Tru64 UNIX

Release Notes

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This manual provides a comprehensive version of the Tru64™ UNIX® (formerly DIGITAL UNIX) *Release Notes*. These notes provide information on restrictions to the software and documentation for Tru64 UNIX.

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About This Manual

This manual contains release notes for the Tru64™ UNIX® (formerly DIGITAL UNIX) Version 5.0 operating system software.

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

Audience

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

Organization

This manual is organized as follows:

Chapter 1	Contains an overview of new and changed features in this version of the operating system software
Chapter 2	Contains information about features that have been retired in this release of Tru64 UNIX and that are scheduled to be removed in future versions
Chapter 3	Contains installation notes
Chapter 4	Contains processor-specific information
Chapter 5	Contains information about the base operating system software
Chapter 6	Contains information about the development environment
Chapter 7	Contains information about the window system software
Chapter 8	Contains information about the documentation
Appendix A	Contains the disk space requirements for the individual subsets included on the kit
Appendix B	Contains information about time zone enhancments

Related Documents

You will find it helpful to have the following documentation available during the installation of this release.

- The hardware documentation for your system
- The *Installation Guide*
- The *Installation Guide — Advanced Topics*
- The online or hardcopy reference pages
- The HTML files that are provided on the CD–ROM, especially *New and Changed Features from Previous Releases*

You can also view the Tru64 UNIX Version 5.0 *Technical Update* for any additional information not included in these notes. You can access the *Technical Update* from the following URL:

http://www-unix.zk3.dec.com:8083/faqs/publications/pub_page/update_list.html

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

G	Books for general users
S	Books for system and network administrators
P	Books for programmers
D	Books for device driver writers
R	Books for reference page users

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

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

Reader's Comments

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Please include the following information along with your comments:

- 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 have changed significantly from previous releases.

Tru64 UNIX Version 5.0 is a major release that includes the following enhancements:

- The operating system is scalable to very large configurations.
- Performance improvements have been implemented in many areas, including file systems, storage management, and networking.
- Installation, set up, and system management have been simplified.
- Reliability, availability, and serviceability features have been enhanced.
- Support for future versions of the Tru64 UNIX TruCluster software product is included.
- New and updated versions of some associated products are included.

The following sections provide more information on the major new features included in Version 5.0.

1.1 Scalability Enhancements

Version 5.0 provides the following scalability enhancements:

- More efficient scaling with more CPUs

  Enhanced scaling allows for the addition of more CPUs in SMP systems. AlphaServer 8400 systems can include up to 14 CPUs in a single system. Additionally, several design improvements have been made to allow CPU scaling well beyond 14 CPUs with future systems.

- Very Large Memory (VLM)

  Improved memory utilization to 28 GB provides for more efficient use of memory in VLM configurations.

- File and Storage Limits

  This version supports 4 TB or larger file and storage systems. For more information, see Section 1.10.2.

- Performance benchmarks

This version provides improvements in the following benchmarks: AIM VII, LADDIS, TPC-C, TPC-D and SPECweb.

- Enhanced device support
  - SCSI-3 standard support allows up to 256 target and LUN addresses per SCSI bus and supports dual pathing (an alternate path to a device).
  - New device naming provides a flexible framework that allows more than 256 device names per SCSI bus. The new device naming supports SCSI-3 and FibreChannel. It includes the ability to convert existing device names in an existing configuration to new device names automatically, while retaining support for old device names. For more information, see Section 1.10.1.
  - FibreChannel support for switched connections and multiple concurrent paths (up to 64) with adaptive load balancing has been added. Both SCSI-2 and SCSI-3 commands are supported.
- Dynamic Tuning

  Most tuning can now be done at run time without rebooting the system.

In addition to these enhancements, this version of Tru64 UNIX also provides extended system limits. More information on some of these limits can be found in the relevant sections of this manual. For more information on system limits in general, see the *Software Product Description* (SPD).

1.2 Installation Improvements

This release provides several improvements to the Update and Full Installation processes.

The following enhancements have been made the Update Installation process:

- A graphical user interface has been added to the Update Installation process. In previous releases, the Update Installation provided only a text-based interface.
- Updating Worldwide Language Support (WLS) software is performed automatically during an Update Installation of the base operating system. It is no longer necessary to remove WLS software before the operating system is updated or to update WLS software as a separate task.
- The Update Installation can be invoked with the optional `-u` flag to run the Update Installation in unattended mode. Unattended means that barring any problems with the update, there is no user interaction required. The only exception to this is the switching of CD-ROMs if WLS

software is being updated. The `-u` flag builds a kernel with all kernel components and does not provide the chance to archive obsolete files.

- An analysis phase has been added to the beginning of the Update Installation process. The system is analyzed for layered products that prevent the Update from continuing, layered products that will need to be reinstalled after the Update, fatal and non-fatal file system type conflicts, and available disk space. If layered product or non-fatal file type conflicts are discovered, you can resolve them directly from the Update Installation user interface; there is no need to exit the Update, resolve the conflict, and restart the Update. If your system does not have enough available disk space for new software and room for temporary processing, disk space recovery options are available directly from the Update Installation user interface as well.

The following improvements have been made to the Full Installation process:

Both the text-based and graphical user interfaces have a new task-oriented design, which steps you through each installation task and lets you go backward and forward at any time to change your answers.

The Advanced File System (AdvFS) is now the default file system type rather than the UNIX File System (UFS).

During optional software subset selection, software dependencies are automatically identified and resolved. Dependency checking ensures that other software required for the proper operation of the optional software also is installed. If such a relationship is detected, the dependent software is installed automatically and you are notified accordingly.

You can configure the Logical Storage Manager (LSM) and install directly into LSM volumes during the Full Installation process.

Worldwide Language Support (WLS) software can be installed during a Full Installation, eliminating the need to install WLS software as a separate task.

A third invocation point has been added for user-supplied files, which can be used to customize the installation. This file must be called `postreboot`, and it is searched for and executed immediately after the newly installed system reboots. More specifically, the `postreboot` file is invoked after the check for a `config.cdf` file so that the `postreboot` file can take advantage of a network-configured system.

For more information, see the *Installation Guide*.

1.3 System Management

This version of Tru64 UNIX provides many new features and enhancements to its system management utilities. The following sections highlight some of these changes. For more information, see the *System Administration* guide, the *Installation Guide*, the `sysman_intro`(8) reference page, and the online help for the applications.

1.3.1 Event Manager

The Event Manager (EVM) has been added to the SysMan utilities. EVM provides a centralized means of gathering, distributing, storing, and reviewing event information, regardless of how the events are posted. Event Manager makes event information more accessible and provides an event infrastructure that is flexible and adaptable. Some of the features included with EVM are:

- A means for user-level components to post events
- A means for processes to request notification when specified events occur
- An event logger that stores selected events and can display them on the system console or forward them to the system administrator as electronic mail
- An event viewer that allows you to retrieve and review stored event information from a character-cell terminal, a CDE window, or a Web browser
- A set of command-line utilities for posting, retrieving, or monitoring events from a shell script or a terminal
- A supporting application programming interface (API) library

For more information, see the *System Administration* guide and the `EVM`(5) reference page.

1.3.2 Exporting Tru64 UNIX System Management Data Using SNMP

This release includes methods for exporting Tru64 UNIX system management data using the Simple Network Management Protocol (SNMP). For more information, see the *System Administration* guide.

1.3.3 SysMan Integration and Application Access

The integration of and access to the SysMan applications has been enhanced in this version of Tru64 UNIX. You can now access the SysMan

applications from the System_Admin section of the desktop's Application Manager, the Custom Setup checklist, and by using the `sysman` command.

The `sysman` command provides access to the suite of system management utilities, making it easier for you to find the applications you need to manage your system. This suite includes the SysMan Menu, the SysMan Station, the `sysman` command line interface, and the `sysman -clone` command. The following list provides a brief overview of these applications:

- The SysMan Menu provides a framework for organizing various system management tasks. Each task represents a small application that is launched from the SysMan Menu. All the tasks on the SysMan Menu can be performed from an X11-capable display, a personal computer running Windows 95, Windows 98, or Window NT, or a character cell terminal.
- The SysMan Station provides a graphical representation of the system and enables system management from a personal computer. For more information, see the `sms`(8) reference page.
- The `sysman` command provides command-line access to system management data for scripting. The `sysman -cli` command enables you to view, add, modify, and delete data. You can perform all the system management tasks available on the SysMan Menu from the command line using the `sysman -cli` command. For more information see the `sysman_cli`(8) reference page.
- The Configuration Description File (CDF) file is an extension of the install CDF file. It enables you to save certain SysMan configuration information from a previously configured system and replicate that configuration information across one or more systems. The configuration information is saved to a text-based CDF file. You can edit the CDF file and change any value; however, certain host-specific attributes must be edited to retain a unique network identity for the cloned systems. This feature is available by running the `sysman -clone` command. For more information, see the System Setup checklist online help, the *Installation Guide — Advanced Topics*, and the `sysman_clone`(8) reference page.

For more information on system management applications, see the `sysman`(8) reference page, the online help for the specific application, and the *System Administration* guide.

1.3.4 New and Changed SysMan Configuration Applications

This version of Tru64 UNIX provides several new configuration applications and many enhancements to existing system management applications. The following list provides a brief overview of the new applications and the changes to the existing ones. For more information on

these applications, see the online help for the application and the *Network Administration* and *System Administration* guides.

- Quick Setup

  The recommended method for performing an initial system configuration after a full installation is to use the new Quick Setup application. Quick Setup is a wizard-like application that guides you through the essential and most commonly performed configuration steps. It provides a fast, user-friendly way to set up your system with the basic system configuration. The resulting system can be used as is or you can augment it with settings accessible in the full-featured configuration applications.

  After a full install, the Quick Setup application is available from the System Setup application that is displayed the first time you log in as root. On a graphics-capable system, click on the Quick Setup icon on the System Setup checklist. On a character-cell system, first enter choice 5 (Begin system configuration) and then enter choice 1 (Quick Setup).

- Division of Privileges (DoP)

  Division of Privileges (DoP) functionality has been enhanced in this release. All privileged system management applications launched via the SysMan Menu, the SysMan Station, the desktop's Application Manager, or the Custom Setup checklist/menu use DoP. The DoP user interface, `sysman dopconfig`, enables administrators to grant users or groups access to execute these privileged programs without knowing the root password. The DoP command line interface also allows users to execute a privileged program or modify the privilege database. For further information about DoP, see the `dop`(8) reference page, the *System Administration* guide, and the `dopconfig` online help.

- Network Setup Wizard

  The Network Setup Wizard leads you through the various applications that you use to add a system to a network. The wizard steps you through the applications in a recommended order and provides information to help you determine which applications are applicable to each situation. This application replaces the former network configuration applications, `netsetup` and `netconfig`. Each step in the Network Setup Wizard can also be invoked as a standalone application off the SysMan Menu. For more information, see the *System Administration* guide and the Network Setup Wizard online help.

- Asynchronous Transfer Mode (ATM) configuration

  This release provides a new SysMan application for configuring the ATM subsystem. This application supports configuring Classical IP over PVCs and IP Switching.

- Point-to-Point Protocol (PPP) configuration

  This release provides new PPP Option File and Authentication File configuration applications. The Option File configuration application offers a simplified method of creating and deleting PPP option files and for selecting options and their values. The PPP Authentication File configuration allows you to add, delete, or modify an entry in the `pap-secrets` or `chap-secrets` authentication files. These applications eliminate the need to manually create or modify these files.

- Network Time Protocol (NTP) configuration

  The new NTP configuration application enables you to set up an NTP client or peer (a local NTP server that can synchronize the time with another server or be synchronized by it). It also enables you to check the status of the NTP daemon and to start, restart, and stop the daemon. This application replaces the former `ntpsetup` application.

- Change to Domain Name Service (DNS) configuration

  The DNS configuration application has a new interface which presents you with a list of tasks relating to DNS/BIND. This application replaces the former `bindsetup` and `bindconfig` applications. (Note that the Tru64 UNIX implementation of DNS is based on BIND Version 8.1.)

- Change to Network File System (NFS) configuration

  The NFS configuration application has a new interface which presents you with a list of tasks relating to NFS. This application replaces the former `nfssetup` and `nfsconfig` applications.

- Change to the `dxshutdown` application

  The `dxshutdown` application now starts the new SysMan Shutdown application. The new user interface is similar to the original, which is still available in the obsolete subset OSFOLDDECW500. For more information, see the *System Administration* guide and the `dxshutdown`(8) reference page.

- The `bindsetup`, `nfssetup`, `ntpsetup`, and `netsetup` scripts have been retired. Replacement applications are available from the SysMan Menu. For more information, see Section 2.1.12.

- The new `secconfig` utility replaces the retired `secsetup` utility.

  You can access the new utility by choosing Security Configuration from the SysMan Menu or by selecting the Security icon from the SysMan Configuration menu.

  The `secconfig` utility's new Enhanced Security options provide the following features:

  – Shadow password mode

– Custom mode, which enables you to enable login logging, establish defaults for site passwords, and password prompting options

You can also use the new utility to enable and disable ACL processing, which you can now do without rebuilding the kernel. For more information, see the Section 1.10.12.2.

The `secconfig` utility is required for TruCluster support. The old `secsetup` utility resides in the Obsolete Commands and Utilities subset. Do not use it on a TruCluster member. For more information, see the *Security* guide.

- The new `auditconfig` utility replaces the old `audit_setup` utility.

  You can access the new utility by choosing Audit Configuration from the SysMan Menu or by selecting the Audit icon from the SysMan Configuration menu.

  Use the `auditconfig` utility to select the location of the audit log files, the action to take if file system space is exhausted, and to select which events to audit.

  To simplify audit event selection, suggested events for different system types are grouped into categories (sometimes referred to as profiles). Choosing an event category enables auditing of all events and file accesses associated with the category. The Events within Categories option displays all events associated with a category, and allows you to tailor the category choices to your site.

  The `auditconfig` utility is required for TruCluster support. The old `auditsetup` utility resides in the Obsolete Commands and Utilities subset. Do not use it on a TruCluster member. For more information, see the *Security* guide.

1.4 File Systems and Storage

The enhancements to file systems and storage include the following:

- Direct I/O for AdvFS provides direct disk access without cache management for database and other applications to increase I/O throughput.
- AdvFS Smooth Synch.
- Enhancements to the `vdump` command.
- Public backup application programming interface for AdvFS.
- Salvage (data recovery utility).
- Increased scalability for AdvFS to support more users, faster access, more and larger files, and better handling of many small files.
- New on-disk formats for AdvFS domains. (See Section 1.10.8.2.)

- Enhancements to the Logical Storage Manager (LSM) include the following:
  - Dirty Region Logging (DRL) replaces Block Change Logging (BCL). DRL provides faster and more predictable failover.
  - RAID5 support.
  - Hot spare support (automatic recovery).
  - Usability improvements.
  - Increased limits.
  - Automatic configuration and load-balancing.
  - Root/swap encapsulation and mirroring on different disks.

1.4.1 File Systems Support for Increased Subdirectories and Links

This version introduces UFS Version 4, which simply supports 65533 hardlinks and continues to support existing UFS (now called Version 3). There is no on-disk structure change; however, there is an incompatibility problem when you use UFS Version 4 with earlier versions of the operating system. For more information, see the *System Administration* guide.

AdvFS, UFS, and VFS now support up to 65531 subdirectories. Previously they supported 32765 subdirectories. The maximum number of links to a file has been increased from 32767 to 65533.

AdvFS domains created under previous releases are called AdvFS Version 3 domains, while AdvFS domains created under Tru64 UNIX Version 5.0 are AdvFS Version 4 domains. An AdvFS Version 4 domain allows up to 65531 subdirectories and up to 65535 links to a file. All AdvFS Version 3 domains, even those created using the Tru64 UNIX Version 5.0 `mkfdmn -V3` command, will support, at most, 32765 subdirectories and 32767 links to a file.

Because AdvFS Version 3 domains cannot have more than 32767 links, they can be moved back and forth between Tru64 UNIX Version 5.0 and earlier versions of the operating system. AdvFS Version 4 domains, however, will only work on Tru64 UNIX Version 5.0 systems.

Note that the `pathconf()` and `fpathconf()` system calls will return the maximum value for a particular pathname with the _PC_LINK_MAX option.

For more information on AdvFS, see the *AdvFS Administration*. For more information on UFS, see the *System Administration*, and the `newfs`(8) and `fsck`(8) reference pages. Also see Section 5.6.3.

1.5 New Networking Features

Networking enhancements include the following:

- ATM enhancements, including a new SysMan configuration application. You no longer need to configure Classical IP over PVCs and IP Switching through the `/etc/atm.conf` file. The `/etc/atm.conf` file is still supported for starting user-written or third-party ATM components that are not supported by the ATM configuration application. The `atm.conf` file is now automatically invoked when the system boots, immediately after the ATM configuration.
- Support for RFCs 1901-1908 (SNMPv2C) in the Extensible SNMP Agent, subagent developer's tools, and SNMP-related commands.
- Support for RFC 2257 (Agent Extensibility) in the Extensible SNMP Agent and subagent developer's tools.
- Support for RFC 2089 (Mapping SNMPv2 to SNMPv1) in the bilingual extensible SNMP agent.
- PPP has been updated to Version 2.3.1 and a new configuration application has been added.
- Resource Reservation Protocol (RSVP) (RFC 1633) has been added for Ethernet and FDDI, which provides QoS for realtime traffic.
- The Domain Name Service (DNS) has been upgraded from BIND Version 4.9.3 to Version 8.1.1, including dynamic updates to DNS.
- New TCP/IP features, including Path MTU over UDP and enhanced rlogin and telnet scaling.
- XTI XPG4 now supports Orderly Release. The XTI XPG4 service type has been changed from `T_COTS` to `T_COTS_ORD`. Orderly Release includes support for the `t_sndrel` and `t_rcvrel` library routines. In previous releases you needed to use XPG3 to get Orderly Release support.

1.6 DAPBA and DAPCA ATM Adapter Support

This release of Tru64 UNIX contains support for the following three new ATM adapters:

- 3X-DAPBA-FA – 155 Mbps ATM adapter (fiber)
- 3X-DAPBA-UA – 155 Mbps ATM adapter (UTP)
- 3X-DAPCA-FA – 622 Mbps ATM Adapter (fiber)

These adapters are all 64-bit PCI cards. See the `lfa`(7) reference page for more information on the adapter and the `sys_attrs_lfa`(5) reference page for more information on the driver configuration options.

Not all platforms support these adapters. See the *Server Options Catalog* for the number and type of each adapter supported on your platform and for any configuration rules that apply.

1.7 Advanced Server for UNIX

The integration of the Advanced Server for UNIX with the Tru64 UNIX operating system has been enhanced to provide for Single Task Management capabilities for UNIX and Windows/NT systems. The UNIX administrator can use UNIX or Windows NT administration tools to configure resources for PC users, such as the following:

- Adding a user
- File sharing
- Printer sharing
- Password synchronization for Windows, NIS, and UNIX domains

1.8 Enhanced TruCluster Support

Several features included in Tru64 UNIX Version 5.0 provide support for future TruClusters products, in addition to providing other functionality. These features include the following:

- New device naming
- Modifications to the file system layout
- Expanded process IDs (PIDs)
- Context-dependent symbolic links (CDSLs)

For more information on new device names and CDSLs, see the *System Administration* guide.

1.9 Documentation

The Tru64 UNIX documentation set has been updated to make it more comprehensive and easier to use. Some of the major improvements are:

- To address the needs of different users, the *Installation Guide* has been divided into two volumes. The *Installation Guide* has been reduced in scope to make it easier for the novice user. The new *Installation Guide — Advanced Topics* guide provides expert installers with the information required to do custom installations.
- The *System Administration* guide has been updated to make it more task-oriented.

- The following manuals have been added to the documentation set:
  - *AdvFS Administration* – This manual describes the Advanced File System (AdvFS) and the AdvFS Utilities. It provides detailed information on features and functions, and it gives suggestions on how to use these functions. Procedures for working at the command line and with the AdvFS graphical user interface are described.
  - *Writing Kernel Modules* – This manual provides information for device driver developers who will benefit from having an intermediate layer of code between the driver software and physical devices. It will also benefit third-party developers who want to augment the kernel with modules tailored to their particular environment.
  - *System Configuration Supplement: OEM Platforms* – This manual provides information on installing and configuring the VME and DMCC single system computers.
- The online help has been updated to make it more complete and robust.
- The complete set of base operating system reference pages is now included in HTML form on the Documentation CD-ROM, with access through the standard HTML Documentation Library. The reference pages are indexed both alphabetically and by section. Reference pages for layered products are not included on the Documentation CD-ROM; if they are installed, those reference pages can be viewed with the man command, the xman command, or the webman viewer. With the addition of the HTML reference pages, the webman viewer has been changed so that it displays only reference pages that are actually installed on the system. The redundant set of compressed reference pages has been removed from the Documentation CD-ROM.

1.10 Additional Changes

The following sections provide brief descriptions of additional changes included in Tru64 UNIX Version 5.0.

1.10.1 Changes to Device Naming

This release provides 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 version of Tru64 UNIX implements this change 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 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.

1.10.2 Changes to Data Structures to Support Larger File Systems and Storage

Prior to Version 5.0, there were restrictions on the support of files and file systems that exceeded 1.2 TB. This was due to the use of 32 bit fields within the `stat` and `statfs` structures. In this release, the following structures have been modified:

- The `struct stat` in `/usr/include/sys/stat.h`
- The `struct statfs` in `/usr/include/sys/mount.h`

The changes to the `stat` and `statfs` structures are to support multiterabyte file systems. This enhancement is implemented in a way that allows current programs to continue to run without error. The `stat` and `statfs` changes are the default for programs and objects that are rebuilt on Version 5.0. The new definitions may only cause problems for applications that pass the structures as part of their API, and then only if the API and the caller were compiled on different versions of the operating system.

Any use of `stat` or `statfs` within an application or library will continue to work without error regardless of any change in the current defaults. However, if the application accepts `stat` or `statfs` structures as input to routines in their API, or returns these structures from routines in their API, a problem could occur, if the API and the code using the API were compiled on different versions of the operating system. If all the sources are compiled on Tru64 UNIX Version 5.0 no problems will occur. Also if your API links with libraries and object files created on previous versions of the operating system, you can use the `-D_V40_OBJ_COMPAT` compiler flag to create object files that are compatible.

Applications and libraries that are built on Version 5.0 will not run on prior versions of the operating system.

1.10.3 Swap Device List and /sbin/swapdefault Moved to /etc/sysconfigtab

The list of swap devices has moved from the `/etc/fstab` file to the `/etc/sysconfigtab` file. The use of `/sbin/swapdefault` to indicate the swap allocation modes has been moved to the `/etc/sysconfigtab` file.

The swap devices and swap allocation mode are automatically placed in the `/etc/sysconfigtab` file during installation.

For more information, see the *System Administration* guide.

1.10.4 Hot Swap Support

The kernel now supports hot-swap I/O devices. This functionality provides the capability to automatically fault-in a device driver when an I/O device is hot-plugged in.

When the hardware code detects a new device is hot-plugged in and determines that the device driver is not present in the kernel, it can make a single kernel function call (for example `cfg_configure`) to automatically load the device's driver into the kernel. Additionally, hot-swap provides the flexibility of not having to prebuild a kernel subsystem or driver into the kernel but to dynamically fault it in at the first access of the device.

1.10.5 Kernel Attribute Changes

All kernel attribute names now use underscores. They no longer contain dashes. Old kernel attribute names using dashes are hidden; they are no longer automatically shown in the output of a query operation. Although existing tools and programs using the old attribute names still work in this release, the old names with dashes will be retired in a future release. For more information on kernel attributes, see the `sys_attrs`(5) reference page.

1.10.6 Kernel Tuning Attribute Changes

The default values for the `maxusers` and `vm_page_free_target` kernel tuning attributes have been modified to improve performance on larger systems. The default values set for these attributes depend on the amount of memory in the system. For more information, see the *System Configuration and Tuning* guide.

You can override the default values for the `maxusers` and `vm_page_free_target` attributes by setting the values in the `/etc/sysconfigtab` file.

Note also that the `vm-mapentries`, `vm-vpagemax`, `vm-maxvas`, `vm-maxwire`, `vm-heappercent`, `vm-zone_size`, and `vm-vpagemax` attributes have been removed. The `vm-mapentries` and `vm-vpagemax` attributes are now set internally to their maximum values. The `vm-maxvas` attribute is replaced by the `max_per_proc_address_space` attribure in the `proc` subsystem.

The `vm_ubcseqstartpercent` attribute is now defined to be a percentage of `ubc_maxpercent` instead of available memory. This allows the system to automatically adjust the sequential drain threshold when the `ubc_maxpercent` attribute is modified. If both the `ubc_maxpercent` and

vm_ubcseqstartpercent attributes are specified in the /etc/sysconfigtab file, examine and adjust the vm_ubcseqstartpercent attribute according to the new specification. For example, if prior to installing Version 5.0 the ubc_maxpercent attribute is set to 40 and the vm_ubcseqstartpercent attribute is set to 20, the attributes must be set as follows to achieve the same results:

```
vm:
     ubc_maxpercent = 40
     vm_ubcseqstartpercent = 50
```

1.10.7 System Management

This section provides information on additional new features to the system management environment.

1.10.7.1 Enhanced Hardware Management

This release includes Enhanced Hardware Management which provides a single method for managing hardware on a Tru64 UNIX system. See the *System Administration* guide for more information.

1.10.7.2 Insight Manager Integrated with sys_check

The sys_check tool has been integrated with Insight Manager. An entry in the /var/spool/cron/crontabs/root file that runs sys_check once a week at 3:00 a.m. every Sunday morning and makes its output available to the Insight Manager home page. This entry is commented out by default.

You can make sys_check data available to Insight Manager by running sys_check automatically as a cron job or by running it from the SysMan Menu. In the SysMan Menu, it is listed as Create a configuration report under Support and Services.

If you want to run sys_check automatically as part of your regular system operations, remove the comment character from in front of the runsyscheck entry in the /var/spool/cron/crontabs/root file. You can edit the entry to run at a time that is convenient for your operations.

For more information, see the *System Administration* guide and the sys_check(8) reference page.

1.10.7.3 New /etc/rc.config.common File

Every system has a system-specific configuration file (/etc/rc.config) and a cluster-wide configuration file (/etc/rc.config.common). Both files can contain run-time configuration variables on a standalone system.

All cluster members in a cluster share the /etc/rc.config.common file. You can also create and use an /etc/rc.config.site file on multiple system for site-specific purposes.

The hierarchy of the configuration files allows an administrator to define configuration variables consistently over all systems within a LAN and within a cluster. Variables that are the same for all machines on the LAN can be defined in the site-wide file. Variables that are not defined for the site but are the same for each cluster member can be defined in the cluster-wide file. Finally, machine-specific variables can be defined in the system-specific file on each system.

The rcmgr command accesses these variables in a standard search order. The command first reads the /etc/rc.config file, then the /etc/rc.config.common file, and then the /etc/rc.config.site file, if it exists. You must manually edit the /etc/rc.config to pull in the /etc/rc.config.site.

In Tru64 UNIX Version 5.0, some run-time configuration variables that were previously stored in the /etc/rc.config file have been placed in the /etc/rc.config.common file.

You can use the rcmgr command to locate, retrieve, and set run-time configuration variables, whether they reside in the /etc/rc.config, /etc/rc.config.common, or /etc/rc.config.site file.

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

1.10.7.4 Mail Enhancements

The sendmail program has been updated to sendmail Version 8. This version of sendmail provides enhanced functionality, including:

- The ability to create, modify, and display dbm files
- The ability to use sendmail Version 8 without reconfiguring the system

This release also provides the ability to connect to a POP3 server from a base UNIX client, namely MH (Rand Mail Handler). The implementation of POP3 provided with Tru64 UNIX is supplied by the MH suite of programs. This implementation also includes a POP3 client.

1.10.7.5 Enhancement to the shutdown Command

The shutdown command has been enhanced with a new option, -s, that enables you to specify that the system should execute the run-level transition scripts before reboot or halt operations. This option can be used with the -r or -h options.

1.10.7.6 Change in root crontab Behavior

The `root crontab` file (`/usr/var/spool/cron/crontabs/root`) contains three entries that clean up system log files once a week at 2:00 AM every Sunday:

- The `/var/adm/wtmp` file that tracks user logins
- The `/var/adm/messages` file that tracks system boot and kernel error messages (including device probe results) that are not captured in the `/var/adm/binary.errlog` file
- The `/var/adm/cron/log` file that tracks the activity of the cron daemon

One compressed backup file of each log file is retained until the next week as part of this process.

If you do not want the `cron` daemon to perform this cleanup or want to preserve your log files for a longer period of time, you can either change the frequency of the cleanup or remove (or comment out) the applicable entries in the `root crontab` file.

For more information, see the `crontab`(1) reference page.

1.10.7.7 NetRAIN Interface Configuration

The method for configuring a Redundant Array of Independent Network Adapters (NetRAIN) interface has changed in this release of Tru64 UNIX. If you are upgrading to Version 5.0 and you configured a NetRAIN set in an earlier version of the operating system, you will need to migrate your set to the new configuration.

Remove the current NetRAIN configuration lines from the `inet.local` file or `rc.config` file on your system, then follow the instructions in the NetRAIN section of the *Network Administration* guide to configure an interface.

1.10.8 AdvFS File System

The following sections describe new features for the AdvFS file system.

1.10.8.1 Fileset Creation with var Area in /usr

Selecting the "in /usr" option for the `var` area now creates both a `usr` fileset and a `var` fileset within the `usr` domain when AdvFS is selected for the `usr` file system. Previously, this option created a single `usr` fileset within the `usr` domain that contained both `usr` and `var` information.

This change affects users who back up AdvFS filesets with the vdump command. Previously, if your system was configured with var in the usr fileset, you needed only to back up the usr fileset. Now that this option creates a separate fileset for the var area, you must issue an additional vdump command against the var fileset or the information in the var fileset will not be backed up.

1.10.8.2 New On-Disk Format for AdvFS Domains

This release provides an improved AdvFS on-disk file system structure that obviates many of the problems with AdvFS file systems that have a large number of files. File domains created using Tru64 UNIX Version 5.0 will use the new on-disk format and will take advantage of its benefits.

File domains that were created using versions of Tru64 UNIX prior to Version 5.0 are recognized by later versions. However, domains created earlier do not support Version 5.0 enhancements. Filesets that are created in these domains, even after an operating system upgrade to Version 5.0, retain the characteristics of the older operating system. File domains created using Tru64 UNIX Version 5.0 are not recognizable by earlier versions of Tru64 UNIX and may not be used by them in any way.

For more information, see the *AdvFS Administration* guide.

1.10.8.3 New AdvFS System Attributes

The following system attributes have been added to AdvFS:

- AdvfsMinFreeAccess
- AdvfsMaxFreeAccessPercent
- AdvfsDomainPanicLevel

The AdvfsMinFreeAccess and AdvfsMaxFreeAccessPercent attributes provide you with more control over the number of available AdvFS access structures on your system. Access structures are the in-memory representation of an AdvFS file. These attributes supersede the AdvfsAccessCleanupPercent attribute, which has been removed.

The AdvfsDomainPanicLevel attribute controls what happens during an AdvFS domain panic. By default, when an AdvFS domain panic occurs, this attribute enables the system to create a crash dump without crashing the system.

Additionally, the default value of the AdvfsAccessMaxPercent attribute has changed.

For more information, see the *AdvFS Administration* and *System Configuration and Tuning* guides and the sys_attrs_advfs(5) reference page.

1.10.8.4 Ehancement to the quotacheck Command

The quotacheck -t ufs option is a new option for the quotacheck command. You can use this option in the /sbin/init.d/quota script to run the quotacheck command on only UFS file systems when quotas are enabled. For more information, see the quotacheck(8) reference page.

1.10.8.5 QUOTACHECK_CONFIG Environment Variable

The QUOTACHECK_CONFIG environment variable in the /etc/rc.config file is now available to control the behavior of the /sbin/init.d/quota script. System administrators can set the QUOTACHECK_CONFIG environment variable to specify options they want to use when running the quotacheck script during system boot. That is, you can instruct the /sbin/init.d/quota script to check both UFS and AdvFS file systems by using the QUOTACHECK_CONFIG environment variable. The default is to check the UFS file system only.

1.10.9 Logical Storage Manager Meta-Data Changes

This version of Tru64 UNIX has a new on-disk internal format for the Logical Storage Manager's (LSM) meta-data. When you boot this version of Tru64 UNIX, either during the installation process or for the first time, the LSM configuration databases for all existing LSM auto-imported diskgroups are automatically converted from the old format to the new format. Once a disk group is converted to the new format, it can not be used on earlier releases.

For LSM diskgroups that are not auto-imported (for example, a disk group that was explicitly deported), the configuration database is not automatically converted to the new format. Later when the diskgroup is imported with the voldg import command, the import will fail and cannot be used unless the administrator explicitly converts the diskgroup from the old format to the new format. To facilitate the conversion, a new LSM option to the voldg import command, -convert_old, updates a diskgroup's on-disk format.

For more information, see the *Logical Storage Manager* manual.

1.10.10 Development Environment

The following sections provide information on new and changed features for the Tru64 UNIX development environment.

1.10.10.1 New Features in Object-File and Symbol-Table Formats

New versions of the Tru64 UNIX object file format (Version 3.13) and symbol table format (Version 3.13) are supported in this release. These changes might impose new requirements on tools that use or modify object files.

The following list provides a brief description of the new features in Version 3.13 of the object file format:

- Comment section extensions
- Object and symbol table versioning
- Abstract types for cross development
- Optimization symbol table entries
- 64-bit auxiliaries
- New variant record representation
- Procedures with no code
- Static parameters
- Unallocated parameters and locals
- Uplevel links
- AddressNil constant
- Correct PDR addresses
- Fortran array descriptor representation

For a full description of the new and changed features, see the supplementary documentation *Tru64 UNIX Object File/Symbol Table Format Specification*.

1.10.10.2 Time Zone Enhancements

Support for many new time zones has been added in this release of Tru64 UNIX. The new and updated time zone files have been added under the `/etc/zoneinfo/`directory. The time zone data file format has also been expanded to handle more complex transition rules. (See the `tzfile`(4) reference page for details). The `zic` compiler, `zdump` command, and several time-related functions in the standard C library have also been updated to support the expanded time zone data file format.

For more information, see the *Installation Guide*.

1.10.10.3 New Graphical Program Analysis Tools (GPA)

The Graphical Program Analysis Tools (GPA) is a set of standalone tools available from the Developers' Toolkit, which is an optional part of the Tru64 UNIX operating system available on the Associated Products Volume 1 CD–ROM The following new tools have been added:

- The Memory Profiler enables you to obtain information about how a Tru64 UNIX application uses memory. The tool uses a graphical display to help you understand when your application is using memory inefficiently, such as through fragmented memory allocations. The tool focuses primarily on dynamic memory use.
- The Multi-Process Viewer gathers performance information about processes running on multiple Tru64 UNIX systems and displays the information graphically while you work on another Tru64 UNIX system. You can also use it to monitor the child processes created by a process.

1.10.10.4 Visual Threads Tool for Threads Debugging

Visual Threads is a new tool available on the Tru64 UNIX Associated Products Volume 2 CD–ROM that lets you analyze your multithreaded applications for potential logic and performance problems. It is licensed as part of the Developer's Toolkit for Tru64 UNIX.

You can use Visual Threads with DECthreads applications that use POSIX threads (Pthreads) and with Java applications.

Visual Threads software includes the following:

- Detects violation conditions based on the application of particular rules in your application. Several predefined rules look for data protection errors, deadlock conditions, programming errors, and performance issues.
- Lets you use templates to define your own rules to specify criteria for violation conditions.
- Keeps track of the events associated with the violations.
- Records events to a trace file so that you can play back and analyze them later.
- Dynamically displays events as they occur, with controls for filtering.
- Suspends execution of the application when it detects violation conditions. You can choose from several options at this point, including invoking the debugger in the appropriate context for your application.
- Dynamically monitors multithreading objects (threads, mutexes, and so on) in real time.

- Provides easy access to object-level statistics and current state information, including use of resources (for example, the mutexes a particular thread holds).

1.10.10.5 OpenMP API

The `cc` compiler now supports the OpenMP application program interface (API). The OpenMP API supports multiplatform shared-memory programming on UNIX platforms and Microsoft Windows NT architectures. Jointly defined by a group of major computer hardware and software vendors, OpenMP is a portable, scalable model that gives shared-memory programmers a simple and flexible interface for developing parallel applications for platforms ranging from desktop to supercomputers.

The feature consists of a set of compile-time `#pragma` directives, a new header file (`omp.h`), a new runtime library (`libots3.so` and `.a`), and new command line options (`-mp` and `-omp`) that enable the pragmas and link with the new runtime library (and other existing thread libraries). If you do not specify one of the command line options to enable the directives the compiler ignores the directives (effectively treating them as comments).

1.10.10.6 Profile–Based Optimization Support

This version of Tru64 UNIX provides many compiler optimizations. For many applications, optimizations are more effective if the compiler and linker (`om`) have an execution profile to guide the optimizations.

The compiler and linker can use a profile to guide optimizations. In previous releases different pixie profiles were used. In this release they can use the same pixie profile. For example:

```
> cc -non_shared -O3 -feedback a.out *.c
> pixie -update a.out
> cc -non_shared -O3 -feedback a.out -om *.c
```

These commands build the application, profile it, and rebuild it using the profile information.

The old feedback behavior is still supported, including the old semantics for the `-feedback` switch and the `-om_ireorg_feedback` option.

For more information, see the *Programmer's Guide* and the `prof_intro`(1), `cc`(1), `pixie`(1), and `prof`(1) reference pages.

1.10.10.7 Integrated Profiling Commands

The `hiprof`, `pixie`, `third`, and `uprofile` commands now provide complete profiling capabilities in single commands that perform all

necessary instrumentation, execution, and display as selected by their command line options. The new prof_intro(1) reference page guides programmers to the most suitable tools for various tasks, such as optimizing or debugging an application.

All profilers can now profile applications that use any combination of signal handlers, and fork and pthread routines. All profilers have enhanced consistency and capabilities. For more information, see the *Programmer's Guide*, *Programmer's Guide* and the hiprof(1), pixie(1), prof(1), third(1), uprofile(1), and pfm(7) reference pages.

1.10.10.8 Extensions to atom Command's Programmable Interfaces

The atom command's IsInstType(5), GetProcInfo(5), and GetInstInfo(5) routines have new options to let tool-writers detect nonoperational (NOP) instructions and interprocedural branches.

Atom can also now instrument executables that have been optimized with the -om flag of the cc(1) command.

1.10.10.9 Change to Profiling of Threaded Programs with hiprof

The -cputime option of the hiprof(5) profiler now provides an instruction-count profile for threaded programs, the same as the -calltime option. This is due to the fact that the cpu cycles reported for kernel-threads by the RPCC instruction cannot be mapped to pthread(3) threads.

The only significant difference is that the profile is displayed as the number of instructions executed instead of cpu seconds used. The -cputime option still profiles cpu seconds for nonthreaded programs.

The new -samples option provides a profile in terms of cpu seconds for both threaded and nonthreaded programs. Therefore, you might prefer to use this option instead of the -cputime option.

The new behavior is the default for the new hiprof(1) command.

1.10.10.10 SIGFPE Signal Code Usage Changes

In previous releases, SIGFPE FAULT codes were incorrectly used instead of the correct SIGFPE TRAP codes.

A FAULT implies that the precise PC is known and that the operation can be fixed and re-executed. When the exception is imprecise and the instruction cannot be restarted, use a TRAP code.

The system software has been fixed to use TRAP codes properly. If you prefer the old behavior, you can use the configurable variable use_faulty_fpe_traps to restore the system to the old behavior, as follows:

```
# sysconfig -r generic use_faulty_fpe_traps=1
```

If you have existing executables that cannot handle the proper TRAP codes you may want to restore the old behavior of always using FAULT codes.

Both before and after the fix, you can distinguish the true TRAP and FAULT codes by comparing the sc_pc and the sc_trap_pc fields of the signal context block. With a true FAULT, the sc_pc field contains the trigger PC of the faulting instruction. With a true TRAP, the sc_pc field contains the trap PC where the exception was realized (and so it will be the same as the sc_fp_trap_pc field). See the ieee(3) reference page for details.

To continue from a FAULT (with the default IEEE result for the exceptional operation), a signal handler might look similar to the following:

```
void fpe_handler(int sig, int code, struct sigcontext *scp)
{
.
.
.
if (scp->sc_pc != scp->sc_fp_trap_pc)
scp->sc_pc += 4;
.
.
.
}
```

If it is a true FAULT, incrementing the sc_pc value by 4 is necessary to advance the PC beyond the exceptional instruction. (Alternatively, the handler could correct the exceptional condition and allow the faulting instruction to re-execute).

1.10.10.11 Double Long Type is Now 128 Bits

The default size of the C language long double type has changed from 64 bits to 128 bits. This allows applications to perform mathematical calculations on larger numbers and with more precision than was possible with the previous long double type. The previous long double was the same size as the double type. See Section 2.1.8 for more information.

1.10.10.12 64-bit Time-Handling Interfaces

A conditional set of time-related data types and interfaces has been added to support basic handling of times beyond the limits imposed by the current 32-bit time_t data type (Dec 13 20:45:52 GMT 1901 through Jan 19 03:14:07 GMT 2038).

To support customers needing access to times beyond this range, a separate 64-bit data type, time64_t, has been added along with several corresponding interfaces. This data type and all corresponding interfaces are Compaq extensions and are accessed by defining the _TIME64_T feature macro during compilation. The supporting interfaces are as follows: ctime64(), ctime64_r(), difftime64(), gettimeofday64(), gmtime64(), gmtime64_r(), localtime64(), localtime64_r(), mktime64(), settimeofday64(), and time64().

A separate timeval64 struct that contains a larger time64_t seconds field and is used by the gettimeofday64() and settimeofday64() functions is also provided.

Macros to assist developers converting between time_t and time64_t data types as well as timeval and timeval64 are also provided. These macros are: TIMET32TO64(), TIMET64TO32(), TIMEVAL32TO64(), and TIMEVAL64TO32().

While the getdate(), strptime(), and strftime() functions do not contain time_t in their external interfaces, they use the broken down tm struct, which can refer to times beyond the specified 32-bit time_t range. These modules have been rebuilt to support the larger range of times.

For more information, see the reference pages that correspond to the specific function. Also see the time(3) reference page for information on the time64_t data type, the _TIME64_T feature macro, and TIMET32TO64() and TIMET64TO32() conversion macros. For more information, see the gettimeofday(2) reference page. It contains information about the timeval64 struct and the TIMEVAL32TO64() and TIMEVAL64TO32() conversion macros.

1.10.10.13 DECthreads Process-Shared Synchronization Objects

You can now use DECthreads to create process-shared synchronization objects which protect data objects that are shared among threads running in different processes. Process-shared synchronization objects can be mutexes, condition variables, and read-write locks. This feature might facilitate the porting of some multithreaded applications to Tru64 UNIX.

The following routines support process-sychronization objects. For more information about using process-shared synchronization objects, see the *Guide to DECthreads* and the following reference pages:

- pthread_condattr_getpshared(3)
- pthread_condattr_setpshared(3)
- pthread_mutexattr_getpshared(3)
- pthread_mutexattr_setpshared(3)

- pthread_rwlockattr_getpshared(3)
- pthread_rwlockattr_setpshared(3)

1.10.10.14 DECthreads Debug Assistant Library

Since the release of DIGITAL UNIX Version 4.0, the Ladebug and TotalView debuggers have been able to determine the state of threads in a threaded process by using the DECthreads Debug Assistant Library. The header file for this library, pthread_debug.h, is currently available on the Tru64 UNIX kit. It provides the DECthreads debugging interface and the sole documentation regarding the interface. The libpthreaddebug library implements this interface.

The Debug Assistant Library is intended only for use by a debugger. Because it must suspend the target process, it is not intended for use by the process being debugged.

1.10.10.15 DECthreads Read-Write Locks

DECthreads support for read-write locks was added to Tru64 UNIX Version 4.0F. The following two new DECthreads read-write lock routines have been added in this release:

- pthread_rwlockattr_getpshared()
- pthread_rwlockattr_getpshared()

1.10.10.16 DECthreads Thread Stack and Backing Store Allocation

DECthreads now defines a writable stack area for each thread, based on the stack size you specify using pthread_attr_setstacksize() routine or, if you accept the default, some maximum based on uncommitted virtual memory at the time the thread is created. However, the writable stack area is made available to the thread, and the corresponding backing store is reserved, only in predefined increments as it is needed. In this way, no more backing store is reserved than the stack actually requires.

1.10.10.17 DECthreads Thread Stack Overflow Warning Area

DECthreads now configures a thread's stack area with an overflow warning area as well as a guard area. The stack overflow warning area is allocated at the overflow end of the thread's defined writable stack area and before the guard area. If the thread attempts to write in the warning area, a stack overflow exception occurs. Your program can catch this exception and continue processing as long as the thread does not attempt to write in the guard area. If the thread attempts to write in the guard area, a memory addressing violation occurs.

DECthreads configures a thread with no guard area or warning area if either of the following is true:

- You specify the size of the thread's guard area as zero (0) using the `pthread_attr_setguardsize()` routine.
- You create the thread using a thread attributes object whose `stackaddr` attribute is set using the `pthread_attr_setstackaddr()` routine.

The size of the stack overflow warning area is platform dependent. For Tru64 UNIXVersion 5.0, the warning area is two pages (16384 bytes).

1.10.10.18 The malloc Function Is Now Tunable

The C runtime library `malloc`(3) function and associated functions have been modified to allow significantly better concurrency when used by multithreaded applications. Additionally, the following three new memory allocator tuning variables have been added to allow more control of allocator behavior:

- `__delayed_free`
- `__first_fit`
- `__max_cache`

As always when developing applications that make significant use of dynamically allocated memory and require maximum speed of execution, carefully read the Tuning Memory Allocation section of the `malloc`(3) reference page.

1.10.11 Commands and Utilities

The following sections provide information on changes to commands and utilities.

1.10.11.1 DXMtools

In this release, a graphical interface has been added to the `mtools` (`dxmtools`) utilities. The `mtools` utilities allow you to manipulate DOS files on a floppy diskette. You can access the `dxmtools` utilities from the Desktop_Apps menu in the Application Manager.

1.10.11.2 Improvements to the Program Stack

The default stack (program stack, used by the primary thread) allocation method has been changed to provide guard pages and to prevent arbitrary `mmap()` from interfering with the stack area.

The current stack limit is used to allocate the stack when a new program is executed. Thus, if the stack limit has been increased, the new limit will decrease the amount of virtual address space available for other purposes. Also, increasing the stack limit without increasing the address space, may result in a failure to execute the program, in which case a failure message similar to the following is displayed:

```
"csh: exec failed to allocate default stack (6)"
```

If this occurs, lower the stack limit or increase the address space limit. See the reference pages for the appropriate shell for information on how to change the limits.

If the stack limit has been increased, the FreePort Express application might not run a SunOS SPARC executable file. The reason is that `fpx` tries to load the SPARC text at a low address, which is now occupied by the large stack. If this occurs, lower the stack limit and rerun the command.

1.10.11.3 Changes to the iostat Disk Statistics Fields

The `bps` and `tps` disk statistics fields have been widened (increased the size of the number that can be displayed) to allow for the higher numbers encountered with modern disk drives. Formerly, the `bps` and `tp` columns could merge together causing confusion about the information displayed. To allow for the wider fields and still keep the line length less than 80 columns, the default number of disks displayed was reduced from four to two.

1.10.11.4 Changes to ACL-Related Features

This release provides several enhancements to access control list (ACL) features, including the following:

- The `typedef acl_id` declaration in the `/usr/include/sys/acl.h` file has been changed to `acl_id_type`. The `acle_t` structure contained a member named `acl_id` with the type `acl_id`. In some cases, this caused compilation errors. Changing this member to `acl_id_type` resolves this problem.
- When default ACLs are inherited, the POSIX specification requires that the ACL being inherited as an access ACL should not be modified by the current `umask`. Previously the three base entries of inherited access ACLs (the user, group, and other permission bits) were being ANDed with the `umask` command of the current process prior to being set.
- The `setacl` command now works properly with user and group names that start with digits. When the user or group name entered is all digits, the `setacl` command searches for a completely numeric user or

group name matching the digits first. If there is no such user or group name, the command considers the digits to be a UID or GID.

- The `acl_get_file` and `acl_get_fd` routines have been modified to return NULL if a default ACL is requested and no default ACL exists. Previously they would return the current permission bits in ACL form.
- The `getacl` and `setacl` routines have been modified as follows:
  - An informational message is displayed if ACL processing is not enabled.
  - Attempting to set a default ACL on a file causes an error.
  - No ACL is displayed if there is no default ACL on the given directory. Previously the `getacl` command would display the current permission bits in ACL form.

1.10.12 Security

The notes in this section provide information on enhancements to security features.

1.10.12.1 Login Success and Failure Logging is Optional

In the Tru64 UNIX Enhanced Security mode, in accordance with strict C2 security rules, the time of each successful or unsuccessful login attempt is recorded in the authentication database, `auth.db`. This time value is the source of the last successful and unsuccessful login messages. The time value also provides Enhanced Security with the means to perform break-in detection and evasion for unsuccessful login attempts. A potential side effect of logging each successful login is frequent write activity and therefore NIS slave updates.

To allow more flexibility in Enhanced Security configuration, this version introduces selectable login logging options for the Enhanced Security model. You can now disable the logging of successful logins, unsuccessful logins, or both.

When unsuccessful login logging is disabled, break-in detection and evasion are not possible. When successful login logging is disabled, the source of the last login time is the local machine-specific `utmp` database rather than the authentication database. In a TruCluster environment, this means that a successful login to an account on one member is not recognized by another member, since the `utmp` database is member-specific.

To alter the logging options, use the new `secconfig` utility (available from the SysMan Security option). Under the Enhanced Security Custom option, select the Login Logging Option you want to use.

In an environment where successful logins are more frequent than unsuccessful login attempts, disabling successful login logging while enabling unsuccessful login logging will provide break-in detection and evasion while still potentially reducing write activity and NIS slave updates.

For more information, see the *Security* guide.

1.10.12.2 Enabling and Disabling ACLs

The way you enable and disable Access Control Lists (ACLs) has changed.

In previous versions of the operating system it was necessary to edit the configuration file, rebuild the system image, and reboot to enable or disable the use of ACLs. Now, you can enable and disable ACL processing using the Enable ACL button of the `secconfig` utility.

Alternatively, you can enable and disable ACL processing using the `sysconfig -r sec acl_mode=enable` command or it can be done automatically at system startup by adding the `acl_mode` entry to your `sysconfig` file. For more information, see the *Security* guide.

1.10.12.3 ACL Management Utility

This version of Tru64 UNIX provides a new ACL management utility, `dxsetacl`. This utility is available from the Daily Administration menu or from the `/usr/bin/X11/dxsetacl` file. This utility allows an appropriately privileged user to create, change, and delete ACLs. It also provides the ability to browse files and display existing ACLs. For more information, see the *Security* guide.

1.10.12.4 Shadow Password Support

This version of Tru64 UNIX has been modified to allow a more gradual transition from Base Security to the more strict Enhanced Security levels.

This release introduces the Shadow Passwords Only option. Enabling Shadow Passwords Only from the `secconfig` utility results in the same underlying security configuration changes required for eventual use of full Enhanced Security. However, this mode functions as if Base Security is still being used with the exception that account passwords are no longer found in the `/etc/passwd` file.

You can enable the additional Enhanced security features at any time using the `secconfig`, `dxaccounts`, or the `edauth` utility.

1.10.12.5 Netscape Communicator

This release contains the latest version of Netscape Communicator, Version 4.51. For information on new features included in Netscape Communicator 4.51, see the release notes at the following URL:

```
http://home.netscape.com/eng/mozilla/4.5/relnotes/unix-4.51.html
```

You can also visit the Netscape Communicator New Features Tour at the following URL:

```
http://home.netscape.com/communicator/v4.5/tour/index.html
```

You can also download the latest version 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
```

1.10.13 Window Systems Software

The following sections provide information on new and changed features for the window system software.

1.10.13.1 X Environment

The X environment has been updated to X11R6.3. This version includes the following new extensions:

- Remote Execution Plugin for Netscape
- Security extension
- X print server
- Application group extension
- Low Bandwidth X

Additionally, the X keyboard extension (`xkb`) has been updated to the Version 1.0 release rather than the prerelease version of Version 0.65 found in DIGITAL UNIX Version 4.0. The PanoramiX extension has also been moved from Advanced Development Kit (ADK) status to being a fully supported extension in this release.

1.10.13.2 Enabling Microsoft Windows Keys

The operating system now supports Microsoft Menu and Right and Left Windows keys. If you are using a PC keyboard, you can enable this feature. For more information, see the *X Window System Administrator's Guide*.

1.10.13.3 CDE Setup

CDE Setup enables you to set up, customize, and configure your preferences for the Common Desktop Environment (CDE) including the following:

- Customize the CDE front panel
- Configure a system as a stand-alone system
- Change default key and button settings
- Configure terminal emulator resources
- Manage the login behavior of a session
- Configure system services

You perform these customizations from a graphical interface; they do not require you to edit CDE and X configuration files directly. For more information, see the CDE Setup online help.

1.10.13.4 CDE Window List

The CDE window manager (`dtwm`) has been enhanced to provide navigation aids that enable you easily locate and access any open application. With multiple workspaces and many open windows on each workspace, it is sometimes time-consuming to search for a particular window. The CDE window manager now includes a function that displays a list of all currently active window applications. For more information, see the CDE Window List online help.

1.10.13.5 X Server Command Line Option to Get Old Vendor String

The X server has been enhanced with a new command line option, `-ov`, to allow applications to obtain the X server vendor string in its old format.

Beginning with this release the X server, by default, returns a vendor string of "Compaq Computer Corporation Tru64 UNIX V5.0". However, to allow for migration of applications that may have a dependency on the old vendor and product name, the `-ov` command line option has been added to the X server. Using this command line option causes the X server to return a vendor string of "DECWINDOWS Digital Equipment Corporation Digital UNIX V5.0".

To make use of this new option, do the following:

1. Edit the `/usr/var/X11/Xserver.conf` file.
2. Locate the line containing the `-pn` option at the bottom of the file and add `-ov` after the `-pn`.

You also need to stop and restart the X server using the `/sbin/init.d/xlogin` command for this change to take effect.

Please note that this command line option is only intended for short term usage while applications are modified to accept the new vendor string. This command line option will be removed in a future version of Tru64 UNIX.

2

Features and Interfaces Scheduled for Retirement

This chapter lists features of Tru64 UNIX 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 features have been retired in this release of Tru64 UNIX. These changes were announced in previous releases of Tru64 UNIX.

2.1.1 td0 Disk Size Requirement for Installation

With this major release, additional features and services have increased the size of the image on the disk. 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 1GB of disk space. However, due to the additional features and services added, performance may be degraded with a smaller disk and it is not recommended. Installing to a smaller disk might also prevent you from installing patches or upgrading to a new version of the operating system.

2.1.2 LVM-to-LSM Migration Tools

The LVM-to-LSM Migration Tool was provided with DIGITAL UNIX Version 4.0 to enable migration from the LVM interfaces that were retired in that release to Tru64 UNIX Logical Storage Manager volumes. This tool has been retired in Tru64 UNIX Version 5.0.

There are no plans to retire UFS or the AdvFS Migration Tools at this time.

2.1.3 LSM Block Change Logging (BCL)

The Logical Storage Manager Block Change Logging (BCL) feature has been retired in this release of Tru64 UNIX. It has been replaced with Dirty Region Logging (DRL). DRL logs regions instead of blocks for writes to

LSM mirrored volumes. For most environments, DRL provides the same ability as BCL to quickly resynchronize mirrors after a failure, but with considerably less logging overhead.

The logging format and configuration for DRL is not compatible with BCL. Therefore, this release provides support to automatically migrate and reconfigure mirrored volumes from BCL to DRL where possible. However, some existing mirrored volume configurations with BCL may require manual reconfiguration to continue to exploit logging for faster mirror recovery.

2.1.4 LSM volprint Command Format

The default output format of the `volprint` command has changed as follows:

- Invoking with no options

  In previous releases, invoking the `volprint` command with no options displayed all objects in the `rootdg`, disk group starting with the `rootdg` disk group record, followed by all of the disk-media records, subdisk records, plex records, and finally volume records.

  Now invoking the `volprint` command with no options displays all records for all disk groups, with all objects arranged in a hierarchical fashion.

- Invoking with an object-type option

  In previous releases, if you invoked the `volprint` command with an object-type option (`v`, `p`, or `s`) it displayed all objects of that type in the specific disk group.

  Now invoking the `volprint` command with any of these options displays all objects of that type, as well as all objects of all subsidiary types, in all disk groups.

- Default

  In previous releases, invoking the `volprint` command displayed the record type, name, association, kernel state, length, and comment field by default.

  Now invoking the `volprint` command displays the record type, name, association, kernel state, length, plex offset, state, and the `tuti10` and `puti10` fields.

If you use the `volprint` command in scripts, use the `-F` option to define the exact output format you require.

2.1.5 The ntpdc Command

The ntpdc utility, which provided the monitor operation of the NTP daemon, has been retired. The xntpd daemon, which was upgraded to Version 3.0 in DIGITAL UNIX Version 4.0, replaces the NTP daemon (ntpd).

The ntpdc command is no longer applicable. The xntpdc command provides a superset of the ntpdc functionality. The xntpdc(8) reference page describes its capabilities for monitoring and controlling the xntpd daemon.

2.1.6 Previous C Compiler

The C compiler for DIGITAL UNIX has been officially replaced by DEC C for Tru64 UNIX. The older compiler is no longer distributed in this release of Tru64 UNIX. The -oldc switch, which was used to request the old C compiler from the cc command in previous versions, is no longer supported. The cc command now issues an error if the -oldc switch is specified.

2.1.7 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 back 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 or $COMP_HOST_ROOT environment variable definitions.

2.1.8 C Language Long Double Type Has Changed to 128 bits

The default size of the C language long double type has changed from 64 bits to 128 bits. This allows applications to perform mathematical calculations on larger numbers and with more precision than was possible with the previous long double type. The previous long double was the same size as the double type.

If an existing application is linked using the -call_shared switch there is one binary incompatability that it can experience with the new default related to the input and output of long double types. Previously, printf, scanf, and similar functions interpreted the format code %Lf (capital L followed by f) as a 64-bit long double type. Now, the format code %Lf specifies a 128-bit long double type.

2.1.9 Replaced pixie Profiler

The original implementation of the `pixie` utility, which existed in `/usr/opt/obsolete/usr/bin/pixie` in DIGITAL UNIX Version 4.0 and higher releases has been removed from this and higher releases of the operating system.

The new `pixie` command, which is based on the `atom` instrumentation system, is a complete replacement, including both compatible and enhanced command-line syntax.

2.1.10 XIsso and XSysAdmin Programs

The `XIsso` and `XSysAdmin` programs have been removed from this release. The functions previously performed by these programs have been moved to the `dxaccounts`, `dxaudit`, and `dxdevices` graphical user interfaces (GUIs).

2.1.11 Remote Prestoserve Support

Prestoserve support for remote operations has been retired. This means that the `-h` option of the `presto` command is no longer supported.

Users who require the ability to perform `presto` operations remotely can do so by using `telnet`, `rlogin`, or `rsh` to gain access to a shell on the remote system and then performing the operation locally.

2.1.12 System Management Utilities

The following setup scripts have been retired in this release:

- `bindsetup`
- `netsetup`
- `nfssetup`
- `ntpsetup`

These scripts have been replaced by tasks that you can perform by running the SysMan Menu and navigating to the desired item, or directly from the command line by using the appropriate menu accelerator. The following table maps the replacement functionality and accelerator:

Retired Script	SysMan Menu Item	SysMan Command
bindsetup	Domain Name Service (DNS(BIND))	sysman dns
netsetup	Network Setup Wizard	sysman net_wizard
nfssetup	Network File System (NFS)	sysman nfs
ntpsetup	Network Time Protocol (NTP)	sysman ntp

Do not use these scripts to configure systems in a TruCluster environment. For more information, see the reference pages for the retired scripts or the *Network Administration* guide.

2.1.13 Different Versions of awk

The gawk and oawk versions of the awk command have been retired. Only the XPG4-compliant version of the awk command is supported in this release. Scripts that use variations of the awk command should access the /usr/bin/awk version.

2.1.14 XPG3 ctab Locales

The XPG3 ctab locales have been retired and have been removed from the obsolete OSFCTABLOC subset. They are superceded by the XPG4 locales distributed in OSFEURLOC and various subsets in the Worldwide Language Support software on the Associated Products CD-ROM.

2.1.15 Retirement of libsecurity.a

The archive form of the enhanced security library (libsecurity.a) has been retired. If you want to link against libsecurity use the shareable form, libsecurity.so.

2.1.16 Adobe Display PostScript, Client Libraries, and X Server Extension

Adobe Systems Incorporated has retired their Display PostScript (DPS) product, which includes the client libraries, X Server extension, and various applications and examples. Therefore, the Adobe DPS product has been retired from Tru64 UNIX. No replacements will be available. Customers who have used the Adobe DPS libraries to develop their own applications will not have a migration path.

The following Adobe applications have been retired and are no longer included with the Tru64 UNIX operating system.

- dpsclock
- dpsexec
- draw
- fontview
- libdps.a and libdps.so
- libdpstk.a and libdpstk.so
- libpsres.a and libpsres.so
- lib_adobe_dps.so
- makepsres
- pswrap
- scratchpad
- showps
- texteroids
- wonderland
- xepsf
- All Adobe fonts under /usr/lib/X11/fonts/Type1Adobe

The following applications, which use Adobe DPS, have been retired and are no longer included with the Tru64 UNIX operating system:

- dxvdoc
- dxbook
- dxnotepad (internationalized version in WorldWide Language Support software on the Associated Products CD-ROM)

During an update installation from Version 4.0D or Version 4.0F to Version 5.0, the DPS commands, libraries, and documentation noted above are marked by the installation update procedure as obsolete inventory and then removed from the system later in the procedure.

Because these obsolete components have been retired from the operating system, they are no longer distributed, and they may not be compatible with a future release. They are not supported as part of the Tru64 UNIX product beginning with this release.

If you have applications or procedures that depend on the DPS software that has become obsolete, you may wish to have the obsolete DPS software remain on your system, yet remove the other obsolete software at this time.

To do this, you can edit the file /var/adm/smlogs/upd_obsolete_files so that the DPS software components are not listed, before you perform the updadmin procedure.

If you remove the DPS components from your system using the updadmin utility, you will have the opportunity to archive all of the obsolete components. If you prepare an archive copy, and later discover a dependency on the obsolete DPS components, you can restore them to the system from the archive copy.

If you remove the obsolete DPS components without making an archive copy, there is no way to restore them from the product distribution media for the current release.

See Section 5.1.6.5 for information on possible user dependencies on the showps utility as a PostScript document viewer for the Netscape browser. The freeware application gv may be a suitable replacement for showps. It has a different user interface than showps but has no dependency on the obsolete DPS software libraries.

Some of the freeware applications delivered with Version 4.0D had dependencies on the DPS client libraries. Those applications have been rebuilt using the GhostScript libraries available on the freeware distribution media.

2.1.17 Open3D Device Support

The following Open3D devices have been retired in this release of Tru64 UNIX:

- PV-L
- PV-M
- PV-P

These devices are also known as:

- ZLX-L1, L2
- ZLX-M1, M2
- ZLXp-L1, L2

Open3D Version 4.4 is the last version of Open3D that supports the PV-L and PV-M cards. Open3D Version 4.9 is the last version of Open3D to support the PV-P graphic adapters.

Additionally, 3D support for the HX+ and TGA has been retired. These are also known as the ZLX-E1, E2, E3; and ZLXp-E1, E2, E3. DIGITAL UNIX 2D support will continue for the initial release of Tru64 UNIX Version 5.0

for these cards. The initial release of Tru64 UNIX Version 5.0 will also be the last release to support the HX and TX graphics adapters.

The replacement functionality is PCI-based systems and graphics devices supported on those systems.

2.1.18 Nonconforming Curses Library

DIGITAL UNIX Version 4.0 included a new X/Open-Compliant Internationalized Curses library. This library was not binary compatible with previous versions of the DIGITAL UNIX Curses library, so compatible binaries (named `libcurses.a` and `libcurses.so`) were shipped in separate directories for Version 4.0.

These compatible binaries have been retired and removed from this release of Tru64 UNIX.

2.1.19 Nemacs

Nemacs Version 3.3.2, a public domain Japanese implementation of emacs, has been removed from this release of Tru64 UNIX. Mule, a public domain multilingual implementation of emacs, have been carried forward as the replacement functionality for Nemacs. The Nemacs subsets `IOSJPNEMACS500` and `IOSJPNEMACSSRC500` will be removed from the system. For more information on `Mule`, refer to the `mule`(1) reference page.

2.1.20 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)
dxprint	dtlp
dxcalendar	dtcm
dxcalc	dtcalc, xcalc

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

Retired Tools/Utilities	Replacement Option(s)
dxclock	Front Panel, xclock
dxpaint	dticon/dtstyle, bitmap
dxnotepad	dtpad
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

2.1.21 secsetup Script Retirement

The `/usr/sbin/secsetup` script, used to configure Enhanced Security authentication support, has been retired in this release of Tru64 UNIX. It has been moved to the `OSFOBSOLETE` subset. The script has been replaced by the `secconfig` application. The `secconfig` application is a graphical user interface and is integrated with the SysMan utilities.

2.1.22 Security Interfaces

Table 2–3 provides a list of interfaces that have been retired from the `libsecurity` library. Other, undocumented interfaces, have been retired as well. These interfaces are not capable of supporting new functionality offered in Tru64 UNIX 5.0.

Table 2–3: Retired libsecurity Interfaces

`getprtcent()`	`getprtcnam()`	`putprtcnam()`
`getprdfent()`	`getprdfnam()`	`putprdfnam()`
`getprfient()`	`getprfinam()`	`putprfinam()`
`getprlpent()`	`getprlpnam()`	`putprlpnam()`
`getdvagent()`	`getdvagnam()`	`putdvagnam()`
`getprpwent()`	`getprpwnam()`	`getprpwuid()`
`putprpwnam()`		
`time_lock`	`get_seed`	`auth_for_terminal`
`locked_out`	`copydvent`	
`read_pw_fields`	`store_pw_fields`	
`read_tc_fields`	`store_tc_fields`	

The associated data structures listed in Table 2–4 have been retired as well.

Table 2–4: Retired libsecurity Interfaces Associated Data Structures

`struct pr_field`	`struct pr_flag`
`struct t_field`	`struct t_flag`
`struct l_field`	`struct l_flag`
`struct dev_field`	`struct dev_flag`
`struct pr_passwd`	`struct pr_term`
`struct pr_file`	`struct pr_lp`

Table 2–4: Retired libsecurity Interfaces Associated Data Structures (cont.)

`struct pr_default`	`struct dev_asg`
`struct system_default_fields`	`struct system_default_flags`

2.1.23 PEX Extensions

Starting with Open3D Version 4.8, support for the PEX extension to the X Server has been retired. The extension libraries still ship on the Open3D product, but no support is available for them.

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 DECthreads

The POSIX 1003.4a, Draft 4 interface of 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 1003.1c-1995, POSIX System Application Program Interface provided by DECthreads. The POSIX 1003.1c standard interface is the most portable, efficient, and powerful programming interface offered by DECthreads. A compatibility mode for the Draft 4 POSIX 1003.4a API has been provided to help ease migration. This compatibility mode will be removed in a future release.

2.2.2 DECthreads CMA Interface

The CMA interface of DECthreads is obsolete beginning with this release of Tru64 UNIX. Obsolescence means that while the CMA API continues to exist in Tru64 UNIX and supported, CMA routines are no longer documented or enhanced. Compaq recommends that you port your CMA based application to the IEEE Std 1003-1c-1995, POSIX System Application Program Interface provided by DECthreads.

2.2.3 Asynchronous I/O Binary Compatibility

Data structures for asynchronous I/O, like `aio_read()` and `aio_write()`, changed between DIGITAL UNIX Version 3.2 and Version 4.0. The kernel

currently handles these differences so that applications built under Version 3.2 continue to run when executed on Version 4.0x systems.

In the next major release of the operating system, support for applications built under Version 3.2x using asynchronous I/O will be discontinued. These applications will need to be recompiled and relinked in order to run properly under Tru64 UNIX.

2.2.4 Berkeley Software Distribution TTY-NAME

The intent to retire the BSD `TTY-NAME` namespace was announced in DEC OSF/1 Version 3.0. This functionality will be retired in a future release.

2.2.5 SCSI Device Names

Support for rz and tz SCSI device names will be retired in a future release of Tru64 UNIX. Any code that derives knowledge about a device from the ASCII name or minor number may be impacted.

All code that uses the current namespace will be compatible when the change occurs because a mechanism that ensures binary compatibility will be provided. Existing interfaces such as names and minor numbers will be fully supported.

2.2.6 The -x and -p Options to addvol and mkfdmn

The `-x` and `-p` options to the `addvol` and `mkfdmn` commands allow you to set the per-volume bitfile metadata table (BMT) when you create a new volume or file domain. Users typically set the BMT to prevent an extent exhaustion problem.

In Version 4.0D and later, the limitations in the operating system that caused the extent exhaustion problem were removed, hence the `-x` and `-p` options are no longer needed and will be retired in a future major release.

2.2.7 LSM volassist Command Syntax

In the next major release of Tru64 UNIX, the syntax of the `volassist` command will change. It will no longer support the following constructs:

- `[!]medianame,offset`

  You will still be able to use `[!]medianame,offset` construct but you will not be able to specify an offset. If you need to specify an offset, you will have to use the low-level commands to create subdisks, plexes, and volumes exactly as required.

- `alloc=size`

  A new construct, `alloc=storage-spec[,storage-spec,...]`, will replace `alloc=size`. However, the new construct will not allow you to specify sizes for all allocations. You will need to use the low-level commands to create subdisks, plexes, and volumes exactly as required.

- `align=size`

  Two new constructs, `diskalign` and `nodiskalign`, will replace `align=size`, allowing you to specify whether subdisks should be created on cylinder boundaries. If you require the ability to specify alignments for all allocations, you will need to use the low-level commands to create subdisks, plexes, and volumes exactly as required.

2.2.8 OSF/Motif Version 1.1.3

The Motif Version 1.1.3 libraries have been provided as run-time services for compatibility with applications that have not yet converted to Motif 1.2. Development support was retired in DEC OSF/1 Version 2.0.

In Version 4.0 of the operating system, the Motif 1.1.3 libraries were moved to an optional subset. Applications requiring the libraries will see an error from the loader and you must install the optional subset. This optional subset will be removed from the product in a future release.

2.2.9 XIE Version 3.0 X Client Extension

Tru64 UNIX Version 5.0 supports XIE Version 5.0. Support for XIE Version 3.0 server extensions was removed in Version 4.0, but client support will not be removed until a later release of Tru64 UNIX.

2.2.10 Graph Utility

The `/usr/bin/graph` utility will be removed in the next major release of Tru64 UNIX.

2.2.11 The atmsetup Script

The `atmsetup` script introduced in DIGITAL UNIX Version 4.0D has been superceded 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 this 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.

2.2.12 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 once 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.

2.2.13 The pixstats Program-Analysis Command

The pixstats program-analysis command will be retired in a future release of Tru64 UNIX. The pixstats command will be replaced by the prof -pixstats command, which became available in DIGITAL UNIX Version 4.0D and which provides a more complete and correct implementation of the same capabilities and flags.

2.2.14 Sendmail Version 5.65

The current version of /usr/sbin/sendmail (Sendmail Version 5.65) will be retired from Tru64 UNIX in a future release. Its replacement, Sendmail Version 8 by Eric Allman, has been introduced in Tru64 UNIX Version 5.0. Both versions still exist in Tru64 UNIX Version 5.0, but Sendmail Version 8 is the default.

If you prefer to use Sendmail Version 5.65 until you can migrate to the new vesion, enter the following command:

```
# /sbin/init.d/sendmail select old
```

This command changes all links related to Sendmail to point to Sendmail Version 5.65.

When you are ready to migrate to the new version, enter the following command:

```
# /sbin/init.d/sendmail select v8
```

This command changes all links back to the new version.

2.2.15 MH/POP

The Post Office Protocol (POP) service provided as part of the Rand Mail Handler (MH) subset (OSFMH500) will be retired from Tru64 UNIX in a future release. The following components are associated with this service:

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

A new POP3 service has been introduced in Tru64 UNIX Version 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`

The exising `mailcv`(1) utility and the new utility `/usr/bin/popcv` utility can be used to migrate existing MH POP information into the new service.

This service is the default service for Tru64 UNIX.

2.2.16 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 (removed from the Tru64 UNIX distribution) 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.

2.2.17 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.

2.2.18 NL*/NC* libc Interfaces

A Worldwide Portability Interface (WPI) for internationalization based on the XPG4 standard was introduced in DIGITAL UNIX Version 2.0. Because the WPI interfaces supercede the `libc` OSF/1 proprietary interfaces, all `libc` interfaces that begin with the letters `NL` or `NC` will be removed in a future release of the operating system.

2.2.19 DEC Ada RTL

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

2.2.20 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 non-existent 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.

2.2.21 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.

The retirement will be done in two phases. Initially, the `dl1152wrof` and `dl5100wrof` entries will be removed from the `/etc/lprsetup.dat` file. In a later release, the print filters will be removed and the installation procedure will convert the old `/etc/printcap` entries, which use the old print filters, to use the new `wwpsof` print filter.

2.2.22 System V Environment

Tru64 UNIX provides 80% 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 re-engineering 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 Version 5.0 family. Instead, many of its features are being re-engineered and will be merged into the Tru64 UNIX Operating System in future releases.

2.2.23 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. When these interfaces are retired they will be undocumented and unsupported.

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.

2.2.24 audit_setup Script

The `/usr/sbin/audit_setup` script, used to configure auditing support, will be retired in a future release of the operating system. It will be replaced by the `audit_config`, which is a SysMan application that provides a full graphical user interface.

2.2.25 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.

3

Installation Notes

The notes in this chapter discuss the following topics:

- General information about installation
- Layered product considerations
- Full installation
- Update installation
- RIS installation

Do not attempt to install Tru64 UNIX Version 5.0 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, 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.

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
```

You can determine the current level of the firmware on your system by entering the following command on most systems:

```
# 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
```

3.1.3 HSZ RAID Configuration Restrictions

The following list describes restrictions on the configurations of HSZ RAID adapters for this release of Tru64 UNIX on a multi-initiator bus:

- HSZ20 - Version 3.2 or higher firmware is required to use this controller on a shared bus.
- HSZ22 - There are no restrictions.
- HSZ40A - Cannot be placed on a multi-initiator bus in a cluster or multi-initiator from the same host.
- HSZ40B - Version 3.2 or higher firmware is required.
- HSZ40C - Version 3.2 or higher firmware is required.
- HSZ50 - Version 5.2 or higher firmware is required.
- HSZ70 - Version 7.1 or higher firmware is required.
- HSZ80 - There are no restrictions.

3.1.4 Changes to sendmail Configuration

After you do a full or update installation, edit the `/var/adm/sendmail/sendmail.cf.pd` file and `/var/adm/sendmail/sendmail.m4` file (if it exists) and replace the word `protocol` in the following phrases with `protocols` before you run either the `mailsetup` script or `mailconfig` application:

```
$(phaseV protocol $)
$(phaseIV protocol $)
$(uucp protocol $)
$(x25 protocol $)
```

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.

3.1.5 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
   ```

3.1.6 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 have been configured. However, sendmail will continue to operate.

3.1.7 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.

3.1.8 Join Database Migration

If your system provides Dynamic Host Configuration Protocol (DHCP), Remote Installation Services (RIS), or Dataless Management Services (DMS) services to other systems, you must update the database files for the `join` daemon after you complete the installation. See Section 5.4.1 for additional information.

3.2 Layered Product Considerations

The following notes apply to layered products for Tru64 UNIX Version 5.0.

3.2.1 Mounting the Associated Products CD–ROM

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

```
# mount -r /dev/rz4c /mnt
```

To mount the APCDs on releases prior to Version 4.0E, you must mount the CD–ROMs 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 Internet AlphaServer System Software

The notes in this section apply to Internet AlphaServer System Software (IASS). It is expected that these problems will be corrected in the next release of IASS.

3.2.2.1 Disable ASE Failover for IASS Services Before Upgrade

IASS Version 4.2 and earlier versions are not supported on this version of the operating system. It is recommended that you upgrade to Open Source Internet Solutions Version 5.0 or later.

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

ASE functionality is replaced by TruCluster Server Version 5.0.

3.3 Full Installation

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

This section provides additional information on performing a full installation.

3.3.1 Systems with Large Numbers of Disks

Because of the new device naming technology in this release, a condition may arise where a machine with a large number of disks might not be able to be initially installed. (Note that a RAID disk is configured as a JBOD, it is seen as single disk.) This is because the number of inodes in the memory file systems used for devices might be exhausted. As a guide, you can refer to following table to determine if you will encounter this problem:

Memory Size	Max Number of Disks
64 MB to 256 MB	63
256 MB to 512 MB	127
512 MB to 1 GB	190

Noted that a RAID device, namely a SWXVR device, is counted as a single disk device.

To avoid the problem, power down a number of the disks on the system prior to attempting the full installation. This reduces the number of inodes used and hence allows you to install the software on the system. Once the installation is complete, you can repower the disks and reboot the system, at which time the disks are reconfigured into the system.

3.4 Update Installation

To update your Tru64 UNIX operating system software to Version 5.0, you must use the `installupdate` utility or full installation procedures as described in the *Installation Guide*.

Version 5.0 supports update installations from DIGITAL UNIX Version 4.0D and Tru64 UNIX Version 4.0F. See the *Tru64 UNIX Software Product Description* for more information about disk space requirements before executing `installupdate`.

Note that the `-i` flag for the `installupdate` command will be retired in a future version of Tru64 UNIX. See Section 2.2.12 for more information.

The following sections apply to the update installation procedure.

3.4.1 Update Installation Might Exit While Removing SVE

If the update installation 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 is terminated by the removal of 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.

3.4.2 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 will ensure that all mail leaving your system has a fully qualified return address and your mail configuration is cluster-ready.

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.

3.4.3 Additional Disk Space Needed

If your system does not have enough free disk space to complete the update installation you will be presented with a list of three options to recover additional 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.

3.4.4 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.

3.4.5 PanoramiX ADK

If you previously installed the Advance Developers kit (ADK) for the PanoramiX extension to the X Server, you must remove it before doing an update installation of Tru64 UNIX Version 5.0. 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 5.0 of the file `/var/X11/Xserver.conf`.
4. Run the `xlogin start` command.

3.4.6 Ignore clu_get_info Warnings During Update Installation

When the update installation process determines that there is not enough disk space to complete the process, you have the option to 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_descrition_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.

3.5 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 5.0; 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.

4

Processor-Specific Notes

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

- Personal Workstation 433au, 500au, and 600au systems
- AlphaServer 1000 and 1000A systems
- AlphaServer GS140 systems

Do not attempt to install Tru64 UNIX Version 5.0 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 5.0.
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 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.

4.1.3 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 alleviate 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 same directory for information about how to use the utility.

4.1.4 DJ-ML200-xx PCI NVRAM Hardware Revision

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

4.1.5 Limited Monitoring of the HSZ and HSG Hardware

This version of the operating system has limited monitoring and configuration of HSZ and HSG hardware. A serial line connection is the only way to configure HSZ and HSG hardware. Both HSZterm and `sys_check` will not be able to monitor this class of controllers.

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

The following notes are specific to Personal Workstation class systems.

4.2.1 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 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
```

4.2.2 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 execute the `sysconfig` command to reconfigure the driver, you must do this every 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.

4.3 AlphaServer 1000 and 1000A Systems

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

4.3.1 EISA Configuration Utility Diskette Version 1.10

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

The default setting for the VGA graphic controller when running the EISA Configuration Utility (ECU) Version 1.10 diskette 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 diskette, the setting for the onboard VGA graphic controller is automatically set to `Disabled`. While running 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 you will use generic console support when you boot Tru64 UNIX.

4.3.2 Graphics Resolution

The default graphics resolution for Compaq AlphaServer 1000A systems containing 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 resolution for Compaq 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.

4.4 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*. (The PCI/ISA modular systems and components product family was formerly known as DIGITAL Modular Computing Components, or DMCC.)

4.5 AlphaServer GS140 Logical Partitions Firmware

The minimum firmware revision for logical partitions on the AlphaServer GS140 is Version 5.4–19 (or higher). This firmware is not contained on the firmware CD–ROM that originally shipped with the operating system. You can obtain this firmware from the following ftp site:

http://ftp.digital.com/pub/DEC/Alpha/firmware/

See the *System Administration* for information on how to configure logical partitions.

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
- SysMan system management graphical user interface
- System administration
- Network and communications
- Local Area Transport (LAT)
- File systems
- Logical Storage Manager (LSM)

5.1 Commands and Utilities

The following notes apply to commands and utilities.

5.1.1 Escaped Comment Symbols in a Makefile

The `make` command will 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 (\).

5.1.2 Security: ACLs and Archive Tools

The `pax`, `tar`, and `cpio` archive tools might not restore access control lists (ACLs) on files in the manner you think that they should be restored.

Always check the ACLs on your files after saving and restoring them with any of these tools.

5.1.3 emacs Removes /tmp_mnt From the File Name

If you use `emacs` to edit a file in the `/tmp_mnt` directory, the `/tmp_mnt` path name is removed from the file name before the file is opened and a message such as the following might be displayed:

```
The directory containing /rock/home/yoyo/foo does not exist.  Create? (yes or no)
```

The error is most likely to occur when editing files in directories that are mounted by automount.

You can avoid the problem by specifying an alternate path to the file that does not contain `/tmp_mnt` in its path. For files in home directories that are mounted by automount, you can specify that as follows: `~/`*`filename`*, `~`*`username`*, or `~/home/`*`username/filename`*.

This is the expected behavior with this version of `xemacs` and conforms to the behavior on other UNIX platforms.

5.1.4 Editing an HTML File with xemacs

If you use `xemacs` to edit an HTML file, it looks for an entry corresponding to the email ID in an `.emacs` file. If this file does not exist or if the entry is not found, `xemacs` prompts the user for their email ID and this information is updated in the `.emacs` file.

5.1.5 Problem with the at Command During Daylight Saving Time

The `at` command can have a problem scheduling jobs on the days of daylight saving time (DST) in time zones and countries where daylight saving time applies. The problem occurs for jobs set to execute during the transition hour on the day the clocks are set ahead.

Currently, if you schedule a command to run during the hour where the clocks are set ahead, the command will run an hour earlier. For example, if you schedule a job to run at 2:30 AM on the day the clocks are set ahead, the job will be executed at 1:30 AM, which is one half hour before 3:00 AM.

Alternatively, you can schedule the job to run an hour later. Then it will run between 3:00 and 4:00 AM.

5.1.6 Netscape Communicator

The following notes apply to the Netscape Communicator.

5.1.6.1 Netscape Communicator Dumps Core Running in CDE

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

As long as this script is used to start Netscape Communicator, the application will display the file selection dialog within CDE without core dumping. Use the `-xrm '*nsMotifFSBCdeMode: True'` command-line option if you are starting 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`

5.1.6.2 Deleting Multiple Mail Messages Causes Netscape Communicator to Dump Core

Deleting multiple mail messages in Netscape Communicator's Messenger Mailbox component sometimes causes Communicator Version 4.51 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.

5.1.6.3 Netscape Communicator Dumps Core Intermittently

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

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

This core dump occurs with different hardware and software configurations and under different circumstances. Sometimes it hangs for a time, taking most of the CPU time, then it crashes. At other times, its process has to be killed and the application restarted. 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.

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

After upgrading to Netscape Communicator Version 4.51 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 Version 4.5 that might require user customization after upgrading to this 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. Select the Preferences option in the Edit pulldown menu and choose the Mail and News Servers option in the Preferences window.
2. Select the Mail Servers option from the list of Mail and News Servers options.
3. Select the IMAP server from the list of servers and choose 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 (quotes and period included) as follows:

   ```
   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 all the Delete options will now be sensitive (dark letters). 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.

5.1.6.5 Communicator Returns sh: /usr/bin/X11/showps: not found

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

```
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.

5.1.6.6 Installing Open3D Causes Netscape Communicator to Dump Core

Netscape Communicator core dumps when scrolling Web pages in Navigator or when editing bookmarks on a system with Open3D installed and a PowerStorm 4D5T graphics option after upgrading from Version 4.0D or later of the operating system. In general, Communicator and some other applications become unstable on this system configuration. The workaround is to set the shells DISPLAY variable to local:0 before starting Netscape Communicator. Another option is to display Netscape Communicator remotely from another system without Open3D installed on it.

5.1.6.7 Netscape Communicator Form Handling Problem in Asian Locales

Netscape Communicator has a form handling problem when running under the Asian locales, such as Japanese or Chinese. The input data field is cleared after the data is submitted. Web applications that use the input field value might not work properly. A workaround is to start Communicator in the C locale, for example:

```
% setenv LANG C
% netscape
```

5.2 SysMan System Management Graphical User Interface

The following sections apply to restrictions on using the SysMan applications.

5.2.1 Account Manager

The following notes apply to the Account Manager, dxaccounts.

5.2.1.1 General Restrictions

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

- When copying user accounts via cut and paste or drag and drop, the Allow Duplicate UIDs option in the General Preferences dialog box is honored. For example, when making a copy of user account that has a UID of 200, if the Allow Duplicate UIDs check box is off (the default), a unique UID is automatically generated for the resulting copy . If the Allow Duplicate UIDs check box is on, then the copy will have an identical UID. The same rules apply to copying groups.
- 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 where 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 may 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 either. 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.
- 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.

- When running the Account Manager from a terminal window, the following message might occasionally be written to stdout:

  ```
  Warning: DtComboBoxWidget: Unable to find item to select
  ```

  You can ignore this message.

5.2.1.2 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 Create/Modify Template dialog screen after selecting the template by double clicking on the template icon in the Template view icon box.
- The C1Crypt Encryption Type restricts the password length to between 6 and 8 characters even though the Minimum Length and Maximum Length fields of the Password Controls imply otherwise. To avoid this problem, set the passwords by using the `/usr/tcb/bin/dxchpwd` or the `/usr/bin/passwd` command when using the C1Crypt Encryption type is chosen.
- Setting a template Encryption Type to C1Crypt will invalidate the template. To avoid this problem, set the C1Crypt Encryption type for the user account by using the Create/Modify User dialog box.
- The Account Manager does not enforce the minimum/maximum password length limitation 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/maximum password length limitation is necessary.
- The Pointer Focus Prompt message in the status line of the Icon Box displays Delete instead of Retire when the mouse pointer is in the Retire toolbar icon.
- Error messages generated from the Create/Modify Template dialog box refer to the user name when they should refer to the template name.
- On an enhanced security system, you typically retire user accounts instead of deleting them. However, there are times when you might want to delete a user account. Account Manager supports retiring user

accounts but not deleting them. To delete a user account, do the following:

1. Manually edit the /etc/passwd and /etc/group files to remove references to the user account.
2. Use the following command to remove the user account from the protected password database:

   # **/usr/tcb/bin/edauth -r <user name>**

- When you rename a user account by changing the Username field of the Create/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 Create/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 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.

- Dropping a template icon on a user account changes the user's account to use that template. However, the template's lock attribute is not honored. For example, if the template developer has the lock field enabled, then dropping this template on a user account should cause the account to be locked but it does not. To avoid this problem, only the drag and drop method of template assignment has this problem. You can use the Create/Modify dialog box to change a single user's template or use the Modify Selected dialog box to change templates for several selected user accounts. Both methods correctly propagate the template's lock field.
- Dragging and dropping a template onto a user's account displays a confirmation message in the view's status line. This message incorrectly displays `template %2` instead of the template's name.
- Deleting a newly created template (the template was created after starting the Account Manager) causes the application to crash. To avoid this problem, restart the Account Manager and then delete the template.
- 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
```

5.2.1.3 NIS Plus and Minus Accounts

The plus (+) and minus (–) signs are special characters used by NIS in the local `/etc/passwd` file that specify whether a user is or is not allowed to log into the system. Users with accounts that are preceded by a plus sign are allowed to log in while users with accounts that are preceded with a minus sign are not. In the following example, the user `joe` would be allowed to log in to the local system and the user `harry` would not:

```
+joe::::::
-harry::::::
```

All the account management commands insist that the NIS user account exist before creating the corresponding plus or minus account. However, even when the NIS account does exist, the account management tools refuse to create the local plus or minus account. This problem effects applications and commands:

- Account Manager (dxaccounts)
- SysMan Menu's Manage local users and Manage NIS users
- useradd -t and usermod -t commands

To avoid this problem, use the Account Manager (dxaccounts), add a plus (+) or a minus (–) sign to the username but do not use the NIS Overrides field in the Options subdialog box. This allows the account to be added correctly. Note that the /etc/passwd record will contain an UID and GID but these will be ignored and the user's NIS UID/GID will be honored.

5.2.2 DNS (BIND) Configuration

The following problems apply to configuring BIND servers with the BIND configuration graphical user interface.

- Once you enter a zone you cannot delete it by clicking on the delete button in the Zone's window. To avoid this problem, edit the /etc/namedb/named.boot file to delete the zone entry.
- At least one forwarder must be entered in the Forwarder window if any Zones are to be added. To avoid this problem, if the Forwarder is not needed, edit the /etc/namedb/named.boot file to remove the Forwarder entry after you Commit to the setup in the BIND configuration interface.
- If your host is configured as a BIND server, and you use the BIND configuration interface to add, delete, or append forwarders, all existing Zones in the /etc/namedb/named.boot file are deleted if the Zones button is not clicked first. To avoid this problem, whenever you modify your BIND setup using the BIND configuration interface, click on the Zones button before you Commit to any changes.
- You cannot modify the Server Addr field of the secondary domain in the Modify Zone window using the BIND configuration interface. To avoid this problem, modify the address by editing the secondary domain entry in the /etc/namedb/named.boot file.

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. Select OK in the main window.
4. Select Yes to update the system hostname to reflect the hostname with new domain name.

5. Select 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 group `staticRoutes`, 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, you can verify that the row was modified properly by issuing the following command:

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

5.2.6 Problem with sysman -cli When Setting Values Interactively Using the -attr option

The following command nullifies the value of the selected attribute (`attr`) when using the interactive mode:

```
# sysman -cli -set value -comp -group -attr
```

To avoid this problem, use the following syntax:

```
#  sysman -cli -set value -comp -group -attr =
```

5.2.7 The -noverbose Argument on sysman -cli When Setting Values Causes Errors

The `-nonverbose` option does not function properly when setting values. Therefore, do not use `-nonverbose` when setting values using the `sysman -cli` command.

5.2.8 System Name Does Not Change When Changing the Host Name of a Network Interface

The system name does not change when you change the host name of a network interface card using the network configuration applications, `sysman -cli` or cloning. The name of the interface card does change in the `/etc/hosts` file, but the system name returned by the `hostname` command or the `HOSTNAME` variable in the `rc.config` file does not change.

To avoid this problem, you can do the following:

- Run Quick Setup. Quick Setup will set the system name as part of configuring the primary network interface.
- Use one of the following commands to change the name:
  - `/sbin/hostname`
  - `/usr/sbin/rcmgr set HOSTNAME`
  - `/usr/sbin/rcinet restart`

After changing the system name manually, you must log out and log back in to reset the X Windows authorization. Otherwise, you might not be able to access the graphical desktop.

5.2.9 Network Wizard Fails After Selecting the Rerun Option

After you configure the network using the Network Wizard you can select OK or Rerun. If you choose Rerun, the wizard restarts the process successfully; however, when you reach the Network Setup: Summary dialog box and select FINISH, the application displays the following message:

```
"Error: can't unset "_init": no such variable"
```

To avoid this problem do not choose Rerun, instead exit the application and run it again.

5.2.10 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.

5.2.11 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.

5.2.12 NIS Configuration and Enhanced Security

The sysman nis configuration for an NIS master server does not build the prpasswd maps required for enhanced security. To build the maps, execute the following commands, after running the NIS configuration:

```
# cd /var/yp
# make prpasswd
```

5.2.13 SysMan Menu

The notes in this section apply to the SysMan Menu application. Also see the Section 8.5.1 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 Some Tasks Can Only be Run by the root User

Each of the tasks in the SysMan Menu is associated with an action name. The task's action name is the same as its accelerator as displayed by the `sysman -list` command. These action names are associated with privileges by the Configure Division of Privilege (DOP) application in the SysMan Menu. Non-root users can be granted the privilege to run specific actions. There is a problem where several SysMan Menu tasks do not have a required privilege associated with their actions. You can perform these tasks only when you are logged in as root. These tasks are:

- View hardware hierarchy
- View cluster
- View device information
- Manage Cluster File System
- Manage DRD Storage
- Cluster Alias Manager

Note that in order to perform cluster tasks, the system must be a member of a cluster.

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 just 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 in the SysMan Menu are front-ends for the `useradd`, `usermod`, and `userdel` commands. If a warning message is displayed when a user account is added or modified, the change to `/etc/passwd` file has completed successfully. However, the

Manage local users and Manage NIS users tasks do not correctly display the changes in their dialog boxes. The happens in the following cases:

- When you are adding or modifying a user and specifying a primary or secondary group that does not exists.
- 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 now be displayed.

5.2.14 SysMan Station (SMS)

The notes in this section apply to the SysMan Station (SMS). Also see the Section 8.5.2 for information related to online help.

5.2.14.1 Incorrect Launch Status

SMS checks the status returned by all the applications that it launches. A few applications incorrectly exit with non-zero (failure) status returns even though the tool has launched successfully.

5.2.14.2 Objects Might Not Display Properly from Internet Explorer

Objects might not display properly in SMS View windows when running SMS from a PC using the Internet Explorer web browser. Sometimes objects are overlayed on top of each other 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 are running the SMS 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 Five Minute Timeout

If the SMS server (`smsd`) is restarted while there are active SM Station clients the clients will keep an active network connection that times out after five minutes have elapsed. Attempts to use the `/sbin/init.d/smsd`

`start` during this five minute interval will fail to restart the server because it cannot access the required network port. You must wait for the five minute timeout to elapse before you can restart the SMS server.

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

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

If no matches are found, you can restart the SMS daemon (`smsd`).

5.2.14.5 Physical Filesystem 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 does correctly indicate 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 groups' label will correctly indicate that the icon represents a group.

5.3 System Administration

The following notes apply to system administration.

5.3.1 License Management Facility Allows Year 2000 Testing

Certain software license PAKs include expiration dates that limit the ability to run software when the date is set well into the future (into the year 2000). While most customers do not have PAKs with expiration dates, those who do (such as CSLG, ASAP, or Partner PAK Program members) might benefit from the following enhancements.

The `lmf` utility and supporting code have been enhanced to allow customers with expiring software license PAKs to set the system date

beyond the expiration dates within a specific time window to allow Year 2000 (Y2K) testing.

Also, a test PAK, 00Y2K-TESTING, is available for use with Version 4.0D and higher of the operating system. If you have license PAKs with expiration dates, you can install this test PAK, allowing your PAKs to operate beyond their expiration dates between the dates of December 1, 1999 and March 2, 2000. The test PAK allows you to conduct Y2K testing within the specified time window.

For information about obtaining the 00Y2K-TESTING PAK and other Y2K issues, see the *Tru64 UNIX Year 2000 Readiness* white paper, available in HTML format on the Tru64 UNIX Version 5.0 Documentation CD–ROM. This document is also available on the Tru64 UNIX web page at the following URL:

```
http://www.unix.digital.com/unix/year2000/whitepaper.html
```

Once you obtain and install the 00Y2K-TESTING PAK and set the system date forward for Y2K testing, you must execute the following command from the root account the first time run level 3 (also referred to as "init 3" or "multiuser mode") is entered after each system boot:

```
# /usr/sbin/lmf reset
```

This ensures that all software licenses are loaded while the system date is set within the Y2K testing window. You need to execute this command only once within run level 3 between each system boot. You can toggle the system between run level 1 and run level 3 after the first execution of the command in run level 3. You are only required to execute the command again after rebooting the system.

5.3.2 EISA Configuration Utility Revision Requirements

For Tru64 UNIX Version 5.0 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.

5.3.3 Open3D Support

Consult the *Open3D Software Product Description* (SPD) before installing Open3D to ensure that this layered product is supported on your system.

Installing Open3D on systems not supported by the Open3D layered product can leave your system in an unusable state.

5.3.4 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 since 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.

5.3.5 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
```

5.3.6 Security

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

5.3.6.1 Shadow Password Mode Requires 8 Character Passwords

When you configure Enhanced security in Shadow Password mode, the default settings restrict a user changing his password to a password of exactly 8 characters. Attempts to enter passwords of different sizes produce the error the following error message:

```
Password must be from 8 to 8 characters long
```

You can change this by setting the system default settings in the `/etc/auth/system/default` file, using the `edauth` utility. The `u_newcrypt` field defines the cryptographic algorithm used on password changes. The default setting of 2 causes the maximum password length to be restricted to 8 characters, which is the maximum that the BSD cryptographic algorithm can accept. Changing the `u_newcrypt` field to 0 invokes the `bigcrypt` algorithm which allows the value of the `u_maxchosen` field to determine the maximum password length.

The 8 character minimum occurs because the `u_minchosen` field defaults to zero. Zero specifies to compute a minimum according to Green Book rules. The computed minimum is 9. The minimum is therefore set to 8 because it would exceed the maximum of 8 characters for the algorithm. You can easily change this behavior by setting the `u_minchosen` field to a value other than zero.

Note that these defaults will change in a future release of Tru64 UNIX.

5.3.6.2 Security and Insight Manager

The Insight Manager agent (or daemon) is configured by default when you install the operating system. Anonymous login to WebAgent applications, enabled by default, allows nonprivileged users to invoke the Insight Manager and view details of any connected devices in the local area network, although users cannot perform any operations unless authorized. If this is not appropriate given your site security policy, see *System Administration* guide for information on reconfiguring the Insight Manager agent.

5.3.6.3 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 retire, instead of remove, accounts on a system running enhanced security.

5.3.7 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 have been changed. 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.

5.3.8 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 system-wide 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.

5.3.9 Startup Messages Lost in Large Configurations

On systems which 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. This problem can be corrected 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 to 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. Since the space used by the buffer is not returned for general use after initialization, set the size only high enough to correct the problem.

5.3.10 Insight Manager

This section provides information on the Insight Manager.

5.3.10.1 Insight Manager Known Problems

The following problems exist in current version of the Insight Manager:

- The Compaq SNMP subagent might dump core while processing verbose messages in the /var/adm/messages file. This is most likely to occur while you are debugging a kernel. If a core dump occurs, delete or rename the /var/adm/messages file and restart the SNMP subagent.
- The Insight Manager Device Discovery web page (http://machine:2301/cpqdev.htm) may show inconsistent or incorrect data on some platforms, as active discovery is not fully functional.

- 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.
- The Insight Manager AutoRefresh option, when set for less than 60 seconds, might stop refreshing web pages when run from a NetScape browser running on Tru64 UNIX.

5.3.10.2 Compaq SNMP Subagent and Insight Manager Restrictions

The online help for Insight Manager in `/usr/share/sysman/bin/insightd` describes four login accounts: anonymous, administrator, operator and user. For this release, only the anonymous and administrator accounts are accessible. Before you log in as the Insight Manager administrator, use the Set Up Insight Manager application from the SysMan Menu to configure the administrator password.

This version of Insight Manager does not generate SNMP traps. Thus, alerts are not generated.

The Compaq SNMP subagent in `/usr/sbin/cpq_mibs` incorrectly reports the CPU logical slot instead of the physical slot on some Alpha platforms. Therefore, Insight Manager displays large values for this attribute.

The Compaq SNMP subagent returns incorrect values for SCSI disk read and write statistics. Therefore, the values displayed by the Insight Manager web pages are also incorrect. The values returned are in units of bytes rather than sectors. Additionally, the statistics displayed are only calculated once, when the subagent is started.

5.3.11 Event Manager (EVM)

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

5.3.11.1 Sorting Events By Summary Gives Incorrect Ordering

If you choose to sort events by Summary in the Event Viewer, events might appear to be sorted incorrectly. The viewer uses the `evmsort` command to provide sorted output. In this release the `evmsort` command does not provide an option to expand an event's format data item before sorting. Therefore, the results are based on the summary before variable data has been included.

5.3.11.2 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 initiating a cleanup of the log file by using the directions in the binlogd(8) reference page. Note that this operation removes the log file and starts a new one. Since two generations of the error log are held, the message continues to be displayed until you run the cleanup procedure twice.

5.3.11.3 Event Viewer Displays Incorrect Warning When Started from the SysMan Station

If you start the EVM event viewer from the SysMan Station as a user other than root, the following inaccurate warning is displayed, even if no other user is running the viewer:

```
Another user is running the event viewer from this account.
You will not be able to save any changes to your default preferences.
```

The warning is issued because the SysMan Station launches the viewer with root as its working directory and it cannot create a preferences file for a user other than root.

5.3.11.4 Double Clicking in the Event Viewer Launched from SMS Core Dumps

If you launch the Event Viewer from the SysMan Station (SMS) and double click in the More options window, the viewer fails resulting in a stack trace.

To avoid this problem, single click and then press OK to finish your choice.

This problem exists only when you launch the Event Viewer from SMS. If you launch the viewer from the command line or from the Sysman Menu, you can double click an option to select it.

5.3.11.5 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.

5.3.11.6 EVM Logger Might Miss Events

The EVM logger might not receive all events in situations where many events are posted in a short period of time. This is due to buffer overflow. If this happens, the logger inserts an event into the log reporting the number of events that were missed.

5.3.11.7 EVM and automount

If you run the `automount` daemon on your system and file systems are mounted and unmounted automatically at a high rate, the EVM event log will contain a corresponding number of NFS events, such as the following:

```
NFS: NFS filesystem xxx mounted on /yyy
```

To prevent these events from being logged, edit the logger configuration file, `/etc/evmlogger.conf`, as follows:

1. Locate the configuration block for the event log named `evmlog`.
2. Locate the `filter` keyword. This keyword is a few lines inside the block.
3. Append the following phrase to the filter string, inside the trailing double quote, using a backslash character to terminate each line of the filter:

```
filter:

    & (! [name @SYS_VP@.fs.nfs.mount]) \
    & (! [name @SYS_VP@.fs.nfs.umount])
```

If the filter entry had not previously been modified from the default, the entry should then appear as:

```
filter  "[prio >= 200] & (! [name @SYS_VP@.binlog]) \
            & (! [name @SYS_VP@.fs.nfs.mount]) \
            & (! [name @SYS_VP@.fs.nfs.umount])"
```

After you have modified the configuration file you must run the following command to reconfigure the logger:

```
# evmreload -l
```

5.3.11.8 The evmsort(1) Command Always Uses /tmp

The `evmsort` command uses temporary sort space in the `/tmp` directory even if the `TMPDIR` environment variable is set. This means that the `evmsort` command and the Event Viewer might fail on systems that have a high number of events if the file system containing the `/tmp` directory has insufficient space available.

The `evmsort` command requires enough temporary space to store all of the events being sorted. Additionally, the event viewer requires the same amount of temporary space for its own storage needs.

5.3.11.9 DECevent Translator

If the DECevent translation utility, `dia`, is not installed on your system and you request a detailed view of a `binlog` event through the Event Viewer or the `evmshow` command, the Translation section of the display shows the following message:

```
binlogshow: Failed to load DECevent translator /usr/sbin/dia binlogshow:
```

Check to ensure that DECevent is properly installed on this system. The DECevent kit is supplied on the Tru64 UNIX Version 5.0 Operating System CD-ROM. Install this kit to ensure that these errors do not occur. For more information on installing the DECevent kit, see the *Installation Guide*.

Note that DECevent is not supported on some newer systems. At this time EVM is not able to request event translations from its successor software tool, Compaq Analyze.

5.3.11.10 The syslogd Daemon Might Crash

It is possible for the system error logger daemon (`syslogd`) to crash if messages are being posted to the daemon at a very high rate and a system error prevents communication with EVM. This might happen if the system runs out of swap space while under a heavy system load.

If your system runs out of swap space correct the problem, then use the `ps` command to check that the `syslogd` daemon is still running. If not, restart it by running the following command while logged in as root:

```
# /usr/sbin/syslogd -e
```

5.3.12 Problem with Low Resolution Displays

Some graphical applications may be longer than the display for low resolution displays using large fonts. Windows that are larger than the display are truncated at the bottom, often resulting in the buttons being

cut off. Some windows in Quick Setup have exhibited this behavior on some displays.

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

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

5.4 Network and Communications

The following notes apply to network and communications software.

5.4.1 DHCP Database Migration (joind and bootpd)

Starting with Tru64 UNIX Version 4.0F, DHCP database files are stored in an entirely new format that is incompatible with older formats. The operating system ships with an online document, provided by JOIN Systems, that explains the reasons behind this change, lists the files that are affected, and provides instructions for converting the files to the new format. The document and conversion utility, README-DB237 and conv185-237, respectively, are located in the /etc/join directory.

5.4.2 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 select the Mail & Newsgroup subtree, then select Mail Servers.
3. Select the Local Mail Directory and change the directory to the UNIX folder directory you want to convert.
4. Select OK and restart Netscape.

5. Select 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 Configuring a Forward-Only Server with bindsetup

When you configure a DNS forward-only server with the `bindsetup` script that is part of the SysMan Utility, the script inserts a corrupted statement into the `/etc/namedb/named.conf` file, as follows:

```
options {
 directory "/etc/namedb";
/tforward only;
/tforwarders {
.
.
.
```

To correct this problem, edit the file to fix the statement. Remove the `/t` characters. For readability, you can optionally insert enough blank spaces to make the `forward-only` and `forwarders` entries line up:

```
options {
 directory "/etc/namedb";
 forward only;
 forwarders {
.
.
.
```

5.4.4 Sendmail Warning Message

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

be 755. However, the permissions are 775. Due to this, 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
```

5.4.5 The netstat Command and UNIX Domain Sockets

The `netstat` command does not display UNIX domain socket statistics for non-root users, and no error messages are printed. For example, the following command will only display information if it is entered by the root user:

```
# /usr/sbin/netstat -f unix
```

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 The newfs Command No Longer Searches disktab File

Starting with Version 4.0D, the `newfs` command does not search the `/etc/disktab` file for hard disk geometry information. It now performs an `ioctl GETDEVGEOM` call to determine the characteristics of a disk.

5.6.2 UNIX File System Warning Message

When a valid UFS file system has been detected and the `fstype` in the disk label is marked as unused the following messages are displayed:

```
# ./mount /dev/disk/dsk5c /mnt
Warning: partition /dev/disk/dsk5c was detected as marked unused.
Warning: partition /dev/disk/dsk5c temporarily set to 'FS_BSDFFS' 4.2BSD
fast file system.
Warning: Please use disklabel to correct this conditions.
```

Currently the `fstype` in the disk label is temporarily set and will revert when you unmount the file system with no warning message. The label could be changed without the knowledge of the user if the `newfs` command is issued on another partition on the same disk.

If you receive this message, use the `disklabel` command to correct the label.

5.6.3 Using UFS Version 3 and Version 4 File Systems

The following restrictions apply if you mount a Version 4 UFS file system on a system that is running a version of the operating system other than Version 5.0:

- Do not run the UFS Version 3 `fsck` command with the `-p` or `-y` options on a UFS Version 4 file system unless there are no files with more than 32767 hard links or 32765 subdirectories. If you do so, the files will be removed.
- Do not put files or directories containing more than 32767 hard links or 32765 subdirectories in the root (/), `/usr`, other UFS partitions in the `/etc/fstab` file that you specify the `fsck` command to run at boot time. If you do, when the system boots, the `fsck -p` command runs on the root, `/usr`, and other file systems specified in the `/etc/fstab` file. As a protection to this, UFS Version 4 will create a mismatch between the main superblock and alternate superblocks so that the `fsck -p` command issued on a UFS Version 3 file system cannot be run on UFS Version 4. See the `fschk`(8) reference page for more information.
- The first time you run the UFS Version 3 `fsck -p` command on a UFS Version 4 file system that contains more than 32767 hard links or 32765 subdirectories, it will fail because of a superblock mismatch with alternate superblocks. The command prompts you to use an alternate superblock. Answer no to this prompt. Even if you answer yes, the UFS Version 4 file system remains untouched provided you do not answer yes to the CLEAR [yn] prompt. You can correct the FREE BLK COUNT and the UPDATE STANDARD SUPERBLOCK, but the next time you enter the UFS Version 3 `fsck -p` command on the file system, the files

with more than 32767 hard links are removed. Therefore, do not run the UFS Version 3 `fsck` command on UFS Version 4 file systems that contain more than 32767 hard links or 32765 subdirectories.

- If you run the UFS Version 3 `fsck` on a UFS Version 4 file system, make sure to answer no at the CLEAR?[yn] prompt. If you answer yes, the file system with more than 32767 hardlinks or 32765 subdirectories is removed and you cannot recover it.

5.6.4 Advanced File System (AdvFS)

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

5.6.4.1 AdvFS and fsync()

You can use the `fsync()` system call to synchronously write dirty file data to disk. There are two ways a file can have dirty data in memory. One way is via the `write()` system call. The other is from a memory write reference after an `mmap()` system call. For AdvFS files, the `fsync()` system call writes out dirty data only from the `write()` system call. If dirty data from an `mmap()` system call also needs to be written then you must also use the `msync()` system call.

5.6.4.2 New AdvFS On-Disk File Formats

Tru64 UNIX Version 5.0 provides new on-disk format (Version 4) for AdvFS. Kernels built with this version of Tru64 UNIX will work with the old on-disk format (Version 3) as well as the new format. However, you cannot use a kernel built with an earlier version of DIGITAL UNIX with the new AdvFS on-disk format.

You can bring an AdvFS domain forward from an earlier version and mount it on a system running Tru64 UNIX Version 5.0. If you do this, your domain will not change; it will continue to use the Version 3 on-disk format, which is still supported.

If you perform an update installation, you do not get the new on-disk format. You only get the new on-disk format if you do a full installation or you create a new domain using Tru64 UNIX Version 5.0 or later.

There is no conversion utility available to move Version 3 domains to Version 4 domains. The only way to move your data to a new domain using the new on-disk format is to back up your data from a Version 3 domain and restore it into a new Version 4 domain.

Due to the new on-disk file formats, certain AdvFS utilities from earlier releases of Tru64 UNIX have the potential to corrupt domains created

using the new on-disk formats. Therefore, all statically-linked AdvFS utilities from earlier versions of Tru64 UNIX will not run on Version 5.0. These utilities are usually from versions prior to Version 4.0. Additionally, the following dynamically-linked utilities from earlier releases of Tru64 UNIX do not run on Version 5.0 either:

- `/sbin/advfs/verify`
- `/sbin/chvol`
- `/usr/sbin/advfsstat`
- `/sbin/showfdmn`
- `/usr/sbin/balance`
- `/usr/sbin/defragment`
- `/usr/sbin/presto`
- `/usr/sbin/rmvol`

5.6.4.3 Cleanly Unmount File Systems Before Changing Operating System Versions

If a system crashes or goes down unexpectedly due to a loss of power or other similar circumstances, AdvFS will perform recovery when the filesets that were mounted at the time of the crash are remounted after rebooting. This recovery keeps the AdvFS metadata consistent and makes use of the AdvFS log file.

Different versions of the operating system use different AdvFS log record types. Therefore, it is important that AdvFS recovery be done on the same version of the operating system that was running at the time of the crash. For example, if your system is running Version 5.0 and the system crashes, do not reboot using Version 3.2G since that version of AdvFS might work with the log records that the Version 5.0 system put into the log.

Therefore, if you want to reboot using a different version of the operating system, make sure that any mounted AdvFS filesets are unmounted cleanly before rebooting. In addition, if the system panicked or an AdvFS domain was domain-panicked, it is best to reboot using the original version of the operating system and run the `/sbin/advfs/verify` command to make sure that the domain is not corrupted. If it is not, it is then safe to reboot using a different version of the operating system and remount the filesets.

5.6.4.4 Running verify on the root Domain

The `verify` command has been modified so that you can no longer run it on a mounted root domain with either the `-f` or `-d` flags. If you need to run

the verify command on the root domain with either of these flags you must boot off another disk or CD–ROM as follows:

1. From the CD–ROM, exit the installation procedure.
2. Change directory to the /etc/fdmns directory:

   # **cd /etc/fdmns**

3. Create a temporary domain directory:

   # **mkdir verify_root**

4. Change directories to the newly created directory:

   # **cd verify_root**

5. Create a symbolic link in this directory to the disk partition which contains the domain you want to run verify on:

   # **ln -s /dev/disk/dsk3a dsk3a**

6. Change directory back to the root directory (/):

   # **cd /**

7. Run verify on the temporary domain:

   # **/sbin/advfs/verify -f verify_root**

8. Delete the temporary domain:

   # **rm -rf /etc/fdmns/verify_root**

5.6.4.5 Very Small AdvFS Domains Created in lockmode 4

The following problem can occur in Version 3 file domains only. It is recommended that you create Version 4 file domains.

Creation of version 3 domains smaller than 20 MB while running in lockmode 4 can cause the system to panic when the first fileset is created within the small domain. You can safely create and use such domains if the system is not running in lockmode 4. To see which lockmode the system is running in, enter the following command:

```
% sysconfig -q generic lockmode
```

5.6.4.6 Direct I/O Non-Sector-Sized Reads Limitation

For files that have been opened using the direct I/O option in AdvFS domains, only sector-multiple reads are supported (512 bytes on all current disks). If non-sector-multiple reads are attempted, the read operation might generate an I/O error (for example, EINVAL). Note that this restriction only applies to read operations; it does not apply to writes.

5.7 Logical Storage Manager

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

5.7.1 Restrictions with LSM root and swap Volumes

The following restrictions apply to root, primary swap, and secondary swap volumes configured under LSM:

- You no longer need to configure the root and primary swap on the same physical disk but you must still configure them using the encapsulation tools.
- You must configure the root, primary swap, and any secondary swap volumes into the disk group named `rootdg`.

5.7.2 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_rootvol_is_dev=1
lsm_swapvol_is_dev=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 (the backslash (\) character indicates line continuation):

```
>>> 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.

5.7.3 Cannot enable logging on RAID5 volumes using LSM's bottom-up commands

RAID5 volumes can be successfully created using either LSM's 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 RAID5 volume.

The `volassist` top-down command does work. Therefore, use the `volassist addlog` command to add logging to RAID5 volumes. Note that if you create a RAID5 volume using the `volassist make` command, logging is configured and enabled automatically.

5.7.4 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.

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
- DECthreads (pthreads)
- Kernel programming

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);
```

The old prototype definitions are accessible 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 have been changed. 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.

6.1.3 Change to the strftime() %V Format Specifier

The `strftime()` function in the standard C library (`libc`) has been updated to comply with the latest corrigenda (update) to the *X/Open CAE Specification Issue 4 Version 2 (UNIX95)*. Specifically, the %V format specifier has been updated to comply with the following description:

> %V is replaced by the week number of the year (Monday as the first day of the week) as a decimal number [01,53]. If the week containing 1 January has four or more days in the new year, then it is considered week 1. Otherwise, it is the last week of the previous year, and the next week is week 1.

The last sentence of the previous version of the specification read as follows:

> Otherwise, it is week 53 of the previous year, and the next week is week 1.

Because the last week of the previous year can be 52 or 53, the updated specification makes more practical sense. Conforming implementations are also required to make appropriate changes when new corrigenda items (updates) to UNIX95 are approved. Therefore, the `strftime()` function has been modified to correctly implement the new wording as referenced above.

6.2 DECthreads (pthreads)

The following notes apply to DECthreads. See Section 1.10.10.4 for information about Visual Threads, a new product that lets you analyze your multithreaded applications for potential logic and performance problems.

6.2.1 Problems with Use of the stackadd Thread Creation Attribute

It is not recommend to use the `stackaddr` thread creation attribute which allows you to allocate your own stack for a thread. 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, since 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 (eight bytes), multiple variables, each of which is less than eight 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 eight 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 eight bytes, or by defining sufficient padding storage after the variable to total eight 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 DECthreads*.

6.2.3 DECthreads 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 zero (0) indicating success. Debuggers such as Ladebug and TotalView provide functionality formerly provided by these routines.

6.2.4 DECthreads SIGEV_THREAD Notification Mechanism

Using the `SIGEV_THREAD` notification mechanism, a user-defined function is called to perform notification of an asynchronous event. The function runs as though it were the start routine of a thread and can make full use of the DECthreads synchronization objects.

The `SIGEV_THREAD` notification mechanism and the function to be called are specified in the `sigevent` structure. This mechanism is useful for programming with the POSIX 1.b realtime signal interfaces such as timers and asynchronous I/O. For information and cautions concerning the use of signals in a multithreaded environment, see the *Guide to DECthreads*. For more information about using `SIGEV_THREAD`, see the *IEEE POSIX 1003.1c-1996* standard and *The Open Group Single UNIX Specification, Version 2*.

6.2.5 DECthreads Change in the Default Stack Size

DECthreads now supports using uncommitted memory for thread stacks. (See Section 1.10.10.16) . As part of this new support, the default thread stack size has been raised to 5 MB. This means that it should rarely, if ever, be necessary to override the default. However, you should change any existing code that determines the default dynamically by fetching from an initialized attributes object and multiplying it to avoid allocating more address space than the application needs. If you do not, the application could also encounter `ulimit` problems.

Also, code that specifies literal sizes usually allocates stacks sizes that are smaller than the default. Therefore, it is recommended that these applications use the default stack size.

6.2.6 Process-Shared Synchonization Objects and Debugging

The DECthreads 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 (See Section 1.10.10.13).

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.

6.3 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 5.0.

Refer to the *Asynchronous Transfer Mode* manual for more information.

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
- X servers
- CDE clients
- Internationalization

7.1 Hardware Notes and Restrictions

The following notes apply to graphics hardware restrictions.

7.1.1 Powerstorm Graphics Support

Support for the following graphics adapters is not available on this version of Tru64 UNIX. Therefore, these devices are supported in VGA mode only:

- Powerstorm 4D40T
- Powerstorm 4D51T
- Powerstorm 4D60T
- Powerstorm 300

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

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

7.1.2 Qvision Graphics Display Error

Different versions of Qvision graphics boards demonstrate `fillsolid` drawing problems, leaving a line at the bottom of the screen, which is

evident when running 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.

7.3 CDE Clients

The following notes apply to CDE clients.

7.3.1 Inaccessible Dialog Buttons

When running CDE with 640 x 480 graphics resolution, the OK, Apply, Cancel, and Help buttons of some application dialogs may be inaccessible. To correct this problem, set the `DXmfitToScreenPolicy` resource to `as_needed` in the application's defaults file or, for systemwide problems, in the `/usr/dt/config/$LANG/sys.resources` file.

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 may 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.
- Select the Off button in the same dialog box.
- Execute `xset s off` 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 `dtfile`. You can get the `pid` for each process by using the following command:

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

7.3.4 Possible Failure in the XOpenDisplay Call

When logging in to the CDE desktop, some applications may not restart. The X server process may 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 in the `dxconsole` window, such as the following error:

```
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 may marginally increase the time before the login completes, it better assures that all applications will be restarted.

This can be added to the `/usr/dt/app-defaults/C/Dtsession` file to make the change for all users automatically.

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 in the following example:

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

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

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

7.4.2 System-Default Keyboard Setting Might Prevent User Login

When a user logs on to a system, the system-default keyboard setting must be appropriate for the keys that the user presses when entering characters in the username 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 onto the system. This situation most often arises when a keyboard is being used in one language and the system-default keyboard setting is another language. You can change the system-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 5.0 documentation. It provides information on the following:

- General information about installation
- System limits documentation
- AltaVista search
- *Command and Shell User's Guide*
- *Installation Guide — Advanced Topics*: recovering a damaged root file system
- Online help

8.1 System Limits Documentation

The system limits information has been moved from the *Release Notes* to the Tru64 UNIX Version 5.0 *Software Product Description* (SPD). Any references to this information being in the *Release Notes* is in error. PDF and PostScript copies of the SPD are located in the `/DOCUMENTATION` directory on the Tru64 UNIX Version 5.0 Base Operating System CD-ROM Volume 1.

8.2 AltaVista CD-ROM Search Might Not Work Correctly with Netscape Communicator

When the Tru64 UNIX 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.

8.3 Commands and Shells User's Guide

Table 3-1 of 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, it 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.

8.4 Installation Guide - Advanced Topics: Recovering a Damaged root File System

A step is missing from the following sections of the *Installation Guide — Advanced Topics* that explain how to recover a damaged root file system:

- Restoring UNIX File Systems (UFS)

- Restoring Advanced File Systems (AdvFS)

This missing step provides information on how to recover a file system from magnetic tape. The should precede the current step 5 (UFS) and step 6 (AdvFS) which instruct you to recover the file systems. The procedures out lined in the *Installation Guide — Advanced Topics* only work when restoring a damaged root to the same disk that it was on originally. The following steps give an example of recovering the file systems from magnetic tape, as follows:

1. Change directory to `/var/mnt`.
2. Run the `restore` command on the tape drive. For example:

```
# restore -Yrf /dev/rmt0h
```

Before you can mount a tape and enter the `restore` or `vrestore` commands, you must ensure that a device special file exists for the default tape device by doing the following:

1. Verify that the tape device is powered up and is connected to the system. If the tape device is not powered up when the system initializes, it might not be visible to the system. Shut the system down, power up the tape device, and reboot the system.
2. Use the following command to obtain information about the devices on the system:

```
hwmgr -view device
```

   If the output from this command does not indicate the presence of a device such as `/dev/tape/tape0_d0` or similar, create the device special file as follows:

```
# /sbin/dn_setup -install_tape
```

   A message is displayed showing the device names that are created during this operation, such as `+tape0`. The plus sign (+) indicates that the device is being added.

When all the tape special device files are created, you can proceed with the recovery of the damaged root file system.

If you want to restore a root (/), `/usr`, or `/var` file to a disk other than the one on which it was originally install, in addition to the procedures in the *Installation Guide — Advanced Topics* and those previously stated in this note, you must also do the following:

1. Halt the system.
2. Boot the restored image to single user mode as follows:

```
>> b -fl s DISK_NAME
```

3. In single use mode, mount the root file system as writable as follows:

   ```
   $ mountroot
   ```

   This creates a device entry for the newly restored disk. As the devices are created, a message such as the following is displayed:

   ```
   dskNa dskNb dskNc ...
   ```

   N represents a number assigned to the newly found disk, which means a disk that is being seen for the first time by the restored system image.

4. This should be the disk that was restored. If more than one disk is displayed it means that multiple disks have been added since the system disk was saved. In that case, you must determine the correct disk that is associated with the restored disk.

5. While in single user mode, you must then exchange the old name of the disk for the new name using the `dsfmgr` command with the following syntax:

   ```
   $ dsfmgr -e  dskNEW  OLD
   ```

   For example:

   ```
   $ dsfmgr -e  dsk12 0
   ```

   If the old device has been removed or deleted, use the move option as follows:

   ```
   $ dsfmgr -m  dskNEW  OLD
   ```

8.5 Online Help

The notes in this section apply to the online help.

8.5.1 SysMan Menu

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

8.5.1.1 Title Bar is Incorrect

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

8.5.1.2 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.

8.5.2 System Management Station

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

8.5.2.1 Some Online Help Does Not Work Until Connected to the Server

The SysMan Station (SMS) client gets its on-line help information from the SMS server. A few of the dialog boxes displayed during the initial connection sequence have Help or More Information buttons that do not function properly because a server connection has not yet been established. Specifically, this is a problem with the Welcome, Connecting to, and Failed to connect dialog boxes.

8.5.2.2 Some Links Do Not Work Properly

The following links under Section 2.2 View Window, of the Reference section of the SysMan Station Online Help do not work properly:

- ADVFS_Filesystems View
- CAA_Applications_(all) View
- CAA_Applications_(active) View
- Hardware View
- Mounted_Filesystems View

- Physical_Filesystems View

You can obtain information on these topics by selecting Section 2.2, View Window.

8.5.2.3 Incorrect Pointer to Access the SysMan Web Page

Section 1.1 Opening SysMan Station of the SysMan Station online help contains an incorrect pointer to the SysMan web page from a PC web browser. In step 1 the online documentation states the following:

> Load the SysMan home page by entering the following file location into the Location: input text field on the File Menu of your browser:`/usr/doc/netscape/sysman/index.html`

The correct way to access the SysMan web page from a PC web browser is to enter the name of the system to be managed from the PC and specify port 2301 in the URL as follows:

`http://`*`system_name`*`:2301`

8.5.2.4 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.

A

Software Subset Information

This appendix provides information on the disk space required to install Tru64 UNIX, 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 higher 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 5.0, use the `df` command to determine free disk space in blocks.

Table A–1: Disk Space Requirements

Tru64 UNIX V5.0 Operating System

Subset	root	/usr	/var	Total
OSFACCT500	9.67	1088.24	12.03	1109.94
OSFADVFS500	6697.60	1391.43	—	8089.03
OSFADVFSBIN500	2308.53	3.06	—	2311.58
OSFADVFSBINOBJECT500	—	3919.73	—	3919.73
OSFADVFSDAEMON500	10.88	1677.74	139.18	1827.80
OSFAFM500	—	2160.73	—	2160.73
OSFATMBASE500	245.91	1327.10	—	1573.01
OSFATMBIN500	4853.54	21.40	—	4874.94
OSFATMBINCOM500	—	281.68	—	281.68

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

Tru64 UNIX V5.0 Operating System

Subset	root	/usr	/var	Total
OSFATMBINOBJECT500	—	17464.94	—	17464.94
OSFBASE500	37386.92	95686.28	1465.55	134538.76
OSFBIN500	16935.54	1495.26	—	18430.80
OSFBINCOM500	42.44	29532.98	72.68	29648.10
OSFBINOBJECT500	—	27263.99	—	27263.99
OSFC2SEC500	417.44	1154.74	160.22	1732.40
OSFCDEAPPS500	—	12496.09	—	12496.09
OSFCDEDEV500	—	27152.64	—	27152.64
OSFCDEDT500	—	55436.00	—	55436.00
OSFCDEMAIL500	—	4198.03	—	4198.03
OSFCDEMANOP500	—	2055.84	—	2055.84
OSFCDEMANOS500	—	1430.46	—	1430.46
OSFCDEMIN500	—	16178.98	22.05	16201.03
OSFCLINET500	970.10	17694.58	47.12	18711.80
OSFCMPLRS500	—	27423.61	—	27423.61
OSFDCMT500	—	1096.92	—	1096.92
OSFDCMTEXT500	—	4387.12	—	4387.12
OSFDECW500	—	2925.28	61.81	2987.10
OSFDIABASE500	6.07	60309.42	49.69	60365.19
OSFDMS500	—	95.33	73.06	168.39
OSFDOSTOOLS500	—	3230.21	—	3230.21
OSFEMACS500	—	111544.13	—	111544.13
OSFENVMON500	21.88	141.92	—	163.80
OSFEURLOC500	—	1509.82	—	1509.82
OSFEXAMPLES500	—	2352.95	—	2352.95
OSFEXER500	—	6853.70	—	6853.70
OSFFONT15500	—	3160.99	—	3160.99
OSFFONT500	—	2432.85	—	2432.85
OSFHWBASE500	25331.54	2639.76	34.40	28005.70

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

Tru64 UNIX V5.0 Operating System

Subset	root	/usr	/var	Total
OSFHWBIN500	26516.53	2011.29	6.10	28533.93
OSFHWBINCOM500	—	3137.28	—	3137.28
OSFHWBINOBJECT500	—	26780.64	—	26780.64
OSFIMXE500	14.23	7223.94	296.71	7534.87
OSFINCLUDE500	—	5773.11	—	5773.11
OSFINET500	1100.06	19615.60	716.36	21432.01
OSFJAVA500	—	21715.71	—	21715.71
OSFJAVADEV500	—	17727.53	—	17727.53
OSFJAVADOC500	—	34278.77	—	34278.77
OSFKBDLK201500	—	361.70	—	361.70
OSFKBDLK401500	—	248.44	—	248.44
OSFKBDLK411500	—	134.33	—	134.33
OSFKBDLK421500	—	16.42	—	16.42
OSFKBDLK444500	—	126.52	—	126.52
OSFKBDPCXAL500	—	273.12	—	273.12
OSFKTOOLS500	—	1565.08	7971.24	9536.32
OSFLAT500	648.96	941.81	7.83	1598.60
OSFLDBBASE500	—	13891.07	—	13891.07
OSFLDBDOC500	—	469.58	—	469.58
OSFLDBGUI500	—	7682.76	—	7682.76
OSFLDBSRV500	—	83.00	—	83.00
OSFLEARN500	—	3100.40	—	3100.40
OSFLIBA500	—	6856.13	—	6856.13
OSFLSMBASE500	8946.53	5035.31	—	13981.84
OSFLSMBIN500	1609.20	9.16	—	1618.36
OSFLSMX11500	13.22	10039.96	62.35	10115.53
OSFMANOP500	—	19081.28	—	19081.28
OSFMANOS500	—	15422.89	—	15422.89
OSFMANWOP500	—	8866.57	—	8866.57

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

Tru64 UNIX V5.0 Operating System

Subset	root	/usr	/var	Total
OSFMANWOS500	—	1238.26	—	1238.26
OSFMH500	—	4398.39	—	4398.39
OSFMITFONT500	—	18754.98	104.01	18858.99
OSFMOTIF11500	—	10808.58	—	10808.58
OSFNETCONF500	—	1405.91	—	1405.91
OSFNETSCAPE500	—	49715.75	—	49715.75
OSFNFS500	53.69	1269.93	—	1323.62
OSFNFSCONF500	—	45.27	—	45.27
OSFOBSOLETE500	—	1495.87	—	1495.87
OSFOLDDECW500	—	329.23	—	329.23
OSFPERL500	—	24685.95	—	24685.95
OSFPGMR500	—	9886.43	—	9886.43
OSFPRINT500	114.10	8272.99	44.13	8431.22
OSFRCS500	—	1889.18	—	1889.18
OSFRIS500	—	193.71	143.19	336.89
OSFSCCS500	—	11017.91	—	11017.91
OSFSDE500	—	22167.50	—	22167.50
OSFSDECDE500	—	323.81	—	323.81
OSFSER500	—	14057.20	51.03	14108.22
OSFSERPC500	—	4099.94	—	4099.94
OSFSERTC500	—	683.81	—	683.81
OSFSERVICETOOLS500	—	1763.25	—	1763.25
OSFSVID2500	31.59	618.19	—	649.78
OSFSYSMAN500	123.04	51985.31	27.64	52135.98
OSFTCLBASE500	—	12927.80	—	12927.80
OSFTERM500	—	3714.44	—	3714.44
OSFTKBASE500	—	10236.40	—	10236.40
OSFUUCP500	101.73	13716.67	272.15	14090.55
OSFX11500	22.70	38973.10	721.42	39717.22

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

Tru64 UNIX V5.0 Operating System

Subset	root	/usr	/var	Total
OSFXADMIN500	—	6679.34	68.38	6747.71
OSFXADVFS500	—	21180.60	654.19	21834.79
OSFXC2SEC500	—	582.56	—	582.56
OSFXDEMOS500	—	1855.40	—	1855.40
OSFXDEV500	—	2726.99	—	2726.99
OSFXEXAMPLES500	—	9209.47	—	9209.47
OSFXIEDOC500	—	1478.88	—	1478.88
OSFXINCLUDE500	—	8142.99	—	8142.99
OSFXLIBA500	—	15216.52	—	15216.52
OSFXMIT500	—	6062.57	47.91	6110.47
OSFXNEST500	—	376.50	9.81	386.31
OSFXOEM500	—	—	965.52	965.52
OSFXPRINT500	—	718.71	—	718.71
OSFXPRT500	—	1207.62	318.93	1526.56
OSFXSYSMAN500	67.84	17594.13	242.82	17904.79
OSFXVFB500	—	219.16	9.81	228.97
Totals	**134601.45**	**1197612.53**	**14879.34**	**1347093.32**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	134601.45	**1197612.53**	**14879.34**	**1347093.32**

Table A–2: Disk Space Requirements

Advanced Printing Software

Subset	root	/usr	/var	Total
APXADMIN100	—	4431.92	—	4431.92
APXBASE100	—	7155.72	76.00	7231.72
APXGUI100	—	14387.37	—	14387.37
APXGW100	—	1078.09	—	1078.09
APXSVR100	—	2435.88	—	2435.88
Totals	**—**	**29488.97**	**76.00**	**29564.97**

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

Alternative Development Environment Tools for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
CMPDEVALT500	—	12543.99	—	12543.99
CMPDEVENH500	—	249.82	—	249.82
Totals	**—**	**12793.81**	**—**	**12793.81**
COM for Tru64 UNIX V1.0				
Subset	**root**	**/usr**	**/var**	**Total**
CUEDEV100	—	9722.27	356.82	10079.08
CUEDOC100	—	4714.35	—	4714.35
CUEMAN100	—	75.15	—	75.15
CUERTS100	—	17290.41	258.21	17548.63
Totals	**—**	**31802.17**	**615.03**	**32417.20**
DEC C++ Class Libraries Version 4.0 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
CXLLIBA500	—	224.93	—	224.93
CXLSHRDA500	—	280.55	—	280.55
Totals	**—**	**505.48**	**—**	**505.48**
Compaq COBOL RTL V2.6-467 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
DCARTL260	—	2581.81	—	2581.81
O2ABASE260	—	1734.24	—	1734.24
Totals	**—**	**4316.05**	**—**	**4316.05**
DIGITAL Fortran RTL #384 for DIGITAL UNIX Alpha Systems (f90 and f77)				
Subset	**root**	**/usr**	**/var**	**Total**
DFARTL384	—	3907.24	—	3907.24
Totals	**—**	**3907.24**	**—**	**3907.24**
DEC Pascal RTL V5.6-21 for Digital UNIX Systems				
Subset	**root**	**/usr**	**/var**	**Total**
DPORTL563	—	1742.89	—	1742.89
Totals	**—**	**1742.89**	**—**	**1742.89**

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

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
DAUSQLNKSVR200	—	—	41443.76	41443.76
Totals	**33.32**	**—**	**75106.97**	**75140.29**
Free Software Foundation GNU Source for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
FSFEMACS500	—	102988.55	—	102988.55
FSFGZIPSRC500	—	1894.79	—	1894.79
FSFINDENTSRC500	—	1244.68	—	1244.68
FSFPERL500	—	20029.00	—	20029.00
FSFRCSSRC500	—	1907.55	—	1907.55
Totals	**—**	**128064.57**	**—**	**128064.57**
Multimedia Services V2.4E for DIGITAL UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
MMEDRVAV201245	—	885.29	—	885.29
MMEDRVAV300245	—	2240.08	—	2240.08
MMEDRVAV3X1245	—	1552.41	—	1552.41
MMEDRVBBA245	—	303.84	—	303.84
MMEDRVMMSESS245	—	638.01	—	638.01
MMEDRVMSB245	—	919.71	—	919.71
MMEMANRT245	—	323.40	—	323.40

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

Multimedia Services V2.4E for DIGITAL UNIX

Subset	root	/usr	/var	Total
MMERELNOTES245	—	1397.53	—	1397.53
MMERT245	20.97	21697.40	11.82	21730.19
MMERTCDE245	—	467.70	—	467.70
MMERTSMPLDAT245	—	12385.79	—	12385.79
Totals	**20.97**	**42811.15**	**11.82**	**42843.94**

Netscape FastTrack V3.01 for Tru64 UNIX

Subset	root	/usr	/var	Total
WEBNETSCAPEFASTTRACK301	—	172955.13	—	172955.13
Totals	**—**	**172955.13**	**—**	**172955.13**

Performance Manager for Tru64 UNIX

Subset	root	/usr	/var	Total
PMGRAPP500	—	460.85	—	460.85
PMGRBASE500	—	4333.56	—	4333.56
PMGRGUI500	—	26387.80	5.65	26393.45
PMGRMAN500	—	63.43	—	63.43
PMGRUTIL500	—	41.14	2293.77	2334.91
Totals	**—**	**31286.77**	**2299.42**	**33586.20**

Digital Porting Assistant V3.0-0 for Digital UNIX

Subset	root	/usr	/var	Total
PRTBASE300	—	50631.13	—	50631.13
PRTMAN300	—	18.45	—	18.45
Totals	**—**	**50649.58**	**—**	**50649.58**

Graphical Program Analysis Tools V2.0-7 for DIGITAL UNIX

Subset	root	/usr	/var	Total
GPABASE207	—	38926.36	—	38926.36
GPAMVIEW207	—	14481.00	—	14481.00
GPAPROFHEAP207	—	21251.91	—	21251.91

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

Graphical Program Analysis Tools V2.0-7 for DIGITAL UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
GPAPVIEW207	—	2226.05	—	2226.05
Totals	**—**	**76885.32**	**—**	**76885.32**
SCSI CAM Layered Components V5.0				
Subset	**root**	**/usr**	**/var**	**Total**
CLCMC500	4.46	3514.04	—	3518.50
Totals	**4.46**	**3514.04**	**—**	**3518.50**
Tru64 UNIX Retired Components				
Subset	**root**	**/usr**	**/var**	**Total**
OSRETIREDCLINET500	—	209.30	—	209.30
OSRETIREDNFS500	—	44.65	—	44.65
Totals	**—**	**253.95**	**—**	**253.95**
Visual Threads V1.1-015 for Tru64 UNIX				
Subset	**root**	**/usr**	**/var**	**Total**
DVTBASE110	—	30530.58	—	30530.58
Totals	**—**	**30530.58**	**—**	**30530.58**
Tru64 UNIX Worldwide Language Support V5.0				
Subset	**root**	**/usr**	**/var**	**Total**
IOSAACMENU500	—	—	—	—
IOSCACDEAPPS500	—	2113.56	—	2113.56
IOSCACDEDEV500	—	163.24	—	163.24
IOSCACDEDT500	—	1163.90	—	1163.90
IOSCACDEMAIL500	—	90.00	—	90.00
IOSCACDEMIN500	—	4074.51	—	4074.51
IOSCADECW500	—	27.00	—	27.00
IOSCAX11500	—	638.09	3.30	641.39
IOSCAXDEV500	—	93.99	—	93.99
IOSCSCDEAPPS500	—	2037.56	—	2037.56
IOSCSCDEDEV500	—	144.24	—	144.24

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSCSCDEDT500	—	1262.44	—	1262.44
IOSCSCDEMAIL500	—	83.71	—	83.71
IOSCSCDEMIN500	—	559.67	—	559.67
IOSCSDECW500	—	40.26	—	40.26
IOSCSUCSBASE500	—	119.56	—	119.56
IOSCSX11500	—	1803.51	3.30	1806.81
IOSCSXDEV500	—	93.87	—	93.87
IOSDECDEAPPS500	—	240.81	—	240.81
IOSDECDEDEV500	—	160.91	—	160.91
IOSDECDEDT500	—	1052.17	—	1052.17
IOSDECDEHLP500	—	20466.24	—	20466.24
IOSDECDEMAIL500	—	92.01	—	92.01
IOSDECDEMIN500	—	549.34	—	549.34
IOSDECHX11500	—	314.59	—	314.59
IOSDEDECW500	—	27.00	—	27.00
IOSDEX11500	—	1910.22	3.30	1913.53
IOSDEXDEV500	—	94.01	—	94.01
IOSELCDEDT500	—	32.54	—	32.54
IOSELCDEMIN500	—	79.74	—	79.74
IOSELFONT100M500	—	1092.72	—	1092.72
IOSELFONT100P500	—	1080.35	—	1080.35
IOSELFONT75M500	—	933.73	—	933.73
IOSELFONT75P500	—	926.07	—	926.07
IOSELOLFONT500	—	2011.26	37.23	2048.49
IOSELUCSBASE500	—	85.32	—	85.32
IOSELX11500	—	469.39	3.30	472.69
IOSESCDEAPPS500	—	229.41	—	229.41
IOSESCDEDEV500	—	159.21	—	159.21
IOSESCDEDT500	—	1062.17	—	1062.17

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSESCDEHLP500	—	24337.28	—	24337.28
IOSESCDEMAIL500	—	91.19	—	91.19
IOSESCDEMIN500	—	528.76	—	528.76
IOSESDECW500	—	27.00	—	27.00
IOSESX11500	—	1918.31	3.30	1921.61
IOSESXDEV500	—	94.04	—	94.04
IOSFRBEX11500	—	314.59	—	314.59
IOSFRCAX11500	—	314.59	—	314.59
IOSFRCDEAPPS500	—	231.59	—	231.59
IOSFRCDEDEV500	—	152.82	—	152.82
IOSFRCDEDT500	—	1060.18	—	1060.18
IOSFRCDEHLP500	—	20803.25	—	20803.25
IOSFRCDEMAIL500	—	94.31	—	94.31
IOSFRCDEMIN500	—	529.52	—	529.52
IOSFRCHX11500	—	314.59	—	314.59
IOSFRDECW500	—	27.00	—	27.00
IOSFRX11500	—	1913.99	3.30	1917.29
IOSFRXDEV500	—	94.10	—	94.10
IOSHUCDEAPPS500	—	2049.44	—	2049.44
IOSHUCDEDEV500	—	160.93	—	160.93
IOSHUCDEDT500	—	1241.03	—	1241.03
IOSHUCDEMAIL500	—	86.40	—	86.40
IOSHUCDEMIN500	—	4094.40	—	4094.40
IOSHUDECW500	—	40.21	—	40.21
IOSHUUCSBASE500	—	103.56	—	103.56
IOSHUX11500	—	1803.34	3.30	1806.64
IOSHUXDEV500	—	93.99	—	93.99
IOSITCDEAPPS500	—	2117.00	—	2117.00
IOSITCDEDEV500	—	158.90	—	158.90

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSITCDEDT500	—	1149.85	—	1149.85
IOSITCDEHLP500	—	14711.69	—	14711.69
IOSITCDEMAIL500	—	94.21	—	94.21
IOSITCDEMIN500	—	535.90	—	535.90
IOSITDECW500	—	27.00	—	27.00
IOSITX11500	—	1924.58	3.30	1927.88
IOSITXDEV500	—	94.04	—	94.04
IOSIWBASE500	—	262.10	3.30	265.40
IOSIWCDEDT500	—	259.01	—	259.01
IOSIWCDEMIN500	—	167.00	—	167.00
IOSIWFONT100M500	—	645.17	—	645.17
IOSIWFONT100P500	—	2157.05	—	2157.05
IOSIWFONT75M500	—	420.21	—	420.21
IOSIWFONT75P500	—	1901.38	—	1901.38
IOSIWOLFONT500	—	3038.24	62.44	3100.68
IOSIWUCSBASE500	—	176.78	—	176.78
IOSIWX11500	—	1680.85	—	1680.85
IOSIWXDEV500	—	939.63	—	939.63
IOSJPABASE500	—	3255.26	—	3255.26
IOSJPAMANOS500	—	35.76	—	35.76
IOSJPBASE500	—	20795.88	13.16	20809.05
IOSJPBIN500	627.49	95.82	6.10	729.41
IOSJPCDEAPPS500	—	673.48	—	673.48
IOSJPCDEDEV500	—	1172.51	—	1172.51
IOSJPCDEDT500	—	3789.27	—	3789.27
IOSJPCDEHLP500	—	32645.72	—	32645.72
IOSJPCDEHLPSJIS500	—	33002.66	—	33002.66
IOSJPCDEMAIL500	—	328.72	—	328.72
IOSJPCDEMIN500	—	2003.46	—	2003.46

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSJPDECW500	—	98.14	—	98.14
IOSJPDOSTOOLS500	—	658.12	—	658.12
IOSJPFONT100M500	—	12440.12	—	12440.12
IOSJPFONT100P500	—	12184.75	—	12184.75
IOSJPFONT75M500	—	8818.36	—	8818.36
IOSJPFONT75P500	—	8523.70	—	8523.70
IOSJPFONTM500	—	13715.83	—	13715.83
IOSJPLDBBASE500	—	1291.05	—	1291.05
IOSJPLDBGUI500	—	3283.22	—	3283.22
IOSJPLSMX11500	—	2641.43	—	2641.43
IOSJPMANOS500	—	7078.98	—	7078.98
IOSJPMANWOS500	—	109.72	—	109.72
IOSJPMSG500	—	1629.90	—	1629.90
IOSJPMSGSJIS500	—	543.26	—	543.26
IOSJPNETSCAPE500	—	5961.17	—	5961.17
IOSJPPGMR500	—	2042.62	—	2042.62
IOSJPSDECDE500	—	41.81	—	41.81
IOSJPSYSMAN500	—	709.43	—	709.43
IOSJPUCSBASE500	—	17183.35	—	17183.35
IOSJPWNN500	9.97	20165.96	95.00	20270.94
IOSJPWNNPGMR500	—	1214.93	—	1214.93
IOSJPWNNSRC500	—	10798.53	—	10798.53
IOSJPX11500	—	2943.51	—	2943.51
IOSJPXADMIN500	—	3648.20	—	3648.20
IOSJPXADVFS500	—	1735.29	—	1735.29
IOSJPXDEV500	—	123.89	—	123.89
IOSJPXSYSMAN500	—	13916.08	—	13916.08
IOSKOBASE500	—	1775.80	6.59	1782.38
IOSKOCDEAPPS500	—	190.12	—	190.12

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSKOCDEDEV500	—	167.04	—	167.04
IOSKOCDEDT500	—	4810.46	—	4810.46
IOSKOCDEHLP500	—	11121.81	—	11121.81
IOSKOCDEMAIL500	—	136.99	—	136.99
IOSKOCDEMIN500	—	858.85	—	858.85
IOSKODECW500	—	48.62	—	48.62
IOSKOFONTM500	—	3858.31	—	3858.31
IOSKOFONTP500	—	9568.90	—	9568.90
IOSKOOLFONT500	—	6157.34	3.07	6160.42
IOSKOPGMR500	—	171.58	—	171.58
IOSKOUCSBASE500	—	9143.78	—	9143.78
IOSKOX11500	—	2374.85	—	2374.85
IOSKOXDEV500	—	96.59	—	96.59
IOSLTX11500	—	197.78	3.30	201.08
IOSPLCDEAPPS500	—	2113.27	—	2113.27
IOSPLCDEDEV500	—	173.18	—	173.18
IOSPLCDEDT500	—	1168.36	—	1168.36
IOSPLCDEMAIL500	—	89.16	—	89.16
IOSPLCDEMIN500	—	4118.42	—	4118.42
IOSPLDECW500	—	40.21	—	40.21
IOSPLUCSBASE500	—	119.56	—	119.56
IOSPLX11500	—	1812.81	3.30	1816.11
IOSPLXDEV500	—	93.98	—	93.98
IOSRUCDEAPPS500	—	1955.53	—	1955.53
IOSRUCDEDT500	—	141.45	—	141.45
IOSRUDECW500	—	40.26	—	40.26
IOSRUUCSBASE500	—	82.33	—	82.33
IOSRUX11500	—	1794.26	3.30	1797.56
IOSRUXDEV500	—	94.14	—	94.14

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSSKCDEAPPS500	—	2097.62	—	2097.62
IOSSKCDEDEV500	—	261.99	—	261.99
IOSSKCDEDT500	—	1201.41	—	1201.41
IOSSKCDEMAIL500	—	86.22	—	86.22
IOSSKCDEMIN500	—	4059.67	—	4059.67
IOSSKDECW500	—	40.26	—	40.26
IOSSKUCSBASE500	—	119.56	—	119.56
IOSSKX11500	—	1769.24	3.30	1772.54
IOSSKXDEV500	—	93.86	—	93.86
IOSSLCDEDT500	—	38.56	—	38.56
IOSSLX11500	—	208.88	3.30	212.18
IOSSVCDEAPPS500	—	232.87	—	232.87
IOSSVCDEDEV500	—	154.52	—	154.52
IOSSVCDEDT500	—	1018.93	—	1018.93
IOSSVCDEHLP500	—	14863.50	—	14863.50
IOSSVCDEMAIL500	—	74.87	—	74.87
IOSSVCDEMIN500	—	499.54	—	499.54
IOSSVDECW500	—	27.00	—	27.00
IOSSVX11500	—	1881.71	3.30	1885.01
IOSSVXDEV500	—	93.84	—	93.84
IOSTHBASE500	—	805.00	3.29	808.29
IOSTHBIN500	503.10	12.20	6.10	521.40
IOSTHCDEAPPS500	—	144.00	—	144.00
IOSTHCDEDEV500	—	255.62	—	255.62
IOSTHCDEDT500	—	1153.24	—	1153.24
IOSTHCDEMAIL500	—	82.08	—	82.08
IOSTHCDEMIN500	—	486.32	—	486.32
IOSTHDECW500	—	40.09	—	40.09
IOSTHFONTM500	—	158.30	—	158.30

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSTHOLFONT500	—	7382.06	123.70	7505.76
IOSTHPGMR500	—	126.13	—	126.13
IOSTHPRINT500	—	173.17	—	173.17
IOSTHX11500	—	1676.68	—	1676.68
IOSTHXDEV500	—	106.23	—	106.23
IOSTRCDEDT500	—	32.48	—	32.48
IOSTRCDEMIN500	—	79.74	—	79.74
IOSTRFONT100M500	—	1097.05	—	1097.05
IOSTRFONT100P500	—	4112.34	—	4112.34
IOSTRFONT75M500	—	944.16	—	944.16
IOSTRFONT75P500	—	3467.88	—	3467.88
IOSTROLFONT500	—	5455.58	102.34	5557.92
IOSTRUCSBASE500	—	85.32	—	85.32
IOSTRX11500	—	556.15	3.30	559.45
IOSWWBASE500	28.32	913.53	186.04	1127.90
IOSWWBIN500	992.05	130.00	12.20	1134.26
IOSWWBINCOM500	17.91	70.36	3.08	91.35
IOSWWEURLOC500	—	1482.94	—	1482.94
IOSWWFGC500	—	1479.80	—	1479.80
IOSWWFONTM500	—	702.40	—	702.40
IOSWWFONTP500	—	396.18	—	396.18
IOSWWLAT2FONT100M500	—	1178.66	—	1178.66
IOSWWLAT2FONT100P500	—	4363.28	—	4363.28
IOSWWLAT2FONT75M500	—	871.17	—	871.17
IOSWWLAT2FONT75P500	—	3805.77	—	3805.77
IOSWWLAT2OLFONT500	—	5573.37	102.34	5675.71
IOSWWLAT4FONT100M500	—	1183.15	—	1183.15
IOSWWLAT4FONT100P500	—	4386.89	—	4386.89
IOSWWLAT4FONT75M500	—	885.65	—	885.65

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSWWLAT4FONT75P500	—	3828.26	—	3828.26
IOSWWLAT9FONT100M500	—	2257.23	—	2257.23
IOSWWLAT9FONT100P500	—	3034.22	—	3034.22
IOSWWLAT9FONT75M500	—	1905.38	—	1905.38
IOSWWLAT9FONT75P500	—	2565.30	—	2565.30
IOSWWLATCFONT100M500	—	1159.46	—	1159.46
IOSWWLATCFONT100P500	—	2420.13	—	2420.13
IOSWWLATCFONT75M500	—	985.95	—	985.95
IOSWWLATCFONT75P500	—	2029.76	—	2029.76
IOSWWLATCOLFONT500	—	3660.26	62.14	3722.40
IOSWWMOTIF11500	—	12749.71	—	12749.71
IOSWWMULE500	—	78941.16	—	78941.16
IOSWWMULESRC500	—	26969.73	—	26969.73
IOSWWPGMR500	—	305.41	—	305.41
IOSWWPHRASE500	454.74	537.91	6.10	998.75
IOSWWPRINT500	38.18	2448.17	44.15	2530.50
IOSWWSVEDEV500	—	438.14	—	438.14
IOSWWSYSMAN500	—	746.63	4.78	751.40
IOSWWUCSBASE500	—	55899.94	—	55899.94
IOSWWUDCOS500	469.07	1961.41	6.10	2436.58
IOSWWUDCWOS500	—	106.88	—	106.88
IOSWWX11500	—	3553.75	—	3553.75
IOSWWXDEV500	—	2392.44	—	2392.44
IOSWWXFR500	13.81	1172.40	3.49	1189.70
IOSZHBASE500	—	25643.41	—	25643.41
IOSZHBIG5500	168.62	250.41	3.05	422.07
IOSZHCNBASE500	—	231.85	3.30	235.15
IOSZHCNCDEAPPS500	—	126.74	—	126.74
IOSZHCNCDEDEV500	—	163.74	—	163.74

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSZHCNCDEDT500	—	9759.93	—	9759.93
IOSZHCNCDEHLP500	—	18545.19	—	18545.19
IOSZHCNCDEMAIL500	—	72.83	—	72.83
IOSZHCNCDEMIN500	—	471.06	—	471.06
IOSZHCNLOC500	—	762.35	—	762.35
IOSZHCNUCSBASE500	—	1864.01	—	1864.01
IOSZHCONV500	82.22	33.33	3.05	118.60
IOSZHHKBASE500	—	1990.06	13.16	2003.22
IOSZHHKUCSBASE500	—	1565.32	—	1565.32
IOSZHPGMR500	—	2474.38	—	2474.38
IOSZHSDECW500	—	40.88	—	40.88
IOSZHSFONTM500	—	3411.72	—	3411.72
IOSZHSFONTP500	—	27595.29	—	27595.29
IOSZHSOLFONT500	—	15013.72	6.19	15019.91
IOSZHSX11500	—	2907.52	—	2907.52
IOSZHSXDEV500	—	195.90	—	195.90
IOSZHTDECW500	—	123.69	—	123.69
IOSZHTELEX500	134.36	6.10	3.05	143.51
IOSZHTFONTM500	—	9158.73	—	9158.73
IOSZHTFONTP500	—	25532.25	—	25532.25
IOSZHTOLFONT500	—	28158.10	6.20	28164.30
IOSZHTWBASE500	—	1772.66	9.86	1782.53
IOSZHTWCDEAPPS500	—	379.01	—	379.01
IOSZHTWCDEDEV500	—	485.64	—	485.64
IOSZHTWCDEDT500	—	10877.54	—	10877.54
IOSZHTWCDEHLP500	—	11943.26	—	11943.26
IOSZHTWCDEMAIL500	—	219.60	—	219.60
IOSZHTWCDEMIN500	—	1378.95	—	1378.95
IOSZHTWLOC500	—	5488.27	—	5488.27

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

Tru64 UNIX Worldwide Language Support V5.0

Subset	root	/usr	/var	Total
IOSZHTWUCSBASE500	—	4649.64	—	4649.64
IOSZHTX11500	—	5168.92	—	5168.92
IOSZHTXDEV500	—	933.82	—	933.82
IOSZHUCSBASE500	—	22588.15	—	22588.15
IOSZHX11500	—	2464.25	—	2464.25
Totals	**3539.86**	**999571.80**	**990.10**	**1004101.76**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	3598.61	**1623600.82**	**79099.34**	**1706298.78**

Table A–3: Disk Space Requirements

Advanced Server for UNIX V4.1

Subset	root	/usr	/var	Total
ASUADM410	—	27657.44	—	27657.44
ASUADMJP410	—	26249.39	—	26249.39
ASUBASE410	12.37	37941.26	—	37953.63
ASUMANJP410	—	511.44	—	511.44
ASUMANPAGE410	—	483.61	—	483.61
ASUSIA410	3.96	83.00	—	86.96
ASUTRAN410	113.49	3824.48	3106.12	7044.09
Totals	**129.82**	**96750.63**	**3106.12**	**99986.57**

CABASE

Subset	root	/usr	/var	Total
CABASE100	—	9147.09	—	9147.09
CADOC100	—	21600.43	—	21600.43
WCCBASE100	18.49	30875.41	—	30893.91
Totals	**18.49**	**61622.93**	**—**	**61641.42**

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

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**
UniCensus				
Subset	**root**	**/usr**	**/var**	**Total**
UNICEN410	—	—	1866.47	1866.47
Totals	**—**	**—**	**1866.47**	**1866.47**
Grand Totals	**root**	**/usr**	**/var**	**Total**
	148.31	**270234.65**	**4972.59**	**275355.55**

A.2 Disk Space Required for Update Installations

For information about the disk space required to update the Tru64 UNIX operating system from DIGITAL UNIX Version 4.0D and Tru64 UNIX Version 4.0F, see the Tru64 UNIX Version 5.0 *Software Product Description*.

A.3 Disk Space Required for RIS Areas

The Remote Installation Services (RIS) area for Tru64 UNIXVersion 5.0 requires approximately 1,113.7 MB of disk space. The space requirements are broken down as follows:

Table A–4: Disk Space Required for RIS Areas

Product Area	**512-Byte Blocks**
Tru64_UNIX_Operating_System	1141598
Advanced_Printing	16587
Alternative_Compiler	7538
COM	32231
Data_Direct	66601
DEC_C++_RTL	300

Table A–4: Disk Space Required for RIS Areas (cont.)

Product Area	512-Byte Blocks
DEC_Cobol_RTL	2061
DEC_Fortran_RTL	2098
DEC_Pascal_RTL	755
DEC_Sort_RTL	1180
GNUSRC	47419
Multimedia_Service	34902
Netscape_FastTrack_Server	79136
Performance_Manager	13420
Porting_Assistant	20093
Program_Analyzers	24875
SCSI_CAM_Layered_Components	2414
Tru64_Retired	168
Visual_Threads	17063
Worldwide_Language_Support	566977
Advanced_Server	62604
Compaq_Analyze	34585
NetWorker	111876
UniCensus	1125
Total	2287606

A.4 Disk Space Required for Documentation

The files for the Tru64 UNIX documentation set are contained on Tru64 UNIX Documentation CD–ROM. The files for the worldwide support documentation are contained on the Tru64 UNIX Associated Products CD–ROM in the */mnt–pnt*/Worldwide_Language_Support/doc directory. These files require the following amounts of disk space if moved from the CD–ROM onto a local disk:

- The Tru64 UNIX operating system documentation requires approximately 130 MB of which 90 MB is for the HTML files and 40 MB is for the PDF files.
- The worldwide support documentation requires approximately 7 MB.

B

Time Zone Enhancements

The naming convention for /etc/zoneinfo/ time zone directories and files has changed from the former COUNTRY/ZONE style (for example, US/Eastern) to the more stable AREA/LOCATION format (for example, America/New_York), where AREA is the name of a continent or ocean, and LOCATION is the name of a specific location (major city, locale, and so on within that region. All previous /etc/zoneinfo/ directories and time zone files are available for compatibility, however many of the files are now hard links to their renamed counterparts. Obsolete time zone mappings are provided for reference in Table B–2.

The time zone data file format has been expanded to handle more complex transition rules. (See the tzfile(4) reference page for details.) The zic compiler zdump command, and several time-related functions in the standard C library have been updated to support the expanded time zone data file format.

While the time zone data file format has been expanded to support additional transition rules, time zone data files created on prior versions of the operating system will work without recompilation. This provides support for user-generated time zone data files which may or may not have original source code.

Conversely, static applications created on prior versions of the operating system and which reference time zone data, will be able to process most of the new time zone data files in the /etc/zoneinfo/ directory. They will not take advantage of the new time zone data file extensions, but will still read and process the portions of these files they did previously. However, due to the expanded number of time transition types available in the new time zone data files, certain older static applications will not be able to read the new time zones listed in Table B–1.

Table B–1: Incompatible New Time Zones

Asia/Aqtobe	Atlantic/Azores	Europe/Monaco
Asia/Aqtau	Atlantic/Madeira	Europe/Moscow
Asia/Baku	Europe/Amsterdam	Europe/Paris
Asia/Riyadh87	Europe/Kaliningrad	Europe/Riga

Table B–1: Incompatible New Time Zones (cont.)

Asia/Riyadh88	Europe/Kiev	Europe/Samara
Asia/Riyadh89	Europe/Lisbon	Europe/Simferopol
Asia/Tbilisi	Europe/Ljubljana	Europe/Tallinn
Asia/Yekaterinburg	Europe/Luxembourg	Europe/Vilnius
Asia/Yerevan	Europe/Minsk	

Enablers were added to DIGITAL UNIX Version 4.0D to allow the new time zones to be read; therefore, static applications built on Version 4.0D or later releases will not have problems with these files. It is important to note that none of the time zones listed in Table B–1 existed on versions of the operating system prior to Version 5.0. It is, therefore, unlikely that any existing applications reference any of the time zones listed.

Shared applications are not affected by the issue above, since they automatically pick up the new time zone data file support in Version 4.0D and later versions of the operating system.

Table B–2 provides a mapping of the old time zones to the new time zones.

Table B–2: Mapping of the Old Time Zones to New Time Zones

Obsolete Time Zone	New Time Zone
Australia/ACT	Australia/Sydney
Australia/LHI	Australia/Lord_Howe
Australia/NSW	Australia/Sydney
Australia/North	Australia/Darwin
Australia/Queensland	Australia/Brisbane
Australia/South	Australia/Adelaide
Australia/Tasmania	Australia/Hobart
Australia/Victoria	Australia/Melbourne
Australia/West	Australia/Perth
Australia/Yancowinna	Australia/Broken_Hill
Belfast	Europe/Belfast
Brazil/Acre	America/Porto_Acre
Brazil/DeNoronha	America/Noronha
Brazil/East	America/Sao_Paulo

Table B–2: Mapping of the Old Time Zones to New Time Zones (cont.)

Obsolete Time Zone	New Time Zone
Brazil/West	America/Manaus
Canada/Atlantic	America/Halifax
Canada/Central	America/Winnipeg
Canada/East-Saskatchewan	America/Regina
Canada/Eastern	America/Montreal
Canada/Mountain	America/Edmonton
Canada/Newfoundland	America/St_Johns
Canada/Pacific	America/Vancouver
Canada/Saskatchewan	America/Regina
Canada/Yukon	America/Whitehorse
Chile/Continental	America/Santiago
Chile/EasterIsland	Pacific/Easter
Cuba	America/Havana
Dublin	Europe/Dublin
Egypt	Africa/Cairo
GB-Eire	Europe/London
GMT	Etc/GMT
GMT+0	Etc/GMT+0
GMT+1	Etc/GMT+1
GMT+10	Etc/GMT+10
GMT+11	Etc/GMT+11
GMT+12	Etc/GMT+12
GMT+13	Etc/GMT+13
GMT+2	Etc/GMT+2
GMT+3	Etc/GMT+3
GMT+4	Etc/GMT+4
GMT+5	Etc/GMT+5
GMT+6	Etc/GMT+6
GMT+7	Etc/GMT+7
GMT+8	Etc/GMT+8

Table B–2: Mapping of the Old Time Zones to New Time Zones (cont.)

Obsolete Time Zone	New Time Zone
GMT+9	Etc/GMT+9
GMT-0	Etc/GMT-0
GMT-1	Etc/GMT-1
GMT-10	Etc/GMT-10
GMT-11	Etc/GMT-11
GMT-12	Etc/GMT-12
GMT-2	Etc/GMT-2
GMT-3	Etc/GMT-3
GMT-4	Etc/GMT-4
GMT-5	Etc/GMT-5
GMT-6	Etc/GMT-6
GMT-7	Etc/GMT-7
GMT-8	Etc/GMT-8
GMT-9	Etc/GMT-9
GMT0	Etc/GMT0
GMT1	Etc/GMT+1
GMT10	Etc/GMT+10
GMT11	Etc/GMT+11
GMT12	Etc/GMT+12
GMT13	Etc/GMT+13
GMT2	Etc/GMT+2
GMT3	Etc/GMT+3
GMT4	Etc/GMT+4
GMT5	Etc/GMT+5
GMT6	Etc/GMT+6
GMT7	Etc/GMT+7
GMT8	Etc/GMT+8
GMT9	Etc/GMT+9
Greenwich	Etc/Greenwich
Hongkong	Asia/Hong_Kong

Table B–2: Mapping of the Old Time Zones to New Time Zones (cont.)

Obsolete Time Zone	New Time Zone
Iceland	Atlantic/Reykjavik
Iran	Asia/Tehran
Israel	Asia/Jerusalem
Jamaica	America/Jamaica
Japan	Asia/Tokyo
Libya	Africa/Tripoli
London	Europe/London
Mexico/BajaNorte	America/Tijuana
Mexico/BajaSur	America/Mazatlan
Mexico/General	America/Mexico_City
NZ	Pacific/Auckland
NZ-CHAT	Pacific/Chatham
Navajo	America/Denver
PRC	Asia/Shanghai
Poland	Europe/Warsaw
ROC	Asia/Taipei
ROK	Asia/Seoul
Singapore	Asia/Singapore
Turkey	Europe/Istanbul
UCT	Etc/UCT
US/Alaska	America/Anchorage
US/Aleutian	America/Adak
US/Arizona	America/Phoenix
US/Central	America/Chicago
US/East-Indiana	America/Indianapolis
US/Eastern	America/New_York
US/Hawaii	Pacific/Honolulu
US/Indiana-Starke	America/Indiana/Knox
US/Michigan	America/Detroit
US/Mountain	America/Denver

Table B–2: Mapping of the Old Time Zones to New Time Zones (cont.)

Obsolete Time Zone	New Time Zone
US/Pacific	America/Los_Angeles
US/Samoa	Pacific/Pago_Pago
UTC	Etc/UTC
Universal	Etc/Universal
W-SU	Europe/Moscow
Zulu	Etc/Zulu

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How to Order Tru64 UNIX Documentation

You can order documentation for the Tru64 UNIX operating system and related products at the following Web site:

http://www.businesslink.digital.com/

If you need help deciding which documentation best meets your needs, see the Tru64 UNIX *Documentation Overview* or call **800-344-4825** in the United States and Canada. In Puerto Rico, call **787-781-0505**. 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/

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
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