**How PNG works.**

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PNG: Portable Network Graphics

Understanding the Compression

PNG’s compression process is entirely lossless; meaning that the compressed file can reconstruct the source image exactly. Done in two stages: prediction (aka filtering) and then compression.

Filtering (prediction)

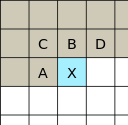
Basic idea of delta encoding: represent any value as a difference from the previous value, so:

[2,3,4,5,6,7,8] can become [2,1,1,1,1,1,1], where

[2, 3–2=1, 4–3=1, 5–4=1, 6–5=1, 7–6=1, 8–7=1]

PNG make use of delta encoding in a format “filtering”. For each scan-line of pixels, a current pixel is encoded in some relation to the pixel to the left, the pixel above, and the pixel above-left.

<https://medium.com/@duhroach/how-png-works-f1174e3cc7b7>



<http://www.libpng.org/pub/png/book/chapter09.html>

Compression (DEFLATE)

Huffman coding

LZ77 compression: just like compression RAW-data to Zip file.

<https://www.zlib.net/feldspar.html>

For images:

BMP 256: Raw color data RGB (for each Red, Green, Blue parameter 8 bit [0 ... 255])

PNG 256: compressed images RGB (for each Red, Green, Blue parameter 8 bit [0 ... 255])

PNG 256 Grayscale: compressed images in grayscale (for just Grayscale value 8 bit [0 … 255])

Radar images calculations:

Frame grabber: 2,5s per pictures. -> 17280 pics per day (12 hours of taking pictures on radar per day)

BMP 256: 3,8MB/pic -> 64,125GB per day

PNG 256: 251KB/pic -> 4,13GB per day

PNG 256 GS: 138KB/pic -> 2,274GB per day

Conclusions:

- Grayscale is not good enough for men to work with, so in the future with better computer algorithms (motion tracking, machine learning, …) is grayscale also a good choice due to its compressed sizes.

- PNG 256 RGB simple calculations:

Theory: 10TB Hard drive disk -> 12,3 years (PNG 256 RGB) of taking radar pictures.

In comparison to: BMP 256 -> 159,7 days of taking radar pictures.