

Command Line: gs & PSUtils

Ghostwriter

PostScript is a platform independent programming language that transmits text and images to printers. In addition to the well-known viewers for these formats there are a number of useful and quick tools for editing and viewing .ps files in the command line. This article looks into intelligent PostScript processing with Ghostscript and the PSUtils.

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Ghostscript [1] can handle both PostScript and PDF files, and provides numerous drivers (“devices”) for converting to other formats. Thus, the tool not only offers printer drivers, but can also convert PostScript to PDF or process files before displaying them on screen.

The PSUtils [2] are a collection of programs for editing PostScript files, including the following tools *psnup* (places multiple pages on a single page), *psresize* (changes the page size), *psselect* (selects individual pages from a PostScript file), *pstops* (document manipulation, such as scaling up or down), *psbook* (organizes the pages like in a book), and *epsffit* (scales an EPS file to a specific size).

Before we delve into the depths of command line PostScript processing, let’s have a look at the basics: What does the internal format of a PostScript file look like?

Basics – Part I

You could theoretically create a PostScript-File manually, just using an editor (see Box 1), as the format is pure ASCII. But this task is normally performed by the print routine of a program. Devices that process information in PostScript files need to have a PostScript interpreter, in order to output the file on screen or to a printer – this device could be a PostScript printer that uses a firmware based PostScript interpreter.

In addition to .ps files, .eps files (“Encapsulated PostScript”), are also

quite common. This format is used to transport information (mostly images) between programs and can be embedded and scaled in other documents. The original PostScript code is placed in a so-called “bounding box” that defines the horizontal and vertical co-ordinates and specifies the bottom left and top right corners of the image.

Basics – Part II

There are numerous approaches to creating PostScript and PDF files. If you use LaTeX [4], you can simply convert .dvi files to PostScript in the command line: *dvips file.dvi -o*.

Simple text files are processed with *a2ps* [5]. This program was originally designed as a conversion tool (text to PostScript). Later versions of this PostScript filter can handle compressed files, LaTeX documents and even graphic formats (see Figure 1). For a complete overview of the program’s features, type:

```
huhn@huhnix:~> a2ps --list=
delegations
Applications configured for
delegation
[...]
Delegation `ImageMagick', from
png to ps
#{del.imagick} 'png:$f' ps:-
| #{del.psselnup}
[...]
```

The *Delegation `ImageMagick', from png to ps* entry indicates that *a2ps* can use an external program called ImageMagick to convert images in PNG format (“Portable Network Graphics”) to PostScript.

Basics – Part III

There are numerous GUIs for Ghostscript that allow you to read, convert or print PostScript, such as Acrobat Reader, KGhostView, GNOME-GhostView, and *gv*. If you need to automate a process (in a shell script, for example), you can access the Ghostscript program, *gs*, natively.

Box 1: Manual PostScript

Ken Monk’s Website [3] includes a comprehensive tutorial that starts with simple examples (such as lines and squares), takes you through complex font variants and ends up with numerous tips and tricks. A simple “Hello World” document would appear as follows:

```
!%PS-Adobe-1.0 % Version number (PostScript versions 1-3)
/Times-Roman findfont % Find font
48 scalefont % Set font to 48 point
setfont % Make the selected font the current font
100 500 moveto % Set the starting point for text output
(Hello World!) show % Output 'Hello World!'
showpage % Output the current page
```

Ideally, PostScript files follow rules and conventions to facilitate processing by other programs. For example, a page description is always split up into a prolog (definitions) and script (which uses definitions to define the page). In the case of multi-page documents, the individual pages are typically described independently of one another.

Our simple example demonstrates a few important characteristics:

- Comments start with a percent sign and end with a new line.
- Structure information is a special kind of comment and starts with *%! or %%*. (Note that these characters must occur at the beginning of a line, as they are interpreted as “normal” comments otherwise.)
- PostScript documents always start with *!%*, preferably with a version number

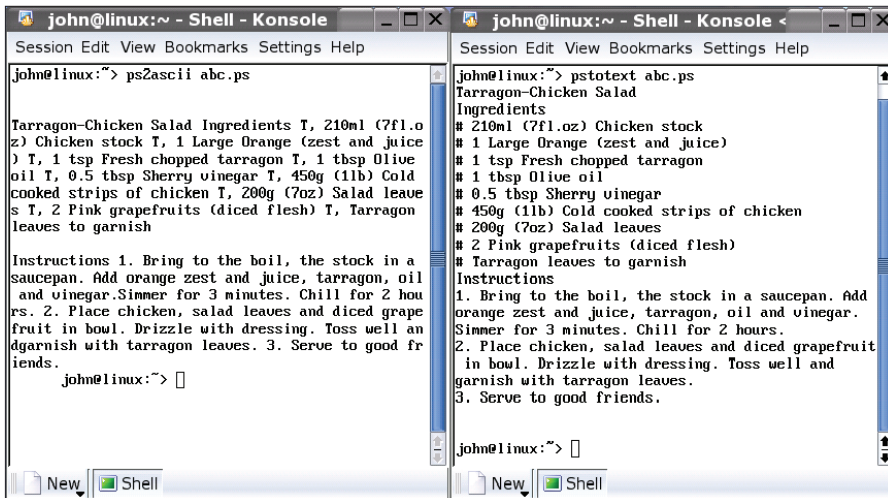


Figure 2: Different quality – ps2ascii vs. pstotext

gs can be launched on the command line with or without a PostScript or PDF file as a parameter. Besides a display window, you will also see output such as the following in your terminal window:

```
huhn@huhnix:~> gs abc.ps
ESP Ghostscript 7.05
(2003-02-05)
[...]
Loading NimbusRomNo9L-Regu font
from /usr/share/ghostscript/
fonts/n021003l.pfb... 2052880
687555 1642520 342518 0 done.
[...]
>>showpage, press <return> to
continue<<
```

If you press [Return] at this point, or launch *gs* without specifying a filename, the *GS>* prompt is displayed. You can quite the interpreter by typing *quit*, or by pressing [Ctrl-C]. *gs -h* or *gs -?* displays the help text, which includes an overview of a few drivers and Ghostscript switches, plus the version number (GNU Ghostscript is currently at version 7.05.6).

There is another fork, released under a more restrictive license, although it basically only restricts commercial dis-

GLOSSARY

dvi file: When *LaTeX* runs (“*latex file.tex*”) it creates numerous files in a directory for further processing. These include a file with the “.dvi” (device independent) suffix. This is a device independent output file that can be used for screen or printer output, provided you supply an appropriate driver.

tribution: the current “AFPL Ghostscript” version is 8.10).

To use a specific driver (device), specify the device as a parameter when calling *gs*, for example, *-sDEVICE=epson file.ps*, if you want to output the file on an Epson printer, or *-sDEVICE=x11 file.ps* to output the file on screen. Alternatively, launch *gs* and enter the following at the prompt:

```
huhn@huhnix:~> gs
[...]
GS> (x11) selectdevice
GS> (abc.ps) run
```

If you do not want to print the file directly, you can use the *-sOutputFile* option instead: *gs* is capable of creating images from PostScript files. The driver list includes a *jpg* option, for example. The following syntax:

```
huhn@huhnix:~> gs -sDEVICE=jpeg
-sOutputFile=abc.jpg abc.ps
```

converts a PostScript document called *abc.ps* to a JPEG file called *abc.jpg*.

Miscellaneous Tools

The *PSUtils* package contains a number of utilities for processing and re-formatting PostScript files. The *psnup* tool allows you to place several document pages on a single page, for example:

```
huhn@huhnix:~> psnup -2 file.ps
2page_file.ps
[1] [2] [3] [4] [5] Wrote 5
pages, 464732 bytes
```

You can additionally specify the page size – either by stipulating the dimensions, as in *-wWidth* and *-hHeight* (the program can handle either point or centimetre units), or set the *-p* flag and specify a well-known format *a3*, *a4*, *a5* etc.

As the name would suggest, the *psresize* tool changes the page format. If the file is in a European format, such as *<A4>*, you can use the following syntax to convert it

```
psresize -PA4 -pletter file.ps
new_file.ps
```

psselect extracts specific pages – for example, you can use the *-e* flag to extract pages with even numbers, or *-o* for odd numbers. This is useful if you need to print both sides of the sheet: If you have a laser printer, you could print all the even pages first, then re-insert the stack of paper and print all the odd pages. The *-p1,2,3,4* syntax allows you to specify the pages you need as a comma-separated list, which can include blocks of several pages, for example

```
psselect -p1-5,7-9 abc.ps new.ps
```

But there is no need to decipher complex instructions, just to quickly view a PostScript file – *ps2ascii* outputs the document in cleartext format (see Figure 2). *pstotext* is another tool that fulfills the same task, but achieves better results. *ps2ascii* is included with the Ghostscript package, and *pstotext* is available from [6].

INFO

- [1] Ghostscript: <http://www.cs.wisc.edu/~ghost/>
- [2] PSUtils: <ftp://ftp.dcs.ed.ac.uk/pub/ajcd/psutils.tar.gz>
- [3] PostScript Tutorial by Ken Monk: <http://www.mis.coventry.ac.uk/~kenmk/psut/psindex.htm>
- [4] LaTeX: Heike Jurzik, LaTeX Workshop: www.linux-magazine.com/issue/26/LaTeX_Part1.pdf
www.linux-magazine.com/issue/28/LaTeX_Workshop_Part2.pdf
- [5] a2ps: <http://www.infres.enst.fr/~demaille/a2ps/>
- [6] pstotext: <http://www.research.compaq.com/SRC/virtualpaper/pstotext.html>