

Common UNIX Printing System Driver Overview

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CUPS Driver Basics

- All drivers use PPD files
 - *CUPS adds several new attributes for non-PS printers*
- PostScript printers typically can be used with the PPD files already supplied with Windows or Mac OS X
 - *Use the `cupstestppd` program to validate the PPD before use*
- Non-PostScript printers need one or more filters to convert a job to a printable format
- The CUPS Raster API is the optimal interface for raster printers in CUPS (and is now LGPL!)

CUPS Driver Development Kit

- Provides a PPD compiler for creating and distributing PPD files
 - *Avoids common cut-and-paste and translation errors*
 - *Easily allows you to create model-specific PPD files that are otherwise identical*
 - *Supports localization and multi-language PPD files*
- Provides extensible ESC/P and PCL drivers you can use with your products
- Provides a CUPS driver interface for use with the PPD compiler driver info files

CUPS Driver APIs

- Back-channel for drivers, port monitors, and backends
 - *cupsBackChannelRead()*, *cupsBackChannelWrite()*
- PPD for PostScript printers/filters
 - *ppdEmit()*, *ppdEmitJCL()*, *ppdEmitJCLEnd()*, *ppdEmitString()*
 - *cupsMarkOptions()*, *ppdMarkDefaults()*, *ppdMarkOption()*
- Raster data for raster printers/filters
 - *cupsRasterClose()*, *cupsRasterOpen()*
 - *cupsRasterInterpretPPD()*
 - *cupsRasterReadPixels()*, *cupsRasterWritePixels()*
 - *cupsRasterReadHeader2()*, *cupsRasterWriteHeader2()*

CUPS Raster Data

- Each page starts with a descriptive header
 - *Includes things like the page size, resolution, color model, etc. from the PostScript page device dictionary*
- Raster data follows
 - *You tell the "toraster" filter in front of you what you need in the PPD file*
 - *Many colorspace, orders, and bit depths are supported*
- When you run out of data, you're done!
 - *Raster drivers tend to be very simple programs, at least at the top level...*

Typical Raster Printer Driver

```
#include <cups/cups.h>
#include <cups/raster.h>

int y;
cups_raster_t *ras;
cups_page_header2_t header;
unsigned char *line;

ras = cupsRasterOpen(0, CUPS_RASTER_READ);
while (cupsRasterReadHeader2(ras, &header))
{
    // put page setup code here
    line = malloc(header.cupsBytesPerLine);
    for (y = 0; y < header.cupsHeight; y++)
    {
        cupsRasterReadPixels(ras, line, header.cupsBytesPerLine);
        // put output code here
    }
    free(line);
    // put page eject code here
}
cupsRasterClose(ras);
```

PPD Files for Raster Drivers

- Use the CUPS DDK's PPD compiler!
- Include a cupsFilter attribute pointing to your driver:

```
*cupsFilter: "application/vnd.cups-raster 0 /path/to/myfilter"
```

- If your printer doesn't support copies, include the cupsManualCopies attribute:

```
*cupsManualCopies: True
```

- Make sure to set the CUPS page attributes in your option commands

PPD Resolution Option

```
*OpenUI *Resolution: PickOne
*OrderDependency: 10 AnySetup *Resolution
*DefaultResolution: 300dpi
*Resolution 300dpi: "<<
  /HWResolution [300 300]           Sets resolution to 300 dpi
  /cupsBitsPerColor 8              Sets depth to 8 bits
>> setpagedevice"
*End
*Resolution 600dpi: "<<
  /HWResolution [600 600]         Sets resolution to 600 dpi
  /cupsBitsPerColor 8              Sets depth to 8 bits
>> setpagedevice"
*End
*CloseUI: *Resolution
```

PPD ColorModel Option

```
*OpenUI *ColorModel/Color Mode: PickOne
*OrderDependency: 10 AnySetup *ColorModel
*DefaultColorModel: Gray
*ColorModel Gray/Grayscale: "<<
    /cupsColorSpace 3           Sets colorspace to black
>> setpagedevice"
*End
*ColorModel RGB/Screen Color: "<<
    /cupsColorSpace 4           Sets colorspace to sRGB
    /cupsColorOrder 0           Sets color order to chunked (RGB RGB RGB)
>> setpagedevice"
*End
*ColorModel CMYK/CMYK Color: "<<
    /cupsColorSpace 6           Sets colorspace to CMYK
    /cupsColorOrder 1           Sets color order to banded (CCC MMM YYY KKK)
>> setpagedevice"
*End
*CloseUI: *ColorModel
```

Driver Development Guidelines

- Use the CUPS DDK's PPD compiler to create your PPD files
- Create CUPS raster drivers for raster printers
- For PCL and ESC/P devices, use the CUPS DDK supplied drivers unless there is a compelling reason not to
 - *and if there is, file a feature request on the CUPS DDK page so that the drivers are updated!*
- Provide PPDs (or driver info files) for every model, not just a "series", to avoid user confusion