XFree86 and DPS

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1. Introduction

Display Postscript (or DPS for short) is a rendering extension for X11. DPS is slightly atypical in that it is based on *code mobility*, the ability to send executable code from client to server. Thus, a DPS client does not request that a line should be rendered; instead, it uploads code to the server which, when executed, causes a line to be drawn.

This document does not aim at teaching programming with DPS; it is only a summary description of the DPS support code included with XFree86. More information about DPS, including a DPS bibliography, is available from the DPS extension site `<URL:http://dps.sourceforge.net>`.

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As all X11 extensions, DPS consists of client-side and server-side components. The DPS client side consists of a number of libraries and a number of tools for programming and configuration. The DPS server side may consist either of an X server extension, or of a client-side process known as the ''DPS agent.'' In this latter case, the term ''server-side'' is somewhat misleading.

At the time of writing, only the client side is included with XFree86; the server side must be obtained separately. Please see *server side* (section 3., page 2) later in this document for more information.

2. The DPS client side

The DPS client side consists of four libraries and a number of basic tools for programming and configuration; these are all included with XFree86.

2.1 Libraries

The `libpsres` library is a library for management of *PostScript resources*, on-disk files representing PostScript data structures such as fonts, font encodings, procsets, *etc.* It is closely related to the `makepsres` tool (see *client-side tools* (section 2.2, page 2) later in this document).

The basic DPS client library is `libdps`. This library contains a number of functions for connection establishment, resource management, as well as stubs for all standard PostScript operators. Normally, all DPS clients should link with `libdps`; in addition, `libdps` may be used for printing by non-DPS clients (this is done, for example, by Sun's JDK). This library is documented in [CLRM] and [CLSX].

The `libdpstk` library contains a number of additional utilities for managing DPS contexts, user paths and user objects, and for previewing EPS files. It is documented in [DPTX].

The `libdpstkXm` library contains four Motif widgets. The *DPS Scrolling Widget* is a DPS drawing area that automatically manages issues such as scrolling, scaling, client-side backing store, incremental redisplay, *etc.* The *Font Selection Box*, and its associated *Font Preview*, present a convenient and powerful interface for choosing scalable fonts. Finally, the *Color Picker* presents an interface for choosing colours using either of the RGB or HSV spaces. The latter three widgets are documented in [DPTX]; some summary Scrolling Widget documentation is available in the `doc` subdirectory of the `DPS.tar.gz` file, available from `<URL:ftp://dps.sourceforge.net/pub/dps/DPS.tar.gz>`.

The source code for `libdpstkXm` is included with XFree86; however, as it depends on Motif, this library is not built by default. A GTK-based library providing some of the functionality of `libdpstkXm` is available from the gtkDPS site `<URL:http://www.gyve.org/gtkDPS/>`.

2.1.1 Libdps and Xt

In X11R5, `libdps` did not depend on `libXt`. In X11R6, however, code was added to make the Xt main loop dispatch to sundry code on DPS events; with this addition, all programs that link with `libdps` need to link with `libXt`, whether they use Xt or not.

This state of affairs is unfortunately true of the version of `libdps` included with XFree86. We are currently considering various solutions to this problem (including the use of weak linker symbols or splitting off the guilty functions into a separate library).

2.2 Client-side tools

In addition to the libraries, the client side of DPS consists of two utilities.

The `makepsres` utility is used for managing PostScript resources. Its basic operation consists in walking recursively a filesystem tree, noting all resources, and then writing out a ''Unix PostScript Resources,'' file, basically a directory of all the resources found. This utility is documented in the makepsres(1) manual page.

The `pswrap` utility is a stub generator for PostScript clients. Roughly speaking, it takes as its input textual PostScript code, and generates a collection of C functions that transmit that code in pre-tokenised form to the DPS extension. `Pswrap` is documented in [PSWRAP].

2.3 Sample clients

XFree86 contains three sample DPS clients, `dpsinfo`, `dpsexec` and `texteroids`. They are documented in their respective manual pages.

A number of sample clients that depend on Motif are available in `<URL:ftp://dps.sourceforge.net/pub/ftp/DPS.tar.gz>`. Additional sample clients can be found as part of GtkDPS (see above).

The GNUstep environment can be compiled to use DPS for all rendering; for more information, please see the GNUstep site `<URL:http://www.gnustep.org>`.

3. The DPS server side

In order to use DPS clients, you need to install a DPS server side, which can be either a server extension (a ''DPS/X extension''), or a separate process (referred to, variously, either as a ''DPS/NX agent'' or, rather confusingly, as ''Client-Side DPS'' (CSDPS).

3.1 Display Ghostscript

Display Ghostscript (note the capitalisation), or DGS, is a client-side implementation of DPS based on the Ghostscript PostScript interpreter. DGS is still in beta at the time of writing; it does, however, provide a very usable implementation of DPS, although it still has some problems with the semantics of multiple DPS contexts.

DGS is available from the GNUstep download area <URL:http://www.gnustep.org/resources/sources.html>.

3.2 The DPS extension

The DPS extension is a much younger project aiming at producing an efficient server-side implementation of DPS. The extension is currently in a state best described as alpha; current versions are known to crash the X server under some circumstances.

The DPS extension is available from the DPS extension site <URL:http://dps.sourceforge.net>.

4. References

Links to electronic versions of all of these, and more, are available from the DPS extension site <URL:http://dps.sourceforge.net>.

[PLRM2] PostScript language reference manual. Adobe Systems, 2nd ed. Addison-Wesley, 1990. ISBN 0-201-18127-4.

[PLRM] PostScript language reference. Adobe Systems Incorporated, 3rd ed. Addison-Wesley, 1999. ISBN 0-201-37922-8.

[INTRO] Display PostScript System. Introduction: Perspective for Software Developers. 15 April 1993.

[CLRM] Display PostScript System. Client Library Reference Manual. 15 April 1993.

[CLSX] Display PostScript System. Client Library Supplement for X. 15 April 1993.

[DPTX] Display PostScript System. Display PostScript Toolkit for X. 15 April 1993.

[PSWRAP] Display PostScript System. pswrap Reference Manual. 15 April 1993.

CONTENTS

`$XFree86: xc/programs/Xserver/hw/xfree86/doc/sgml/dps.sgml,v 1.2 2003/01/20 03:43:07 dawes Exp $`