

Ignite-UX Administration Guide

for HP-UX 11.00 and 11i



Manufacturing Part Number : B2355-90997

Edition 24, September 2006

© Copyright 1999-2006 Hewlett-Packard Development Company L.P.

Legal Notices

© Copyright 1999-2006 Hewlett-Packard Development Company, L.P.

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Intel® Itanium® Logo, Intel, Intel Inside and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Microsoft® and Windows® are U.S. registered trademark of Microsoft Corporation.

UNIX® is a registered trademark of The Open Group.

About This Document

1. Introducing Ignite-UX

Ignite-UX Overview	24
Using Ignite-UX for Installation and Recovery	26
Ignite-UX Commands	27
Ignite-UX Web Site	29
Ignite-UX Training	29
Other Information Sources	30

2. Getting Started With Ignite-UX

Ignite-UX Server Requirements	34
Ignite-UX Installation Overview	36
Getting the Ignite-UX Software	37
Installing Ignite-UX	39
Making Configuration Decisions for Ignite-UX Servers	42
Introduction to the Ignite-UX Graphical User Interface	49
Managing Clients from the Ignite-UX Server	50

3. Creating a Server for Network Booting Registered Clients

Configuring the Ignite-UX Server for PA-RISC Clients	56
Configuring the Ignite-UX Server for Itanium-Based Clients	63
Setting Up Software from Depots	65
More Server Setup Options	67
Configuring Server Options	68
Configuring Session Options	72
Advanced Installation Topics	74
Installing Minimal Ignite-UX Filesets	74
Set Up or Update the Software Source	76
Add Optional Applications	77

4. Creating a Server for Network Booting Anonymous Clients

Overview of Anonymous Clients	82
Configuring a Server to Boot Anonymous PA-RISC Clients	83
Using the Server Setup Wizard	83

Contents

Considerations For Booting Anonymous Itanium-Based Clients	84
Understanding PXE Booting of Itanium-based Systems	84
HP-UX 11i v2 Ignite-UX Server and Boot-Helper Setup	85
Isolating Ignite-UX From Noncontrollable DHCP Systems	88
Replacing bootpd with instl_bootd	89
5. Installing HP-UX from the Client Console	
Preparing Clients for Installation	92
Noninteractive Installation Using bootsys	94
Igniting PA-Based Clients from the Console	96
Igniting Itanium-Based Clients using the Network	98
Managing Speed and Duplexing of LAN Interfaces Executing Network Boots	102
Examples	103
6. Installing HP-UX on Clients from the Server	
Methods of Installing Client Systems	108
Supported Peripherals	108
Network Requirements	109
Installing from the Ignite-UX Server	110
Booting a Client	111
Configuring the Installation	114
New Installation	115
Functions Available on All Tabs	116
Basic Tab	117
Software Tab	123
System Tab	126
File System Tab	136
Advanced Disk Parameters	141
Advanced File System Parameters	142
Advanced Volume Layout Parameters	144
Advanced Group Parameters	147
Advanced Tab	148
Repeat an Installation	150
Executing the Installation: Go!	151
Viewing and Printing a Manifest	154

7. Golden Images

Installing from Golden Images	158
Creating a Golden Image	159
A: Installing the HP-UX Operating System	160
B: Installing Critical Patches onto the Operating System	161
C: Installing Optional Software	161
D: Customizing the System	162
Configuring the Ignite-UX Server to Recognize the Golden Image	164
Enabling the Client	168
Installing the Golden Image on the Client	170

8. Customizing Your Installation

Using Configuration Files	174
Classes of Configuration Files	175
Combining Configuration Files Using INDEX Entries	179
Example Configuration Files	182
Customizations Based on the Client Hardware	185
Customizations Based on User Selection	187
Avoid Archiving Patch Files	189
Debugging Configuration Files	190
Using Post-Installation Scripts	191
How the Installation Functions	191
Adding a Post-Installation Script	193

9. Automating Installations

Starting a Noninteractive Installation with bootsys	196
Using a Saved Configuration	197
Specifying Defaults in the config.local File	198
Setting Defaults with instl_admin	199
Using the Per-Client Configuration File	200
Scheduling Installations	203
Setting Installation Parameters Dynamically	204
Checking Modified Files for Errors	206

Contents

10. Creating Your Own Installation Media

Why Use Custom Installation Media?	208
Creating Custom Installation Media	209
Building an Installation Tape	210
Installation Tape Contents	210
Logical Interchange Format	210
Creating the LIF Volume	210
Recovery Images and Archives	213
Creating an Archive Configuration File	214
Creating an Installation Tape	215
Building an Installation CD	219
Building an Installation DVD	226

11. System Recovery

Overview	236
System Recovery using Network and Tape	236
Expert Recovery	238
System Recovery Tools	238
Recovery Tool Comparison	238
Considerations When Using Veritas Volume Manager from Symantec	239
Archive Contents	241
Archive Configuration Policies	243
Large File Support	244
Image Creation Process	245
Examining Image Contents	248
Verifying Image Results	251
Creating and Using Recovery Tapes	253
Recovery Tape Creation Examples	255
Tape Recovery for PA-Based Systems	256
Tape Recovery for Itanium-Based Systems	256
Creating and Using Network Recovery Images	264
Adding Clients for Recovery	265
Examples	267
Recovering using the Network for PA-Based Clients	268
Recovering using the Network for Itanium-Based Clients	269
Retaining Known-Good Images	272

Making Recovery Configuration File Additions	274
Selecting File Systems During Recovery	275
Tape Recovery with No Tape Boot Support	276
Notes on Cloning Systems	279
Cloning a System Using <code>make_net_recovery</code>	280
Expert Recovery Using the Core Media	282
Automated Recovery Procedures	283
Recovering the LIF/EFI Volume and Critical HP-UX Files	283
Recovering Critical HP-UX Files Only	293
Recovering the Kernel Only	297
System Recovery Questions and Answers	303
A. Troubleshooting	
Errors and Warnings	310
Ignite-UX Server Problems	311
Installing Systems with Ignite-UX	312
Installing from Media	320
Installing from Golden Images	321
Running <code>swinstall</code>	323
Common Network Booting Errors.	324
B. Configuring DHCP Services	
Overview of DHCP Services	328
DHCP Usage Examples	330
Using <code>bootptab</code> as an Alternative to DHCP	332
Background Information on DHCP Design	333
Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles	334
The <code>dbprofile</code> Command	336
The <code>lanboot</code> Command	338
C. Using a Boot-Helper System	
Setting Up the Boot-Helper System	342
Installation Using a Boot-Helper	344

Contents

D. Terminal Keyboard Shortcuts

Basic Keyboard Shortcuts	346
Advanced Keyboard Navigation	347
HP Terminals	347
vt100 Terminals	348

Index	351
--------------------	------------

Table 1. Publishing History Details	16
Table 2. HP-UX 11i Releases	19
Table 3. Typographic Conventions	20
Table 1-1. Ignite-UX Commands and Descriptions	27
Table 2-1. Ignite-UX Bundles Available at Software Depot.	37
Table 3-1. Ignite-UX Filesets	74
Table 6-1. File System Default Choices	119
Table 8-1. Installation Kernel and File System Names by Hardware Architecture	176
Table 11-1. Comparing System Recovery Tool Features	239
Table D-1. Basic Keyboard Shortcuts	346
Table D-2. HP Terminal Function Keys	347
Table D-3. Advanced Actions	347
Table D-4. Function Keys.	349
Table D-5. Advanced Keyboard Actions	349

Tables

Figure 2-1. The SD Install Window	39
Figure 2-2. SD Install: Specify Source Window	40
Figure 2-3. Depot Paths	40
Figure 2-4. Install Analysis Window	41
Figure 2-5. Decision Tree for Network Booting PA-RISC Systems	44
Figure 2-6. Decision Tree for Network Booting Itanium-Based Systems	45
Figure 2-7. Decision Tree for Booting PA-RISC or Itanium-Based Stand Alone Systems	47
Figure 2-8. Ignite-UX GUI	49
Figure 2-9. Ignite-UX GUI By Properties View	51
Figure 2-10. Client Status Dialog Box	53
Figure 3-1. Ignite-UX First Launch Message	56
Figure 3-2. Ignite-UX GUI Welcome Dialog Box	57
Figure 3-3. Server Setup Wizard	58
Figure 3-4. Server Setup: IP Addresses	59
Figure 3-5. Configure Booting IP Addresses	60
Figure 3-6. Software Depot Setup Page	66
Figure 3-7. Ignite-UX Server Configuration Tabs	68
Figure 3-8. Configure Booting IP Addresses Dialog Box	70
Figure 3-9. Add DHCP Addresses Dialog Box	71
Figure 3-10. Session Options Tab	72
Figure 5-1. Noninteractive Installation Using the bootsys Command	94
Figure 6-1. Ignite-UX Graphical User Interface (GUI)	110
Figure 6-2. Client Context-Sensitive Actions Menu	111
Figure 6-3. Boot Client Dialog Box	112
Figure 6-4. Boot Confirmation Dialog Box	112
Figure 6-5. Ignite-UX Actions Menu	114
Figure 6-6. Configuration Settings Confirmation Dialog Box	115
Figure 6-7. Ignite-UX Client Installation Configuration Tabs	116
Figure 6-8. Root Disk... Dialog Box	118
Figure 6-9. Languages Dialog Box	121
Figure 6-10. Additional Configuration Controls Dialog Box	122
Figure 6-11. Software Tab	123
Figure 6-12. System Tab	126

Figures

Figure 6-13. Set Time Zone Dialog Box	128
Figure 6-14. Set Root Password Dialog Box	129
Figure 6-15. Network Services Tabs	130
Figure 6-16. DNS Tab	131
Figure 6-17. Set DNS Search Domains Dialog Box	132
Figure 6-18. NIS Tab	133
Figure 6-19. XNTP Tab	134
Figure 6-20. Network Interface(s) Dialog Box	134
Figure 6-21. Security Choices Dialog Box.	135
Figure 6-22. File System Tab.	136
Figure 6-23. Add/Remove Disks Dialog Box	140
Figure 6-24. Advanced Disk Parameters Dialog Box.	141
Figure 6-25. Advanced File System Parameters Dialog Box.	143
Figure 6-26. Advanced Volume Layout Dialog Box	145
Figure 6-27. Advanced Group Parameters Dialog Box	147
Figure 6-28. Advanced Tab	149
Figure 6-29. Repeat Installation Dialog Box	150
Figure 6-30. Installation Confirmation Dialog Box	151
Figure 6-31. Client Status... Dialog Box	152
Figure 6-32. Installation Log File	153
Figure 6-33. View/Print Manifest Dialog Box.	155
Figure 8-1. Configuration File Use and Locations	175
Figure 8-2. Configuration Choices Dialog Box	180
Figure 8-3. Software Tab	188
Figure 8-4. Installation Process.	192
Figure 10-1. Installation Tape Layout	210
Figure 11-1. Get Archive Build Status Dialog Box.	248
Figure 11-2. Output From reconnect -r.	258
Figure 11-3. Mapping the Hardware Path to the EFI Device Path.	258
Figure 11-4. EFI Menu With Timer	259
Figure 11-5. Boot Configuration	259
Figure 11-6. Add Boot Entry	260
Figure 11-7. List of Selectable Boot Devices.	260

Figure 11-8. Enter a Description for the Boot Option	261
Figure 11-9. Enter Load Options.....	261
Figure 11-10. Save Changes to NVRAM.....	262
Figure 11-11. The Boot Manager Menu with the New Option	262
Figure 11-12. Add New Client for Recovery Dialog Box	266
Figure 11-13. Confirmation Dialog Box	267

Figures

About This Document

This guide describes installing, configuring, and using Ignite-UX to facilitate installing and recovering HP-UX on systems in your computing environment.

Ignite-UX will help install new systems and maintain existing ones with less effort than using individual installation and update tools.

NOTE

The terms **Ignite-UX**, **IUX**, and **Ignite** are used interchangeably throughout this guide.

All of these terms may appear in other related Ignite-UX and HP-UX documentation that accompanies this product.

Intended Audience

This document is intended for system and network administrators responsible for installing, configuring, and managing HP-UX servers and workstations. Administrators are assumed to have an in-depth knowledge of HP-UX operating system concepts, commands, and configuration. It assumes familiarity with installing HP computer hardware and software, upgrading software, applying patches, and troubleshooting system problems.

Additionally, administrators are expected to have knowledge of Transmission Control Protocol/Internet Protocol (TCP/IP) networking concepts and network configuration. This guide is not a TCP/IP or a Ignite-UX tutorial.

Publishing History

The publication date and part number identify published editions of this guide. The publication date changes when a new edition is released. The manufacturing part number changes when extensive changes are made.

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

Table 1 Publishing History Details

Document Manufacturing Part Number	Operating Systems Supported	Edition No.	Publication Date
B2355-90997	HP-UX 11.00, 11i v1, 11i v2	24	September 2006
B2355-90970	HP-UX 11.00, 11i v1, 11i v2	23	June 2006
B2355-90959	HP-UX 11.00, 11i v1, 11i v2	22	March 2006
B2355-90941	HP-UX 11.00, 11i v1, 11i v2	21	December 2005
B2355-90893	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	20	September 2005
B2355-90875	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	19	June 2005
B2355-90872	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	18	December 2004
B2355-90849	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	17	September 2004
B2355-90837	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	16	June 2004
B2355-90834	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	15	March 2004
B2355-90831	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	14	December 2003

Table 1 Publishing History Details (Continued)

Document Manufacturing Part Number	Operating Systems Supported	Edition No.	Publication Date
B2355-90788	HP-UX 11.00, 11i v1, 11i v1.6, 11i v2	13	September 2003
B2355-90829	HP-UX 11.00, 11i v1, 11i v1.6	12	September 2003
B2355-90810	HP-UX 11.00, 11i v1, 11i v1.5, 11i v1.6	11	June 2003
B2355-90772	HP-UX 10.x, 11.00, 11i v1, 11i v1.5, 11i v1.6	10	March 2003
B2355-90767	HP-UX 10.x, 11.00, 11i v1, 11i v1.5, 11i v1.6	9	December 2002
B2355-90770	HP-UX 10.x, 11.00, 11i v1, 11i v1.5, 11i v1.6	8	October 2002
B2355-90765	HP-UX 10.x, 11.00, 11i v1, 11i v1.5, 11i v1.6	7	September 2002
B2355-90758	HP-UX 10.x, 11.00, 11i v1, 11i v1.5	6	September 2002
B2355-90750	HP-UX 10.x, 11.00, 11i v1, 11i v1.5	5	June 2002
B2355-90749	HP-UX 10.x, 11.00, 11i v1, 11i v1.5	4	March 2002
B2355-90738	HP-UX 10.x, 11.00, 11i v1, 11i v1.5	3	June 2001
B2355-90704	HP-UX 10.x, 11.00, 11i v1	2	December 2000

Table 1 Publishing History Details (Continued)

Document Manufacturing Part Number	Operating Systems Supported	Edition No.	Publication Date
B2355-90677	HP-UX 10.x, 11.00, 11i v1	1	March 1999

For the latest version of this guide and other HP-UX documentation, see the HP Technical Documentation Web site at:

<http://www.docs.hp.com/>

HP-UX 11i Release Names and Release Identifiers

Each HP-UX 11i release has an associated release name and release identifier. The following table shows the releases available for HP-UX 11i.

Table 2 HP-UX 11i Releases

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

a. PA-RISC is supported on HP-UX 11i v2 starting with the September 2004 release.

The *uname* (1) command with the `-r` option returns the release identifier.

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

```
# swlist | grep HPUX11i
```

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

```
HPUX11i-TCOE      B.11.23.0512 HP-UX Technical  
Computing Operating Environment Component
```

The previous revision string represents the following:

B.11.23 = HP-UX 11i v2

0512 = December 2005 Update Release

Typographic Conventions

The following table describes the typographic conventions used in this guide.

Table 3 **Typographic Conventions**

Typeface	Usage	Examples
<i>Italics</i>	New terms, book titles, emphasis, or variables to be replaced by a name or value.	<i>Ignite-UX Reference</i> <code>bootsys -R <i>release</i></code>
Key	The name of a keyboard key. Note that Return and Enter both refer to the same key.	Esc
Bold	The defined use of an important word or phrase.	golden image
Computer	Computer output, file contents, files, directories, software elements such as command options, function names, and parameters.	The DVD drive is connected at <code>/dev/dsk/c0t0d0.</code> <code>ignite</code>
UserInput	Commands and other text that you type.	bootsys -r
[]	The contents are command options. If the contents are a list separated by , you can choose one of the items.	<code>ls [-a]</code> <code>mount [suid nosuid]</code>
.	The scrolling content is replaced to indicate extensive computer output or an excerpt. <code>cfg "Golden System" {</code>

Related Documents

The most current edition of following documents may be of particular interest and are found at the HP Technical Documentation Web site at:

<http://www.docs.hp.com/>

Ignite-UX Reference

Successful System Cloning using Ignite-UX White Paper

Configuring Bastille to Operate with Ignite-UX White Paper

Ignite-UX Custom Configuration Files White Paper

Successful System Recovery using Ignite-UX White Paper

Installing and Updating Ignite-UX White Paper

Ignite-UX Installation Booting White Paper

Read Before Installing or Updating to HP-UX

HP-UX Installation and Update Guide

HP-UX Reference

Managing Systems and Workgroups: A Guide for HP-UX System Administrators

Software Distributor Administrator's Guide

HP-UX Patch Management

HP System Partitions Guide

Getting Started with Software Package Builder

VERITAS File System 4.1 (HP OnlineJFS / JFS) and VERITAS Volume Manager 4.1 Installation Guide

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

HP Encourages Your Comments

HP encourages your comments concerning this document. We are truly committed to providing documentation that meets your needs.

Please send comments to:

<http://www.docs.hp.com/en/feedback.html>

Please include the document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document.

1 Introducing Ignite-UX

This chapter introduces you to the features and uses of Ignite-UX. It discusses the following topics:

- Ignite-UX Overview (see page 24)
- Using Ignite-UX for Installation and Recovery (see page 26)
- Ignite-UX Commands (see page 27)
- Ignite-UX Web Site (see page 29)
- Ignite-UX Training (see page 29)
- Other Information Sources (see page 30)

Ignite-UX Overview

- Client and Server Control** Ignite-UX installation sessions for multiple clients can be controlled from a single server in a true client/server model. The **Ignite-UX Graphical User Interface** (GUI) helps you manage multiple simultaneous installations. Alternatively, you can run a single installation session from the client console if that is more convenient. A single Ignite-UX server can install multiple HP-UX releases.
- Easy-to-Use GUI** The Ignite-UX GUI uses tabs and dialog boxes for task navigation. A wizard mode is also available for certain processes and commands.
- Terminal User Interface** Commands that power Ignite-UX can be executed directly from the operating system's command shell on an Ignite-UX server or client. For the list of commands, see “Ignite-UX Commands” on page 27.
- Multi-Sourced Installations** You can install the base operating system from one Software Distributor (SD) depot, a set of patches from another depot, and the applications you want from a third depot all in one session.
- Multiple Archive Formats** In addition to supporting SD depot sources, Ignite-UX supports `tar`, `cpio`, and `pax` archives. Tools are provided to help you create a **golden image**, or known client configuration, that you can use to install other clients.
- Custom Installations** It is easy to create a system that is ready to go as soon as the installation session completes. Many of the tasks typically done as separate steps after an installation are now incorporated into the Ignite-UX installation process. Ignite-UX lets you specify what kernel parameters you want set and what user-supplied scripts you want to run as part of the session. Many different **script hooks** are provided so you can add your own customizations during and after the installation. Also, the host and networking information that must normally be supplied at first boot can be specified at installation time. You can:
- Create a configuration for your particular needs, save it, and then quickly apply that configuration to multiple installation clients.
 - Set up a configuration and then install it on a client with no further user interaction. This is possible for both the initial installation and the reinstallation cases.

- Scan a system and produce a report detailing what hardware is present, how the disks are used, what kernel modifications have been made, and what software has been installed. This report can be customized to meet your needs.
- Construct your own customized bootable installation/recovery media. An example script, `make_media_install`, is provided that can help you create bootable media (PA-RISC tapes, CDs, and DVDs) with or without golden images and/or SD depots included. The example script can be found at:

```
/opt/ignite/data/scripts/examples/make_media_install
```

System Recovery You have consistent, reliable recovery in the event of a catastrophic failure of the system disk or root volume group using either the `make_tape_recovery` or `make_net_recovery` command.

Support for Multiple Architectures Ignite-UX supports both the **Precision Architecture Reduced Instruction Set Computing** (PA-RISC or PA-based) and the Intel®Itanium® (Itanium®-based) hardware architectures.

Support for HP Servicecontrol Manager Ignite-UX supports installing HP-UX clients in the HP Servicecontrol Manager environment. For details, see the *HP Servicecontrol Manager 3.0 User's Guide*.

Using Ignite-UX for Installation and Recovery

Once you have an Ignite-UX server installed and configured for your environment, it can help you solve many common installation and recovery problems.

One-Step Installation

Once you configure a system with a **common configuration** that you want replicated to other systems, use Ignite-UX to either manually or automatically install each client system. This common configuration can include any supported HP-UX 11.0, or 11i operating system, and you can add any required patches and applications. This configuration can be bundled into a golden image on the Ignite-UX server or any system in your environment. You can also copy software from an Ignite-UX server and install the client locally. These processes are explained in the chapters that follow.

Reinstall HP-UX Quickly

You can quickly reinstall the operating system on an existing system from a golden image or SD depots. See Chapter 7, “Golden Images,” on page 157 for details.

Scanning a System

With Ignite-UX you can easily scan one system or all systems in your environment to see what hardware is present, how the disks are used, what kernel modifications have been made and what software has been installed. See Chapter 6, “Installing HP-UX on Clients from the Server,” on page 107 for details.

Automating Installations

Using the Ignite-UX configuration files enables you to completely automate the operating system installation process on any systems in your environment, as explained in Chapter 9, “Automating Installations,” on page 195.

Quick System Recovery

In addition to using golden images for initial installations, you can create recovery images on tape (access from a drive on the client) or on any system in your environment (access using the network). See Chapter 11, “System Recovery,” on page 235 for details.

Ignite-UX Commands

The manual pages (**manpages**) associated with Ignite-UX are installed in the `/opt/ignite/share/doc/` directory and are listed in Table 1-1.

Table 1-1 Ignite-UX Commands and Descriptions

Ignite-UX Manpage	Description
<i>ignite</i> (5)	Ignite HP-UX onto clients remotely from the Ignite-UX GUI and provide an overview of all Ignite-UX commands.
<i>archive_impact</i> (1M)	Calculate the per file system disk space for an archive and create the <code>impacts</code> statements for use in configuration files.
<i>add_new_client</i> (1M)	Construct and populate a client directory without requiring a reboot.
<i>auto_adm</i> (1M)	Manage logical interchange format (LIF) automatic configuration files.
<i>bootsys</i> (1M)	Reboot and install systems using Ignite-UX.
<i>copy_boot_tape</i> (1M)	Replicate <i>make_tape_recovery</i> (1M) boot tape.
<i>instl_adm</i> (1M) <i>instl_adm</i> (4)	Manage Ignite-UX configuration files. Description of configuration file syntax.
<i>instl_bootd</i> (1M)	Boot protocol server for Ignite-UX client.
<i>instl_combine</i> (1M) <i>make_medialif</i> (1M)	Construct custom, bootable installation media. An example script, <code>/opt/ignite/data/scripts/examples/make_media_install</code> , is provided that can help you create bootable media (PA-RISC tapes, CDs, and DVDs) with or without golden images and/or SD depots included.

Table 1-1 Ignite-UX Commands and Descriptions (Continued)

Ignite-UX Manpage	Description
<i>instl_dbg</i> (1M)	Debug configuration files and client directory data files.
<i>make_bundles</i> (1M)	Package Software Distributor (SD) products into an SD bundle.
<i>make_boot_tape</i> (1M)	Create a system boot tape.
<i>make_config</i> (1M)	Generate a configuration file for bundled software in an SD depot.
<i>make_depots</i> (1M)	Create SD depots from media.
<i>make_medialif</i> (1M)	Create a bootable LIF media image for PA-based systems.
<i>make_ipf_tape</i> (1M)	Create a bootable ANSI labeled tape for Itanium-based systems.
<i>make_net_recovery</i> (1M)	Create recovery images on a network system.
<i>make_sys_image</i> (1M)	Create an image of a client.
<i>make_tape_recovery</i> (1M)	Create recovery tapes.
<i>manage_index</i> (1M)	Manage the /var/opt/ignite/INDEX file.
<i>pkg_rec_depot</i> (1M)	Create a recovery depot to be used for network recovery of clients.
<i>print_manifest</i> (1M)	Print a system manifest.
<i>save_config</i> (1M)	Create hardware configuration file.
<i>setup_server</i> (1M)	Perform Ignite-UX client/server administration tasks.

Ignite-UX Web Site

The Ignite-UX Web site contains product announcements, the Ignite-UX documentation including white papers, the Ignite-UX Frequently Asked Questions (FAQs), and downloads of the latest version of Ignite-UX. This Web site is found at:

<http://www.docs.hp.com/en/IUX>

Details about recent changes to Ignite-UX are in the *Ignite-UX Release Notes* located on the Web site as described previously. Additionally, the release notes are installed in the `/opt/ignite/share/doc/release_note` directory on your system.

Ignite-UX Training

HP offers the *Managing Software with Ignite-UX* course for the experienced HP-UX system administrator. For details and registration, go to:

<http://www.hp.com/education/courses/h1978s.html>

You can find other HP-UX related courses at:

<http://www.hp.com/education/sections/hpux.html>

Additionally, HP offers technical online seminars that may be of interest located at:

<http://www.hp.com/education/sections/hpux.html#tos>

Other Information Sources

The HP IT Resource Center

The *HP IT Resource Center* (ITRC) can be an invaluable source of information regarding HP products and can be found at:

<http://www.itrc.hp.com>

The *IT Resource Center Forum* related to Ignite-UX is found at:

<http://forums.itrc.hp.com/cm/CategoryHome/1,,209,00.html>

The HP Documentation Web Site

HP provides a Web site where the latest HP-UX documentation and updates are available and is found at:

<http://www.docs.hp.com/>

The section “Related Documents” on page 20 contains a list of documents that may be of particular interest, which are found at this Web site.

NOTE

The most current version of this document, as well as most HP documentation, is always found at the HP Technical Documentation Web site:

<http://www.docs.hp.com/>

Sources of information related to the HP-UX 11i v2 release are available to you on the Web at:

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

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

<http://www.docs.hp.com/en/oshpux11i.html>

Additional Web Sites

Additionally, the following Web sites may be of interest in obtaining a variety of information regarding the HP-UX and associated hardware architectures:

Enterprise servers, Workstations, and Systems Hardware:

<http://www.docs.hp.com/en/hw.html>

HP Integrity server family overview:

<http://www.hp.com/go/integrity>

HP Product Manuals:

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

Software Depot:

<http://www.hp.com/go/softwaredepot>

HP Software Releases and Media:

<http://www.hp.com/software/releases/releases-media2>

Software Availability Matrix:

<http://www.hp.com/go/softwareinfo/MATRIX/>

Developer & Solution Partner Program (DSPP):

<http://www.hp.com/dspp>

Dev Resource Central:

<http://devresource.hp.com>

This chapter introduces common tasks for getting started with Ignite-UX or for setting up a new Ignite-UX server.

This chapter covers the following topics:

- Ignite-UX Server Requirements (see page 34)
- Ignite-UX Installation Overview (see page 36)
- Getting the Ignite-UX Software (see page 37)
- Installing Ignite-UX (see page 39)
- Making Configuration Decisions for Ignite-UX Servers (see page 42)
- Introduction to the Ignite-UX Graphical User Interface (see page 49)
- Managing Clients from the Ignite-UX Server (see page 50)

Ignite-UX Server Requirements

Hardware Requirements

An Ignite-UX server that will boot and install HP-UX on client systems requires the following hardware:

- **Computer:** An HP 9000 (PA-RISC) system running HP-UX 11.00, 11.11, or 11.23; or an Itanium®-based system running HP-UX 11.23.
- **Interface device:** An appropriate interface, such as a CD, DVD, tape drive, or LAN card.
- **Disk drive:** At least one hard drive with the following capacities:
 - To run HP-UX you need 2.2 GB for 11.00, and 4.0 GB for 11.11 or 11.23.
 - Ignite-UX requires a minimum of 105 MB and up to 250 MB of disk space in the `/opt/ignite` directory. Additional disk space is required for each version of HP-UX you intend to install onto clients - the amount of space depends on the size of the Operating Environment depots. Additional space is also required in the `/var/opt/ignite` directory for image and application software depot storage.

NOTE

The `swinstall` command performs an analysis of disk space needed prior to installing the software.

Other Considerations

- **Use of `tftp`:** Ignite-UX transfers some files using `tftp`. A list of the minimum directories needed for file transfer is kept in the `/etc/inetd.conf` file. You may need to add directories to the list if you place configuration scripts in nonstandard locations.
- **Use of `ssh`:** For Ignite-UX version C.6.8 and later, the commands `ignite` and `bootsys` can use `ssh` instead of `remsh`. To take advantage of this new functionality, you need to make `ssh` available on the Ignite -UX server and client if it is not already installed.

- Optional use of an X11 display server: An X11 display server allows a text-based terminal to run the Ignite GUI. Your Ignite-UX server can use an X server to display the Ignite GUI, or you can redirect the display to another X terminal by entering the following command:

```
export DISPLAY=system_name:0.0
```

- **Software:** Get Ignite-UX and any software depots you plan to distribute to clients from the product media (CD or DVD). Ignite-UX can also be downloaded from the Web; see “Getting the Ignite-UX Software” on page 37 for more information.
- **Network considerations:**

Below are listed some general configurations for Ignite-UX servers and their clients. See “Making Configuration Decisions for Ignite-UX Servers” on page 42 for more details.

- Set up your Ignite-UX server and all clients to be initially booted over the network on the same subnet.
- Use the `bootsys` command to boot clients manually outside the Ignite-UX server’s subnet.
- Create and use a **boot-helper** system to boot clients outside the Ignite-UX’s subnet. For more information, see Appendix C, “Using a Boot-Helper System,” on page 341.

NOTE

Most clients can only be booted using their built-in LAN interfaces. Other interfaces may or may not work. For more information about LAN interface boot support, consult the hardware documentation for the system.

Ignite-UX Installation Overview

Getting Ignite-UX and Installing it on the Server

The first steps in setting up your Ignite-UX server are to obtain and install Ignite-UX. Make sure you have reviewed the server hardware, software, and networking requirements explained in “Ignite-UX Server Requirements” on page 34 . See “Getting the Ignite-UX Software” on page 37 and “Installing Ignite-UX” on page 39 to complete these steps.

Configuring the Ignite-UX Server for Your Clients

After Ignite-UX is installed, you must configure Ignite-UX for clients. There are a number of variables to consider when configuring your server, such as: client hardware type, if network booting will be implemented, if DHCP will be running on your system, if you want your clients to be registered or anonymous, and if clients will be within same subnet as the Ignite-UX server. See “Making Configuration Decisions for Ignite-UX Servers” on page 42 for details and pointers on how to proceed.

NOTE

It is also possible to complete the Ignite-UX server configuration outside Ignite-UX by using the `setup_server` command. For more information, see `setup_server` (1M).

Getting the Ignite-UX Software

Ignite-UX is available from the following sources in standard Software Distributor for HP-UX depot format:

- The application CD or DVD supplied with the HP-UX operating system media: **B5725AA**.
- The HP Software Depot Web site. You can find the link to the Software Depot on the "Download Ignite-UX" page of the Ignite-UX Web site:

<http://www.docs.hp.com/en/IUX/download.html>

IMPORTANT

Ignite-UX obtained from CD or DVD only installs the designated operating system. Ignite-UX from the Software Depot installs the HP-UX operating systems determined by the depots downloaded. See Table 2-1 for a list of depots and their corresponding HP-UX versions.

Table 2-1 Ignite-UX Bundles Available at Software Depot

Depot Name	HP-UX Operating Systems the Depot can Install and Recover
Ignite-UX-11-ALL_C.6.x.xx.depot	HP-UX 11.00, 11.11, and 11.23
Ignite-UX-11-00_C.6.x.xx_HP-UX_B.11.00_32+64.depot	Only HP-UX 11.00
Ignite-UX-11-11_C.6.x.xx_HP-UX_B.11.00_32+64.depot	Only HP-UX 11.11 (B.11.11)
Ignite-UX-11-23_C.6.x.xx_HP-UX_B.11.00_32+64.depot	Only HP-UX 11.23 (B.11.23)

Each Ignite-UX bundle contains the Ignite-UX tools, plus the data files required to support the particular HP-UX operating systems indicated by the bundle name.

You can install one or more of the individual Ignite-UX-11-xx bundles onto your system.

HP recommends that you install the Ignite-UX product containing all three bundles unless you want to block the use of a specific version of HP-UX or increase the download speed.

IMPORTANT

Installing individual bundles instead of the complete product may cause problems for Ignite-UX if the complete product was installed previously. Please refer to the *Installing and Updating Ignite-UX* white paper if you are unsure of what to install to upgrade Ignite-UX. Links to the Ignite-UX white papers are found at:
<http://www.docs.hp.com/en/IUX/infolib.html>

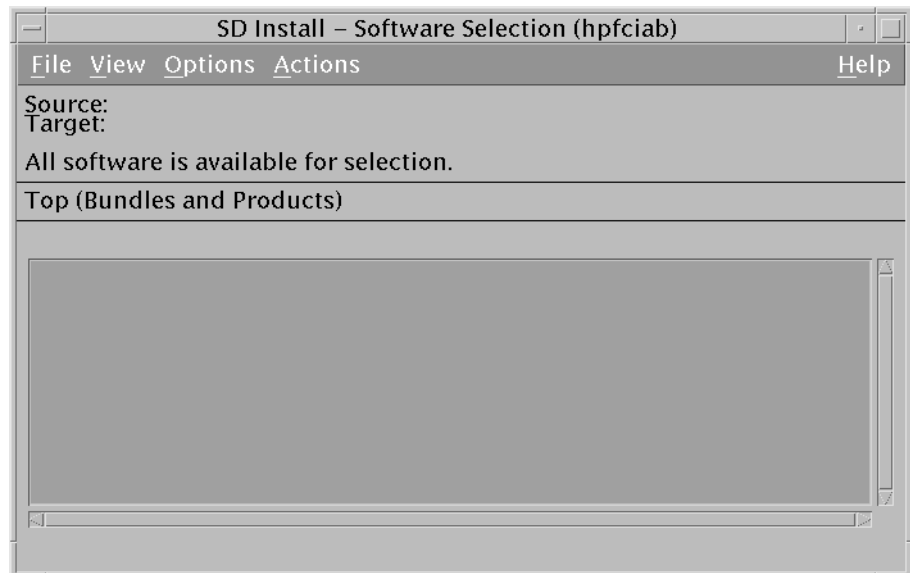
Installing Ignite-UX

If you are installing Ignite-UX from media, place the CD, DVD, or tape in the drive on the system you are installing it on.

Using the `swinstall` GUI

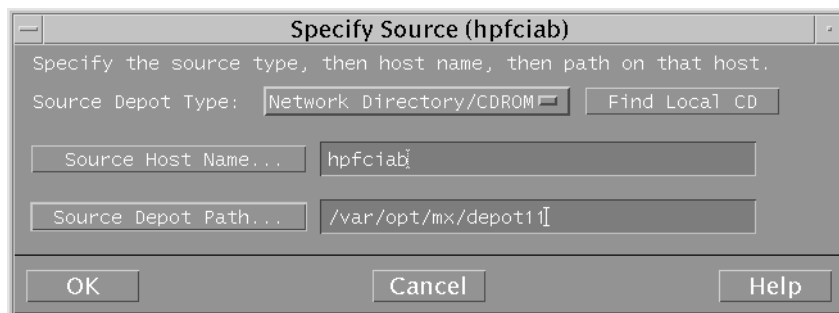
If you are unfamiliar with installing HP-UX software, the easiest way to install an Ignite-UX depot is by running the `swinstall` command with its GUI. To do this, just enter the command with no arguments, and the GUI will launch, as shown in Figure 2-1 on page 39.

Figure 2-1 **The SD Install Window**



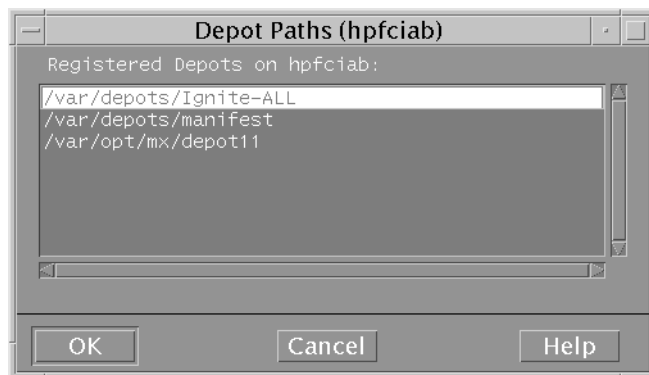
Immediately, the window will appear for you to specify the source depot - see Figure 2-2 on page 40

Figure 2-2 SD Install: Specify Source Window



If you are using a downloaded depot, select the **Source Depot Type: (Local Directory)** from the Specify Source window, and the **Source Depot Path...** from the Depot Paths window shown in Figure 2-3 on page 40. The **Source Depot Path...** must be the full path to the file, including the file name. Note that the depot you downloaded must be on the same system you are installing it on.

Figure 2-3 Depot Paths

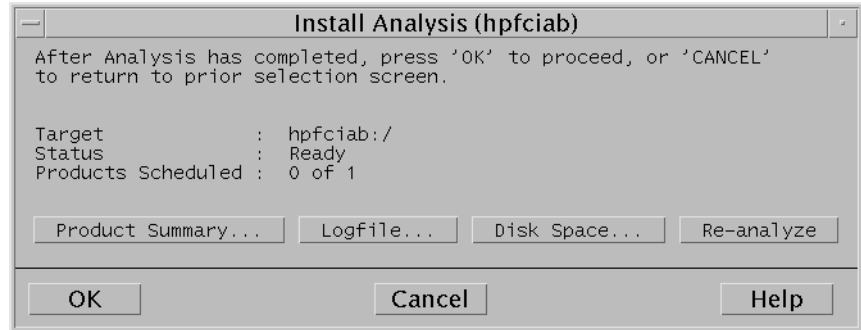


If you are installing from media, and if you have not already mounted it, click **Find Local CD** on the Specify Source window to locate and mount the media.

Click **OK** on the Specify Source window, and you are returned to the SD Install window, which is now populated with available depots to install. Select the depots you want to install, and then select **Actions->Install**. You are then taken to the Install Analysis window, shown in Figure 2-4 on page 41, where potential impacts of the installation are analyzed and

reported in the log file. After the analysis runs, check to see if there are any errors or warnings to attend to before actually installing your depots.

Figure 2-4 Install Analysis Window



Once your Install Analysis is satisfactory, click **OK**, and the Install Window will appear. When the installation is complete, check the log file and product summary for information.

You have successfully installed Ignite-UX on your server. Click **Done** in the Install Window, and select **File->Exit** from the SD Install window.

NOTE

If you must access a remote CD/DVD drive, you must mount it before you launch the SD Install GUI. You may also need to register the mount point of the CD/DVD on the remote system as a depot by using `swreg` on the remote system.

After installing Ignite-UX, unmount and remove the media.

If you do not want to install the entire Ignite-UX bundle, see “Installing Minimal Ignite-UX Filesets” on page 74.

For more information on `swinstall` see *swinstall* (1M).

Making Configuration Decisions for Ignite-UX Servers

Configuring an Ignite-UX server requires you to make some decisions as to how you would like your server to manage clients. This section provides an overview of network booting to help in making some of those decisions.

Network Booting and IP Addresses

When a system boots HP-UX from an Ignite-UX server, it needs an IP address to get the operating system kernel. This first IP address is not necessarily the same IP address the system will be assigned for networking when its kernel is up and running. The mechanisms for distributing the first and second IP addresses are sometimes different.

PA-RISC Systems

When a PA-RISC system boots from an Ignite-UX server, the first IP address request is answered by the `instl_bootd` daemon. This communication uses ports 1067 and 1068. The file `/etc/opt/ignite/instl_boottab` is referenced to assign the first IP address to the booting system whether it is registered or anonymous.

After HP-UX is running on a PA-RISC system, it requests a second IP address for networking. This request is answered by `bootpd` using ports 67 and 68. The `/etc/bootptab` file is referenced for registered clients; DHCP services are used for anonymous clients.

Itanium-Based Systems

When an Itanium-based system boots from an Ignite-UX server, the first IP address request is answered by the `bootpd` daemon. This communication uses ports 67 and 68. The file `/etc/bootptab` is referenced to assign the first IP address to a registered booting system. If the system is not registered, and you are running HP-UX 11.23 on the Ignite-UX server, DHCP services are used to assign the booting IP address.

When Itanium-based systems request a second IP address for networking, it uses the same daemon, file, and ports described above. Configuring DHCP services for booting is separate from configuring DHCP for assigning network IP addresses. See “Considerations For Booting Anonymous Itanium-Based Clients” on page 84 for information about how to configure DHCP for assigning first and second IP addresses without conflict.

Sorting Through the Options

Questions you will have to answer as an Ignite-UX system administrator are:

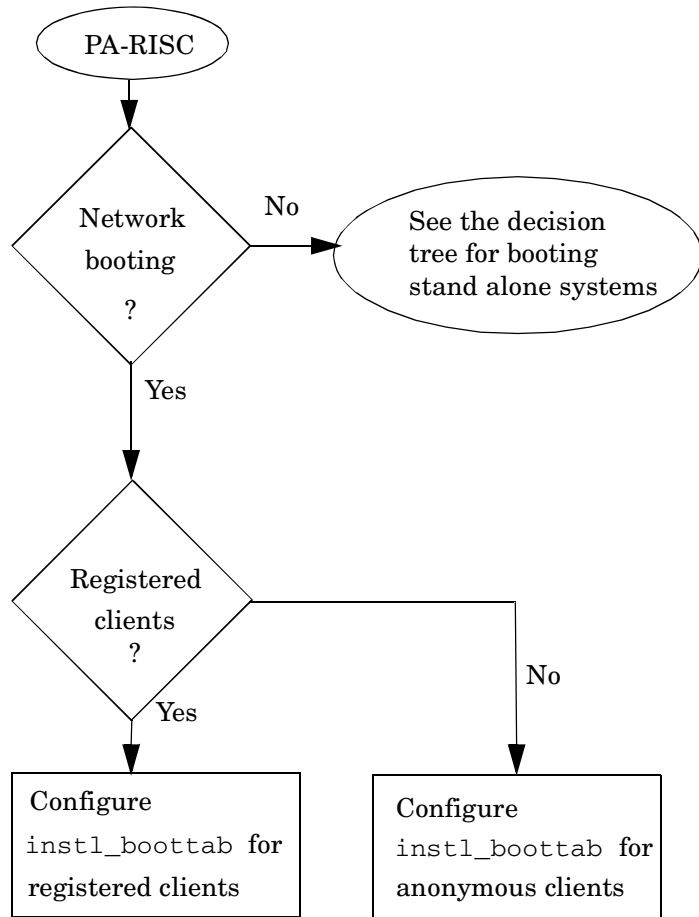
- Are my clients PA-RISC or Itanium-based?
- Do I want to network boot my clients?
- Do I want my clients to have their LLAs registered with the server to always boot to the same assigned IP address (registered clients), or do I want an available IP address assigned to them when they boot (anonymous clients)?
- Do I want the booting IP address to be the same IP address used for networking?
- Do I have DHCP running on my subnet?

Decision trees for reaching booting decisions follow. Do not treat them as strictly yes-or-no exercises. Your environment may require choosing multiple methods from the decision trees, and although you may be able to use an option, you may reject it because it is not the best answer for your environment. Also, keep in mind that these decision trees cover booting, so only the first IP address is affected.

A decision tree for network booting PA-RISC systems is shown in Figure 2-5 on page 44. A decision tree for network booting Itanium-based systems is shown in Figure 2-6 on page 45. The decision trees assume the network boot clients are on the same subnet as the Ignite-UX server, and that you will always use the `install` option to the boot console handler (BCH) `boot` command. Further, the decision tree for network booting Itanium-based systems assumes there is only one DHCP server on your subnet configured to answer boot requests, and that it is running HP-UX.

If you want to boot a system without using the network and your Ignite-UX server, see the decision tree shown in Figure 2-7 on page 47.

Figure 2-5 **Decision Tree for Network Booting PA-RISC Systems**

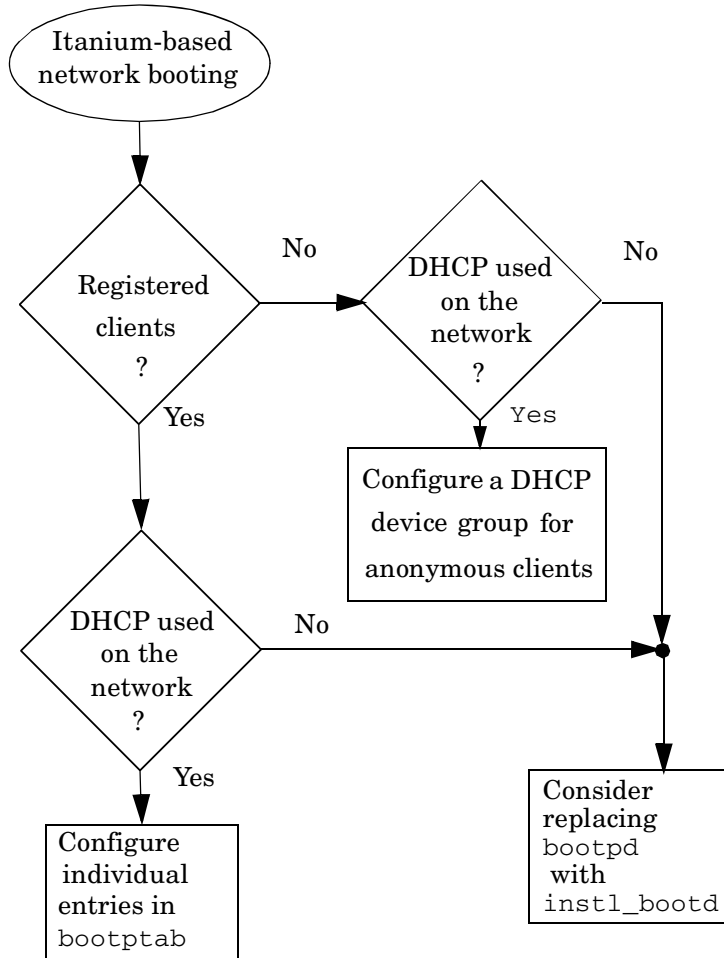


Configure `instl_boottab` for registered clients - To network boot registered PA-RISC clients, the server uses the `instl_bootd` daemon to answer boot requests, and has clients' IP addresses and LAN addresses registered in `/etc/opt/ignite/instl_boottab`. The process of configuring an Ignite-UX server for registered PA-RISC clients is described in “Configuring the Ignite-UX Server for PA-RISC Clients” on page 56.

Configure `instl_boottab` for anonymous clients - Network booting anonymous PA-RISC clients is similar to booting registered PA-RISC clients; the difference is that some IPs in the `/etc/opt/ignite/instl_boottab`

file are not associated with any clients' LLAs, and so may be assigned to clients as requests come in. See "Configuring a Server to Boot Anonymous PA-RISC Clients" on page 83 for more information.

Figure 2-6 **Decision Tree for Network Booting Itanium-Based Systems**



Configure individual entries in bootptab - To network boot registered Itanium-based clients, the server uses the `bootpd` daemon to answer boot requests, and has clients' IP addresses and LAN addresses registered in `/etc/bootptab`. One drawback to this option is that you

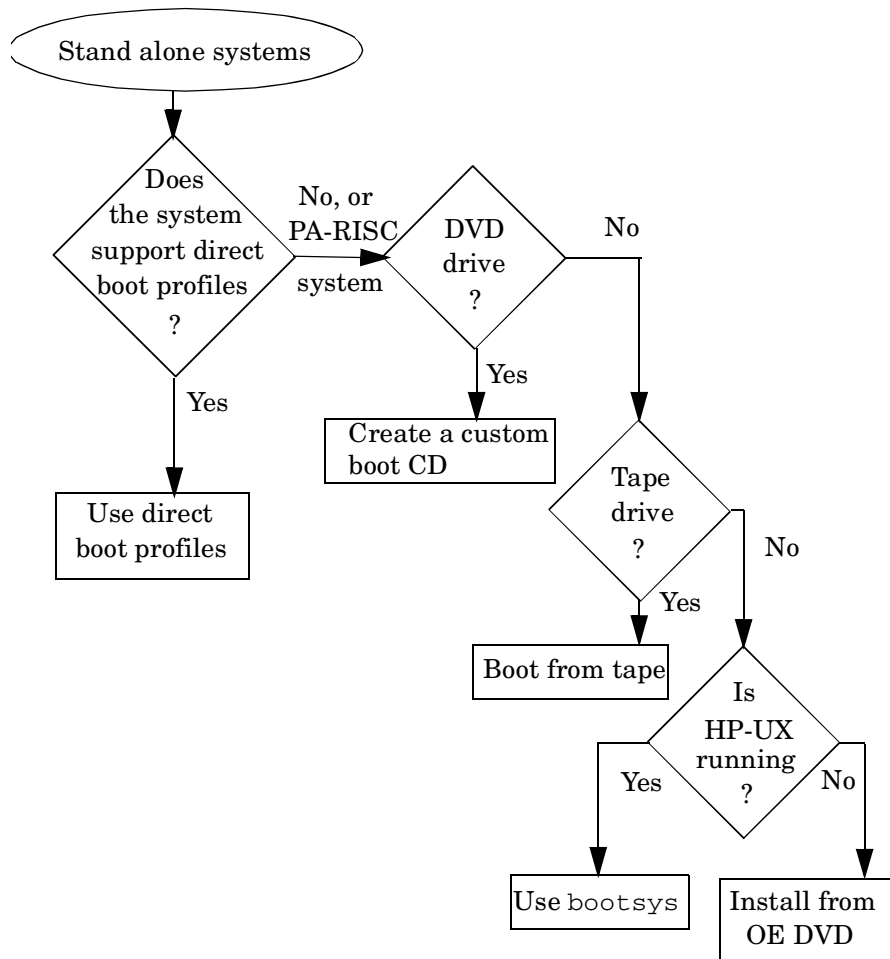
must configure an entry for every system that needs to boot. The advantage of this method is that it works on all versions of HP-UX. See “Configuring the Ignite-UX Server for Itanium-Based Clients” on page 63 for details.

Configure a DHCP device group for anonymous clients -

Configuring an Ignite-UX server to boot anonymous Itanium-based clients requires sophisticated considerations; see “Considerations For Booting Anonymous Itanium-Based Clients” on page 84. This option is only available for HP-UX 11i v2 and later.

Consider replacing bootpd with instl_bootd - The `instl_bootd` daemon can support anonymous Itanium-based clients and provide enough information for them to boot. The `instl_bootd` daemon can also be configured for registered clients. You might consider running `instl_bootd` if you have PA-RISC and Itanium-based clients on one subnet, since this would allow you to manage client IP addresses in one place: `/etc/opt/ignite/instl_boottab`. The drawback to this arrangement is that an Ignite-UX server configured this way cannot provide DHCP services. This method is not recommended for an environment that consists mainly of Itanium-based systems - use DHCP or `bootpd` in that case. See “Replacing bootpd with instl_bootd” on page 89 for more information.

Figure 2-7 Decision Tree for Booting PA-RISC or Itanium-Based Stand Alone Systems



Use direct boot profiles - All partitionable Itanium-based systems allow the definition of direct boot profiles. Some other Itanium-based systems such as the Itanium-based blades in an HP Integrity BL60p blade server also provide this EFI functionality. With these profiles, you can supply all the networking information needed to contact an Ignite-UX server and perform an install or recovery. For more information, see “Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles” on page 334.

Create a custom boot CD - For more information, see “Building an Installation CD” on page 219.

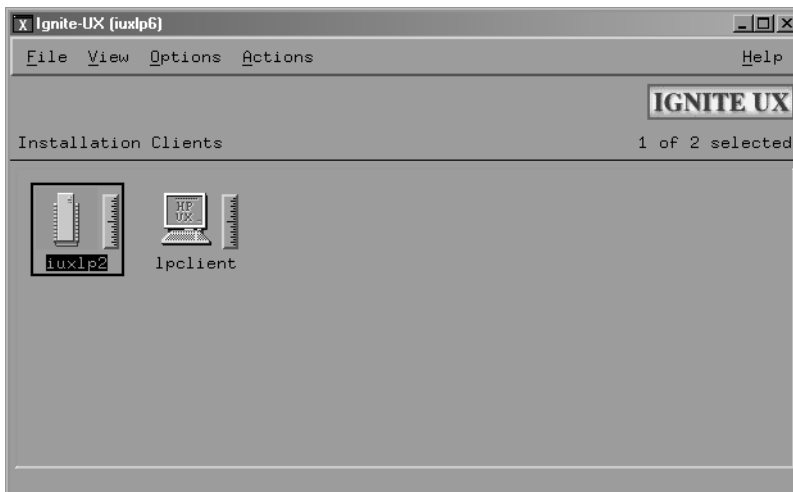
Boot from tape - This alternative may not be available if your Itanium-based system does not have firmware capable of a tape boot.

Use `bootsys` - If the system to boot is currently running an instance of HP-UX, you can use `bootsys` to reinstall or recover the system. See the *bootsys* (1M) manpage for more information.

Install from OE DVD - The last option available to you is to install the system from the OE DVD. This requires the system to have a DVD drive attached for DVD OE media, or a CD drive attached for revisions of HP-UX that deliver install media on CD-ROM.

Introduction to the Ignite-UX Graphical User Interface

Figure 2-8 Ignite-UX GUI



The Ignite-UX GUI workspace graphically represents each booted client as an icon labeled with the client hostname. You can:

- Click a client to select it for further actions.
- Double-click the client to display the **Client Status** dialog box.
- Right-click a client to get a context-sensitive **Actions** menu. You must select the client before right-clicking; any selections made from the **Actions** menu apply to the selected client.

For more information about these actions, see Chapter 5, “Installing HP-UX from the Client Console,” on page 91, and Chapter 6, “Installing HP-UX on Clients from the Server,” on page 107.

Managing Clients from the Ignite-UX Server

The Ignite-UX GUI workspace provides access to all management tasks using the menu bar and context-sensitive menus (see Figure 2-8 on page 49).

Each client's installation status is indicated by the colored border around its icon:

Green: The operating system is completely installed, booted, and running with no errors or warnings.

Yellow: A warning condition exists and should be investigated.

Red: An error condition is present. The operating system is partially installed, or the installation has stopped. The light blue installation indicator shows the relative progress.

No color: Installation has not yet started or the client has been stopped.

Client icons are shown for all booted clients and those that can be used as recovery systems. These systems are known to Ignite-UX by their existence in the `/var/opt/ignite/clients` file.

File Menu

The File menu contains basic Ignite-UX functionality:

- **Search** - Find clients that match a text string.
- **Print** - To print a listing of systems, the display must be set with **View->By Properties**
- **Exit** - Quit Ignite-UX.

View Menu

Use the **View** menu to customize the Ignite-UX GUI display:

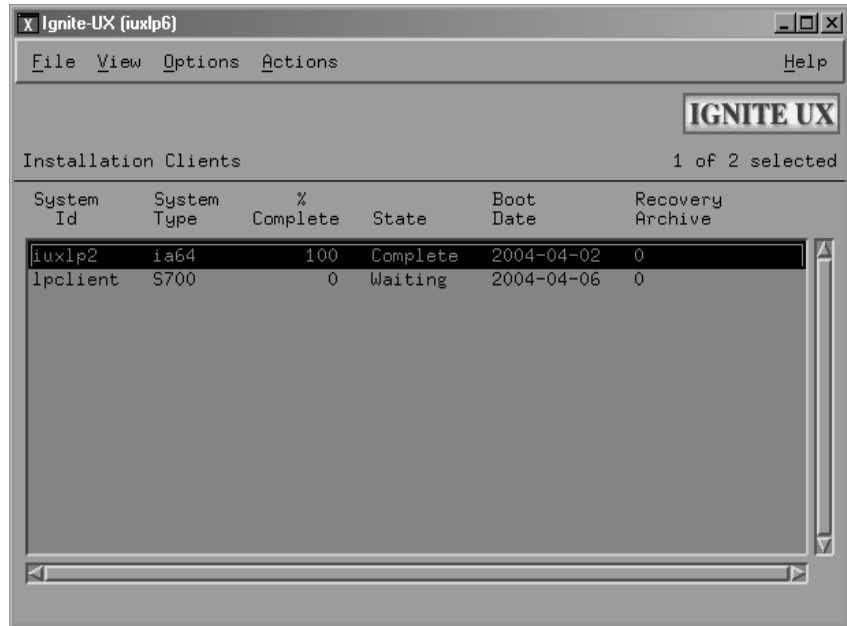
- **Columns** - Choose which client attributes to display in which column. These selections are apparent only when the object list is displayed by properties.
- **Filter** - View a subset of clients by selected criteria.
- **Sort** - Orders the displayed clients by sort criteria.
- **By Name and Icon** - Displays clients graphically.

- **By Properties** - Displays clients in a text format rather than in the default graphical representation.

NOTE

Using the **By Properties** view and sorting the list makes it easier to scan for clients that have finished installing. For example, to view the clients by the percentage of completion, select **View->Sort->% Complete: Descending**. The list of clients will then appear with the clients closest to completion first, as shown in Figure 2-9.

Figure 2-9 Ignite-UX GUI By Properties View



- **Save View as Default** - Saves the current Ignite-UX GUI View settings.

Options Menu

Use the **Options** menu to set server configuration variables and to control the refresh rate of the Ignite-UX display.

- **Server Configuration** - Identify and set up your installation server. The selections here are covered in detail in “More Server Setup Options” on page 67.

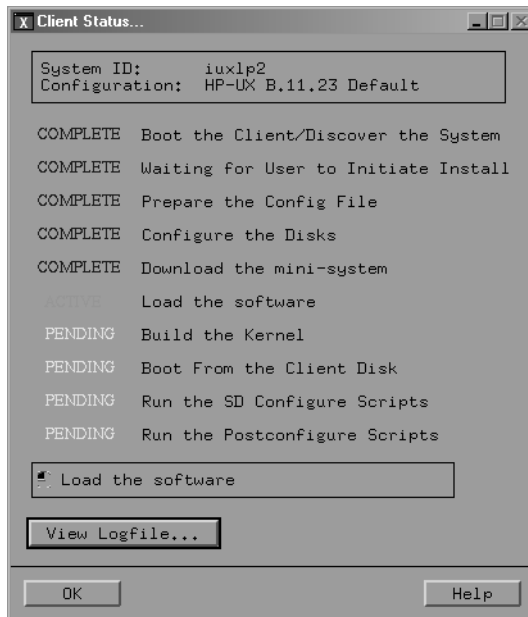
- **Change Refresh Interval** - Select how frequently you want the client display updated.
- **Refresh List** - Update the client display immediately.

Actions Menu

To view available actions for a client, select its icon, then select the **Actions** menu. The actions displayed are dependent on the status of the client, so all actions may not be available. You can use the following actions to manage clients:

- **View Install History...** - Lists details of all successfully installed clients.
- **Boot Client...** - Boots the selected client. If no client is selected, one will be prompted for.
- **Add New Client for Recovery...** - Selects a client to be recovered. For more information, see “Adding Clients for Recovery” on page 265.
- **Run Tutorial/Server Setup...** - Displays the Welcome dialog box. From there, you can run the **Tutorial and Demo**, or click **Server Setup...** to launch the Server Setup Wizard.
- **Client Status...** - The status of the selected client is polled and displayed, as in Figure 2-10 on page 53.

Figure 2-10 Client Status Dialog Box



- **Install Client** - Starts the HP-UX installation process for the selected client. This process is explained in Chapter 6, “Installing HP-UX on Clients from the Server,” on page 107
- **Stop Install...** - Stops the installation process on the selected client. After stopping an install, you can reboot or halt the client.
- **Create Network Recovery Archive** - Creates a network recovery image using the `make_net_recovery` command. See Chapter 11, “System Recovery,” on page 235 for more information.
- **Create Tape Recovery Archive** - Creates a recovery image using the `make_tape_recovery` command. See Chapter 11, “System Recovery,” on page 235 for more information.
- **Move to History...** - Saves critical files for the client, adds them to the history file, and removes the client. The client installation must successfully complete for the configuration to be moved to the history file.
- **Remove Client...** - Deletes the selected client configuration. All client data, except for the recovery image, is removed. Recovery information in the client’s directories will be removed.

- **View Hardware...** - Lists the hardware associated with the selected client.
- **View/Print Manifest...** - Allows you to view and print the manifest for the selected client. The manifest file details the client's installation and is available on the client and Ignite-UX server after the installation. For more information, see "Viewing and Printing a Manifest" on page 154.
- **Change Icon Name...** - Launches a dialog box for renaming the selected icon.

3 Creating a Server for Network Booting Registered Clients

This chapter describes how to install a basic Ignite-UX server configuration for network booting and installing HP-UX on clients registered with the server. This chapter does not discuss support for anonymous clients. For information about how to set up anonymous clients, see Chapter 4: Creating a Server for Network Booting Anonymous Clients.

For PA-RISC clients, a basic server setup will use the `instl_bootd` daemon to answer boot requests, will not use DHCP for initial system boot, and will register clients' IP addresses and LAN addresses in `/etc/opt/ignite/instl_boottab`.

For Itanium-based clients, a basic server setup will use the `bootpd` daemon to answer boot requests, will not use DHCP for initial system boot, and will have clients' IP addresses and LAN addresses registered in `/etc/bootptab`.

Setting up software depots is the same for PA-RISC and Itanium-based systems.

The following topics are covered in this chapter:

- Configuring the Ignite-UX Server for PA-RISC Clients (see page 56)
- Configuring the Ignite-UX Server for Itanium-Based Clients (see page 63)
- Setting Up Software from Depots (see page 65)
- More Server Setup Options (see page 67)
- Advanced Installation Topics (see page 74)

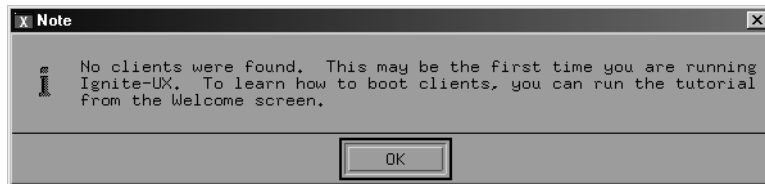
Configuring the Ignite-UX Server for PA-RISC Clients

Launch Ignite-UX As superuser, start Ignite-UX by entering the following command:

```
/opt/ignite/bin/ignite
```

Because this is the first time Ignite-UX is launched, there are no clients and the message in Figure 3-1 appears. You must boot a client before it can be recognized and managed by Ignite-UX. Acknowledge the message by clicking **OK**.

Figure 3-1 Ignite-UX First Launch Message



The Ignite-UX Welcome dialog box is displayed, as shown in Figure 3-2.

Figure 3-2 Ignite-UX GUI Welcome Dialog Box

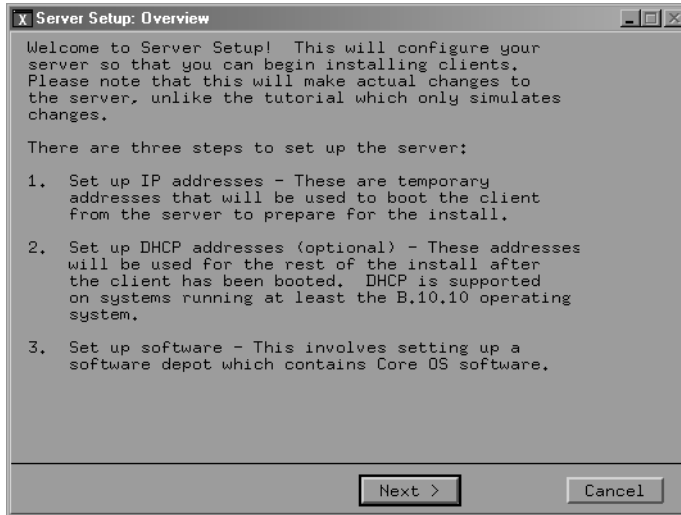


To learn more about the Ignite-UX GUI now, click **Tutorial and Demo...** Access the tutorial later by clicking **Actions-> Run Tutorial/Server Setup->Tutorial and Demo.**

To bypass this welcome the next time you start Ignite-UX, click the **Do not show this screen again** check box.

Launch the Server Setup Wizard To begin configuring your Ignite-UX server, click Server Setup... to launch the Server Setup Wizard, as shown in Figure 3-3.

Figure 3-3 Server Setup Wizard



To set up an Ignite-UX server for PA-RISC clients, complete step 1 (Set up IP addresses); skip step 2 (Set up DHCP addresses); and complete step 3 (Set up software).

Click **Next** to advance to the Server Setup: IP Addresses dialog box (Figure 3-4).

NOTE

To end the setup process at any time and leave the system unchanged, click **Cancel**.

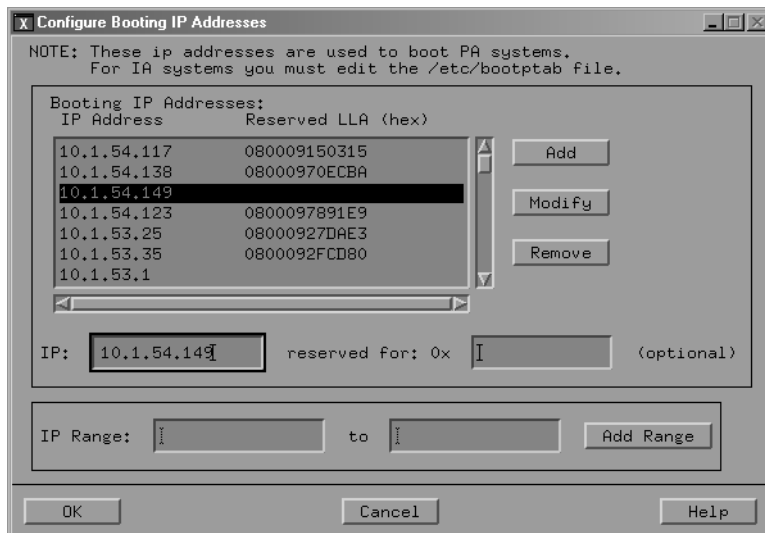
Figure 3-4 **Server Setup: IP Addresses**



Register the PA-RISC Clients with the Server

Select **Configure Booting IP Addresses Now** from the Server Setup: IP Addresses dialog box (Figure 3-4 on page 59), then click **Next** to proceed to the Configure Booting IP Addresses dialog box shown in Figure 3-5 on page 60.

Figure 3-5 Configure Booting IP Addresses



Use the Configure Booting IP Addresses dialog box to register client IP addresses with their physical LLAs. The IP addresses and corresponding reserved LLAs are read from the /etc/opt/ignite/instl_boottab file on the server to display in the Booting IP Addresses window. IP addresses with blank reserved LLAs are not currently reserved for any client.

If you want to add a new IP address to reserve for a client, click in the IP text box and enter the IP address intended for your client. Then click in the reserved for: 0x text box and enter the client's LLA. Click **Add** to enter the IP address/LLA pair into the Booting IP Addresses window. The LLA given here must be the LLA of the network interface to be used to boot the system over the network.

If the IP address you want to reserve for a client is already listed in the Booting IP Addresses window, select that line. The IP address will appear in the IP text box, and the current LLA it is reserved for, if there is one, will appear in the reserved for: 0x box. Enter the client LLA in the reserved for: 0x box, then click **Modify**. The IP address will then appear in the Booting IP Addresses window with the client LLA you just entered.

You can remove sets of IP addresses/LLAs from the Booting IP Addresses window by selecting the line and then clicking **Remove**.

Continue assigning IP addresses to clients' LLAs until all the clients to be booted from the Ignite-UX server are registered. You can modify this information in the future by manually editing the `/etc/opt/ignite/instl_boottab` file, or via the Ignite-UX GUI under **Options->Server Configuration**. See page 69 for more information.

When you have completed registering clients, click **OK** to write the contents of the Booting IP Addresses window to the `/etc/opt/ignite/instl_boottab` file.

Once you exit the Configure Booting IP Addresses dialog box, a registered client's boot request is answered by `instl_bootd`, and the client will boot to the reserved IP address listed in the Booting IP Addresses window.

NOTE

No manual intervention is required to have `instl_bootd` pick up changes to the `/etc/opt/ignite/instl_boottab` file. When a boot request is received, `instl_bootd` always checks whether the file was modified since last read, and rereads it before answering any boot request. Care should be taken if you edit the `/etc/opt/ignite/instl_boottab` file manually. For the correct procedure see *instl_bootd* (1M).

Skip DHCP Setup

After exiting the Configure Booting IP Addresses dialog box, the Server Setup: DHCP (optional) dialog box appears. Click **Skip DHCP Setup**, then click **Next**.

A dialog box is displayed to tell you how to configure DHCP services later. Click **OK**.

NOTE

DCHP services configured with the Ignite-UX GUI supply IP addresses and other network information to clients after the client has been booted. For more information, see Appendix B, “Configuring DHCP Services,” on page 327.

The Server Setup: Software Depot Setup dialog box is then displayed (Figure 3-6 on page 66).

Go to the Software Setup Section

Proceed to “Setting Up Software from Depots” on page 65 to complete the Ignite-UX server setup.

Configuring the Ignite-UX Server for Itanium-Based Clients

Register the Itanium-based Clients with the Server

Registered Itanium-based clients must be entered in the `/etc/bootptab` file manually; they cannot be registered using the Server Setup Wizard. The `/etc/bootptab` file acts as the database for the `bootpd` daemon on the Ignite-UX server. All registered clients you intend to boot from the Ignite-UX server must be entered in the `bootptab` file.

A typical `bootptab` file has a generic, default client specification defined. The individual clients use this default definition and make their specific modifications to it, such as the IP address and the hardware address (LLA). In the following example, `IADEF` is the default configuration for Itanium-based clients on the subnet, and `iuxclient1` is the specific entry for that particular client.

```
IADEF:\  
ht=ethernet:\  
hn:\  
bf=/opt/ignite/boot/npd.efi\  
bs=48:\  
sm=255.255.248.0:\  
gw=190.1.48.1:\  
ds=190.1.48.11:
```

```
iuxclient1:tc=IADEF:ip=15.1.52.204:ha=00306E4A3391
```

The `tc` tag indicates the use of a template for common defaults, so all the values from `IADEF` are assumed for `iuxclient1` unless specifically overridden in the client's definition. The `ip` tag indicates the client's IP address, and the `ha` tag indicates the LLA. For more information on the `bootptab` file syntax, see *bootpd* (1m).

For each client you intend to boot from the Ignite-UX server, enter their respective IPs and LLAs in the `bootptab` file.

From now on, when a registered client's boot request is answered by `bootpd`, it will boot to the reserved IP address you entered in the `/etc/bootptab` file. You can make changes to the `bootptab` file at any time.

IMPORTANT

The server that sends the response to the boot request is the same system from which the client will attempt to `tftp` the boot file. If you are not using an HP-UX system to reply to a request, you must make the required boot files available and current with new releases of Ignite-UX. HP does not provide support for this kind of configuration.

Use the Server Setup Wizard to Proceed to Software Depot Setup

Follow the steps outlined in the section “Configuring the Ignite-UX Server for PA-RISC Clients” on page 56 from Launch Ignite-UX through Launch the Server Setup Wizard. When you get to the Server Setup: IP Addresses dialog box (Figure 3-4) click **Skip Booting IP Setup**, and then click **Next**.

A note appears instructing you how to configure IP addresses in the future. Click **OK**, and the Server Setup: DHCP (optional) dialog box is displayed. Click **Skip DHCP Setup**, then click **Next**.

A dialog box is displayed to tell you how to configure DHCP services later. Click **OK**.

NOTE

DCHP services configured with the Ignite-UX GUI supply IP addresses and other network information to clients after the client has been booted. For more information, see Appendix B, “Configuring DHCP Services,” on page 327.

The Server Setup: Software Depot Setup dialog box now appears (Figure 3-6 on page 66).

Go to the Software Setup Section

Proceed to “Setting Up Software from Depots” on page 65 to complete the Ignite-UX server setup.

Setting Up Software from Depots

For a more complete discussion of this task, refer to the "Ignite-UX Custom Configurations Files" document, specifically the "Installation configurations using Software Distributor depots" and the "Configuration for software to be installed" sections. To access this document see the following Web page:

<http://www.docs.hp.com/en/IU/infolib.html>

This section is limited in scope and does not attempt to address fully what can become a complex task.

Before you Start

Before starting the software depot installation, you should have on hand either a set of OE media or information about a remote system that contains a previously installed OE depot.

If you are using media, you will need a locally attached optical drive: a DVD-ROM for DVD or CD media, or a CD-ROM drive for CD media. The media should not be mounted before starting if you are planning to create a local depot. The media can be mounted before starting if you are planning to install directly from the media. For performance reasons, HP does not recommend installing directly from media when more than one system will be attempting to access the media.

If you are using a previously installed OE depot, it should have been installed using the process described below, or by using the `make_depots` command.

Setting Up Software from Depots

Regardless of the source of the OE depot, the full OE should be installed, not a subset.

Figure 3-6

Software Depot Setup Page



Media You are prompted to insert the media and select a device. The core operating system is automatically installed on your server.

Installed Depot You are prompted for the hostname of the system containing the operating system depots. Enter the hostname, then click **Show Depots....** Select a depot containing a core operating system from the list, and then click **OK**.

A series of questions asks you to confirm your choices. Then a Server Setup Logfile dialog box appears so you can monitor the depot installation progress. This process is lengthy and can take up to 2 hours. During this time this dialog box remains active and is updated when new information is written to the log file.

Upon completion, either click **OK** to continue installing additional depots by repeating this process, or click **Finish** to complete the server setup.

NOTE

Although you can change the server configuration options later (see “More Server Setup Options” on page 67) you must use the Server Setup Wizard to install all operating system depots on clients.

To install additional depots later, see “Add Optional Applications” on page 77.

More Server Setup Options

You must configure the Ignite-UX server and session options before you can use the server to install HP-UX on clients. The configuration process is described in this section and includes the following tasks:

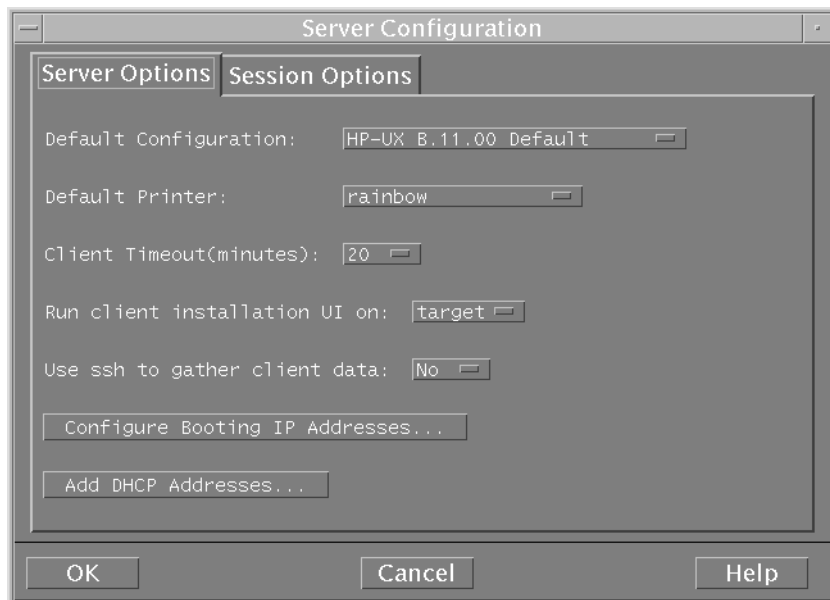
- Setting up your network installation on either a PA-RISC or an Itanium-based server
- Configuring the IP addresses to be used to boot the installation clients
- Configuring the DHCP address range to be used for directing the client installation process

Configuring Server Options

Use the following steps to configure your Ignite-UX server:

- Step 1.** Select **Options->Server Configuration**. The tabs shown in Figure 3-7 appear.

Figure 3-7 Ignite-UX Server Configuration Tabs



The default tab is **Server Options**.

- Step 2.** Click the button next to Default Configuration, then select an operating system or Operating Environment (OE) from the list. The selected configuration is the default that will be used when installing clients. You can override this default setting on a per-client basis with Ignite-UX.
- Step 3.** Click the button next to Default Printer, then select one of the available (configured) printers. This is the printer used for printing a manifest or installation history. The printer IP address is verified by Ignite-UX before a job is sent.

If necessary, use the System Administration Manager (SAM) to add a new printer to the system.

- Step 4.** Click the button next to Client Timeout, then select the number of minutes or **off**. Status information is written into the client's `install.log` file during the installation, and this log is actively monitored by Ignite-UX. Setting this value configures Ignite-UX to display a warning message if the `install.log` file has not been updated in the selected number of minutes. HP recommends you use the default value.

Setting Client Timeout to **off** disables this notification but does not affect the outcome of the installation.

- Step 5.** Use the Run client installation UI on menu to designate where you want to view the client UI for this installation. If you have an Ignite-UX server configured, you can run the client installation interface from the target (or client) using a terminal user interface (TUI), or from the server using whatever UI is set up there (the Ignite-UX GUI or TUI). If the client installation is to be noninteractive (no user intervention), select **none**.

The default location for the GUI to be displayed is the Ignite-UX server.

- Step 6.** Configuring network boot IP addresses is hardware architecture dependent. Choose the appropriate method for your hardware (PA-RISC or Itanium-based).

**PA-RISC
Configuration**

Select **Configure Booting IP Addresses...**. The dialog box shown in Figure 3-8 is displayed.

Figure 3-8 **Configure Booting IP Addresses Dialog Box**



During the installation process, the clients must do a network boot from the Ignite-UX server. In order to do this, the clients must be assigned a temporary IP address.

In the IP Range fields, enter an initial range of available IP addresses from which this Ignite-UX server can execute the initial client boot. The following example enables Ignite-UX to perform 20 simultaneous installations using this range of IP addresses:

10.2.73.1 10.2.73.20

This temporary IP address is only used to boot over the network during the initial transfer of the kernel from the server to the client. You may only need one or two addresses, depending on how many systems are performing network boots at the same time.

IMPORTANT

Be sure that the temporary IP addresses you enter here are not assigned. If they are, this creates a network conflict and unexpected results.

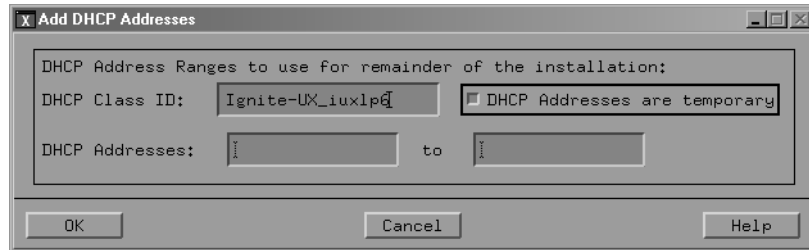
If you need to change these addresses later, you must edit the `/etc/opt/ignite/instl_boottab` file.

For more information, see *instl_bootd* (1M).

Itanium-Based Configuration

Select **Add DHCP Addresses...** The dialog box shown in Figure 3-9 is displayed.

Figure 3-9 Add DHCP Addresses Dialog Box



The IP addresses you provide are used during the operating system download and application installation. These addresses are in use for most of the Ignite-UX download to a client. One address is required for each simultaneous download.

This provision of DHCP capability is for the installation only. You might want to limit configurations so that they do not interfere with prior DHCP server functions.

Permanent IP addresses are distributed using DHCP Services. Unless you are familiar with DHCP services, do not modify the DHCP Class ID field or the **DHCP Addresses are temporary** check box. The DHCP service is only used for client configurations that do not have predefined system hostnames and IP addresses.

Provide a range of available, permanent IP addresses in the DHCP Addresses fields to indicate the range from lowest number to highest. For example:

10.2.73.21 10.2.73.40

You can supply these addresses *once* in Ignite-UX. After this initial definition, use SAM to modify these IP addresses.

More Server Setup Options

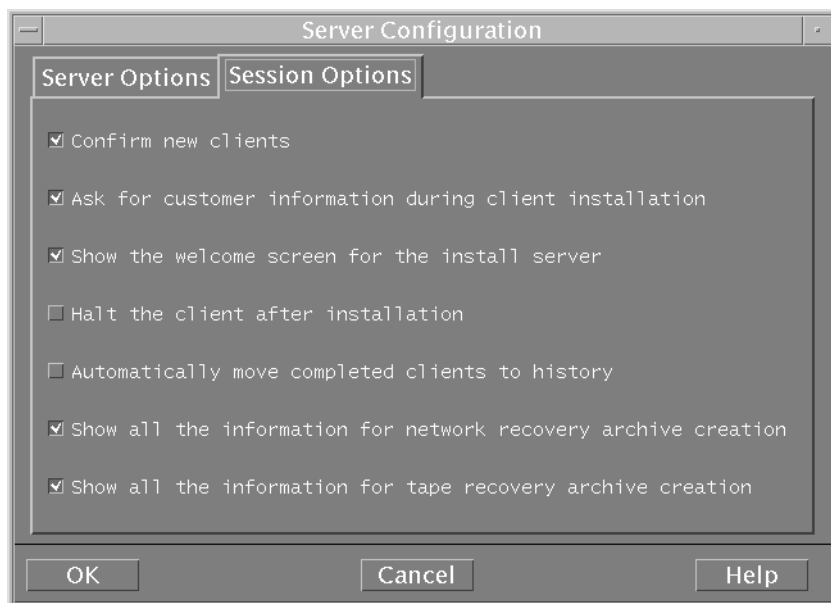
For more information about configuring DHCP, see Appendix B, “Configuring DHCP Services,” on page 327. For more information about setting up DHCP functions, addresses, and class IDs, see *setup_server* (1M) and *instl_adm* (4).

Configuring Session Options

Ignite-UX allows you to choose how client installation sessions behave. For example, you can decide whether or not to display the Welcome dialog each time you start Ignite-UX, and whether clients are halted on completion of the installation. You can accept the default settings set by Ignite-UX or you can modify them.

To configure client installation behavior from the **Session Options** tab, select **Options->Server Configuration**, then click the **Session Options** tab (Figure 3-10).

Figure 3-10 **Session Options Tab**



The options that you can configure on this tab are explained as follows:

- **Confirm new clients** - Controls whether a confirmation dialog box appears each time a new client is booted from the Ignite-UX server.

- **Ask for customer information during client installation -** Controls whether an input window appears to enable entry of customer name, system serial number, and order number. This information is stored in the `manifest.seed` file in the `/var/opt/ignite/local/manifest` directory. It is used when you are Viewing and Printing a Manifest (see page 154) by `print_manifest (1M)`. The information entered has no effect on the outcome of an installation.
- **Show the welcome screen for the install server -** Controls whether the Welcome dialog box appears. The default behavior is to display this dialog box.
- **Halt the client after installation -** Controls whether the client system is halted (rather than rebooted, the default) after installation.
- **Automatically move completed clients to history -** Controls whether completed clients are automatically added to the end of the history log, `/var/opt/ignite/clients/history/history.log`. As part of this action, client configuration and manifest files are automatically moved to the history directory on the Ignite-UX server for future reference. The client icon is removed from the GUI workspace. The client must be `COMPLETE` (fully installed) for this to take place.
- **Show all the information for network recovery image creation -** Controls the amount of information that appears during network recovery image creation and installation. The default behavior is to hide this information.
- **Show all the information for tape recovery image creation -** Controls the amount of information that appears during tape recovery image creation and installation. The default behavior is to hide this information.

Advanced Installation Topics

After you have successfully installed and configured your Ignite-UX server, you might want to explore these advanced installation topics.

Installing Minimal Ignite-UX Filesets

Depending on how you are using Ignite-UX, you may be able to reduce the disk space usage by not installing the full product. The following is a list of typical usages and a list of what parts of Ignite-UX you need:

- **Using the Ignite-UX server to install HP-UX on clients** - Install the Ignite-UX-xx-yy bundles for each HP-UX release (xx-yy) that you plan to install onto clients. You can omit the Ignite-UX.OBAM-RUN fileset if your server is HP-UX 11i (B.11.11) or later and you do not plan to use make_net_recovery for HP-UX 10.20 clients.
- **Using the Ignite-UX server to support network recovery for clients** - You need the full Ignite-UX-xx-yy bundle for each version of HP-UX your clients are running. Table 3-1 lists the Ignite-UX filesets included in PA-RISC and Itanium-based bundles.

Table 3-1 Ignite-UX Filesets

PA-RISC	Itanium-Based
Ignite-UX.BOOT-COMMON-PA	Ignite-UX.BOOT-COMMON-IA
Ignite-UX.BOOT-KRN-11-00 Ignite-UX.BOOT-KRN-11-11	Ignite-UX.BOOT-KRN-11-23
Ignite-UX.BOOT-SERVICES	Ignite-UX.BOOT-SERVICES
Ignite-UX.FILE-SRV-11-00 Ignite-UX.FILE-SRV-11-11	Ignite-UX.FILE-SRV-11-23
Ignite-UX.IGNITE	Ignite-UX.IGNITE
Ignite-UX.IGNT-ENG-A-MAN	Ignite-UX.IGNT-ENG-A-MAN
Ignite-UX.MGMT-TOOLS	Ignite-UX.MGMT-TOOLS
Ignite-UX.OBAM-RUN	Ignite-UX.OBAM-RUN
Ignite-UX.RECOVERY	Ignite-UX.RECOVERY

- **Using the `make_tape_recovery` command** - You only need the following file sets:
 - `Ignite-UX.RECOVERY`
 - `Ignite-UX.BOOT-KERNEL`
 - `Ignite-UX.FILE-SRV-release`, where the *release* is the HP-UX release identifier of the operating system you are running. For example, for HP-UX 11i v1 (B.11.11) this fileset name is `Ignite-UX.FILE-SRV-11-11`.
 - `Ignite-UX.MGMT-TOOLS`
- **Using only `make_net_recovery` on a client** - Ignite-UX typically installs the filesets a client needs from the depot created by the `pkg_rec_depot` command. The following are the only filesets required for `make_net_recovery` on the client:
 - `Ignite-UX.RECOVERY`
 - `Ignite-UX.MGMT-TOOLS`
- **Using a network boot-helper system**- It is not possible to boot or install a client on a remote subnet without a boot-helper system. Creating a boot-helper system is described in “Setting Up the Boot-Helper System” on page 342.

For all cases, you can omit the `Ignite-UX.IGNT-ENG-A-MAN` fileset if you do not want online documentation.

Use `swinstall` to install each of the Ignite-UX file sets. For more information, see *swinstall* (1M).

NOTE

If you are unsure about which filesets to install, or if you are not concerned with disk space, you should install the entire Ignite-UX product to ensure that all necessary files to ignite and recover clients are available.

To install optional applications, see “Add Optional Applications” on page 77.

Set Up or Update the Software Source

For a more complete discussion of this task, refer to the "Ignite-UX Custom Configurations Files" document, specifically the "Installation configurations using Software Distributor depots" and the "Configuration for software to be installed" sections. To access this document see the following Web page:

`http://www.docs.hp.com/en/IU/infolib.html`

This section is limited in scope and does not attempt to address fully what can become a complex task.

Ignite-UX offers many options for installing software on clients. The basic option is to install all software from SD depots on the server. This section describes how to set up the software to install on the Ignite-UX server.

If you plan to use both SD sources and non-SD sources (tar or cpio), reference the applicable section below for each source type.

For SD Software HP recommends that you copy the depots you want to use to disk rather than using the CD/DVD drives as the source for installation.

Follow these steps to make an SD source available to Ignite-UX:

- Step 1.** If you do not already have a disk depot, create one by using the `make_depots` command. For example, to create the necessary disk depot that corresponds to the HP-UX 11.11 core operating system CD/DVD that is connected at `/dev/dsk/c0t0d0`, enter:

```
make_depots -r B.11.11 -s /dev/dsk/c0t0d0
```

One or more depots are created in the `/var/opt/ignite/depots/Rel_B.11.11` directory.

- Step 2.** If you used `make_depots` as described in step 1 to create your depots, use the `make_config` command to create Ignite-UX configuration files for each of the depots you plan to use. For example:

```
make_config -r B.11.11
```

This command creates configuration files for all depots found in the `/var/opt/ignite/depots/Rel_B.11.11` directory. It also adds these configuration files to all `/var/opt/ignite/INDEX` entries for the HP-UX 11.11 release.

- Step 3.** If you did not use `make_depots` to create your depots, run `make_config` and point it at a specific depot. For example:

```
make_config -s server.com:/depot_11_11 \  
-c /var/opt/ignite/data/Rel_B.11.11/core_cfg
```

Now add a reference to the `/var/opt/ignite/INDEX` file:

```
manage_index -a -f /var/opt/ignite/data/Rel_B.11.11/core_cfg
```

For more information, see *ignite* (5).

For Non-SD Software

If the software source is not an SD depot, the `make_config` command is not applicable. You must create a unique configuration file that represents the non-SD software. An example configuration file is found here: `/opt/ignite/data/examples/noncore.cfg`

Copy this file and make edits to it as instructed in the comments contained in the file. Then use the `manage_index` command to insert a reference to your new configuration in the `/var/opt/ignite/INDEX` file. Use of configuration files is described in Chapter 5, “Installing HP-UX from the Client Console,” on page 91. For more information, see the *Installing and Updating Ignite-UX* White Paper, available on the “Information Library” page of the Ignite-UX Web site at

<http://www.docs.hp.com/en/IUX/infolib.html>

Add Optional Applications

If you have other SD-packaged software that you want to install onto clients, and you want to make the software available for selection in the Ignite-UX interface, run the `make_config` and `manage_index` commands on those depots.

IMPORTANT

Inclusion of multiple versions of Veritas Volume Manager from Symantec (VxVM) in the same installation depot, or in separate depots that are used together in a single cold-installation session, is not supported. Doing so generates errors when attempting to use the installation depot, or during reboot when using non-SD depots. For more information, see “Considerations When Using Veritas Volume Manager from Symantec” on page 239.

For SD Application Software Run the following commands for each depot from which you plan to install SD software during the installation. The `make_config` command only handles SD software that is packaged in bundle form. All software supplied by HP is packaged in this form. For more information about making SD bundles in an SD depot, see *make_bundles* (1M).

To make compiler depot bundles available, as `root` enter the following commands:

```
/opt/ignite/bin/make_config \  
-s [server.corp.com:] /depots/compiler \  
-c /var/opt/ignite/data/Rel_B.11.11/compilers_cfg
```

```
/opt/ignite/bin/manage_index \  
-a -f /var/opt/ignite/data/Rel_B.11.11/compilers_cfg
```

Replace the depot server name (in this example *server.corp.com*) with the server from which you plan to install SD software. You can omit the server name to use the server where this command is being executed. The depot server can be a different system from the Ignite-UX server.

TIP

You must rerun the `make_config` command each time you add or modify software in the depot. Be aware that if you customize any configuration file created by `make_config`, your customizations are lost when you re-create it with `make_config`.

The `make_config` command constructs Ignite-UX configuration files that correspond to SD depots. When an SD depot is used as part of the Ignite-UX process, it must have a configuration file that describes the contents of the depot to Ignite-UX. This command can automatically construct such a configuration file when it is given the name of an SD depot target. Run this command when you add or change a depot that is to be used by Ignite-UX.

The `manage_index` utility manipulates the stanzas containing configuration file information in `/var/opt/ignite/INDEX` file. This utility is primarily started by other Ignite-UX tools but can also be started directly. For more information, see *manage_index* (1M).

**For Non-SD
Application
Software**

If the source is not an SD depot, the `make_config` command is not applicable. You must create a unique configuration file that references the non-SD software. Refer to the sample configuration file (`/opt/ignite/data/Rel_release/examples/noncore.cfg`), which illustrates a noncore archive.

NOTE

Do not attempt to use golden images (such as layered applications) that contain files that get installed in `/var/adm/sw/*`. Delivering files to this directory in this method can corrupt the SD database.

- Step 1.** Copy the `non_core.cfg` file to `/var/opt/ignite/data/Rel_B.11.11/configx`, then make the changes to `configx` in that directory.
- Step 2.** After editing `configx`, use `manage_index` to insert a reference to `configx` in `/var/opt/ignite/INDEX`.

Creating a Server for Network Booting Anonymous Clients

This chapter describes how to configure your server to network boot and install HP-UX on anonymous clients. The following topics are discussed in this chapter:

- Overview of Anonymous Clients (see page 82)
- Configuring a Server to Boot Anonymous PA-RISC Clients (see page 83)
- Considerations For Booting Anonymous Itanium-Based Clients (see page 84)

Overview of Anonymous Clients

When booting registered PA-RISC clients, the clients' IP addresses and LLAs were entered in the `/etc/opt/ignite/instl_boottab` file. If the clients were Itanium®-based, they were registered in the `/etc/bootptab` file.

An anonymous client can be booted from an Ignite-UX server without an IP address previously mapped to its LLA. Anonymous clients boot using an IP address provided by the server.

Using anonymous client booting on a network is useful when you have many different systems that must be booted, installed, or recovered. It relieves you from the task of configuring for each specific system and eliminates the errors inherent in typing IP addresses and LLAs. Such an error could cause IP addresses to be accidentally assigned to more than one computer at a time.

The `/etc/opt/ignite/instl_boottab` file is used to provide PA-RISC systems with anonymous client booting. Within the `instl_boottab` file there are IP addresses not assigned to any LLA, and so are available to lease to requesting anonymous clients.

Itanium-based clients use DHCP to boot anonymously.

Configuring a Server to Boot Anonymous PA-RISC Clients

Using the Server Setup Wizard

If you know you want to use anonymous client boot when you start up your Ignite-UX server, you can set it up that way using the Server Setup Wizard.

Start Ignite-UX and the Server Setup Wizard as described in “Configuring the Ignite-UX Server for PA-RISC Clients” on page 56 until you get to the Configure Booting IP Addresses dialog box as shown in Figure 3-5 on page 60.

Enter individual or a range of valid IP addresses. Instead of entering an LLA in the **reserved for: 0x** box, leave it blank. When the `instl_bootd` daemon requests an IP address for your anonymous PA-RISC client to boot from, it will be given an IP address not registered with any specific LLA.

Considerations For Booting Anonymous Itanium-Based Clients

Understanding PXE Booting of Itanium-based Systems

When an Itanium-based system boots over the network, it sends out a PXE boot request. The PXE protocol is built on top of DHCP. This can cause confusion if there is more than one DHCP server configured to respond to PXE boot requests.

It is not possible for an Itanium-based system to specify the server from which to accept boot services. In other words, there is not an Itanium-based equivalent for the PA-RISC boot command, `boot lan.192.10.10.10 install`, which causes the system to ignore any response except from the IP address 192.10.10.10. This functionality is known as server selection.

The Itanium-based system sends out the PXE boot request and it tries to boot from the first PXE response it gets. If no PXE responses are received within a certain time, the system uses the first DHCP response it gets. If any of these responses are inadequate for network booting, the PXE boot attempt fails and an error message is displayed on the console of the requesting system. The information displayed with PXE errors is usually not explicit enough to determine the cause of the problem (see “Common Network Booting Errors” on page 324).

For any network where there will be PXE boot requests from Itanium-based systems, only DHCP servers that can supply enough information for a successful boot should be configured to respond. If you have a DHCP server that responds to every DHCP request, regardless of whether it is a PXE request or not, it almost definitely interferes with PXE boot requests from Itanium-based servers. The boot request fails when a normal DHCP response is received in response to a PXE boot request.

In addition to boot failure, the inability to select a boot server can lead to installation of the wrong operating system. Having PXE servers that respond with different boot content on the same network can cause confusion. For example, if there is a system supporting Linux boot and a

system supporting HP-UX boot on the same network, they can each send a response to a PXE boot request, and the first server to respond will be used. It is not predictable which server would be used for boot.

Interference with a PXE request from a DHCP server is a configuration issue on the DHCP server side. This issue is not specific to HP-UX or Ignite-UX, but rather is related to the way firmware performs a PXE boot.

IMPORTANT

When you configure DHCP servers, make sure there is only one DHCP server on the network that is configured to respond to Itanium-based system PXE boot requests, and that the server is running HP-UX if you want to install HP-UX.

Once Ignite-UX starts running, a DHCP request will be used to obtain an IP address used for install or recovery if needed. Ignite-UX can be configured to specify a class-id for this request.

For more information see Appendix B, “Configuring DHCP Services”, and *bootpd* (1M).

HP-UX 11i v2 Ignite-UX Server and Boot-Helper Setup

HP-UX 11i v2 supports `dhcp_device_group` options that improve anonymous client DHCP booting for Itanium-based clients. The two configuration keywords `re` and `ncid` are used in a DHCP device pool group for this purpose.

Make sure that at a minimum, HP-UX 11i v2 is installed on your Ignite-UX server or boot-helper system.

Add your device pool group entry to the `/etc/dhcptab` file on your Ignite-UX server or boot-helper system.

You should not need to restart `bootpd` if it is already running. When a new `bootp` DHCP request is received, `bootp` checks to see whether it must reread any configuration files. If you want to force `bootp` to reread the configuration file, send it the `SIGHUP` signal.

The following example DHCP device group is the best way to support anonymous Itanium-based clients:

Creating a Server for Network Booting Anonymous Clients

Considerations For Booting Anonymous Itanium-Based Clients

```
dhcp_device_group:\
  re:\
  ncid:\
  class-id="PXEClient:Arch:00002:.*":\
  lease-time=300:\
  subnet-mask=255.255.255.0:\
  addr-pool-start-address=192.168.1.10:\
  addr-pool-last-address=192.168.1.20:\
  bf=/opt/ignite/boot/nbp.efi
```

The options in the `dhcp_device_group` stanza are:

`dhcp_device_group`

Starts a DHCP device pool group for allocating a range of IP addresses to assign to clients with a matching `class-id` in their boot requests.

`re`

A binary option that sets regular expression matching on the `class-id` rather than a default literal match. This is a new option for HP-UX 11i v2.

`ncid`

A binary option that sets removal of the `class-id` from message responses. Since `bootpd` does not support the full Intel Preboot Execution Environment (PXE) protocol, it must not send back a `class-id` in the response. This is a new option for HP-UX 11i v2.

`class-id`

Different kinds of systems may make PXE boot requests. For example, Itanium-based systems and industry standard servers such as HP ProLiant servers may each make a PXE boot request. It is unlikely the same configuration could be used for these different requests. The `class-id` may be used to respond to PXE requests from the correct clients, while ignoring the wrong ones.

All Itanium-based servers send a 32-character PXE boot request in the following format:

```
PXEClient:Arch:00002:UNDI:xxxyyy
```

where `xxxyyy` are major and minor numbers for the Universal Network Device Interface revision.

An industry standard server, such as an HP ProLiant server, sends a PXE boot request in this format:

```
PXEClient:Arch:00000:UNDI:xxxxyy
```

where `xxxxyy` are the same as described above.

The `class_id` in the `dhcp_device_group` example above tells the `bootpd` daemon to respond only to clients with a boot request containing

```
PXEClient:Arch:00002
```

 followed by zero or more of any character. Requests from industry standard servers are ignored.

A DHCP server or boot-helper system configured to respond to any DHCP boot request containing `PXEClient` will respond to both Itanium-based servers and industry standard servers. A PXE response suitable for an industry standard server is unlikely to allow an Itanium-based system to boot.

`lease-time`

How long in seconds the IP address may be used to boot a system. The example value is 300 seconds (5 minutes) but you may need more time if your network is a busy one. Booting on high-traffic networks may take 10 or 15 minutes since the install kernel and file system must be downloaded. The problem with increasing the `lease-time` is the possibility of running out of IP addresses to use for booting. If you increase this number, make sure you have enough IP addresses in the pool to accommodate systems that might boot simultaneously.

`subnet-mask`

The subnet mask used by clients.

`addr-pool-start-address`

The first IP address for this address pool.

`addr-pool-last-address`

The last IP address for this address pool.

IMPORTANT

The use of the `ncid` option is critical because it instructs the DHCP server to exclude the DHCP `class-id` in the response to the client's boot request. If a DHCP server responds to a PXE boot request with the DHCP `class-id` in the response, the booting PXE client attempts to communicate with a PXE proxy server on the same host. Since HP-UX does not supply a PXE proxy server, the boot fails. The `ncid` option resolves this issue.

With the device pool group added to the `/etc/dhcptab` file, your HP-UX 11i v2 Ignite-UX server is now configured to respond to anonymous Itanium-based clients.

IMPORTANT

The server that sends the response to the PXE boot request is the system that the PXE client will attempt to `tftp` the boot file from. If you are not using an HP-UX system to reply to an Itanium-based PXE request, you must make the required boot files available and current with new releases of Ignite-UX. HP does not provide support for this kind of configuration.

Isolating Ignite-UX From Noncontrollable DHCP Systems

If you have DHCP servers on your network that you have no control over, it is possible to completely isolate Ignite-UX from them. This is done by adding a `class-id` to the `dhcp_class_id` keyword in the install file system. See *instl_adm* (1M) and *instl_adm* (4) for additional information.

When the network boot process completes and the install kernel is running, Ignite-UX will use DHCP again to obtain an IP address. This is done because Ignite-UX has no way to determine the IP address used by firmware. You can use this behavior to isolate DHCP requests from systems that boot and install HP-UX from other DHCP server requests.

If you are running HP-UX 11i v2 and have configured a DHCP device group for Itanium-based server PXE requests, you can reuse this device group for isolation purposes. If you added the following into the install file system:


```
dhcp_class_id="IgniteDHCPDeviceGroup",
```

you can change that `dhcp_class_id` entry to read:

```
dhcp_class_id="PXECient:Arch00002:.*|IgniteDHCPDeviceGroup"
```

Since regular expression matching is used, `|` means "or" and allows response to an incoming `class-id` that matches either expression. This example entry would support responding to the initial Itanium-based system boot request as well as subsequent DHCP requests during Ignite-UX operation.

The DHCP servers that respond to any DHCP `class-id` must be reconfigured or isolated to a different subnet.

Replacing `bootpd` with `instl_bootd`

If your Itanium-based system is not running DHCP services, replacing the daemon `bootpd` with the daemon `instl_bootd` allows network booting for registered and anonymous clients, and both Itanium-based and PA-RISC clients. See Figure 2-6, "Decision Tree for Network Booting Itanium-Based Systems," on page 45 and the subsequent discussions for more information.

IMPORTANT

Do not replace `bootpd` with `instl_bootd` if your server is currently providing DHCP services. This procedure configures your Ignite-UX server to run `instl_bootd` instead of `bootpd`. Performing the steps in the following section will prevent the system from providing DHCP services.

Using `instl_bootd` on an Ignite-UX server requires that the `bootpd` daemon is not running on the server. The `instl_bootd` daemon responds to all boot requests from clients. The `instl_bootd` daemon normally runs on a set of unique network ports, 1067/1068, which are used only for booting PA-RISC clients. However, in this implementation, the `instl_bootd` runs on the standard `bootpd` ports, 67/68.

If you are running `bootp` with DHCP on your network, do *not* perform these steps. The `instl_bootd` daemon will answer DHCP requests as if the system were requesting a network boot. Consider other alternatives if you have `bootp` with DHCP running on your network.

Follow these steps to configure your Ignite-UX server to run `instl_bootd` as a replacement for `bootpd`:

- Step 1.** After you have set up your Ignite-UX server, ensure that `bootpd` is disabled on ports 67/68 by commenting out the following line in the `/etc/inetd.conf` file:

```
bootps dgram udp wait root /usr/lbin/bootpd bootpd
```

- Step 2.** Enable the `instl_bootd` daemon on ports 67/68 by adding the following line to `/etc/inetd.conf`:

```
bootps dgram udp wait root /opt/ignite/lbin/instl_bootd \  
instl_bootd
```

- Step 3.** Restart the Internet daemon, `inetd`, to implement the port changes made in step 2:

```
/usr/sbin/inetd -c
```

Your Ignite-UX server is now configured to respond to anonymous clients. For more information, see *instl_bootd* (1M) and *inetd* (1M).

5 **Installing HP-UX from the Client Console**

You can install the HP-UX operating system on a client by installing the software from the Ignite-UX server GUI or in terminal user interface (TUI) mode, as explained in this chapter.

This chapter discusses the steps for installing HP-UX on clients from the client console. Topics discussed are:

- Preparing Clients for Installation (see page 92)
- Noninteractive Installation Using `bootsys` (see page 94)
- Igniting PA-Based Clients from the Console (see page 96)
- Igniting Itanium-Based Clients using the Network (see page 98)
- Managing Speed and Duplexing of LAN Interfaces Executing Network Boots (see page 102)

Preparing Clients for Installation

Begin preparing your clients for installation of HP-UX by ensuring that the following criteria is met:

- Be currently booted under HP-UX 11.00 or later.
- Be accessible on the network.
- Have enough disk space in the `/stand` directory to hold these files:

```
/opt/ignite/boot/Rel_release/INSTALL  
/opt/ignite/boot/Rel_release/INSTALLFS
```

For V-class PA-RISC clients the files are:

```
/opt/ignite/boot/Rel_release/VINSTALL  
/opt/ignite/boot/Rel_release/VINSTALLFS
```

For other 64-bit PA-RISC clients the files are:

```
/opt/ignite/boot/Rel_release/WINSTALL  
/opt/ignite/boot/Rel_release/WINSTALLFS
```

For Itanium-based clients the files are:

```
/opt/ignite/boot/Rel_release/IINSTALL  
/opt/ignite/boot/Rel_release/IINSTALLFS
```

Boot each client system that supports network boot either by entering the appropriate command (explained in the following pages) or by using the Ignite-UX GUI. If a client with a known IP address is already running HP-UX, you can use the `bootsys` command (see “Noninteractive Installation Using `bootsys`” on page 94) from the Ignite-UX server to install a specific configuration without further interaction.

TIP

To interrupt the boot process on any HP server or workstation, press **Esc** on the given system.

The next section provides a brief review of the manual boot process. Boot ROM commands for manual booting are explained in the installation guide for each version of HP-UX.

If the client cannot find an Ignite-UX server to boot from, check these items:

- The client is on the same subnet as the Ignite-UX server.
- Investigate `instl_bootd` errors in `/var/adm/syslog/syslog.log`.
- In the `/var/adm/inetd.sec` file, ensure that if the service `instl_boots` exists, that the IP address `0.0.0.0` is allowed (or not denied). The entry should look like:

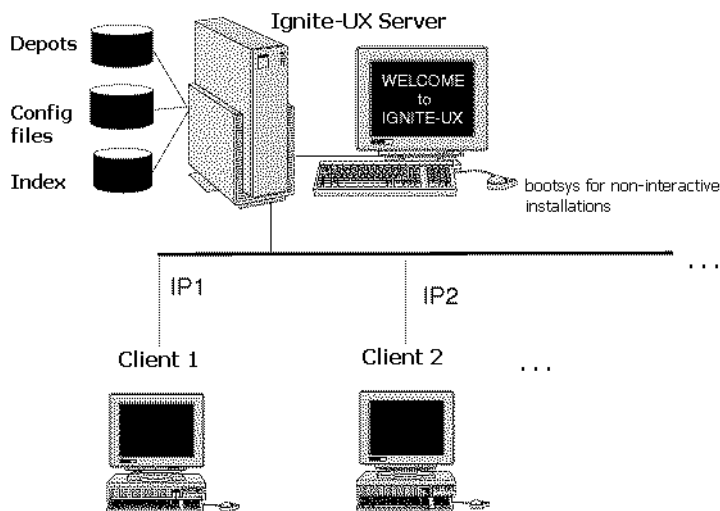
```
instl_boots allow 0.0.0.0
```
- If `/etc/services` comes from NIS, make sure that the NIS server has `instl_boot*` entries.

All clients booted from the Ignite-UX server should now appear in the Ignite-UX GUI on the server. If the Ignite-UX server has not been set up completely, or if the client cannot obtain enough networking parameters using DHCP, then the client may require interaction from the GUI on the Ignite-UX server.

Noninteractive Installation Using `bootsys`

You can use `bootsys` to start a noninteractive system installation on one or more clients without logging onto the client system, as illustrated in Figure 5-1.

Figure 5-1 Noninteractive Installation Using the `bootsys` Command



You can invoke `bootsys` from the command line interface (CLI), or from the Ignite-UX GUI (see “Installing from the Ignite-UX Server” on page 110).

The `bootsys` command copies the Ignite-UX kernel and RAM file system from the Ignite-UX server to each client and then sets the system `AUTO` file in the LIF area of the root disk to automatically boot from this kernel at the next system reboot.

WARNING

The `bootsys` command does not support network interfaces that are grouped using HP Auto Port Aggregation (APA). You must not select an APA group as the interface through which Ignite-UX will communicate with the Ignite-UX server. In these cases select an interface outside the APA group, or break the APA group and use a single ungrouped interface with `bootsys` (this may require reconfiguring the switch the APA group is connected to.)

Examples

This sample command boots the client system from the Ignite-UX server, `boot1`, and waits for installation instructions from this server:

```
bootsys -R release -w boot1
```

where `release` is the release that you want to install on the client. For example, `B.11.23`.

If you have already run an installation session from the Ignite-UX server, issuing `bootsys` without the `-w` option results in automatic installation without further intervention.

To automatically install `client1` using a different IP address than what is currently assigned and without waiting for Ignite-UX server interaction, use this command:

```
bootsys -a client1:10.2.3.45
```

More information...

For more information, see *bootsys* (1M). Common problems using `bootsys` with Ignite-UX are covered in Appendix A, “Troubleshooting,” on page 309.

TIP

To prevent a critical client from being inadvertently booted using `bootsys`, create the file, `/.bootsys_block`, on the client. For example, you can create this file with:

```
touch /.bootsys_block
```

Igniting PA-Based Clients from the Console

This section describes how to install HP-UX on PA-RISC clients from the client console using an Ignite-UX server.

If you need further help with the boot process, enter:

```
BOOT ADMIN> help boot
```

IMPORTANT

Any data on the client, including the operating system, is removed entirely as part of this installation process.

- Step 1.** Obtain the IP address of the Ignite-UX server you intend to use.
- Step 2.** Cycle the power (perform a cold reset) on the client to bring it to a known state.

NOTE

If you have the AUTOBOOT flag set, you will have to interrupt the boot sequence by pressing **Esc** when the **Processor Dependent Code (PDC)** offers the opportunity with this message:

To stop selection process, press and hold ESCAPE key.

For detailed information regarding the boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*.

During the boot sequence, status messages are displayed on the client console. Depending on the type of machine, server or workstation model, a boot administration menu and/or firmware prompt may appear.

- Step 3.** Boot the client using your Ignite-UX server's IP address by entering this command at the client console:

```
firmware prompt> boot lan.n.n.n.n install
```

where: *n.n.n.n* is the IP address of the Ignite-UX server.

The client then begins to install the installation kernel (or ignite the client) from the network server. This should take approximately 5 minutes.

TIP

To search for Ignite-UX servers, enter the following at the client console (workstations only):

```
firmware prompt> search lan install
```

The list of servers that you can boot the client from is displayed with the corresponding IP addresses and is similar to:

```
Searching for potential boot devices(s)... on Path LAN
This may take several minutes.
```

To discontinue search, press any key (termination may not be immediate).

Path Number	Device Path	Device Type
-----	-----	-----
P0	LAN.15.1.46.117.3.254	lp2 100/Full Dx
P1	LAN.15.1.41.70.3.254	lp4 100/Full D

You may need to run the `nslookup` command on another running system to determine which address corresponds to your Ignite-UX server.

Step 4. When an Ignite-UX server responds, the installation begins with the following query:

```
hpux KernelPrompt "Choose Operating System to Install :"
```

1. target OS is B.11.00
2. target OS is B.11.11
3. target OS is B.11.23 PA
4. Exit

```
Choose Operating System to Install :
```

Select the operating system version that you want to install on the client by typing the appropriate number, and then press **Enter** to continue the installation.

Igniting Itanium-Based Clients using the Network

This section describes how to install HP-UX on Itanium-based clients from the network using an Ignite-UX server and the Ignite-UX TUI.

- Step 1.** Cycle the power (perform a cold reset) on the client to bring it to a known state.

NOTE

If you have the `AUTOBOOT` flag set, you must interrupt the boot sequence by pressing **Esc** when the Processor Dependent Code offers the opportunity with this message:

```
Press Any Key to interrupt Autoboot
```

Next, you will need to enter **exit** at the prompt to invoke the **Extensible Firmware Interface** (EFI) Boot Manager menu.

For detailed information regarding the boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* and the hardware documentation for your system.

During the boot sequence, status messages are displayed on the client console. Depending on what type of machine, server or workstation model, the EFI Boot Manager menu appears and looks similar to:

```
EFI Boot Manager ver 1.10 [14.60]
```

```
Please select a boot option
```

```
HP-UX Primary Boot: 0/2/2/0.0.0.0  
EFI Shell [Built-in]  
Boot option maintenance menu  
Security/Password Menu
```

```
Use ^ and v to change option(s). Use Enter to select an option
```

TIP

On some machines, the up-arrow and down-arrow keys may not work. If this is the case, you can use **Shift-6** (^) for up and **v** for down.

- Step 2.** Select **Boot option maintenance menu** using the up and down arrows, which advances you to the EFI Boot Maintenance Manager Main Menu, similar to the following example:

```
EFI Boot Maintenance Manager ver 1.10 [14.60]

Main Menu. Select an Operation

    Boot from a File
    Add a Boot Option
    Delete Boot Option(s)
    Change Boot Order

    Manage BootNext setting
    Set Auto Boot TimeOut

    Select Active Console Output Devices
    Select Active Console Input Devices
    Select Active Standard Error Devices

    Cold Reset
    Exit
```

- Step 3.** Select **Add a Boot Option**.

```
EFI Boot Maintenance Manager ver 1.10 [14.60]

Add a Boot Option. Select a Volume

    Removable Media Boot[Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)]
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E1E4ED4)]
    Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E1E3ED6)]
    Exit
```

- Step 4.** Select the appropriate network interface so that this network boot loads the appropriate file. For example, look for entries identified with a Media Access Control (Mac) address (or link-level address [LLA]) as in this example.

```
Device Path Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E1E4ED4)
Boot0001: Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4A134B)
Edit Existing Boot Option or make a new entry [E-Edit N-New]:
```

- Step 5.** Press **N** to add the new boot option.

- Step 6.** Enter a brief, descriptive boot option name at the message prompt. In this example, the new boot option is named LAN1.

```
Enter New Description:
```

Step 7. Enter a brief description for this boot option.

```
New BootOption Data. ASCII/Unicode strings only, with max of 240
characters
```

```
Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption] :
```

Step 8. Enter the data type of this boot option.

```
Save changes to NVRAM [Y-Yes N-No]:
```

Step 9. Press **Y** to save the new boot option.

```
EFI Boot Maintenance Manager ver 1.10 [14.60]
```

```
Add a Boot Option.  Select a Volume
```

```
LAN1 [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E1E4ED4)]
Removable Media Boot[Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)]
Load File [EFI Shell [Built-in]]
Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E1E4ED4)]
Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E1E3ED6)]
Exit
```

NOTE

The boot option name, description, and data type information can be modified using the Edit operation in a manner similar to the New operation as described in this procedure.

Step 10. Exit to the EFI Boot Manager menu taking care not to select a boot option, as you will be forced to re-enter the information for the selected option.

The new boot option should appear in the EFI Boot Manager main menu.

```
EFI Boot Manager ver 1.10 [14.60]
```

```
Please select a boot option
```

```
HP-UX Primary Boot: 0/2/2/0.0.0.0
LAN1
EFI Shell [Built-in]
Boot option maintenance menu
Security/Password Menu
```

```
Use ^ and v to change option(s). Use Enter to select an option
```

Step 11. Select the new boot option, LAN1 in this case, from the list and press **Enter**.

The following is an example of a successful network boot using the new LAN1 boot option, which ignites the client:

```
Loading.: LAN1
Running LoadFile()

CLIENT IP: 10.1.52.128  MASK: 255.255.248.  DHCP IP: 10.1.53.37
GATEWAY IP: 10.1.48.1
Running LoadFile()

Starting: LAN1

@(#) HP-UX IA64 Network Bootstrap Program Revision 1.0
Downloading HPUX bootloader
Starting HPUX bootloader
Downloading file fpswa.efi (371200 bytes)

(c) Copyright 1990-2001, Hewlett Packard Company.
All rights reserved

HP-UX Boot Loader for IA64  Revision 1.671

Booting from Lan
Downloading file AUTO (528 bytes)
Press Any Key to interrupt Autoboot
AUTO ==> boot IINSTALL
Seconds left till autoboot - 0
AUTOBOOTING...
```

Managing Speed and Duplexing of LAN Interfaces Executing Network Boots

The default behavior of the kernel at boot up is to automatically negotiate the speed and duplex settings of all LAN interfaces that support this feature. This default behavior is later modified in HP-UX by startup scripts that can set any speed and duplex rather than allow the LAN interface to automatically negotiate these settings.

When you use an installation kernel with Ignite-UX to install or recover a system, there are no startup scripts. If a Fast or Gigabit Ethernet LAN interface fails to autonegotiate, it defaults to 100 Half-Duplex regardless of the speed and duplex settings at the other end. Mismatched speed and duplex settings can cause serious performance and reliability issues when using Ignite-UX.

You can adjust the speed and duplex settings when using Ignite-UX with the `_hp_lanadmin_args` variable. The LAN interface Ignite-UX uses must be brought up before the Ignite-UX server can be contacted so this keyword serves no purpose if it is located in the normal configuration files used by Ignite-UX. In view of this, `_hp_lanadmin_args` must be configured in the installation file system on the server that it boots from. If the client boots using a boot helper, `_hp_lanadmin_args` must be configured on the boot helper system not the Ignite-UX server.

NOTE

In a default setting, modern switches and hubs will autonegotiate the speed and duplex settings with your PA-RISC or Itanium-based system. However, in some cases you may want to set the speed and duplex settings to certain values for your environment. For example, the switch may always fail to autonegotiate with your system. If you do not use autonegotiation on the switch or hub that your system is connected to, you must provide the correct speed and duplex settings for Ignite-UX using `_hp_lanadmin_args`. Mismatched speed and duplex settings may cause significant performance issues or failures during recovery.

Almost all Fast and Gigabit Ethernet interfaces support setting the speed and duplex using the `_hp_lanadmin_args` variable for the `-x` option. Some old Fast Ethernet interfaces may not support full-duplex so

Managing Speed and Duplexing of LAN Interfaces Executing Network Boots

please consult the product documentation for any network interfaces you encounter problems with to confirm the speed and duplex settings that each supports.

You can still take advantage of the other options available using the `lanadmin` command. For more information, see the examples in `instl_adm` (4) regarding setting the MTU (`-M`) and Duplex (`-S`) options of `_hp_lanadmin_args`.

IMPORTANT

Due to a problem in Ignite-UX in versions prior to B.5.2.x, some parts of the recovery may run with the wrong speed and/or duplex on the LAN interface when the system first reboots and until the final reboot. If this proves to be a problem in your environment, you should ensure that you have installed Ignite-UX version B.5.2.x or later.

Examples

Following are two examples of how to set the duplex in differing situations.

Setting 100 Full Duplex

If you want all Fast Ethernet LAN interfaces to run at 100 Full Duplex, this would cause some immediate problems for Ignite-UX because of the duplex mismatches created. To correct the mismatches, you would add the following code to the installation file system to extract, update, and replace the current configuration in the installation file system:

```
instl_adm -d > /tmp/cfg.tmp
```

Edit the file and add the following:

```
vi /tmp/cfg.tmp
```

Add the following stanza:

```
( lan[].driver == "btlan" )
{
    _hp_lanadmin_args="-X 100FD"
}
```

Add this configuration stanza to `[W|V|I]INSTALLFS`:

```
instl_adm -f /tmp/cfg.tmp
```

Managing Speed and Duplexing of LAN Interfaces Executing Network Boots

You can then review the current contents of the configuration in the installation file system with the `inslt_admin -d` and the output is similar to this example:

```
( lan[].driver == "btlan" )
{
    _hp_lanadmin_args="-X 100FD"
}
env_vars += "TZ=EST-10EDT"
```

NOTE

You should ensure that the driver name used matches the name used in the HP-UX revision that the installation kernel runs, not the HP-UX revision being installed or recovered. In the previous example `btlan` is used as the driver name. As of Ignite-UX version B.3.0.x and forward, the 32-bit PA-RISC installation kernel is based upon HP-UX 11i v1. HP-UX 11i v1 uses a unified Fast Ethernet driver, and HP-UX 11.00 uses separate drivers for Fast Ethernet interfaces. In view of this, even when you are installing HP-UX 11.00 you must use the HP-UX 11i v1 driver names (not the HP-UX 11.00 driver names) in the configuration.

Setting Mixed Interface Types

In more complex environments, particularly those with mixed interface types, it is possible to be more complex in setting `_hp_lanadmin_args`. In this example, a default is set for `_hp_lanadmin_args` and a specific setting is defined for Gigabit Ethernet interfaces:

```
( lan[].driver == "btlan" | lan[].driver == "gelan" )
{
    _hp_lanadmin_args="-X 100FD"
} else {
    ( lan.driver == "igelan" )
    {
        _hp_lanadmin_args="-X 1000FD"
    }
}
```

This ensures that if the driver used to control the LAN interface being used is `btlan` or `gelan` it is changed to 100 Full Duplex, and if the driver is `igelan` the interface is set to 1000 Full Duplex.

Managing Speed and Duplexing of LAN Interfaces Executing Network Boots

Alternatively, if you want all Fast and Gigabit Ethernet interfaces to set to 100 Full Duplex you could use the following:

```
( lan[].driver == "btlan" | lan[].driver ~ "gelan" )
{
    _hp_lanadmin_args="-X 100FD"
}
```

The ~ (tilde) operator performs an extended regular expression match. You should exercise care with extended regular expressions to prevent false matches. For more information regarding regular expressions, see *regex* (5).

The `grep` command can be used from the command line to test extended regular expressions against different input. For more information, see *grep* (1).

Installing HP-UX from the Client Console

Managing Speed and Duplexing of LAN Interfaces Executing Network Boots

6 **Installing HP-UX on Clients from the Server**

This chapter discusses the steps for the manual installation of HP-UX on client systems from an Ignite-UX server. The topics discussed are:

- Methods of Installing Client Systems (see page 108)
- Installing from the Ignite-UX Server (see page 110)
- Configuring the Installation (see page 114)
- Executing the Installation: Go! (see page 151)
- Viewing and Printing a Manifest (see page 154)

Methods of Installing Client Systems

Ignite-UX enables you to install client systems manually from the Ignite-UX GUI, as explained in this chapter, or automatically, as explained in Chapter 9. You can also install clients from a remote system by using `bootsys`, or install the client locally using an operating system obtained from an Ignite-UX server, as explained in Chapter 5.

Each installation method requires a configuration (config) file, as explained in Chapter 8. The configuration can include any supported HP-UX 11.00, 11i v1, or 11i v2 or higher operating system, plus any required patches and applications.

This chapter describes installing from the Ignite-UX server, either using the Ignite-UX GUI or remotely using the `bootsys` command.

Begin your installation process with “Preparing Clients for Installation” on page 92.

Supported Peripherals

In general, if a disk device is visible, it is supported for installation. At times you may need new firmware to support a new device or host bus adapter (HBA). Ensure that the client’s firmware supports the device or HBA for boot. For example, Ultra 160 interfaces on an HP Integrity rp8400 server require a firmware update to support booting.

Additionally, Fibre Channel, tape devices, and LAN cards are also supported.

You can install disk arrays using HP-UX, but the installation tasks do not support configuring an array. The disk array must be configured first; see your array documentation for configuration instructions.

The Ignite-UX client-side operating system installation tools support VT100 and Wyse 60 terminals, compatible emulations, and all HP terminals. Additional information regarding how to navigate within the Ignite-UX GUI with the keyboard is found in Appendix D, “Terminal Keyboard Shortcuts,” on page 345.

Network Requirements

Only one LAN interface can be used during installation, configured in the Ignite-UX GUI, or handled automatically by `bootsys`. If a client has multiple LAN interfaces, you can select the one that is configured on the correct network by using the **Additional Interfaces...** button on the System tab (see “System Tab” on page 126).

In addition, you need to consider the following:

- If you plan to perform a network boot for a client, then the Ignite-UX server must be on the same subnet as the client that will be installed.
- If you have more than one LAN connection, you must select the one to be used for the installation process.
- If you want to use a more advanced method, you can implement a boot-helper system on each subnet from which to boot clients. See Appendix C, “Using a Boot-Helper System,” on page 341 for more information, or use the `bootsys` or `make_boot_tape` commands.
- If you use `bootsys` to boot the system, you cannot select an interface that is part of an HP Auto Port Aggregation (APA) group. The `bootsys` command does not support interfaces that are part of an APA group. See “Noninteractive Installation Using `bootsys`” on page 94 for more information.

TIP

Normally, you can only use the Ethernet interface for booting and only depend on the built-in Ethernet interface on the primary I/O interface being bootable. Other LAN interfaces may not have boot support so you might consider booting from media (CD, DVD, or tape) devices, and then contact an Ignite-UX server over these other network interfaces.

Installing from the Ignite-UX Server

Starting Ignite-UX If you have not already done so, run Ignite-UX on the server as root:

```
/opt/ignite/bin/ignite
```

Running Ignite-UX on the server is explained in the following procedures as is using the GUI shown in Figure 6-1. Running Ignite-UX remotely from a client or other system provides a terminal user interface (TUI) with equivalent keyboard navigation.

Figure 6-1 Ignite-UX Graphical User Interface (GUI)



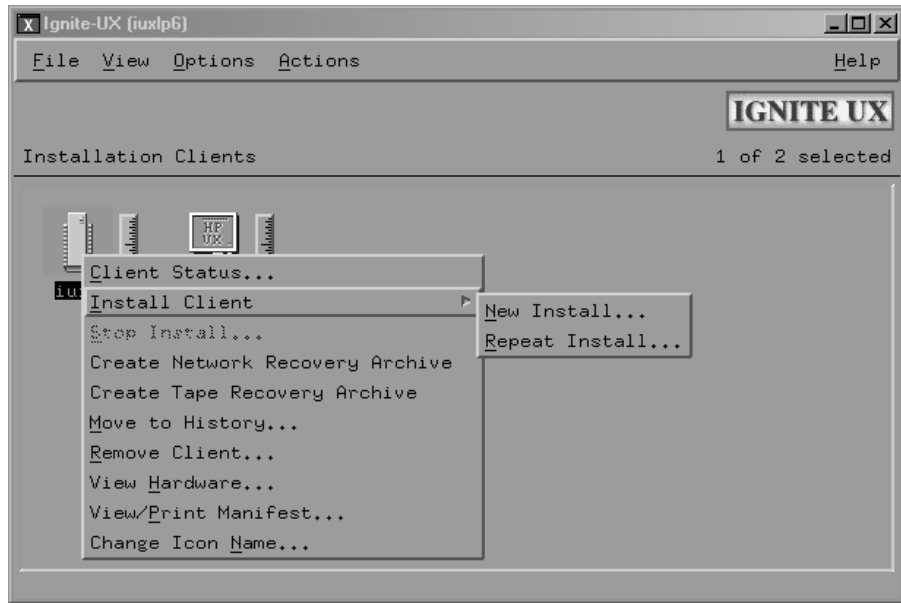
Clients are represented in the Ignite-UX GUI once they are added to the Ignite-UX server in one of two ways:

- By booting a client that is already running an operating system. You can do this remotely using the Ignite-UX server from the Actions menu by selecting **Boot Client**. For detailed information, see “Booting a Client” on page 111.
- By adding a client, previously configured with an operating system, for the purpose of creating a recovery archive. You can do this from the Actions menu by selecting **Add New Client for Recovery**. For detailed information, see “Adding Clients for Recovery” on page 265.

When clients display, you can:

- Click a client icon to select it for further actions.
- Double-click the client icon to get a Client Status dialog box.
- Right-click the selected client icon to activate a context-sensitive Actions menu, as illustrated in Figure 6-2.

Figure 6-2 Client Context-Sensitive Actions Menu



For more about the available Ignite-UX selections, see Chapter 5, “Installing HP-UX from the Client Console,” on page 91 or click **Help**.

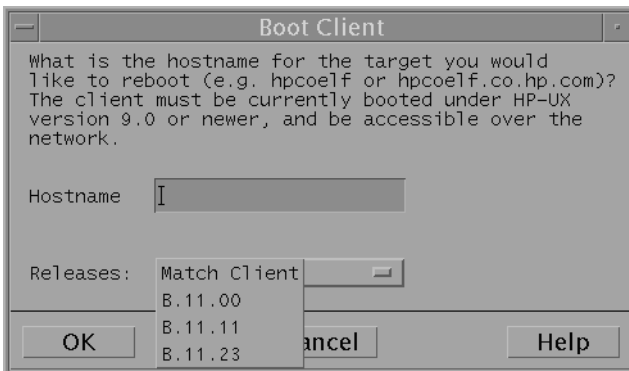
Booting a Client

You can boot a client that is running so that it is added to the Ignite-UX server and you can manage it from the GUI. This allows you to change the version of HP-UX installed on the client, view its hardware configuration and create recovery images.

To boot a client, follow these steps:

Step 1. On the Ignite-UX server, from the Actions menu, select **Boot Client**.

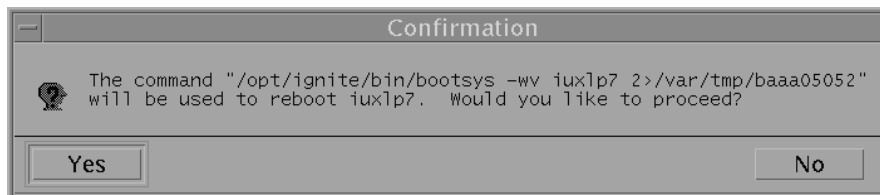
Figure 6-3 **Boot Client Dialog Box**



Step 2. Enter the name of the client in the Hostname box.

Step 3. From the Releases list, select the HP-UX release (kernel) that you want to boot this client with.

Figure 6-4 **Boot Confirmation Dialog Box**



A boot confirmation dialog box appears, if you want to continue booting the client and manage it from the Ignite-UX server then click **Yes**; otherwise click **No**.

A terminal window appears detailing the remote shell (`remsh`) communication and booting progress of the client including any errors that may occur. Should errors occur, you are advised of the `bootsys` command that can be used from the Ignite-UX server to boot the client manually.

Once the client has successfully booted, it is added to the Ignite-UX GUI.

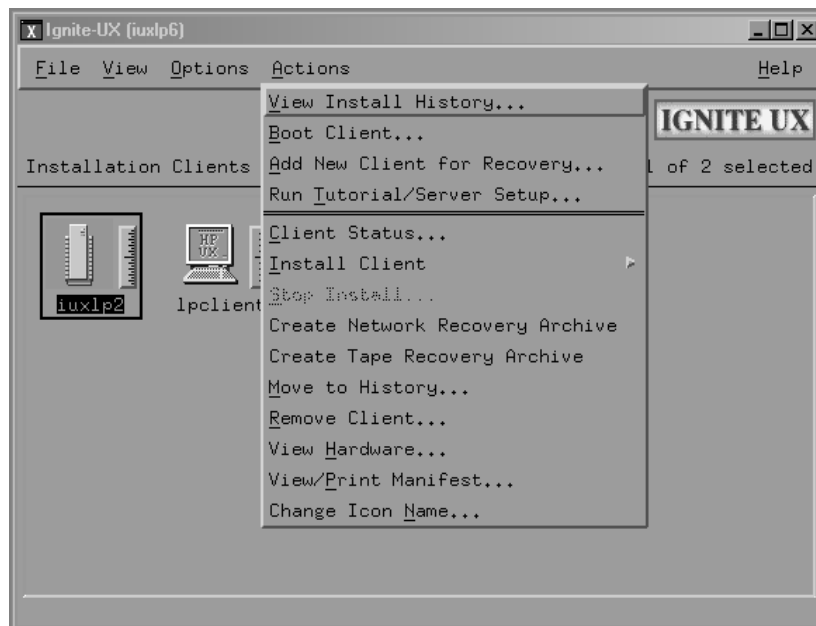
If the client is not running, see “Igniting PA-Based Clients from the Console” on page 96 or “Igniting Itanium-Based Clients using the Network” on page 98.

Configuring the Installation

To begin the installation, select a client, and from the Actions menu (see Figure 6-5) select one of the following:

- **Install Client**, and then click **New install** to install a new client as described in “New Installation” on page 115.
- **Install Client**, and then click **Repeat install** to use the configuration of a previously ignited client as described in “Repeat an Installation” on page 150.

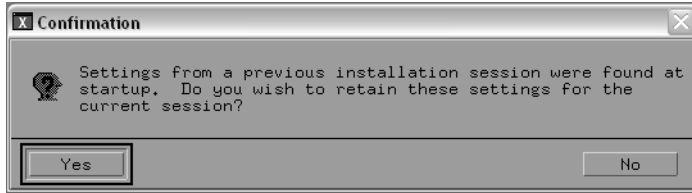
Figure 6-5 Ignite-UX Actions Menu



New Installation

If you previously installed a client, you are asked if you want to use the last installation configuration used by the Ignite-UX server, as shown in Figure 6-6.

Figure 6-6 Configuration Settings Confirmation Dialog Box



Respond **Yes** to reuse some or all of the configuration used in the previous session; respond **No** to create an entirely new configuration and begin with the defaults determined by Ignite-UX.

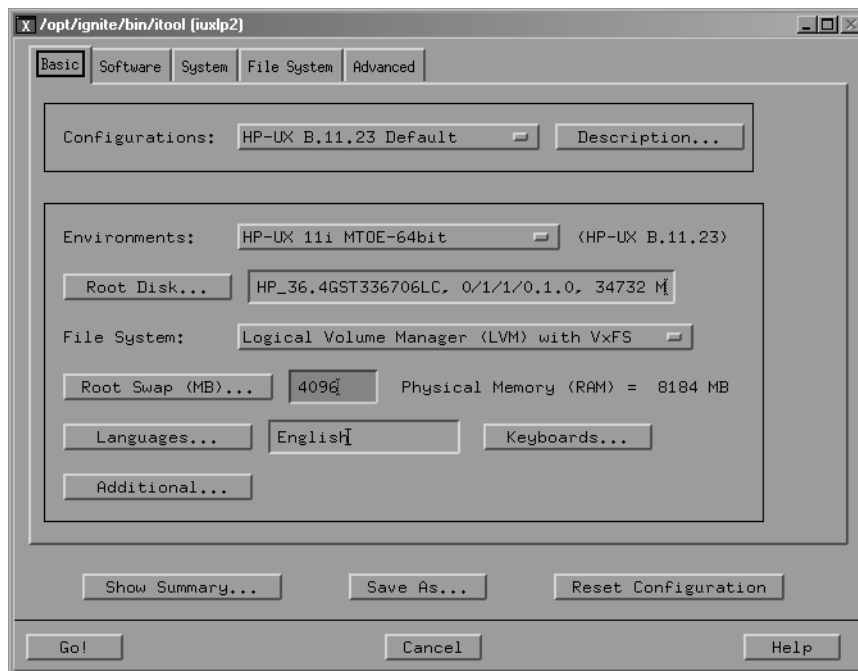
IMPORTANT

To avoid an installation failure, ensure that the `/var/opt/ignite/clients/` directory and all subdirectories are owned by `bin:bin`. The ownership of these directories must be set to `bin:bin` so that the client's configuration information can be written to its `config` file.

Configuring the Installation

After you choose to install a client, the installation and configuration dialog box containing five tabs is presented (Figure 6-7).

Figure 6-7 Ignite-UX Client Installation Configuration Tabs



The five installation configuration tabs enable you to customize all or part of the operating system installation on the client. You can navigate between the tabs by clicking on the tab name.

Functions Available on All Tabs

The buttons that appear on each tab operate the same from any of the tabs and are explained as follows:

Show Summary... Click **Show Summary...** to display the current release ID of the operating system, software, basic disk layout, and hardware inventory (in a tabular format) that is about to be installed on the client.

Save As... After supplying your configuration on all tabs, save the configuration for use in other client installations. Saved configurations appear in the pop-up selection list adjacent to Configurations... on the Basic tab (see “Configurations: List Button” on page 118).

NOTE This configuration saving functionality is not available when you run the Ignite-UX TUI from the client you are installing.

Reset Configuration Click **Reset Configuration** to change the configuration settings for the currently selected configuration back to the default settings. You can do this from any tab.

Go! Click **Go!** to initiate an installation. Because **Go!** is always available, you can select it from any of the tabs.

After clicking **Go!**, you still have the opportunity to cancel out of the installation sequence using a confirmation dialog box.

TIP If you want to accept the defaults computed by Ignite-UX, select a configuration using the pop-up selection list adjacent to Configurations:, then click **Go!** to begin the installation. See “Executing the Installation: Go!” on page 151 for information regarding the client installation process.

Cancel Click **Cancel** to exit the current installation.

Help Help information is available for all dialog boxes, and you can get context-sensitive help for specific areas by pressing the **F1** function key.

Basic Tab

The Basic tab, shown in Figure 6-7, is the default tab that appears when you begin to install a client. The basic installation parameters that you can modify are presented including the operating system configuration, file system type, and HP-UX 11i Operating Environment (OE). Additionally, you can configure languages, locale, and keyboard requirements.

Configuring the Installation

The controls on this tab and their use are explained in the subsections that follow.

Configurations: List Button Click the selection list button adjacent to Configurations: and select the configuration you want to use for this installation from the list of available operating system configurations.

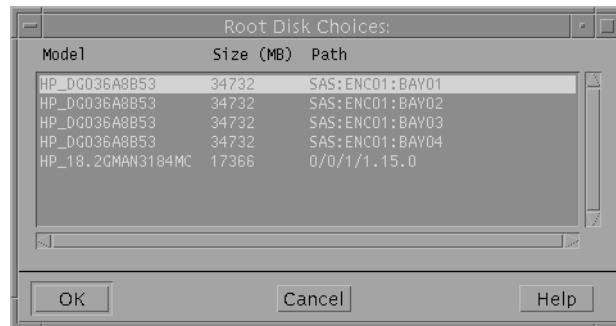
The configuration options presented are stored on the Ignite-UX server in the `/var/opt/ignite/INDEX` file.

Description... Button Click **Description...** to view more information about the selected configuration.

Environments: List Button Click the selection list button adjacent to Environments: and select the operating system or HP-UX 11i OE that you want to install from the list. For HP-UX 11.0/11i/11.23 and higher, this may include 64-bit or 32-bit operating system versions. The choices and defaults depend on the releases available on the Ignite-UX server, and may include, for example, Common Desktop Environment (CDE) as the default.

Root Disk... Button To change the root disk, click **Root Disk...**

Figure 6-8 **Root Disk... Dialog Box**



Select a different disk from the list of available disks then click **OK**. Only supported devices are displayed for use, so if you do not see a particular device in the list, it is not supported by Ignite-UX.

NOTE After you choose a root disk device and are returned to the Basic tab, the hardware path may appear truncated because this field has a character limit on the Basic tab.

For example, if the root disk you selected from the Root Disk... dialog was SEAGATE_ST118202FC 14/0/6/0/0.8.0.255.0.9.0 then the hardware path is truncated to SEAGATE_ST118202FC 14/0/6/0/0.8.0.255.0 in the corresponding field on the Basic tab.

**File System:
List Button**

Click the selection list button adjacent to File System:, and then select from the list of available file system architectures.

The list of file system choices that appears is dependent on the hardware architecture of the client. By default the choices are outlined in the following table and descriptions follow.

Table 6-1 File System Default Choices

	PA-RISC	Itanium-Based
Whole Disk with VxFS		Yes
Whole Disk (not LVM) with HFS	Yes	
LVM with HFS	Yes	
VxVM with VxFS	Yes	Yes
LVM with VxFS	Yes	Yes

For guidelines in planning file system layouts and for disk-management strategies, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*. Additionally, see the “File System Tab” on page 136 for detailed information on file system configuration.

- **Whole Disk (Not LVM) with HFS or VxFS** - These selections treat the entire disk as a single unit. This is the option for HFS, or if the disk is 2 GB or less on PA-RISC. You can use a 70 GB disk as a single unit on an Itanium-based system.

Logical Volume Manager (LVM) with HFS (Hierarchical File System) - This selection formats single or multiple disk systems to combine the disk space into a single, large disk pool, then allocates volumes as needed. The root volume and the swap must be on the same physical volume and are configured in this manner by Ignite-UX. Use the File System tab (see page 136) to configure the LVM volumes, or use the values that Ignite-UX computes for you. For more information, see lvm (7).

Configuring the Installation

- **Veritas Volume Manager (VxVM) with VxFS** - This selection formats single or multiple disk systems to combine the disk space into a single, large disk pool under VxVM, then allocates volumes as needed. The root (/), boot (/stand), and primary swap volumes must be on the same physical disk and are configured in this manner by Ignite-UX. Use the File System tab (see page 136) to configure the VxVM volumes. VxFS enables you to change file system sizes after installation. With the optional HP OnlineJFS product you can resize, defragment, or make a "snapshot" of a mounted file system.
- **Logical Volume Manager (LVM) with VxFS (Veritas File System)** - This selection formats single or multiple disk systems to combine the disk space into a single, large disk pool, then allocates volumes from this pool as needed. VxFS is the same as the Journaled File System (JFS). With the HP VxFS product, you can resize, defragment, or make a "snapshot" of a mounted file system.

Root Swap (MB)... Button

The amount of root swap space depends on the applications being installed. You can choose to use the default that Ignite-UX computes based on available memory on the client. Or you can click **Root Swap (MB)...** and select from the choices that appear in the list. You can also modify the adjacent field directly by typing in the amount you want. The swap is rounded down to a multiple of 4 MB or the LVM extent size.

For information regarding computing swap space, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*.

Languages... Button

The languages available with your HP-UX system are listed when you click **Languages...** The default language, which was set when the GUI was started for the first time, appears in the adjacent field. Select the language you want as the default for the client, if it is other than the current default language. You can select more than one language by double-clicking on each item. To select a range of items in the list, you click and hold the mouse button, drag the pointer down within the dialog box, then click **mark/unmark**.

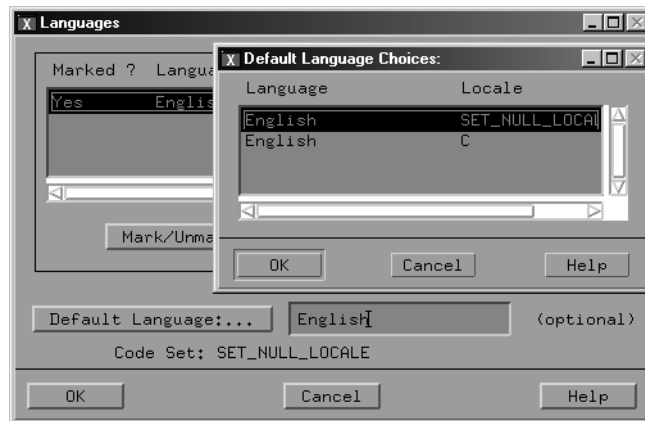
Each language has a corresponding locale (language variant), which describes the system management of a language for doing the following:

- Messaging
- Representing numbers
- Displaying monetary values
- Telling time
- Generating characters

- Sorting text

Click **Default Language...** to see the Default Language Choices (Figure 6-9). They are listed in two columns: Language and Locale. Each language may have more than one way of representing itself on the system. If this is the case, there will be multiple locale entries for the same language.

Figure 6-9 Languages Dialog Box



The locale determines how languages are activated, and are reflected adjacent to Code Set:, as follows:

- **ASK_AT_FIRST_BOOT** enables you to leave the language setting open (unset) until the client system is first booted. At that time, you are prompted. The language setting will be performed as part of the initial system configuration.
- **SET_NULL_LOCALE** creates a NULL language environment leaving the locale variables, such as LANG and LC_ALL, unset by default. With no locale set, programs execute without using localized message catalogs, which can increase system performance. All HP-UX programs operate in the C locale and messages appear in English.

For information regarding other methods of setting the language environment, see *geocustoms* (1M) and *HP CDE Getting Started Guide*.

Configuring the Installation

Keyboards... Button

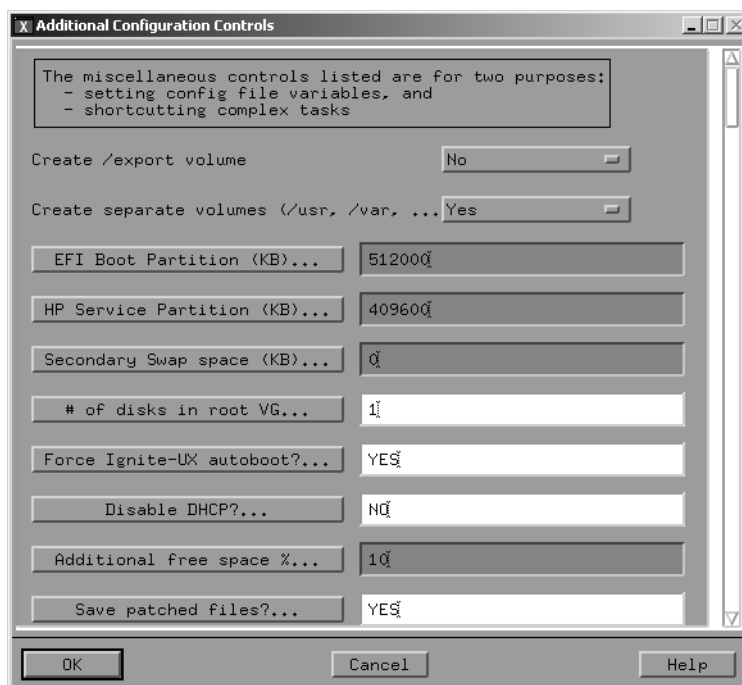
Click this button to select the type of keyboard to be used on the client. Otherwise, the default selection is used.

The selected keyboard language name is stored in the `/etc/kbdlang` file. If you have incorrectly set the language, you can quickly recover by removing this file.

Additional... Button

Click **Additional...** to select among certain preconfigured use models and variables from your current configuration files. The buttons available are determined from the variables in your configuration file and enable you to choose a setting for each variable. Figure 6-10 is an example of the buttons you might see if the client is an Itanium-based client.

Figure 6-10 Additional Configuration Controls Dialog Box



If for example you are using LVM, you see selections for easily setting up multiple disks, striping, and file system creation. For more information, see *instl_adm* (4).

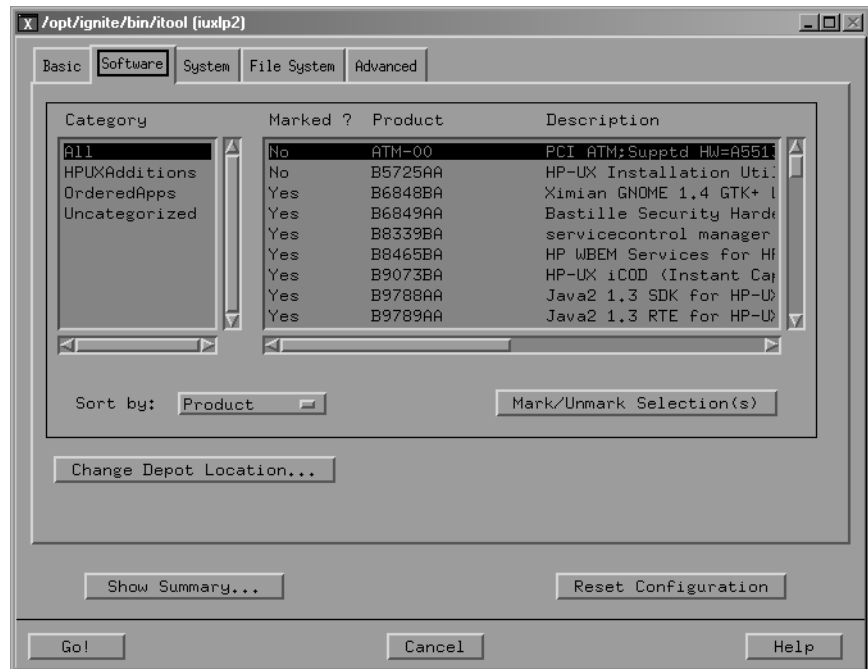
Software Tab

Use the Software tab to choose additional applications that you configured when you set up your Ignite-UX server. You can access a specific depot, and you can also change depot locations. This display does not dynamically update from a newly selected depot. When you choose a new depot, it must be identical in content to the current one. If not, use `make_config` on the Ignite-UX server to configure the new depot prior to invoking Ignite-UX.

An example of what you might see on the Software tab is shown in Figure 6-11.

Figure 6-11

Software Tab



- Category** - Select a topical category to display the products that are available. When **All** is selected, all software bundles in the depot are displayed. Selecting a category other than **All** will shorten the list. Additional categories may be visible if defined by any custom configuration files.

Configuring the Installation

- **Product** - Double-click on a product in the list to select and display the status of the product in the Marked ? column. Use **Mark/Unmark Selection(s)** to change the status of the selected product. The status choices available are:

Required Selected and cannot be unselected.

Yes Selected and can be unselected.

No Unselected and can be selected.

Unavail Unselected and cannot be selected.

For more information, see *instl_adm* (4).

You can change the status of how HP-UX software products are installed in the following ways:

- **Always-Installed (Required)**: Software and network driver bundles required by HP-UX and cannot be unselected. Other always-installed bundles are also included as part of your operating environment. Examples include the core operating system bundles and some network and mass-storage drivers.
- **Default-Installed (Yes)**: Software bundles that are installed by default. You can manually unselect these bundles before you install or update the client. Examples include Mozilla Application Suite and the HP-UX Web Server Suite bundles.
- **Selectable (No)**: Software bundles that are *not* installed or updated by default. You must manually select these bundles before you install or update your client. Examples include Ignite-UX and Software Package Builder.

Sort by... Selection List

You can select a column name by which the product listings will be sorted. By default, the listings are sorted by Product. You can also perform a two-level sort. For example you can sort first by Product and then by Marked to see all the products that are marked Required listed in alphabetical order, followed by all the products marked Yes listed in alphabetical order, and so on for products marked No and Unavail.

Mark/Unmark Selection(s) Button

Select this button to change the status of the selected product.

**Change Depot
Location...
Button**

Select this button to change the location of the depot from which you are selecting software. This display does not dynamically update from a newly selected depot. When you choose a new depot, it must be identical in content to the current one. If not, use `make_config` on the Ignite-UX server to configure the new depot prior to invoking Ignite-UX.

If patches are kept in a separate depot, by default they are installed after the operating system. If there is more than one application depot to be installed, you may need to specify the installation order for the patches in a configuration file. For more information see, “Using Configuration Files” on page 174.

IMPORTANT

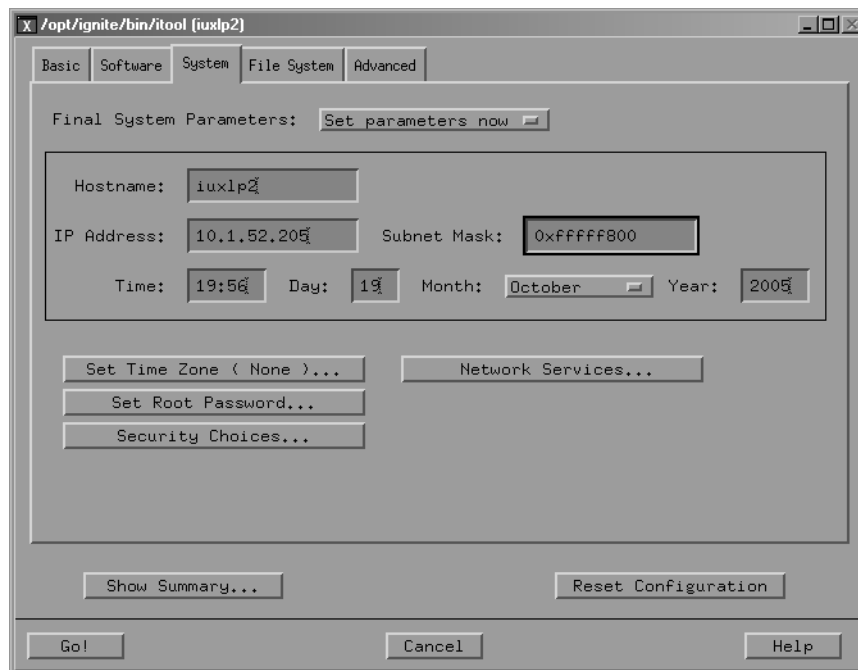
Inclusion of multiple versions of Veritas Volume Manager from Symantec (VxVM) in the same installation depot, or in separate depots that are used together in a single cold-installation session, is not supported. Doing so renders it unusable and generates errors when attempting to use the installation depot, or in the case of non-SD depots during the reboot attempt. For more information, see “Considerations When Using Veritas Volume Manager from Symantec” on page 239.

Configuring the Installation

System Tab

Use the System tab (Figure 6-12) to specify the information unique to this client such as the hostname, IP address, root password, and the time zone.

Figure 6-12 System Tab



Final System Parameters: Button

You can choose to set these final system parameters now or at the first boot of the client. If you select first boot, you do not need to modify anything on this tab.

Hostname: Field

Your client must have a unique system name, known as a **hostname**, which can be a simple name.

A hostname must fulfill the following conditions:

- It should not contain more than 8 characters, for compatibility with the `uname` command.
- It must contain only letters, numbers, underscore (`_`), or hyphen (`-`).

- It must start with a letter. Uppercase letters are not recommended.

For more information, see *hostname* (1).

IP Address: Field You use this field to enter the IP address in the form:

n.n.n.n

where:

each *n* can be 0 through 255.

For example:

10.1.48.140

To determine the IP address of an existing system, use `nslookup`. For example, if the hostname of the client is `test`, enter the following:

```
nslookup test
```

```
Name Server: server.corp.com  
Address: 10.1.48.11
```

```
Trying DNS  
Non-authoritative answer:  
Name: test.corp.com  
Address: 10.1.50.12  
#
```

IMPORTANT

Do not inadvertently use the IP address of the name server. Your network could stop functioning; results are unpredictable.

Alternatively, you can use `ping` to determine the hostname, the IP address of a system, or if a given IP address is already in use. If you are in doubt, be sure to coordinate IP address allocation with your Network Administrator.

**Subnet Mask:
Field**

This field sets the subnet mask. The subnet mask is typically provided by your Network Administrator, and is in the form of an IP address or a corresponding hex number. For example:

255.255.248.0 *or* 0xfffff800

or

255.255.255.0 *or* 0xffffffff00

Configuring the Installation

Time and Date Information

The time and date that is displayed for the client is dependent on the installation method. If you are installing from the server, the time is synchronized with the server; if you are installing from the client, it is set using the client's hardware clock. If necessary, enter information for the Time, Day, and Year fields: For time, use the 24-hour format: *hh:mm*.

Select the correct Month by clicking the adjacent selection list button, and then selecting from the list. Edit other fields by using the Backspace and Delete keys.

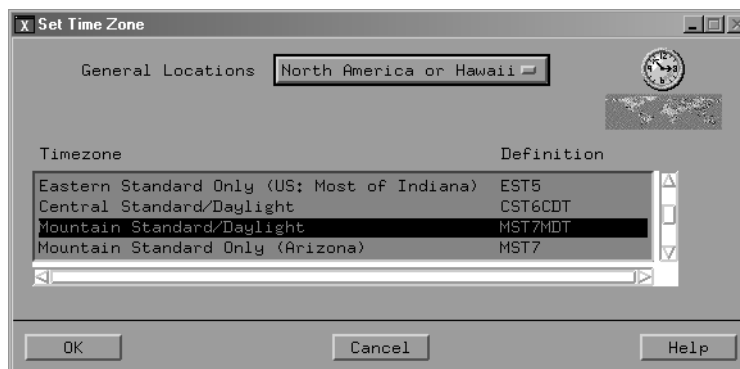
The time that you set is automatically adjusted if you select a different time zone using the **Set Time Zone...** button.

Set Time Zone... Button

Click this button to display the time zone selections, as illustrated in Figure 6-13. There are two selection lists. The first consists of general locations, and the second has corresponding time zones.

Figure 6-13

Set Time Zone Dialog Box

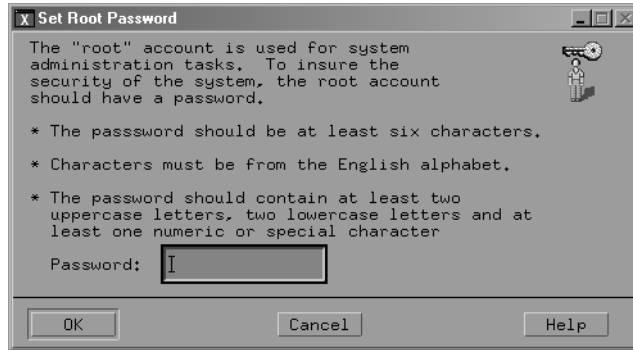


Select a time zone from the list and click **OK**. The time and date on the **System** tab are adjusted to reflect the new time zone, and the TZ environment variable is set.

**Set Root
Password...
Button**

Use the `root` account for system administration tasks. To ensure the security of the system, create a password for the `root` account. Click this button to set up the `root` password for the client. The Set Root Password dialog box appears, as shown in Figure 6-14.

Figure 6-14 Set Root Password Dialog Box



To strengthen security, HP recommends that you observe the following requirements when setting a password:

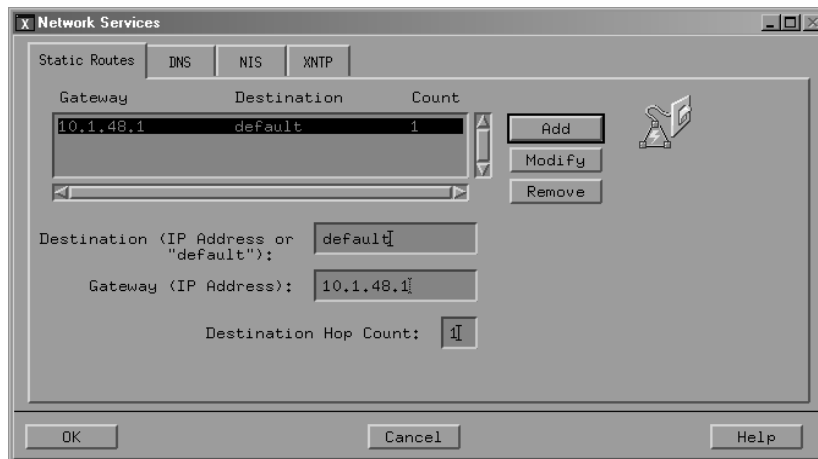
- The password be at least eight characters long.
- Characters be from the English alphabet.
- The password should contain at least two uppercase letters, two lowercase letters and at least one numeric or special character.
- Avoid the use of the `@` special character; if it must be used, you must use the syntax `\@`.

Configuring the Installation

Network Services... Button

Click **Network Services...** to access the Network Services dialog box containing the following tabs, which enable you to provide information to configure your network within Ignite-UX (Figure 6-15):

Figure 6-15 Network Services Tabs



- **Static Routes** - Provides a specific destination for network packets. For more information, see *routing* (7).
- **Domain Name Server (DNS)** - Provides mapping of hostnames to IP addresses, and maps IP addresses to hostnames.
- **Network Information Service (NIS)** - Provides the names and IP addresses of all the other hosts in your network and is administered centrally on your system. For more information, see *domainname* (1M) and *resolver* (4).
- **Network Time Protocol (XNTP)** - Provides continuous update of the system time to match that of the XNTP server by using the Network Time Protocol.

The Static Routes tab is the default tab. If your network is divided into subnets, you will probably need to specify a gateway system to reach other subnets:

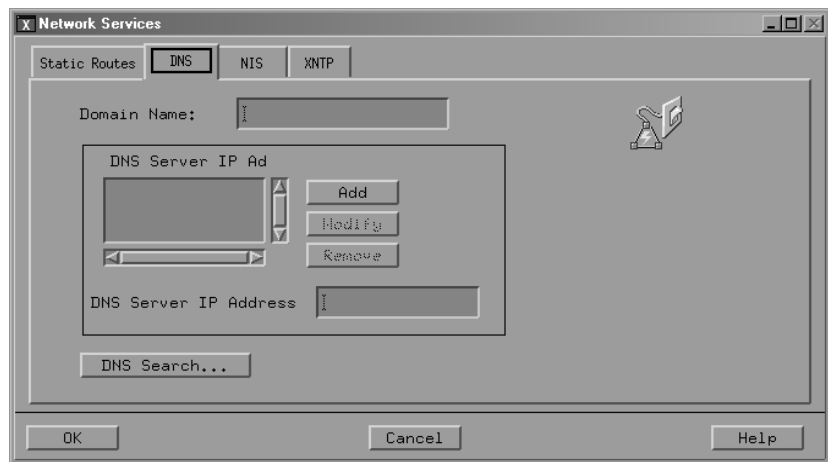
- **Destination** - The field has the word "default" or the IP address of the destination network.

- **Gateway** - This is the IP address of the device connecting your network to the remote network, or your own IP, if wildcard routing is used.
- **Destination Hop Count** - If your gateway IP address is not the same as the IP address of your clients, this is usually set to 1. If your gateway IP address is the same as your client IP address, then the destination hop count is 0.

After you complete the appropriate fields on this tab, click **Add** or **Modify**, as appropriate, to save the information. For more information, see *routing* (7).

Click **DNS** to advance to that tab (Figure 6-16).

Figure 6-16 DNS Tab

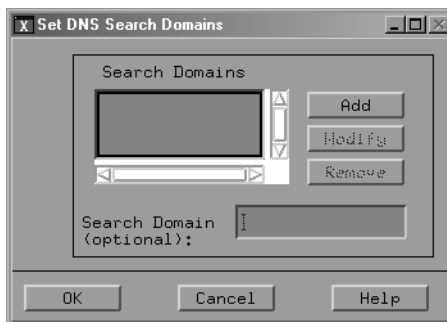


On the DNS tab, you can configure the Domain Name (an extension to the hostname, such as `xx.corp.com`) and the IP address of the Domain Name Server.

The list of DNS servers by IP address is populated if they are predefined in the Ignite-UX server. Use the `nslookup` command on a running system to find this information if you need to add a DNS server to this list. Use the **Add**, **Modify**, and **Remove** buttons to modify this list directly.

Additionally, you can use the **DNS Search...** button to set optional DNS domains to be searched, as shown in Figure 6-17.

Figure 6-17 Set DNS Search Domains Dialog Box



The domains in this search list are used for hostname lookups. Up to six search domain entries are enabled, with a syntax like `xx.corp.com`. The first entry in the list should be the local domain for unqualified hostnames to work properly.

You can add to or modify the domains to be searched by entering the text in the Search Domain field and clicking the appropriate button, **Add** or **Modify**. To remove a domain, select it from the list and click **Remove**.

NOTE

The domain and search options are mutually exclusive, though both can be specified. If they are, the search option is written out last and takes precedence.

For more information, see *resolver (4)*, *Installing and Administering NIS Services* or *HP-UX IP Address and Client Management Administrator's Guide*.

Click **NIS** to advance to that tab (Figure 6-18).

Figure 6-18 **NIS Tab**



It is common for the nonserver hosts in a network to be NIS clients. Whenever a process on an NIS client requests configuration information, it calls the NIS server instead of looking in its local configuration files. The set of configuration data maps shared by the servers and clients is called the **NIS domain**.

For more information, see *domainname (1)*, *domainname (1M)*, and *Installing and Administering NIS Services*.

Click **XNTP** to advance to that tab (Figure 6-19).

Figure 6-19 XNTP Tab

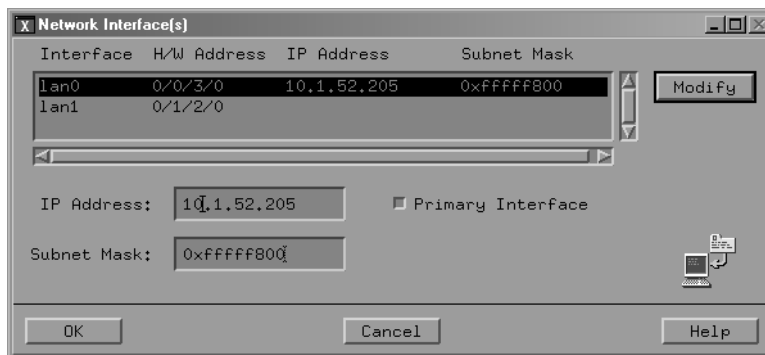


The `xntpd` daemon maintains system time, in agreement with Internet standard time servers. For more information, see `xntpd` (1M).

Additional interface(s)... Button

Click this button on the System tab to invoke the Network Interface(s) dialog box, as shown in Figure 6-20, and identify additional LAN interface cards that exist in the client. You can add or change IP and subnet information, as needed, and designate the primary interface to be used.

Figure 6-20 Network Interface(s) Dialog Box



1. Select an Interface card from the selection list.
2. Enter or modify the IP Address:, as needed.
3. Enter or modify the Subnet Mask:, as needed.
4. Select **Primary Interface**, depending on the status you want for this interface.

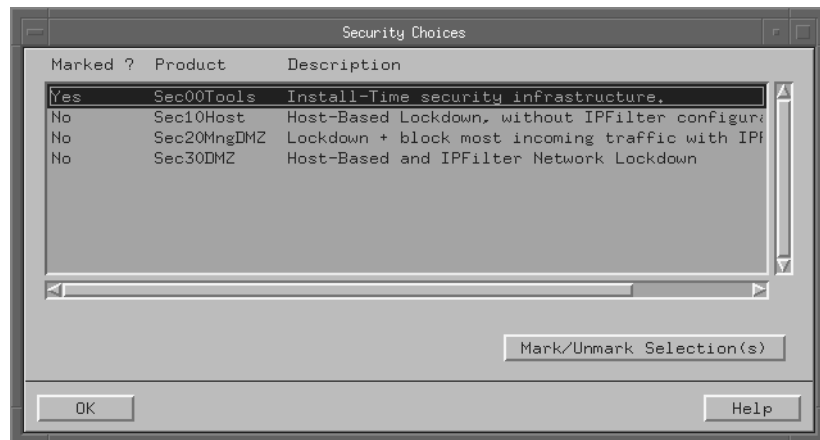
NOTE

If the client has more than one interface, the primary LAN interface will be associated with the hostname of the system in `/etc/hosts`.

5. Click **Modify** when you have finished updating each interface.

Security Choices... Button Click this button on the System tab to invoke the Security Choices dialog box. This button is available only if you have install-time security available in your configuration. The install-time security choices allow you to choose from several predefined security levels, thereby hardening the system. If you select a security choice, be sure to set the root password before you click **GO!**, or your system may be vulnerable.

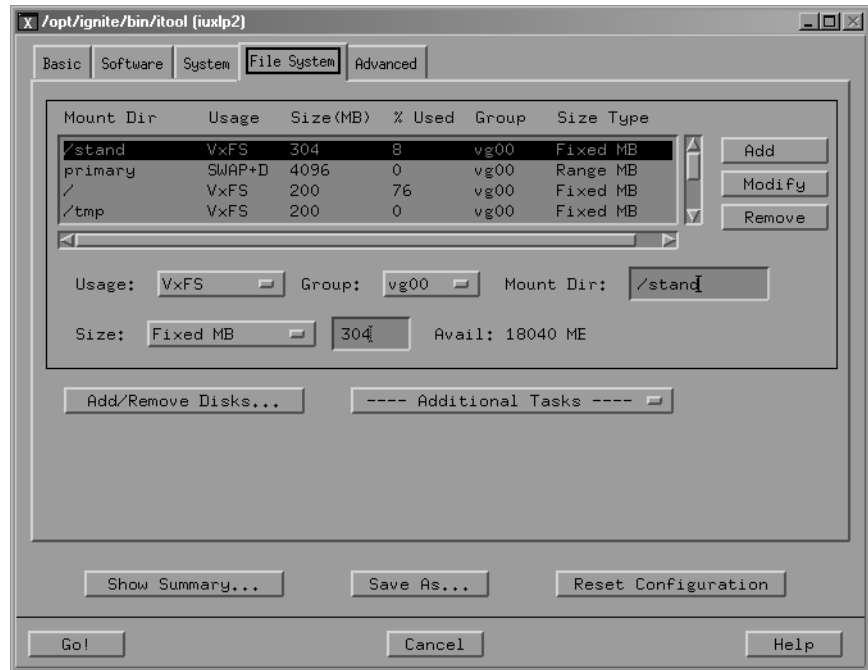
Figure 6-21 Security Choices Dialog Box



File System Tab

The File System tab enables you to do a variety of file system and disk configuration tasks. Its appearance depends on your file system selection on the Basic tab. The example in Figure 6-22 illustrates what you would see if you had selected LVM on a PA-RISC client.

Figure 6-22 File System Tab



IMPORTANT

The information appearing on this tab is tailored to the operating system release and hardware architecture. HP recommends that extreme care be exercised when altering these values.

Adding or Changing a File System Configuration

Adding a new file system or changing an existing one are similar actions in that the same information is needed for both. To add or change any of the file system configurations, use the following steps:

1. Select a file system from the list. To view all of the available information for the file system, you can use the horizontal and vertical scroll bars, or resize the dialog box.
2. Enter or change the information using the following buttons or fields:

Usage: Click the selection list button adjacent to Usage: to choose from the list of file system usage types. The available choices are HFS, VxFS, SWAP, Unused, DUMP, and SWAP+DUMP.

In general, HP recommends the use of VxFS.

Group: Click the selection list button adjacent to Group: to select the appropriate volume group name for the selected file system.

IMPORTANT

Renaming or changing the disk file system structure causes the old file system on that disk to be lost.

- To add a new/unused disk and give it a different volume group name or create a new volume group, use the **Add/Remove Disks...** button.
- If you want to reconfigure the volume group in general, including renaming it, click **Additional Tasks** and then select **Group Parameters** to supply a custom group name and to change other disk parameters.

Mount Dir: Modify this field to set the root disk, using the standard HP-UX mount directory designations (/ , /usr, /stand, /var, /opt, etc.). You can also specify your own mount points, such as "/special" or "/apps".

Size: Click the selection list button adjacent to Size: to select the file system size (as shown in the Mount Dir column of the file system list). The types of sizing available are:

Fixed The selected file system is set to this size.

- All Remaining** The selected file system automatically takes over all remaining file system space on the disk or volume group.
- Free Size** This selection is useful when you know how much free space you want the volume to have after the system is installed. The size of the volume will be the specified amount plus the amount required for the selected software.
- Free Percent** This category is similar to free size, but expressed in percent. It is used if you know how full you want the volume to be, in percentage of the volume size. If you indicate 20 percent, then the volume would be 80 percent full after the installation of the selected software.
- Size Range** Select this category in the list to set a maximum size for the file system (the minimum is determined by the software selected for the file system).
- The `/usr` file system must have sufficient space to accommodate an operating system update. The absolute minimum is 324 MB for a 64-bit system. See the installation guide supplied with your release of HP-UX.
- Avail:** This field indicates the space that is unallocated in the volume group currently selected.

NOTE

Although you can change the size of file systems, Ignite-UX enforces minimum sizes and modifies the sizes upwards if required for some file systems. These sizes are based upon the size of the software that is to be installed and the size defined for the file system.

3. Click the appropriate button **Add** or **Modify**.

IMPORTANT

Changes are not saved until you click **Add** or **Modify**. If you make any changes and then select another tab without using one of these buttons, your changes *are not* applied and are lost.

Additional considerations for specific file system layouts are as follows:

- LVM:**
- One of the volumes must be `root (/)`.
 - A swap volume (primary) is required.
 - Directory names must have valid HP-UX names (for example, `/usr` or `/database`).
- VxVM:**
- One of the volumes must be `root (/)`.
 - One of the volumes must be `boot (/stand)` with HFS usage.
 - A swap volume (primary) is required.
 - Directory names must have valid HP-UX names (for example, `/usr` or `/database`).

Removing a File System

To delete any of the file systems listed on the tab, select the mounted directory and click **Remove**.

Add/Remove Disks... Button

The **Add/Remove Disks...** button invokes a dialog box that enables you to do the following:

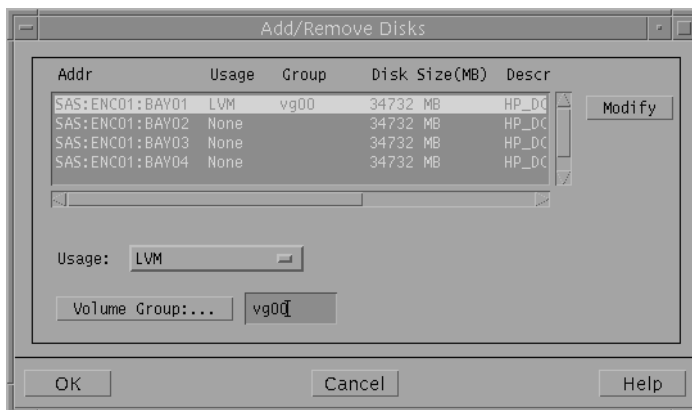
- Add a new disk and configure its file system type and volume group designation, if any.
- Remove a disk from use on the client by designating it as Unused.
- Determine your current disk usage.

Configuring the Installation

To change, add, or remove a disk from the client:

1. Click **Add/Remove Disks...** (Figure 6-23).

Figure 6-23 Add/Remove Disks Dialog Box



2. Select a disk from the list.
3. Click the selection list button adjacent to Usage: to select a different use for this disk or **Unused** to remove it. Depending on your selection, other fields and buttons appear. For example, selecting **LVM** or **VxVM** results in the appearance of the **Volume Group...** button and associated field.
4. Click **Modify** to execute your changes.
5. Click **OK** when you are finished and to return to the File System tab.

Additional Tasks Button

The **----Additional Tasks----** button enables you to configure advanced information, if necessary, in the following categories:

- Advanced Disk Parameters (see page 141)
- Advanced File System Parameters (see page 142)
- Advanced Volume Layout Parameters (see page 144)
- Advanced Group Parameters (see page 147)

The selection of one of these categories results in a change to name of the button and a dialog box that enables you to change the parameters associated with the chosen category appears.

NOTE Dialog box choices differ depending on the file system choices you made on the Basic tab.

Advanced Disk Parameters Follow these steps to further define the tracks per cylinder or revolutions per minute for each disk on the client using the **Disk Parameters** selection of the **Additional Tasks** button. Additionally, you have the option of initializing each disk.

NOTE HP recommends that you do not modify Trks/Cyl: or Disk RPM: or enable Media Init: to be run. Modern disk drives do not gain any benefit from setting tracks per cylinder or the disk rotations per minute, and they automatically exclude defective sectors from use. If you experience read/write errors on a disk, consider replacement of the disk. In addition, because modern disk drives are so large, running Media Init: to initialize the disk literally takes hours and does nothing useful.

Step 1. Click **---Additional Tasks---** and select **Disk Parameters...** A dialog box similar to the one in Figure 6-24 appears.

Figure 6-24 Advanced Disk Parameters Dialog Box



Step 2. Highlight a disk in the selection list to select it.

Configuring the Installation

- Step 3.** Configure the Trks/Cyl: (tracks and cylinder) and Disk RPM: fields by direct editing, as needed. The default values are recommended because these values are predetermined for each supported disk device.
- Step 4.** Indicate whether or not you want the disk initialized by using the Media Init: button.

If you choose to initialize the disk, the Intrlv: field, indicating the interleave factor, appears. Interleave refers to the relationship between sequential logical records and sequential physical records on the disk. It defines the number of physical records that lie between the beginning points of two consecutively numbered logical records. Your choice of interleave factor can have a substantial impact on disk performance.

For more information, consult the guide for your disk hardware and see *mediainit* (1).

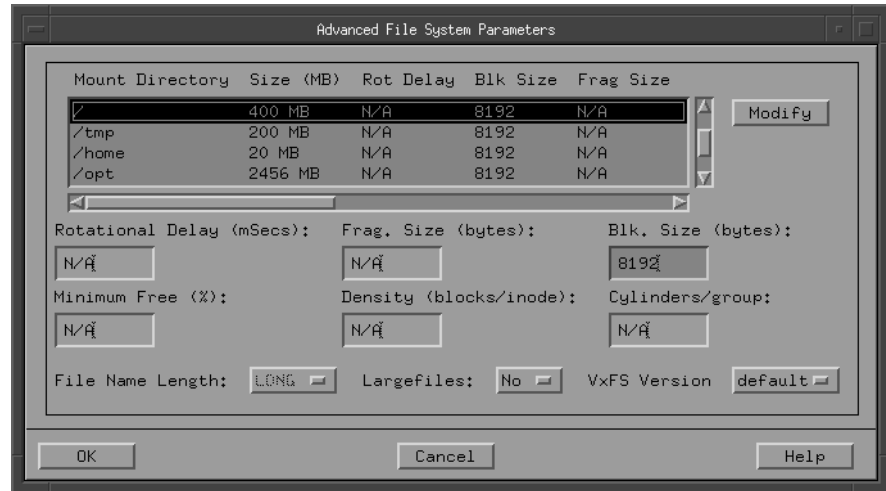
- Step 5.** Click **Modify** to implement all changes.
- Step 6.** Click **OK** when you are finished and you are returned to the File System tab.

For more detailed information regarding these disk parameters, see *mkfs_vxfs* (1M) and *mkfs_hfs* (1M).

Advanced File System Parameters Several file systems are already defined by Ignite-UX, but you can modify them as follows to suit your environment.

- Step 1.** Click **----Additional Tasks----** and select **File System Parameters....** A dialog box similar to the one in Figure 6-25 appears.

Figure 6-25 **Advanced File System Parameters Dialog Box**



- Step 2.** The values that appear are specific to the file system type and can vary. Modify the following values as needed:

- Rotational Delay
- Frag. Size
- Blk. Size
- Minimum Free
- Density
- Cylinders/group
- File Name Length
- Largefiles
- VxFS Version (This option is available when a VxFS file system is selected. For HP-UX 11i v2 clients, use this option to specify the version of the VxFS file system to create for a mount point. If the **Default** value is selected, then a value of 5 will be used.)

Configuring the Installation

WARNING

Do not enable largefiles on the boot file system. HP does not support doing this, and Ignite-UX will not allow an installation or recovery to proceed while largefiles are enabled on the boot file system.

NOTE

HP does not recommend setting a value of rotational delay for HFS file systems. Setting this value typically does not provide any benefit with modern disk drives.

For specific information regarding the use of these parameters, see *mkfs* (1M), *newfs_hfs* (1M), *mkfs_hfs* (1M), and *tunefs* (1M).

Step 3. Click **Modify** to implement all changes.

Step 4. When you finish modifying all values, click **OK** to return to the File System tab.

Advanced Volume Layout Parameters Follow these steps to modify the default volume values and perform detailed volume configurations for LVM and VxVM file systems.

Step 1. Click **---Additional Tasks---** and select **Volume Parameters...** A dialog box similar to the one in Figure 6-26 appears, which is an example of an LVM volume.

Figure 6-26 **Advanced Volume Layout Dialog Box**



Step 2. Modify the following values as needed:

Cont Alloc: This sets the contiguous allocation policy. A contiguous logical volume has these characteristics:

- Physical extents are allocated in ascending order.
- No gap is enabled between physical extents within a mirror copy.
- Physical extents of any mirror copy all reside on a single physical volume.
- The root volume (/), the boot volume (/stand), dump volumes, and primary swap must *always* be created with Cont Alloc set to **Yes**.

Stripes:... If two or more disks are in the volume group, then you may enable data striping over multiple disks for performance purposes.

Stripe Size: Configure this if you have at least two disks in a volume group. The first drop-down allows you to configure the unit, and the second drop-down allows

Configuring the Installation

you to configure the size. The default stripe size is equal to the file system block size, which is normally 8KB.

B-block Relo: Bad-block relocation is a mechanism that, when a disk defect is found, attempts to relocate the failing block to another location on the disk. This is the default behavior when a logical volume is created though it is not supported for `root`, `swap`, or `dump` logical volumes.

Vol Name: Enter the name you want for the selected volume.

Disk Mapping... Displays a dialog box that enables you to restrict the disk drives on which the volume data will reside. Normally, the data will be allocated over these disks sequentially.

For more information, see *lvcreate* (1M) for LVM or *vxassist* (1M) for VxVM.

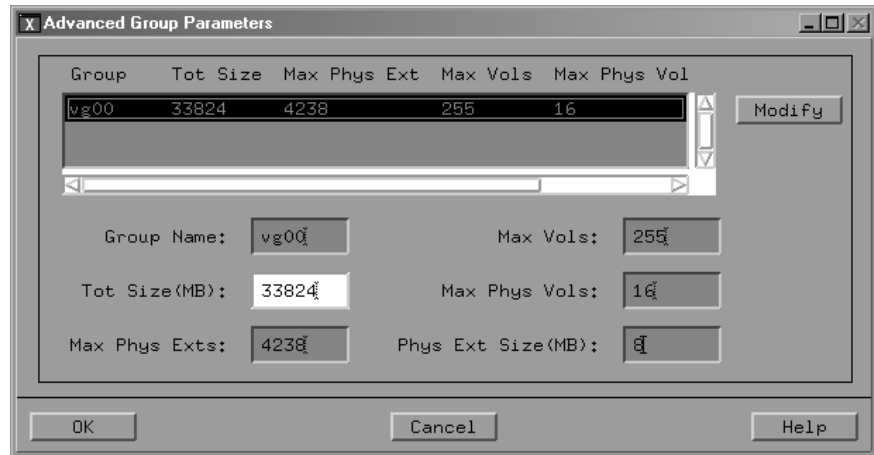
Step 3. Click **Modify** to implement all changes.

Step 4. When you have finished modifying all values, click **OK** to return to the File System tab.

Advanced Group Parameters You can set additional volume group parameters as follows to further define volumes.

- Step 1.** Click **---Additional Tasks---** and select **Group Parameters...** A dialog box similar to the one in Figure 6-27 appears, which is an example of an LVM group layout.

Figure 6-27 **Advanced Group Parameters Dialog Box**



- Step 2.** Modify the following values as needed:

- Group Name: — Use to rename existing volume groups.
- Max Vols: — Maximum number of logical volumes.
- Tot Size: — Total size of all volumes in MBs.
- Max Phys Vols: — Maximum number of volumes.
- Max Phys Exts: — Maximum physical extents.
- Phys Ext Size: — Physical extent size in MBs.

For more information, see *vgcreate* (1M) for LVM or *vxassist* (1M) for VxVM.

- Step 3.** Click **Modify** to implement all changes.

Configuring the Installation

- Step 4.** When you have finished modifying all values, click **OK** to return to the File System tab.

Advanced Tab

You can use the Advanced tab, as shown in Figure 6-28, to activate any HP or custom scripts that you might want to run on the client after the installation has completed. For example, you could include a script to install additional software from other depots or one that contains specific system configuration changes for the intended use of the client.

Two different lists appear on this tab, Scripts to be Executed: and Available Scripts:, and it is important to recognize how they differ.

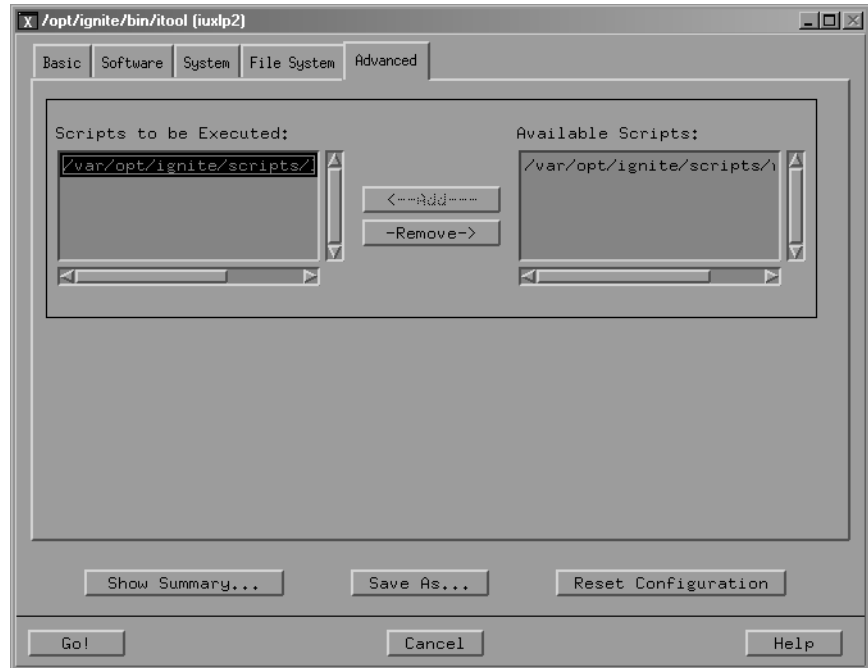
The scripts that populate the Available Scripts list are derived from the `/var/opt/ignite/INDEX` file and are identified by the `scripts` keyword. When you add new scripts to the `/var/opt/ignite/INDEX` file using `manage_index`, they are automatically added to this list and are available for use the next time you invoke the Ignite-UX GUI. For example, if you want to add a script called `run_fsck` located in `/var/opt/ignite/scripts`, you would use the following command:

```
manage_index -a -s "/var/opt/ignite/scripts/run_fsck"
```

For more information, see *manage_index* (1M).

You populate the Scripts to be Executed: list by adding or removing scripts from the Available Scripts: list. Descriptions for each action follow.

Figure 6-28 **Advanced Tab**



Adding a Script

To add a script for Ignite-UX to execute after the installation, select the item from Available Scripts: column, then click **<---Add---**.

For more information regarding the use of scripts to automate Ignite-UX tasks, see Chapter 8, “Customizing Your Installation,” on page 173 and see *instl_adm* (4). See also the *Ignite-UX Custom Configuration Files* White Paper, available on the “Information Library” page of the Ignite-UX Web site at:

<http://www.docs.hp.com/en/IUX/infolib.html>

Removing a Script

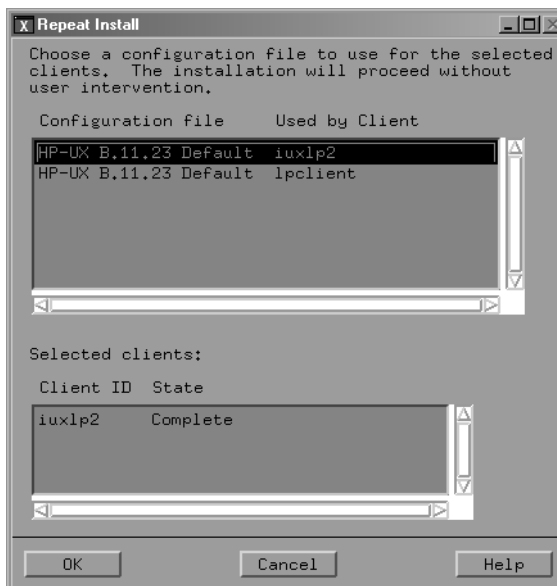
To remove a script, select it in the Scripts to be Executed: list, then click **-Remove->**. The item is removed from the list and is not executed after the installation. The removed script remains in the Available Scripts: list for use at another time.

Repeat an Installation

Once you have successfully installed a client, you have built a repeatable client installation configuration. You can choose to use any past configuration to install, or reinstall, a client. This method requires no intervention, which enables you to launch multiple installations quickly. The Configuration File list (Figure 6-29) is populated by the last installation configuration and all those that you have created using the **Save As...** button, which appears on all of the installation configuration tabs. These saved installation configurations are stored in `/var/opt/ignite/saved_cfgs/`.

If there are no saved configurations, the **Repeat Install** action is not available and you must begin a new installation as described in “New Installation” on page 115.

Figure 6-29 Repeat Installation Dialog Box



Select one of the configurations listed by clicking on it, then click **OK**. Ignite-UX begins the installation process with a confirmation query to alert you that the clients appearing in the Selected Clients list are about begin the installation of HP-UX. Confirm or cancel the installation of the listed clients using the appropriate button.

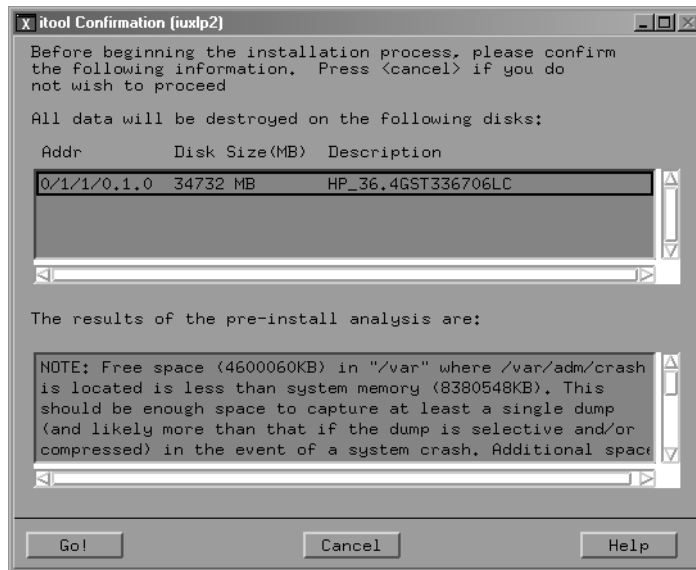
Executing the Installation: Go!

You can click **Go!** to initiate a new installation from all of the Ignite-UX GUI. You do not need to examine all the tabs if you simply want to do a generic installation and accept all of the defaults calculated by Ignite-UX.

If you are repeating a previous installation, click **Go!**

Ignite-UX executes a preinstallation consistency check to identify any errors that must be corrected for the installation to occur (Figure 6-30).

Figure 6-30 Installation Confirmation Dialog Box



The confirmation dialog box lists disks that are to be written to during the installation process and a preinstallation analysis log of any notes, warnings, or errors.

- If you do not want to proceed with the installation at this time, click **Cancel**.
- View the preinstallation analysis using the scroll bars. Be sure to inspect all of the information and ensure that the disk identified is the one on which you intend to install HP-UX.

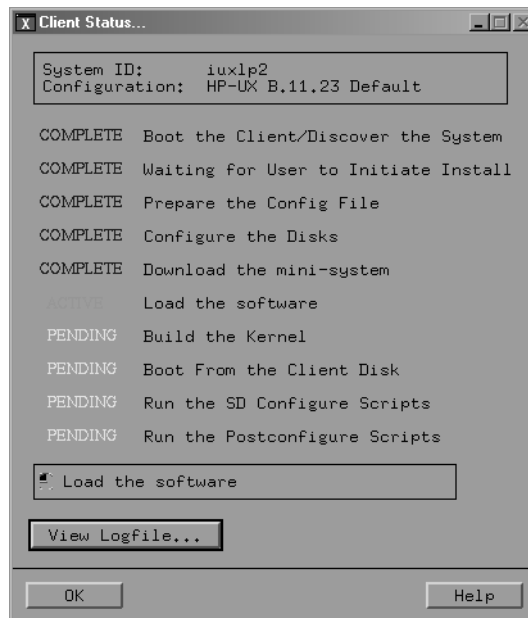
Executing the Installation: Go!

- All errors listed *must* be corrected before you can proceed with the installation.

After you have reviewed all of the information and determined whether or not the client installation can continue, click **OK**.

As the installation proceeds, a Client Status... dialog box appears so that you can monitor the installation progress (Figure 6-31).

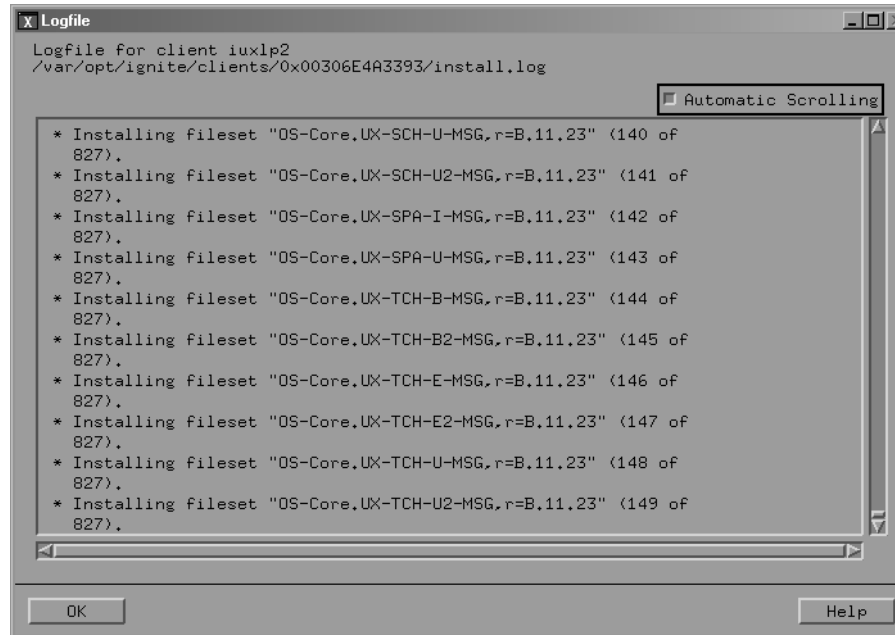
Figure 6-31 Client Status... Dialog Box



The information is updated automatically as the status of the client changes; the most current information appears in the box at the bottom of the dialog box.

You can view specific installation information using the **View Logfile...** button, which invokes a dialog box containing the log file being written to during the client installation (Figure 6-32).

Figure 6-32 Installation Log File



Carefully review this scrolling status information for errors. Continuous scrolling is the default behavior. You can change it using the Automatic Scrolling checkbox.

In addition, you should review the complete installation log, located on the Ignite-UX server
`in/var/opt/ignite/clients/hostname/install.log`.

NOTE

Because errors can occur during the installation that result from other components within HP-UX, all errors may not be written to this log file.

Viewing and Printing a Manifest

Ignite-UX creates a manifest for each client upon the successful completion of the operating system installation. This manifest details all of the installation information for the selected client. Use it to ensure that the installation executed as expected and all software was installed, or to keep a record of each client installation. The client installation manifest contains the following information:

- System Information
- System Hardware
- Installed Software
- File System Layout
- Disk Layout
- Swap Configuration
- Kernel Configuration

You can view or print the manifest when a client installation is complete, as indicated by the Client Status dialog box, by using actions available on the Actions menus.

Location of Client Manifest Files

Manifest files for each client installed are saved on the Ignite-UX server in:

```
/var/opt/ignite/clients/0xLLA/manifest/manifest.info
```

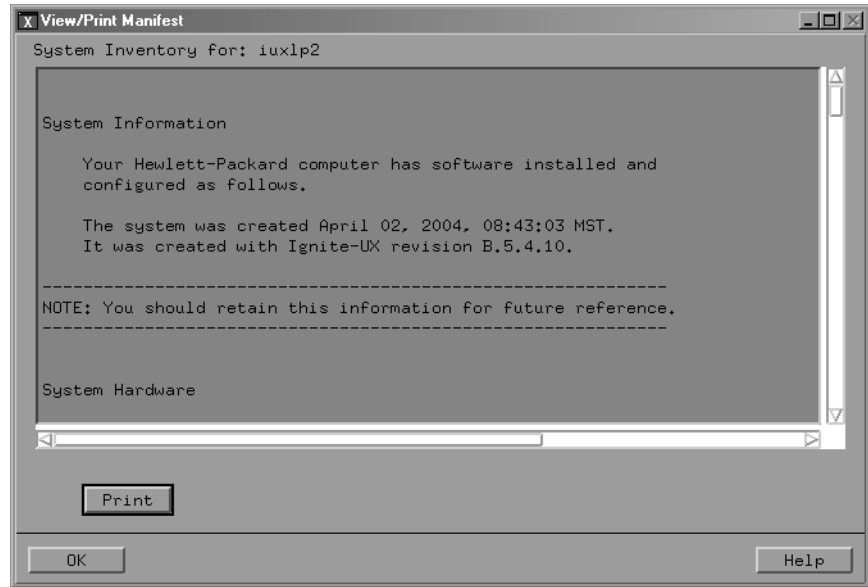
and on the client in:

```
/var/opt/ignite/local/manifest/manifest.info
```

Access from the Ignite-UX GUI

To view a client manifest from Ignite-UX, select the client and then select **View/Print Manifest** from the Actions menu; or right-click on a client icon and click **View/Print Manifest**. The system search may take a moment. An example of a manifest is shown in Figure 6-33.

Figure 6-33 View/Print Manifest Dialog Box



Access Using the Command Line

To print the system manifest from the Ignite-UX server command line, enter:

`/opt/ignite/bin/print_manifest`

The ASCII file is printed to `stdout` using format instructions from the manifest template file.

For more information, see *print_manifest* (1M).

Installing HP-UX on Clients from the Server

Viewing and Printing a Manifest

7 Golden Images

This chapter describes how to create and use your own Ignite-UX installation archives. Topics include:

- Installing from Golden Images (see page 158)
- Creating a Golden Image (see page 159)
- Configuring the Ignite-UX Server to Recognize the Golden Image (see page 164)
- Enabling the Client (see page 168)
- Installing the Golden Image on the Client (see page 170)

A **golden image** is a snapshot of a known-good operating system installation and configuration that is archived for use in installing other clients. The golden image is a compressed `tar` or `cpio` image that Ignite-UX can recognize and can be installed on other client machines.

Ignite-UX does not require creating a golden image to install an operating system on clients, but it is a very powerful tool for system administrators. The use of golden images facilitates the following:

- Increased installation speed versus installing the operating system using `swinstall`, the command used by Ignite-UX when installing software from SD depots.
- Exact replication of customized system configurations to clients.
- Mass deployment of operating system configurations to clients.
- One single, self-contained client image that could also be used for disaster recovery purposes.

Installing from Golden Images

In addition to supporting the standard software installations from an SD depot, Ignite-UX supports installing from known-good local system images, called golden images. This method recognizes that many, if not all, clients in a network may be identical (or almost identical) to each other. It is possible to take advantage of this fact by building an image that contains all of the files including configuration files that you want installed on each of the clients, and then using Ignite-UX to install them.

This approach can have several advantages:

- Because the compressed system image is unpacked directly to disk over the network, the installation process can be much faster than an equivalent process using SD. The time savings depends on the size of the installation and the capacity of the network, but a typical golden image can be extracted in about 20 minutes compared to about an hour for an SD install.
- Instead of troubleshooting a client, it is often more cost-effective to completely reinstall the operating system with a known-good system image.
- When coupled with dataless nodes (all volatile data is on a separate file server), system replacement time or move time is drastically reduced.
- Once a golden image has been created, it is simple to apply it to multiple clients. Very little or no user interaction is required during subsequent installs, reducing the chance of error.

Building this golden image is done by setting up a single system the way that you want all of your systems to look, and then creating an image of that system. Follow instructions in this chapter to set up the first system.

Creating a Golden Image

In general, the golden image is created from a golden system configured with all the software and customizations needed to distribute it to a group of clients. The golden image can be saved to media from the golden system and installed on individual systems. Or, the golden image can be stored on another system and installed remotely over the network.

You may have already created the equivalent of a golden system on which you have configured modifications relating to your environment on top of a base HP-UX operating system release. Critical patches are installed onto the operating system. Local, common software that is used generically is also layered on the operating system. The resulting system is tested to ensure proper operation in your environment.

These systems represent a prototype or starting point for all users. The steps needed for installation customizations are normally captured and are well known. They make good candidates for a golden image as explained here. If a golden system already exists, proceed to “Configuring the Ignite-UX Server to Recognize the Golden Image” on page 164.

Creating a golden system from scratch involves the following steps described in this section:

“A: Installing the HP-UX Operating System” on page 160

“B: Installing Critical Patches onto the Operating System” on page 161

“C: Installing Optional Software” on page 161

“D: Customizing the System” on page 162

Once you have a golden system with the base operating system, use Ignite-UX to create an golden image. It is up to the administrator to define exactly what constitutes a golden system. You may choose to place patches, applications, kernel configurations, etc. on the golden system, or just include the core operating system. In our example, we only include the core operating system.

Ignite-UX is capable of installing systems from SD depots and/or archives. You may want to use this capability when setting up your golden system, since you must have a system installed before you can get an image.

A: Installing the HP-UX Operating System

Although this can be performed without an Ignite-UX server by using `swinstall` from media, this example uses Ignite-UX and a network depot as the source of our software.

- Step 1.** On the Ignite-UX server, set up the 11i v1 core operating system to be distributed, enter the following commands:

```
/opt/ignite/bin/make_depots -r B.11.11 \  
-s server:/depots/11.11/B5725AA
```

where *server* is the name of the server on which the depot is located.

```
/opt/ignite/bin/make_config -r B.11.11
```

The `make_depots` command copies HP-UX 11i v1 (B.11.11) software at the SD depot pointed to by the `-s` option (this pathname depends on the setup of the SD depot you are accessing) onto the local Ignite-UX server.

Also, you can run `make_config` and point it to the remote depot directly. The `make_config` command then adds this software as a configuration available for Ignite-UX installations.

- Step 2.** Begin installing HP-UX onto the client golden system by booting the client from the Ignite-UX server:

- If the client is currently running HP-UX, enter:

```
bootsys -v -w -f -i "HP-UX B.11.11 \  
Default" client_hostname
```

where *client_hostname* is the name of the client.

- If the client is not currently running HP-UX, from the client console at the `boot admin` prompt, enter:

```
boot lan.ip_address install
```

where *ip_address* is the address of your Ignite-UX server.

For example, if the IP address of the Ignite-UX server is 10.2.70.9 the command to enter is `boot lan.10.2.70.9 install`.

- Step 3.** Select the configuration you have just set up, **HP-UX B.11.11 Default**, and continue with the next section.

B: Installing Critical Patches onto the Operating System

At this point, you should have a client with the basic HP-UX 11.11 release. If you have patches that you want to distribute to all users, install them now. This is normally done using the standard SD tools.

For example, to install patch PHSS_8375:

Step 1. Download and unshar PHSS_8375 to obtain two files: PHSS_8375.depot
PHSS_8375.text

Step 2. Install the patch noninteractively:

```
swinstall -x autoreboot=true -x match_client=true \  
-s /PHSS_8375.depot
```

These instructions can also be found in the PHSS_8375.text file.

C: Installing Optional Software

Load any optional HP and third-party software you want to make available to *all* clients. Keep in mind that you are creating a golden system, and anything you install is distributed to all clients installed using the golden image. You must keep in mind any licensing restrictions, as well.

HP software (such as compilers) is normally installed using SD from media or a network SD depot. Third-party software installation varies depending on the vendor.

IMPORTANT

Inclusion of multiple versions of Veritas Volume Manager from Symantec (VxVM) in the same installation depot, or in separate depots that are used together in a single cold-installation session, is not supported. Doing so renders it unusable and generates errors when attempting to use the installation depot, or in the case of non-SD depots during the reboot attempt. For more information, see “Considerations When Using Veritas Volume Manager from Symantec” on page 239.

D: Customizing the System

Perform any customizations that you want to distribute to all clients. These might include customized CDE login dialog boxes, base `/etc/passwd` files, additional phone tools and manpages, or corporate-wide default DNS and NIS setup. It would *not* include system, work-group or site-specific changes such as gateways, user accounts, or machine-specific networking; these are taken care of by Ignite-UX later.

Use the next steps to create the golden image from the golden system, and configure Ignite-UX to use it. The `make_sys_image` command is provided to assist in creating the golden image. For more information, see *make_sys_image* (1M).

IMPORTANT

Do not use the system while `make_sys_image` is running in the next step. Device files are removed, and the host and/or networking information on the system is reset. After the command is complete, these files are put back.

- Step 1.** On the golden system, copy
`/opt/ignite/data/scripts/make_sys_image` to `/tmp`.
- Step 2.** Set the permissions of `/tmp/make_sys_image` so that you can execute it.
- By default, `make_sys_image` stores the image in the `/var/tmp` directory. You can also have `make_sys_image` save the image to a remote server that enables remote access from this client. Whichever method you choose, you will need sufficient disk space to hold the image. The amount of disk space is approximately one half the amount of data contained on your golden system (assuming a 50 percent compression ratio.)
- Step 3.** On the Ignite-UX server, create an archives directory to store the golden image:

```
mkdir -p /var/opt/ignite/archives/Rel_B.11.11
```

The `-p` option creates intermediate directories. It is best to keep the naming conventions: `Rel_B.11.11` (or the release you are using.) This directory must be NFS exported if you are using NFS to transfer the archive to the client.

- Step 4.** Optionally, if you do not have enough disk space, or you want the archive created on a remote server, you may use the following options:

```
/tmp/make_sys_image -d directory_to_place_archive \  
-s destination_system_IP_address
```

- Step 5.** On the golden system, run:

```
/tmp/make_sys_image [options]
```

By default, this creates a gzip-compressed archive in `/var/tmp` with the name `hostname.gz` (where `hostname` is the name of the client) and all specific host information, device files, log files, and network information are removed.

IMPORTANT

If an error similar to the following appears:

```
ERROR: Cannot remsh server system_name (check server .rhosts  
file).
```

You must add the name of the client to the `/.rhosts` file on your Ignite-UX server as in the following example entry:

```
system_name root
```

The `make_sys_image` command can also build an image containing any combination of `tar`, `cpio`, `gzip` and compressed formats. HP recommends using `tar` for the archive format and `gzip` for compression.

For example:

```
/tmp/make_sys_image -d \  
/var/opt/ignite/archives/Rel_B.11.11 -s 10.2.72.150
```

Configuring the Ignite-UX Server to Recognize the Golden Image

To create an Ignite-UX configuration file for the golden image, use the example file: `/opt/ignite/data/examples/core11.cfg`

- Step 1.** Create a copy of the example configuration file:

```
cp /opt/ignite/data/examples/core11.cfg \  
/var/opt/ignite/data/Rel_B.11.11/core_archive_cfg
```

The destination file name is arbitrary. You can store configuration files anywhere on the system you chose. Ignite-UX manages the names and locations using the `/var/opt/ignite/INDEX` file (see Step 3.) This file must be accessible using `tftp`.

- Step 2.** Modify the `core_archive_cfg` file to set up the golden image for NFS transfer. (See the `sw_sel` example following these instructions. Use values appropriate for your systems.) Key changes are:

- a. In the `sw_sel` stanza, change the following:

```
nfs_source = "10.2.72.150:/var/opt/ignite/archives/Rel_B.11.11"
```

This points `nfs_source` to the directory where the archive resides, which must be NFS exported.

- b. In the `init sw_sel` stanza, change the following:

```
description = "Archive HP-UX 11.11 CDE"
```

This configuration will appear as an operating system environment choice on the Basic tab (see page 117) in the Ignite-UX GUI.

- c. Ensure that the following variable:

```
archive_path = "hostname.gz"
```

where:

`hostname` points to the actual file in combination with the `nfs_source` line in step a.

Configuring the Ignite-UX Server to Recognize the Golden Image

- d. Add `impacts` lines in the `init sw_sel` stanza by executing the following:

```
/opt/ignite/lbin/archive_impact -t -g archive_file
```

- e. Include the results in the file, replacing the example `impacts` lines. By default, this assumes that you created a `tar` archive that was then changed to `gzip` format.
- f. Review the `init sw_sel "English"` stanza and modify it for the locales you want available in the golden image.

The format of an entry in the locale list is

```
"<locale>:<description>"
```

where **<locale>** is the name of a locale shown in the output of the `locale -a` command run on the golden image system (for example: `ja_JP.SJIS`.) The **<description>** is a text string labeling that particular locale. The **<description>** text string cannot contain white space; if you need more than one word in the description, please use the underscore character. Locale list entries must be enclosed in double quotes.

For example, the following line would make available any of the Japanese or English locales on the system:

```
locale = { "ja_JP.SJIS:Japanese", "ja_JP.eucJP:Japanese",  
"ja_JP.utf8:Japanese", "SET_NULL_LOCALE:English",  
"C:English" }
```

The locale line in the configuration file should not be wrapped; it should be one continuous line. Never add locales that do not exist in the golden image.

Be aware that by listing a locale, it means that it can be selected via `itool`. Any locale present when the golden image is created will still be available on any system installed using this golden image, whether it is listed or not.

Here is the complete `sw_sel` stanza example:

```
init sw_sel "golden image" {  
  description = "Archive HP-UX 11.11 CDE"  
  sw_source = "core archive"  
  sw_category = "HPUXEnvironments"  
  archive_type = gzip tar
```

Configuring the Ignite-UX Server to Recognize the Golden Image

```

# For NFS, the path to the archive is relative to the mount
# point specified in the sw_source:
archive_path = "hostname.gz"
# ftp/remsh sources can use a full path:
# archive_path = "/pub/IUXarchives/B.11.11_CDE.gz"
impacts = "/" 23Kb
impacts = "/.dt" 35Kb
impacts = "/TT_DB" 18Kb
impacts = "/etc" 1375Kb
impacts = "/export" 1Kb
impacts = "/opt" 74079Kb
impacts = "/sbin" 13449Kb
impacts = "/stand" 1Kb
impacts = "/tmp" 1Kb
impacts = "/usr" 225459Kb
impacts = "/var" 5736Kb
} = TRUE

```

Step 3. Add the new configuration file (`core_archive.cfg`) to Ignite-UX:

Edit the `/var/opt/ignite/INDEX` file to install a new configuration to Ignite-UX. For this example, add a new `cfg` stanza as follows:

```

cfg "HP-UX B.11.11 archive" {
    description "some description of this archive..."
    "/opt/ignite/data/Rel_B.11.11/config"
    "/var/opt/ignite/data/Rel_B.11.11/core_archive_cfg"
    "/var/opt/ignite/config.local"
}

```

The line of most interest is the one containing `core_archive_cfg`. The `config` and `config.local` files contain default configurations.

The `/var/opt/ignite/config.local` file should be the last file in the `cfg` stanza. The last configuration file has the highest priority and can override values in the configuration files listed before it.

The file `/opt/ignite/data/Rel_B.11.11/config` supplies the disk and file system layout defaults, plus other control information required by Ignite-UX. It must be first in every `cfg` stanza.

Each `cfg` stanza appears as an available configuration to Ignite-UX. Therefore, the string `HP-UX B.11.11 archive` now appears as a valid configuration.

Step 4. Ensure that the NFS file system is exported correctly.

Configuring the Ignite-UX Server to Recognize the Golden Image

In the `sw_source` stanza in the example in the previous step, we specified the location of the golden image to be a file on an NFS server. You need to ensure clients have access to this directory.

Make sure the NFS configuration is correct. To view the current status and ensure the directory containing the image is correctly exported, enter:

```
exportfs -v
```

Ignite-UX automatically tries to export `/var/opt/ignite/clients` for its use. In our example, `/var/opt/ignite/archives/Rel_B.11.11` must also be exported because that is where we placed the golden image.

Here is our `/etc/exports` file:

```
/var/opt/ignite/clients -anon=2  
/var/opt/ignite/archives/Rel_B.11.11 -ro,anon=2
```

If these are not correct, use SAM to set them up correctly.

Enabling the Client

Since the Ignite-UX server now knows about your new golden image, you can use Ignite-UX to install the golden image onto a client. To do this, you need to get the client to inform the Ignite-UX server that it is ready to install a new operating system. There are two methods for doing this.

Method 1:

If the system is currently running HP-UX 11.00 or later versions

— From the Ignite-UX server, use `bootsys` to reboot the client for which you want to install the new operating system. The client can be booted in a mode in which it can be controlled by the Ignite-UX user interface.

```
/opt/ignite/bin/bootsys -w -v client_name
```

This causes the client to boot a copy of the Ignite-UX kernel and file system that `bootsys` copies to the client. An icon representing the system appears in the Ignite-UX GUI on the Ignite-UX server when the client has completed the boot process, which can take several minutes.

NOTE

If the client had HP-UX 11i v2 (B.11.23) previously installed and you attempt to use the `-R release` option of `bootsys` to install HP-UX 11i v1 (B.11.11), you must use the `-f` option to override the previous installation. If you do not use the `-f` option, the installation will not continue and an error similar to the following appears:

```
ERROR: The target release "B.11.23" does not match the release  
"B.11.11" referenced by "previous config name" in  
"per client config file". Use the -f option to bootsys  
to cause removal of "per client config file" if you wish  
to install "B.11.23".
```

If the Ignite-UX server cannot resolve the client name, specify to `bootsys` the `client_name` and `IP_address`:

```
/opt/ignite/bin/bootsys -w -v client_name:IP_address
```


Method 2:

If the system does not have an operating system — Manually reboot the system. Interrupt the boot process and select the Ignite-UX server as the LAN boot source. This command is slightly different depending on your client.

For example, to install to a C8000 workstation, from the `boot admin` prompt, enter:

```
boot lan.10.2.72.150 install
```

You could use this command by replacing the IP/Ethernet addresses with the correct value for your Ignite-UX server. When prompted with a message about interacting with the Initial System Loader (IPL), respond **NO**.

Installing the Golden Image on the Client

In this section, you will use Ignite-UX to customize an operating system installation. Chapter 9, “Automating Installations,” on page 195 explains how to execute an installation with no interaction.

- Step 1.** Run the Ignite-UX GUI by executing this as `root`:

```
/opt/ignite/bin/ignite
```

When the client has rebooted (using either `bootsys` or manual network boot) and is ready for installation, it appears as an icon labeled with its original hostname (if rebooted using `bootsys`), by the hostname supplied by DHCP, or in the Ignite-UX GUI.

- Step 2.** Select or click on the client you want to install.
- Step 3.** From the Actions menu, select **Install Client** and click **New Install**.

The Ignite-UX GUI installation tabs appear. For more information, see “New Installation” on page 115

- Step 4.** On the Basic tab select **HP-UX B.11.11 archive** using the button adjacent to Configurations:.
- Step 5.** Ensure that the Root Disk, Root Swap and other fields are correct for your installation.

CAUTION

Any disks you select here are overwritten. If you have a disk with existing user information that you do not want to modify, add it manually after Ignite-UX has installed the operating system.

- Step 6.** On the Software tab, there are no changes needed because there is only an archive at this point so the dialog box is blank. A patch and application depot are added later in the process.
- Step 7.** Click on the System tab, and then click **Set parameters now**, which is adjacent to Final System Parameters:.

Fill in the appropriate data under Set Time Zone, Network Services... and optionally, Set Root Password.

- Step 8.** Click on the File System tab and verify the correct disk usage parameters are set. You can also add disks at this point or modify the disk and file system parameters.

NOTE

A `newfs` is performed on all selected disks.

- Step 9.** On the Advanced tab there are no changes needed at this time.
- Step 10.** When finished entering data, select **Go!**. Review the data in the configuration dialog box and select **Go!** again.
- Step 11.** To display client installation status, double-click the client on the Ignite-UX GUI during execution.

When the installation process is complete, the client should have the new operating system installed, a new kernel built, and the system rebooted and ready for use. Status of the client is shown on its icon, and in the status dialog box.

Ignite-UX determines the state of a client by reading the files in the `/var/opt/ignite/clients/0xLLA` directory. Seeing an icon on the Ignite-UX GUI does not mean that the client actually exists, only that its configuration and control files exist in the Ignite-UX directories. We can use this behavior to our advantage to reinstall systems. This means that if you are reinstalling a system that Ignite-UX has already installed, you may need to either execute `bootsys` again or boot the client from the Ignite-UX server.

8 Customizing Your Installation

This chapter introduces Ignite-UX configuration files, provides examples of how you can use them, and offers debugging tips. Additionally, it describes how to create local customizations for clients using post-installation scripts, and how to exclude software patch files from archives. The topics discussed are:

- Using Configuration Files (see page 174)
- Avoid Archiving Patch Files (see page 189)
- Debugging Configuration Files (see page 190)
- Using Post-Installation Scripts (see page 191)

Using Configuration Files

Ignite-UX is driven by **configuration files**, which define how clients are installed and configured. A configuration file can be thought of as a set of instructions. Ignite-UX provides a set of default configuration files when you install the product. These default configuration files are used until you change or customize them for use in your environment. By creating your own custom installation configurations, you can:

- Save time during installation
- Ensure standard configurations for similar clients
- Create configurations specific to operating system version or hardware architecture
- Automate all manner of tasks that would otherwise require manual intervention

The configuration file is expressed in a human- readable language, which is fully defined in *instl_adm* (4). The configuration file language is much like other programming languages in that it supports the use of variables and conditional expressions. You can create configuration files directly or by using the Ignite-UX GUI.

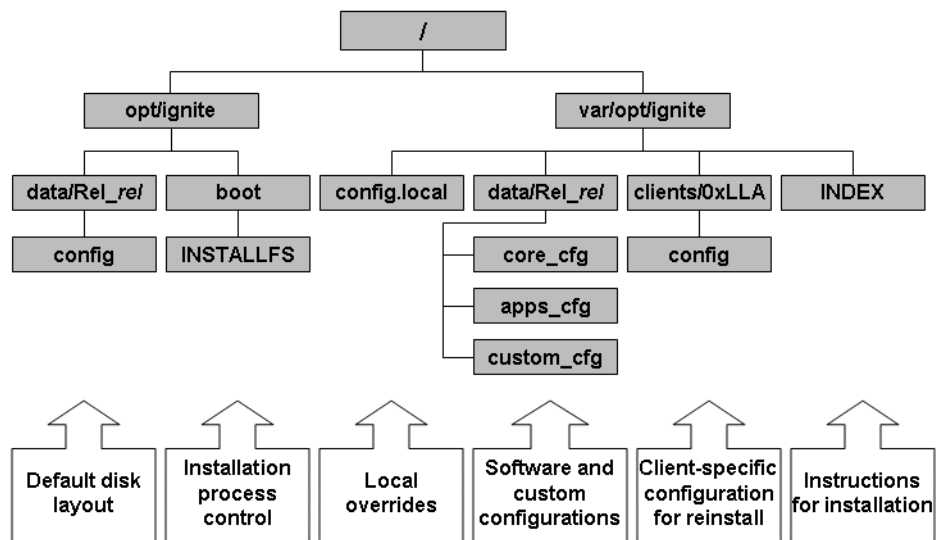
Most of the important elements that make up an installed system are described in the configuration files:

- Identity of the client, presence of network configuration, and kernel modifications (additional drivers or tunable parameter settings)
- Disk and file system layout
- Software to be installed
- User-defined scripts that run at various points in the installation process to further customize the client

Classes of Configuration Files

The configuration files used by Ignite-UX during the installation process logically group similar information into classes by operating system and functionality. Figure 8-1 illustrates the classes of configuration files and their locations.

Figure 8-1 Configuration File Use and Locations



Ignite-UX processes `config` files in the order shown below. The following description of each class explains how the various installation parameters can be progressively overridden:

1. **Installation control parameters** - You can define the behavior of the installation process using parameters stored within the segment of the installation file system that is reserved for configuration parameters (the first 8 KB). This configuration file location is special because it is available to Ignite-UX very early in the boot process. Some parameters that control installation must be specified here. You can specify defaults for parameters, such as:

- IP address of the Ignite-UX server
- Whether to halt the client when the installation is complete
- Whether to execute installation of new clients from the Ignite-UX server GUI

Table 8-1 lists the installation kernel and file system names and supported hardware architecture.

Table 8-1 **Installation Kernel and File System Names by Hardware Architecture**

Hardware Architecture	Kernel Name	File System Name
PA-RISC 32-bit	INSTALL	INSTALLFS
PA-RISC 64-bit	WINSTALL	WINSTALLFS
Itanium-based	IINSTALL	IINSTALLFS
V-Class	VINSTALL	VINSTALLFS

These installation kernels and file systems are located in the `/opt/ignite/boot/Rel_release` directory. Installation kernels are normally hard linked, such that `INSTALLFS`, `WINSTALLFS`, `IINSTALLFS`, & `VINSTALLFS` files are one and the same. Ignite-UX uses the `INSTALLFS` file system as a default unless an alternate is specified using the `-F` option of the `instl_adm` command. For more information, see *instl_adm* (1M).

Control parameters, such as `run_ui`, `control_from_server`, and `disable_dhcp`, can only be specified in the installation file system configuration area and are accessed early in the installation process when this area is available. Boot control parameters are detailed in the `Control Parameters` section of *instl_adm* (4).

You must use *instl_adm* (1M) to add, change, or delete these boot control and network definitions.

NOTE

Before upgrading to a new version of Ignite-UX, consider retaining the current control parameters, located in the first 8 KB of your installation file system, so that you can reapply them after you have successfully updated your Ignite-UX server.

Extract the current parameters into a file, with the following command:

```
instl_adm -d -F [W|V|I]INSTALLFS > first8k_param_file
```

Edit the `first8k_param_file` to define your control parameters. Check your syntax with the following command:

```
instl_adm -T -f first8k_param_file
```

If you want to reapply these control parameters to all installation file systems on your Ignite-UX, use the following command:

```
instl_adm -f first8k_param_file
```

If you want these control parameters applied to only one specific installation file system, use the `-F` option. For more information, see *instl_adm* (1M).

-
2. **Default disk and file system layout** - The capabilities of each operating system release differ somewhat so HP supplies a different set of disk and file system layout configuration defaults for each release. These configuration files are located in:

```
/opt/ignite/data/Rel_release/config
```

Enter **uname -r** on the command line to determine the *release*. For example, the file that contains the default disk layout for HP-UX 11.11 would be in:

```
/opt/ignite/data/Rel_B.11.11/config
```

as revealed by the `uname -r` command.

3. **Software description of a single SD depot** - Configuration files that describe software available from SD depots can be automatically generated using the `make_config` tool within Ignite-UX. This tool produces one configuration file per SD depot. Software description configuration files are located in:

```
/var/opt/ignite/data/Rel_release/*
```

4. **Software description of an archive** — You can create configuration files to enable access to archives (templates are provided with Ignite-UX in `/opt/ignite/data/examples/` to give you a good starting point). Archive software description configuration files are also located in:

```
/var/opt/ignite/data/Rel_release/
```

5. **Local configuration overrides that apply to all clients** - It is often convenient to specify defaults to be applied to every client, in addition to the necessary operating system configuration installed from a particular Ignite-UX server. For example, you might want to specify the same NIS domain for all systems. You must include this type of configuration override information in:

```
/var/opt/ignite/config.local
```

This file is not overwritten when the operating system is updated.

6. **Client-specific configuration file** - This file contains specific directives appropriate for a specific system to override what may have been defined as general defaults for all systems in earlier configuration files. For example, you might want to customize the disk layout beyond what the operating system release defaults allow in:

```
/opt/ignite/data/Rel_release/config
```

The unique customizations appear in the directory dedicated to the client by Media Access Control (MAC) address or link-level address (LLA) address:

```
/var/opt/ignite/clients/0xLLA/config
```

This file is created when you use the Ignite-UX GUI to specify the client configuration.

7. **Creating and saving custom configuration choices** - You can create your own custom configurations using the Ignite-UX GUI, save them for repeated use, and easily select them when installing clients. For example, you might have a large number of users with similar systems who all run Computer Aided Design (CAD) tools. You could build a configuration that defines all necessary parameters and save it in a configuration called `CAD System`. When you want to install a new system for a CAD user, you can select **CAD System** from the GUI and you are done (or you could customize it further using `CAD System` as the template). Saved configurations are located in: `/var/opt/ignite/saved_cfgs/`

NOTE

Configuration files are often referred to as **config files** because the word configuration is shortened to create file and directory names. For example, a client's local configuration file is `config.local`.

You can build your own configuration files that specify the various installation parameters you are interested in, and then combine them in arbitrary ways into any number of different custom configurations using the `/var/opt/ignite/INDEX` file. Place these custom configuration files in one of the HP-UX release-specific operating system directories:

```
/var/opt/ignite/data/Rel_release/*
```

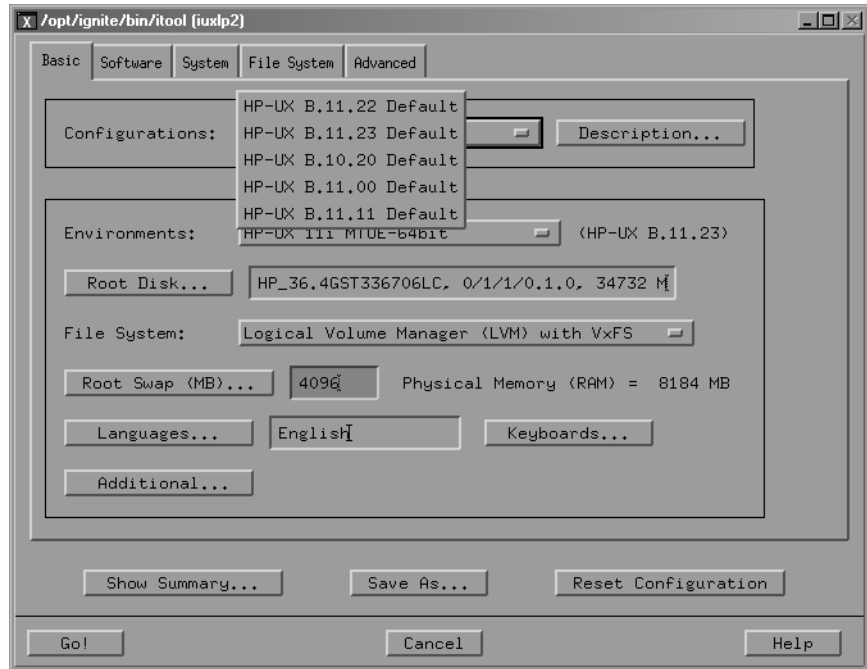
The next section describes how to combine multiple configuration files (default or customized) to define a single configuration.

Combining Configuration Files Using INDEX Entries

Grouping configuration files into useful configurations is accomplished in `/var/opt/ignite/INDEX`. This file contains a list of configurations in separate stanzas; each comprising one or more configuration files that define an installation. Each configuration stanza, or clause, begins with `cfg` and a name by which the configuration is known.

You can view these configuration names using the `instl_adm` command. When installing a new client from the Ignite-UX GUI, you can view these configurations by clicking the button adjacent to Configurations... on the Basic tab by as shown in Figure 8-2.

Figure 8-2 Configuration Choices Dialog Box



A typical `/var/opt/ignite/INDEX` file might contain stanzas similar to the following excerpt:

```
.  
. .  
cfg "HP-UX B.11.23 Default" {  
    description "Default B.11.23 release configuration."  
    "/opt/ignite/data/Rel_B.11.23/config"  
    "/opt/ignite/data/Rel_B.11.23/core_cfg"  
    "/opt/ignite/data/Rel_B.11.23/hw_patches_cfg"  
    "/var/opt/ignite/config.local"  
} = TRUE  
. .  
cfg "CAD System-11.23" {  
    description "Supplies the CAD System configuration."  
    "/opt/ignite/data/Rel_B.11.23/CAD_config"  
    "/opt/ignite/data/Rel_B.11.23/CAD_core_cfg"  
    "/opt/ignite/data/Rel_B.11.23/hw_patches_cfg"  
    "/opt/ignite/data/Rel_B.11.23/CAD_sw_sels_cfg"  
    "/var/opt/ignite/config.local"
```

```
}  
.  
.  
.
```

With this `/var/opt/ignite/INDEX` file, the Ignite-UX GUI would present two configurations: **HP-UX B.11.23 Default** and **CAD System-11.23**. The **HP-UX B.11.23 Default** configuration is the default because that `cfg` stanza is set to `TRUE`. After choosing a configuration, you can further customize the configuration using the GUI, or accept the configuration defaults to begin the installation immediately.

The order of the configuration files within a `cfg` stanza is significant; attributes specified in a later configuration file can override the same attributes specified in an earlier configuration file. Two configuration files are used implicitly every time:

- Any information stored in the first 8 KB of `/opt/ignite/boot/Rel_release/[W|V|I]INSTALLFS` is implicitly prepended to each configuration list and is the first configuration data processed.
- The client-specific configuration file `/var/opt/ignite/clients/0xLLA/config`, if it exists, is implicitly added as the last configuration file for each configuration.

A default `cfg` stanza for each release is shipped as part of Ignite-UX. Additional `cfg` stanzas are added when you:

- Save a named configuration from the GUI with the **Save As** button.
- Create a configuration by modifying the `/var/opt/ignite/INDEX` file directly.
- Use the `manage_index` file to automate `/var/opt/ignite/INDEX` file modifications.

NOTE

To facilitate client recovery configurations, a `CINDEX` configuration file, similar to an installation `INDEX` file, is created. For more information, see Chapter 11, “System Recovery,” on page 235 or see `manage_index` (1M) and `make_net_recovery` (1M).

Additionally, you can specify how installation software is handled by Ignite-UX using the following three constructs:

- A `sw_source` specifies an SD depot or an access method to a server containing software depots.
- The `sw_sel` specifies the software contained in the SD depot or specifies the path to a depot on the server or media. Typically there is one `sw_sel` definition per software bundle or depot. (See the `cfg` “*CAD System-11.23*” stanza in the example that follows Figure 8-2 for an sample of the `sw_sel` construct.
- The `sw_category` is simply a mechanism for grouping `sw_sel` definitions.

For more information, see *instl_adm* (1M).

Be sure to pass all user-generated configuration files through the following command to check for syntax errors:

```
instl_adm -T -f cfg_file
```

Example Configuration Files

This section shows a few example configuration files to give you an idea of their look and capabilities. For a complete description of Ignite-UX configuration files, see *instl_adm* (4).

For additional examples of configuration files, see the white paper, *Ignite-UX Custom Configuration Files* available on the "Information Library" page of the Ignite-UX Web site:

<http://www.docs.hp.com/en/IUX/infolib.html>

Defining Disks

This example shows how a disk might be defined. Here, the disk is located at hardware address 2/0/1.6.0 and does not use Logical Volume Manager (LVM) or Veritas Volume Manager by Symantec (VxVM). The disk contains the root (/) file system and a swap area. The swap area takes up 512 MB and the root file system assumes the remainder:

```
partitioned_disk
{
    physical_volume disk[2/0/1.6.0]
    fs_partition {
        usage = HFS
        size = remaining
        mount_point = "/"
    }
}
```

```

swap_partition {
    usage = SWAP
    mount_point = "primary"
    size = 512
}
}

```

Combining Disks to Form a Single Volume Group

You can put two disks together to form a single volume group. Two file systems are defined; both are striped across both disks. The following example illustrates this concept:

```

volume_group "appsvol" {
    usage=LVM
    physical_volume disk[2/0/1.5.0] {
    }

    physical_volume disk[2/0/1.4.0] {
    }

    logical_volume "apps1" {
        mount_point = "/apps1"
        usage = VxFS
        size=30% free
        minfree = 5
        stripes = 2
    }

    logical_volume "apps2" {
        mount_point = "/apps2"
        usage = VxFS
        size = remaining
        minfree = 5
        stripes = 2
    }
}

```

The preceding example uses LVM as the volume manager. However, it is also applicable to VxVM if `usage=LVM` is changed to `usage=VxVM`.

The first file system, `/apps1`, is sized by calculating the amount of space required by the software that is to be installed, and then adding 30 percent for free space. The second file system, `/apps2`, uses the remaining space on the disks.

NOTE

You can modify the file system volume sizes in the recovery image when the image is installed. By default, Ignite-UX ensures that there is 10 percent free space for each volume and modifies the file system volume size accordingly. If you do not want Ignite-UX to modify the file system volume sizes automatically, add `init _hp_ignore_sw_impact=1` to your `/var/opt/ignite/recovery/latest/system_cfg` file, or to the `/var/opt/ignite/clients/0xLLA/recovery/latest/system_cfg` file and the `0xLLA` indicates the client's link-level address (or MAC address).

Defining Networking Parameters

The following example lines define a few of the network parameters that are assigned to the system after it has been installed:

```
final system_name = "acorn1"
final ip_addr["lan0"] = "10.99.45.123"
final netmask["lan0"] = "255.255.255.0"
final nis_domain = "nis1"
final route_gateway[0] = "10.99.45.1"
```

Defining an Installation Depot

The next example defines a single SD depot from which software can be installed. Two different pieces of software are defined for the SD depot. Each can be selected independently for installation. The `impacts` lines tell Ignite-UX how much space this software requires in a given directory. This information is used to size the file systems correctly. The `sw_category` construct enables you to group the software so that the GUI can present it in chunks that make sense to you. Because this example references an SD depot, it could have been created by `make_config`:

```
sw_source "ee_apps_depot" {
    description = "Electrical Engineering Application Depot"
    source_format = SD
    source_type = "NET"
    sd_server = "10.23.45.6"
    sd_depot_dir = "/var/opt/ignite/depots/Rel_B.11.11/ee_apps"
}
sw_category "Applications" {
    description = "User Applications"
}
sw_sel "EE CAD Package" {
    sw_source = "ee_apps_depot"
    sw_category = "Applications"
    sd_software_list = "EECad,r=1.2,a=HP-UX_B.11.11"
    impacts = "/var" 90524Kb
    impacts = "/sbin" 1248Kb
}
```



```

}
sw_sel "EE Routing Package" {
    sw_source = "ee_apps_depot"
    sw_category = "Applications"
    sd_software_list = "EERoute,r=2.4,a=HP-UX_B.11.11"
    impacts = "/usr" 12568Kb
    impacts = "/var" 26788Kb
}

```

Customizations Based on the Client Hardware

The configuration file syntax provides a large number of system attribute keywords that describe the client. Some examples are:

<code>disk[<i>hw_path</i>].size</code>	size of the disk at the specified <i>hw_path</i>
<code>memory</code>	amount of memory present on the client
<code>hardware_model</code>	string returned from <code>uname -m</code>
<code>lla</code>	MAC (or LLA) address of the client

Using the logical expressions provided by *instl_adm* (4), you can use system attribute keywords to construct expressions in configuration files so that a particular stanza is only included in specific client situations. The basic format of these stanzas is:

```
(x) {y}
```

which translates roughly to "if the expression *x* is true, then do *y*."

For example, this stanza sets the size of two kernel tunable parameters if the client has more than 4096 MB of memory:

```

(memory > 4096MB) {
    mod_kernel += "nproc (20+100*MAXUSERS)"
    mod_kernel += "maxuprc 1000"
}

```

As another example, use this if you want to run a script to do some particular graphics customizations, but you only want to do so when the client has the appropriate hardware:

```

(graphics[0].planes > 0) {
    post_config_script +=
        "/var/opt/ignite/scripts/multi_plane_graphics"
}

```

You can also specify multiple conditions. The following example installs a particular piece of previously defined application software if the client is a supported PA-RISC or Itanium-based server or workstation having at least two disks. A message lets you know why it is happening:

```
( (HARDWARE_MODEL ~ "9000/7.*" | MODEL ~ "ia64 .* workstation .*")
& (num_disks >= 2) ) {
    note += "Installed application software contained in apps1."
    init sw_sel "apps1" = TRUE
```

You must use both `HARDWARE_MODEL` and `MODEL` because of the differences in the way the `uname` and `model` commands work on Itanium-based systems. For example on an Itanium-based client you can use the following commands to find this information:

```
uname -m
```

```
# ia64
```

```
model
```

```
# ia64 hp workstation zx2000
```

Notice that the response from the `uname` command is truncated so it is not possible to determine if the client is a server or a workstation, whereas on a PA-RISC client, the same command results in the following:

```
uname -m
```

```
# 9000/785
```

```
model
```

```
# 9000/785/J6000
```

Additionally, you can add an `else` stanza so that a choice can be executed automatically. The following example uses a generic variable capability and mathematical expressions to set the primary swap size based on the amount of memory in the client:

```
(memory > 512Mb) {
    init _hp_pri_swap = 512Mb
}
else {
    init _hp_pri_swap = memory * 2
}
```

The preceding examples represent a few of the numerous ways that system attribute keywords can be used in client configurations and should not be considered an exhaustive list.

Customizations Based on User Selection

One of the ways you can use Ignite-UX to your advantage is to create a customized configuration independent of the client's hardware setup that can be selected for use repeatedly. For example, you might have some clients that you intend to use as NFS file servers and you would like to be able to quickly install these clients by selecting the same configuration from the GUI.

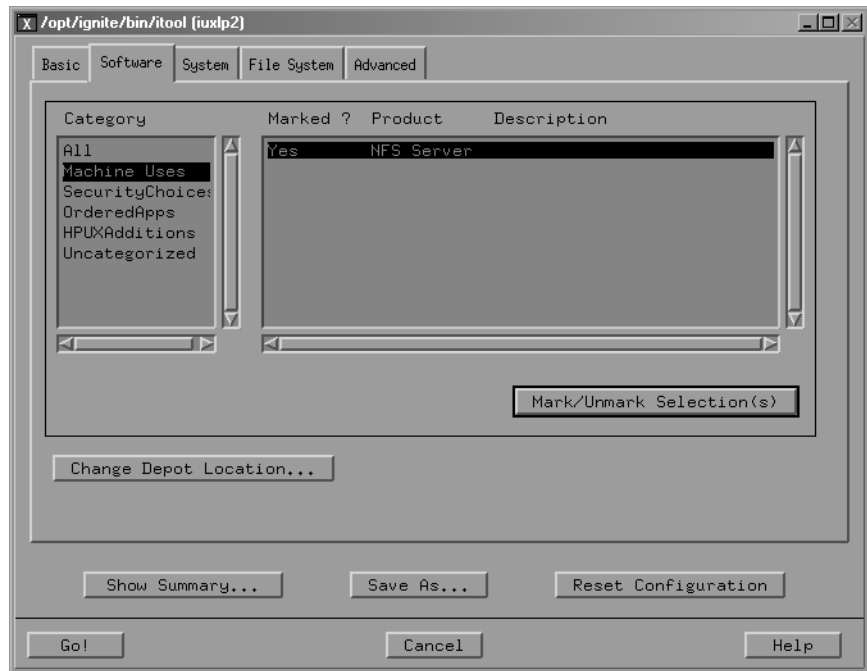
Let's assume that you have found NFS file servers to be more efficient if two of their kernel parameters are modified. NFS file servers also require some changes to the `/etc/rc.config.d/nfsconf` file using the `ch_rc` command.

One alternative to effecting these changes manually is to define a custom software selection in `/var/opt/ignite/config.local` with a `sw_sel` stanza, which then becomes a selection on the Software tab when you are configuring a new client installation. For example, the following stanzas would automatically configure your NFS file servers:

```
sw_source "special configs" {
    source_format = cmd
}
sw_sel "NFS Server" {
    sw_category = "Machine Uses"
    sw_source = "special configs"
    mod_kernel += "dbc_min_pct 35"
    mod_kernel += "dbc_max_pct 65"
    post_config_cmd += "
        /usr/sbin/ch_rc -a -p NFS_SERVER=1
        /usr/sbin/ch_rc -a -p NFS_CLIENT=1
        /usr/sbin/ch_rc -a -p NUM_NFSD=8"
}
```

Figure 8-3 shows the Software tab when the NFS server configuration file is used. As shown, the selected category is Machine Uses as defined in the configuration file using the `sw_category` stanza as in the previous example. This selection causes the kernel modifications and the `ch_rc` commands to be applied during the installation in addition to the other software categories that you select.

Figure 8-3 **Software Tab**



Using the installation tabs to configure client installations is explained in Chapter 6, “Installing HP-UX on Clients from the Server.”

Avoid Archiving Patch Files

When you install HP-UX patches from SD depots, the files that are patched are normally saved, in case you want to remove the patch at a later date. However, doing this takes up additional space in the `/var` directory, so you might want to turn this feature off.

The way you control this feature depends on whether you are installing HP-UX 11.00 or 11i. It also differs if the patches are coming from the core depot and being controlled by the `hw_patches_cfg` configuration file. See `/opt/ignite/share/doc/ace_hwe_setup` for more information about `hw_patches_cfg`.

In general, you can control this feature by using the following option of the `swinstall` command:

```
-xpatch_save_files=[false|true]
```

You can specify `swinstall` options in configuration file using the `sd_command_line` keyword either at the global level or within individual `sw_source` stanzas, depending on whether you want it specified for all installations or just for certain ones.

For patches in the operating system depot, this option is specified in the `/opt/ignite/data/Rel_release/hw_patches_cfg` file. It is controlled by the configuration file variable `_hp_patch_save_files` and can be modified from the Ignite-UX GUI using the Additional Configuration Controls dialog box. For more information, see the “Additional... Button” on page 122.

To specify this option at the global level (for example in the `/var/opt/ignite/config.local` file), you can add the following line:

```
sd_command_line += " -xpatch_save_files=false "
```

To default the variable controlling the operating system patches to no, add the following to `config.local` (which must be listed after `hw_patches_cfg` in the `/var/opt/ignite/INDEX` file):

```
init_hp_patch_save_files = "NO"
```

For more details, see the "Managing Patches" chapter in the *Software Distributor Administration Guide* and the *Patch Management User Guide for HP-UX 11.x Systems*.

Debugging Configuration Files

Designing a configuration file to meet your needs can be a very tedious task. It usually requires a lot of trial and error. You will need to install systems to test your configuration files. The `instl_dbg` command is designed to help you with configuration file design and avoid wasting time attempting to install with invalid configuration files. With the `instl_dbg` command you can:

- Parse a client's configuration files for syntax errors.
- Display and set variables, software selections, and use models.
- Detect errors that may occur during a client installation due to faulty configuration files, such as missing software depots/archives.

After you have developed a new configuration file, run the `instl_dbg` command from the Ignite-UX server to ensure that there are no errors in your configuration files. The `instl_dbg` command first scans for any syntax errors. Then, `instl_dbg` substitutes variables, use models, and software selections (`sw_sel`) with real values, and writes a single, unified configuration file if the `-f` option is specified. Now, you can use this file to install the client. Other options are available for more thorough checking or to provide more details. For more information, see *instl_dbg* (1M).

Examples

Enter the following command to debug a client configuration file named `system1`, print the debugged configuration file to `stdout`, and then save the debugged configuration file to a new file, `system1_cfg.out`:

```
instl_dbg -D /var/opt/ignite/clients/system1 -d \  
-f system1_cfg.out
```

To debug this same client configuration file, `system1`, to show the effects upon the disk layout when the `_hp_disk_layout` and `_hp_pri_swap` values are changed, and then print the "very, very verbose" (`-vvv`) output to the console and to the `system1_cfg.out` file, you would enter the following command:

```
instl_dbg -D /var/opt/ignite/clients/system1 -d \  
-V _hp_disk_layout="Whole disk (not LVM) with HFS" \  
-V _hp_pri_swap=500MB -vvv -f system1_cfg.out
```

For more information, see *instl_dbg* (1M).

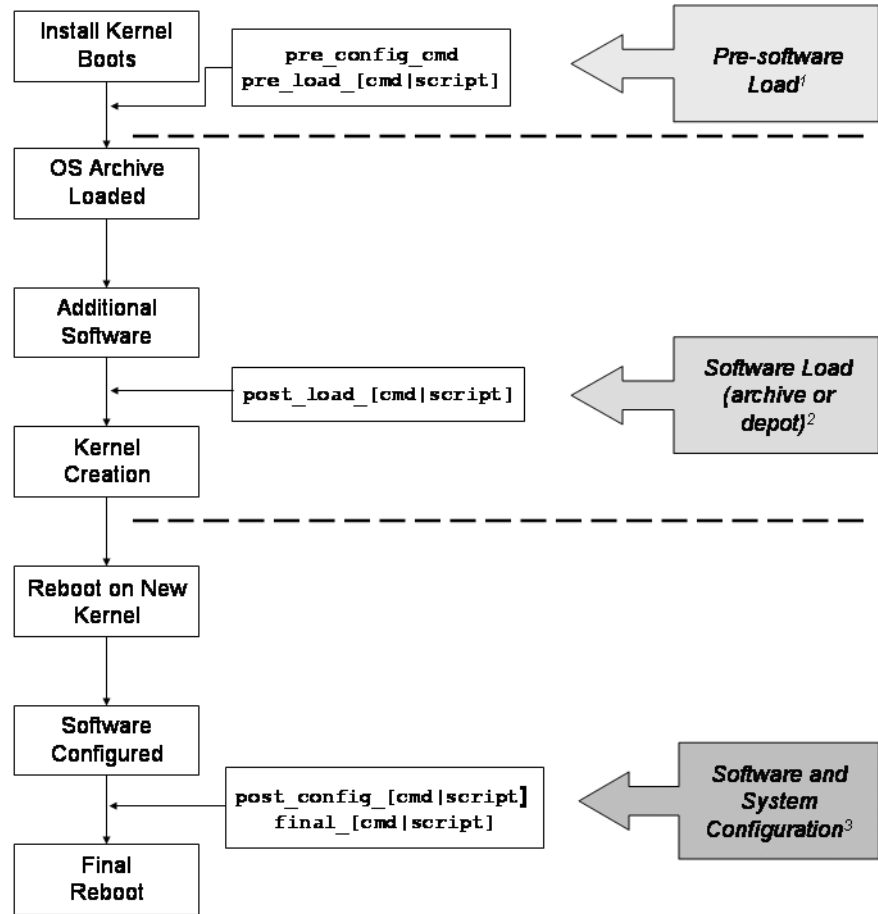
Using Post-Installation Scripts

You can perform any number of tasks on a client after installing the operating system by providing a script to be executed. This section provides some common examples to assist you. Additionally, you can write your own scripts to mount additional disk drives, add additional software, or modify configurations based on system use.

How the Installation Functions

It is important to understand how an installation functions when using Ignite-UX. The diagram in Figure 8-4 illustrates when the various commands and scripts are executed during the installation process.

Figure 8-4 Installation Process



¹ The commands available are very limited and execute before any volume groups or disk groups are created.

² The available pre-load commands are limited and the script executes before any archives or depot-based software are installed.

³ The `install.log` file is closed, then the final scripts execute; any messages that are generated appear only on the console.

There are a number of points in the installation process in which you can force scripts or commands to be run. See the "Command and Script Execution Hooks" section of *instl_adm* (4) for specifics.

Adding a Post-Installation Script

Example

One task you generally need to perform after a new operating system installation is setting up printers. To automate this process, you can write a script that performs the HP-UX commands for adding a printer.

Following is a script for adding a remote printer named `remotepriinter`, making it the default printer, and then enabling the printer so that it is ready the next time that the `lp` scheduler is started:

```
#!/usr/bin/sh
# Post process IUX script to add a local default printer
# Performing task "Add Remote Printer": Adding "remotepriinter"
#
/usr/sbin/lpadmin -premotepriinter -ormserver.com -orptsslj \
  -mrmodel -v/dev/null -orc -ocmrcmodel -osmrsmodel
/usr/sbin/lpadmin -dremotepriinter
/usr/sbin/accept remotepriinter
/usr/bin/enable remotepriinter
```

NOTE

Make sure that the directory the post-installation script resides in is available to `tftp` by examining and changing the `/etc/inetd.conf` file.

- Step 1.** Create a script to set up access to a default network printer.
- Step 2.** Ignite-UX post-installation scripts are defined using the `post_config_script` variable. To add the script you created in the previous step, edit your `core_cfg` configuration file and add the following line:

```
post_config_script += \
"/var/opt/ignite/scripts/install_default_printer"
```

This sets the `install_default_printer` script to be run as a post-installation process on the client. This line should stand alone, and be placed *outside* of any stanzas in the file (such as a `sw_sel` stanza). The script set to execute with the `post_config_script` variable executes

Using Post-Installation Scripts

after all software has been installed and the system has been booted with its final kernel, but *before* any of the normal `/etc/rc` startup scripts have been run.

You can change the default installation script behavior from the Actions menu, by choosing **Install Client**, and then choosing **New install**. Then click on the Advanced tab and select the post-installation scripts that you want to be executed.

TIP

If you want to make a script available under all configurations, add it to the `/var/opt/ignite/INDEX` file. For example, to execute the `install_default_printer` script following every client installation, add the following line to the end of this file:

```
scripts {"var/opt/ignite/scripts/install_default_printer"}
```

This script is made available for selection on the Advanced tab for all configurations. For more information, see “Advanced Tab” on page 148.

9 Automating Installations

This chapter shows how to use the `bootsys` command and configuration files to automate the Ignite-UX installation process. The topics discussed are:

- Starting a Noninteractive Installation with `bootsys` (see page 196)
- Using a Saved Configuration (see page 197)
- Specifying Defaults in the `config.local` File (see page 198)
- Setting Defaults with `instl_adm` (see page 199)
- Using the Per-Client Configuration File (see page 200)
- Scheduling Installations (see page 203)
- Setting Installation Parameters Dynamically (see page 204)

Starting a Noninteractive Installation with `bootsys`

Ignite-UX can install HP-UX on a client noninteractively using the default configuration specified in the `/var/opt/ignite/INDEX` file for the given operating system. The `/var/opt/ignite/INDEX` file can have a unique stanza for each operating system you want to support. Alternatively, you can choose from other configurations that exist as unique stanzas in the `INDEX` file to use with `bootsys (1M)` from the command line.

To start an automatic, noninteractive installation, execute the `bootsys` command from the server as follows:

```
bootsys -a -v [-i configuration] [-f] client_hostname
```

`-a` Specifies an automatic installation.

`-v` Specifies verbose mode.

`-i` Specifies a default configuration for installing the client. If not set, the default specified on the Ignite-UX server is used. If an incorrect configuration or one that does not match the last configuration saved for the client is selected and the `-f` option is not used, an error results.

`-f` Forces Ignite-UX to disregard and delete the previous configuration information that was saved for a client during the last installation.

You can define the default configuration from the Ignite-UX GUI Server Options menu (see “Configuring Server Options” on page 68), or you can set it manually with a `=TRUE` statement immediately following the closing of a `cfg` stanza in the `/var/opt/ignite/INDEX` file.

After you have initiated the installation, Ignite-UX contacts the client and extracts its hostname, IP address, and default gateway. The configuration that you specified is installed. After the installation completes, Ignite-UX resets the hostname, IP address, and gateway to their original values. This installation configuration is then automatically saved, or overwritten if one exists, for this client and can be reused the next time an installation is needed. For `bootsys` to function, access to the client using `remsh` is required; if a remote shell is not available, the `bootsys` command prompts you for the `root` password of the client.

A noninteractive installation using `bootsys` is the quickest way to install a client. You can install a client with a custom configuration using `bootsys` with the following simple four-step process:

1. Create the configuration files that describe how you want the client to be installed.
2. Save the configuration files that you created.
3. Add a `cfg` stanza to the `/var/opt/ignite/INDEX` file that describes your custom configuration.
4. Execute the `bootsys` command, specifying the custom configuration.

For more information regarding configuration files, see “Using Configuration Files” on page 174 and the white paper, *Ignite-UX Custom Configuration Files*, available on the "Information Library" page of the Ignite-UX Web site:

<http://www.docs.hp.com/en/IUX/infolib.html>

For details on how to select a configuration, force its use, and use the many other installation options that are available, see *bootsys* (1M).

Using a Saved Configuration

After you specify a configuration for a particular client during an installation, you can save the result as a named configuration. This saves any changes that you made during the installation session for use in subsequent sessions. For more information regarding configuration files, see “Using Configuration Files” on page 174.

To specify a saved configuration as the default, define it in your server’s `/var/opt/ignite/INDEX` file, or use the `bootsys` command with the `-i` option and name you have given it.

Specifying Defaults in the config.local File

The `/var/opt/ignite/config.local` file is normally included in every configuration (cfg) stanza in the `/var/opt/ignite/INDEX` file. It provides a convenient location, in which to store default parameters that are the same for all configurations. Typically these are networking parameters, default software selections, and kernel modifications.

The following is an example of what a `config.local` file could look like. The `sw_sel` definitions depend on what you have defined in other configuration files on the Ignite-UX server.

```
dns_domain="corp.com"
dns_nameserver[0] = "10.2.72.2"
nis_domain="corpdomain"
wait_for_nis_server=FALSE
root_password="JPDw02THwAhiQ"
timezone="MST7MDT"
ntpdate_server="10.1.48.1"
init sw_sel "Misc_Patches"=TRUE
init sw_sel "B3919DA_AGP"=TRUE
mod_kernel += "maxuprc 100"
set_kernel += "dbc_max_pct 20"
```

NOTE

After making manual edits to `config.local`, *always* use the following command to verify that the syntax is correct and to avoid installation errors:

```
instl_adm -T -f config.local
```

Setting Defaults with `instl_adm`

Some network parameters need to be known by the client when it first boots. However, the netmask and gateway can be supplied in the installation or RAM file system (`INSTALLFS`, `WINSTALLFS`, `IINSTALLFS`, `VINSTALLFS`). You can do this by using the `instl_adm` command, which has options to set the client's netmask, gateway, Ignite-UX/tftp server, and so on.

For example, you may want to set the keyboard language so that it never prompts you for it when booting from Ignite-UX. The file you store using `instl_adm -f first8k_param_file` might look like this:

```
# instl_adm defaults:
server="10.2.72.150"
route_gateway[0]="10.2.70.1"
route_destination[0]="default"
netmask[]="255.255.255.0"
# end instl_adm defaults.
kbdlang="PS2_DIN_US_English"
```

Using the Per-Client Configuration File

When Ignite-UX begins an installation session, it scans the directory `/var/opt/ignite/clients` for a directory matching the Media Access Control (MAC) address or link-level address (LLA) of the client. For example, if the MAC address of the client is `0x08000992E346`, Ignite-UX looks for a file named `config` in `/var/opt/ignite/clients/0x08000992E346`. However, to enable you to find clients easily Ignite-UX also creates a symbolic link between the client's name and the MAC address. If the client has more than one LAN interface, the MAC address of each interface is used until a matching directory is found.

Ignite-UX overwrites this client-specific `config` file at the end of the installation, creating a record of the parameters defined for this client's most recent installation.

The configuration data in this file is used to override the default installation parameters. For more information regarding configuration files, see "Using Configuration Files" on page 174.

The easiest way to create a client-specific custom configuration file is to start with one of the default files provided by Ignite-UX. However, if you have previously installed a client, you can start with a configuration file in the `/var/opt/ignite/clients/0xLLA` directories. It is best to use one from a client similar to the one you want to install. You could use this as the basis for your new configuration file.

The following is an example configuration file:

```
cfg "HP-UX B.11.11 archive"=TRUE
#
# setting _hp_cfg_detail_level to ipv6 indicates that the file
# contains information about which cfg INDEX selection to be used,
# the variable settings, software selection settings, and system
# parameters.
_hpcfg_detail_level="ipv6"
#
# Variable assignments
init _hp_pri_swap=68304K
init _hp_root_disk="2/0/1.5.0"
init _hp_sec_swap=0K
init _hp_root_grp_disks=1
init _hp_root_grp_stripped="NO"
init_hp_locale="SET_NULL_LOCALE"
```



```
init_hp_keyboard="PS2_DIN_US_English"
init_hp_default_final_lan_dev="lan0"
init_hp_boot_dev_path="2/0/1.6.0"
#
# Software Selections
init_sw_sel "English"=TRUE
#
# System/Networking Parameters
init_hp_custom_sys="Current System Parameters"
_hp_custom_sys help_text "Final System/Networking Parameters"
{
final_system_name="server"
final_ip_addr["lan0"]="10.2.75.14"
final_netmask["lan0"]="255.255.248.0"
final_dns_domain="xx.corp.com"
final_dns_nameserver[0]="10.2.72.254"
TIMEZONE="MST7MDT"
is_net_info_temporary=TRUE
}
```

To customize this configuration file, change the final networking parameters in the example file to the correct values for your client. For example:

```
final_system_name="system11"
final_ip_addr["lan0"]="10.2.75.193"
```

It is also possible to add kernel parameters to this file. See “Setting Installation Parameters Dynamically” on page 204.

IMPORTANT

You should update the variable `_hp_cfg_detail_level` to reflect the parameters that you have modified to indicate that they should be used by Ignite-UX; by default this variable is set to `ipvs`. This variable is fully described in *instl_adm* (4).

To perform an automatic installation of a client using a custom configuration file, execute the following steps on your Ignite-UX server:

- Step 1.** Determine the MAC address, or *LLA*, of the client, either through the `boot_admin` commands at boot time or by using *lanscan* (1M) after the client is booted.

For more information, see *boot* (1M), *efi* (4), *isl* (1M), and *pdcc* (1M).

- Step 2.** Create the following directory, assuming the MAC address is 0x08000992E346:

```
mkdir /var/opt/ignite/clients/0x08000992E346
```

- Step 3.** Copy an example configuration file to be used as a starting point:

```
cp config /var/opt/ignite/clients/0x08000992E346/config
```

- Step 4.** These files are accessed using NFS so you must ensure that the correct ownership and directory access permissions are assigned.

Set the client directory to 644 and change the ownership to ensure that bin can read and write to the directory:

```
chmod 644 /var/opt/ignite/clients/0x08000992E346  
chown bin:bin /var/opt/ignite/clients/0x08000992E346  
chown bin:bin /var/opt/ignite/clients/0x08000992E346/config
```

- Step 5.** Edit your new configuration file to define your client-specific information.

- Step 6.** Run `bootsys` on the Ignite-UX server to begin the installation:

```
bootsys -a -v client_hostname
```

The client is booted and the operating system is installed without interaction using the client-specific configuration file you created. Errors are reported in

`/var/opt/ignite/clients/0x08000992E346/install.log` and in the client status dialog box (see page 152) in the Ignite-UX GUI on the Ignite-UX server.

Scheduling Installations

Client installations can also be automated using the `cron` daemon. To perform repeated installations for a client, you could use `crontab` entries. For more information, see *cron* (1M) and *crontab* (1).

For single installations, use the `at` command. For example, to perform an installation of a client at 8:00 PM using the `at` command, as `root` enter:

```
at 8:00pm
bootsys -a -v client_hostname
Press Ctrl-D
```

NOTE

This example requires `remsh` access from the Ignite-UX server on which you execute the `bootsys` command to the client because the server cannot obtain the `root` password by prompting you.

Setting Installation Parameters Dynamically

Ignite-UX can make intelligent decisions about installation parameters when it runs, based on information it reads from the client. Instead of forcing static values (for example, swap size or kernel parameters), Ignite-UX can determine the best values for these based on the characteristics of the client.

This feature can make the configurations that you set up more general purpose and limit the need for multiple, custom configurations to handle minor system differences.

These decisions are specified in a C-like language and grammar unique to Ignite-UX. For more information, see *instl_adm* (1M).

The following examples show how Ignite-UX set installation parameters dynamically.

Example 1

In this example, if the client's root disk is smaller than 8.5 GB and has less than 1 GB (1024 MB) of random access memory (RAM), then the primary swap partition size (`_hp_pri_swap`) is set to 512 MB; otherwise, it is set to 1 GB. If the disk is larger than 8.5 GB, then `_hp_pri_swap` is set to 1024 MB or 4096 MB, depending on the memory size.

Add the following lines to the end of the file

`/var/opt/ignite/config.local` as this file is typically referenced in all configurations defined in the `/var/opt/ignite/INDEX` file:

```
# default to very minimal swap of 8500MB
# unless the disk is larger than 8.5 GB
# and we have more than 512MB RAM

(disk[_hp_root_disk].size < 8500MB)
{
    (memory < 1024Mb) {
        init _hp_pri_swap=512MB
    } else {
        init _hp_pri_swap=1024MB
    }
} else {
    (memory < 2048Mb) {
        init _hp_pri_swap=1024MB
    } else {
        init _hp_pri_swap=4096MB
    }
}
```

You could also put this in a separate file, for example, `/var/opt/ignite/data/Rel_B.11.11/custom_cfg`, and then add that file name to the desired `cfg` stanza in the `/var/opt/ignite/INDEX` file.

Additionally, you could add this to the configuration file created for automatic installations. If the `_hp_pri_swap` parameter is set later in the order of files searched in the `cfg` stanza, this setting is overwritten. The configuration file parsing order and precedence is documented in *instl_adm* (4) and in “Using Configuration Files” on page 174.

CAUTION

The per-client configuration file in `/var/opt/ignite/clients/0xLLA` used for non interactive installations is overwritten as part of the installation process.

Example 2

To force the installation of a patch bundle if the client matches a regular expression, such as a hardware architecture type like J6700 or J6750 PA-RISC workstations, add the following lines to the end of the `/var/opt/ignite/data/Rel_B.11.11/custom_cfg` configuration file:

```
# check for H/W model J6700 or J6750
# and add the Misc_Patches bundle if true

(hardware_model ~ "9000/785/J67[05]0") {init sw_sel "Misc_Patches"
= true}
```

Example 3

In this example, Ignite-UX runs a previously created post-installation script and increases a tunable kernel parameter if it determines the client is a C3600, C3650, C3700, or C3750 workstation. If not, it sets a default value for the kernel parameter:

```
post_config_script +=
"/var/opt/ignite/scripts/new_C_series_special"
(HARDWARE_MODEL == "9000/785/C3[67][05]0") { mod_kernel += "maxuprc
300"
} else {mod_kernel += "maxuprc 100"}
```

Example 4

You can specify an entirely different custom configuration based on the size of the client's RAM and disk size. To set the default configuration dynamically to put into effect, it must go into the [W|V|I] INSTALLFS file using *instl_adm* (1M) as in the following script excerpt:

```
# For a system with only one disk and small memory, select
# the "small system configuration"
(num_disks == 1 & memory < 256MB )
{cfg "small system configuration" = true}
```

Checking Modified Files for Errors

You can validate the syntax of a file that is *not yet* in the `/var/opt/ignite/INDEX` file to avoid installation problems later, by entering the following:

```
instl_adm -T -f file
```

After you modify configuration files, *always* validate the syntax of all of the files that are referenced in the `cfg` stanzas in the `/var/opt/ignite/INDEX` file, by entering the following:

```
instl_adm -T
```

10 **Creating Your Own Installation Media**

This chapter explains how to create custom HP-UX installation media. To do this process, you need a basic knowledge of Ignite-UX functionality, as explained in the previous chapters. The topics discussed in the chapter are:

- Why Use Custom Installation Media? (see page 208)
- Building an Installation Tape (see page 210)
- Building an Installation CD (see page 219)
- Building an Installation DVD (see page 226)

Why Use Custom Installation Media?

Building your own custom installation media enables you to capture specific client installations onto media for repeatable installations. Customized installation media can be standardized or tailored. Standardized customization uses a golden image that contains a base operating system, applications, patches, third-party software and local customizations, already packaged into an archive. This entire system must be tested, verified, and tuned before creating the image. This golden image can be the starting point for all installations to ensure standardization.

The customization uses Ignite-UX configuration files to install additional software, change kernel parameters, and run scripts.

You may want to build custom installation media if:

- You have a large number of systems that are basically identical, and the networking does not allow easy or fast access to an Ignite-UX server, perhaps due to dispersed geography or for security reasons.
- You have systems that lack network boot capability so a two-step boot recovery process is required to contact the Ignite-UX server.
- You want to create noninteractive installation media to deliver to a technician or operator.
- You want a single medium that contains all the desired parts of the operating system (HP-UX, applications, patches, diagnostics and local customizations).
- You want a general disaster recovery image snapshot. This is applicable to tape and DVD because these types of media provide the necessary capacity. For system-specific recovery solutions, you should use the tools described in Chapter 11, “System Recovery,” on page 235.

Creating Custom Installation Media

The remainder of this chapter describes building custom installation media that has these characteristics:

- Is constructed from a golden image built using the `make_sys_image` command. For more information regarding golden images, see Chapter 7, “Golden Images,” on page 157.
- Contains a set of applications that are contained in one or more serial depots.
- Is a complete installation medium; all software is obtained from the media so there is no need for an Ignite-UX server during installation.

IMPORTANT

If you boot clients from custom installation media, and want to complete the installation from network archives or depots on an Ignite-UX server, you *must* ensure that these archives and depots were created with the same version of Ignite-UX to prevent version mismatches. For example, if you created an installation tape with Ignite-UX version C.6.0.x, then the network Ignite-UX server must also be running this same version.

TIP

The remaining examples for this chapter are also contained in the following example shell script:

```
/opt/ignite/data/scripts/examples/make_media_install
```

This script was introduced in Ignite-UX version C.6.2.x.

Building an Installation Tape

This section describes golden image file layout and building an installation tape for use on PA-RISC systems. This functionality is not supported on Itanium-based systems, although you can utilize “Tape Recovery with No Tape Boot Support” on page 276

IMPORTANT

The media and data format (density and compression) of the installation tape that you create must be compatible with the clients on which it will be read. For example, using 90 meter DDS-1 tapes to make installation tapes with Ignite-UX ensures that the tape works with any DDS drive.

Installation Tape Contents

An installation tape is constructed as shown in Figure 10-1.

Figure 10-1

Installation Tape Layout

LIF	A1/E	D/A2	A3	A4	...
-----	------	------	----	----	-----

Logical Interchange Format

The first file on any bootable tape is a **Logical Interchange Format (LIF)** volume containing all the components required to boot from the tape. It also includes the Ignite-UX toolset and configuration information that controls how Ignite-UX will operate. Additionally, the tape will include configuration files that describe installation functionality.

In the case of PA-based systems, you can create an installation tape with just the LIF volume. In other words, without recovery archives. For example, if you need an boot-helper tape to simply boot a system and load the software from the network, only the LIF volume is necessary.

Creating the LIF Volume The `make_medialif` command creates the LIF volume. A typical LIF volume for B.11.00 and B.11.11 systems looks like the following output from the command, `liflfs -l`

```
/var/tmp/lifvol:
```

```

volume ISL10 data size 640615 directory size 2 04/04/17 14:06:17
filename  type  start  size  implement  created
=====
ISL      -12800 16     306   0         04/04/17 14:06:17
AUTO    -12289 328    1     0         04/04/17 14:06:17
INDEX   BIN     336    1     0         04/04/17 14:06:17
CONFIG  BIN     344    247   0         04/04/17 14:06:17
HPUX    -12928 592    848   0         04/04/17 14:06:17
INSTALL -12290 1440   68184 0         04/04/17 14:06:17
INSTALLFS -12290 69624 35840 0         04/04/17 14:06:18
VINSTALLFS -12290 69624 35840 0         04/04/17 14:06:18
WINSTALLFS -12290 69624 35840 0         04/04/17 14:06:18
VINSTALL -12290 105464 73806 0         04/04/17 14:06:20
WINSTALL -12290 179272 83837 0         04/04/17 14:06:20
INSTCMDS BIN     263112 30227 0         04/04/17 14:06:20
RECCMDS BIN     293344 985    0         04/04/17 14:06:20
SYSCMDS BIN     294336 77611 0         04/04/17 14:06:21
SCRIPTS BIN     371952 45     0         04/04/17 14:06:21

```

The following list describes files used in the previous example and identifies the options you use with `medialif` to create them, when applicable.

ISL — Initial System Loader. If it is run interactively, it issues a prompt and waits for user interaction. Otherwise it looks for the `AUTO` file. It is extracted by `make_medialif` from the default boot file:

```
/opt/ignite/boot/boot_lif
```

AUTO — Autoexecute file defines the default boot behavior.

INDEX — Default `INDEX` file. It has the same function as `/var/opt/ignite/INDEX` does on an Ignite-UX server.

CONFIG — Contains all Ignite-UX software configuration information. You should begin with the default configuration file for the release. For example, for Ignite-UX 11i v1 look in `/opt/ignite/data/Rel_B.11.11/config`. Additional configuration files can be appended using the `-f` option of the `make_medialif` command.

Information in this file allows complete access to all the archives and depots on the media. The `CONFIG` file is referenced in the `INDEX` file.

For more information, see “Using Configuration Files” on page 174.

[W|V|I]INSTALL — The installation kernel booted by installation clients.

- For use with V-class systems, use `make_medialif` with the `-o 64` option to create a LIF volume for installations with the `VINSTALL` kernel.

Building an Installation Tape

- For use with PA-RISC 32-bit systems, use the `-o 64w` option to include `INSTALL` files.
- For use with PA-RISC 64-bit systems, use the `-o 64w` option to include `WINSTALL` files.
- For use with all systems, use the `make_medialif -a` option to include all `[W|V|I]INSTALL` and `[W|V|I]INSTALLFS` files.

For more information, see “Classes of Configuration Files” on page 175.

[W|V|I]INSTALLFS — The RAM (installation) file system used by installation clients. Configuration information stored in the first 8 KB of this file is accessible using `instl_adm`.

- For V-class systems, the installation file system is called `VINSTALLFS`.
- For 32-bit PA-RISC systems, the installation file system is called `INSTALLFS`.
- For 64-bit PA-RISC systems, the installation file system is called `WINSTALLFS`.
- For Itanium-based systems, the installation file system is called `IINSTALLFS`.

For more information, see “Classes of Configuration Files” on page 175.

INSTCMDS, INSTCMDSIA, RECCMDS or RECCMDSIA — Some commands in a `tar gzip` archive. These commands are needed for disk layout and expert recovery. The commands in the archive match the operating system release of the installation kernel and run inside the RAM file system.

SYSCMDS — The commands in this `tar gzip` archive are used to install the software onto the system. The `SYSCMDS` match the operating system release being installed.

SCRIPTS — A `tar gzip` archive of all required `post_load` and `post_config` scripts. By default, when installing an image the `load_order` is zero, which means it gets installed first. Two scripts in `/opt/ignite/data/scripts` called `os_arch_post_l` and `os_arch_post_c` are executed.

Scripts like these are discussed in depth in *instl_adm* (4).

For more detailed information regarding the HP-UX boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*.

IMPORTANT

The first 8 KB of the installation file system file (in other words, the RAM file system file such as WINSTALLFS) can contain Ignite-UX text. If it does, this information is used first and can override configuration statements in the LIF INDEX and CONFIG files. In particular, the information in the first 8 KB can cause the client to switch off the media to a server, go interactive, etc.

For more information, see “Using Configuration Files” on page 174.

Recovery Images and Archives

The LIF volume is followed by the first golden image or is empty if the installation is solely from the software depot.

The first golden image is then followed by either a serial depot or another golden image. There can only be one depot on a tape, and it must be the third file on the tape. The `make_config` command is used to create the configuration file information for this depot. This configuration file is then modified to reflect the final destination of the depot and the depot is written to the tape.

The previous files can be followed by one or more additional archives, limited only by the capacity of the tape. These archives are optional.

TIP

If an installation tape will be used for various purposes, put the archive you intend to use most often on the tape first. For example, if the tape will be used more for installing multiple clients and you will install HP-UX 11i v1 most frequently, put this archive on the tape first.

Creating an Archive Configuration File

The best way to start creating a configuration file for an archive is to use the template file supplied by Ignite-UX in `/opt/ignite/data/examples/`. Other files are available for supported HP-UX releases. Copy this file to `/var/tmp/archive.cfg` and modify it to suit your situation.

To modify the archive configuration file, change the following archive access attributes in the `sw_source core` stanza of `/var/tmp/archive.cfg`:

- Find the `source_type` attribute and change the value from `NET` to `MT` (for example, `source_type=MT`).
- Find the `change_media=FALSE` attribute line and remove the comment hash mark (`#`).
- Find the `nfs_source` attribute line and place a comment hash mark before it (for example, `#nfs_source=`).

These changes modify the source type from network (`NET`) access (which is NFS, `ftp` or `remsh`) to magnetic tape (`MT`). Since the archive is going to reside on the same media, `change_media` is set to false by uncommenting that attribute. To avoid trying to NFS mount that directory, the `nfs_source` attribute is commented out.

Archive path and impacts changes for a single archive tape:

In the `HARDWARE_MODEL ~ 9000.*` stanza:

- Find the `archive_path` attribute and change the value to the number of archives on your tape (`archive_path=n`)
- Find the `impacts` attribute with the value `/ 27KB` and change the value to what is reported by `archive_impact`.
- Optionally, you can find the `sw_sel` and `description` attributes and change their values to something more descriptive and applicable for your situation. These modified values are visible only on Basic tab of the Ignite-UX GUI.

The change in `archive_path` indicates that there is one or more end of file (EOF) marks to skip on the tape and the archive begins after that mark. The first archive is the first file on the tape after the LIF volume EOF.

The `archive_type` must match what was done by `make_sys_image`. If you have only one archive, as in this example, you can delete the entire stanza called `golden_image2`. It is included in the template file in case you have two different types of archives, such as one for 32-bit and one for 64-bit architecture. If more than one archive per architecture is on the media, use an `exerequisite` attribute between them so only one archive can be selected at one time. For more information about `archive_type`, see *instl_adm* (4).

It is important not to change anything else in the file, unless you are very sure of what you are doing. In particular, it is potentially dangerous to change the `sw_category` and other `sw_source` and `sw_sel` attributes.

Creating an Installation Tape

Example Assumptions

The following example assumes that you have created a golden image to be written to the tape. Additionally, it is assumed there is a depot in that contains all the applications you want to install in addition to the golden image.

The golden image in this example was created using `make_sys_image` on a system running HP-UX 11i v1 (B.11.11).

The archive is in gzip compressed tar format and is named `/var/tmp/myOSarchive.gz`.

The `archive_impact` command should be used to obtain disk-space usage information for this image so that configuration information can be supplied. Further, it is assumed that a configuration file has been created, using `make_config`, that describes this image and that it is named `myOSarchive.cfg`.

For more information, see Chapter 7, “Golden Images,” on page 157.

Example PA-Based Installation Tape Creation

Step 1. Create a configuration file. The configuration file will be created in `/var/tmp/depot`. Enter the following command:

```
make_config -s /var/tmp/depot -c /var/tmp/depot_cfg
```

Building an Installation Tape

Step 2. Create the serial depot. The depot put on a tape is known as a serial depot. An Software Distributor depot can exist as a regular file, but it cannot be accessed remotely.

To create a serial depot from `/var/tmp/depot` and store it in `/var/tmp/serialdepot`, enter:

```
swpackage -s /var/tmp/depot -x media_type=tape \  
  @ /var/tmp/serialdepot
```

Step 3. Modify the configuration file. Edit the `/var/tmp/depot_cfg` file as follows:

I. Remove the following two attribute lines:

```
sd_server = IP_address  
sd_depot_dir = /var/tmp/depot
```

The deleted information is not needed when accessing a serial depot on a tape.

II. Find the `source_type` attribute and change the value from `NET` to `MT` as follows:

```
source_type=MT
```

The `source_type` value change indicates that the depot is located on a tape instead of over the network.

Step 4. Create the LIF volume. The LIF will be created in `/var/tmp/lifvol` by entering the following `make_medialif` command:

```
make_medialif -f /opt/ignite/data/Rel_B.11.11/config \  
  -f /var/tmp/myOSarchive.cfg -f /var/tmp/depot_cfg \  
  -l /var/tmp/lifvol -r B.11.11
```

The LIF volume now contains the defaults Ignite-UX provides and information on the archives and depot. In particular, the configuration statements in the first 8 KB of the LIF volume can cause the client to switch off the media to a server, go interactive, etc., as indicated in the next step.

Step 5. Modify the installation file system configuration. You can control the environment in which Ignite-UX operates at client installation time by changing the `run_ui` and `control_from_server` configuration parameters in the installation file system (`[W|V|I]INSTALLFS`). When

`control_from_server` is true, an attempt is made to contact the Ignite-UX server as defined in the configuration information. For more information, see *instl_adm* (4).

To set `run_ui` and `control_from_server` variables using `instl_adm` to TRUE and FALSE, execute the following steps:

I. Create a temporary configuration file, enter:

```
instl_adm -d -F /var/tmp/lifvol > /var/tmp/cfg
```

II. Open `/var/tmp/cfg` for editing.

III. Add or change the `run_ui` variable.

For an interactive installation, set `run_ui=TRUE`. For a noninteractive installation, set `run_ui=FALSE`.

When `run_ui` is false, no interaction occurs and the installation proceeds according to all the configuration information provided to Ignite-UX.

IV. Add or change the `control_from_server` variable.

To control the installation from the Ignite-UX server, set `control_from_server=TRUE`. An attempt is made to contact the server.

V. Check the syntax of your changes to avoid writing errors to the installation file system, enter:

```
instl_adm -T -f /var/tmp/cfg
```

VI. Write the modified temporary configuration file into the LIF volume, enter:

```
instl_adm -F /var/tmp/lifvol -f /var/tmp/cfg
```

VII. Verify your changes, enter:

```
instl_adm -d -f /var/tmp/lifvol
```

Step 6. Create a new tape device file. Tape devices often support multiple formats or densities. Different generations of tape device typically support prior densities or formats. However, newer densities and formats are typically not supported by older generation devices. It is important to carefully select format and density when creating media for use with various tape devices.

Building an Installation Tape

For example, HP recommends that DDS-1 density format be used to create tape media that may be used by all DDS tape devices regardless of the specific type of DDS tape drive connected to the client system. The following example creates a device file, which writes tapes using the DDS-1 density format.

To create a device with DDS-1 characteristics, find the hardware path with the following command:

```
ioscan -fCtape
```

```
Class   I  H/W Path      Driver S/W State  H/W Type      Description
=====
tape    0  10/1/2/0.3.0  stape CLAIMED  DEVICE        HP      C1533A
```

Then use this hardware path to create the device.

The following example creates a device file for a DDS tape drive, which is compatible with all DDS drives.

```
mksf -v -H 10/1/2/0.3.0 -b DDS1 -n -a
```

Alternatively, you could use SAM to accomplish this task.

- Step 7. Create the installation tape.** Create the tape using the proper density, no compression, no rewind device file. This series of commands creates a tape with DDS-1 characteristics and copies the files in the correct tape layout as described in “Installation Tape Contents” on page 210:

```
mt -t /dev/rmt/c0t3d0DDS1n rew

dd if=/var/tmp/lifvol of=/dev/rmt/c0t3d0DDS1n obs=2k

dd if=/var/tmp/myOSarchive.gz of=/dev/rmt/c0t3d0DDS1n obs=10k

dd if=/var/tmp/serialdepot of=/dev/rmt/c0t3d0DDS1n obs=10k

mt -t /dev/rmt/c0t3d0DDS1n rew
```

TIP

You should ensure that you use a "no rewind" device file, such as `/dev/rmt/0mn`. This prevents the tape device from rewinding between the successive `dd` commands in this step and overwriting files that were previously written to the tape.

The tape is now ready to use for installations of PA-based systems.

Building an Installation CD

There are similarities between creating a CD and a tape (described in the previous section). However, one major difference is in disk space use. You must create a logical volume (or provide a whole disk) large enough to hold the image you are creating that will be written to the CD. The other difference is that while a series of files are written when creating a tape, a media image is created for optical media and then written to it.

A bootable CD is not a serial device like a tape. It has a file system on it, and a LIF volume that contains the same information as described in “Building an Installation Tape” on page 210, except for the configuration files that describe the archives and depots. Access to this data is somewhat different.

The file system on the CD can be either HFS or CDFS. You can create an HFS file system using standard HP-UX commands.

Example Assumptions

The golden image in this example was created on a system running HP-UX 11i v2 (B.11.23) using `make_sys_image`. The image is in gzip compressed tar format and is named `/var/tmp/image/archives/B.11.23_archive.gz`.

An HFS file system is used in this example and it creates a logical volume.

For more information, see Chapter 7, “Golden Images,” on page 157.

NOTE

Building installation CDs requires the `cdrecord`, and `mkisofs` commands. Beginning with Ignite-UX version C.6.2.x, these commands are delivered in the `/opt/ignite/sbin/` directory. You must use the fully-qualified path (as in the following example) to ensure that you are using the correct command because these commands are also available for installation within the HP-UX `cdrecord` and HP-UX `dvd+rw-tools` products.

Example Installation CD Creation

Step 1. Create a logical volume to store the image to be written to CD.

The logical volume that is used in this example is `/dev/vg00/image`. It is an HFS file system mounted at `/var/tmp/image`. Using HFS and standard HP-UX commands, create the logical volume using the following commands:

```
lvcreate -L 800 -n image vg00

newfs -F hfs -f 2048 /dev/vg00/rimage

mkdir /var/tmp/image

mkdir /var/tmp/image_cfgs

mount /dev/vg00/image /var/tmp/image
```

Though this example uses an HFS file system, the use of other file system types is supported.

For CDFS file systems, there are similar commands. Check the software supplier documentation.

Step 2. Create a system archive directory. Change directory to `/var/tmp/image` to create an archives directory for use in creating the CD image in this example. Enter the following commands:

```
cd /var/tmp/image

mkdir /var/tmp/image/archives
```

TIP

The `make_sys_image` command in the next step provides you the option of storing your image locally or on an Ignite-UX server via the network. If your CD-RW device is attached to a remote system, you may want to indicate the name of this system rather than identifying it as the local system as in the commands in this step. To do so, in the following command change the `-s` option to `-s system_name` and indicate the hostname of the system controlling the CD-RW device using `system_name`.

Step 3. Create the golden image. Generate the golden image compressed tar archive of system files using the following command:

```
/opt/ignite/data/scripts/make_sys_image \  
-s local -d /var/tmp/image/archives \  
-n B.11.23_archive.gz
```

For more information regarding installation archives, see Chapter 7, “Golden Images,” on page 157 or see *make_sys_image* (1M).

NOTE

The image file created in this step may be several gigabytes in size so the command may take several minutes to over an hour to complete depending on the speed of your system and the size of the archive. No feedback is supplied by *make_sys_image* and it is not complete until the shell prompt appears.

Step 4. Create the archive configuration file. Ignite-UX must have a configuration file that describes each archive you created. The easiest way to begin is to copy the example file installed with Ignite-UX, enter:

```
cp /opt/ignite/data/examples/B.11.23.archives.cfg \  
/var/tmp/image_cfgs/archive.cfg
```

Step 5. Generate archive impact statements. You must define how much space is necessary for the volumes within the archive just created for Ignite-UX. These archive impact statements are generated using *archive_impact* (1M).

Execute *archive_impact*, for the appropriate hardware enter as follows:

```
/opt/ignite/sbin/archive_impact -tg B.11.23_archive.gz \  
>temp_impacts
```

Step 6. Update the archive configuration file. Edit the *B.11.23.archives.cfg* file. For PA-based systems, edit the *is_hppa* stanza; for Itanium-based systems, edit the *is_ia64* stanza.

- i. Replace the impact statements using the information generated in the previous step. The *temp_impacts* file contains information similar to the following:

```
impacts = "/" 32Kb  
impacts = "/dev" 14Kb  
impacts = "/etc" 211581Kb
```

```

impacts = "/home" 834Kb
impacts = "/opt" 39818Kb
impacts = "/sbin" 40719Kb
impacts = "/stand" 36133Kb
impacts = "/usr" 41773Kb
impacts = "/var" 51663Kb

```

- ii. Change the value of `archive_path` from `archives/B.11.23_archive_[PA|IA].gz` to `B.11.23_archive.gz`.

Step 7. Create and access a depot. Though tape is restricted to a single depot, that restriction does not apply to a CD. However, in this example a single depot is used for the sake of simplicity. Create a depot with `swcopy` using the following command. Indicate the name of the depot you want to use using *yourdepot*:

```
swcopy -s /depots/yourdepot \* @ /var/tmp/image/depot
```

Step 8. Create the depot configuration file. Use `make_config` to create the configuration file for this depot by using the following command:

```
make_config -s /var/tmp/image/depot \
-c /var/tmp/image_cfgs/depot.cfg
```

Step 9. Update the configuration file. Edit the `depot.cfg` file and update the depot details.

- i. Delete the entire `sd_server = "IP address"` line.
- ii. Change the `source_type` attribute from `NET` to `DSK` (for example, `source_type=DSK`).
- iii. The change to `source_type` indicates that the depot is located on a CD instead of over the network.

Step 10. PA-RISC systems only: Assemble the CD. Execute this step for PA-RISC systems *only*. You must copy the raw file system just created into a regular file so it can be written to the CD using the following command:

```
umount /var/tmp/image

dd if=/dev/vg00/rimage of=/var/tmp/PAimage_dd bs=1024k
```

Step 11. Create a copy of the LIF volume. The CD must contain a LIF volume. Execute one of the following commands to create it:

- For PA-based systems:

```
make_medialif -f /opt/ignite/data/Rel_B.11.23/config \  
-f /var/tmp/image_cfgs/archive.cfg \  
-f /var/tmp/image_cfgs/depot.cfg \  
-l /var/tmp/PAimage_lifvol \  
-r B.11.23
```

- For Itanium-based systems:

```
make_medialif -f /opt/ignite/data/Rel_B.11.23/config \  
-f /var/tmp/image_cfgs/archive.cfg \  
-f /var/tmp/image_cfgs/depot.cfg \  
-l /var/tmp/image/IPF.lif \  
-r B.11.23 \  
-o ipf
```

This creates the LIF volume that includes all the configuration information. It includes the defaults Ignite-UX provides and provides the access to the archives and the depot.

Step 12. Update the installation file system information. Change configuration information in `[W|V|I] INSTALLFS` by clearing the previous values, setting the correct values for the new LIF volume, and then checking the syntax of all configuration files by executing one of the following:

- For PA-based systems:

```
instl_adm -b -F /var/tmp/PAimage_lifvol  
  
instl_adm -d -F /var/tmp/PAimage_lifvol
```

- For Itanium-based systems:

```
instl_adm -b -F /var/tmp/image/IPF.lif  
  
instl_adm -d -F /var/tmp/image/IPF.lif
```

Correct any errors that are displayed to avoid writing them to the CD.

Step 13. Itanium-based systems only: Create a copy of the EFI and ISO images for the archive. Execute this step for Itanium-based systems *only*. The CD must contain an EFI and the image must be an ISO image for Itanium-based systems. Execute the following command:

```
cp -p /opt/ignite/boot/Rel_B.11.23/EFI_CD_image \  
/var/tmp/image/
```

```

/opt/ignite/sbin/mkisofs -U -max-iso9660-filenames \
  -D \
  -o /var/tmp/IPFimage.iso \
  -no-emul-boot \
  -b EFI_CD_image \
  -eltorito-alt-boot \
  -no-emul-boot \
  -b IPF.lif \
  /var/tmp/image

```

Step 14. Combine the LIF boot image and the archives file system. The final CD will be both a bootable disk (via the LIF image) and a file system that can be mounted by HP-UX. To enable the CD to function both ways, use `instl_combine` by executing one of the following:

— For PA-based systems:

```

/opt/ignite/sbin/instl_combine \
  -F /var/tmp/PAimage_lifvol \
  -C /var/tmp/PAimage_dd

```

— For Itanium-based systems:

```

/opt/ignite/sbin/instl_combine -C /var/tmp/IPFimage.iso
umount /var/tmp/image

```

Step 15. Complete the CD. Write the image to the CD, enter one of the following commands:

— For PA-based systems:

```

/opt/ignite/sbin/cdrecord -v -eject dev=0,0,0 speed=16 \
  /var/tmp/PAimage_dd

```

— For Itanium-based systems:

```

/opt/ignite/sbin/cdrecord -v -eject dev=0,0,0 speed=16 \
  /var/tmp/IPFimage.iso

```

The CD is now ready to be used for installations.

TIP

You can execute the following steps to mount and verify the CD created with the previous process:

1. Create a directory to which the CD can be mounted like `/cd`. For example:

```
mkdir /cd
```

2. Mount the CD to the device path for your CD device. For example:

```
mount /dev/dsk/c0t0d1 /cd
```

Building an Installation DVD

There are similarities between creating a DVD, CD, or tape. One major difference, however, is in disk space use. In particular, you must provide enough disk space to contain the system archive, any depots you wish to include, the LIF volume, and related files, as well as an ISO image containing all of these items.

In the example in this section, you will create a logical volume (or provide a whole disk) large enough to hold the archives and the depots. You must have that same amount of additional space to copy the logical volume to an ISO image file. You must have approximately *twice* the amount of disk space that is consumed by your archives and depots.

The following steps explain how to set up a logical volume that you use to assemble the files that comprise your DVD, create those files, place those files into an ISO image, and write that image to a DVD.

A bootable DVD is not a serial device like a tape. It has a file system on it, and a LIF volume that contains the same information as described in “Building an Installation Tape” on page 210 except for the configuration files that describe the archives and depots. Access to this data is somewhat different.

File Size Considerations When Using a DVD

The size of the ISO image is limited to the capacity of a DVD, which is approximately 4.7GB. Further, no file contained within the ISO image, including the archive created by `make_sys_image`, can be greater than or equal to 2GB when using versions of Ignite-UX previous to the following:

- For HP-UX 11i v2 (B.11.23), Ignite-UX version C.6.5.x
- For HP-UX 11i v1 (B.11.11) or 11.00, Ignite-UX version C.6.8.x

Prior to these Ignite-UX versions, the `cdfs` driver in the installation kernels did not support files 2GB or larger on ISO9660 media.

NOTE

The limitation of less than 2GB for the size of a file is a limitation in the ISO9660 standard, therefore not a restriction imposed by HP-UX.

The file system on the DVD can be either HFS or CDFS. You can create an HFS file system using standard HP-UX commands. Various third-party applications are available for a CDFS file system.

Example Assumptions

The following example assumes that HP-UX 11i v2 is installed on your system though these same steps can be used with HP-UX 11i v1. Additionally, your system must have at least 8GB of disk space to allocate to a temporary volume that will contain the information to be written to the DVD.

You must use HP DVD+RW drives to build installation DVDs.

NOTE

Building installation DVDs requires the `mkisofs` and `growisofs` commands. Beginning with Ignite-UX version C.6.2.x, these commands are delivered in the `/opt/ignite/sbin/` directory. You must use the fully-qualified path (as in the following example) to ensure that you are using the correct command because these commands are also available for installation within the HP-UX `dvd+rw-tools` product.

Example Installation DVD Creation

- Step 1. Create the logical volume.** Assume that the logical volume is a VxFS file system located in `/dev/vg00/image` and is mounted at `/var/tmp/image`. Create the logical volume and mount the file system using SAM or the following commands:

```
lvcreate -L 8000 -n image /dev/vg00  
newfs -F vxfs -o largefiles -b 8192 /dev/vg00/rimage  
mkdir /var/tmp/image  
mount /dev/vg00/image /var/tmp/image
```

TIP

If you will perform this task regularly, you can add an entry for this new file system to the `/etc/fstab` file so it is automatically mounted after rebooting.

Step 2. Verify the logical volume size. Verify that the `/stand` file system has been properly created with large file system capability enabled using the following command:

```
fsadm -F vxfs /var/tmp/image
```

```
largefiles
```

If the previous command reports `largefiles` as shown, then the file system supports the use large files so continue to the next step.

If `nolargefiles` is reported, you must execute the following steps:

A. Enter the following commands:

```
fsadm -F vxfs -o largefiles /var/tmp/image
```

```
mount -o remount,largefiles /var/tmp/image
```

```
fsadm -F vxfs /var/tmp/image largefiles
```

B. If you receive an error from the `mount` command using the `-o remount` option, you must unmount the file system, and then mount it again with the `largefiles` option.

C. Enter:

```
mount -v | grep image
```

```
/dev/vg00/image on /var/tmp/image type vxfs log,largefiles on  
Mon Jan 30 12:45:43 2006
```

The `largefiles` option is enabled and the file system has been mounted with this option. If the file system is VxFS, it is mounted with the `largefiles` option of the `mount` command set by default based on how this option is configured on the file system.

For more information, see *fsadm* (1M) and *mount* (1M).

IMPORTANT

If `/stand` does not have `largefiles` set correctly, the creation of the DVD will fail.

Step 3. Create a system archive directory. Change directory to `/var/tmp/image`, and then create an `archives` directory for use in creating the DVD image in this example using the following commands:

```
cd /var/tmp/image
```

```
mkdir /var/tmp/image/archives
```

Step 4. Create the golden image archive. Generate the golden image compressed tar archive of system files using the following command:

```
/opt/ignite/data/scripts/make_sys_image \  
-s local -d /var/tmp/image/archives \  
-n B.11.23_archive.gz
```

TIP

The `make_sys_image` command provides you the option of storing your image locally or on an Ignite-UX server via the network. If your DVD-RW device is attached to a remote system, you may want to indicate the name of this system rather than identifying it as the local system as in the commands in this step. To do so, in the following commands you would change the `-s` option to `-s system_name`, indicating the hostname of the system controlling the DVD-RW device using `system_name`.

For more information regarding installation archives, see Chapter 7, “Golden Images,” on page 157 or see `make_sys_image` (1M).

NOTE

The archive file created in this step may be several gigabytes in size so the command may take several minutes to over an hour to complete depending on the speed of your system and the size of the archive. Intermittent feedback is supplied by `make_sys_image` and it is not complete until the shell prompt appears.

Step 5. Verify the archive size. Ensure the size of the ISO image file adheres to the restrictions outlined in File Size Considerations When Using a DVD on page 226:

```
ll /var/tmp/image/archives/B.11.23_archive.gz
```

Step 6. Create an archive configuration file. Ignite-UX must have a configuration file that describes the archive you just created. The easiest way to begin is to copy the example file installed with Ignite-UX, enter:

```
cp -p /opt/ignite/data/examples/B.11.23.archives.cfg \  
/var/tmp/image
```

Step 7. Generate archive impact statements for the client archive. You must define how much space is necessary for the volumes within the archive just created for Ignite-UX. These archive impact statements are generated using *archive_impact* (1M). Execute *archive_impact*, for the appropriate hardware type, against each archive as follows:

```
/opt/ignite/lbin/archive_impact \  
-tg archives/B.11.23_archive.gz > temp_impacts
```

NOTE

The impact statements generation in this step may take several minutes to an hour to complete depending on the storage devices installed on the system.

The results are directed to a temporary file to aid in you in editing your configuration file. You may want to remove these files at the completion of this procedure.

Step 8. Update the archive configuration file. Edit the *B.11.23.archives.cfg* file. For PA-based systems, edit the *is_hppa* stanza; for Itanium-based systems, edit the *is_ia64* stanza.

Replace the impact statements using the information generated in the previous step.

TIP

You can now remove the *temp_impacts* file because it is no longer needed.

Step 9. Create a copy of the LIF volume. The DVD must contain a LIF volume. Execute the following command to create it:

```
/opt/ignite/bin/make_medialif -a -r B.11.23 \  
-f /opt/ignite/data/Rel_B.11.23/config \  
-f /var/tmp/image/B.11.23.archives.cfg \  
-l /var/tmp/image/B.11.23.lifimage
```

Step 10. Itanium-based systems: Copy the EFI image to `/var/tmp/image`.

Execute this step for Itanium-based systems *only*. The `EFI_CD_image` must be in the same directory as the LIF volume and archive configuration files. Copy the file using the following command:

```
cp -p /opt/ignite/boot/Rel_B.11.23/EFI_CD_image \  
/var/tmp/image/
```

Step 11. Create an ISO image of the archives file system. The archives file system is now fully populated with the necessary files and an ISO image must be created to write to the DVD.

NOTE

The size of the ISO image is limited to the capacity of a DVD, which is approximately 4.7GB. Further, no file contained within the ISO image, including the archive created by `make_sys_image`, can be greater than or equal to 2GB.

To create an ISO image of this file system, execute one of the following commands:

— For PA-based systems:

```
/opt/ignite/lbin/mkisofs \  
-D -R -U -max-iso9660-filenames \  
-eltorito-alt-boot \  
-no-emul-boot \  
-b B.11.23.lifimage \  
-o /var/tmp/B.11.23.iso \  
/var/tmp/image
```

— For Itanium-based systems:

```
/opt/ignite/lbin/mkisofs \  
-D -R -U -max-iso9660-filenames \  
-no-emul-boot \  
-b EFI_CD_image \  
-eltorito-alt-boot \  
-no-emul-boot \  
-b B.11.23.lifimage \  
-o /var/tmp/B.11.23.iso \  
/var/tmp/image
```

NOTE

The PATHSPEC is the path of the directory tree to be copied into the ISO file system and is provided as the last on the command line to `dvd+rw-mkisofs`. The PATHSPEC in this command is `/var/tmp/image`. The file name of the boot image specified with the `-b` option must be relative to the PATHSPEC.

The ISO image is written to a location outside of the `/var/tmp/image` logical volume, in this case to `/var/tmp`. Ensure that this directory contains at least as much free space as is used by the files contained under `/var/tmp/image`.

Messages similar to the following appear:

```
Warning: creating file system that does not conform to ISO-9660.
Warning: ISO-9660 filenames longer than 31 may cause buffer
overflows in the OS.
```

```
Size of boot image is 10240 sectors -> No emulation
```

```
Size of boot image is 410588 sectors -> No emulation
```

```
  0.53% done, estimate finish Thu Sep  9 10:26:19 2004
  1.06% done, estimate finish Thu Sep  9 10:26:19 2004
```

```
.
.
.
```

```
 99.27% done, estimate finish Thu Sep  9 10:26:51 2004
 99.80% done, estimate finish Thu Sep  9 10:26:51 2004
```

```
Total translation table size: 2048
Total rockridge attributes bytes: 1040
Total directory bytes: 4096
Path table size(bytes): 44
Max brk space used f000
946880 extents written (1849 Mb)
```

Step 12. Combine the LIF boot image and the archives file system. The final DVD will be both a bootable DVD (via the LIF image) and a file system that can be mounted by HP-UX. To enable the ISO image to function both ways, `inst1_combine` is used as follows:

```
/opt/ignite/sbin/inst1_combine -C /var/tmp/B.11.23.iso
```

Messages similar to the following appear:


```
El Torito offset for LIF volume is: 0xf800
Adjusting LIF file: ISL (Old iplstart: 4096; New iplstart: 67584)
Adjusting LIF file: AUTO
Adjusting LIF file: INDEX
.
.
.
Adjusting LIF file: SYSCMDS
Adjusting LIF file: SCRIPTS
Adjusting LIF file: PAD
```

Step 13. Ensure that the ISO image is recognizable. Ensure that the ISO image was created properly before writing it to the DVD using *lifls* (1) as follows:

```
ll /var/tmp/B.11.23.iso
```

If the size of `/var/tmp/B.11.23.iso` is less than 2GB:

```
lifls /var/tmp/B.11.23/iso
```

If the size of `/var/tmp/B.11.23.iso` is 2GB or more:

```
dd if=/var/tmp/B.11.23.iso of=/var/tmp/liftest bs=1024k \  
count=500  
lifls /var/tmp/liftest  
  
rm /var/tmp/liftest
```

The reason for using *lifls* (1) as documented previously, is that it does not support large files. If you use *lifls* on a file greater than or equal to 2GB in size, it will exit after printing errors. This method will require you to have 500MB of free space available if the ISO image is greater than or equal to 2GB in size.

Step 14. Complete the DVD. A copy of the ISO image can now be written to the DVD. The DVD device file in this case is `/dev/rdisk/c0t0d0`. You can find your device file with `ioscan -fnkC disk`. Write the ISO image to DVD, enter:

```
/opt/ignite/sbin/growisofs -Z \  
  
/dev/rdisk/c0t0d0=/var/tmp/B.11.23.iso
```

If you have never used the `growisofs` command, you may receive a `mknode` message similar to the following:

Building an Installation DVD

```
:( unable to open("/dev/rscsi/c0t0l0",O_RDONLY): No such file or
directory
:~! consider 'mknod /dev/rscsi/c0t0l0 c 203 0x000002; chmod 0600
/dev/rscsi/c0t0l0'
```

Execute the given `mknod` command exactly as displayed by your system. In this case, the command to execute would be as follows:

```
mknod /dev/rscsi/c0t0l0 c 203 0x000002; chmod 0600 \
/dev/rscsi/c0t0l0
```

This creates the necessary device file for the DVD writer. You must execute the `growisofs` command again to write the ISO image to the DVD.

The DVD is now ready to be used for installations.

TIP

You can execute the following steps to mount and verify the DVD created with the previous process:

1. Create a directory to which the DVD can be mounted like `/dvd`. For example:

```
mkdir /dvd
```

2. Mount the DVD to the device path for your DVD device. For example:

```
mount /dev/dsk/c0t0d0 /dvd
```

11 System Recovery

This chapter describes important system recovery tools available with Ignite-UX:

- Overview (see page 236)
- Creating and Using Recovery Tapes (see page 253)
- Creating and Using Network Recovery Images (see page 264)
- Image Creation Process (see page 245)
- Verifying Image Results (see page 251)
- Retaining Known-Good Images (see page 272)
- Making Recovery Configuration File Additions (see page 274)
- Selecting File Systems During Recovery (see page 275)
- Tape Recovery with No Tape Boot Support (see page 276)
- Notes on Cloning Systems (see page 279)
- Expert Recovery Using the Core Media (see page 282)
- System Recovery Questions and Answers (see page 303)

Overview

Ignite-UX provides two recovery methods as part of the standard product: system recovery and expert recovery. The method you use depends on your situation.

System Recovery using Network and Tape

The system recovery tools available with Ignite-UX enable you to quickly recover from a failed disk (root disk or disk in the root volume group.) The failure can be either a hardware failure or a catastrophic software failure.

System recovery requires some work *before* a problem occurs. On a regular basis, you need to run the appropriate tool on each of your systems: use the `make_net_recovery` command to create a recovery image to reside on another system or the `make_tape_recovery` to create a recovery image on tape.

The `make_tape_recovery` and `make_net_recovery` commands both create a bootable recovery (installation) image that is customized for your machine. The image contains your system's configuration information (disk layout, etc.) and an archive of files on your root disk or root volume group. You can exert some control over which files are saved as part of the archive.

IMPORTANT

The `copyutil` is a diagnostic tool for HP-UX 11.00 or later versions, and should not be used for system recovery. Instead, use one of the tools described in this chapter.

Once you have a recovery image on tape or Ignite-UX server, recovering a failed system is easy:

1. If a disk failed, replace it.
2. Boot from your recovery tape or system.
3. Wait for the recovery to complete.

4. Once the system comes back up, recover the latest copies of files from the last system backup. Ensure that you do not recover operating system files as this can create unexpected results.

IMPORTANT

Serial Attached SCSI (SAS) devices function differently than those of other storage devices. During installation and recovery Ignite-UX correlates sorted SAS hardware paths and physical locations. As a result, hardware paths are consistent for SAS configurations and do not change.

Ignite-UX recovery is not supported on systems that include SAS devices if the SAS I/O configuration has been modified by adding, removing or replacing SAS devices after installation.

When the SAS hardware configuration is changed after installation, the SAS hardware paths and physical locations are not predictably correlated. Thus, the mapping between hardware paths and physical locations is likely to change when Ignite-UX correlates them during recovery. In view of this, automatic recovery may not be possible if the SAS I/O configuration has been changed. Additionally, different SAS devices may be selected for recovery by Ignite-UX if the SAS configuration has been changed after installation. If recovery is attempted on a system on which the SAS I/O configuration has been changed, care should be taken to validate device selection during the recovery. This is necessary because different SAS devices may be used versus those that were used to create the recovery image (even if automatic recovery is possible.)

Expert Recovery

Expert recovery enables you to recover a root disk or root volume group with software damage. With this method, you repair the boot/root disk and root volume group from your Ignite-UX server or HP-UX core media. Once the recovery system has been booted, you can:

- Put a known-good kernel in place.
- Fix the LIF volume on the disk.
- Load essential files and commands into place.

Expert recovery does not require that you complete any preparation before you use it. The media used is supplied by HP so it does not contain any customization you may have on your system. In addition to using boot media, you can also boot from your Ignite-UX server.

Depending on the failure cause, expert recovery gives you enough capabilities to recover HP-UX onto your system. At that point, you need to recover your data files using your restore tool to completely recover your system to the state it was in before the problem occurred.

Expert recovery is not useful in recovering from hardware failures.

System Recovery Tools

The `make_net_recovery` and `make_tape_recovery` tools share many features in common, with few differences aside from the different media that are used and ways of handling them. Both system recovery tools share the same basic archive creation options, data structures, archive file content, and installation dialog boxes.

Recovery Tool Comparison

To determine which system recovery tool is best suited for your needs, consider the following:

Use `make_tape_recovery` to:

- Manage a single or limited number of systems locally; manage systems that are not networked.
- Create tape media for an off-site recovery system.

- Access clients on a subnet different from the Ignite-UX server when a boot-helper system cannot be utilized.

Use `make_net_recovery` to:

- Centrally manage networked systems.
- Avoid tape issues (handling, multi-tape archives, etc.)
- Use disk space for archive storage.
- Perform unattended backups without tape handling.
- Access clients on a different subnet than the Ignite-UX server when boot-helper systems cannot be utilized.

The following table summarizes and compares some of the features of the `make_tape_recovery` and `make_net_recovery` tools:

Table 11-1 Comparing System Recovery Tool Features

	<code>make_tape_recovery</code>	<code>make_net_recovery</code>
Minimum hardware configuration	Stand-alone system; local tape drive	Two networked systems; sufficient disk space to hold archive
Archive Creation Interface	Client command line; Ignite-UX Server GUI; Client TUI	Client command line; Ignite-UX Server GUI; Client TUI
Archive	Self contained image; written to the client's tape drive	Requires an Ignite-UX server to install; written to NFS mounted file system

Considerations When Using Veritas Volume Manager from Symantec

If you intend to use or are using VxVM, consider the following issues that impact both the `make_tape_recovery` and `make_net_recovery` tools:

- Ignite-UX only supports cold installing Symantec products that are in an OE depot as shipped by HP.

- HP only supports an environment where the versions of VxFS and VxVM match. For example, if you install VxFS 4.1, you must also install VxVM 4.1.
- Systems with mixed versions of VxVM disk groups are recovered with all disk groups specified in the recovery image converted to the higher VxVM version. For example, when your image contains both VxVM 3.5 and 4.1 disk groups, all disk groups are created as VxVM 4.1 disk groups.
- If your system has different versions of VxFS and VxVM, such as VxFS 4.1 and VxVM 3.5, you will still have mixed versions after the system is recovered.
- Before an installation is allowed to proceed, Ignite-UX verifies that the correct version of VxVM is being installed, if the installation is coming from an SD depot. If the installation is coming from an archive (or golden image), Ignite-UX will log a note stating that it is assumed that the correct version is included in the archive. For example, if your disk layout is VxVM 4.1, your archive must contain the VxVM version 4.1 software.

Archive Contents

The `make_net_recovery` and `make_tape_recovery` commands enable you to view and control archive contents:

- The list of essential files to be included in the archive is available as a simple text file: `/opt/ignite/recovery/mnr_essentials`. This file enables you to see what files and directories are included in the archive by default.
- You can specify what additional volume groups, directories, and files you want included, and what directories and files you want excluded. This is done using simple syntax in the client-specific content file, `/var/opt/ignite/clients/0xLLA/recovery/archive_content`, or by using command line options. You are not restricted to one or two volume groups. You can create a complete multi-volume group file system archive.
- You can use the user interface to find out which volume groups and/or disks will be untouched, which will be partially restored, and which will be restored in full if the archive is used, based on the specifications in the `mnr_essentials` file and the `archive_content` file.
- You can also use the user interface to edit the `archive_content` file and dynamically see the changes in the volume groups and disks that are affected.
- The policies for user-specified content are documented in “Archive Configuration Policies” on page 243.

The `make_tape_recovery` tool creates a bootable tape that can be used to restore a system using the system’s tape drive. Remember that `make_tape_recovery` is subject to the requirements and limitations inherent with tape media:

- A tape drive must be available on each system to be archived.
- If you want to save the previous good archives before creating new ones, you need to remove the old tapes and insert different tapes on each system.
- If an archive exceeds the capacity of a tape, you need to swap tapes for both creation and extraction.

- If you want to make sure that the newly created tapes are good, you must check the log files on the system.
- Tape drives are more error prone than a local network.

Archive Configuration Policies

When specifying archive content for both `make_net_recovery` and `make_tape_recovery`, using either the Ignite-UX GUI or the command line, the following rules apply:

- No essential file or directory can be excluded.
- Files and directories inside an included directory will be included recursively.
- If an essential file or directory exists outside the root disk or volume group, the disk or volume group it resides in is included in the recovery archive. That disk or volume group will be recreated during a recovery.
- If a symbolic link to a file or directory is included, only the link will be included in the archive. The actual file or directory is *not* included unless it is specified or the symbolic link is essential. A warning will be given when the item itself is a symbolic link.
- If a directory is included that contains symbolic links to other files or directories, the symbolic links will be included but not the referenced files or directories, unless they too are included. No warnings are given regarding these links.
- If a directory contains local mount points, the files and directories under the local mount points are not included, by default. This policy can be waived by specifying the option, `inc_cross` (include directories and cross-mount points), in the selection interface or command line.
- In case of conflicting entries in the selections, exclusions take precedence over inclusions.
- File system volume size must provide 10 percent free space for each volume; Ignite-UX automatically modifies the file system volume size accordingly. For more information, see the description of the `_hp_addnl_fs_free_pct` variable in *instl_adm* (4).

Large File Support

Specific support for is needed if archives containing files greater than 2 GB are to be created. This requires ensuring that both the file system and the NFS mount on the archive server will support large files.

The `fsadm` command can be used to determine whether large files are currently supported on a specific file system. An example of how to change the file system to support large files is found in *fsadm* (1M). If you use `fsadm` to convert a file system, it is prudent to *always* execute **`exportfs -a`** again, to ensure that clients are affected by your changes.

To support large files using NFS, you must use NFS version 3. HP-UX 11.00 and later can use NFS version 3 though are capable of mounting NFS version 2 file systems.

If a NFS mount is done using NFS version 2 the NFS file system will not support files larger than or equal to 2Gb.

The Ignite-UX Release Notes (`/opt/ignite/share/doc/release_note`) identifies which patches are required for NFS support of archives greater than 2 GB for HP-UX 11.00 and later versions.

Image Creation Process

The process of creating an image using Ignite-UX is comprised of six successive functions that are described as follows:

Prepare the Client

The primary functions of the `make_[tape|net]_recovery` commands are to check that the recovery tools installed on the client are compatible with the versions on the Ignite-UX server, and to create the necessary directories and files. If the client was not previously installed using the Ignite-UX server, these commands create a new directory for the client in `/var/opt/ignite/clients` on the server.

In addition, `make_[tape|net]_recovery` generates a timestamp for naming the archive, the configuration, and the configuration directory. The directory containing the configuration files for the archive is similar to the following:

```
/var/opt/ignite/clients/0xLLA/recovery/2005-03-17,11:19
```

The corresponding archive is:

```
/var/opt/ignite/recovery/archives/client/2005-03-17,11:19
```

The timestamp is important for coordinating configuration files and archives, and for ongoing archive management.

An overview of the files located in the client's directory on the Ignite-UX server for use in network recovery (for a local tape, the directory would be `/var/opt/ignite/recovery`) is as follows:

```
/var/opt/ignite/clients/0xLLA
  CINDEX
  client_name
  client_status
  config.sys
  host.info
  hw.info
  install.log
  recovery/
    archive_content
    client_status
    defaults
    latest -> 2005-03-17,11:19

    2005-03-17,11:19/
      archive_content
```

```
system_cfg  
archive_cfg  
control_cfg  
recovery.log  
flist  
manifest
```

Run the Recovery Interface

If the `-i` option is specified on the command line, the recovery user interface is executed next. This interface enables users to set or change the following default values for the archive:

- Long description of the image. This description may be used to add identifying information that can help to distinguish images when the timestamp is not sufficient. This information is shown by clicking Description on the Basic tab during installation configuration.
- Maximum number of archives to keep. When the number of archives in the destination directory reaches this maximum, `make_[tape|net]_recovery` removes the oldest archive. It uses the timestamp in the name of the archive to determine which one to remove.
- Destination host for the archive.
- Destination directory for the archive.

The user interface also gives you the opportunity to review and edit the `archive_content` file as mentioned in the previous step. When you exit the recovery user interface, the default values that you entered are written to:

```
/var/opt/ignite/clients/0xLLA/recovery/defaults
```

The archive content is written to:

```
/var/opt/ignite/clients/0xLLA/recovery/archive_content
```

Save the System Configuration

For all disk and volume groups, even those not included in the archive, `make_[tape|net]_recovery` backs up disk and volume group configuration information, and then stores it in the `system_cfg` file. For LVM, it also obtains map files for volume groups that are not part of the archive. The volume group configuration files and the map files generated at this stage are stored in `/etc/lvmconf`. This directory is included by the list of essential files so the LVM files are included in the archive. For VxVM, commands are included in `control_cfg` that restores disk groups.

After the volume group information is saved, `make_[tape|net]_recovery` creates the `control_cfg` file. This file includes the `post_config_cmds` to import all volume or disk groups that were not included in the archive and to activate all volume groups that were imported. It also includes control flags, such as `recovery_mode=true`, to guide the behavior of Ignite-UX during recovery.

Build the Archive

Next, `make_[tape|net]_recovery` calls `make_sys_image` to create the archive. Then `make_sys_image` passes a prebuilt `flist` to calculate the total disk space currently used by all the files to be included in the archive. It uses this information with a compression ratio to estimate the final size of the archive. If the destination directory has sufficient free disk space for the archive, `make_sys_image` creates the archive using `pax`. For more information, see *pax* (1).

Prepare the Configuration File

Once the archive is created, `make_[tape|net]_recovery` calls `make_arch_config` to create the `archive_cfg` file to reference it. Then `make_arch_config` uses `archive_impact` to calculate the file system impacts for the archive, and includes these in the `sw_sel` stanza it writes.

Update the CINDEX File

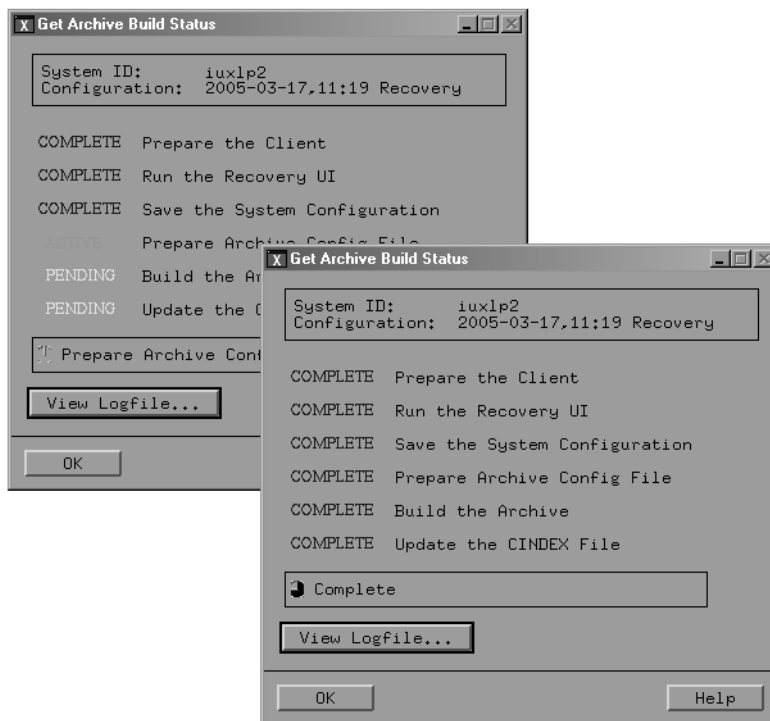
Lastly, `make_[tape|net]_recovery` uses `manage_index` to update the `/var/opt/ignite/clients/0xLLA/CINDEX` file for the client. This file contains a list of all the recovery configurations available for the client. The configuration clause for the most recently created archive is similar to the following excerpt:

```
cfg "2005-03-17,11:19 Recovery Archive" {
    description "Recovery Archive"
    "recovery/2005-03-17,11:19/system_cfg"
    "recovery/2005-03-17,11:19/control_cfg"
    "recovery/2005-03-17,11:19/archive_cfg"
}=TRUE
```

Image Creation Status

You can monitor the status of the image creation process by right-clicking on the client icon or clicking the Actions menu, then selecting **Client Status...** The resulting dialog box details the progress as the image is being created with `make_net_recovery` as shown in Figure 11-1.

Figure 11-1 Get Archive Build Status Dialog Box



Examining Image Contents

What Files will be Archived?

To list the files and directories that will be included in a `make_[tape|net]_recovery` archive, enter:


```
/opt/ignite/sbin/list_expander -l -f input_file
```

You can examine the list of files that will be recreated during an installation from a `make_net_recovery` configuration by viewing the `/var/opt/ignite/clients/0xLLA/recovery/flist` file. For example:

```
pg /var/opt/ignite/clients/0xLLA/recovery/fhist
```

If `make_tape_recovery` was used, the list of recovery files resides in `/var/opt/ignite/recovery/latest/fhist` and can be viewed in the same manner.

NOTE

The `make_net_recovery` and `make_tape_recovery` commands call `list_expander` to determine the files that will be included in a recovery archive. The following circumstance may cause `list_expander` to halt:

When processing information, `list_expander` uses the `libc` function, `ftw` (3C) to recursively descend the directory hierarchy (also referred to as "walking the directory").

When `ftw` encounters a directory containing a large number of files, all of the descendent files are processed recursively. For example, if the directory contained 400,000 files and the size of the stack frame allocated by `ftw` was 128 bytes, the stack size must be at least 49Mb to support the number of recursive function calls (400,000x128). In this case, it is wise to allocate additional space for other stack entries so 64Mb is a better stack size choice.

If the stack segment of the process is not large enough, `list_expander` is killed due to a stack growth failure. To avoid this situation, you should configure the kernel tunable `maxssiz` accordingly.

What Disks or Volume Groups will be Recovered?

To list disks or volume groups that will be recreated during an installation from a `make_[tape|net]_recovery` configuration, from the client, enter:

```
/opt/ignite/sbin/list_expander -d -f input_file
```

where `input_file` is a file specifying what is to be archived. See `make_net_recovery` (1M) for details on the format of the input file. The `make_net_recovery` command can take input from an input file, no input, or input from the command line with the `-x` option. The `list_expander` command can take input from an input file, or no input

at all. The `list_expander` command does not support a `-x` option, as `make_net_recovery` does, so to see the results of `list_expander` you must put it in a file, and then pass it that file name using the `-f` option.

If you used the Ignite-UX GUI to specify what is to be included in the archive, the input file can be found on the Ignite-UX server in:

```
/var/opt/ignite/clients/0xLLA/recovery/archive_content
```

You can copy this file from the Ignite-UX server to the client, and then execute `list_expander` against that file itself.

Omitting `-f input_file` causes `list_expander` to use only the essential files as input. This will show what disks or volume groups will get recreated for the minimal archive. The following is an example:

In?	dsk/vg	name	minor#	Associated disks
0	d	/dev/dsk/c0t3d0		
1	v	/dev/vg00	0x00	/dev/dsk/c0t6d0 /dev/dsk/c0t4d0
0	v	/dev/vg01	0x01	/dev/dsk/c0t1d0
0	v	/dev/vg02	0x02	/dev/dsk/c0t2d0

The `In?` column shows, for each disk or volume group, if it will be:

2 = included in full (`INC_ENTIRE` specifies entire disk/volume group), or

1 = included in part (some files are included, some not), or

0 = not included at all (no files from this disk/volume group are included).

The 0 means the disk or volume group will *not* be touched. The 1 or 2 means that the disk or volume group *will* be recreated and files from the archive will be restored during a recovery operation.

The `dsk/vg` column shows that the system has one whole disk (d) and three volume groups (v). The next column gives the names of the disks and volume groups.

NOTE

The file system volume sizes in the recovery archive can be modified when the archive is installed. By default, Ignite-UX ensures that there is 10 percent free space for each volume and modifies the file system volume size accordingly. If you do not want Ignite-UX to modify the file system volume sizes automatically, add `init _hp_ignore_sw_impact=1` to your `/var/opt/ignite/recovery/latest/system_cfg` file, or to the `/var/opt/ignite/clients/0xLLA/recovery/latest/system_cfg` file indicating the client's link-level address by changing `0xLLA`.

Verifying Image Results

During a system recovery, Ignite-UX by default restores the system to the state it was in when the image was created. Ignite-UX is a general-purpose installation too. It modifies many system configuration files, if changes from the recovery configuration are required, such as increasing volume sizes.

When you run `make_[tape|net]_recovery`, system configuration information is gathered and saved in configuration files that are used later when the system is recovered. During the system recovery you are allowed to make changes to this information, and Ignite-UX makes the appropriate changes to the system configuration. If you do not make any changes, Ignite-UX simply reapplies the same information, and there should be no change to the system after recovery.

Most of the system configuration files that Ignite-UX will modify are listed in the script, `/opt/ignite/data/scripts/os_arch_post_1`. The `os_arch_post_1` script checks for the system recovery case by checking the `$RECOVERY_MODE` variable. When this variable is `TRUE`, the `os_arch_post_1` script causes some configuration files to be protected from modification by using the "save_file" function. The `os_arch_post_1` script uses the "merge_file" function on files that Ignite-UX knows how to merge information into.

The files operated on by "merge_file", as well as those that have a commented out "save_file" line, are likely to be modified by Ignite-UX. Comments in the file explain any exceptions.

Because the list of files modified by Ignite-UX may change from release to release, it is best to look at the `os_arch_post_1` file on your system to see which files are saved as-is and which are merged with information from the Ignite-UX configuration files.

Creating and Using Recovery Tapes

The Ignite-UX `make_tape_recovery` command creates a system recovery tape that can be used to boot and recover a system that has become unbootable due to corruption of the root disk or root volume group. A system can be booted and installed from the tape without user intervention for configuration, customization, software selection, hostname, or IP address.

NOTE

A bootable recovery tape can also be created from the Ignite-UX server. However, the client must have a local tape drive.

The `make_tape_recovery` tool creates a system recovery image and stores this image on a local tape. The image created by `make_tape_recovery` is specific to the system it was created for and its identity includes the host's name, IP address, networking information, etc. In the event of a root disk failure, the recovery image can be installed using tape to restore the system.

IMPORTANT

The media and data format (density and compression) of the installation tape that you create must be compatible with the clients on which it will be read. For example, using 90 meter DDS-1 tapes to make installation tapes with Ignite-UX ensures that the tape works with any DDS drive.

The contents of the system recovery archive will always include all files and directories that are considered essential to bringing up a functional system. This **essential** list is predefined by `make_tape_recovery` and is located in the following file:

```
/opt/ignite/recovery/mnr_essentials
```

In addition to the essential list, data can be included in the archive on a disk/volume group, file, or directory basis. Nonessential files and directories can also be excluded.

The tape created by `make_tape_recovery` is completely self-contained and does not require an Ignite-UX server. The `make_tape_recovery` image contains a specially prepared LIF volume. The configuration file

in the LIF volume is the configuration file for the archive. The `/var/opt/ignite/INDEX` file in the LIF volume specifies the recovery configuration as the default for the system. The recovery tape contains additional configuration information so no user interaction is required.

Additional files needed for booting and installing are copied from `/opt/ignite/boot/Rel_release` and `/opt/ignite/data` to the LIF volume are included on the tape, so that everything the system needs to recover is there. You could use your `make_tape_recovery` tape without the need for an Ignite-UX server.

It is preferable to use the Ignite-UX GUI on the Ignite-UX server when running an interactive `make_tape_recovery` session. Executing it from the Ignite-UX GUI causes any additional server configuration of NFS mounts to be performed. Additionally, more informative progress reporting is provided and it is easier to use that interface.

NOTE

During the recovery process, when the file system is set up and the I/O tree is initialized, tape device files may be mapped differently from when the original recovery tape was made. Therefore, it is possible for a recovery tape to be created with one tape device file, for instance `/dev/rmt/0m`, and recovered from a different device file, such as `/dev/rmt/2m`, even though the physical device is the same.

You can also replicate a system and create a system archive that can be used for installing clients. The section, "Notes on Cloning Systems" on page 279 describes how to make use of this process. For additional information regarding system cloning, see the *Cloning and Recovery Issues using Ignite-UX* White Paper on the "Information Library" page of the Ignite-UX Web site at:

<http://www.docs.hp.com/en/IUX/infolib.html>

IMPORTANT

If you use `make_tape_recovery` for recovery, your tapes should be clearly labeled with the Ignite-UX version used to create them to avoid mixing Ignite-UX versions when two-step media recovery is used.

Recovery Tape Creation Examples

The following examples are intended to assist you in using the `make_tape_recovery` tool.

Recovering a Minimal Operating System

To create a minimal operating system recovery tape at `/dev/rmt/0mn` containing only the operating system elements required to boot the system, perform the following steps:

- Step 1.** Load a writable tape in the default tape drive for your system.
- Step 2.** As `root`, enter `make_tape_recovery`.

A tape will be created without further interaction.

System recovery from this tape would involve booting from the tape to recover the minimum core operating system. Then you would follow up with data recovery of all user files newer than those restored from the recovery tape.

NOTE

If you are creating a recovery tape for an Itanium®-based system, you can choose to use the `-D` option of `make_tape_recovery` to specify the name of the ANSI tape volume.

Creating a System Recovery Tape of the Entire Root Disk Volume

To create a system recovery tape at the default device, `/dev/rmt/0m`, that includes the entire root disk in the recovery archive, perform the following steps:

- Step 1.** Load a writable tape in the default tape device for your system.
- Step 2.** Enter the appropriate command:

```
make_tape_recovery -x inc_entire=vg00
```

A tape will be created without further interaction.

Creating a System Recovery Tape of the Root Disk Volume with `/usr` on a Different Volume Group

You can easily create a system recovery tape of the entire root disk even if the `/usr` file system resides on a different volume group using the `-A` option of `make_tape_recovery` by performing the following steps:

- Step 1.** Load a writable tape in the default tape device for your system.
- Step 2.** To create a system recovery archive with all the files/directories on the disks/volume groups containing the files specified by the default essentials file list `/opt/ignite/recovery/mnr_essentials` or the user defined version of this file that replaces this file, `/var/opt/ignite/recovery/mnr_essentials`, enter:

```
make_tape_recovery -s myserver -a /dev/rmt/0m
```

A tape is created on the default device, `/dev/rmt/0m`, without further interaction. You can boot this tape on your new system.

Tape Recovery for PA-Based Systems

To install a system recovery archive from a tape on a PA-based system, use the following procedure:

- Step 1.** Load the system recovery tape in the tape drive.
- Step 2.** Boot the system.
- Step 3.** Interrupt the boot sequence by pressing **Esc**.
- Step 4.** Select the tape drive you want to use, and then boot from it.
- Step 5.** Allow the installation process to complete.

For more information on creating recovery tapes, see *make_tape_recovery* (1M).

Tape Recovery for Itanium-Based Systems

To boot from tape on an Itanium-based system you must first create a tape boot option on the EFI Boot Manager menu. Verify that your Itanium-based system has firmware support for tape boot. If there is firmware that supports tape boot available for your system, you may first need to upgrade your firmware to make this functionality available. A set of tables showing minimum firmware revisions and SCSI HBAs that support tape boot is available in the *Ignite-UX Installation Booting* white paper available at

<http://www.docs.hp.com/en/IUX/infolib.html>

The first version of Ignite-UX to support native tape boot for Itanium-based systems is C.6.8. Recovery tapes created before that version of Ignite-UX can only be used with two-step recovery. See “Tape Recovery with No Tape Boot Support” on page 276 for more information on two-step recovery.

The screens shown in this example are from an HP Integrity rx1620 system. Other systems may vary in method and screen format. For information on how to configure boot devices for your system, please consult your system’s hardware documentation.

IMPORTANT

Configuring an EFI menu option for tape boot requires downtime since it can only be done from the EFI Boot Manager. If you are going to use tape recovery on your Itanium-based system, consider adding the tape boot option at your next planned maintenance window.

TIP

An ideal time to test tape recovery on your unique combination of system, tape drive, and HBA, is after you have configured an EFI Boot Manager menu option for tape boot. You do not need to recover the system. If you create a recovery tape with the `-I` option, you will enter an interactive recovery. When you get to the interactive screens, reset the system instead of performing a recovery.

Determining the Tape Drive’s EFI Path

When adding a tape boot option to the firmware, you must identify the tape drive you will use for booting. The EFI menus will display device paths to choose from. Before beginning the tape boot configuration process at the EFI level, you must determine the device path to your tape drive so you can select the correct one to use for booting.

The `ioscan -e` command does not report EFI device paths for tape drives. Alternative methods must be used to determine the correct path.

The EFI device path for our example is

```
Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun4,Lun0)
```

One way to identify the tape drive's path is to use the `reconnect -r EFI` command to get its SCSI Physical and Logical unit numbers (PUN and LUN). The Pun and Lun numbers can be mapped to the last part of the EFI device path. Below is the output of `reconnect -r` for our example.

Figure 11-2 Output From `reconnect -r`

```
Shell> reconnect -r
Scsi(Pun0,Lun0) HP 36.4GST336754LC HPC2 (320 MBytes/sec)
Scsi(Pun1,Lun0) HP 36.4GST336754LC HPC2 (320 MBytes/sec)
Scsi(Pun4,Lun0) HP Ultrium 1-SCSI E23D ( 80 MBytes/sec)
ReconnectController(0,0,0) : Status = Success

Shell> █
```

Finding the Ultrium tape drive's Pun and Lun numbers in this example is simple because not many devices are listed.

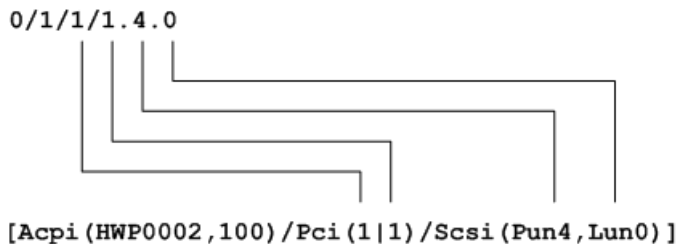
If your system is partitionable, EFI will not automatically enumerate all connected devices. (This allows for a speedier boot.) For this reason the tape drive you want to use may not be listed. If this is the case, you will need to use the `search` command to list the devices on the HBA the tape drive is connected to. Please see your system's Operations Guide for details on the `search` command.

A third way to find the EFI device path is to use the tape drive's hardware path as a map to it. The `ioscan -fkeCtape` command will list the hardware path of the tape drive.

For our example, the hardware path is `0/1/1/1.4.0`

Use the following diagram to map the hardware path to the EFI device path:

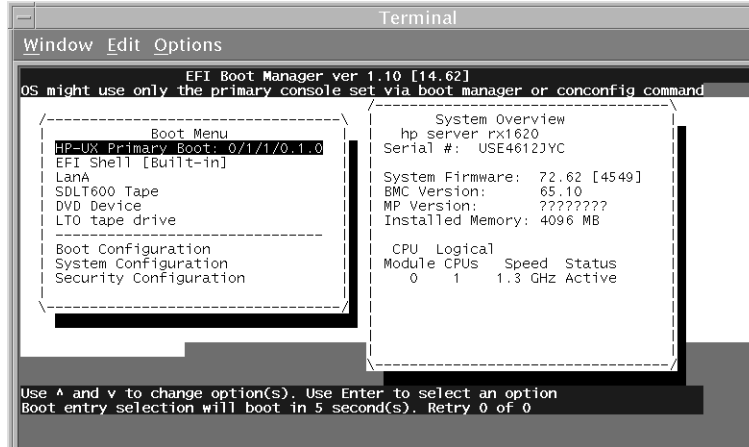
Figure 11-3 Mapping the Hardware Path to the EFI Device Path



Configuring the Tape Boot Option

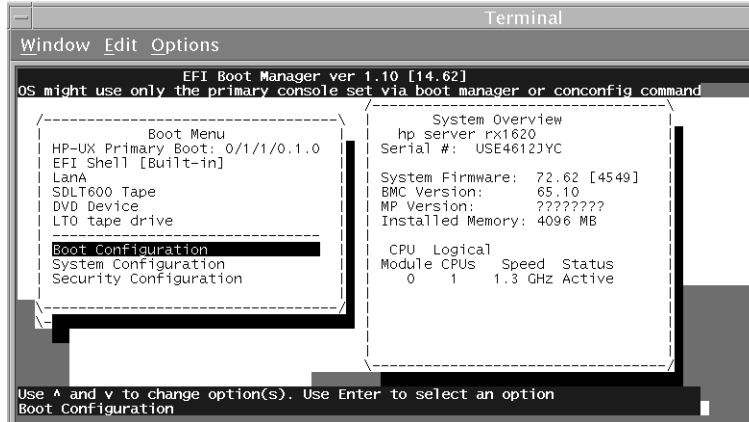
Reboot your system and stop the process at the EFI menu before it times-out, as shown in the figure below. Notice the last line warns that reboot will occur after the remaining seconds expire.

Figure 11-4 EFI Menu With Timer



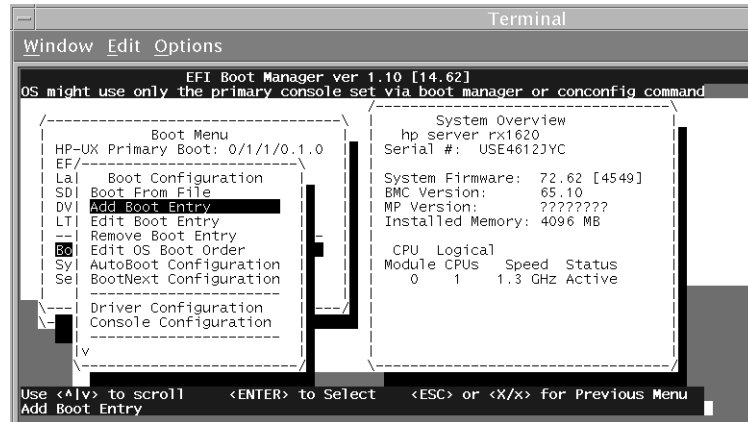
Select **Boot Configuration** from the Boot Menu.

Figure 11-5 Boot Configuration



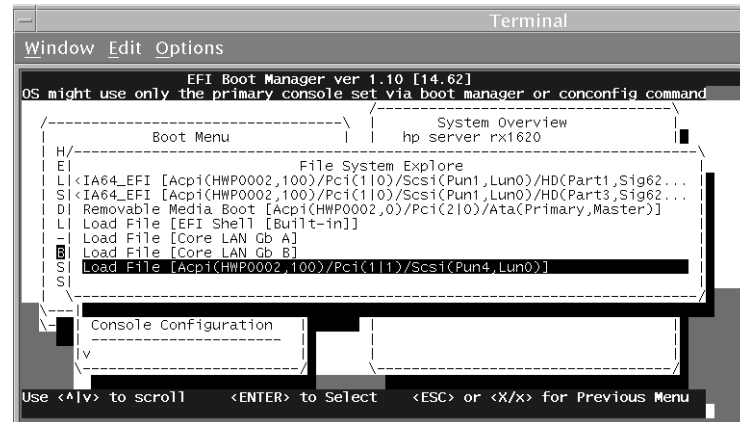
Select **Add Boot Entry** from the Boot Configuration menu.

Figure 11-6 Add Boot Entry



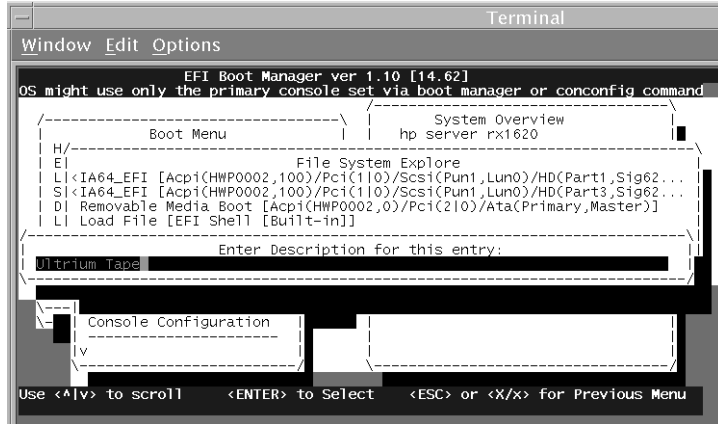
The EFI Boot Manager will then display a menu listing the available devices to choose from. Select the tape drive you wish to boot from. See Determining the Tape Drive's EFI Path above for how to select the correct device.

Figure 11-7 List of Selectable Boot Devices



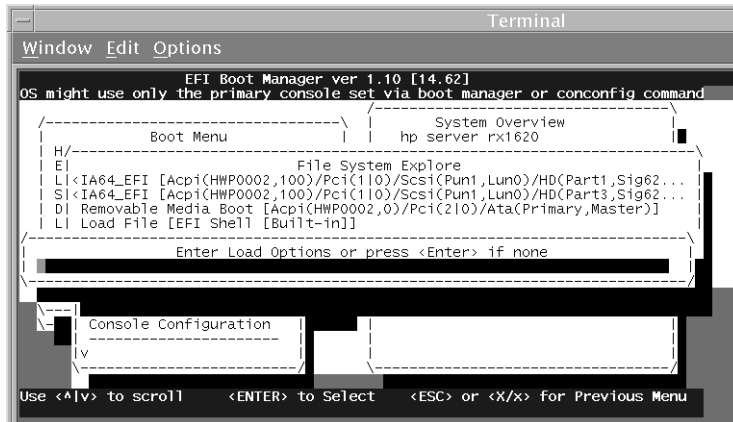
Enter a description in the next dialog box. This is the text that will appear in the Boot Menu listing. For this example, the new boot option will be called "Ultrium Tape."

Figure 11-8 Enter a Description for the Boot Option



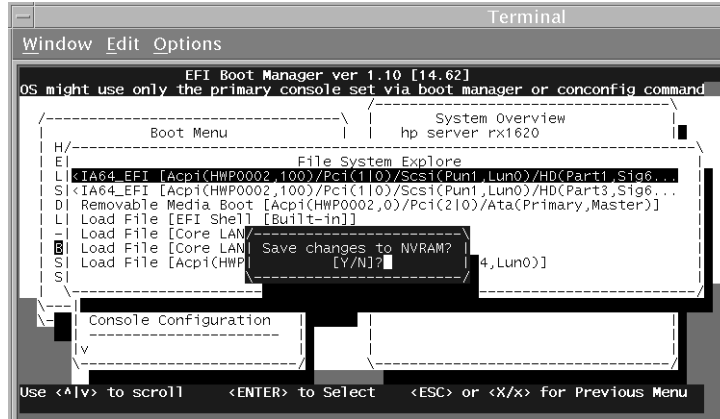
Next, you will be prompted for load options. Press **Enter** at this point without entering anything.

Figure 11-9 Enter Load Options



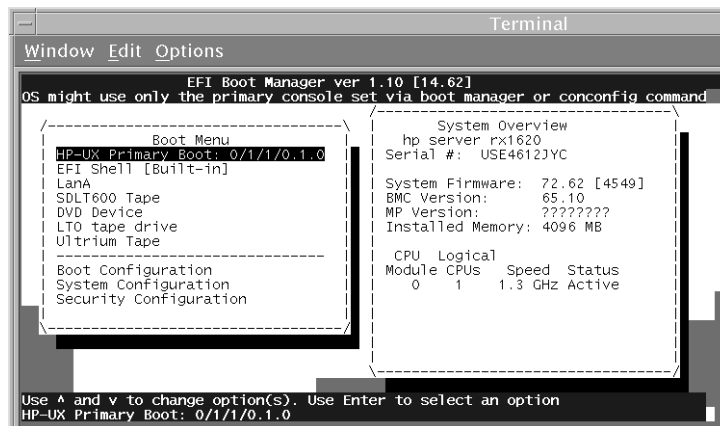
The last step is to save your edits to NVRAM. If you have made a mistake, press **n**, otherwise press **y** and the changes will be saved to NVRAM.

Figure 11-10 Save Changes to NVRAM



You will be returned to the main EFI Boot Manager menu. If you answered **y** to the Save changes to NVRAM question, your new boot option will appear listed with the description text you entered in Figure 11-8.

Figure 11-11 The Boot Manager Menu with the New Option



At this point you have successfully configured a tape boot option, and it may be selected from the EFI Boot Menu. For more information on creating recovery tapes, see *make_tape_recovery* (1M).

NOTE

When executing any Itanium-based boot using the install kernels and file systems, the following errors will appear in the output:

```
execve("/sbin/sh") failed, errno 0xffffffff  
execve("/bin/sh") failed, errno 0xffffffff
```

These errors are not indicative of any Ignite-UX problem and can be safely ignored. The failures occur because `/sbin/sh` and `/bin/sh` are not present on the system when the kernel is starting; Ignite-UX does not need them at this point. On a non-installation boot, the kernel would be attempting to run `/sbin/pre_init_rc`, a script.

Creating and Using Network Recovery Images

Ignite-UX enables you to create recovery images using the network onto the Ignite-UX server system or any other specified system. You can either use the Ignite-UX GUI `/opt/ignite/bin/ignite` or run `/opt/ignite/bin/make_net_recovery` on a client system. Systems can be recovered across subnets from a boot tape using `make_boot_tape`, local boot server or the `bootsys` tool from an Ignite-UX server.

The `make_net_recovery` tool creates a system recovery image and stores it on a system that may be accessed using the network. The image created by `make_net_recovery` is specific to the system it was created for and its identity includes hostname, IP address, networking information, etc. In the event of a root disk failure, the recovery image can be installed using Ignite-UX to recover the system.

The contents of the system recovery archive will always include all files and directories that are considered essential to bringing up a functional system. This essential list is predefined by `make_net_recovery`. By running `make_net_recovery` in interactive mode, the directories and files that make up the essential list can be displayed. In addition to the essential list, data can be included in the archive on a disk/volume group, file, or directory basis. Nonessential files and directories can also be included.

Network Recovery Dependency The images created by `make_net_recovery` are designed to work with an Ignite-UX server; you cannot remove your Ignite-UX server and still use your recovery image.

Networking Features Two NFS mount points are established on the client by `make_net_recovery`. The `/var/opt/ignite/clients` directory on the Ignite-UX server is mounted to the client system to store configuration files that describe the client configuration and location of the recovery archive. The second mount point is made to the `archive_server:archive_dir` (see the `-a` option) and is used to store the recovery archive of the client system; the default location on the Ignite-UX server is `/var/opt/ignite/recovery/archives`. After successful or unsuccessful completion of the system recovery image, the NFS mount points are unmounted.

The NFS mount for the archive directory may be exported on a per-client basis. A separate archive directory is used for each client. This enables you to NFS export each directory only to the individual client owning the archive, which provides security.

NOTE

If clients obtain temporary IP addresses from DHCP that differ from the IP address that they use during normal operation, you must allow the client access to all of the possible IP addresses to ensure access to the archive. If you do not, the client may fail to mount the archive directory from the NFS server and the recovery will fail.

If the client system does not have the most recent version of Ignite-UX, the Ignite-UX GUI uses `swinstall` to install the "recovery package" that contains all necessary files to perform the recovery.

Log Files

On an Ignite-UX server, progress and errors are logged to:

```
/var/opt/ignite/clients/0xLLA/recovery/datetime/recovery.log
```

On a local system, progress and errors are logged to:

```
/var/opt/ignite/recovery/datetime/recovery.log
```

Adding Clients for Recovery

You can add a new client to your Ignite-UX server for the purpose of creating recovery images if the client is already running HP-UX. Unlike installation, adding a client for recovery only does not require you to reboot the client. This is useful when you have installed the operating system, customized it and now want to be able to recover it in the event of a problem or for disaster recovery purposes.

To add a new client to your Ignite-UX server, and then create a system recovery image, use the following steps:

TIP

You can execute the Ignite-UX GUI as if you were on the Ignite-UX server from a different system using the following:

- On your host system, allow the Ignite-UX server to access your display by adding the Ignite-UX server hostname to your `xhost` list:

```
xhost +Ignite-UX_server_hostname
```

Creating and Using Network Recovery Images

- Set the `DISPLAY` variable to your local host system, if necessary. For example:

```
export DISPLAY=Your_host_system:0
```

where:

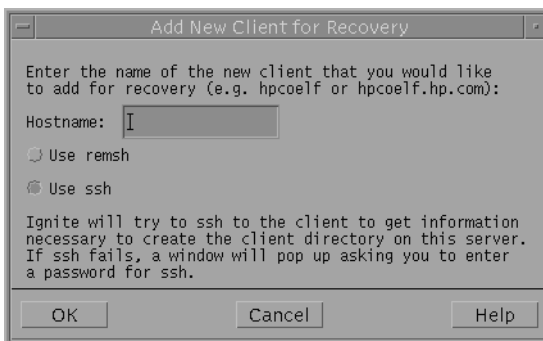
Your_host_system is the hostname of your system.

Step 1. On the Ignite-UX server, as root execute:

```
/opt/ignite/bin/ignite
```

Step 2. Select **Add New Client for Recovery** from the Actions menu.

Figure 11-12 Add New Client for Recovery Dialog Box



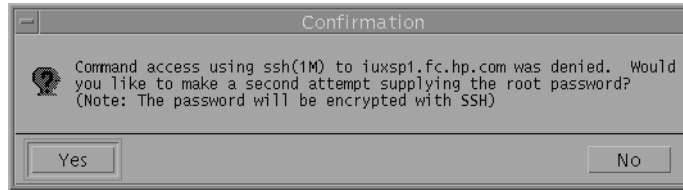
Step 3. In the Hostname box, enter the name of the client for which you want to create a recovery image.

Step 4. Select how you want to communicate with the client, `ssh` or `remsh`, and then click **OK**. Use the default, `ssh` for secure encrypted communications or the unsecured `remsh`.

Step 5. If you choose `ssh`, you are asked if you want to use this communication method for all subsequent recovery, as well as any installation sessions run from the Ignite-UX server. Click **Yes** to set `ssh` as the default client communication, or **No** if you only want to use `ssh` for this recovery session.

The Ignite-UX server then attempts to contact the client to begin the recovery initialization process and build a directory to contain the client's information. In the event that access to the client is denied, as in Figure 11-13, you are asked if you want to provide the `root` password.

Figure 11-13 Confirmation Dialog Box



Clicking **Yes** produces a terminal window allowing you to enter the root password; clicking **No** halts the addition of this client and returns you to the Ignite-UX GUI.

Once communication with the client is established and the client directory is constructed, a client icon appears in the Ignite-UX GUI.

- Step 6.** Ensure that the client icon for which you want to create a recovery image is selected, and then select **Create Network Recovery Archive** from the Actions menu. You may be prompted for the `root` password for the client.

The network recovery tools needed on the client are automatically installed.

After some informational dialog boxes, an Include/Exclude Selection dialog box appears. To view the essential files, click **Show**. Essential files cannot be excluded, but you can customize the archive by specifying additional volumes, directories, or files. When an item is duplicated as both Include and Exclude, the Exclude category takes precedence.

Examples

The following examples apply for system recovery using either `make_net_recovery` or `make_tape_recovery`:

Create a Recovery Image from the Client

These commands create a system recovery image from the client, using settings from the last invocation of Ignite-UX, and using the options file on the Ignite-UX server (*myserver*) in the default location, `/var/opt/ignite/clients/0xLLA/recovery/:`

```
make_net_recovery -s myserver
```

Create a Recovery Tape on a Client that Includes the Volume Group, vg00 To create a system recovery archive from the client that includes files from all file systems in the vg00 volume group, enter:

```
make_net_recovery -s myserver -x inc_entire=vg00
```

Preview System Recovery To preview the creation of the system recovery archive enter:

```
make_net_recovery -s myserver -p
```

The use of the `-p` option can be particularly helpful during a tape recovery to be sure of the tape contents before attempting the recovery.

Recovering using the Network for PA-Based Clients

To recover a failed disk or volume group using the system recovery image:

- Step 1.** Boot the failed system using one of these methods (see “Igniting PA-Based Clients from the Console” on page 96):
- Using Ignite-UX after booting with: **boot lan install**
 - Booting from an Ignite-UX server, using `bootsys` if the client operating system is running.
 - Booting the failed client locally by using a boot tape previously created with `make_boot_tape`.
- Step 2.** Do not interact with ISL.

If your Ignite-UX server supports installing more than one version of HP-UX, a target operating system menu will appear:

```
ISL booting hpux KernelPrompt "Choose Operating System to Install:"
```

```
1. target OS is B.11.00
2. target OS is B.11.11
3. target OS is B.11.23 PA
4. Exit
```

```
Choose Operating System to Install :
```

- Step 3.** At the client, from the main menu, select **Install HP-UX**.

- a. Respond to the Network Configuration dialog box.
- b. Respond to the UI Display Options dialog box (run at the Ignite-UX server or at a client).
- c. If working from the Ignite-UX server, select the client for the system to be recovered.

Step 4. Select **Install/New Install**.

Step 5. Select the recovery configuration to use, and then allow the recovery to continue.

Recovering using the Network for Itanium-Based Clients

To recover a failed disk or volume group using the system recovery image:

Step 1. From the EFI Boot Manager menu, you will see a prompt to select a boot option. Select **Boot Configuration**.

```
EFI Boot Manager ver 1.10 [14.62]
```

```
Please select a boot option
```

```
HP-UX Primary Boot: 0/1/1/1.2.0
```

```
EFI Shell [Built-in]
```

```
-----  
Boot Configuration
```

```
System Configuration
```

```
Use ^ and v to change option(s). Use Enter to select an option
```

Step 2. The Main Menu appears and prompts you to choose an operation. Select **Add a Boot Option**.

```
EFI Boot Maintenance Manager ver 1.10 [14.62]
```

```
Main Menu. Select an Operation
```

```
Boot from a File
```

```
Add a Boot Option
```

```
Delete Boot Option(s)
```

```
Change Boot Order
```

Creating and Using Network Recovery Images

```

Manage BootNext setting
Set Auto Boot TimeOut

Select Active Console Output Devices
Select Active Console Input Devices
Select Active Standard Error Devices

Cold Reset
Exit

```

- Step 3.** Select the appropriate network interface so that this network boot option loads the appropriate file from the following menu. For example, look for entries identified with a Media Access Control (Mac) address (or link-level address [LLA]) as in this example.

```

EFI Boot Maintenance Manager ver 1.10 [14.61]

Add a Boot Option.  Select a Volume

IA64_EFI [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Si
IA64_EFI [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part3,Si
IA64_EFI [Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun2,Lun0)/HD(Part1,Si
Removable Media Boot [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
Load File [EFI Shell [Built-in]]
Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(123456789000)]
Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(987654321000)]
Exit

```

- Step 4.** Enter an appropriate boot option name at the message prompt. For this example, the new boot option is named lan0.
- Step 5.** Exit to the main menu by pressing **Esc**. The new boot option now appears in the EFI Boot Manager main menu.

```

EFI Boot Manager ver 1.10 [14.62]

Please select a boot option

HP-UX Primary Boot: 0/1/1/1.2.0
EFI Shell [Built-in]
Boot from lan0
-----
Boot Configuration
System Configuration

Use ^ and v to change option(s). Use Enter to select an option

```

- Step 6.** Select the new boot option you created. The following is an example of a successful boot using the new boot option.

```
Starting: Boot from lan0

@(#) HP-UX IA64 Network Bootstrap Program Revision 1.0
Downloading HPUX bootloader
Starting HPUX bootloader
Downloading file fpswa.efi   (328192 bytes)

(C) Copyright 2004 Hewlett-Packard Development Company,
    L.P.All rights reserved

HP-UX Boot Loader for IPF  --  Revision 2.018

Booting from Lan
Downloading file AUTO   (26 bytes)
Press Any Key to interrupt Autoboot
AUTO ==> boot Rel_B.11.23/IINSTALL
Seconds left till autoboot -   0
AUTOBOOTING...
AUTO BOOT> boot Rel_B.11.23/IINSTALL
Downloading file Rel_B.11.23/IINSTALL
```

- Step 7.** At the client, from the main menu, select **Install HP-UX**.
- a. Respond to the Network Configuration dialog box.
 - b. Respond to the UI Display Options dialog box (run at Ignite-UX server or at a client).
 - c. If working from the Ignite-UX server, select the client for the system to be recovered.

- Step 8.** Select **Install/New Install**.

- Step 9.** Select the recovery configuration to use, and then allow the recovery to continue.

Retaining Known-Good Images

You may want to prevent known-good images from being deleted from your system. The `make_net_recovery` command provides the `-n` option to specify the number of images to save. To preserve disk space, the oldest images are removed as new images are created. The number of images that get removed is based on the number of images specified to be saved.

One way to ensure that known-good images are saved is to specify the number of images to save to be greater than the maximum number of images you plan to store on the system at any given time. This requires adequate disk space.

An alternative and better approach to saving known-good images is to rename the archive and edit the configuration file to include the new archive name.

NOTE

Ignite-UX also creates a symbolic link between the client's name and the MAC address. In the following procedure, *system_name* is the name of the client.

Follow these steps:

- Step 1.** Log into the system where the archive is to be stored. (This could be other than the Ignite-UX server.)
- Step 2.** Rename the archive. (The path to the archive may be different from the example.) The name of the archive to save can be anything unique, but it should be outside the naming convention *yyyy-mm-dd, hr:min:*

```
cd /var/opt/ignite/recovery/archives/system_name  
mv old_archive_name saved_archive_name
```

For example:

```
mv 2001-05-11,15:14 Recovery_Archive.0511.save
```

- Step 3.** If your archive server is different from your Ignite-UX server, log in to the Ignite-UX server.

Step 4. Edit the following file to reference the new archive name:

```
/var/opt/ignite/clients/system_name/recovery/archive_cfg
```

Change the `archive_path` variable, inside the `(source_type == "NET")` stanza, to the name of the saved archive.

For example:

```
(source_type == "NET") {  
    archive_path = "Recovery_Archive.0511.save"  
}else {  
    archive_path = "1"  
}
```

Step 5. Optionally, you can edit the `cfg` tag entry in the following file:

```
/var/opt/ignite/clients/client/CINDEX
```

to change the name and description of the configuration so it is unique and descriptive when viewed using the Ignite-UX GUI. For example:

Change from:

```
cfg "2001-05-13,06:51 Recovery Archive" {  
    description "Weekly System Recovery Archive"  
    ...  
}
```

To:

```
cfg "Saved Recovery Archive" {  
    description "Weekly System Recovery Archive"  
    ...  
}
```

Making Recovery Configuration File Additions

To make configuration file additions to all recovery configurations for a given client, create a new Ignite-UX configuration file called:

```
/var/opt/ignite/clients/0xLLA/recovery/config.local
```

For local tapes the file is located in:

```
/var/opt/ignite/recovery/config.local
```

This `config.local` file will automatically be included into your recovery configuration for this client each time you run `make_net_recovery`. (`make_net_recovery` is run for you when you use Ignite-UX for network recovery.)

If you already have recovery configurations for this client and would like them to include the `config.local` file, edit the

`/var/opt/ignite/clients/0xLLA/CINDEX` file to include a reference to `recovery/config.local` in all of the configuration stanzas.

Selecting File Systems During Recovery

It is possible to change the way your disks are configured when you recover from an image saved by `make_net_recovery`. If you want to use a standard HP file system layout, you can specify the disk configuration using Ignite-UX. For more information, see “Basic Tab” on page 117.

If you do not want to use a standard HP file system layout, you can modify the `/var/opt/ignite/clients/0xLLA/CINDEX` file for the client you are recovering. The `CINDEX` file contains one or more configuration stanzas that refer to the recovery images you have previously created with `make_net_recovery`. Add a new configuration file entry to the stanza that you intend to recover from. If you want to add the standard HP file system choices, add the file:

```
/opt/ignite/data/Rel_release/config
```

where:

release is the operating system release on the client you intend to recover. For example:

```
/opt/ignite/data/Rel_B.11.11/config
```

would be added for a client with the HP-UX 11.11 operating system. This new configuration file entry should be the first entry in the stanza you are modifying.

When you use the Ignite-UX GUI during recovery, select the File System type you want to use on the Basic tab.

Tape Recovery with No Tape Boot Support

You can use the Ignite-UX tape recovery tool to recover your system even if there is no tape boot support on the system. (This process may also be referred to as two-step media recovery.)

IMPORTANT

HP recommends that you boot from the Operating Environment (OE) media that corresponds to the version of Ignite-UX you used to create your recovery tape. HP supports *only* matched OE media and recovery tape version combinations, it is unknown if mismatched OE media and Ignite-UX recovery tapes can successfully recover a system.

If you have misplaced the matching OE, or are using an Ignite-UX version with no matching OE, you can make your own minimal bootable CD/DVD to support two-step media recovery. Please see the `make_media_install` command help, or see the section, *How do I create the CD equivalent of a tape created by make_boot_tape?* in the *Ignite-UX Custom Configuration Files* white paper found on <http://docs.hp.com/en/IUX/infolib.html>.

-
- Step 1.** Insert the HP-UX OE media or the bootable custom media into the appropriate drive, and boot from it. Either media *must* match the HP-UX version used when creating the recovery tape.

The following interface screen appears:

```

                                User Interface and Media Options

This screen lets you pick from options that will determine if an
Ignite-UX server is used, and your user interface preference.

Source Location Options:
[ * ] Media only installation
[   ] Media with Network enabled (allows use of SD depots)
[   ] Ignite-UX server based installation

User Interface Options:
[ * ] Guided Installation (recommended for basic installs)
[   ] Advanced Installation (recommended for disk and file
      system management)
[   ] No user interface - setup basic networking, use defaults
      and go
[   ] Remote graphical interface running on the Ignite-UX server

Hint: If you need to make LVM size changes, or want to set the
      final networking parameters during the install, you will
      need to use the Advanced mode (or remote graphical
      interface).

[ OK ]                [ Cancel ]                [ Help ]
```

Step 2. Click **OK** to continue and you are advanced to the next screen:

```

                                Media Installation

This screen provides an option to switch the install source
from the default CD/DVD to a recovery tape. This is helpful
for those systems and for tape devices which do not support
booting from a tape.

[   ] CD/DVD Installation
[ * ] Boot from CD/DVD, Recover from Tape

[ OK ]    [ cancel ]    [ Help ]
```

Tape Recovery with No Tape Boot Support

- Step 3.** Select **Boot from CD/DVD, Recover from Tape** and click **OK** to advance to the Tape Drive Selection screen:

Tape Drive Selection

There are one or more tape drives detected on the system. Insert your recovery tape into one of the drives and then select that drive from the list below.

Use the <tab> and/or arrow keys to move to the desired TAPE device to enable, then press <Return/Enter>.

HW Path	Device File	Description
[0/18/1/0/0.0.3.0	/dev/rmt/c0t0d0	HP C5683A]
[0/18/1/0/0.1.0.0	/dev/rmt/c1t1d1	HP A5580A]

- Step 4.** Select the tape drive that contains the archive tape, then press **Enter** to start the installation of the recovery tape archive from the chosen tape drive.

Notes on Cloning Systems

Ignite-UX offers two main options for replicating (cloning) systems. The more flexible and complex golden image method makes use of `make_sys_image` to create an archive of the source system, followed by manually modifying configuration files to meet your needs. A much simpler (but less flexible approach) uses `make_net_recovery` or `make_tape_recovery`. The pros and cons of each are described here.

In each case, the source system that is used must contain software that is compatible with all clients. This means that the version of HP-UX, patches, drivers, etc., must be sufficient for all systems involved. This often requires installing a superset of software and drivers onto the source system that will be used on all potential clients.

Using the `make_sys_image` method

Using the golden image method of creating an archive with `make_sys_image` and then modifying Ignite-UX configuration files to reference the archive is very flexible, but somewhat time consuming. The end result gives you:

- The ability to install systems from network or media from either an Ignite-UX server or local clients.
- The ability to customize the process and tune it to accommodate many different situations.
- A "clean" system — log files and most remnants specific to the source system are removed.
- A rebuilt kernel containing just the drivers needed by the client's hardware.
- The ability to install additional software or patches on top of the system archive from an SD depot. This reduces the need to recreate the archive and enables you to add support for new hardware that requires new patches or drivers without making a new archive.

Using the `make_[tape/net]_recovery` method

The `make_tape_recovery` and `make_net_recovery` tools are designed to reproduce a system exactly the way it was at the time the snapshot was taken. These tools try to accommodate cloning in various ways:

- You can change hostname and networking information.
- You can make changes to disks and file systems during the recovery.

- You can detect hardware model changes and rebuild the kernel.

However, their attempt to reproduce a system exactly may be undesirable:

- The disk layout is saved "as-is" from the original system and does not have flexible logic to accommodate disks of varying sizes or locations.
- Hardware instance numbers for devices that exist at the same paths between systems have the instance numbers preserved from the original system. This can cause non-contiguous assignments in instance numbers, which is usually only a cosmetic problem.
- Many files that are specific to the system the recovery image was taken from are preserved. This includes many log files, etc.
- When the kernel is rebuilt (in the "cloning" situation), drivers may be added as needed by the hardware, but unused drivers will not be removed.

Cloning a System Using `make_net_recovery`

The recovery configurations and archives created by `make_net_recovery` are stored in a separate directory on the Ignite-UX server for each client. Using the configuration and archive created by `make_net_recovery` on one system to install a different system involves manually copying some configuration files and allowing NFS access to the source system's archive.

A system recovery tape created using `make_tape_recovery` can also be used to clone systems. The system you are installing by cloning must have a local tape drive so you can boot from the system recovery tape.

The following example illustrates how to clone a system:

- Step 1.** Use `make_net_recovery` or Ignite-UX to create a system recovery image of the source system.
- Step 2.** On the Ignite-UX server, if the client to be installed does not currently have a directory in `/var/opt/ignite/clients` but is up and running, use the Ignite-UX GUI to create that directory using **Add New Client for Recovery** from the Actions menu. For more information, see "Adding Clients for Recovery" on page 265.

If the client is not running, you will either need to boot it from the Ignite-UX server or from a tape made with `make_boot_tape` in order for this directory to be created.

- Step 3.** Copy the `CINDEX` and recovery directory from a source client to the target client directory. If the target client has previously used `make_net_recovery`, it will already have a `CINDEX` file. If the `CINDEX` file for the client exists, you may want to save a copy and/or edit the file to add the desired entries from the source client. The following commands copy the required files. You may specify `src_client` and `target_client` using either the LAN addresses (such as `0x0060B04AAB30`), or by using the client's hostname (which is a symlink to the LAN address):

```
cd /var/opt/ignite/clients/src_client
find CINDEX recovery | cpio -pdvma ../target_client
```

- Step 4.** Give the target client NFS access to the archive of the source system. To do this, log in to the system that holds the archive (normally the Ignite-UX server).

Typically each target client has its own directory for storing the archives, and the directory is exported only to the individual client. In this case, you will need to edit the `/etc/exports` file to allow access to both the source and target clients:

- a. Enter `vi /etc/exports`
- b. Append: `target-client` to the end of the source-client's line.
- c. Enter `exportfs -av`

- Step 5.** Boot the target client from the Ignite-UX server (using any method you want). Then, when you install the system you can select from the recovery configurations of the source system.

- Step 6.** Change the system networking parameters for the client during the installation.

For additional information regarding system cloning, see the *Cloning and Recovery Issues using Ignite-UX* White Paper on the "Information Library" page available at the Ignite-UX Web site at:

<http://www.docs.hp.com/en/IUX/infolib.html>

Expert Recovery Using the Core Media

If your system should become compromised or corrupt and will not boot to a login prompt, or the system boots but critical operating system files are corrupted adversely affecting overall system operation, it may be useful to restore system elements with core recovery media.

Before you attempt to recover an HP-UX system, you should have the following information about your system disk available.

Much of this information, including file system types, can be obtained by accessing your online system manifest, either using Ignite-UX or by reading the hardcopy that came with your system.

- Revision of the HP-UX system that you are attempting to recover.

CAUTION

You should only attempt to recover HP-UX systems that match the HP-UX version number of the recovery tools you are using. For example, you can use HP-UX v1 (B.11.11) core media to attempt to recover an HP-UX 11i v1 (B.11.11) system.

-
- The hardware path of the `root` file system on the disk (that is, what file system you will be checking/repairing using `fsck`).
 - The address of the LIF volume (`bootlif`) path of that disk.
 - What the `AUTO` file in the LIF volume should contain.
 - Whether you have an LVM, VxVM, or whole-disk system.

The more you know about the system disk and its partitioning scheme *before you encounter major damage or corruption*, the easier it will be for you to recover.

The procedures that follow assume that both `fsck` and `mount` can be run successfully on the system disk; otherwise, the following procedures are not applicable.

Automated Recovery Procedures

There are two possible expert recovery situations that occur after a system problem, each one has an associated recovery procedure as follows:

- The system does not boot to the HP-UX boot loader prompt (ISL for PA-RISC systems and EFI Boot Manager for Itanium-based systems) from a known good `root` file system.

On the system disk, rebuild the LIF volume on PA-RISC systems or the EFI, HP Service Partition, and HP-UX partitions on Itanium-based systems. Then, install all critical operating system files required to boot on the `root` file system.

- The system boots to the HP-UX boot loader prompt, but cannot boot `vmunix`. This means that the kernel cannot be found, is corrupted or the file systems are corrupt or damaged.

Install *only* the critical operating system files required to boot on the `root` file system. If you believe that the kernel is corrupted then replace only the kernel on the `root` file system.

The following subsections describe these procedures in detail.

Recovering the LIF/EFI Volume and Critical HP-UX Files

Following is an example of the procedure for rebuilding the LIF volume of the system disk and for installing all the critical operating system files necessary to boot from the `root` file system.

NOTE

The following example requires the use of the core operating system media for the appropriate version of HP-UX.

- Step 1.** Boot your system from the media device to begin the recovery process. For specific information regarding how to boot your system from an alternate boot source, see Chapter 5, "Administering a System: Booting and Shutdown", of the *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* manual.

The following menu appears once the booting process from the media device is complete:

```

Welcome to the HP-UX installation/recovery process!

Use the <tab> key to navigate between fields, and the arrow keys
within fields. Use the <return/enter> key to select an item.
Use the <return/enter> or <space-bar> to pop-up a choices list. If the
menus are not clear, select the "Help" item for more information.

Hardware Summary:                System Model: ia64 hp server rx2600
+-----+-----+-----+ [ Scan Again ]
| Disks: 2 ( 67.8GB) | Floppies: 0 | LAN cards: 4 |
| CD/DVDs: 1         | Tapes: 0   | Memory: 2036Mb |
| Graphics Ports: 0 | IO Buses: 4 | CPUs: 2        | [ H/W Details ]
+-----+-----+-----+

[      Install HP-UX      ]
[  Run a Recovery Shell  ]
[   Advanced Options    ]

[ Reboot ] [ Help ]
```

Step 2. Select **Run a Recovery Shell**. The next prompt is:

```
Would you like to start up networking at this time? [n]
```

Step 3. Unless you need networking to be able to ftp files to or from other systems, press **n**.

Ignite-UX installs the commands and mounts the file systems necessary to the recovery. Upon completion, the HP-UX Core Media System Recovery menu appears:

```

HP-UX CORE MEDIA SYSTEM RECOVERY
MAIN MENU

s. Search for a file
b. Reboot
l. Load a file
r. Recover an unbootable HP-UX system
x. Exit to shell
```

This menu is for listing and loading the tools contained on the core media. Once a tool is loaded, it may be run from the shell. Some tools require other files to be present in order to successfully execute.

Select one of the above:

Step 4. To install a file or files, enter **l** at the prompt.

NOTE: Loading some files may require other files/libraries to be loaded.

If an attempt is made to load a file, and an error message is encountered when the command is invoked, it may be useful to use the `chatr` command (on a system that is up and running) to ensure that dependencies are met. See `chatr(1)` for more details.

For some commands (`vi`, `ftp`, `rcp`), the dependent files will be automatically loaded. For others, you need to load them manually.

If you specify a filename of "all" a list of all the files available will be displayed.

```
Filesystem kbytes    used   avail %cap iused   ifree iused Mounted on
/           33980   15499   18481  46%   172    8468   2%   ?
```

Step 5. Enter the names of the damaged or corrupted files you want to install or files that you need to repair the system. For example:

```
ftp vi date grep
```

NOTE

In order to use `ftp`, networking had to have been enabled in Step 3.

The following example lists two files (`ex` and `libm.so.1`) that must be installed before the files `vi` and `grep` can be installed. It also lists a file (`date`) that is not in the installation list.

System Recovery

Expert Recovery Using the Core Media

Adding dependent files to the list

```
NOTE :
  Since ./usr/lib/hpux32/libm.so is linked to ./usr/lib/hpux32/libm.so.1
  './usr/lib/hpux32/libm.so.1' will be added to the list to load.
Adding dependent libraries for vi to the list
```

```
NOTE :
  Since ./usr/bin/vi is linked to ./usr/bin/ex
  './usr/bin/ex' will be added to the list to load.
```

```
***** THE REQUESTED FILE(S) : *****
```

```
./usr/bin/ex ./usr/lib/hpux32/libm.so.1 ./usr/bin/ftp ./etc/inetsvcs.conf
./usrp
```

Is the above load list correct? [y/(n)]

Step 6. If yes, the following messages appear:

```
***** downloading the files *****
x ./usr/lib/hpux32/libelf.so.1, 180044 bytes, 352 tape blocks
x ./usr/lib/hpux32/libm.so symbolic link to ./libm.so.1
x ./usr/lib/hpux32/libm.so.1, 1469944 bytes, 2871 tape blocks
x ./usr/lib/hpux32/libxcurses.so.1, 531640 bytes, 1039 tape blocks
x ./usr/lib/hpux32/libgss.so, 132132 bytes, 259 tape blocks
x ./usr/lib/hpux32/libcom_err.so, 22376 bytes, 44 tape blocks
x ./usr/lib/hpux32/libk5crypto.so, 177872 bytes, 348 tape blocks
x ./usr/lib/hpux32/libkrb5.so, 903932 bytes, 1766 tape blocks
x ./usr/bin/grep, 44572 bytes, 88 tape blocks
x ./usr/bin/ftp, 257816 bytes, 504 tape blocks
x ./usr/bin/ex, 553808 bytes, 1082 tape blocks
./usr/bin/vi linked to ./usr/bin/ex
x ./sbin/date, 542412 bytes, 1060 tape blocks
x ./etc/inetsvcs.conf, 15 bytes, 1 tape blocks
```

<Press return to continue>

Step 7. Press **Enter** and the Main Menu appears. To search for a file you want to install, press **s**.

Either enter the filename(s) to be searched for, or 'all' for a total listing.

Step 8. Enter the following command:

```
vi awk /sbin/sh date
```

The following messages appear:

```
./usr/bin/vi linked to ./usr/bin/ex
./sbin/awk
./sbin/sh
```

```
./sbin/date
```

```
<Press return to continue>
```

Step 9. Press **Enter** to return to the HP-UX Core Media System Recovery menu:

```
HP-UX CORE MEDIA SYSTEM RECOVERY  
MAIN MENU
```

- s. Search for a file
- b. Reboot
- l. Load a file
- r. Recover an unbootable HP-UX system
- x. Exit to shell

This menu is for listing and loading the tools contained on the core media. Once a tool is loaded, it may be run from the shell. Some tools require other files to be present in order to successfully execute.

Select one of the above:

Step 10. To begin the system recovery, press **r**.

```
DEVICE FILE VERIFICATION MENU
```

This menu is used to specify the path of the root file system. When the information is correct, select 'a'.

```
INFORMATION to verify:
```

```
Device file used for '/'(ROOT) is c1t15d0  
The hardware path to disk is 0/0/1/1.15.0
```

```
Select one of the following:
```

- a. The above information is correct.
- b. WRONG!! The device file used for '/'(ROOT) is incorrect.

- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

```
Selection:
```

Step 11. Since **c1t15d0** is the correct root device filename, press **a**.

TIP

If the root device is incorrect, press **b** to enter the correct device path.

```
Enter the address associated with the '/'(ROOT) file system  
Enter "list" to see a list of disks found on the system.  
(default: 0/1/1/0.0.0) :
```

Enter the correct root device hardware path. For example, if you enter **c1t12d0** as the root device filename, you would see the following verification query appear:

DEVICE FILE VERIFICATION MENU

This menu is used to specify the path of the root file system.
When the information is correct, select 'a'.

INFORMATION to verify:

Device file used for '/'(ROOT) is c1t12d0
The hardware path to disk is 0/0/1/1.12.0

Select one of the following:

- a. The above information is correct.
- b. WRONG!! The device file used for '/'(ROOT) is incorrect.
- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

Selection:

HP-UX Recovery MENU

Select one of the following:

- a. Mount the root disk and exit to a shell only.
- b. Recover the bootlif/os partitions.
- c. Replace the kernel on the root file system.
- d. Both Options: b and c
- v. Read information about VxVM Recovery (VXVM.RECOVER)
- m. Return to 'HP-UX Recovery Media Main Menu'.
- x. Exit to the shell.

Use this menu to select the level of recovery desired.

Selection:

Step 12. To repair both the LIF/EFI volume (bootlif) and critical operating system files, press **d**.

If your system is PA-RISC, the following message appears:

BOOTLIF PATH VERIFICATION MENU

This menu must be used to determine the path to the bootlif
(ISL, HPUX and the AUTO file).

When the information is correct, select 'a'.

INFORMATION to verify:

Path to the bootlif is 0/0/1/1.15.0

Select one of the following:

- a. The above information is correct.

- b. WRONG!! Prompt user for a new bootlif path.
- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

Selection:

Assuming that the bootlif path displayed is correct, press **a**.

For both PA-based and Itanium-based systems, the following message appears next:

BOOT STRING VERIFICATION MENU

This menu must be used to verify the system's boot string.
When the information is correct, select 'a'.

The system's boot string is currently: 'boot vmunix'

When correct this string will be placed in the AUTO file.

Select one of the following:

- a. The above information is correct.
- b. WRONG!! Prompt the user for a new system's boot string.
- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

Selection:

Step 13. Assuming that the boot string is correct, press **a**.

FILE SYSTEM CHECK
MENU

The file system check '/sbin/fs/vxfs/fsck -y /dev/rdisk/c2t0d0s4'
will now be run.

Select one of the following:

- a. Run fsck -y.
- b. Prompt for the fsck run string on c2t0d0s4.
- m. Return to the 'HP-UX Recovery MENU.'

Selection:

Step 14. Press **a** to execute `fsck -y` to check your file systems for corruption.

Loading /sbin/fs/vxfs/fsck...

```
Doing fsck on /ROOT file system
Loading /sbin/fs/vxfs/fsck...
/sbin/fs/vxfs/fsck -y /dev/rdisk/c2t0d0s5
file system is clean - log replay is not required
Mount /ROOT file system
/sbin/fs/vxfs/mount /dev/dsk/c2t0d0s5 /ROOT
Loading mount commands ...
```

```
Mount /ROOT/stand again
/sbin/fs/vxfs/mount -F vxfs /dev/dsk/c2t0d0s4 /ROOT/stand
vxfs mount: Cannot open portal device: No such file or directory
```

```

Entering loading kernel...
Filesystem      kbytes    used    avail %cap iused    ifree iused Mounted on
/ROOT           1024000  316688  702120  31%  5109   22091  19%  ?
Filesystem      kbytes    used    avail %cap iused    ifree iused Mounted on
/ROOT/stand     311296   118008  191824  38%   112    6032   2%  ?

```

The default action is to keep the existing kernel /stand/vmunix.
 If you want to replace the old kernel (/stand/vmunix) with downloading
 a kernel, the /stand/vmunix will be saved to /stand/vmunixBK.

Do you want to download a new kernel? [y/(n)]

Step 15. Assuming your file system is not corrupted, and you want to continue with the system recovery, press **Return** to mount your root file system under the / (root) directory.

Step 16. To overwrite the existing kernel with the new kernel, press **y** at the prompt.

```

'/stand/vmunix' has been saved as '/stand/vmunixBK'

```

```

Downloading IINSTALL to /stand/vmunix

```

```

=====
The root disk has been mounted under /ROOT, if you want to chroot
to this directory type the commands:

```

```

    loadfile chroot
    chroot /ROOT /sbin/sh

```

```

#

```

Step 17. Complete the recovery process by entering **reboot** at the shell prompt.

```

NOTE:      System rebooting...
NOTE:      run_cmd: Process: 84 (/sbin/sh): killed by signal: 9.

```

```

sync'ing disks (0 buffers to flush):
  0 buffers not flushed
  0 buffers still dirty

```

```

Closing open logical volumes...
Done

```

```

.
.
.

```

```

Console Login:

```

Your Itanium-based system may not be configured to automatically boot to multi-user mode. If this is the case you will be booted to single-user mode, and the boot sequence must be completed manually. Enter **init 3** to bring a single-user mode Itanium-based system to multi-user mode:

```
.  
. .  
INIT: Overriding default level with level 's'  
INIT: SINGLE USER MODE  
INIT: Running /sbin/sh  
# init 3
```

For detailed information regarding the boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* and the hardware documentation for your system.

IMPORTANT

If your PA-RISC system is running VxVM, the system will boot to single-user mode.

You must execute the following steps to bring a single-user mode PA-RISC system to multi-user mode:

- A. To start the VxVM configuration daemon, at the shell prompt you enter **vxconfigd**

- B. List the contents of the root disk, enter:

```
vxdisk list
```

Messages similar to the following appear:

DEVICE	TYPE	DISK	GROUP	STATUS
c2t0d0	simple	-	-	online
c2t1d0	simple	-	-	online
c3t2d0	simple	rootdisk01	rootdg	online

- C. Start all of the disabled volumes, execute

```
vxvol -g rootdg startall
```

- D. Mount all VxVM volumes, execute **mountall**

- E. Update the boot program on the root disk, enter:

```
mkboot -l /dev/rdisk/c1t15d0
```

- F. Update the information contained in the LABEL file for the LIF disk, enter:

```
vxvmbboot -v /dev/rdisk/c3t2d0
```

Messages similar to the following appear:

```
LIF Label File @ (1k) block # 834 on LVM Disk /dev/rdisk/c3t2d0:  
Label Entry: 0, Boot Volume start:      2912; length: 140011 MB
```

- G. For systems executing HP-UX 11i v1 (B.11.11) *only*, execute the following commands:

```
mv /etc/resolv.conf /etc/resolv.conf.save  
/sbin/rc1.d/S320hostname start  
/sbin/rc2.d/S008net.init start  
swagentd  
mv /etc/resolv.conf.save /etc/resolv.conf
```

- H. Configure the system boot information on the boot disk, enter:

```
/etc/vx/bin/vxbootsetup -g rootdg rootdisk01
```

- I. Update the LABEL file once again, enter:

```
vxvmbboot -v /dev/rdisk/c3t2d0
```

- J. Complete the PA-RISC recovery process by entering **reboot**. The system will now boot correctly to multi-user mode.

This completes the process for rebuilding the LIF volume and installing critical operating system files.

Recovering Critical HP-UX Files Only

The following example is the procedure for installing all the critical operating system files necessary to boot on the client root file system.

- Step 1.** Boot your system from the media device to begin the recovery process. For specific information regarding how to boot your system from an alternate boot source, see Chapter 5, "Administering a System: Booting and Shutdown", of the *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* manual.

The following menu appears once the booting process from the media device is complete:

```

Welcome to the HP-UX installation/recovery process!

Use the <tab> key to navigate between fields, and the arrow keys
within fields. Use the <return/enter> key to select an item.
Use the <return/enter> or <space-bar> to pop-up a choices list. If the
menus are not clear, select the "Help" item for more information.

Hardware Summary:                System Model: ia64 hp server rx2600
+-----+-----+-----+-----+ [ Scan Again ]
| Disks: 2 ( 67.8GB) | Floppies: 0 | LAN cards: 4 | |
| CD/DVDs: 1 | Tapes: 0 | Memory: 2036Mb | |
| Graphics Ports: 0 | IO Buses: 4 | CPUs: 2 | | [ H/W Details ]
+-----+-----+-----+-----+

                                [ Install HP-UX ]

                                [ Run a Recovery Shell ]

                                [ Advanced Options ]

                                [ Reboot ] [ Help ]
```

- Step 2.** Select **Run a Recovery Shell**. The display clears, and the following query appears:

```
Would you like to start up networking at this time? [n]
```

- Step 3.** Unless you need networking to be able to ftp files to or from other systems, press **n**.

Ignite-UX installs the commands and mounts the file systems necessary to the recovery. Upon completion, the HP-UX Core Media System Recovery menu appears:

```
HP-UX CORE MEDIA SYSTEM RECOVERY
MAIN MENU
```

- s. Search for a file
- b. Reboot
- l. Load a file
- r. Recover an unbootable HP-UX system
- x. Exit to shell

This menu is for listing and loading the tools contained on the core media. Once a tool is loaded, it may be run from the shell. Some tools require other files to be present in order to successfully execute.

Select one of the above:

Step 4. To begin the actual system recovery, press **r**.

```
DEVICE FILE VERIFICATION MENU
```

This menu is used to specify the path of the root file system. When the information is correct, select 'a'.

INFORMATION to verify:

```
Device file used for '/'(ROOT) is clt15d0
The hardware path to disk is 0/0/1/1.15.0
```

Select one of the following:

- a. The above information is correct.
- b. WRONG!! The device file used for '/'(ROOT) is incorrect.

- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

Selection:

Step 5. If the root device is correct, press **a** (press **b** to provide the correct root device).

HP-UX Recovery MENU

- Select one of the following:
- a. Mount the root disk and exit to a shell only.
 - b. Recover the bootlif/os partitions.
 - c. Replace the kernel on the root file system.
 - d. Both Options: b and c
 - v. Read information about VxVM Recovery (VXVM.RECOVER)

 - m. Return to 'HP-UX Recovery Media Main Menu'.
 - x. Exit to the shell.

Use this menu to select the level of recovery desired.

Selection:

Step 6. To install critical operating system files only, press **b**.

Loading commands needed for boot recovery...

Entering boot area repairing

Loading commands needed for boot recovery...

Verification of partitions on /dev/rdisk/c2t0d0 completed OK.

Running mkboot to verify/repair boot areas

Ignore the following question, and wait a few seconds...

BOOT STRING VERIFICATION MENU

This menu must be used to verify the system's boot string.
When the information is correct, select 'a'.

The system's boot string is currently: 'boot vmunix'

When correct this string will be placed in the AUTO file.

- Select one of the following:
- a. The above information is correct.
 - b. WRONG!! Prompt the user for a new system's boot string.
 - m. Return to the 'HP-UX Recovery MENU.'
 - x. Exit to the shell.

Selection:

Step 7. Assuming that the system's boot string is correct, press **a**.

```

HPUX.EFI                               4/11/2005                536124
The disk is LVM
Setting boot and root device file for c2t0d0...
Loading /sbin/umount .....

```

```

HP-UX Recovery MENU

```

```

Select one of the following:
a.  Mount the root disk and exit to a shell only.
b.  Recover the bootlif/os partitions.
c.  Replace the kernel on the root file system.
d.  Both Options: b and c
v.  Read information about VxVM Recovery (VXVM.RECOVER)

m.  Return to 'HP-UX Recovery Media Main Menu'.
x.  Exit to the shell.

```

```

Use this menu to select the level of recovery desired.

```

```

Selection:

```

Step 8. Exit to the shell by pressing **x**.

```

Loading /sbin/umount .....
#

```

Step 9. Complete the recovery process by entering **reboot** at the shell prompt.

```

NOTE:   System rebooting...
NOTE:   run_cmd: Process: 84 (/sbin/sh): killed by signal: 9.

```

```

sync'ing disks (0 buffers to flush):
 0 buffers not flushed
 0 buffers still dirty

```

```

Closing open logical volumes...
Done

```

```

.
.
.

```

```

Console Login:

```

Your system may not be configured to automatically boot to multi-user mode. If this is the case, you must complete the boot sequence manually. For detailed information regarding the boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* and the hardware documentation for your system.

This completes the process for recovering critical operating system files only.

Recovering the Kernel Only

It may be necessary to recover only the kernel if all kernels in the `/stand` directory were removed inadvertently and then the system was rebooted. If the current kernel fails to boot and backup kernels exist you should attempt to boot from those kernels before replacing the current kernel.

NOTE

Replacing the kernel removes any tunable settings that existed for the old kernel. When you have booted the system from the replaced kernel, create a new kernel and reapply any tunable changes you have previously made, or recover a kernel that was known to work from your backups. You must reboot the system from the new or recovered kernel to begin using that kernel.

The following example is the detailed procedure for recovering the kernel in the client `root` file system.

- Step 1.** Boot your system from the media device to begin the recovery process. For specific information regarding how to boot your system from an alternate boot source, see Chapter 5, "Administering a System: Booting and Shutdown", of the *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* manual.

The following menu appears when the booting process from the media device is complete:

```

Welcome to the HP-UX installation/recovery process!

Use the <tab> key to navigate between fields, and the arrow keys
within fields. Use the <return/enter> key to select an item.
Use the <return/enter> or <space-bar> to pop-up a choices list. If the
menus are not clear, select the "Help" item for more information.

Hardware Summary:                System Model: ia64 hp server rx2600
+-----+-----+-----+-----+ [ Scan Again ]
| Disks: 2 ( 67.8GB) | Floppies: 0 | LAN cards: 4 |
| CD/DVDs: 1 | Tapes: 0 | Memory: 2036Mb |
| Graphics Ports: 0 | IO Buses: 4 | CPUs: 2 | [ H/W Details ]
+-----+-----+-----+-----+

          [ Install HP-UX          ]

          [ Run a Recovery Shell   ]

          [ Advanced Options       ]

[ Reboot ]                          [ Help ]

```

Step 2. Select **Run a Recovery Shell**. The display clears, and the following query appears:

```
Would you like to start up networking at this time? [n]
```

Step 3. Unless you need networking to be able to ftp files to or from other systems, press **n**.

Ignite-UX installs the commands and mounts the file systems necessary to the recovery. Upon completion, the HP-UX Core Media System Recovery menu appears:

```
HP-UX CORE MEDIA SYSTEM RECOVERY
MAIN MENU
```

- s. Search for a file
- b. Reboot
- l. Load a file
- r. Recover an unbootable HP-UX system
- x. Exit to shell

This menu is for listing and loading the tools contained on the core media. Once a tool is loaded, it may be run from the shell. Some tools require other files to be present in order to successfully execute.

Select one of the above:

Step 4. To begin the actual system recovery, press **r**.

```
DEVICE FILE VERIFICATION MENU
```

This menu is used to specify the path of the root file system. When the information is correct, select 'a'.

```
INFORMATION to verify:
Device file used for '/'(ROOT) is clt15d0
The hardware path to disk is 0/0/1/1.15.0
```

Select one of the following:

- a. The above information is correct.
- b. WRONG!! The device file used for '/'(ROOT) is incorrect.
- m. Return to the 'HP-UX Recovery MENU.'
- x. Exit to the shell.

Selection:

Step 5. If the root device is correct, press **a** (press **b** to provide the correct root device).

```
HPUX.EFI                                4/11/2005                536124
The disk is LVM
Setting boot and root device file for c2t0d0...
Loading /sbin/umount .....
```

HP-UX Recovery MENU

- Select one of the following:
- a. Mount the root disk and exit to a shell only.
 - b. Recover the bootlif/os partitions.
 - c. Replace the kernel on the root file system.
 - d. Both Options: b and c
 - v. Read information about VxVM Recovery (VXVM.RECOVER)
-
- m. Return to 'HP-UX Recovery Media Main Menu'.
 - x. Exit to the shell.

Use this menu to select the level of recovery desired.

Selection:

Step 6. Press **c** to rebuild only the kernel.

FILE SYSTEM CHECK
MENU

The file system check '/sbin/fs/vxfs/fsck -y /dev/rdisk/c2t0d0s4'
will now be run.

Select one of the following:

- a. Run fsck -y.
- b. Prompt for the fsck run string on c2t0d0s4.
- m. Return to the 'HP-UX Recovery MENU.'

Selection:

Step 7. Press **a** to execute `fsck -y` to check your file systems for corruption.

```
Loading /sbin/fs/vxfs/fsck...

Doing fsck on /ROOT file system
Loading /sbin/fs/vxfs/fsck...
/sbin/fs/vxfs/fsck -y /dev/rdisk/c2t0d0s5
file system is clean - log replay is not required
Mount /ROOT file system
/sbin/fs/vxfs/mount /dev/dsk/c2t0d0s5 /ROOT
Loading mount commands ...

Mount /ROOT/stand again
/sbin/fs/vxfs/mount -F vxfs /dev/dsk/c2t0d0s4 /ROOT/stand
vxfs mount: Cannot open portal device: No such file or directory
Entering loading kernel...
Filesystem      kbytes    used    avail %cap iused    ifree iused Mounted on
/ROOT           1024000  316688  702120  31%  5109   22091  19%   ?
Filesystem      kbytes    used    avail %cap iused    ifree iused Mounted on
/ROOT/stand     311296   118008  191824  38%   112    6032   2%   ?

The default action is to keep the existing kernel /stand/vmunix.
If you want to replace the old kernel (/stand/vmunix) with downloading
a kernel, the /stand/vmunix will be saved to /stand/vmunixBK.

Do you want to download a new kernel? [y/(n)]
```

Step 8. To overwrite the existing kernel with the new kernel, press **y** at the prompt.

```
'/stand/vmunix' has been saved as '/stand/vmunixBK'

Downloading IINSTALL to /stand/vmunix

=====
The root disk has been mounted under /ROOT, if you want to chroot
to this directory type the commands:

    loadfile chroot
    chroot /ROOT /sbin/sh

#
```

Step 9. Complete the recovery process by entering **reboot** at the shell prompt.

```
NOTE:      System rebooting...
NOTE:      run_cmd: Process: 84 (/sbin/sh): killed by signal: 9.

sync'ing disks (0 buffers to flush):
  0 buffers not flushed
  0 buffers still dirty

Closing open logical volumes...
Done

.
```

.
.
Console Login:

Your system may not be configured to automatically boot to multi-user mode. If this is the case, complete the boot sequence manually. For detailed information regarding the boot sequence, see *Managing Systems and Workgroups: A Guide for HP-UX System Administrators* and the hardware documentation for your system.

This completes the process for rebuilding the kernel only.

System Recovery Questions and Answers

Question: **Can I use a network recovery archive if my system is not network bootable or is not on the same subnet as the Ignite-UX server?**

Yes, one of the tools developed with the network recovery toolset is `make_boot_tape`, a command that creates a minimal tape that can be used by any client. The tape contains just enough information to boot a client and then connect to the Ignite-UX server where the tape was created. If that is the server where the client's recovery configuration files are stored, the client can then be recovered. It is not possible to boot all systems from a tape device. See "Tape Recovery with No Tape Boot Support" on page 276.

If you initiate recovery archive creation from the Ignite-UX server, the server will warn you if a boot tape is needed for a client. If you ignore this warning, misplace your boot tape, or find that your tape is for the wrong Ignite-UX server, you can always create a new boot tape on the server that you want to use. There is no client-specific information on the tape.

Notice that a tape created by `make_boot_tape` is useful not only for recovery situations, but also for ordinary installations. If you do not want to set up a boot helper for systems not on the same subnet as the Ignite-UX server, you can now simply use `make_boot_tape`.

Question: **How can I change my setup so that a network recovery archive is available not only on the system for which it was created, but also on other systems with very similar hardware?**

Because networking information can now be changed using the interface and will not be overwritten by files extracted from the archive, it is natural to think about sharing recovery archives for systems with identical or nearly identical hardware. But unlike "global" configurations that appear in the configuration list of all clients, network recovery configurations only appear in the configuration list of the client for which they were created.

The source for shared configurations is the `/var/opt/ignite/INDEX` file that is shipped with Ignite-UX, and the source for client-specific configurations is the `CINDEX` file that is created by `make_net_recovery` in the `/var/opt/ignite/clients/0xLLA` directory. One simple way to

share a recovery configuration among two systems with similar hardware is to copy the `CINDEX` file and the recovery directory of the client with the archive to the directory of the client without the archive. The fact that the entries in `CINDEX` use relative paths means that you do not have to change the `CINDEX` file when you copy it. (You may need to export the directory containing the archive to the sharing client.)

Question: **I do not want to interact with the user interface after I reboot the client. How can I have my latest network recovery archive chosen automatically?**

As long as the client is currently booted, use `bootsys -a` to start the installation process on the client without the need to interact with the user interface.

Ignite-UX chooses a configuration to use based on these guidelines:

- If `/var/opt/ignite/clients/0xLLA/config` exists, use the `cfg` stanza that is specified there.
- If `/var/opt/ignite/clients/0xLLA/config` does not exist, use the default `cfg` stanza for the client.

The default `cfg` for the client is the last `cfg` entry set to true in the `CINDEX` file if it exists. Otherwise the default `cfg` is the last `cfg` set to true in the `INDEX` file. Because `make_net_recovery` sets the most recently created recovery `cfg` to true in `CINDEX` whenever it creates a new archive, that will be the default unless it is manually changed.

To set Ignite-UX to choose the latest network recovery archive automatically:

1. Rename or remove the configuration file currently in the client's directory.
2. Run this from the Ignite-UX server:

```
bootsys -a client
```

Question: **Why does `ioscan` core dump when running `make_tape_recovery` or `make_net_recovery`?**

It is possible for `ioscan` to core dump due to the value set for the `COLUMNS` environment variable in versions prior to HP-UX 11i v1. When the `-n` option is used, `ioscan` uses the `COLUMNS` variable to determine how wide the screen is when formatting the names of device files.

If a core dump occurs, you will see messages similar to these:

```
sh: 13061 Floating exception(coredump)
WARNING: pclose of ioscan returned: 34816
```

Should this happen, unset COLUMNS then rerun `make_tape_recovery` or `make_net_recovery`. If you are using an `xterm`, `hpterm`, or `dtterm` to run `make_tape_recovery` or `make_net_recovery`, do not resize the terminal window to a smaller size. Instead, minimize it if it is in the way.

Question: **When running the recovery system option from a client booted in Ignite-UX, why do errors appear that seem to point to files not being accessible using `tftp`?**

Only `/opt/ignite` and `/var/opt/ignite` should be needed for `tftp` access.

Question: **What can I do when problems occur from hot-swapping disks during recovery?**

Ignite-UX supports only hot-swappable disks that are completely installed and not removed when creating a recovery image. Proper software and hardware procedures must be used for hot-swap disk removal or replacement before or after recovery, but not in the middle. The LVM command, `lvlnboot`, used by `save_config` does not work when a disk is removed and the system is in this intermediate state. If this command is not working, a recovery cannot succeed.

Question: **Why are the Online Diagnostics LIF/EFI files not restored during a recovery?**

Ignite-UX destroys the old LIF/EFI volume on the boot disk and creates new LIF/EFI volumes every time the system is installed. At no point during the installation are the old LIF/EFI volumes copied and restored to the disk.

To restore the LIF/EFI volumes to the disk, reinstall the application, or look at the SD configure scripts for the application and rerun the commands that put the LIF/EFI volumes in place on the disk.

For example, to restore the `OnlineDiag` bundle on a PA-RISC system you would use the following script to install the `OnlineDiag` LIF volumes on the root disk:

```
/var/adm/sw/products/LIF-LOAD/LIF-LOAD-MIN/postinstall
```

It uses the following command:

```
/usr/sbin/diag/lif/lifload -f /usr/sbin/diag/lif/updatediaglif
```

Question: Why does `make_net_recovery` fail when the archive is 2 GB or more?

The `make_net_recovery` command uses NFS to write/read the system archive from the client to/from the server. To manage archives greater than 2 GB requires that both the client and server use NFS protocol Version 3 (PV3). NFS PV3 is standard on HP-UX 11.00 and all HP-UX 11i releases.

If you know you have NFS PV3 and are having problems, check the `/etc/rc.config.d/nfsconf` file for the configured parameter, `MOUNTD_VER` that defines the default mount to be PV2 or PV3; it must be set to 3.

Question: Why is the LAN address different after replacing a client system?

Ignite-UX uses a separate directory for each client under `/var/opt/ignite/clients`. Each subdirectory is named based on the client's LAN address (LANIC, LLA, MAC address, etc). If you replace the client hardware or even the LAN interface that the old LAN address was based on, it will no longer access the same directory on the server.

The simplest solution is to obtain the new LAN address, which you can do from the Boot-ROM console command, `LanAddress` (actual commands may vary from system to system.) Once you have the new address, manually rename the directory. You may just remove the hostname symlink (it will be recreated automatically.) Note that the LAN address must be in all upper-case, and begin with 0x.

If you already booted from the client that caused it to create a new directory, you can just remove that directory before renaming the old directory. Be careful not to remove the original directory to avoid losing the recovery information. For example:

```
cd /var/opt/ignite/clients
mv 0x00108300041F 0x00108300042A
rm old_hostname
```

Question: **When I am recovering a system from a tape across multiple volumes, why do disk space errors similar to the following, appear?**

ERROR: There is not enough disk space to allocate for volume:

This situation can occur if you have three or more disks with volumes mapped to those disks and overlap on one disk, but not others.

For example, if the original layout before recovery was as follows:

- A. Operating system volumes; mapped to disk1
- B. Mapped to disk2
- C. Mapped to disk2 & disk3
- D. Mapped to disk1 & disk2

```
|AAAAAAAAAAADDDD| |BBBBBBCCCCDDDD| |CCCCC          |  
          disk1          disk2          disk3
```

After recovery, the volumes fail to fit because the sorting order of the disks causes allocation in A,B,C,D order. The image of the allocation at the time of failure is as follows:

```
|AAAAAAAAAAADDDD| |BBBBBBCCCCCCCC| |C          |  
          disk1          disk2          disk3
```

The allocation of disk space across volumes was enhanced in Ignite-UX version C.6.2.x and greater. HP recommends upgrading Ignite-UX to one of these versions to avoid future issues. However, you can change the Disk Mapping value from **Assigned Disk** to **Any** to avoid these errors. For information regarding how to set the Disk Mapping value, see “Advanced Volume Layout Parameters” on page 144.

Question: **Why is the tape device different between making the recovery image and using the recovery image?**

During the recovery process, when the file system is set up and the I/O tree is initialized, tape device files may be mapped differently from when the original recovery tape was made. Therefore, it is possible for a recovery tape to be created with one tape device file, for instance /dev/rmt/0m, and recovered from a different device file, such as /dev/rmt/2m, even though the physical device is the same.

A Troubleshooting

Topic areas discussed in this appendix are as follows:

- Errors and Warnings (see page 310)
- Ignite-UX Server Problems (see page 311)
- Installing Systems with Ignite-UX (see page 312)
- Installing from Media (see page 320)
- Installing from Golden Images (see page 321)
- Running swinstall (see page 323)
- Common Network Booting Errors (see page 324)

This appendix includes troubleshooting hints from the Ignite-UX FAQs. For the latest on Ignite-UX problems and workarounds, see the Ignite-UX FAQs at the Ignite-UX Web site:

<http://www.docs.hp.com/en/IUX/faq.html>

For information regarding system recovery troubleshooting, see "System Recovery Questions and Answers" page 303.

Errors and Warnings

During an HP-UX installation, messages indicating the status of tasks are written to the client log file and either the log viewer (Ignite-UX server GUI-based installation) or the console (client UI-based installation). Some of these messages may be `ERROR` or `WARNING` messages, which have the following significance:

<code>ERROR</code>	This indicates a serious problem, usually requiring action from you in order to proceed with an installation.
<code>WARNING</code>	This indicates something out of the ordinary, but <i>not</i> fatal. The warning <i>may</i> require action.

If you encounter a message or experience unusual behavior, you can use the following sections as prioritized lists of likely problems and their solutions.

Ignite-UX Server Problems

Mixed Versions of Ignite-UX

Cannot find /d_cfg_mnt_sb61/monitor_bpr after updating the server.

This is caused by having a mix of Ignite-UX fileset versions on your server. In most cases it happens when you update only one release bundle even though you install other releases from that server.

An easy way to check for this case is to look at the output from the command:

```
swlist Ignite-UX
```

All the filesets should have the same version; if not, then you need to install all consistent versions. If you have **boot-helper** systems (see "Using a Boot-Helper System" page 341), they also need to have the Ignite-UX product updated to match the same version as the server that they reference.

Installing Systems with Ignite-UX

Numerous `samreg` errors *Igniting from an image returns numerous `samreg` errors.*

The problem is that the SAM filesets have not been configured when certain products are trying to register themselves with SAM.

The workaround is to place the following configuration stanza in `/var/opt/ignite/config.local` or in the configuration file that contains the `sw_source` stanza of the core operating system.

```
sw_source "core"
{
  post_load_cmd += "swconfig -xautoselect_dependencies=false
-xenforce_dependencies=false SystemAdmin.SAM -xreconfigure=true"
}
```

NOTE

Due to formatting limitations, unintended line wraps exist in the previous example; the `post_load_cmd` line should not wrap in your configuration file. You verify the syntax with the `instl_adm -T` command.

Problem Installing Clients on Multiple Subnets *Problems occur when installing clients on multiple subnets.*

Executing a LAN boot of clients on multiple subnets to a single, multi-homed Ignite-UX server has the following limitations:

- The `instl_bootd` daemon allocates IP addresses from the `instl_boottab` file and matches the IP addresses with the subnet from which the request came. If the `instl_boottab` file does not contain an IP address that is valid for the client's subnet, the client will not be able to boot from the server. Due to this lack of information, it can allocate an IP address that is not valid for the client's subnet, and thus the client will not be able to boot from the server.

The workarounds for this problem are:

- For every subnet from which you may want to boot clients, you must have at least one IP address that is valid for that subnet in `/etc/opt/ignite/instl_boottab`. This ensures that `instl_bootd` can allocate an appropriate address.
- For every possible client that you may want to boot, assign "reserved" IP addresses in `/etc/opt/ignite/instl_boottab` that are tied to the client's MAC address. This ensures that `instl_bootd` allocates an appropriate address (see the comments in the `instl_boottab` file on how to reserve addresses).
- Alternatively, you can set up entries in `/etc/bootptab` for every client that you want to boot from the Ignite-UX server.
- Configure a boot-helper system on each subnet that the client can boot from before contacting your central Ignite-UX server. Appendix C, "Using a Boot-Helper System," on page 341.
- The "server" keyword that specifies the IP address for your Ignite-UX server can only correspond to one of the LAN interfaces. If each subnet is routed such that all clients can use the one IP address to contact their server, then the installation will work. However, it is more efficient for the client to use the server's IP address that is connected directly to the client's own subnet. If a client is on a subnet that does not have a route to the IP address specified by "server", it will not be able to contact the server after it boots.

Workarounds for this problem are:

- Manually correct the server's IP address on the networking dialog box that appears on the client console when you boot the client.
- Use a boot-helper on each subnet. When using a boot-helper, the server's IP address can be specified correctly on each helper system.

Too Much File Space Needed

Ignite-UX requests more file system space than expected.

Ignite-UX adds the value of `_hp_addnl_fs_free_pct` (normally 10 percent) to the amount required by the software impact. The configuration variable, `_hp_addnl_fs_free_pct` can be set in any configuration file. It is set to a default value of 10 percent in each default

release configuration file. You can set this value using the **Additional...** button on the Basic tab in the Ignite-UX GUI during an interactive installation. For more information, see "Basic Tab" page 117.

You may have software bundles that have overlapping contents (filesets and/or files). The `make_config` command makes `sw_impact` statements for each bundle without doing anything special to guard against over-counting when the bundles overlap. For example the Ignite-UX-11-xx bundles all overlap quite a bit so when you install all of them using Ignite-UX, it estimates too much space. To find the space needed, add the `sw_impact` of all the `sw_sels` that you are installing.

Debugging SD During Cold-Installation

How do I monitor Software Distributor operations during cold-installations from the Ignite-UX server?

Software Distributor debugging can be enabled on a per-session basis without modifying the Ignite-UX server configuration files. From the initial Ignite-UX menu on the client, select **Advanced Options** then **Edit config file**. This invokes `vi` and you could add, for example:

```
env_vars += "SDU_DEBUG_RPC=1"
sd_command_line += "-x logdetail=true -x loglevel=2"
```

Additionally, these configuration statements can be added to the Ignite-UX server configuration file `/var/opt/ignite/config.local` if debug output is wanted for multiple clients or for multiple installation sessions and avoids adding them interactively each time.

Booting Errors on PA-RISC Systems

Error: IPL error: bad LIF magic

Possible problems are:

- The `tftp` service does not have access to `/opt/ignite` and `/var/opt/ignite`. The `/etc/inetd.conf` file on the server should have an entry similar to:

```
tftp dgram udp wait root /usr/sbin/tftpd tftpd\
/opt/ignite\
/var/opt/ignite
```

If not, correct the `inetd.conf` file and run `inetd -c`. Kill any `tftpd` processes that may be running. Installing Ignite-UX should set up `inetd.conf`. The `tftp` service can also be configured using SAM.

- Using a `bootptab` entry for the client that is referencing a non-existent boot file (`bf`).
- A corrupted `/opt/ignite/boot/boot_lif` file.

**Booting Error on
Itanium-Based
Systems when
using
`/etc/bootptab`**

Error: PXE-E16: Valid PXE offer not received.

Exit status code: Invalid Parameter

When using `/etc/bootptab` to define Ignite-UX boot services, a number of problems can be introduced resulting in this error. The following checklist can be used to isolate the problem:

1. Check `inetd`:

- Check `/etc/inetd.conf` to make certain `bootps` and `tftp` entries have been uncommented. Make certain the `tftp` line contains `/opt/ignite` and `/var/opt/ignite` paths.
- Signal `inetd` to reread the configuration files (`inetd -c`) after the files are edited. If the `inetd` process is not running, start it using:
`/sbin/init.d/inetd start`
- Check `/var/adm/syslog/syslog.log` to make certain `inetd` was restarted and no bad messages are found. Specifically check for messages from `bootpd` and `tftpd`.
- Check for entries in `/var/adm/inetd.sec` that may cause `inetd` to deny service to certain clients.

2. Check `bootpd`:

- Check the `/etc/bootptab` entry. Make certain the MAC address matches the client MAC address. Use `dhcptools -v` to validate the format of the `/etc/bootptab` file.
- Check for entries in `/etc/dhcpdeny` to ensure that `bootpd` is not set to deny service for particular clients.
- Check `/var/adm/syslog/syslog.log` for a message from `bootpd` that indicates it was started when a `bootpd` packet was received.

If packets were not received, use a tool such as `tcpdump` to check for network packets. Verify that `bootp` packets are being seen by the system. If you do not have `tcpdump` on your system, you can download it for either HP-UX 11i v1 or HP-UX 11i v2 from the HP Internet Express Web site at:

`https://h20293.www2.hp.com/portal/swdepot/try.do?productNumber=HPUXIEXP1111`

or

`http://h20293.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=HPUXIEXP1123`

- Check to see if there are other systems on the network that may also be replying to the booting client system.
- Check to see if the system booting is on a different subnet to the bootp server to ensure that any router between the two allows the forwarding of bootp requests. The configuration is router specific.

3. Check tftpd:

- Check the tftp line in `/etc/inetd.conf` to make certain that the `/opt/ignite` and `/var/opt/ignite` directories are listed.
- Check the tftpd connection manually by using the tftp command, for example:

- a. `$ tftp [server-name]`
- b. `tftp> get /opt/ignite/boot/nbp.efi /tmp/nbp.efi`
Received [n] bytes in [s] seconds
- c. `tftp> quit`

Problems Pointing to Client Over Network

The control_from_server=true and run_ui=false variables are in [W/V/I]INSTALLFS, but I still get prompted for information on the client.

Possible problems are:

- If the dialog box is showing the client name in an editable field and a **Cancel** button at the bottom of the dialog box, then all is well and there should be an icon waiting for you on the Ignite-UX GUI. The text box enables you to change the icon name or switch to a client side install.
- If the dialog box is showing two or more LAN interfaces to choose from, then there was not enough information in the configuration files to tell it which LAN to use. Once you select a LAN and select **Install HP-UX**, you should be set.

- If the dialog box is prompting you for networking information, then either DHCP did not respond or there is no entry in `/etc/bootptab` for the client. Enter the network information, select **Install HP-UX** and continue the install.

Applications Hang After Igniting *Some applications and shells hang over NFS after igniting.*

The reason for the hang is most likely due to a problem with the NFS file locking daemons, `rpc.statd` and `rpc.lockd`, caused by the action of reinstalling the system. Many applications use file locking and can hang in this situation. Most common are user home directories that are NFS mounted, in which case `sh` and `ksh` will attempt to lock the `.sh_history` file and hang before giving you a prompt.

When a system is running and has an active NFS mount with a server in which files have been previously locked, both the client and server cache information about each other. Part of the information that is cached is what RPC port number to use to contact the `rpc.lockd` daemon on the server and client.

This RPC port information is cached in memory of the running `rpc.statd/rpc.lockd` process on both the server and client sides. The `rpc.statd` process keeps a file in the directory `/var/statmon/sm` for each system that it knows it should contact in the event that the system reboots (or `rpc.statd/rpc.lockd` restarts). During a normal reboot or crash, `rpc.statd` will contact all systems in `/var/statmon/sm` and inform them to flush their cache regarding this client.

When you reinstall a system, the `/var/statmon/sm` directory is wiped out. In this case, if the reinstalled system tries to re-contact a server that has cached information, the server will try to communicate over an old RPC port. The communication will fail for `rpc.lockd` and any file locking done by an application over that NFS mount will hang.

There are a several ways to avoid and/or fix the problem if it happens:

- If you are using `bootsys` to install clients, use the `-s` option to allow the client to shutdown normally and inform servers that it is going down.
- If you experience a hang, you can reboot the client or kill/restart `rpc.lockd` and `rpc.statd` on the client. At the point of the hang, the `/var/statmon/sm` directory will contain the name of the server, thus rebooting or restarting the daemons will tell the server to flush its cache. If more than one server is involved, you may end up doing this multiple times until all servers are notified.

- As part of the installation, create a file for each server in `/var/statmon/sm` that contains the server's name. This will cause the first boot to generate a crash recovery notification message to each server, causing it to purge the stale port information. Following is an example `post_config_cmd` that could be placed in your `/var/opt/ignite/config.local` file. Replace `sys*` with your NFS server names.

```
post_config_cmd += "
    mkdir -p /var/statmon/sm
    for server in sys1 sys2 sys3
    do
        echo $server > /var/statmon/sm/$server
        chmod 0200 /var/statmon/sm/$server
    done
"
```

The `bootsys` Command Seems to Work in Reverse

With `bootsys -w client`, the client does not wait for the server.

With `bootsys client`, the client waits for the server.

This was probably due to running through the GUI once on the server prior to running `bootsys`. The server drops the instruction for the client to start installing, and the next time the client boots it picks that instruction up and goes. Ignite-UX tells you that the installation will happen the next time that `bootsys -w` is used, but does not say it happens automatically. Then, the next time you run `bootsys`, you did not use the GUI without the client being booted from the server.

Server Not Listed

The search `lan install` command does not list the server.

Check these items on the Ignite-UX server from which you are trying to boot:

- Messages from `instl_bootd /var/adm/syslog/syslog.log`. If you need to add more IP addresses to `/etc/opt/ignite/instl_boottab`, you will see messages in `syslog.log` such as the following:

```
instl_bootd: Denying boot request for host: 080009F252B3 to
avoid IP address collision. Try booting again in 214 seconds, or
add more IP addresses to /etc/opt/ignite/instl_boottab.
```

- A message in `syslog.log` that indicates that you have no IP addresses in `/etc/opt/ignite/instl_boottab` is:

```
instl_bootd: No available IP address found in:
/etc/opt/ignite/instl_boottab
```

- If the client is an older system that does not use the BOOTP protocol (like 720s, 710s, 735s, 750s), then also look in the log file `/var/adm/rbootd.log`, and check to make sure that the `rbootd` daemon is running. The `rbootd` daemon always runs, whereas `instl_bootd` is started using `inetd` and only runs when needed.

Also, for these older clients, there is an intentional delay built into the `rbootd` process when a client wants to do an installation boot (as opposed to a diskless boot). This prevents the server from showing up during the first search. Retrying the search two or three times may be necessary.

The `bootsys` Command Fails with Insufficient Space

The `bootsys` command fails due to insufficient space in the `/stand` volume.

The `bootsys` command must copy the two files, `/opt/ignite/boot/Rel_release/[W|V|I]INSTALL` and `/opt/ignite/boot/Rel_release/[W|V|I]INSTALLFS` from the server into the client's `/stand` directory. This error indicates that there is not enough space in `/stand`. To correct this situation, you may need to remove any backup kernels. Also, check for kernels in the `/stand/build/` directory (like `vmunix_test`).

TUI Does Not Accept User Input

The text fields in the TUI do not accept keyboard input during client installations.

The text fields within the TUI do not recognize keyboard input, causing dialogs to reopen or loop. This occurs when the **Insert** key is active so you must ensure that the **Insert** key is deactivated by pressing it to enter data in the TUI.

Installing from Media

DCE/RPC Errors

DCE / RPC errors (RPC exceptions) occur during the configuration stage, and a failure message is printed at the end of the installation.

There is an apparent problem with certain SD operations (for example, `swacl`) when only loopback networking is enabled. This would occur if the "media only" installation option is selected. The workaround is to install using the "media with networking enabled" option and set up (perhaps temporary) networking parameters: hostname, IP address, netmask, routing, etc. SD operations will complete normally.

Installing from Golden Images

Cannot Find Specified Archive

```
Errors: gunzip: stdin: unexpected end of file
      pax_iux: The archive is empty.
```

```
ERROR: Cannot load OS archive (HP-UX Core Operating System
      Archives)
```

The NFS mount probably succeeded, but the file was not accessible from the client. Check these possibilities:

- File has a different name (check your configuration files).
- File has the wrong permissions such that it is not readable (check `/etc/exports`).

Missing `.conf` Files

The `/etc/nsswitch.conf` and `/etc/resolv.conf` files from the archive do not end up on the installation client.

Ignite-UX changes some files during the configuration process, including `resolv.conf` and `nsswitch.conf`. The Ignite-UX `os_arch_post_l` and `os_arch_post_c` scripts place these files on the client after the install.

These scripts are delivered in `/opt/ignite/data/scripts/`. You will probably only need to modify `os_arch_post_l`. Search on `resolv.conf` and `nsswitch.conf` for directions on what to change. After the script has been changed, modify your configuration file, which describes the archive to point to the new script.

`pax_iux` Errors

Errors resulting from `pax_iux` similar to the following:

```
pax_iux: X: Cross-device link
pax_iux: X: File exists
```

Both of these errors may occur when installing a system from an archive that does not have the same file system partitioning as the system from which the archive was created.

The `Cross-device link` error is caused when two files exist as hard links in the archive, and when the two files would end up in separate file systems. For example, if you created an archive on a system that did not use LVM, the root file system is all one file system. If you have two files,

`/usr/local/bin/f1` and `/opt/myprod/bin/f2` as hard links, this error occurs if you make an archive of this system and try to apply it to a system that uses LVM and has `/usr` and `/opt` as separate file systems.

The `File exists` error may occur when the archive has a symlink or regular file that is named the same as a directory or mount point that exists when the archive is installed. This may happen, for example, if the original system that the archive was made from has a symlink like `/opt/myprod -> /extra/space`; then, when you are installing a system from the archive, you decide to create a mounted file system as `/opt/myprod`. The `pax` command will fail to create the symbolic link because a directory exists in its place.

When the error happens, you will be asked if you want to push a shell (on the client's console). Answer **yes**, and from the shell enter **exit 2** to ignore the error, and it will continue. Once the system is up, you can more-easily determine what should be done with the paths it complained about.

To avoid the error, the system that the archive is created from should not contain hard links between directories that are likely to be created as separate file systems.

Running `swinstall`

Tape Is Not Readable

The `swinstall` command cannot read the tape. For example you may see messages similar to the following:

```
Source connection failed for "ignitesvr:/dev/rmt/0m".
```

Possible causes and fixes are:

- Wrong device file
 - Use the Actions menu in the Peripheral Devices/Tape Devices area of SAM to show the device files for the tape drive.
- Failure reading the contents of the tape
 - No device file present for the tape

Use the Actions menu in the Peripheral Devices/Tape Devices area of SAM to create the device files for the tape drive.

- Bad/wrong tape

Verify label on tape. Check the contents. SD tapes are in `tar` format:

```
tar tvf device_file | more
```

For example, if the tape device is `/dev/rmt/0m`, enter:

```
tar tvf /dev/rmt/0m | more
```

You should see a `tar` format table of contents. If you do not see this, the tape is corrupt.

- Dirty head in DDS tape drive

Use a DDS tape cleaning cartridge to clean the tape head.

Common Network Booting Errors

Insufficient Response to PXE Boot Request

PXE-E16: Valid PXE offer not received

When the above error is seen during a PXE boot, one of the following may be true (this is not an exhaustive list):

- The response from the DHCP server did not contain enough information to continue the PXE boot.
- No PXE boot response was received.

Additional errors may be printed after this PXE error to show what the problem is related to.

File Size Miscalculated

PXE-E05: Download buffer is smaller than requested file.

This problem is related to firmware in EFI on the HP Integrity rx1600/rx1620 systems. Upgrade the firmware on the system to a version that addresses the above message (system firmware 02.11 or later.)

When using a tftp server that does not support the `tsize` option, a file must be completely downloaded to determine its size. The file is then downloaded again into memory allocated based on the determined size. The EFI code calculates the wrong size, hence the allocated buffer is too small to hold the file.

Apart from updating the firmware, using a tftp server that supports the `tsize` option will also solve this problem. The `tsize` option allows a tftp client to ask the tftp server for the size of the file. This saves the client from having to download the file to determine its size.

The HP-UX 11i v2 operating system supports the `tsize` option from first release; HP-UX 11.0 requires the patch PHNE_25355, and HP-UX 11i v1 requires the patch PHNE_32825.

Using a tftp server that supports the `tsize` option makes network booting faster, since every file to be downloaded from the Ignite server via tftp does not have to be downloaded twice (once to determine its size, and again to download it into memory.)

**File Size
Miscalculated on
HP Integrity Virtual
Machines**

```
AUTOBOOTING...Obtaining size of Rel_B.11.23/IINSTALL  
(63450640 bytes)  
Downloading file Rel_B.11.23/IINSTALL /  
TFTP session failed. (reason:Buffer Too Small)  
Could not open Rel_B.11.23/IINSTALL
```

The error TFTP session failed. (reason:Buffer Too Small) is applicable only to HP Integrity Virtual Machines. The reason is the same as described under the heading: File Size Miscalculated. No version of HP Integrity VM contains fixed firmware at this time. To resolve this issue, install the patches listed in the File Size Miscalculated section so the tftp daemon supports the tsize option.

B **Configuring DHCP Services**

HP-UX and Ignite-UX support retrieving network information using the Dynamic Host Configuration Protocol (DHCP). This appendix describes setting up DHCP and includes:

- Overview of DHCP Services (see page 328)
- DHCP Usage Examples (see page 330)
- Using bootptab as an Alternative to DHCP (see page 332)
- Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles (see page 334)

Ignite-UX allows for setting up DHCP for use during system installation. This appendix is for those who want to use DHCP for ongoing IP address management, as well as for system installation.

HP Itanium-based servers that can be partitioned provide an alternative to using DHCP for network booting, for more information see “Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles” on page 334

Overview of DHCP Services

DHCP provides these features:

- Enables dynamic allocation of IP addresses and hostnames.
- Automatically supplies most of the networking defaults that are requested during a system installation or first-time boot.
- Provides for on-going IP address maintenance using a concept of an "IP address lease." Having a lease on an IP address means that if the system "goes away" for a specified period of time without renewing the lease, then that IP address can be given to a different system that requests a new IP address lease.
- Assists in reestablishing valid network parameters when a system has been moved from one DHCP-managed network to another.

DHCP works best under these conditions and restrictions:

- When a range of currently unused IP addresses can be allocated for use during new system installation.
- When the IP address-to-hostname mapping can be made ahead of time (before the system to use it is installed), and this mapping can be configured in the name services database before installing a system.
- When the IP address and hostname that get assigned to a system are not important. A system will keep the same IP address and hostname for as long as it renews the lease. However, the original assignment is arbitrary.
- When you do not want to choose a hostname for the system and will accept the hostname already registered for the IP address supplied by DHCP. This ensures that the system will be recognized immediately by its hostname.
- When existing systems that did not use DHCP before are willing to accept an arbitrary hostname and IP address.

An alternative to using DHCP is to create `/etc/bootptab` entries for each specific client on the network. This allows for specific IP address mappings and greater control. For more detail, see "Using bootptab as an Alternative to DHCP" on page 332.

For additional information regarding the use of DHCP with Itanium-based systems, see “Considerations For Booting Anonymous Itanium-Based Clients” on page 84 and see the *HP-UX IP Address and Client Management Administrator's Guide*.

DHCP Usage Examples

To enable a DHCP server to respond only to specific clients during an installation, use `instl_adm` to configure specific `dhcp_class_ids`.

Your situation might fall into one of these categories:

- The network has a DHCP server that manages the whole network, and the clients performing installations will be using the addresses from this server permanently. In this case, do nothing because this line is entered in `[W|V|I]INSTALLFS` file by default:

```
is_net_info_temporary=false
```

- The network has a DHCP server, but you would like to manage a small group of temporary IP addresses for use in performing installations. When deployed, the clients will be reassigned new addresses.

Manage Clients with Temporary IP Addresses

You may want to use this example to setup an Ignite-UX server as a "departmental" DHCP server. In this case, the IP address leases are permanent, but they will be isolated to the departmental DHCP server.

Step 1. Ensure that DHCP is configured and operating on the Ignite-UX server.

Step 2. Use a unique `dhcp_class_id` in both the `dhcptab` and the RAM file system images, `[W|V|I]INSTALLFS`, using `instl_adm`. This `dhcp_class_id` could include the server's hostname. In this case, enter the following in `[W|V|I]INSTALLFS` using `instl_adm`:

```
is_net_info_temporary=true
```

Step 3. Enter your class ID as the following in the `dhcptab` and `[W|V|I]INSTALLFS`:

```
dhcp_class_id
```

If you have a non-HP server that does not recognize `dhcp_class_id`, you must specify the server using the `dhcp_server` keyword instead.

**Manage Clients
with DHCP
Assigned IP
Addresses**

You may want to use this example to start using DHCP with your Ignite-UX server managing the whole network.

Step 1. Ensure that DHCP is configured and operating on the Ignite-UX server.

Step 2. Enter this line:

```
is_net_info_temporary=false
```

Step 3. Enter your class ID as the following in the `dhcptab` and `[W|V|I]INSTALLFS`:

```
dhcp_class_id
```

(Or use the `dhcp_server` keyword as explained in the previous example.)

Use a unique `dhcp_class_id` in both the `dhcptab` and the `[W|V|I]INSTALLFS` file. This `dhcp_class_id` could contain the server's hostname.

For more information, see *setup_server* (1M) and *bootpd* (1M).

Using bootptab as an Alternative to DHCP

If you want to have more control over the allocation of IP addresses and their mappings to your clients, you can configure entries in `/etc/bootptab` for each client. Because the Bootstrap Protocol (BOOTP) is a subset of the DHCP protocol, the client's request for a DHCP server will be satisfied with the BOOTP response.

If you also specify a boot file (`bf`) of `/opt/ignite/boot/boot_lif` in the bootptab entries, you do not need any additional entries in `/etc/opt/ignite/inst_boottab`. In this case, you would boot the clients using `boot lan` instead of `boot lan install`. Only clients known in `/etc/bootptab` will be able to boot if you do not use `instl_boottab`.

A minimal example `/etc/bootptab` entry follows; you must use your own hostname, IP address, hardware address, and subnet mask. Other networking information may also be specified here or using `instl_adm`. Specify the Ignite-UX server's IP address with the `instl_adm -t` option.

```
sysname:\
  hn:\
  vm=rfc1048:\
  ht=ether:\
  ha=080009352575:\
  ip=10.1.51.82:\
  sm=255.255.255.0:\
  bf=/opt/ignite/boot/boot_lif
```

NOTE

Important information relevant to using `bootptab` to enable network installation of clients is found in “Configuring the Ignite-UX Server for Itanium-Based Clients” on page 63

Background Information on DHCP Design

The DHCP protocol is implemented as extensions to the BOOTP protocol, and in fact the HP-UX DHCP server and BOOTP daemons are the same: `bootpd`. This daemon reads two configuration files: `/etc/bootptab` and `/etc/dhcptab`.

The mapping of systems to IP addresses and lease time information is kept in the DHCP database file `/etc/dhcpdb`. Some amount of management of this database is provided by the `dhcptools` command.

On the client side, a command called `/usr/sbin/dhcpclient` is used to contact the server to get an IP address lease. This command has the ability to broadcast out onto the network prior to the network interface being enabled.

The `dhcpclient` also serves as a daemon process that sleeps until such time that it needs to renew the IP address lease. At that time, the client will re-contact the server from which it got the original lease in order to extend it.

The `dhcpclient` command is not intended to be run by users directly; it is called by other tools during system bootup and installation.

For more information regarding the networking parameters that DHCP can supply, see *auto_parms* (1M) and *dhcpdb2conf* (1M).

For more general information regarding DHCP, see *bootpd* (1M) and *dhcptools* (1M).

Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles

All partitionable Itanium-based systems allow the definition of direct boot profiles (this may require firmware updates.) Some other Itanium-based systems such as the Itanium-based blades in an HP Integrity BL60p blade server also provide this EFI functionality.

The `dbprofile` command allows you to create direct boot profiles that can be used in conjunction with the `lanboot` EFI command. A direct boot profile contains information needed to talk over the network to an installation server.

NOTE

This does not affect any DHCP support you may need to configure to allow the installation process to talk to an Ignite-UX server once the installation kernel has started. The use of direct boot profiles only allows network boot from EFI without needing to setup a `bootp/DHCP` server.

The following `dbprofile` command, when run from EFI,

```
dbprofile -dn testprofile -sip 192.1.2.1 -cip \  
  192.1.1.20 -gip 192.1.1.1 -m 255.255.255.0 -b \  
  "/opt/ignite/boot/nbp.efi"
```

creates a new direct boot profile (or updates the profile if it exists) called `testprofile`. The profile contains the following information:

Ignite-UX server IP address (<code>-sip</code>)	192.1.2.1
Ignite client IP address (<code>-cip</code>)	192.1.1.20
Gateway IP address (<code>-gip</code>)	192.1.1.1
Network mask (<code>-m</code>)	255.255.255.0
Boot file name (<code>-b</code>)	<code>/opt/ignite/boot/nbp.efi</code>

IMPORTANT

If you do not have the client IP address defined in a direct boot profile, EFI will use DHCP instead of the direct boot profile to start the boot process.

When creating a direct boot profile, always define the boot file using the `-b` option to set the value to `/opt/ignite/boot/nbp.efi`. This is required to install HP-UX.

The `dbprofile` command accepts a gateway IP address. This is important because when using a direct boot profile that has a gateway defined, the EFI network stack will have somewhere to route non-local traffic. In this case, the Ignite-UX server does not have to be located on the same LAN segment as the client; traffic can be routed to it via the gateway. No boot-helper is required for this client on the local LAN segment.

To network boot using a direct boot profile, use the `-dn` option of the EFI `lanboot` command as in the following example:

```
lanboot select -dn testprofile
```

This results in a list of LAN interfaces for you to choose from. However, no DHCP request is sent out when an interface is selected. Instead, the network boot uses information from the direct boot profile `testprofile` and immediately starts booting from the Ignite-UX server.

NOTE

If you have multiple LAN interfaces, you must choose the LAN interface that the direct boot profile is applicable to. If you choose a LAN interface on a network other than (using the example from above) `192.1.1.x`, the client will fail to contact the Ignite-UX server.

The `dbprofile` Command

The section provides information for the `dbprofile` command. This command is part of the EFI Shell and is accessible from an nPartition console when the nPartition is in an active state, but has not booted an operating system. For more information, see the *HP System Partitions Guide* available at the HP Technical Documentation Web site:

<http://www.docs.hp.com/>

Syntax

```
dbprofile [-dn name [-dhcp] [-sip server_ip] [-cip client_ip]
[-gip gateway_ip] [-m subnet_mask] [-b "boot_file"]
[-od "optional_data"]] | [-h]
dbprofile [rm name] | [-h]
dbprofile [cp src_name dst_name] | [-h]
```

Options and Operands

<code>-dn name</code>	Display/create/modify a direct boot profile with the name <i>name</i> .
<code>-dhcp</code>	A DHCP server will be used to get the client information.
<code>-sip server_ip</code>	Set the static IP address for the boot server to <i>server_ip</i> .
<code>-cip client_ip</code>	Set the static IP address for the client to <i>client_ip</i> .
<code>-gip gateway_ip</code>	Set the static IP address for the gateway to <i>gateway_ip</i> .
<code>-m subnet_mask</code>	Set the subnet mask for the local network to <i>subnet_mask</i> .
<code>-b "boot_file"</code>	Load boot file from the boot server. <i>boot_file</i> is the full path to the boot file on the boot server.
<code>-od "optional_data"</code>	Pass optional command line arguments to the boot file.
<code>-rm name</code>	Remove a direct boot profile with the name <i>name</i> .
<code>-cp src_name dst_name</code>	Copy a db-profile from <i>src_name</i> to <i>dst_name</i> .
<code>-h</code>	Display help for this command

NOTE

A direct boot profile name can be 12 characters long at most, and spaces are not allowed. If the direct boot profile name already exists, it will be updated with the new values passed as arguments to this command.

If client IP address information is missing in the direct boot profile, DHCP is used by default.

Only IPv4 is supported.

Use quotations (") around the *boot_file* and *optional_data* fields.

Examples

- To display settings in the direct boot profile:

```
Shell> dbprofile
```

or

```
Shell> dbprofile -dn test
```

- To create and modify settings in a direct boot profile:

```
Shell> dbprofile -dn test -dhcp -sip 192.168.0.1 \  
-m 255.255.255.0
```

```
Shell> dbprofile -dn test -b "tmp/nparsys1/loader.efi" \  
-od "optional data"
```

where *optional data* is the actual data you want to pass to the boot file.

- To copy a direct boot profile:

```
Shell> dbprofile cp test profile
```

- To remove a direct boot profile:

```
Shell> dbprofile rm test
```

The lanboot Command

The section provides information for the `lanboot` command. This command is part of the EFI Shell and is accessible from an nPartition console when the nPartition is in an active state, but has not booted an operating system. For more information, see the *HP System Partitions Guide* available at the HP Technical Documentation Web site:

<http://www.docs.hp.com/>

Syntax

```
lanboot [select] [-od "optional_data"] | [-dn name]
```

Options and Operands

<code>select</code>	Select from a list of available LAN devices.
<code>-od "optional_data"</code>	Pass optional command line arguments to the boot file.
<code>-dn name</code>	Specify the direct boot profile name to use for the LAN boot.

NOTE

Use `select` when no default LAN device is provided so a list of available LAN devices is provided for user selection.

Use `-od` to specify optional data to be passed to the boot file.

Use `-dn` to specify a direct boot profile to be used to handle the LAN boot. Use the `dbprofile` command to create and manage direct boot profiles.

Examples

- To LAN boot from a boot server that has been previously setup:


```
Shell> lanboot
```

or

```
Shell> lanboot select
```
- To specify optional data to be passed to the boot file that will be loaded from the boot server:


```
Shell> lanboot -od "optional_data"
```

or

```
Shell> lanboot select -od "optional_data"
```

Alternative to DHCP for Itanium-based Servers Supporting Direct Boot Profiles

where *optional data* is the actual data you want to pass to the boot file.

- To perform a direct LAN boot using a previously created direct boot profile:

```
Shell> lanboot -dn profile1
```

or

```
Shell> lanboot select -dn profile1
```


C Using a Boot-Helper System

A system running HP-UX 11.00 or 11i can install or recover from an Ignite-UX server across a network gateway if the client is booted using the `bootsys` command. If the system is booted manually, it must have a helper system to enable booting it across a network gateway.

This appendix describes how to configure the boot-helper system and the topics are:

- Setting Up the Boot-Helper System (see page 342)
- Installation Using a Boot-Helper (see page 344)

To boot HP-UX across a network gateway, you must have a system on the local subnet to provide the client with the operating system kernel. The helper system can run either HP-UX 11.00 or 11i. The initial installation environment is needed for installation or recovery.

Setting Up the Boot-Helper System

Follow these steps to set up and use a system on the local subnet to enable a client to perform a network boot and then contact a remote Ignite-UX server:

Setting Up an HP-UX 11.00 or 11i Boot-Helper

- Step 1.** Install the Ignite-UX minimum core functionality onto the helper system:

```
swinstall -s Ignite-UX_server_IP Ignite-UX.MinimumRuntime
```

where:

Ignite-UX_server_IP is the name of your network depot file.

- Step 2.** On the boot-helper system, set the default Ignite-UX server via:

```
/opt/ignite/bin/instl_adm -t Ignite-UX_server_IP
```

This changes the configuration content in [W/V/I/]INSTALLFS. For more information, see *instl_adm* (1M).

- Step 3.** Verify that the server is set to the correct Ignite-UX server and gateway for your subnet, enter:

```
/opt/ignite/bin/instl_adm -d
```

- Step 4.** If the gateway value is incorrect, you can use `instl_adm -g yourgatewayIP` to correct it. This value is set by `swinstall` when the Ignite-UX product is installed.

- Step 5.** On the boot-helper system, edit the `/etc/opt/ignite/instl_boottab` file, and then add the IP addresses that clients can use to boot containing lines in the following format:

```
10.1.53.180  
10.1.53.181  
10.1.53.182
```

These temporary IP addresses were provided during the initial Ignite-UX server setup and are used during initial boot. These IP addresses must be valid for the subnet.

NOTE

Temporary IP addresses provided by the Ignite-UX server will not be valid on the boot-helper subnet if a boot-helper is needed.

For more information, see `/etc/opt/ignite/instl_boottab` on your Ignite-UX server for more details.

Installation Using a Boot-Helper

You can boot the client to the `BOOT ADMIN` menu and then boot from the boot-helper system. For example:

```
boot lan.helper_IP_address install
```

If only one Ignite-UX server is available on the subnet to install from, enter:

```
boot lan install
```

The installation should proceed, controlled from the Ignite-UX server previously specified with `instl_adm`.

D Terminal Keyboard Shortcuts

The Ignite-UX client-side installation tools support HP terminals, VT100, and Wyse 60 to navigate within the Ignite-UX GUI using a keyboard.

The following sections describe the various keyboard shortcuts that can be used in conjunction with the support terminals.

- Basic Keyboard Shortcuts (see page 346)
- Advanced Keyboard Navigation (see page 347)

Basic Keyboard Shortcuts

These basic keyboard shortcuts can be used on both the vt100 and wyse60 terminals.

Table D-1 Basic Keyboard Shortcuts

Action	Keys
Move among window elements.	Tab
Move within or scroll a window element.	Arrow keys
Move to the tabs appearing across the top of the window.	Tab
Leave the tabs.	Tab
Select (highlight) a list item.	Space bar
Unselect a list item.	Space bar
Click a button, radio button or checkbox.	Space bar
Scroll up or down one page.	Page Up and Page Down keys (See “Advanced Keyboard Navigation” on page 347 if these keys are not available.)
Refresh the window and contents.	Ctrl-L or Shift-F1

Advanced Keyboard Navigation

HP Terminals

HP-family terminals display function key labels, also called softkey labels, at the bottom of the window. These labels vary depending on the type of window being displayed, but the functions of the **F1-F4** keys are consistent. These four keys function as follows:

Table D-2 **HP Terminal Function Keys**

Function	Key
Context-sensitive Help	F1
ALT (a modifier key)	F2
Select/Unselect	F3
Menu bar on/off	F4

Some of the advanced actions in the following table require a key-combination by pressing the **Alt** key (**F2**), releasing it, and then pressing another key. For example, selecting all items in a list requires first pressing **F2**, releasing it, and then pressing **/**.

Table D-3 **Advanced Actions**

Action	Key Combination
Scroll a list left one page.	Prev
Scroll a list right one page.	Next
Select (highlight) all items in a list.	F2 , then / on the main keyboard
Unselect all items in a list.	F2 , then \ on the main keyboard
Open a menu on the menu bar by using the mnemonic (underlined) letter	F2 , then the mnemonic (underlined) letter
Press a button if the cursor is not resting on it.	F2 , then the mnemonic (underlined) letter

TIP

To quickly save changes to a file system on the File System tab when using an HP terminal, press **F2** followed by the letter **m**. You save time and effort using this method since you do not have to navigate to the **Modify** button then press it.

vt100 Terminals

Typically the vt-100-family keyboards use the same row of keys immediately above the numeric key pad as function keys. These keys may be labeled **[PF1]** - **[PF4]**, but in some cases may be labeled *****, **/**, **+**, and **-**. On some HP workstation (and HP 700 series terminals) keyboards, these keys may be four unlabeled keys above the keypad. If this is the case, **[PF1]** is the left unlabeled most key and **[PF4]** the right most key.

If you are unsure where the **[PF1]** - **[PF4]** keys are located on your keyboard, HP recommends the following:

- Consult the hardware documentation for your terminal to determine the keys that correspond to the **[PF1]** - **[PF4]** keys.
- If you are using X11, you must determine how your X11 key bindings are set. To view your current X11 key bindings, run `xmodmap` with no options.

To set the keypad keys, *****, **/**, **+**, and **-** to be **[PF1]** - **[PF4]**, you would use the following commands:

```
xmodmap -e "keysym KP_Multiply = KP_F1"  
xmodmap -e "keysym KP_Divide = KP_F2"  
xmodmap -e "keysym KP_Add = KP_F3"  
xmodmap -e "keysym KP_Subtract = KP_F4"
```

NOTE

Modifying the key bindings in X Window in this manner affects all X clients. The changes are not retained between sessions so you must modify the key bindings each time you login to an X Window session.

- If you are using a PC terminal emulator, consult the emulator application documentation to determine how the **[PF1]** - **[PF4]** keys have been mapped to your PC keyboard; it is possible that no mappings exist. Typically, the **[PF1]** - **[PF4]** keys are mapped to the keys above the key pad on your PC keyboard.

These four keys function as follows:

Table D-4 **Function Keys**

Function	Key
ALT (a modifier key)	PF1
Context-sensitive Help	PF2
Menubar (to/from)	PF3
Escape to Shell	PF4

Some of the advanced keyboard actions in the following table require a key-combination using the **PF1** key. In other words, you must first press the **PF1** key, release it, and then press some other key. For example, to scroll a list one page requires you must press **PF1**, release it, and then press either the **2**, **4**, **6**, or **8** keys on the numeric keypad.

The advanced keyboard actions for a vt100 are as follows:

Table D-5 **Advanced Keyboard Actions**

Action	Key Combination
Scroll a list up one page.	PF1 , then 8 on the numeric keypad
Scroll a list down one page.	PF1 , then 2 on the numeric keypad
Scroll a list left one page.	PF1 , then 4 on the numeric keypad
Scroll a list right one page.	PF1 , then 6 on the numeric keypad
Select all items in a list.	PF1 , then / on the main keyboard
Unselect a list item.	PF1 , then \ on the main keyboard
Select a range of list items.	PF1 , then . on the first item; move the cursor; PF1 , then . on the last item
Press a button if the cursor is not resting on it.	PF1 , then the mnemonic (underlined) letter

A

- adding optional applications, 77
- additional network interfaces, 134, 135
- advanced installation topics, 74
- advanced tab, 149
- Always-Installed, 124
- anonymous clients, 81
- at(1), 203
- audience for this guide, 15
- automatic installations
 - example configuration file, 200
 - overview, 195
 - scheduling, 203
 - specifying defaults, 198
 - using configuration files, 200
 - with bootsys, 196

B

- backup patch files, 189
- boot-helper system, 85, 341
- booting
 - boot client, 111
 - decision making, 43
 - decision tree for Itanium-based network booting, 45
 - decision tree for PA-RISC network booting, 44
 - decision tree for stand alone systems, 47
 - install kernel paths, network, 97
 - Itanium-based clients via the network, 98
 - PA-based clients via the network, 96
 - registered clients over the network, 55
- bootpd daemon
 - and PA-RISC systems, 42
 - booting error, 315
 - booting Itanium-based systems, 42
 - booting registered Itanium-based clients, 45, 63
 - class-ids and PXE, 86, 87
 - decision tree for booting Itanium-based clients, 45
 - DHCP design, 333
 - replacing bootpd with instl_bootd, 46, 89
 - restarting after editing /etc/dhcptab, 85
- bootptab
 - alternative to DHCP, 332

- registering Itanium-based clients, 63

bootsys

- automatic installations, 196
- non-interactive installations, 94

bootsys_block file, 95

C

- CD, building installation media, 219
- client actions, 52
- client icons, 50
- client status screen, 52
- client status, scanning for, 50
- commands, Ignite-UX, 27
- common configuration, 26
- configuration files
 - changes for system recovery, 274
 - custom install media, 181
 - examples, 182
 - overview, 174
- configuration for install
 - advanced, 148
 - basic, 117
 - file system, 136
 - software, 123
 - system, 126
- configuring session options, 67
- configuring the Ignite-UX server, 42
- control_from_server, 208
- core media recovery, 282
 - procedures, 283
- custom installation media
 - accessing a serial tape depot, 215
 - accessing tape, 214
 - building, 209
 - CD, 219
 - DVD, 226
 - overview, 208
 - tape, 215
 - tape format, 210
- custom installation scripts, 149
- custom installations, 24
- customizing installations, 173

D

- daemons
 - bootpd, see bootpd daemon
 - dhcpcclient, 333

Index

inetd, 90, 315, 319
instl_bootd, see instl_bootd daemon
rbootd, 319
replacing bootpd with instl_bootd, 46, 89
xntpd, 134
date, setting, 126
day, setting, 126
decision tree
 booting stand alone systems, 47
 network booting Itanium-based systems, 45
 network booting PA-RISC systems, 44
Default-Installed, 124
DHCP
 adding addresses, 71
 anonymous client booting, 85
 class ids, 88
 design, 333
 design information, 332
 document information, 327
 example uses, 330
 isolating noncontrollable systems, 88
 PXE, 84
 server, configuring, 327, 333
 using bootptab, 332
dhcp_device_group, 85
dhcpclient daemon, 333
disks
 adding and removing, 139
 renaming file system structure, 137
 setting parameters, 136
DNS
 configuring, 131
 screen, 131
documentation
 computing swap space, 120
DVD, building installation media, 226
E
EFI
 configuring tape boot option, 256
 determining EFI path for tape drive, 257
 invoking, 98
error messages, 310
executing install, 151
execve error, 263
exit, 154
expert recovery

 procedures, 283

F

FAQ, Ignite-UX, 29
file system parameters
 setting, 136
firmware prompt, 96

G

Go! button, 151
golden images
 installing from, 158
 overview, 158
 troubleshooting, 321
graphical user interface, 24
GUI
 client colors, 50
 detailed introduction, 49
 menus, 50
 overview, 24

H

HFS file systems, 119
hop count
 configuring, 131
HP-UX
 selecting operating system environment,
 117

I

ignite
 client server screen, 50
Ignite-UX
 adding optional applications, 77
 advanced server configuration, 74
 advanced server installation, 74
 commands, 27
 disk requirements, 34
 FAQ, 29
 hardware requirements, 34
 installing minimal filesets, 74
 interface, 155
 manpages, 27
 obtaining software, 37
 overview, 24

- software source, 76
- training, 29
- Ignite-UX server
 - boot client, 111
 - installing, 37
 - problems, 311
 - troubleshooting, 311
- Ignite-UX Web site, 29
- INDEX file
 - examples, 180
- INDEX files
 - automatic installations, 196
 - combining configuration files, 179
- inetd daemon, 90, 315, 319
- install
 - (pre-configured) Go!, 117, 151
 - overview, 36
 - using a boot-helper system, 344
 - using defaults, 117
- install depot, defining, 184
- install kernel
 - boot paths, network, 97
- install media, custom, 208
- install params, setting dynamically, 204
- installation scripts, 149
- installing client systems, methods, 91, 108
- installing client systems, server method, 110
- installing from media, troubleshooting, 320
- installing systems, troubleshooting, 312
- instl_adm, 198, 204
- instl_adm(4), 174
- instl_bootd daemon
 - and updating instl_boottab, 61
 - booting anonymous PA-RISC clients, 83
 - booting PA-RISC systems, 42
 - booting registered PA-RISC clients, 44
 - decision tree for booting Itanium-based clients, 45
 - installing clients on multiple subnets, 312
 - problems installing from client, 93
 - problems with server selection, 318
 - replacing bootpd with instl_bootd, 46, 89
- instl_boottab
 - and boot-helper systems, 342
 - and bootptab, 332
 - assigning boot IP addresses, 42
 - configuring for anonymous clients, 44
 - installing clients on multiple subnets, 312
 - problems with server selection, 318
 - registering PA-RISC clients, 44, 60
 - replacing bootpd with instl_bootd, 46
 - updating for instl_bootd, 61
- IP address
 - setting with DHCP, 327
- J**
- JFS file systems, 120
- L**
- language, specifying, 120
- layered applications
 - installed in /var/adm/sw/*, 79
- license
 - HP-UX, selecting, 117
- LIF volume content, 210
- LLA, 43, 44, 60, 63, 82, 83, 171, 178, 185, 200, 251, 270, 306
- LVM file systems, 119
- M**
- make_boot_tape
 - recovering a system not on network, 303
- make_net_recovery, 236, 264
 - cloning systems, 279
 - overview, 264
- make_sys_image
 - cloning systems, 279
- make_tape_recovery, 253
 - cloning systems, 279
 - duplicating a system, 255
- managing network printers, 193
- manifest, 154
- manifest files, 155
- minimal filesets for Ignite-UX server, 74
- multiple-archive formats, 24
- N**
- network
 - configuring destination IP, 130
 - configuring gateway, 130
 - configuring interfaces, 134, 135
 - considerations, 35
 - network booting overview, 42
 - networking requirements, 109
- NIS
 - configuring, 132
 - screen, 133
- nslookup, 131

Index

O

- operating system archives
 - configuring server for, 164
 - creating, 159
 - enabling client, 168
 - installing on client, 170
 - non-core, possible corruption, 79
- optional applications, adding, 77
- order of loading patches, 125

P

- parameters
 - advanced, 136
 - disk, 136
 - file system, 136
 - system, 126
- patches
 - avoiding backup files, 189
 - order of loading, 125
- peripherals supported, 108
- post-install scripts, 191
- print_manifest, 155
- PXE, 84

R

- record keeping, manifest, 154
- recovery
 - archive configuration policies, 243
 - archive contents, 241
 - bootable recovery tape, 236
 - cloning systems, 279
 - configuration files additions, 274
 - core media, 282
 - create a network image, 264
 - creating a recovery tape, 253
 - creating network image, 264
 - examine image contents, 248
 - examples, 267
 - expert, 282
 - expert recovery overview, 238
 - image creation process, 245
 - large file support, 244
 - network recovery, 236
 - overview, 236
 - procedures (core media), 283

- recovering a system not on network, 303
- replace the kernel only, 297
- retaining known-good images, 272
- selecting files to recover, 275
- system, 236, 264
- system tools, 238
- tools comparison, 241
- troubleshooting questions, 303
- using a network image, 264
- using a recovery tape, 253
- verify recovery images, 251
- registered clients, 55
- requirements
 - networking, 109
 - server, 34
- run_ui, 208

S

- scheduling automatic installations, 203
- screens, see Figures listing
- scripts, post-install, 191
- Selectable, 124
- server
 - advanced installation tasks, 74
 - configuring options, 67
 - installing minimal filesets, 74
- server requirements for Ignite-UX, 34
- server selection, 84, 96, 318
- server setup wizard, 58
- ServiceControl Manager support, 24
- set root password, 129
- set time zone, 128
- set up or update software source, 76
- set_parms, 126
- setting install params dynamically, 204
- size, disk
 - Ignite-UX requirement, 34
- software
 - HP-UX, selecting, 117
- ssh, 34
- stand alone systems
 - booting, 47
- static routes
 - configuring, 130
 - screen, 130
- sw_sel, 181
- sw_source, 181

swap space, specifying, 120
swinstall
 troubleshooting, 323
 using to install Ignite-UX, 39
system installation status, 50
system recovery, 236
 advantages using the network, 265
 installing critical root files only, 293
system recovery tools, 238
system tab, 118

T

tab
 advanced, 148
 basic, 117
 file system, 136
 software, 123
 system, 126
tape depot, accessing, 215
tape recovery
 creating boot tape, 236
 troubleshooting, 305
tape recovery for Itanium-based systems, 256
tape recovery for PA-RISC systems, 256
tasks
 adding DHCP addresses, 71
 advanced
 adding optional apps., 77
 software source, 76
 advanced server installation, 74
 automatic installations, 201
 automatic system recovering, 304
 client recovery via the network, 268
 cloning systems, 280
 configuring client installations, 114
 configuring server for OS archive, 164
 configuring server options, 67
 configuring session options, 67
 create system recovery image from an
 Ignite-UX server, 265
 creating an OS archive, 159
 duplicating a system, 255
 image creation with ignite, 248
 installing Ignite-UX server software, 39
 installing minimal filesets, 74
 managing clients, 50
 obtaining Ignite-UX software, 37
 preparing clients for installation, 92
 recovering a minimal operating system, 255

 recovering a root disk, 255
 recovering from the client, 268
 recovering Itanium-based clients using the
 network, 269
 recovering PA-based clients using the
 network, 268
 setting install params dynamically, 204
 setting up a boot-helper system, 342
terminal user interface, 24, 110, 319
tftp, 34
time zone, setting, 126
training, available, 29
troubleshooting
 Ignite-UX server problems, 311
 installing from images, 321
 installing from media, 320
 installing systems, 312
 swinstall, 323
 tape recovery, 305
TUI, 24, 110, 319

V

view menu screen, 50
volume group name
 changing, 147
VxFS file systems, 119, 120, 137, 143, 228, 240
VxVM, 77, 119, 120, 139, 144, 183, 239, 246,
 291

W

Web sites
 feedback, 22
 HP education, 29
 HP technical documentation, 20
 software depot, 37
 sources of information, 30
 white papers, 38
whole disk, 119

X

X server display, 35
XNTP
 configuring, 134
 screen, 134
xntpd daemon, 134

Index