guide to Preparing Product Kits* (Section 8.8)
- Addition to the `sysman_clone`(8) reference page (Section 8.9)
- Online help (Section 8.10)

8.1 Hardware Product Kits and New Hardware Delivery

This release of the operating system does not support New Hardware Delivery (NHD) or hardware product kits. Please disregard any references to NHD or hardware product kits.

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* guide 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* guide 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 Sharing Software on a Local Area Network

Section 6.2 of the *Sharing Software on a Local Area Network* manual is incomplete. It should include the following information:

> If you are performing a rolling upgrade from a RIS server, you must register both the cluster alias and the lead cluster member as RIS clients before you execute the Install Phase of the rolling upgrade.

8.8 Guide to Preparing Product Kits

The *Guide to Preparing Product Kits*, Appendix A, Creating a Consolidated Firmware CD-ROM, Section A.1.1, Prepare for the Build Session, contains incorrect information for the disk partition size. Step 2 incorrectly states the following:

> Use the `disklabel` utility to set up a 635 Mb partition on a spare disk, starting at block 0, with a size of 1300480 512-byte blocks and a file system type of unused.

The correct values are a 750 Mb partition with a size of 1536000 512-byte blocks.

Additionally, the following caution should be added to Section A.1.1, step 2:

> Although you are creating a 750 Mb partition, remember that the CD-ROM is limited to 650 Mb and that you should only copy the specific versions of the firmware that you require.

Change the sample `disklabel` command in Section A.1.2, Build the Consolidated Firmware CD-ROM, step 5, and Section A.2.2, Building the Consolidated Firmware CD-ROM, step 6, to the following:

```
% disklabel -r -w -t cdfs -f \
      /spare/cons_oper_sys.cdfs \
      /mdec/xxboot.cdfs /cdimage/mdec/bootxx.cdfs
```

8.9 Addition to the sysman_clone(8) Reference Page

The `sysman_clone`(8) reference page is missing an entry from the list of cloned components. The missing entry should read as follows:

The division of privileges (DOP).

When you use the `sysman -clone` command, all current DOP actions and privileges are included in the configuration definition file.

Refer to the `dop`(8) reference page for more information on the DOP component.

8.10 Online Help

The notes in this section apply to the online help.

8.10.1 SysMan Menu

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

8.10.1.1 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.

8.10.1.2 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.

8.10.2 System Management Station

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

8.10.2.1 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.

8.10.3 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 thisTru64 UNIX Version 5.1, 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, refer to the *Installation Guide*. If you want to add optional subsets after you install Tru64 UNIX Version 5.1, use the `df` command to determine free disk space in blocks.

Table A–1: Disk Space Requirements

Tru64 UNIX Version 5.1 Operating System

Subset	root	/usr	/var	Total
OSFACCT510	9.28	1078.76	99.53	1187.56
OSFADVFS510	6958.04	3044.47	—	10002.51
OSFADVFSBIN510	2340.46	3.06	—	2343.52
OSFADVFSBINOB-JECT510	—	4065.68	—	4065.68
OSFADVFSDAEMON510	10.88	1677.90	139.18	1827.96
OSFAFM510	—	2160.73	—	2160.73
OSFATMBASE510	245.52	1306.15	—	1551.67
OSFATMBIN510	5302.34	21.40	—	5323.75
OSFATMBINCOM510	—	284.96	—	284.96
OSFATMBINOBJECT510	—	20911.46	—	20911.46

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

Tru64 UNIX Version 5.1 Operating System

Subset	root	/usr	/var	Total
OSFBASE510	39475.36	96280.94	1538.07	137294.37
OSFBIN510	18133.71	1507.29	—	19641.01
OSFBINCOM510	42.44	30230.59	75.03	30348.05
OSFBINOBJECT510	—	29628.64	—	29628.64
OSFC2SEC510	414.71	1172.04	160.22	1746.97
OSFCDEAPPS510	—	12500.88	—	12500.88
OSFCDEDEV510	—	27346.34	—	27346.34
OSFCDEDT510	—	55855.91	—	55855.91
OSFCDEMAIL510	—	4240.93	—	4240.93
OSFCDEMANOP510	—	2039.40	—	2039.40
OSFCDEMANOS510	—	1436.41	—	1436.41
OSFCDEMIN510	—	16309.64	22.05	16331.69
OSFCLINET510	1071.98	18112.33	47.12	19231.43
OSFCMPLRS510	—	30336.58	—	30336.58
OSFDCMT510	—	1110.91	—	1110.91
OSFDCMTEXT510	—	4368.22	—	4368.22
OSFDECW510	—	2877.47	60.99	2938.46
OSFDMS510	—	95.63	73.13	168.76
OSFDOSTOOLS510	—	3244.59	—	3244.59
OSFEMACS510	—	170396.90	—	170396.90
OSFENVMON510	21.48	142.42	—	163.91
OSFEURLOC510	—	1526.19	—	1526.19
OSFEXAMPLES510	—	1643.61	—	1643.61
OSFEXER510	—	6919.20	—	6919.20
OSFFONT15510	—	3160.99	—	3160.99
OSFFONT510	—	2432.85	—	2432.85
OSFHWBASE510	28171.92	2802.46	34.40	31008.77
OSFHWBIN510	31696.85	2639.74	6.10	34342.69
OSFHWBINCOM510	—	3828.95	—	3828.95

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

Tru64 UNIX Version 5.1 Operating System

Subset	root	/usr	/var	Total
OSFHWBINOBJECT510	—	31689.53	—	31689.53
OSFIMXE510	19.69	4503.43	7165.05	11688.17
OSFINCLUDE510	—	5768.84	—	5768.84
OSFINET510	1973.44	25566.12	731.65	28271.21
OSFJAVA122510	—	48211.61	—	48211.61
OSFJAVA510	—	22601.85	—	22601.85
OSFJAVADEV122510	—	34854.18	—	34854.18
OSFJAVADEV510	—	16835.59	—	16835.59
OSFJAVADOC122510	—	20315.02	—	20315.02
OSFJAVADOC510	—	35536.52	—	35536.52
OSFKBDLK201510	—	361.70	—	361.70
OSFKBDLK401510	—	248.44	—	248.44
OSFKBDLK411510	—	134.33	—	134.33
OSFKBDLK421510	—	16.42	—	16.42
OSFKBDLK444510	—	126.52	—	126.52
OSFKBDPCXAL510	—	273.11	—	273.11
OSFKTOOLS510	—	1582.45	8044.04	9626.49
OSFLAT510	665.28	941.26	7.83	1614.37
OSFLDBBASE510	—	13460.43	—	13460.43
OSFLDBDOC510	—	408.38	—	408.38
OSFLEARN510	—	3099.87	—	3099.87
OSFLIBA510	—	9050.32	—	9050.32
OSFLSMBASE510	7151.65	6558.77	—	13710.42
OSFLSMBIN510	1474.53	6.11	—	1480.64
OSFLSMX11510	—	10333.63	61.54	10395.18
OSFMANOP510	—	19398.56	—	19398.56
OSFMANOS510	—	15690.97	—	15690.97
OSFMANWOP510	—	8788.48	—	8788.48
OSFMANWOS510	—	1261.56	—	1261.56

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

Tru64 UNIX Version 5.1 Operating System

Subset	root	/usr	/var	Total
OSFMH510	—	4146.81	—	4146.81
OSFMITFONT510	—	18754.98	104.01	18858.99
OSFNETCONF510	—	1416.79	—	1416.79
OSFNETSCAPE510	—	54082.61	—	54082.61
OSFNFS510	56.32	1512.55	—	1568.87
OSFNFSCONF510	—	53.85	—	53.85
OSFOBSOLETE510	—	2100.48	—	2100.48
OSFOLDDECW510	—	342.34	—	342.34
OSFPERL510	—	23981.10	—	23981.10
OSFPGMR510	—	10229.52	—	10229.52
OSFPRINT510	114.87	8508.84	44.13	8667.84
OSFRCS510	—	1890.00	—	1890.00
OSFRIS510	—	199.94	143.37	343.31
OSFSCCS510	—	12838.45	—	12838.45
OSFSDE510	—	23258.71	—	23258.71
OSFSDECDE510	—	314.93	—	314.93
OSFSER510	—	14145.13	50.63	14195.76
OSFSERPC510	—	4122.44	—	4122.44
OSFSERTC510	—	685.34	—	685.34
OSFSERVICETOOLS510	15.93	2303.28	3.08	2322.30
OSFSVID2510	30.00	616.81	—	646.80
OSFSYSMAN510	129.76	70201.90	32.33	70364.00
OSFTCLBASE510	—	24813.76	—	24813.76
OSFTERM510	—	3702.49	—	3702.49
OSFTKBASE510	—	16010.13	—	16010.13
OSFTRUETYPE510	—	404.26	—	404.26
OSFUUCP510	119.63	15489.02	272.15	15880.80
OSFX11510	22.30	39057.14	717.84	39797.28
OSFXADMIN510	—	6720.16	68.38	6788.54

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

Tru64 UNIX Version 5.1 Operating System

Subset	root	/usr	/var	Total
OSFXADVFS510	—	21218.69	654.24	21872.94
OSFXC2SEC510	—	582.69	—	582.69
OSFXDEMOS510	—	1856.03	—	1856.03
OSFXDEV510	—	2769.04	—	2769.04
OSFXEXAMPLES510	—	9172.60	—	9172.60
OSFXIEDOC510	—	1478.88	—	1478.88
OSFXINCLUDE510	—	8077.15	—	8077.15
OSFXLIBA510	—	15575.29	—	15575.29
OSFXMIT510	—	6063.70	47.91	6111.61
OSFXNEST510	—	393.97	9.81	403.78
OSFXOEM510	—	—	965.52	965.52
OSFXPRINT510	—	719.34	—	719.34
OSFXPRT510	—	1226.66	318.93	1545.59
OSFXSYSMAN510	66.73	15433.42	242.82	15742.97
OSFXVFB510	—	235.25	9.81	245.06
Totals	**145735.07**	**1353073.05**	**21950.91**	**1520759.03**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	145735.07	**1353073.05**	**21950.91**	**1520759.03**

Table A–2: Disk Space Requirements

Advanced Printing Software

Subset	root	/usr	/var	Total
APXADMIN110	—	4558.79	—	4558.79
APXBASE110	—	7535.19	95.00	7630.19
APXGUI110	—	14196.02	—	14196.02
APXGW110	—	1053.96	—	1053.96

Table A–2: Disk Space Requirements (cont.)

Advanced Printing Software				
Subset	**root**	**/usr**	**/var**	**Total**
APXSVR110	—	2420.56	—	2420.56
Totals	**—**	**29764.52**	**95.00**	**29859.52**
COM for Tru64 UNIX V2.0				
Subset	**root**	**/usr**	**/var**	**Total**
CUEDEV200	—	10964.87	75.71	11040.59
CUEDOC200	—	5915.69	—	5915.69
CUEMAN200	—	83.07	—	83.07
CUERTS200	—	17432.83	3677.57	21110.39
Totals	**—**	**34396.46**	**3753.28**	**38149.74**
DEC C++ Class Libraries Version 4.0 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
CXLLIBA510	—	224.93	—	224.93
CXLSHRDA510	—	283.37	—	283.37
Totals	**—**	**508.29**	**—**	**508.29**
Compaq COBOL RTL V2.6-467 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
DCARTL260	—	2581.81	—	2581.81

Table A–2: Disk Space Requirements (cont.)

Compaq COBOL RTL V2.6-467 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
O2ABASE260	—	1734.24	—	1734.24
Totals	**—**	**4316.05**	**—**	**4316.05**
Compaq Fortran RTL #388 for Compaq Tru64 UNIX Alpha Systems (f90 and f77)				
Subset	**root**	**/usr**	**/var**	**Total**
DFARTL388	—	4543.53	—	4543.53
Totals	**—**	**4543.53**	**—**	**4543.53**
Compaq Pascal RTL V5.7-23 for Tru64 UNIX Systems				
Subset	**root**	**/usr**	**/var**	**Total**
DPORTL570	—	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	—	—	15484.19	15484.19
DAUSQLNKJAVA200	—	—	4738.95	4738.95
DAUSQLNKODBC200	33.32	—	5512.07	5545.39

Table A–2: Disk Space Requirements (cont.)

MERANT DataDirect				
Subset	**root**	**/usr**	**/var**	**Total**
DAUSQLNKSVR200	—	—	41444.28	41444.28
Totals	**33.32**	**—**	**75107.50**	**75140.82**
Development Enhancement Tools for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
CMPDEVENH510	—	251.64	—	251.64
Totals	**—**	**251.64**	**—**	**251.64**
Multimedia Services V3.1 for Compaq Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
MMEDEV301	—	3427.35	—	3427.35
MMEDOC301	—	256.68	—	256.68
MMEDOCDEV301	—	4.00	—	4.00
MMEDRVEN-SONIQ301	—	920.54	—	920.54
MMEDRVMMSESS301	—	875.54	—	875.54
MMEDRVMSB301	—	1178.47	—	1178.47
MMEMANDEV301	—	1619.74	—	1619.74
MMEMANRT301	—	261.01	—	261.01
MMERELNOTES301	—	37.24	—	37.24
MMERT301	23.93	27762.09	11.23	27797.25
MMERTCDE301	—	445.34	—	445.34

Table A–2: Disk Space Requirements (cont.)

Multimedia Services V3.1 for Compaq Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
MMERTSMPLDAT301	—	12389.19	—	12389.19
Totals	**23.93**	**49177.20**	**11.23**	**49212.35**
Netscape Directory Server				
Subset	**root**	**/usr**	**/var**	**Total**
IAENDIR530	8.84	307558.67	102.39	307669.90
Totals	**8.84**	**307558.67**	**102.39**	**307669.90**
Netscape FastTrack V3.01 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
WEBNETSCAPEFAST-TRACK301	—	172955.13	—	172955.13
Totals	**—**	**172955.13**	**—**	**172955.13**
Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSAACMENU510	—	—	—	—
IOSCABASE510	—	287.77	—	287.77
IOSCACDEAPPS510	—	2154.62	—	2154.62
IOSCACDEDEV510	—	315.39	—	315.39
IOSCACDEDT510	—	1199.80	—	1199.80
IOSCACDEMAIL510	—	90.00	—	90.00
IOSCACDEMIN510	—	587.83	—	587.83
IOSCADECW510	—	32.61	—	32.61
IOSCAX11510	—	435.79	3.30	439.09
IOSCAXDEV510	—	101.14	—	101.14
IOSCAXSYSMAN510	—	118.47	—	118.47
IOSCSBASE510	—	267.98	—	267.98
IOSCSCDEAPPS510	—	2078.40	—	2078.40
IOSCSCDEDEV510	—	154.96	—	154.96
IOSCSCDEDT510	—	1362.69	—	1362.69

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSCSCDEMAIL510	—	83.71	—	83.71
IOSCSCDEMIN510	—	4015.83	—	4015.83
IOSCSDECW510	—	45.39	—	45.39
IOSCSX11510	—	1402.01	3.30	1405.31
IOSCSXDEV510	—	101.07	—	101.07
IOSCSXSYSMAN510	—	117.09	—	117.09
IOSDEBASE510	—	370.54	—	370.54
IOSDECDEAPPS510	—	283.14	—	283.14
IOSDECDEDEV510	—	322.75	—	322.75
IOSDECDEDT510	—	1122.91	—	1122.91
IOSDECDEHLP510	—	20557.40	—	20557.40
IOSDECDEMAIL510	—	92.01	—	92.01
IOSDECDEMIN510	—	590.27	—	590.27
IOSDECHX11510	—	387.56	—	387.56
IOSDEDECW510	—	32.48	—	32.48
IOSDEX11510	—	1326.03	3.30	1329.33
IOSDEXDEV510	—	101.14	—	101.14
IOSDEXSYSMAN510	—	119.12	—	119.12
IOSELBASE510	—	161.67	—	161.67
IOSELCDEDT510	—	29.45	—	29.45
IOSELCDEMIN510	—	79.76	—	79.76
IOSELFONT100M510	—	1092.72	—	1092.72
IOSELFONT100P510	—	1080.35	—	1080.35
IOSELFONT75M510	—	933.73	—	933.73
IOSELFONT75P510	—	926.07	—	926.07
IOSELOLFONT510	—	2011.26	37.23	2048.49
IOSELX11510	—	119.71	3.30	123.02
IOSESBASE510	—	380.70	—	380.70

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSESCDEAPPS510	—	271.49	—	271.49
IOSESCDEDEV510	—	319.40	—	319.40
IOSESCDEDT510	—	1132.21	—	1132.21
IOSESCDEHLP510	—	24428.80	—	24428.80
IOSESCDEMAIL510	—	91.19	—	91.19
IOSESCDEMIN510	—	569.63	—	569.63
IOSESDECW510	—	32.59	—	32.59
IOSESX11510	—	1334.25	3.30	1337.55
IOSESXDEV510	—	101.19	—	101.19
IOSESXSYSMAN510	—	119.12	—	119.12
IOSFRBASE510	—	364.68	—	364.68
IOSFRBEX11510	—	393.38	—	393.38
IOSFRCAX11510	—	393.34	—	393.34
IOSFRCDEAPPS510	—	274.60	—	274.60
IOSFRCDEDEV510	—	306.91	—	306.91
IOSFRCDEDT510	—	1130.29	—	1130.29
IOSFRCDEHLP510	—	20892.03	—	20892.03
IOSFRCDEMAIL510	—	94.31	—	94.31
IOSFRCDEMIN510	—	570.44	—	570.44
IOSFRCHX11510	—	393.39	—	393.39
IOSFRDECW510	—	32.60	—	32.60
IOSFRX11510	—	1326.00	3.30	1329.30
IOSFRXDEV510	—	101.25	—	101.25
IOSFRXSYSMAN510	—	119.31	—	119.31
IOSHUBASE510	—	271.13	—	271.13
IOSHUCDEAPPS510	—	2092.18	—	2092.18
IOSHUCDEDEV510	—	171.68	—	171.68
IOSHUCDEDT510	—	1336.10	—	1336.10

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSHUCDEMAIL510	—	86.40	—	86.40
IOSHUCDEMIN510	—	4063.31	—	4063.31
IOSHUDECW510	—	45.32	—	45.32
IOSHUX11510	—	1408.17	3.30	1411.47
IOSHUXDEV510	—	101.16	—	101.16
IOSHUXSYSMAN510	—	117.48	—	117.48
IOSITBASE510	—	364.73	—	364.73
IOSITCDEAPPS510	—	2157.91	—	2157.91
IOSITCDEDEV510	—	318.46	—	318.46
IOSITCDEDT510	—	1347.77	—	1347.77
IOSITCDEHLP510	—	14673.57	—	14673.57
IOSITCDEMAIL510	—	94.21	—	94.21
IOSITCDEMIN510	—	576.85	—	576.85
IOSITDECW510	—	32.53	—	32.53
IOSITX11510	—	1350.14	3.30	1353.44
IOSITXDEV510	—	101.18	—	101.18
IOSITXSYSMAN510	—	119.48	—	119.48
IOSIWBASE510	—	461.31	3.30	464.61
IOSIWCDEDT510	—	131.46	—	131.46
IOSIWCDEMIN510	—	139.46	—	139.46
IOSIWFONT100M510	—	664.17	—	664.17
IOSIWFONT100P510	—	2157.05	—	2157.05
IOSIWFONT75M510	—	439.21	—	439.21
IOSIWFONT75P510	—	1901.38	—	1901.38
IOSIWOLFONT510	—	3038.24	62.44	3100.68
IOSIWX11510	—	1529.80	—	1529.80
IOSIWXDEV510	—	941.01	—	941.01
IOSJPABASE510	—	3332.68	—	3332.68

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSJPAMANOS510	—	35.49	—	35.49
IOSJPBASE510	—	50422.53	13.16	50435.70
IOSJPBIN510	653.66	95.88	6.10	755.64
IOSJPCDEAPPS510	—	661.89	—	661.89
IOSJPCDEDEV510	—	1117.30	—	1117.30
IOSJPCDEDT510	—	3548.12	—	3548.12
IOSJPCDEHLP510	—	32613.80	—	32613.80
IOSJPCDEHLP-SJIS510	—	32964.96	—	32964.96
IOSJPCDEMAIL510	—	325.31	—	325.31
IOSJPCDEMIN510	—	2256.11	—	2256.11
IOSJPDECW510	—	97.34	—	97.34
IOSJPDOSTOOLS510	—	673.92	—	673.92
IOSJPFONT100M510	—	12497.12	—	12497.12
IOSJPFONT100P510	—	12184.75	—	12184.75
IOSJPFONT75M510	—	8875.36	—	8875.36
IOSJPFONT75P510	—	8523.70	—	8523.70
IOSJPFONTM510	—	13715.83	—	13715.83
IOSJPLDBBASE510	—	991.19	—	991.19
IOSJPLSMX11510	—	2585.02	—	2585.02
IOSJPMANOS510	—	6939.41	—	6939.41
IOSJPMANWOS510	—	109.16	—	109.16
IOSJPNETSCAPE510	—	6132.76	—	6132.76
IOSJPPGMR510	—	2099.40	—	2099.40
IOSJPSDECDE510	—	41.81	—	41.81
IOSJPSYSMAN510	—	1749.83	—	1749.83
IOSJPWNN510	9.57	20086.90	95.00	20191.47
IOSJPWNNPGMR510	—	1217.33	—	1217.33

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSJPWNNSRC510	—	10803.77	—	10803.77
IOSJPX11510	—	2480.64	—	2480.64
IOSJPXADMIN510	—	3637.18	—	3637.18
IOSJPXADVFS510	—	1749.29	—	1749.29
IOSJPXDEV510	—	129.59	—	129.59
IOSJPXSYSMAN510	—	13943.71	—	13943.71
IOSKOBASE510	—	13941.94	6.59	13948.52
IOSKOCDEAPPS510	—	195.71	—	195.71
IOSKOCDEDEV510	—	313.87	—	313.87
IOSKOCDEDT510	—	4744.45	—	4744.45
IOSKOCDEHLP510	—	11097.10	—	11097.10
IOSKOCDEMAIL510	—	137.24	—	137.24
IOSKOCDEMIN510	—	880.04	—	880.04
IOSKODECW510	—	53.73	—	53.73
IOSKOFONTM510	—	3896.31	—	3896.31
IOSKOFONTP510	—	9568.90	—	9568.90
IOSKOOLFONT510	—	6157.34	3.07	6160.42
IOSKOPGMR510	—	171.66	—	171.66
IOSKOX11510	—	2117.87	—	2117.87
IOSKOXDEV510	—	106.23	—	106.23
IOSKOXSYSMAN510	—	117.25	—	117.25
IOSLTX11510	—	195.85	3.30	199.15
IOSPLBASE510	—	271.10	—	271.10
IOSPLCDEAPPS510	—	2155.64	—	2155.64
IOSPLCDEDEV510	—	184.03	—	184.03
IOSPLCDEDT510	—	1265.03	—	1265.03
IOSPLCDEMAIL510	—	89.16	—	89.16
IOSPLCDEMIN510	—	4087.36	—	4087.36

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSPLDECW510	—	45.38	—	45.38
IOSPLX11510	—	1422.07	3.30	1425.37
IOSPLXDEV510	—	101.20	—	101.20
IOSPLXSYSMAN510	—	118.55	—	118.55
IOSRUBASE510	—	145.55	—	145.55
IOSRUCDEAPPS510	—	1954.39	—	1954.39
IOSRUCDEDT510	—	269.00	—	269.00
IOSRUDECW510	—	39.86	—	39.86
IOSRUX11510	—	1438.29	3.30	1441.59
IOSRUXDEV510	—	101.30	—	101.30
IOSSKBASE510	—	271.03	—	271.03
IOSSKCDEAPPS510	—	2138.77	—	2138.77
IOSSKCDEDEV510	—	272.73	—	272.73
IOSSKCDEDT510	—	1261.33	—	1261.33
IOSSKCDEMAIL510	—	86.22	—	86.22
IOSSKCDEMIN510	—	4053.73	—	4053.73
IOSSKDECW510	—	45.39	—	45.39
IOSSKX11510	—	1390.55	3.30	1393.85
IOSSKXDEV510	—	101.05	—	101.05
IOSSKXSYSMAN510	—	117.27	—	117.27
IOSSLCDEDT510	—	32.41	—	32.41
IOSSLX11510	—	206.95	3.30	210.25
IOSSVBASE510	—	364.67	—	364.67
IOSSVCDEAPPS510	—	273.89	—	273.89
IOSSVCDEDEV510	—	310.88	—	310.88
IOSSVCDEDT510	—	1091.93	—	1091.93
IOSSVCDEHLP510	—	14948.54	—	14948.54
IOSSVCDEMAIL510	—	86.24	—	86.24

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSSVCDEMIN510	—	543.92	—	543.92
IOSSVDECW510	—	32.51	—	32.51
IOSSVX11510	—	1333.68	3.30	1336.98
IOSSVXDEV510	—	100.96	—	100.96
IOSSVXSYSMAN510	—	115.43	—	115.43
IOSTHBASE510	—	868.00	3.29	871.29
IOSTHBIN510	532.78	12.20	6.10	551.08
IOSTHCDEAPPS510	—	150.02	—	150.02
IOSTHCDEDEV510	—	266.79	—	266.79
IOSTHCDEDT510	—	1017.89	—	1017.89
IOSTHCDEMAIL510	—	82.59	—	82.59
IOSTHCDEMIN510	—	478.31	—	478.31
IOSTHDECW510	—	45.36	—	45.36
IOSTHFONTM510	—	196.30	—	196.30
IOSTHOLFONT510	—	7382.06	123.70	7505.76
IOSTHPGMR510	—	126.40	—	126.40
IOSTHPRINT510	—	173.23	—	173.23
IOSTHX11510	—	1417.40	—	1417.40
IOSTHXDEV510	—	108.73	—	108.73
IOSTHXSYSMAN510	—	119.05	—	119.05
IOSTRBASE510	—	183.51	—	183.51
IOSTRCDEDT510	—	29.40	—	29.40
IOSTRCDEMIN510	—	79.76	—	79.76
IOSTRFONT100M510	—	1097.05	—	1097.05
IOSTRFONT100P510	—	4112.34	—	4112.34
IOSTRFONT75M510	—	944.16	—	944.16
IOSTRFONT75P510	—	3467.88	—	3467.88
IOSTROLFONT510	—	5455.58	102.34	5557.92

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1

Subset	root	/usr	/var	Total
IOSTRX11510	—	183.59	3.30	186.89
IOSWWBASE510	23.70	60892.31	177.67	61093.68
IOSWWBIN510	1172.75	130.07	12.20	1315.01
IOSWWBINCOM510	17.52	70.45	3.08	91.05
IOSWWBINUCS510	1649.15	6.09	3.05	1658.29
IOSWWEURLOC510	—	1499.38	—	1499.38
IOSWWFGC510	—	1485.27	—	1485.27
IOSWWFONTM510	—	702.40	—	702.40
IOSWWFONTP510	—	396.18	—	396.18
IOSWWLAT2FONT100M510	—	1178.66	—	1178.66
IOSWWLAT2FONT100P510	—	4363.28	—	4363.28
IOSWWLAT2FONT75M510	—	871.17	—	871.17
IOSWWLAT2FONT75P510	—	3805.77	—	3805.77
IOSWWLAT2OL-FONT510	—	5573.37	102.34	5675.71
IOSWWLAT4FONT100M510	—	1183.15	—	1183.15
IOSWWLAT4FONT100P510	—	4386.89	—	4386.89
IOSWWLAT4FONT75M510	—	885.65	—	885.65
IOSWWLAT4FONT75P510	—	3828.26	—	3828.26
IOSWWLAT9FONT100M510	—	2257.23	—	2257.23
IOSWWLAT9FONT100P510	—	3034.22	—	3034.22
IOSWWLAT9FONT75M510	—	1905.36	—	1905.36
IOSWWLAT9FONT75P510	—	2565.30	—	2565.30
IOSWWLAT9LOC510	—	1301.93	—	1301.93
IOSWWLATC-FONT100M510	—	1159.46	—	1159.46
IOSWWLATC-FONT100P510	—	2420.13	—	2420.13

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1

Subset	root	/usr	/var	Total
IOSWWLATC-FONT75M510	—	985.95	—	985.95
IOSWWLATC-FONT75P510	—	2029.76	—	2029.76
IOSWWLATCOL-FONT510	—	3660.26	62.14	3722.40
IOSWWMULE510	—	78274.99	—	78274.99
IOSWWMULESRC510	—	26985.53	—	26985.53
IOSWWOBSOLETE510	37.38	680.82	—	718.21
IOSWWPGMR510	—	301.63	—	301.63
IOSWWPHRASE510	485.17	538.04	6.10	1029.30
IOSWWPRINT510	—	1783.99	44.15	1828.14
IOSWWSVEDEV510	—	428.30	—	428.30
IOSWWSYSMAN510	—	732.36	4.78	737.14
IOSWWUDCOS510	499.51	1961.60	6.10	2467.21
IOSWWUDCWOS510	—	122.95	—	122.95
IOSWWX11510	—	3316.08	—	3316.08
IOSWWXDEV510	—	2401.29	—	2401.29
IOSWWXFR510	14.98	1174.27	3.49	1192.74
IOSZHBASE510	—	115571.78	—	115571.78
IOSZHBIG5510	169.77	250.41	3.05	423.23
IOSZHCNBASE510	—	4009.43	6.57	4016.00
IOSZHC-NCDEAPPS510	—	154.96	—	154.96
IOSZHCNCDEDEV510	—	318.69	—	318.69
IOSZHCNCDEDT510	—	11228.75	—	11228.75
IOSZHCNCDEHLP510	—	18520.48	—	18520.48
IOSZHCNCDE-MAIL510	—	95.91	—	95.91

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1

Subset	root	/usr	/var	Total
IOSZHCNCDEMIN510	—	584.49	—	584.49
IOSZHCNLOC510	—	796.01	—	796.01
IOSZHCONV510	82.25	75.51	3.05	160.81
IOSZHHKBASE510	—	4549.01	13.16	4562.17
IOSZHPGMR510	—	2476.51	—	2476.51
IOSZHSDECW510	—	45.93	—	45.93
IOSZHSFONTM510	—	3449.72	—	3449.72
IOSZHSFONTP510	—	27595.29	—	27595.29
IOSZHSOLFONT510	—	15013.72	6.19	15019.91
IOSZHSSYSMAN510	—	825.28	—	825.28
IOSZHSTTFONT510	—	85204.57	—	85204.57
IOSZHSX11510	—	2634.35	—	2634.35
IOSZHSXADMIN510	—	30.58	—	30.58
IOSZHSXDEV510	—	207.93	—	207.93
IOSZHSXSYSMAN510	—	77.81	—	77.81
IOSZHTDECW510	—	122.50	—	122.50
IOSZHTELEX510	135.79	6.10	3.05	144.94
IOSZHTFONTM510	—	9272.73	—	9272.73
IOSZHTFONTP510	—	25532.25	—	25532.25
IOSZHTOLFONT510	—	28158.10	6.20	28164.30
IOSZHTWBASE510	—	7526.92	9.86	7536.78
IOSZHTWCDEAPPS510	—	379.01	—	379.01
IOSZHTWCDEDEV510	—	612.40	—	612.40
IOSZHTWCDEDT510	—	10549.04	—	10549.04
IOSZHTWCDEHLP510	—	11918.55	—	11918.55
IOSZHTWCDE-MAIL510	—	221.14	—	221.14
IOSZHTWCDEMIN510	—	1373.65	—	1373.65

Table A–2: Disk Space Requirements (cont.)

Tru64 UNIX Worldwide Language Support V5.1				
Subset	**root**	**/usr**	**/var**	**Total**
IOSZHTWLOC510	—	5579.95	—	5579.95
IOSZHTX11510	—	4908.29	—	4908.29
IOSZHTXDEV510	—	962.73	—	962.73
IOSZHX11510	—	4767.70	—	4767.70
Totals	**5483.98**	**1164186.75**	**988.06**	**1170658.79**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	5550.07	**1771600.16**	**80057.46**	**1857207.68**

Table A–3: Disk Space Requirements

Advanced Server for UNIX V5.0 ECO1				
Subset	**root**	**/usr**	**/var**	**Total**
ASUADM501	—	27720.55	—	27720.55
ASUADMJP501	—	26249.39	—	26249.39
ASUBASE501	13.01	38837.10	—	38850.11
ASUMANJP501	—	535.83	—	535.83
ASUMANPAGE501	—	513.62	—	513.62
ASUSIA501	3.96	83.00	—	86.96

Table A–3: Disk Space Requirements (cont.)

Advanced Server for UNIX V5.0 ECO1				
Subset	**root**	**/usr**	**/var**	**Total**
ASUTRAN501	111.89	4066.57	3174.83	7353.29
Totals	**128.86**	**98006.07**	**3174.83**	**101309.76**
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**
ESVFBIN100	—	18340.34	22.06	18362.40
ESVFMAN100	—	1970.96	—	1970.96
Totals	**—**	**20311.30**	**22.06**	**20333.36**
Free Software Foundation GNU Source for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
FSFEMACS510	—	68236.46	—	68236.46
FSFGZIPSRC510	—	1894.79	—	1894.79
FSFINDENTSRC510	—	1238.49	—	1238.49
FSFM4V14510	—	2739.14	—	2739.14
FSFPERL510	—	30587.95	—	30587.95

Table A–3: Disk Space Requirements (cont.)

Free Software Foundation GNU Source for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
FSFRCSSRC510	—	1907.55	—	1907.55
Totals	**—**	**106604.38**	**—**	**106604.38**
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**
LGTOCLNT551	—	54576.15	—	54576.15
LGTOMAN551	—	2199.61	—	2199.61
LGTONODE551	—	21428.00	—	21428.00
LGTOSERV551	—	33657.32	—	33657.32
Totals	**—**	**111861.09**	**—**	**111861.09**
Performance Manager for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
PMGRAPP510	—	411.37	—	411.37
PMGRGUI510	—	27146.55	5.65	27152.20
PMGRMAN510	—	53.77	—	53.77
PMGRUTIL510	—	3748.58	2293.77	6042.35
Totals	**—**	**31360.27**	**2299.42**	**33659.69**
Digital Porting Assistant V3.0-0 for Digital UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
PRTBASE300	—	50631.13	—	50631.13

Table A–3: Disk Space Requirements (cont.)

Digital Porting Assistant V3.0-0 for Digital UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
PRTMAN300	—	18.45	—	18.45
Totals	**—**	**50649.58**	**—**	**50649.58**
PowerStorm 3x0 Support				
Subset	**root**	**/usr**	**/var**	**Total**
3X0CONFIG515	—	—	—	—
3X0DEVICE515	—	43811.26	—	43811.26
3X0GLBASE515	—	7536.25	—	7536.25
Totals	**—**	**51347.50**	**—**	**51347.50**
PowerStorm 4DxxT support V5.02				
Subset	**root**	**/usr**	**/var**	**Total**
4DTBASE502	—	12578.07	—	12578.07
4DTCONFIG502	—	—	—	—
4DTGLBASE502	—	7349.09	—	7349.09
4DTGLEXAM502	—	12586.55	—	12586.55
4DTGLMAN502	—	2050.56	—	2050.56
4DTZE3502	—	25976.59	—	25976.59
Totals	**—**	**60540.87**	**—**	**60540.87**
Graphical Program Analysis Tools V3.1 for Compaq Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
GPABASE311	—	45393.38	—	45393.38
GPALCLCLIENTS311	—	18172.43	—	18172.43
JAVJRE117	—	6475.42	—	6475.42

Table A–3: Disk Space Requirements (cont.)

Graphical Program Analysis Tools V3.1 for Compaq Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
JAVJREOPT117	—	5755.11	—	5755.11
Totals	**—**	**75796.34**	**—**	**75796.34**
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**
OSRETIREDTCL76510	—	3451.68	—	3451.68
OSRETIREDTK42510	—	3834.83	—	3834.83
Totals	**—**	**7286.51**	**—**	**7286.51**
Tru64 UNIX TruCluster(TM) Server Software T5.1-10				
Subset	**root**	**/usr**	**/var**	**Total**
TCRBASE510	874.74	74697.65	13083.97	88656.37
TCRMAN510	—	1782.38	—	1782.38

Table A–3: Disk Space Requirements (cont.)

Tru64 UNIX TruCluster(TM) Server Software T5.1-10				
Subset	**root**	**/usr**	**/var**	**Total**
TCRMIGRATE510	—	2167.76	—	2167.76
Totals	**874.74**	**78647.79**	**13083.97**	**92606.50**
UniCensus				
Subset	**root**	**/usr**	**/var**	**Total**
UNICEN434	—	—	2224.47	2224.47
Totals	**—**	**—**	**2224.47**	**2224.47**
Java JRE 1.1.7B-5				
Subset	**root**	**/usr**	**/var**	**Total**
DVTBASE200	—	33432.55	—	33432.55
JAVJRE117	—	6475.42	—	6475.42
Totals	**—**	**39907.97**	**—**	**39907.97**
Web-based Enterprise Service				
Subset	**root**	**/usr**	**/var**	**Total**
WEBESBASE210	—	55985.90	—	55985.90
Totals	**—**	**55985.90**	**—**	**55985.90**
Windows 2000 Single Sign On				
Subset	**root**	**/usr**	**/var**	**Total**
W2KSSO100	73.96	5278.96	—	5352.91
Totals	**73.96**	**5278.96**	**—**	**5352.91**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	46137.28	**933777.39**	**21410.75**	**1001325.41**

A.2 Disk Space Required for RIS Areas

The Remote Installation Services (RIS) area for Tru64 UNIXVersion 5.1 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. The first is where you can boot a disk containing Tru64 UNIX Version 5.1 and run the `cleanPR` command. The second is where you are trying to install Tru64 UNIX Version 5.1 on a disk that is behind an HSG80 or HSZ80 controller, has a persistent reservation on it, and there is no installed version of the base operating system is available.

For the first scenario, if you encounter persistent reservations when attempting to access storage that was previously used in a cluster, boot the Tru64 UNIX Version 5.1 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 Version 5.1 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.

For example:

```
# /usr/sbin/cleanPR clean                          cleanPR
Version: 1.3


                                WARNING
       This shell script will clear all Persistent Reservations
        from the HSX80 devices attached to this system.

                                WARNING

Do you wish to proceed ? {y/n} [n]: y
        Removing Persistent Reservations from all HSX80 devices...

 Checking HSG80 at /dev/rdisk/dsk10a (SCSI #2 (SCSI ID #4) (SCSI LUN #11))
                       Key Entry 0: 0x10002
                       Key Entry 1: 0x10001

                Registered with key 0x0
                Cleared

 Checking HSG80 at /dev/rdisk/dsk11a (SCSI #2 (SCSI ID #4) (SCSI LUN #10))
                       Key Entry 0: 0x10002
                       Key Entry 1: 0x10001

                Registered with key 0x0
                Cleared

 Checking HSG80 at /dev/rdisk/dsk12a (SCSI #2 (SCSI ID #4) (SCSI LUN #29))
                       Key Entry 0: 0x10002
                       Key Entry 1: 0x10001

                Registered with key 0x0
                Cleared

 Checking HSG80 at /dev/rdisk/dsk13a (SCSI #2 (SCSI ID #4) (SCSI LUN #28))
                       Key Entry 0: 0x10002
```

```
                Key Entry 1: 0x10001

            Registered with key 0x0
            Cleared

 Checking HSG80 at /dev/rdisk/dsk14a (SCSI #2 (SCSI ID #1) (SCSI LUN #22))
                Key Entry 0: 0x10001
                Key Entry 1: 0x10002

            Registered with key 0x0
            Cleared

 Checking HSG80 at /dev/rdisk/dsk15a (SCSI #2 (SCSI ID #1) (SCSI LUN #20))
                Key Entry 0: 0x10001
                Key Entry 1: 0x10002

            Registered with key 0x0
            Cleared

 Checking HSG80 at /dev/rdisk/dsk16a (SCSI #2 (SCSI ID #1) (SCSI LUN #25))
                Key Entry 0: 0x10001
                Key Entry 1: 0x10002

            Registered with key 0x0
            Cleared

Checking HSG80 at /dev/rdisk/dsk17a (SCSI #2 (SCSI ID #1) (SCSI LUN #24))
                Key Entry 0: 0x10001
                Key Entry 1: 0x10002

            Registered with key 0x0
            Cleared

 Checking HSG80 at /dev/rdisk/dsk6a (SCSI #2 (SCSI ID #1) (SCSI LUN #1))

                Key Entry 0: 0x10001
                Key Entry 1: 0x10002

            Registered with key 0x0
            Cleared

 Checking HSG80 at /dev/rdisk/dsk7a (SCSI #2 (SCSI ID #1) (SCSI LUN #4))

                Key Entry 0: 0x1
                Key Entry 1: 0x1

            Registered with key 0x0
            Cleared
```

```
 Checking HSG80 at /dev/rdisk/dsk8a (SCSI #2 (SCSI ID #1) (SCSI LUN #7))

                       Key Entry 0: 0x10001
                       Key Entry 1: 0x1

                  Registered with key 0x0
                  Cleared

 Checking HSG80 at /dev/rdisk/dsk9a (SCSI #2 (SCSI ID #1) (SCSI LUN #6))

                       Key Entry 0: 0x1
                       Key Entry 1: 0x10002

                  Registered with key 0x0
                  Cleared


Total of 12 devices found w/Persistent Reservations
Total of 12 devices cleared of Persistent Reservations
```

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How to Order Tru64 UNIX Documentation

To order Tru64 UNIX documentation in the United States and Canada, call **800-344-4825**. In other countries, contact your local Compaq subsidiary.

If you have access to Compaq's intranet, you can place an order at the following Web site:

http://asmorder.nqo.dec.com/

If you need help deciding which documentation best meets your needs, see the Tru64 UNIX *Documentation Overview*, which describes the structure and organization of the Tru64 UNIX documentation and provides brief overviews of each document.

The following table provides the order numbers for the Tru64 UNIX operating system documentation kits. For additional information about ordering this and related documentation, see the *Documentation Overview* or contact Compaq.

Name	Order Number
Tru64 UNIX Documentation CD-ROM	QA-6ADAA-G8
Tru64 UNIX Documentation Kit	QA-6ADAA-GZ
End User Documentation Kit	QA-6ADAB-GZ
Startup Documentation Kit	QA-6ADAC-GZ
General User Documentation Kit	QA-6ADAD-GZ
System and Network Management Documentation Kit	QA-6ADAE-GZ
Developer's Documentation Kit	QA-6ADAF-GZ
Reference Pages Documentation Kit	QA-6ADAG-GZ
TruCluster Server Documentation Kit	QA-6BRAA-GZ

Reader's Comments

Tru64 UNIX
Release Notes for Version 5.1
AA-RH8WB-TE

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