HP-UX 11i Version 2 Release Notes

HP Integrity Servers and HP Workstations

Manufacturing Part Number: 5992-2854
October 2003, Edition 3

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Acknowledgements

This product includes software developed by the Apache Software Foundation. This documentation is based on information from the Apache SoftwareFoundation (**http://www.apache.org**).

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (**http://www.openssl.org**).

This product includes cryptographic software written by Eric Young (**eay@cryptsoft.com**).

This product includes PHP, freely available from the PHP Group (**http://www.php.net**).

This product includes software developed by the OpenLDAP Project (**http://www.openldap.org**).

Publication History

The manual's publication date and part number indicate its current edition. The publication date changes when a new edition is released. The manual part number changes when extensive changes are made.

To ensure that you receive the new editions, you should subscribe to the appropriate product support service. See your HP sales representative for details.

- *HP-UX 11i Version 2 Release Notes*

  October 2003, Edition 3, 5992-2854

  Instant Information DVD and Web at **http://www.docs.hp.com**

- *HP-UX 11i Version 2 Release Notes*

  October 2003, Edition 2, 5990-6737 (retired)

  Instant Information DVD and Web at **http://www.docs.hp.com**

- *HP-UX 11i Version 2 Release Notes*

  September 2003, Edition 1, 5187-2723 (retired)

  Instant Information DVD and Web at **http://www.docs.hp.com**

The new edition of this manual incorporates corrections and additions to the previous edition. For the latest version, see the HP-UX 11i Version 2 documentation on the Web at **http://www.docs.hp.com/hpux/os/11iV2**.

Please direct comments regarding this guide to:

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Typographic Conventions

We use the following typographical conventions.

audit (5)	An HP-UX manpage. *audit* is the name and 5 is the section in the *HP-UX Reference*. On the Web and on the Instant Information media, it may be a hot link to the manpage itself. From the HP-UX command line, enter "`man audit`" or "`man 5 audit`" to view the manpage. See *man* (1).
Book Title	The title of a book. On the Web and on the Instant Information media, it may be a hot link to the book itself.
Emphasis	Text that is emphasized.
Emphasis	Text that is strongly emphasized.
`ComputerOut`	Text displayed by the computer.
`Command`	A command name or qualified command phrase.
`Computer`	`Computer font` indicates literal items displayed by the computer. For example: `file not found`
`Filename`	Text that shows a filename and/or filepath.
`UserInput`	Commands and other text that you type.
`Variable`	The name of a variable that you may replace in a command or function or information in a display that represents several possible values.
`[ ]`	The contents are optional in formats and command descriptions.
`{ }`	The contents are required in formats and command descriptions. If the contents are a list separated by `|`, you must choose one of the items
. . .	The preceding element may be repeated an arbitrary number of times.
|	Separates items in a list of choices.

Contents

7. Security

8. Commands and System Calls

9. Libraries and Programming

1 Overview of the Release Notes

What's in This Chapter?

The purpose of this chapter is to help you use these release notes along with related HP-UX documentation effectively. The following topics are covered in this overview:

What's the Purpose of HP-UX Release Notes?

The *HP-UX 11i Version 2 Release Notes* document describes what is new, changed, or obsolete in this release (Release ID B.11.23) as compared to the HP-UX 11i v1.6 (B.11.22) release. These release notes apply only to features that are part of the HP-UX 11i v2 Operating Environments.

As with other HP-UX system release notes, the *HP-UX 11i Version 2 Release Notes* does not completely document all the features of this release. Instead, it contains high-level information and pointers to more detailed operating system and product-specific documentation. Where appropriate, it also notes changes in the support of products.

Additional product-specific release notes are often located in the `/opt` directory, in sub-directories named *`[name]`*`/newconfig/RelNotes` (where *`name`* represents the name of the product). For example, Distributed Computing Environment (DCE) release notes are loaded in the `/opt/dce/newconfig/RelNotes` directory.

Where Should I Begin?

This document contains information about the initial (October 2003) HP-UX 11i v2 release. It describes what has been added, changed, and deleted in relation to the HP-UX 11i v1.6 release.

It is recommended that you proceed to "What's New in This Release" on page 19 to acquaint yourself with a general view of the HP-UX 11i v2 release. There you can obtain an overview of Operating Environment contents, as well as a table of features that are new, have changed, or have been deprecated or obsoleted.

HP-UX system release notes can be found in the following locations:

- The HP-UX Instant Information media. See "HP-UX 11i v2 Instant Information DVD" on page 16 for more information.
- At the Web site **http://www.docs.hp.com/hpux/os/11iV2/**.

Be sure to consult the version most appropriate to your release. If you are concerned with just the initial (October 2003) release of HP-UX 11i v2, consult the *HP-UX 11i Version 2 Release Notes*. If, on the other hand, you are concerned about an update of the initial release, then you should begin with the *Release Notes* version appropriate to that release. For instance, the *HP-UX 11i Version 2 March 2004 Release Notes* would be most appropriate to the March 2004 update release.

For details on performing an installation, be sure to review the appropriate *HP-UX 11i Version 2 Installation and Update Guide* at the above Web site.

For critical, late-breaking cold-install and update issues not in the *HP-UX 11i Version 2 Installation and Update Guide*, you should also review the media booklet, *Read Before Installing or Updating to HP-UX 11i Version 2*, which is also available at the above Web site.

NOTE The most current version of these documents, as well as most HP documentation, can always be found at **http://www.docs.hp.com/**.

Information about the HP-UX 11i v1.6 release is available on the Web at

http://www.docs.hp.com/hpux/os/11iV1.6/

Additionally, you may want to familiarize yourself with the HP-UX 11i v1 release. This information is available on the Web at

http://www.docs.hp.com/hpux/os/11i/

Locating Release Notes for Previous Versions of HP-UX

Release notes are found in the following locations:

- HP-UX Instant Information DVD. See “HP-UX 11i v2 Instant Information DVD” on page 16 for more information.
- The `/usr/share/doc/` directory of your HP-UX 11i v2 system. Please note, however, that the latest editions may not be contained in this directory and are instead located at **`http://www.docs.hp.com/`**.
- The HP Documentation Site at **`http://www.docs.hp.com/`**. Here you will find release notes pertinent to all previous releases of HP-UX, as well as release notes for various individual products.

  See “The HP Documentation Web Site” on page 16 for more information.

Other Sources of Information about This Release

In addition to the *HP-UX 11i Version 2 Release Notes*, you have many other sources of information related to the HP-UX 11i v2 release available to you on the Web at

http://www.docs.hp.com/hpux/os/11iV2

The following documents, which are found at this Web site, may be of particular interest:

Getting Started with Software Package Builder, MPN **5187-3646**

HP-UX 11i Version 2 Installation and Update Guide, MPN **5187-2725**

HP-UX 11i Version 2 Reference, MPN **B2355-60103**

HP-UX Networking Ports Reference Guide, MPN **5187-4242**

HP-UX System Partitions Guide, MPN **5971-4742**

Ignite-UX Administrator's Guide, Edition 11, MPN **B2355-90788**

Managing Systems and Workgroups, Edition 6, MPN **5187-2216**

Read Before Installing or Updating to HP-UX 11i Version 2, MPN **5187-2734**

Software Distributor Administrator's Guide, MPN **B2355-90789**

Some or all of these documents are available on the Instant Information DVD and in printed form.

Of additional interest is the following document, which can be found in the "Networking and Communications" section of **http://docs.hp.com**:

HP-UX Networking Ports Reference Guide, MPN **5187-4242**

Additionally, the following Web sites may be of interest in obtaining a variety of information regarding the HP-UX 11i v2 release:

HP Integrity Servers: **http://www.hp.com/products1/servers/integrity**

Intel® Itanium®-based Workstations:
http://www.hp.com/workstations/itanium/index.html

Product Manuals:
http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp?locale=en_US&contentType=SupportManual&docIndexId=179166

HP Software Depot: **http://software.hp.com**

HP Software Releases and Media: **http://www.software.hp.com/RELEASES-MEDIA**

Software Availability Matrix: **http://software.hp.com/MATRIX**

IT Resource Center (ITRC): **http://itrc.hp.com**

Developer & Solution Partner Program (DSPP): **http://h21007.www2.hp.com/dev**

HP-UX 11i v2 Instant Information DVD

The Instant Information media provides HP-UX documentation on DVD. With this DVD, documentation supporting the release can be accessed before the software is installed. The Instant Information DVD provides improved online presentation, print quality and search capabilities.

HP-UX Welcome Page

The HP-UX Welcome Page on your HP-UX 11i v2 system contains pointers to information that will help you use your HP-UX system.

Manual Pages

For the HP-UX 11i v2 release, the manual pages (manpages) are available on the HP-UX Welcome Page of your system, on the Instant Information DVD under the title *HP-UX Reference*, through the use of the `man` command, and on the Web at

`http://www.docs.hp.com/hpux/os/11iV2/index.html#HP-UX%20Reference%20%28Manpages%29`

White Papers on HP-UX

White papers associated with the HP-UX 11i v2 release are available at

`http://www.docs.hp.com/hpux/os/11iV2`

Other white papers, including an HP-UX 11i v2 overview, can be found at the HP-UX Information Library at

`http://www.hp.com/products1/unix/operating/infolibrary/index.html`

README Documents

README documents are media booklets that contain information about the installation process that may not appear in the *HP-UX 11i Version 2 Installation and Configuration Guide*. Any product contained in the release may have a README document, so several README documents may be included. The README document specific for HP-UX 11i v2 is included with your media kit.

The HP Documentation Web Site

Hewlett-Packard provides a Web site where the latest HP-UX documentation and updates are available. This Web site is found at

`http://www.docs.hp.com/`

What's in the Remaining Chapters?

The remaining chapters of these release notes:

- Chapter 2, "What's New in This Release," on page 19, provides a quick overview of the new and changed features of each of the five Operating Environments, along cross-references to other, more detailed sections of this book.
- Chapter 3, "Workstation- and Server-Specific Information," on page 39, presents information regarding supported systems, networking and mass storage cards and drivers, and information that is server or workstation specific.
- Chapter 4, "General System Administration," on page 57, includes information of particular interest to system administrators.
- Chapter 5, "Disk and File Management," on page 109, presents information regarding directory, file system and disk management including Logical Volume Manager (LVM) and VERITAS Volume and File Managers (VxVM and VxFS).
- Chapter 6, "Internet and Networking," on page 123, covers changes to networking functionality and internet services.
- Chapter 7, "Security," on page 173, covers changes and enhancements to security services.
- Chapter 8, "Commands and System Calls," on page 191, includes information about new and changed commands and system calls.
- Chapter 9, "Libraries and Programming," on page 201, covers a wide variety of changes of particular interest to programmers, including changes to compilers, editors, and libraries.
- Chapter 10, "Internationalization," on page 235, presents information about text fonts and converters relating to various international languages.
- Chapter 11, "Other Functionality," on page 245, includes additional applications or functionality in the Operating Environments.

2 What's New in This Release

What's in This Chapter?

This chapter provides an overview of the new, changed, and deprecated/obsoleted features of each of the five Operating Environments, along with cross-references to other, more detailed sections of this book. The following topics are covered:

Welcome to HP-UX 11i Version 2

HP-UX 11i version 2 is the newest release of HP-UX 11i for the Intel®Itanium® architecture. This enterprise release offers a full range of HP-UX Operating Environments, including systems management and high-availability software products. Itanium®-based systems offer significantly better price/performance and performance scalability than systems based on current architectures, and HP-UX 11i v2 provides the best way to preserve your investment through the transition from Precision Architecture Reduced Instruction Set Computing (PA-RISC) systems to Itanium-based systems.

Hewlett-Packard's enterprise computing business has carefully planned the transition to Itanium-based systems, placing a premium on customer and partner investment protection. HP-UX 11i v2 maintains compatibility with HP-UX 11i v1 on PA-RISC through:

- Common “look and feel”
- Application Build Environment compatibility (source code compatibility)
- Data compatibility
- Binary compatibility

HP-UX 11i v2 offers these industry firsts for Itanium-based systems:

- Support for HP-UX 11i, Linux, and Windows running in separate hardware-based partitions on the same computer
- 64-way performance scaling
- iCOD (Instant Capacity on Demand) and Pay-Per-Use

HP-UX 11i v2 brings to Itanium-based systems the full power of HP-UX 11i, the #1 rated UNIX operating system in the world (DH Brown 2002 UNIX OS Review; see **`http://www.hp.com/hpinfo/newsroom/press/2002/020530b.html`**). HP-UX 11i version 2 on Itanium takes its place alongside HP-UX 11i version 1 on PA-RISC as an industry mainstay for mission critical enterprise applications.

HP-UX 11i Release Names and Release Identifiers

Each HP-UX 11i release has an associated release name and release identifier. The *uname* (1) command with the `-r` option returns the release identifier. The following table shows the releases currently available for HP-UX 11i.

Table 2-1 HP-UX 11i Releases

Release Identifier	Release Name	Supported Processor Architecture
B.11.11	HP-UX 11i v1	PA-RISC
B.11.20	HP-UX 11i v1.5	Itanium-based
B.11.22	HP-UX 11i v1.6	Itanium-based
B.11.23	HP-UX 11i v2	Itanium-based

You can also determine the update release date and the Operating Environment by entering the following:

```
# swlist | grep HPUX11i
```

The resulting output will list the current release identifier, update release date, and Operating Environment. For example:

```
HPUX11i-TCOE            B.11.23.0403 HP-UX Technical Computing Operating
Environment Component
```

In the above, the revision string shows:

`B.11.23` = HP-UX 11i v2

`0403` = March 2004 Update Release

HP-UX 11i v2 Software and Driver Bundle Types

The HP-UX 11i v2 media contains all of the software and network driver bundles for your system to run the latest version of HP-UX 11i v2. Additional software and network driver bundles are included, which you may choose to either select or unselect prior to install or update. HP-UX 11i v2 contains three types of bundles:

- **Always-Installed**: Software and network driver bundles required by HP-UX 11i v2. Other always-installed bundles are also included as part of your operating environment. Examples include the core OS bundles, some software bundles, and some network and mass-storage drivers.
- **Default-Installed**: Software bundles that are installed by default. You can manually de-select the bundles before you install or update system. Examples include Mozilla Application Suite and the HP-UX Web Server Suite bundles.
- **Selectable**: Software bundles that are *not* installed or updated by default. You must manually select these bundles before you install or update your system. Examples include Ignite-UX and security.

For a detailed list of the always-installed, default-installed, and selectable bundles, see Appendix D of the *HP-UX 11i Version 2 Installation and Update Guide*, available at **`http://www.docs.hp.com`**.

HP-UX 11i v2 Operating Environments

Overview

Operating Environments (OEs) are tested and integrated application bundles designed to work with the operating system and provide the functionality needed for your system's purpose. The following lists the currently available HP-UX 11i v2 OEs:

- **HP-UX 11i v2 Foundation OE (FOE)** — Designed for the demands of Web servers, content servers and front-end servers, this OE includes applications such as HP-UX Web Server Suite, Java, and Mozilla Application Suite. This OE is bundled as `HPUX11i-OE`. For more details, see "HP-UX 11i v2 Foundation OE (FOE)" on page 24.
- **HP-UX 11i v2 Enterprise OE (EOE)** — Designed for database application servers and logic servers, this OE contains the HP-UX 11i v2 Foundation OE bundles and additional applications such as GlancePlus Pak to enable an enterprise-level server. This OE is bundled as `HPUX11i-OE-ENT`. For more details, see "HP-UX 11i v2 Enterprise OE (EOE)" on page 25.
- **HP-UX 11i v2 Mission Critical OE (MCOE)** — Designed for the large, powerful back-end application servers and database servers that access customer files and handle transaction processing, this OE contains the Enterprise OE bundles, plus applications such as MC/ServiceGuard and Workload Manager to enable a mission-critical server. This OE is bundled as `HPUX11i-OE-MC`. For more details, see "HP-UX 11i v2 Mission Critical OE (MCOE)" on page 26.
- **HP-UX 11i v2 Minimal Technical OE (MTOE)** — Designed for workstations running HP-UX 11i v2, this OE is provided at no charge and includes the Mozilla Application Suite, Perl, VxVM, and Judy applications, plus the OpenGL Graphics Developer's Kit. This OE is bundled as `HPUX11i-MTOE`. For more details, see "HP-UX 11i v2 Minimal Technical OE (MTOE)" on page 26.
- **HP-UX 11i v2 Technical Computing OE (TCOE)** — Designed for both compute-intensive workstation and server applications, this OE contains the MTOE bundles plus extensive graphics applications and Math Libraries. This OE is bundled as `HPUX11i-TCOE`. For more details, see "HP-UX 11i v2 Technical Computing OE (TCOE)" on page 27.

The following table details the supported Operating Environments for HP Servers and Workstations:

Table 2-2 Supported Operating Environments for Servers & Workstations

	FOE	EOE	MCOE	MTOE	TCOE[a]
HP Commercial Servers	X	X	X		X
HP Workstations				X	X

a. Can be purposed as either a workstation or compute-intensive technical server.

HP-UX 11i v2 Foundation OE (FOE)

The HP-UX 11i v2 Foundation Operating Environment is the standard OE from which the Enterprise OE and Mission Critical OE have been derived by adding appropriate applications. The HP-UX 11i v2 Foundation OE includes the base 64-bit HP-UX operating system, plus the following features. ("New/Changed Features at a Glance" on page 29 details which of these features are new or have changed.)

Always-Installed Features

- Event Monitoring Service
- FDDI (PCI)
- FibreChannel (PCI)
- Gigabit Ethernet (PCI)
- Gigabit Ethernet Next Generation (PCI)
- HP CIFS Client
- HP CIFS Server
- HP WBEM Services for HP-UX
- HP-UX Kernel Configuration
- iEther (PCI)
- instant Capacity on Demand
- Logical Volume Manager
- nPartition Provider
- ONC+
- Online Diagnostics
- PAM Kerberos
- Peripheral Device Tool
- Runtime Plug-in (JPI) for Netscape/Mozilla for the Java™ 2 Platform v1.3 and v1.4
- SCSI U320-00
- Software Distributor
- SWGETTOOLS
- Update-UX
- VERITAS File System (base VxFS/JFS)
- VERITAS Volume Manager (base)

Default-Installed Features

- GTK+ Libraries
- HP-UX Bastille
- HP-UX IPFilter
- HP-UX Secure Shell
- HP-UX Web Server Suite (including HP-UX Apache-based Web Server, HP-UX Tomcat-based Servlet Engine, HP-UX Webmin-based Admin, and HP-UX XML Web Server Tools)
- Install-Time Security
- Java SDK v1.3 and v1.4
- Judy Libraries
- Mozilla Application Suite
- Mozilla Source
- MySQL
- Netscape 7
- Partition Manager
- Perl
- Runtime Environment (RTE) for the Java™ 2 Platform v1.3 and v1.4

- Security Patch Check
- Servicecontrol Manager

Selectable Features

- ATM-00
- HP-UX Host Intrusion Detection System (HIDS) (servers only)
- HP-UX Install Utilities
- HyperFabric
- Ignite-UX
- Java (Out of Box) Tunable
- Pay Per Use
- PCI MUX
- Security Level 10
- Security Level 20
- Security Level 30
- Software Package Builder
- Token Ring

HP-UX 11i v2 Enterprise OE (EOE)

The HP-UX 11i v2 Enterprise Operating Environment (EOE) is targeted especially for database application servers and logic servers. In addition to the features found in the HP-UX 11i v2 Foundation Operating Environment (described in "HP-UX 11i v2 Foundation OE (FOE)" on page 24), the Enterprise OE includes the following additional features. ("New/Changed Features at a Glance" on page 29 details which of these features are new or have changed.)

Always-Installed Features

- Event Monitoring Service
- MirrorDisk/UX
- VERITAS File System (full VxFS/OnlineJFS v3.5)
- GlancePlus Pak
- HP Process Resource Manager

Default-Installed Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

Selectable Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

HP-UX 11i v2 Mission Critical OE (MCOE)

The HP-UX 11i v2 Mission Critical Operating Environment (MCOE) is a high-availability Operating Environment for HP servers. In addition to the features found in the Foundation and Enterprise operating environments, the Mission Critical OE includes the following features. ("New/Changed Features at a Glance" on page 29 details which of these features are new or have changed.)

Always-Installed Features

- Enterprise Cluster Master Toolkit
- MC/ServiceGuard
- MC/ServiceGuard NFS Toolkit
- Cluster Object Manager
- Workload Manager
- Workload Manager Toolkits

Default-Installed Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

Selectable Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

HP-UX 11i v2 Minimal Technical OE (MTOE)

The Minimal Technical Operating Environment (MTOE) is the smallest and most fundamental OE that is defined specifically for HP workstations. It exists to offer an HP-UX 11i v2 solution to the customer who is interested in a low-cost HP Workstation and a correspondingly basic Operating Environment. The Minimal Technical Operating Environment is directed to the Workstation OEM market and to those customers for whom the Technical Computing Operating Environment (TCOE) is not a suitable solution.

The MTOE contains all the base functionality that is common to the other four OEs, including the base 64-bit HP-UX operating system, network drivers, and some of the other always-installed features. However, compared to the Technical Computing Operating Environment, the set of additional features is greatly reduced.

The HP-UX 11i v2 Minimal Technical Operating Environment includes the following features. ("New/Changed Features at a Glance" on page 29 details which of these features are new or have changed.)

Always-Installed Features

- Event Monitoring Service
- FDDI (PCI)
- FibreChannel (PCI)
- Gigabit Ethernet (PCI)
- Gigabit Ethernet Next Generation (PCI)
- HP WBEM Services for HP-UX
- HP-UX Kernel Configuration
- iEther (PCI)

- instant Capacity on Demand
- nPartition Provider
- ONC+
- Online Diagnostics
- OpenGL
- Peripheral Device Tool
- SCSI U320-00
- Software Distributor
- Technical System Configuration (TechSysConf)
- SWGETTOOLS
- Update-UX
- USB
- VERITAS File System (base VxVS/JFS)
- VERITAS Volume Manager (base)

Default-Installed Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

Selectable Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

HP-UX 11i v2 Technical Computing OE (TCOE)

Like the Minimal Technical Operating Environment, the Technical Computing Operating Environment (TCOE) contains all the base functionality that is common to the other four OEs, including the base 64-bit HP-UX operating system, network drivers, and other always-installed functionality. While it is *not* a superset of the Foundation 11i v2 OE, it *is* a superset of the Minimal Technical OE. Unlike the Minimal Technical OE, however, the Technical Computing OE is available on both technical servers and workstations.

In addition to the features found in the HP-UX 11i v2 Minimal Technical OE, the HP-UX 11i v2 Technical Computing OE includes the following features. ("New/Changed Features at a Glance" on page 29 details which of these features are new or have changed.)

Always-Installed Features

- HP CIFS Client
- HP CIFS Server
- PAM Kerberos
- Runtime Plug-in (JPI) for Netscape/Mozilla for the Java™ 2 Platform v1.3 and v1.4
- HP 3D Technology for the Java™ 2 Platform
- HP MLIB
- HP Message Passing Interface (MPI)

Default-Installed Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

Selectable Features

- See "HP-UX 11i v2 Foundation OE (FOE)" on page 24

New/Changed Features at a Glance

The following table lists the features and applications that are new, have changed, or have been deprecated or obsoleted. For further information, consult the corresponding section in the remainder of this document.

The table's columns signify the following:

Feature An alphabetical listing of new, changed, or deprecated/obsoleted features and applications.

IM Installation Method: "AI" = Always Installed; "DI" = Default Installed; "S" = Selectable.

FOE Foundation Operating Environment

EOE Enterprise Operating Environment

MCOE Mission Critical Operating Environment

MTOE Minimum Technical Operating Environment

TCOE Technical Computing Operating Environment

Table 2-3 New/Changed Operating Environment Features

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
100Base-T (see page 41)	AI	X	X	X	X	X
1000Base-T (Gigabit Ethernet) (see page 41)	AI	X	X	X	X	X
400K File Descriptors (see page 202)	AI	X	X	X	X	X
Adaptive Address Space (AAS) (see page 205)	AI	X	X	X	X	X
Absolute Debugger (adb) (see page 207)	AI	X	X	X	X	X
Aries Binary Translator (see page 206)	AI	X	X	X	X	X
ATI FireGL (see page 50)	AI				X	X[b]
ATM-00 (see page 43)	S	X	X	X	X	X
AutoFS (see page 110)	AI	X	X	X	X	X
Automounter (Obsolete) (see page 112)	n/a	n/a	n/a	n/a	n/a	n/a
BIND 9.2.0 (see page 135)	AI	X	X	X	X	X
Boot Authentication (see page 174)	AI	X	X	X	X	X
Buffer Cache Tunable Parameters: `nbuf`, `bufpages`, `bufcache_max_pct`, `dbc_min_pct`, `dbc_max_pct` (Deprecated) (see "File Systems Tunable Parameters" on page 66)	n/a	n/a	n/a	n/a	n/a	n/a

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
C99 Support for HP-UX System C Library (libc) (see page 224)	AI	X	X	X	X	X
ccNUMA (see page 246)	AI	X	X	X	X	X
Common Desktop Environment (CDE) (see page 249)	AI	X	X	X	X	X
Compressed Dump (see page 59)	AI	X	X	X	X	X
Dynamic Host Configuration Protocol (DHCP) v6 (see page 136)	AI	X	X	X	X	X
Diagnostics (see page 60)	AI	X	X	X	X	X
Distributed Computing Environment (DCE) (see page 253)	AI	X	X	X	X	X
Dynamic Loader (dld.so) (see page 211)	AI	X	X	X	X	X
Enterprise Cluster Master Toolkit (see page 64)	AI			X		
The envd Environment Daemon (see page 192)	AI	X	X	X	X	X
Event Monitoring Service (EMS) (see page 64)	AI	X	X	X	X	X
Fibre Channel Tachlite (see page 48)	AI	X	X	X	X	X
File Descriptor Allocation (see page 213)	AI	X	X	X	X	X
File Systems Tunable Parameters (see page 66)	AI	X	X	X	X	X
gated (see page 137)	AI	X	X	X	X	X
Generic Security Service Application Programming Interface (GSS-API) (see page 175)	AI	X	X	X	X	X
GlancePlus Pak (see page 68)	AI		X	X		
The groupadd, groupdel, groupmod, useradd, userdel, usermod Commands (see page 192)	AI	X	X	X	X	X
GTK+ Libraries (see page 214)	DI	X	X	X	X	X
HP 3D Technology for the Java 2 Platform (see page 226)	AI					X
HP aC++ Compiler (see page 214)	AI	X	X	X	X	X
HP C Compiler (see page 216)	AI	X	X	X	X	X
HP Caliper (see page 70)	AI	X	X	X	X	X

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
HP CIFS Client (see page 113)	AI	X	X	X		X
HP CIFS Server (see page 114)	AI	X	X	X		X
HP Fortran (see page 218)	AI	X	X	X	X	X
HP Kernel Debugger (KWDB) (see page 208)	AI	X	X	X	X	X
HP Math Library (libm) (see page 219)	AI	X	X	X	X	X
HP Message Passing Interface (MPI) (see page 220)	AI					X
HP MLIB (see page 222)	AI					X
HP OSI Transport Services/9000 (see page 125)	AI	X	X	X	X	X
HP Process Resource Manager (see page 72)	AI		X	X		
HP WBEM Services for HP-UX (see page 81)	AI	X	X	X	X	X
HP Wildebeest Debugger (WDB) (see page 209)	AI	X	X	X	X	X
HP-UX Auditing System (see page 176)	AI	X	X	X	X	X
HP-UX Apache-based Web Server (see page 130)	DI	X	X	X	X	X
HP-UX Bastille (see page 177)	DI	X	X	X	X	X
HP-UX C Library (libc) (see page 223)	AI	X	X	X	X	X
HP-UX Data Link Provider Interface (DLPI) (see page 126)	AI	X	X	X	X	X
HP-UX Host Intrusion Detection System (HIDS) (see page 179)	S	X	X	X		X
HP-UX IPFilter (see page 180)	DI	X	X	X	X	X
HP-UX Kernel Configuration (see page 83)	AI	X	X	X	X	X
HP-UX nPartition Configuration Commands (see page 73)	AI	X	X	X	X	X
HP-UX Peripheral Devices (pdweb) (see page 85)	AI	X	X	X	X	X
HP-UX Processor Sets (see page 75)	AI	X	X	X	X	X
HP-UX Secure Shell (see page 181)	DI	X	X	X	X	X
HP-UX Tomcat-based Servlet Engine (see page 132)	DI	X	X	X	X	X
HP-UX Web Server Suite (see page 128)	DI	X	X	X	X	X

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
HP-UX Webmin-based Admin (see page 133)	DI	X	X	X	X	X
HP-UX Workload Manager (see page 76)	AI			X		
HP-UX Workload Manager Toolkits (see page 78)	AI			X		
HP-UX XML Web Server Tools (see page 133)	DI	X	X	X	X	X
HyperFabric (see page 44)	S	X	X	X	X	X
Instant Capacity on Demand (iCOD) (see page 52)	AI	X	X	X	X	X
Ignite-UX (see page 87)	S	X	X	X	X	X
inetd (see page 138)	AI	X	X	X	X	X
The insf, lssf, mksf Commands (see page 195)	AI	X	X	X	X	X
Install-Time Security (see page 182)	DI	X	X	X	X	X
Internationalization (see page 235)	AI	X	X	X	X	X
Internet Services (see page 134)	AI	X	X	X	X	X
Interrupt Migration (see page 88)	AI	X	X	X	X	X
INTL100 (see page 45)	S	X	X	X	X	X
The ioscan Command (see page 196)	AI	X	X	X	X	X
IPv6 Network Transport Software (see page 150)	AI	X	X	X	X	X
IPv6 Support by Common Desktop Environment (CDE) (see page 152)	AI	X	X	X	X	X
IPv6 Support by HP Openview Emanate Agent (see page 153)	AI	X	X	X	X	X
IPv6 Support by HP-UX libc and HP-UX Commands (see page 154)	AI	X	X	X	X	X
IPv6 Support for Internet Service Products (see page 138)	AI	X	X	X	X	X
Itanium Unwind Library (libunwind.so) (see page 225)	AI	X	X	X	X	X
Kerberos Client (KRB5-Client) (see page 184)	AI	X	X	X	X	X
The lanscan Command (see page 161)	AI	X	X	X	X	X
Link Editor (ld) (see page 229)	AI	X	X	X	X	X

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
The linkloop Command (see page 162)	AI	X	X	X	X	X
The lanadmin Command (see page 160)	AI	X	X	X	X	X
Logical Volume Manager (see page 115)	AI	X	X	X	X	X
Logging User Accounting Information (see page 140)	AI	X	X	X	X	X
Mainframe iconv Converters for Japanese Characters (see page 237)	AI	X	X	X	X	X
MAXSYMLINKS literal (Deprecated) (see "File Systems Tunable Parameters" on page 66)	n/a	n/a	n/a	n/a	n/a	n/a
MC/ServiceGuard (see page 90)	AI			X		
MC/ServiceGuard Extension for SAP R/3 (see page 92)	AI			X		
MC/ServiceGuard NFS Toolkit (see page 93)	AI			X		
MC/ServiceGuard Quorum Server (see page 94)	AI			X		
Micro Focus OO COBOL 4.2 Run-Time Libraries (Deprecation) (see page 230)	n/a	n/a	n/a	n/a	n/a	n/a
The mmap() Function (see page 197)	AI	X	X	X	X	X
Mozilla Application Suite (see page 171)	DI	X	X	X	X	X
MySQL (see page 95)	DI	X	X	X	X	X
named-xfer (Obsolete) (see page 141)	n/a	n/a	n/a	n/a	n/a	n/a
Netscape 7 (see page 171)	DI	X	X	X	X	X
Network Information Service Plus (Deprecated) (see page 162)	AI	X	X	X	X	X
Network Tracing and Logging (NetTL) (see page 164)	AI	X	X	X	X	X
Network Transport (ARPA) (see page 165)	AI	X	X	X	X	X
Networking libc APIs getaddrinfo() and getnameinfo() (see page 167)	AI	X	X	X	X	X
Networking libc APIs getipnodebyname() and getipnodebyaddr() (see page 168)	AI	X	X	X	X	X
nPartition Provider (see page 78)	AI	X	X	X	X	X
The nslookup Program (see page 169)	AI	X	X	X	X	X
Object File Tools (elfdump) (see page 230)	AI	X	X	X	X	X
Offline Diagnostic Environment (see page 60)	AI	X	X	X	X	X

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
On-line Addition and Replacement (OLAR) of I/O Adapters (see page 45)	S	X	X	X	X	X
Online Diagnostics (see page 62)	AI	X	X	X	X	X
PAM Kerberos (see page 185)	AI	X	X	X		X
Partition Manager (see page 79)	DI	X	X	X	X	X
Pay Per Use (see page 53)	S	X	X	X	X	X
PCI FDDI (FDDI-00) (see page 42)	AI	X	X	X	X	X
PCI Multiplexer (Mux) (see page 46)	S	X	X	X	X	X
PCI Token Ring (see page 47)	S	X	X	X	X	X
Perl (see page 231)	DI	X	X	X	X	X
Printing Using Asian TrueType Fonts for HP PCL5 Printers (see page 238)	AI	X	X	X	X	X
The psrset Command (see page 193)	AI	X	X	X	X	X
The pstat_getfile() Interface (Obsolete) (see page 198)	AI	X	X	X	X	X
rbootd (Obsolete) (see page 142)	AI	X	X	X	X	X
rexecd (see page 142)	AI	X	X	X	X	X
Router Discovery Protocol Daemon (rdpd) (Obsolete) (see page 170)	AI	X	X	X	X	X
Runtime Environment (RTE) for the Java 2 Platform (see page 227)	DI	X	X	X	X	X
Runtime Plug-in (JPI) for Netscape/Mozilla for the Java 2 Platform (see page 228)	AI	X	X	X		X
rwhod (see page 143)	AI	X	X	X	X	X
SAM - Nodal Network Communication (NNC) (see page 96)	AI	X	X	X	X	X
Scalable Boot (see page 97)	AI	X	X	X	X	X
SCSI Drivers (see page 49)	AI	X	X	X	X	X
Secure Internet Services (see page 144)	AI	X	X	X	X	X
Security Patch Check (see page 186)	DI	X	X	X	X	X
Sendmail 8.11.1 (see page 145)	AI	X	X	X	X	X
Servicecontrol Manager (SCM) (see page 97)	DI	X	X	X	X	X
ServiceGuard Extension for RAC (see page 99)	AI			X		

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
ServiceGuard Manager (see page 100)	AI			X		
The setboot Command (see page 194)	AI	X	X	X	X	X
Shadow Passwords (see page 187)	AI	X	X	X	X	X
Simplified Chinese Input Methods (see page 236)	AI	X	X	X	X	X
SLP 0.8 (see page 146)	AI	X	X	X	X	X
Software Distributor (SD) (see page 101)	AI	X	X	X	X	X
Software Package Builder (SPB) (see page 102)	S	X	X	X	X	X
Software Transition Kit (see page 37)	AI	X	X	X	X	X
Strong Random Number Generator (see page 188)	AI	X	X	X	X	X
Swap Space Adjustment for Large Memory-Mapped Files (see page 116)	AI	X	X	X	X	X
System Administration Manager (SAM) (see page 104)	AI	X	X	X	X	X
System Support for Latin and South American Locales (see page 239)	AI	X	X	X	X	X
System-V IPC Kernel Tunable Parameter (semmap) (Obsolete) (see page 105)	n/a	n/a	n/a	n/a	n/a	n/a
System-V IPC Kernel Tunable Parameter (semmsl) (see page 106)	AI	X	X	X	X	X
TCP Wrappers 7.6 (see page 147)	AI	X	X	X	X	X
Technical System Configuration (see page 54)	AI				X	X
Thread Context (see page 232)	AI	X	X	X	X	X
Transition Links Commands (Deprecated) (see page 198)	AI	X	X	X	X	X
Unicode 3.0 Support (see page 242)	AI	X	X	X	X	X
Update-UX (see page 106)	AI	X	X	X	X	X
Usage of Capacity-related ioctls: DIOC_CAPACITY, DIOC_DESCRIBE, and SIOC_CAPACITY (see page 199)	AI	X	X	X	X	X
Usage of ustat(), statfs(), and statvfs() (see page 199)	AI	X	X	X	X	X
VERITAS File System (VxFS) 3.5 (see page 117)[c]	AI	X	X	X	X	X

Table 2-3 New/Changed Operating Environment Features (Continued)

Feature	IM[a]	FOE	EOE	MCOE	MTOE	TCOE
VERITAS Volume Manager (VxVM) 3.5 (see page 119)	AI	X	X	X	X	X
Virtual Memory Kernel Tunable physical_io_buffers (Deprecated) (see page 107)	AI	X	X	X	X	X
WU-FTPD 2.6.1 (see page 148)	AI	X	X	X	X	X

a. Installation Method: AI = Always Installed; DI = Default Installed; S = Selectable
b. Supported only on workstations.
c. The base VxFS (JFS) is delivered on all OEs. The full VxFS (OnlineJFS) is delivered only on the EOE and MCOE.

Software Transition Kit

Software Transition Kit (STK) version 1.9 has been updated to support source code transition from HP-UX 11i v1.6 to HP-UX 11i v2. The changes include a set of new impact pages, updated file scanning tools, updated documentation, and new HP-UX 11i v2 HTML manpages.

There have been thirty additional impacts added to the STK impact database to support the API transition from HP-UX 11i v1.6 to HP-UX 11i v2. Updated documentation can be found in the "Partner" and "Reference" sections, as well as in the new manpages.

The following documents have been added or updated:

- "Libm Library and Floating-Point Arithmetic for HP-UX on Itanium," available at **`http://devresource.hp.com/STK/partner/fp_whitepaper.pdf`**
- "Compiler Technical Overview" document, available at **`http://devresource.hp.com/STK/partner/CompilersTechOverview.pdf`**
- Updated Web site content at **`http://devrsrc1.external.hp.com/STK/`**

The STK product can be installed either from the Application Release CD (Product # **B4580AA**) or from the STK Web site:

Application Release CD Installation

To install your software, run the SD-UX `swinstall` command. It will invoke a user interface that will lead you through the installation. For more information about installation procedures and related issues, refer to "Managing HP-UX Software with SD-UX" and related README, installation, and upgrade documentation provided or described in your HP-UX 11i operating system package.

Installation of STK from the STK Web Site

Please check out **`http://devrsrc1.external.hp.com/STK/download.html`** for instructions as how to download and install the STK product from the STK Web site.

3 Workstation- and Server-Specific Information

What's in This Chapter?

This chapter describes server and workstation specific platforms and configurations, including:

Supported Servers and Workstations

HP-UX 11i v2 supports only a 64-bit version of the HP-UX kernel. The HP-UX 11i v2 release fully supports the following HP Integrity servers and HP workstations:

- HP Integrity rx2600 server
- HP Integrity rx4640 server
- HP Integrity rx5670 server
- HP Integrity rx7620 server
- HP Integrity rx8620 server
- HP Integrity Superdome server
- HP zx2000 workstation
- HP zx6000 workstation

NOTE Additional information regarding these servers and workstations, including specifications, warranty, and support, is found on the Web at:

`http://www.hp.com/products1/itanium`

Unsupported Servers and Workstations

HP-UX 11i v2 is not supported on the following platforms:

- PA-RISC
- HP Integrity rx4610 server
- i2000 workstation

Always-Installed Network Drivers

The following sections describe network drivers and devices that are automatically installed.

100Base-T

The `btlan` driver supports 100BASE-T Ethernet adapters, like the PCI 100BASE-T single-port card **A5230A** and the 4-port PCI 100BASE-T cards **A5506A/A5506B**.

Summary of Change

The changes to the 100BASE-T driver, `btlan`, in the HP-UX 11i v2 release are to provide support for interrupt migration and OLAR on Itanium-based platforms.

Impact

Interrupt migration provides the capability for the user to move device interrupts amongst processors allowing the balancing of the system's interrupt load, thereby improving performance.

The OLAR feature enables the addition and/or replacement of 100Base-T adapter cards without shutting down the system. For more information, see On-line Addition and Replacement (OLAR) of I/O Adapters (see page 45).

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For information on installing, configuring, advanced features, and troubleshooting the 100Base-T Ethernet adapter, see these documents on the Instant Information CD and at **`http://www.docs.hp.com/hpux/netcom/index.html#10/100Base-TX/9000`**:

- *PCI 10/100Base-TX/9000 Quick Installation (HP-UX 10.x, HP-UX 11.0)*
- *Using PCI 10/100Base-TX/9000 (HP-UX 10.x, HP-UX 11.0, HP-UX 11i, HP-UX 11i Version 1.6)*

Obsolescence

Not applicable.

1000Base-T (Gigabit Ethernet)

The Gigabit Ethernet LAN adapters are data link adapters that support the IEEE 802.3z standard for 1000Base-SX operation over fiber and the IEEE 802.3ab standard for 1000Base-T operation over 4-pair CAT-5 copper wiring.

Summary of Change

In the HP-UX 11i v2 release, the GigEther-01 product (which supports the Gigabit Ethernet adapters: **A4926A**, **A4929A**, **A6794A**, **A6825A**, **A6847A**, **and A6865A**) is supported and the IEther-00 product, supporting the zx2000 core, is introduced. The drivers, `igelan` and `iether`, are available in the `GigEther-01` and `IEther-00` software bundles respectively.

Additionally, 1024~9000 Maximum Transmission Unit (MTU) support for both adapters is supported in HP-UX 11i v2 to enable you to operate at any MTU from 1024 to 9000, whereas previously only 1500 or 9000 was allowed.

Impact

There are no impacts.

Compatibility

Earlier versions of `lanscan` will not work in HP-UX 11i v2, as they depend on the `lanscan` shared library which has been obsoleted in the current version of the driver products.

Performance

There are no performance issues.

Documentation

For information on installing, configuring, and troubleshooting Gigabit Ethernet, see *PCI 1000Base-T and 1000Base-SX Quick Installation and Configuration Guide* and related documents. This documentation is available in the `/opt/networkdocs` directory on your system and at **`http://www.docs.hp.com`**.

For advanced features and detailed information on troubleshooting, see *Using PCI 1000Base-T and HSC/PCI 1000Base-SX (Gigabit Ethernet)*. This document is available on the Instant Information DVD and at **`http://www.docs.hp.com`**.

Obsolescence

For the `GigEther-01` and `IEther-00` software bundles, the `lanscan` shared library and catalog file have been obsoleted because they are not necessary to the HP-UX 11i v2 `lanscan` executable.

PCI FDDI (FDDI-00)

The `fddi4` software driver supports the HP PCI FDDI network adapter **A3739B**. The adapter and the software provide system connectivity to FDDI networks, operating at 100 Mb/sec.

The product can be installed on HP-UX systems with PCI bus and the HP-UX 11i v2 operating system.

Summary of Change

PCI FDDI has been enhanced to provide the FDDI network connectivity for Itanium-based platforms.

Impact

You can now connect to FDDI networks from your Itanium-based system.

Compatibility

Earlier versions of the `lanscan` and `lanadmin` binaries do not work on HP-UX 11i v2 because they depend on the `lanscan` and `lanadmin` shared libraries.

Performance

There are no performance issues.

Documentation

For further information, see *Installing and Administering HP9000 PCI FDDI* (product number **J3626-90032**), available at **`http://www.docs.hp.com/hpux/netcom/index.html#FDDI/9000`**.

Obsolescence

The `lanscan` and `lanadmin` shared libraries and their corresponding catalog files have been obsoleted.

Selectable Network Drivers

The following sections describe network drivers and devices that are selected during installation rather than automatically installed.

ATM-00

Asynchronous Transfer Mode (ATM), ATM-00, product supports Classical IP and Lan Emulation over ATM protocols. ATM-00 software is compliant with UNI 3.0, 3.1 and 4.0 versions of ATM Signaling.

All the supported ATM adapters work with MC/ServiceGuard to provide local and remote recovery high availability features. ATM adapters also support Online Addition and Replacement (OLAR) of PCI cards.

Summary of Change

The ATM networking solution is now available on enterprise Itanium-based platforms. Only the ATM adapter **A5513A** (155Mbps MMF) is supported on Itanium-based platforms.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

No changes are necessary when compared to previous versions.

Documentation

For further information on HP-UX ATM networking connectivity, refer to **http://docs.hp.com/hpux/netcom/index.html#ATM**.

Obsolescence

Only the **A5513A** card is supported with HP-UX 11i v2.

HyperFabric

HyperFabric is a high-speed, packet-based interconnect for achieving node-to-node communication. HyperFabric provides higher speed, lower network latency and less CPU usage than other industry standard protocols (e.g. Fibre Channel and Gigabit Ethernet). Instead of using a traditional bus-based technology, HyperFabric is built around switched fabric architecture, providing the bandwidth necessary for high speed data transfer.

The HyperFabric hardware consists of host-based interface adapter cards, interconnect cables, and optional switches. The HyperFabric software resides in Application Specific Integrated Circuits (ASIC) and firmware on the adapter cards and includes user space components and HP-UX drivers.

Summary of Change

The `/opt/clic/bin/clic_ping` utility is not be available in HP-UX 11i v2.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The *clic_ping* (1M) manpage is not delivered in HP-UX 11i v2.

The following documents can be found at **http://docs.hp.com/hpux/netcom/index.html#HyperFabric**:

- *Installing and Administering Hyperfabric*
- *HyperFabric Configuration Guidelines*
- *HP HyperFabric Release Notes*

Obsolescence

Not applicable.

INTL100

INTL100 is a LAN driver for Intel 82559 ASIC-based LAN ports. This driver controls the management LAN ports of the HP Integrity rx5670 and rx2600 servers and the management port of the HP zx6000 workstation.

Summary of Change

INTL100 is required for the HP Integrity rx5670 and rx2600 servers and the HP zx6000 workstation.

Impact

There are no impacts.

Compatibility

The **A6792A** add-on card is not supported on HP-UX 11i v2.

Performance

There are no performance issues.

Documentation

There are no documentation changes.

Obsolescence

Not applicable.

On-line Addition and Replacement (OLAR) of I/O Adapters

The Online Addition and Replacement (OLAR) of PCI/PCI-X I/O adapter cards is a feature that provides the capability for adding and replacing of PCI/PCI-X I/O cards while a system is running thus eliminating the need to reboot. This feature is delivered as part of the core HP-UX functionality.

Summary of Change

The enhanced OLAR functionality delivered in HP-UX 11i v2 is new for Itanium-based systems. It enhances the overall high-availability solution provided since a system can remain active during the addition or replacement of an OLAR capable I/O adapter cards.

The new *olrad* (1M) command provides the command line interface for OLAR functionality. It provides the ability to execute a critical resource analysis routines to ensure that the system integrity is not compromised before performing an OLAR operation as well as the actual OLAR operations.

Some systems support the use of Doorbells or Attention-Buttons on its slots that can be used to manually trigger an OLAR operation. This capability is provided by the new *hotplugd* (1M) daemon.

The HP-UX Peripheral Device Tool provides a graphical user interface for performing OLAR operations. For more information, see “HP-UX Peripheral Devices (pdweb)” on page 85.

Impact

The OLAR functionality is now provided on Itanium-based systems with this release of HP-UX. When combined with other high availability products, such as MC/ServiceGuard, the system availability can be improved significantly.

Machines Affected The addition and replacement of I/O cards are supported on these servers:

HP Integrity Superdome
HP Integrity rx4640, rx7620 and rx8620

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The new *olrad* (1M) and *hotplugd* (1M) manpages are delivered in HP-UX 11i v2. Additionally, these documents, available at **`http://docs.hp.com`**, are introduced in this release:

- *Interface Card OL* Support Guide*
- *Interface Card OL* White Paper*
- *Interface Card OL* Support Matrix*

Obsolescence

The *rad* (1M) command is deprecated in HP-UX 11i v2 and is replaced by the new *olrad* (1M) command.

PCI Multiplexer (Mux)

The PCI Multiplexer (Mux) is a high-speed, serial communications, multiple port product available in two adapters **A6748A** (8-port Mux) and **A6749A** (64-port Mux). Along with several different modular components, these adapters provide multiple serial ports which can be configured in a variety of combinations, to satisfy most applications.

Summary of Change

The PCI Mux networking solution, TermIO-00 version B.11.23.01, is now available on Itanium-based platforms with the release of HP-UX 11i v2.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Documentation regarding PCI Mux networking is found at:

http://www.docs.hp.com/hpux/netcom/index.html#EISA/PCI%20Multiplexer

Obsolescence

Not applicable.

PCI Token Ring

The PCI Token Ring adapter card, **A5783A**, is a 32-bit, bus master, high-speed token ring networking solution that supports the IEEE 802.5 Token Ring standard and is delivered with HP-UX 11i v2. The adapter provides networking on PCI-based servers and workstations via the PCI bus specifications in HP-UX and the use of the `pcitr` driver, **J1644AA**.

The PCI Token Ring adapter runs at 4, 16, or 100 Mb/s over shielded twisted pair (STP) cabling via a 9-pin, D-shell connector and unshielded twisted pair (UTP) via an RJ-45 connector without the need for a user make a selection. No more than one data cable may be connected to the PCI Token Ring adapter at a time. This adapter also operates in full-duplex mode when connected to a full-duplex capable switch or Dedicated Token Ring (DTR). The PCI Token Ring NIC operates at a bus speed of 33 MHz.

Summary of Change

The PCI Token Ring networking solution is now available on Itanium-based 64-bit platforms with the release of HP-UX 11i v2.

Impact

The capability to connect to PCI Token Ring networks from an Itanium-based system is now available. More information on the product can be found at:

http://www.docs.hp.com/hpux/netcom/#Token%20Ring/9000

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Documentation regarding PCI Token Ring networking is found at:

http://www.docs.hp.com/hpux/netcom/#Token%20Ring/9000

Obsolescence

The high-speed PCI Token Ring adapter, **A5783A**, is the replacement for **A4930A**, which was discontinued by IBM. The **A4930A** product, which was discontinued as of June 1, 1999, is supported on V-class machines only. Should an existing **A4930A** card fail, it should be replaced with the replacement **A5783A** card. When the **A4930A** card is replaced with the new **A5783A** card, the `pcitr` driver must be upgraded to **J1644AA**.

Mass Storage Drivers

The following sections describe mass storage drivers and adapters that are automatically installed.

Fibre Channel Tachlite

In HP-UX 11i v2, the Fibre Channel Tachlite driver supports both the **A5158A** and **A6795A** PCI Fiber Channel adapter cards.

Summary of Change

The changes to the Fibre Channel Tachlite driver in HP-UX 11i v2 release include:

- Interrupt migration
- Online Addition and Replacement (OLAR) of Fibre Channel apdater cards

Impact

The interrupt migration provides the capability to move individual interrupts allowing the balancing of the systems interrupt load, thereby improving performance.

The OLAR feature enables the addition and/or replacement of Fibre Channel Tachlite adapter cards without shutting down your system. For more information, see “On-line Addition and Replacement (OLAR) of I/O Adapters” on page 45.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues

Documentation

There are no documentation changes.

Obsolescence

Not applicable.

SCSI Drivers

The Small Computer System Interface (SCSI) product is delivered as part of each HP-UX 11i v2 operating environment. The SCSI product activates the mass storage stack in HP-UX. It consists of services and a disk class driver that are common layers for all the storage stacks, including Fibre Channel and interface drivers for parallel SCSI cards.

Summary of Change

The SCSI product is changed in HP-UX 11i v2 as follows:

- The SCSI support is limited to PCI cards only.
- The new cards supported are: **A5149A** and **A5838A** (SCSI/LAN combination card).
- The user-level utility, `scsictl`, includes the new `-o` option for SCSI cards that are added on-line with the use of OLAR.
- The SCSI High Voltage Differential (HVD) cards, **A4800A**, **A5159A** and **A5159B**, are not supported in HP-UX 11i v2.
- The use of Online Addition and Replacement (OLAR) for the **A6828A** and **A6829A** cards is supported.
- The capability to move individual interrupts, allowing the balancing of the systems interrupt load, is provided with interrupt migration.

Impact

The SCSI HVD cards, **A4800A**, **A5159A** and **A5159B**, are not supported in HP-UX 11i v2.

In earlier versions of HP-UX, the parameters of the card were modified through a configuration utility before booting HP-UX. In HP-UX 11i v2, as with previous releases, the parameters for cards on the system can be changed using `scsictl -o` if necessary after an on-line addition using the configuration tool from the EFI shell.

The PCI Ultra160 SCSI HBA cards, **A6828A** and **A6829A**, can be used in multi-initiator setups. A setup with more than one SCSI initiator on the same SCSI bus is considered a multi-initiator setup.

The **A5149A**, **A5150A**, and **A5838A** cards have the following limitations:

Boot Support	It is not possible to boot from these cards on HP Integrity servers. For a list of these servers supported by HP-UX 11i v2, see Supported Servers and Workstations (see page 40).
OLAR Support	Is not available at the time of this release though it may be available at a later date.
SCSI Parameters	Only default parameter settings are supported; no parameter changes are supported.

ServiceGuard Support	It is not possible to use these cards in a ServiceGuard environment on HP Integrity servers.
Multi-initiator Setups	It is not possible to use these cards for multi-initiator setup on HP Integrity servers.

The interrupt migration provides the capability to move individual interrupts allowing the balancing of the systems interrupt load, thereby improving performance.

The OLAR feature enables the addition and/or replacement of the SCSI cards, **A6828A** and **A6829A**, without shutting down your system. For more information, see “On-line Addition and Replacement (OLAR) of I/O Adapters” on page 45

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for *scsictl* (1M) has been updated to reflect the new `-o` option.

Obsolescence

With the delivery of HP-UX 11i v2, support for the SCSI HVD card, **A5159A**, is obsoleted for Itanium-based systems.

ATI FireGL

The ATI FireGL X1 and ATI FireGL Z1 are advanced graphics cards providing support for the X server (XFree86 v4.2 [`/usr/bin/X11/Xf86`]) and OpenGL API (v1.1+).

Summary of Change

The ATI FireGL X1 (**A9653A**) and ATI FireGL Z1 (**A9654A**) graphics cards provide binary and source compatibility with the current ATI Fire GL4 card and provide significant performance increase.

The drivers that are shipped with the products are as follows:

Kernel driver -

`/opt/graphics/common/kernel/drmfglrx/hpux64/drmfglrx`

32-bit OpenGL driver -

`/opt/graphics/OpenGL/lib/hpux32/libddfglrx.so.2`

64-bit OpenGL driver -

`/opt/graphics/OpenGL/lib/hpux64/libddfglrx.so.2`

Xf86 driver -

```
/usr/lib/hpux32/X11/Xserver/modules/xf86/drivers/libfglrx.so.1
```

Impact

The ATI FireGL X1 (**A9653A**) and ATI FireGL Z1 (**A9654A**) graphics cards provide improved raw performance over the ATI Fire GL4 card, which translates into better overall performance for your application.

Machines Affected

The ATI FireGL X1 and Z1 cards are supported on the following systems:

HP Workstations: **zx2000** and **zx6000** only

Compatibility

The ATI FireGL X1 and Z1 cards maintain both binary compatibility (ABI) and source code compatibility (API) with the previous ATI Fire GL4 device.

Performance

The ATI FireGL X1 and Z1 cards provide significant performance improvement over the ATI Fire GL4 card.

Documentation

The following documents can be found at **`http://www.hp.com/support/workstation_manuals/`**:

- *HP OpenGL Release Notes of IPF-Based Systems*
- *Release Notes for HP Common 3D Graphics for HP-UX 11.0 (September 2002) on IPF-Based Systems*
- *OpenGL Implementation Guide for HP-UX 11.X (IPF version)*
- *Graphics Administration Guide for HP-UX 11.X (IPF version)*

Obsolescence

Not applicable.

Instant Capacity on Demand (iCOD)

Instant Capacity On Demand (iCOD) version 6.0 provides customers the ability to increase system capacity on specified HP servers.

Summary of Change

With version 6.0 of the iCOD product, customers can increase system capacity on iCOD servers by performing the following process:

1. Purchase the component (for example, cell, memory, or processor).
2. Acquire the license codeword through the iCOD portal at the HP Web site:

   `http://www.hp.com/icod/portal`
3. Apply the license codeword.
4. Activate the licensed component

The iCOD 6.0 product is installed as part of the OE and cannot be unselected. It does not require e-mail connectivity unless Temporary Capacity is being used.

The `icodd` manpage is introduced in this release as part of the iCOD software and it provides a complex-wide view of system processing capacity.

Impact

iCOD 6.0 is compatible with HP-UX 11i v2 and Itanium-based servers.

The iCOD daemon is installed and started on all potential iCOD systems and re-spawns itself if killed.

Machines Affected

The iCOD 6.0 is supported on these servers:

HP Integrity Superdome
HP Integrity rx7620 and rx8620

Compatibility

There are no compatibility issues.

Performance

There are no performance issues

Documentation

For more information, see the following iCOD manpages:

- *icod* (5)
- *icodd* (1M)
- *icod_modify* (1M)

- *icod_notify* (1M)
- *icod_stat* (1M)

For further information, see the iCOD product Web page at **http://www.hp.com/products1/unixservers/solutions/icod/index.html**.

The following documents are available at **http://www.docs.hp.com/**:

- *Instant Capacity on Demand (iCOD) User's Guide for version B.06.00*
- *Instant Capacity on Demand (iCOD) Release Notes for version B.06.00*

Obsolescence

Not applicable.

Pay Per Use

Pay Per Use (PPU) version 6.0 is a lease model that provides customers the ability to pay only for the percent utilization of processors in specified HP servers.

Summary of Change

Version 6.0 of the PPU product is supported in HP-UX 11i v2 on Itanium-based hardware platforms.

Impact

PPU 6.0 is compatible with HP-UX 11i v2 and Itanium-based servers.

Machines Affected

The PPU 6.0 is supported on these servers:

HP Integrity Superdome
HP Integrity rx7620 and rx8620

Compatibility

There are no compatibility issues.

Performance

There are no performance issues

Documentation

The following PPU manpages have been changed:

- *ppud* (1M)
- *ppuconfig* (1M)

For further information, see the PPU Web page at **http://www.hp.com/hpfinancialservices/pay_per_use.html**.

The following documents can be found at **http://docs.hp.com**:

- *Pay Per Use (PPU) User's Guide for version B.06.00*
- *Pay Per Use (PPU) Release Notes for version B.06.00*

Obsolescence

Not applicable.

Technical System Configuration

The Technical System Configuration(TechSysConf) product adjusts various configurable kernel settings, as well, as other system settings with the intent of improving system performance. TechSysConf determines the system RAM to choose a set of values for kernel and system tunables. These tunables are compared against any values you may already have set, and if the proposed value is greater that the current value the proposed value is used. The modifications that TechSysConf implements are advantageous to the vast majority of users.

Summary of Change

The HP-UX 11i v2 release delivers a restructured TechSysConf bundle. This bundle *no longer* includes the TC-OpenSource tools. The TC-OpenSource tools are still available, via the Internet Express Media, though are not installed as part of TechSysConf.

The changes to the TC-SysSetup product, that remains within the TechSysConf bundle, in the HP-UX 11i v2 release, are:

- Alters kernel configurable parameters, assigning values that are proven to increase performance in technical environments.
- Alters selected system configuration files to facilitate easier NFS, AutoFS, and NIS+ configuration.

Impact

The structure of the TechSysConf bundle has change to exclude the TC-OpenSource product. The TC-OpenSource product is removed from the target system during an update from HP-UX 11i v1.6, and removes approximately 140 MB of information from `/opt`. All of the TC-OpenSource tools can be installed from the Internet Express Media.

Installing the TC-SysSetup product changes kernel parameters, which results in a kernel build and system reboot. Since most of the kernel parameters are selected for the ability to improve performance in typical EDA and MDA application environments, a performance increase should be realized without further kernel tuning.

Specific changes, unrelated to the kernel, include:

- Configure the system as an NFS server in `/etc/rc.config.d/nfsconf`.
- Set *`NFS`* daemons to 30 and *`BIO`* daemons to 16 in `/etc/rc.config.d/nfsconf`. These values should only be changed if it increases the setting.
- Modify the search sequence and fallback activities in `/etc/nsswitch.conf`.
- Enable *`AUTOFS`* and *`AUTOMOUNT`* in `/etc/rc.config.d/nfsconf`.
- Set read and write block size to 32Kb in `/etc/auto_master`.
- Configure `/etc/passwd` and `/etc/group` to import NIS-served data.

There are no unique system installation requirements or dependencies. This bundle is intended to be installed on HP Workstations and Technical Servers.

IMPORTANT Users who anticipate running a thousand or more of concurrent processes under either the TCOE or MTOE should consider decreasing the kernel parameter *`maxssiz64_bit`* to 256MB, or increasing swap allocation to prevent resource exhaustion issues.

Compatibility

Potential conflicts with other install-time parameter specifications, such as SISP enables, have been identified and addressed in TechSysConf.

Performance

The use of TechSysConf results in an all-around performance improvement on systems with mid-range or large memory capacity.

Documentation

There are no documentation changes.

Obsolescence

Not applicable.

4 General System Administration

What's in This Chapter?

This chapter presents information of particular interest to system administrators, including:

- ServiceGuard Extension for RAC (see page 99)
- ServiceGuard Manager (see page 100)
- Software Distributor (SD) (see page 101)
- Software Package Builder (SPB) (see page 102)
- System Administration Manager (SAM) (see page 104)
- System Swap Space Adjustment (see page 105)
- System-V IPC Kernel Tunable Parameter (semmap) (Obsolete) (see page 105)
- System-V IPC Kernel Tunable Parameter (semmsl) (see page 106)
- Update-UX (see page 106)
- Virtual Memory Kernel Tunable physical_io_buffers (Deprecated) (see page 107)

Compressed Dump

The goal of the Compressed Dump feature is to speed up the memory dump for HP-UX in the event of a system crash, so that dumps are taken faster and system availability is improved. This feature is primarily targeted for “large memory machines” running HP-UX 11i v1, 11i v2, or any later release.

Summary of Change

In HP-UX 11i v2, a new feature has been added to the Dump Subsystem to compress the physical pages before dumping, resulting in a faster crash dump process.

The following system console interface options have been augmented to manage this new feature:

`crashconf`	This utility configures system crash dumps on a running system.
`savecrash`	This utility saves the crash dump information of the system (assuming information was made when the system crashed) and writes a reboot message in the shutdown log file.
`crashutil`	This utility copies and preserves crash dump data, and performs format conversions on it.

System crash dumps that are compressed are in a new format called `PARDIR`. This new format requires use of new tools and utilities for processing:

- The new *crashconf* (2) and *crashconf* (1M) interfaces released with HP-UX 11i v2 are required to configure for compressed dumps.
- System crash dumps that are in compressed format (`PARDIR`) require the new `savecrash` utility to save the dump from the dump device to the file system.

The dump library `libcrash` (released with HP-UX 11i v2) should be used to read these dumps in `PARDIR` format. To be able to read `PARDIR`, you must link the kernel debugger tools `q4`, `adb`, and `kwdb` with `libcrash`.

Impact

With the Compressed Dump feature, kernel dump+save times are speeded by at least a factor of 3X. As a consequence, down-time is reduced.

Compatibility

With the utility `crashutil` (released with HP-UX 11i v2), which can be used to convert the dump to any of the older formats, older versions of tools can be used with the new dump format `PARDIR`.

If uncompressed, the format of system crash dumps will be exactly the same as the `CRASHDIR` format and can be processed with the older kernel debugger tools and utilities `savecrash`, `crashutil`, and `libcrash`.

Performance

Compressed dumps should speed-up the dump and save time by at least a factor of 3 for all dumps, excluding the UNUSED page class.

For dumps including the UNUSED page class, system crash dumps will be at least as fast as uncompressed dump.

Documentation

The following manpages have been updated:

- *crashconf* (1M)
- *crashutil* (1M)
- *savecrash* (1M)
- *crashconf* (2)

For further information, see the “Compressed Dump” white paper, available at **http://www.docs.hp.com**

Obsolescence

Not applicable.

Diagnostics

HP-UX 11i v2 provides a complete set of tools for verifying, troubleshooting, and monitoring HP system hardware, including CPUs, memory, interface cards, and mass storage devices. Diagnostics (also known as Support Tools) in HP-UX 11i v2 include the Offline Diagnostic Environment (ODE) and Online Diagnostics (EMS Hardware Monitors and Support Tools Manager).

The Offline Diagnostic Environment is delivered on the Offline Diagnostics & Utilities CD. Online Diagnostics are delivered in the Operating Environments.

This section covers the following topics:

- “Offline Diagnostic Environment” on page 60
- “Online Diagnostics” on page 62

Offline Diagnostic Environment

The Offline Diagnostics Environment (ODE) is an offline support tools platform that enables users to troubleshoot a system that is running without an operating system or cannot be tested using the online tools. The ODE is also useful for some types of testing in which it is not desirable to have to boot the system first.

The Itanium-based ODE includes offline diagnostics and utilities for all current Itanium-based hardware systems, and is delivered separately on the Offline Diagnostics & Utilities CD.

Summary of Change

The following new hardware platforms are now supported:

- For hp Integrity Superdome, hp Integrity rx8620, and hp Integrity rx7620:
  - Processor Diagnostic – `CPUDIAG`
  - Memory Diagnostic – `MEMDIAG`
  - Core I/O Diagnostic – `CIODIAG`
  - Reo Diagnostic – `REODIAG`
  - Togo Diagnostic – `TOGODIAG`
  - ODE Platform
  - I /O Mapper – `MAPPER`
  - Peripheral Verifier – `PERFVER`
  - Disk FW Update Utility – `DFDUTIL`
  - Disk Copy Utility – `COPYUTIL`
  - I/O Diagnostic for FC – `IODIAG`
  - FC FW Update Utility – `FCFUPDATE`

- For hp Integrity rx4640, hp Integrity rx5670, hp Integrity rx2600, and hp workstation zx2000:
  - Processor Diagnostic – `CPUDIAG`
  - Memory Diagnostic – `MEMDIAG`
  - Core I/O Diagnostic – `CIODIAG2`
  - Pluto Diagnostic – `PLUTODIAG`
  - ODE Platform
  - I/O Mapper – `MAPPER`
  - Peripheral Verifier – `PERFVER`
  - Disk FW Update Utility – `DFDUTIL`
  - Disk Copy Utility – `COPYUTIL`
  - I/O Diagnostic for FC – `IODIAG`
  - FC FW Update Utility – `FCFUPDATE`

Impact

You can now run offline diagnostics on your Itanium-based systems.

Compatibility

The Itanium-based ODE diagnostics are compatible with the following systems:

- hp Integrity Superdome
- hp Integrity rx8620
- hp Integrity rx7620
- hp Integrity rx4640
- hp Integrity rx5670
- hp Integrity rx2600
- hp workstation zx6000
- hp workstation zx2000

Performance

There are no performance issues.

Documentation

Further information can be found in the documentation directory on the Offline Diagnostics and Utilities CD, as well the ODE Web site: **`http://www.docs.hp.com/hpux/onlinedocs/diag/ode/ode_over.htm`**.

Obsolescence

Not applicable.

Online Diagnostics

Online diagnostics for HP-UX 11i v2 include:

EMS Hardware Monitors allow you to monitor the operation of a wide variety of hardware products and be alerted immediately if any failure or other unusual event occurs. The EMS Hardware Monitors are started automatically with no user intervention.

Support Tools Manager (STM) is the platform for executing online diagnostics. The commands to start it are `xstm` (GUI interface), `mstm` (menu-driven interface), `cstm` (command line interface), or `stm` (general).

Summary of Change

CPU, Memory, Core HW and System tools and monitors have been modified to support all current systems releasing on HP-UX 11i v2. Additionally, I/O tools and monitors have been modified to support new cards and new peripherals on these current systems.

Details of the changes are described below:

- New CPE monitor. Monitors corrected platform errors. See customer documentation at **`http://www.docs.hp.com/hpux/diag/`**.
- New FPL monitor. Monitors forward progress logs. See customer documentation at **`http://www.docs.hp.com/hpux/diag/`**.

- New Event Viewer. Allows viewing low level system log and field replacement unit information. See customer documentation at **http://www.docs.hp.com/hpux/diag/**.
- CMC Monitor upgraded to monitor all current systems releasing on HP-UX 11i v2.
- IA-64 core hardware monitor upgraded to monitor all current systems releasing on HP-UX 11i v2.
- CPU expert and CPU exerciser tools upgraded to monitor all current systems releasing on HP-UX 11i v2.
- Support for IPV6.
- IA-64 Memory Monitor has been upgraded to monitor all current systems releasing on HP-UX 11i v2.
- Memory exerciser, info tools have been upgraded to monitor all current systems releasing on HP-UX 11i v2.
- Logtool view memlog has been upgraded to support all current systems releasing on HP-UX 11i v2. This includes the corresponding upgrade in the memory decode module.
- Licensing has been modified to include the support of all current systems releasing on HP-UX 11i v2.

Impact

You are now able to monitor and diagnose the new supported systems as described above.

Compatibility

There have been changes to the STM commands and output, and to the output of the HP-UX monitors. Details of the changes to the UI commands and displays will be listed in the Online Diagnostic release notes. Details of the output changes for the Hardware Monitors are listed in the Monitor Event Data Sheets. Both the release notes and the Data Sheets are available at **http://www.docs.hp.com/hpux/diag/**.

Performance

There are no performance issues.

Documentation

The following documentation can be found at **http://www.docs.hp.com/hpux/diag/**:

- New event listings for all monitors listed in summary.
- Updated data sheet for all monitors listed above.
- New data sheet for CPE monitor, FPL monitor, SMS IPMI log acquirer, and event viewer.
- Updated data sheet for the IA64 memory monitor.
- Any new event listings for the IA 64 memory monitor.

Obsolescence

Not applicable.

Enterprise Cluster Master Toolkit

The Enterprise Cluster Master Toolkit is a set of scripts that enable the use of third-party applications to run as packages in a ServiceGuard cluster environment.

Summary of Change

In HP-UX 11i 2, the ECM Toolkit version B.01.08 contains tools for supporting the Oracle 9i database in MC/ServiceGuard clusters.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For details of the content of the release, see the *Enterprise Cluster Master Toolkit Version B.01.08 Release Notes*, available at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

Event Monitoring Service (EMS)

The Event Monitoring Service (EMS) is a framework for monitoring system resources which includes configuring, checking resource status, and sending notification when configured conditions are met.

Summary of Change

EMS A.04.00.01 includes the following:

- EMS A.04.00 framework and GUI are available as 32-bit native applications on Itanium platforms. High Availability (HA) Monitors are also available as 32-bit native binaries on Itanium platforms.
- A new command line utility, EMS CLI, is available to configure and manage persistent monitoring requests for Event Monitoring Service (EMS) monitors, such as HA Monitors, Hardware Monitors and Kernel Monitors. EMS CLI can be used to perform the following activities:
  - Add, modify, delete, and list monitoring requests
  - Generate script for currently configured monitoring requests
  - View status of monitoring requests
  - List resource instances available for monitoring
- EMS supports IPv6 on HP-UX 11i v2.

Impact

There are no impacts.

Compatibility

EMS libraries are also shipped as PA-RISC binaries to provide compatibility for the existing PA-RISC based monitors via Aries.

Performance

There are no performance issues.

Documentation

Event Monitoring Service A.04.00.01 Release Notes for HP-UX 11i v2 and *High Availability Monitors A.04.00.01 Release Notes for HP-UX 11i v2* are shipped with Event Monitoring Service product in HP-UX 11i v2. These documents can be found on the Instant Information CD and at **`http://www.docs.hp.com/hpux/ha`**.

A new manpage, *emscli* (1M), which describes the `emscli` functionality is shipped with the product. The *resls* (1) manpage has been updated and is shipped with the product.

The EMS user manuals, *Using Event Monitoring Service* and *Using High Availability Monitors*, have been updated and are shipped with the product.

Obsolescence

Not applicable.

File Systems Tunable Parameters

Many of the HP-UX File Systems tunable parameters are now dynamic tunables (their value can be modified without the need to reboot the system). Several default values and allowed values for File Systems tunables have also been modified for performance, usability, and/or system availability reasons.

Summary of Change

HP-UX File Systems now has 13 dynamic tunable parameters available in HP-UX 11i v2. Their values can be modified dynamically using the tunables infrastructure interfaces (e.g., *kctune* (1M), *kcweb* (1M)[1], *settune* (2)).

The following File Systems tunables were static in previous HP-UX releases, and have been converted to dynamic tunables in HP-UX 11i v2. In addition to making these tunables dynamic, some of the default and/or allowed values have been modified. See the manpages for details:

- *nfile* (5)
- *nflocks* (5)
- *dbc_min_pct* (5)
- *dbc_max_pct* (5)
- *aio_max_ops* (5)
- *aio_listio_max* (5)
- *aio_prio_delta_max* (5)

The following are new File Systems dynamic tunables:

- *fs_symlinks* (5) - Maximum number of symbolic links used to resolve a path name
- *aio_proc_threads* (5) - Maximum number of process threads allowed in AIO pool
- *aio_monitor_run_sec* (5) - Frequency of AIO thread pool monitor execution (in seconds)
- *aio_proc_thread_pct* (5) - Percentage of all process threads allowed in AIO pool
- *aio_req_per_thread* (5) - Desirable ratio between number of pending AIO requests and servicing threads

The *maxfiles_lim* (5) tunable has been dynamic in previous HP-UX releases, but its default and allowed values have been modified. See manpage for details.

The following file systems tunables remain static (system reboot is required when modified), but have been enhanced with new default and/or allowed values. See manpages for details:

- *maxfiles* (5)
- *ncsize* (5)
- *dnlc_hash_locks* (5)

1. For more information about kcweb, see “HP-UX Kernel Configuration” on page 83.

- *ninode* (5)
- *ncdnode* (5)

Tunable parameters related to the static buffer cache that existed in previous HP-UX releases are now considered obsolete. The recommended way to obtain a fixed size buffer caches is to set the value or tunable *dbc_min_pct* equal to the value of tunable *dbc_max_pct*.

Impact

The new default values were selected to improve performance in the majority of system environments, but may not be suitable or optimum for all systems and environments. By making the tunables dynamic, the values of the tunables can now be modified while maintaining system availability.

System update scripts take new tunables restrictions into consideration, adjusting the tunables values to new allowed values if necessary.

Compatibility

System update scripts take new tunables restrictions into consideration, adjusting the tunables values to new allowed values if necessary.

For the *MAXSYMLINKS* literal, and the tunables *nbuf*, *bufpages* and *bufcache_max_pct*, compatibility will be maintained through HP-UX 11i v2, but obsolescence is planned for the next release. See the following obsolescence section.

Performance

The new default values were selected to improve performance in the majority of system environments, but may not be suitable or optimum for all systems and environments.

Documentation

The following manpages have changed:

- *nfile* (5)
- *maxfiles* (5)
- *maxfiles_lim* (5)
- *nflocks* (5)
- *dbc_min_pct* (5)
- *dbc_max_pct* (5)
- *aio_max_ops_ops* (5)
- *aio_listio_max* (5)
- *aio_prio_delta_max* (5)
- *ninode* (5)
- *ncdnode* (5)
- *fs_async* (5)

The following manpages are new:

- *fs_symlinks* (5)
- *aio_proc_threads* (5)
- *aio_monitor_run_sec* (5)
- *aio_proc_thread_pct* (5)

- *aio_req_per_thread* (5)
- *dnlc_hash_locks* (5)
- *ncsize* (5)

Tunables manpages (section 5) can be found at **http://www.docs.hp.com**.

For general HP-UX Tunables Infrastructure documentation, see the *HP-UX 11i v2.0 Driver Development Guide (DDG)*, available at **http://h21007.www2.hp.com/dspp/tech/tech_TechSoftwareDetailPage_IDX/1,1703,5441,00.html**.

Obsolescence

The following has been deprecated in HP-UX 11i v2, and will be obsolete in post-HP-UX 11i v2 releases:

- The *MAXSYMLINKS* literal traditionally included in the <*sys/param.h*> header is being deprecated in HP-UX 11i v2 and should not be used by applications. *MAXSYMLINKS* was defined as the maximum number of symbolic links that may be expanded in a path name.

  This limit (number of symbolic links that may be expanded in a path name) is now a tunable parameter: *fs_symlinks*. The interfaces provided by the tunable infrastructure should be used to obtain the value of *fs_symlinks*. At the application level, for example, use the *gettune* (2) or *kctune* (1M) interfaces.

  Applications using the *MAXSYMLINKS* literal may not be consistent with the kernel. The *MAXSYMLINKS* literal will be removed from <*sys/param.h*> in post-HP-UX 11i v2 releases.

- All tunables associated to the buffer cache (nbuf, bufpages, bufcache_max_pct, dbc_min_pct, and dbc_max_pct) are still supported through HP-UX 11i v2, but will be obsolete in future HP-UX releases. The dbc_min_pct and dbc_max_pct tunables will be replaced with new dynamic tunables that will control the amount of memory to be used for file caching in general (for caching file I/O data and metadata).

GlancePlus Pak

GlancePlus Pak integrates the GlancePlus and HP OpenView Performance Agent for HP-UX (OVPA) products into a single tool to help customers better manage the performance and availability of their servers.

Summary of Change

GlancePlus Pak version C.03.71.23 includes enhancements and defect repairs. This release includes the following enhancements:

- For OVPA:
  - The following metrics were added:
    - *BYNETIF_QUEUE*

  - — *GBL_THRESHOLD_PROCMEM*
  - — OVPA has been enhanced to select interesting processes based on memory use.
- For GlancePlus:
  - — To keep track of the process/thread entries that are used by the measurement layer, the following metrics were added to Glance:
    - — *GBL_MI_LOST_PROC*
    - — *GBL_MI_LOST_PROC_CUM*
    - — *GBL_MI_PROC_ENTRIES*
    - — *GBL_MI_THREAD_ENTRIES*

For a list of the defect repairs for OVPA and Glance, refer to each product's Release Notes in `/opt/perf/ReleaseNotes/`, or at the following site: **`http://ovweb.external.hp.com/lpe/doc_serv/`**.

Impact

Refer to the Release Notes of each product (GlancePlus and OpenView Performance Agent) `/opt/perf/ReleaseNotes/`, or at the following site: **`http://ovweb.external.hp.com/lpe/doc_serv/`**.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Please refer to the release notes and other documentation of each product (GlancePlus and OpenView Performance Agent) in `/opt/perf/ReleaseNotes/`, or at the following site: **`http://ovweb.external.hp.com/lpe/doc_serv/`**.

Obsolescence

Not applicable.

HP Caliper

HP Caliper is a general-purpose performance analysis tool for applications on Itanium-based HP-UX systems. HP Caliper allows you to understand the performance of your program and to identify ways to improve its run-time performance. HP Caliper works with any Itanium-based binary and does not require your applications to have any special preparation to enable performance measurement.

The two primary ways to use HP Caliper are as a profile based optimization (PBO) tool and as a performance analysis tool.

Summary of Change

- Itanium and Itanium 2 chip support
- Full multi-process support with arbitrary process selection and process summary
- Caliper info mode with detailed help on PMU events
- Performance data files for saving and replaying Caliper data
- Ability to attach to a running process for all measurements and detach for PMU measurements
- Ability to measure specific regions of code for PMU measurements
- Traces of PMU measurements
- Improved ability to print Caliper reports at failure points
- Usability improvements (startup files, better inline & source correlation, cumulative percentage, improved performance, memory usage & scaling with threads & processes, bug fixes)

Impact

You can run Caliper 3.0 for HP-UX 11i v2 on Itanium and Itanium 2 machines for all measurement capabilities. For multi-process applications, you can measure one, all or any set of arbitrary processes in the process-tree by specifying the processes to selected in one of many ways (pattern matching, name etc.). You can then get the output for each process along with a process tree and summary detailing; such reports pertain to which process and what processes are the top performance bottlenecks. You can also attach to a running process via pid, specify a duration to stay attached, and then detach for PMU measurements.

In this release, for instrumenting measurements, you can attach to a running process and run till the process completes. For PMU measurements, you can demarcate specific regions to enable and disable the PMU for exact measurements.

Caliper also provides 3 modes of operation: measurement mode (as before); a new report mode (the measurement mode can simply generate data files and the report mode can later replay the data); and a new info mode (provides detailed PMU event descriptions).

You will also see better Caliper startup and runtime performance in many cases and smaller memory footprint. The source correlation and inline information are more accurate in several cases, and reports include various usability improvements like an additional cumulative percentage column and more consistent address/offset information.

Caliper 3.0 supports startup files where the user can specify common configuration, measurement and report formatting options. Caliper 3.0 supports both automatic and user-triggered printing into a report of the data gathered thus far for some failure modes. Various bug fixes are also included in this release (including a kernel fix to speed up Caliper performance with large page applications).

Machines Affected

Itanium 1 machines with HP-UX 11i v1.5 OS and compiler tool chain and libraries are not supported.

Compatibility

Caliper 3.0 is not supported on HP-UX 11i v1 systems and 11i v1 compilers.

Performance

Performance & memory usage may improve by up to 2x in some cases.

Documentation

For more product information, go to **`http://www.hp.com/go/hpcaliper.`**

Online documentation is in `/opt/caliper/doc`. The following documentation is available at **`http://www.docs.hp.com/hpux/dev/index.html#Performance%20Tools%20and%20Libraries`**:

- *HP Caliper User Guide*
- *HP Caliper Release Notes*

Obsolescence

Not applicable.

HP Partitioning

Partitioning provides the ability to subdivide system resources into isolated regions that operate independently from each other (the equivalent of a box within a box). HP is the only high end UNIX offering to provide a broad range of solutions designed to meet the diverse needs of our customers. Changes to these solutions are described in the following sub-sections:

- “HP Process Resource Manager” on page 72

HP Process Resource Manager

HP Process Resource Manager (PRM) version C.02.01.01 enables system administrators to guarantee CPU, real memory, and disk bandwidth resources to users and applications on a system.

Summary of Change

PRM now supports VERITAS Volume Manager (VxVM)[1] for disk bandwidth management.

Various PRM utilities now have a wide-column option `-w` available for better display of group names.

Impact

There are no impacts.

Compatibility

There is a new `/etc/rc.config.d/prm` file. If you've modified your `/etc/rc.config.d/prm` file, the new file is placed in `/usr/newconfig/etc/rc.config.d/prm`.]

Performance

PRM enhances performance by allowing the administrator to isolate applications that might otherwise overuse resources

Documentation

The following manpages have been revised:

- *prmconfig* (1)
- *prmlist* (1)
- *prmmonitor* (1)
- *prmmove* (1)
- *prmrun* (1)
- *xprm* (1)

For further information, go to the PRM Web site at **`http://www.hp.com/go/prm`**. See also the *Process Resource Manager User's Guide* at **`http://www.docs.hp.com/hpux/ha/#Process%20Resource%20Manager`**.

1. For further information about VxVM, see “VERITAS Volume Manager (VxVM) 3.5” on page 119.

Obsolescence

Not applicable.

HP-UX nPartition Configuration Commands

The HP-UX nPartition Configuration Commands are a set of system administration commands to create/modify/remove partitions, control power to cells and I/O chassis, flash/turn off attention LEDs for cells, cabinets and I/O chassis, and display information about a hardware partitionable complex.

The command line interface for nPartition configuration consists of the following commands:

- *cplxmodify* (1M)
- *fruled* (1)
- *frupower* (1M)
- *parcreate* (1M)
- *parmodify* (1M)
- *parremove* (1M)
- *parstatus* (1)
- *parunlock* (1M)

Summary of Change

In HP-UX 11i v*1.0*, the nPartition configuration commands only support operations on a single hardware complex of a PA-RISC partitionable platform. They will not work on an Itanium-based partitionable platform due to architectural and design changes in the software stack required by the command. In addition, they cannot be used to manage hard partitions on a remote complex (a complex other than the one they run on).

With HP-UX 11i v*2*, the management scope of the nPartition configuration commands has now been extended to remote partitions and complexes, including support for remote management and cell local memory. The nPartition configuration commands will provide the same partition management functionality on partitionable Itanium-based and PA-RISC hardware platforms and will also allow support of remote management and cell local memory.

For HP-UX 11i v2, the HP-UX nPartition configuration commands have been enhanced to support Itanium-based systems. They have also been enhanced to support the following new features:

- Set/modify complex attributes:
  - A new nPartition configuration command (`cplxmodify`)
  - Modifies attributes of the complex of a partitionable system
  - For HP-UX 11i v2, the only modifiable attribute is the complex name (`-N` option).
- Remote partition and complex management:
  - nPartition configuration commands have been enhanced to manage remote (non-local) partitions and complexes, with appropriate authorization.
  - New options (`-u`, `-g` and `-h`) have been added to support remote management:

  - The `-u` command option enables access to a remote partition using a Web-Based Enterprise Management (WBEM) LAN connection.
  - The `-g` command option enables access to a remote complex using an Intelligent Platform Management Interface (IPMI) over LAN connection. The `-g` option is valid only on those platforms which support IPMI (hp Integrity Superdome, hp Integrity rx8620, hp Integrity rx7650, hp 9000 rp8420, and hp 9000 rp7420). IPMI is not available on the hp 9000 SuperDome, hp 9000 rp8400, or hp 9000 rp7410.
  - The `-h` command option should only be used in combination with either the `-u` or `-g` option.
  - The arguments to the `-u`, `-g` and `-h` options consist of partition or complex login information (username, passwd, hostname or IP address).

- Cell local memory (CLM) setting:
  - The `parcreate` and `parmodify` commands have been enhanced to allow users to specify/modify for each cell the amount of total cell memory that will be configured as cell local (non-interleaved) memory. The arguments to the `-c`, `-a` and `-m` options have been extended to include the value of cell local memory.
  - The `parstatus` command has been enhanced to display cell local memory information for individual cells and partitions.
- Integration with Instant Capacity On Demand (iCOD):
  - Parmodify is fully integrated with iCOD.
- nPartition Configuration Privilege policy (restricted state) check:
  - nPartition Configuration Privilege can be set to restricted or unrestricted state, using the service processor menu, to prevent a superuser on one partition from affecting the configuration of other partitions, or from performing tasks that affect the complex.
  - The `parcreate`, `parmodify`, `parremove`, `cplxmodify`, and `frupower` commands have been enhanced to check for this restricted state. If the state is restricted, a superuser on a partition cannot modify the complex profile (also known as Group A Profile or Complex Configuration Data), including changes that only affect the local partition: cell assignment, CLM parameters. Nor can the superuser modify the cell profile (also known as Group C Profile or Partition Configuration Data) of partitions other than then local partition. Finally, the superuser cannot power on/off resources that are free or not owned.

Impact

- Itanium and PA-RISC: Starting with HP-UX 11i v2, the nPartition configuration commands will work on both PA-RISC and Itanium-based partitionable platforms.
- CLM: The user can specify the cell local memory of any cell in the partition.
- nPartition Configuration Privilege: If set to the restricted state, the following modifications will cause the command to fail:
  - Create/remove partitions
  - Add/delete cells to any partition in the complex.
  - Modify the CLM parameters of any cell in the complex.

— Modify any attributes of cells that are not assigned to the local partition.

— Modify the name of the complex or of any partition other than the local partition.

— Power on/off cells it does not own, including free resources.

Compatibility

There are no compatibility issues.

Performance

The nPartition configuration commands are not performance sensitive. Overall response time depends on WBEM stack elements and network bandwidth.

Documentation

The following manpages have been created or modified:

- *cplxmodify* (1M)
- *fruled* (1)
- *frupower* (1M)
- *parcreate* (1M)
- *parmodify* (1M)
- *parremove* (1M)
- *parstatus* (1)
- *parunlock* (1M)

The existing *HP System Partitions Guide* is the reference guide. It can be found at **`http://www.docs.hp.com`**.

Obsolescence

Not applicable.

HP-UX Processor Sets

The HP-UX Processor Sets allow a multi-processor system to be partitioned into two or more groups of processors (CPU's), so that CPU resources for selected applications or users can be isolated from those of other applications or users. Processor Sets (also known as psets) may be created and reconfigured dynamically by users who have the appropriate privileges. Processor Sets was first shipped as part of the optional Software Pack on HP-UX 11i v1 in October 2001, and is available in the Kernel from HP-UX 11i v1.6 by default. Where Processor Sets is available in HP-UX, it is supported on all multi-processor systems. Processor Sets is a full-functioning stand-alone feature, but psets functionality is also fully supported by and integrated with the optionally available products HP-UX Workload Manager (WLM) and Process Resource Manager (PRM).

The `psrset` command creates and manages processor sets.

Summary of Change

- The `psrset` command has been enhanced to display Locality Domain information. When used with the option `-i`, or when used without any option, the `psrset` will display, apart from other details, the Locality Domain information for the processor set.

- The kernel now supports Real Time Extension to processor sets in HP-UX 11i v2, and `psrset` has been enhanced to manage the RTE processor set. The following new options have been added for RTE processor set:

  `-l` Lists all the processor sets that are configured as RTE processor set.

  `-m` *`pset_id`* Marks a processor set with the identification number, *`pset_id`*, as an RTE processor set.

  `-s` *`pset_id`* Un-marks the processor set with the identification number, *`pset_id`*, as an RTE processor set.

  `-R [processor_list]` Creates a new RTE processor set and displays the processor set identification number (*`pset_id`*) for the new processor set.

Impact

- You can get LDOM details along with processor set information, a capability that was not possible earlier.
- You are now able to get information about RTE processor sets, as well as modify them.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for the `psrset` command, *psrset* (1M), has been modified to indicate that `psrset` will display Locality Domain information for the processor set, along with other details.

The manpage for the `psrset` command has also been updated to document the new options added for RTE processor set support.

Obsolescence

Not applicable.

HP-UX Workload Manager

HP-UX Workload Manager (WLM) version A.02.01.01 provides goal-based workload management, enabling automatic resource allocation and application performance management. WLM uses a configuration file specifying workloads and their prioritized service-level objectives (SLOs). WLM automatically allocates CPU resources to the workloads based on priorities and current performance.

Summary of Change

HP-UX WLM version A.02.01.01 includes the following:

- `wlminfo` utility for monitoring workloads and their SLOs
- auditing and billing information
- PSET-based workload groups can now have their number of CPUs adjusted based on SLOs
- passive mode to allow you to see how WLM will approximately respond to a given WLM configuration
- ability to easily capture the *`stderr`* of data collectors by using `coll_stderr` in your WLM configuration
- ability to temporarily remove groups with no active SLOs by using the *`transient_groups`* keyword, ensuring that resource use is reduced to zero for such groups

Impact

HP-UX WLM version A.02.01.01 offers greater functionality and ease of use.

Compatibility

There is a new `/etc/rc.config.d/wlm` file. If you've modified your `/etc/rc.config.d/wlm` file, the new file is placed in `/opt/wlm/newconfig/etc/rc.config.d/wlm`.

Performance

HP-UX WLM version A.02.01.01 improves application performance once you have properly configured workload groups for critical applications. Applications that are not placed in workload groups may experience performance degradation. Additionally, misconfiguring WLM can degrade performance.

Documentation

The following manpages have been revised or are new:

- *sg_pkg_active* (1M) (revised)
- *wlmaudit* (1M) (new)
- *wlmcw* (1M) (revised)
- *wlmd* (1M) (revised)
- *wlminfo* (1M) (new)
- *wlmconf* (4) (revised)

For further information, go to the HP-UX Workload Manager Web site at **`http://www.hp.com/go/wlm`**. See also the *HP-UX Workload Manager User's Guide* at **`http://www.docs.hp.com/hpux/netsys/index.html#HP-UX%20Workload%20Manager`**.

Obsolescence

Not applicable.

HP-UX Workload Manager Toolkits

HP-UX Workload Manager Toolkits (WLMTK) version A.01.04.01 consists of utilities and examples that make it easier to deploy Workload Manager (WLM)[1] for the management of specific mission-critical software products.

Summary of Change

WLMTK now has a toolkit for BEA WebLogic Server.

Impact

With the toolkit for BEA WebLogic Server, you can now automatically optimize the CPU resources allocated to WebLogic instances.

Compatibility

There are No compatibility issues.

Performance

WLMTK facilitates use of WLM, which automatically manages application performance.

Documentation

The following manpages are new:

- *wlmwlsdc* (1M) (new)
- *expsmooth* (1M) (new)

For further information, go to the HP-UX Workload Manager Web site at **http://www.hp.com/go/wlm**. See also the *HP-UX Workload Manager Toolkits User's Guide* at **http://www.docs.hp.com/hpux/netsys/index.html#HP-UX%20Workload%20Manager**.

Obsolescence

Not applicable.

nPartition Provider

The nPartition Provider, version B.01.00, is the HP-UX WBEM Services provider for nPartition-related information on partitionable systems.

Summary of Change

nPartition Provider is a new product with HP-UX 11i v2. This product is used by Partition Manager and the partition commands to configure and manage HP systems that support nPartitions. With this component, partitionable systems can be managed both locally and remotely. The nPartition Provider product is only used through a WBEM interface. It is not invoked directly by the user.

1. For further information about WLM, see “HP-UX Workload Manager” on page 76.

Complete information is in the nPartition provider product data sheet, installed as **/opt/nparprovider/doc/nParProviderDataSheet.html**.

Impact

With nPartition Provider, you can configure and manage both local and remote HP systems that support nPartitions.

Compatibility

There are no compatibility issues.

Performance

You should be aware of the following items that may affect performance:

- When managing a remote partitionable complex, the performance degrades when the connection traverses long network distances, e.g., managing a partitionable complex in California from a system in New York. Furthermore, when managing a remote system, performance can be improved by connecting to an nPartition Provider on the remote system, rather than connecting directly to the system's service processor.
- The nPartition provider maintains a cache of information about systems being managed. This cache is cleared when the nPartition Provider is unloaded by the CIM server. Performance may be reduced when managing a system for the first time, or immediately after the CIM server has been restarted. Subsequent management sessions of the same system will be faster.

Documentation

The nPartition provider product data sheet is installed as **/opt/nparprovider/doc/nParProviderDataSheet.html**.

Obsolescence

Not applicable.

Partition Manager

NOTE Partition Manager version B.11.23.01.00, originally released with HP-UX 11i v2 (B.11.23), contained a security defect that has been fixed in subsequent releases. This fix is included in Partition Manager version B.11.23.02.00.02, available with the March 2004 update to HP-UX 11i v2. It can also be downloaded for free from the HP Web at **http://software.hp.com/portal/swdepot/displayProductInfo.do?productNumber=ParMgr**.

For more information, refer to HP Security Bulletin SSRT3636 (document id: HPSBUX0311-296), which is available from the IT Resource Center at **http://itrc.hp.com**.

Partition Manager version B.11.23.01.00 (aka parmgr) provides system administrators with a convenient graphical user interface for configuration and management of nPartitions on HP server systems. In addition, Partition Manager enhances the reliability and performance of HP partitioning products by providing automatic detection of several types of configuration problems.

Partition Manager is a Web-based application that can be launched from Servicecontrol Manager 3.0, System Administration Manager (SAM), or as a stand-alone product. Customers interact with Partition Manager through a Web browser running on their client workstation or PC.

Partition Manager can be used to manage nPartitions on any complex in the customer's network. It provides both high-level overviews and detailed specifications of the hardware and software resources of the complex. Using Partition Manager, the system administrator can examine the state of the complex, create nPartitions, modify the allocation of resources between nPartitions, delete nPartitions, and perform other tasks. Step-by-step guidance is provided for complex tasks, and Web-based online help is provided for every screen.

Summary of Change

This version of Partition Manager offers fundamentally the same functionality as the previous release of Partition Manager, with the following major enhancements to the user interface:

- accessed through a Web browser from a PC or client workstation;
- configuration of nPartitions on remote complexes;
- intuitive graphical views of all the data in the complex;
- hardware components are shown in their actual physical location in the complex's cabinets.

Other new features of this release include support for Cell Local Memory (CLM), which can improve memory access performance, and support for Itanium-based systems.

This release of Partition Manager is supported on all HP server systems that support nPartitions and HP-UX 11i v2.

Impact

This version of Partition Manager brings graphical nPartition management to Itanium-based systems.

The enhanced graphical user interface provides a visual map of the complex. It is easier to see “at a glance” how resources are allocated between nPartitions. It is easier to select the correct resources for actions such as creating and modifying nPartitions and configuring memory.

Compatibility

There are no compatibility issues.

Performance

Due to significant changes between versions, performance differences between this release and the previous release of Partition Manager are not available. However, you should be aware of the following items that may affect performance:

- When managing a remote partitionable complex, the performance degrades when the connection traverses long network distances, e.g. managing a partitionable complex in California from a system in New York. Furthermore, when managing a remote system, performance can be improved by connecting to an nPartition Provider on the remote system, rather than connecting directly to the system's service processor.
- A noticeable delay may occur at startup, and the first time that each Partition Manager view is displayed. This is due to the initial compilation of the Java Server Pages by the HP-UX Tomcat-based Servlet Engine. This compilation occurs the first time that a view is displayed after the Servlet Engine is started or restarted. Once a given view has been displayed, subsequent displays of that view will be significantly faster.
- When managing a remote system, possible performance improvements can be obtained by running the Web browser on the local system, instead of running the browser remotely to a local X Server.
- The nPartition provider maintains a cache of information about systems being managed. This cache is cleared when the nPartition Provider is unloaded by the CIM server. Performance may be reduced when managing a system for the first time, or immediately after the CIM server has been restarted. Subsequent management sessions of the same system will be faster.

Documentation

The principal documentation for Partition Manager is HTML-based online help. The online help is accessed through context-sensitive help links in Partition Manager, and can also be viewed outside of Partition Manager through a Web browser.

The `parmgr` command (which can be used to start or stop Partition Manager) is documented in the *parmgr* (1M) manpage that is included with the product. Both English and Japanese versions of the manpage are included.

The latest release of Partition Manager can be downloaded for free from the HP Web at **`http://software.hp.com/portal/swdepot/displayProductInfo.do?productNumber=ParMgr`**.

Obsolescence

Not applicable.

HP WBEM Services for HP-UX

HP WBEM Services for HP-UX (**`http://www.dmtf.org/`**) is a platform- and resource-independent Distributed Management Task Force (DMTF) standard that defines both a common model (i.e., description) and protocol (i.e., interface) for monitoring and controlling a diverse set of resources. The HP WBEM Services for HP-UX product is the HP-UX implementation of the DMTF WBEM standard.

HP WBEM Services for HP-UX, version A.01.05.01, supports HP-UX 11i v2 and is included as a component in the HP-UX 11i v2 OE.

This product is based on The Open Group (TOG) Pegasus Open Source Software (OSS) project (**`http://www.opengroup.org/pegasus/`**).

Summary of Change

This release of HP WBEM Services for HP-UX supports the HP-UX 11i v2 Intel®Itanium® processor family. Major features in this release include:

- This version of the product supports strong SSL encryption.
- The CIM Server can now be configured to simultaneously support both SSL and non-SSL connections.
- Local connections have been enhanced to use UNIX Domain Sockets, offering increased security and improved performance.
- Four additional providers have been added to the HP-UX WBEM Services product: HP-UX Network Time Protocol (NTP) CIM Provider, HP-UX Domain Name System (DNS) CIM Provider, HP-UX Network Information Service (NIS) CIM Provider and HP-UX Internet Protocol (IP) CIM Provider.

Impact

No significant change with the exception of access to the new features listed above.

Compatibility

With the HP-UX 11i v2 release of HP WBEM Services, the default value for the configuration parameter, *`enableRemotePrivilegedUserAccess`*, has been changed to `true`. This means that, by default, an authenticated user, with privileged access to the system running WBEM Services, will be allowed to issue requests to WBEM Services from a remote system. For more information about this parameter, refer to the WBEM documentation available at **`http://www.docs.hp.com`**.

Performance

There are no performance issues.

Documentation

The manpage for `cimconfig` has been updated. Manpages are packaged with the product and are placed in the directory `/opt/wbem/share/man`.

For further information, see the HP WBEM Web site at **`http://www.hp.com/large/infrastructure/management/wbem/hpux/index.html`**.

Additional information may be found in *HP WBEM Services for HP-UX System Administrator's Guide* and *HP WBEM Services for HP-UX Version A.01.05 Release Notes*. Both can be found at **`http://www.docs.hp.com/hpux/netsys/index.html`**.

Obsolescence

Not applicable.

HP-UX Kernel Configuration

HP-UX Kernel Configuration is a combination of a command set and a Web-based graphical user interface (GUI), kcweb, that allows the user to configure an HP-UX kernel and to monitor consumption of kernel resources controlled by parameters.

The HP-UX Kernel Configuration application provides a set of commands for the following:

- tuning the kernel
- loading and unloading kernel modules
- configuring alarms

The HP-UX Kernel Configuration tool (kcweb) can be launched from SCM and also from the command-line. You can also launch kcweb as a separate tool from the SAM TUI although it is no longer an integral part of SAM (as it was prior to HP-UX 11i v1.6).

HP-UX Kernel Configuration can also be set up to be launched automatically by a Web browser. See the *waconf* (1M) manpage for more details.

Summary of Change

The kcweb application has incorporated the following changes and new features:

- Adds more information about a parameter's auto-tuning capability and value at last boot
- Supports easy DLKM configuration
- Enables a user to view the history of change for a specific tunable, module or all tunables, modules through the change log viewer.

The maxusers tunable has been obsoleted and removed in the HP-UX 11i v2 release. Changes to this tunable will have no effect on the kernel. Prior to the HP-UX 11i v2 release, the maxusers tunable was used to calculate the default values of nclist, nfile, and ninode, all of which control kernel data structures that determine the system resource allocation.

As of HP-UX 11i v2, however, no tunables depend on maxusers. All tunables that used to depend on it for default values have now been assigned individual numerical defaults. Changing maxusers will have no affect on any other tunable. Individual tunables should be changed for system tuning. Please refer to the respective tunable manpages for more information.

In HP-UX 11i v2, the Kernel Configuration (KC) commands have been replaced by a new set of commands. The `config`, `kmadmin`, `kminstall`, `kmmodreg`, `kmsystem`, and `kmupdate` commands have been removed. The `kmtune`, `kmpath`, and `mk_kernel` commands have only limited transitional support and will be removed in a future release. The new KC commands are `kconfig`, `kcmodule`, `kctune`, `kclog`, and `kcpath`.

In addition to these command changes, there are changes to the location of kernels and related files on disk; to the manner in which a kernel configuration is chosen at boot time; and to the manner in which the system automatically maintains a backup kernel configuration.

For more information, see the documentation listed below.

Impact

With the new KC commands, the customer has simpler, more reliable, and more efficient management of HP-UX kernel configurations. With the new KC commands, many configuration changes that required a kernel rebuild and system reboot can now be made without them. Even when a kernel rebuild or system reboot is still required, no compilations of kernel code are needed. The new KC commands share a consistent user interface and management model.

Customers who are used to using the removed commands, listed above, will need to use the appropriate new KC command. System administrators will need to be aware of the changes in kernel location, boot-time selection, and automatic backup creation.

Compatibility

The HP Apache-based Web Server must be installed for `kcweb` to work. HP Apache does not need to be running on its default port 80. The `kcweb` tool can be used with a locally installed copy of Mozilla or Netscape. The Mozilla, Netscape, and Microsoft Internet Explorer Web browsers can also be used from any type of remote system.

NOTE For the `kcweb` tool (GUI mode) to run, cookies must be enabled in your browser (Mozilla or Internet Explorer).

Scripts or applications using the commands being removed will have to be changed. (For `kmtune` and `kmpath`, which are the most commonly used scripts, compatibility interfaces have been provided to ease the transition.)

Scripts or applications that hard-code the location of the kernel should be changed.

Performance

There will be no noticeable increase or decrease in response time for Kernel Configuration tasks.

Documentation

Information is available in the white paper called “Managing Kernel Configurations in HP-UX 11i version 2,” available at **http://www.hp.com/products1/unix/operating/infolibrary/whitepapers/7202__ManagingKernelConfig_WP__051403.pdf**.

Information is also available in the *Managing Systems and Workgroups* manual for this release, available at **http://www.docs.hp.com**.

Information is available in the following online manpages:

- *kcalarm* (1M)
- *kcmond* (1M)
- *kconfig* (5)
- *kconfig* (1M)
- *kcmodule* (1M)
- *kctune* (1M)
- *kclog* (1M)
- *kcpath* (1M)
- *kcusage* (1M)
- *kcweb* (1M)
- *system* (4)
- *waconf* (1M)

Obsolescence

The `config`, `kmadmin`, `kminstall`, `kmmodreg`, `kmsystem`, and `kmupdate` commands are obsolete and have been removed.

The `kmtune`, `kmpath`, and `mk_kernel` commands have been deprecated and are obsolescent. Only some of their options are supported in this release, and they will be removed altogether in a future release.

The `maxusers` tunable has been obsoleted and removed. (See the “Summary of Change” on page 83.)

HP-UX Peripheral Devices (pdweb)

Peripheral device configuration and management is now supported by a combination of commands and a Web browser-based graphical user interface (GUI) in the new HP-UX Peripheral Device (v B11.23.01) tool. This new tool replaces the peripheral devices functionality of the System Administration Manager (SAM) tool and introduces two new commands:

pdweb (1m) and *waconf* (1m).

The Peripheral Device tool operates on a single system, similar to SAM. It can be used stand-alone, is accessible from SAM, the Partition Manager tool, and Servicecontrol Manager (SCM).

Summary of Change

In this release, the Peripheral Device tool allows you to perform the same peripheral configuration actions as SAM in HP-UX 11i v1, including:

- viewing all available PCI/OLAR slots
- adding, replacing, and/or removing a card
- viewing devices and creating device files

Additional capabilities include:

- viewing detailed information about cards, slots, and devices
- generating a Critical Resource Analysis report detailing critical resources lost when a slot is powered down
- bringing cards online
- lighting the LED of a specific slot

Impact

The Web browser-based GUI provides easy access and greater ease of use.

The Peripheral Device tool automatically replaces the peripheral devices functionality in SAM. In addition, the `pdweb` and `waconf` commands are added to provide numerous improvements over previous approaches to peripheral device management. The `ioscan`, `olrad`, and `mksf` commands provide U.S. Federal legislation manadated Section 508 accessibility compliance.

Compatibility

The HP Apache-based Web Server version 2.0 (`hpuxwsApache`) must be installed for the Peripheral Device tool to operate correctly. HP Apache does not need to be running on its default port 80. The Peripheral Device tool can be used with a locally installed copy of Mozilla or Netscape. The Mozilla, Netscape, and Microsoft Internet Explorer Web browsers can also be used from any type of remote system.

NOTE For the Peripheral Device tool to operate successfully, cookies must be enabled in your browser (Mozilla, Netscape or Microsoft Internet Explorer).

Performance

You will experience a significant improvement in response time using the Peripheral Device tool, particularly at start-up, which is approximately five seconds or less. In addition, the response-time when building sub-screens could be as little as two seconds per page.

Documentation

The *pdweb* (1M) and *waconf* (1M) manpages have been added.

Additionally, the Peripheral Device tool GUI contains an on-line help facility to further assist you.

Also refer to the *Interface Card OL* Support Guide*, available at **http://docs.hp.com**.

Obsolescence

The Peripheral Device tool replaces the peripheral devices functionality in the SAM tool. For more information regarding the changes to SAM, see “System Administration Manager (SAM)” on page 104.

Ignite-UX

Ignite-UX addresses your need to perform system installations and deployment, often on a large scale. With Ignite-UX, you can:

- Create and reuse standard system configurations.
- Archive a standard system configuration and use that archive to replicate systems.
- Create customized processes to allow interactive and unattended installs.
- More-easily recover OS and applications after crashes and hardware failures.

Summary of Change

Ignite-UX (B.5.0) for HP-UX 11i v2 has incorporated the following changes:

- Support for HP-UX 11i v2 Itanium®-based installations.
- Support for the new HP-UX Service Partition (HPSP) created at the end of the boot disk used by Online and Offline Diagnostics to hold tools and system data.
- Enhanced support for dual media (tape and CD/DVD) recovery.
- Enhancements to the *mod_kernel* keyword of the *instl_adm* (4) command to support new `/stand/system` syntax used in this release.

Impact

Ignite-UX can be used to install and recover HP-UX 11i v2 on Ignite-UX servers and clients. You can execute an expert system recovery using either tape or CD/DVD. Additionally, you can use Ignite-UX to create the HP-UX Service Partition when installing HP-UX 11i v2.

Compatibility

There are restrictions regarding the use of both Ignite-UX and the new Bastille product. Details can be found at the Ignite-UX Web site at **http://www.software.hp.com/products/IUX/**. For more information about Bastille, see “HP-UX Bastille” on page 177.

The changes in VxVM 3.1 (delivered in HP-UX 11i v1.6) to 3.5 (delivered in this release), most notably the use of static versus dynamic major numbers, means that systems using VxVM 3.1 on HP-UX 11i v1.6 cannot be installed or recovered using Ignite-UX version B.5.0. If you are using VxVM on HP-UX 11i v1.6 you should not upgrade Ignite-UX past version B.4.4. For further information on VxVM, see “VERITAS Volume Manager (VxVM) 3.5” on page 119.

Performance

There are no performance issues.

Documentation

The *instl_adm* (4) manpage has been updated accordingly.

The *Ignite-UX Administration Guide*, **B2355-90788**, Edition 13 and later, has been updated to reflect all changes to the product and can be found at **`http://www.docs.hp.com/`**.

Ignite-UX product information and documentation is available at: **`http://www.software.hp.com/products/IUX/`**

Obsolescence

Not applicable.

Interrupt Migration

The Interrupt Migration feature is part of HP-UX 11i v2 core. Interrupt Migration can be used to view and modify the interrupt configuration of the system.

The intended users of Interrupt Migration are system performance-tuning experts who need to manage the interrupt distribution of the system.

Interrupts from interface cards can be either line-based (LBI) or transaction-based (TBI) interrupts. If a processor receives an interrupt when the processor's interrupt pin is asserted, that interrupt is line-based. If a processor detects an interrupt message bus transaction on the system bus, that interrupt is transaction-based.

The `intctl` command provides options to display the interrupt configuration of the system, migrate external I/O interrupts from one processor to another, and to save and restore the interrupt configuration of the system. The `intctl` command can be used by performance tuning experts to re-distribute the interrupt load across the CPUs and to assign interrupts of Real Time Extension (RTE)-reserved cards to RTE-reserved CPUs.

The `intctl` command is not a general system administration command. It should be used only by performance-tuning experts with an advanced level of system knowledge. Improper re-distribution of interrupts across CPUs could decrease overall system performance by overloading some processors and not optimally using the remaining processors.

For further information about Interrupt Migration, see the manpage *intctl* (1M).

Summary of Change

Interrupt Migration can be used to do the following:

- View the interrupt configuration of the system.
- Change the interrupt configuration of the system by migrating interrupts from one CPU to another. The system performance can be significantly improved by distributing the interrupt load across the CPUs through the Interrupt Migration command (`intctl`).
- Store and restore the interrupt configuration of the system.
- Activate, de-activate or reserve CPUs (to receive interrupts from some specific cards) for interrupts through the Processor Sets command, psrset (see “HP-UX Processor Sets” on page 75).

Machines Affected

This feature works on all the servers supported by the HP-UX 11i v2 release, but not on the workstations (see “Workstation- and Server-Specific Information” on page 39 for details).

Impact

Interrupt Migration can be used to manage the interrupt configuration of the system. Through proper distribution of the interrupt load across processors, the overall system performance can be improved. RTE uses Interrupt Migration to reserve a CPU for interrupts from RTE-reserved cards.

The Interrupt Migration command (`intctl`) can be used to display and change the interrupt configuration of the system. The interrupt configuration of the system can be saved and restored at a later time through the `intctl` command.

Compatibility

There are no compatibility issues.

Performance

The Interrupt Migration feature can be used by system administrators to distribute the interrupt load across the CPUs and thus to improve system performance.

Documentation

For further information, see the Interrupt Migration command manpage *intctl* (1M).

Obsolescence

Not applicable.

MC/ServiceGuard

MC/ServiceGuard (Multi-Computer/ServiceGuard) is a specialized facility for protecting mission critical applications from a wide variety of hardware and software failures.

Summary of Change

MC/ServiceGuard version A.11.15.00 includes the following features:

- Support for new Itanium-based hardware
- ServiceGuard A.11.15.00 on HP-UX 11i v2 Itanium-based platform
- Supports all ServiceGuard 11.15.00 (PA-RISC) features except maximum nodes, which is 8
- Rolling upgrade from SG11.14.01 (Itanium-based) to SG11.15.00 (Itanium-based)
- Support for VxVM 3.5
- Support for Quorum Server 2.00
- Fully compatible with default settings for Bastille Sec10Host configuration. Any Bastille configuration that invokes IPFilter must follow specific rules for using IPFilter and ServiceGuard.
- Using IPFilter and ServiceGuard require specific IPFilter rules to ensure proper operation of ServiceGuard clusters. The rules for using IPFilter and ServiceGuard are documented in the IPFilter Release Note, available at **`http://www.docs.hp.com`**.
- Support for ServiceGuard Manager 3.0
- Support for SGeRAC (ServiceGuard Extension for RAC, formerly ServiceGuard OPS)
- MC/ServiceGuard A.11.15 supports up to 200 relocatable package IP addresses per cluster. This can be a combination of IPv4 and IPv6 addresses
- ServiceGuard A.11.15 supports IPv6, with the following restrictions:
  - The heartbeat IP address must be IPv4. Therefore, IPv6-only operation nodes or IPv6-only nodes are not supported in a ServiceGuard environment.
  - The hostnames in a ServiceGuard configuration must be IPv4. ServiceGuard does not recognize IPv6 hostnames.
  - Auto-configured IPv6 addresses are not supported in ServiceGuard as *`STATIONARY_IP`* addresses. All IPv6 addresses that are part of a ServiceGuard cluster configuration must not be auto-configured through router advertisements, for example. They must be manually configured in `/etc/rc.config.d/netconf-ipv6`.
  - Link-local IP addresses are not supported, either as package IPs or as *`STATIONARY_IP`*s. Depending on the requirements, the package IP could be of type site-local or global.

— ServiceGuard supports only one IPv6 address belonging to each scope type (site-local and global) on each network interface (that is, restricted multi-netting). Therefore, up to a maximum of two IPv6 *STATIONARY_IP*s can be mentioned in the cluster ascii file for a *NETWORK_INTERFACE*: one being the site-local IPv6, and the other being the global IPv6.

— Quorum Server, if used, has to be configured on an IPv4 network. It is not IPv6-capable. A Quorum Server configured on an IPv4 network can still be used by ServiceGuard IPv6 clusters that have IPv6 networks as a part of their cluster configuration.

— ServiceGuard supports IPv6 only on the Ethernet networks, including 10BT, 100BT, and Gigabit Ethernet.

The following are not supported on SG A.11.15.00:

- Advanced Tape Services
- ServiceGuard SAM interface is not included
- Partitioned Luns
- Virtual Partitions (vPARs)
- Mixed Itanium-based and PA-RISC nodes within a cluster
- Auto Port Aggregation (APA)
- Virtual LAN (Vlan)
- HP-UX 11i v1.6
- The rx9610 and rx4610 servers
- U2 SCSI cards and combo cards
- Boot support with Tachlite

Impact

If you want to use the new features of SGeRAC A.11.15.00, then you may need to edit the existing ASCII configuration files and control scripts, and you must reapply them to the cluster.

Compatibility

MC/ServiceGuard A.11.15.00 is a new set of executables on the Itanium-based platform. Rolling upgrade will be provided from MC/ServiceGuard A.11.14.01 (Itanium-based) to A.11.15.00 (Itanium-based).

Performance

There are no performance issues.

Documentation

For more details, see the *MC/ServiceGuard Version A.11.15.00 Release Notes*, available at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

MC/ServiceGuard Extension for SAP R/3

MC/Serviceguard Extension for SAP R/3 (SGeSAP) Version B.03.09 provides high availability for R/3 using MC/ServiceGuard technology. This product is a toolkit that provides automated failover for SAP mySAP components based on SAP WAS, SAP LiveCache and SAP R/3 technology.

Summary of Change

On HP-UX 11i v2, the SGeSAP Toolkit version B.03.09 will provide the same functionality as B.03.08 provides for PA-RISC systems running HP-UX 11i v1.

In addition to the functionality of B.03.08, B.03.09 will provide the means to use Secure Shell[1] as a communication method between nodes running mySAP components.

Please note, that at initial release not all SAP products might be supported on HP-UX 11i v2 and therefore will also not be supported with SGeSAP for HP-UX 11i v2.

When SAP completes the availability of their products on HP-UX 11i v2, the support for SGeSAP will be added for those products, too.

The SGeSAP product number on HP-UX 11i v2 is **T2357BA**.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For additional details, refer to the following product documentation at **`http://www.docs.hp.com`**:

- *SGeSAP Manual* (part number: **B7885-90018**)
- *SGeSAP Release Note* (part number: **T2357-90001**)

1. For more information on Secure Shell, see “HP-UX Secure Shell” on page 181.

Obsolescence

Not applicable.

MC/ServiceGuard NFS Toolkit

MC/ServiceGuard NFS is a toolkit that includes the configuration files and control scripts and allows you to use MC/ServiceGuard to set up highly available NFS servers. Highly available systems protect users from failure of a system processing unit (SPU) or local area network components. In the event that one component fails, the redundant component takes over and MC/ServiceGuard coordinates the transfer between components.

MC/ServiceGuard NFS Toolkit A.11.23.01 is functionally equivalent to version A.11.11.02 and has dependencies on MC/ServiceGuard A.11.13 or later. (MC/ServiceGuard A.11.15 is delivered with HP-UX 11i v2.) MC/ServiceGuard (MC/SG) A.11.15 provides the integrated solution for multiple MC/ServiceGuard partner software working together under the new MC/SG framework. (For more information about MC/ServiceGuard A.11.15, see “MC/ServiceGuard” on page 90.)

Summary of Change

The MC/ServiceGuard NFS Toolkit A.11.23.01 provides the following important new features:

- Product re-architected to provide a smoothly integrated solution with other MC/ServiceGuard partner software.
- NFS-related control functions and variables have been extracted from the MC/ServiceGuard package control script to a separate NFS specific control script, `hanfs.sh`. When the MC/ServiceGuard package is started, MC/ServiceGuard will check if this NFS-specific control script exists under the package directory. If so, it will invoke the NFS control script.
- Dependent on MC/ServiceGuard version A.11.13 and above.
- Support for VERITAS Volume Manager (VxVM) 3.5. The VERITAS Volume Manager for HP-UX is available as an alternative volume manager for online data and storage management.[1]
- An easy troubleshooting mechanism provided. It is easier for customers to identify if a problem resides in MC/ServiceGuard NFS Toolkit from the MC/ServiceGuard package log file.
- Support for NFS high availability over NFS TCP and NFS UDP.

1. For further information on VxVM, see “VERITAS Volume Manager (VxVM) 3.5” on page 119.

Impact

This new version of MC/ServiceGuard NFS Toolkit has been re-architected to fit under the new MC/ServiceGuard framework and also provides an easier troubleshooting mechanism.

Compatibility

There is no compatibility impact on current environments using MC/ServiceGuard NFS Toolkit.

Performance

There are no known performance issues.

Documentation

Please refer to the following MC/ServiceGuard NFS Toolkit product documentation in the “High Availability” section at Website: **`http://www.docs.hp.com/`**:

- *MC/ServiceGuard NFS Toolkit version A.11.00.05, A.11.11.02 and A.11.23.01 Release Notes* (part number **B5140-90014**)

Obsolescence

Not applicable.

MC/ServiceGuard Quorum Server

The MC/ServiceGuard Quorum Server is a software component that provides tie-breaking services for ServiceGuard clusters to avoid split-brain syndrome.

Summary of Change

On HP-UX 11i v2, the Quorum Server version A.2.0 includes the following features:

The

- Quorum Server runs on both HP-UX and Linux and supports multiple HP-UX and/or Linux Clusters.
- The Quorum Server can be configured in a package in a cluster.

Impact

There are no impacts.

Compatibility

The earlier versions of Quorum Server (Version 1.0 and 1.1) are not compatible with ServiceGuard 11.14.02. For ServiceGuard 11.14.02 or later, use A.2.0 version of the Quorum Server.

Performance

There are no performance issues.

Documentation

For more details, see the *MC/ServiceGuard Quorum Server Version A.2.0 Release Notes*, available at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

MySQL

MySQL is an open source relational SQL database developed by MySQL AB.

Summary of Change

MySQL version 3.23 is used by Servicecontrol Manager (SCM) 3.0 to store vital information about the management domain. This is the first version of SCM that uses MySQL. (For more information about Servicecontrol Manager, see “Servicecontrol Manager (SCM)” on page 97.)

Impact

SCM 2.5 used Netscape Directory Server (NDS) for the repository. SCM 3.0 uses MySQL instead of NDS for the repository. Therefore, after you upgrade to SCM 3.0, you can remove NDS if it is not used by another product. The upgrade process including steps to remove NDS is covered in the *HP Servicecontrol Manager 3.0 User's Guide* on **http://www.docs.hp.com**.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

MySQL information is available at **www.mysql.com**.

MySQL information as it applies to SCM 3.0 is available at:

- **http://software.hp.com/products/SCMGR/**
- **http://www.docs.hp.com/hpux/netsys/index.html#Servicecontrol%20Manager**

Obsolescence

Not applicable.

SAM - Nodal Network Communication (NNC)

SAM - NNC is a GUI tool that handles the configuration of network-related resources. (For more information about System Administration Manager [SAM], see “System Administration Manager (SAM)” on page 104.)

Summary of Change

SAM - NNC for HP-UX 11i v2 includes the following changes:

- Support for DHCPv6. From HP-UX 11i v2 onwards, the SAM GUI can be used to configure DHCPv6.

Impact

You will find it easier to configure DHCPv6 using SAM -NNC.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

SAM online help and the SAM manpage, *sam* (1M), have been updated with DHCPv6 information. Both are shipped with the product.

Obsolescence

Not applicable.

Scalable Boot

The scalable boot project improves system boot/reboot times, having a positive effect on system availability. Scalable boot benefits mainly high-end systems with large I/O configurations.

Summary of Change

By performing parallel `ioscan`s, boot time is reduced by 5-95%, depending on the I/O configuration.

Impact

When a system is booted or rebooted for any reason, it can be brought back on-line more quickly with scalable boot. Higher-end systems with larger I/O configurations will realize the most difference in reduced boot/reboot time.

Compatibility

There are no compatibility issues.

Performance

Boot time has been reduced by 5-95%, depending on the I/O configuration.

Documentation

Since implementation is done in the kernel and no user/administrator adjustments are exported, scalable boot documentation is unnecessary.

Obsolescence

Not applicable.

Servicecontrol Manager (SCM)

HP Servicecontrol Manager (SCM) provides a convenient multi-system management solution for HP-UX and Linux systems. You can access SCM using a Web-enabled graphical user interface or a command line interface. SCM enables you to execute HP-UX and Linux manageability tools, including custom tools and scripts, across multiple systems simultaneously.

Summary of Change

SCM version 3.0 provides the following new features:

- Linux-based central management server
- Certified HP ProLiant Linux agents
- XML file format
- Web-browser-based tools
- Improved user interface and ease-of-use
- Increased number of administration roles
- Increased security through HTTP and SSL
- MySQL database (for further information, see “MySQL” on page 95)

Impact

There are no impacts.

Compatibility

SCM 3.0 agents are only compatible with an SCM 3.0 central management server (CMS). Therefore, if you have an existing SCM 2.5 management domain, you will need to upgrade these systems from SCM 2.5 to 3.0 to add HP-UX 11i v2 (B.11.23) nodes to that domain.

Servicecontrol Manager version 3.0 supports the following operating systems:

- For the central management server:
  - HP-UX 11.0
  - HP-UX 11i v1
  - HP-UX 11i v2
  - Red Hat Linux 7.2 Professional
  - Red Hat Linux 7.3 Professional
  - SuSE Linux 8.0 Professional
- For a managed node:
  - HP-UX 11.0
  - HP-UX 11i v1
  - HP-UX 11i v2
  - Red Hat Linux 7.2 Professional
  - Red Hat Linux 7.3 Professional
  - SuSE Linux 8.0 Professional

Performance

There are no performance issues.

Documentation

Further information about Servicecontrol Manager can be found at the following Web sites:

- **http://software.hp.com/products/SCMGR/**
- **http://www.docs.hp.com/hpux/netsys/index.html#Servicecontrol%20Manager**

Obsolescence

Not applicable.

ServiceGuard Extension for RAC

ServiceGuard Extension for RAC (formerly known as ServiceGuard OPS Edition) is a special addition to MC/ServiceGuard that supports Oracle RAC (OPS) clusters in addition to providing all the basic ServiceGuard cluster functionality.

Summary of Change

ServiceGuard Extension for RAC (SGeRAC) version A.11.15.00 includes the following features:

- Supports all ServiceGuard A.11.15.00 (Itanium-based) features
- DB provider: ServiceGuard Manager will show RAC instances in property sheet
- Fast detection of Oracle instance crash
- Rolling upgrade feature enabled
- Software Distributor (SD) upgraded from SGeRAC 11.14.01
- New product number (T1859CA)

The following are not supported on SGeRAC A.11.15.00:

- Advanced Tape Services
- ServiceGuard SAM interface is not included
- Partitioned Luns
- Virtual Partitions (vPARs)
- Mixed Itanium-based and PA-RISC nodes within a cluster
- Auto Port Aggregation (APA)
- Virtual LAN (Vlan)
- HP-UX 11i v1.6

- Servers with different HPUX versions in the cluster
- Servers with mixed 32/64 bit HP-UX in the cluster
- Support of PA-RISC version of Oracle RAC through Aries
- The rx9610 and rx4610 servers

Impact

If you want to use the new features of SGeRAC A.11.15.00, then you may need to edit the existing ASCII configuration files and control scripts, and you must reapply them to the cluster.

Compatibility

ServiceGuard Extension for RAC A.11.15.00 is a new set of executables on the Itanium-based platform. You can upgrade from ServiceGuard Extension for RAC A.11.14.01 to ServiceGuard Extension for RAC A.11.15.00

Performance

There are no performance issues.

Documentation

For more details, including the differences between SGeRAC A.11.15.00 and SGeRAC A.11.14.01, see the *ServiceGuard Extension for RAC A.11.15.00 Release Notes*, available at **`http://www.docs.hp.com`**

Obsolescence

Not applicable.

ServiceGuard Manager

ServiceGuard Manager is a graphical user interface (GUI) for displaying and managing MC/ServiceGuard and ServiceGuard Extension for RAC clusters.

Summary of Change

In HP-UX 11i v2, ServiceGuard Manager version A.03.00 contains the following new features:

- The ServiceGuard Manager interface is now available in 5 languages.
- ServiceGuard Manager supports clusters on different subnets.
- ServiceGuard Manager can now display several sessions, where each session represents a connection.

- The Alerts icon on the toolbar can show you the most critical problem among all the cluster objects on.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For more details, see the *ServiceGuard Manager Version A.03.00 Release Notes*, available at **`http://www.docs.hp.com`**.

Obsolescence

Not applicable.

Software Distributor (SD)

Software Distributor (SD) is used to manage software, including patches, on HP-UX.

Summary of Change

SD for HP-UX 11i v2 includes the following changes:

- SD for HP-UX 11i v2 runs in Itanium as a native application, resulting in better performance for Itanium machines.
- SD for HP-UX 11i v2 provides support for Dynamically Loadable Kernel Module (DLKM) software packaging.

Impact

There are no impacts beyond added capability and increased performance.

Compatibility

SD is backward compatible.

Performance

Running SD in Itanium native improves performance.

Documentation

The Software Distributor Administration Guide has been updated to reflect all changes and can be found at **http://www.docs.hp.com/**.

Obsolescence

Not applicable.

Software Package Builder (SPB)

Software Package Builder (SPB) provides a visual method to create and edit software packages using the HP-UX Software Distributor (SD) package format. Once software is packaged, it can easily be transferred to a distribution medium, mass produced, and installed by administrators.

The SPB graphical user interface (GUI) provides a window into the software package structure, showing attributes that can be set for each package element. SPB dynamically loads packaging policies and validates software package attributes against these policies. The SPB command line interface (CLI) can also perform validation of software package attributes against policies and supports automated edits to the software package specification.

Whether you are new to packaging or experienced, SPB can help you. Features of SPB include:

- Create a product specification file (PSF) to organize files into products, filesets, and optionally, into bundles and subproducts.
- Set attribute values to define the software package characteristics such as revision, architecture, file permissions, and dependencies.
- Control scripts can further customize how the software is handled when installing or removing it on the destination system.
- Validate the PSF against packaging policies to ensure successful depot creation with the `swpackage` command and subsequent software installation.
- Edit and validate the PSF automatically as part of the nightly build process using SPB's CLI.

With SPB, developers and administrators can easily package software in SD format, making management of software with standard SD tools (such as `swinstall`, `swlist`, `swremove`) possible. For example, SPB makes it easy to put an SD wrapper around open source software. As a result, software inventory management and system administration get easier.

Summary of Change

Software Package Builder is a new product. SPB will improve the customer's experience with software packaging by providing:

- A graphical user interface (GUI) for creating product specification files (PSF) in SD format.
- A command line interface (CLI) for automating nightly changes to packages.
- A policy validator for verifying a package's use of legal SD syntax.

Impact

Currently, most customers do not choose to package software in SD format due to its complexity. SPB should significantly reduce your learning curve and the time required to package software. By packaging software in SD format, you gain the ability to easily tell what software is installed on the system, making software management easier.

Compatibility

SPB uses Java 1.4.0 or greater.

Performance

Java Swing behavior may cause navigational inconsistencies when running SPB through an X emulator. If your mouse click behavior setting is too slow, it can prevent SPB from buffering all mouse clicks. This could potentially lead to data loss. The SPB product release notes contain a detailed procedure for correcting this performance issue. It is highly recommended that you complete the procedure prior to using SPB.

For this and other troubleshooting topics, refer to the SPB Help system.

Documentation

For further information on Software Package Builder, see the following:

- the spb manpage, *spb* (1M)
- the SPB Web site at **http://software.hp.com/products/SPB/**
- the *Software Package Builder User's Guide* found at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

System Administration Manager (SAM)

The System Administration Manager (SAM) is an HP-UX System Administration tool that provides an easy-to-use user interface (UI) for performing various system administration tasks.

Summary of Change

- The new HP-UX Kernel Configuration tool (kcweb) is used to configure kernel tunables and modules. For more information regarding kcweb, refer to “HP-UX Kernel Configuration” on page 83 in this chapter.
- In the Peripheral Devices functional area, the Cards and Device List subareas have been replaced by the new Web-based HP-UX Peripheral Devices tool (pdweb), and can be launched from SAM or by using the new pdweb command. All the existing functionality in the peripheral devices functional area remain. Using pdweb, some PCI cards can be added or replaced online. For more information, refer to the pdweb manpage, *pdweb* (1), and see “HP-UX Peripheral Devices (pdweb)” on page 85.
- SAM is available as PA-RISC binaries on HP-UX 11i v2, and requires the Aries translator to run on HP-UX 11i v2 Itanium systems. For more information about Aries, see “Aries Binary Translator” on page 206.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

Since SAM is available as PA-RISC binaries, performance is impacted: actions performed by a user (such as selecting a particular functional area) in the SAM GUI will be slow.

Documentation

The SAM manpage, *sam* (1M), and SAM online help have been updated appropriately.

Obsolescence

The SAM functional areas Kernel Configuration, Distributed Print Services (DPS), Peripheral Devices, and Dump Devices are now obsolete.

System Swap Space Adjustment

With HP-UX 11i v2, VxFs enables the creation of file system sizes up to 4 TB. Files can be a maximum of 2 TB. Because of this, you should be aware of adjustments that may be necessary when you configure system swap space.

See “Swap Space Adjustment for Large Memory-Mapped Files” on page 116.

System-V IPC Kernel Tunable Parameter (semmap) (Obsolete)

In the past, the semmap tunable specified the size of a System-V IPC semaphore space resource map which tracked the free space in shared semaphore memory. There is no such resource map anymore and the tunable is obsoleted.

Summary of Change

It is no longer necessary to tune the semmap kernel parameter. In HP-UX 11i v2, the memory allocation of semaphore sets previously controlled by semmap is done dynamically by the kernel. The semmap kernel parameter is no longer tunable.

Impact

You do not need to tune semmap. This parameter has been removed from the list of tunable parameters.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The *semmap* (5) manpage has been removed from the manpage distribution.

Obsolescence

See “Summary of Change” above.

System-V IPC Kernel Tunable Parameter (semmsl)

The System-V IPC kernel tunable configuration parameter *semmsl* sets the maximum number of semaphores per ID which can be grouped within a single System-V IPC semaphore set.

Summary of Change

The minimum and default value of *semmsl* was 2048 on the HP-UX 11i v1 release. Its minimum value is now 1; its default value is 2048, while its upper limit remains 10240.

Dynamic tune adjustments to *semmsl* may be done using SAM or the kernel configuration command *kctune* (1M).

The value of *semmsl* can be increased or decreased dynamically.

Impact

The ability to select a smaller *semmsl* value allows you to further constrain application use of kernel resources.

Compatibility

There are no compatibility issues.

Performance

Some applications which create a number of semaphore sets up to the *semmsl* maximum may realize a performance improvement by being forced to spread the semaphores over more semaphore sets, thereby reducing the contention associated with accessing semaphores belonging to the same set.

Documentation

For further information, see the *semmsl* (5) manpage.

Obsolescence

Not applicable.

Update-UX

The `update-ux` command updates the HP-UX operating system to a newer version. Update-UX is new to the HP-UX 11i v2 (B.11.23) release and allows an update from HP-UX 11i v1.6 (B.11.22).

Summary of Change

The `update-ux` command is new with HP-UX 11i v2. For details about usage of `update-ux`, see the *HP-UX 11i v2 Installation and Update Guide* at **`http://www.docs.hp.com`** and the manpage *update-ux* (1M).

Impact

Update-UX allows you to update an HP-UX 11i v1.6 system to HP-UX 11i v2.

Compatibility

Update-ux itself does not affect compatibility for source files, scripts, makefiles, executables, data, etc. In the process of updating a system, the software installed might have compatibility issues. However, those issues are described with the products themselves.

Performance

There are no performance issues.

Documentation

Update-UX and the update process is described in the *HP-UX 11i v2 Installation and Update Guide* at **`http://www.docs.hp.com`**. The `update-ux` command has a manpage, *update-ux* (1M).

Obsolescence

Not applicable.

Virtual Memory Kernel Tunable physical_io_buffers (Deprecated)

The Virtual Memory kernel tunable `physical_io_buffers` is used to size a shared buffer pool for physical I/O operations in the kernel.

The Virtual Memory kernel tunable `physical_io_buffers` has been deprecated and will be obsoleted post-HP-UX 11i v2.

5 Disk and File Management

What's in This Chapter?

This chapter describes other new and changed operating-system software functionality supported by the HP-UX 11i v2 release, including:

AutoFS

AutoFS is part of the ONC product known as NFS Services/800 or **B1031A**. AutoFS mounts directories automatically when users or processes request access to them, and it unmounts them automatically after they have been idle for a period of time.

Summary of Change

AutoFS has been upgraded to include the features of the SUN ONC AutoFS version 2.3 product in addition to other customer requests. These upgrades include:

- Only the file systems that are being accessed are automatically mounted, rather than all file systems hierarchically related to such file systems. This on-demand mounting is a performance enhancement.
- All directories that could be mounted for an indirect map are shown, rather than just the directories that are mounted. This browsability is a convenience for the customer.
- The device id of a mounted file system in the `/etc/mnttab` file can be used for reference during a future unmount. This is a performance enhancement as the unmount will not have to get the information from the remote file system.
- Concurrent mounts and unmounts are allowed to take place in a multi threaded automount daemon. This is a performance enhancement.
- The `ping` time-out value for remote servers can be configured based on the network setup. This is a performance enhancement as operations can better distinguish servers that are down versus those that are slow in responding.
- Loopback NFS mounts can be used instead of LOFS mounts when mounting a local file system. This provides a better functioning, highly available NFS environment.
- The CIFS client is supported.

Impact

This new version of AutoFS 2.3 is a better performing and less troublesome product than its predecessor (AutoFS1.2). Previous timing-related issues have been resolved by a better overall design.

Compatibility

There are no compatibility issues.

Performance

The performance of the new version of AutoFS has been significantly improved by its better design.

Documentation

The following manpages have changed:

- *automount* (1M)
- *automountd* (1M)

The "Configuring and Administering AutoFS" section of the *Configuring and Administering NFS Service* manual has changed. Please refer to the NFS product documentation in the Networking and Communications section of the HP documentation Web site at **http://www.docs.hp.com/**.

Obsolescence

AutoFS is the replacement for the Automounter (see "Automounter (Obsolete)" on page 112), which has been obsoleted from HP-UX 11i v2 forward. All users of this facility will need to migrate to use AutoFS.

If you were using the old Automounter previously, you should not see any difference when using AutoFS. Therefore, no migration tool is necessary.

Changes to HP-UX libc Support of AutoFS

The system C library, `libc`, provides the interface between the user program and the kernel. (This section covers `libc` changes to support AutoFS. For other changes to `libc`, see "IPv6 Support by HP-UX libc and HP-UX Commands" on page 154.)

Summary of Change

In previous releases, when AutoFS unmounted a filesystem, it obtained the device id from the filesystem server. If that server were slow, or not responding, there could be a delay of 15 seconds or more. On systems with many AutoFS-managed filesystems and many slow or non-responding servers, the cumulative delay could be quite significant.

In HP-UX 11i v2, `libc` has been changed so that the device id of each mounted file system is made available in the mounted file system table, `/etc/mnttab`. As a result, AutoFS can now pick up the device id of the filesystem to be unmounted from the `/etc/mnttab` file instead from the filesystem server, thus improving performance.

Impact

In earlier versions, the option string of each entry in the mounted file system table, `/etc/mnttab`, did not have the device id of the mounted file system. Now, with the `libc` changes, the option string of each entry of `/etc/mnttab` will have the device id of the mounted file system.

While unmounting a filesystem, AutoFS can now get the device id from the `/etc/mnttab` file instead from the filesystem server, which leads to performance improvement on systems with many AutoFS-managed filesystems and many slow or non-responding servers.

Compatibility

There are no compatibility issues.

Performance

Now that the device id of each mounted filesystem is available in the `/etc/mnttab` file, AutoFS can get the device id from the `/etc/mnttab` file instead from the filesystem server. This leads to performance improvements on systems with many AutoFS-managed filesystems and with slow or non-responding servers.

Documentation

The *getmntent* (3X) has been modified to reflect this change.

Obsolescence

Not applicable.

Automounter (Obsolete)

The Automounter mounts directories automatically when users or processes request access to them, and it unmounts them automatically after they have been idle for a period of time.

Summary of Change

HP has obsoleted the Automounter in the HP-UX 11i v2 release.

Impact

The AutoFS automounter was released in all versions of HP-UX beginning with HP-UX 10.30. Formerly co-existent with the Automounter, AutoFS is its recommended replacement. AutoFS performs the same functions as Automounter, but it has a new, more reliable design. Additionally, AutoFS uses the same maps as Automounter, and AutoFS supports the NFS PV3 protocol whereas the Automounter does not.

In summary, only AutoFS is supported in HP-UX 11i v2 and future releases. (See “AutoFS” on page 110.)

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

See “AutoFS” on page 110.

Obsolescence

AutoFS (see “AutoFS” on page 110) is the replacement for the Automounter, which has been obsoleted from HP-UX 11i v2 forward. All users of this facility will need to migrate to use AutoFS.

If you were using the old Automounter previously, you should not see any difference when using AutoFS. Therefore, no migration tool is necessary.

HP CIFS Client

The HP CIFS Client allows HP-UX users to mount as UNIX filesystems shares from CIFS file servers, including Windows servers, HP-UX machines running HP CIFS Server, Linux system running Samba, and others.

Summary of Change

The HP CIFS Client A.01.09 provides the following new features and bug fixes:

- Kerberos Authentication - This release provides Kerberos authentication within the `cifslogin` and `cifsmount` commands.
- Integration with System Kerberos Cache - This release provides a method for automatic CIFS logins by integrating CIFS authentication with programs that utilize the system Kerberos cache, such as PAM KERBEROS and `kinit`.
- Added support for new infolevel for *`FIND_FIRST`* and *`FIND_NEXT`* SMBs - An enhancement has been implemented that improves interoperability with third-party CIFS servers that do not support older SMB infolevels.
- Fix for duplicate `/etc/mnttab` entries - This fix eliminates a problem where, in certain instances, duplicate entries for CIFS-mounted filesystems could be created in `etc/mnttab`, thus causing duplicate entries to be displayed in the output of `mount`.
- Resolve of the defect of CIFS mounts becoming unuseable - This fix eliminates the cause of a rare problem wherein a CIFS mount could become inaccessible under certain conditions.

For more information about new features of this release, please see the User Manual *Installing and Administering the HP CIFS Client*, available in the “Networking and Communications” section at **`http://www.docs.hp.com`**, and in the product directory `/opt/cifsclient/HP_Docs`.

Impact

This release provides security, reliability, and interoperability enhancements to the HP CIFS Client.

Compatibility

There are no compatibility issues.

Performance

The new version of HP CIFS Client A.01.09 does not degrade performance.

Documentation

The User Manual *Installing and Administering the HP CIFS Client* and Product Release Note *HP CIFS Client Release Note* can be found in the "Networking and Communications" section at **`http://www.docs.hp.com`**, and in the product directory `/opt/cifsclient/Hp_docs`.

Obsolescence

Not applicable.

HP CIFS Server

The HP CIFS Server provides file sharing, printer access and authentication services to CIFS clients including Microsoft Windows NT, XP, 2000 and HP-UX machines running HP CIFS Client software.

Summary of Change

The HP CIFS Server 2.2e (version A.01.09.04) is available on HP-UX 11i v2.

The CIFS server 2.2e is based on Samba version 2.2.5 and contains fixes and minor enhancements. This new version of CIFS Server incorporates the new tools and new configuration parameters from the previous version 2.2d. Please refer the *CIFS Server 2.2b/c/d/e Release Note* for detail changes.

Impact

This new version of CIFS Server incorporates fixes and minor enhancements developed since Samba version 2.2.3a.

Compatibility

There are no known compatibility issues.

Performance

There are no performance issues.

Documentation

For a more detailed description of changes, please refer to the following documentation in the “networking and communications” section at **http://www.docs.hp.com**:

- *HP CIFS Server 2.2b Release Note version A.01.08.01*
- *HP CIFS Server 2.2c Release Note version A.01.09.01*
- *HP CIFS Server 2.2d Release Note version A.01.09.02*
- *HP CIFS Server 2.2e Release Note version A.01.09.04* (part number **B8725-90046**)

Obsolescence

Not applicable.

Large File System Compatibility Issue

For a compatibility issue related to the support of larger file systems, see “Usage of ustat(), statfs(), and statvfs()” on page 199.

Logical Volume Manager

As of HP-UX 11i v1.6, the Logical Volume Manager (LVM) is the designated default volume manager. As such, LVM provides a feature set on Itanium-based platforms in HP-UX 11i v2 that is equivalent to the set provided for the Logical Volume Manager (LVM) feature on PA-RISC systems in HP-UX 11i v1.

Summary of Change

- Formerly, shared LVM volumes (SLVM) were supported in ServiceGuard HA clusters with as many as eight nodes. The changes in HP-UX 11i v2 allow for the support of SLVM in configurations of up to 16 nodes.
- On HP-UX 11i v2, the LVM powerfail message has been changed from

  ```
  LVM: vg[1]: pvnum=0 (dev_t=0x32000) is POWERFAILED
  ```

  to

  ```
  LVM: VG 64 0x50000: PVLink 31 0x32000 Failed!. The PV is not
  accessible.
  ```

Impact

The same SLVM functionality that is currently available to you has been extended to larger clusters.

Compatibility

These changes are fully backward-compatible.

Performance

For existing configurations, these changes will not have any effect on performance.

Documentation

Supported configurations are documented in *MC/ServiceGuard Version A.11.15.00 Release Notes*, available at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

Swap Space Adjustment for Large Memory-Mapped Files

With HP-UX 11i v2, VxFs enables the creation of file system sizes up to 4 TB. Files can be a maximum of 2 TB. (See “VERITAS File System (VxFS) 3.5” on page 117.) Because of this, you should be aware of adjustments that may be necessary when you configure system swap space.

When you configure the amount of swap space for the system, an adjustment should be made if necessary to provide for large, memory-mapped files.

As the size of a memory-mapped file increases, the swap consumption for storing the related metadata will also increase. So, if the system will have many large memory-mapped files at runtime, then the swap on the system also must increase. For example, a 1 TB file will probably require about 4 GB of swap space for storing metadata. So for 10 such files, about 40 GB of swap space will be needed just for metadata.

VERITAS File System (VxFS) 3.5

The VERITAS File System 3.5 (HP OnlineJFS/JFS 3.5) product is an extent-based, intent-logging file system. This product is particularly geared toward UNIX environments that require high performance and availability, and that deal with large volumes of data. The VERITAS File System 3.5 (HP OnlineJFS/JFS 3.5) product is the next generation of the product known as HP OnlineJFS/JFS 3.3.

The base VERITAS File System 3.5 (HP JFS 3.5) is a new version of the base journaled file system for HP-UX 11i and is available at no charge as part of HP-UX 11i v2.

The full VERITAS File System 3.5 (HP OnlineJFS 3.5) enables advanced file system features and is ordered as a separate product.

NOTE

The terms *base VERITAS File System 3.5*, *HP JFS 3.5*, and *base VxFS* are used interchangeably throughout these release notes.

In addition, the terms *full VERITAS File System 3.5*, *HP OnlineJFS 3.5*, and *full VxFS* are used interchangeably throughout these release notes.

All of these terms may appear in other related VERITAS File System (HP OnlineJFS/JFS 3.5) documentation that accompanies this product.

Summary of Change

The VERITAS File System 3.5 (HP Online JFS/JFS 3.5) release contains the following new and changed features:

- New and/or Enhanced Tunable Parameters – *`hsm_write_prealloc`*, *`read_ahead`*, *`write_throttle`*
- Enhanced VxFS Commands – VxFS commands that have been enhanced are `vxdump`, `vxrestore`, `vxfsconvert`, and `mount`.
- New I/O Error Handling Policy – The `ioerror` option has been added to the `mount` command to provide four different ways to handle system I/O errors.
- New Default Intent Log Mode – To increase performance, the `mount` command `delaylog` option has replaced the `log` option as the default for base/full VxFS 3.5 file systems.
- New Default System Block Size - The new default file system block size is 1024 bytes for all base/full VxFS 3.5 file systems.
- VxFS System Activity Reporter - The `vxfsstat` command displays VxFS file system statistics, which can be used to analyze performance and aid in tuning.
- Forced Unmounts - A base/full VxFS 3.5-specific `vxumount` command is available in this release to perform forced unmounts of VxFS file systems.
- Disable File Access Time - The `-o noatime` option has been added to the `mount` command to disable access time updates.
- Parallel Log Replay - The `fsck -o p` option and `fsck -p` option allow a log replay on multiple file systems in parallel.

- New VxFS Directory Name Lookup Cache (DNLC) - The new DNLC caches filenames less than or equal to 32 characters instead of 39 characters as in VxFS 3.3.
- New VxFS Buffer Cache for Meta-data only - The new VxFS buffer cache can be tuned with *vx_bc_bufhw* global tunable.
- VxFS supports file systems up to 4 terabytes in size.
- Version 5 enables the creation of file system sizes up to 4 terabytes. Files can be a maximum of 2 TB.[1] File systems larger than 2 TB must be created on a VERITAS Volume Manager volume. Version 5 also enables setting up to 1024 access control list (ACL) entries.

Machines Affected or No Longer Supported

This release is the last to support the VxFS Version 2 and Version 3 disk layouts. You can still mount these older disk layout versions, but you cannot create them using the VERITAS `mkfs` command.

Impact

There are no impacts.

Compatibility

For a compatibility issue related to the support of larger file systems, see “Usage of ustat(), statfs(), and statvfs()” on page 199.

Performance

A hang issue has been observed on workstations and low-end memory systems, which can be avoided by re-setting the default tunable values. For further information, see the *HP-UX 11i v2 Installation and Update Guide*.

Documentation

For further information, see the following documentation:

- Manpages:

  This release includes the manpages as part of the VERITAS File System 3.5 (HP Online JFS/JFS 3.5) product.

- User Manuals:

  The VERITAS File System 3.5 (HP Online JFS/JFS 3.5) Administrator's Guide has been updated. Refer to **`http://www.docs.hp.com`** for more information.

Obsolescence

- The *vx_fancy_readahead* tunable is obsolete and has been replaced by the file system tunable *read_ahead*. Additionally, the following tunables are obsolete:

  — *vx_ncsize*

1. See also “Swap Space Adjustment for Large Memory-Mapped Files” on page 116.

  - *vxfs_ra_per_disk*
  - *vx_max_ra_kbytes*

- The *labelit* (1M) command is obsolete starting this release.

VERITAS Volume Manager (VxVM) 3.5

Volume Manager (VxVM) is a storage management subsystem that allows you to manage physical disks as logical devices called volumes. (A volume is a logical device that appears to data management systems as a physical disk.) VxVM overcomes physical restrictions imposed by hardware disk devices by providing a logical volume management layer. This allows volumes to span multiple disks.

With Ignite-UX installed, VxVM offers “rootability”: you can select at installation time to have your root disk managed by VxVM.

Summary of Change

VxVM 3.5 includes the following new features:

- VERITAS Cluster Volume Manager 3.5 for HP-UX (CVM) [B9117AA] - This product is purchased separately and provides enhanced volume management features for a clustered environment. It is integrated with MC/ServiceGuard and ServiceGuard OPS Edition and can be used only when version A.11.14.02 of either of those products has been installed first.
- Device Discovery Layer - This feature allows for the dynamic addition of new disk arrays without the need for a kernel rebuild and system reboot.
- SIG Licensing Product - This replaces the old ELM licensing product used for previous VxVM releases.
- VERITAS Enterprise Administrator (VEA) - This replaces the previous VMSA product used for previous VxVM releases.

Impact

VxVM 3.5 offers significant enhancements over the previous Itanium-based VxVM 3.1 release, which speed transactions, reduce processing time, and improve bandwidth usage. These improvements do not require special tuning and are particularly noticeable in large configurations.

- The maximum size of a private region has been doubled; this allows large sites to create more volume manager objects in a disk group, and is particularly useful for users who use layered volumes.
- Object creation time (especially with `vxassist`) has been reduced dramatically for configurations over approximately 5,000 objects. Volume creation time remains nearly constant up to and beyond 50,000 objects.

- Disk group import times are faster, due to improvements in object indexing and new code which improves I/O bandwidth usage while validating the on-disk configuration copies. All configurations notice faster import times, but large configurations experience the most dramatic improvements. If existing large disk groups are combined, the results are even more impressive.
- System management commands like `vxprint` and `vxstat` run in a fraction of the time, and have less impact on other operations.
- Modifying existing objects with commands such as `vxedit`, `vxmend`, and `vxdisk` takes less time. In large configurations, operations are almost instantaneous instead of taking up to half a minute.
- Now any system configuration can reach the maximum I/O throughput of the system without approaching any VxVM limitations. Large numbers of parallel resynchronous operations no longer have a significant effect on other administrative commands.

Compatibility

For a compatibility issue related to the support of larger file systems, see “Usage of ustat(), statfs(), and statvfs()” on page 199.

Performance

There are no performance issues.

Documentation

The following documents, all available at **`http://www.docs.hp.com`**, provide additional information about using VERITAS Cluster Volume Manager (CVM):

- *Managing MC/ServiceGuard* describes how to use and configure clusters with CVM and VxVM in an MC/ServiceGuard environment.
- *Configuring OPS Clusters with ServiceGuard OPS Edition* describes how to use and configure clusters with CVM in a ServiceGuard OPS Edition environment.
- *VERITAS Volume Manager 3.5 Administrator's Guide* includes a chapter, “Chapter 10, Administering Cluster Functionality,” that describes CVM features.
- *VERITAS Volume Manager 3.5 User's Guide - VERITAS Enterprise Administrator's Guide* includes a chapter, "Chapter 6, Cluster Tasks," that describes how to manage cluster features with the Storage Administrator GUI.

The following HP-UX 11i v2 documentation for VxVM 3.5 are also available on HP's documentation Web site at **`http://www.docs.hp.com`**:

- *VERITAS Volume Manager 3.5 Administrator's Guide for HP-UX*
- *VERITAS Volume Manager 3.5 Hardware Notes for HP-UX*
- *VERITAS Volume Manager 3.5 Installation Guide for HP-UX*
- *VERITAS Volume Manager 3.5 Migration Guide for HP-UX*
- *VERITAS Volume Manager 3.5 Release Notes for HP-UX*
- *VERITAS Volume Manager 3.5 Troubleshooting Guide for HP-UX*

- *VERITAS Volume Manager 3.5 User's Guide - VERITAS Enterprise Administrator for HP-UX*

Complete VxVM 3.5 manpages are delivered with the VRTSvmdoc package of the VxVM bundled product.

Obsolescence

Not applicable.

6 Internet and Networking

What's in This Chapter?

This chapter describes new and changed Internet and networking functionality supported by the HP-UX 11i v2 release, including:

HP OSI Transport Services/9000

HP OSI Transport Services/9000 (OTS/9000) is the OSI networking stack of HP-UX. It provides functions of OSI Layers 3 (Network), 4 (Transport), 5 (Session), 6 (Presentation) and ACSE/ROSE over X.25, FDDI, and IEEE802.3 LAN interfaces. It also provides RFC1006 that allows users to run OSI Services over TCP connections. Applications can use OTS/9000 via Application Program Interfaces (APIs) to layers 4, 5, 6, and ACSE/ROSE application entities.

Summary of Change

HP OTS/9000 version C.12.00 provides the following feature:

- `otsshownsaps`

  When `otsshownsaps` is executed, it shows the list of Network Service Access Point addresses (NSAPs) configured on OTS/9000. In addition, the new enhancement shows the following:

  — state of the NSAP (whether it is static or dynamic)

  — interface on which the NSAP is configured

  — the NSAP's alias

- Expedited data transfer on RFC1006 subnet

  This is an enhancement for support of transferring expedited data on RFC1006 subnet using the XTI API interface. New features are as follows:

  — Support for sending and receiving of expedited data on RFC1006 subnet, using XTI interface.

  — Support for sending user data as a part of Connect Request PDU, using XTI interface.

  — Support for 64K size Data Transfer PDUs.

  — Provides means to enable & disable the feature to support expedited data on RFC1006 subnet.

Impact

- `otsshownsaps`

  With this feature, it is now possible to find the state of an NSAP, as well as the interface to which the NSAP is configured. Where possible, the NSAP's alias is also shown.

- Expedited data transfer on RFC1006 subnet

  With this feature, it is now possible to transfer expedited data from XTI applications over the RFC1006 subnets. It is also possible to send user data as a part of the Connect Request PDU.

Compatibility

There are no known compatibility issues.

Performance

There are no performance issues.

Documentation

The OTS/9000 version C.12.00 product release notes is available online when the OTS/9000 product is installed. Please see `/opt/ots/doc/README_C1200` for an ASCII version of the release notes.

Obsolescence

Not applicable.

HP-UX Data Link Provider Interface (DLPI)

Hewlett-Packard's implementation of the Data Link Provider Interface, HP-UX DLPI, conforms to the DLPI Version 2.0 Specification as a Style 2 provider.

Summary of Change

Changes to HP-UX DLPI for HP-UX 11i v2 include the following:

- Enhancements to the Streams interface to provide a richer feature set for network stack feature options. This will impact existing IP Stream modules.
- New third-party driver interface for non-native Streams drivers.
- Updates to the native Stream driver models to fit into the HP-UX `lanscan` tool.
- Consolidation of `.h` files and elimination of obsolete functions:
  - Header files obsoleted[1]:
    - `<sio/lanc.h>`
    - `<sio/lan_dlpikrn.h>`
  - Header files deprecated[2]:
    - `<sys/netio.h>`
  - New header files:

1. No longer delivered or supported.
2. Planned for future obsolescence.

— <sio/dlpi_drv.h>

- Clarifications of subsys errors for primitives to provide more specific error status.
- Obsolescence of the dump read capability of lanscan.
- The Network Tracing and Logging (NetTL) facility logging for customers and internal tracing.

NOTE VLAN functionality is not supported in HP-UX 11i v2.

Impact

- Enhancements to the Streams interface provide a richer feature set for network stack feature options. This includes the options negotiations mechanism between the DLS user/application and the underlying drivers. This will impact existing IP Stream modules requiring recode and recompile.
- Third-party driver writers can take advantage of the non-native driver interfaces for their drivers.
- Third-party driver writers supporting their own native models can now hook more easily into the lanscan tool.
- With consolidation through obsoleting, deprecating, and adding new header files, comes a clean-up of obsolete declarations and a division of application and driver required structures.
- Clarifications of subsys errors for primitives provide more specific error status.
- The dump read capability of lanscan has been obsoleted.
- With status logging for DLPI through nettl, customers are provided additional information for events, as well as internal logging and tracing for engineering internal support.

Compatibility

- Kernel IP Stream modules that previously used options or fastpath negotiation features, or that looked into network data packets in previous versions, *must* make changes and recompile for HP-UX 11i v2.
- While third-party driver writers can now write non-native drivers, native driver writers will need to make changes if they want to interact with HP's lanscan command. This would require recoding and recompiliation.
- Driver writers will need to recode and recompile with the new included files, and will need to remove references to obsoleted include files.
- Applications that are interested in subsys errors for primitive calls will need to recode and recompile.

Performance

There are no performance issues.

Documentation

For further information, see the following documentation:

- *lanscan* (1M) (the manpage for lanscan)
- *DLPI Programmers Guide*, available at **http://www.docs.hp.com**
- *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **http://h21007.www2.hp.com/dev/**

Obsolescence

- The dump read capability of lanscan has been obsoleted.
- The following header files have been removed:
  - <sio/lanc.h>
  - <sio/lan_dlpikrn.h>
- The following header file has been deprecated:
  - <sys/netio.h>

HP-UX Web Server Suite

The HP-UX Web Server Suite is a free product available for the HP-UX platform. It contains key software products necessary to deploy, manage, and implement a mission critical Web server. The following components can be separately installed:

- HP-UX Apache-based Web Server (see page 130)
- HP-UX Tomcat-based Servlet Engine (see page 132)
- HP-UX Webmin-based Admin (see page 133)
- HP-UX XML Web Server Tools (see page 133)

Installation

The following installation changes have been made:

- Products are now separately installable into their own directory under /opt/hpws/.

NOTE Shared documentation, such as Migration Guides and FAQs, are located at `/opt/hpws/hp_docs` and are included in the HP-UX Webmin-based Admin product.

Table 6-1 Locations of Apache Products

Product	Location
HP-UX Apache-based Web Server	`/opt/hpws/apache`
HP-UX Tomcat-based Servlet Engine	`/opt/hpws/tomcat`
HP-UX Webmin-based Admin	`/opt/hpws/webmin`
HP-UX XML Web Server Tools	`/opt/hpws/xmltools`

- After installing, use the `README` and `GETTING_STARTED` documents for details on prerequisites and starting each component. The `README` is located at `/opt/hpws/README`. The `GETTING_STARTED` document is found in multiple locations under each component directory (i.e., `/opt/hpws/apache/GETTING_STARTED`).
- Products do *not* start automatically after installation. Previously, Apache would try to start on port 80.
- For updates, new configuration files are delivered in the standard location if the existing one is unchanged or nonexistent. Otherwise, they are delivered in an alternate location, allowing the system administrator to incorporate the changes individually. Detailed information can be found in the `GETTING_STARTED` document.
- Filenames and variables have changed for the RC (Resource Configuration) files, located in the `/etc/rc.config.d/` directory.

Table 6-2 Resource Configuration Filenames

Product	Filename
HP-UX Apache-based Web Server	`hpws_apacheconf`
HP-UX Tomcat-based Servlet Engine	`hpws_tomcatconf`
HP-UX Webmin-based Admin	`hpws_webminconf`
HP-UX XML Web Server Tools	`hpws_xmltoolsconf`

Installation Requirements

The following requirements must be fulfilled before certain components/features will work. See the following documentation section for the location of further information.

- Building Apache DSOs using `apxs` depends on Perl installed at `/opt/perl/bin/perl`.
- Fast Perl scripts and Apache modules written in Perl require `mod_perl` to be configured and Perl 5.8.0 (available with the Operating Environment) to be installed.

- HP-UX Tomcat-based Servlet Engine and HP-UX XML Web Server Tools requires HP-UX Developer's Kit for Java 1.3 or later. If your Web application uses Java Server Pages (JSPs) then you will also need the Java Development Kit (JDK) so you can compile the JSPs.
- HP-UX Webmin-based Admin depends on Perl 5 or later.

Documentation

Bundled documentation (Release Notes, Admin Guides, User Guides, Migration Guides and FAQs) now install into `/opt/hpws/hp_docs`. These documents can be accessed through HP-UX Apache-based Web Server, HP-UX Tomcat-based Servlet Engine, and HP-UX Webmin-based Admin by browsing to **`http://yourserver.com/hp_docs`** on the appropriate port (i.e., for Webmin on port 10000, the URL should be: **`http://yourserver.com:10000/hp_docs`**).

NOTE Shared documentation, such as Migration Guides and FAQs, are located at `/opt/hpws/hp_docs` and are included in the HP-UX Webmin-based Admin product.

The latest information can also be found on the product Web site: **`http://www.hp.com/go/webserver`**

HP-UX Apache-based Web Server

HP-UX Apache-based Web Server combines Apache with numerous popular modules from other Open Source projects and provides HP value-added features for the HP-UX platform:

- Scripting capabilities: PHP, mod_perl, CGI
- Content management: WebDAV
- Security: authentication through an LDAP server, Chrooted environment, SSL and TLS support

Summary of Change

HP-UX Apache-based Web Server v.1.0.06.01 includes the following:

- Security fixes:
  - — Apache upgraded to 2.0.46:

    All users are urged to upgrade immediately to Apache 2.0.46, which is a cumulative release that addresses and fixes the security vulnerabilities described at **`http://cve.mitre.org/`** (CAN-2003-0189, CAN-2003-0245), including all previously reported problems such as those described at **`http://cve.mitre.org/`** (CAN-2003-0132, CAN-2002-0839, CAN-2002-0843, CAN-2002-1156) and at **`http://nagoya.apache.org/bugzilla/index.html`** (BUG # 17206).
  - — Fixed OpenSSL 0.9.6i:

All users are urged to upgrade immediately to OpenSSL 0.9.6i, which is a cumulative release that addresses and fixes the security vulnerabilities described at **http://cve.mitre.org/** (CAN-2003-0147, CAN-2003-013, CAN-2003-0078).

- New features/enhancements:
  - Support for IPv6
  - mod_auth_ldap and its caching module, mod_ldap, have been added to provide authentication to an LDAP directory. These are new modules from the Apache Software Foundation. auth_ldap is still provided; however all ldap users are encouraged to begin transitioning to mod_auth_ldap. auth_ldap is provided during this transition but will be removed in a future release.
  - New Apache modules: mod_charset_lite, mod_deflate, mod_mem_cache
  - New PHP extensions, which add support for sockets, FTP, network management, XML manipulation using DOM, handling compressed files, image manipulation, and password strength checking.
  - HP-UX Apache-based Web Server is now compiled with *_USE_BIG_FDS* to raise the maximum allowed number of simultaneous open files, or maximum number of file descriptors, from 2048 to 60000 per process (depending on system configuration).
  - mod_perl upgraded to 1.99_09 and depends on Perl 5.8.0, which is included in the Operating Environments. mod_perl is upgraded in conjunction with the Apache upgrade.
- Other Fixes:
  - PHP 4.2.3, a maintenance release with a large number of bug fixes to version 4.2.2. This version of PHP also incorporates a fix for PHP bug #17466 for uid/gid in safe_mode.
  - Resolved a problem with Apache going into an infinite loop under certain network conditions, consuming 100% CPU. The details are available at **http://nagoya.apache.org/bugzilla/index.html** (BUG # 15380)
  - Resolved a problem with Apache not able to load modules written in C++.

Complete documentation detailing changes can be found after installing, at /opt/hpws/hp_docs or at **http://www.hp.com/go/webserver**.

Impact

See “Installation” on page 128.

Compatibility

This release is binary-compatible with Apache 2.0.42 and greater. All the modules compiled with Apache 2.0.42 or greater will continue to work with this version since the Apache API has not changed

Performance

Performance is similar to previous HP Apache-based Web Server 1.3.*x* and 2.*x* releases.

Documentation

See “Documentation” on page 130.

Obsolescence

Not applicable.

HP-UX Tomcat-based Servlet Engine

HP-UX Tomcat-based Servlet Engine provides customers with Java-based extensions for dynamic content generation via Servlets and JavaServer Pages (JSPs).

Summary of Change

HP-UX Tomcat-based Servlet Engine v.1.0.06.01 includes the following:

- Tomcat 4.1.12 supports ajp13 protocol
- `mod_jk` 1.2
- Support for IPv6 requires Java 1.4 JDK. See the *HP-UX Tomcat-based Servlet Engine Admin Guide* for more information on how to enable and use IPv6 with Tomcat.
- Fix to the Tomcat Admin application that had affected numerous Tomcat administrative tasks.

Complete documentation detailing changes can be found after installing, at `/opt/hpws/hp_docs` or at **`http://www.hp.com/go/webserver`**.

Impact

See “Installation” on page 128.

Compatibility

Server-side Java Servlets and JavaServer Pages (JSPs) that used Tomcat 3.x or JServ may need to be modified to use Tomcat 4.x. Configuration files have also changed in Tomcat 4.x. Details about changes can be found in the *Tomcat Migration Guide* which is included in the product. See “Documentation” on page 130 for more information.

Performance

There are no performance issues.

Documentation

See “Documentation” on page 130.

Obsolescence

Not applicable.

HP-UX Webmin-based Admin

HP-UX Webmin-based Admin is a configuration and administration GUI with extensive enhancements for the HP-UX Apache-based Web Server.

Summary of Change

HP-UX Webmin-based Admin v.1.0.06.01 includes the following:

- Webmin upgraded to 1.070:

  All users are urged to upgrade immediately to Webmin 1.070 which addresses and fixes these security vulnerabilities described at **`http://cve.mitre.org/cgi-bin/cvename.cgi?name=CAN-2003-0101`**

- HP-UX Webmin-based Admin has also been enhanced to integrate with HP-UX Internet Express.
- This release has been extensively enhanced to be more tightly integrated with the HP-UX Web Server Suite. Many changes have been made, including new HP look-and-feel, easy access to documentation, support for more Apache modules (`auth_ldap`, `mod_ssl`), and added “help” for Apache directives.

Complete documentation detailing changes can be found after installing, at `/opt/hpws/hp_docs` or at **`http://www.hp.com/go/webserver`**.

Impact

See “Installation” on page 128.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

See “Documentation” on page 130.

Obsolescence

Not applicable.

HP-UX XML Web Server Tools

HP-UX XML Web Server Tools is a collection of a Java-based XML tools used for XML parsing, stylesheet and XSL processing, Web-publishing and image translating from the Open Source projects: Xerces, Xalan, Cocoon, FOP, and Batik.

Summary of Change

New HP-UX XML Web Server Tools v.1.0.06.01 includes the following:

- Xerces-J 2.2.1, Xalan-J 2.4.1, Batik 1.5, FOP 0.20.4, Cocoon 2.0.3

Complete documentation detailing changes can be found after installing, at `/opt/hpws/hp_docs` or at **`http://www.hp.com/go/webserver`**.

Impact

See “Installation” on page 128.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

See “Documentation” on page 130.

Obsolescence

Not applicable.

Internet Services

The Internet Services product family delivers and supports the networking services considered essential to HP-UX users interoperating on TCP/IP based networks.

This section covers the following topics:

• "WU-FTPD 2.6.1" on page 148

BIND 9.2.0

The Domain Name System (DNS) is a mechanism that implements a machine name hierarchy for TCP/IP based networks. The Berkeley Internet Name Domain server (BIND) is a commonly used DNS implementation.

Summary of Change

BIND 9.2.0 provides the following new features:

- In the "options" statement, the following new options are added:
  - `dump-file`
  - `statistics-file`
  - `blackhole`
  - `coresize`
  - `sortlist`
  - `max-cache-size`
- A new option `bogus` is added to the "server" statement to prevent queries to a remote server that gives out invalid data. The default value of `bogus` is no.
- In the "zone" statement, the following new options are added:
  - `forwarders` This option specifies the IP addresses used for forwarding.
  - `allow-update` This option specifies the hosts that are allowed to submit Dynamic DNS updates to master zones.
- The command, `rndc-confgen`, can be used to generate `rndc.conf`, the `rndc` configuration file. Alternatively, it can also be run with the `-a` option to set up the `rndc.key` file to avoid the need for an `rndc.conf` file and a control statement.
- The remote name daemon control program, `rndc`, allows system administrators to control the operations of a name server. The new commands added in `rndc` are as follows:
  - `reconfig`
  - `trace`
  - `trace level`
  - `notrace`
  - `flush`
  - `flush [view]`
  - `status`
  - `start`
  - `stop`

- BIND 9.2.0 supports Incremental Zone Transfer (IXFR), a feature which enables the slave server to transfer only the modified data to the master server instead of the entire zone.
- BIND 9.2.0 supports all the DNS security features.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX IP Address and Client Management Administrator's Guide* at **http://www.docs.hp.com**.

Obsolescence

The lightweight resolver daemon, `lwresd`, which is currently hard-linked to `named`, will be deprecated in releases post 11.23.

Dynamic Host Configuration Protocol (DHCP) v6

Dynamic Host Configuration Protocol (DHCP) is an extension of `bootp` that defines a protocol for passing configuration information to hosts on a network. The current version of DHCP shipped with HP-UX 11i v2 is based on 16th version of the Internet Draft on DHCP for IPv6.

Summary of Change

The following new features are available in DHCPv6:

- New message types
- Multiple IP address request
- Configuration parameters from a DHCPv6 server
- Reconfiguration messages

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX IP Address and Client Management Administrator's Guide* at **http://www.docs.hp.com**.

The manpages associated with DHCPv6 are as follows:

- *dhcpv6d* (1M)
- *dhcpv6db2conf* (1)
- *dhcpv6client_ui* (1)
- *dhcpv6clientd* (1M)

Obsolescence

Not applicable.

gated

The routing daemon, gated, handles multiple routing protocols and replaces routed, egpup, and any routing daemon that speaks the HELLO routing protocol. The gated routing daemon currently handles the RIP, BGP, EGP, HELLO, and OSPF routing protocols.

Summary of Change

Now available in this release is ospfagt (SNMP MIB), which obtains the OSPF routing information from the gated product.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX Routing Services Administrator's Guide* at **http://www.docs.hp.com** for more information.

Obsolescence

Not applicable.

inetd

The `inetd` daemon is the Internet superserver, which invokes Internet server processes as needed. It must be running before other hosts can connect to the local host through `ftp`, `rcp`, `remsh`, `rlogin`, and `telnet`.

Summary of Change

The following new command-line option has been added:

`-r` *`count [interval]`*	This option is used by `inetd` to identify a UDP service as broken or in-loop when it receives a *`count`* number of connections in *`interval`* seconds of time. The default values for *`count`* and *`interval`* are 40 and 60 seconds respectively.

The following variable has been added to the `/etc/rc.config.d/netdaemons` file:

`INETD`	You can use the new variable *`INETD`* in the `/etc/rc.config.d/netdaemons` file to enable or disable `inetd` during system startup. If you set this variable to 1 (default value), `inetd` starts during system startup. If you set this variable to 0, `inetd` is disabled during system startup.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX Internet Services Administrator's Guide* at **`http://www.docs.hp.com`**.

Obsolescence

Not applicable.

IPv6 Support for Internet Service Products

IPv6 is the next generation Internet Protocol. It provides the infrastructure for the next wave of Internet devices, such as PDAs, mobile phones and appliances; it also provides greater connectivity for existing devices such as laptop computers.

This section only discusses information about IPv6-enhanced Internet Services software. For further information about IPv6 software, see “IPv6 Support” on page 149.

Summary of Change

The following Internet Services products are IPv6 enabled:

- BIND 9.2 (To enable IPv6 functionality in BIND 9.2.0, specify the `listen-on-v6` option in the `named.conf` file.)
- DHCPv6
- inetd
- name and address resolution resolver routines
- R-commands
- telnet
- WU-FTPD 2.6.1
- Secure Internet Services

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The following Internet Services guides have been updated to include IPv6 Information:

- *HP-UX Internet Services Administrator's Guide*
- *HP-UX Mailing Services Administrator's Guide*
- *HP-UX Routing Services Administrator's Guide*
- *HP-UX IP Address and Client Management Administrator's Guide*
- *HP-UX Remote Access Services Administrator's Guide*

The following manpages have been modified for the IPv6 functionality:

- *gethostent* (3n)
- *getnameinfo* (3n)
- *hosts* (4)
- *hosts_to_named* (4)
- *inet* (3n)
- *inet6* (3n)
- *inetd* (1m)
- *inetd.conf* (4)
- *inetd.sec* (4)
- *named* (1m)
- *named.conf* (4)
- *nslookup* (1m)
- *resolver* (3n)
- *rresvport* (3n)
- *sig_named* (1m)

- *remshd* (1M)
- *rexecd* (1M)
- *remsh* (1)
- *rcp* (1)
- *rdist* (1)
- *rlogin* (1M)
- *rlogind* (1M)
- *dhcpv6d* (1M)
- *dhcpv6clientd* (1M)
- *dhcpv6client_ui* (1)
- *dhcpv6db2conf* (1)
- *ftp* (1)
- *ftpd* (1M)
- *telnetd* (1M)
- *sendmail* (1M)

For further information about IPv6 software in this Release Notes, see “IPv6 Support” on page 149.

Obsolescence

Not applicable.

Logging User Accounting Information

Summary of Change

The `telnetd`, `rlogind`, `remshd`, `rexecd` and `ftpd` utilities now use the new scalable `utmps`/`wtmps`/`btmps` interfaces to log the user accounting information. (For more information on these interfaces, see “IPv6 Support by HP-UX libc and HP-UX Commands” on page 154.)

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The following manpages are new:

- *wtmps* (4)
- *btmps* (4)
- *utmpd* (1M)
- *getuts* (3C)
- *bwtmps* (3C)

Obsolescence

Not applicable.

named-xfer (Obsolete)

The named-xfer ancillary program is executed by *named* (1M) to perform an inbound zone transfer. It is generally used to debug problems encountered during a zone transfer.

Summary of Change

The following changes are in effect due to the obsolescence of the named-xfer utility:

- Starting from the HP-UX 11i v1.5 release, BIND 9.2 (which is available in the base operating system) does not support the named-xfer utility.
- The dig utility replaces the named-xfer utility in all releases starting from HP-UX 11i v1.5. For example, you can use the following dig command to transfer the contents of the zone *zone_to_transfer* received from the DNS server *nameserver*, to the file *db_file*:

  dig *zone_to_transfer* axfr @*nameserver* > *db_file*

  where:

db_file	Specifies the name of the file to which the zone must be dumped when the information is received from the primary server.
nameserver	Specifies the DNS server that is queried in each query.
zone_to_transfer	Specifies the name of the zone to be transferred.

  The equivalent named-xfer command is as follows:

  named-xfer -f *db_file* -z *zone_to_transfer nameserver*

  For more information on the dig utility, see the *dig* (1M) manpage.
- BIND 8.1.2 and BIND 4.9.7, which are available in the base operating systems of HP-UX 11i v1 and 11.0, respectively, are the only versions of BIND supporting the named-xfer utility.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to *dig* (1M), the manpage for the `dig` utility that has replaced the `named-xfer` utility.

Obsolescence

Starting with the release HP-UX 11i v1.5, the `named-xfer` utility and its respective manpage have been obsoleted.

rbootd (Obsolete)

The remote boot server for RMP clients, `rbootd` services initial boot-up requests from RMP clients over a local area network.

Summary of Change

HP-UX 11i v 1.6 was the last operating system that included `rbootd`. Starting from the HP-UX 11i v2 release, clients using the RMP protocol during bootup are no longer supported.

Impact

You must move from RMP to BOOTP (Internet Boot Protocol) for the HP-UX 11i v2 release.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

There are no documentation changes. For more information about `rbootd`, see the *rbootd* (1M) manpage.

Obsolescence

Not applicable.

rexecd

The `rexecd` utility is the server for the `rexec()` routine, and in the case of IPv6 systems, the `rexec_af()` routine. It expects to be started by the internet daemon (see *inetd* (1M)). The `rexecd` utility provides remote execution facilities with authentication based on user account names and unencrypted passwords.

Summary of Change

Added to rexecd is the new option, -S, which prevents a user from logging in as a superuser.

Additionally, rexecd now uses the new scalable utmps/wtmps/btmps interfaces to log user accounting information. (For more information on these interfaces, see “IPv6 Support by HP-UX libc and HP-UX Commands” on page 154.)

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for rexecd, *rexecd* (1M), has been modified.

Obsolescence

Not applicable.

rwhod

The rwhod server maintains the database used by rwho and ruptime. The rwhod server sends to, and receives status information from, other nodes on the local network that are running rwhod.

Summary of Change

The rwhod server has been updated to use the utmps interfaces to read the user accounting information.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The following manpages are new:

- *wtmps* (4)

- *btmps* (4)
- *utmpd* (1M)
- *getuts* (3C)
- *bwtmps* (3C)

Obsolescence

Not applicable.

Secure Internet Services

Secure Internet Services (SIS) is an optionally enabled mechanism that incorporates Kerberos V5 authentication and authorization for remote access services: `ftp`, `rcp`, `remsh`, `rlogin`, and `telnet`.

Summary of Change

- The following new options have been added in SIS:

  `fallback` — The `fallback` option is available in all the SIS clients (namely `rlogin`, `ftp`, `rcp`, `remsh` and `telnet`) and are set in the *`[appdefaults]`* section. If the `fallback` option is set to true and the Kerberos authentication fails, SIS clients use the non-secure mode of authentication. Refer to the *krb5.conf* (4) manpage for more information on the *`[appdefaults]`* section.

  `-f` and `-F` — For `remsh`, `rlogin` and `telnet`, the options `-f` and `-F` are set in the `\etc\krb5.conf` file with the tag names *`forward`* and *`forwardable,`* respectively.

  The `-f` option instructs `telnetd` to use the normal authentication mode whenever the `telnet` client communicates NULL type in the authentication option negotiation.

NOTE Command-line options override the configuration file options.

- IPv6 has now been enabled for R-commands:

  To enable IPv6 functionality in the SIS environment for R-commands, first change `tcp` to `tcp6` for the following two entries in the `/etc/inetd.conf` file:

```
# kshell stream tcp nowait root /usr/lbin/remshd remshd -K
# klogin stream tcp nowait root /usr/lbin/rlogind rlogind -K
```

  Next, restart `inetd` using the command `inetd -c`.

NOTE You must change the `/etc/inetd.conf` file only if the interface is configured for IPv6 functionality.

- Kerberos is supported in an IPv6 environment for `ftp`, `r-commands`, and `telnet`.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For a detailed description of Secure Internet Services, refer to the manual *Using HP-UX Internet Services* at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

Sendmail 8.11.1

`Sendmail` is an electronic mail transport agent that sends messages to one or more recipients, routing the message over whatever networks necessary.

Summary of Change

The following new options have been added to Sendmail 8.11.1:

- `AlertTmpFailure` This option logs transient error messages as *`LOG_ALERT`* messages at `Loglevel >=2` .
- `restrictqrun` This option restricts the *`-q`* command-line flag.

Impact

There are no impacts.

Compatibility

The following compatibility exceptions have been identified:

- Non-root users cannot send signals to their `sendmail` process, and use the `praliases`/`mailstats` utilities that are generally designed for administrators.
- By default, non-root users cannot process the mail queue.
- Terminating and restarting the `sendmail` daemon may not be instantaneous.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX Mailing Services Administrator's Guide* at **http://www.docs.hp.com**.

The following manpages have been changed:

- *killsm* (1M)
- *sendmail* (1M)

Obsolescence

Not applicable.

SLP 0.8

The Service Location Protocol (SLP) is an emerging Internet standard network protocol that provides a framework to allow networking applications to discover the existence, location, and configuration of networked services in enterprise networks. SLP implementation on HP-UX is based on OpenSLP version 0.8.0 developed by Caldera Systems, Inc.

SLP 0.8 facilitates the following:

- Client application requests for network service location information
- Advertisement of services
- Segregation of services and users into logical or functional groups
- Managed recovery from primary server failures

Summary of Change

SLP 0.8 is new with HP-UX 11i v2. The salient features of SLP 0.8 are as follows:

- Dynamic Service Tracking
- Ease of Administration
- Ease of Development

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX IP Address and Client Management Administrator's Guide* at **http://www.docs.hp.com**.

The following manpages are associated with SLP 0.8:

- *slpd* (1M)
- *slpdc* (1M)
- *libslp* (3N)

- *SLPOpen* (3N)
- *SLPClose* (3N)
- *SLPReg* (3N)
- *SLPDereg* (3N)
- *SLPDelAttrs* (3N)
- *SLPFindSrvs* (3N)
- *SLPFindSrvTypes* (3N)
- *SLPFindAttrs* (3N)
- *SLPParseSrvURL* (3N)
- *SLPEscape* (3N)
- *SLPUnescape* (3N)
- *SLPFree* (3N)
- *SLPGetRefreshInterval* (3N)
- *SLPFindScopes* (3N)
- *SLPGetProperty* (3N)
- *SLPSetProperty* (3N)
- *SLPError* (3N)
- *slp.conf* (4)
- *slp.reg* (4)
- *slp_syntax* (7)

Obsolescence

Not applicable.

TCP Wrappers 7.6

The TCP Wrappers product suite provides an enhanced security mechanism for services spawned by the `inetd` Internet services daemon.

Summary of Change

TCP Wrappers 7.6 provides the following features:

- Monitoring incoming requests for Internet Services
- Controlling access to services spawned by `inetd`
- Enforcing access control in stand-alone daemon programs
- Predicting how TCP Wrappers 7.6 handles a specific request for a service
- Checking the wrapper's behavior from a remote shell

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX Internet Services Administrator's Guide* at **http://www.docs.hp.com**.

The following manpages are associated with TCP Wrappers 7.6:

- *tcpd* (1M)
- *tcpdmatch* (1)
- *tcpdchk* (1)
- *hosts_access* (3)
- *hosts_access* (5)
- *hosts_options* (5)
- *tcpd.conf* (4)
- *tryfrom* (1)
- *sffinger* (1)

Obsolescence

Not applicable.

WU-FTPD 2.6.1

File Transfer Protocol (`ftp`) enables users to transfer files between a client system and a remote server system. On the client system, a file transfer program provides the user with an interface to transfer files; on the server, the requests are handled by the file transfer daemon, `ftpd`. HP's implementation of the `ftp` daemon for HP-UX 11i and later versions is based on the replacement `ftp` daemon developed at Washington University known as WU-FTPD.

Summary of Change

The following changes have been made in WU-FTPD 2.6.1:

- The `ftp` daemon audits all the login activities irrespective of a success/failure login.
- WU-FTPD 2.6.1 logs bad login attempts to the `/var/adm/btmps` file.

NOTE Bad logins are not properly audited when a user fails to login as an “anonymous” or “guest” user, as in the following cases:

- Incorrect permissions for the user's home directory in the FTP server
- Invalid entries in the `/etc/passwd` file for the anonymous or guest user
- Failure to set the effective user ID

- The following command-line options have been added:
  - `-w` This is the default option which enables the `wtmps` and `btmps` logins.
  - `-W` This option disables both the `wtmps` and `btmps` logins.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Refer to the manual *HP-UX Remote Access Services Administrator's Guide* at **http://www.docs.hp.com**.

The following manpages have been changed:

- *ftp* (1)
- *ftpd* (1M)
- *ftpusers* (4)

Obsolescence

Not applicable.

IPv6 Support

IPv6 is the next generation Internet Protocol. It provides the infrastructure for the next wave of Internet devices, such as PDAs, mobile phones and appliances; it also provides greater connectivity for existing devices such as laptop computers.

This section covers the following topics:

For pointers to other products that have changed to support IPv6, see the following "IPv6 Software Overview" on page 150

IPv6 Software Overview

The following software offers IPv6 support: Transport, Internet Services, DCE, DLPI, FDDI, SAM-NNC, libc, HP-UX commands, Desktop (CDE), X11R6-based applications, C2 Audit, EMS, Online Diagnostics, SNMP, NetTL, IPSec, Kerberos Client, ServiceGuard, GlancePlus Pak, HP-UX Secure Shell, HP-UX Web Server Suite, and the Runtime Environment (RTE) for the Java™ 2 platform.

For further information, including manpages and pointers to additional documentation, see the following:

- “Diagnostics” on page 60
- “Distributed Computing Environment (DCE)” on page 253
- “Event Monitoring Service (EMS)” on page 64
- “GlancePlus Pak” on page 68
- “HP-UX Data Link Provider Interface (DLPI)” on page 126
- “HP-UX Secure Shell” on page 181
- “HP-UX Web Server Suite” on page 128
- “IPv6 Network Transport Software” on page 150
- “IPv6 Support by Common Desktop Environment (CDE)” on page 152
- “IPv6 Support by HP Openview Emanate Agent” on page 153 (for information on SNMP)
- “IPv6 Support by HP-UX libc and HP-UX Commands” on page 154
- “IPv6 Support for Internet Service Products” on page 138
- “Kerberos Client (KRB5-Client)” on page 184
- “Network Tracing and Logging (NetTL)” on page 164
- “PCI FDDI (FDDI-00)” on page 42
- “Runtime Environment (RTE) for the Java 2 Platform” on page 227
- “MC/ServiceGuard” on page 90
- “SAM - Nodal Network Communication (NNC)” on page 96

IPv6 Network Transport Software

IPv6 is the next generation Internet Protocol. The IPv6 protocol is also referred to as “IPng” (IP next generation). IPv6 was designed by the Internet Engineering Task Force (IETF) to improve upon the scalability, security, ease of configuration, and network management capabilities of IPv4. HP-UX 11i v2 IPv6 network transport software provides host support for IPv6.

Summary of Change

HP-UX 11i v2 IPv6 network transport software supports the following features:

- IPv4/IPv6 Dual Stack support: HP-UX 11i v2 IPv6 supports both IPv4 and IPv6 applications. Programmers can write IPv6 applications that communicate with both IPv6 and IPv4 peers. Existing IPv4 applications continue working.

- IPv6 tunneling enables IPv6/IPv4 hosts and routers to connect with other IPv6/IPv4 hosts and routers over the existing IPv4 network. IPv6 tunneling encapsulates IPv6 datagrams within IPv4 packets. The encapsulated packets travel across an IPv4 network until they reach their destination host or router. The IPv6-aware host or router decapsulates the IPv6 datagrams, forwarding them as needed. IPv6 tunneling eases IPv6 deployment by maintaining compatibility with the large existing base of IPv4 hosts and routers.
- Ethernet Links and FDDI links.
- IPv6 Stateless address autoconfiguration.
- IPv6 Neighbor Discovery (which includes Router Discovery and Duplicate Address Detection).
- TCP/UDP over IPv6, PMTUv6, ICMPv6, IPv6 MIBs, Sockets APIs.
- Network Configuration and Troubleshooting Utilities for both IPv4 and IPv6 transport: `ifconfig`, `netstat`, `ping`, `route`, `ndd`, `ndp` (neighbor-discovery command for IPv6 only) and `traceroute`.
- New `netconf-ipv6` File Stores IPv6 Settings

  The `/etc/rc.config.d/netconf-ipv6` configuration file stores IPv6 configuration information similar to IPv4's `netconf` file.
- `/etc/hosts` Supports IPv4 and IPv6 Addresses

  The `/etc/hosts` file contains IP addresses and corresponding host names. The file can contain IPv4 and IPv6 addresses for the same host. Lookup policies are identical to IPv4.
- Name Service Switch

  `/etc/nsswitch.conf` (*nsswitch.conf* (4)) is a configuration file for the name service switch. A new entity, `ipnodes`, specifies which name services resolve IPv6 addresses and host names.

Impact

With only a few configuration steps, customers can enable IPv6 network transport software and realize the functional benefits of IPv6 and IPv6-enhanced components.

For customers not planning to use IPv6 software, there is no impact. Even though the software is included, there is no action needed to “not use” IPv6.

Compatibility

There are no compatibility issues with having IPv6 software in HP-UX 11i v2.

Performance

There are no performance issues.

Documentation

The following manpages have changed or are new:

- *bind* (2)
- *connect* (2)
- *ifconfig* (1M)

- *if_freenameindex* (3N)
- *if_indextoname* (3N)
- *if_nameindex* (3N)
- *if_nametoindex* (3N)
- *ip6* (7P)
- *ndd* (1M)
- *ndp* (1M)
- *ndp* (7P)
- *netfmt* (1M)
- *netstat* (1)
- *nettladm* (1M)
- *ping* (1M)
- *recv* (2)
- *route* (1M)
- *send* (2)
- *socket* (2)
- *tcp* (7P)
- *udp* (7P)

The following IPv6 network transport documentation can be found at **http://www.docs.hp.com**, in the “Networking and Communications” topic area:

- *HP-UX IPv6 Porting Guide*
- *HP-UX IPv6 Transport Administrator's Guide*

Obsolescence

Not applicable.

IPv6 Support by Common Desktop Environment (CDE)

The Common Desktop Environment 2.1 (CDE) is an environment for interacting with your workstation. When CDE is running on your system, it is said to be your system's desktop.

Summary of Change

With HP-UX 11i v2, CDE 2.1 supports IPv6. This is in addition to the IPv4 support that CDE already provides.

- The `dtspcd` (CDE subprocess control service) and `rpc.ttdbserver` (RPC-based ToolTalk database server) services should be configured to run in IPv6 mode. Please refer the corresponding manpages listed below for further details.
- The CDE Applications will support the IPv6 addresses for the `DISPLAY` environment variable.
- CDE has been enhanced to use the scalable `utmps`/`wtmps`/`btmps` services. (For more information on these services, see “IPv6 Support by HP-UX libc and HP-UX Commands” on page 154.)
- TPS has been enhanced to support IPv6.

- The audio subsystem has been enhanced to support IPv6. The audio subsystem includes the Audio server (Aserver), `asecure`, and Audio libraries (`libAlib.2`, `libAlibkt.1` [32 and 64-bit], `libAt.3`). The `libAlib.1` library does not support IPv6.

For additional changes to CDE, see "Common Desktop Environment (CDE)" on page 249.

Impact

Although the terminal emulators `hpterm` and `xterm` have not been enhanced to use the scalable `utmps/wtmps/btmps` services, the terminal emulator `dtterm` uses the scalable `utmps/wtmps/btmps` services.

The terminal emulators `hpterm` and `xterm` do not support IPv6, but `dtterm` supports IPv6 addressing.

Compatibility

CDE 2.1 is compatible with the IPv4 mode.

Performance

There are no performance issues

Documentation

The manpages of the following applications have been updated:

- `dtspcd` (CDE subprocess control service)
- `xhost` (server access control program for X)
- `recserv` (HP SharedX Receiver Service)

For further information about IPv6, see "IPv6 Software Overview" on page 150.

For further information about CDE documentation, see "Common Desktop Environment (CDE)" on page 249.

Obsolescence

Not applicable.

IPv6 Support by HP Openview Emanate Agent

The Simple Network Management Protocol (SNMP) is an industry-standard management protocol, originally designed for managing TCP/IP networks. SNMP is described by a series of Request for Comments (RFCs) that specifies and structures the information that is exchanged between managing and managed systems. Although SNMP is used predominately in TCP/IP networks, its popularity has caused its use to be extended to managing additional software and hardware products.

The Master SNMP Agent (`/usr/sbin/snmpdm`) and the collection of subagents that would attach to the Master Agent collectively form a single SNMP agent. The SNMP agent accepts SNMP Get, GetNext, and Set requests from an SNMP manager which cause it to read or write the Management Information Base (MIB). The MIB objects are instrumented by the subagents.

The HP Openview Emanate Agent, version 15.3, installs the Master Agent `snmpdm`, along with the subagents `hp_unixagt`, `mib2agt`, `trapdestagt`, and `ipv6agt` on the HP-UX 11i v2 machine.

Summary of Change

- Since HP-UX 11i v2 comes with an IPv6 protocol stack installed, the OS contains the relevant MIB support with the IPv6 subagent, `ipv6agt`. The installed files related to the IPv6 SNMP subagent are as follows:
  - `/usr/sbin/ipv6agt`
  - `/sbin/init.d/SnmpIpv6`
  - `/etc/rc.config.d/SnmpIpv6`
- The `snmpd` script is responsible for starting the `ipv6agt` also, apart from the other subagents.
- As part of the IPv6 stack, the following Request for Comments (RFCs) are supported:
  - RFC 2452
  - RFC 2454
  - RFC 2465
  - RFC 2466

Impact

If the IPv6 stack is enabled, the `snmpd` script will start the IPv6 subagent, `ipv6agt`, apart from the other subagents, `hp_unixagt`, `mib2agt`, `trapdestagt`.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues

Documentation

The *snmpdm* (1m) manpage has been changed to include IPv6 subagent-related information.

Obsolescence

Not applicable.

IPv6 Support by HP-UX libc and HP-UX Commands

The system C library, `libc`, provides the interface between the user program and the kernel. (This section covers `libc` changes to support IPv6. For other changes to `libc`, see “AutoFS” on page 110.)

The HP-UX commands discussed in this section are listed below. (For other changes to HP-UX commands, see “HP-UX Commands” on page 192.)

- /usr/sbin/reboot
- /sbin/reboot
- /usr/sbin/shutdown
- /sbin/shutdown
- /usr/bin/write
- /usr/sbin/wall
- /usr/bin/tsm
- /usr/bin/uptime
- /usr/sbin/getty
- /sbin/init
- /usr/sbin/ptydaemon
- /usr/bin/users
- /usr/sbin/acct/acctcon
- /usr/sbin/acct/acctcon1
- /usr/sbin/acct/closewtmp
- /usr/sbin/acct/utmp2wtmp
- /usr/sbin/acct/fwtmp
- /usr/sbin/acct/wtmpfix
- /usr/bin/last
- /usr/sbin/acct/runacct
- /usr/bin/finger
- /usr/bin/who
- /usr/sbin/syslogd
- /usr/sbin/uucpd

Summary of Change

Changes to libc To support IPv6 in HP-UX 11i v2, the following new Application Programming Interfaces (APIs) have been introduced as part of HP-UX libc:

- setutsent()
- getutsent()
- getutsid()
- getutspid()
- getutsline()
- pututsline()
- endutsent()
- bwtmpname()
- endbwtmp()
- setbwtmp()
- updatebwdb()
- getbwent()

While providing support for IPv6, the new solution addresses the performance scalability and feature scalability problems existing in the previous implementation. This solution introduces a daemon, utmpd, and a library, libuseracct, to manage user accounting on HP-UX.

To accommodate increases in the sizes of various fields of the structure at a future date and for scalability, the new solution implements the user-accounting database as an in-memory database of the daemon utmpd. HP-UX applications using the old /etc/utmp and /etc/utmpx files to log user-accounting information (namely, telnetd, rlogind,

login, and Common Desktop Environment applications) now log user-accounting information to the in-memory database maintained by utmpd. In addition, HP-UX commands that formerly had interaction with the old /etc/utmpx database have now been modified to use the new in-memory user-accounting database of the utmpd daemon.

The utmpd daemon does a two-way synchronization between the old /etc/utmpx database and its own database; that is, it synchronizes any entries that are added or updated in the /etc/utmpx file to its in-memory database and vice versa. The database accommodates for any increase in size of the members of the various fields of the utmps structure.

In the case of the wtmp and btmp files, there were no interfaces provided for applications to read the databases or to update the databases. These databases contain utmp-like records and have the scalability issues as described above.

The new solution provides a new shared library, namely libuseracct, which provides interfaces in which the feature scalability issues of the old wtmp and btmp databases are addressed. These databases have been designed to take care of future extensions to utmps structure. Also, a set of new bwtmps interfaces have been provided for reading from these databases and updating these databases.

The manpages of the new APIs and the daemon have the complete information about the product.

Changes to HP-UX Commands To support IPv6 in HP-UX 11i v2, the following HP-UX commands, which formerly accessed/modified the old utmpx, wtmp, and btmp files, have now been modified to access/update the new in-memory utmps database, as well as the wtmps and btmps databases:

- /usr/sbin/reboot
- /sbin/reboot
- /usr/sbin/shutdown
- /sbin/shutdown
- /usr/bin/write
- /usr/sbin/wall
- /usr/bin/tsm
- /usr/bin/uptime
- /usr/sbin/getty
- /sbin/init
- /usr/sbin/ptydaemon
- /usr/bin/users
- /usr/sbin/acct/acctcon
- /usr/sbin/acct/acctcon1
- /usr/sbin/acct/closewtmp
- /usr/sbin/acct/utmp2wtmp
- /usr/sbin/acct/fwtmp
- /usr/sbin/acct/wtmpfix
- /usr/bin/last
- /usr/sbin/acct/runacct
- /usr/bin/finger
- /usr/bin/who
- /usr/sbin/syslogd
- /usr/sbin/uucpd

New options have been added to the following commands:

- who (accepts new wtmps database if invoked with -W option)

  who (Reads in-memory utmps database)
  who <*file*> (Reads utmp records from <*file*>)
  who -W (Reads wtmps database)

- last (By default, last and lastb read the new wtmps and btmps databases. The last and lastb commands continue to read files containing old utmp-like records by using the -f option.)

  last -f <*file that contains utmp-like records*>
  last (Reads wtmps database)

- acctcon and acctcon1 (accept wtmps-like record from *STDIN* if invoked with -W option)

  acctcon1 -t -l lineuse -o reboots < wtmp (Reads utmp records from *STDIN*)
  acctcon1 -W -t -l lineuse -o reboots < wtmps (Reads wtmps-like records from STDIN)

- acctwtmp (writes the new wtmps-like record to stdout if the -X option is used. Otherwise, acctwtmp writes the old utmp-like record to stdout.)

  acctwtmp `uname` [>> /var/adm/wtmp] (Writes utmp record to STDOUT)
  acctwtmp -X `uname` [>>/var/adm/wtmps] (Writes wtmps-like to STDOUT)

- fwtmp (can be used to modify the new wtmps and btmps databases by using the -X option. Without the -X option, fwtmp continues to work on files containing utmp-like records.)

  fwtmp -X < /var/adm/wtmps (For binary to ASCII conversion)
  fwtmp -cX < /var/adm/wtmps (For binary to binary conversion)
  fwtmp -iX </var/adm/wtmps (For ASCII to ASCII conversion)
  fwtmp -icX < file1 >file2 (For ASCII to binary conversion)

- init (updates both the /etc/utmpx and the in-memory utmps databases. It also updates both the /var/adm/wtmp and /var/adm/wtmps databases.

NOTE Accounting commands that are used to modify the wtmp and btmp files—namely closewtmp, utmp2wtmp, and wtmpfix—now work on the new wtmps and btmps databases. A new option, -X, has been provided for fwtmp, last/lastb, and acctwtmp for accessing/modifying files containing wtmps-like records.

Impact

This solution is primarily intended for large server systems which support a large number of users/login sessions. The solution speeds up the response time for users to log in to such systems.

System parameters like *nproc*, *max_thread_proc*, *maxfiles*, *maxfiles_lim*, and *nfile* should be appropriately tuned to support a large number of simultaneous login sessions.

Applications that use getutx APIs to read information from the /etc/utmpx file will not see the entries being updated in real-time. There will be a time lag between the applications updating the in-memory database of the utmpd and these entries being reflected in the /etc/utmpx file.

Any entries written to the /etc/utmpx file will not be updated in the daemon's database in real time. As a result, commands like who might not show the information instantly but will eventually show it after a time lag. This time lag could range from a few seconds on lightly loaded systems to a few minutes on heavily loaded systems.

Entries written by legacy archive applications that update only the /etc/utmp file will not be reflected in the new database and commands like who will no longer report such entries. It is recommended that such applications re-compile for their entries to be reflected in the new user-accounting database.

Applications that directly read entries from the wtmp and btmp files will have to be modified to use the new bwtmps interfaces for accessing/updating the new wtmps and btmps databases.

HP-UX commands that either access or modify the utmp/x, wtmp, and btmp files have been modified to use the new interfaces and thus will be using new databases instead of their old counterparts.

HP-UX commands read the new in-memory utmps database for information related to active user sessions, and the commands access wtmps and btmps databases for other accounting related records.

Compatibility

The old interfaces getut and getutx, which update the /etc/utmp and /etc/utmpx files have not been modified. However, there will be a time lag in the entries written to these files being reflected in the utmpd's database and vice versa. But this does not break compatibility with any existing applications, as the legacy interfaces are unmodified.

Performance

The solution improves performance in the following cases:

- When a large number of login sessions are opened simultaneously (a few thousand in number) on the system and a huge number of processes are updating the user-accounting database simultaneously.

  In the earlier implementation, this situation would cause the system to enter a crawl condition. Now, with the new solution, the system will go back to a normal state in a few seconds.

- The solution also fares better with the user-accounting database containing a large number of entries. The getutsid(), getutsline() APIs perform more than two orders of magnitude better when compared to the old implementation with a user accounting database containing around 20,000 records. The new APIs give better results as the number of entries in the database increase.

The performance improvement is due to two factors:

- The linear searching of the /etc/utmp and /etc/utmpx files record-by-record to find and update an entry being replaced by a near-constant time algorithm to query the utmpd daemon's database.
- The updates to the /etc/utmp and /etc/utmpx files (disk read/writes) being replaced by updates to the in-memory database maintained by the daemon.

Documentation

For detailed information the customer should refer to the following new manpages:

- *getuts* (3C)
- *bwtmps* (3C)
- *utmpd* (1M)
- *wtmps* (4)
- *btmps* (4)

The following manpages have been modified:

- *acct* (1M)
- *acctcon* (1M)
- *date* (1)
- *finger* (1)
- *fwtmp* (1M)
- *init* (1M)
- *last* (1)
- *users* (1)
- *uucpd* (1M)
- *who* (1)
- *write* (1)

The following APIs can be found in the manpage, *getuts* (3C):

- `setutsent()`
- `getutsent()`
- `getutsid()`
- `getutspid()`
- `getutsline()`
- `pututsline()`
- `endutsent()`

The following APIs can be found in the manpage, *bwtmps* (3C):

- `bwtmpname()`
- `endbwtmp()`
- `setbwtmp()`
- `updatebwdb()`
- `getbwent()`

Obsolescence

Not applicable.

Kernel Logging (Deprecation)

Kernel Logging (KL) is a high-availability feature that gives system administrators the ability to collect the information necessary to diagnose problems with the HP-UX kernel while the system is running.

Summary of Change

HP-UX 11i v2 is the last release in which Kernel Logging is supported.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For more information, refer to the *kl* (1M) manpage.

Obsolescence

Kernel Logging will not be supported post-HP-UX 11i v2.

LAN Commands

The lanadmin Command

The Local Area Network Administration Program, `lanadmin`, administers and tests the Local Area Network (LAN).

Summary of Change

A new option, `-g`, has been added to `lanadmin` to display the MIB-II statistics and dlpi-level MIB statistics.

A new option, `-p`, has been added to `lanadmin` to display usage information about a LAN interface. The usage information includes the upper-level protocols and applications attached to the interface corresponding to the specified PPA (Physical Point of Attachment).

The `lanadmin` command now supports third-party LAN drivers.

Impact

There are no impacts.

Compatibility

The lanadmin binary from earlier HP-UX releases will not work on HP-UX 11i v2.

Performance

There are no performance issues.

Documentation

The lanadmin manpage, *lanadmin* (1M), has been modified.

For further information, see also the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **http://h21007.www2.hp.com/dev/**.

Obsolescence

Not applicable.

The lanscan Command

The lanscan command displays LAN device configuration and status.

Summary of Change

A new option, -l, has been added to lanscan to display information about PPAs (Physical Points of Attachment) that are acquired by APA.

The lanscan feature of reading from a crash dump has been removed; lanscan doesn't require the system file name, even when the system is booted with an alternate UNIX image file other than /stand/vmunix.

Impact

The lanscan command can no longer be used to read from crash dumps.

Compatibility

The lanscan binary from earlier HP-UX releases will not work on HP-UX 11i v2.

Performance

There are no performance issues.

Documentation

The lanscan manpage, *lanscan* (1M), has been modified.

For further information, see also the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **http://h21007.www2.hp.com/dev/**.

Obsolescence

The lanscan feature of reading from system image vmunix and crash dump has been obsoleted in HP-UX 11i v2.

The linkloop Command

The `linkloop` command verifies LAN connectivity with link-level loopback.

Summary of Change

The `linkloop` command was not working correctly with the Ethernet interfaces set for an MTU size other than 1500. This has been fixed in HP-UX 11i v2.

The `linkloop` command now supports third-party LAN drivers.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For further information, see the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **`http://h21007.www2.hp.com/dev/`**.

Obsolescence

Not applicable.

Network Information Service Plus (Deprecated)

Network Information Service Plus (NIS+) is a distributed database system that allows you to maintain commonly used configuration information on a master server and propagate the information to all the hosts in the network. You can read or modify these databases from any host in the network, if you have the proper credentials and access permissions. NIS+ is part of the ONC product known as NFS Services.

Summary of Change

HP-UX 11i v2 is the last HP-UX release on which NIS+ will be supported. NIS+ will be supported for the life of the OS release on 11.0, 11i v1, and 11i v2.

HP will be introducing a migration strategy to facilitate customers' move from NIS+ to LDAP. LDAP is the recommended replacement for NIS+. HP fully supports the industry standard naming services based on LDAP.

As a replacement for NIS+, the LDAP-UX product (J4269AA) offers:

- A common repository for network-based account management in LDAP directories.
- Integration (unified login) with other directory-enabled applications, including Windows.
- Login and password policies as defined by the directory server.
- Access control and other privacy features of the directory server.
- Centralized and distributed enterprise management.
- An NIS-to-LDAP gateway and migration scripts for customers moving from NIS to LDAP.

Impact

A more comprehensive replacement for NIS+, which uses LDAP, will be available in the next major release of HP-UX. For customers wishing to migrate to LDAP with current version of HP-UX 11i v2, the LDAP-UX product is available. However, there are additional considerations the customer should be aware of:

- The Netscape Directory Server will not be available with the initial release of HP-UX 11i v2. However, LDAP-UX will function with the Netscape Directory Server available on HP-UX 11.00 and 11i, as well as other directory servers products and on other platforms. See the LDAP-UX product release notes for a more comprehensive directory server support statement. (See “Documentation” on page 163.)
- Customers requiring LDAP-UX support with Trusted Systems may find the features of the HP-UX `/etc/shadow` product, *shadow* (4), as a suitable alternative.
- HP plans to offer a migration procedure, in the form of customizable scripts and a procedure checklist document, after the 11i v2 release of HP-UX.

Compatibility

If you wish to migrate from NIS+ in a Trusted Systems environment, you need to be aware that LDAP-UX is not supported with Trusted Systems. Instead `/etc/shadow`, *shadow* (4), may provide a suitable alternative.

Performance

There are no performance issues.

Documentation

For further information about LDAP-UX, see *LDAP-UX Client Services B.03.10 Release Notes* (part number **J4269-90020**), available on **`http://www.docs.hp.com`** under the “communication and security” category.

Obsolescence

NIS+ has been deprecated and will be obsoleted in a future release.

Network Tracing and Logging (NetTL)

The Network Tracing and Logging facility (NetTL) is a troubleshooting tool used to gather information on network activity and networking products, by logging product events and tracing inbound and outbound packets.

Summary of Change

The following changes have been made in this release of NetTL:

- IPv6 changes to support tracing and formatting of IPv6 packets
- Rearchitecture of the tracing framework in order to improve performance
- Provision of the graphical user interface (GUI) `nettladm`. The `nettladm` GUI was shipped in HP-UX 11i v1 but not in HP-UX 11i v1.6

The following options have been added to *nettl* (1M):

- `-mem` <*init_mem*> [<*max_mem*>]:
  - Used with first `-traceon` option only.
  - Used to set the memory (in KB) which constitutes the trace buffers that hold the trace messages until they are written to the file.
  - <*init_mem*> is used to set the initial memory used for trace buffers when tracing is turned on.
  - More memory (after the initial allocation) is allocated on a need basis; that is, when NetTL is not able to withstand the incoming traffic.
  - <*max_mem*> is used to set the maximum memory that will be used for trace buffers.
- `-bind` <*cpu_id*>:
  - Used alone or with first `-traceon` option only.
  - Used to specify the processor id to which the process that writes the trace messages to disk is to be bound to.

The above information can be displayed using `nettl -ss TRACE`.

Impact

There are no impacts.

Compatibility

The PA Shared library `libntl.sl` (both 32 bit and 64 bit) has been changed due to change in the transient storage of the tracing data before saving to disk. Therefore, this library is shipped to support backward compatibility of 32-bit and 64-bit tracing applications which are built on 11.00 and 11i. The PA Shared library `libntl.1` is shipped to support backward compatibility of 10.20 tracing applications.

Performance

NetTL's performance is improved, as the disk write is now done in the kernel and NetTL binds the disk write thread to a specific CPU.

Documentation

The *nettl* (1M) and *netfmt* (1M) manpages have been updated with IPv6 and new Tracing Framework related changes.

For further information, see the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **`http://h21007.www2.hp.com/dev`**.

Obsolescence

HP-UX 11i v2 is the last release in which `nettladm` is supported.

Network Transport (ARPA)

The ARPA services are a subset of the networking services originally developed by the University of California at Berkeley for the Advanced Research Projects Agency (ARPA). ARPA services have become a *de facto* standard for multivendor network communication.

ARPA Transport provides support for TCP/IP and Sockets. It also provides commands for administering TCP/IP.

(For information about IPv6 support, see “IPv6 Support” on page 149.)

Summary of Change

Changes made to HP-UX ARPA Transport for HP-UX 11i v2 include the following:

- Support for the HP-UX 11i v2 enhancements of HP-UX DLPI

  An OOP (Options negotiations and Out-of-Packet) header has been added to the front of all IP packets for both inbound packets from DLPI layer and outbound packets to DLPI layer.

  This change supports the HP-UX 11i v2 enhancements of HP-UX DLPI to the Streams interface to provide a richer feature set for network stack feature options.

  For more information, please see “HP-UX Data Link Provider Interface (DLPI)” on page 126.

- Enhancements to CKO (Check-sum Offload) interfaces between HP-UX Transport and DLPI

  This change makes the CKO interfaces more general with respect to the types of checksum offload hardware that HP will support, and adds sufficient flexibility to the interface that supports checksum offload for future transport protocols.

This change incorporates the DLPI OOP header to carry the type of checksum offload and the offloaded checksum itself.

The Transport internal kernel header file, `net/cko.h`, has been modified to support this enhancement.

Again, for more information, please see "HP-UX Data Link Provider Interface (DLPI)" on page 126.

- Support for dump reading by `netstat` and `arp` has been permanently removed as of HP-UX 11i v2.

  Until HP-UX 11i v1, the commands `netstat` and `arp` have provided a means for reporting information from a crash dump as well as from a live HP-UX system. Starting with HP-UX 11i v1.5, support for reading crash dumps has not been available for Itanium-based systems. Because HP-UX 11i v1.5 and 11i v1.6 only supported Itanium-based systems, this effectively means that dump reading in `netstat` and `arp` have not been supported since HP-UX 11i v1.

- IPv6 transport

  On HP-UX 11i v2, IPv6 transport is supported. For more information, see "IPv6 Support" on page 149.

Impact

- There is no impact to user space applications.
- For third-party kernel development, please see the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **`http://h21007.www2.hp.com/dev/`**.
- You will no longer be able to use `arp` and `netstat` to obtain information from crash dumps.

Compatibility

Kernel IP Stream modules that previously used options or fastpath negotiation features or looked into network data packets in previous versions *must* make changes and recompile for HP-UX 11i v2.

Performance

There are no performance issues.

Documentation

For further information see the following:

- *DLPI Programmers Guide*, available at **`http://www.docs.hp.com`**
- *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **`http://h21007.www2.hp.com/dev/`**
- "HP-UX Data Link Provider Interface (DLPI)" on page 126
- the header file <`sys/dlpi_ext.h`>

The netstat and arp manpages, *netstat* (1) and *arp* (1M), have been changed to eliminate the syntax which allows references to crash dumps.

Obsolescence

Support for crash dump reading in arp and netstat is obsoleted as of HP-UX 11i v2.

Networking libc APIs getaddrinfo() and getnameinfo()

The C library, libc, provides the interface between the user program and the kernel.

The getnameinfo() networking libc function is used to look up a host name and service name, given the binary address and port. The getaddrinfo() networking libc function is used to translate the hostname-to-address in a protocol-independent fashion.

The getipnodebyname() and getipnodeaddr() functions are the two networking libc APIs which provide the same functionality as getnameinfo() and getaddrinfo(), respectively.

Summary of Change

The following changes are applicable to the networking APIs getaddrinfo() and getnameinfo():

- The libc APIs getnameinfo() and getaddrinfo() look into the repositories specified in the ipnodes directive to resolve addresses. If this resolution fails, and if an IPv4 address is requested using a flag parameter, getnameinfo()/getaddrinfo() additionally looks into the repositories specified with the hosts directive of the /etc/nsswitch.conf file to resolve an IPv4 address. This additional lookup involves getaddrinfo() calling the gethostbyname() function, and getnameinfo() calling the gethostbyaddr() function to resolve IPv4 addresses.
- A call to getaddrinfo()/getnameinfo() may overwrite the storage which is used by the gethostbyname()/gethostbyaddr() functions to return the result. Therefore, the data returned by gethostbyname()/gethostbyaddr() should be copied to a different location before a subsequent call to getaddrinfo()/getnameinfo() (or the libc APIs getipnodebyname()/getipnodebyaddr()) is made.[1]

Impact

Networking applications that call the getnameinfo()/getaddrinfo() functions may notice a change in the value of the parameter *addrinfo* returned by these functions while resolving IPv4 addresses.

1. See also “Networking libc APIs getipnodebyname() and getipnodebyaddr()” on page 168.

Compatibility

There are no compatibility issues.

Performance

A timeout delay can be noticed due to the additional lookup by the `getaddrinfo()` and `getnameinfo()` functions.

Documentation

The following manpages have been modified:

- *getaddrinfo* (3N)
- *getnameinfo* (3N)
- *gethostent* (3N)

Obsolescence

Not applicable.

Networking libc APIs getipnodebyname() and getipnodebyaddr()

The C library, `libc`, provides the interface between the user program and the kernel.

The `getipnodebyname()` `libc` function performs the translation from nodename to IP address using the policy specified in the `/etc/nsswitch.conf` file. The `getipnodebyaddr()` `libc` function performs the translation from IP address to nodename using the policy specified in the `/etc/nsswitch.conf` file.

Summary of Change

HP-UX 11i v2 is the last operating system supporting the `libc` APIs `getipnodebyname()` and `getipnodebyaddr()` and may be removed in future releases.

Impact

You are discouraged from using the `libc` APIs `getipnodebyaddr()` and `getipnodebyname()` in your applications. Instead, you can use the `libc` APIs `getaddrinfo()` and `getnameinfo()` which support the same functionality.[1]

Compatibility

There are no compatibility issues.

1. See “Networking libc APIs getaddrinfo() and getnameinfo()” on page 167.

Performance

There are no performance issues.

Documentation

The following manpages have been modified:

- *getaddrinfo* (3N)
- *getnameinfo* (3N)

Obsolescence

Not applicable.

The nslookup Program

The nslookup program is used to query the Internet domain name servers interactively.

Summary of Change

The nslookup program has been extended to follow the configured host name resolution algorithm and to query NIS, DNS, and host tables.

When nslookup receives an answer packet larger than 512 bytes, it prints the resource records that can be interpreted from the record, and a single error message for the remaining records is printed, instead of printing error messages for all the uninterpreted records.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

There are no documentation changes. For further information about nslookup, see the *nslookup* (1) manpage.

Obsolescence

Not applicable.

Router Discovery Protocol Daemon (rdpd) (Obsolete)

The router discover protocol daemon, `rdpd`, implements the host portion of the router discovery protocol.

Summary of Change

The `rdpd` daemon is transitioning from an obsolescent state to obsolete. Any references to `rdpd` have been removed, and `rdpd` will no longer start at bootup.

The functionality of `rdpd` has been subsumed in `gated`. See the `routerdiscovery` statements described in *gated* (4).

Components for `rdpd` are delivered into `/usr/old/sbin`, `/usr/old/sbin/init.d`, and `/usr/old/sbin/rc*.d`.

Impact

Instead of relying on `rdpd`, you will instead have to use `gated`, which is more flexible.

Compatibility

You should not use `rdpd` if you have enabled `routerdiscovery` client when running `gated`.

Performance

There are no performance impacts.

Documentation

The manpage for `rdpd`, *rdpd* (1M), has been modified to show that the daemon is obsolete.

Obsolescence

The `rdpd` daemon is obsolete. It is longer be supported, but will still be delivered in `/usr/old`. It will be removed in a future release.

Web Browsing

HP-UX 11i v2 includes two Web browsers: Mozilla (the default) and Netscape 7.

Mozilla Application Suite

Mozilla 1.2.1 (product number **B9005AA**) is an Open Source Web browser, very similar to Netscape 7.0. Netscape 6/7 is actually based on the Mozilla code base.

Summary of Change

Mozilla 1.2.1 has been added as the default browser for HP-UX 11i v2. A Netscape browser is also still available.

Additional information about Mozilla 1.2.1 can be found at **www.hp.com/go/mozilla**.

Impact

Mozilla has almost the same functionality as previous versions of Netscape. It has more bug fixes, more performance improvements, and more standards compliance than any version of Netscape on HP-UX.

Compatibility

Multi-media plug-in support for these browsers is slightly different than for Netscape Communicator 4.7x. For details, please see **http://www.hp.com/products1/unix/java/mozilla/mozilla_plugins.html**.

Performance

The first time it is started, Mozilla will be slower than Netscape 4.x because it's creating a profile. After that, it should come up just as quickly.

Documentation

The documentation for Mozilla 1.2.1 is included in the Help menu of the product itself. README files are also included in the bundle.

Further information about Mozilla 1.2.1 can be found at **www.hp.com/go/mozilla**.

Obsolescence

Netscape will continue to be distributed for HP-UX through 10/2005. No defect fixes will be provided during this time, though all defects will be addressed in the Mozilla product, which is the upgrade for Netscape.

Netscape 7

Netscape 7.0 (product number **B6835AA**) is a Web browser, email client, and HTML editor based on the open source Mozilla browser. Netscape 7 is similar to, and the replacement for, Netscape Communicator.

Summary of Change

Netscape 7.0 has replaced Netscape Communicator 4.79 on HP-UX 11i v2. Mozilla is the default browser.

Impact

Netscape 7 and Netscape Communicator are very similar. Although you will notice some differences in the interface, the basic functionality is the same.

Compatibility

Multi-media plug-in support for these browsers is slightly different than for Netscape Communicator 4.7x. Please see **www.hp.com/go/netscape_plugins** for details.

Performance

The first time it is started, Netscape 7 will be slower than Netscape Communicator because it's creating a profile. After that, it should come up just as quickly.

Documentation

The documentation for Netscape 7 is included in the Help menu of the product itself. README files are also included in the bundle.

Also see **www.hp.com/go/netscape** for more information.

Obsolescence

Netscape 7 and Communicator will continue to be distributed for HP-UX through 10/2005. No defect fixes will be provided during this time, though all defects will be addressed in the Mozilla product, which is the upgrade for Netscape.

7 Security

What's in This Chapter?

This chapter covers changes and enhancements to security services, including:

Boot Authentication

The Boot Authentication feature makes it possible to configure a system so that only authorized users are allowed to boot the machine into Single-user Mode.

Summary of Change

Formerly, the Boot Authentication feature was only available on systems that have been converted to Trusted Mode. Starting with HP-UX 11i v2, the feature is available on all Standard Systems.

The Trusted Mode Boot Authentication feature remains unchanged, while the Standard Mode Boot Authentication feature can be configured by two parameters in the `/etc/default/security` file. They are *`BOOT_AUTH`* and *`BOOT_USERS`*. See the *security* (4) manpage for more detailed information.

Impact

If you wish to protect your system against unauthorized booting into Single-user Mode, you may now do so without converting to Trusted Mode.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The *init* (1M) and *security* (4) manpages have been updated.

Obsolescence

Not applicable.

File Descriptor Allocation

The behavior of the file descriptor allocation in HP-UX 11i v2 has been changed to prevent security problems such as unauthorized modification of root-owned files. For further information, see “File Descriptor Allocation” on page 213.

Generic Security Service Application Programming Interface (GSS-API)

The Generic Security Service Application Programming Interface (GSS-API) provides security services for applications independent of the various underlying security mechanisms. The services include authentication, integrity, and/or confidentiality services.

Summary of Change

The GSS-API product is now delivered as part of HP-UX 11i v2. The following change has been made to GSS-API:

- IPv6 support has been enabled.

See also “Kerberos Client (KRB5-Client)” on page 184.

Impact

Users must recompile their existing Kerberos and GSS-API applications to take advantage of the IPv6 features.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

Further information may be found in the *Configuration Guide for Kerberos Client Products on HP-UX*, available on the Web at
`http://www.docs.hp.com/hpux/onlinedocs/J5849-90007/J5849-90007.html`

Obsolescence

Not applicable.

HP-UX Auditing System

The purpose of the auditing system is to record instances of access by subjects to objects and to allow detection of any (repeated) attempts to bypass the protection mechanism and any misuses of privileges, thus acting as a deterrent against system abuses and exposing potential security weaknesses in the system.

The audevent command changes the auditing status of the given events or system calls. The audisp command analyzes and displays the audit information contained in the specified *audit_filename* audit files.

Summary of Change

Currently, audevent and audisp accepts a number of previously obsoleted system call names and a list of undocumented event types as valid arguments. These options are deprecated in HP-UX 11i v2, and they are slated to be obsoleted in the next release. In other words, such names are accepted as valid arguments in HP-UX 11i v2, but in the next release, they will generate an error.

The accepted, but to-be-obsoleted system call options include:

- sethostid
- rfa_netunam
- ipccreate
- ipclookup
- ipcconnect
- ipcrecvcn
- ipcshutdown
- ipcdest
- kload
- ca_setpgrp
- ulimit64

The accepted, but to-be-obsoleted, event type options include:

- creds
- sock
- file
- link
- unlink

Impact

You should stop using the listed system call names as options to audevent and audisp. Although these system calls were obsoleted previously, the HP-UX Auditing System was not updated accordingly. With HP-UX 11i v2, these system calls are still treated as valid by the Auditing System, but they will not be in future releases.

You should also stop using the listed to-be-obsoleted event type options with audevent and audisp. These event type options were never documented and had no effect to the system in the past, but they were accepted by audevent and audisp as valid options.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The audevent and audisp manpages, *audevent* (1M) and *audisp* (1M), have been updated.

Obsolescence

See previous sections.

HP-UX Bastille

HP-UX Bastille 2.1 is a security hardening/lockdown tool which can be used to enhance the security of the HP-UX operating system. It provides customized lockdown on a system-by-system basis by encoding functionality similar to the Bastion Host and other hardening/lockdown checklists.

Bastille was originally developed by the open source community for use on Linux systems. HP is contributing by providing Bastille on HP-UX.

This tool, along with Install-Time Security (ITS) 1.0[1] and Security Patch Check (SPC) 1.3[2], introduces new, out-of-the-box security functionality.

1. For further information, see “Install-Time Security” on page 182.
2. For further information, see “Security Patch Check” on page 186.

Summary of Change

Previously available via the Web only, HP-UX Bastille 2.1 is now included in the HP-UX 11i v2 Operating Environments. The new version adds finer granularity of configuration, improved question flow, better input validation, and new lockdown features to include configuration of IPFilter and password shadowing.

HP-UX Bastille may also be downloaded from **http://www.hp.com/go/bastille**.

Impact

Since it is included in the Operating Environments, system administrators will find Bastille easier to install and configure. In addition, Bastille can configure a system during installation (and during later system operation) at one of four predefined security configurations, ranging from none to a level appropriate for a network Demilitarized Zone (DMZ).

Administrators can also create their own custom configurations through an interactive runtime interface that poses and explains over 70 security issues.

For the effects of Bastille's options on the Common Desktop Environment, see "Common Desktop Environment (CDE)" on page 249.

Compatibility

Since Bastille shuts off services and configures supported HP-UX parameters, some tools that rely on other settings, or services that Bastille turns off may either not be fully functional or cease to function. Those conflicts are either described in general terms within the security/compatibility questions that Bastille presents, or in the dependant HP-UX application, as appropriate.

For the compatibility of Bastille's options with MC/ServiceGuard, see "MC/ServiceGuard" on page 90.

Bastille and ITS rely on IPfilter for host-based firewall protection. Since IPFilter does not support some interfaces currently, those interfaces would not be protected. For a full list of supported interfaces, see the *HP-UX IPFilter A.03.05.06 Release Notes* at **http://www.docs.hp.com/hpux/onlinedocs/B9901-90020/B9901-90020.html**.

Performance

There are no performance issues.

Documentation

Note that the Bastille product has incorporated the recommendations of a number of security checklists and documents, including the now-retired HP-UX Bastion-Host whitepaper into a rich and educational wizard-style interface.

More information can be found in the following documents:

- *bastille* (1M) manpage (add `/opt/sec_mgmt/share/man/` to `MANPATH`)
- *Bastille User's Guide* delivered in `/opt/sec_mgmt/bastille/docs/user_guide.txt`
- HP-UX Bastille Web site at **http://www.hp.com/go/bastille**

- *HP-UX 11i v2 Installation and Update Guide*, online at **http://www.docs.hp.com**
- Chapter 8 of *Managing Systems and Workgroups*, online at **http://www.docs.hp.com**
- “Common Desktop Environment (CDE)” on page 249
- “MC/ServiceGuard” on page 90
- *HP-UX 11i Security* by Chris Wong (Prentice Hall PTR, ISBN 0-13-033062-0), see **http://www.hp.com/hpbooks/prentice/ptr_0130330620.html**

Obsolescence

Not applicable.

HP-UX Host Intrusion Detection System (HIDS)

HP-UX HIDS v2.2, product number **J5083AA**, provides continuous and near real-time surveillance for HP-UX servers to help identify potential malicious activities on the host.

Summary of Change

HP-UX HIDS v2.2 is a maintenance release containing defect fixes and a few enhancements. No new functionality is included in this version.

For more details and specific information, please refer to the product Release Notes at **http://www.docs.hp.com/hpux/internet/**. Select “Intrusion Detection System.”

Impact

Customers using the default template setting provided with the product will notice fewer alerts under certain conditions. See the product Release Notes for more details and specific information.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

All documentation is available on the Web at **http://www.docs.hp.com/hpux/internet/** (select “Intrusion Detection System”), including:

- *HP-UX Host Intrusion Detection System Administrator's Guide*

Updated and enhanced for version 2.2.

- *HP-UX Host Intrusion Detection System Version 2.2 Release Notes*

  Product changes and installation.

Obsolescence

This maintenance release (v2.2) is the actively supported version. All older versions are discontinued. Customers using older versions of the product are strongly encouraged to update to this version.

HP-UX IPFilter

HP-UX IPFilter (B9901AA) version A.03.05.06 is a statefull system firewall that filters IP packets to control packet flow in or out of a machine. It works as a security defense by cutting down on the number of exposure points on a machine.

HP-UX IPFilter is based on ipfilter v3.5 alpha 5 from the public domain.

Summary of Change

HP-UX IPFilter version A.03.05.06 provides:

- support for HP-UX 11i v2 on the Itanium®-based platform
- automatic installation with all HP-UX Operating Environments

Impact

There are no impacts.

Compatibility

Using IPFilter and ServiceGuard requires specific IPFilter rules to ensure proper operation of ServiceGuard clusters. The rules for using IPFilter and ServiceGuard are documented in the *IPFilter version A.03.05.06 Release Note*, available at **`http://www.docs.hp.com`**.

Performance

There is no significant performance impact with HP-UX IPFilter.

Documentation

All customer documentation and white papers can be found in the Internet and Security Solutions section at **`http://www.docs.hp.com`**, including:

- *Installing and Administering HP-UX IPFilter version A.03.05.06*

- *HP-UX IPFilter version A.03.05.06 Release Note*

For FAQs and forums, go to the IT Resource Center at **http://itrc.hp.com**.

Obsolescence

Not applicable.

HP-UX Secure Shell

HP-UX Secure Shell A.03.10, based on OpenSSH 3.1p1, provides a secure channel for remote communication by transparently encrypting network traffic. HP-UX Secure Shell uses hashing to ensure data integrity and supports several authentication methods.

Summary of Change

HP-UX Secure Shell is a new product in the HP-UX 11i Operating Environments.

HP-UX Secure Shell A.03.10 is not vulnerable to the following CERT Advisories:

- CA-2002-24: Trojan Horse OpenSSH Distribution
- CA-2002-23: Multiple Vulnerabilities in OpenSSL
- CA-2002-18: OpenSSH Vulnerabilities in Challenge Response
- CA-2002-07: Double Free Bug in zlib Compression Library

Impact

HP supports HP-UX Secure Shell at no additional cost to customers with HP-UX support agreements. HP-UX Secure Shell is a fully tested HP product. HP built HP-UX Secure Shell A.03.10 with the following libraries:

- zlib v1.1.4
- OpenSSL v0.9.6c
- TCP Wrappers v7.6
- Kerberos-4 v1.1.1

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For installation and quick configuration steps, see the *HP-UX Secure Shell Release Notes* for version A.03.10 at the following URL:
http://www.docs.hp.com/hpux/internet/index.html#HP-UX%20Secure%20Shell

There are several HP-UX Secure Shell manpages available. Use the ssh manpage to learn about HP-UX Secure Shell technology. Use the sshd manpage to learn about the HP-UX Secure Shell daemon. The ssh and sshd manpages also contain references to additional task-specific HP-UX Secure Shell manpages.

For answers to questions about HP-UX Secure Shell, consult the "HP-UX Secure Shell FAQs" by searching the IT Resource Center at **http://www.itrc.hp.com**. Search for keywords "HP-UX Secure Shell Frequently Asked Questions (FAQs)."

A large volume of information exists for Secure Shell technology. HP recommends learning more by reading O'Reilly's *SSH, The Secure Shell - The Definitive Guide* by Daniel J. Barrett and Richard E. Silverman.

You can also learn about Secure Shell technology at the following locations:

- OpenSSH at **http://www.openssh.com**
- IETF at **http://www.ietf.org/** (go to Working Groups > Security)
- HP's *HP-UX 11i Security* book by Chris Wong. A portion of the HP-UX Secure Shell content is available at **http://searchnetworking.techtarget.com**. Go to the "Tips and Newsletters" section and do a search on the keywords "Chris Wong."

Obsolescence

Not applicable.

Install-Time Security

Install-Time Security 1.0 adds a security step to the install/update process that allows you to configure the Bastille security lockdown engine during system installation.

Summary of Change

In earlier releases, Bastille had to be downloaded and installed from the HP Software Depot. In HP-UX 11i v2, Bastille is included in the Operating Environment, along with Security Patch Check and IPfilter.

During an installation step, you can choose among four preconfigured levels of security (the default is none):

Security Levels:

1. Sec00Tools - Install security infrastructure without applying security
2. Sec10Host - Host-Based Lockdown, without IPFilter configuration

3. Sec20MngDMZ - Lockdown + block most incoming traffic with IPFilter firewall
4. Sec30DMZ - DMZ-Appropriate, Host-Based and IPFilter Network Lockdown

For precise configuration information, please refer to the README or Chapter 2 of the *HP-UX 11i v2 Installation and Update Guide*.

The readme is available by running the `swlist` command as follows:

`swlist -a readme -s <depot path> <Level Bundle>`

Example:

```
swlist -a readme -s mysystem:/var/spool/sw Sec30DMZ
```

IMPORTANT

During installation, you configure security elements on the Software Selection Screen. This screen is used to configure a wide variety of optional software.

In the box on the left side of the screen, select Security Choices. In the right side box, select which of the three SecLevel* Bastille nondefault security levels you want. You can also select Security Patch Check and other security tools. See the *HP-UX 11i v2 Installation and Update Guide* for details.

The system is only secured during the first boot of the new kernel, when Install-Time security has had a chance to run shortly after the software configuration phase. To guarantee security *during* installation, a local install using media is recommended.

Impact

Install-time security makes it simpler for system administrators to configure the Bastille security lockdown engine prior to first boot to one of four predefined security configurations, ranging from none to DMZ.

Compatibility

See “Compatibility” on page 178.

Performance

There are no performance issues.

Documentation

- *HP-UX 11i v2 Installation and Update Guide*
- “HP-UX Bastille” on page 177
- “Security Patch Check” on page 186
- “HP-UX IPFilter” on page 180

Obsolescence

Not applicable.

Kerberos Client (KRB5-Client)

The KRB5-Client product helps to provide Kerberos authentication and strong cryptography for secure communication over the network.

Summary of Change

The KRB5-Client is now delivered as part of HP-UX 11i v2. The following changes have been made to the KRB5-Client:

- Support for appdefaults section in the `/etc/krb5.conf`:

  Each tag in the [appdefaults] section of the `/etc/krb5.conf` defines a Kerberos V5 application. The value of the tag is a subsection with relations that define the default behaviors for that application. For example:

  ```
  [appdefaults]
      kinit = {
         forwardable = true
      }
  ```

  The application defaults specified in this section are over-ridden by those specified in the *`[realms]`* section.

  Two new APIs, `krb5_get_appdefault_string()` and `krb5_get_appdefault_boolean()`, have been added to `/usr/share/libkrb5` library. Applications can now use these APIs to get the default values from the appdefaults section of the Kerberos Configuration file.

- Multidomain support:

  The `krb5_parse_name()` has been modified to obtain the principal's realm name from the W2K multidomain if the LDAPUX product has been configured with W2K multidomain. If the principal is not present in the W2K multidomain, then the principal's realm will be the default realm, as specified in the Kerberos Configuration file.

  The *`ldapux_multidomain`* flag needs to be set to 1 by the administrator if the realm name of the user needs to be obtained from the W2K multidomain.

- Support for IPv6 is enabled in KRB5-Client

See also “Generic Security Service Application Programming Interface (GSS-API)” on page 175.

Impact

Users must recompile their existing Kerberos and GSS-API applications to take advantage of the IPv6 features.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

- The following manpages have been changed:
  - `/usr/share/man/man3.Z/libkrb5.3`
  - `/usr/share/man/man4.Z/krb5.conf.4`
- Further information may be found in the *Configuration Guide for Kerberos Client Products on HP-UX*, available on the Web at **`http://www.docs.hp.com/hpux/onlinedocs/J5849-90007/J5849-90007.html`**.

Obsolescence

Not applicable.

PAM Kerberos

The Pluggable Authentication Modules (PAM) [OSF RFC 86.0] are an easily configurable framework that provides support for multiple authentication technologies on HP-UX. PAM Kerberos (Product No. **J5849AA**) is the PAM module that provides support for the Kerberos authentication protocol.

Summary of Change

PAM-Kerberos in HP-UX 11i v2 supports both Itanium and PA-RISC applications in 32-bit mode.

To increase security and to conform to standards, a user now cannot change another user's password even if the user is aware of the other user's password. To achieve this new feature, the following changes have been made:

- When a user logs onto a system using PAM kerberos they obtain credentials that are stored in a file. This file is deleted when the user logs out of the system if the `/etc/pam.conf` file contains an entry for PAM Kerberos under session management and the application calls `pam_close_session()`.
- The new tool, `pamkrbval`, helps administrators validate the PAM Kerberos setup. It validates the following files for PAM Kerberos related entries:
  - `/etc/pam.conf`
  - `/etc/pam_user.conf`
  - `/etc/krb5.conf`
  - `/etc/krb5.keytab`

- In the /etc/pam.conf file, if the flag *krb_prompt* is added to either the login or password entry, the prompt explicitly specifies kerberos as shown below:

```
$ old password        <----- Previous output
$ old kerberos password <----- Output if krb_prompt is specified
```

Impact

By preventing a user from changing another user's password, systems now conform to standards and are now more secure.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The pamkrbval manpage, *pamkrbval* (1M), is now available.

The pam_krb5 manpage, *pam_krb5* (1), has been updated to reflect all changes.

Obsolescence

Not applicable.

Security Patch Check

Security Patch Check is a tool that analyzes the currency of a system with respect to security patches. It recommends patches for security vulnerabilities that have not been fixed by other patches currently on the system. Use of the Security Patch Check (SPC) software tool can help efficiently improve system security, but does not guarantee system security. SPC can be set up as part of the Bastille interactive configuration or manually.

Summary of Change

Previously available only via the Web, Security Patch Check version 1.3 is now included in the HP-UX 11i v2 Operating Environments. This version of security patch check does better corner-case handling, and incorporates a number of bug-fixes and clearer wording.

Impact

Security Patch Check simplifies the process of determining whether you have all the relevant security patches on your HP-UX 11.x system.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

- *security_patch_check* (1M) manpage (add `/opt/sec_mgmt/share/man/` to `MANPATH`)
- *Managing Systems and Workgroups*, Chapter 8
- “HP-UX Bastille” on page 177

Obsolescence

Not applicable.

Shadow Passwords

The new Shadow Password feature enhances system security by hiding user-encrypted passwords in a shadow password file.

Summary of Change

The HP-UX 11i v2 release introduces an optional, configurable Shadow Password feature based on the *de facto* standard provided by other UNIX flavors, including Sun Solaris™ and Linux. Encrypted passwords previously stored in the publicly readable `/etc/passwd` file can be moved to `/etc/shadow`, which is accessible only by a privileged user. For HP-UX 11i v2, Shadow Passwords are not supported with NIS nor NIS+.

Impact

The Shadow Passwords feature is optionally configurable, and is inactive by default. The feature has no impact on systems running in trusted mode. Additionally, systems in standard mode are not impacted until the `pwconv` command is run to activate the feature. The feature can be subsequently deactivated by running the `pwunconv` command.

Compatibility

The behavior of systems running in trusted mode is not changed. When run in standard mode, the `pwconv` command now converts the system to use Shadow Passwords.

In HP-UX 11i v2, Shadow Passwords are not supported with NIS nor NIS+. Do not run `pwconv` on these configurations.

On a system which has been converted to use Shadow Passwords, the only applications that can be affected are those that either use the `getpwent`/`getpwnam` interfaces, or directly access the password field of the `/etc/passwd` file with the assumption that password and aging information resides there. Every password field is set to `x`, and the corresponding encrypted password is stored in the `/etc/shadow` file, which is accessible only by privileged users.

Performance

There are no performance issues.

Documentation

The following manpages have been updated appropriately:

- *pwconv* (1M)
- *pwunconv* (1M)
- *pwck* (1M)
- *passwd* (1)
- *getspent* (3C)
- *putspent* (3C)
- *passwd* (4)
- *shadow* (4)
- *security* (4)

Obsolescence

Not applicable.

Strong Random Number Generator

HP-UX 11i v2 Strong Random Number Generator provides a secure, non-reproducible source of binary sequences for applications that generate encryption keys and other cryptographic quantities. It extracts informational entropy from sub-microsecond timing data associated with external interrupts. In contrast to pseudo-random number generators such as *random* (3M), this feature does not depend on computationally deriving random sequences from seed values, and is truly unpredictable. It provides a higher degree of security for cryptographic applications.

Summary of Change

The Strong Random Number Generator is new in HP-UX 11i v2. This feature is provided as a Dynamically Loadable Kernel Module (DLKM) that can be configured into or removed from the HP-UX kernel without rebooting the system. This feature only requires that the `/dev/random` and `/dev/urandom` devices are not in use during removal or upgrade. Installation, upgrade, and removal can be completed without system downtime.

The /dev/random device interface provides random, unpredictable binary sequences through the standard read system call. This read blocks temporarily if the kernel-resident device buffer is too empty to guarantee the highest level of entropy. The /dev/urandom device interface has the advantage of a non-blocking read call, but the entropy may be much more dilute than that provided by /dev/random. This device interface also provides non-reproducible random data, but relies on cryptographic hashing to guarantee a non-blocking source of random numbers.

It is intended that the /dev/[*u*]random read interfaces provide transparent binary compatibility for applications developed on Linux. However, the various ioctl commands available with the Linux /dev/random device are not available with this feature. These commands do not appear to be of general use to applications. The Linux write capability to /dev/random internal buffering within the kernel is also not available since it potentially could constitute a security problem.

More information can be found in the *random* (7) manpage.

Impact

Space requirements are very small. When loaded, it uses less than 100KB of memory. For security reasons, this feature does not store state or initialization data on disk or other permanent devices. The DLKM and configuration files take less than 100KB on disk.

Compatibility

There are no compatibility issues.

Performance

The performance impact to external interrupt handling, even when the strong random number generator is heavily utilized, is very small—much less than 1% of the overhead associated with interrupt handling.

Documentation

More information can be found in the *random* (7) manpage.

Obsolescence

Not applicable.

8 Commands and System Calls

What's in This Chapter?

This chapter provides information about new and changed commands and system calls, including:

HP-UX Commands

The envd Environment Daemon

The envd daemon is a system physical environment daemon which provides a means for the system to respond to environmental conditions, such as an over-temperature condition and chassis fan failure detected by the hardware.

Summary of Change

The envd daemon was not supported on the Itanium®-based platform in the previous release. Now the Itanium Core Hardware Monitor (ia64_corehw) has been modified to support the envd daemon.

Impact

Customers who are migrating from PA-RISC to the Itanium-based platform can use envd.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for *envd* (1M) command has been changed to indicate that this functionality is available on both PA-RISC and Itanium-based platforms.

Obsolescence

Not applicable.

The groupadd, groupdel, groupmod, useradd, userdel, usermod Commands

The groupadd command adds a new group to the system, the groupdel command deletes a group from the system, and the groupmod command modifies a group on the system.

The useradd command adds a new user login to the system, the userdel command deletes a user login from the system, and the usermod command modifies a user login on the system.

Summary of Change

In trusted mode operation, the groupadd, groupdel, groupmod, useradd, userdel, usermod commands now write audit records into the audit subsystem's audit trail. This is required for "Common Criteria." (More information on "Common Criteria" can be found at **http://www.commoncriteria.org**.)

By default the useradd command will not change the ownership of the home directory (shared home directory or an existing directory) and the underlying files for the new user being added. However, a new option, -r, has been added for the useradd command to set or unset this behavior.

Impact

The groupadd, groupdel, groupmod, useradd, userdel, usermod commands are now self-auditing.

If you want useradd to change the ownership of a home directory that already exists, you can set this behavior by using the -r option to specify the default behavior of the useradd command. Refer to the *useradd* (1M) manpage for more details.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for *audit* (5) has been modified to mention groupadd, groupdel, groupmod, useradd, userdel, usermod as self-auditing commands.

The manpage for *useradd* (1M) has been modified to document the functionality of the new option -r, as well as the behavior of the useradd command.

Obsolescence

Not applicable.

The psrset Command

The psrset utility controls the management of processor sets.

Summary of Change

The kernel now supports Real Time Extension to processor sets in HP-UX 11i v2, and psrset has been enhanced to manage the RTE processor set.

The following new options have been added for RTE processor set:

-l	Lists all the processor sets that are configured as RTE processor set.
-m *pset_id*	Marks a processor set with the identification number, *pset_id*, as an RTE processor set.

`-s` *`pset_id`* Un-marks the processor set with the identification number, *`pset_id`*, as an RTE processor set.

`-R [processor_list]` Creates a new RTE processor set and displays the processor set identification number (*`pset_id`*) for the new processor set.

For other changes to `psrset`, see “HP-UX Processor Sets” on page 75.

Impact

Through the `psrset` command, you are now able to get information about RTE processor sets, as well as modify them.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for the `psrset` command, *psrset* (1M), has been updated to document the new options added for RTE processor set support.

See also “HP-UX Processor Sets” on page 75.

Obsolescence

Not applicable.

The setboot Command

The `setboot` command displays and sets boot variables in stable storage (also known as nonvolatile memory). The `setboot` command can be used for setting the primary boot path and alternate boot path.

Summary of Change

Now added is the support for setting the High Availability (HA) Alternate boot path using a new option `-h`.

The SpeedyBoot[1] firmware and software extensions allow a superuser to control which firmware tests are executed by the system during the boot process. Formerly, the `setboot` command could only be used to set these firmware tests on a PA platform. Now, however, `setboot` has been enhanced to support the setting of a firmware test for the next boot on the Itanium-based platform.

Impact

With HP-UX 11i v2, you can set the HA alternate path through the `setboot` command. You can also set the SpeedyBoot option for the next reboot.

1. For more information about SpeedyBoot, see the setboot manpage, *setboot* (1M).

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The manpage for the `setboot` command, *setboot* (1M), has been updated to document the `-h` option, as well as the SpeedyBoot-related options supported by `setboot`.

Obsolescence

Not applicable.

I/O Commands

The insf, lssf, mksf Commands

The `insf` command installs special files in the devices directory, normally `/dev`. If required, `insf` creates any subdirectories that are defined for the resulting special file.

The `lssf` command lists information about a special file.

The `mksf` command creates a special file in the devices directory (normally `/dev`) for an existing device, a device that has already been assigned an instance number by the system.

Summary of Change

- The `insf`, `lssf`, and `mksf` commands now support IHV drivers, provided the IHV drivers provide a shared library, `libsf<`*`drivername`*`>.sl` (PA-RISC) or `libsf<`*`drivername`*`>.so (Itanium)`, to support them.
- When the system has one node in an “Unclaimed” state in the IO tree, and has at least one MISC type of DLKM module, execution of the `insf` command in the presence of certain types of DLKMs (for example, some Graphical modules on a system) results in the following messages in `syslog`/`dmesg` output:

  ```
  Jul 30 13:32:23 gold76 vmunix: MOD: mod_load_helper:
  gvid_him_fgl(gvid_him_fgl): _load returned error 13.
  Jul 30 13:32:23 gold76 vmunix: MOD: mod_load_helper:
  gvid_him_rad(gvid_him_rad): _load returned error 13.
  ```

  (Where `gvid_him_fgl` and `gvid_him_rad` are names of the DLKM modules.)

Impact

Apart from the presence of the messages described in the previous section, there are no other known impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For further information, see the *Driver Development Guide*, available from the Developer and Solution Partner Program (DSPP) at **http://h21007.www2.hp.com/dev/**.

Obsolescence

Not applicable.

The ioscan Command

The `ioscan` command scans the system and lists all reportable hardwares found on the system.

Summary of Change

The `ioscan` command includes two enhancements for HP-UX 11i v2:

- The `-t` option allows you to display the date and time at which the system hardware was last scanned. Similar to the `date` command output, the output of `ioscan -t` will look as follows:

  ```
  Mon Apr 28 17:47:05 2003
  ```

  This option must be used exclusively; that is, it cannot be used with any other `ioscan` option.

- The `-e` option allows you to display the Extended Firmware Interface (EFI) device paths for certain devices (disks).

  The appearance is subject to change, but currently it looks as follows:

  ```
  1/0/8/0/0.0.0                       disk      HP 36.4GST336752LC
     Acpi(000222F0,17E)/Pci(0|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig8B3C0000)/
  \EFI\HPUX\HPUX.EFI
  ```

Impact

- Benefits of the `-t` option:

  Initiating an actual hardware scan on a system by running `ioscan` takes more time on a fully loaded system. Using this new `-t` option provides a decision point to determine if a new hardware scan is necessary or can be postponed to be run at a time when the system is less loaded.

- Benefits of the `-e` option:

  You will be able to visually map the firmware representation of the device (EFI path) to its HP-UX representation. This should aid in a multi-OS environment where the other OSes understand the EFI but don't understand the HP-UX path.

Compatibility

There are no compatibility issues.

Performance

The new options will not affect performance of the `ioscan` command.

Documentation

The *ioscan* (1M) manpage and the `ioscan` usage message have been enhanced to provide information about these new options.

Obsolescence

Not applicable.

The mmap() Function

The `mmap()` function establishes a mapping between a process's address space and a file.

Summary of Change

By using the new *`MAP_IO`* flag, you may now use the `mmap()` function to establish a mapping between a process's address space and I/O device registers or memory. This functionality allows user programs to set up DMA or RDMA functionality and other I/O mechanisms without the overhead of going through a kernel driver. The *`MAP_IO`* functionality will be limited to superusers and processes running in Real Time Extensions processor sets.

This interface is a requirement for HP-UX Real Time Extensions functionality.

See also “ccNUMA” on page 246 for other changes to `mmap()`.

Impact

It is now possible to perform mappings between a process's address space and I/O device registers or memory.

No existing functionality of mmap is modified by this extension. Customers not using *`MAP_IO`* will not be impacted.

Compatibility

There are no compatibility issues. This new flag does not affect existing users of `mmap()`.

Performance

This change has no impact on system performance. User programs who previously had to use kernel driver `ioctl()` functions to memory map I/O or configure DMAs will be able to perform these tasks more quickly.

Documentation

The `mmap()` function's manpage, *mmap* (2), now documents the *MAP_IO* flag along with the expected calling format.

Obsolescence

Not applicable.

The pstat_getfile() Interface (Obsolete)

The interface `pstat_getfile()` is obsolete and should not be used. It will be removed in a future HP-UX release. The interface is used to get information specific to a particular open file for a specified process. A second interface, `pstat_getfile2()`, should be used in its place as it provides a much more scalable interface.

Transition Links Commands (Deprecated)

The "Upgrade" product which contains the transition links management tools will be removed from the next HP-UX release. The transition links (`tlinks`) management tools were intended to be temporary transition tools for application migration from HP-UX 9.*x* to HP-UX 10.*x* file system layout. The following transition links management tools are being deprecated and will become obsolete in post-HP-UX 11i v2 releases:

- `tlinstall`
- `tllist`
- `tlremove`

Usage of Capacity-related ioctls: DIOC_CAPACITY, DIOC_DESCRIBE, and SIOC_CAPACITY

The DIOC_CAPACITY `ioctl` can be used to obtain the capacity of a disk device in DEV_BSIZE units. The DIOC_DESCRIBE `ioctl` can be used to obtain device specific identification information. The information returned includes the disk's logical block size. The SIOC_CAPACITY `ioctl` indicates the current device size.

Summary of Change

Applications that use the DIOC_CAPACITY or DIOC_DESCRIBE `ioctl` calls should be rebuilt because `capacity_type` and `disk_describe_type`, respectively, now include 64-bit fields to better represent the size of newer, larger devices. Unrebuilt applications will continue to work properly because the kernel will detect the smaller struct sizes and return the proper 32-bit values. However, if these `ioctls` are used with a truly large device, these 32-bit fields can overflow and result in an EOVERFLOW error.

Applications that use the SIOC_CAPACITY `ioctl` for devices that may become large at some point should now use the new SIOC_STORAGE_CAPACITY `ioctl` (which uses the new `storage_capacity_t` struct which includes a 64-bit size field). Otherwise, the SIOC_CAPACITY `ioctl` will return an EOVERFLOW error when a truly large device causes an overflow in the `capacity` struct.

Usage of ustat(), statfs(), and statvfs()

The `ustat()` system call returns information about a mounted file system. The `statfs()` function returns status information for a mounted file system.The `statvfs()` function returns information about a mounted file system.

Compatibility

There is a compatibility issue involving old binaries that still use `ustat()`, the various forms of `statfs()` (`fstatfs()`, `statfsdev()`, `fstatfsdev()`) and the various forms of the 32-bit flavor of `statvfs()`, (`fstatvfs()`, `statvfsdev()`, `fstatfsdev()`).

When these old binaries are exposed to a truly large file system, these calls will return an EOVERFLOW error that the binaries have never seen before. In some cases, this may be interpreted as a file being absent (some libraries and commands look at the `-1` result, but not the `u.uerror`) or draw other incorrect conclusions. HP-provided command and library code has been updated to use the 64-bit flavor of `statvfs()`, so rebuilt binaries should not have this problem. The bottom line is that administrators need to be aware of this when setting up their file systems. These older binaries need to be run against data that resides on smaller file systems, rather than new, huge ones that will overflow the various 32-bit status fields.

9 Libraries and Programming

What's in This Chapter?

This chapter covers a wide variety of changes of particular interest to programmers, such as changes to compilers, editors, and libraries, including:

400K File Descriptors

The “maximum supported number of file descriptors” refers to the maximum number of simultaneous open files allowed per process. *MAXFUPLIM* specifies the absolute maximum number of files a process can have open at one time.

Summary of Change

The maximum supported number of file descriptors per process has been raised from 60000 (60K) to 400,000 (400K).

The semantics of *USE_BIG_FDS* has changed. In the 10.10 and above releases, the use of the *_USE_BIG_FDS* define raised *MAXFUPLIM* from the default value of 2048 to 1048576.

In HP-UX 11i v2, in order to support the 400K file descriptor feature, if *USE_BIG_FDS* is defined to a value > 60,000 (e.g., *_USE_BIG_FDS*=400000), then *_MAXFUPLIM* and *FD_SETSIZE* will be set to (1024 * 1024). Applications using the *select* (2) system call must set *FD_SETSIZE* to the appropriate value for the application. Failure to do so may result in a memory resource issue resulting in the application terminating abnormally.

The related value of *FD_SETSIZE* is changed based on the definition of *_USE_BIG_FDS* as follows:

- The default value will remain at 2048 if *_USE_BIG_FDS* is not defined.
- The value for *FD_SETSIZE* will default to 60,000 if *_USE_BIG_FDS* is defined but not assigned a value.
- The value for *FD_SETSIZE* will default to (1024 * 1024) if *_USE_BIG_FDS*=400000 is defined.

This feature is an enhancement of the 60,000 File Descriptor Feature. It is optional because it will not be often used and to minimize the impact on existing code. An application requiring more than 2048 file descriptors must be recompiled with the symbol *_USE_BIG_FDS* defined. To do this, add the flag *-D_USE_BIG_FDS=400000* to the compile command in the application's `makefile`. This symbol can be defined at the beginning of every application source file (via `#define _USE_BIG_FDS` which must be done before the `#includes`). For applications that define *_USE_BIG_FDS=400000*, *FD_SETSIZE* will be defined as (1024 * 1024) by default. To use the *select* (2) system call for more file descriptors, *FD_SETSIZE* must be defined appropriately by the application.

Impact

NOTE It should be noted that this feature does not impact existing binaries. All executables will run unaffected on this release.

As in previous releases, there are also per-application resource limits, independent of the *MAXFUPLIM* limit. To use a large amount of file descriptors, your application might need to modify its *RLIMIT_NOFILE* resource limits with *getrlimit* (2) and *setrlimit* (2). (See the manpages for these system calls for more information.) Alternatively, the system-wide

RLIMIT_NOFILE defaults can be changed (as in previous releases) by modifying the kernel tunables *maxfiles* (5) and *maxfiles_lim* (5). See the *kctune* (1M) and *kcweb* (1M) manpages and the SAM online kernel configuration help for more information.

Any system running an application that uses a large amount of file descriptors might need to be reconfigured with a larger value for the kernel tunable `nfile`. This tunable specifies the per-machine (as opposed to per-process) maximum number of simultaneous open files and is by default much less than 1048576. See the *nfile* (5), *kctune* (1M) and *kcweb* (1M) manpages and the SAM online kernel configuration help for more information.

This new functionality might have the following possible effects:

- For all user-space code (commands, libraries, applications, and user code):

  User-space code that raises its *RLIMIT_NOFILE* resource limit with `setrlimit` (see above) beyond *MAXFUPLIM* might fail. Since the system's maximum value is dynamically controlled by a tunable, an application may set its maximum number of file descriptors larger than *MAXFUPLIM*. This may cause failures in kernel system calls that compare against the *MAXFUPLIM* value or a related upper limit (e.g., *select* (2)).

- Side effects of 400K file descriptor functionality with libraries:

  Use of this new feature is not compatible with all libraries. Users need to review the libraries used by their application to determine if they can use this feature. The use of 400K file descriptors in conjunction with some libraries is not supported. A library compiled with the old *MAXFUPLIM* value might not work with applications using the new *MAXFUPLIM* value. Any calls to *select* (2) made by a library function on behalf of the application would fail if you had more than 2048 or 60,000 (if the library was previously compiled with *_USE_BIG_FDS*) open files, as in the preceding item above.

  The use of 400K file descriptors in conjunction with the following libraries is not supported:

  — X Window System libraries

  — dce threads libraries

  — Pascal and Fortran libraries

  — pre-10.10 libraries

  — 3D graphics libraries (Starbase, HP PEX, and HP-PHIGS)

  — third-party libraries

- Side effects of 400K file descriptor functionality with applications:

  Programs that opt for 400K file descriptors might experience excessive memory usage or performance degradation if there is a dependency on *MAXFUPLIM*.

Compatibility

The use of the *_USE_BIG_FDS* define will raise *MAXFUPLIM* from the default value of 2048 to 1048576. The related value of *FD_SETSIZE* is changed based on the definition of *_USE_BIG_FDS* as follows:

- The default value will remain at 2048 if *_USE_BIG_FDS* is not defined.

- The value for *FD_SETSIZE* will default to 60,000 if *_USE_BIG_FDS* is defined but not assigned a value.
- The value for *FD_SETSIZE* will default to (1024 * 1024) if *_USE_BIG_FDS=400000* is defined.

The default size of *FD_SETSIZE* will be set to (1024 * 1024) when *_USE_BIG_FDS=400000* is defined. This is for compatibility with existing applications which may have assumed that *_MAXFUPLIM* and *FD_SETSIZE* were equivalent and used them interchangeable. After HP-UX 11i v2, no such assumption may be made about *MAXFUPLIM* and *FD_SETSIZE*, and they are not considered to be equivalent when *USE_BIG_FDS=400000* is defined.

As a result, any application using the *select* (2) system call and that requires a higher number of file descriptors must now explicitly define *FD_SETSIZE* (up to 400K) in the source or at compile time. Failure to do so may result in a memory resource issue resulting in the application terminating abnormally.

Performance

This change may positively impact performance for applications (such as Web servers) that require a large number of simultaneously open file descriptors. This impact may be realized if the application was limited by the current allowable number of file descriptors and was blocked or needed to close file descriptors in order to continue processing.

The use of a large number of file descriptors will consume a considerable amount of kernel memory that may have a negative impact on system performance.

Documentation

For further information, see the following manpages:

- *select* (2)
- *maxfiles* (5)
- *maxfiles_lim* (5)
- *kctune* (1M)
- *kcweb* (1M)
- *nfile* (5)

Obsolescence

Not applicable.

Adaptive Address Space (AAS)

Version 1.0 of Adaptive Address Space (AAS) allows you to create binaries that provide you with a large address space and more control over it.

AAS is available only on HP-UX for Itanium®-based servers.

Summary of Change

The AAS product is used to create a new type of binary, MPAS, by using the `chatr` command.

For 32-bit applications, MPAS processes get the entire 4GB of virtual address space, all of which can be used to map any combination of shared or private data. This is in contrast to the default address space model for 32-bit applications on previous versions of HP-UX, which provided applications with only 2GB of shared address space and at most 2GB of private address space.

MPAS processes also get some additional features that other OSs (e.g., Solaris and Linux) have had support for, but until now, HP-UX has not had. In particular, MPAS processes are allowed to `mmap` using the *`MAP_SHARED`*`|`*`MAP_FILE`* flags, the very same offset of the file multiple times. Each mapping is independent of the others (i.e., unmapping one will not make the others go away).

Impact

AAS version 1.0 benefits you in a number of ways:

- Some applications (e.g. java virtual machine) benefit in terms of performance from a larger private address space.
- Many users would like more control over their address space. Previous HP-UX address space models split up the 4GB address space into separate segments for private and shared data (e.g., share magic applications had 1GB private space, 2GB shared space, and so on). Now, the application has 4GB of space in which it can dynamically allocate any type of object.

Compatibility

Existing applications suites will see no difference in behavior (i.e., ABI and API compatibility will be maintained). However, applications that have MPAS processes or a mixture of MPAS processes and old-style HP-UX processes will notice changes. (But these aren't compatibility issues, per se).

Performance

MPAS processes will have lower performance. In fact, using MPAS processes will lower performance for the entire system, including other, independent, non-MPAS processes. Exact numbers will depend on the application itself.

Documentation

The following manpages have changed:

- *chatr* (1M)
- *mmap* (2)
- *shmget* (2)
- *shmat* (2)

Obsolescence

Not applicable.

Aries Binary Translator

Aries is the HP-UX PA-RISC to HP-UX Itanium binary emulator. Aries transparently emulates both 32-bit and 64-bit HP-UX PA-RISC applications on HP-UX 11i v2.

The Aries distribution on HP-UX Itanium-based systems consists of four shared libraries:

```
/usr/lib/hpux32/aries32.so
/usr/lib/hpux32/pa_boot32.so
/usr/lib/hpux64/aries64.so
/usr/lib/hpux64/pa_boot64.so
```

The HP-UX 11i v2 kernel invokes `pa_boot[32/64].so` when a 32/64-bit PA-RISC binary is launched. Similarly, `pa_boot[32/64].so` invokes `aries[32/64].so`.

Summary of Change

Changes for Aries on HP-UX 11i v2 include the following:

- Support for MxN threads
- Support for Itanium 2 processor
- Experimental implementation of a new dynamic translator with improved performance

  By default, the current dynamic translator is turned on and the experimental dynamic translator is turned off. To use the experimental dynamic translator, you will need to add an option to the `Aries` resource file. More details about this option, and about other changes to Aries, can be found in the manpage, *Aries* (5).

Impact

There are no impacts.

Compatibility

There are no compatibility issues. (Note that Aries itself is a key product in binary compatibility between PA-RISC and Itanium-based.)

Performance

The experimental dynamic translator significantly improves the performance of the emulated application. From the initial measurements it has been observed that the overall Aries performance, with the experimental dynamic translator turned on, increases by 20% on an average. This increase may vary based on the nature of the emulated PA-RISC application.

Documentation

The manpage for `Aries`, *Aries* (5), has been changed.

For further information, see the white paper, “Compatibility Mode on Itanium-based HP-UX: A Developer Perspective,” available at **`http://devrsrc1.external.hp.com/STK/Aries.html`**.

Obsolescence

Not applicable.

Debugging

This section includes the following topics:

Absolute Debugger (adb)

The `adb` command executes a general-purpose debugging program, the Absolute Debugger, that is sensitive to the underlying architecture of the processor and operating system on which it runs. It can be used to examine files and provide a controlled environment for executing HP-UX programs.

Summary of Change

Absolute Debugger incorporates the following new features:

- Support for Lazyfp
- Support for Dual pdir
- Support for debugging MxN threads in a process/core

- Support for debugging INIT and MCA crash dumps
- Support for debugging a shared library for an attached process

Impact

- By using adb, you can debug HP-UX kernel and crash dumps with Lazyfp support.
- You can debug HP-UX kernel and crash dumps with Dual pdir support.
- You can debug an executable, a running process, and the core with MxN threads.
- You can debug crash dumps for INIT and MCA events.
- You can also debug shared libraries of an attached process. (However, such libraries can be debugged only when they are loaded after the process is brought under debugger control.)

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The adb manpage, *adb* (1), has been changed.

Further information about adb, including tutorials, can be found at the IT Resource Center at `http://www.itrc.com`.

Obsolescence

Not applicable.

HP Kernel Debugger (KWDB)

The HP Kernel Debugger (KWDB) is a source-level kernel and driver debugger for the HP-UX operating system. KWDB is based on the HP Wildebeest Debugger (WDB), an HP-supported implementation of the GDB user-space debugger. It also incorporates all the features of Q4, a crash dump and live memory analyzer.

NOTE Although KWDB is included in HP-UX 11i v2, HP does not provide support for it.

Summary of Change

KWDB includes the following features:

- Support for debugging 32-bit and 64-bit HP-UX kernels
- Support for debugging dynamically loadable kernel modules (DLKM)
- Support for MP debugging

- Source code interspersed with disassembly listing
- Ability to attach and detach from a running kernel
- Ability to debug multiple targets on any subnet simultaneously
- Support for crash dump analysis
- Support for remote crash dump analysis
- Support for live memory analysis
- Support for Perl scripts

Impact

There are no impacts.

Compatibility

KWDB supports debugging of any PA-RISC system running HP-UX 11.0 or later or any Itanium-based system. The host system can be any PA-RISC system running HP-UX release 10.20 or later or any Itanium-based system.

KWDB incorporates all the features of Q4, a crash dump and live memory analyzer. It can be used to analyze crash dumps from 32-bit or 64-bit PA-RISC systems or Itanium-based systems.

Performance

There are no performance issues.

Documentation

The manpage for kwdb, *kwdb* (1) has been added.

Product information, file downloads and, documentation are available at **http://h21007.www2.hp.com/dspp/tech/tech_TechSoftwareDetailPage_IDX/1,1703,257,00.html**

Obsolescence

Not applicable.

HP Wildebeest Debugger (WDB)

The HP Wildebeest Debugger (WDB) 4.0 is an HP-supported implementation of the GDB version 5.0 debugger. It supports source-level debugging of a program written in HP C, HP aC++ and Fortran 90 on HP-UX 11i v1.6 and later.

Summary of Change

HP WDB 4.0 includes the following features:

- Performance improvements over 11.22 of up to 50% improvement in startup time and 70% improvement in runtime.
- Support for Runtime Memory Checking:

HP WDB provides several commands that help expose the memory related problems. The commands will allow you to:

— Report memory leaks

— Report heap profile

— Stop at the free of unallocated or a deallocated block

— Stop when freeing a block if bad writes occur outside block boundary.

— Scramble previous memory contents during allocation and free.

A detailed list of commands and their usage can be found in the *Debugging with GDB* manual at **www.hp.com/go/wdb**.

- Support for enabling/disabling threads for better DDE compatibility:

  When debugging a multi-threaded application, if you suspect that a specific thread is causing a problem, it is useful to suspend the other threads in the debugger and debug the suspect thread. WDB provides commands to disable/enable the specific threads:

  — The `thread disable` command prevents specified threads from running until they are enabled again using `thread enable`.

  — The `thread enable` command allows the specified thread to run when you issue a continue/step command. By default, all threads are enabled; ordinarily you use `thread enable` to reactivate a disabled thread.

- Support for unwinding through corrupted PC:

  WDB 4.0 supports stack tracing when the Program Counter is corrupted due to a call through a bad function pointer.

- Support for stack traces in Java/C/C++ programs.
- Enhanced support for C++ templates - WDB 4.0 can work with templates without having to specify details about the instantiation. This results in increased pattern matching capabilities and better usability.
- New command: `dumpcore`
- Info threads command output has changed.

Previous changes available in published release notes at **http://www.docs.hp.com/hpux/dev/index.html#Debugging%20Tools**.

Impact

- You may perceive improved performance up to 50% for bring up and 70% for runtime.
- You will be able to do runtime memory checking and obtain a report of leaks and heap usage and other memory checks.
- When debugging a multi-threaded application, you will be able to enable/disable particular threads.
- You can obtain stacktraces in Java/C/C++ programs.
- You can work with templates without having to specify details about the instantiation.

- You can use the `dumpcore` command to generate a core image file of a process running under the debugger in the middle of execution.
- You will be able to unwind through a corrupt pc.
- You will see different info threads command output

Machines Affected WDB 4.0 does not support the following:

- Itanium 1 machines
- HP-UX 11i v1.5 OS and tool chain

Compatibility

For executables that contain virtual functions and have been compiled with the HP-UX 11i v1.6 compiler or lower, you need to issue the following command before issuing the file command:

```
set old-vtable on
```

Performance

WDB 4.0 has better performance than HP-UX 11i v1.6. You should see about 50% improvement in startup time and 70% improvement in runtime performance.

Startup time performance is the bring up performance of the debugger. which entails:

```
file exe
b main
run
```

Runtime performance is the performance for setting breakpoints, doing backtraces, continue, next commands and other gdb commands.

Documentation

Online documentation is available in `/opt/langtools/wdb/doc`

Product information and file downloads are available at **`http:/www.hp.com/go/wdb/`**

HP WDB 4.0 Release Notes are available at
`http://www.docs.hp.com/hpux/dev/index.html#Debugging%20Tools`

Obsolescence

Not applicable.

Dynamic Loader (dld.so)

The Dynamic Loader, `dld.so`, dynamically loads shared libraries during executable startup.

Summary of Change

Changes to Dynamic Loader version B.12.20 include the following:

- Support for applications built with `+[no]lazyload` and `-B [direct|lazydirect|nodirect]`
- Lazy loading of shared library - Shared libraries marked with lazy loading during link time will not be loaded during program startup. Instead, the shared library will be loaded on the first reference during execution.

  Lazy loading of shared library can be disabled during runtime by setting the environment variable *LD_NOLAZYLOAD* to a non-null value.
- Direct binding - For symbols with direct binding information, the dynamic loader will try to resolve the symbol using interposer libraries. If the symbol cannot be resolved using interposer libraries, the dynamic load will try to resolve the symbol using only the shared library recorded during link time. Other loaded libraries will not be searched.

  Direct binding can be disabled during runtime by setting the environment variable *LD_NODIRECTBIND* to a non-null value.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

Lazy loading of shared libraries improves an executable's startup time. Direct binding shortens symbol resolution time during execution.

Documentation

Please see the *ld* (1) manpage for more information on lazy loading or direct binding. For further information about Dynamic Loader, see the manpage *dld.so* (5).

Obsolescence

Not applicable.

File Descriptor Allocation

A file descriptor is a positive integer that is generated by the system when a process opens a file. Operations which perform I/O on the file would use this descriptor to refer to the file.

Summary of Change

The behavior of the file descriptor allocation in HP-UX 11i v2 has been changed to prevent security problems such as unauthorized modification of root-owned files. This change will keep the file descriptors 0, 1 and 2 (`STDIN`, `STDOUT`, and `STDERR`) open if they are closed in the target program invoked using an `exec()` system call. The `exec`'d target program can be any UNIX95 compliant function, `setuid()`/`setgid()`, or non-UNIX95 compliant program.

Impact

The change in file descriptor allocation will not affect most applications because they already have these file descriptors open. The change will affect applications that depend on these specific file descriptors being available at the time the program starts. If it breaks an application, the change can be disabled by setting the value of the dynamic tunable, `cleanup_stdio`, to 0. By default, the value of `cleanup_stdio` will be set to 1 and the new functionality is enabled.

Compatibility

This change will affect applications that depend on these specific file descriptors being available at the time the program starts. To fix this problem, you can disable the change in file descriptor allocation by setting the value of the dynamic tunable, `cleanup_stdio`, to 0.

Performance

There are no performance issues.

Documentation

There are no other document changes.

Obsolescence

Not applicable.

GTK+ Libraries

The GTK+ Libraries are the open source GNU toolkit for X windows development. The copy provided in HP-UX 11i v2 is only supported for use with the Mozilla browser, which depends on it.

Summary of Change

The GTK+ libraries have been added because they are required for Netscape 7 and Mozilla.

The GTK+ Libraries, version 1.2.10.2, consists of the following component libraries:

- GLib - Provides many useful data types, macros, type conversions, string utilities and a lexical scanner.
- GDK - A wrapper for low-level windowing functions.
- GTK - An advanced widget set.

Impact

This product allows the use of Netscape 7 and Mozilla.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For more information, see **`http://www.software.hp.com/cgi-bin/swdepot_parser.cgi/cgi/displayProductInfo.pl?productNumber=B6848BA`** and **`http://www.gtk.org/announce.html`**.

Obsolescence

Not applicable.

HP aC++ Compiler

The HP aC++ Compiler for Itanium®-based systems, version A.05.50, supports much of the ISO/IEC 14882 Standards for the C++ Programming Language (the international standard for C++). When invoked in C mode, it supports the American National

Standard for Information Systems - Programming language C, ANS X3.159-1989 (the ANSI C 89 standard). It has partial support for C99 language features when used in C mode.

Summary of Change

Included with HP-UX 11i v2 is the `librwtool_v2` library which corresponds to Rogue Wave's Tools.h++ version 7.1.1. To use this library with `-AA`, link with `-lrwtool_v2`.

Impact

With the `librwtool_v2` library, you can use the functionality of Tools.h++ in C++ applications compiled for use with the `-AA` option (the option that selects the Standard C++ runtime, as opposed to the "classic" C++ runtime library.) Previously, the functionality of Tools.h++ was only available to programs that were compiled for the "classic" C++ runtime (`-AP`).

Compatibility

There is a binary incompatibility if you are using the `-AP` iostream clog stream. It conflicts with the `-AA` version, so you can't mix and match.

Performance

There are no performance issues.

Documentation

Documentation for the HP aC++ Compiler for Itanium-based Systems is delivered with the product.

Obsolescence

- In the post-HP-UX 11i v2 release, the Transition Links product will be removed.

  For the `C-Dev-Tools.C-AUX` fileset, the Transition Links will not be replaced by symbolic links. The files in question are in:

  ```
  /opt/langtools/tlinks/C-AUX
  ```

  They include `cpp`, `cpp.ansi`, `lex`, and `yacc`, as well as links to locales in `/opt/langtools/lib/nls/msg/`. (The `lex` and `yacc` commands will be available if the contents of the file `/etc/PATH` are included in your `$PATH`.)

- For the OS-Core.C-KRN fileset, `/usr/bin/cc` will *not* be replaced by a symbolic link, unless the optional C-ANSI-C product is installed.

  (If C-ANSI-C is not installed, the `cc` command will be available if the contents of the file `/etc/PATH` is included in your `$PATH`.)

HP C Compiler

The HP C Compiler for Itanium®-based systems, version A.05.50, supports the American National Standard for Information Systems - Programming language C, ISO 9899:1990 (the ANSI C 89 standard), and it also supports the majority of the extensions introduced in ISO/IEC 9899:1999(E) (commonly referred to as “C99”).

Summary of Change

The `legacy_hpc/` subdirectory is no longer provided.

Impact

Removal of the legacy C compiler and tools should have minimal impact. It was provided in the HP-UX 11i v1.6 delivery as a “fallback.”

Compatibility

Delivery of the legacy HP C compiler under the `/opt/ansic/legacy_hpc` directory was only a temporary safeguard for the HP-UX 11i v1.6 release. It is being removed entirely from the HP-UX 11i v2 release.

The following features available in the PA-RISC HP C (legacy C) compiler are *not* available in the HP C Compiler:

- support for HP-C K&R mode:

  Note: The behavior of the K&R mode (`-Ac` option) supported in the legacy HP-C compiler differs from the ANSI C mode primarily in the following areas:

  — Large integer constant will be promoted to unsigned in ANSI mode, not in K&R mode (value preserving vs. signedness).

  — Float parameters and operands are not widened to double in ANSI mode.

  — Struct or union tags have scope in ANSI mode, but they don't in K&R mode.

  — Aggregates whose initializers contain partially-elided braces will parse differently in ANSI mode.
- support for deprecated HP C extensions or bug compatibility
- support for implicit *`int`* variable declarations
- built-in `__int32` data type (use `#define __int32` if needed)
- `+M0`, `+M1`, or `+M2` migration options. They are all ignored.
- MPE long pointers (^)
- support for the following pragmas:

  — `#pragma` *`HP_ALIGN`* (use `pack` pragma)

  — `#pragma` *`ALIGN`* (use `pack` pragma)

  — `#pragma` *`COMDAT`*

  — `#pragma` *`WARN_LEVEL`*

- support for +L (listing) option and the related listing control #pragmas (*LINES*, *WIDTH*, *TITLE*, *SUBTITLE*, *PAGE*, *LIST* and *AUTOPAGE*)
- support for the standalone C tools:
  - cpp, lint, cb, cflow, cxref, endif, protogen

Performance

There are no performance issues.

Documentation

The following manpages have been deleted:

- *cb* (1)
- *cflow* (1)
- *cxref* (1)
- *lint* (1)
- *protogen* (1)

Documentation for the HP C Compiler for Itanium-based Systems is delivered with the product.

Obsolescence

The C-Analysis-Tools product is obsoleted and the following tools are no longer shipped: cb, cflow, cxref, endif, lint, protogen.

In the post-HP-UX 11i v2 release, the Transition Links product will be removed.

For the C-Dev-Tools.C-AUX fileset, the Transition Links will not be replaced by symbolic links. The files in question are in:

```
/opt/langtools/tlinks/C-AUX
```

They include cpp, cpp.ansi, lex, and yacc, as well as links to locales in /opt/langtools/lib/nls/msg/. (The lex and yacc commands will be available if the contents of the file /etc/PATH are included in your $PATH.)

For the C-ANSI-C.C fileset, the Transition Links will not be replaced by symbolic links except for cc. The files in question are in:

```
/opt/ansic/tlinks/C
```

They include cc, c89, and ccom. (The c89 command will be available if the contents of the file /etc/PATH are included in your $PATH. ccom no longer exists for Itanium-based systems.)

HP Fortran

HP Fortran is a modern, powerful mathematical and scientific language that supports array-handling, data abstraction, and data hiding. HP Fortran is now available on both PA-RISC and Itanium platforms, and includes the following features:

- Full Fortran 95 compiler, based on International ANSI/ISO standards
- Full OpenMP v2.0
- Object-oriented Fortran feature optimizations
- Math intrinsic inlining support
- Standard Fortran library
- HP WDB debugger support
- HP Caliper

HP Fortran products are increasingly the language of choice for software engineers writing scientific applications and who demand superior run-time performance, code portability, and programmer productivity.

Summary of Change

HP Fortran v2.7 for HP-UX 11i v2 contains performance-tuning enhancements.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

For further information, see the following:

- The *f90* (1) manpage, which provides a summary reference to the compile-line options
- The white paper, “Libm Library and Floating-Point Arithmetic for HP-UX on Itanium,” located at **`http://cllweb.cup.hp.com/mathlibs/external/document/fp_whitepaper.pdf`**
- The *HP Fortran Programmer's Reference* and *HP Fortran Programmer's Guide*, both located at **`http://www.docs.hp.com/hpux/dev/index.html#Fortran`**
- The most current version of the release note, located at `/opt/fortran90/newconfig/RelNotes/Fortran90.2.7.htm|pdf|ps|txt`

- The product Web page, located at **http://h21007.www2.hp.com/dspp/tech/tech_TechSoftwareDetailPage_IDX/1,1703,1844,00.html**

Obsolescence

Not applicable.

HP Math Library (libm)

The HP Math Library, `libm`, provides mathematical functions for C, C++, and Fortran90. The `math.h`, `complex.h`, `tgmath.h`, and `fenv.h` headers provide C interface, and the headers `cmath` and `complex` provide C++ interface for the `libm` library.

The `libm` library supports all mathematical functions specified by the C standard, ANSI/ISO/IEC 9899:1999 (C99), as well as functions specified by the XPG4.2, SVID, and COSE Common API (Spec 1170) specifications.

Summary of Change

The following describes changes to the `libm`, `math.h`, `complex.h`, `tgmath.h`, `fenv.h`, `cmath`, and `complex` components for HP-UX 11i v2.

- Major performance upgrade for power functions: `pow`[fwlq], `pown[fwlq]`, and `powlln[fwlq]`.
- Miscellaneous minor performance and accuracy tuneups.
- New `sincos[fwlq]` functions in the HPUX namespace in the `math.h` and `cmath` headers compute both sin(x) and cos(x). These have the same interface as the Intel `sincos()` functions.
- New `cis[fwlq]` functions in the HPUX namespace in the `complex.h`, `tgmath.h`, and `complex` headers compute the complex value cos(x) + i sin(x), for real x. These have the same interface as the Intel `cis()` functions.
- To conform to C99 TC1, functions in `fenv.h` previously of type void have been changed to return `int` (0 indicating success). The affected functions are `feclearexcept()`, `feraiseexcept()`, `fegetexceptflag()`, `fesetexceptflag()`, `fegetenv()`, `fesetenv()`, and `feupdateenv()`.
- A switch (*`_INCLUDE_STDC__SOURCE_199901`*) has been introduced into `math.h()` to support a strict C99 namespace. See documentation for the `-AC99` compile option.

Impact

The change in the return type of `fenv.h` functions will not affect existing normal use, which will ignore the new return value. On HP-UX the return value will always be 0 (indicating success).

Compatibility

The names of the new functions will expand the HP-UX namespace:

- `sincos()` `sincosf()` `sincosl()` (`math.h`)
- `cis()` `cisf()` `cisl()` (`complex.h`)

and additionally with the `-fpwidetypes` option:

- `sincosw()` `sincosq()` (`math.h`)
- `cisw()` `cisq()` (`complex.h`)

Customers who have used these names for other purposes may need to change their code.

Performance

Power functions will be substantially faster where calls are compiled with `+Ofltacc=relaxed`, more so where compiled with +O3 (which enables math function inlining).

Using `sincos()` or `cis()` instead of separate sin and cos calls will not generally result in a significant speedup on HP-UX (which recognizes and optimizes separate calls with the same input). However, it will result in a significant speedup on some other platforms, and the common interface helps with code portability.

Documentation

Manpages describe the new `sincos()` and `cis()` functions and the changes to the `fenv.h` interface.

The power function speedup, new `sincos()` and `cis()` functions, and `fenv.h` interface changes are discussed in the math library white paper, “The Libm Library and Floating-Point Arithmetic in HP-UX for Itanium®-Based Systems,” available at **`http://h21007.www2.hp.com/dspp/files/unprotected/Itanium/FP_White_Paper_v3.pdf`**.

Obsolescence

Not applicable.

HP Message Passing Interface (MPI)

HP MPI Version 1.8.3 is a high-performance implementation of the Message Passing Interface standard. HP MPI provides an application programming interface and software libraries to support parallel, message-passing applications that are efficient, portable, and flexible.

Summary of Change

HP MPI 1.8.3 adds the following new features to those of HP MPI 1.8:

- Additional launch utility `mpirun.all`
- HyperFabric/HyperMessaging Protocol (HMP) functionality for Itanium-based platforms
- `stdio` is not processed by default
- Argument error checking is turned off by default

For more information on HP MPI and HMP, refer to the documents available at **`http://www.docs.hp.com`**.

Impact

- The new launch utility `mpirun.all` is provided for customers that are unable to install MPI on all hosts.
- This release expands HP MPI support for HMP from PA-RISC only to also include Itanium. This functionality is turned off by default. Please refer to the *HP MPI Version 1.8.3 Release Note* (included in the product or on **`http://www.docs.hp.com`**) for instructions on enabling HMP.
- `stdio` is now not processed by default. However, it may be enabled using `-stdio=`*`options`*.
- The function parameter error checking is turned off by default. However, it may be enabled by adding `Eon` to the `MPI_FLAGS` settings.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The HP MPI Documentation Kit is an optional product (product number **B6281AA**) consisting of the following hardcopy books:

- *MPI: The Complete Reference* (2 volume set) Product number **B6011-96012**
- *HP MPI User's Guide* (Seventh Edition) Product number **B6060-96009**

The *HP MPI User's Guide* and HP MPI release notices are available online at the following locations:

- In `/opt/mpi/doc` after you install the product
- At **`http://www.docs.hp.com/hpux/dev/index.html#Performance%20Tools%20and%20Libraries`**
- At **`www.hp.com/go/mpi`**

Refer to **www.hp.com/go/mpi** for information about the HP MPI product.

Obsolescence

Not applicable.

HP MLIB

HP MLIB Version 8.4 contains robust callable subprograms, including all BLAS 1, 2, and 3 subroutines, sparse BLAS subroutines, a collection of commonly used dense and sparse linear system solvers, including LAPACK, ScaLAPACK, and SuperLU_DIST; Fast Fourier Transforms (FFTs), and convolutions. HP MLIB can be used on HP-UX systems ranging from single-processor servers to multiprocessor high-end servers such as the Superdome. MLIB is optimized for HP PA-RISC 2.0 and Intel Itanium2™ processors. HP MLIB has four components, VECLIB, LAPACK, ScaLAPACK, and SuperLU_DIST .

Summary of Change

The major enhancement for this release of HP MLIB is performance tuning.

HP MLIB 8.4 incorporates algorithmic improvements, and several tunable parameters have been adjusted for improved execution performance.

Impact

VECLIB is optimized by using highly efficient implementations of BLAS 1, 2, and 3; as well as the NIST Sparse BLAS Standard. LAPACK fully conforms with the public-domain version 3.0 of LAPACK. The key computational kernels in LAPACK are optimized to take full advantage of both PA-RISC and Itanium2-based architectures. The HP version of ScaLAPACK is tuned on HP servers and built with HP Message Passing Interface (MPI) and fully conforms to the V1.7 fo the ScaLAPACK standard.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The following documents provide additional HP MLIB 8.4 product information:

- *mlib* (3m) manpages - installed in the directory `/install_dir/share/man`. Set this path in your *MANPATH* environment variable to access man pages for VECLIB, LAPACK, ScaLAPACK, and Distributed SuperLU.

- HP MLIB User's Guide VECLIB, LAPACK, ScaLAPACK, and Distributed SuperLU - describes the MLIB software library and shows how to use it. For more information on HP MLIB documentation, refer to **http://www.hp.com/go/mlib**.
- *LAPACK Users' Guide* - This Society for Industrial and Applied Mathematics (SIAM) publication provides an introduction to the design of LAPACK as well as complete specifications for all the driver and computational routines. (ISBN 0-89871-447-8) The latest edition of this document is available online at **http://www.netlib.org/lapack/lug**.
- *ScaLAPACK User's Guide* - This Society for Industrial and Applied Mathematics (SIAM) publication provides an informal introduction to the design of the package, a detailed description of its contents, and a reference manual. (ISBN 0-89871-397-8) The latest edition of this document is available online at **http://www.netlib.org/scalapack/slug**.
- SuperLU User's Guide - This publication provides an introduction to the design of SuperLU as well as complete specifications for the driver and computational routines. The latest edition of this document is available online at **http://www.nersc.gov/~xiaoye/SuperLU**.
- *Parallel Programming Guide for HP-UX Systems* - describes efficient methods for shared-memory programming using HP-UX compilers. The latest edition of this document is available online at **http://www.docs.hp.com**.

Obsolescence

Not applicable.

HP-UX C Library (libc)

The C library, `libc`, provides the interface between the user program and the kernel. For changes to `libc`, see the following sections:

- “Changes to HP-UX libc Support of AutoFS” on page 111
- “IPv6 Support by HP-UX libc and HP-UX Commands” on page 154
- “Networking libc APIs getaddrinfo() and getnameinfo()” on page 167
- “Networking libc APIs getipnodebyname() and getipnodebyaddr()” on page 168
- “C99 Support for HP-UX System C Library (libc)” on page 224

C99 Support for HP-UX System C Library (libc)

The System C Library, `libc`, contains a set of commonly used Application Programming Interfaces (APIs) and also is the entry point for most system calls.

Summary of Change

As part of an effort to make HP-UX C99 standard compliant, a set of 8 new APIs have been introduced in `libc`. The new APIs are as follows:

- `strtoll()`
- `strtoull()`
- `strtoumax()`
- `strtoimax()`
- `wcstoll()`
- `wcstoull()`
- `wcstoumax()`
- `wcstoimax()`

For the complete information on these new APIs, see the following manpages:

- *strtoimax* (3C)
- *strtol* (3C)
- *wcstoimax* (3C)
- *wcstol* (3C)

Impact

The new APIs will make it easier for you to convert strings to the “long long” data type. Prior to this, APIs were available that could convert strings to type “int” and type “long.” APIs that convert strings to type “long long” did not exist.

Compatibility

There are no known compatibility issues.

Performance

The new APIs do not in any way interfere with the performance of existing APIs.

Documentation

The following manpages, available at **`http://docs.hp.com`**, have been added or modified:

- Added:
  - *strtoimax* (3C)
  - *wcstoimax* (3C)
- Modified:
  - *strtol* (3C)
  - *wcstol* (3C)

Obsolescence

Not applicable.

Itanium Unwind Library (libunwind.so)

The Itanium Unwind Library, `libunwind.so`, supports stack unwind and C++ exception handling on HP-UX 11i v2.

Summary of Change

Changes to the Itanium Unwind Library for HP-UX 11i v2 include the following:

- Added a new set of "Unwind Express" APIs that perform stack unwinding considerably faster.
- New header files <`uwx.h`> and <`uwx_self.h`>
- New manual page, *uwx* (3x)

Impact

Use of the new APIs will provide better performance and less memory usage.

Compatibility

There are no compatibility issues. The old APIs continue to be supported with no difference in behavior.

Performance

The new APIs perform stack unwinding considerably faster than the old ones.

Documentation

There is a new manpage for `uwx`, *uwx* (3x).

Obsolescence

Not applicable.

Java 2 Platform

Java™ 2 Standard Edition(J2SE™) products for HP-UX provide solutions to develop or deploy Java applications with the best performance on HP-UX servers and workstation.

This section covers the following topics:

HP 3D Technology for the Java 2 Platform

HP 3D Technology for the Java Platform version 1.3 contains the classes for creating 3D applications on systems with Java 1.3 and 1.4 and the HP-UX 700 OpenGL 3D Graphics Runtime Environment. HP 3D technology for Itanium-based solutions version 1.3 is supported with the Java Runtime Environment 1.3 and 1.4.

Summary of Change

The current Java3D product version 1.2 is being replaced by 2 new Java 3D products (T1868AA and T1869AA). Both these new Java 3D products are the same version 1.3; the only difference is in the way they install. One Java 3D will install into the Java Runtime Environment version 1.3, and the other Java 3D will install into Java Runtime Environment version 1.4.[1]

For the most up to date information on current HP 3D Technology for Java products, go to **www.hp.com/go/java**.

Impact

The HP 3D Technology for Java 2 version 1.3 provides the latest Java technology.

Compatibility

There are no known compatibility issues.

Performance

There are no performance issues.

Documentation

Manpages for HP 3D Technology for Java are not included.

Customers can find the latest documentation for HP 3D Technology for Java on the Java™ 2 Standard Edition™ (J2SE) for HP-UX Web site at **www.hp.com/go/java**. The Web site contains patch information, release notes, the *Java for HP-UX Programmer's Guide*, frequently asked questions, articles, white papers, and tips and techniques for performance tuning.

There is no HP 3D Technology for Java documentation on **http://www.docs.hp.com**. All HP 3D Technology for Java documentation is on the Web at **www.hp.com/go/java**.

Obsolescence

Not applicable.

1. For information about Java Runtime Environment, see "Runtime Environment (RTE) for the Java 2 Platform" on page 227.

Runtime Environment (RTE) for the Java 2 Platform

The Runtime Environment (RTE) for the Java™ 2 Platform allows you to deploy Java version 1.3 or 1.4 technology with the best performance on Itanium-based and PA-RISC systems running HP-UX 11i v1 and 11i v2. It is redistributable.

Summary of Change

Previously, only RTE for Java version 1.3 was offered. The Runtime Environment for Java 2 version 1.4 has now been added, giving customers the latest Java technology. The RTE version 1.3 is still included.

The following are new features of the RTE version 1.4:

- nonblocking I/O APIs, under the package `java.nio`
- IPv6 (Internet Protocol Version 6) support
- New garbage collectors: parallel, and concurrent mark and sweep
- Java Web Start 1.2 application deployment technology now bundled with the RTE

For more information on these new features, read the release notes in the RTE product, or on the Web at **`www.hp.com/go/java`**.

For the most up to date information on current Java products offered for HP-UX, go to **`www.hp.com/go/java`**.

Impact

The Runtime Environment for Java 2 version 1.4 provides the latest Java technology. The latest version of 1.3 is also included.

Compatibility

There are no known compatibility issues.

Performance

There are no performance issues.

Documentation

Customers can download the latest Java for HP-UX software as soon as it is available from the Java™ 2 Standard Edition™ (J2SE) for the HP-UX Web site at **`www.hp.com/go/java`**.

The Web site also contains patch information, release notes for all current Java products, the *Java for HP-UX Programmer's Guide*, frequently asked questions, articles, white papers, and tips and techniques for performance tuning.

There is no Java for HP-UX documentation on **`http://www.docs.hp.com`**. All Java for HP-UX documentation is on the Web at **`www.hp.com/go/java`**.

Obsolescence

Not applicable.

Runtime Plug-in (JPI) for Netscape/Mozilla for the Java 2 Platform

The Runtime Plug-in (JPI) for Netscape/Mozilla for the Java™ 2 Platform allows you to use a version of the HP-UX Runtime Environment for the Java 2 platform different from the HP-UX Runtime Environment for Java embedded with Netscape 4.*x*. Mozilla and Netscape 6/7 do not have an embedded Java runtime. They must use the Java Plug-in to enable Java within the browser.

Summary of Change

Previously, only JPI for Java version 1.3 was offered. The Runtime Plug-in for Java 2 version 1.4 has now been added, giving customers the latest Java technology. The Java Plug-in will also work for Mozilla 1.2.1 browser as well as Netscape. The JPI version 1.3 is still included as well.

For the most up to date information on current Java products offered for HP-UX, go to **www.hp.com/go/java**.

Impact

The Runtime Plug-in for Java 2 version 1.4 provides the latest Java technology. The latest version of 1.3 is also included.

Compatibility

There are no known compatibility issues.

Performance

There are no performance issues.

Documentation

You can download the latest Java for HP-UX software as soon as it is available from the Java™ 2 Standard Edition™ (J2SE) for the HP-UX Web site at **www.hp.com/go/java**.

The Web site also contains patch information, release notes for all current Java products, the *Java for HP-UX Programmer's Guide*, frequently asked questions, articles, white papers, and tips and techniques for performance tuning.

There is no Java for HP-UX documentation on **http://www.docs.hp.com**. All Java for HP-UX documentation is on the Web at **www.hp.com/go/java**.

Obsolescence

Not applicable.

Link Editor (ld)

The Link Editor, ld, takes one or more object files or libraries as input and combines them to produce a single (usually executable) file.

Summary of Change

New functionality introduced to ld in HP-UX 11i v2 includes lazy loading of shared libraries and direct binding support:

- Lazy loading of shared library (option: +[*no*]lazyload) – This option will enable [disable] lazy loading of shared libraries.

  For +lazyload libraries, loading is deferred until a reference is made to that library during execution. Both the +lazyload and +nolazyload options may appear on the link line at the same time. The mode that is specified, either explicitly or by default, remains on for all subsequent libraries on the link line until the next occurrence of one of these two options.

  Libraries satisfying one or more of the following conditions are ineligible for lazy loading:

  — is a filter library

  — is accessed via a data reference from another module

  — is accessed via an indirect function call

  The linker will silently convert such libraries into +nolazyload libraries.

  Dependent libraries of +lazyload shared libraries will not be processed during link time, unless they are explicitly specified on the link line.

  Lazy loading can be disabled during runtime by setting the *LD_NOLAZYLOAD* environment variable.

- Direct binding (option: -B [*direct*|*lazydirect*|*nodirect*]) – This option will create a direct link between symbol references and shared libraries by recording the name of the resolved shared library during symbol resolution. This information is used during runtime to quickly resolve symbols without searching through all currently loaded libraries.

  -B *direct* will record direct binding for all shared libraries. Dependent shared libraries will not be processed for -B *direct* link, unless they are explicitly specified on the link line.

  -B *lazydirect* will record direct binding information for libraries marked for lazy loading.

  -B *nodirect* will not record direct binding for any shared library; instead a “direct hint” is recorded for references to libraries marked for lazy-loading.

- Interposer library (option: +interposer) – This option is only valid when building a shared library. This will create a shared library that can be used for interposition. When resolving references for an application with direct binding information, the dynamic loader will search interposer libraries first. If the symbol cannot be resolved on any interposing libraries, the direct binding information will be used.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance issues.

Documentation

The `ld` manpage, *ld* (1), has been updated to include the new options.

Obsolescence

Not applicable.

Micro Focus OO COBOL 4.2 Run-Time Libraries (Deprecation)

The HP-UX Micro Focus Object Oriented COBOL PA-RISC runtime libraries (product number **B2435EB**) will no longer be included in future HP-UX 11i releases for Itanium-based platforms.

These libraries were originally made available to help customers continue to use this COBOL code in an emulation mode under Aries. The native HP-UX COBOL compiler is now available on Itanium-based platforms. There is no longer a need for simulation of the Object Oriented COBOL PA_RISC libraries to run under Aries. The HP-UX/Micro Focus Server Express product, including the Application Server, has been ported to the HP-UX Itanium-based platform.

Object File Tools (elfdump)

The `elfdump` application dumps information contained in the ELF object files.

Summary of Change

The `elfdump -tv` option has been introduced to print out the version string of the symbol when printing the symbol table.

Impact

There are no impacts.

Compatibility

There are no compatibility issues.

Performance

There are no performance changes.

Documentation

The `elfdump` manpage, *elfdump* (1), has been updated to include the new option.

Obsolescence

Not applicable.

Perl

Perl is a high-level programming language created and enhanced by the Open Source community. Perl takes the best features from other languages, such as C, awk, sed, sh, and BASIC, among others and at least a dozen other tools and languages.

Summary of Change

This build corresponds to the Perl 5.8.0 source code release. The following changes have been made:

- Better Unicode support
- New IO implementation
- New thread implementation
- Better numeric accuracy
- Safe signals
- Many new modules
- More extensive regression testing

Significant changes that have occurred in the 5.8.0 release are documented in `perldelta`. This document can be viewed by typing **`man perldelta`**.

Impact

There are no impacts.

Compatibility

Perl 5.8 is not binary compatible with earlier releases of Perl. XS modules have to recompiled. (Pure Perl modules should continue to work.)

The major reason for the discontinuity is the new IO architecture called PerlIO. PerlIO is the default configuration because without it many new features of Perl 5.8 cannot be used. In other words, you will just have to recompile your modules containing XS code.

Performance

There are no performance changes.

Documentation

For more information, see the manpage *perldelta*, which can be viewed by typing **`man perldelta`**.

Further information about Perl can be found at the following Web sites:

- **`www.perl.org`**
- **`www.activestate.com`**
- **`http://learn.perl.org`**

Obsolescence

Not applicable.

Source Code Transition from HP-UX 11i v1.6 to HP-UX 11i v2

The Software Transition Kit version 1.9 has been updated to support source code transition from HP-UX 11i v1.6 to HP-UX 11i v2. For more information, see “Software Transition Kit” on page 37.

Thread Context

The context of a thread is the set of values found in the machine registers when the thread is running, either in user-space or in the kernel. At various points, this context, together with some other information, must be copied to memory outside of the processor while the machine registers are (or may be) used for another purpose. System software keeps these copies so that it can restore them later.

Summary of Change

The code responsible for saving and restoring register state on entry to the kernel via interruption (bubbleup) or syscall (syscallinit) and at context switch time (save/resume, setjmp/longjmp) has been revised to improve performance and support minor changes to the runtime architecture.

Changes to the code include the following:

- Protection Key Registers saved/restored on context switch
- Lazy FP implementation: Most floating-point (FP) registers now saved in pcb rather than save_state. To improve syscall and interruption performance, the task of saving and restoring the state of 120 of the 128 FP registers has shifted from code executed when a thread enters and leaves the kernel (`bubbleup` and `syscallinit`) to code that is executed if and when the processor switches to a different thread (save/resume).
- New scratch registers supported: The Itanium-based Runtime Architecture was revised to designate `ar.csd` and `ar.ssd` as scratch registers reserved for future use. These registers are now treated like scratch registers by the operating system. (Previouslyany values stored in these registers were lost when a processor switched from one thread to another. No existing code should use these registers.)
- Save_state, pcb, and label structures changed: To support the changes listed above, the names and order of fields in these structures have changed. New fields have been added for the new scratch registers and some unused fields have been removed. The bulk of the FP registers are now stored in the pcb rather than the save_state. (f6-f11 remain in the save_state because the kernel may use them.)

Support engineers need to be aware of these changes when examining register state using q4 or other kernel debuggers.

Impact

The only customer-visible change (aside from performance improvement) is the support for `ar.csd` and `ar.ssd` as scratch registers.

Compatibility

These data structures and functions are kernel internals. No release-to-release compatibility is promised.

Applications using the `uc_access` interfaces to access register state saved in a signal context (`ucontext_t`) are unaffected. Note that several system libraries including `libpthread`, `libc`, `libuca`, `aries`, and `pa_boot*` must match the kernel to maintain compatibility. You can't mix and match pre/post HP-UX 11i v2 kernels and libraries.

Performance

This change results in a small performance improvement (~7%). The improvement varies with workload. Threads that do not use the FP registers but do make a lot of syscalls or context switch a lot will see more improvement than threads that use the FP registers or run uninterrupted on a CPU.

Documentation

The manpage for uc_access, *uc_access* (3) has been updated to list `ar.csd`/`ar.ssd` under the `__uc_get_ar()` and `__uc_set_ar()` interfaces.

Obsolescence

Not applicable.

10 Internationalization

What's in This Chapter?

This chapter describes internationalization functionality, including:

Simplified Chinese Input Methods

System level support is provided in HP-UX 11i v2 for the GB18030 character set.

GB18030 is officially referred to as “Chinese National Standard GB18030-2000: Information Technology - Chinese Ideograms Coded Character Set for Information Interchange - Extension for the Basic Set.” It is a government-mandated conformance requirement for all products sold in China, effective as of September 1, 2001.

Summary of Change

In order to support input for characters defined by the GB18030 standard, a new Chinese input method, Intelligent ABC, has been added to HP-UX. Two obsolete Simplified Chinese input methods have been removed.

Since 2001 HP-UX has supported the China mandatory National Standard GB18030, but did not have a modern S-Chinese input method for the input of GB18030 characters, until the addition of Intelligent ABC.

The Intelligent ABC Chinese input method is a very powerful and popular input method in China. It is widely used in MS Windows, IBM AIX, Apple Mac OS, and Linux.

The Intelligent ABC input method supports the full GB18030 character set and has been certified by the Chinese standards agency CITS.

The input method is based on Pinyin. It is easy to learn and supports stroke input, word input, and user-defined words.

The Intelligent ABC input method will support zh_CN.hp15CN, zh_CN.utf8 and zh_CN.gb18030, the three Simplified Chinese locales.

Due to low customer usage, the T-C and T-C Rapid input methods will be removed from HP-UX 11i v2.

Impact

Intelligent ABC is now available in HP-UX 11i v2 to support characters defined by the GB18030 standard.

T-C and T-C Rapid input methods have been obsoleted and removed.

Compatibility

No compatibility issues

Performance

No performance issue.

Documentation

The change will be documented in the *Simplified Chinese System Environment* manual.

Obsolescence

T-C and T-C Rapid input methods of XSIM have been removed.

Mainframe iconv Converters for Japanese Characters

Mainframe `iconv` converters between ShiftJIS/eucJP/UCS2 and NEC-JIPS/Hitachi-KEIS/Fujitsu-JEF were introduced at HP-UX 11i v1. This release includes several fixes of mapping errors for JIS standard characters.

Summary of Change

This release of mainframe `iconv` conversion tables includes numerous fixes for mapping errors for JIS standard characters in the basic parts of those mainframe codesets. The detailed changes are described in `MFConvChanges.jips`, `MFConvChanges.keis`, and `MFConvChanges.jef` under the `/usr/share/doc` directory.

In addition, this release of mainframe `iconv` conversion methods includes a fix to handle an incomplete shift sequence at the end of an input buffer.

Impact

If you have already used the HP-UX 11i v1 version of mainframe `iconv` converters and then use this version, the results will be different because of fixes in mapping for JIS standard characters. Therefore, HP recommends that you save the previously installed tables and rename them prior to installation of this release. You can then convert persistent data back using the old tables and then reconvert it using the new tables to achieve the correct representation.

If the last character in the input buffer could be a valid character OR an incomplete shift sequence, `iconv` returns `EINVAL`. If that character is the final one of the input file, `iconv` will not return successfully without appending other dummy data like `NULL` to that character. That character is `0x1a` for `jipsj`, `0x3f` for `jipsec/jipsek` and `0xa` for `keis7c/keis7k/keis8c/keis8k`, which could be a control character OR an incomplete shift sequence.

Compatibility

No compatibility problems are anticipated. However, if compatibility concerns arise with regard to persistent data stored on an older HP-UX system, HP recommends that you save the previously installed tables and rename them prior to installation of this release. You can then convert the persistent data back using these old tables and then reconvert the data to the correct representation using the new `iconv` tables.

Performance

No performance issues.

Documentation

Refer to the *Japanese System Environment User's Manual* and to the *iconv* (3C) manpage.

Obsolescence

Not applicable.

Printing Using Asian TrueType Fonts for HP PCL5 Printers

A text file including Asian characters can be printed on an HP PCL5 printer using Asian TrueType fonts which are installed by default in HP-UX.

Summary of Change

The PCL5.asian printer model that works with the `lp` command has been enhanced to print as many Asian characters as possible by accessing both printer resident fonts and host-installed TrueType fonts. In previous HP-UX releases, PCL5.asian model supported printer-resident fonts only.

If there are no Asian resident fonts in a PCL5 printer, use the `-onodimm` option for the PCL5.asian model in order to download the Asian characters rasterized from host-installed TrueType fonts.

Host-installed TrueType fonts are Mincho and Gothic typefaces for `ja_JP.SJIS/ja_JP.eucJP/ja_JP.utf8` locales; Batang and Dotum typefaces for `ko_KR.eucKR/ko_KR.utf8` locales; Sun and Hei typefaces for `zh_CN.hp15CN/zh_CN.gb18030/zh_CN.utf8` locales; and Ming typeface for `zh_TW.ccdc/zh_TW.big5/zh_TW.eucTW/zh_TW.utf8/zh_HK.hkbig5/zh_HK.utf8` locales. The character sets of these TrueType fonts comply with country and regional standards.

When the specified locale is `utf8`, the PCL5.asian model tries to use as many country typefaces as possible to print multilingual text.

Impact

A larger set of Asian characters is available for printing when you use Asian UTF-8 locales.

Compatibility

Backward compatibility has been preserved.

Performance

Accessing host-installed TrueType fonts may require time to rasterize and download characters to the printer.

Documentation

The option `-ooptions` to the `lp` command will show the list of available print options for the PCL5.asian model.

Obsolescence

Not applicable.

System Support for Latin and South American Locales

System level support is provided for numerous Latin/South American countries in HP-UX 11i v2.

Summary of Change

A total of 51 new locales are provided in HP-UX 11i v2 to enable system-level support for Latin/South Amercian geographies. This includes support for the input, storage, retrieval, display, and printing of characters encoded in ISO-88591, ISO-885915, or UTF-8 character sets.

The following 43 locale binaries are delivered in PA-RISC 1.1 and PA-RISC 2.0 versions, as well as both 32- and 64-bit IA versions:

Table 10-1 Latin/South American Locale Binaries

Locale	ISO-88591 based	ISO-885915 based	utf8 based[ab]
Brazil	pt_BR.iso88591	pt_BR.iso885915	pt_BR.utf8
Mexico	es_MX.iso88591	es_MX.iso885915	es_MX.utf8
Argentina	es_AR.iso88591	es_AR.iso885915	es_AR.utf8
Chile	es_CL.iso88591	es_CL.iso885915	es_CL.uft8
Columbia	es_CO.iso88591	es_CO.iso885915	es_CO.utf8
Peru	es_PE.iso88591	es_PE.iso885915	es_PE.utf8
Uraguay	es_UY.iso88591	es_UY.iso885915	es_UY.utf8
Venezuela	es_VE.iso88591	es_VE.iso885915	es_VE.utf8
Puerto Rico	es_PR.iso88591	es_PR.iso885915	es_PR.utf8

Table 10-1 Latin/South American Locale Binaries (Continued)

Locale	ISO-88591 based	ISO-885915 based	utf8 based[ab]
Bolivia	es_BO.iso88591	es_BO.iso885915	
Ecuador	es_EC.iso88591	es_EC.iso885915	
Paraguay	es_PY.iso88591	es_PY.iso885915	
Costa Rica	es_CR.iso88591	es_CR.iso885915	
Guatemala	es_GT.iso88591	es_GT.iso885915	
Nicaragua	es_NI.iso88591	es_NI.iso885915	
Panama	es_PA.iso88591	es_PA.iso885915	
El Salvador	es_SV.iso88591	es_SV.iso885915	

a. Not all utf8 locale binaries are delivered due to disk space considerations. However, source files for all 51 locales are provided under `/usr/lib/nls/loc/src`, and you may build these binaries by using the `localedef` command. Refer to the `localedef` manpage for more information.
b. UTF-8 locales adhere to the character repertoire defined in the Unicode 3.0 Standard.

NOTE In the case of building utf8 locales, the `univ.utf8.m` method file must be specified as part of the `localedef` options to ensure proper creation of correct utf8 locales, i.e.:

```
localedef -cn -m /usr/lib/nls/loc/src/univ.utf8.m \
              -f /usr/lib/nls/loc/charmaps/utf8.cm \
              -i /usr/lib/nls/loc/src/es_BO.utf8.src es_BO.utf8
```

X11R6 Xlib and CDE provides support for all of these locales.

The following printer model files have been enhanced to support these locales:

- colorlaserjet
- deskjet1200C
- deskjet1600CM
- hp33447a
- hp5000c30
- hp5000f100
- hpC1208a
- laserjet
- laserjet4
- laserjet4Si
- laserjet4v
- laserjet5Si
- laserjetIIISi

- paintjetXL300
- PCL4
- PCL5

To specify printing in either of the ISO-885915 or UTF-8 locales, use the lp option `-ocs9N` (or `-oscs9N`) to select the correct character set as the primary (or secondary) character set.[1] For example:

```
lp -d<printer_name> -ocs9N -o<other_options ><print_filename>
```

For ISO-88591 locales, no codeset (-cs) option is required.

Localization of the message catalogs for core HP-UX OS commands are supported for Spanish-based locales (es_*).

Impact

Base offering (installed on all systems): Approximately 136 MB additional disk space is required.

No additional memory requirements are needed when running in any of these locales.

Machines Affected or No Longer Supported

System level support for this new set of Latin and South American locales is not provided for applications compiled in 10.20 mode. Only applications compiled on 11.0 and later releases are supported.

Compatibility

There are no compatibility issues involved with the addition of this feature.

Performance

There is no impact on performance.

Documentation

No documentation changes were necessary.

Obsolescence

Not applicable.

1. Note: The printer should support ISO-885915 (Latin 9) fonts to allow for printing codeset specific characters, such as the Euro.

Unicode 3.0 Support

Unicode 3.0 is aligned with the revised ISO 10646-1:2000 standard and includes an additional 10,194 characters from the previous version of the standard. Most notable of these additional characters are 6,582 new CJK characters (Han Extension A) for use in various Asian countries.

Summary of Change

HP-UX 11i v2 includes Unicode 3.0 support, which is an extension to the previously supported Unicode 2.1 standard.

All 34 previously supported system-supplied utf8 locales have been updated to support the character repertoire specified by the Unicode 3.0 standard. In addition, all new utf8 locales (refer to “System Support for Latin and South American Locales” on page 239) align with the Unicode 3.0 standard.

Changes have been made in the streams `ldterm` modules, `libc` utf8 methods libraries, Xlib, and Asian print drivers to support Unicode 3.0.

Impact

Base offering (installed on all systems): Approximately 1 MB additional disk space is required. No additional memory requirements are needed when running in any of these locales.

Support for Unicode 3.0 is only provided for PA-RISC 1.1 and 2.0 (32/64 bit modes) as well as Itanium®-based 32/64 bit applications. Unicode 3.0 support is not provided for applications that were compiled on HP-UX 10.20 systems. 10.20-compiled applications will continue to use the Unicode 2.1 character repertoire as supported in earlier HP-UX releases.

Compatibility

There are no compatibility issues associated with the addition of this feature.

Performance

There is no impact to performance.

Documentation

No documentation changes were necessary.

Obsolescence

In the future, you will no longer be permitted to link PA-RISC internationalized applications (i.e., those that call `setlocale()` internally) to archived `libc` routines. As has been previously documented in both the 10.x and 11.0 release notes, using the archived versions of `libc` library routines is strongly discouraged due to possible errant systems behavior caused by intermixing archived `libc` routines with other shared internationalized locale method libraries.

Changes are forthcoming within the HP-UX Internationalization architecture which will disallow this intermixing for both PA-RISC 1.1 32-bit and PA-RISC 2.0 64-bit environments. (Note: the archived versions of `libc` are not supported on IA platforms.)

Deprecated Functionality

Several commands, library routines and lp model files that implement internationalization functionality are being deprecated as of this release. They will be removed in the next major release of HP-UX.

Summary of Change

The following table shows commands, library routines and lp model files that are considered deprecated as of this release, along with suggested replacements where relevant. Many of these functions relate to hardware that is no longer supplied or supported. Others provided character set conversions that are now obsolete (such as for C-Windows 3.1) or functionality that is available in other commands.

Table 10-2 Deprecated Internationalization Functionality

Name	Fileset	Replacement	Remarks
`sconv`	`STK-SCH-RUN`	*iconv* (1)	
`sptr`	`STK-SCH-RUN`	None	
`big5-et`	`TTK-TCH-RUN`	None	T-Chinese Eten UDC format conversion
`et-big5`	`TTK-TCH-RUN`	None	T-Chinese Eten UDC format conversion
`big5-cwin`	`TTK-TCH-RUN`	None	Microsoft C-Windows 3.1 UDC format conversion
`cwin-big5`	`TTK-TCH-RUN`	None	Microsoft C-Windows 3.1 UDC format conversion
`ptr`	`TTK-TCH-RUN`	None	terminal transparent print tool for C2402A/B/C/D
`coder`	`TTK-TCH-RUN`	None	CNS-EUC code lookup tool
`bserver`	`IMTERM-RUN`	None	
`nlio`	`UTILS-RUN`	None	
`nliostart`	`UTILS-RUN`	None	
`nlioinit`	`UTILS-RUN`	None	
`big5udfgen`	`TTK-TCH-RUN`	*xudced* (1)	
`big5udfdown`	`TTK-TCH-RUN`	*udcload* (1)	

Table 10-2 Deprecated Internationalization Functionality

Name	Fileset	Replacement	Remarks
ccdcudfgen	TTK-TCH-RUN	*xudced* (1)	
ccdcudfdown	TTK-TCH-RUN	*udcload* (1)	
hpc1208a	PRT-LP-RUN	None	lp model file
PCL4.nloo	PRT-LP-RUN	PCL5.nloo	lp model file
PS.nlio	PRT-LP-JPN-RUN	PS2.nlio	lp model file
LIPS3	PRT-LP-JPN-RUN	LIPS4	lp model file
Japanese specific commands and library routines	CODE-JPN-RUN, IMX11-JPN-COM, IMX-JPN-RUN	*iconv* (1), *iconv* (3C), None	All commands and library routines described in /usr/share/doc/JpnCmdLib.txt

Impact

You should check for any usage of these items. Where applicable, you are encouraged to begin using the commands suggested as replacements.

Compatibility

At this release, there are no impacts to compatibility, since the functionality referenced is supplied in the current release. Future compatibility impacts are expected to be minimal since equivalent functionality is being provided for those commands which do not reference obsolete hardware or character encodings.

Performance

There are no performance issues.

Documentation

There are no other documentation changes.

Obsolescence

The functions listed in Table 10-2 will be removed at the next major HP-UX release.

11 Other Functionality

What's in This Chapter?

This chapter describes other new and changed operating-system software functionality, including:

ccNUMA

HP's new cell-based platforms use a ccNUMA (Cache Coherent Non-Uniform Memory) Architecture. This means that memory latencies and bandwidths are not uniform across the whole system. The latency and bandwidth of a same-cell memory access is better than accessing memory on a different cell. This may have significant performance implications for some workloads. The HP-UX 11i v2 release supports the following for the ccNUMA platforms:

- give administrators the ability to configure memory
- provide good default behavior for applications that are not ccNUMA-aware
- give ccNUMA-aware applications the ability to control their memory placement as well as process placement

ccNUMA is a core feature of HP-UX and does not have a separate product or version number.

Summary of Change

Memory can be configured into “interleaved” and “cell local” memory. Interleaved memory is a hardware-provided feature that mixes memory from different cells with a very fine granularity. This has the effect of spreading out memory accesses and eliminating “hot spots.” Cell local memory provides faster access to processes running on the same cell as the memory, but slower access to processes running on any other cell.

The system administrator has the ability to configure how much memory will be interleaved and how much will be cell local via the command line (`parcreate` or `parmodify`) or Partition Manager GUI (`parmgr`)[1].

Applications can now control which locality[2] they execute in using the locality binding and launch policy features.

Application requests for memory are filled by the operating system with memory of the appropriate type (if available) based on a set of heuristics. The operating system also manages processes with the goal of keeping them “near” the memory they're using. Interfaces are provided so that the placement of physical memory can be controlled by applications and users.

Changes include the following:

- `mmap()`

  These new memory locality flags have been added to `mmap()`:[3]

  `MAP_MEM_INTERLEAVED`, *`MAP_MEM_LOCAL`*, *`MAP_MEM_FIRST_TOUCH`*.

1. For more information, see “Partition Manager” on page 79.
2. A locality domain consists of a related collection of processors, memory, and peripheral resources that comprise a fundamental building block of the system. All processors and peripheral devices in a given locality domain have equal latency to the memory contained within that locality domain.
3. For other changes to `mmap`, see “The mmap() Function” on page 197.

- `shmget()`

  These new memory locality flags have been added to `shmget()`:

  `IPC_MEM_INTERLEAVED`, *`IPC_MEM_LOCAL`*, *`IPC_MEM_FIRST_TOUCH`*.

- `pstat_getlocality()`, `pstat_getproclocality()`

  These are two new `pstat` functions which return information about aspects of a ccNUMA system.

- `sysconf()`

  The sysconf() system call with existing flag *`_SC_CCNUMA_SUPPORT`* will return a positive value if it is running on a ccNUMA system with an operating system that can take advantage of this ccNUMA capability; otherwise it returns -1.

- `mpctl(2)`

  This syscall supports user binding, system query, and launch policy operations. These operations are NUMA sensitive. The syscall now supports two variants of round-robin and fill-first launch policies for processes and threads. These launch policies can now be tree-based or breadth-first.

- `pset_ctl()`

  This system call provides processor set configuration query operations, and now it can return NUMA configuration information for a pset. There is no change in API definition.

- `pset_assign()`, `pset_destroy()`

  These system calls change processor set configuration, and they need to perform some additional tasks on NUMA systems. The system administrator should be aware of NUMA boundaries when configuring processor sets with processors; they should attempt to select processors from as few locality domains as possible.

- `pstat_getpset()`

  This system call now contains number of `ldoms` for the processor set.

- `mpsched(1)`

  The `mpsched` command provides following capabilities:

  — Display system's topology information (ldoms, processors),

  — Display current bindings for a specified process,

  — Assign locality binding or launch policy to a running process, and

  — Execute a command with specified comm locality binding or launch policy.

  Two new launch policy options, `RR_TREE` and `FILL_TREE`, are now supported.

- `pthread` library

  The `pthread_num_ldoms_np(3t)`, `pthread_ldom_id_np(3t)`, `pthread_num_ldomprocs_np(3t)`, and `pthread_spu_to_ldom_np(3t)` interfaces provide a way to retrieve information about locality domains for the thread.

  The `pthread_ldom_bind_np(3t)` provides a way to bind a thread to a specified locality domain.

The `pthread_launch_policy_np(3t)` provides a way to set launch policy for a thread. Two new launch policy requests, `PTHREAD_POLICY_RR_TREE_NP` and `PTHREAD_POLICY_FILL_TREE_NP`, are now supported.

- `parcreate`

  The existing option `-c` has been enhanced to take an additional argument to specify cell local memory (CLM) configuration for individual cells. A new option `-L` has been added to allow users to specify the CLM configuration for every cell in the partition.

- `parmodify`

  The existing options `-a` and `-m` have been enhanced to take an additional argument to specify the CLM configuration for individual cells.

- `parstatus`

  The display of existing options `-V -c` and `-V -p` has been enhanced to display the CLM configuration information for cells and partitions.

- `psrset`

  The `psrset` utility has been enhanced to display Locality Domain information for the Processor Set apart from the other details when used with the option `-i` or without any option.[1]

Impact

On HP-UX 11i v2 cell-based systems you will see greater performance for some work loads than you would have without this feature. You have the ability to configure your system for optimal performance with regard to interleaved versus cell local memory usage. Application developers have the ability to give guidance to the operating system so that the most appropriate memory is allocated according to an application's usage model. Applications can control how the processes are distributed among localities.

Compatibility

There are no compatibility issues.

Performance

This feature can improve system and application performance when the memory of the system is appropriately configured to the proper balance between interleaved and cell local memory for the particular work load running on the system. Further performance improvements are possible if applications are modified to advise the operating system of the usage model for the memory they request.

This feature can degrade performance if the system memory configuration does not match the work load on the system: for example, if the work load largely requires interleaved memory but the system has been configured with mostly cell local memory.

This feature can also degrade performance if multithreaded applications have their threads distributed across multiple locality domains while their memory is allocated cell local.

1. For other changes to `psrset`, see “HP-UX Processor Sets” on page 75.

Documentation

For further information, see the following manpages:

- *mmap* (2)
- *mpctl* (2)
- *mpsched* (1)
- *parcreate* (1M)
- *parmodify* (1M)
- *parstatus* (1)
- *pset_assign* (2)
- *pset_ctl* (2)
- *pset_destroy* (2)
- *psrset* (1M)
- *pstat_getlocality* (2)
- *pstat_getproclocality* (2)
- *pstat_getpset* (2)
- *pthread_ldom_bind_np* (3T)
- *pthread_ldom_id-np* (3T)
- *pthread_num_ldoms_np* (3T)
- *pthread_num_ldomprocs_np* (3T)
- *shmget* (2)
- *sysconf* (2)

Also see *HP System Partitions Guide*, available at **http://www.docs.hp.com**. The *HP System Partitions Guide* covers administration issues related to cell local memory (CLM) configuration and operations.

Also see the white paper "ccNUMA and Cell Local Memory," available at **http://www.docs.hp.com**.

Obsolescence

The `pstat_getnode()` function has been deprecated in HP-UX 11i v2 and will be obsoleted in a future release. The platform for which this interface was designed is no longer supported. For current ccNUMA platforms, the `pstat_getlocality()` and `pstat_getproclocality()` interfaces provide similar information.

Common Desktop Environment (CDE)

The Common Desktop Environment (CDE) is an environment for interacting with your workstation. When CDE is running on your system, it is said to be your system's *desktop*.

Summary of Change

- With HP-UX 11i v2, CDE supports IPv6. This is in addition to the IPv4 support that CDE already provides. For further information, see "IPv6 Support by Common Desktop Environment (CDE)" on page 152.

- CDE now has features to provide more accessibility to the desktop for physically challenged users. These additional features are as follows:

  — A single-point of GUI control through dtstyle for enabling or disabling accessibility features.

  — AccessX, a client for changing keyboard and mouse settings that allows a user to navigate easily. AccessX can be invoked from the Desktop Style Manager. Alternately, it can be invoked from the command line as `/usr/bin/X11/AccessX/accessx`.

  — A new screen magnifier utility called `xzoom` that is available unsupported under `/usr/contrib/bin/X11`.

  The accessibility features are not localized, but they are available in all locales that CDE supports.

- The `dtlogin` process does not start X server when the mouse is not connected to the machine. The following entry is commented out in `/etc/dt/config/Xservers`:

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

  However, the system administrator can make `dtlogin` start X Server by setting the value of *`DT_LOCAL_X_START_ALWAYS`* to "1" in `/etc/rc.config.d/desktop`. Please refer the manpage of `dtlogin` for further details.

- CDE provides Large File support (files greater than 2GB in size) through `dtfile`. With `dtfile`, the following functions can be done on large files:

  — File manipulations like File Move, File Copy, File Copy As Link, File Rename, and File Change Permission can be performed.

  — File search operations can be performed.

  — The size of the large file can be viewed correctly in the Detailed View mode and in the Change Permission dialog box.

- CDE applications and its libraries, XClients (`xterm`, `hpterm`, etc.), TPS, Audio Subsystem, and Imaging Subsystem are delivered as PA on Itanium®-based platform. They run through Aries (PA compatibility). (For more information about Aries, see "Aries Binary Translator" on page 206.)

Impact

- For the impact of CDE's support for IPv6, see "IPv6 Support by Common Desktop Environment (CDE)" on page 152.
- Improved accessibility features on the desktop will benefit physically challenged users.
- CDE will not come up when the mouse is not connected to the system.
- Large file support is provided only by `dtfile` and not by `dtpad` and `dtlp`. Hence, the following operations which require `dtpad` and `dtlp` cannot be performed:

  — Large file opening by double-clicking on the file in the File View window.

  — Large file printing

- Itanium-based CDE shared libraries are not available to customers who want to port their applications to Itanium. This means that applications that directly or indirectly link against `libDtSvc`, `libDtTerm`, `libDtWidget`, `libtt`, `libcsa`, `libDtPrint`, `libDtHelp`, and `libDtMrm` will not be able to compile and link on Itanium-based platforms.
- Escape sequences used for reporting the window title and the window icon's title features are disabled in the `libDtTerm` widget. So, `dtterm` and any application which uses `libDtTerm` will no longer be able to use this reporting feature.
- Itanium-based Audio shared libraries `libAlib`, `libAlibkt`, and `libAt` are not available.
- Itanium-based Image libraries `libil` and `libilefs` are not available.
- The supported method to achieve these functionalities on HP-UX 11i v2 is to compile the application on a PA system and then use the Aries PA emulation facilities on HP-UX 11i v2.
- The Digital Video libraries (`libyuv2.*` and `libvlVideo.*`) and Digital Video server (`vlServer`) are not available. (See also the following “Obsolescence” section.)
- On configuring a user machine with Bastille's maximum security options, the following impact can be seen in the CDE Desktop environment:[1]
  - — Remote hosts will not be able to execute any CDE actions on the Bastille configured machine.
  - — `cmsd` service will not be available.
  - — Exchange of messages between CDE applications will be forbidden.
- The following describes the system services that CDE uses. Some of these may be disabled by users or by the Bastille lockdown utility:

Table 11-1 Impacts on CDE System Services

Service	Impact if Disabled	To Re-enable Service
`dtspcd` [a]	The user will not be able to execute CDE remote actions from a non-Bastille machine to a Bastille enabled machine.	1. a.Uncomment the entry for `/usr/dt/bin/dtspcd` in `/etc/inetd.conf` b.Reread the newly modified `/etc/inetd.conf` by executing `/usr/sbin/inetd -c`. 2. Change the value of `SecureInetd.deactivate_dttools` to *N* in the file `/etc/opt/sec_mgmt/bastille/config`.

1. If the user wishes to use the features described herein, they should not use the default high-security settings but either select a security level that does not lockdown the items CDE requires (as described in Table 11-1), create a custom level that does not include those lockdown steps, or take the actions described in Table 11-1. See the Bastille information in *Managing Systems and Workgroups*, part number **5187-2216**, available at **`http://www.docs.hp.com`**.

Table 11-1 Impacts on CDE System Services (Continued)

Service	Impact if Disabled	To Re-enable Service
`rpc.cmsd` [a]	Appointments / To Do / Compare calenders and Menu Editors options available in Calendar Manager will not work.	1. a.Uncomment the entry for `rpc.cmsd` in `/etc/inetd.conf` b.Reread the newly modified `/etc/inetd.conf` by executing `/usr/sbin/inetd -c`. 2. Change the value of `SecureInetd.deactivate_dttools` to *N* in the file `/etc/opt/sec_mgmt/bastille/config`.
`rpc.ttdbserver` [a]	Network aware mail locking feature of dtmail will not work.	1. a.Uncomment the entry for `rpc.ttdbserver` in `/etc/inetd.conf` b.Reread the newly modified `/etc/inetd.conf` by executing `/usr/sbin/inetd -c`. 2. Change the value of `SecureInetd.deactivate_dttools` to `N` in the file `/etc/opt/sec_mgmt/bastille/config`.
`rlpdaemon`	Using TPS, user will not be able to print remotely. The request will be shown as “pending” in the `lpstat`.	1. Use `rlpdaemon` running machine for remote print service. 2. a.Uncomment the entry for `rlpdaemon` in `/etc/inetd.conf` b.Reread the newly modified `/etc/inetd.conf` by executing `/usr/sbin/inetd -c`. 3. Change the value of `SecureInetd.deactivate_printer` to `N` in the file `/etc/opt/sec_mgmt/bastille/config`.

a. In Bastille, when “CDE Helper services” is disabled/enabled, it disables/enables all of these services. In addition, the top two security levels configure a firewall which will block off-host CDE messages. If you wish CDE messages to be received from off-host, you should select a level (Sec10Host) that doesn't set up a firewall. If you have already configured the firewall with Bastille or an Install-Time level, you can disable it through the interactive Bastille interface.

Compatibility

CDE is compatible with the IPv4 mode.

Performance

There are no performance issues.

Documentation

- For further information about documentation for CDE’s support for IPv6, see “IPv6 Support by Common Desktop Environment (CDE)” on page 152.

- For further information about CDE's added accessibility features, see the following:
  - The manpage and online help for `dtstyle`
  - Online help for AccessX
  - The manpage for `xzoom`
- For further information about the `dtlogin` change, see the `dtlogin` manpage.
- For further information about the `dtterm` escape sequences change, see the `dtterm` manpage.
- For further information about HP-UX Bastille, see "HP-UX Bastille" on page 177 and *Managing Systems and Workgroups*, part number **5187-2216**, available at **`http://www.docs.hp.com`**.

Obsolescence

The following Digital Video components are obsolete and no longer available with this release:

- `/opt/video/lib/libyuv2.2`
- `/opt/video/lib/libvlVideo.2`
- `/opt/video/lib/libyuv2.1`
- `/opt/video/lib/libvlVideo.1`
- `/opt/video/lbin/vlServer`
- `/opt/video/lbin/raReader`

The `hpterm` terminal emulator is delivered with HP-UX 11i v2. However, `hpterm` has some limitations, and will not be supported with future releases. In addition to limitations documented in the manpage and elsewhere in release notes, `hpterm` is limited by its use of `X11R5` and `libc.1` libraries. It is recommended that `dtterm` be used instead of `hpterm`. For more information on `hpterm` or `dtterm`, please see the respective manpages and release notes.[1]

Distributed Computing Environment (DCE)

Distributed Computing Environment (DCE) products provide a high-quality, comprehensive, standard framework to develop, administer, and use distributed applications.

Integrated Login provides a single-step login and also provides the means for incorporating DCE security technology in the HP-UX environment.

HP DCE version 1.9 on HP-UX 11i v2 consists of:

- Remote Procedure Call daemon (Itanium version)
- CDS client (Itanium Version)
- Security client (Itanium Version)

1. For additional information about `hpterm` and `dtterm`, see the "Impact" section in "IPv6 Support by Common Desktop Environment (CDE)" on page 152.

- DTS client (Itanium Version)
- CMA Threads: POSIX 1003.1c, a user-space implementation (PA-RISC) only
- DCE runtime library, CMA version, 32 and 64 bit version of Kernel Threaded version, 32 and 64 bit version of KT runtime library are available in native Itanium
- DCE-CoreTools as in HP-UX 11i v1 (PA-RISC version)

Summary of Change

The following products are available on HP-UX 11i v2 as part of HP DCE version 1.9:

- DCE-Core: PA-RISC version remains as it is except for `DCE-CORE-RUN` and `DCE-CORE-DTS`.
- `DCE-COR-IA-RUN` is new fileset and has native Itanium daemons `dced`, `cdsadv`, `auditd`. `DCE-COR-IA-RUN` now has native Itanium and Kernel threaded versions of `auditd`, `cdsadv`, `dced`, and the supporting library `libdcedpvtkt.so`.
- `DCE-COR-IA-DTS` is new fileset and has native Itanium binaries: `dtsd`, `auditd`, `dts_spectracom_provider`, `dts_null_provider`, and `dts_ntp_provider`.
- `DCE-COR-PA-RUN` is new fileset and has PA-RISC daemons `dced`, `cdsadv`, `auditd`.
- `DCE-COR-PA-DTS` is new fileset and has PA-RISC deliverables : `dtsd`, `dts_spectracom_provider`, `dts_null_provider`, and `dts_ntp_provider`.

NOTE PA-RISC DCE libraries are provided so that non-ported/compiled PA-RISC DCE applications can continue to run on HP-UX 11i v2. These applications will use the dynamic emulator, Aries. (See “Aries Binary Translator” on page 206.)

Integrated Login product has Itanium and KT ported versions of `ilogind`, `libpma_dce`, `libnss_dce`. Both 32- and 64-bit Itanium-based versions of `libpam_dce` and `libnss_dce` are available.

DCE Client daemons and DCE runtime is now is IPv6 enabled: two new APIs, `rpc_server_inq_all_bindings()` and `rpc_network_inq_all_protseqs()`, have been provided, which can be used to write IPv6 applications.

The following products are available on HP-UX 11i v2 through the Application Release CD:

- CDS Services: DCE-CDS-Server
- Security Server: DCE-SEC-Server
- DCE Administration Tools: DCE-CoreAdmin

Impact

To take advantage of the Itanium features, you need to recompile your RPC applications.

Compatibility

DCE client applications on Itanium system can work with DCE server on a PA-RISC system.

The header files `/opt/dce/include/dce/pthread_exc_wrap.h` and `/opt/dce/include/dce/exc_handling_wrap.h` are not delivered. Applications using these files should use `/usr/include/pthread_exc.h` and `/usr/include/exc_handling.h` respectively.

Performance

Applications might experience some performance degradation while running PA-RISC applications on Itanium systems.

Documentation

For further information, see the following document, available at **`http://www.docs.hp.com`**:

- *HP DCE Version 1.9 Application Development Tools for HP-UX 11i v2 Release Note*

Obsolescence

CMA application development is no longer supported. KRB-Support product (which was available on HP-UX 11i v1) is no longer supported.