

**NAME**

**optipng** – optimize Portable Network Graphics files

**SYNOPSIS**

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

**DESCRIPTION**

**OptiPNG** shall attempt to *optimize* PNG files, i.e. reduce their size to a minimum, without losing semantic 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 the image is in PNG format:

Attempts to optimize the given file in-place. If optimization is successful, or if the option **-force** is enabled, replaces the original file with its optimized version.

– If the image is in an external format:

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

**OPTIONS****General options**

**-?, -h, -help**

Show a complete summary of options.

**-backup**

Back up the modified files.

The backup file name is composed from the original file name and a backup suffix. The backup suffix is `.bak`.

**-clobber**

This option, which has no effect, is deprecated and will be removed eventually.

Starting with **OptiPNG** version 1.0, output files are clobbered by default. Use **-no-clobber** to revert this setting.

**-dir** *directory*

Write the output files to *directory*.

**-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 creation of a new output file.

This option overrides the program's decision not to create such file, e.g. when the PNG input is

digitally signed (using dSIG), or when the PNG output becomes larger than the PNG input.

**-keep** This option is deprecated and will be removed eventually. Use **-backup**.

**-log file**

This option is no longer supported. Use standard shell redirection.

**-no-clobber**

Do not overwrite existing output or backup files.

**-no-create**

Perform the encoding trials, but do not create any files.

**-stdout**

Write output to the standard console output.

**-out file**

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

**-preserve**

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

**-quiet, -silent**

Run in quiet mode: do not show the informational messages on the console.

**-simulate**

This option is deprecated and will be removed eventually. Use **-no-create**.

**-v**

Enable the options **-verbose** and **-version**.

**-verbose**

Run in verbose mode.

**-version**

Show copyright, version and build info.

**--**

Stop option switch parsing.

## PNG encoding and optimization options

**-o level**

Select the optimization level.

The optimization level 1 is an alias to the option **-fast**, which enables a single IDAT compression trial.

The optimization levels 2 and higher enable multiple IDAT compression trials; the higher the level, the more trials.

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

**-fast** Select the *fast* compression level.

Only one IDAT compression trial is performed. The trial chosen is what **OptiPNG** thinks it's probably the most effective.

At this level, **OptiPNG** is functionally similar to other common single-pass PNG encoders that run at their highest and *slowest* compression level (which, usually, is 9). Use the option **-zc** to tailor this level.

**-fastest**

Select the *fastest* compression level.

Only one IDAT compression trial is performed, except when encountering existing IDAT datastreams, which are not recompressed. The trial chosen is what **OptiPNG** thinks it's probably the fastest that can give a decent compression ratio.

**-f filters**

Select the PNG delta filters.

The *filters* argument is specified as a rangeset (e.g. **-f0-5**), and the default *filters* value depends on the optimization level set by the option **-o**.

The filter values 0, 1, 2, 3 and 4 indicate static filtering, and correspond to the standard PNG filter codes (*None*, *Left*, *Up*, *Average* and *Paeth*, respectively). The filter value 5 indicates adaptive filtering, whose effect is defined by the **libpng**(3) library used by **OptiPNG**.

- full** This option is deprecated and will be removed eventually. Use **-paranoid**.
- i type** Select the interlace type (0–1).  
If the interlace type 0 is selected, the output image shall be non-interlaced (i.e. progressive-scanned). If the interlace type 1 is selected, the output image shall be interlaced using the *Adam7* method.  
By default, the output shall have the same interlace type as the input.
- nb** Do not apply bit depth reduction.
- nc** Do not apply color type reduction.
- np** Do not apply palette reduction.
- nx** Do not apply any lossless image reduction: enable the options **-nb**, **-nc** and **-np**.
- nz** Do not recode IDAT datastreams.  
The IDAT optimization operations that do not require recoding (e.g. IDAT chunk concatenation) are still performed.  
This option has effect on PNG input files, as well as files that contain embedded PNG datastreams, like PNG-compressed BMP files. It is ignored otherwise.
- paranoid**  
Encode IDAT fully and show its size in the report.  
This option might slow down the encoding trials, but has no effect on the final output.
- zc levels**  
Select the zlib compression levels used in IDAT compression.  
The *levels* argument is specified as a rangeset (e.g. **-zc6–9**), and the default *levels* value depends on the optimization level set by the option **-o**.  
The effect of this option is defined by the **zlib**(3) library used by **OptiPNG**.
- zm levels**  
Select the zlib memory levels used in IDAT compression.  
The *levels* argument is specified as a rangeset (e.g. **-zm8–9**), and the default *levels* value depends on the optimization level set by the option **-o**.  
The effect of this option is defined by the **zlib**(3) library used by **OptiPNG**.
- zs strategies**  
Select the zlib compression strategies used in IDAT compression.  
The *strategies* argument is specified as a rangeset (e.g. **-zs0–3**), and the default *strategies* value depends on the optimization level set by the option **-o**.  
The effect of this option is defined by the **zlib**(3) library used by **OptiPNG**.
- zw size**  
Select the zlib window size (32k,16k,8k,4k,2k,1k,512,256) used in IDAT compression.  
The *size* argument can be specified either in bytes (e.g. 16384) or kilobytes (e.g. 16k). The default *size* value is set to the lowest window size that yields an IDAT output as big as if yielded by the value 32768.  
The effect of this option is defined by the **zlib**(3) library used by **OptiPNG**.

### Editing options

- set object=value**  
Set an image data object in a PNG file.  
TODO: Explain **-set image.alpha.precision=num**, etc.
- reset objects**  
Reset image data objects in a PNG file.  
TODO: Explain **-reset image.alpha**.

**-strip** *objects*

Strip metadata objects from a PNG file.

PNG metadata is the information stored in any ancillary chunk except tRNS. (tRNS represents the alpha channel, which, even if ignored in rendering, is still a proper image channel in the RGBA color space.)

The accepted *objects* are either chunk names or the **all** object. Multiple *objects* can be comma-separated within a single **-strip** option, or split across multiple **-strip** options.

**-protect** *objects*

Prevent metadata objects from being stripped.

This option has priority over **-strip**. For example, under **-strip all -protect sRGB**, everything except sRGB is stripped; under **-strip all -protect all**, nothing is stripped.

The accepted *objects* are either chunk names or the **all** object. Multiple *objects* can be comma-separated within a single **-protect** option, or split across multiple **-protect** options.

**-snip**

Cut one image out of multi-image, animation or video files.

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

**Notes**

Option names are case-sensitive and may be abbreviated to their shortest unique prefix. Option parsing stops at the first file name or at the option **--**, whichever comes first.

Some options may have arguments that follow the option name, separated by whitespace or the equal sign ('='). If the option argument is a number or a rangeset, the separator may be omitted. For example:

```
-out newfile.png <=> -out=newfile.png
-o3 <=> -o 3 <=> -o=3
-f0,3-5 <=> -f 0,3-5 <=> -f=0,3-5
```

Rangeset arguments are cumulative; e.g.

```
-f0 -f3-5 <=> -f0,3-5
-zs0 -zs1 -zs2-3 <=> -zs0,1,2,3 <=> -zs0-3
```

**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 minimum 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**, **-np** and **-nx**. 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. Step 4 is executed only if a new IDAT is being created, and may be fine-tuned via the option **-zw**.

Extremely exhaustive searches are not generally expected to yield significant improvements in compression ratio, and are recommended to advanced users only.

The **-o1** heuristic consists of picking the compression parameters that are believed to produce the smallest IDAT. (Most other good PNG encoders use a similar heuristic.) This heuristic works as follows:

Select the zlib compression level 9 (i.e. the highest available).

Select the filter value 0 (*None*) for images encoded in palette mode or with a bit depth less than 8; select the filter value 5 (*All*) otherwise.

Select the zlib memory level 8 and the zlib strategy 0 (Z\_DEFAULT\_STRATEGY) if the filter value is 0; select the zlib memory level 9 and the zlib strategy 1 (Z\_FILTERED) otherwise.

## EXIT STATUS

Upon program termination, the following exit codes shall be returned:

- 0        The execution terminated normally. The input files (if any) were either successfully optimized or left intact.
- 1        One or more input files had errors, all of which were successfully fixed. This can only happen if the **-fix** option is enabled.
- 2        One or more input files had errors that were not fixed. This can happen when the errors are too severe to recover, or the **-fix** option is not enabled.
- 64 (EX\_USAGE)        The command line was incorrect.
- 66 (EX\_NOINPUT)        A file or directory did not exist or was not readable.
- 69 (EX\_UNAVAILABLE)        An unavailable or unimplemented program feature or service was requested.
- 70 (EX\_SOFTWARE)        An unrecoverable internal software error (i.e. a severe bug) was detected.
- 71 (EX\_OSERR)        A system error (e.g. a memory allocation failure) has occurred.
- 73 (EX\_CANTCREAT)        A file or directory could not be created.

Other sysexits may be added in the future.

## EXAMPLES

```
optipng file.png        # default speed
optipng -o4 file.png    # slow
optipng -o6 file.png    # very slow
```

## CAVEAT

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.

Encoding of images whose total IDAT size exceeds 2GB is not supported.

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

Metadata is not imported from the external image formats.

There is no support for pipes or streams.

## SEE ALSO

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

## STANDARDS

The files produced by **OptiPNG** are compliant with **PNG–2003**:  
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.