

# X and DPS

**Juliusz Chroboczek**

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Updated by Jim Gettys and Juliusz Chroboczek.

## 1. Notice of Obsolescence and Removal from X.Org Releases

DPS is now obsolete.

At the time when I started this project, there was no decent rendering interface for X11 other than DPS.

Since then, there has been a large amount of work on a simple and clean X server extension, Xrender, which provides the basis for just such an interface.

Rendering libraries that are being built above Xrender include Xft, a font rendering library built on FreeType; Cairo, a geometry rendering library that provides PostScript-like rendering primitives but with from-the-ground support for Porter-Duff compositing (transparency); Pango, a high-level typesetting library.

If your application uses DPS, please consider porting it to the above libraries. See the DPS extension site (<http://dps.sourceforge.net>) for more details

The client-side DPS software is included and built by default (except as noted below) in the X.Org X11R6.8 release series. The client-side software will be included, but not built unless specifically configured by the builder, in the X.Org X11R6.9 release series. Most of the client-side DPS software is no longer included in X11R7.0 or later releases.

The server-side software is not included in any X.Org release for licensing reasons; the code is still available from the DPS extension site (<http://dps.sourceforge.net>); it is not known whether it still compiles.

## 2. 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 X11R. More information about DPS, including a DPS bibliography, is available from the DPS extension site (<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 X11R; the server side must be obtained separately. Please see server side later in this document for more information.

## 3. 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 X11R.

### 3.1. 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 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 <65533> (<ftp://dps.sourceforge.net/pub/dps/DPS.tar.gz>).

The source code for `libdpstkXm` is included with X11R; 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 (<http://www.gyve.org/gtkDPS/>).

### 3.1.1. 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 X11R. 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).

## 3.2. 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)` (`makepsres.1.html`) 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].

### **3.3. Sample clients**

X11R 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 <65533> (<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 (<http://www.gnustep.org>).

## **4. 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)).

### **4.1. 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 (<http://www.gnustep.org/resources/sources.html>).

### **4.2. 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 (<http://dps.sourceforge.net>).

## 5. References

Links to electronic versions of all of these, and more, are available from the DPS extension site (<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.