Tru64 UNIX

Documentation Overview for Version 5.1A

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This manual describes the documentation for the Compaq Tru64 UNIX operating system. It also describes the structure of the documentation kits and provides information about ordering them.

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Houston, Texas

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About This Manual

This manual describes the documentation that comes with the Compaq Tru64™ UNIX operating system. It also provides information about the structure of the documentation kits and the tools used to access the documentation.

Audience

This manual is for anyone who needs to access documentation about the Tru64 UNIX operating system. It can help you decide which manuals in the documentation set are most useful to you and how you can use those manuals.

New and Changed Features

This manual was revised to provide you with information about changes to the Tru64 UNIX documentation that have been made since the last release of the operating system. For an overview of the major changes to the Version 5.1A documentation set, see *Section 1.2*.

Organization

This manual is organized as follows:

Chapter 1	Provides general information about the Tru64 UNIX documentation set.
Chapter 2	Describes the manuals and other documentation that are used by all users of the Tru64 UNIX operating system.
Chapter 3	Describes the manuals and other documentation that are used by system and network administrators of the Tru64 UNIX operating system.
Chapter 4	Describes the manuals and other documentation that are used by software developers who program on or for the Tru64 UNIX operating system.
Chapter 5	Describes some additional documentation that is packaged on the Tru64 UNIX Operating System and Associated Products CD–ROMs.

Chapter 6	Describes the Tru64 UNIX reference pages, shows the various ways of displaying the reference pages on line, and describes the contents of the Reference Pages Documentation Kit.
Chapter 7	Describes the Device Driver Kit and the contents of the books in that kit.

Reader's Comments

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

You can send your comments in the following ways:

- Fax: 603-884-0120 Attn: UBPG Publications, ZKO3-3/Y32
- Internet electronic mail: `readers_comment@zk3.dec.com`

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

  `/usr/doc/readers_comment.txt`

Please include the following information along with your comments:

- The full title of the manual and the order number. (The order number appears on the title page of printed and PDF versions of a manual.)
- The section numbers and page numbers of the information on which you are commenting.
- The version of Tru64 UNIX that you are using.
- If known, the type of processor that is running the Tru64 UNIX software.

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

1

Finding the Documentation You Need

You can find most of the Tru64 UNIX documentation you need on the Documentation CD–ROM that comes with the Tru64 UNIX product and also on the World Wide Web. Most of this documentation is provided on line in HTML and PDF formats and is also available as printed books.

Your Web browser gives you access to the HTML format, and the Adobe Acrobat Reader lets you view and print the PDF versions. The printed books are packaged in kits that you can purchase from Compaq.

Additional documentation is included on the Tru64 UNIX Operating System CD–ROM and on the Associated Products CD–ROMs.

This chapter can help you to find the documentation you need, in the format that is most convenient to you.

1.1 Introduction to the Documentation Set

Tru64 UNIX is a feature-rich operating system designed to be used in many different types of computing environments. The components of the operating system range from those used by every user to those used by only a small handful of users.

Likewise, the documentation must serve many different users in different fields and with different levels of technical knowledge — from the novice general user to the advanced system administrator or program developer.

The Tru64 UNIX documentation is organized according to whether it is used by all users, or specifically by system and network administrators and software programmers:

- General user documentation

  This information is for all users of the Tru64 UNIX operating system. Examples include the *Master Index* and the *Release Notes*. Users of this information range from novice to advanced.

- System and network management documentation

  This information is for those who install, configure, maintain, and troubleshoot the Tru64 UNIX operating system.

- Programming documentation

This information is for those who develop software on and/or for the Tru64 UNIX operating system.

Be aware, however, that some of this documentation is written to serve different audiences. For example, the *Security* manual is divided into three parts to provide guidance for individual users, system administrators, and programmers who must develop secure programs.

The following sections describe some of the terms used to categorize documentation that is provided with the operating system or used in conjunction with utilities and applications that run on the operating system.

1.1.1 Core Documentation

Core documentation consists of books and reference pages that help you to use the Tru64 UNIX operating system, including the components provided when you install the system's optional and mandatory subsets.

The core documentation is provided in printed and online formats and was created by Compaq writers who worked closely with the developers of the operating system to document the system's various components (except for a few externally published manuals).

On line, the Tru64 UNIX reference pages are available as optional subsets of the operating system and in HTML format on the Documentation CD–ROM. They are also available as printed books in a multivolume kit.

For information about the core manuals and guides, see the "Printed and Online Documentation" sections of Chapter 2, Chapter 3, and Chapter 4. For information about the reference pages, see Chapter 6.

1.1.2 Supplementary Documentation

Supplementary documentation tends to be less formal in structure than the core documentation. This category includes many different types of documents, such as QuickSpecs (formerly called Product Descriptions), release notes for some components of the Tru64 UNIX operating system, and industry reference material and white papers that come from Compaq engineers and other sources. Supplementary documentation exists only on line, so it is not available in any of the printed Tru64 UNIX documentation kits.

Much of the supplementary documentation is provided on the Documentation CD–ROM, although some is packaged with the individual software subsets or in various directories on Tru64 UNIX media. For more information about the supplementary documentation on the Documentation CD–ROM, see the "Online Documentation" sections of the following chapters. For information about other supplementary documentation, see Chapter 5.

1.1.3 Layered Products

Layered products documentation consists of books and other documents that aid in the use of separately licensed products, such as TruCluster™ and Compaq C++. For more information, see Section 1.6.

1.2 Changes to the Version 5.1A Documentation Set

This section describes changes to the ways you can access documentation and lists the documentation that was revised, removed, or offered for the first time in this release. See the appropriate section in the following chapters for information about a book's content.

1.2.1 Structural Changes

With this release of Tru64 UNIX, the Compaq TruCluster Server documentation is included on the Tru64 UNIX Documentation CD–ROM, as well as on the Associated Products Volume 2 CD–ROM. The books are described in Chapter 2, Chapter 3, and Chapter 4. See Section A.1.2 for a list of the books and Section 1.6.1 for information about the TruCluster Server software.

This release also introduces a new search function that will help you find specific Tru64 UNIX and TruCluster Server topics in any document on the documentation Web site or on a local area network. See Section 1.4 for more information.

1.2.2 Revised Documentation

The following core and supplementary documentation was revised in this release. The changes were made to the printed books and their online versions, unless otherwise noted.

In some cases, the documents were revised to provide information about new and changed features to the operating system. In other cases, the revisions expand or otherwise improve existing information.

Although the TruCluster Server manuals were previously available, this release marks the first time they are included on the Tru64 UNIX Documentation CD–ROM. All of the cluster manuals have been revised.

General User Documentation

- *Cluster Release Notes*
- *Cluster Technical Overview*
- *Command and Shell User's Guide*

- *How to Access Tru64 UNIX Documentation* (print-only document)
- *Master Index*
- *Quick Reference Card* (print-only document)
- *Release Notes for Version 5.1A*
- *Security*
- *Technical Overview for Version 5.1A*
- *Tru64 UNIX Version 5.1A CD–ROMs* (print-only document)

System and Network Administration

- *AdvFS Administration*
- *Cluster Administration*
- *Cluster Highly Available Applications*
- *Cluster Hardware Configuration*
- *Cluster Installation*
- *Full Installation Quick Start* (print-only document)
- *Installation Guide*
- *Installation Guide — Advanced Topics*
- *Logical Storage Manager*
- *Network Administration*

  The information in this manual has been divided into two new manuals:
  - *Network Administration: Connections* (Section 3.1.13)
  - *Network Administration: Services* (Section 3.1.14)
- *Performance Manager* (online-only document)
- *Sharing Software on a Local Area Network*
- *System Administration*
- *Update Installation Quick Reference Card* (print-only document)
- *X Window System Environment*

Programming Documentation

- *Compaq C Language Reference Manual*
- *Guide to Preparing Product Kits*
- *Ladebug Debugger Manual* (online-only document)
- *Network Programmer's Guide*

- *Technical Reference for Using Chinese Features* (online-only document)
- *Technical Reference for Using Japanese Features* (online-only document)

1.2.3 New Documentation

The following documentation is new with this release:

- *Managing Online Addition and Removal*

  This manual is provided on line and in printed format; it is included with the system and network management documentation.

- *Cluster LAN Interconnect*

  This manual is provided on line and in printed format; it is included with the system and network management documentation and the programming documentation.

- *System Limits*

  This document is available only from the Web. See Section 1.4.2 for more information.

1.2.4 Removed Documentation

The *Compaq Portable Mathematics Library* manual has been removed from the Tru64 UNIX documentation set. It is still available on the Web in the documentation sets of previous releases of the operating system.

1.2.5 Device Driver Documentation

Chapter 7 now describes the documentation provided with Version 2 of the Device Driver Kit.

1.3 What You Get

The documentation that you receive from Compaq depends upon the purchase you make:

- If you purchase a Tru64 UNIX media kit, you receive a CD–ROM containing all of the online documentation, as well as printed versions of the Startup documentation described in Section 1.5.
- If you purchase the Tru64 UNIX Documentation Kit, you receive printed versions of the books described in Section 1.5.
- If you purchase an Update Contract for the media, you receive the most current version of the Documentation CD–ROM, and printed versions of new and revised books in the Startup documentation.

- If you purchase an Update Contract for the documentation set, you receive printed versions of the books that have been updated.
- If you purchase a system with the Tru64 UNIX operating system preinstalled (often called a FIS system, for factory installed software), online versions of the following books are installed on the system:
  - *Release Notes for Version 5.1A*
  - *Installation Guide*
  - *Installation Guide — Advanced Topics*
  - *Security*
  - *System Administration*
  - *Network Administration: Services*
  - *Network Administration: Connections*
  - *Documentation Overview for Version 5.1A* (the book you are reading)
  - *Safety & Comfort Guide*

1.4 Online Documentation

The documentation for the Tru64 UNIX operating system, including the reference pages, is available on the Tru64 UNIX Documentation CD–ROM in formats that are readable with a Web browser or with the Adobe Acrobat Reader.

This documentation, as well as documentation for associated applications, is also available on the World Wide Web (see Section 1.4.2). Most of the features that are available on the Documentation CD–ROM, such as the links to other documentation, are also available on the Web.

If you are working on a Compaq Alpha™ system, the operating system provides a Netscape browser for viewing the HTML documentation. If you want to view the documentation on a Windows PC or Macintosh, you will need a browser that supports frames and JavaScript Version 1.1, such as Version 4.0 or higher of Netscape Navigator, Netscape Communicator, or Microsoft Internet Explorer.

To view the PDF files, you need to install Version 3.0 or higher of the Adobe Acrobat Reader or the Reader plug-in to your Web browser. The Documentation CD–ROM provides the Acrobat Reader for Tru64 UNIX systems, Windows PCs, Macintosh, and several other platforms. You can also obtain the latest version directly from the Adobe Systems Inc. Web site:

http://www.adobe.com

With Acrobat Reader, you can scroll through books, print selected sections or entire books, and copy sections to the clipboard.

The Version 5.1A release offers a new full-text search facility, called *isearch*, for finding information in Tru64 UNIX documentation on the Web and on local area networks, using any platform, including UNIX workstations, Macintosh computers, and PCs:

- When accessing Tru64 UNIX documentation on the Web, you simply type a word or words in the search facility to find the places in the documentation that discuss the topic.
- To use the search facility on an intranet, your system administrator must install the *isearch* software on your local server. Thereafter, users with access to that server can search the documentation in the same way as they would on the Web.

  The required software is provided free on the Tru64 UNIX Documentation CD–ROM.

1.4.1 The Documentation CD–ROM

The Documentation CD–ROM contains HTML and PDF versions of Tru64 UNIX documents. The complete set of operating system reference pages is available in HTML format. The CD–ROM provides links to these HTML and PDF documents.

You can use the Tru64 UNIX Documentation CD–ROM on a Tru64 UNIX system, as well as on a Windows PC or Macintosh — laptop or workstation — or on any other system that uses the ISO 9660 Level 1 CD–ROM standard.

In addition to the *isearch* facility described in Section 1.4, the Documentation CD–ROM contains a copy of the AltaVista Search CD–ROM software with a complete index of the HTML documents. The AltaVista software runs on an x86–based PC with Windows 95, Windows 98, Windows 2000, or Windows NT Version 4.0.

The CD–ROM's online Documentation Library is arranged in categories that generally follow the structure of the printed documentation kits. Each category is represented by a bulleted list, with the bullet for each book colored to indicate the documentation subkit to which the book belongs:

- A blue bullet indicates documentation for general users.
- A purple bullet indicates documentation for programmers.
- A red bullet indicates documentation for system and network administrators.

- A silver bullet indicates supplementary documentation, which is documentation that is not part of any kit and cannot be ordered from Compaq.
- A green bullet indicates reference pages.

Books that meet the needs of different audiences appear in several categories. For example, you will find the *Security* manual in the General User, Programming, and System and Network Management categories because it serves each of those audiences. Because it is part of the General User subkit, its bullet is blue in all of the categories in which it appears.

Most cross-references are hot links, so you can follow those references from book to book, from book to reference page, from reference page to book, and from reference page to reference page.

Each book you refer to opens in a separate window so you can easily move from book to book as you gather the information you need. When following links to reference pages, the first reference page opens in a new window, and references to subsequent reference pages will appear in the same reference page window as long as you keep it on your screen.

The Documentation CD–ROM also contains the `webman` viewer, a program you can use with your browser to view reference pages. For information about the `webman` viewer, see Chapter 6.

To mount the Documentation CD–ROM on Tru64 UNIX systems, PCs, and Macintosh computers, see the information accompanying the Documentation CD–ROM. The Tru64 UNIX *Installation Guide* provides an overview of using CD–ROMs on Tru64 UNIX systems.

1.4.2 Documentation on the World Wide Web

You can find most of the Tru64 UNIX core and supplementary documentation, the reference pages, and other useful documentation on the World Wide Web. To view this documentation, point your browser to the following Web site:

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

Other documentation you will find there includes the following:

- Tru64 UNIX Best Practices documentation (see Section 5.1 for details)
- Tru64 UNIX Device Driver documentation library (see Chapter 7 for details)
- TruCluster Server (including the TruCluster reference pages)
- Documentation sets from previous versions of the operating system
- Advanced Server for UNIX (ASU)

- Internet Express for Tru64 UNIX (formerly Open Source Internet Solutions)
- Tru64 UNIX Porting Guides
- Tru64 UNIX POSIX Conformance Documentation
- System Limits

  This document lists the system limits for the components of the Tru64 UNIX operating system.

The Web site also provides updates to documentation between formal product releases. For example, Compaq maintains online Technical Updates, which provide information about restrictions and problems that have been discovered with specific versions since their release. Visit the following Web site to see the Technical Update for Version 5.1A:

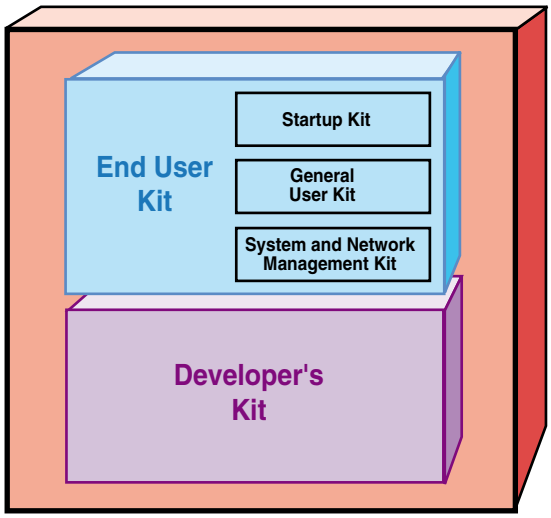
http://www.tru64unix.compaq.com/docs/pub_page/update_list.html

We recommend that you view this site periodically to see if any new information has been added.

1.5 Printed Documentation

When you purchase a Tru64 UNIX media kit, you receive printed versions of various manuals to help you install and begin using the operating system. To receive printed versions of the rest of the core documentation, you must order a Tru64 UNIX Documentation Kit (Figure 1–1) or one or more of its subkits.

Figure 1–1: Structure of the Tru64 UNIX Documentation Kit



The printed manuals include a letter icon on the spine to help you quickly find the book you are looking for. The following icons are used:

G Indicates books that are for general users

S Indicates books that are for system and network administrators

P Indicates books that are for programmers

Although a book's primary audience determines the documentation kit it is packaged in, some books help meet the needs of several audiences. For example, a general user can read the *Programming Support Tools* manual (packaged in the Developer's Documentation Kit) to get advanced information about using commands such as `grep` or `awk`. The *Security* manual (packaged in the General User Documentation Kit) provides information for system administrators and programmers, as well as for general users. Keep this in mind when searching for information on specific topics.

The following sections describe the kits that comprise the Tru64 UNIX Documentation Kit and the documentation that each kit contains. This documentation is also provided on line, except where indicated.

1.5.1 End User Documentation Kit

The End User Documentation Kit contains all the information needed to install, use, and administer the Tru64 UNIX system. This kit is divided into three subkits as follows:

- Startup Documentation Kit

  This kit is primarily for the person who installs the Tru64 UNIX operating system. It contains information on how to configure software components and some information (such as the *Release Notes*) needed by all Tru64 UNIX users.

  When you order the Tru64 UNIX operating system, the books in the Startup Documentation Kit are packaged with the distribution media.

  This kit contains the following documentation:

  Release Notes for Version 5.1A
  Technical Overview for Version 5.1A
  Documentation Overview for Version 5.1A
  Installation Guide
  Installation Guide — Advanced Topics
  Full Installation Quick Start Card (printed only)
  Update Installation Quick Reference Card (printed only)
  Quick Reference Card (printed only)
  Tru64 UNIX Version 5.1A CD–ROMs (printed only)

- General User Documentation Kit

This kit provides general information on how to use the Tru64 UNIX operating system. The manuals in this kit are for everyone who uses Tru64 UNIX.

This kit contains the following documentation:

CDE Companion
Command and Shell User's Guide
Master Index
Security

- System and Network Management Documentation Kit

  This kit is for people who are responsible for managing the Tru64 UNIX operating system or network. The manuals in this kit provide information on how to configure, manage, and tune Tru64 UNIX systems.

  This kit contains the following documentation:

  AdvFS Administration
  Guide to Prestoserve
  Kernel Debugging
  Logical Storage Manager
  Managing Online Addition and Removal
  Network Administration: Connections
  Network Administration: Services
  Sharing Software on a Local Area Network
  Software License Management
  System Administration
  System Configuration and Tuning
  System Configuration Supplement: OEM Platforms
  X Window System Administrator's Guide (printed only)
  X Window System Environment

1.5.2 Developer's Documentation Kit

The Developer's Documentation Kit is for software developers who write programs on or for the Tru64 UNIX operating system. The books in this kit include information on tools and programming recommendations.

This kit contains the following documentation:

Assembly Language Programmer's Guide
Asynchronous Transfer Mode
Calling Standard for Alpha Systems
Compaq C Language Reference Manual
Guide to the POSIX Threads Library
Guide to Preparing Product Kits
Guide to Realtime Programming
Network Programmer's Guide
OSF/Motif Programmer's Guide (printed only)
OSF/Motif Style Guide (printed only)
Programmer's Guide
Programmer's Guide: STREAMS (printed only)

Programming Support Tools
Programming with ONC RPC
Writing Kernel Modules
Writing Software for the International Market

1.5.3 Additional Documentation in the Media Kit

The following documentation is packaged in the Tru64 UNIX media kit, but is not included in any of the orderable Tru64 UNIX documentation kits:

How to Access Tru64 UNIX Documentation
Cluster Technical Overview

1.6 Documentation for Layered Products

Compaq and third-party vendors produce many applications that run on Tru64 UNIX systems. The documentation for most of these products is included with the individual application software. The following sections provide some guidance.

1.6.1 TruCluster Server Software

TruCluster Server is a separately licensed product that ships on the Associated Products CD–ROM Volume 2. It is a highly integrated synthesis of Tru64 UNIX software, Compaq AlphaServer™ systems, and storage devices that operate as a single system.

The TruCluster Server documentation is included on the Tru64 UNIX documentation CD–ROM, as well as with the software on the Associated Products CD–ROM Volume 2 and in printed form in a separately orderable documentation kit (see Section A.1.2 for more information).

1.6.2 Other Products Packaged with Tru64 UNIX

The CD–ROMs in the Tru64 UNIX media kit include the software and documentation for several separately licensed products. You do not need a license to view this documentation, which in most cases is provided in both HTML and PDF (or PostScript) formats.

In addition to the previously mentioned TruCluster Server software, the following separately licensed products are among those included with the kit:

- Advanced File System (AdvFS) Utilities
- Advanced Server for UNIX

See the *Tru64 UNIX Version 5.1A CD–ROMs* sheet packaged with the Tru64 UNIX media for a complete list and the location of the layered products

included with Tru64 UNIX. See Section 5.3 for information about the Tru64 UNIX Associated Products CD–ROMs.

1.6.3 Tru64 UNIX Alpha Online Documentation Library

Many of the layered products produced by Compaq, such as Compaq's C++ product and the Distributed Computing Environment (DCE), are included on the Tru64 UNIX Alpha Software Product Library, a collection of CD–ROMs in a kit that is updated every three months. The documentation for these products is included on the companion Tru64 UNIX Alpha Online Documentation Library CD–ROM. These software and documentation kits are separately orderable products; they are not included with the Tru64 UNIX media kit. For information about ordering these kits, contact your Compaq sales representative.

1.6.4 Device Driver Documentation

Documentation for programmers who create device driver software for the Tru64 UNIX operating system is available as a separately orderable kit. See Chapter 7 for more information about the Device Driver Documentation Kit.

2

General User Documentation

This chapter describes the general user documentation, which provides information for all users of the Tru64 UNIX operating system. The books in this category provide introductory information for people who are unfamiliar with Tru64 UNIX, as well as advanced information for the experienced user. Each document is individually described.

Printed books can be purchased from Compaq in the documentation kits described in Section 1.5.

Except for a few externally published manuals, the documentation described here was produced by Compaq writers working closely with the developers of the Tru64 UNIX operating system.

Books identified as revised, were updated with the Version 5.1A release.

2.1 Printed and Online Documentation

The documentation described in this section is provided on the Tru64 UNIX Documentation CD–ROM and in the optional printed documentation kits. For more information on the printed documentation set, see Section 1.5.

2.1.1 *CDE Companion*

The *CDE Companion* provides an introduction to Compaq's implementation of the Common Desktop Environment (CDE), an easy method of interacting with the Tru64 UNIX operating system.

For users migrating from DECwindows Motif to CDE, this book serves as an introduction to the new environment, providing information on how to use CDE to complete tasks previously done by using DECwindows.

For users who are new to desktop environments, this book provides quick-start information on topics such as logging into the system, navigating the system, and using and managing the desktop and applications.

This book can be used in conjunction with the *Common Desktop Environment: User's Guide*.

2.1.2 *Cluster Release Notes* (revised)

The *Cluster Release Notes* provide a brief introduction to the TruCluster Server and describe known problems and workarounds.

2.1.3 *Cluster Technical Overview* (revised)

The *Cluster Technical Overview* describes the major components of the TruCluster Server product. The opening chapter introduces the features of a TruCluster Server cluster. Subsequent chapters provide a more in-depth description of certain features, including:

- Clusterwide file systems, storage, and device names
- The connection manager
- Highly available applications
- The cluster application availability (CAA) component
- The cluster alias subsystem
- The cluster interconnect
- The distributed lock manager (DLM)
- Installation and system management

Note

A printed version of this book is packaged with the Tru64 UNIX operating system media but is not included in any of the Tru64 UNIX documentation kits. It is, however, included in the TruCluster Server documentation kit.

2.1.4 *Command and Shell User's Guide* (revised)

The *Command and Shell User's Guide* introduces the basic features of the Tru64 UNIX operating system. It describes how to use the command line interface and to perform such tasks as copying files and creating directories. It also describes how to use the shells and their built-in commands.

Although this manual is primarily for users who have little or no familiarity with UNIX-compatible systems, experienced users can find useful shortcuts and tips.

2.1.5 *Documentation Overview for Version 5.1A* (revised)

The document you are currently reading.

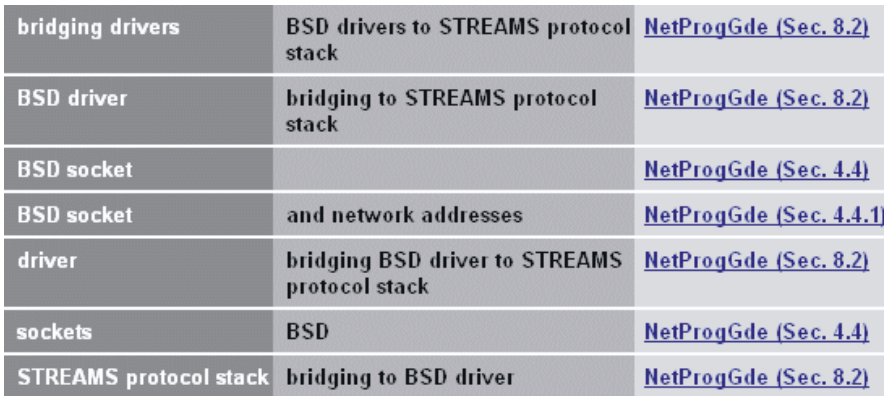
2.1.6 *Master Index* (revised)

The *Master Index* can help you find the information you need in the core documentation set, as follows:

- In the printed version of this book, the index items direct you to the books and pages where the topic is discussed.
- In the online version of this book, clicking on an index entry in many cases will take you to the appropriate book at the point where the topic is discussed. For the Common Desktop Environment books and a few other books, clicking on the index item will take you only to the beginning of the appropriate book, where you can then use the table of contents or the book's index to find out where the topic is discussed.

  The Documentation Library on CD–ROM and the Web includes a search utility with the *Master Index* entry. When you enter a word or phrase you want to find, the search utility searches all *Master Index* entries for matches and then displays the results. Then when you click on an entry in the search results, the target book opens in its own window — in most cases, to the place in the text that is indicated by the entry. Figure 2–1 shows the result of a search on the text string "bsd."

Figure 2–1: Example Master Index Search



bridging drivers	BSD drivers to STREAMS protocol stack	NetProgGde (Sec. 8.2)
BSD driver	bridging to STREAMS protocol stack	NetProgGde (Sec. 8.2)
BSD socket		NetProgGde (Sec. 4.4)
BSD socket	and network addresses	NetProgGde (Sec. 4.4.1)
driver	bridging BSD driver to STREAMS protocol stack	NetProgGde (Sec. 8.2)
sockets	BSD	NetProgGde (Sec. 4.4)
STREAMS protocol stack	bridging to BSD driver	NetProgGde (Sec. 8.2)

2.1.7 *Programming Support Tools*

The online version of the *Programming Support Tools* manual is included with the General User information because it contains information of interest to non-programmers. However, the printed version is included only in the Developer's Documentation Kit. See Section 4.1.11 for information about this manual.

2.1.8 *Release Notes for Version 5.1A* (revised)

The *Release Notes for Version 5.1A* are for all users of the Tru64 UNIX operating system. This book includes the following information:

- An overview of the new and changed features of the Version 5.1A software
- Announcements about features and interfaces that are scheduled for removal in future versions of Tru64 UNIX
- Information about installing the software
- Information that is relevant to specific Compaq Alpha processors
- Information about the base operating system
- Information about the development environment
- Information about the graphical interfaces
- Additions and corrections to the books in the Tru64 UNIX documentation set
- Information about the contents of the media and disk-space requirements

We recommend that you read this information before installing or using the Tru64 UNIX operating system.

Note

Compaq maintains an online *Technical Update* that contains information about restrictions and problems discovered after Version 5.1A began shipping. To view this document on the Web, go to the following URL:

http://www.tru64unix.compaq.com/docs/updates/V51A/TITLE.HTM

We recommend that you visit this site periodically to see if any new information has been added.

2.1.9 *Security* (revised)

The *Security* manual describes how to use, administer, and write programs for the Tru64 UNIX operating system with the optional enhanced security subsets installed. It also provides information about traditional UNIX security and other optional security features.

When the enhanced security subset is installed and configured, the system is referred to as a trusted system. The enhanced security features result in a system that can be configured to meet the C2 and F-C2 security classes.

The information is organized as follows:

- Part 1 is aimed at general users. It introduces the enhanced security features and helps users to start using them. Other topics include the following:
  - How to connect to other systems
  - Using the security features of the Common Desktop Environment (CDE)
  - Using access control lists (ACLs) on files and directories
- Part 2 describes how to set up and administer the operating system's enhanced security, which includes enhanced passwords and the audit subsystem. Topics in this part include the following:
  - Creating and modifying secure devices
  - Creating and maintaining accounts
  - Administering the audit subsystem
  - Administering ACLs
  - Ensuring authentication database integrity
  - Working within the framework of the Security Integration Architecture (SIA) layer
  - Troubleshooting a trusted system
- Part 3 describes how to write programs that run on the Tru64 UNIX operating system with enhanced security. The reader should have general programming knowledge, including knowing how to use the Tru64 UNIX programming tools. Topics in this part include the following:
  - Using the security information stored in the authentication database
  - Using the per-process audit ID (AUID), which is unique to Tru64 UNIX
  - The mechanics of writing and reading audit records
  - Using the Security Integration Architecture (SIA) interfaces
  - Programming with ACLs

2.1.10 *Technical Overview for Version 5.1A* (revised)

The *Technical Overview for Version 5.1A* describes the major components of the Tru64 UNIX operating system. The opening chapter provides an introduction to the operating system, including discussions of recent enhancements, licensing, and available optional software. This is followed by more in-depth discussions on various aspects of the operating system. A partial list of the topics follows:

- Features available to system administrators

- Networking protocols and applications
- Supported file systems
- The Tru64 UNIX kernel, symmetric multiprocessing, virtual memory, and device recognition
- Major features of the Tru64 UNIX development environment
- Tru64 UNIX interoperability with Windows NT and Windows 2000
- Tru64 UNIX security
- Internationalization features

An appendix to this manual lists the Internet RFC (Request for Comments) standards and non-RFC standards to which the Tru64 UNIX operating system conforms. When viewing the *Technical Overview* on line on a system connected to the Internet, you can click on an RFC to display the text of that RFC in your Web browser.

Because this book might introduce new terms to you, it contains the *Glossary of Common UNIX and General Computer Terms*. When using the online version of the *Technical Overview for Version 5.1A*, some of the terms used within the discussions are linked to the Glossary, which means you are a mouse click away from the term's definition.

2.2 Printed-Only Documentation

The documentation described in this section is provided only in printed books. This documentation is included in the Tru64 UNIX documentation kits.

2.2.1 *Quick Reference Card* (revised)

The *Quick Reference Card* provides fingertip access to the format of common user commands, such as `cd`, `chmod`, `lpr`, and `man`. The card also describes options that are commonly used with each command.

Additionally, this card provides command summaries for the `vi`, `emacs`, `Mail`, and `mail` applications, and it summarizes the rules for forming regular expressions. It provides a description of command control symbols (such as `|`, the pipe symbol) and gives definitions of shell environment variables and metacharacters.

2.2.2 *How to Access Tru64 UNIX Documentation* (revised)

The Tru64 UNIX documentation is available to you whether you are working in your office or on the road — on an Alpha system, PC, or other system.

The card titled *How to Access Tru64 UNIX Documentation* provides a brief overview of the various ways available to you to find and access the information you need, including the Tru64 UNIX reference pages. It also lists the documentation included in the printed documentation kits.

This book is packaged with the Tru64 UNIX operating system media, but is not included in any of the Tru64 UNIX documentation kits.

2.2.3 *Tru64 UNIX Version 5.1A CD–ROMs* (revised)

The document titled *Tru64 UNIX Version 5.1A CD–ROMs* provides a brief listing of the components on the CD–ROMs in the Tru64 UNIX media kit.

2.3 Online-Only Documentation

The documentation described in this section is provided on the documentation CD–ROM and the Web.

2.3.1 *New and Changed Features from Previous Releases* (revised)

The *New and Changed Features from Previous Releases* document lists the major features that were introduced and changes that were made to the Tru64 UNIX operating system since Version 4.0. The information in this document was originally presented in the *New and Changed Features* chapter of the operating system *Release Notes* for each of those versions.

2.3.2 Advanced Printing Software *User Guide*

The Advanced Printing Software *User Guide* provides information about using the Advanced Printing Software, which is included as an optional component of the Tru64 UNIX operating system. The *User Guide* describes how to submit jobs to your printer using the command-line interface. It also shows you how to set up your local print environment and monitor jobs you have submitted.

This manual is also packaged with the software kit, as is the following companion documentation:

- Advanced Printing Software *System Administration and Operation Guide*
- Advanced Printing Software *Command Reference Guide*
- Advanced Printing Software *Release Notes*
- Advanced Printing Software *Installation Guide*

2.3.3 *Common Desktop Environment: User's Guide*

The Common Desktop Environment: User's Guide describes the basic features of the CDE and describes how to use the desktop and the desktop applications. It expands upon some of the topics in the *CDE Companion* and provides illustrations of the graphical interface as it is displayed on workstation screens.

2.3.4 *Common Desktop Environment: Advanced User's and System Administrator's Guide*

The *Common Desktop Environment: Advanced User's and System Administrator's Guide* describes how to customize the appearance and behavior of the CDE. It provides information on topics such as the following:

- Customizing system initialization, login, and session initiation
- Adding applications and providing interface representations for applications and their data
- Configuring desktop processes, applications, and data across the network
- Customizing desktop services such as window management, printing, colors, and fonts

This book is intended for users who want to perform customizations that cannot be accomplished using the desktop user interface. This book is also intended for system administrators; many of the tasks in this book require superuser privileges.

2.3.5 *How to Order Tru64 UNIX Documentation*

The file titled *How to Order Tru64 UNIX Documentation* provides information about ordering documentation and lists the order numbers for documentation kits.

2.3.6 *Safety & Comfort Guide*

The *Safety & Comfort Guide* describes how to set up your workstation environment to minimize the possibility of injury and provide you with the maximum of comfort. This guide focuses on posture and on other health and work habits for computer users. Additionally, it provides product safety information applicable to all Compaq products.

3

System and Network Management Documentation

This chapter describes the Tru64 UNIX system and network management documentation, which provides information on topics such as configuring systems and networks, maintaining disks, and using system administration tools. The books in this category are generally geared toward advanced users. Each document is individually described.

Books that are printed can be purchased from Compaq in the documentation kits described in Section 1.5.

Except for a few externally published manuals, the documentation described here was produced by Compaq writers working closely with the developers of the Tru64 UNIX operating system.

Books identified as revised, were updated with the Version 5.1A release.

3.1 Printed and Online Documentation

The documentation described in this section is provided on the Tru64 UNIX Documentation CD–ROM and in the optional printed documentation kits. For more information on the printed documentation set, see Section 1.5.

3.1.1 *AdvFS Administration* (revised)

The *AdvFS Administration* manual provides task-based information and instruction on using, configuring, troubleshooting, tuning, and administering AdvFS base and utilities functions.

AdvFS is the default file system for the Tru64 UNIX operating system. It provides rapid crash recovery and a flexible structure that allows you to manage your file system while it is on line.

The AdvFS Utilities, which are available as a layered product, extend the file system capabilities by including utilities to add volumes, create clones, stripe files, and balance file domains.

3.1.2 *Cluster Administration* (revised)

The *Cluster Administration* manual describes how to perform tasks related to the day-to-day management of a TruCluster Server system.

This manual is intended for the person who will configure and manage the TruCluster Server system. Instructions in this manual assume the user is an experienced UNIX administrator who can configure and maintain hardware, operating systems, and networks. The following topics are discussed:

- The differences between managing a standalone Tru64 UNIX system and a TruCluster Server cluster
- The graphic user interfaces and command-line tools for managing clusters
- How to use cluster aliases to provide network applications with a single-system view of the cluster
- How to manage quorum and votes to maintain cluster availability
- How to configure, manage, and remove cluster members
- How to configure and administer member and client networks in a cluster
- How to configure mail, printing, and other services in a cluster. Methods for providing highly available network services are provided
- Day-to-day tasks involved in managing highly available applications
- How to manage the cluster file system and the device request dispatcher, how to add and remove storage devices, and how to load-balance disk servers
- How to use the Logical Storage Manager (LSM) software in a cluster
- How to investigate and resolve common TruCluster Server problems

3.1.3 *Cluster Hardware Configuration* (revised)

The *Cluster Hardware Configuration* manual describes how to set up the systems that will become cluster members and how to configure cluster shared storage.

This manual is intended for the person who will configure and manage the TruCluster Server system. The instructions in this manual are for experienced UNIX administrators who can configure and maintain hardware, operating systems, and networks. The following topics are discussed:

- Hardware requirements and restrictions
- SCSI bus requirements, how to set up a shared SCSI bus, and how to connect storage to a shared SCSI bus using the latest UltraSCSI

products (DS-DWZZH UltraSCSI hubs, and HSZ70 and HSZ80 RAID array controllers)

- How to prepare systems for a TruCluster Server configuration and how to connect host bus adapters to shared storage using the DS-DWZZH UltraSCSI hubs and the newest RAID array controllers (HSZ70 and HSZ80)
- How to set up and upgrade Memory Channel cluster interconnects
- An overview of Fibre Channel and how to set up Fibre Channel hardware to allow Tru64 UNIX and TruCluster Server installation on Fibre Channel disks
- The use of AlphaServer GS80, GS160, or GS320 hardware partitions in a TruCluster Server configuration
- How to configure a shared SCSI bus for tape drive, tape loader, or tape library usage
- Requirements for a shared SCSI bus using externally terminated configurations and radial configurations using non-UltraSCSI RAID array controllers
- How to prepare systems and host bus adapters for TruCluster Server configurations using externally terminated configurations and radial configurations using non-UltraSCSI RAID array controllers

3.1.4 *Cluster Highly Available Applications* (revised)

The *Cluster Highly Available Applications* manual describes how to move applications from a TruCluster Available Server or TruCluster Production Server to a TruCluster Server environment and how to use TruCluster Server functionality to make applications highly available.

A tutorial is provided on how to use the Cluster Application Availability (CAA) subsystem to track the state of members and resources in a cluster and restart or relocate them to another member if a failure in an application is detected.

This manual also describes how to use TruCluster Server application programming interfaces (APIs) to take advantage of cluster technologies such as the distributed lock manager (DLM), cluster alias, and Memory Channel.

3.1.5 *Cluster Installation* (revised)

The *Cluster Installation* manual describes the following installation procedures:

- Installing TruCluster Server software on the Tru64 UNIX operating system and creating a new cluster

- Adding members to a cluster
- Reinstalling cluster members
- Performing a rolling upgrade from the previous version of the base operating system and cluster software to the current version
- Upgrading to TruCluster Server software from TruCluster Production Server software or TruCluster Available Server software Version 1.5 or Version 1.6

3.1.6 *Cluster LAN Interconnect* (new)

The *Cluster LAN Interconnect* manual describes how to configure and maintain Local Area Network (LAN) hardware for use as a cluster interconnect in TruCluster Server environment. The following topics are discussed:

- Interconnect-specific issues that are involved in creating a cluster and adding a member to an existing cluster
- The day-to-day administration of a LAN interconnect and miscellaneous configuration and management issues
- Features of Ethernet switches that are required for a highly available LAN interconnect

This manual also contains sample installation logs for the `clu_create` and `clu_add_member` commands and lists the `/etc/sysconfigtab` attributes written by the cluster installation procedure to define the cluster interconnect.

3.1.7 *Guide to Prestoserve*

Prestoserve speeds up synchronous disk writes, including Network File System (NFS) server access, by reducing the amount of disk I/O.

The Guide to Prestoserve describes how to manage and maintain a Tru64 UNIX system that includes the optional Prestoserve hardware and software.

3.1.8 *Installation Guide* (revised)

The *Installation Guide* describes how to install the Tru64 UNIX Version 5.1A operating system on all supported systems. Topics include preparing your system for an installation, booting the system from the distribution media, and performing the Full and Update Installation procedures on all supported processors.

Other topics include the following:

- The system management applications to use in setting up services following a Full Installation
- An overview of ways to manage software
- On overview of the Tru64 UNIX mandatory and optional subsets
- The Tru64 UNIX device-naming conventions
- An overview of the processes for installing associated products
- An overview of the installation log files, which capture the screen output and processing of Full, Update, and Cloned installations

This manual is intended for anyone who is installing or updating the operating system software or the Worldwide Language Support (WLS) software.

3.1.9 *Installation Guide — Advanced Topics* (revised)

The *Installation Guide — Advanced Topics* manual describes advanced installation procedures for the Tru64 UNIX operating system. Topics include the following:

- Performing an Update or Full Installation from a Remote Installation Services (RIS) server
- Adding support for additional languages (Worldwide Language Support software subsets) after the base operating system is installed
- Using the UNIX shell to perform disk and file system maintenance before or during a Full Installation.
- Using the built-in disk planning features of the Full Installation process
- Installing and updating product kits
- Customizing the installation process
- Duplicating the installation and configuration characteristics of a running system onto one or more systems using the Installation Cloning and Configuration Cloning processes

This manual is intended for experienced installers who want to take advantage of the wide range of advanced installation features.

3.1.10 *Kernel Debugging*

The *Kernel Debugging* manual describes using the `dbx`, `kdbx`, and `kdebug` debuggers to diagnose problems in kernel code. It also describes how to write a `kdbx` utility extension and how to create and analyze a crash dump file.

This manual is for system programmers who write programs that are built as part of the kernel and that reference kernel data structures. It is also

intended for system administrators who are responsible for managing the operating system. To understand and use the information in this manual, system programmers and administrators should have in-depth knowledge of operating system concepts, commands, and utilities.

3.1.11 *Logical Storage Manager* (revised)

The Logical Storage Manager (LSM) software provides high data availability, better performance, and greater storage management flexibility through online support for disk storage devices on Alpha systems.

The *Logical Storage Manager* manual explains LSM concepts and how to install and administer the LSM software.

The following topics are among those discussed:

- Encapsulating and mirroring the boot disk
- Creating and configuring LSM volumes and disks
- Using LSM commands to manage LSM objects such as disks, disk groups, volumes, plexes, and subdisks
- LSM-related preventative maintenance procedures that enable administrators to restore the LSM configuration if a disk or system fails
- Troubleshooting the LSM software
- Using the Storage Administrator graphical interface to manage LSM objects such as disks, disk groups, volumes, plexes, and subdisks

This manual is intended for system administrators who need to configure and maintain disk storage under the control of the LSM software. The reader should have a working knowledge of the operating system, a basic understanding of system administration, and a basic understanding of disk structures.

3.1.12 *Managing Online Addition and Removal* (new)

This*Managing Online Addition and Removal* manual describes the Tru64 UNIX Online Addition and Removal (OLAR) features. It provides guidelines for their use and provides configuration and management techniques.

Although some tasks described in this manual are geared toward systems that have OLAR capabilities, many can be performed on systems without such capabilities.

The following topics are among those discussed:

- An overview of OLAR hardware components and the operating system features related to OLAR used to increase a system's availability

- High-level considerations — such as environment factors and power requirements — to take into account in order to properly set up and configure system hardware
- Component "indictment and deallocation," which refers to the methodology of identifying system components that have a likelihood of serious failure (indictment) and then automatically taking them off line (deallocation)
- Step-by-step procedures for adding and removing components in a system while keeping the operating system and associated applications running
- How to use various service applications to manage and monitor operating system services and user defined services, including Web-Based Enterprise Service (WEBES), SysMan, Compaq Analyze, Compaq Crash Analysis Tool (CCAT), Revision and Configuration Management (RCM), `sys_check`, and `collect`
- How to prevent and correct operating system and application memory errors using memory trolling

This manual is written for system administrators, service technicians, and system operators who have extensive knowledge of their system's applications and hardware configurations and are responsible for managing and configuring a Tru64 UNIX system

3.1.13 *Network Administration: Connections* (new)

The *Network Administration: Connections* manual is a new title, created by dividing the *Network Administration* manual into two separate volumes. See also the *Network Administration: Services* manual.

This manual, written for experienced system or network administrators, describes the procedures for configuring your system to operate in a network, for configuring the network services, and for day-to-day management of the network, network interfaces, and network services. This manual also includes information for solving problems that might arise while using the network and network services.

Topics discussed include the following:

- Configuring basic Tru64 UNIX network environments including Ethernet, Token Ring, Fiber Distributed Data Interfaces (FDDI), automatic network adapter failover (NetRAIN), and link aggregation groups
- Configuring an Internet Protocol Version 6 (IPv6) network
- The Asynchronous Transfer Mode (ATM) environment and how to configure and manage ATM networks

- Configuring and managing the Dynamic Host Configuration Protocol (DHCP)
- Configuring point-to-point connections using the Serial Line Internet Protocol (SLIP) and the Point-to-Point Protocol (PPP)
- The Local Area Transport (LAT) protocol and how to configure and maintain a LAT environment
- Troubleshooting networks and network services using flow charts and other problem-solving tools

3.1.14 *Network Administration: Services* (new)

The *Network Administration: Services* manual is a new title, created by dividing the *Network Administration* manual into two separate volumes. See also the *Network Administration: Connections* manual.

This manual, written for experienced system or network administrators, describes the tasks for configuring your system to operate in a network, for configuring the network services, and for day-to-day management of the network, network interfaces, and network services. This manual also includes information for solving problems that might arise while using the network and network services.

The topics discussed include the following:

- The Domain Name System (DNS) environment and how to configure and manage DNS servers and clients
- The Network Information Service (NIS, formerly Yellow Pages) environment and how to configure and manage NIS servers and clients
- The Network File System (NFS) environment and how to configure and manage NFS servers and clients
- The UNIX-to-UNIX Copy Program (UUCP) and how to configure and manage it
- The components of the Network Time Protocol (NTP) and how to configure and manage NTP clients and servers
- The components of the Tru64 UNIX mail system and information such as:
  - How to configure mail (the `sendmail` utility) on a standalone system or across an enterprise
  - How to configure POP and IMAP mail
  - How to administer mail on server and client systems
- The Simple Network Management Protocol (SNMP) implementation on a Tru64 UNIX system

- Troubleshooting networks and network services using flow charts and other problem-solving tools

3.1.15 *Security* (revised)

The online version of the *Security* manual is included with the system and network administration information because it contains information of interest to those administrators. However, the printed version is included only in the End User Documentation Kit. See Section 2.1.9 for information about this manual.

3.1.16 *Sharing Software on a Local Area Network* (revised)

The *Sharing Software on a Local Area Network* manual describes Remote Installation Services (RIS) and Dataless Management Services (DMS).

The RIS utility is used for installing software across a network, instead of using locally mounted media. RIS topics discussed in this manual include the following:

- Preparing and configuring a RIS server
- Booting a RIS client
- Managing RIS clients and environments
- Managing a RIS profile set
- Troubleshooting a RIS system

DMS allows a server system to maintain the root, `/usr`, and `/var` file systems for client systems. Each client computer has its own root file system on the server, but clients share the `/usr` and `/var` file systems. DMS topics discussed in this manual include the following:

- Setting up and configuring a DMS environment
- Managing DMS clients and environments
- Troubleshooting DMS

3.1.17 *Software License Management*

The *Software License Management* manual describes how to use the License Management Facility (LMF) to manage software licenses from Compaq.

Although intended primarily for system administrators responsible for managing software licenses on Tru64 UNIX systems, this manual also provides information for anyone who uses licensed software on Tru64 UNIX systems.

The LMF software can be used by companies other than Compaq. Those companies can issue Product Authorization Keys (PAKs) or have Compaq issue them on their behalf. Additionally, other companies can include license-checking functions in their software. However, the *Software License Management* manual addresses only software that is supplied and produced by Compaq.

3.1.18 *System Administration* (revised)

The *System Administration* manual describes how to configure, use, and maintain the Tru64 UNIX operating system. It includes information on general day-to-day activities and tasks, changing system configurations, and locating and eliminating sources of trouble.

System administrators are provided with overviews of administrative concepts, as well as step-by-step instructions to perform necessary tasks using either the SysMan graphical interface or the command-line tools.

The topics discussed include the following:

- System administration methods and utilities
- Shutting down and starting up a system
- Customizing the system environment
- Configuring the kernel
- Managing hardware
- Administering file systems
- Administering user accounts and groups
- Administering the print services
- Administering the archiving services
- Administering the system accounting services
- Monitoring and testing the system
- Monitoring and administrating system events
- Administering crash dumps

This manual is for system administrators responsible for managing the operating system. The reader should be knowledgeable about operating system concepts and commands, as well as supported hardware and software configurations.

Administrators should know the operational aspects of UNIX system administration and be familiar with all the procedures necessary to maintain

a UNIX system for high availability. This manual is not intended to train administrators or to plan the installation of a UNIX system.

3.1.19 *System Configuration and Tuning*

The *System Configuration and Tuning* manual describes how to plan, set up, and tune high-performance and high-availability systems running the Tru64 UNIX operating system. It can help system administrators to accomplish many system tasks, including the following:

- Monitoring systems and diagnosing performance problems
- Configuring and tuning a system that will meet current and future needs
- Tuning system resource limits (such as the size of system tables and the virtual address space) that were set at boot time
- Understanding how hardware, operating system subsystems, and layered products interact to affect system performance
- Managing the performance of memory, the CPU, disk storage, file systems, and networks

3.1.20 *System Configuration Supplement: OEM Platforms*

The *System Configuration Supplement: OEM Platforms* manual provides information needed to set up OEM platforms running the Tru64 UNIX operating system. It helps system and network administrators configure Alpha VME single-board computers (SBCs), PCI/ISA modular SBCs, and VMEbus backplane networks in which SBCs operate as Ethernet nodes.

This manual is for experienced system and network administrators who are thoroughly familiar with their platform's I/O bus and with the operating system concepts, commands, and configurations.

3.1.21 *X Window System Environment* (revised)

The *X Window System Environment* manual describes various aspects of the X Window System environment as it is implemented on Tru64 UNIX. It provides information on how to perform system administration tasks for the Tru64 UNIX X Window System environment, and describes how to customize X Window System resources and key mappings. It also provides information about programming within the Tru64 UNIX X Window System environment.

3.2 Printed-Only Documentation

The documentation described in this section is provided only in printed books. This documentation is included in the Tru64 UNIX documentation kits.

3.2.1 *Full Installation Quick Start* (revised)

The *Full Installation Quick Start* card describes the basic steps for performing a Full Installation of the Tru64 UNIX operating system from the installation CD–ROM. It walks you through the process of performing preinstallation tasks, installing the operating system, and setting up services.

Users of this card should have a working knowledge of the Tru64 UNIX operating system and to have previously performed a Full Installation. First-time installers are urged to follow the more detailed instructions provided in the *Installation Guide*.

3.2.2 *Update Installation Quick Reference Card* (revised)

The *Update Installation Quick Reference Card* describes the basic steps for upgrading your Tru64 UNIX operating system from Version 5.0A or 5.1 to Version 5.1A from the installation CD–ROM or from a Remote Installation Services (RIS) server. Update installations preserve disk partitions, file systems, and file customizations.

Users of this card should have a working knowledge of the Tru64 UNIX operating system and to have previously performed an Update Installation. Users who are performing their first Update Installation are urged to follow the more detailed instructions provided in the *Installation Guide*.

3.2.3 *X Window System Administrator's Guide*

The *X Window System Administrator's Guide*, published by O'Reilly & Associates, describes how to customize a wide range of X Window System environments, from an individual workstation to groups of workstations and X terminals connected on a network. Major topics include security, the X display manager (`xdm`), fonts, color, X terminals, and X client applications.

3.3 Online-Only Documentation

The documentation described in this section is provided on the Documentation CD–ROM and the Web.

3.3.1 *BIND Configuration File Guide*

The *BIND Configuration File Guide* describes the Berkeley Internet Name Domain (BIND) Version 8 and its implementation as an Internet name server for BSD-derived operating systems.

Version 8 is more configurable than previous releases of BIND, with new areas of configuration such as access control lists and categorized logging.

Also, you can now selectively use many options that previously applied to all zones.

3.3.2 *DECevent Translation and Reporting Utility*

DECevent provides an interface between a system user and the operating system's event logger. DECevent can help system administrators to troubleshoot Tru64 UNIX system problems.

The *DECevent Translation and Reporting Utility* manual describes the DECevent command features related to the translation and reporting of events on Tru64 UNIX operating systems. It contains an overview of the utility, information on how to obtain help for the utility, and information about all the commands necessary to translate event logs on Tru64 UNIX operating systems.

3.3.3 *Performance Manager* (revised)

Performance Manager is a real-time performance management tool that allows system administrators to detect and correct performance problems in Tru64 UNIX systems. The three primary components of the Performance Manager are a graphical user interface, the Performance Manager daemon, and an activity daemon. An additional daemon monitors systems running the TruCluster Server software.

The *Performance Manager* manual explains the concepts of the Performance Manager software and describes tasks such as monitoring, thresholding, archiving, and distributed command execution.

3.3.4 *sendmail Installation and Operation Guide*

The *sendmail Installation and Operation Guide* describes the configuration file for Version 8.9 of the `sendmail` utility, which implements a general-purpose internetwork mail routing facility under the Tru64 UNIX operating system.

The `sendmail` utility is not tied to any one transport protocol — its function can be likened to a crossbar switch, relaying messages from one domain into another. In the process, it can do a limited amount of message header editing to put the message into a format that is appropriate for the receiving domain. All of this is done under the control of a configuration file.

4

Programming Documentation

This chapter describes the documentation designed for software developers who write applications on or for the Tru64 UNIX operating system. The books in this category are generally geared toward advanced users. Each document is individually described.

Books that are printed can be purchased from Compaq in the documentation kits described in Section 1.5.

Except for a few externally published manuals, the documentation described here was produced by Compaq writers working closely with the developers of the Tru64 UNIX operating system.

Books identified as revised, were updated with the Version 5.1A release.

4.1 Printed and Online Documentation

The documentation described in this section is provided on the Tru64 UNIX Documentation CD–ROM and in the optional printed documentation kits. For more information on the printed documentation set, see Section 1.5.

4.1.1 *Assembly Language Programmer's Guide*

The *Assembly Language Programmer's Guide* describes the Alpha hardware architecture's assembly language, which is supported by the Tru64 UNIX compiler system. The manual describes the assembly language syntax rules, and how to write assembly language programs.

This manual is for system software developers who are writing assembly language programs on or for Tru64 UNIX.

4.1.2 *Asynchronous Transfer Mode*

The *Asynchronous Transfer Mode* manual describes the Tru64 UNIX Asynchronous Transfer Mode (ATM) subsystem, how to configure the subsystem, and how to use the ATM kernel interfaces. It is written for experienced UNIX kernel programmers who are responsible for writing ATM device drivers and kernel modules. After reading this manual, a kernel programmer should be able to do the following:

- Understand the ATM subsystem architecture

- Configure ATM software
- Understand how the different kernel interfaces operate
- Write a kernel module

This manual does not describe the application programming interface (API) that user-level applications would use to access the ATM subsystem. This manual is not an ATM networking tutorial.

4.1.3 *Calling Standard for Alpha Systems*

The *Calling Standard for Alpha Systems* manual defines the requirements, mechanisms, and conventions used in the interface that supports procedure calls on Tru64 UNIX for Alpha systems. The standard defines data structures, constants, algorithms, conventions, methods, and functional interfaces, which enable a native, user-mode procedure to operate correctly in the multilanguage and multithreaded Tru64 UNIX environment on Alpha hardware.

Although this manual primarily defines requirements for compiler and debugger writers, the information applies to procedure calling for all programmers at all levels of programming.

4.1.4 *Cluster Highly Available Applications* (revised)

The online version of the *Cluster Highly Available Applications* manual is included with the programming information because it contains information of interest to programmers. The printed version is included in the Tru64 UNIX media kit and with the TruCluster Server product. See Section 2.1.9 for information about this manual.

See Section 3.1.4 for information about this manual.

4.1.5 *Compaq C Language Reference Manual* (revised)

The *Compaq C Language Reference Manual* (previously called the *DEC C Language Reference Manual*) provides reference information for using the Compaq C language on Compaq systems. Compaq C is an ISO/ANSI-compliant C compiler for Tru64 UNIX and OpenVMS, VAX, and Alpha systems.

The C language is based on the ISO C Standard (ISO 9899:1990[1992]), formerly the ANSI X3J11 committee's standard for the C programming language (commonly called ANSI C). This manual describes all library functions and language extensions to the ANSI C standard.

This manual is intended for programmers who need reference information on the Compaq C language. For task-oriented information or platform-specific information, see the cc(1) reference page and the *Programmer's Guide*.

4.1.6 *Guide to Preparing Product Kits* (revised)

The *Guide to Preparing Product Kits* describes the procedures for creating, maintaining, and installing the collections of files and directories that make up a layered product kit. A kit is the standard mechanism by which layered product modifications are delivered and maintained on a Tru64 UNIX system. Kits are distributed on CD–ROM, diskettes, or tape for installation on customers' systems.

This is the same manual that is included in the Tru64 UNIX Device Drivers Kit (Chapter 7).

4.1.7 *Guide to Realtime Programming*

The *Guide to Realtime Programming* is for programmers who are developing realtime applications on Tru64 UNIX systems. It provides information on writing new realtime applications and porting existing realtime applications from other systems.

This manual does not present function syntax or reference information; the online reference pages provide that information.

This manual is for application programmers or system engineers who are already familiar with the C programming language. Readers should have experience with UNIX operating systems and with UNIX software development tools.

4.1.8 *Guide to the POSIX Threads Library*

The *Guide to the POSIX Threads Library* (formerly called *Guide to DECthreads*) provides usage and reference information on POSIX Threads Library routines. It provides information on the three POSIX Threads Library interfaces used to perform multithreaded operations: cma, pthread, and pthread exception-returning.

This manual is for programmers writing multithreaded applications. Readers should have experience with a high-level programming language (such as C), with UNIX operating systems, and with UNIX software development tools.

4.1.9 *Network Programmer's Guide* (revised)

The *Network Programmer's Guide* describes the Tru64 UNIX network programming environment. It provides an in-depth description of the X/Open

Transport Interface (XTI) and the sockets and STREAMS programming frameworks, including information about system calls, header files, and libraries. Additionally, it provides information about porting sockets-based applications to XTI.

This manual also describes the software bridge `ifnet` (STREAMS module and DLPI STREAMS pseudodevice driver) that the Tru64 UNIX operating system supports. This bridge allows programs that use sockets-based protocol stacks to access STREAMS drivers and programs that use STREAMS-based protocol stacks to access BSD-based drivers.

This manual is for experienced UNIX programmers.

4.1.10 *Programmer's Guide*

The *Programmer's Guide* describes the programming environment of the Tru64 UNIX operating system, with an emphasis on the C programming language.

Topics include the following:

- The compiler system
- Pragma preprocessor directives
- Shared libraries
- Debugging programs with `dbx`
- Debugging programs with Third Degree
- Profiling programs to improve performance
- Using and developing Atom tools
- Optimizing techniques
- Handling exception conditions
- Developing thread-safe libraries
- Open MP parallel processing
- Posting and receiving EVM events
- Using 32–bit pointers on Tru64 UNIX systems
- Differences in the System V habitat
- Creating dynamically configurable kernel subsystems
- The "old-style" (pre-OpenMP) parallel-processing interface
- Handling names of device special files

This manual is for programmers who use the Tru64 UNIX operating system to create or maintain programs in any supported language.

4.1.11 *Programming Support Tools*

The *Programming Support Tools* manual describes commands and utilities for text manipulation, macro and program generation, and source file management on Tru64 UNIX.

Although the commands and utilities described in this manual are primarily for programmers, some of them (such as `grep` and `sed`) are useful for general users.

The following topics are among those discussed:

- Finding information with regular expressions and the `grep` command
- Matching patterns and processing information with `awk`
- Editing files with the `sed` editor
- Creating input language analyzers and parsers
- Using m4 macros in programs
- Managing source files with RCS or SCCS
- Building programs with the `make` utility

This manual is for moderately experienced users of UNIX systems.

4.1.12 *Programming with ONC RPC*

The *Programming with ONC RPC* manual provides an overview of high-level programming with remote procedure calls (RPC) in the Open-Network Computing Environment (ONC). It describes how to use the `rpcgen` protocol compiler to create RPC applications and describes the RPC programming interface.

This manual is for programmers who want to write network applications without knowledge of the underlying network.

4.1.13 *Security* (revised)

The online version of the *Security* manual is included with the programming information because it contains information of interest to programmers. However, the printed version is included only in the End User Documentation Kit. See Section 2.1.9 for information about this manual.

4.1.14 *Writing Kernel Modules*

Kernel modules are binary images containing code and data structures that run in the UNIX kernel. These modules provide a level of common code that improves the efficiency of a system by combining like tasks in a single area and eliminating redundant code.

The *Writing Kernel Modules* manual provides information for developers who want to augment the kernel with modules tailored to their particular environment.

This manual is also included in the Tru64 UNIX Device Drivers Kit (Chapter 7).

4.1.15 *Writing Software for the International Market*

Internationalization (often called I18N) is the process of designing or adapting programs to interact with users in their own language and to reflect the culture of the user's region.

The *Writing Software for the International Market* manual provides an overview of internationalization concepts. It also provides details about writing internationalized programs, creating and using message catalogs, and developing or customizing locales.

The following topics are among those discussed:

- Developing internationalized software
- Creating and using message catalogs
- Handling wide-character data with `curses` routines
- Creating internationalized X, Xt, and Motif applications
- Using internationalized software
- Creating locales
- Setting up and using user-defined character databases
- Setting up and using the Chinese phrase input method
- Using DECterm localization features in programs

Also included is a summary of worldwide portability interfaces (WPI) that are defined by Version 5 of the X/Open CAE specification for system interfaces and headers (XSH), and sample locale source files.

This manual is for programmers developing internationalized applications for the Tru64 UNIX operating system.

4.2 Printed-Only Documentation

The documentation described in this section is provided only in printed books and is included in the Tru64 UNIX documentation kits.

4.2.1 *OSF/Motif Programmer's Guide*

The *OSF/Motif Programmer's Guide* (produced by the OSF and published by Prentice Hall) provides programming information on how to use the various

components of the OSF/Motif environment: the Toolkit, window manager, and user interface language.

This manual is for programmers who want to create applications in the OSF/Motif environment.

4.2.2 *OSF/Motif Style Guide*

The *OSF/Motif Style Guide* (produced by the OSF and published by Prentice Hall) provides a framework of behavior specifications to guide application developers, widget developers, and window manager developers in the design and implementation of products consistent with the Presentation Manager and the OSF/Motif user interface.

This manual establishes consistent behavior among new products by drawing out common elements from a variety of current behavioral models.

This manual is for programmers and interface designers developing OSF/Motif applications who want to present a uniform and usable software interface consistent with other OSF/Motif applications.

4.2.3 *Programmer's Guide: STREAMS*

The *Programmer's Guide: STREAMS* (published by Prentice Hall) provides information on the use of the STREAMS mechanism at the user and kernel levels. It contains introductory information for those who are unfamiliar with the STREAMS mechanism.

This manual addresses topics such as using STREAMS to monitor, control, and poll STREAMS; designing and implementing STREAMS modules and drivers; and using STREAMS-based pipes and FIFOs. It also describes the STREAMS multiplexing facility and the STREAMS-based terminal and pseudo-terminal subsystems.

4.3 Online-Only Documentation

The documentation described in this section is provided on the Documentation CD–ROM and the Web.

4.3.1 *Common Desktop Environment: Application Builder User's Guide*

The *Common Desktop Environment: Application Builder User's Guide* introduces the Application Builder and explains how to use it to build CDE applications. Because the Application Builder helps to easily create and modify user interfaces, it is a powerful tool for programmers, user interface designers, and project managers.

4.3.2 *Common Desktop Environment: Desktop KornShell User's Guide*

The *Common Desktop Environment: Desktop KornShell User's Guide* provides the information needed to create Motif applications with KornShell (`ksh`) scripts. It also provides several example scripts of increasing complexity.

This manual is for programmers who want to develop Motif applications using KornShell scripts rather than the C programming language. Readers should have knowledge of KornShell programming, Motif, and the Xt Intrinsics, as well as familiarity with the X programming library (`Xlib`).

4.3.3 *Common Desktop Environment: Help System Author's and Programmer's Guide*

The *Common Desktop Environment: Help System Author's and Programmer's Guide* describes how to develop online help for CDE applications. It describes how to create help topics and how to integrate online help into a CDE application.

This manual is for application programmers who want to do the following:

- Design, create, and view online help information
- Create software applications that provide a fully integrated help facility

4.3.4 *Common Desktop Environment: Internationalization Programmer's Guide*

The *Common Desktop Environment: Internationalization Programmer's Guide* provides information for internationalizing the desktop and enabling applications to support various languages and cultural conventions in a consistent user interface.

This manual is for CDE application programmers whose products are available worldwide.

4.3.5 *Common Desktop Environment: Product Glossary*

This *Common Desktop Environment: Product Glossary* provides a comprehensive list of terms used in the Common Desktop Environment.

This manual is for all CDE users.

4.3.6 *Common Desktop Environment: Programmer's Guide*

The *Common Desktop Environment: Programmer's Guide* contains the information needed to integrate an existing application into the CDE desktop. It also describes how to write new CDE applications.

Readers should be familiar with Motif, X, UNIX, and C programming.

4.3.7 *Common Desktop Environment: Programmer's Overview*

The *Common Desktop Environment: Programmer's Overview* provides a high-level view of the development environment and the developer documentation set for CDE. It is for the following audiences:

- Application developers who develop new CDE applications, or integrate existing OSF/Motif applications into CDE
- Managers or project leaders interested in designing a project involving applications that will run on CDE

4.3.8 *Common Desktop Environment: Style Guide and Certification Checklist*

The *Common Desktop Environment: Style Guide and Certification Checklist* provides style guidelines for CDE application design and lists the requirements for CDE application-level certification. CDE requirements consist of the OSF/Motif Version 1.2 requirements with CDE-specific additions.

4.3.9 Java Documentation

The Tru64 UNIX operating system includes a Java™ Development Kit (JDK), which provides tools to develop and run Java applets and programs on the Tru64 UNIX operating system.

The *Java Development Kit (overview)* provides a link to Compaq's Java web site, which offers free Java downloads for Compaq's Alpha platforms and online documentation for you to read prior to downloading a Java kit. It also provides access to a site were you can offer comments, make suggestions, or ask questions about the Compaq JDK and Java SDK product.

4.3.10 *Ladebug Debugger Manual* (revised)

The Ladebug Debugger is a tool for debugging executable programs at the source-code and machine-code levels. It can debug programs written in C and C++, Ada, COBOL, and Fortran.

The *Ladebug Debugger Manual* is for developers who need to debug multiprocess and multithreaded applications, perform kernel debugging, and perform remote client/server debugging.

4.3.11 *Object File and Symbol Table Format Specification*

The *Object File and Symbol Table Format Specification* provides technical information for compiler and debugger writers and other developers who must access or manipulate object files on the Tru64 UNIX operating system. It supplements or replaces information that has been previously available in the Assembly Language Programmer's Guide. Readers should be familiar with basic program development and symbol table concepts.

4.3.12 Technical References for Asian Languages

The following guides provide language-specific information and describe the features of several Asian languages supported on the Tru64 UNIX system. The guides describe character and code sets, locales, device setup, keyboards, printing, and input methods. The information in these guides is useful to programmers and to some advanced users of the Tru64 UNIX system:

- *Technical Reference for Using Chinese Features* (revised)
- *Technical Reference for Using Japanese Features* (revised)
- *Technical Reference for Using Korean Features*
- *Technical Reference for Using Thai Features*

4.3.13 ToolTalk Service Documentation

ToolTalk is an interapplication communication service that is included as part of the Common Desktop Environment. ToolTalk provides a way for applications and desktop components to request services from each other and to announce events. The following books provide information about the ToolTalk service:

- *Common Desktop Environment: ToolTalk Messaging Overview*

  The *Common Desktop Environment: ToolTalk Messaging Overview* describes how the ToolTalk service works and how it uses information that applications supply to deliver messages. It also describes how applications use the ToolTalk service and ToolTalk components.

  The reader should be familiar with the ToolTalk service, UNIX operating system commands, system administrator commands, and system terminology.

- *ToolTalk User's Guide*

The *ToolTalk User's Guide* is useful to developers who create or maintain applications that use the ToolTalk service to interoperate with other applications; it is also useful to system administrators who set up workstations.

The reader should be familiar with operating system commands, system administrator commands, and system terminology.

- *ToolTalk Reference Manual*

  The *ToolTalk Reference Manual* describes components of the ToolTalk application programming interface such as enumerated types and functions. It also describes enhanced operating system shell commands, error messages, and standard ToolTalk messaging sets.

4.3.14 X Window System Documentation

The X Window System is a network-transparent window system, in which multiple applications can run simultaneously in windows, generating text and graphics in monochrome or color on a bitmap display. Network transparency means that application programs can run on machines scattered throughout the network. Because the X Window System permits applications to be device-independent, applications need not be rewritten, recompiled, or even relinked to work with new display hardware.

The documentation described in this section was written by the engineers who developed the X Window System and was provided by the X Consortium.

- *X Window System: The Complete Reference to Xlib, X Protocol, ICCCM, XFLD*

  The *X Window System: The Complete Reference to Xlib, X Protocol, ICCCM, XFLD* manual describes the features of X Window System Version 11, Release 4. This manual was written by Robert W. Scheifler and James Gettys, and was originally published by Digital Press.

- *X Window System Protocol*

  The *X Window System Protocol* manual describes Version 11, Release 6 of the X Window System protocol. This paper was written by Robert W. Scheifler.

- *Inter-Client Communication Conventions Manual*

  The *Inter-Client Communication Conventions Manual* proposes suitable conventions for interclient communications with X Window System Version 11 software. The proposed conventions do not attempt to enforce any particular user interface. To permit clients written in different languages to communicate, these conventions are expressed in terms of protocol operations, rather than the more familiar associated Xlib interfaces.

This manual (written by David Rosenthal) is based on the Release 6 software.

- *X Toolkit Intrinsics — C Language Interface*

  Intrinsics are a programming library tailored to the special requirements of user-interface construction within a network window system — specifically the X Window System. The Intrinsics and a widget set make up the X Toolkit. The *X Toolkit Intrinsics — C Language Interface* manual describes the X Toolkit Intrinsics. It is based on Version 11, Release 6.

  This manual (written by Joel McCormack, Paul Asente, and Ralph R. Swick) is intended for application programmers who will use one or more of the many widget sets built with the Intrinsics and by widget programmers who will use the Intrinsics to build widgets for one of the widget sets.

- *X Logical Font Description Conventions*

  The *X Logical Font Description Conventions* (XLFD) manual provides a standard logical font description and the conventions to be used in the core protocol, so that clients can query and access screen type libraries in a consistent manner across all X servers. In addition to completely specifying a given font by means of its FontName, the XLFD also provides a standard set of key FontProperties that describe the font in more detail.

  Written by Jim Flowers, this manual is based on X Window System Version 11, Release 6.

- *Xlib — C Language X Interface*

  The *Xlib — C Language X Interface* manual provides reference information for the low-level C language interface to the X Window System protocol. It provides a detailed description of each function in the library, as well as a discussion of the related background information. It is not tutorial nor a user's guide to programming the X Window System.

  This manual is based on Version 11, Release 6 of the X Window System. The reader should have a basic understanding of a graphics window system and of the C programming language. It was written by Robert W. Scheifler and James Gettys.

5

Supplementary Documentation

This chapter describes some of the supplementary documentation that is provided on the Tru64 UNIXOperating System CD–ROM, Associated Products CD–ROMs Volumes 1 and 2, and Compaq's Web site. The Printed and Online Documentation sections of the previous chapters describe the supplementary documentation provided on the Documentation CD–ROM.

Supplementary documentation is provided only on line and comes from various sources. Some of this material, including all of the Best Practice documentation, is produced by Compaq writers working closely with Tru64 UNIX developers. Other documentation is produced by UNIX professionals both within Compaq and outside the corporation. Supplementary documentation tends to be less formal in structure than the core documentation.

Examples of supplementary documentation include installation guides and release notes for components such as the Multimedia Services for Tru64 UNIX run-time environment and DECevent, QuickSpecs, nd lists of fixes made to earlier versions of the operating system.

This *Documentation Overview* does not list all of the supplementary documentation included on the CD–ROMs and the Web, but it does provide some guidance in the following sections.

5.1 Web-Based Best Practices Documentation

A Best Practices document offers a recommended procedure for performing a task, rather than presenting all of the options available. This type of documentation walks you step-by-step through the process.

The recommended procedure might depend on your configuration environment. For example, the Best Practice for performing a particular task on a Web server might differ from the one for performing the same task on a file server. The Best Practice documentation cannot meet the needs of all users, but it is aimed at the most common tasks and system configurations in order to meet the demands of most users.

The Best Practices documentation resides only on the Web at the following site:

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

The volume of Best Practice documentation continues to grow, due in part to requests from customers. The Best Practices Web page provides information for sending your suggestions to Compaq. You might find new Best Practice documentation at this site each time you visit it.

5.2 Operating System CD–ROM

The documentation described in the following sections is included on the Tru64 UNIX Operating System CD–ROM. Some of this documentation is available only when you install the software it describes.

5.2.1 QuickSpecs

QuickSpecs (formerly called *Software Product Descriptions*, or SPDs) provide technical information about Compaq products. They describe the software and give information about its capabilities and the hardware it supports.

The *Tru64 UNIX Operating System QuickSpec* and QuickSpecs for the Developer's Toolkit, the Advanced File System Utilities, and the Logical Storage Manager are provided on the Operating System Volume 1 CD–ROM in PDF and HTML formats. You can find the files in the *mount_point*/DOCUMENTATION directory (where *mount_point* is the directory in which the CD–ROM is mounted).

5.2.2 Listings of Patches to the Operating System

Listings of fixes (usually called patches) that Compaq has made to each version of the Tru64 UNIX operating system are provided in text files on the CD–ROM in the *mount_point*/DOCUMENTATION/TEXT directory. The files are named as follows:

```
Digital_UNIX_V4_0_CLD_Fixes.txt
Digital_UNIX_V4_0A_CLD_Fixes.txt
Digital_UNIX_V4_0B_CLD_Fixes.txt
DIGITAL_UNIX_V4_0D_CLD_Fixes.txt
DIGITAL_UNIX_V4_0E_CLD_Fixes.txt
Tru64_UNIX_V4_0F_CLD_Fixes.txt
Tru64_UNIX_V4_0F_CLD_Fixes.txt
Tru64_UNIX_V5_0_CLD_Fixes.txt
Tru64_UNIX_V5_0A_CLD_Fixes.txt
Tru64_UNIX_V5_1_CLD_Fixes.txt
Tru64_UNIX_V5_1A_CLD_Fixes.txt
```

To obtain Tru64 UNIX patch kits from Compaq, visit the following Web site:

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

5.2.3 Text Version of the Tru64 UNIX *Release Notes*

As an alternative to the PDF and HTML versions of the Tru64 UNIX *Release Notes* included on the Documentation CD–ROM, an ASCII text version of this document is included on the Operating System CD–ROM as follows:

mount_point/DOCUMENTATION/TEXT/Tru64_UNIX_V5_1A_Release_Notes.txt

5.2.4 X Image Extension Documentation

The X Image Extension (XIE) code provides a powerful mechanism for the transfer and display of virtually any image on X-capable hardware. Documentation for XIE is provided in the `/usr/share/doclib/xie` directory on an installed Tru64 UNIX system.

Before you can view or print an XIE document, you must uncompress it using the `gzip -d` command. For more information, see the `gzip(1)` reference page.

The following list describes the XIE documentation. The names of the individual files are listed after the titles.

- *X Image Extension Overview* (`overview.ps.gz`)

  This document provides general information about the X Image Extension code. The topics covered include XIE design goals, historical summary, architecture, element definitions, and subsetting.

- *XIElib Specification* (`xielib.ps.gz`)

  This document contains reference information about the XIElib functions, XIElib events, and XIElib errors. The Functions section covers such functions as startup, LUT, photomap, ROI, photoflo, client data, abort and await, photoflo element, technique, and free.

- *XIE Sample Implementation Architecture* (`xieSIarch.ps.gz`)

  This document provides an architecture overview of XIE, including chapters on extension initialization, memory management, request dispatching, data representation, data structures, protocol requests, DIXIE photoflo management, DDXIE photoflo management, and photo elements.

- *X Image Extension Protocol Reference Manual, Version 5.0* (`XIEProto.ps.gz`)

  This document specifies the X wire protocol for XIE. It defines the syntax, structure, and semantics of the XIE protocol elements. The topics covered include syntax specification, parameter types, resources, pipelined processing, import elements, process elements, export elements, events and errors, techniques, service class, and protocol encodings.

5.3 Associated Products CD–ROMs

The Associated Products CD–ROMs contain documentation for various components of Tru64 UNIX. The document called *Tru64 UNIX Version 5.1A CD–ROMs* (a printed sheet packaged with the Tru64 UNIX media kit) provides a list of the applications located on these CD–ROMs, as do the `00README.TXT` files located on the CD–ROMs.

Both Associated Products CD–ROMs provide a graphical user interface that you can use to access documentation and to install product software. To use this interface, invoke Netscape and go to the following location:

`file://<mount_point>/index.html`

A list of products on the CD–ROM will be displayed. When you click on a product name, you will be given the option to install the product or access the documentation, if applicable.

The Associated Products CD–ROMs comply with the ISO 9660 Level 1 CD–ROM standard, which means you can view the contents of these CD–ROMs on a Windows PC or Macintosh or on any other system that uses that ISO standard.

6

Tru64 UNIX Reference Pages

The Tru64 UNIX operating system provides an extensive set of reference pages (also called man pages or manual pages), each of which describes one topic, such as a command, function, or file. This chapter discusses the reference pages.

6.1 Reading Reference Pages On Line

You can use the `webman` utility to read the reference pages on line using your Web browser and print them by clicking on the browser's Print menu. Alternatively, you can use the `xman` or `man` utilities from the command line to read the reference pages.

Your system administrator determines at system installation time whether to make the operating system reference pages available on your system. If you receive an error message when you try to access reference pages, the problem might be that they are not installed.

Your system administrator also decides whether to install the reference pages that are included with layered products. This includes products such as the TruCluster Server, which provides a full set of its own reference pages.

6.1.1 Using the Documentation CD–ROM

The Library on the Documentation CD–ROM includes a category that contains the full set of base operating system reference pages in HTML form. You can view these reference pages with your Web browser just as you would view any of the HTML books. These references pages are indexed and hot-linked with the books for easy access. (The reference pages for layered products are not included on this CD–ROM.)

6.1.2 Using webman

The Documentation CD–ROM contains the `webman` viewer, a UNIX CGI program you can use with your browser to view the reference pages that are installed with the operating system. The `webman` viewer is most useful when the Documentation CD–ROM is not mounted, or when you need to access reference pages that have been installed with layered products. For

information about installing and using webman, see the following file on the Documentation CD–ROM:

/*mount-point*/DOCS/HTML/webman/Installing_webman.txt

See Section 1.4.1 for information about the Documentation CD–ROM.

6.1.3 Using the xman Command

The xman command starts an X Window System reference-page browsing tool. One function of the tool is to display a list of the reference pages. You display a reference page by double-clicking on its name in the list. For more information about the xman command, start the application by entering the following command:

```
% xman &
```

The ampersand (&) runs the command in the background, allowing the command line to be used for other tasks. The application displays a small window that contains three buttons. Click on the Manual Page button to read a reference page about the xman command.

6.1.4 Using the man Command

The man command displays the reference page specified on the man command line. For more information about the man command, read the man(1) reference page. To display this reference page, enter the following command:

```
% man man
```

6.2 Reading Reference Pages in Printed Books

Compaq provides a separately orderable Reference Pages Documentation Set. In this printed format, the Reference Page books are grouped according to their sections, each of which contains one or more volumes. The books contain an R on the spines to help you quickly identify them as reference page books.

Note

The Reference Page Kit has not been updated since Version 5.0. Therefore, the online reference pages provide more current information than the printed books.

6.3 Overview of the Reference Page Sections

The reference pages are grouped into sections, according to their function, audience, or both. The section numbers appear as numbers in parentheses next to the name of the reference page. For example:

```
lpr(1)
automount(8)
createlabel(3)
```

The following list describes each section:

Reference Pages Section 1

Section 1 describes user commands that are available to everyone who uses the Tru64 UNIX operating system.

In printed form, this section is divided into five volumes.

Reference Pages Section 2

Section 2 defines system calls (entries into the Tru64 UNIX kernel) that programmers use. The introduction to Section 2, `intro(2)`, lists error numbers with brief descriptions of their meanings. The introduction also defines many of the terms used in this section.

In printed form, this section is in one volume.

Reference Pages Section 3

Section 3 describes the routines available in Tru64 UNIX programming libraries, including the C library, Motif library, and X library. This section is for programmers.

In printed form, this section is divided into seven volumes.

Reference Pages Section 4

Section 4 describes the format of system files and how the files are used. The files described include assembler and link editor output, system accounting, and file system formats. This section is for programmers and system administrators.

In printed form, this section is divided into two volumes.

Reference Pages Section 5

Section 5 contains miscellaneous information, including ASCII character codes, mail-addressing formats, text-formatting macros, and a description of the root file system. This section is for programmers and system administrators.

In printed form, this section is divided into two volumes.

Reference Pages Section 7

Section 7 describes special files, related device driver functions, databases, and network support. This section is for programmers and system administrators.

In printed form, this section is in one volume.

Reference Pages Sections 8 and 1m

Sections 8 and 1m describe commands for system operation and maintenance. These sections are for system administrators.

In printed form, these sections are divided into three volumes.

Reference Pages Sections 9

Section 9 describes data structures and routines used in writing kernel modules. This section is for programmers.

In printed form, this section is in one volume.

7

Device Driver Documentation

Documentation to aid programmers in writing device drivers for Tru64 UNIX is packaged in a separately orderable Device Driver Kit (DDK). This documentation was produced by Compaq writers working closely with the device driver developers.

This kit (Version 2.0, part number QA-6ADAV-A8) contains a CD-ROM that includes the Tru64 UNIX Device Driver sample drivers, driver development tool (code template generator), documentation in HTML and PDF formats, and printed installation instructions and release notes.

You can obtain printed copies of the documentation by ordering the Tru64 UNIX Device Driver Documentation Kit (part number QA-6ADAV-GZ).

The rest of this section describes the books in the DDK. This information is provided here because of the close relationship between the device driver documentation and the Tru64 UNIX documentation set.

Note

The Device Driver Kit is produced independently of the Tru64 UNIX operating system. The following descriptions are for Version 2 (December 2000) of the Device Driver Kit, which supports Tru64 UNIX Version V5.0A and higher. For information about this kit, visit the following Web site:

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

Writing Device Drivers

This manual contains information that systems engineers need when writing a device driver for hardware that runs on the Tru64 UNIX operating system. This manual replaces the manual *Writing Device Drivers: Tutorial*. It includes the chapter on funnels and the chapter on how to write disk device drivers that were previously part of manual named *Writing Device Drivers: Advanced Topics*.

This manual also provides a glossary of device driver terms.

Writing Kernel Modules

This manual describes topics for all kernel modules such as kernel threads and writing kernel modules in a symmetric multiprocessing (SMP) environment. Read this manual before you use the *Writing Device Drivers* manual.

This is the same manual that is included in the Developer's Kit of the Tru64 UNIX documentation set.

Writing PCI Bus Device Drivers

This manual provides information for systems engineers who write device drivers for the PCI bus. It describes PCI bus-specific topics, including PCI bus architecture and data structures that PCI bus device drivers use.

Writing VMEbus Device Drivers

This manual contains information systems engineers need to write device drivers that operate on the VMEbus. It describes VMEbus-specific topics, including VMEbus architecture and routines that VMEbus device drivers use.

Writing Network Device Drivers

This manual contains information that systems engineers need to write network device drivers that operate on any bus.

Writing a Graphics Device Driver and DDX for the Tru64 UNIX X Server

This manual describes how to add graphics device support to the X Window System on systems running the Tru64 UNIX operating system.

Guide to Preparing Product Kits

This manual describes how to create kernel (device driver) product kits. It provides the information that kit developers need to produce kernel products and layered product kits.

This is the same manual that is included in the Developer's Kit of the Tru64 UNIX documentation set.

Installation Instructions and Release Notes

This manual explains how to install the Device Driver Kit Version 2.0 product, including source code with sample drivers and user manuals. It also describes changes to the product and documentation since Device Driver Kit Release 1.0.

A

Documentation Listings

This appendix lists the core and supplementary components of the Tru64 UNIX documentation.

A.1 Components of the Tru64 UNIX and TruCluster Server Printed Documentation Kits

The following sections list the contents of the Tru64 UNIX and TruCluster Server documentation kits.

A.1.1 Tru64 UNIX Documentation Kit

The documentation in the following list comprises the Tru64 UNIX Documentation Kit (QA-6ADAA-GZ). Except where indicated, this documentation is also provided on the Documentation CD-ROM. See Section 1.5 for information about the printed documentation.

Startup Kit (QA-6ADAC-GZ)

Release Notes for Version 5.1A
Tru64 UNIX *Technical Overview for Version 5.1A*
Documentation Overview for Version 5.1A
Installation Guide
Installation Guide — Advanced Topics
Full Installation Quick Start Card (printed only)
Update Installation Quick Reference Card (printed only)
Quick Reference Card (printed only)
Tru64 UNIX Version 5.1A CD–ROMs (printed only)

General User Documentation Kit (QA-6ADAD-GZ)

CDE Companion
Command and Shell User's Guide
Master Index
Security

System and Network Management Documentation Kit (QA-6ADAE-GZ)

AdvFS Administration
Managing Online Addition and Removal
Guide to Prestoserve
Kernel Debugging
Logical Storage Manager
Network Administration: Connections

Network Administration: Services
Sharing Software on a Local Area Network
Software License Management
System Administration
System Configuration and Tuning
System Configuration Supplement: OEM Platforms
X Window System Administrator's Guide (printed only)
X Window System Environment

Developer's Kit (QA-6ADAF-GZ)

Assembly Language Programmer's Guide
Asynchronous Transfer Mode
Calling Standard for Alpha Systems
Compaq C Language Reference Manual
Guide to the POSIX Threads Library
Guide to Preparing Product Kits
Guide to Realtime Programming
Network Programmer's Guide
OSF/Motif Programmer's Guide (printed only)
OSF/Motif Style Guide (printed only)
Programmer's Guide
Programmer's Guide: STREAMS (printed only)
Programming Support Tools
Programming with ONC RPC
Writing Kernel Modules
Writing Software for the International Market

A.1.2 TruCluster Server Documentation Kit

The documentation in the following list comprises the TruCluster Server Documentation Kit (QA-6BRAA-GZ). This documentation is also provided on the Documentation CD-ROM. See Section 1.6.1 for more information.

Cluster Administration
Cluster Hardware Configuration
Cluster Highly Available Applications
Cluster Installation
Cluster LAN Interconnect
Cluster Release Notes
Cluster Technical Overview

A.2 Supplementary Documentation on the Documentation CD–ROM

The documentation in the following list is provided on the Tru64 UNIX Documentation CD–ROM.

Advanced Printing Software *User Guide*
BIND Configuration File Guide
DECevent Translation and Reporting Utility
How to Order Tru64 UNIX Documentation
Java Documentation

Ladebug Debugger Manual
New and Changed Features from Prior Releases
Object File and Symbol Table Format Specification
Performance Manager
Safety & Comfort Guide
sendmail Installation and Operation Guide

Common Desktop Environment documentation

Common Desktop Environment: Advanced User's and System Administrator's Guide
Common Desktop Environment: Application Builder User's Guide
Common Desktop Environment: Desktop KornShell User's Guide
Common Desktop Environment: Help System Author's and Programmer's Guide
Common Desktop Environment: Internationalization Programmer's Guide
Common Desktop Environment: Product Glossary
Common Desktop Environment: Programmer's Guide
Common Desktop Environment: Programmer's Overview
Common Desktop Environment: Style Guide and Certification Checklist
Common Desktop Environment: ToolTalk Messaging Overview
Common Desktop Environment: User's Guide
ToolTalk Reference Manual
ToolTalk User's Guide

Technical references for Asian languages

Technical Reference for Using Chinese Features
Technical Reference for Using Japanese Features
Technical Reference for Using Korean Features
Technical Reference for Using Thai Features

X Windows documentation

Inter-Client Communication Conventions Manual
X Toolkit Intrinsics — C Language Interface
X Logical Font Description Conventions
Xlib — C Language X Interface
X Window System Protocol
X Window System: The Complete Reference to Xlib, X Protocol, ICCCM, XFLD

A.3 Alphabetical Listing of Core, Supplementary, and TruCluster Server Documentation

Table A–1 provides an alphabetical listing of the documentation that is included in the Tru64 UNIX and TruCluster Server documentation kits and on the Tru64 UNIX Documentation CD–ROM.

Table A–1: Alphabetical Listing of Core, Supplementary, and TruCluster Server Documentation

Title	On Line	Printed
Advanced Printing Software *User Guide*	Yes	No
AdvFS Administration	Yes	Yes
Assembly Language Programmer's Guide	Yes	Yes
Asynchronous Transfer Mode	Yes	Yes
BIND Configuration File Guide	Yes	No
Calling Standard for Alpha Systems	Yes	Yes
CDE Companion	Yes	Yes
Cluster Administration	Yes	Yes
Cluster Hardware Configuration	Yes	Yes
Cluster Highly Available Applications	Yes	Yes
Cluster Installation	Yes	Yes
Cluster LAN Interconnect	Yes	Yes
Cluster Release Notes	Yes	Yes
Cluster Technical Overview	Yes	Yes
Command and Shell User's Guide	Yes	Yes
Common Desktop Environment: Advanced User's and System Administrator's Guide	Yes	No
Common Desktop Environment: Application Builder User's Guide	Yes	No
Common Desktop Environment: Desktop KornShell User's Guide	Yes	No
Common Desktop Environment: Help System Author's and Programmer's Guide	Yes	No
Common Desktop Environment: Internationalization Programmer's Guide	Yes	No
Common Desktop Environment: Product Glossary	Yes	No
Common Desktop Environment: Programmer's Guide	Yes	No
Common Desktop Environment: Programmer's Overview	Yes	No
Common Desktop Environment: Style Guide and Certification Checklist	Yes	No
Common Desktop Environment: ToolTalk Messaging Overview	Yes	No
Common Desktop Environment: User's Guide	Yes	No

Table A–1: Alphabetical Listing of Core, Supplementary, and TruCluster Server Documentation (cont.)

Title	On Line	Printed
Compaq C Language Reference Manual	Yes	Yes
DECevent Translation and Reporting Utility	Yes	No
Documentation Overview for Version 5.1A	Yes	Yes
Full Installation Quick Start Card	No	Yes
Guide to Preparing Product Kits	Yes	Yes
Guide to Prestoserve	Yes	Yes
Guide to Realtime Programming	Yes	Yes
Guide to the POSIX Threads Library	Yes	Yes
How to Access Tru64 UNIX Documentation	No	Yes
How to Order Tru64 UNIX Documentation	Yes	No
Installation Guide	Yes	Yes
Installation Guide — Advanced Topics	Yes	Yes
Inter-Client Communication Conventions Manual	Yes	No
Java Documentation	Yes	No
Kernel Debugging	Yes	Yes
Ladebug Debugger Manual	Yes	No
Logical Storage Manager	Yes	Yes
Managing Online Addition and Removal	Yes	Yes
Master Index	Yes	Yes
Network Administration: Connections	Yes	Yes
Network Administration: Services	Yes	Yes
Network Programmer's Guide	Yes	Yes
New and Changed Features from Prior Releases	Yes	No
Object File and Symbol Table Format Specification	Yes	No
OSF/Motif Programmer's Guide	No	Yes
OSF/Motif Style Guide	No	Yes
Performance Manager	Yes	No
Programmer's Guide	Yes	Yes
Programmer's Guide: STREAMS	No	Yes

Table A–1: Alphabetical Listing of Core, Supplementary, and TruCluster Server Documentation (cont.)

Title	On Line	Printed
Programming Support Tools	Yes	Yes
Programming with ONC RPC	Yes	Yes
Quick Reference Card	No	Yes
Release Notes for Version 5.1A	Yes	Yes
Safety & Comfort Guide	Yes	No
Security	Yes	Yes
sendmail Installation and Operation Guide	Yes	No
Sharing Software on a Local Area Network	Yes	Yes
Software License Management	Yes	Yes
System Administration	Yes	Yes
System Configuration and Tuning	Yes	Yes
System Configuration Supplement: OEM Platforms	Yes	Yes
Tru64 UNIX *Technical Overview for Version 5.1A*	Yes	Yes
Technical Reference for Using Chinese Features	Yes	No
Technical Reference for Using Japanese Features	Yes	No
Technical Reference for Using Korean Features	Yes	No
Technical Reference for Using Thai Features	Yes	No
ToolTalk Reference Manual	Yes	No
ToolTalk User's Guide	Yes	No
Tru64 UNIX Version 5.1A CD–ROMs	No	Yes
Update Installation Quick Reference Card	No	Yes
Writing Kernel Modules	Yes	Yes
Writing Software for the International Market	Yes	Yes
Xlib — C Language X Interface	Yes	No
X Logical Font Description Conventions	Yes	No
X Toolkit Intrinsics — C Language Interface	Yes	No
X Window System Administrator's Guide	No	Yes
X Window System Environment	Yes	Yes

Table A–1: Alphabetical Listing of Core, Supplementary, and TruCluster Server Documentation (cont.)

Title	On Line	Printed
X Window System Protocol	Yes	No
X Window System: The Complete Reference to Xlib, X Protocol, ICCCM, XFLD	Yes	No

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