HP-UX Patch Management

A Guide to Patching 10.X Systems

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Document History

This guide's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The part number changes when extensive technical changes are incorporated.

New editions of this manual will incorporate all material updated since the previous edition.

New editions of this manual will incorporate all material updated since the previous edition. For the latest version, see the HP-UX 10.20 Operating System section, Patch Management subsection, on the Web at:

`http://docs.hp.com/os/10.20/`

For additional help with patching HP-UX systems, see:

`http://itrc.hp.com/`

or

`http://software.hp.com/SUPPORT_PLUS/`

Please direct comments regarding this guide to:

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You can also send your questions and comments to `patchguide@hp.com`. If appropriate, include page numbers and document revision with your comments.

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1   Introduction

HP-UX system patching is one of the most confusing areas for new system administrators. Patching has its own terminology and tools, and patch management has its own motivations and methods. While some patch documentation exists, it is found piecemeal in separate manuals. This tutorial summarizes the technical information required to understand HP-UX patching.

Please send your questions and comments to `patchguide@hp.com`. If appropriate, include page numbers and document revision with your comments.

Typographical Conventions

This guide uses the following typographical conventions:

Computer
: `Computer font` indicates literal items displayed by the computer. For example: `file not found`

User input
: Bold, computer text indicates literal items that you type. For example, to change to your account's home directory, enter:

    cd

Italics
: Manual titles, variable in commands and emphasized words appear in *italics*. For example, you would substitute an actual directory name for *directory_name* in this command:

    cd *directory_name*

[ ] and |
: Brackets **[ ]** enclose optional items in command syntax. The vertical bar | separates syntax items in a list of choices. For example, you can enter any of these three items in this syntax:

    ls [-a | -i | -x]

Enter
: Text in **this bold, sans-serif font** denotes keyboard keys and on-screen menu items. A notation of **Ctrl**-**Q** indicates that you should hold the **Ctrl** key down and press **Q**.

The following chapters in this document cover the steps required to create and use patch depots. The appendices provide supporting information.

- Chapter 2, "Planning for Recovery."

  Planning for recovery can create a virtual "Undo" button that lets you return a system to a previous state. This limits risk and lets you support a proactive patching methodology. This chapter discusses the basic requirements and options for system recovery.

- Chapter 3 , "Acquiring Patches."

  You can get patches from a wide variety of sources, each with different abilities. Some sources require an HP support contract while others are free. This chapter describes the array of patch sources and how you can use them to acquire patches.

- Chapter 4, "Depot Management."

  The patch depot lets you use patches most efficiently by letting you manage systems as groups rather than as individual systems. This chapter describes the types of patch depots and how to use them.

- Chapter 5, "Patch Installation."

  Once you have created a patch depot, you must install the depot contents onto other systems. This chapter describes the recommended steps to install, configure, and verify patches.

- Appendix A, "Basic Patch Concepts."

  Patches terminology and operations differ from other types of HP-UX software. This appendix provides a basic understanding of patch concepts.

- Appendix B, "SD-UX Tools & Objects."

  All patch operations involve some aspects of the Software Distributor (SD) tools. This appendix provides SD information related only to patching.

- Appendix C , "The Patch Text File."

  The patch text file provides the core documentation of each patch. This appendix lists and describes all of the fields within the `.text` file.

Getting Help

For technical support, software management, and electronic patch management services, contact HP's IT Resource Center (ITRC):

`http://itrc.hp.com`

Use the ITRC to:

- Quickly access customized support tools

- Make informed decisions with proactive information

- Access a rich knowledge database to quickly self-solve problems

- Submit hardware and software calls online

- Identify and download patches quickly and accurately

- Get one-stop access to software updates for your entitlements

- Take advantage of ITRC resources across the IT life-cycle:

  — Forums—a community where you can collaborate and tackle IT questions with peers

  — Training—including online seminars and self-paced web-based training

  — Planning, Design and Implementation—guidance to manage changes to your IT environment

Other Sources of Information

HP-UX Technical Documentation

All HP-UX technical documentation is available at:

`http://docs.hp.com`

This source provides online access to HP-UX manuals, guides, and white papers. Information on particular hardware platforms, HP-UX releases, and software products is available for browsing, download, or purchase.

HP Software Depot

`http://software.hp.com`

The HP Software Depot provides a variety of HP-UX software. While some require purchase, many products (such as Ignite-UX and the Support Plus patch bundles) are free.

Interex

`http://www.interex.org/tech/9000/index.html`

The International Association of Hewlett-Packard Computing Professionals, known as Interex, maintains this list of technical resources for HP-UX systems. Interex, which is not a part of HP, is also noted for the yearly trade shows Interworks and HPWorld trade shows and for regional users groups. Review the main page (`http://www.interex.org`) to learn about the benefits of membership.

HP-UX Administrators Mailing List

`http://www.dutchworks.nl/htbin/hpsysadmin`

Another resource outside of HP is the HP-UX Administrators Mailing List. This URL provides an interface to the list archives dating back to 1995. To join the list itself, send email to `majordomo@dutchworks.nl` and include the following command in the body of the message:

`subscribe hpux-admin-digest`

See also the Software Archive and Porting Centre for HP-UX at this

URL:

`http://hpux.cs.utah.edu/`

or

`http://hpux.cae.wisc.edu/`

Mirrored sites are available for Canada, France, Germany, Italy, Japan, Netherlands, South Africa, and the UK.

Other Web Resources

Additional help with HP-UX patching and related resources is available on the Web:

- Support Plus information:

  `http://software.hp.com/SUPPORT_PLUS/`

- Latest hardware support tools (diagnostics) information, including STM and EMS Hardware Monitors:

  `http://docs.hp.com/hpux/diag/`

- Latest HP-UX 10.20 manuals and white papers:

  `http://docs.hp.com/hpux/os/10.x/`

- HP-UX 11i features and news:

  `http://www.hp.com/products1/unix/operating/`

- Latest Ignite-UX information:

  `http://software.hp.com/products/IUX/`

- Software Distributor (SD):

  `http://software.hp.com/SD_AT_HP/`

- European information:

  `http://itrc.hp.com/`

  Select the link to the European site.

Introduction
Other Sources of Information

2 Planning for Recovery

This chapter presents an overview of planning for system recovery.

Recovery Planning and Patching

- Establish a recovery plan and do all necessary pre-work. This includes setting up the root volume group, selecting a recovery technique, planning for system re-installation, and keeping a "wish list" of changes you want to make to a system when it is down.

- Use more than one recovery option to protect yourself from events such as a bad tapes or network failures.

- Proactive maintenance—fixing known problems before they appear on a system—can reduce the cost of a system failure.

- Use patches as a form of proactive maintenance. The documentation for each patch lists all of the defects or enhancements that the patch addresses. You can weigh the known cost of returning to an original system state against the documented conditions of a patch.

The Root Volume Group

The Logical Volume Manager (LVM) lets you subdivide a single disk or treat a group of disks as a single unit. To enable the recovery options discussed in this chapter, you must properly set up the volume group that contains the core system (also known as the root volume group, usually named vg00).

These concepts also apply to users of whole-disk HFS root disks.

A volume group is a group of one or more physical volumes or disks. The physical volumes in a volume group form a pool of disk space which may be allocated to one or more logical volumes. Volume groups usually follow the naming convention:

- /dev/vg00
- /dev/vg01
- /dev/vg02, and so on.

However, you may use any naming convention you wish. By default, vg00 is a special volume group known as the "root volume group" which typically contains the default boot disk and the majority of the HP-UX operating system. You may have other volume groups on your system for applications, and other user and application data.

Separating Volatile Data from Stable System Data

You can preserve a known system state by creating an image of the root volume group. You can then return to that image after a failure.

To preserve the root volume group as a whole, you must place some restrictions on the root volume group:

- Limit the size of the root volume group

    — Reduces the size of recovery images

    — Reduces the cost of disk mirroring

- Do not place volatile data on the root volume group

    — Avoids loss of data when you restore the root volume image

— Saves an additional recovery step

• Keep all system data within the root volume group

— Avoids unexpected recovery problems. For example, Ignite-UX may not be able to save critical data if you have relocated parts of the directory structure.

See also "File System Guidelines" on page 20 for more information

TIP   Do not break these rules of data separation except to meet a specific need. If you do break these rules, make sure you have some kind of alternate recovery methods.

Preserving Configuration via NIS or DHCP

Network Information Services (NIS) and Dynamic Host Configuration Protocol (DHCP) let you maintain data off of your system. This off-system storage of system information that changes frequently (such as networking configuration and password files) can simplify the restoration process.

An NIS master server holds master copies of the configuration files, or maps. The master server may distribute copies of the maps to NIS slave servers to provide load balancing and reliability. An NIS client gets configuration information from the master server or a slave server instead of from its local configuration files. NIS allows centralized management of common configuration files, like `/etc/passwd`, `/etc/hosts`, and `/etc/services`.

• For more information on NFS, see *Installing and Administering NFS Services*

• For more information on DHCP, see the *Ignite-UX Administration Guide* and *Installing and Administering Internet Services*.

These and related documents are available on `http://docs.hp.com/`

File System Guidelines

To best support recovery, use these guidelines to organize your file system:

- `/`, `/sbin`, `/stand`, `/dev`, **and** `/etc`

  These directories contain the critical parts of the core system required for booting. They must exist completely within the root volume group.

- `/usr`

  The `/usr` directory tree contains those elements of the core system that support the post-boot system functionality. Although you don't need to include this directory with the root volume group, do not place it in a volume group that includes volatile data. (Note that Ignite-UX preserves the full contents of the volume group that includes the `/usr` directories.)

- `/opt` **and** `/var`

  Only certain parts of `/opt` and `/var` (such as `/var/adm/sw`) are considered part of the core system. (Ignite-UX preserves these areas regardless of the parent volume group.)

- `/home`

  This directory, which normally holds the login or home directory for each user, also holds dynamic user data. You should isolate this directory from both the root volume group and `/usr`. (You can do this with NIS and the NFS automounter.)

- Backup and recovery tools

  If you need to restore additional data from backup media, you can save time by including all of the backup and recovery software (such as Omniback) within the recovery image.

Ignite-UX

HP's Ignite-UX is a set of tools for system installation, recovery, and duplication. Ignite-UX is available free of charge. To download the latest version and to browse Ignite-UX documentation, go to `http://software.hp.com/products/IUX`

The *Ignite-UX Administration Guide* provides complete information about using Ignite-UX.

• Chapter 2 tells you how to install and administer an Ignite-UX server.

• Chapter 3 tells you how to use configuration files to set up system recovery information.

• Chapter 11 tells you how to use the Ignite-UX system recovery tools, including:

  — *make_tape_recovery*(1M)

  — *make_net_recovery*(4)

  — Expert (manual) recovery procedure using Core media tools

The *Ignite-UX Administration Guide* is also available on the Instant Information CD and at **http://docs.hp.com**

Have a Wish List

When you are forced to perform a system recovery, you may want to use the opportunity to make some system changes that you can't make at any other time. Keep a "wish list" of desired changes so you can take advantage of a failure. For example:

• File System Layout

   If your recovery method requires you to recreate the root volume group, use the opportunity to change the number and size of logical volumes. For example, you may want to adjust partitions if any filesystems such as /var are too small.

• Hardware Modifications

   Time will limit the extent of the hardware changes you can make during a system outage, you can accomplish some performance optimizations—such as adding another SCSI controller or replacing an older root disk with a larger, faster model—at a relatively small incremental cost.

   To identify performance bottlenecks caused by slow hardware, use performance tools such as HP's GlancePlus. For more information, see the HP Software Depot (**http://software.hp.com**) and HP OpenView (**http://openview.hp.com/products/**).

• Kernel Tuning

   Consider tuning any kernel parameters that you can alter only by rebooting the system. HP's GlancePlus can help identify opportunities for kernel tuning.

3   Acquiring Patches

These are the primary sources for acquiring patches from HP:

- The patch database from the IT Resource Center (ITRC) (page 24).
- HP patch bundles from Support Plus media or Software Depot (page 31)
- Custom selection from the ITRC (page 35)
- The ITRC Patch Fulfillment Server (FFS) (page 45)

About the HP ITRC   HP's ITRC is a web-based support environment. Some services are available at no cost, others are available only if you have an HP support agreement.

To sign up to use the ITRC:

1. Go to the ITRC web site at:

    `http://itrc.hp.com`

2. Click on the **register now!** link.

3. (Optional) For those with the higher levels of system support, HP provides proactive patch analysis in which HP monitors and selects the correct patches for your systems. To sign up for additional services:

    a. Click on the **my profile** link.

    b. Click on the **link a support agreement to your user id** link.

    c. Follow the screen instructions.

Please consult your local HP sales representative for more information about additional services.

Using the Patch Database

Use the patch database as your primary mechanism for searching for and acquiring individual patches. To access the database:

1. Go to the ITRC web site: `http://itrc.hp.com`

2. Click on the **log in** link. The log-in screen appears.

3. Enter your user name and password.

4. Click on the **log-in** link. The main ITRC page appears.

5. Click on the **maintenance and support** link.

6. Click on the **individual patches** link in the patching section. The patch database main page appears (Figure 3-1).

7. Click on the **hp-ux** link. The patch database search page appears (Figure 3-2).

   This document discusses two ways of finding HP-UX patches from the search page:

   • Searching by keyword

   • Entering specific patch names

Figure 3-1   **Patch Database Main Screen**
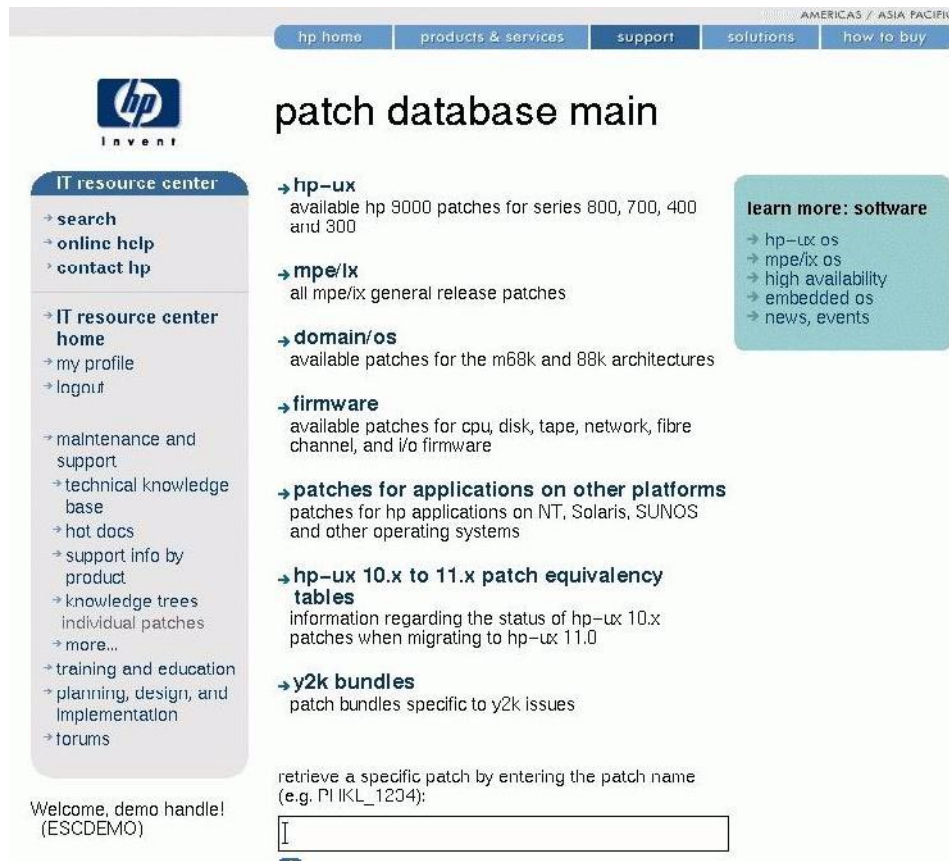
Searching for HP-UX Patches by Keywords

To conduct a keyword search:

1. Select the hardware by clicking on a radio button (for example, Series 700).

2. Select an OS from the pop-up menu (for example, 10.20).

3. Select **Search by Keyword** from the pop-up menu.

4. Enter one or more keywords in the text field.

5. Select a search criteria:

  - **all words**

  - **any word**

  - **exact phrase**

  - **boolean**

    — Boolean search results are limited to 200 results.

    — The precedence of boolean operators in a search are:

      a. Expressions inside parentheses ( )

      b. NOT, AND

      c. OR

    — Expressions are processed from left to right. Expressions inside parentheses are evaluated following the same order of precedence.

    — An all UPPERCASE or all lowercase search string yields a case-insensitive search.

    — A mixed case search string yields a case-sensitive search.

6. Click **SEARCH**.

Figure 3-3 shows the results of a keyword search on "LVM" and "mirrored." Listed are the patch name, size in bytes, and a one line description of each patch. Each patch name is a clickable hyperlink to the patch text file, which documents the patch. (See Appendix C , "The Patch Text File.")

Figure 3-2   **Patch Database, HP-UX Search Screen**
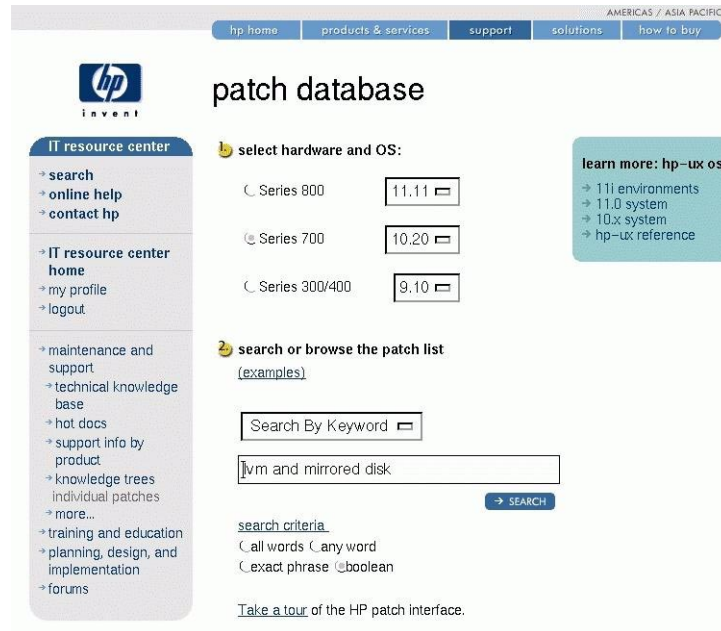
Figure 3-3   **Keyword Search Results**

To download a patch from the search results:

1. Click on the check box next to the patch to select it. (You can also use the **Select All** or **Deselect All** buttons.

2. Click **Add to Selected Patch List** when you have made all your selections. A list of all your selected patches appears along with any dependent patches (Figure 3-4). See "Dependency Analysis and the Patch Database" on page 30.

Figure 3-4   **List of selected patches and dependencies**

3. Click on the **DOWNLOAD** button beside each listed patch to save it to your system.

Searching by Patch IDs

To search by patch ID from the patch database search screen (**Figure** 3-2):

1. Select the hardware by clicking on a radio button (for example, Series 700).

2. Select an OS from the pop-up menu (for example, 10.20).

3. Select **Search by Patch IDs** from the pop-up menu.

4. Enter one or more patch ID numbers in the text field.

5. Click **SEARCH**. A list of all your selected patches appears along with any dependent patches (see "Dependency Analysis and the Patch Database").

6. Click on the **DOWNLOAD** button beside each listed patch to save it to your system.

Dependency Analysis and the Patch Database

When you select a group of patches, the patch database automatically analyzes dependencies and lists any other required patches. (Previously, you had to manually check each patch text file for dependency information.) This analysis takes superseding and recalled patches into account.

This automatic dependency analysis does not occur when you search for a single patch. (This is because a patch may support more than one architecture and HP-UX release.) To find out about dependencies for an individual patch:

1. Display the patch description (Figure 3-5).

2. Select the **dependencies** link.

Figure 3-5   **Patch Description**
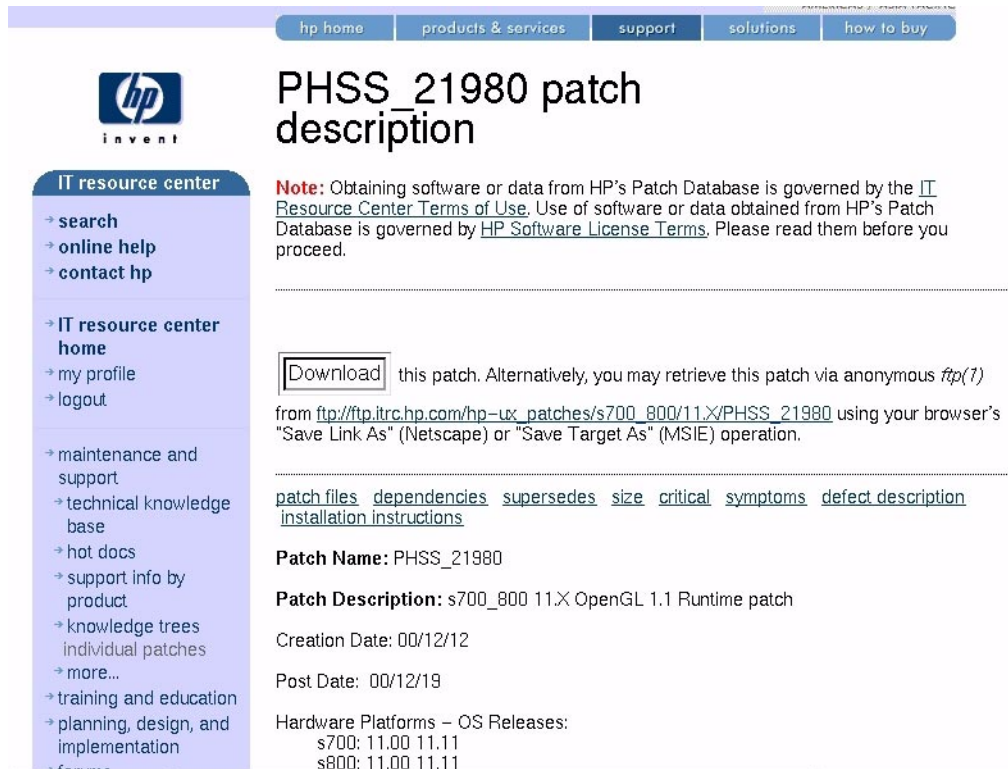
HP Patch Bundles

HP provides pre-packaged bundles of patches designed to be installed as a unit. These bundles are subjected to stringent levels of testing to assure a high level of reliability and are periodically updated.

You can obtain HP patch bundles from the HP Software Depot on the web or (if included in your support contract) from the quarterly Support Plus media.

Software Depot

The HP Software Depot (`http://www.software.hp.com`) is an online store that provides you with instant access to HP software for free trial or purchase.

Software Depot provides a number of patch products. These patch products are generally available at no charge and are found in the **enhancement releases** area of Software Depot.

(Although you can download the software for free, you may have to register with Software Depot first.)

- **Support Plus Bundles**

  The patch bundles and diagnostic utilities of the Support Plus CDs are also provided for free download from Software Depot. The support contract restrictions related to the actual media do not apply to electronic access. As an added benefit, the bundles are available within Software Depot earlier than on media.

  For more information on Support Plus see "Support Plus Media" on page 32 and:

  `http://www.software.hp.com/SUPPORT_PLUS`

- **Additional Core Enhancements (ACE)**

  An ACE bundle is a collection of enhancements to the HP-UX Operating System. Each ACE release extends HP-UX to support new hardware and software features for HP workstations. ACE software also corrects any critical or serious defects discovered since the original system release. For more information, see:

  `http://www.software.hp.com/ACE`

- **Hardware Extensions (HWE)**

  HWE bundles enabling new hardware or enhance OS performance, reliability, or functionality. See:

  `http://www.software.hp.com/products/HWE`

- **Product Updates**

  Some HP-UX products release a new version rather than a patch. These can be downloaded from Software Depot. Some products available at this time include Ignite-UX and Software Distributor.

- **Specialty Patch Bundles**

  Occasionally, special needs dictate the creation of a unique patch bundle (for example, Y2K defects or support for the European currency).

Support Plus Media

HP-UX Support Plus CDs deliver diagnostics and HP-UX system patches to you on a quarterly basis. This patch software enables new hardware and fixes known defects. The contents of each Support Plus release is freely available from Software Depot (page 31), but physical media is only available to customers with an HP-UX Software Support contract.

Requesting Support Plus CD-ROMs

HP notifies these customers when each Support Plus release becomes available. The notification letter includes a request form for physical media.

Support Plus Patch Bundles

Support Plus includes patch bundles that contain the following software:

- Diagnostics (`OnlinDiag`), including Support Tool Manager (STM) for online diagnostics, ODE (off-line diagnostics), EMS hardware monitors, Predictive Support, EMS Kernel Resource Monitor, and the Instant Capacity on Demand (iCOD) client product.

- General Release (GR) patches, including current patches for all Core Operating System (OS) software. The GR bundles have recommended HP-UX patches with the highest confidence ratings based on patch distribution and age, and successful completion of tests by the HP Enterprise Patch Test Center.

- Quality Pack (QPK) bundle for workstations, including all recommended, stable, and third-party defect-fix patches for selected Core OS and other products.

- Hardware/critical (HWCR) patches, including hardware enablement and critical patches. These patches may match or supersede patches found in other HP-UX patch bundles. You should install this bundle after other patch bundles (e.g. GR and QPK bundles) and after installation of applications (e.g. Networking driver products).

Use the following table to determine which bundle you need to install.

If your platform is:	And you want to:	You should install:	Updated:
HP-UX workstation or server	Update or install all the latest diagnostic tools, including hardware monitors	Diagnostic bundle: `OnlineDiag`	Quarterly
HP-UX workstation	Install selected defect-fix patches for the Core OS, HP products, or important third party applications	Quality Pack (QPK) bundle: `700QPK1020` (HP strongly recommends that you include the latest Quality Pack as part of the OS environment for end-user systems.)	As needed
HP-UX workstation	Bring all Core OS software to current patch level without custom patch selection	General Release (GR) bundle for HP-UX workstations: `XSW700GR1020`	Quarterly
HP-UX workstation	Enable Visualize-fx graphics hardware and update selected HP applications for this hardware	Visualize-fx Graphics/Hardware Enablement bundle: `B6825AA` (Install this bundle after installing HP 3D graphics software.)	As needed
HP-UX workstation	Enable and manage add-on hardware (includes patch to update PDC workstation firmware)	Hardware (HW) enablement bundle for HP-UX workstations: `XSW700HW1020`	Quarterly
HP-UX server	Install critical patches or enable new add-on hardware	Hardware/Critical (HWCR) bundle: `XSW800HWCR1020`	Quarterly

If your platform is:	And you want to:	You should install:	Updated:
HP-UX server	Bring all Core OS software to current patch level without custom patch selection	General Release (GR) bundle for HP-UX servers: `XSW800GR1020`	Quarterly

Getting More Information

For detailed information about Support Plus bundles and installation instructions, see the *Support Plus User's Guide*. You can obtain this guide from these sources:

- The HP documentation web site:

  `http://docs.hp.com/hpux/os/10.x/`

- The HP Instant Information CD

- The Support Plus CD in the file:

  `/cdrom/USRGUIDE.PDF`

Custom Acquisition and Notification

The HP ITRC offers custom solutions for getting patches or informing you about them: Custom Patch Manager (CPM) and Custom Patch Notification. Both services require the *phone-in* level of support agreement or above and may not be available in all geographic locations. (You can also use CPM on a pay-per-use basis. Consult the ITRC for details.)

About CPM

Custom Patch Manager (CPM) is a tool for selecting and downloading patches that are appropriate for a target system.

Benefits of Custom Patch Manager

- CPM patches and patch information are updated daily. This lets you update the collection script and perform an analysis on a regular schedule. For example, you can perform a monthly check for new critical patches, which could help identify a system risk before it is seen in production machines.

- Automatic dependency and conflict analysis, which reduces the need for lengthy review of the patch documentation.

Using CPM

To access CPM:

1. Go to the ITRC web site (`http://itrc.hp.com`) and log in.

2. Click on the **maintenance/support** link. This takes you to the maintenance and support page.

3. Click on the **customized patch bundles (custom patch manager)** link. This takes you to the custom patch manager main page (Figure 3-6).

   (If your profile indicates you do not have the appropriate support agreement, a pay-per-use notice appears. Click on **BUY NOW** and fill out the payment form to continue.)

Figure 3-6   Custom Patch Manager Main Screen

Step 1. **Collect Configuration Information**

This step requires that you download the `cpm_collect.sh` script. This shell script collects the names and revisions of all the products installed on your system. HP recommends that you download the script on a regular basis to ensure you have the latest version of the script.

To use the script:

1. Click on the **Collect Configurations** link on the main CPM page. This displays the system information collection page.

2. Follow the instructions in the "collect system configuration" section to download and execute the script on the system you want to patch (Figure 3-7). The script requires no special privileges and creates a data file using the name of the system followed by a `.fs` suffix.

3. Follow the instructions in the "upload results to IT resource center" section to return the data file to the ITRC via ftp:

   • The ftp system to use is identified on the same ITRC page used to download the collection script.

   • Use your ITRC user name and password to log in.

   • Once connected, place the data file in the `incoming` subdirectory on the ftp server. (This directory is subject to space limitations.)

Figure 3-7   **Executing the cpm_collect.sh script**

```
patchsvr> ./cpm_collect.sh

Copyright (c) Hewlett-Packard 1995-1998.  All Rights Reserved.

     cpm_collect.sh version: A.03.04

This script will collect information about filesets and installed
patches from your system in the file /tmp/patchsvr.fs for
subsequent transfer to Hewlett-Packard.

Do you wish to continue, [Y] or N ? y

removing /tmp/patchsvr.fs

Creating list of patches in /tmp/patchsvr.fs...

Creating list of products and filesets in /tmp/patchsvr.fs...

The file /tmp/patchsvr.fs has been created.
```

Step 2. Perform Patch Analysis

In this step, you analyze your system configuration information to determine what patches you need.

1. After you have uploaded the configuration information (Step 1), return to the custom patch manager main page.

2. Click on the **Perform Patch Analysis** link. This displays a list of the current configuration files found within the incoming directory.

3. Click on the radio button beside the appropriate configuration file in the list.

4. (Optional) Use the search and filter options at the bottom of the page to reduce the number of patches displayed. Options include:

   - Descriptive search
   - Boolean search
   - Critical patches only
   - Fileset filtering
   - Command patches
   - Kernel patches
   - Network patches
   - Subsystem patches

   Click on the **tips for setting filters and searching** link for more information about using these search options.

5. Click on the **DISPLAY CANDIDATE PATCHES** button. This displays the candidate patch list (Figure 3-8).

   (The search and filter options appear above list. Using these options regenerates the display to show only the patches that match the filter or search criteria.)

Figure 3-8   **Candidate Patch List**

description	date installed	installed	recommended	latest
s700_800 11.00 restore(1M) fix for cross−platform archives	000322	PHCO_14419(3)	PHCO_18138(3)	PHCO_18138(3)
s700_800 11.00 login(1) cumulative patch			PHCO_18572(2)	PHCO_18572(2)
s700_800 11.00 pax(1) cummulative patch	000322	PHCO_20027(3)	PHCO_20416(3)	PHCO_20416(3)
s700_800 11.00 Enhance find(1) for JFS ACLs	000322	PHCO_20037(2)	PHCO_20575(3)	PHCO_20575(3)
s700_800 11.00 useradd(1M) cumulative patch	000322	PHCO_17440(2)	PHCO_20679(3)	PHCO_20679(3)
s700_800 11.00 patch(1) patch			PHCO_20818(3)	PHCO_20818(3)

The candidate patch list displays:

- A brief description of the patch
- The date it was installed on your system
- A link to a full description of an installed patch
- A link to the description of the corresponding HP-recommended patch.

    — Always use the recommended patch unless the latest patch explicitly fixes a problem on your system.

    — If the recommended column is blank, HP does not have a patch that is better than the patch (if any) that is already on your system.

- A link to the description of the corresponding latest patch. This patch may have a lower patch rating than the recommended patch.

6. Select one or more patches from the candidate list by clicking on the check box next to the patch listing. You can also use the **select all recommended** or **select all latest** buttons at the bottom of the list.

7. (Optional) Click on the patch name to display detailed information on the patch (Figure 3-9). (Click the **Add** button to add the patch to your list and go to the selected patch list.)

Figure 3-9   **Individual Patch Details**

```
PHSS_21663 Patch Details

 Add   PHSS_21663 to the Selected Patch List.

Description:      s700_800 11.00 AudioSubsystem June 2000 Periodic Patch
Status:           General Release
Patch Rating:     3
Critical Patch:   No
Reboot Required:  No
Dependencies:     No
Package Size:     911360 bytes

Predecessors:
This patch supersedes these patches.
PHSS_17119 PHSS_17979 PHSS_18778 PHSS_21482

Equivalencies:
This patch is equivalent to these patches.
s700,10.01: PHSS_21662
s700,10.10: PHSS_21662
s700,10.20: PHSS_21662
s800,10.01: PHSS_21662
s800,10.10: PHSS_21662
s800,10.20: PHSS_21662

Patch Files:
This patch replaces these files.
/usr/share/man/man1m.Z/asecure.1m
/usr/share/man/man1m.Z/aserver.1m
/opt/audio/lib/libAlib.1
/opt/audio/lib/libAlib.2
/opt/audio/lib/libAt.1
/opt/audio/lib/libAt.2
/opt/audio/lib/libAt.3
/opt/audio/bin/Aserver
/opt/audio/bin/asecure

What(1) Output:
Revision information
```

8. Click the **ADD TO SELECTED PATCH LIST** button to display the selected patch list (Figure 3-10). This list includes additional information on reboot requirements, dependencies, size, and patch age.

   (To remove a patch from the list, deselect the check box beside the patch and click the **REMOVE** button.)

Figure 3-10   **Selected Patch List**

	Patch Name	Reboot Required	Dependencies	Size (kbytes)	Date Posted
☑	PHCO_18837	No	No	225	990622
☑	PHCO_19485	No	Yes	10947	990924
☑	PHCO_20330	No	No	317	991202
☑	PHCO_20441	No	No	9667	991122
☑	PHKL_18872	Yes	No	727	990623
☑	PHKL_18913	Yes	No	82	990622
☑	PHKL_19158	Yes	Yes	92	990713
☑	PHKL_19166	Yes	Yes	215	990715
☑	PHKL_19235	Yes	No	72	990720
☑	PHKL_19539	Yes	Yes	164	990824
☑	PHKL_19704	Yes	Yes	72	990907
☑	PHKL_19721	Yes	Yes	195	991207
☑	PHKL_19755	Yes	Yes	205	990915

Step 3. Conflict Analysis

In this step, CPM analyzes the selected patches for conflicts. (This step is optional but highly recommended.)

1. Click on the **Analyze** button below the selected patch list. This examines your list of patches for conflicts and displays the results (Figure 3-11).

Figure 3-11   **Results of Analysis of Selected Patch List**

→ ANALYZE   the **Selected Patch List** for possible conflicts.

Tips on conflict resolution are available.

Recalled Patches: PHCO_14044(Installed)Replacements for PHCO_14044
(Select one patch from each line of table)

Recalled Patch	HP Recommended Replacement	Latest Replacement
PHCO_14044(R)	☐ PHCO_22096(3)	☐ PHCO_22096(3)

PHCO_17556(Installed)Replacements for PHCO_17556
(Select one patch from each line of table)

2. (Optional) Follow the links from the conflicts display to get more information about how to resolve the conflict or to view other patches. See "Resolving Patch Conflicts" on page 53 for more information. You can add other patches to your list if necessary.

Step 4. Package and Download Your Patches

1. After you have selected all patches, click the **Package** button. This generates a script and places it in the `outgoing` subdirectory for your account on one of the FTP servers. (CPM directs you to the appropriate server.) The script is a shell script that extract scripts and provides instructions for downloading your selected patches.

2. Follow the instructions delivered with your script to run the script on your HP-UX system.

   The selected patches are transferred individually to your system. One of the scripts delivered in the shell archive is used to place all of these patches into a common depot for future installation.

Custom Patch Notification

Custom Patch Notification is a an optional feature of Custom Patch Manager that provides you with weekly or monthly e-mail notification of newly posted patches that apply to your system. (This tool differs from the ITRC Support Information Digests by using configuration files and filters to narrow down the list of patches about which you are notified and by customizing the report contents.) To set up Custom Patch Notification, select the **custom patch notification** link from the custom patch manager main page (Figure 3-6 on page 36).

NOTE   Custom Patch Notification does not work with depot configuration files.

Profiles

Profiles specify the kinds of reports you want to receive.

• A profile may be based off either a Custom Patch Manager configuration file or a platform and OS revision.

• Select one or more filters for your notification list, such as filtering for critical patches, by keywords, or for different patch categories.

- You may create up to 10 notification profiles

- Profile names may only contain alphanumeric characters (a-z, A-Z, 0-9, and the underscore). The first character of name must be a letter.

- Profiles are processed weekly or monthly. You receive an e-mail if the ITRC has posted new patches that apply to any of your profiles. This notification includes applicable patch names and one-line descriptions.

- To get more information about a new patch, log in to the ITRC, go to the Custom Patch Manager main page, and view the full reports on the Custom Patch Notification main screen. You have the ability to specify which fields are displayed in the report by selecting the Patch Report Fields.

Preferences

The preference screen lets you verify the e-mail address to which your notifications are sent.

- To modify this address, select the **User Info** link at the top of the screen.

- You can have only one ITRC e-mail address, so changing it affects *all* e-mails you receive from the ITRC.

Reports

You can specify whether you want to receive your reports on a weekly or monthly basis.

- Reports are not cumulative from week to week or month to month.

- Weekly reports are sent out on Sundays. Monthly reports are generated on the last day of each month.

- You can also specify what patch text fields are displayed when you view your on-line report. These fields can be changed and the report re-loaded if you want to view the same report with different filters set.

Configuration Files

- To use a current configuration file, simply select the radio button next to the configuration file on which you want your notifications to be based.

- You can add new configuration files by downloading the `cpm_collect.sh` script and uploading the results as described on page 37.

- You can also specify configuration by platform (e.g., 9000/735, 9000/855) and OS revision (e.g., B.10.20) for a profile. Use the *uname*(1) command on your system to determine what values to enter in these fields:

  To determine the platform, type: `uname -m`

  To determine the OS revision, type: `uname -r`

  (If you go from a configuration based profile to a profile based on platform and OS revision, you need to click the **Reset** button to clear the configuration file table so only the platform and revision fields are filled in.)

Filters

- Custom Patch Notification can filter patch notification lists based on these categories:

  — Critical: Lists all patches tagged as critical by the HP (independent of the actual patch categories listed below)

  — Command

  — Kernel

  — Network

  — Subsystem

- All HP-UX patches are included in one of the four patch categories (Command, Kernel, Network, Subsystem).

- CPM does not let you deselect all categories.

- Selecting more than one category acts as a logical OR operation. For example, if you pick the Command and Kernel options, you are notified of all Command patches or all Kernel patches that fit your profile.

- Selecting a category options and the Critical filter acts as a logical AND operator. For example, if you pick the Critical, Kernel and Command filters, CPM notifies you of all patches tagged as Critical AND all Command patches OR all Kernel patches that fit your profile.

The Fulfillment Server

The fulfillment server (FFS) is the patch repository used by the patch database. You can use ftp to directly access all patches on the FFS.

Two FFS systems are currently available:

- **`ftp://us-ffs.external.hp.com`** (Americas and Asia/Pacific)

- **`ftp://europe-ffs.external.hp.com`** (Europe)

HP recommends that you use the other techniques discussed in this chapter as your primary patch acquisition method. However, the FFS offers these advantages

- You can access patches from any system that supports the ftp command and has direct access to the Internet. (No web server is required, although you can also use FFS via the web.)

- Access is anonymous. You do not need an ITRC account.

- Works well for finding and downloading a known patch.

Disadvantages:

- Does not work well for finding groups of related patches.

- The FFS server limits the total number of simultaneous ftp connections.

Accessing the Fulfillment Server via ftp

Figure 3-12 shows how to use the /usr/bin/ftp command on an HP-UX system to connect to the Americas/Asia/Pacific FFS system. Note that the response supplied for the name prompt is **anonymous**. The password used is the user's e-mail address.

Because the FFS server limits the total number of simultaneous ftp connections, direct ftp access has an advantage over web ftp access. You can perform multiple downloads without having to re-establish a connection each time.

Figure 3-12   Establishing an anonymous FTP session

```
patchsvr(103)-> ftp us-ffs.external.hp.com
Connected to hpcc933.external.hp.com.
220-
220-Welcome to the HP Electronic Support Center ftp server
220------------------------------------------------------
220-
220-You are user 0, and there is a limit of 200 simultaneous accesses.
220-
220-Log in as user "anonymous" (using your e-mail address as your password)
220-to retrieve available patches for HP-UX, MPE/iX, and other platforms.
220-
220-If you are a user of other HP ESC services, log in with your
220-HP ESC User ID and password to deposit or retrieve your files.
220-
220-If you have questions, send email to:
220-
220-   support_feedback@us-ffs.external.hp.com
220- hpcc933 FTP server (Version wu-2.4, HP ASL, w/CNS fixes (277)
220-Wed Jun 24 18:02:04 PDT 1998) ready.
Name (us-ffs.external.hp.com:username): anonymous
331 Guest login ok, send your complete e-mail address as password.
Password:username@hp.com
230 Guest login ok, access restrictions apply.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```

Web Access to FFS

You can also access the FFS from your web browser. Simply enter an ftp address as you would a URL (Figure 3-13). For example, entering `ftp://us-ffs.external.hp.com` into your browser creates an anonymous ftp connection to the Americas/Asia/Pacific FFS system.

- Advantage: you can browse the FFS directories graphically.

- Disadvantage: FFS limits the total number of simultaneous ftp connections, and you web browser must re-establish the connection each time you change directories or download files. You may have to make several attempts if the server is busy.

Figure 3-13   **Browser Listing of the Fulfillment Server**

FTP Listing of Root at us–ffs.external.hp.com

Welcome to the IT Resource Center ftp server

You are user 0, and there is a limit of 400 simultaneous accesses.

Log in as user "anonymous" (using your e-mail address as your password) to retrieve available patches for HP-UX, MPE/iX, and other platforms.

If you are a user of other HP ITRC services, log in with your HP ITRC User ID and password to deposit or retrieve your files.

If you have questions, send email to:

    support_feedback@us-ffs.external.hp.com

.archive	Sep 30 1998 00:00	Directory
bin	Feb 01 2001 05:53	Directory
domain patches	Oct 08 1998 00:00	Directory
export	Sep 30 1998 00:00	Directory
firmware patches	Feb 01 2001 03:00	Directory
hp-ux patches	Feb 06 2001 03:05	Directory
mpe-ix patches	Feb 04 2001 03:05	Directory
mv patches	Feb 06 2001 03:05	Directory
patch bundles	Apr 13 1999 00:00	Directory
recalled patches	Feb 06 2001 03:06	Directory
superseded patches	Feb 06 2001 03:12	Directory
tmp	Feb 06 2001 03:22	Directory
users	Feb 01 2001 05:53	

The FFS Directories

These are some of the more useful FFS directories for HP-UX patching:

- `/hp-ux_patches/ARCHITECTURE/OS_RELEASE/`
  (HP-UX patches)

  All active HP-UX patches are grouped by architecture (`s700`, `s800`, and `s700_800`) and the version of HP-UX supported (`10.X`, `11.X`). For example, patches for Series 700 workstations on HP-UX 10.20 are found in the `/hp-ux_patches/s700/10.X` subdirectory. Patches common to both architectures are found under `s700_800`.

- `/firmware_patches/hp` (Firmware patches for HP Hardware)

  This directory contains patches that supply firmware updates to HP hardware. Subdirectories exist for firmware specifically for CPUs, Fibre Channel, graphics cards, and I/O cards.

- `/superseded_patches/` (Patches that have been superseded by newer patches)

  This directory contains patches that have been replaced by newer patches. Use them only if you must revert to an earlier version of a patch to resolve a specific problem.

- `/export/patches` (data files)

  This directory does not deliver any patches, but provides useful data files, including:

  — `hp-ux_obs_patch_list`, which contains a full list of every patch that has been superseded with the name of the active superseding patch.

  — `hp-ux_patch_matrix`, which lists all patches that address known security issues for each release.

  — `hp-ux_patch_sums`, which contains the checksum for the `.depot` file of all HP-UX patches.

Patch directories contain the full *shar*(1) archive and the patch text file. The text file contains the patch location within the FFS hierarchy as the Path Name field. See Appendix , "Patch Text File Fields," on page 120 for more information on the text file.

Downloading the Patch

- **To download by ftp:**

  1. (Optional) Enter `bi` to specify a binary transfer. (The shar archive may deliver 8-bit binary data, but is encoded to contain only 7-bit characters. When files of this type are transferred through other systems such as personal computers they may be treated as text and undergo a translation step.)

  2. Use the `get patch_name` command to download specific files, in which *patch_name* is the file you wish to download. (Use `mget` for downloading multiple files.)

- **To download by your web browser:**

  1. Click on the file you want to download.

  2. Right-click on the patch link and select the appropriate save option from the pop-up menu (**Save Link As...** for Netscape, **Copy to Folder...** for Internet Explorer). This downloads the shar file of the patch to your system or displays a dialog to select a location to which to download.

  3. Unpack the shar file by typing `sh filename`

About Patch Recommendations

The patch database helps you find the "best" patches: the most recently released patches having the highest HP rating. HP rates patches with a three-point scale:

Table 3-1   **HP Patch Ratings**

HP rating	Description
1 or *	Functional testing by HP has verified: • The patch fixes the problem that it purports to fix • No unwanted side effects exist • The patch will install and de-install in its target environments
2 or **	Patch has been installed in customer environments with no problems reported
3 or ***	Patch has been stress- and performance-tested by HP in simulated customer mission-critical environments using common application stacks. (Not all patches receive this testing.)
R	**Patch is known to introduce another problem and has been recalled. It is no longer recommended by HP. (Not every recalled patch causes problems for every customer. Read the patch description to determine why it was recalled.)** Whenever you download a patch from the patch database, the ITRC automatically registers the patch with your account. If any of your registered patches is recalled, the ITRC notifies you.

- The higher the rating, the lower the risk of side-effects and the more suitable the patch is for mission critical environments.

- HP releases a patch after it meets HP's minimum patch quality standards.

- Patches are assigned a rating of 1 upon initial release. The patches then receive additional HP and customer environment testing. The patch rating is updated accordingly as HP's confidence in the patch increases.

- When a patch is rated 1, HP recommends that you defer fixing the problem until more is known about the patch unless the patch fixes a problem critical to your system.

- Patches undergo testing for promotion to an HP rating of 3 on a quarterly basis (on February 1, May 1, August 1, and November 1). If you defer installing a patch because it is "Not yet HP Recommended," re-check it after one of the quarterly dates.

- The Rating of a patch may be updated from 1 to 2 on a daily basis.

About Patch Notes

Patches may include descriptive notes to help you determine the status or risk of a patch, and any impact to your environment. These are displayed in the Notes section of patch lists. Most notes are self-explanatory (such as, "Fixes critical problem" or "Reboot required after installation"). Other notes include:

• *Not yet HP recommended*

All patches adhere to certain HP quality standards. Patches are assigned an HP Rating of 1, 2, or 3 based on how many quality standards they meet. As a matter of course, it purposely takes time to meet the higher standards. Upon their initial release, patches are assigned an HP Rating of 1 and are labeled "Not yet HP Recommended". These patches may fix the problem, but also may contain some element of risk. As patches advance on the patch confidence scale, the higher the rating becomes. Patches with ratings of 2 or 3 are denoted by the term "HP Recommended" in the Notes field.

These patches are available to give you the option of obtaining a fix sooner if you can tolerate some risk to fix a critical problem. Whenever the patch database suggests a patch that is not yet recommended by HP, you must make an informed assessment of these trade-offs based on your own situation.

If you are not facing a critical problem, HP recommends waiting for a patch to gain a higher HP Rating.

• *Recalled*

A patch may be labeled as recalled when it is known to introduce another problem. However, not every recalled patch causes problems for every customer. Click on the one line patch description to view the patch details to determine why it was recalled.

The patch database recommends a replacement patch when you search by patch ID and find a recalled patch.

• *Patch not available*

A patch might be unavailable if, for instance, it has a dependency that requires the installation of a product that needs to be purchased separately.

Resolving Patch Conflicts

These are the possible conflicts that can come up during an analysis and how to resolve them:

- **Behavioral conflict:** A behavioral conflicts generally means a selected patch should not be installed with a patch installed on your system. You must choose between the new patch and the existing one. View the details for each patch to decide which you want. If you choose to leave the existing patch installed, remove the conflicting patch from your selected patch list and perform another analysis.

  If two selected patches conflict, view the details for each patch and decide between them. Generally, you should select the patch with the highest rating unless a newer patch fixes a specific problem.

- **Structural Conflict:** A structural conflict indicates that both patches will replace the same software file on your system. Check the revision numbers descriptions When two patches have structural conflicts, you should verify the revisions and install one or both of the patches as needed. This is a rare occurrence that when encountered can lead to unexpected behavior when a patch is effectively partially superseded. A structural conflict may not exclude the selected patch, but it will generally imply special handling.

- **Dependency Conflict:** A selected patch or a patch already on your system requires another patch to be installed with it. This kind of conflict may be common. For example, you may select critical patches that have dependencies on noncritical patches. To resolve dependency conflicts with selected patches:

  1. Click on the dependent patch.

  2. Review its description and any superseded patches listed.

  3. If appropriate, add the patch to your selected patch list.

  4. Analyze for conflicts again to verify that the conflict is resolved.

  5. If you don't want the patch, de-select and remove it from your selected patch list. Analyze for conflicts again to verify that the conflict is resolved.

- **Recalled:** A Recalled patch has been removed from distribution. To find an alternative patch:

  1. Click on the patch name to view its details.

  2. Look for a recommended alternate patch, usually explained in the Warning/Description field or the final patch listed under Predecessor patches.

  3. Add the recommended alternative patch. If you do not find information about an alternative patch, it might still be in development. Continue checking the ITRC to check for updates.

4   Depot Management

Patch depots let you simplify systems management by defining a common reservoir of software to be shared by a group of systems. Depots let you centrally manage the work of defining and testing the modified software that results from patching.

Introduction to Patch Depots

A **depot** is a software container present on disk, tape, CD-ROM, or network directory that you can use as a source for the swinstall software installation utility. You can create depots using the SD-UX **packaging** process. Customizable depots give you a powerful tool for managing software.

Benefits of Using Patch Depots

There are compelling reasons to use depots for patch management:

- Depots separate patch management from system management

  Patch management requires a number of unique skills and is an ongoing task. This adds responsibilities to a system administrator's work load. With patch depots, a centralized team can define and support a standardized patch level that many administrators can use.

- Depots can streamline installation

  Installing software from a depot lets a single installation session load everything in the depot, no matter how many sources you use to create the depot. For example, combining all patches that cause kernel rebuilds into a single depot lets you install multiple patches from the depot but requires only one reboot.

- Depots permit remote administration

  Depots let you install software without having to mount media. This saves time and lets you administer patches on remote systems—or systems that are just far enough away to be annoying).

Types of Depots

There are two types of depots: directory and tape. Each type has advantages in certain situations.

A **tape depot** is a single data file that is accessed in a serial manner. This format is not limited to tape media. It is also a convenient method to transfer a depot over a network without using the SD-UX swcopy command. For example, this is how HP transfers the `.depot` file delivered within any patch shell archive from the Patch Database or

Fulfillment Server (see Chapter 1, "Introduction," on page 11).

Also known as a network depot, a **directory depot** contains each packaged file (as well as SD-UX infrastructure) as distinct files in a directory. Although this format is not as easily transferable as a tape depot, it is much better suited to parallel access. This type of depot works best if you plan to access the depot from multiple remote systems.

NOTE   All depots discussed in this document are directory depots unless otherwise indicated.

HP-UX 10.x vs. 11.x Depots

With HP-UX 11.0, HP significantly enhanced the abilities of the Software Distributor tools for handling patches. This changed the basic layout of the SD-UX software objects. The layout_version attribute differentiates the old and new versions, with 10.x depots identified by the value 0.8 and 11.x depots indicated by 1.0.

CAUTION   Although you can use depots of with a 0.8 layout version on an HP-UX 11.x system to provide software for use on HP-UX 10.x systems, you may encounter problems. HP recommends that you install patch PHCO_20078 (or its current replacement) before you create such depots. Otherwise, if you copy an HP-UX 11.x depot to an HP-UX 10.x system or layout_version=0.8 depot, data will be lost and the depot corrupted.

Patch Depots

Patch selection, analysis, and monitoring are some of the more difficult administrative tasks required for HP-UX systems. Creating several types dedicated patch depots can reduce the effort required for patch administration.

Periodic Patch Depot

Periodic patch depots are generated on a regular basis, which varies according to the needs of your users. You may create this depot quarterly to match the release of the Support Plus media, monthly to ensure a more timely inclusion of critical fixes, or only in advance of scheduled system downtime to take advantage of the opportunity for rebooting.

There are two critical aspects for maintaining such a depot:

- The patches should be tested on the target system configurations.

- All dependencies must be met. (See "Dependency Analysis" on page 63.)

After you have created a periodic patch depot, you can install patches on production systems using the swinstall command with the `match_target` option enabled. (See Chapter B, "SD-UX Tools & Objects," for more information.)

Critical Fix Patch Depot

Creating a periodic patch depot often requires a significant investment in testing and analysis. You may not want to change such a periodic depot after it has been released—yet a system may still encounter a problem that requires a new patch.

In this situation, you may find it useful to create a critical fix depot that contains fixes to known problems in the current environment. You can use this depot to update any system that encounters a known failure or as a starting point for the next version of a periodic depot.

(As with the periodic depots, critical fix depots should also include dependencies of the patches in the depot.)

Depending on the severity or probability of a given failure, you may want to place a newer patch in both the periodic and the critical fix depot.

Patch Hubs

While HP does not recommend such depots for general use, you may in some situations find it useful to create a "kitchen sink" depot that contains every patch that your users may ever need. This method can conserve disk space and act as a local resource to ensure local access to any needed patch.

The problem with this approach, however, is that the results of an SD-UX matching operation may not produce a defined or tested environment. Although you may be tempted to give all users direct access to a patch hub, there are a variety of ways in which a system administrator could perform an incorrect operation that could leave a system in an unknown state. Therefore, if you do create a patch hub, HP recommends that you restrict access to it or leave it unregistered. or be given restricted access (see "Depot Access" on page 65).

If you fully understand the risks of patch hubs and decide to create one, you can use the following mechanisms to define subsets of the full patch hub:

- Patch Bundles

  You can acquire patch bundles directly from HP, create them using the IUX make_bundles command, or get them using external tools such as those available through the Interex Users Group. (These tools are discussed in the paper *Creating Custom Patch Bundles* by Dominguez & Scott in the Interworks 1998 proceedings, also available at `http://www.interex.org`).

  Such a bundle can be explicitly selected for installation, but numerous issues exist. See Chapter 5, "Patch Installation," for more information on installation issues.

- Explicitly patch selection with software and session files

  The SD-UX commands used to install patches provide both a software file (specified with the `-f` option) and a session file (specified with the `-C` option). These files give you a mechanism to explicitly select a set of patch software. Session files also let you specify SD-UX options in addition to the software list. This can be particularly useful when working with bundle wrappers.

Directly specifying bundles, patches, or patch filesets from the swinstall user interface or a software or session file is known as explicit selection. For software to be explicitly specified within a swinstall session without reported errors, all of the filesets specified must be able to load. For example, this would require separate bundles containing only 32-bit (Series 700) or 64-bit (Series 800) filesets. For example, a patch that has already been superseded by a patch found on the system will be excluded with an error.

• Depot copy

An alternative to explicit selection is to swcopy the patches included in the bundle or software/session file to their own depot in which you can use an SD-UX matching operation successfully.

Creating a Patch Depot

Once you have decided to create a patch depot and have identified and acquired the necessary patches, you can finally begin the actual creation of the depot. The more individuals, systems, and depots involved, the more time and energy you need to devote to preparation. Even if you are the only person to use the depots, creating the correct depot environment now will help support any changes required later.

Preparation Tasks

Consider these issues before you put a depot into production:

- Depot naming

  The SD-UX interactive user interfaces lets users select from a list of available depots on a system. It helps the users when the depot name identifies the contents, especially when they must choose between several different depots or revisions of depots. For example, `/depots/order_db/Y2001Q1` might contain the periodic patch bundle for the first quarter of the year 2001 for use on systems hosting the order entry database.

- Disk considerations

  Depot operations can involve significant disk activity. You must make sure adequate disk space is available. If you expect depot usage to be high, you must also consider the performance of the disk devices and interface cards. When your environment requires constant availability of the depot, you must also consider high availability storage solutions such as disk arrays or mirroring.

- Network considerations

  Take into account the performance of the networking interfaces and the location of the depot within the network. Consider the performance of the server and the impact on others applications and users. If you can access groups of remote systems only by a congested or expensive link, creating a mirror depots may be a valuable option.

- Compression

  By default, SD-UX creates depots in an uncompressed state. You can conserve disk space and network bandwidth by setting the swcopy

option `compress_files` to true when you create the depot.

- Depot access

  When you create a depot using swcopy, it is automatically registered. If the final form of the depot require more than a single swcopy operation, you should make the depot inaccessible during the creation process. You can do this by setting the `register_new_depot` option to false during the initial swcopy session.

Copying Existing Depots

All SD-UX-packaged software (including patches) exists in a depot. You can therefore assume that an initial depot is always available. You can copy one depot to another using the swcopy command (for directory depots), or to with the swpackage command (for tape depots). The following example shows how a copy depot on the default tape drive to `/depots/testdepot` on the current system while ensuring that all files are compressed:

```
swcopy -x compress_files=true -s /dev/rmt/0m \*.\* \
       @ /depots/testdepot
```

(The swcopy command is described in more detail in the *swcopy*(1m) man page and in "The swcopy Command" on page 102.)

Combining Patch Depots

You may want to combine patch depots so that you can perform a single install and reboot for a given session. When multiple patch depots are combined, each is simply copied in turn. This may result in the depot containing patches and their replacements together. While an installation using such a depot should be successful, error messages may be produced during the operation and unpredictable results may be encountered if the active patch is removed in the future. Superseded patches can be removed from a depot via the cleanup utility (delivered by patch PHCO_19549 or current replacement). When given the `-d` option and the full path to a depot, cleanup removes any superseded patches in the depot. The following command runs cleanup for `testdepot`:

```
/usr/sbin/cleanup -d /depots/testdepot
```

If the cleanup command detects any superseded patches, the command lists them and prompts you to determine if those patches should be removed.

Dependency Analysis

Although the patch database and the SD-UX tools perform automatic dependency analysis, you may occasionally have to perform the analysis manually. This section describes how to analyze dependencies.

Figure 4-1 shows two supersession chains that have a mutual dependency. The supersession chains are shown in the vertical column, with the older patches on the bottom. A patch dependency is indicated by a dashed arrow pointing from a patch to the patch it is dependent on.

Figure 4-1   **Example of Dependencies Between Patches**
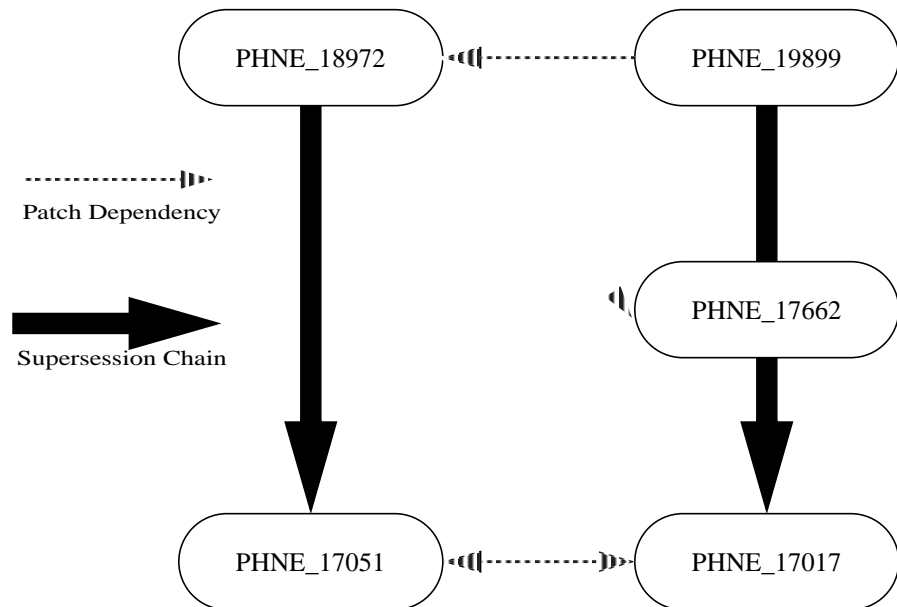
For example, suppose that you need a critical fix found in patch PHNE_17051.

1. Read the PHNE_17051 text file.

   For example, the PHNE_17051 file lists a dependency on PHNE_17017.

2. Search the patch database for any dependent patches.

For example, searching for PHNE_17017 shows that the patch is
recalled and is not available, but it has been superseded by
PHNE_19899.

3. Check the dependency information for any superseding patches.

For example, the `.text` file for PHNE_19899 shows a dependency on
PHNE_18972. The Supersedes field (in the patch `.text` file or the
patch database) shows that PHNE_18972 has replaced PHNE_17051.
PHNE 18972 also has a dependency on PHNE_17662. PHNE_17662
itself has been replaced by PHNE_19899, which you already selected.

At this point, no unresolved dependencies remain, and you can install
patches PHNE_18972 and PHNE_19899 onto the system. Even
though you did not install the original patch (PHNE_17051), the
cumulative nature of HP-UX patches ensures that the replacement
patches include the needed functionality.

Chapter 3 , "Acquiring Patches," has more information about using the
patch database and dependency analysis.

Depot Access

You will often want to restrict access to patch depots. This could be due to entitlements, training, geography, or the depot not being prepared for production. Two mechanisms exist to restrict access: depot registration and access control lists.

Depot Registration

A registered depot is visible and accessible to remote systems. When unregistered, a depot remains accessible on its own system without being visible to remote systems. For patch depots, this is usually sufficient for most needs. Registration tasks are done using the swreg command. See "The swreg Command" on page 111 for more information.

SD-UX Access Control Lists (ACLs)

If you require more complex access control, the SD-UX access control lists (ACLs) let you restrict access with a high level of detail. You can specify access rights for individual products within a depot and individual users on specific systems. The rights can be further divided by the type of access granted.

A full description of ACLs goes beyond the scope of this document. For more information, see the *swacl*(1m) man page or *Managing HP-UX Software With SD-UX*, available from `http://docs.hp.com`.

Depot Management
Depot Access

5   Patch Installation

This chapter describes a basic process for installing patches onto an HP-UX system. It provides a general checklist of tasks that you can use as a starting point for establishing your own installation process.

Before you install patches, you should have:

- Created a current system recovery image. (See Chapter 2, "Planning for Recovery.")

- Selected and acquired the patches you wish to install. (See Chapter 3 , "Acquiring Patches.")

- Made sure the installation depot contains all dependencies and is free of superseded patches. (See "Dependency Analysis" on page 63.)

System Preparation

Even if your patch depot is ready, there is more to be done to prepare for any system modification.

Back-ups, Back-ups!

Even though this document has so far focused on backing up system software, data backups still matter. If you have any question about your ability to maintain the stability or reproducibility of user data, you must resolve it before proceeding. Although disk arrays and mirroring provide excellent protection from hardware failures, software failures and operator error are not hindered in their destructive ability.

While the risks may be small, the costs can be huge.

A Note on Change Management

Computer systems are complex environments and system administrators are often driven by constant and critical interruptions. When you work with multiple systems and system administrators, it is easy to get confused, make mistakes, and complicate the analysis of system failures.

If you do not already have such a process, you should consider establishing a formal change control process for critical systems. Although a smaller data center would receive less benefit, such a process is almost essential in a large or growing environment.

A formal change control process should include:

• Clear ownership of each change

  The submitter of a change request becomes the initial owner of a task. By requiring a formal handoff to any new owners, the individual responsible for executing the change can quickly be identified.

• Change review and approval

  By requiring a period of review and authorization, senior administrators and management can provide guidance and ensure that business needs are not controlled by technical decisions.

- Centralized change database

    Keeping change records on a protected central system prevents their loss when a system failure occurs. You can construct the database to provide access to experienced administrators and to provide visibility of upcoming changes to system users.

System Activity

The SD-UX tools used for patching rely on DCE and networking support for even the most basic functions. For this reason, most HP-UX documentation recommends that the system be in run-level (init) 2 or higher—the multi-user states that are usually associated with active systems.

This is not meant to indicate that updates should take place on active systems. Both the initial state prior to the installation and the final state upon completion should be supported and stable environments. During the installation process, system files, libraries, and commands are gradually changed. Scripts may kill and restart daemons. Commands and libraries may not match the currently running kernel. The system is between supportable configurations.

Experience and recovery planning should be your guide. Halt any non-critical applications, and don't start any new processing. Remember that the risk is not only to the failure of an application, but to the system being left in a partially installed and corrupted state.

Patch Committal

When installing a large numbers of patches, such as a Support Plus patch bundle, it is not uncommon for some of the patches to already be present or superseded on the target system. If it becomes necessary to return to the initial state by removing the new patches, patches that were already there may be inadvertently removed. If a superseding patch present before the install is removed, the superseded patch that was to have been loaded will not be present. Each of these conditions can result in a patch required to fulfill a dependency being removed.

One method that can be used to avoid these issues is to perform a system-wide commitment of all patches prior to the installation of the new set. This causes the initial patched state to become the minimum system environment. The committed patches cannot be removed, and the

current patch level becomes a low-water mark. An attempt to remove all active patches can only delete those that are newly delivered.

The recommended method for performing a system-wide patch committal is through the cleanup utility. Delivered by patch PHCO_19549PHCO_19550, the -F option directs cleanup to commit active and superseded patches. This not only sets a hard floor to the patch level, it also reclaims the disk space required to support rollback operations. (See "The cleanup Command" on page 114 for more information.)

While patch committal has benefits, there is also a cost. If a committed patch must be removed, the patched products must be reinstalled to provide the older versions of files. Selected reinstallation and Installed Products Database (IPD) modification can be a complex and risky operation. Before you commit patches, HP strongly recommends that you create a recovery image for your system. You can use this image if you need to return to the uncommitted state. Do not commit patches unless there is an immediate need.

Planning for System Reboot

The core of the HP-UX operating system is the kernel. Most kernel (PHKL) and many networking (PHNE) patches require that the kernel be rebuilt and restarted. The only method currently available to restart an HP-UX kernel is to reboot the system.

When is a Reboot Needed?

A flag in each patch's file and a fileset attribute within the patch itself indicate which patches require a reboot. To determine if a patch requires a system reboot:

Look at the Automatic Reboot in the patch's `.text` file.

Use the swinstall GUI. You are prompted before the system installs any patches that require a reboot.

Use the swlist command to examine the is_reboot attribute of patch filesets. For example, to check the patches in `/MyDepot`:

```
swlist -d -l fileset -a is_reboot PH\* @ /MyDepot | grep true

swlist -d -l fileset -a is_reboot *.*,c=patch @ /MyDepot \
        | grep true
```

Timing of the Reboot

The section, "System Activity" on page 69, discusses the fact that the system is in an unknown state until the installation process completes. This ambiguous condition exists until any required system reboot and configuration steps are completed. Not only is a reboot often required, but it should also not be unnecessarily delayed. Despite this and the cautions regarding system activity, it is certain that at times users and applications will remain active during an install and need to be prepared before a reboot can occur.

This becomes an issue when the swinstall command line interface is used. The CLI will not allow an installation that will require a system reboot to begin unless the an override option (`-x autoreboot=true`) is specified. If specified, the `autoreboot` option instructs swinstall to reboot the system whenever required. This does not allow any time or warning before the system is halted.

Installation

Installation should be simple and quick if you have created proper depot and prepared your system. There are complex methods of patch installation, and some are mentioned in this document. Unless a special need exists, avoid using them unnecessarily. The goal is to have all systems at a common level with the least amount of overhead.

Using the SD-UX Matching Operations

The HP-UX 10.X versions of SD-UX do not recognize patches as being distinct from products. To select only the patches required by the target system, use the `match_target` option. This option searches the target system for the ancestor filesets of every patch in the depot. Every patch with an ancestor present on the target system will be installed.

The `match_target` operation operates across the entire depot. It cannot be filtered or restricted to only those patches found within a specific bundle. To load the required patches found in /mydepot:

```
swinstall -s /mydepot -x match_target=true \
          -x autoreboot=true
```

Limitations:

- The `match_target` option applies to both patches and non-patch software in the same depot. There is no way to ensure that patches and non-patch software are installed in the correct order. This complicates the process of software updates and requires that you keep patches in separate depots from other software. This also makes it impossible to install both a product and its patches in a single step.

- SD-UX cannot determine when patches are superseded by other patches. You must manually remove superseded patches from your patch depots to prevent them from being used again.

- All patches in the source depot that correspond to software on the target system are selected. There is no way to filter them according to patch type or level of severity.

Installing to a Committed Patch State

Patch commitment may take place during patch installation, or after the fact. If the file `/var/adm/sw/patch/PATCH_NOSAVE` exists during installation, any patches will be installed directly to a committed state. This file can be created by the root user with the *touch*(1) command:

```
touch /var/adm/sw/patch/PATCH_NOSAVE
```

To commit patches after they have been loaded onto a system, a special utility is required. The HP-UX 10.X patch PHCO_12140 (or current replacement) delivers the script `/usr/sbin/cleanup`. One of the functions of this tool is to commit the currently installed patches. This is discussed in more detail in "The cleanup Command" on page 114.

Installing Support Plus Patch Bundles

Follow this procedure to install patch bundles from the Support Plus CD. For complete information on Support Plus, see "HP Patch Bundles" on page 31 and the *Support Plus User's Guide*, available on the Support Plus CD and at `http://docs.hp.com.`

Step 1. Mount the CD

1. Open a terminal window and become root on your system.

2. If the CD drive is external, switch it on.

3. Put the appropriate Support Plus CD into the drive. Wait for the busy light to stop blinking.

4. If necessary, define a new directory as the mount point for the CD drive. For example, to define /cdrom as the mount point, enter:

   `mkdir /cdrom`

5. If necessary, identify the drive device file:

   `ioscan -fnC disk`

   This command lists all recognized CD drives and their associated device files. The file name will be something similar to /dev/dsk/c1t2d0.

6. Mount the CD drive to the mount-point directory:

   `mount -r /dev/dsk/c1t2d0 /cdrom`

   If the CD drive's device-file name is not c1t2d0, use the name you found using ioscan in Step 5 above.

7. You can now access the CD via the mount-point directory. For example:

   `ls /cdrom`

Step 2. Check for Last-Minute Information

Support Plus often contains last-minute information. Before proceeding, HP strongly recommends that you read the documentation for each bundle or patch you wish to load. There are several important sources of information:

- Check the HP IT Resource Center for information about recommended patches:

  http://itrc.hp.com/

  Select the **Maintenance and Support** page, then select the appropriate patching tools.

- Refer to the Support Plus web site for additional information:

  http://software.hp.com/SUPPORT_PLUS/

- Refer to the *Read Before Installing* document that accompanies the Support Plus CD. This short document contains up-to-date information about known problems with patches in recent Support Plus releases.

- Each patch bundle has its own readme file. This file contains additional installation instructions, notes about problems in previous releases, a list of patches (and their dependencies) in the bundle, changes since the last release, and a listing of disk space usage. You can print or view these files directly from the CD. For example:

  more /cdrom/XSW800GR1020.readme

- Each patch has an accompanying text file in the `/cdrom/TEXT_FILES` directory. This file provides detailed information about the patch. (Patch text files are also included with individual patches that you retrieve from HP.) You can print or view these directly from the CD. For example:

  more /cdrom/TEXT_FILES/PHCO_12140.txt

- Each bundle readme file is also available in HTML format. These files contain hyperlinks to the patch text files. You can enter a URL into a web browser to view these files directly from the CD. For example:

  file:/cdrom/XSW800GR1020.readme.html

- Diagnostic products have readme files and additional information in the `/cdrom/DIAGNOSTICS` directory. Some information is in Adobe® Portable Document Format (PDF) files. A free version of the Adobe Acrobat® Reader is available at:

  http://www.adobe.com

TIP   To simplify sharing of patch information, you may wish to copy the documentation files onto your own system. The hyperlinks from the HTML bundle readme files to the patch text files will work as long as the HTML files reside in the same directory as the `TEXT_FILES` subdirectory.

If you mounted the CD on the system that is the target for the patch or diagnostic installation, proceed to "Install the Selected Bundles" on page 77.

Step 3. (Optional) Set Up Sharing for Remote Systems

To enable direct access from one or two other systems, you must register a Support Plus bundle with the swreg command. For example, to register the `XSW800GR1020` bundle if the Support Plus CD is mounted to /cdrom:

1. Register the depot:

   swreg -l depot /cdrom/XSW800GR1020

2. Install the bundles (see "Install the Selected Bundles" on page 77).

3. Disable remote access by unregistering the depot before unmounting the CD:

   swreg -u -l depot /cdrom/XSW800GR1020

Step 4. (Optional) Set Up Hard Disk Access

If more than two systems must access the depot, or if you cannot dedicate the CD drive to the Support Plus CD, HP recommends that you copy the patch depots to a hard disk using the swcopy command. For example, with the CD mounted at `/cdrom`, use:

swcopy -s /cdrom/XSW800GR1020 * @ /var/tmp/MyDepot

This copies the contents of the XSW800GR1020 bundle and depot to the local system under the /var/tmp/MyDepot directory. The new depot is automatically registered for use by remote systems.

Notes
- HP recommends that you do not merge depots created on different versions of HP-UX. Also, HP recommends that both the host system and depot should have the same major HP-UX version (for example, 10.x).

- If the swcopy interactive user interface appears, an unexpected condition was encountered and you may need to enter additional information or take other action.

Step 5. Install the Selected Bundles

Each bundle on the Support Plus CD is built, tested, and intended for use as a unit. Although you can install individual patches from each bundle, you must carefully analyze the readme files to ensure you do not overlook dependencies on other software in the bundle.

To ensure greatest reliability, HP recommends the following tasks for all systems:

1. *Plan for system down time*

   Even though the swinstall command used for installing the bundles requires that the system has networking enabled, it is prudent to limit system activity during any installation. Also, Support Plus bundles commonly include patches that require a system reboot. Therefore, you should plan the installation for an appropriate time and announce a system outage to the users ahead of time.

2. *Create a system backup*

   Some amount of risk is involved in any system modification. You should implement a recovery plan as an insurance policy against a system failure. One recovery technique is to use HP's Ignite-UX tools (available from http://software.hp.com/products/IUX/) to create recovery images.

3. *Review the documentation*

   The bundle readme files may contain additional installation instructions and other important information. Although you should already have reviewed the patch documentation, it is wise to recheck

the readme files before installing. See "Check for Last-Minute Information" on page 75.

4. *Install the patch bundles*

HP recommends that after you have selected a bundle for installation (see "HP Patch Bundles" on page 31), you install the bundle using the matching operations of the swinstall command. For example, to install from a CD mounted and registered on the system `grendel`:

```
swinstall -s grendel:/cdrom/XSW800GR1020 \
          -x match_target=true -x autoreboot=true
```

You can use the swinstall command's preview mode (`-p` option) to get an idea of what to expect for the bundle you want to install. For example:

```
swinstall -p -s grendel:/cdrom/XSW800GR1020 \
        -x match_target=true -x autoreboot=true
```

NOTE   If the swinstall interactive user interface appears, an unexpected condition was encountered. You may need to enter additional information or take other action.

Finishing Touches

Once you have completed the installation, you must verify the actions taken and begin preparations as the next cycle begins.

Verifying the Installation

Software Distributor maintains a database of software that it controls known as the Installed Products Database or IPD. The swverify command is provided as a method to compare the data within the IPD with the actual system directories and files. When verifying installed software, swverify checks software states, dependency relationships, file existence and integrity.

The swverify command can be used to verify a patch bundle or even a single patch, but it is recommended that a wildcard be used to verify all products and patches on the system. This can be done using:

```
swverify \*
```

Checking the Logs

Each SD-UX command logs messages to /var/adm/sw/sw*<task>*.log, where *task* is the name of the SD-UX command. This contains a terse summary of command activity. (You can specify a different logfile by modifying the logfile option. See the SD-UX manual for more information.)

A swagent process performs the actual operations for each many SD-UX commands, including swinstall, swcopy, and swremove. This log file is much more complete. For example, it includes the output from installation scripts, which would not be in the command log file for swinstall. This log is located at /var/adm/sw/swagent.log. For depot operations, swagent logs messages to the file swagent.log beneath the depot directory (for example, /var/spool/sw/swagent.log). If you experience problems with one of the SD-UX commands, the swagent log is a good place to look for more information.

The cleanup command can help you manage SD-UX log files. See "Cleanup Command" on page 22.

Erroneous Errors and Warnings

Unfortunately, some errors and warnings output by a SD-UX install or verify do not indicate serious problems. Examples of false errors and warnings are shown below and most likely refer to incorrect mtime, cksum, mode, owner ID and group ID. These are usually artifacts of incorrect patch creation and are typically not indicative of a real system problem.

Some examples:

```
WARNING: Directory "/usr/sam" should have mode "555" but the actual
mode is "755".
```

```
WARNING: Directory "/usr/sam" should have group,gid "bin,2" but the
actual group,gid is "sys,3".
```

```
WARNING: Fileset "SW-DIST.SD-FAL,l=/,r=B.10.20" had file warnings.
```

```
ERROR: File "/opt/graphics/common/bin/gamma" had a different mtime
than expected.
```

```
ERROR: File "/opt/graphics/common/bin/gamma" should have cksum
"3372307748" but the actual cksum is "4034162912".
```

```
ERROR: Fileset "Xserver.AGRM,l=/,r=B.10.20" had file errors.
```

Another potential false error involves missing files. This is often the result of the delivery of a file to and subsequent move from a temporary location or name. Some patches initially deliver files to a temporary location before moving them to the final location. When the file is delivered to this temporary location, the IPD is updated with this information. The file is then moved to its final destination by the patch scripts. Later, when the system is verified, the newly delivered file is looked for and not found in the initial delivery location resulting in a "file missing" error in the swagent.log file. A popular initial patch file delivery location is /usr/newconfig or as a .tmp file.

Here is an example of a missing file error:

```
ERROR: File "/usr/newconfig/usr/ccs/bin/ld" missing.
```

```
ERROR: Fileset "PHSS_10764.PHSS_10764,l=/,r=B.10.00.00.AA"
had file errors.
```

Missing files are a critical problem that deserves attention. However, at the current time, SD-UX does not have a method for dealing with patches delivering files to and moving them from initial locations so it may be difficult to determine if a real problem exists. It is an issue that HP is working with patch creators to resolve in the future. In the

meantime, you can resolve this problem if it occurs by looking for clues that the missing file was delivered under one name or location and then moved to a different name and location. Look in the swagent.log file for clues from the /usr/newconfig and .tmp files. Then locate the delivered file in its final destination to verify that it is not missing. For instance, in the above example, although the file /usr/newconfig/usr/ccs/bin/ld does not exist, the permanent file /usr/ccs/bin/ld does exist.

A very similar false error to the above is the missing .o file. Before being archived into a library, a .o file will be delivered to a temporary location. The IPD is updated and then the file is archived to the appropriate library. When the system is verified, the .o is justly no longer found in the initial location resulting in a "file missing" error in the swagent.log file. An example is shown below:

```
ERROR: File "/usr/conf/lib/vm_text.o" missing.

ERROR: File "/usr/conf/lib/vm_vas.o" missing.

ERROR: File "/usr/conf/lib/vm_vhand.o" missing.

ERROR: Fileset
       "PHKL_10757.PHKL_10757,l=,r=B.10.00.00.AA" had
       file errors.
```

A   Basic Patch Concepts

This appendix defines basic patch terminology and concepts.

Patch management differs in many ways from standard forms of software management. Certain terms and actions apply only to patching. Although you can support your systems without understanding patch concepts, understanding these concepts will help you rely less on external tools or experts.

A patch is an incremental change to the released software. Patches deliver defect fixes, performance enhancements, and sometimes new functionality. You can load patches in response to a system failure or to proactively avoid problems in the future.

Patch Mechanics

Ancestors and Patches

Ancestors are one of the basic concepts of patch operations. The ancestor of a patch consists of the preexisting software that is being modified or replaced. For a patch that delivers a new version of a single file, the ancestor is the original version of that file.

Ancestors are usually managed between grouping of files known as **filesets**. (Filesets are discussed in detail in Appendix B, "SD-UX Tools & Objects.") Filesets permit several patches to modify a single product or single patches to modify several products. Patches created for HP-UX 10.X releases are generally created within a single fileset.

Figure A-1 shows a simple example in which patch `PHCO_0100` modifies the four filesets of product `Prod`. The `PHCO_0100` patch fileset must deliver files to four distinct ancestor filesets.

Figure A-1   **HP-UX 10.X patch and ancestors**
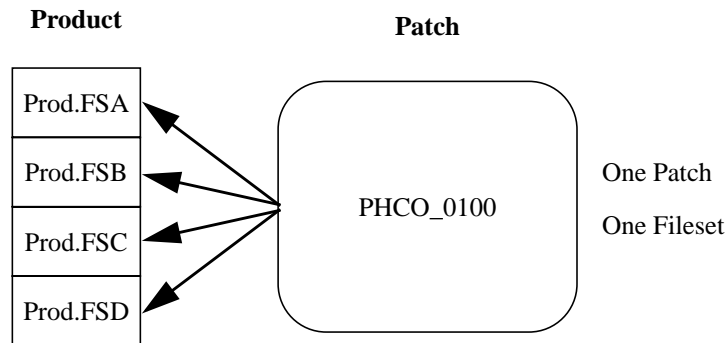
This delivery strategy can create complications. If you install `PHCO_0100` on a system that has `Prod` installed without fileset `FSD`, the files intended for fileset `FSD` are still delivered. They are assigned to one of the other three filesets because the system does not have enough information on file ownership. If you install fileset `FSD` later, you would have to remove `PHCO_0100`, install fileset FSD, then re-install `PHCO_0100`.

Patch Supersession

Patches for HP-UX products are **cumulative**. This means that any individual patch supplied by HP must contain all aspects of any preceding patch. The newer patch is said to supersede all earlier patches. A series of patches, each replacing the previous patch, forms a supersession chain. In general, the patch numbers will increase along a patch supersession chain.

Figure A-2   **Patch Supersession Chain**

```
┌──────────┐
│ PROD.FS  │ ◄── ( PHCO_1000 ) ◄── ( PHCO_2000 ) ◄── ( PHCO_3000 )
└──────────┘
```
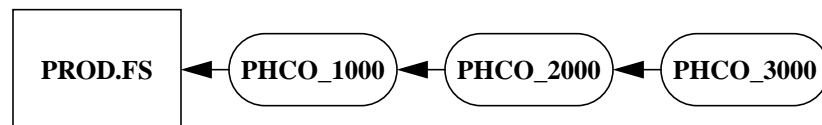
Figure A-2 shows a supersession chain. The SD-UX-packaged product `Prod`, is initially patched by `PHCO_1000`. This patch is superseded by `PHCO_2000` which is superseded in turn by `PHCO_3000`. When a patch is superseded, it remains on the system, but is not active. Only the top patch of the chain is in the active (**applied**) state.

Since patches are designed to be cumulative, it is not required to have all patches in a supersession chain installed. In fact, the presence of a superseding patch prevents the installation of any preceding patch. This prevents an older patches from replacing newer versions.

Patch supersession should not be considered in a negative manner. While a newer patch usually contains additional fixes, the fixes may not be critical. The known qualities of an older patch may have greater value than the non-critical improvements in a subsequent patch.

Patch Rollback

The installation of a patch differs from the installation of a product in several ways. One of the key differences is the ability to perform patch **rollback** to restore the pre-patched behavior.

When a patch is loaded onto a system, the default behavior is to save copies of all files patched prior to loading the new versions. If the patch is removed, these saved files are restored. Only the active member of a supersession chain can be removed, but as each superseded patch returns to the active state, it becomes eligible for removal in future

sessions. Figure A-3 shows the save areas for the `Prod.FS` supersession chain (shown above in Figure A-2).

Figure A-3   **Patch Rollback**

Patch Save Area
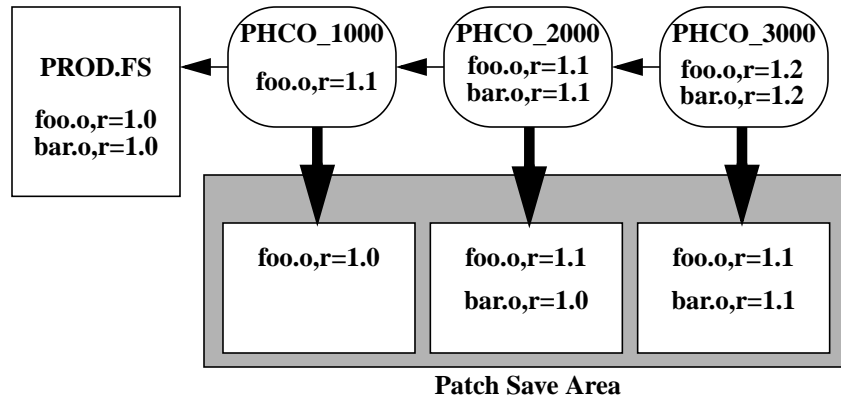
The `Prod.FS` fileset contains the relocatable object files `foo.o` and `bar.o`, both having a of revision 1.0. When `PHCO_1000` is loaded, it delivers a new version of `foo.o`. When this happens, the version delivered with the original product (v1.0) is stored in a save area associated with `PHCO_1000`.

When `PHCO_2000` is loaded, it delivers a new version of `bar.o`. As a cumulative patch, it must also deliver the version of `foo.o` that was delivered by `PHCO_1000`, even though it did not change. The versions of `foo.o` and `bar.o` that existed on the system before `PHCO_2000` are then stored in the save area.

Finally, patch `PHCO_3000` delivers new version of both files, and the existing files on the system are preserved in a save area associated with `PHCO_3000`.

If you remove patch `PHCO_3000` from the system, the files in the save area are automatically restored to the system, and patch `PHCO_2000` again becomes the active patch. If you removed each patch in sequence, you would eventually return `Prod.FS` to its original state.

Patch Commitment

The rollback mechanism is not without cost. Cumulative patching ensures that the amount of change delivered by a patch increases during the life of a supersession chain. In some cases, multiple copies of the same file are preserved.

The disk space used to support patch rollback may be reclaimed through patch **commitment**. When you commit a patch, HP-UX deletes the patch's associated save area—which means you can no longer directly remove the patch. The product remains patched until you update to a newer version or removed the product from the system.

Because the information lost describes the state before the installation of the patch, reinstalling the committed patch does not restore the rollback ability. Also, if you commit any patch in a supersession chain, you lose the ability to restore any prior patches—although you can now reclaim the disk space from the save area for those patches.

Patch Dependencies

To become fully active, a patch may require changes to other areas of the system. Because patches are cumulative, the areas affected by a single patch are limited. To inform you when other changes are required, a patch may document a **dependency** against patches responsible for these other areas.

The different types of dependencies are documented in a patch's `.text` file or in the `readme` attribute of each patch. The fields used in the `.text` file are filled in as appropriate for each type of dependency.

Special Dependency Types

Patch dependencies include these special types:

- Standard Dependency

  An execution-time software dependency without any exceptions or conditions. For example, the commands in PHCO_1000 cannot be used without the kernel support of patch PHKL_1234 because of a dependency. Standard dependencies are documented in the Patch Dependencies field of the `.text` file for each patch.

- Ordered Dependency

  An installation time software dependency without any exceptions or conditions, but the dependency must be loaded first for the requirement to be satisfied. These are documented in the Patch Dependencies field and/or the Special Installation Instructions field.

- Hardware Dependency

  Certain patches are only applicable to specific system models. These system-level dependencies are documented in the Hardware Dependencies field.

- Other Dependencies

  There are dependencies that do not fit the other types. These include optional dependencies required under specific circumstances or hardware dependencies below the system level. All miscellaneous dependencies are explained in the Other Dependencies field.

The HP-UX Patch

An HP-UX patch is a partial delivery of software that fixes defects found in the original. In some cases, the patch extends the original functionality. Each patch includes a set of properties that are documented in an associated text file. This section will examine some of these properties, the .text file is described in detail in Appendix C , "The Patch Text File."

Patch Status

Almost every patch created is intended for general release to all customers, but the patch may transition into different release states. The current release state, known as the patch status, can be found within the .text file and is also displayed when viewing patches within the ITRC. The data within the .text file reflects the initial state of the patch due to the static nature of the file. The ITRC data, and in particular the Patch Database itself, provide the current patch state.

The following patch states are used by all patches that should be available to customers. Any value other than those listed here denotes a patch that should be restricted and used only with full understanding and great caution.

- General Release

  A status of General Release indicates a patch that is approved for widespread use and is the active member of the supersession chain. As the newest available patch, it contains all known fixes to date for the target software.

- Special Release

  A special release patch is an active patch not intended for use by all customers. Patches may be created as special release if a set of customers require nonstandard behavior or configuration-specific change that might cause problems for general use.

- General/Special Superseded

  When an active patch is replaced by a newer version, it enters the superseded state. Applicable to both General and Special Release patches. (A newer patch does not imply that the previous patch was

defective. The newer version may only deliver additional changes of a non-critical nature.)

• General/Special Recalled

Under certain conditions, HP may recall a patch and removed from general distribution. As with superseded patches, you should weigh the issues documented in the recall notice against the value of the current patch fixes and cost of system change. Although the generic recommendation is to remove and replace the patch, the appropriate action for your specific system may vary.

The Critical Patch

While each patch is created to improve upon the original version of the ancestor software, certain patches address issues of the highest priority and are considered **critical**. Examples of conditions that cause a patch to be marked critical include data loss, data corruption, system panic, or system hang. HP designates patches as critical in response to the severity of a failure, not the probability you will actually encounter the failure.

Patches are classified into one of three categories:

• Not critical

No part of the patch addresses a critical failure. While there may still be compelling reasons to install such a patch (such as a performance enhancement), there is no reason to take any immediate action.

• Critical

The patch delivers a new fix for a critical failure. The severity of the defect is such that you should evaluate the patch for applicability to your systems and environments. Even if you take an extremely conservative approach to making system changes, a critical designation may still give you good reason to load the patch to avoid the possible failure.

• Not critical, but supersedes a critical patch

The patch does not contain critical fixes, but delivers critical content that was introduced within a patch that has been superseded within the same patch chain.

Patch Identification

An HP-UX patch name consists of a four-character type identifier, followed by an underscore, followed by a four- or five-digit patch number. The patch number is unique to each patch, regardless of the patch type. The currently defined patch types are:

PHCO	Commands and libraries
PHKL	Kernel
PHNE	Networking
PHSS	All other HP-UX subsystems

NOTE   This naming convention is not recognized by the SD-UX software management tools.

The Patch Shar File

The shar command produces shell archive files, a useful and portable way to package groups of files for transfer between Unix-based systems. When you acquire a patch from the Patch Database within the ITRC or from the Fulfillment Server (FFS), it is packaged as a shell archive. (These sources are described in more detail in Chapter 3 , "Acquiring Patches.")

When exercised by the shell, the patch shell archive recreate two files within the current working directory. These are the `.depot` and `.text` files. The `.depot` file is an SD-UX tape-style depot containing the actual patch. The `.text` file is the complete documentation for the patch, including descriptions of the symptoms and defects repaired by the patch, special installation instructions (if any), dependencies, and the list of files contained within the patch.

Basic Patch Concepts
The HP-UX Patch

B SD-UX Tools & Objects

This appendix provides an overview of Software Distributor commands for HP-UX (SD-UX-UX) commands and concepts as they apply to patching. Many patch operations involve some aspects of the SD-UX tools, but you need only a small subset of SD-UX functionality for patching operations. SD-UX functionality that is not appropriate for patching is not discussed.

SD-UX is included with the HP-UX Operating System and by default manages software on the local host only. You can also enable SD-UX to install and manage software simultaneously on multiple remote hosts from a central controller. Consult the SD-UX manual for more information.

This appendix does not discuss SD-UX remote operations or installations involving NFS diskless clusters or alternate roots.

For More Information   This appendix does not present a comprehensive view of SD-UX. For in-depth information, consult the SD-UX manual, *Managing HP-UX Software with SD-UX*, available at `http://docs.hp.com`.

The Basic SD-UX Object Types

Software Distributor uses a variety of object types. This section gives you a simplified view of the object types that relate to patches. You can find formal definitions in Managing *HP-UX Software with SD-UX* and the *sd*(4) man page.

The Fileset

A fileset is one or more related files, grouped into a manageable unit. It describes a unique subset of the files that make up a product. A fileset may include scripts that control installation and removal, but these are rarely seen at the fileset level in 10.X patches.

In general, patches are created and managed at the product level, and patch filesets are delivered only within a patch product. Therefore, you should avoid selecting patches at the fileset level, even though SD-UX permits this kind of selection. Selecting patches by fileset level may cause a fix to be only partially applied.

The Product

An HP-UX patch is structured as a single SD-UX product that contains one or more filesets. HP-UX 10.X include SD-UX control scripts at the product level. These scripts implement the patch infrastructure. HP-UX 10.X patch products generally contain a single fileset.

The Bundle

A bundle encapsulates products and filesets into a single software object. Bundles provide a convenient way to group software objects together for easy selection. More than one bundle can contain the same software objects. A bundle can be thought of as a virtual "configuration" of software.

HP provides several types of standard patch bundles. See "Support Plus Patch Bundles" on page 32 for more information.

The Depot

A depot is a directory that contains software products or bundles that are

available for direct or remote installation. You can change the contents of a depot. A depot can also be a distribution media (e.g. tape or CD-ROM) or a single, serial file that contains products or bundles.

Patch-related Object Attributes

Each of the objects described in "Patch-related Object Attributes" on page 96 has a set of properties known as attributes. Attributes control aspects of patch behavior and define patch properties and relationships. The patch-related attributes are described below. You can view SD-UX object attributes with the swlist command (see "The swlist Command" on page 108).

ancestor

- Applies to filesets.

- Lists the filesets that this fileset modifies.

- The following example shows patch PHKL_16750, which has a single fileset that is also named PHKL_16750. This fileset modifies seven ancestor filesets, found in five different products.

    `swlist -l fileset -a ancestor PHKL_16750`

    ```
    # PHKL_16750
    ```

    ```
    PHKL_16750.PHKL_16750AdvJournalFS.VXFS-ADV-KRN
    JournalFS.VXFS-BASE-KRN JournalFS.VXFS-PRG LVM.LVM-KRN
    OS-Core.CORE-KRN OS-Core.KERN-RUN ProgSupport.C-INC
    ```

is_reboot

- Applies to filesets.

- When set to true, is_reboot indicates that installation of the fileset will cause the system to reboot.

software_spec

- Applies to bundles, products, or filesets.

- The software_spec attribute (short for software specification) contains the fully qualified identifier for the bundle, product, or fileset. The software_spec contains the object name and any version or architecture information. See "Software Specifications" on page 115 for more information.

state

- Applies to filesets.

- A fileset's state attribute (also used for non-patch software) provides useful information about the installation state of software. SD-UX commands automatically keep track of software management operations by creating an Installed Products Database (IPD) and various catalog files that contain information about the software on the system. Some attributes are stored in the IPD only.

  An SD-UX operation leaves a fileset in one of the following states and records it in the fileset's state attribute:

  installed (IPD only)
  > The software was successfully installed but not configured. Although not every patch requires configuration, HP recommends that you move all patches left in the installed state to the configured state with the swconfig command. The swconfig command is not discussed in this tutorial, consult the *swconfig*(1m) man page or *Managing HP-UX Software with SD-UX* for more information.

  configured (IPD only)
  > The product was successfully installed *and* configured. No further operations are required.

  available (depot only) :
  > The software is ready for access. It can be used by a swinstall or swcopy session using the depot as the source.

  corrupt
  > Indicates that errors detected in the execution phase of a swcopy or swinstall process left the software in an unknown state and that the software should not be used.

  transient
  > Indicates that swinstall or swcopy was killed or aborted during the execution phase leaving the software in an unknown and incomplete state. The transient state differs from the corrupt state in that SD-UX did not detect the failure when it initially occurred.

Introduction to the SD-UX Commands

This appendix discusses the SD-UX commands that relate to patching. The following list shows the commands, ordered by those most commonly used:

- swinstall - installs and configures software products.

- swcopy - copies software products for subsequent installation or distribution.

- swremove - unconfigures and removes software products.

- swlist - displays information about software products.

- swreg - registers or unregisters depots or roots.

- swmodify - modifies software product information in a target root or depot.

- swpackage - packages software products into a depot (directory or tape).

All SD-UX commands run from the command line. In addition, swinstall, swcopy, and swremove have an optional GUI mode.

Additional concepts for using the SD-UX commands are discussed in "Other Options and Aids to Using the SD-UX Commands" on page 115.

The swinstall Command

The swinstall command is used to load patch software from a source depot and onto a target system.

Synopsis

```
swinstall [-i] [-p] [-v] [-s source]
[-x option=value][software_selections]
```

TIPS:
- Because many patches aren't designed for individual installation, you should always use the automatic matching option (`match_target`) to install patches.

- swinstall has numerous options that you should not use for patching because they lack dependency support. HP recommends that you use only the options discussed below.

Table B-1   **Patch-related command line arguments for swinstall**

-i	Use an interactive user interface. If the environment variable DISPLAY is set to a valid X windows display, a graphical user interface is invoked. Otherwise a terminal user interface (TUI) designed for use on ASCII terminals is invoked. The GUI starts by default if you enter swinstall without any software_selections.
-p	Previews the install operation without performing the actual installation. Preview mode is not enabled by default.
-v	Requests verbose mode. This option affects only standard output and not the log files.
-s source	Specifies the depot (source) containing the software to be installed.
-x option=value	Sets the specified default option to the value given, overriding any other values for that option. Patch-related default options are specified below. See "Setting Default Values for Command Options" on page 117 for more information on setting defaults.
software_selections	One or more software specifications. See "Software Specifications" on page 115 for more information

Patch-related Options

The following options have the most relevance to patching (see "Setting Default Values for Command Options" on page 117). Where appropriate, default values are shown. For the full set of available options, consult the *swinstall*(1m) man page or refer to the SD-UX manual.

Table B-2   **Patch-related options for swinstall**

option=default value	Menu Path in Interactive Interface
Description	
`autoreboot=false`	None (GUI waits for permission to reboot)
Enables an automatic reboot upon completion of the software installation.	
`autoselect_dependencies=true`	**Actions→Autoselect dependencies** (when marking software)
When software is selected for installation with an SD-UX-enforced dependency, that software will automatically be selected for installation if present in the source depot and autoselect_dependencies is set to true. While few patches exist with dependencies enforced by the SD-UX tools, those that do employ them to enforce critical requirements of content and load order. This option should not be set to false unless directed by an HP Support Engineer.	
`autoselect_reference_bundles=true`	None
When set to true, any bundle wrappers within the source depot that contain software selected for installation will be automatically selected if the is_reference attribute set to true. Note that this does not mean all of the software listed in the wrapper will be selected, only the bundle wrapper itself.	
`enforce_dependencies=true`	**Options→Change Options→Enforce dependency analysis errors in agent**
Enforces software dependencies. When software is selected for installation with an SD-UX-enforced dependency, if the dependency is not present on the target system and is not selected for installation from the source depot, installation will only proceed if enforce_dependencies is set to false. While few patches exist with dependencies enforced by the SD-UX tools, those that do employ them are enforcing critical requirements of content and load order. This option should not be set to false unless directed by an HP Support Engineer.	
`enforce_scripts=true`	**Options→Change Options→Enforce script failures**
Each patch has several installation scripts associated with it. These scripts control all aspects of the patch infrastructure and may issue errors to protect the system from incorrect patch usage. This option should not be used unless directed by an HP Support Engineer.	
`match_target=false`	**Actions→Match What Target Has**

Table B-2   **Patch-related options for swinstall**

Selects all software within the source depot with an ancestor attribute that matches a fileset currently on the target system. This is the recommended method of installing patches from a managed depot, such as those provided directly from Hewlett-Packard. See Chapter 5, "Patch Installation," for more information.	
`mount_all_filesystems=true`	**Options→Change Options→Mount filesystems in /etc/fstab or /etc/checklist**
By default, swinstall requires that all filesystems listed in the systems /etc/fstab file are mounted prior to installation. Setting this option to false removes this restriction.	
`reinstall=false`	**Options→Change Options→Reinstall filesets even if the same revision exists**
Prevents SD-UX from re-installing (overwriting) an existing revision of a fileset. If set to true, filesets will be re-installed. WARNING: for HP-UX 10.20, this option may cause the data saved to support patch rollback to become corrupted. Do not use this option unless instructed to by an HP Support Engineer.	
`source_cdrom=/SD-UX_CDROM`	None (default cannot be changed within GUI)
Specify the device file of the CD-ROM to be used as the default.	
`source_tape=/dev/rmt/0m`	None (default cannot be changed within GUI)
Specify the device file of the tape drive to be used as the default.	
`write_remote_files=false`	None
Prevents installation of files to a target that exists on a remote (NFS) file system. By default, swinstall skips files that would be installed to a remote (NFS) file system (or that are already there). When set to true and superuser has write permission on the remote file system, the remote files are installed.	

Examples   • Install from a CD mounted and registered on the system `grendel`:

```
swinstall -s grendel:/cdrom/XSW800GR1020 \
-x match_target=true -x autoreboot=true
```

• Use the swinstall command's preview mode (–p option) to get an idea of what to expect for the bundle you want to install. For example:

```
swinstall -p -s grendel:/cdrom/XSW800GR1020 \
-x match_target=true
-x autoreboot=true
```

The swcopy Command

The swcopy command copies software from one depot to another. This can be particularly useful if software exists in several depots. For example, you can copy all of the contents of individual patches into a single depot from which the group can be loaded in a single session and with a single reboot (if needed).

Note that the swcopy command automatically registers (enables remote access to) any depot that it creates. You do not need to use the swreg command on depots created by swcopy. (See "The swreg Command" on page 111 for more information.)

Synopsis
```
swcopy [-i] [-p] [-v] [-s source] [-x option=value]
[software_selections] [@ target_selection]
```

Table B-3   **Patch-related Command Line Arguments**

-i	Use an interactive user interface. If the environment variable DISPLAY is set to a valid X windows display, a graphical user interface is invoked. Otherwise a terminal user interface (TUI) designed for use on ASCII terminals is invoked. The GUI starts by default if you enter swcopy without any `software_selections`.
-p	Previews the copy operation without performing the actual copy. Preview mode is not enabled by default.
-v	Requests verbose mode. This option affects only standard output and not the log files.
-s source	Specifies the depot (source) containing the software to be copied.
-x option=value	Sets the specified option to the value given, overriding any other values for that option. Patch-related options are specified below. See "Setting Default Values for Command Options" on page 117 for more information on overriding defaults.
software_selections	One or more software specifications. See "Software Specifications" on page 115 for more information
target_selections	The absolute path name (directory location) to which you want the `software_selections` to be copied. If you specify a host with the directory, the syntax is `host:/directory` where the host name can be a name, domain name, or internet address.

Patch-related Options   The following options have the most relevance to patching (see "Setting Default Values for Command Options" on page 117). Where appropriate, default values are shown. For the full set of available options, consult the *swcopy*(1m) man page or refer to the SD-UX manual.

Table B-4   **Patch-related options for swcopy**

option=default value	Menu Path in Interactive Interface
Description	
`autoselect_dependencies=true`	**Actions→Autoselect dependencies** (when marking software)
When software is selected for copying with a registered dependency on other software, that other software will automatically be selected to be copied if present in the source depot and `autoselect_dependencies` is set to true.	
`autoselect_reference_bundles=true`	None (default cannot be changed within GUI)
When set to true, any bundle wrappers within the source depot that contain software selected for copying will be automatically selected if the `is_reference` attribute set to true. Note that this does not mean all of the software listed in the wrapper will be selected, only the bundle wrapper itself.	
`compress_files=false`	**Options→Change Options→Compress files during transfer**
Setting this option to true causes swcopy to compress file before transfer to the target depot. This will conserve disk space and can enhance performance on slower networks (50 Kbytes/sec. or less), although it may not improve fast networks.	
`enforce_dependencies=true`	**Options→Change Options→Enforce dependency analysis errors in agent**
Enforces software dependencies. When software to be copied has an SD-UX-enforced dependency, if that dependency is not present on the target system and is not marked for copying from the source depot the copy will only proceed if enforce_dependencies is set to false. While few patches currently exist with dependencies enforced by the SD-UX tools, those that do employ them to enforce critical requirements of content and load order. This option should not be set to false unless directed by an HP Support Engineer.	
`mount_all_filesystems=true`	**Options→Change Options→Mount filesystems in /etc/fstab or /etc/checklist**
By default, swcopy requires that all filesystems listed in the systems `/etc/fstab` file are mounted prior to installation. Setting this option to false removes this restriction.	
`reinstall=false`	**Options→Change Options→Recopy filesets even if the same revision exists**
Prevents SD-UX from overwriting an existing revision of a fileset. If set to true, filesets will be recopied.	

Table B-4   **Patch-related options for swcopy**

source_tape=/dev/rmt/0m	None (default cannot be changed within GUI)
Specifies the device file of the tape drive to be used as the default.	
uncompress_files=false	**Options→Change Options→Uncompress files after transfer**
When set to true, files are uncompressed before swcopy puts them into the target depot. See also the compress_files option.	
write_remote_files=false	None
Prevents copying of files to a target that exists on a remote (NFS) file system. By default, swcopy skips files that would be copied to an NFS file system (or that are already there). When set to true and superuser has write permission on the remote file system, files are copied to remote systems.	

Examples

- With the CD mounted at /cdrom, copy the contents of the XSW800GR1020 depot to the local system under the /var/tmp/MyDepot directory.

  swcopy -s /cdrom/XSW800GR1020 * @ /var/tmp/MyDepot

- Invoke an interactive session, using the default depot at hostX as the source:

  swcopy -i -s hostX

- Copy all patches in current directory to the depot /hub/patches (assuming root shell is /sbin/sh):

  for PATCHDEPOT in *.depot

  do

  swcopy -s $PATCHDEPOT * @ /hub/patches

  done

- Copy a HP-UX 10.X format depot from the system oldsys to an HP-UX 11.x system.

  **swcopy -s oldsys:/depot -x layout_version=0.8 * **
  **   @ /depots/oldsys**

The swremove Command

The swremove command deletes software that has been installed on your system. It also removes software from depots.

Limitations   Note that swremove has several limitations when used for patch operations:

- You cannot use swremove to remove committed patches.

- You should not use swremove to remove patch information that remains in the IPD after installing a new version of HP-UX. (See also "The cleanup Command" on page 114.)

- If you use swremove to remove a patch, you must make sure you don't "break" any software dependencies. If the removed patch fulfilled a dependency (which you can determine by the patch documentation), then you must satisfy the dependency by the rollback process or by installing another patch.

- Removing a patch bundle does not automatically return you to the patch state that existed before you loaded the bundle.

- swremove may not always be your first and best solution for error recovery. Make sure your other recovery methods are not more appropriate before you use this command.

Synopsis   swremove [-i] [-d] [-p] [-v] [-x option=value] [software_selections][@ target]

Table B-5   **Patch-related command line arguments for swremove**

-i	Use an interactive user interface. If the environment variable DISPLAY is set to a valid X windows display, a graphical user interface is invoked. Otherwise a terminal user interface (TUI) designed for use on ASCII terminals is invoked. The GUI starts by default if you enter swremove without any software_selections.
-d	Operate on a depot rather than installed software.
-p	Previews the remove operation without performing the actual removal. Preview mode is not enabled by default.
-v	Requests verbose mode. This option affects only standard output and not the log files. Verbose mode is enabled by default.

Table B-5   **Patch-related command line arguments for swremove**

`-x option=value`	Sets the specified default option to the value given, overriding any other values for that option. Patch-related default options are specified below. See "Setting Default Values for Command Options" on page 117 for more information on setting defaults.
`software_selections`	One or more software specifications. See "Software Specifications" on page 115 for more information
`target`	The depot from which software is to be removed. If not specified, the target is assumed to be the system itself.

Patch-related Options

The following options have the most relevance to patching (see "Setting Default Values for Command Options" on page 117). Where appropriate, default values are shown. For the full set of available options, consult the *swremove*(1m) man page or refer to the SD-UX manual.

Table B-6   **Patch-related options for swremove**

option=default value	Menu Path in Interactive Interface
Description	
`autoselect_reference_bundles=true`	None
If true, bundles that have the is_reference attribute set to true will be automatically removed when the last of its contents is removed. If false, the bundles will not be automatically removed.	
`enforce_dependencies=true`	**Options→Change Options→Enforce dependency analysis errors in agent**
Enforces software dependencies. When software selected for removal has a registered dependency, if the dependency is not present on the target system or also selected for removal from the source depot, removal only proceeds if `enforce_dependencies` is set to false. While few patches currently exist with dependencies enforced by the SD-UX tools, those that do employ them to enforce critical requirements of content and removal order. Do not set this option to false unless directed to do so by an HP Support Engineer.	
`enforce_scripts=true`	**Options→Change Options→Enforce script failures**
Each patch has several removal scripts associated with it. These scripts control all aspects of the patch infrastructure and may issue errors to protect the system from incorrect patch usage. This option should not be used unless directed by an HP Support Engineer.	
`mount_all_filesystems=true`	**Options→Change Options→Mount filesystems in `/etc/fstab` or `/etc/checklist`**

Table B-6   **Patch-related options for swremove**

By default, SD-UX requires that all filesystems listed in the systems /etc/fstab file are mounted prior to removal. Setting this option to false removes this restriction.	
`write_remote_files=false`	None (default cannot be changed within GUI)
Prevents removal of files from a target that exists on a remote (NFS) file system. By default, swremove skips files that would be removed from an NFS file system. When set to true and superuser has write permission on the remote file system, files are removed from remote systems.	

Examples   Remove only the bundle wrapper `XSW800HWCR1020` from the system, leaving any contents present (Note that the trailing period (.) is essential to removing the wrapper only):

swremove XSW800HWCR1020.

Remove all contents of the depot `/depots/MyDepot`:

swremove -d * @ /depots/MyDepot

The swlist Command

The swlist(1m) command provides information on software installed on a system or located in a depot. You can:

- See what's installed on a system.

- See what software is in a depot.

- Check attributes of software.

- See what depots are available on remote systems.

Synopsis   swlist [-d] [-v] [-a attribute] [-l level] [-s source]
[software_selections] [@ target]

Table B-7   **Patch-related command line arguments for swlist**

-d	Lists software depots instead of software currently installed on the target system.
-v	If no -a options are specified, then list all the attributes for an object, one attribute per line. The attributes are listed in the format: keyword value If one or more -a options are specified, then list the selected attributes in the above format.
-a attribute	The named attribute is included in the listing when defined at the specified level. While this option may be specified multiple times, the ordering of the arguments does not control the format of the list.
-s source	Specifies the software source to list. This is an alternative way to list a source depot. You can also specify the sources as target depots and list them using the -d option.
software_selections	One or more software specifications. See "Software Specifications" on page 115 for more information.
target	The depot to be listed. If not specified, the target is assumed to be the system itself.

Table B-7	**Patch-related command line arguments for swlist**

−l *level*	Specifies the level detail of the swlist output. Possible level values are:
	
	`file`
	
	Lists all files recorded in the IPD. The listing may be limited in scope by the `software_selections` specification. Each file is preceded by the product and fileset that is the registered owner of that file. A comment (marked by a leading # character) precedes each block giving the name, revision, and description of the product or fileset to be listed.
	
	`fileset`
	
	List all filesets recorded in the IPD (in `product.fileset` format) with the associated revision and description. A comment (marked by a leading # character) precedes each block giving the name, revision, and description of the product.
	
	`product`
	
	List all products with revision and description for each.
	
	`bundle`
	
	List all bundles with revision and description for each.
	
	`depot`
	
	List all registered depots on the target system.
	
	default (no level specified)
	
	When no level is specified, swlist displays all bundles within the depot followed by any products not contained within a bundle. As is the case with their respective levels, the bundles and products are listed with revision and one-line description.

Patch-related Options

None. For the full set of available options, consult the *swlist*(1m) man page or refer to the SD-UX manual.

Examples   List all patches in the depot `/var/MyDepot` on the system `grendel`:

```
swlist -d -l product PH[CKNS][OLES]_\* \
       @ grendel:/var/MyDepot
```

List the filesets modified by installed patch PHSS_8675:

```
swlist -a ancestor PHSS_8675
```

List all of the files delivered within patch PHCO_12140 after
downloading that patch from the ITRC:

```
swlist -d -l file @ /tmp/PHCO_12140.depot
```

Also see "Software Specifications" on page 115 for more examples.

The swreg Command

The swreg command registers or unregisters an existing depot. When a depot is registered, it can be accessed from remote systems. Unregistration of a depot can be a convenient way to limit access during development. (Note that unregistered depots are still available locally.)

Synopsis   swreg -l depot [-u] [-v] [objects]

Table B-8   **Patch-related Command Line Arguments for swreg**

-l depot	Perform operations on depots. (Other levels of SD-UX objects may be modified by swreg, they are not within the scope of this tutorial.)
-u	Causes swreg to unregister the specified objects instead of registering them.
-v	Requests verbose mode. This option affects only standard output and not the log files.
objects	Specifies the path to the object[s] to be registered or unregistered.

Patch-related Options   None. For the full set of available options, consult the *swreg*(1m) man page or refer to *Managing HP-UX Software with SD-UX*.

Examples   Register the patch depot XSW800GR1020:

swreg -l depot /cdrom/XSW800GR1020

Disable remote access by unregistering the depot XSW800GR1020 (local access is still enabled):

swreg -u -l depot /cdrom/XSW800GR1020

The swpackage command

The swpackage command is primarily used to create depots from source files. This command also allows the transfer of software onto a tape or into a tape depot which can then be used as a software source. Either method can be used to transport the contents of a depot to another system for local access. The tape can be used in the absence of networking support, and the tape depot could be provided via ftp(1).

Synopsis   swpackage [-p] [-v[v]] [-s directory] [-x option=value] [software_selections] [@ target]

Table B-9   **Patch-related command-line arguments for swpackage**

-p	Previews the package operation without performing the actual packaging. (Preview mode is not enabled by default.)
-v	Requests verbose mode. This option affects only standard output and not the log files.
-s directory	An existing directory depot (which already contains products) to be used as the source.
-x option=value	Sets the specified default option to the value given, overriding any other values for that option. Patch-related default options are specified below. See "Setting Default Values for Command Options" on page 117 for more information on setting defaults.
software_selections	One or more software specifications. See "Software Specifications" on page 115 for more information
target	If you are creating a distribution depot (directory), this operand defines the location of the directory. Without this operand, /var/spool/sw is used as the default depot directory.
	If you are creating a distribution tape, this operand names the device file on which to write the tar archive. The device file must exist so that swpackage can determine if the media is a DDS tape or a disk file. Without this operand, swpackage uses the device file /dev/swtape.

Patch-related Options

The following options have the most relevance to patching (see "Setting Default Values for Command Options" on page 117). Where appropriate, default values are shown. For the full set of available options, consult the *swpackage*(1m) man page or refer to the SD-UX manual.

option=default value	Description
`compress_files=false`	Setting this option to true causes swpackage to compress files before packaging them. This creates smaller depots.
`layout_version=1.0`	Specifies the POSIX layout version to which the SD-UX commands conform when writing distributions. Supported value is 0.8. Refer to the swpackage(1m) or SD-UX manual for more information.
`target_type=directory`	Defines the type of distribution to create. The recognized types are directory and tape.

swpackage Examples

Re-package the entire contents of the depot /var/spool/sw onto the tape at `/dev/rmt/0m`:

```
swpackage -s /var/spool/sw -x target_type=tape  \
          @ /dev/rmt/0m
```

The cleanup Command

The cleanup command removes any patches for earlier releases from the Installed Product Database after updating to a newer version of HP-UX. It is also used to remove patches from a software depot if they have been superseded by patches available in the same depot. The cleanup utility also allows patches to be committed across the entire system.

The cleanup command is not delivered with HP-UX, but as patch PHCO_12140.

The cleanup command logs all information to /var/adm/cleanup.log.

Synopsis   cleanup [-F]|[-t]|[-i]|[-d absolute_path_to_depot]

Table B-10   **Patch-related Command Line Arguments for cleanup**

default	Removes all backups of patches that have been superseded and prompts for trimming of the log files. Removal of superseded patch save areas leaves enough data on the system to allow patch removal back one level but precludes removing a series of patches in which each supersedes the next. Some accounting information (less than 1K) is left on the system to allow SD-UX-database synchronization should a superseding patch be removed from the system.
-F	Removes all backups of patches, not just those which have been superseded. This recovers the most disk space but eliminates the possibility of backing out any currently installed patch. You are prompted before any backup removal takes place.
-i	Determines which patches in the IPD have been overwritten by installations or updates. These patches are removed from the IPD upon confirmation so that they are no longer displayed in the output of the swlist command.
-t	Trims all the SD-UX log files in /var/adm/sw/sw*.log. These log files are be trimmed to their most recent five entries. There is no confirmation step when trimming the log files only.
-d absolute_path_to_depot	Determines which patches in the software depot have been superseded by newer patches also available from the depot. Upon confirmation from the user, these superseded patches will be removed from the software depot.

Other Options and Aids to Using the SD-UX Commands

Software Specifications

When an SD-UX command can be supplied a software selection, the selection is comprised of one or more software specifications. A software specification is a unique identifier for an SD-UX software object. A software specification must name either a product or a bundle, and filesets can be specified only within a product. If you explicitly select a bundle, all products within the bundle are also selected. If you select a product, all filesets within that product are also selected.

For patch operations, you usually only need to refer to a patch or bundle name.

The software specification takes one of the following formats:

`product[.fileset][,version]`

`bundle[.product[.fileset]][,version]`

where the version has the form:

`[r=revision][,a=arch][,v=vendor][,c=category]`

(The version may also have a `l=location` component that applies only to installed software and refers to software installed to a location other than the default product directory.)

The `software_spec` attribute contains the full software specification for any bundle, product, or patch (see "Patch-related Object Attributes" on page 96). You can use the swlist command to display this information. The following example shows how swlist can create a list of the software specifications for a patch at the fileset level. The software specification for the patch product appears in the output as a comment:

`swlist -l fileset -a software_spec PHKL_16750`

```
# PHKL_16750
PHKL_16750,l=/,r=B.10.00.00.AA,a=HP-UX_B.10.20_700,v=HP

PHKL_16750.PHKL_16750 PHKL_16750.PHKL_16750,l=/,r=B.10.00.00.AA,
a=HP-UX_B.10.20 _700,v=HP
```

Session Files

Session files let you save your work from a command session. Each invocation of an SD-UX command defines a session. The invocation options, source information, software selections, and target hosts are saved before command execution actually commences. This lets you re-execute the command even if the session ends before proper completion. Each session is saved to the file `$HOME/.sw/sessions/{command}.last`. This file is overwritten on each invocation.

You can also save session information from interactive or command-line sessions. From an interactive session, you can save session information into a file at any time by selecting the **Save Session** or **Save Session As** option from the **File** menu. From a command-line session, you can save session information by executing swinstall or swcopy with the `-C session__file` option.

A session file uses the same syntax as the defaults files (see "Setting Default Values for Command Options" on page 117). You can specify an absolute path for a session file. If you do not specify a directory, the default location for a session file is `$HOME/.sw/sessions/`.

To re-execute a saved session from an interactive session, use the **Recall Session** option from the **File** menu. To re-execute a session from a command-line, specify the session file as the argument for the `-S session__file` option of swinstall or swcopy.

Note that when you re-execute a session file, the values in the session file take precedence over values in the system defaults file. Likewise, any command line options or parameters that you specify when you invoke swinstall or swcopy take precedence over the values in the session file.

NOTE   Use of session files is not recommended with swremove because the session file could include software selections that you do not want included in the removal operation.

Setting Default Values for Command Options

SD-UX commands have extensive options that alter command behavior. The default option values are listed within the file `/usr/lib/sw/sys.defaults`, a template that lists and explains each option, all possible values, and the resulting system behavior. These options are listed as comments that you can copy into the system defaults file (`/var/adm/sw/defaults`) or your personal defaults file (`$HOME/.sw.defaults`).

Values in these option files are specified using this syntax:

[*command.*]*option=value*

These rules govern the way the defaults work:

- Option values in `/usr/lib/sw/sys.defaults` are hard-coded and are usable only as text to copy to other default files.

- Option values in `/var/adm/sw/defaults` file affect all users in a system.

- Option values in your personal `$HOME/.sw/defaults` file affect only you and not the entire system.

- Option values in a session file affect activities only for that session and revert when that session is completed.

- Option values changed on the command line affect only that activity.

For system-wide policy setting, use the `/var/adm/sw/defaults` file. (Note that individual users can override these values with their own `$HOME/.sw/defaults` file, session files, or command line changes.)

System-wide option values can also be overridden by specifying an options file with the `-X option_file` or with one or more `-x option=value` options directly on the command line. Values can also be changed using the GUI Options Editor.

Altering option values and storing them in a defaults file can help when you want the SD-UX command to behave the same way each time the command is invoked. Options in the defaults file are read as part of command initialization. Because the daemon is already running, after changing daemon options, the daemon must be restarted in order for these options to be recognized. To restart the daemon, type:

/usr/sbin/swagentd -r

C   The Patch Text File

This appendix lists and explains the individual fields in the patch text file that accompanies each patch.

Patch Text File Fields

Patch Name

The name of the patch. This identifier is used for:

- Patch shar, text, and depot files
- Patch products
- HP-UX 10.x releases the patch fileset *__***Huh? ***__*

The identifier syntax is:

`PHxx_yyyy`

where:

- PH = Patch HP-UX.
- xx = area patched:

CO	general HP-UX commands
KL	kernel patches
NE	network specific patches
SS	SS =all other subsystems (X11, Starbase, etc.)
yyyy	a unique number

For example, PHSS_14014 identifies an HP-UX subsystem patch name.

Patch Description

A one-line description of the patch.

Creation Date

The date the patch was created.

Post Date

The date on which HP posted the patch for general distribution.

Hardware Platforms—OS Releases

The hardware platforms and HP-UX OS releases on which you can install the patch.

Products

The product name and all product revisions to which the patch applies, if the patch is for an optional product (that is, for a non-core operating system product). If the patch is for the core operating system, the value in this field is "N/A".

Filesets

A list of all the filesets that contain one or more files that are included in this patch.

Automatic Reboot?

A Yes/No flag that indicates whether or not this patch requires a system reboot after installation.

Status

The support status of the patch, either GR or SP, where:

- GR = General Release

  A patch that should be installed on all systems meeting the OS, product, and dependency requirements.

- SP = Special Release

  A site-specific patch for installation at one specific customer or set of customers, and other non-GR patches.

Critical

A Yes/No flag followed by text. The flag indicates a "critical" patch—a patch that fixes a critical problem or that supersedes a patch that fixes a critical problem. HP uses these criteria to define critical problems:

• The problem causes the OS or kernel to fail, crash, or panic.

• The problem causes a major application to fail in a way that severely impacts the system's operation.

• The problem causes data loss or corruption.

• The patch delivers a fix related to processing dates in the year 2000 and beyond.

Path Name

The patch's storage location on the HP ITRC ftp server (`ftp://us-ffs.external.hp.com`). The current choices for supported releases are:

• `/hp-ux_patches/s700/10.X/PHxx_yyyy`

• `/hp-ux_patches/s800/10.X/PHxx_yyyy`

• `/hp-ux_patches/s700_800/10.X/PHxx_yyyy`

The identifier syntax is:

`PHxx_yyyy`

where:

• PH = Patch HP-UX.

• xx = area patched:

CO	general HP-UX commands
KL	kernel patches
NE	network specific patches
SS	SS =all other subsystems (X11, Starbase, etc.)
yyyy	a unique number

For example, PHSS_14014 identifies an HP-UX subsystem patch name.

Symptoms

The external symptoms of the problem (specific system behavior that a user would experience).

Defect Description

A detailed description of the defect that specifically addresses the conditions that caused the problem (if they are known), and (if known) how to reproduce the problem. Also includes methods to verify if the patch needs to be installed.

SR

A list of all Service Request (SR) numbers addressed by the patch and all its predecessors. An SR is a formal request from a customer to have a defect resolved or a feature added to HP software.

Patch Files

The full installed path name of all files in the patch. If the patch replaces an object module in a library, the full path of the library is listed with the object module following in parentheses. For example, if a patch replaces the object module `vers.o` in the library `/usr/conf/lib/libhp-ux.a`, the path listed would be `/usr/conf/lib/libhp-ux.a(vers.o)`.

what(1) Output

The output (or "what string") from the what command for each file or library object file listed in the Patch Files field. For example: `$Revision: 1.13 $`. The what string lets you identify the software version, which you can use to verify that a patch is installed. See the *what*(1) manpage for more information on the what command.

Patch Conflicts

All known patch conflicts, including file conflicts and behavioral conflicts.

Patch Dependencies

A list of other patches that must be installed to insure proper operation of this patch.

Hardware Dependencies

Specific system models to which this patch is limited.

Other Dependencies

Any non-patch and non-hardware dependencies that may exist.

Supersedes

A list of all patches replaced by this patch.

Equivalent Patches

All equivalent patches for other hardware platforms and OS releases not including this patch.

Patch Package Size

The size in Kilobytes of the patch.

Installation Instructions

The standard installation instructions common to all patches. (See Chapter 5, "Patch Installation," for more information on patch installation.)

Special Installation Instructions

Any special instructions not covered by other text fields.