NAME

netpbm - package of graphics manipulation programs and libraries

DESCRIPTION

Netpbm is a package of graphics programs and programming libraries.

There are over 220 separate programs in the package, most of which have "pbm", "pgm", "ppm", or "pnm" in their names. For example, **pnmscale** and **giftopnm**.

For example, you might use **pnmscale** to shrink an image by 10%. Or use **pnmcomp** to overlay one image on top of another. Or use**pbmtext** to create an image of te xt. Or reduce the number of colors in an image with **pnmquant**.

The Netpbm Formats

All of the programs work with a set of graphics formats called the "netpbm" formats. Specifically, these formats are **pbm**(5), **pgm**(5), **ppm**(5), and **pam**(5). The first three of these are sometimes known generically as **pnm**. Many of the Netpbm programs convert from a Netpbm format to another format or vice versa. This is so you can use the Netpbm programs to work on graphics of any format. It is also common to use a combination of Netpbm programs to convert from one non-Netpbm format to another non-Netpbm format. Netpbm has converters for over 80 graphics formats, and as a package Netpbm lets you do more graphics format conversions than any other computer graphics facility.

The Netpbm formats are all raster formats, i.e. they describe an image as a matrix of rows and columns of pixels. In the PBM format, the pixels are black and white. In the PGM format, pixels are shades of gray. In the PPM format, the pixels are in full color. The PAM format is more sophisticated. A replacement for all three of the other formats, it can represent matrices of general data including but not limited to black and white, grayscale, and color images.

Programs designed to work with PBM images have "pbm" in their names. Programs designed to work with PGM, PPM, and PAM images similarly have "pgm", "ppm", and "pam" in their names.

All Netpbm programs designed to read PGM images see PBM images as if they were PGM too. All Netpbm programs designed to read PPM images see PGM and PBM images as if they were PPM. See the section "Implied Format Conversion" below.

Programs that have "pnm" in their names read PBM, PGM, and PPM but unlike "ppm" programs, they distinguish between them and their function depends on the format. For example, **pnmtogif** creates a black and white GIF output image if its input is PBM or PGM, but a color GIF output image if its input is PPM. And **pnmscale** produces an output image of the same format as the input. A **ppmscale** program would read all three PNM input formats, but would see them all as PPM and would always generate PPM output.

If it seems wasteful to you to have three separate PNM formats, be aware that there is a historical reason for it. In the beginning, there were only PBMs. PGMs came later, and then PPMs. Much later came PAM, which realizes the possibility of having just one aggregate format.

The formats are described in the man pages **pbm**(5), **pgm**(5), **ppm**(5), and **pam**(5),

Implied Format Conversion

A program that uses the PGM library to read an image can read a PBM image as well as a PGM image. The program sees the PBM image as if it were the equivalent PGM image, with a maxval of 255.

A program that uses the PPM library to read an image can read a PGM image as well as a PPM image and a PBM image as well as a PGM image. The program sees the PBM or PGM image as if it were the

equivalent PPM image, with a maxval of 255 in the PBM case and the same maxval as the PGM in the PGM case.

Netpbm and Transparency

In many graphics format, there's a means of indicating that certain parts of the image are wholly or partially transparent, meaning that if it were displayed "over" another image, the other image would show through there. Netpbm formats deliberately omit that capability, since their purpose is to be extremely simple.

In Netpbm, you handle transparency via a transparency mask in a separate (slightly redefined) PGM image. In this pseudo-PGM, what would normally be a pixel's intensity is instead it an opaqueness value. See **pgm**(5). **pnmcomp** is an example of a program that uses a PGM transparency mask.

The Netpbm Programs

The Netpbm programs are generally useful run by a person from a command shell, but are also designed to be used by programs. A common characteristic of Netpbm programs is that they are simple, fundamental building blocks. They are most powerful when stacked in pipelines. Netpbm programs do not use graphical user interfaces (in fact, none of them display graphics at all, except for a very simple Linux Svgalib displayer) and do not seek input from a user.

Each of these programs has its own man page.

Common Options

There are a few options that are present on all programs that are based on the Netpbm libraries, including virtually all Netpbm programs. These are not mentioned in the individual man pages for the programs.

-quiet Suppress all informational messages that would otherwise be issued to Standard Error. (To be precise, this only works to the extent that the program in question implements the Netpbm convention of issuing all informational messages via the **pm_message()** service of the Netpbm libraries).

-version

Instead of doing anything else, report the version of the **libpbm** library linked with the program (it may have been linked statically into the program, or dynamically linked at run time). Normally, the Netpbm programs and the libraries are installed at the same time, so this tells you the version of the program and all the other Netpbm libraries and files it uses as well.

Here is a directory of the Netpbm programs. You can also use **man -k** to search for a program that does what you want.

Converters

ppmtompeg
convert series of PPM frames to an MPEG movie

jpegtopnm
convert JFIF/JPEG/EXIF file to Netpbm format

pnmtojpeg
convert PPM to JPEG/JFIF/EXIF format

anytopnm
convert any graphics format to Netpbm format

bmptoppm
convert Windows or OS/2 Bitmap file to PPM

ppmtobmp
convert PPM to Windows or OS/2 Bitmap file

winicontoppm
convert Windows icon file to PPM

ppmtowinicon
convert PPM to Windows icon file

giftopnm
convert GIF to portable anymap

ppmtogif
convert PPM to GIF

pnmtopng
convert Netpbm format to Portable Network Graphics

pngtopnm
convert PNG (Portable Network Graphics) to Netpbm formats

palmtopnm
convert Palm pixmap to Netpbm formats

pnmtopalm
convert Netpbm formats to Palm pixmap

jbigtopbm
convert JBIG BIE (compressed bitmap) to PBM

pamtopnm
convert a PAM image to PBM, PGM, or PPM

pbmtojbig
convert PBM to JBIG BIE (compressed bitmap)

pnmtofiasco
convert Netpbm image to Fiasco (wfa) highly compressed format

fiascotopnm
convert Fiasco (wfa) highly compressed format to Netpbm image

hpcdtoppm
convert photo CD to PPM

pbmtonokia
convert PBM to Nokia Smart Messaging Format (SMF)

pbmtowbmp
convert PBM to WAP (Wireless App Protocol) Wireless Bitmap

wbmptopbm
convert WAP (Wireless App Protocol) Wireless Bitmap to PBM

neotoppm
convert Atari Neochrome (.neo) image to PPM

ppmtoneo
convert PPM image to Atari Neochrome (.neo)

pbmtomda
convert from PBM to Microdesign (for Amstrad PCWs)

mdatopbm
convert from Microdesign (for Amstrad PCWs) to PBM

atktopbm
convert Andrew Toolkit raster object to PBM

pbmtoatk
convert PBM to Andrew Toolkit raster object

brushtopbm
convert Xerox doodle brushes to PBM

cmuwmtopbm
convert CMU window manager format to PBM

g3topbm
convert Group 3 FAX to PBM

pbmtog3
convert PBM to Group 3 FAX

icontopbm
convert Sun icon to PBM

pbmtoicon
convert PBM to Sun icon

gemtopnm
convert GEM .img format to PBM or pixmap

macptopbm
convert MacPaint to PBM

pbmtomacp
convert PBM to MacPaint

mgrtopbm
convert MGR format to PBM

pbmtomgr
convert PBM to MGR format

pi3topbm
convert Atari Degas .pi3 to PBM

pbmtopi3
convert PBM to Atari Degas .pi3

xbmtopbm
convert X10 or X11 bitmap to PBM

pbmtoxbm
convert PBM to X11 bitmap

pbmtox10bm
convert PBM to X10 bitmap

ybmtopbm
convert Bennet Yee "face" file into PBM

pbmtoybm
convert PBM into Bennet Yee "face" file

pbmto10x
convert PBM to Gemini 10x printer graphics

pbmtoascii
convert PBM to ASCII graphic form

asciitopgm
convert ASCII character graphics to PGM

pbmtobbnbg
convert PBM to BBN BitGraph graphics

pbmtocmuwm
convert PBM to CMU window manager format

pbmtoepson
convert PBM to Epson printer graphics

pbmtogem
convert PBM into GEM .img file

pbmtogo
convert PBM to GraphOn graphics

pbmtolj
convert PBM to HP LaserJet black and white graphics

ppmtolj
convert PPM to HP LaserJet color graphics (PCL)

pjtoppm
convert HP PaintJet file to PPM

ppmtopj
convert PPM to HP PaintJet file

thinkjettopbm
convert HP Thinkjet printer stream to PBM

pbmtoplot
convert PBM into Unix plot(5) file

pbmtoptx
convert PBM to Printronix graphics

pbmtozinc
convert PBM to Zinc Interface Library icon

fitstopnm
convert FITS format to portable anymap

pnmtofits
convert Netpbm formats to FITS format

fstopgm
convert Usenix FaceSaver(tm) format to PGM

pgmtofs
convert PGM to Usenix FaceSaver(tm) format

hipstopgm
convert HIPS format to PGM

lispmtopgm
convert a Lisp Machine bitmap file into PGM format

pgmtolispm
convert PGM into Lisp Machine format

pnmtops
convert Netpbm formats to Postscript

pstopnm
convert Postscript to Netpbm formats

psidtopgm
convert PostScript "image" data to PGM

pbmtolps
convert PBM image to Postscript using lines

pbmtoepsi
convert a PBM image to encapsulated Postscript preview bitmap

pbmtopsg3
convert PBM images to Postscript using G3 fax compression.

rawtopgm
convert raw grayscale bytes to PGM

pgmtopbm
convert PGM to PBM

gouldtoppm
convert Gould scanner file to PPM

ilbmtoppm
convert IFF ILBM to PPM

ppmtoilbm
convert PPM to IFF ILBM

imgtoppm
convert Img-whatnot to PPM

mtvtoppm
convert MTV ray-tracer output to PPM

pcxtoppm
convert PC Paintbrush format to PPM

pgmtoppm
colorize a portable graymap into a PPM

pi1toppm
convert Atari Degas .pi1 to PPM

ppmtopi1
convert PPM to Atari Degas .pi1

picttoppm
convert Macintosh PICT to PPM

ppmtopict
convert PPM to Macintosh PICT

qrttoppm
convert QRT ray-tracer output to PPM

rawtoppm
convert raw RGB bytes to PPM

sldtoppm
convert an AutoCAD slide file into a PPM

spctoppm
convert Atari compressed Spectrum to PPM

sputoppm
convert Atari uncompressed Spectrum to PPM

tgatoppm
convert TrueVision Targa file to PPM

ppmtotga
convert PPM to TrueVision Targa file

ximtoppm
convert Xim to PPM

xpmtoppm
convert XPM format to PPM

ppmtoxpm
convert PPM to XPM format

yuvtoppm
convert Abekas YUV format to PPM

eyuvtoppm
convert Encoder/Berkeley YUV format to PPM

ppmtoeyuv
convert PPM to Encoder/Berkeley YUV format

ppmtoyuv
convert PPM to Abekas YUV format

ppmtoyuvsplit
convert PPM to 3 subsampled raw YUV files

yuvsplittoppm
merge 3 subsampled raw YUV files to one PPM

ppmtoacad
convert PPM to AutoCAD database or slide

ppmtoicr
convert PPM to NCSA ICR graphics

ppmtopcx
convert PPM to PC Paintbrush format

ppmtopgm
convert PPM to portable graymap

ppmtopuzz
convert PPM to X11 "puzzle" file

rasttopnm
convert Sun raster file to Netpbm formats

pnmtorast
convert Netpbm formats to Sun raster file

tifftopnm
convert TIFF file to portable anymap

pnmtotiff
convert Netpbm formats to TIFF RGB file

pnmtotiffcmyk
convert Netpbm formats to TIFF CMYK file

xwdtopnm
convert X10 or X11 window dump to Netpbm formats

pnmtoxwd
convert Netpbm formats to X11 window dump

pnmtoplainpnm
convert regular Netpbm format image into plain Netpbm format

pbmtopgm
convert PBM file to PGM by averaging areas

411toppm
convert 411 (Sony Mavica) to PPM

ppmtosixel
convert PPM to DEC sixel format

ppmtouil
convert PPM to Motif UIL icon file

sbigtopgm
convert Santa Barbara Instrument Group CCD file to PGM

vidtoppm
convert Parallax XVideo JPEG to sequence of PPM files

pnmtorle
convert PNM to Utah Raster Toolkit (urt/rle) file

rletopnm
convert Utah Raster Toolkit (urt/rle) file to PNM

ppmtoleaf
convert PPM to Interleaf

leaftoppm
convert Interleaf to PPM

bioradtopgm
convert Biorad confocal image to PGM

pbmtoln03
convert PGM image to Dec LN03+ Sixel image

pbmtopk
convert PBM image to packed format (PK) font

pktopbm
convert packed format (PK) font to PBM image

Image Generators
All of these generate Netpbm format output.

pbmmake
create a blank PBM image of a specified size

ppmmake
create a PPM image of a specified size and color

pgmramp
generate a grayscale ramp

ppmpat
create a pretty PPM image

ppmrainbow
create a spectrum-like image with colors fading together.

pgmnoise
create a PGM image of white noise

pbmtext
render text into a PBM image

pbmupc
create a Universal Product Code PBM image

ppmcie
generate a CIE color map PPM image

pbmpage
create a printer test pattern page in PBM format

ppmcolors
create a color map (PPM image) containing all possible colors of given maxval

Image Editors
All of these work on the Netpbm formats

ppmlabel
Add text to an image

pnmshadow
add a shadow to an image so it looks like it’s floating

ppmbrighten
brighten or dim an image -- change saturation and value

ppmdim
dim an image - different way from ppmbrighten

pbmreduce
reduce a PBM N times, using Floyd-Steinberg

pgmnorm
normalize contrast in a PGM image

ppmnorm
normalize contrast in a PPM image

pbmpscale
enlarge a PBM image with edge smoothing

pnmscale
scale an image with high precision

pnmscalefixed
scale an image quickly with low precision

pnmenlarge
enlarge an image N times

ppmdither
ordered dither for color images

pnmcolormap
Choose the N best colors to represent an image; create a colormap

pnmremap
Replace colors in an image with those from a color map

ppmquant
quantize colors in a color image down to fewer colors

pnmquant
quantize colors/shades in a color or grayscale image down to fewer

ppmquantall
quantize colors on many files

ppmrelief
run a Laplacian Relief filter on a PPM

pnmarith
perform arithmetic on two images

pnmcat
concatenate images

pnmpad
add borders to an image

pnmcomp
create composite (overlay) of images

ppmmix
mix (overlay) two images.

pnmcrop
crop all like-colored borders off an image

pamcut
select a rectangular region from an image

pnmcut
obsolete version of **pamcut** (kept because it may have fewer bugs)

pamdice
slice an image into many horizontally and/or vertically

pamdeinterlace
remove every other row from an image

pamchannel
extract a single plane (channel, e.g. R, G, or B) from an image

pnmdepth
change the maxval in an image

pnmflip
perform one or more flip operations on an image

pamstretch
scale up an image by inserting interpolated pixels

pamstretch-gen
scale by non-integer values using pamstretch and pnmscale

pnminvert
invert an image

pnmgamma
perform gamma correction on an image

pnmhisteq
histogram equalize image to increase contrast

pnmmargin
add a margin to an image

pnmpaste
paste a rectangle into an image

pnmrotate
rotate an image

pnmshear
shear an image

pnmsmooth
smooth am image

pnmtile
replicate an image into a specified size

pbmclean
remove lone pixels (snow) from a PBM image

pnmalias
antialias an image

ppmchange
change all of one color to another in PPM image

pnmnlfilt
filter an image by replacing each pixel with a function of nearby pixels

ppmshift
shift lines of PPM image left or right a random amount

ppmspread
move pixels of PPM image a random amount

pnmconvol
general MxN convolution on an image

rgb3toppm
combine three portable graymaps into one PPM

ppmtorgb3
separate a PPM into three portable graymaps

pbmlife
apply Conway’s rules of Life to a PBM image

ppmdist
map colors to high contrast grayscales arbitrarily

ppmntsc
adjust colors so they are legal for NTSC or PAL television

Image Analyzers
These all work on the Netpbm formats as input.

pnmfile
describe an image’s vital characteristics

pnmpsnr
measure difference between two images

pgmedge
edge-detect a PGM image

pgmenhance
edge-enhance a PGM image

pgmslice
print grayscale values for a row or column of a PGM image

pgmtexture
calculate textural features on a PGM image

pgmhist
print a histogram of the values in a PGM image

ppmhist
print a histogram of a PPM

pnmhistmap
draw a histogram of a PGM or PPM

ppmtomap
generate a map of all colors in an image

ppm3d generate a blue/green 3D glasses image from two images

Miscellaneous

ppmsvgalib
display a PPM image on a Linux virtual console using Svgalib

pbmmask
create a mask bitmap from a regular bitmap

ppmcolormask
create mask of areas of a certain color in an image

pnmsplit
split a multi-image Netpbm file into multiple 1-image files

pnmindex
build a visual index of a bunch of Netpbm images

pcdindex
build a visual index of a photo CD from PCD overview file

pnmmontage
build multiple Netpbm images into a single montage image

pgmbentley
Bentleyize a PGM image

pgmcrater
create cratered terrain by fractal forgery

pamoil turn a PNM or PAM image into an oil painting

ppmforge
fractal forgeries of clouds, planets, and starry skies

pgmkernel
generate a convolution kernel

ppmtv Make an image lined so it looks like an old TV

pbmto4425
Display PBM image on AT&T 4425 ASCII terminal with gfx chars

Uncatalogued As Yet

pnmtoddif

pnmtosgi

pnmtosir

ppmflash

ppmqvga

ppmtomitsu

ppmtopjxl

sgitopnm

sirtopnm

spottopgm

xvminitoppm

zeisstopnm

The Netpbm Libraries

The Netpbm programming libraries, **libpbm**(3), **libpgm**(3), **libppm**(3), and **libpnm**(3), make it easy to write programs that manipulate graphic images. Their main function is to read and write files in the Netpbm format, and because the Netpbm package contains converters for all the popular graphics formats, if your program reads and writes the Netpbm formats, you can use it with any formats.

But the libraries also contain some utility functions, such as character drawing and RGB/YCrCb conversion.

The libraries have the conventional C linkage. Virtually all programs in the Netpbm package are based on the Netpbm libraries.

Application Notes

As a collection of primitive tools, the power of Netpbm is multiplied by the power of all the other unix tools you can use with them. These notes remind you of some of the more useful ways to do this. Often, when people want to add high level functions to the Netpbm tools, they have overlooked some existing tool that, in combination with Netpbm, already does it.

Often, you need to apply some conversion or edit to a whole bunch of files.

As a rule, Netpbm programs take one input file and produce one output file, usually on Standard Output. This is for flexibility, since you so often have to pipeline many tools together.

Here is an example of a shell command to convert all your of PNG files (named *.png) to JPEG files named *.jpg:

for i in *.png; do pngtopnm $i | ppmtojpeg >‘basename $i .png‘.jpg; done

Or you might just generate a stream of individual shell commands, one per file, with awk or perl. Here’s how to brighten 30 YUV images that make up one second of a movie, keeping the images in the same files:

ls *.yuv .br | perl -ne ’chomp;
print yuvtoppm $_ | ppmbrighten -v 100 | ppmtoyuv >tmp$$.yuv; ,
mv tmp$$.yuv $_0
’ .br | sh

The tools **find** (with the **-exec** option) and **xargs** are also useful for simple manipulation of groups of files.

Some shells’ "process substitution" facility can help where a non-Netpbm program expects you to identify a disk file for input and you want it to use the result of a Netpbm manipulation. Say printcmyk takes the filename of a Tiff CMYK file as input and what you have is a PNG file **abc.png**. Try:

printcmyk <({ pngtopnm abc.png | pnmtotiffcmyk ; })

It works in the other direction too, if you have a program that makes you name its output file and you want the output to go through a Netpbm tool.

Other Graphics Software

Netpbm contains primitive building blocks. It certainly is not a complete graphics library.

The first thing you will need to make use of any of these tools is a viewer. For the X inclined, there is **xzgv**. See **ftp://metalab.unc.edu/pub/Linux/apps/graphics/viewers/X**.

xloadimage and its extension **xli** are also common ways to display a graphic image in X.

ImageMagick is like a visual version of Netpbm. Using the X/Window system on Unix, you can do basic editing of images and lots of format conversions. The package does include at least some non-visual tools. Convert, Mogrify, Montage, and Animate are popular programs from the **ImageMagick** package. **ImageMagick** runs on Unix, Windows, Windows NT, Macintosh, and VMS.

The Gimp is a visual image editor for Unix and X, in the same category as the more famous, less capable, and much more expensive Adobe Photoshop, etc. for Windows. See**http://www .gimp.org**.

The **file** program looks at a file and tells you what kind of file it is. It recognizes most of the graphics formats with which Netpbm deals, so it is pretty handy for graphics work. Netpbm’s **anytopnm** program depends on **file.** See **ftp://ftp.astron.com/pub/file**.

The Utah Raster Toolkit serves a lot of the same purpose as Netpbm, but without the emphasis on format conversions. This package is based on the RLE format, which you can convert to and from the Netpbm formats. **http://www.cs.utah.edu/research/projects/alpha1/urt.html** gives some information on the Utah Raster Toolkit, but does not tell where to get it.

There are some Netpbm-like graphics tools distributed by the Army High Performance Computing Research Center at **http://www.arc.umn.edu/gvl-software/media-tools.html**. These operate directly on non-Netpbm format images, so they aren’t included in the Netpbm package. However, you can use them with any image format by using the Netpbm format converters.

Ivtools is a suite of free X Windows drawing editors for Postscript, Tex, and web graphics production, as

well as an embeddable and extendable vector graphic shell. It uses the Netpbm facilities. See **http://www.ivtools.org**.

Ilib is a C subroutine library with functions for adding text to an image (as you might do at a higher level with **pbmtext**, **pnmcomp**, etc.). It works with Netpbm input and output. Find it at **http://www.radix.net/~cknudsen/Ilib**. Netpbm also includes character drawing functions in the **libppm** library, but they do not have as fancy font capabilities (see **ppmlabel** for an example of use of the Netpbm character drawing functions).

GD is a library of graphics routines that is part of PHP. It has a subset of Netpbm's functions and has been found to resize images more slowly and with less quality.

pnm2ppa converts to HP's "Winprinter" format (for HP 710, 720, 820, 1000, etc). It is a superset of Netpbm's **pbmtoppa** and handles, notably, color. However, it is more of a printer driver than a Netpbm-style primitive graphics building block. See **http://sourceforge.net/project/?group_id=1322**.

The program **morph** morphs one image into another. It uses Targa format images, but you can use **tgatoppm** and **ppmtotga** to deal with that format. You have to use the graphical (X/Tk) Xmorph to create the mesh files that you must feed to **morph**. **morph** is part of the Xmorph package. See **http://www.colorado-research.com/~gourlay/software/Graphics/Xmorph**.

To create an animated GIF, or extract a frame from one, use **gifsicle**. **gifsicle** converts between animated GIF and still GIF, and you can use **ppmtogif** and **giftopnm** to connect up to all the Netpbm utilities. See **http://www.lcdf.org/gifsicle**.

To convert an image of text to text (optical character recongition - OCR), use **gocr** (think of it as an inverse of **pbmtext**). See**http://altmark.nat.uni-magdeb urg.de/~jschulen/ocr/**.

http://schaik.com/pngsuite contains a PNG test suite -- a whole bunch of PNG images exploiting the various features of the PNG format.

Another version of **pnmtopng**/**pngtopnm** is at **http://www.schaik.com/png/pnmtopng.html**. The version in Netpbm was actually based on that package a long time ago, and you can expect to find better exploitation of the PNG format, especially recent enhancements, in that package. It may be a little less consistent with the Netpbm project and less exploitive of recent Netpbm format enhancements, though.

jpegtran Does some of the same transformations as Netpbm is famous for, but does them specifically on JPEG files and does them without loss of information. By contrast, if you were to use Netpbm, you would first decompress the JPEG image to Netpbm format, then transform the image, then compress it back to JPEG format. In that recompression, you lose a little image information because JPEG is a lossy compression. **jpegtran** comes with the Independent Jpeg Group's (http://www.ijg.org) JPEG library.

Some tools to deal with EXIF files (see also Netpbm's **jpegtopnm** and **pnmtojpeg**): To dump (interpret) an EXIF header: Exifdump ((http://topo.math.u-psud.fr/~bousch/exifdump.py) or Jhead (http://www.sentex.net/~mwandel/jhead).

A Python EXIF library and dumper: http://pyexif.sourceforge.net.

Latex2html converts Latex document source to HTML document source. Part of that involves graphics, and Latex2html uses Netpbm tools for some of that. But Latex2html through its history has had some rather esoteric codependencies with Netpbm. Older Latex2html doesn't work with current Netpbm. Latex2html-99.2beta8 works, though.

Other Graphics Formats

People never seem to tire of inventing new graphics formats, often completely redundant with pre-existing ones. Netpbm cannot keep up with them. Here is a list of a few that we know Netpbm does *not* handle (yet).

CAL (originated by US Department Of Defense, favored by architects). http://www.landfield.com/faqs/graphics/fileformats-faq/part3/section-24.html

array formats dx, general, netcdf, CDF, hdf, cm

CGM+

Windows Meta File (.WMF). Libwmf converts from WMF to things like Latex, PDF, PNG. Some of these can be input to Netpbm.

Microsoft Word, RTF. Microsoft keeps a proprietary hold on these formats. Any software you see that can handle them is likely to cost money.

DXF (AutoCAD)

HISTORY

Netpbm has a long history, starting with Jef Poskanzer's **Pbmplus** package in 1988. The file *HISTORY* in the Netpbm source code contains a historical overview as well as a detailed history release by release.

AUTHOR

Netpbm is based on the **Pbmplus** package by Jef Poskanzer, first distributed in 1988 and maintained by him until 1991. But the package contains work by countless other authors, added since Jef's original work. In fact, the name is derived from the fact that the work was contributed by people all over the world via the Internet, when such collaboration was still novel enough to merit naming the package after it.

Bryan Henderson has been maintaining **Netpbm** since 1999. In addition to packaging work by others, Bryan has also written a significant amount of new material for the package.