NAME

OptiPNG – Advanced optimization program for **Portable Network Graphics (PNG)**

SYNOPSIS

optipng [**−?** | **−h** | **−help**]
optipng [*options...*] *files...*

DESCRIPTION

The **OptiPNG** program shall attempt to *optimize* PNG files, i.e. reduce their size to a minimum, without losing any information. In addition, this program shall perform a suite of auxiliary functions like integrity checks, metadata recovery and pixmap-to-PNG conversion.

The optimization attempts are not guaranteed to succeed. Valid PNG files that cannot be optimized by this program are normally left intact; their size will not grow. The user may request to override this default behavior.

FILES

The input files are raster image files encoded either in PNG format (the native format), or in an external format. The currently supported external formats are GIF, BMP, PNM and TIFF.

OptiPNG processes each image file given in the command line as follows:

− If it is in PNG format:

> Attempt to optimize the given file in-place. If optimization is successful, or if the option **−force** is in effect, replace the original file with its optimized version. The original file is backed up if the option **−keep** is in effect.

− If it is an external format:

> Create an optimized PNG version of the given file. The output file name is composed from the original file name and the `.png` extension.

OPTIONS

Basic options

-?, **−h**, **−help**
> Show a complete summary of options.

−o *level*
> Select the optimization level.
> Use **−o0** to disable IDAT recompression trials. This option has no effect on non-PNG input files.
> Use **−o1** to enable a single IDAT recompression trial.
> Use a higher *level* to enable more trials (the higher the *level*, the more trials).
> The behavior and the default value of this option may change across different program versions.
> Use option **−h** to see the details pertaining to your specific version.

−i *type*   Select the interlace type (0−1).
> Use **−i0** to produce a non-interlaced output.
> Use **−i1** to produce an interlaced (*Adam7*) output.
> By default, the output will have the same interlace type as the input.

−k, **−keep**
> Keep a backup of the modified file(s).
> The files that use the backup names prior to the program execution are *not* overwritten.

−q, **−quiet**
> Run in quiet mode.

−v   Show copyright, version and build info; run in verbose mode.

Advanced options

−zc *levels*
> Select the zlib compression levels.
> The behavior and the default value of this user option may change across different program

versions. Use option **–h** to see the details pertaining to your specific version.

–zm *levels*

Select the zlib memory levels.

The behavior and the default value of this user option may change across different program versions. Use option **–h** to see the details pertaining to your specific version.

–zs *strategies*

Select the zlib compression strategies.

The behavior and the default value of this user option may change across different program versions. Use option **–h** to see the details pertaining to your specific version.

–zw *window size*

Select the zlib window size (32k,16k,8k,4k,2k,1k,512,256).

The window size can be specified either in bytes (e.g. 16384) or kilobytes (e.g. 16k).

–f *filters*

Select the PNG delta filters.

The behavior and the default value of this user option may change across different program versions. The filter values 0, 1, 2, 3, 4 correspond to the PNG standard filters (*None*, *Left*, *Up*, *Average* and *Paeth*, respectively). The other values are used to specify adaptive filtering. Use option **–h** to see the details pertaining to your specific version.

–nb   Do not apply bit depth reduction.

–nc   Do not apply color type reduction.

–np   Do not apply palette reduction.

–nz   Do not perform IDAT recompression (also disable reductions).

–fix   Enable error recovery. This option has no effect on valid input files.

The program will spend a reasonable amount of effort to recover as much data as possible, without increasing the output file size, but the success cannot be generally guaranteed. The program may even increase the file size, e.g., by reconstructing missing critical data. Under this option, integrity shall take precedence over file size.

When this option is not used, the invalid input files are left unprocessed.

–force   Enforce writing of a new output file.

Use this option to override the program's decision not to write such file, e.g. when the PNG input is digitally signed (using dSIG), or when the PNG output becomes larger than the PNG input.

–full   Produce a full report on IDAT. This option might slow down the trials.

–preserve

Preserve file attributes (time stamps, file access rights, etc.) where applicable.

–simulate

Run in simulation mode: perform the trials, but do not create output files.

–snip   Cut one image out of multi-image, animation or video file(s).

Depending on the input format, this may be either the first or the most relevant (e.g. the largest) image.

–out *file*

Write output file to *file*. The command line must contain exactly one input file.

–dir *directory*

Write output file(s) to *directory*.

–log *file*

Log messages to *file*. For safety reasons, *file* must have the extension `.log`.

––   Stop option switch parsing.

Notes

Option names are case-insensitive and can be abbreviated. Any abbreviation must uniquely identify the full option name and must be no shorter than two letters, unless one letter is explicitly permitted. For example, **−quiet** can be abbreviated as **−q** or **−qu** (because **−q** is explicitly mentioned in the list of possible options), while **−preserve** can be abbreviated as **−pr** but not as **−p**.

Some options may have arguments that follow the option name, with or without a whitespace used as a separator; e.g.

> **−i1** <=> **−i 1**
> **−o3** <=> **−o 3**

Range arguments are cumulative; e.g.

> **−f0 −f3−5** <=> **−f0,3−5**
> **−zs0 −zs1 −zs2−3** <=> **−zs0,1,2,3** <=> **−zs0−3**

The zlib window size is automatically set to a minimum that does not affect the compression ratio.

The output files will have all IDAT in a single chunk, even if no recompression is performed.

Extremely exhaustive searches are not generally recommended.

EXTENDED DESCRIPTION

The PNG optimization algorithm consists of the following steps:

> 1. Reduce the bit depth, the color type and the color palette of the image. This step may reduce the size of the uncompressed image, which, indirectly, may reduce the size of the compressed image (i.e. the size of the output PNG file).

> 2. Run a suite of compression methods and strategies and select the compression parameters that yield the smallest output file.

> 3. Store all IDAT contents into a single chunk, eliminating the overhead incurred by repeated IDAT headers and CRCs.

> 4. Set the zlib window size inside IDAT to a mininum that does not affect the compression ratio, reducing the memory requirements of PNG decoders.

Not all of the above steps need to be executed. The behavior depends on the actual input files and user options.

Step 1 may be customized via the no-reduce options **−nb**, **−nc** and **−np**. Step 2 may be customized via the **−o** option, and may be fine-tuned via the options **−zc**, **−zm**, **−zs** and **−zw**. Step 3 is always executed; for example, even though IDAT recompression is disabled under **−o0**, all IDAT chunks from the input are concatenated into a single IDAT chunk in the output. Step 4 is executed only if a new IDAT is being created.

EXAMPLES

```
optipng file1.png file2.gif file3.tif

optipng -o5 file1.png file2.gif file3.tif

optipng -i1 -o7 -v -full -sim experiment.png -log experiment.log
```

BUGS

Lossless image reductions are not completely implemented. (This does NOT affect the integrity of the output files.) Here are the missing pieces:

> – The color palette reductions are implemented only partially.
> – The bit depth reductions below 8, for grayscale images, are not implemented yet.

TIFF support is limited to uncompressed, PNG-compatible (grayscale, RGB and RGBA) images.

Metadata is not imported from the external image formats.

SEE ALSO

png(5), **libpng**(3), **zlib**(3), **pngcrush**(1), **pngrewrite**(1).

Glenn Randers-Pehrson et al. *Portable Network Graphics (PNG) Specification, Second Edition.*
W3C Recommendation 10 November 2003; ISO/IEC IS 15948:2003 (E).
`http://www.w3.org/TR/PNG/`

AUTHOR

OptiPNG is written and maintained by Cosmin Truta.

This manual page was originally written by Nelson A. de Oliveira for the Debian Project. It was later updated by Cosmin Truta, and is now part of the **OptiPNG** distribution.