week::nine
Raster Image Optimization for the Web

Web Imagery Characteristics

Size Measurement

- o An image used on the web is always measured in **pixels**, not in inches.

- o Image resolution requirements on the web is **generally less** than in print work.

  - ▪ Web design techniques common for mobile devices have normalized scaling of images.

  - ▪ For devices with High DPI screens (iPhones, iPads, computers with "Retina" displays, and many other devices), generally these have *four pixels* for every pixel on a "standard resolution" screen and display Web imagery at 2x their pixel size.

- o Still, images should be scaled to a *reasonable image size* for use on a website.

- o In Photoshop, always work at a **magnification of 100%** (Command-1) on standard displays.

  - ▪ This will display the imagery exactly how it will appear on the web.

  - ▪ On HiDPI displays, you must view the images at 200% in order to see their "true" size as presented on most screens. This is true of the VC lab's 27" monitors—they are HiDPI.

- o When creating web graphics with fonts in Photoshop, aim to set your image's **pixels per inch (PPI) setting to 96**. This will allow you to use familiar font sizes in Photoshop.

Understanding Intended Size

- o In order to thoughtfully scale an image, we need to have some idea of the size it will be used on a website, usually using the desktop version of the site as a basis.

  - ▪ If it will be displayed as a small thumbnail, we can reduce its resolution.

  - ▪ If it will be displayed using the full width of the browser, we will want more resolution.

- o A (very) general rule would be to size the image **1.5x–2x larger than** the size used on a desktop website.

  - ▪ This allows for a reasonable file size across most devices, while including HiDPI screens.

  - ▪ There are far-more complicated ways to handle images, including using the <picture> element to serve images of different sizes for different devices, but they are more-suited to automated web workflows like in online publishing.

Optimizing for File Size

- o Compared to print, web images are smaller and easier to work with.

- o However, all images bound for the web require **optimization**.

- o Optimization tweaks the image to reduce its file size, which reduces download times.

- o How does optimization make an image smaller?

  - ▪ Removes unwanted colors (GIF, PNG)

  - ▪ Removes non-essential visual data (lossy compression; JPEG)

  - ▪ Removes embedded previews, thumbnails, icons and metadata

  - ▪ **Compresses** the image (through JPEG, GIF and PNG file types)

Preferred Formats for Web Use

- o For raster images, we use **JPEG**, **PNG**, or **GIF**

- o For vector images, we use the **SVG** format.

GIF Images

Description
- o Limited to a maximum of 256 colors.
- o Uses compression to reduce image size.

Features
- o **LZW Compression**
  - Is a *loss-less* method of compression, meaning that the pixel data is unaltered when compressed.
  - Works especially well on large areas of continuous color.
- o **Transparenc**y
  - Colors can be set as transparent. This affects all occurrences of a color.
  - GIF uses a simple 1-bit transparency: A color is either transparent or opaque.
- o Simple Cell-based **Animations**
  - The animated GIF is currently experiencing a sort of renaissance on the Web.

Optimizing Tips
- o Always try to use as few colors as you can when saving a GIF. Experiment by trying various color depths and previewing them in the Optimize window in the Photoshop *Save for Web and Devices...* menu.
- o When optimizing anti-aliased artwork, like text or vector graphics, you need at least **8 colors** per color transition to create a smooth appearance.
- o When using anti-aliasing, you must matte your image to the same background color you intend to use in the web page.
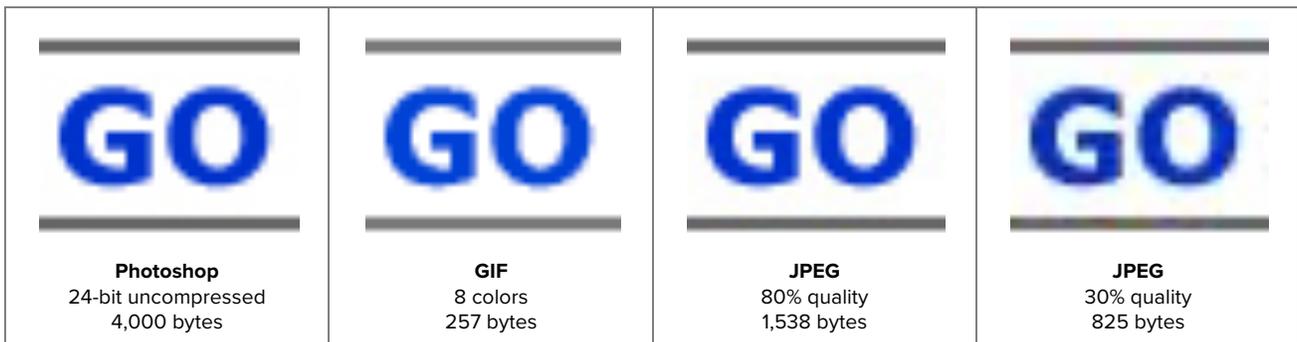
Good for:
- o Navigation elements
- o Type as a graphic, with or without anti-aliasing
- o Images with sharp edges or fine detail
- o Images requiring simple 1-bit transparency
- o Images with a large area of a single color
- o Animations

Bad for:
- o Photographs
- o Any image with more than 256 colors

Examples
- o Note how the GIF image is not only perfect in appearance but is actually smaller in file size as well. (Images are enlarged 250%)

Photoshop 24-bit uncompressed 4,000 bytes	**GIF** 8 colors 257 bytes	**JPEG** 80% quality 1,538 bytes	**JPEG** 30% quality 825 bytes

JPEG Images

Description
- o Can display millions of colors (true-color, 24 bit image).
- o Designed from the beginning for photos.

Features
- o **Excellent Compression**
  - ▪ Compression is "lossy", resulting in JPEG artifacts.
  - ▪ JPEG reorganizes an image's pixels to reduce file size.
  - ▪ JPEG offers selectable levels of compression:

Export	0% ------- 50% ----- 100%
Save As	0 ---------- 5 --------- 10 ----- 12
	small size large size
	poor quality perfect quality

  - ▪ Done correctly, these artifacts are only visible when the image is magnified.
- o **True-Color Support**
  - ▪ JPEGs support millions of colors (24 bit).

Optimizing Tips
- o Save photos for the web between the **60%** to **80%** quality levels.
- o Always same your original Photoshop files. Once an image is compressed using JPEG, you cannot revert to a previous, superior quality level without the original, uncompressed image.
- o While it is possible to save CMYK images in JPEG format, don't use them. They are bigger than RGB versions and don't display in most browsers.
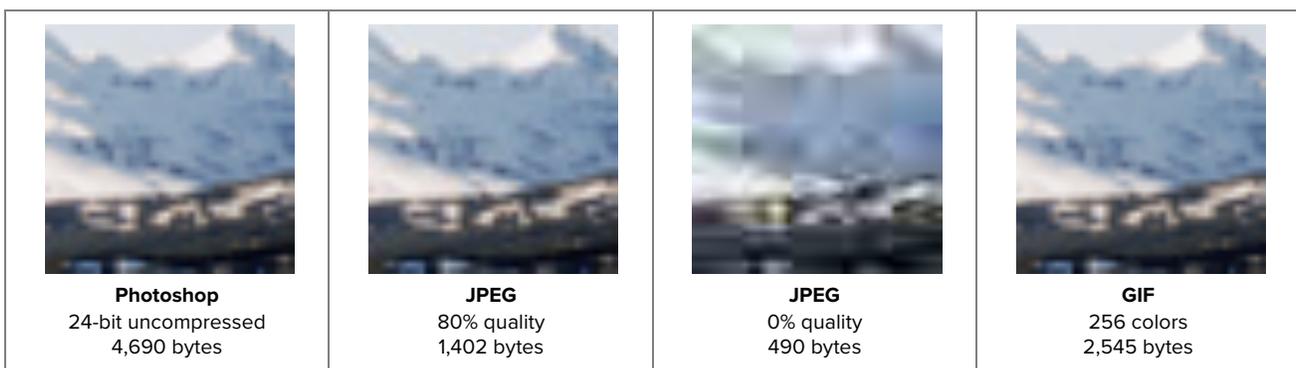
Good for:
- o Photographs
- o Any image requiring more that 256 colors
- o Complex imagery with soft edges

Bad for:
- o Animations
- o Images requiring transparency
- o Most navigation elements
- o Images that need to be "pixel-perfect"

Examples
- o The 80% quality JPEG is much smaller in file size and displays the full range of color, making it a better choice than the 256-color GIF image.

Photoshop	**JPEG**	**JPEG**	**GIF**
24-bit uncompressed	80% quality	0% quality	256 colors
4,690 bytes	1,402 bytes	490 bytes	2,545 bytes

PNG Images

Description
- o Created as a free, open-source version of the GIF file format.
- o Is now the standard graphic file format for non-photographic imagery on the Web.

Features
- o PNG (Portable Network Graphics) brings the best parts of GIF into an open format.
- o Supports precise color selection and loss-less compression (like GIF).
- o Supports 24-bit color (like JPEG), though with non-lossy compression.
- o Provides excellent **8-bit transparency support when using PNG-24**.
  - ▪ This is PNG's killer feature.
- o Is an open format—no one company owns the technology behind PNG.

Use
- o **PNG-8** mimics the GIF file format.
- o **PNG-24** is like GIF (non-lossy compression), but with 24-bit color support.

Good for:
- o Any image that you would have saved as a GIF image.
- o Images that have 8-bit transparency (like in Photoshop).
  - ▪ Photographic images that also require transparency should use the PNG-24 format. Not as small as JPEG, but does include transparency support.

Bad for:
- o Images that contain only photographic information.
- o Internet Explorer for Windows 6.0 and earlier users (IE 7 and above are OK).

Examples
- o Note how the PNG image is not only perfect in appearance but is actually smaller in file size as well. (Images are enlarged 250%)

| **Photoshop** 24-bit uncompressed 4,000 bytes	**GIF** 8 colors 257 bytes	**PNG-8** 8 colors / 1-bit transparency 363 bytes	**PNG-24** with 8-bit transparency 1,471 bytes
Photoshop 24-bit uncompressed 4,690 bytes	**PNG-8** 256 colors 2,438 bytes	**PNG-24** 24-bit/lossless compression 3,634 bytes	**JPEG** 80% quality 1,402 bytes

Using Export in Photoshop

Export As…

- o   To optimize an image for the Web, Photoshop provides a specialized command: **File > Export > Export As…**
- o   Set the appropriate **file format and compression options**:
    - ▪ Select whether to save as a **JPEG**, **PNG**, or **GIF**, and adjust the quality setting to find a balance between image quality and file size. Be sure to enable transparency, if necessary, and to turn dithering off.
- o   This option has improved over the years, but it still does not offer the same level of options as the next option, Save for Web…

File > Export > Save for Web

- o   Command-Option-Shift-S
- o   Allows you to set **individual optimization settings** for each slice.
- o   Provides the **Optimize** window tab, which lets you preview how your image will look after it is exported.
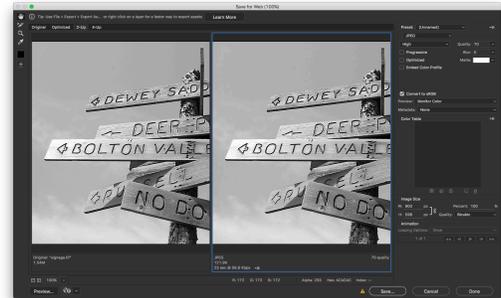
The Exporting Process

1. In Photoshop, isolate the imagery either using the Layers panel or the Selection tools.
    - ▪ If it's a layer, you can right-click on the layer name and select the *Quick Export as PNG* option.
    - ▪ If not, copy-and-paste into a new Photoshop document, and continue to the next steps.
    - ▪ Or, use the Slice tool to make individual image slices of the design, then use the Slice Select tool to select slices and give them meaningful names.

2. Select **File > Export > Save for Web…** and click on the **Optimize** tab in the main image window. This will allow you to view exactly how the image will look when optimized.
    - ▪ Original shows you the image at full quality, regardless of the type of compression chosen.
    - ▪ You can also use **2-Up** and **4-Up** to make quality comparisons between optimization settings.

3. Set the appropriate options in the **Optimize** palette within Save for Web….
    - ▪ **Optimize Settings:** Using the Optimize palette, select whether to save the slice as a **JPEG or PNG**, and adjust the quality setting to find a balance between image quality and file size. Be sure to enable transparency, if necessary, and to turn dithering off.
    - ▪ **Repeat this step** for every slice in your layout.

4. Save your images:
    - ▪ Click the **Save** button.
    - ▪ In the Save dialog box, select **Images Only** from the Format menu.
    - ▪ Create a new folder or navigate to the images folder in your site root directory and click **Save**.