gstoraster – a CUPS filter to convert PostScript or PDF to CUPSraster

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Introduction

By default, there are two filters to convert PostScript or PDF input to the CUPS raster format, both based on the `cups` device of Ghostscript:

pstoraster converts PostScript to raster format (by *Michael Sweet*)
pdftoraster converts PDF to raster format (by *Till Kamppeter*)[1]

If the `pdftoraster` filter is not used, PDFs are first fed through the `pdftops`[2]; depending on if it is based on the original *Xpdf* suite[3] or on *poppler*[4], PDF pages which have width and height exchanged with respect to the specified page size are oriented differently or even scaled down instead of rotated. On the other hand, the `pdftoraster` filter relies on the `cups` device's capability to do the transformation internally, but unfortionally this conforms to the PPD specification `*LandscapeOrientation: Minus90`, which cannot be changed neither by job attribute or PPD statement.

This `gstoraster` filter accepts the same options as the `pstoraster` filter and, in contrast, accepts both PostScript and PDF and obeys the landscape orientation statement in the PPD.

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[1] As of Ghostscript 9.02, these two filters have been combined to a single (C programmed) filter named **gstoraster** as well

[2] On Max os X, there are proprietary filters: `cgpdftops`, `cgpdftoraster`

[3] `www.foolabs.com/xpdf/`

[4] `poppler.freedesktop.org/`

Mode of Operation

First, a "probe" PostScript program is fed through the `pstops` filter, the output of which is processed by Ghostscript. The probe PostScript contains only a prolog section which defines some procedures needed later[5], and a setup section which transforms the contents of the page device dictionary into command line options for Ghostscript and page device key – value pairs for the actual Ghostscript instance that processes the input data. The only purpose of this preparative action is to evaluate the PPD defaults and PPD related job attributes. Additionally, the PPD keyword `*LandscapeOrientation:` is evaluated into a PostScript statement to execute the respective orientation transformation.

Using the output of the preparative action as described above, a Ghostscript command line[6] is composed using the `cups` device. This Ghostscript instance processes two files in sequence:

1) an initialization file, which
  - sets up the page device using the results of the probe operation as described above,
  - redefines the `setpagedevice` operator to a procedure which determines the landscape transformation from the value of the `/PageSize` key[7], if present, eliminates both the `/PageSize` and `/Orientation` keys, if present, and then calls the original `setpagedevice` operator,
  - redefines the operators `setcolorspace`, `setcolor`, and `setcmykcolor` in order to replace cmyk colors of the form `0 0 0` k by the equivalent gray value, if and only if the PPD contains the statement
    `*ColorDevice:  False`
    This affects only graphic objects which are stroked or filled, not images. [8]

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[5]In fact, also the `setpagedevice` and `currentpagedevice` operators are redefined and reduced to the mere dictionary merging, as tests with *espgs 815.02* revealed that this Ghostscript's `cups` device does not accept the `/PageSize` key.

[6]in effect an array passed to the `system` function of Perl

[7]In case of PDF input, this stems from the `/CropBox` (if present) or else the `/MediaBox` entry of the PDF's page object

[8]The reason for this hack is the fact that Ghostscript 9.00 and higher does all color rendering through ICC profiles, and the profile used to render `/DeviceCMYK` colors renders

2) the original PostScript or PDF[9] file.

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part of the black component as a combination of cyan, magenta, and yellow for the sake of "better color presentation on ink jet printers".

[9]we use Ghostscript's feature that PDF is processed by an enhanced PostScript interpreter

Installation and Configuration

The filter must be installed in the usual filter directory. In addition, the mime database must be extended by the following two statements in a, say, `local.convs` file:

```
application/postscript application/vnd.cups-raster 30 gstoraster
application/pdf application/vnd.cups-raster 30 gstoraster
```

Note that the cost must be less than both the total cost of using the original filter chain; otherwise you must comment out the respective conversion rules.

The `gstoraster` filter in general doesn't need any special configuration, but in case you have an unusual system setup, the script contains a set of configuration parameters which may be edited as needed:

@paths = ('/bin', '/usr/bin', '/usr/local/bin', '/opt/bin');
 This is the default search path for executables, e. g. Ghostscript.
$cmdlpgsz = 1;
 The page size is specified by the Ghostscript command line options
  `-dDEVICEWIDTHPOINTS=`www and `-dDEVICEHIGHTPOINTS=`hhh [10]
 Otherwise the page size is specified by the `setpagedevice` entry
  `/PageSize [ `www hhh` ] `.
$ignore_gserror = 0;
 If set to **1**, Ghostscript errors when converting the input to raster format
  are logged but ignored [11].
$gsname = 'gs';
 Edit this if the Ghostscript executable is installed under a different name.
$log = 1;
 The page device specific parameters for Ghostscript are logged as `NOTICE:`
  messages.
  Set to **0** to supress these messages.

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[10]This is necessary when using `espgs 815.02` for instance
[11]This has cropped up with Ghostscript 8.62 on openSUSE 11.1

Implementation Notes

The filter is written in Perl[12] and is guaranteed to work with Perl versions 5.83 or higher[13].

The PostScript programs of the filter make use of a number of Ghostscript specific procedures and operators, and Ghostscript must have the `cups` device compiled in.

The filter has been successfully tested with the following Ghostscript versions and platforms:

ESP gs 815.02 Linux RH 7.1
GPL gs 8.62 openSuSE 11.1
GPL gs 8.64 Mac OS X (10.5.8)
GPL gs 8.70 Mac OS X (10.5.8)
GPL gs 8.71 Peppermint One Linux
GPL gs 9.00 to 9.02 Mac OS X (10.5.8)

Restrictions

Currently, no scaling transformations, such as *scale-to-fit*, are implemented.

Version History

1.00 2010-12-15/Bl
      Initial implementation
1.01 2011-05-14/Bl
      Insert `%%BoundingBox: (atend)` into header of probe PS to avoid error message from pstops filter.
1.02 2011-05-16/Bl
      Fixed dumping PostScript strings in dump_obj
      Fixed landscape handling bug
      Added `-dNOMEDIAATTRS` to Ghostscript options

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[12]Therefore it is not necessary to have the CUPS related development packages or even the CUPS sources installed as is needed for usual compilation.

[13]When using Perl versions from 5.6 to 5.82, it may be necessary to insert the pragma `use bytes;`, as these versions have some difficulties with unicode.

1.03 2011-05-20/Bl

Iff the PPD contains `*ColorDevice:  False`, activate replacing pure black CMYK by gray for stroking and filling.

1.04 2011-08-02/Bl

Sanitize the command line parameters `username` and `jobname` by escaping embedded space characters (in the usual manner by prepending a backslash). The options parameter is (and has been from the beginning) enclosed in double quotes.

Acknowledgements