Image optimization quick guide

Understanding compression, compression tools, updated image dimension summary

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Part 1: Understanding Compression

Part 2: Useful Tools

Part 3: Image Dimension Standards

Part 1: Understanding Compression[1]

What is Image Compression?

Each image requires a certain amount of memory to be stored. The amount of required allocated memory is based on the image's dimensions, how many pixels the image contains, and the amount of colours available per pixel (known as bit depth). Image compression is the process of reducing the amount of memory that an image takes up.

Why do we need to Compress Images?

The speed at which a website loads is based on two things: the speed of the internet connection and the amount of data stored within the website. While we can't control the former; we can control the latter. By reducing the size of images that will be placed on our website, we also reduce the total data that needs to be loaded each time a viewer visits it. Compressing images is essential for a fast website which will hold the user's attention.

Fact: 40% of internet user's will exit a website if it doesn't load within 3 seconds.

Lossy vs. Lossless Compression

Lossy compression means that some of the pixel data in the image will be removed. When dealing with lossy compression, make sure to save a copy of the original as you will not be able to revert back after compression. This type of compression typically has greater file size reduction.

Lossless compression means that the pixel data will only be compressed, but not removed.

So - which do I use?

This is when your own judgement comes into place. Use both if you are willing to sacrifice some quality for file size. Skip the lossy step if the file contains intricate details or needs to be shown as is. Keep in mind – just because lossy compression sacrifices pixel data doesn't necessarily mean that the resulting image will be ugly. Visual results are often almost just as good and the file savings can be huge.

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[1] https://developers.google.com/web/fundamentals/performance/optimizing-content-efficiency/image-optimization

Vector vs. Raster Images

Vector graphics are resolution and scale independent, which makes them a perfect fit for the multi-device and high-resolution world. They use lines, points, and polygons to represent images. They are best used for images which consist of geometric shapes and deliver sharp results at every resolution/zoom. File sizes are usually smaller, especially when dealing with simple images that need to be displayed at any size.

Vector images should be stored in a Scalable Vector Graphics (SVG) format. SVG files can be created by vector drawing software (We recommend Adobe Illustrator) or by hand and directly in your favourite text editor. However, they will need to be saved as a web-friendly file format before being inserted into a webpage (See Selecting the Correct File Format)

Use vector graphics when displaying simple shapes such as logos, icons, and so on.

Raster graphics represent an image by encoding the individual values of each pixel within a rectangular grid. This means that the files sizes are typically larger than vector graphics, but they can handle more complex images. However, they are resolution and scale dependent meaning that quality will diminish as size increases (think of what happens when you try to stretch a photo). This means it may sometimes be necessary to save multiple copies of the image at different sizes.

Raster graphics can be created using Photoshop, MS Paint, Paintbrush etc. Also, any photo/screenshot will be a raster graphic by default.

Use raster graphics when displaying images that would be difficult to describe using lines, points, and polygons such as photos and screenshots.

Selecting the Correct File Format

Once you've finished creating/editing your image, you will need to save it for the web. There are 3 universally supported image formats: GIF, PNG, and JPEG. PNG can be split into PNG-8 (256 possible colors) or PNG-24 (16,777,216 possible colors). To decide which format you should use, follow this simple flowchart:
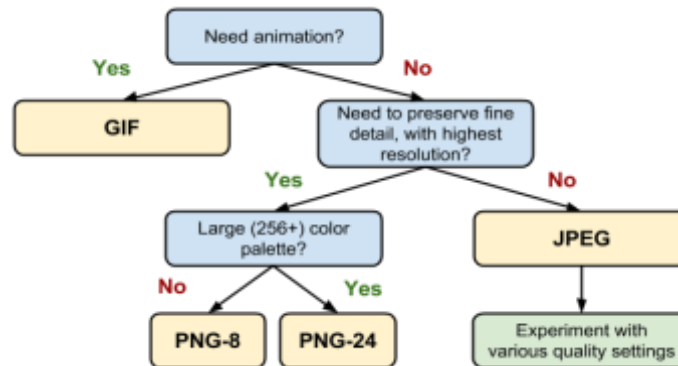
Time to Compress

At this point, you've saved your image and made all the right decisions regarding which type of compression you're looking for, graphics type, and file format. The next step is to compress the image. In part 2, we've provided you with many tools to do this as well as instructions on how to decide which tool(s) to use.

Tips and Tricks

- Use vector images as much as possible. Vector images will allow you to resize with ease and save space.

- Make sure you pick the right image format for the job. Use GIF only for animation. Use JPEG's for photos that don't need to be the highest resolution, as well as screenshots. Use PNG's when resolution is a priority and use specifically PNG-24 when a wide color palette is necessary.

- Remove unnecessary image metadata. Many raster images contain metadata that isn't need. Remove metadata about geographic information, camera information etc. to reduce the size of the image.

- **Keep files to a maximum of 1 MB. This is more than enough data to have a high quality image while still allowing your page to load quickly.**

Part 2: Useful Tools[2]

Tiny PNG – http://tinypng.com/

- Can bulk upload images using drag and drop.
- Images can be downloaded to computer or straight to Dropbox.
- Maintains a good quality versus size balance.

When to use?
Tiny PNG should be your go-to image compressor. For the majority of projects and images, Tiny PNG will get the job done by decreasing size while maintaining quality.

Compressor.io - https://compressor.io/compress

- Allows you to choose between lossy and lossless compression (read above)
- Loseless compression is limited to JPG and PNG images and file savings are typically very small.

When to use?
Compressor should be used if you have to often switch between lossy and lossless compression. Keep in mind the essential balance/tradeoff between quality and size.

JPEG Optimizer - http://jpeg-optimizer.com/

- Unrivaled for decreasing file size, but the compressed image's quality is much lower than the original's.

When to use?
Use JPEG Optimizer when the quality of the image is not a priority (e.g. if image will be sized very small on the webpage)

Optimizilla - http://optimizilla.com/

- Allows you to upload up to 20 images at a time which can be downloaded as a ZIP file

When to use?
Optimizilla is ideal when you need to compress a bulk of images at once.

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[2] http://enviragallery.com/9-best-free-image-optimization-tools-for-image-compression/

Resize Photos - http://www.resize-photos.com/

- Includes a resizing feature. This will allow you to compress pictures and resize it at the same time.

When to use?
Use Resize Photos when you want to both compress and change the size of a picture.

Optimization Using Photoshop

You can also optimize images using Adobe Photoshop. To do this:

1. Open your image in Photoshop
2. Under the File tab, click Save for Web
3. Select your image format (See Selecting the Correct File Format)
4. Adjust setting to reduce file size (Shown in bottom left corner):
   a. For GIF and PNG-8: Try unchecking "Interlaced", reducing number of colours, reducing dither percentage, adjusting color reduction algorithm (Perceptual or selective usually reduce file size the most). There are a lot of options here – play around and see what gives you the best quality and size.
   b. For JPEG: Adjust quality percentage as desired. Set Metadata to none.
   c. For PNG-24: This file format doesn't have any useful compression options. Avoid it if you can.
5. Once you're finished, save the file. Try to use a different name so you don't accidentally overwrite the original and you know which file is compressed and which is not.

No matter which compression tool you choose, ensure that none of your images are greater than 1 MB.

Part 3: Image Dimensions[3]

As of 2017, the dimension standards for images on Western websites have changed to provide a more modern look.

Image Type	Pixel Dimensions (Width x Height)
Homepage banner/slides	2000 x 600
Lower-level page banner	900 x 300
Full-page	1200 x 350
"Connect with us"	265 x optional height (per column)
2-column	415 x optional height
3-column	285 x optional height
Image slider	220 x 180
Right sidebar	245 x optional height
Faculty / staff directory	160 x 180

[3] Dimensions with examples can be found in Western's Image Guide