SharedPrint/UX User and Administrator's Guide for HP-UX 10.0

HP Part No. Order No. B1171-90124
Printed in USA E1195

Notice

HEWLETT-PACKARD MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information which is protected by copyright. All rights reserved. No part of this document may be photocopied, reproduced or translated to another language without the prior written consent of Hewlett-Packard Company.

Use, duplication or disclosure by the U.S. Government is subject to restrictions as set forth in sub-paragraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Hewlett-Packard Company 3000 Hanover Street Palo Alto, CA 94304 U.S.A.

Rights for non-DOD U.S. Government Departments and Agencies are as set forth in FAR 52.227-19(c)(1,2).

UNIX® is a registered trademark of the UNIX System Laboratries Inc.

Postscript® is a registered trademark of Adobe Systems, Inc. in the U.S. and other countries.

© Copyright 1995, Hewlett-Packard Company All rights reserved

Preface

The *SharedPrint/UX User and Administrator's Guide for HP-UX 10.0* describes procedures for configuring, troubleshooting, using, and extending SharedPrint/UX. SharedPrint/UX is client-server software that includes a graphical user interface for printing.

The manual also introduces the SharedPrint/UX Manager, which helps administrators manage SharedPrint/UX print requests and other print requests in a networked environment.

This manual is organized as follows:

Chapter 1	Introducing SharedPrint/UX
Chapter 2	Setting Up SharedPrint/UX
Chapter 3	Using SharedPrint/UX
Chapter 4	Understanding the SharedPrint/UX Architecture
Chapter 5	Using SharedPrint/UX Filters
Chapter 6	Extending SharedPrint/UX
Chapter 7	Troubleshooting SharedPrint/UX
Appendix A	SharedPrint/UX Printing Options
Appendix B	CGM Support
Appendix C	Meeting NCS of DCE Requirements

Problems, Questions, and Suggestions

If you have any questions or problems with our hardware, software, or documentation, please contact either your HP Response Center or your local HP representative.

Printing History

December 1992..... ..B2154-90601
October 1993..... ... B3242-90601
January 1995..... .... B3242-90602
November 1995..... ..B1171-90124

Contents

1. Introducing SharedPrint/UX

SharedPrint/UX Features 1-1
SharedPrint/UX From the `lp` Command 1-2
Printers Needed for Specific Files 1-2
Types of Files Supported 1-4
Printing TIFF Files 1-5
Printers and Plotters Supported 1-6
Basic Architecture of SharedPrint/UX 1-7

2. Setting Up SharedPrint/UX

Configuring Local Printers for SharedPrint/UX 2-1
Adding Remote SharedPrint/UX Printers 2-8
Enabling SharedPrint/UX on a System 2-9

3. Using SharedPrint/UX

Printing Files 3-1
Printing From HP VUE 3-1
OK versus Print 3-2
Printing from the UNIX Command Line 3-2
Checking Print Status 3-3
Accessing SharedPrint/UX Manager at the Command Line . . 3-3
Saving Common Print Setups 3-3
Getting Help With SharedPrint/UX 3-4
Printing Multiple Files and Silent Printing 3-5
Printing or Saving Screen Images 3-5

4. Understanding the SharedPrint/UX Architecture

The HP-UX Spooling System 4-1
Communications Phase 4-2
Processing Phase 4-2
How lp Creates the Control File 4-2
The print_model.sh Shell Script 4-3
Parse Command Line 4-6
Get Printer Type 4-6
Build Options 4-6
Front Banner Page 4-7
Get File Type 4-9
Command line option 4-9
File Type Reader 4-10
File Extension Value 4-10
Build Pipeline 4-10
Execute Pipeline 4-11
Last Copy 4-11
Last File 4-12
Rear Banner Page 4-12
Error Page Function 4-12
Configuration Files 4-12
Filter Design Needs 4-14
Driver Design Needs 4-14

5. Using SharedPrint/UX Filters

Text Filters 5-2
Text to PCL Filter 5-4
Text to PostScript Filter 5-5
CGM Filter 5-6
PCL Page Description Language Filter 5-7
PCL Filter Features 5-7
PCL Filter Limitations 5-8
Image Library Filter 5-9
PostScript PDL Filter Raster 5-10
PCL PDL Filter Raster 5-10
Image Library Consumers 5-11
Postscript 5-11
PCL 5-11

6. Extending SharedPrint/UX
Adding Support For An Unsupported Printer 6-1
Adding Support For A New Filter 6-2
Modifying Default SharedPrint/UX Behavior 6-3

7. Troubleshooting SharedPrint/UX
What To Do 7-1
If nothing appears on the printer 7-2
If Network Computing System (NCS) errors appear 7-4
If GUI performance problems occur 7-6
If performance slows on servers with network printers 7-7
If problems occur on PostScript printers 7-8
If the output is a "PostScript Not Installed" page 7-8
If problems occur on LaserJet printers 7-8
If problems occur on large format plotters 7-8
If PCL fonts or symbols print incorrectly 7-9
If the wrong file type is used 7-9
You cannot print text in landscape mode 7-9
Analyzing Debug and Error Pages 7-10
Analyzing a debug page 7-10
Analyzing an error page 7-12

A. SharedPrint/UX Printing Options
How SharedPrint/UX Applies Options A-1
User Options A-2
Printer Configuration File Options A-7

B. CGM Support
Starbase and HP-PHIGS CGM Generators B-1
CGM Element Bounds B-3

C. Meeting NCS or DCE Requirements
Meeting HP DCE/9000 Requirements C-1
Checking the NCS Setup C-3
Choosing Systems to Run glbd C-3
Starting the First glbd Daemon C-5
Starting Additional glbds C-7

Index

Figures

1-1. SharedPrint/UX Access to Files, Printers, and Plotters . . . 1-3
1-2. SharedPrint/UX Client Server Architecture 1-7
4-1. **print_model.sh** Shell Script 4-5
5-1. The SharedPrint/UX Filters 5-2

Tables

1-1. Files Supported by SharedPrint/UX 1-4
4-1. Banner Page Formatting Features 4-8
5-1. txpcl and txps Filter Formatting Options 5-3

1

Introducing SharedPrint/UX

SharedPrint/UX enhances the basic capabilities of the `lp` spooling system, using a client-server implementation. SharedPrint/UX is included as part of HP-UX 10.0 on all HP 9000 Series 700 and 800 systems as SharedPrint/UX version 1.5.

SharedPrint/UX includes two graphical user interfaces:

- The SharedPrint/UX printing interface, which lets you print many types of files by dropping file icons on the HP VUE Printer control or Printers subpanel
- The SharedPrint/UX Manager, which lets you check the status of printers and print requests and administer SharedPrint/UX printers

SharedPrint/UX Features

SharedPrint/UX provides these features:

- Graphical User Interfaces that you use to make print requests, set options, check the queue status, and set defaults for future print requests
- Integration of the System Administration Manager (SAM) for printer setup and configuration.
- Drag and drop printing in the HP VUE File Manager, so you can select a file and drop it on the printer icon
- Support of a wide array of HP hardcopy devices such as laser printers, color ink-jet printers, and large format plotters for certain types of files
- Adherence to industry standard file formats such as PCL, CGM, X-windows bitmaps, and TIFF

SharedPrint/UX From the `lp` Command

You can also use SharedPrint/UX with the `lp` command; you can use any of the options found in SharedPrint/UX Graphical User Interface. See Appendix A for a list of option names.

Printers Needed for Specific Files

Figure 1-1 provides a overview of what types of files you can print using SharedPrint/UX. The following files require specific printers:

- PostScript and Encapsulated PostScript files require a PostScript printer.
- CGM files require an HP-GL/2 printer.
- Bitmap and Pixmap files require a PCL or PostScript printer.

If you are printing PCL3 or higher files on a PCL1 or PCL2 printer, SharedPrint/UX automatically converts the file to print correctly. Chapter 5 describes how SharedPrint/UX converts files to different printer formats.

For more detail on what files you can print, see the section "Types of Files Supported," which follows.

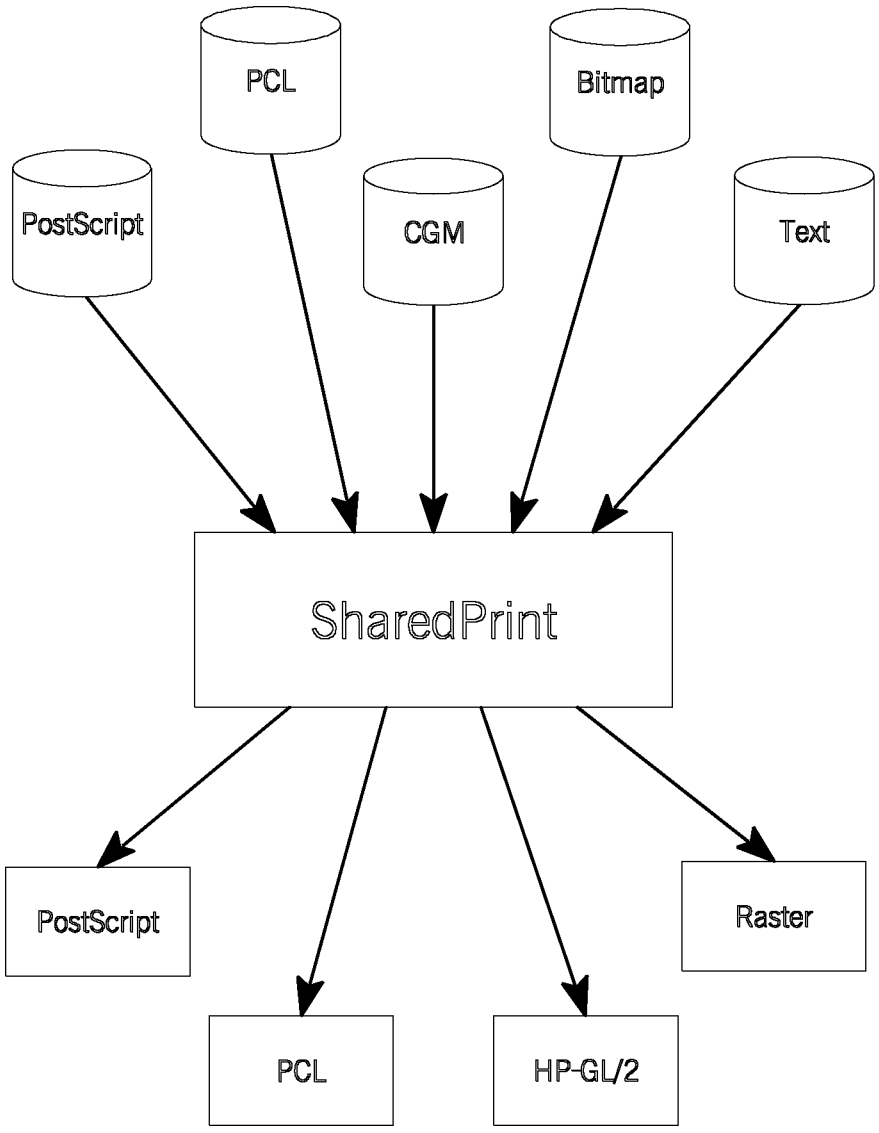

Figure 1-1. SharedPrint/UX Access to Files, Printers, and Plotters

Types of Files Supported

SharedPrint/UX can print the types of files listed in Table 1-1.

Note For details about some printers requirements, see the preceding section, "Printers Needed for Specific Files."

Table 1-1. Files Supported by SharedPrint/UX

File Type	File Contents	Version Supported
TIFF	PC, scanned, and FAX images	5.0 (6.0 for TIFF JPEG)
JFIF	JPEG-compressed images	8-R8
GIF	xv and xgif images	87a and 89a
XWD	Pixmap images from xwd (Z format)	X11[1]
XBM	Bitonal X bitmap images	X11
XPM	Color X pixmap images	3.0
BMF	Starbase pixmap images (Z format)	1[1]
HP-GL/2	Vector Commands	1
PCL	HP Page Description Language	1 through 5
Postscript	Adobe ™ Page Description Language	(not applicable)
EPS	Encapsulated PostScript Object	3.0
CGM	Computer Graphics Metafile	(not applicable)
Text	8-bit text	(not applicable)
IMG	PC bitmap image	3.0
PCX	PC bitmap image	3.0
BMP	GEM PC images	(not applicable)

1 The Z format, noted for BMF and XWD files, refers to a pixel-oriented bitmap format.

Printing TIFF Files

SharedPrint/UX can print any type of TIFF image file that the HP-UX Image Library can read. The following TIFF files can be printed:

- Bitonal (1-bit)
- Grayscale (4 and 8-bit)
- Palette (4 and 8-bit color)
- RGB (12 and 24-bit color)
- YCbCr (24-bit color)

The TIFF images you can print can be in uncompressed format or in any of the following compressed formats:

- JPEG (Grayscale, RGB, and YCbCr images)
- LZW (Bitonal, Grayscale, RGB, and YCbCr images)
- CCITT Group 3 and 4, TIFF-compatible Group 3 (Bitonal images)
- Packbits (Grayscale, RGB, Bitonal images)

Printers and Plotters Supported

SharedPrint/UX supports the following printers and plotters. To add support for additional printers, see Chapter 6, **Extending SharedPrint/UX**.

- HP LaserJet II
- HP LaserJet IID
- HP LaserJet IIP
- HP LaserJet III
- HP LaserJet IIID
- HP LaserJet IIIP
- HP LaserJet IIISi
- HP LaserJet 4
- HP LaserJet 4L
- HP LaserJet 4M
- HP LaserJet 4ML
- HP LaserJet 4MP
- HP LaserJet 4P
- HP LaserJet 4Si
- HP LaserJet 4Si MX
- HP PaintJet
- HP PaintJet XL
- HP PaintJet XL300
- HP DesignJet
- HP DesignJet 200
- HP DesignJet 650C
- HP DeskJet
- HP DeskJet 500
- HP DeskJet 500C
- HP DeskJet 520
- HP DeskJet 550C
- HP DeskJet 560C
- HP DeskJet 1200C
- Most 300 dpi monochrome Postscript ® printers (including HP LaserJet with Postscript ® cartridge)
- HP Model 250/255 monochrome electrostatic plotters
- HP Model 355 color electrostatic plotter
- HP DraftMaster MX/RX/SX plotter (HP-GL/2 and CGM only)
- Tektronix 4693DX and Tektronix Phaser I

Basic Architecture of SharedPrint/UX

SharedPrint/UX uses a client/server implementation. The SharedPrint/UX client contains the user interface, while the SharedPrint/UX server contains the software that processes print requests. The server software invokes the necessary conversion and formatting filters, and controls the use of printer capabilities, such as duplex printing and tray selection.

Figure 1-2 illustrates the client/server architecture of SharedPrint/UX. For more detail, see Chapter 4, **Understanding the SharedPrint/UX Architecture**.

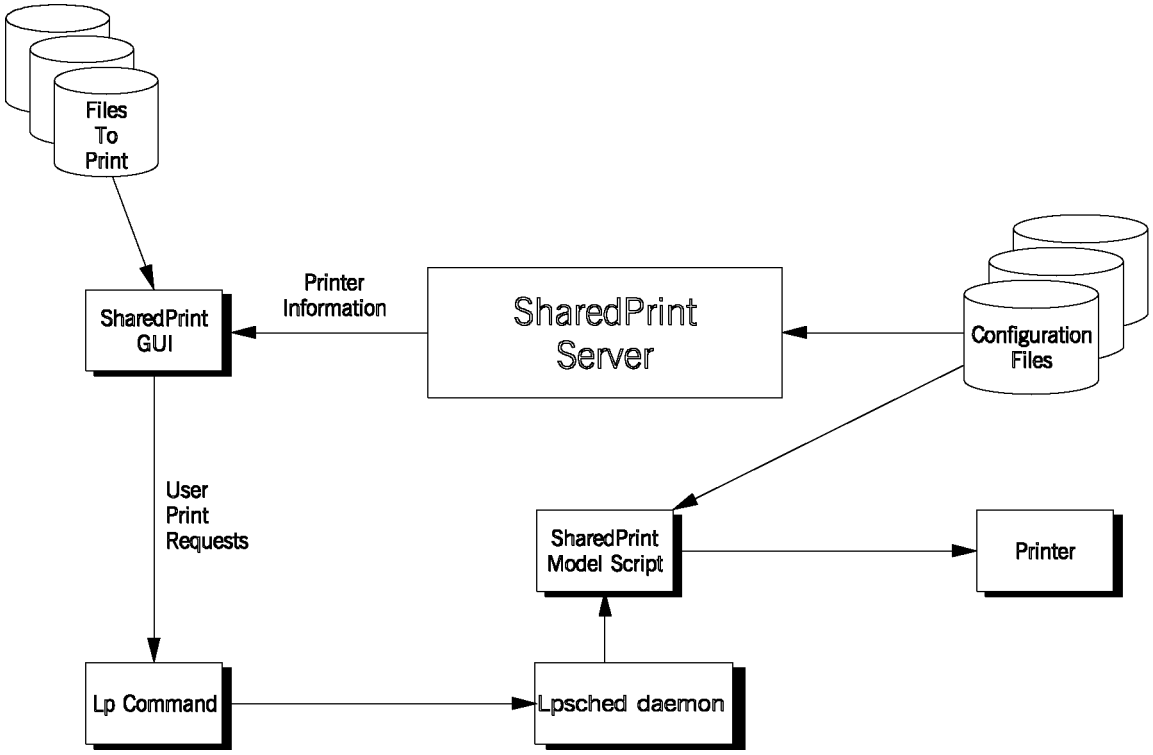

Figure 1-2. SharedPrint/UX Client Server Architecture

2

Setting Up SharedPrint/UX

You can use this chapter for three tasks:

- To configure local printers to support SharedPrint/UX
- To add remote printers that were configured for SharedPrint/UX
- To enable printing via SharedPrint/UX on a user's system

Configuring Local Printers for SharedPrint/UX

Check the printer you need is listed under "Supported printers and plotters" in Chapter 1. Then, choose a procedure that applies:

- Printer Attached to SharedPrint/UX Server
- Printer Controlled by JetDirect Network Software
- Printer Attached to an X Station

Note If you are using a localized version of SharedPrint/UX, one additional step exists. When you use `sam` to add or remove printers, first set your locale to C. In an hpterm window, type:

```
export LANG=C
```

On Series 800 Systems

An X display is required for the `setup_pr` script referenced in this chapter. If the system you are using has no X display, replace the `setup_pr` step with the section "Alternative to setup_pr" later in this chapter.

Printer Attached to SharedPrint/UX Server

1. Become root on the SharedPrint/UX server.
2. Use `sam` as follows:
   a. Use the Printer/Plotter Manager to list printers on your system.
   b. If the list includes the printer you planned to add for SharedPrint/UX, use the `sam` action for removing it. (By completing subsequent steps, you add it back for use by both SharedPrint/UX and `lp`.)
   c. Use the procedure for adding a local printer, filling in these fields as follows:
      `Printer Name` - assign a name to the printer.
      `Printer Model/Interface` - click this button to select a printer model number that `sam` lists as a `SharedPrint` model.
      - Select `PS` if the printer only accepts PostScript input
      - Select a different `SharedPrint` model if the printer handles multiple types of files.
   d. Exit `sam`.
3. Execute the following script, responding to prompts that guide you through the set up:

   ```
   /opt/sharedprint/lbin/setup_pr.sh
   ```

   For a parallel printer, no input is required; choose `Quit` instead of `OK` to dismiss the dialog.

   The `setup_pr.sh` script is required as a check that NCS or HP DCE/9000 is set up on the network. If `setup_pr` issues a message that neither is set up, see Appendix C, "Meeting NCS or DCE Requirements."
4. If this is a parallel printer, add the following line to the `/etc/inittab` file:

   `lp:2:once:/usr/bin/slp -r /dev/`*device-filename* `2>/dev/null`

   For *device-filename*, supply the appropriate file name.
5. If the printer will be used for color graphics, see "Modifying Color Printers" later in this chapter.
6. Configure other printers (if needed) using a procedure in this chapter.
7. When all printers are configured, see "Enabling SharedPrint/UX on a System" at the end of this chapter.

Printer Controlled by JetDirect Network Software

1. Become root on the SharedPrint/UX server.
2. If you have *not* installed the JetDirect Network software (separately purchased TCP/IP software) on the SharedPrint/UX server, use the documentation that comes with the TCP/IP Ethernet Network Peripheral Interface to install this TCP/IP software.
3. Use the JetDirect `jetadmin` command as follows:
   - Configure the boot server for this printer.
   - Add this printer to the spooler.
   - Change the model script for this printer to: `sharedprint`
4. Execute the following script, responding to the prompts that guide you through the set up:

   ```
   /opt/sharedprint/lbin/setup_pr.sh
   ```

   When prompted for a model number, use these guidelines:

   - Select `PostScript-Only` if the printer only accepts PostScript input.
   - Select a different model if the printer handles multiple types of files.

   If you receive a message that NCS or DCE is not set up, see Appendix C, "Meeting NCS or DCE Requirements."
5. If the printer will be used for color graphics, see "Modifying Color Printers," later in this chapter.
6. Configure other printers (if needed) using a procedure in this chapter.
7. When all printers are configured, see "Enabling SharedPrint/UX on a System," at the end of this chapter.

Printer attached to an X Station

1. Attach the printer to the serial or parallel port of an HP 700/RX, HP ENVIZEX Station, or ENTRIA X Station.
2. If the printer is connected to the parallel port, skip to step 3. If the printer is connected to serial port, perform these steps:

a. Hold the F12 key on the X station keyboard until the setup window appears.
b. Choose the `Terminal` button.
c. Set the `Serial Port` parameters to match your printer.
d. Choose `OK` to close the setup window.
e. Continue with step 3.

3. Become root on the system that is the X server for the X Station.
4. If this is a parallel printer, add the following line to the `/etc/inittab` file:

   `lp:2:once:/usr/bin/slp -r /dev/`*device-filename* `2>/dev/null`

   For *device-filename*, supply the appropriate file name.
5. If the X station is *not* an HP 700/RX, skip to the next step.

   For an HP 700/RX, make sure that the HP 700/RX software is at least `Release B.04.01`.
6. Run `xtadm` and respond to the prompts as follows:

   a. From the main menu, choose `Printers, plotters`.
   b. From the next menu, choose `Add a printer or plotter`.
   c. Respond to all prompts, entering `sharedprint` at this prompt:

      `Enter printer type or '*' to see choices.`

   If you enter `*` to `see choices`, `sharedprint` appears with an `@` symbol; however, you omit this symbol.
7. Exit `xtadm` by choosing `p`, then `x`.
8. Execute the following script, responding to the prompts that guide you through the set up:

   `/opt/sharedprint/lbin/setup_pr.sh`

   When prompted for a model number, use these guidelines:

   - Select `PostScript-Only` if the printer only accepts PostScript input.
   - Select a different model if the printer handles multiple types of files.

   If you receive a message that NCS or DCE is not set up, you need to set up either NCS or HP DCE/9000 on your network. See Appendix C, "Meeting NCS or DCE Requirements."

9. If the printer will be used for color graphics, see "Modifying Color Printers," later in this chapter.
10. Configure other printers (if needed) using a procedure in this chapter.
11. When all printers are configured, see "Enabling SharedPrint/UX on a System" at the end of this chapter.

Modifying Color Printers

A new feature of SharedPrint/UX optimizes the printing of highly-detailed color graphics (such as scanned photographs) on these five printers:

- PaintJet XL300
- DeskJet 500C
- DeskJet 550C
- DeskJet 560C
- DeskJet 1200C

If you have *not* configured or reconfigured one of these printers at this version of SharedPrint/UX, no action is required. See "Enabling SharedPrint/UX on a System" at the end of this chapter.

Otherwise, follow these guidelines for the best color graphics printouts:

1. Enable SharedPrint/UX on this system by entering this command:

   ```
   /opt/sharedprint/bin/sp_enable
   ```

2. If the printer always has HP Special paper loaded, skip to step 3. Whenever other paper is used, modify the printer's configuration file as follows:
   a. On the SharedPrint/UX server, click the Printer control in the front panel.
   b. Choose Configuration Files from the Administer menu.
   c. Select the appropriate printer name.
   d. Reset `media_type` to another media type shown in the file.
   e. Save and exit the file.
3. For users who mainly print simple color graphics (such as screen dumps or simply-colored bar charts), suggest that they *deselect* `Color Correct` on the `Graphics Options` window of SharedPrint/UX.
4. For users who mainly print highly-detailed color graphics (such as scanned photographs), users should leave `Color Correct` selected and leave the `Gamma Value` blank (the defaults for both options).

Printing in Europe

In Europe, most SharedPrint/UX users require the `HP_Roman_8` symbol set and `a4` paper size which are *not* the default values. While each individual user can set these defaults values via the GUI, you can change the defaults for all users:

1. Become root on the SharedPrint/UX server that controls the printer.
2. Enable SharedPrint/UX on this system by entering this command:

   ```
   /opt/sharedprint/bin/sp_enable
   ```

3. Click on the front panel printer control to display the SharedPrint/UX-Manager.
4. From the `Administer` menu, select `Configuration Files ...`
5. Select a printer name.
6. Reset `symbol_set` to: `HP_Roman_8`
7. Reset `papersize` to: `a4`
8. Save and exit the file.
9. For each printer, repeat from step 3.

Alternative to setup_pr

If the system you are using has no X display, use these steps in place of the `setup_pr` script:

1. Check that NCS or HP DCE/9000 is set up on your network by entering this command.

   ```
   /opt/sharedprint/lbin/splistpr -glbd
   ```

   If you receive a message that NCS or DCE is not set up, you need to set up either NCS or HP DCE/9000 on your network. See Appendix C, "Meeting NCS or DCE Requirements."

   When no errors result from this command, continue with the next step.

2. Change to the `/opt/sharedprint/lbin` directory.

3. Choose an appropriate printer model number from a list you display with this command:

   ```
   ./list_tmplt.sh
   ```

   - Select `PS` if the printer only accepts PostScript input.
   - Select a different model if the printer handles multiple types of files.

4. Add the printer to the system and the SharedPrint/UX database by entering this command:

   `./add_printer.sh` *printer_name model_number io_port*

   - *printer_name* is any name you assign, up to 14 characters long.
   - *model_number* is a printer model number displayed by `list_tmplt.sh`.
   - *io_port* applies only for local printers - choose one of these device filenames which identify the port on the rear of the system:

     `/dev/ptr_rs232_a` (Port ttya)
     `/dev/ptr_rs232_b` (Port ttyb)
     `/dev/ptr_tek` (Parallel port connecting a Tektronix 4693DX printer)
     `/dev/ptr_parallel` (Parallel port)

5. For a serial printer, set the system's serial line parameters by entering a command with this format:

   `./set_tty.sh` *io_port speed*

   where:

   - *io_port* is the *io_port* you used for `add_printer.sh`.
   - *speed* is the baud rate for running the printer.

   For example, for a printer with an *io_port* of `/dev/ptr_rs232_a` and a baud rate of `19200`, you enter:

   ```
   ./set_tty.sh /dev/ptr_rs232_a 19200
   ```

6. If this is a parallel printer, add the following line to the `/etc/inittab` file:

   `lp:2:once:/usr/bin/slp -r /dev/`*device-filename* `2>/dev/null`

   For *device-filename*, supply the appropriate file name.

7. When all printers are configured, see "Enabling SharedPrint/UX on a System" at the end of this chapter.

Adding Remote SharedPrint/UX Printers

1. Log on to the SharedPrint/UX server where you configured the printer for SharedPrint/UX.
2. Note down the exact printer name(s) displayed by this command:

   ```
   /opt/sharedprint/lbin/splistpr -llsp
   ```

   No output means no printers are configured for SharedPrint/UX.
3. On the client system, become root.
4. Run `sam` and respond to the prompts as follows:

   a. Choose `Printers and Plotters`, then `Printers/Plotters`.
   b. If `sam` lists a printer that you planned to add, you must use `sam` to remove it first. (In Step *c*, you will add it back for use by both SharedPrint/UX and `lp`.)
   c. From the `Actions` menu, choose `Add a Remote Printer/Plotter` and enter the following in these fields:
      Printer Name - Enter the printer name you found in step 2.
      Remote System Name - Enter the name (or IP address) of the system that is the SharedPrint/UX server.
      Remote Printer Name - Enter the *same* name you entered for *Printer name*.
   d. Repeat Steps *b* and *c* for each printer you want to use.
   e. Optionally, make a printer you added the default system printer.

Note If you plan to print HP Help screens, choose a LaserJet Series III (or later) printer as the default system printer. That printer does not need to be a SharedPrint/UX printer.

   f. Exit `sam`.

5. When all printers are configured, see "Enabling SharedPrint/UX on a System," which follows.

Enabling SharedPrint/UX on a System

Once you have access to one or more SharedPrint/UX printers (either local or remote), you need to enable SharedPrint/UX on each system where you plan to print. On each system, become root and execute the following command:

```
/opt/sharedprint/bin/sp_enable
```

If you later decide to return a specific system to the non-SharedPrint/UX method of printing, issue this command on that system:

```
/opt/sharedprint/bin/sp_disable
```

After using this command, the SP-labeled printers in the Printers subpanel no longer accept print requests. To remove these printers from the subpanel, restart the VUE Window Manager.

3

Using SharedPrint/UX

Once you have set up SharedPrint/UX printers on a system, you can use this chapter to get started start printing various text and graphics files. See the following topics covered in this chapter:

- Printing Files
- Checking Print Status
- Saving Common Print Setups
- Getting Help with SharedPrint/UX

Printing Files

You can print from HP VUE or from the UNIX command line once you have access to SharedPrint/UX printers. However, if you have not yet enabled SharedPrint/UX on your system, become root and issue this command:

```
/opt/sharedprint/bin/sp_enable
```

Printing From HP VUE

1. Display the SharedPrint/UX window by choosing one of these actions:
   - Drop a file icon on the Printer control in the HP VUE Front Panel.
   - *Or*, select a file in File Manager, then select `Print` from the `Actions` menu.

Note After adding a printer, the first attempt to display the SharedPrint/UX window may result in a one-minute delay; afterwards, performance becomes normal.

2. On the SharedPrint/UX window that appears, select the printer you want by clicking the `Printers` button.
3. Type the number of copies you want in the `Copies` field.
4. Change other print controls and fill in text fields, if needed; use the `Help` button for details.
5. Choose OK to print the file.
6. To confirm the file is printing, choose the Printer control in the HP VUE Front Panel. The SharedPrint/UX Manager displays all print requests in the queue.

OK versus Print

When you choose `OK` to print, SharedPrint/UX saves your selections for controls (buttons and fields) as the defaults for your next print request.

If you choose `Print` to print, only the current print request uses these selections. Also, the SharedPrint/UX window remains displayed; the `Close` button dismisses it.

Printing from the UNIX Command Line

To access SharedPrint/UX at the HP-UX command line, use this command:

`/opt/sharedprint/bin/sprint` [x-options] [-p *printer*] [*filename* {`-post`, `-no_post`}]

For further details on this command, type: **man sprint**.

The alternative command line method is to use the `lp` command with the `-o` option. Use the options described in Appendix A.

Checking Print Status

To invoke the SharedPrint/UX Manager, click on the printer control in the front panel. A Graphical User Interface appears and displays menus for checking the status of printers and print requests and administering the SharedPrint/UX system.

Accessing SharedPrint/UX Manager at the Command Line

To access the SharedPrint/UX Manager at the HP-UX command line, use this command:

```
/opt/sharedprint/bin/spadmin
```

For further details on this command, type: **man spadmin**.

Saving Common Print Setups

After setting up a print request by selecting options and filling in fields, you can save the current print setup for use in future print requests. Your saved print setup is called a **Virtual Printer**, a specific printer plus the combination of the options you selected. The Virtual Printer appears in the `Printers` list, so you can reapply these options to other files.

For instance, you may frequently set up SharedPrint/UX to print draft quality output. To be able to reuse what you enter for options, you would perform these steps:

1. On each SharedPrint/UX window, set the buttons and enter values as needed for your print request.
2. Click on Virtual Printer on the first SharedPrint/UX window.
3. Under Add Virtual Printer, enter a name that reminds you of these print settings. For instance, enter `draft` if they apply to draft output.
4. Press Return.
5. Select Close.
6. Select Printers to confirm your virtual printer is now in the list.

Before creating a Virtual Printer, you may wish to test your print request to check that it provides the output you want. Because SharedPrint/UX saves the last used settings, the next time you enter SharedPrint/UX, you can fine-tune your settings or values and then create the Virtual Printer.

For more details on Virtual Printers, click on the Help button on the Virtual Printers window.

Getting Help With SharedPrint/UX

From within SharedPrint/UX and the SharedPrint/UX Manager you can use the Help buttons to display information that applies to the current window or task.

You can also preview the help windows before starting SharedPrint/UX. Use these steps:

1. Click on the Help control, shown as a Bookcase symbol in the HP VUE front panel. A window appears listing entries for all help on the system.
2. Scroll down to where you see `SharedPrint/UX`.
3. Click on `SharedPrint/UX` to select it. A window appears with two entries that you can select:
   - `SharedPrint/UX`
   - `SharedPrint/UX Manager`

Printing Multiple Files and Silent Printing

If you added a SharedPrint/UX printer to your subpanel, you see an `SP` labeled on the printer icon. To print one or more files on that printer, drop the file(s) on that printer icon. This action prints the file(s) with the last SharedPrint/UX options you used. This printing is called *silent* printing, because the SharedPrint/UX dialog does *not* appear.

You can also use the Printers subpanel to obtain the status of printers. Click an `SP` printer to display the SharedPrint/UX Manager showing the state of your printers.

Printing or Saving Screen Images

From the SharedPrint/UX dialog, you can choose Capture Screen to print:

- A window
- A screen region
- The whole screen

Respond to the prompts to capture the image and then select a printer that can print bitmap images.

If you want to save a screen image in a file, you can use the HP-UX `Capture` tool. `Capture` lets you capture a screen image and save it in a file in either XWD format or a compressed TIFF format you choose to save disk space.

The `Capture` tool is in the Media Toolbox in the General Toolbox.

For more details on printing or saving a screen image, choose the Help button on the Capture Screen window.

4

Understanding the SharedPrint/UX Architecture

The spooling system interface for HP-UX is based on the System V **lp** spooling system. This system uses a shell script to process a print request. SharedPrint/UX does not modify the **lp** spooler functionality, but adds the **print_model.sh** shell script to process spooled requests.

This chapter covers the following topics that explain how SharedPrint/UX and its **print_model.sh** script interact with the HP-UX spooling system:

- The HP-UX Spooling System
- The **print_model.sh** Shell Script
- Configuration Files
- Filter Design Needs
- Driver Design Needs

The HP-UX Spooling System

The HP-UX spooling system consists of the following two phases:

- Communications phase
- Processing phase

During these phases, the **lp** command and **lpsched** daemon use the files and directories created by **lpadmin** to process the request. The following sections describe the communications and processing phases and provide details about how the **lp** command gathers the information required to process the request.

Communications Phase

The communications phase begins when the user makes a print request with the **lp** command. During the communications phase, **lp** creates the data and control files in the **/var/spool/lp/request/***printer_name* directory, where *printer_name* is the name of the printer specified for this request. Then, a child process spawned by the Line Printer scheduling daemon (**lpsched**) opens a streams connection to the data and control files. The communications phase involves the **lp** command and the **lpsched** daemon.

Processing Phase

The processing phase begins when the **lpsched** child process executes the interface program and ends when the file is printed. During the processing phase, **lpsched** opens the output device (usually a printer), reads and executes the interface program, and deletes the data and control files. The processing phase involves the **lpsched** daemon and the interface program.

After deleting the data and control files for the current request, **lpsched** rescans the appropriate **/var/spool/lp/request/***printer_name* directory for a control file belonging to another request. If it finds another control file, it repeats the steps to process the request. The **lpsched** daemon repeats the *get request - process request* loop until it finds no more control files for this printer.

How lp Creates the Control File

When a user invokes the **lp** command to submit a request to the printer, **lp** creates two files for each request: the data file, which contains the data to be printed, and the control file, which contains information about how to process the data file. There are three sources of information for the control file: the options specified in the **lp** command, the environment variables of the process that executes **lp**, and the printing system configuration. In some cases, **lp** must use all three sources to obtain the required information.

The print_model.sh Shell Script

The **print_model.sh** shell script, which is also referred to as the SharedPrint/UX model script, is the interface program invoked by the **lpsched** print daemon when a print request is processed. The script is found in **/opt/sharedprint/lbin** and is called with the following arguments:

- *job_id*
- *user_name*
- *title*
- *copies*
- *options*
- *files*

The first four arguments represent the request number, user who queued the request, print request title, and number of copies to be printed. The *options* argument contains zero or more tokens, each representing an option specified by the user who queued the request. These options are set on the **lp** command line by preceding the option string with the letter **o**. The SharedPrint/UX graphical user interface includes menu items to select and set each of these options. The *files* argument is a list of one or more files to be printed.

The **print_model.sh** script serves all the supported printers by dynamically configuring itself for each print request. The information needed for this operation comes from a set of files that can be modified as required. Each printer requires a unique printer configuration file that is customized to that printer. This file is created when a printer is added to the system. It can be modified by selecting **Configuration Files** ... from the **Administer** menu of the SharedPrint/UX Manager. In the **/opt/sharedprint/bin** directory, the command **spadmin** starts the SharedPrint/UX Manager.

The **print_model.sh** script is a Korn shell script that makes extensive use of shell variables to control the print request process. The script invokes control programs to perform some of the process and information gathering tasks. Each control program expects a certain set of inputs. The print script provides these inputs as global shell variables. In addition to the control programs, the script invokes filter programs to perform the actual translation and formatting steps.

The following 5 steps form the basic procedure for each request:

1. Determine the printer type
2. Build an options list for the request
3. Determine the file type
4. Build a filter pipeline to process the request
5. Execute the filter pipeline

Figure 4-1 illustrates the flow of **print_model.sh**, and its use of configuration files. It is followed by sections that describe each block in the flow chart.

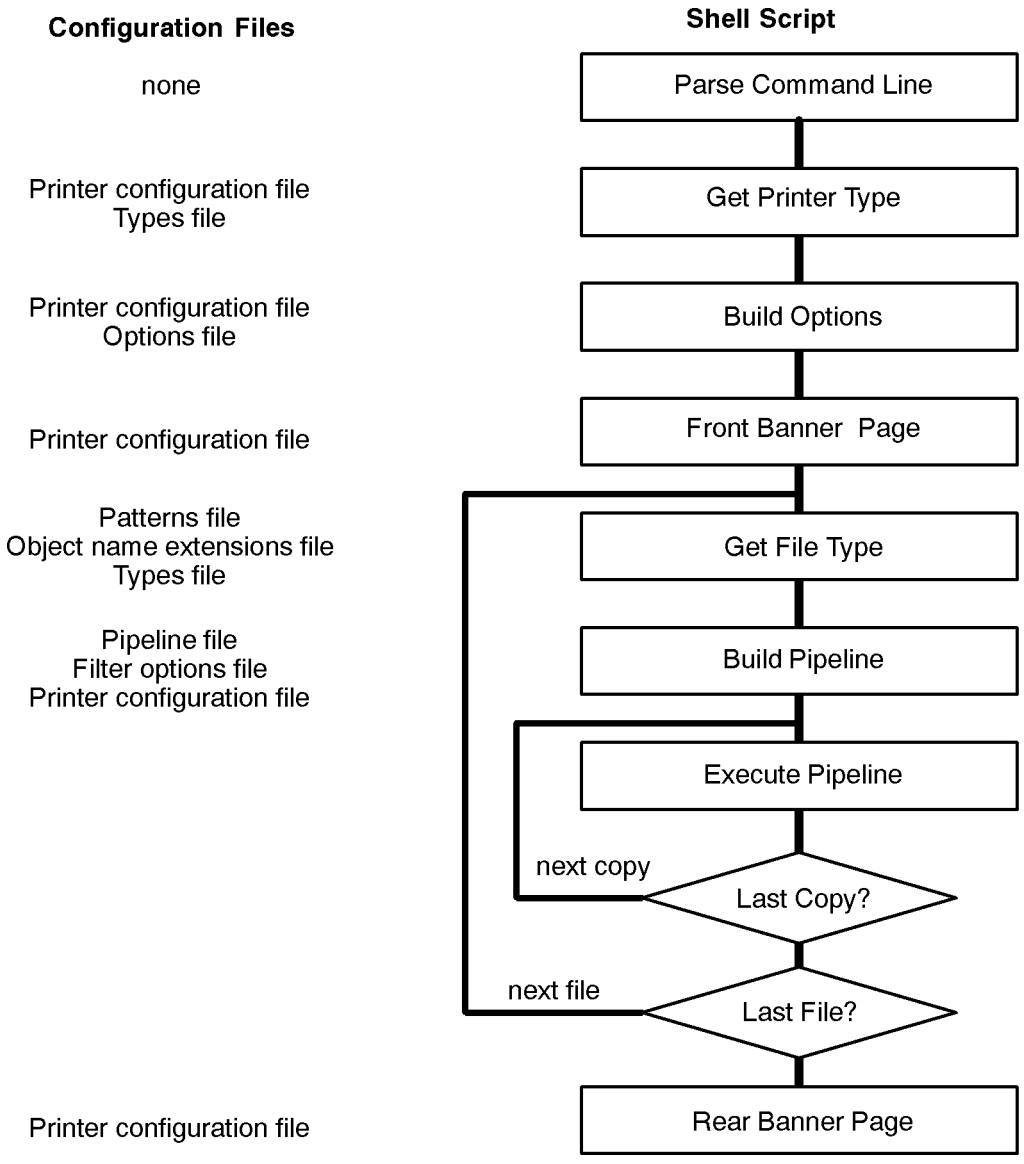

Figure 4-1. *print_model.sh* **Shell Script**

Parse Command Line

The Parse Command Line function (**parse_cmdline**) reads the command line arguments and converts them to the shell variables used by the remaining portion of the script. The main purpose of this function is to enclose the specifics of a spooling system in one location.

For the HP-UX spooling system, this function first strips the printer name off the *request_id* argument. It builds the printer configuration file name from this printer name. The format of the filename is *printer_name*.**pcf**, and the file is stored in the directory **/etc/opt/sharedprint**. If the configuration file does not exist, the script disables this printer, attempts to print an error page and exits. Each of the remaining command line arguments is copied to shell variables.

Get Printer Type

The Get Printer Type function (**get_printer_info**) determines which file type or types are supported by this printer. This function requires the printer configuration file name as input, and sets the shell variable OUTTYPE as an output parameter. If multiple file types are supported by the printer, the variable OUTTYPE contains each of the type strings separated by a : (colon).

The printer configuration file defines the printer type or types; this file is created when a printer is added to the **lp** spooling system. The configuration file **Types.cf** lists the supported file types. The **get_printer_info** function scans the configuration file for this entry, and builds the output type string. If no file type entry exists in the configuration file or the configuration file cannot be located, an error page is sent to the printer, the printer is disabled, and a mail message is sent to the user who made the print request.

If the user has specified a pipeline, this function is ignored.

Build Options

The Build Options function (**build_options**) builds a list of options from a set of defaults defined in the printer configuration file and the options passed by the user. All options are defined in Appendix A of this manual.

The inputs for the Build Options function are the printer configuration file name, command line options, and command line *copies* variable. This function

writes a shell variable called OPTIONS, which is a list of options and their values. The format of each item in the list is OPTION=VALUE, with each item separated by newlines.

The Build Options function parses each token in the options variable, checks the file **Options.cf** for the correct spelling, and stores the option and its value. After parsing the last token in the options variable, the **build_options** function reads directives from the printer configuration file. If a directive was already set by the options variable, the printer configuration file value is ignored. If a directive was not already set, it is added to the options list. When the printer configuration file is completely parsed, the options list is copied to the shell variable named OPTIONS.

When a user option or an option in the printer configuration file is absent from the **Options.cf** file, that option is added to the options list without being modified.

Options on the **lp** command line must be preceded with a – (minus sign). To pass multiple options to **print_model.sh**, use the following syntax:

lp -o"*-option1 val1 -opt2 val2 ...* "

If an option has no associated value, it is treated as TRUE or ON. All option strings are lower case.

The maximum option string that can be passed with the **lp -o** option is 512 bytes. Scripts that build long command lines should use one of the alias names defined in the **Options.cf** file.

Front Banner Page

The Front Banner Page function (**print_banner**) creates a banner page file, then calls the print script to send it to the printer. Thus, any type of banner page can be sent to any printer. SharedPrint/UX includes a banner page program for PostScript, PCL4, and ASCII text.

The banner pages are modeled on the standard banner produced by the **lp** print scripts.

Table 4-1 shows the format for the banner page.

Table 4-1. Banner Page Formatting Features

Feature	units high
Filled region (maybe text)	3
white space	2
user name	4
white space	2
full user name from **/etc/passwd**	1
white space	1
request id: # printer name:	1
white space	1
date & time	1
white space	2
title	4
white space	2
filled region (possibly text)	3

The basic flow of this function follows:

1. Check if the front banner is in the Configuration file. Exit, if no entry.
2. Check if the user has specified the **-banner off** option. Exit, if this is TRUE.
3. Execute the banner script or program and write the output to a file named **/etc/opt/sharedprint/banner.***printer_name*
4. Call **print_model.sh**, passing the file produced by the banner script.
5. Delete the file **banner.***printer_name*

The module that produces the banner page can be a script or a program. In either case, it expects the user name and title as input. The module writes the output to standard output. The banner function redirects **stdout** to the banner file.

Get File Type

The Get File Type function (**get_file_type**) determines the file type of the spooled file. The file types supported by this model are listed in the print script configuration file **file_types**. The file type is necessary to determine what if any processing is necessary so that the content is correctly formatted for the target printer. For instance, a PostScript file must be converted to PCL to print on a LaserJet printer.

The file typing checking process uses three methods in the following order:

1. Command Line Option
2. File Type Reader
3. File Extension Value

When a match is found, the type checking process terminates. The matched string is compared to values in the types file in case the string is an alias. The shell variable INTYPE is then set to the file type value.

If the file type can not be determined from any of the above methods, an error page is printed, and the request is aborted.

If the user has specified a pipeline, the Get File Type function is ignored.

The Get File Type function is a shell script that calls other shell scripts and binary programs. The input to this function is a file name and options variable. If this function is successful, it sets the variable INTYPE and returns with an exit status of 0. If unsuccessful, the script creates and prints an error page and the function returns a status code of 1.

The following sections provide detail on the individual functions within the Get File Type script.

Command line option

If the user includes the **-file_type** option on the command line, the file type value will be set to the value following **-file_type**. If the value following **file_type** is not listed in the file **Types.cf**, the value is used as is. This handles the situation of the pipeline file having an entry for the file type, but **Types.cf** has no entry.

File Type Reader

The File Type Reader function compares the file contents with a predefined set of patterns for specific file types. These patterns are coded as C programs or Korn shell scripts in the **/opt/sharedprint/bin** directory. Each program or script expects a file as input. If the file type matches the defined pattern, the program or script writes the type string to standard output, and returns an exit code of 0. If no match results, the program or script returns an exit code of 1.

A special file type program is based on the HP-UX Image Library. If the Image Library can process the file, the file type program writes the string *bitmap* to standard output, and exits with a status code of 0.

The overall file type reader is a function that executes each of the programs or scripts in the **filetypes** directory until a match is found. If all the programs or directories are called and no match is found, this function exits with a status of 1.

File Extension Value

The File extension value function (**get_file_type_by_ext**) checks the extension (suffix) of the filename. The function extracts the extension value (the string following the .) from the title argument and maps it to a file type via the file **ObjNamExt.cf**.

Build Pipeline

The Build Pipeline function (**build_pipeline**) starts by checking to see if the user has specified a pipeline. If a pipeline is not specified, this function scans the **Pipeline.cf** file which maps the input file type to the printer file types. At each intersection, a set of filters is defined to perform the translation. If no filtering is necessary, the table entry becomes a null string. If no entry is found for the specified input and output types, an error page is printed and the request is aborted.

The pipeline is completed by adding a driver function to the filter pipeline. The driver is determined from the printer configuration file. The pipeline string at this point has the format *filter1*|*filter2*|*driver*. Note that each *filter* ... string can be a filter name followed by some options that control how the filter is executed.

Next, the executable script is created by adding the appropriate options to each of the filter and driver elements. The file **OptionsMap.cf** maps the options that apply to each filter or driver, so that the correct arguments are passed to the actual filters. Thus, the final pipeline string has the following format:

filter1 -o1 v -o2 v -o3 v|filter2|driver -o1 v

If the standard options string does not match the filter options string, the filter options map includes a translation string with the following syntax:

filter_name=option1:options2(filter options string):options3

The Build Pipeline function replaces the standard options string with the filter-specific string.

Execute Pipeline

The Execute Pipeline function (**execute_pipeline**) executes the pipeline created in the Build Pipeline function. Output from the last stage is sent to standard output, which is the I/O connection to the printer. Multiple copies may cause the pipeline to be executed multiple times. This may not happen if the printer can be directed to perform the multiple copies operation.

If an error occurs in any of the filter or driver elements, the error is captured and an error page is printed.

The **execute_pipeline** routine uses the `nice` command to assign a low CPU priority to print requests. If you want SharedPrint/UX to devote more CPU time to print requests, edit the `print_model.sh` script to change the use of this command. See the `nice` man page for more details.

Last Copy

The Last Copy function checks if the pipeline must be reexecuted because another copy is needed.

Last File

The Last File function cycles the script back to processing the next request. The initial state of the options, printer configuration file, and output type remain the same and do not need to be recalculated.

Rear Banner Page

The Rear Banner Page function is the same function used to print the front banner page (**print_banner**). It may be used to print a short trailer or for requests on printers that print face up.

Error Page Function

The Error Page function (**print_error**) is called when some unrecoverable event occurs. The file **errorlog.***printer_name* contains all output from **print_model.sh**. Each function or filter is expected to write all error or warning messages to standard error. **print_model.sh** redirects these messages to the error log. If **print_model.sh** detects an unrecoverable error, the contents of this file are sent as a request to the print script, in the same way the banner page is printed.

Anytime a filter or driver writes to **stderr**, an error page is printed. To turn off the error page printing function, add the directive **NoErrorPage** to the configuration file for that printer.

Configuration Files

This section defines the files used by the **print_model.sh** script to process print requests. A copy of each file is included in SharedPrint/UX. These configuration files provide all the information required to process any supported file type on any supported printer.

Users can modify these files using an editor, or in the case of the printer configuration files, by using the SharedPrint/UX Manager. In all cases, an item in one of the files can be continued on the next line by placing a \ (backslash) at the end of the line. No blank space or other characters must follow the backslash.

- printer model files - These files are templates that contain information for a specific model of printer. The information in each file includes options supported by this printer, default values for any filters that may be used with this printer, default interface settings, and file types which this printer can handle. The format is *option=value* or if an option supports multiple values the format is *option=value1:value2:*

  These files are stored in **/opt/sharedprint/lib/printers**.

- printer configuration files - These files each contain information about an individual printer. The file is created from one of the printer model files when a printer is added to the system. Users can modify this file to reflect changes made to the printer, such a swapping paper trays or inserting font cartridges. Changes are used at the next print request. The format for each item in the file is *option_name=val1:val2*.

  These files are stored in the **/etc/opt/sharedprint** directory.

- types file - This file lists the supported file types and alias strings for each type. The format of each entry in the file is *type_string:alias1:alias2,* where *type_string* is the entry used in other configuration files that contain file type references.

  This file is stored as **Types.cf** in the **/opt/sharedprint/lib/config** directory.

- object name extension file - This file contains a list of entries that map file extension values to file types. A file extension value is the component of a pathname that follows the **.** (period). The format for each item in the file is *extension_string=file_type* .

  This file is stored as **ObjNamExt.cf** in the **/opt/sharedprint/lib/config** directory.

- pipeline file - This file specifies a filter pipeline for each combination of input file type and output file type. The format is *INTYPE:OUTTYPE=filter1|filter2*. Each of the filter specifications can include options and white space.

  This file is stored as **Pipeline.cf** in the **/opt/sharedprint/lib/config** directory.

- filter options file - This file lists the supported options for each filter or driver. The format is *filter_name=option:option(filter specific spelling):option*.

  This file is **OptionsMap.cf** in the **/opt/sharedprint/lib/config** directory.

- options file - This file lists the known options and aliases. The format is *option:alias:alias*.

  This file is stored as **Options.cf** in the **/opt/sharedprint/lib/config** directory.

Filter Design Needs

Each filter reads from standard input and writes to standard output. Error, warning and information messages should be written to standard error. All arguments to the filter must be optional. Built-in defaults should handle any arguments not passed to the filter.

Driver Design Needs

Each driver reads from standard input and writes to standard output. Error, warning, and information messages should be written to standard error. All arguments to the driver must be optional. Built-in defaults should handle any arguments not passed to the driver.

In most cases, the driver sends a header containing any request control information such as language switching commands for HP LaserJet IIISi, then passes the input stream to the output stream. In some cases, the driver should examine the first few bytes of a file to check for any reset control characters that could interfere with the driver header stream. For instance, PCL files may contain an ESC E, which resets the printer state. The driver must strip these bytes if the header must be sent.

5

Using SharedPrint/UX Filters

The directory **/opt/sharedprint/bin** contains the SharedPrint/UX filters. These filters are programs that operate on data, producing resultant data with different characteristics. SharedPrint/UX has two types of filters:

- **translators** - filters that change the encoding of the information in the data file without changing its appearance.

  For example, a translator may convert text to PostScript format.

- **formatters** - filters that modify how the information in the data file is rendered on the page.

  For example, a formatter might rotate or scale an image, add commands for multi-column text printing or add footers and headers to a document. These filters often have options that the user can set to control the final appearance.

Filters are invoked by the **print_model.sh** script working with the Filter Pipe Builder function described in Chapter 4. Each filter reads from standard input and writes to standard output with error messages being sent to standard error.

The SharedPrint/UX filters are illustrated in Figure 5-1.

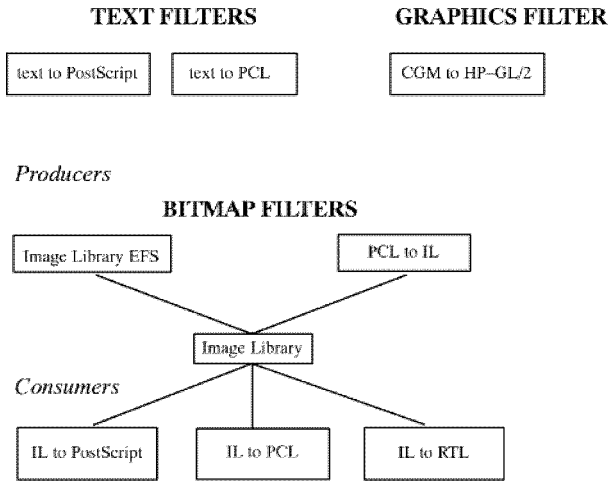

Figure 5-1. The SharedPrint/UX Filters

This chapter explains these filters under the following headings:

- Text Filters
- CGM Filter
- PCL Page Description Language Filter
- Image Library Filter

Text Filters

The txpcl and txps filters format and translate text documents into PCL and PostScript, respectively. As Table 5-1 shows, formatting options enable users to change point size, print portrait or landscape, choose double-columns, add headers and footers, and change typeface and symbol set mapping.

Table 5-1. txpcl and txps Filter Formatting Options

Option	Description
orientation	select landscape or portrait layout
columns	select one (1) or two (2) columns
margins	set top, left, right, bottom margin to a specified measurement
header	specify a header string to place at the top of the page
footer	specify a footer string to place at the bottom of the page
wrap	wrap text which exceeds the right margin to the next line
page reverse	output the pages in last-page-first order
collate	collate multiple page documents
symbol set	specify the symbol set mapping
point	specify the height of the text in points. One (1) point=1/72 inch.
lpi	specify the line spacing in lines per inch
PCL-specific options are:	
typeface	specify the font design to be used to print the document
weight	specify the font weight
spacing	specify proportional or fixed width font
pitch	specify the inter-character spacing in lines per inch
style	specify upright or italic printing

Using the SharedPrint/UX Graphical User Interface (**/opt/sharedprint/bin/sprint**) you can set up options, saving them as **Virtual Printers** for reuse in print requests.

Not all combinations of options can be satisfied. The filters attempt to match the required attributes to the closest available font on the target printer.

Options that have conflicting requirements are resolved in this order of priority:

orientation
symbol_set
style
spacing
point
pitch
weight
typeface

These filters process the following control characters (ASCII code in parenthesis):

backspace (0x08)	Insert a bold character at the preceding position if the next character is the same. Add an underline to the preceding character if the next character is an underscore. Overlay the preceding character with the next character if the characters do not match
tab (0x09)	Replace the tab character with spaces up to the next stop.
lf (0x0A)	Move the current text position to the start of the next line.
cr (0x0D)	Overlay the previous line and the next line.
ff (0x0C)	Finish the current page and begin a new page.

Text to PCL Filter

The **txpcl** (text to PCL) filter supports all PCL3, PCL4, and PCL5 devices. The core of the filter is independent of the printer type. The printer or PCL level specific information is resolved by code which selects the font to be used to print the document. It is based on the model name specified in the printer configuration file.

The font metric information is read from a set of Tagged Font Metrics (TFM) files that are included with this product. Every internal font for all the supported printers is represented by a TFM file. Support for font cartridges is not included.

Text to PostScript Filter

The **txps** (text to PostScript ®) filter supports all level 1 (initial PostScript release) and level 2 PostScript devices.

The font metrics used by this filter are stored internally and are limited to courier typefaces. An external set of files is used to define PostScript code used to remap the existing symbol sets. SharedPrint/UX includes a symbol set mapping for the Latin-1 character set.

For each encoding file, the file name corresponds to the symbol set name on the **lp** command line or SharedPrint/UX Graphical User Interface. For example, if the user specifies **-symbol_set ISO_100,** the file **ISO_100** in the directory **/opt/sharedprint/filters/afm** is used to build the encoding vector. The encoding vector specifies how character codes are mapped to character glyphs.

Two types of entries are found in these encoding files. The first type of entry maps a glyph name to a character code. For example, the ASCII character code 156 would produce a pound sterling symbol on the page.

156 / £

The second type of entry defines a PostScript procedure to create a character. Typically, these entries are composite characters that have no predefined glyphs that are printer-resident or glyphs that come from the symbol font. This example shows how to create the 3/4 character and map it to character code **190**:

190 {0.5 0.5 sl 0 200 tl (3) hfc 400 100 ng tl (/) hfc 400 100 ng tl (4) hfc}

The following PostScript procedures are predefined as an aid in creating new character procedures:

```
/in {72 mul} def
/sh {show} def
/mt {moveto} def
/tl {translate} def
/ng {1 neg mul} def
/sl {scale} def
/hf &/ Courier findfont 1000 scalefont def
/hfc {hf setfont 0 0 moveto show} def
/hs &/ Symbol findfont 1000 scalefont def
/hsc {hs setfont 0 0 moveto show} def
```

CGM Filter

The **cgmhpgl2** (CGM to HP-GL/2) filter reads a binary CGM file and produces an HP-GL/2 byte stream. It is used to obtain 2D graphics output from Starbase or HP-PHIGS CGM files. Other CGM files also correctly plot if the CGM file conforms to the CGM application profile specified in Appendix B.

Not supported by these filters are the CGM clear text and character encodings.

The following options are supported by this filter:

fitpage	Forces the plot to fit on the page as best as possible.
orientation	Specifying portrait forces the image to be rotated 90 degrees on the paper. Normally, the plot is oriented so that the long axis is the paper is plotted as the x axis.
pen_color	Specifies that the target device is a pen plotter.
paperwidth	Specifies the width of the output media in inches.
paperlength	Specifies the length of the output media in inches.

PCL Page Description Language Filter

The device Page Description Language (PDL) specifies the commands and data structures the printer can interpret to produce a page image. Most printers contain only a single PDL, but some printers can support multiple PDLs, usually by means of an escape sequence that informs the printer which PDL mode to use.

Files that contain PDL commands supported by the target printer can be sent directly to the printer with no modification. Files with content that cannot be interpreted by the printer require the services of a PDL translator.

Each translator reads the input file and produces a raster image of the files content. The raster image is then formatted further based on the target printer's PDL. This approach allows users to queue files created from various applications to any printer without the need to know about the printer's PDL.

PCL Filter Features

The PCL PDL filter reads PCL files and creates a raster image for each page. This filter can read PCL versions 1 through 4, except for PCL 3+ files, but including Version 4 files with the Version 5 scalable fonts. The raster image is fed to the formatter, which adds the appropriate control or command codes for the target device. Then, the formatted raster image is sent to the device driver where any additional job control information is added.

The PCL PDL filter requires the following information to create the raster image:

resolution Specifies the target device dot spacing in dots per inch.

paperwidth Specifies the width of the output media in inches.

paperlength Specifies the length of the output media in inches.

PCL Filter Limitations

The PCL PDL filter has the following limitations:

- This filter converts characters with bitmap sizes of up to 64 KB. A 64 KB character is approximately 2.5 by 2.5 inches (at 300 dots per inch), or 7.5 by 7.5 inches (at 100 dots per inch). The filter terminates with an error if the character is too large.
- HP-GL/2 commands are not supported; all HP-GL/2 commands are ignored. Therefore, graphic content can show up when the file is printed on an HP-GL/2 printer.
- This filter does not support PCL3+ commands, the color commands used by the PaintJet, PaintJet XL, and DeskJet 500c. The PCL3+ commands result in bitonal output.
- This filter may substitute a different font from the font in PCL file in these situations:
  - The currently selected font is an internal bitmap, cartridge bitmap, or cartridge scalable font and the print direction changes or selection of the primary or secondary fonts is attempted.
  - The file contains a dingbat; this filter does not support Dingbat symbols.
  - The PCL file fails to reselect a font after the return of a macro. If the PCL file shifts to primary or secondary font, but fails to reselect the original font, some characters may be lost.

- This filter does not support the following commands in a PCL file:
  - Simplex/Duplex: ESCAPE & I # s/S
  - User Defined Logical Page: ESCAPE & a # w/W [LP definition]
  - VFC (Vertical Format Control sequence) Support
  - Source Transparency Mode: ESCAPE * v # n/N
  - Pattern Transparency Mode: ESCAPE * v # o/O
  - Select Pattern: ESCAPE * v # t/T
  - User-Defined Patterns: ESCAPE * c # w/W [pattern data]
  - Set Pattern Reference Point: ESCAPE * p # r/R

Image Library Filter

The **ilFilter** (Image Library) filter converts a well-known bitmap format, or a PCL 4 file into a PostScript or PCL file. The filter is composed of the following three stages:

1. A producer converts the input object into an Image Library format.
2. One or more filters manipulate the raster image.
3. A consumer converts the Image Library image into a PostScript, or PCL file.

The Image Library producers read a bitmap file and translate it to an Image Library format. In addition to the producers shown in figure 5-1, the EFS Image Library includes producers that accept the following formats:

- X window dumps
- Bitonal X bitmaps
- Color X pixmaps
- Starbase bitmaps
- TIFF 5.0 and TIFF JPEG 6.0 images
- JFIF images
- GIF images

PostScript PDL Filter Raster

The PostScript PDL raster producer takes a bitmap created by the PostScript PDL and feeds it to the Image Library pipeline. Translations can be added here as necessary to perform functions such as scaling or rotation. In general, this filter is used to feed one of the Image Library consumers.

PCL PDL Filter Raster

The PCL PDL raster producer feeds a bitmap produced by the PCL PDL filter to the Image Library pipeline. Additional filters can be added to the Image Library pipeline to perform scaling or rotation operations. In general, this filter is used to feed one of the Image Library consumers.

Image Library Consumers

The Image Library consumers read an image from an Image Library pipeline and formats it for a specific device PDL. Figure 5-1 shows the following consumers:

- X-Windows (as an X bitmap)
- TIFF files
- JFIF files

Postscript

The PostScript Image Library consumer generates Level 1 PostScript. Color information is mapped to the Level 1 PostScript color commands.

PCL

This consumer generates PCL 3 or PCL4+ code as directed by the printer configuration file. It prints up to the first 200 pages of the print request.

6

Extending SharedPrint/UX

This chapter describes the three ways that SharedPrint/UX can be extended:

- Adding Support For An Unsupported Printer
- Adding Support For A New Filter
- Modifying Default SharedPrint/UX Behavior

Adding Support For An Unsupported Printer

To add support for an unsupported printer to SharedPrint/UX, perform the following steps:

1. Write a new driver for the printer.

   This driver reads from standard input, writes to standard output, and sends error messages to standard error. The driver can choose to support any of the standard options or define some of its own. Place this driver in the **/opt/sharedprint/lbin** directory.

2. Modify the pipeline file **Pipeline.cf**, specifying filter paths for your new printer from each of the filetypes you expect to support.
3. Modify the **OptionsMap.cf** file to specify which options are supported by your driver.
4. Modify the **Options.cf** file if you defined any new options.
5. Modify the **Types.cf** file if you defined any new types for your driver.
6. Create a configuration file for your new printer.

Make a copy of an existing template that contains elements that are the most similar to your printer's capabilities; then, edit the copied template. The

important items are the *file_types* directive and the *driver* directive. The *file_types* directive tells SharedPrint/UX which file types this printer can handle. The *driver* directive should specify the driver you are creating or adding.

Adding Support For A New Filter

To add a new filter to SharedPrint/UX, perform the following steps:

1. Write a new filter if needed; see the Chapter 4 section, **Filter Design Needs**.
2. Modify the pipeline file **Pipeline.cf**. Specify a filter path for your new filter for each combination of input and output types.
3. Modify the **OptionsMap.cf** file, identifying which options are supported by your filter.
4. Modify the **Options.cf** file if you defined any new options.
5. Modify the **Types.cf** file if you defined any new types for your filter.

Modifying Default SharedPrint/UX Behavior

To modify the default behavior of SharedPrint/UX, perform the following steps:

1. Modify the pipeline file **Pipeline.cf**.

   Changing the order of the specifications may cause different filters to be used. For instance, if a printer supports PostScript and PCL, a text file can be printed by using the **txpcl** or **txps** filter. SharedPrint/UX uses the first specification encountered that performs the required translation.

2. Modify the printer configuration file.

   You can change any of the default parameters. The default parameters are those used by the filters and drivers if the user specifies no value. In addition, if the printer supports multiple types, changing the order of parameters can change which filter is used when multiple print paths are available.

7

Troubleshooting SharedPrint/UX

This chapter gives you information on what to do if problems occur during printing and on how to analyze error and debug pages.

What To Do . . .

This section tells you what to do if any of the following situations occur:

- If nothing appears on the printer.
- If Network Computing System (NCS) errors appear.
- If GUI performance problems occur.
- If performance slows on servers with network printers.
- If problems occur on PostScript printers.
- If the output is a "PostScript Not Installed" page.
- If problems occur on large format plotters.
- If problems occur on LaserJet printers.
- If PCL fonts or symbols print incorrectly.
- If the wrong file type is used.
- If you cannot print text in landscape mode.
- If you get an error message when printing from vuepad.

If nothing appears on the printer

If you send print requests, but nothing appears on the printer, use the following steps:

1. From the client system, check the print queue as follows:

   `$ lpstat -o`*printer_name*

   If `lpstat` displays a warning, such as `Warning` *printer_name* `is down`, skip to Step 2.

   If `lpstat` lists the print request in the queue, but the output does not eventually appear, check if the printer has the ONLINE button set to OFF or if it is out of paper.

2. On the client system, check if the scheduler is running:

   `$ lpstat -r`

   If the system displays `scheduler is running`, skip to Step 3. Otherwise, perform these steps:

   a. Login as root on the client system and start the scheduler as follows:

      `$ /usr/lib/lpsched`

   b. Check the printer status as follows:

      `$ lpstat -o`*printer_name*

   c. If the file is not in the printer queue, use these commands on the client system:

      ```
      $ disable printer_name
      $ enable printer_name
      $ lpstat -oprinter_name
      ```

   d. If `lpstat` still does not show the file in the printer queue, reissue the preceding commands on the server system.

   e. If `lpstat` still does not show the file in the printer queue, try Step 3.

3. Assuming you are using a printer attached to another system, check if your system (the client system) can contact the system with the printer (the server system) across the network. On the client system, use this command:

```
$ /etc/ping server_name  64 2
```

If this command issues information indicating 0% packet loss, the client can see the server. Skip to the Step 4.

If `/etc/ping` issues an error, or a message indicating 100% packet loss, the client cannot see the server. To see the server, the client must *either* have `named` enabled or must list the server in the `/etc/hosts` file. To correct this problem, use these steps:

a. On the client system, check if `named` is enabled as follows:

```
$ ps -e |grep named
```

If this command displays no output, `named` is *not* running. Skip to the step b.

If `named` appears in the output, as in the following example (and `/etc/ping` did issue an error), your network may be experiencing problems. See your network administration documentation.

```
$ ps -e |grep named
  110 ?     0:52 named
```

b. Search the file `/etc/hosts` for the name of the server as follows:

```
$ grep server_name /etc/hosts
```

If this command displays no output, make the client known to the server using step c.

If the command output shows the server name (and `/etc/ping` did issue an error), either the internet address in `/etc/hosts` is incorrect or the network may be experiencing problems. See your network administration documentation.

c. To make the client known to the server, use *either* of the following steps:

- On the client system, add the correct internet address and the server name to `/etc/hosts`. This is the quickest step.
- *Or*, on the client system, enable `named` using the man page for named. This solution provides the same results for using SharedPrint/UX, but also provides other systems with easier access to the client system.

  Check that the client can now see the server as follows:

```
$ /etc/ping server_name 64 2
```

If `/etc/ping` still issues an error, your network may be experiencing problems.

4. If `/etc/ping` issued *no* errors, use these commands on the client system:

```
$ disable printer_name
$ enable printer_name
$ lpstat -oprinter_name
```

5. If `lpstat` still does not show the file in the printer queue, perform these steps:

   a. Search the file `/etc/inetd.conf` for the following line:

```
#printer stream tcp nowait root /usr/lib/rlpdaemon rlpdaemon -i
```

   b. If the preceding line includes the `#` symbol as shown in column 1, remove this symbol.
   c. Save and exit this file.
   d. Enable the `rlpdaemon` by executing the command:

```
/etc/inetd -c
```

6. On the client system, use SharedPrint/UX to submit a new print request.

7. Check the print queue as follows:

```
$ lpstat -oprinter_name
```

8. If none of the preceding steps corrected the problem, reboot the client system and resubmit the print request.

If Network Computing System (NCS) errors appear

Use this procedure if selecting a printer in SharedPrint/UX results in a message with the following text: `Network Computing System` or `NCS`

1. If the SharedPrint/UX client is on a different system from the SharedPrint/UX server (the system with the attached printer you selected), check that the client can access the server. On the client, use this command:

```
$ /etc/ping server_system  64 2
```

   If this command issues information indicating 0% packet loss, the client can see the server. Skip to the Step 2.

If `/etc/ping` issues an error, or any message indicating 100% packet loss, the client cannot see the server. Network problems exist; see your network administrator documentation.

2. On the client and the server system, check that either NCS or DCE is correctly set up. (Refer to Appendix C for NCS. For DCE, refer to the HP DCE/9000 documentation.)

3. If the server is running and you still cannot print, check the **llbd** by issuing this command from the system with the printer attached.

   ```
   $ ps -e | grep llbd
   ```

   If this gives no output, perform these steps:

   a. Check the file `/etc/netncsrc` for the following line:

      ```
      START_LLBD=0
      ```

   b. If this line is included, change it to the following line:

      ```
      START_LLBD=1
      ```

   c. Start the llbd by entering this command:

      ```
      /etc/ncs/llbd
      ```

4. On the server system, issue the following command:

   ```
   $ ps -ef | grep spserver
   ```

   If the command output includes the text `/opt/sharedprint/bin/spserver`, kill the process. The following example illustrates this interaction.

   ```
   %  ps -ef | grep spserver
   root 180   1  0  Oct 13  ?  0:00 /opt/sharedprint/bin/spserver
   %  kill 180
   ```

   If the `ps -ef | grep spserver` command output does *not* include the text `/opt/sharedprint/bin/spserver`, perform these steps:

   a. Search the file `/etc/inittab` for this line:

      ```
      ShPr::respawn:/opt/sharedprint/bin/spserver
      ```

   b. If this line is absent, add it to the file.

   c. Start the SharedPrint/UX server using this command:

```
/opt/sharedprint/bin/spserver
```

5. On the system with the printer attached, use SharedPrint/UX to submit a print request.
6. If the print request succeeds, use the client system to submit the print request.
7. If SharedPrint/UX fails on the client system, but works on the server system, use `sam` to reinstall the remote printer.

If GUI performance problems occur

If SharedPrint/UX GUI is slow to respond, the cause may be that the print server software has failed. Such a failure results in an orphaned entry in the NCS global location database, which can cause delays in processing print requests.

To check if the server is no longer running, issue the following command:

```
/opt/sharedprint/bin/splistpr -check
```

If any entries show a – (minus sign) as shown in the following sample output, this indicates that this system may have failed or the print server software may no longer be running on it.

```
status machine_name
 +      node_a
 +      node_b
 -      node_c
 +      node_d
```

If you know one of these situations has occurred, you can correct the problem by issuing this command:

```
/opt/sharedprint/bin/splistpr -delete -ma machine-name
```

Caution Before issuing this command, be sure the system is not just temporarily offline. If the system comes back online after you issue this command, the server on it will be severely impaired and you will need to reboot that server.

The following example illustrates the use of the `splistpr` command.

```
$ /opt/sharedprint/bin/splistpr -check

status machine_name
 +      node_a
 +      node_b
 -      node_c
 +      node_d

One or more SharedPrint/UX servers are down.  If a
SharedPrint/UX server machine is operational, and there is
no spserver process on that machine, execute the command
splistpr -delete machine_name, where machine_name is the
name listed by splistpr -check

$ /opt/sharedprint/bin/splistpr -delete -ma node_c

SharedPrint/UX server removed from global database.

$ /opt/sharedprint/bin/splistpr -check

status machine_name
 +      node_a
 +      node_b
 +      node_d
```

If performance slows on servers with network printers

If performance slows on a server with a network printer, and you are printing images or PostScript files, the timeout value on the printer may need adjustment.

The manual provided with the printer describes how to adjust the timeout value on the network interface card in the printer. If the timeout value remains at the default setting, additional printing processes may be spawned every 90 seconds until the print request completes.

If you are printing images or PostScript documents with an output page size of D or larger, try 1800 as the timeout value.

If problems occur on PostScript printers

If problems occur when you print a full-page bitmap image on a PostScript printer, the printer may need more memory. Up to 2 MB of memory may be required.

If the output is a "PostScript Not Installed" page

This message indicates you do *not* have a PostScript option installed on one of these printers:

- HP LaserJet IIISi
- HP PaintJet XL300
- HP DesignJet 650C
- HP DeskJet 1200C

You need to modify the *file_type* definition in the *printer_name*.pcf file. Move the comment mark (#) on the first line to the second line:

```
#file_type=pcl5:hpgl2:pcl4:pcl3
file_type=pcl5:hpgl2:postscript:pcl4:pcl3
```

If problems occur on LaserJet printers

If you print full-page images or PostScript files on a LaserJet printer and a single-page output is split between two pages, the LaserJet may require more memory. Make sure the printer has 1 MB of memory.

If problems occur on large format plotters

If problems occur in printing images or PostScript documents on DesignJet or Electrostatic or other large format plotters, use these guidelines:

- If the print server shows excessive paging activity, you need to increase the amount of main memory on the server. At least 32 MB of main memory is needed for printing PostScript files or images over C size.

- If no output appears on the plotter or if you receive swap space errors, you need to increase the swap space on your system. See your HP-UX system administration tasks documentation.
- If you receive disk full error messages, the disk with the `/usr/spool/lp` directory has insufficient space for processing the print request. Consider moving `/usr/spool/lp` to a second disk and creating a link between the original and new `/usr/spool/lp` directories.

If PCL fonts or symbols print incorrectly

If some PCL print requests start using incorrect fonts or symbol sets, you may need to update some X11 Intellifont (AGFA) information. If a font or symbol set definition was added or removed from the system after installation of IMAGING-PCL, you must update the X11 information. To do so, issue this command:

```
/opt/sharedprint/lib/imaging/pcl/update_pcl_fonts
```

This script is executed automatically at installation of IMAGING-PCL, so you need to reexecute it only if you modify these font or symbol set definitions.

If the wrong file type is used

SharedPrint/UX can usually determine which type of file the user is attempting to print. However, in some cases, it fails to detect the file type or assigns an incorrect type. If the wrong output appears, see "Analyzing a debug page". Using the the debug page, you can determine if the assigned file type was incorrect. If so, resubmit the print request, using the *file_type* option on the Advanced Options window to set the input file type.

You cannot print text in landscape mode

For three printers, printing text in landscape mode requires that you set the margins listed in the table below.

Margin Settings

Printer	Top	Bottom	Left	Right
Tektronix 4693DX	0.2	0.2	1.7	1.7
Tektronix Phaser	0.2	0.2	1.7	1.7
HP DeskJet 500C	0.25	0.25	0.5	0.5

Analyzing Debug and Error Pages

SharedPrint/UX provides the following printing tools that help you analyze printing problems:

- A debug page, created with each print request.
- An error page, created only if printing fails.

Analyzing a debug page

Every print request creates a debug page, a page of information that shows how the print request was processed. This page is stored in a file named `/var/opt/sharedprint/debug.`*printername*.

If you want to print the debug page, reissue the `lp` command with the syntax you used plus the `PrintDebugPage` option as follows:

`lp -d`*printername* `-o" PrintDebugPage` *other-options*`" filename`

The following is a sample debug page in a `debug.`*printername* file. The meaning of each section of the page is described following the example.

```
=========================
Debug information for job pjxl-358
=========================
job owner = jones_c
options = -resolution 90
file(s) = /usr/spool/lp/request/pjxl/dA0358toast
title = four_files
Fri Jul 24 15:06:30 EDT 1992

printer file type(s) =
```

```
    pcl3xl
    pcl3+
    pcl3
JOB_OPTIONS -copies 1 -resolution 90 -orientation portrait
-papersize letter -top 0.25 -bottom 0.25
-left 0.25 -right 0.25 -tab 8 -charheight 10.0 -columns 1  -
wrap 1 -symbolset
ISO_100
-page_reversal 1 -collate_copies 1

processing " /usr/spool/lp/request/pjxl/dA0358toast"
file type = bitmap
pipeline = "ilFilter -p 3 -c 2 5 -resolution 90 -orientation
portrait
-papersize letter -top 0.25 -bottom 0.25 -left 0.25 -right
0.25 | pjxl.sh
-copies 1"
end of job
```

These lines identify the job id:

```
================
Debug information for job pjxl-358
================
```

This line identifies the job owner:

```
job owner = jones_c
```

This line shows the options passed to the `lp` command from this application:

```
options = -resolution 90
```

This line lists the files to be printed. In most cases, it is only one file:

```
file(s) = /usr/spool/lp/request/pjxl/dA0358toast
```

This line shows the filename:

```
title = four_files
```

This line identifies the date the print request was processed:

```
Fri Jul 24 15:06:30 EDT 1992
```

These lines list the file types supported by this printer. Other file types must be translated to one of these file types.

```
 printer file type(s) =
```

```
pcl3xl
pcl3+
pcl3
```

These lines show command line and printer configuration file options:

```
JOB_OPTIONS -copies 1 -resolution 90 -orientation portrait
-papersize letter -top 0.25 -bottom 0.25
-left 0.25 -right 0.25 -tab 8 -charheight 10.0 -columns 1
-wrap 1 -symbolset ISO_100
-page_reversal 1 -collate_copies 1
```

This line indicates which file is being processed by the print request:

```
processing "/usr/spool/lp/request/pjxl/dA0358toast"
```

This line shows the file type of the print request being processed.

```
file type = bitmap
```

These lines show the pipeline created by `print_model.sh` for this request:

```
pipeline = "ilFilter -p 3 -c 2 5 -resolution 90 -orientation portrait
-papersize letter -top 0.25 -bottom 0.25 -left 0.25 -right
0.25 | pjxl.sh
-copies 1"
```

This line indicates the end of the print request:

```
end of job
```

Analyzing an error page

If the print request fails, SharedPrint/UX also creates an error page. If the printer can print text files, it prints the error page instead of the file. If the printer cannot print text files, SharedPrint/UX saves the error page as `/var/opt/sharedprint/errorlog.`*printername*`.save`.

The following is a sample error page. The meaning of each section of the page is described following the example.

```
=================
Error page for job tp-376
=================
job owner = smith_b
options = -orientation portrait
file(s) = /usr/spool/lp/request/tp/dA0376toast
title = four_files
```

```
Mon Jul 27 14:29:30 EDT 1992

Can not determine a pipeline for this job .
/usr/spool/lp/request/tp/dA0376toast

=================
Debug information for job tp-376
=================
job owner = smith_b
options =
file(s) = /usr/spool/lp/request/tp/dA0376toast
Mon Jul 27 14:29:29 EDT 1992
printer file type(s) =
     teksx
JOB_OPTIONS -copies 1 -orientation portrait -papersize
letter -paperwidth 8.500000  -paperlength 11.000000 -top 0.5 -bottom 0.5
-left 1.0 -right 1.0 -tab 8 -charheight 10.0 -columns 1 -wrap 1 -symbolset ISO_100
-resolution 300 -page_reversal 0 -collate_copies 1

processing "/usr/spool/lp/request/tp/dA0376toast"
file type = pcl5
```

These lines identify the job id:

```
==================
Error page for job tp-376
==================
```

This line identifies the job owner.

```
job owner = smith_b
```

This line shows the options passed to the `lp` command by SharedPrint/UX:

```
options = -orientation portrait
```

This line identifies the file to be printed with this print request. In most cases, only one file is requested:

```
file(s) = /usr/spool/lp/request/tp/dA0376toast
```

This line shows the filename:

```
title = four_files
```

This is the date the job was processed:

```
Mon Jul 27 14:29:30 EDT 1992
```

These lines identify the error for the file:

```
Can not determine a pipeline for this print request.
```

```
/usr/spool/lp/request/tp/dA0376toast
```

The remaining lines provide the same debug information explained in "Analyzing a debug page".

A

SharedPrint/UX Printing Options

This appendix describes options under two headings:

- **The User Options** - the options that you can set either through the (Graphical User Interface) GUI or the `lp` command line.
- **Printer Configuration File Options** - the options that appear *only* in the printer's configuration file, not in the SharedPrint/UX GUI.

  These options contain the default values for the behavior of the printer. However, these defaults are overriden when you use the `lp` command.

How SharedPrint/UX Applies Options

SharedPrint/UX uses the following rules for applying options:

1. If the user sets an option, the user value takes precedence over that option's value in the printer's configuration file.
2. If the user omits a value for an option, the value in the printer configuration file is used.
3. If neither the user nor the configuration file supplies a value for an option, a value is assigned by the filters used to process the print request.

User Options

These options can be set either through the GUI or by using the `lp` command line, which has this format:

`lp -d`*printer* `-o" -`*option1 value1 -option2 value2 ... "*

For a given printer, these options can also be set in the printer configuration file (**/var/opt/sharedprint/***printer***.pcf**) on the server, the system with the printer. If an option does not apply to the current print request, it is grayed out on the GUI.

If you want to identify the file type, use the `-t` *filepathname.ext* option. For example,

`lp -d`*printer* `-t` *filepathname.ext* `-o" -`*option1 value1 -option2 value2 ... "*

The format for describing these options is:

option-name (abbreviation) *values*

- **banner (ban)** {**on, off**}

  Determines if a banner page is printed.

- **bgcolor (bg)** *string*

  Sets the background color for graphics print requests. No SharedPrint/UX filters use this option, but other filters can be created to use it.

- **bitmapplane (bmp)** *integer*

  Determines the bitmap plane to be printed when only a single plane is to be printed. The default is to print a full-depth bitmap. No SharedPrint/UX filters use this option, but other filters can be created to use it.

- **bottom_margin (bottom, bm)** *real-number*

  Sets the bottom margin in inches for text and graphics print requests.

- **charheight (point, ch)** *real-number*

  Sets the character height for text files.

- **charweight (weight, cw)** *integer*

  Sets the character weight of text to a point size between −7 (a thin weight and +7 (a thick weight).

- **copies (cop)** *integer*

  Sets the number of copies to be printed.

- **columns (cpl, columns_per_line, col_per_line)** {**1, 2, 4**}

  Sets the page make-up to a single column (1), double column (2), or four-column format (4). Note that no SharedPrint/UX filters use the 4-column format, but other filters can be created to use it.

- **duplex (du)** {**long, short, off**}

  Determines if the printer prints on both sides of the paper, using long-edge or short-edge binding, or prints on only one side (off).

- **fgcolor (fg)** *string*

  Sets the foreground color of graphics print requests. No SharedPrint/UX filters use this option, but other filters can be created to use it.

- **fixedspacing (fs)** {**on, off**}

  If on, uses fixed spacing for text.

- **file_type (ftype)** *string*

  Tells the print request to use the file type that you enter rather than allowing SharedPrint/UX to detect the file type. For a list of file types, see the **/opt/sharedprint/lib/config/Types.cf** file on the server.

- **filter_pipe (fpipe)** *string*

  Identifies a filter that overrides the default processing performed by SharedPrint/UX. This option is primarily intended to invoke filters that have been added to SharedPrint/UX.

- **fit_to_page (ftp, fitpage)** {**on, off**}

  If **on**, scales the graphic print request to the maximum size that completely fits on the page. If **off**, no scaling is performed, meaning that each pixel in the file is printed as one pixel on the page.

- **footer (foot, foot_string)** *left-string/center-string/right-string*

  Places the text string you supply at the bottom of each page. This string can include any of the characters defined for **header**.

- **gamma (ga)** *real-number*

  Sets the gamma correction value. To darken the image, use a number between 1 and 0; to lighten it, use a number higher than 1.

- **header (head, head_string)** *left-string/center-string/right-string*

  Places the text string you supply at the top of each page. The following special characters return the values indicated when they are included in this string:

#	page number
*	literal space
%	date job is printed
!	filename (Requires the -t*filename* option of `lp`)
\	escape character

  For example, this command prints pages using a header of the filename on the left, **Page** followed a space and the page number in the middle, and the date on the right.

  ```
  lp -dLJet -tworksheet1 -o"-header !/Page*#/%" worksheet1
  ```

  For example, the first page might have the following header:

  ```
  worksheet1          Page 1            Tue Aug 31 17:52:04 1993
  ```

- **italic (it)** {**1, 0**}

  If 1, prints text files using an italic font.

- **left (lm, left_margin)** *real-number*

  Sets the left margin in inches for text and graphics print requests.

- **lines_per_inch (lpi)** *real-number*

  Sets the number of lines per inch. The default value depends on the point size of the font.

To print text documents that are formatted for 66 lines per page, set the following options:

- lpi 6.3
- wrap off
- top_margin 0.25
- bottom_margin 0.25

- **nobgcolor (nobg)** {**on, off**}

  If on, sets the background color to white.

- **orientation (or, orient)** {**landscape, portrait**}

  Determines the orientation of the page. **portrait** prints the text or x-axis of the bitmap parallel to the short edge of the paper. **landscape** prints the text or x-axis of the bitmap parallel to the long edge of the paper.

- **paperlength (pl)** *real-number*

  Sets the length of the page in inches, if you set papersize to variable.

- **papersize (psize)** {**variable, letter, legal, b, c, d, e, a3, a4, a5, b3, b4, b5**}

  Sets the paper size to one of these sizes:

variable	lets you set the size by paperlength and paperwidth
letter	8.50 by 11.00 inches
legal	8.50 by 14.00 inches
b	11.00 by 17.00 inches
c	17.00 by 22.00 inches
d	22.00 by 34.00 inches
e	34.00 by 44.00 inches
a3	11.69 by 16.54 inches (297mm by 420mm)
a4	8.27 by 11.69 inches (210mm by 297mm)
a5	5.38 by 8.27 inches (137mm by 210mm)
b4	9.84 by 13.90 inches (257mm by 364mm)
b5	5.93 by 9.89 inches (182mm by 257mm)

- **papersource (psrc, psource)** {**upper, lower, manual**}

  Feeds paper from the upper tray, lower tray, or feeds paper manually.

- **paperwidth (pw)** *real-number*

  Sets the length of the page in inches, if you set papersize to variable.

- **pitch (pi, charspace)** *real-number*

  Sets the number of characters printed per (horizontal) inch. This value is used only if **fixedspacing** is set to **on**.

- **pixelexp (pex)** *integer*

  Determines the size of the printed image:

  - To enlarge the image - Enter a number greater than 1.
  - To shrink the image - Enter a number between 1 and 0.
  - To fill the page - Enter 0 or select `Best Fit on Paper`.
  - To print unchanged - Enter 1 or leave blank.

- **print_quality (pq, printqa)** *integer*

  Sets the output quality. Enter an integer between 0 and 100, using 0 for draft quality (to save toner) and 100 for professional quality.

- **resolution (res)** *real-number*

  Sets the resolution of the page in dots per inch (dpi). The default is 300 dpi.

- **raw** {**on, off**}

  Submits the file to the requested printer, ignoring all other options.

- **right_margin (rm, right)** *real-number*

  Sets the right margin in inches for text and graphics print requests.

- **start_pos (spos, startpos)**{**on, off**}

  If set to **on**, positions the graphic at the top left margin. If set to **off**, centers the graphic on the page.

- **symbol_set (ss, symbolset)** *string*

  Sets the character set mapping, defining how character codes are mapped to symbol shapes. For character sets you can use, see the configuration file for this printer.

- **tabs (tab, tabspace)** *integer*

Sets the number of spaces between tabs.

- **top_margin (tm, top_margin)** *real-number*

  Sets the top margin in inches for text and graphics print requests.

- **typeface (tf)** *string*

  Set the typeface for text files to one supported by this printer. For typefaces you can enter, see the configuration file for this printer.

- **wrap (wr)** {**on, off**}

  If on, wraps lines that exceed the right margin. If off, truncates lines that exceed the margin.

Printer Configuration File Options

The following options can be set in the printer configuration file, but do *not* appear in the SharedPrint/UX GUI. They contain the default values for the behavior of the printer.

However, these default values can be overriden by using the `lp` command line, which has this format:

`lp -d`*printer* `-o" -`*option1 value1 -option2 value2 ...* `"`

The format for describing these options is:

option-name (abbreviation) *values*

- **collate_copies (cc)** {**on, off**}

  If on, collates a multi-page, multi-copy document.

- **driver** *string*

  Identifies the driver to use.

- **front_banner (fb)** *string*

  Uses the banner program named for printing a banner page at the beginning of a job.

- **media_type (mt, media)** *string*

  Identifies the type of media that is loaded in the printer/plotter.

- **page_reversal (pr){on, off}**

  If on, reverses the order of text page output.

- **pen_color (pc)** *string*

  Sets the pen colors loaded in the pen plotter for graphics print requests. The format is *color1:color2:color3... color8* where:

  color*n* is the pen color loaded in carousel slot number *n*. Use the following values for color. (Except for red-violet, they are first three letters of the color.)

aqu	aqua
bla	black
blu	blue
bro	brown
gre	green
ora	orange
red	red
rdv	red-violet
vio	violet
yel	yellow

- **rear_banner (rb)** *string*

  Uses the banner program for printing a banner page at the end of a job.

B

CGM Support

This appendix defines the support for CGM to HP-GL/2 conversion under these topics:

- Starbase and HP-PHIGS CGM Generators
- CGM Element Bounds

Starbase and HP-PHIGS CGM Generators

The following list contains the CGM elements supported by the **cgmhpgl2** (CGM to HP-GL/2) filter. This list represents the CGM elements emitted by the StarBase and HP-PHIGS CGM generators.

- 0 1 BEGIN METAFILE
- 0 2 END METAFILE
- 0 3 BEGIN PICTURE
- 0 4 BEGIN PICTURE BODY
- 0 5 END PICTURE
- 1 1 METAFILE VERSION
- 1 2 METAFILE DESCRIPTION
- 1 3 VDC TYPE
- 1 4 INTEGER PRECISION
- 1 5 REAL PRECISION
- 1 6 INDEX PRECISION

- 1 7 COLOR PRECISION
- 1 8 COLOR INDEX PRECISION
- 1 11 METAFILE ELEMENT LIST
- 2 1 SCALING MODE
- 2 2 COLOR SELECTION MODE
- 2 3 LINE WIDTH SPECIFICATION MODE
- 2 5 EDGE WIDTH SPECIFICATION MODE
- 2 6 VDC EXTENT
- 3 2 VDC REAL PRECISION
- 3 5 CLIP RECTANGLE
- 3 6 CLIP INDICATOR
- 4 1 POLYLINE
- 4 7 POLYGON
- 4 8 POLYGON SET
- 4 10 GENERALIZED DRAWING PRIMITIVE
- 4 12 CIRCLE
- 4 15 CIRCLULAR ARC CENTER
- 5 2 LINE TYPE
- 5 3 LINE WIDTH
- 5 4 LINE COLOR
- 5 22 INTERIOR STYLE
- 5 23 FILL COLOR
- 5 24 HATCH INDEX
- 5 27 EDGE TYPE
- 5 28 EDGE WIDTH
- 5 29 EDGE COLOR

- 5 30 EDGE VISIBILITY
- 5 34 COLOR TABLE

CGM Element Bounds

The following are the specific CGM element bounds:

VDC TYPE	0, 1
INTEGER PRECISION	16
REAL PRECISION	0 9 23 32-bit floating-point
INDEX PRECISION	8
COLOR PRECISION	8
COLOR INDEX PRECISION	8
METAFILE ELEMENT LIST	-1 1 Drawing plus Control Set
SCALING MODE	0, 1
LINE WIDTH SPECIFICATION MODE	0, 1
EDGE WIDTH SPECIFICATION MODE	0, 1
VDC EXTENT	VDC values: 0 - 32767, 0.0 - 32767.0
VDC REAL PRECISION	0 9 23 32-bit floating-point
CLIP RECTANGLE	VDC values: 0.0 - 32767.0
CLIP INDICATOR	0, 1
POLYLINE	2-1024 points VDC values: 0 - 32767, -32767.0 - 32767.0

POLYGON	3-1024 points VDC values: 0 - 32767, -32767.0 - 32767.0
POLYGON SET	3-1024 points VDC values: -32767.0 - 32767.0
GENERALIZED DRAWING PRIMITIVE	gdp-id: -100 0-1024 points VDC values : -32767.0 - 32767.0 datarecord contents : 0-1024 4-byte integer values : 0 - 16
CIRCLE	VDC values: 0 - 32767, -32767.0 - 32767.0
CIRCLULAR ARC CENTER	VDC values: 0 - 32767, -32767.0 - 32767.0
LINE TYPE	1 - 5
LINE WIDTH	1 - 32767, 0.0 - 32767.0
LINE COLOR	0 - 255
INTERIOR STYLE	0, 1, 3, 4
FILL COLOR	0 - 255
HATCH INDEX	3, 4
EDGE TYPE	1 - 5
EDGE WIDTH	1 - 32767, 0.0 - 32767.0
EDGE COLOR	0 - 255
EDGE VISIBILITY	0, 1
COLOR TABLE	0, 127 start index

C

Meeting NCS or DCE Requirements

SharedPrint/UX depends on either Network Computing System (NCS) or HP DCE/9000. This appendix is provided for network administrators who have *not* set up NCS in the standard manner or have *not* set up HP 9000/DCE to accommodate SharedPrint/UX.

- If HP DCE/9000 is set up, use the following section to have it work with SharedPrint/UX.
- If NCS is set up, SharedPrint/UX will work with no changes. If you don't know if NCS is set up, see the section "Checking the NCS Setup."

Meeting HP DCE/9000 Requirements

If you want to have both SharedPrint/UX and HP DCE/9000 on your network, perform these steps to have them work together:

1. Use these steps to stop the SharedPrint/UX server:
   a. Find the PID for the `spserver`. Type:

      ```
      ps -ef|grep spserver
      ```

   b. Kill the `spserver`. Type: `kill -KILL` *PID*
   c. Edit the `/etc/inittab` file as follows:
      i. Add a `#` (pound symbol) at the start of this line:

      ```
      Shpr:: "/opt/sharedprint/bin/spserver"
      ```

      ii. Save and exit the file.

2. To have DCE also work with the HP-UX Audio server (another NCS-based application) you need to stop it also; at later step shows you how to restart it. Use these steps to stop the Aserver:

   a. Find the PID for the `Aserver`. Type:

      ```
      ps -ef|grep Aserver
      ```

   b. Of the two processes displayed, remove the lower-numbered PID. Type:
      `kill` *PID*

   c. To check if both processes were killed, type:

      ```
      ps -ef|grep Aserver
      ```

   d. If one process still exists, remove it by typing:
      `kill -KILL` *PID*

3. Stop `glbd` (via `drm_admin` "stop ") if it is running.

4. Stop `llbd` (via `kill(1)`).

5. Configure HP DCE/9000 as needed, using the DCE/9000 Release Notes in the following files:

   ```
   /opt/dce/newconfig/RelNotes/HPDCE1.3RelNotes.ps
   /opt/dce/newconfig/RelNotes/HPDCE1.3RelNotes.txt
   ```

6. Run `/etc/rc.config.d/ncs` to restart NCS daemons.

7. Restart the SharedPrint/UX and Audio servers as follows:

   ```
   /opt/sharedprint/bin/spserver
   /opt/audio/bin/Aserver -f
   ```

8. Edit the `/etc/inittab` file to add this line (*or*, if the line already exists, remove the `#`):

   ```
   Shpr:: "/opt/sharedprint/bin/spserver"
   ```

Checking the NCS Setup

Use this procedure to check if you already have one or more glbd daemons running on your network:

1. Log on to any SharedPrint/UX server or client machine as root.
2. Be sure that NCS/NCK (the Network Computing Kernel) is installed on all the system as follows:
   a. Check for the existence of the file `/usr/sbin/ncs/glbd`. If this file exists, you can assume that NCK has been installed.
   b. If NCK is not installed, install it from your HP-UX installation media. You will need the NCSNCK-RUN fileset from the NETWORKING partition and the NCSNCK-MAN fileset from the REFERENCEDOC partition.
3. Enter the following command:

   ```
   /opt/sharedprint/bin/splistpr -glbd
   ```

   If you receive a "communications failure" error message, use the next section "Choosing Systems to Run glbd" to set up NCS. If no error appears, NCS is correctly set up.

Choosing Systems to Run glbd

You need to run at least one `glbd` to service all the SharedPrint/UX servers within the network. However, if you have a large network, you should increase the chance that at least one daemon is available at all times, by running `glbd` on at least *two* systems.

When choosing systems, be sure that each SharedPrint/UX server is able to communicate (via TCP/IP) with at least one host that is running `glbd`. If you have TCP/IP running within your network, you should have no problem finding systems on which to run `glbd`; TCP/IP provides the underlying communications mechanism for NCS.

The following guidelines give additional suggestions for selecting systems on which to run `glbd`:

- The systems running the NCS daemons should be stable; they should not be systems that are frequently taken down or unavailable.
- If you already have designated "server" systems within your network, these systems are generally good candidates for the `glbd` daemon. These server systems could be file servers, print servers, mail hubs, or diskless servers.
- Take into account the layout of your network. If your network consists of multiple segments connected to a backbone, it is a good idea to place a `glbd` server on a system within each of these segments. This will allow software running on machines within a segment to access a `glbd`, if the backbone or other segments of the network are unreachable.

Once you have selected systems to run the `glbd` daemon, use the following guidelines to choose which procedure to follow.

Single LAN

If your site consists of a single local area network, perform these procedures to set up NCS:

1. Perform "Starting the First glbd Daemon" to start the first `glbd` on a network.
2. If you want to set up additional `glbd`s, continue with "Starting Additional glbds".

Multiple LANs

If your site consists of multiple local area networks, each local area network needs a `glbd`. For each local area network, perform these procedures:

1. Perform "Checking the NCS Setup" to see if a `glbd` is running.
2. If no `gbld` is running, perform "Starting the First glbd Daemon" to start the first `glbd`.
3. Once a `glbd` is running on the network, perform "Starting Additional glbds" if you want to start subsequent `glbd`s as replicas of the first `glbd`. A replica `glbd` is useful in case the first `glbd` somehow becomes unavailable.

Starting the First glbd Daemon

After choosing systems to run `glbd`s from the preceding section, use the following procedure to start `glbd`.

1. For use later in this procedure, write down the names and internet addresses of the hosts that will run `glbd` daemons.
2. Be sure that NCS/NCK (the Network Computing Kernel) is installed on all the systems where you plan to run `glbd` as follows:
   a. Check for the existence of the file `/usr/sbin/ncs/glbd`. The following example shows the contents of an `/usr/sbin/ncs` directory:

      ```
      % ls /usr/sbin/ncs
      drm_admin lb_admin  perf     uuid_gen
      glbd     lb_test   stcode
      ```

      If this file exists, you can assume that NCK has been installed.

   b. If NCK is not installed, install it from your HP-UX installation media. You will need the NCSNCK-RUN fileset from the NETWORKING partition and the NCSNCK-MAN fileset from the REFERENCEDOC partition.
3. On each host that will run `glbd`, use the following steps, which describe how to show if the NCS local location broker daemon (`llbd`) is running, then how to start it if not running.
   a. Use the `ps` command to see if `llbd` is currently running. (If the daemon is running, the output from `ps` will show the `llbd` process; if `llbd` is not running, `ps` will not display any output.)

      The following example shows typical output from `ps` when `llbd` is running.

      ```
      % ps -e | grep llbd
       11626 ?      2:11 llbd
      ```

   b. If `llbd` is not running, issue the `llbd` startup command, and verify that the daemon has started as shown in this example.

```
% /usr/sbin/ncs/llbd
% ps -e | grep llbd
 11628 ?      0:00 llbd
```

c. Perform the following steps to automate the `llbd` and `glbd` startup processes, so that they restart whenever the host is rebooted:

   i. Open the `/etc/rc.config.d/ncs` file
   ii. Check that the `START_LLBD` variable is set to 1. If it's set to 0, edit the file to change the value to 1.
   iii. Check that the `START_GLBD` variable is set to 1. If it's set to 0, edit the file to change the value to 1.
   iv. Save and exit this file.

d. Make sure that the following lines are in the file `/etc/netlinkrc`. If these lines are missing, add them to the end of the `/etc/netlinkrc` file.

```
if [ -f /etc/rc.config.d/ncs ]
then
  /etc/rc.config.d/ncs
fi
```

4. On one of the hosts that will run `glbd`, start the first `glbd` daemon by doing the following:

   a. Become root.

   b. Start the `glbd` daemon using the `-create`, `-first`, and `-family ip` options and verify that the daemon has started. For example,

```
# /usr/sbin/ncs/glbd -create -first -family ip
# ps -e | grep glbd
 11630 ?      0:00 glbd
```

   c. Verify that you can communicate with the `glbd` daemon using the following steps and example:

      i. Start the NCS utility `drm_admin`. (You can run `drm_admin` from any host where NCS/NCK is installed.)

ii. Set the default `glbd` to be the one you just started. To specify a `glbd` host on HP-UX, use a name with the form `ip:`*host*. For *host*, use either a network address (preceded by a # sign) or a system name.

The following example shows how to start `drm_admin` and set the default `glbd` to the daemon running on the host `ip:mars`.

```
# /usr/sbin/ncs/drm_admin
drm_admin: set -o glb -h ip:mars
   Default object: glb default host: ip:mars state: in service

    Checking clocks of glb replicas
    ip:mars     1992/07/14.15:38
drm_admin: quit
#
```

5. Start additional `glbd`s by performing "Starting Additional glbds", if you want an extra `glbd`.

Starting Additional glbds

An additional `glbd` daemon is useful in case the first `glbd` somehow becomes unavailable. If you want more than one `glbd` daemon, start the additional daemons by following these steps.

1. Be sure that NCS/NCK (the Network Computing Kernel) is installed on all the systems where you plan to run `glbd` as follows:

   a. Check for the existence of the file `/usr/sbin/ncs/glbd`. The following example shows the contents of an `/usr/sbin/ncs` directory:

   ```
   % ls /usr/sbin/ncs
   drm_admin     lbcm_cache_dir uuid_gen
   glbd        llbd        uuidname.txt
   lb_admin      perf
   ```

   If this file exists, you can assume that NCK has been installed.

b. If NCK is not installed, install it from your HP-UX installation media. You will need the NCSNCK-RUN fileset from the NETWORKING partition and the NCSNCK-MAN fileset from the REFERENCEDOC partition.

2. On each host that will run `glbd`, use the following steps, which describe how to show if the NCS local location broker daemon (`llbd`) is running, then how to start it if not running.

   a. Use the `ps` command to see if `llbd` is currently running. (If the daemon is running, the output from `ps` will show the `llbd` process; if `llbd` is not running, `ps` will not display any output.)

      The following example shows typical output from `ps` when `llbd` is running.

```
% ps -e | grep llbd
 11626 ?     2:11 llbd
```

   b. If `llbd` is not running, issue the `llbd` startup command, and verify that the daemon has started as shown in this example.

```
% /usr/sbin/ncs/llbd
% ps -e | grep llbd
 11628 ?     0:00 llbd
```

3. Perform the following steps to automate the `llbd` and `glbd` startup processes, so that they restart whenever the host is rebooted:

   a. Open the `/etc/rc.config.d/ncs` file

   b. Check that the `START_LLBD` variable is set to 1. If it's set to 0, edit the file to change the value to 1.

   c. Check that the `START_GLBD` variable is set to 1. If it's set to 0, edit the file to change the value to 1.

   d. Save and exit this file.

4. Make sure that the following lines are in the file `/etc/netlinkrc`. If these lines are missing, add them to the end of the `/etc/netlinkrc` file.

```
if [ -f /etc/rc.config.d/ncs ]
then
  /etc/rc.config.d/ncs
fi
```

5. Verify that the clocks on each `glbd` host are within two minutes of each other. If the clocks are skewed (that is, if they are not within two minutes of each other), reset the clocks. Use the `date` command to check the system clock and reset it, if necessary.

```
% date
Tue Jul 14 15:40:47 EDT 1992
```

   In general, when you synchronize skewed clocks, you should move the time on the slower clock forward.

6. Become root and start the additional `glbd` daemons on the appropriate hosts, using the `-create` and `-from` options. Specify the `glbd` host whose copy of the database will be used to initialize the new database. After you start `glbd`, use the `ps` command to verify that the daemon started successfully.

   The following example shows how to start a `glbd` by initializing its database from the `glbd` database on the host `ip:mars`. The example also shows how to verify that the daemon process exists.

```
# /usr/sbin/ncs/glbd -create -from ip:mars
# ps -e | grep glbd
 11632 ?     0:00 glbd
```

7. Verify that you can communicate with each newly started `glbd`, by using the `drm_admin` utility, setting the default to a `glbd` that you just started.

   The following example sets the default `glbd` to a newly started daemon on `ip:pluto` and then to a newly started daemon on `ip:saturn`. Note

that the output also indicates whether the clocks on the the `glbd` hosts are synchronized. (You'll receive a warning if the clocks are skewed.)

```
# /usr/sbin/ncs/drm_admin
drm_admin: set -o glb -h ip:pluto
   Default object: glb default host: ip:pluto state: in service

   Checking clocks of glb replicas
   ip:pluto     1992/07/14.15:45
   ip:saturn    1992/07/14.15:45
   ip:mars      1992/07/14.15:45
drm_admin: set -o glb -h ip:saturn
   Default object: glb default host: ip:saturn state: in service

   Checking clocks of glb replicas
   ip:saturn     1992/07/14.15:45
   ip:pluto      1992/07/14.15:45
   ip:mars       1992/07/14.15:45
drm_admin: quit
```

Index

A

architecture, 1-7, 4-1
automating glbd startup, C-7
automating llbd startup, C-6, C-8

C

CGM, B-1
client, 1-7
command line access
  to GUIs, 3-2
configuration files, 4-12, 4-14

D

DCE, C-1
debug page, 7-10
drivers
  creation of, 4-14
drm_admin, C-6
drm_admin utility
  verifying glbd communication, C-7, C-10

E

error page, 7-12
/etc/hosts, 7-3
/etc/netlinkrc file, C-6, C-9
/etc/rc.config.d/ncs file, C-6, C-9

F

filesets
  for NCS, C-3
file type, 7-9
file types
  supported, 1-3
filters
  adding support, 6-2
  CGM, 5-6
  formatters, 5-1
  Image Library, 5-9
  PDL, 5-7
  supported, 5-2
  text, 5-2
  translators, 5-1

G

glbd, C-3, C-5, C-7
  how to start:a second daemon, C-9
  how to start:the first daemon, C-6
  startup script for, C-7

H

HP DCE/9000, C-1
HP-PHIGS, B-1

I

Image Library
  consumers, 5-11
installation
  checking:ncs, C-3, C-5, C-7

L

landscape mode, 7-9
llbd
  startup script for, C-6, C-8

N

NCK, C-5
NCS, 7-4, C-3, C-5
netlinkrc file, C-6, C-9
network printer performance, 7-7

P

PCL Font problems, 7-9
plotters, 7-8
postscript printers, 7-8
printers
  adding support, 6-1
  configuration files, 4-12, 4-14
  troubleshooting, 7-1
printers and plotters supported, 1-6
print_model.sh
  arguments, 4-3
  program flow, 4-4
  purpose of script, 4-3

S

sam, 7-6
server, 1-7
SharedPrint/UX
  architecture, 1-7, 4-1
  client, 1-7
  extending, 6-1
  features, 1-1
  file types supported, 1-3
  Manager, 3-3
  printer and plotters supported, 1-6
  server, 1-7
  starting at the command line, 3-2
Starbase, B-1
START_LLBD variable, C-6, C-8
startup script
  for glbd, C-7
  for llbd, C-6, C-8

T

TIFF support, 1-5
troubleshooting
  fonts, 7-9
  performance problems, 7-6
  plotters, 7-8
  printers, 7-7, 7-8
  SharedPrint, 7-1–14