

Scanning Tips

Rasters, Pixels, File Size and Download Times

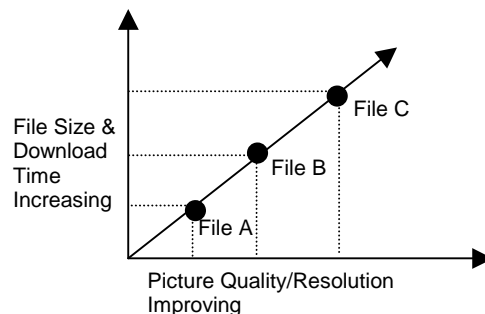
When you scan an image into the computer to create a file, the computer typically will store your image in a "raster" format. Basically, a raster format is a generic term meaning that your picture has been converted into a mosaic that is made up of "pixels". The WDWL provides the following definition of a pixel:

Short for Picture Element, a pixel is a single point in a graphic image. Images on your monitor are pixels, arranged in thousands of rows and columns and placed so closely together as to appear connected. The number of pixels displayed collectively is referred to as the resolution.

Web Developer's Virtual Library (wdvl.com)

Thus the more pixels in your image (or rather the higher the resolution) the better your picture will appear on the Web. However, there is a problem. The higher the resolution of your picture the larger the file size, and thus the slower the download time. So picking the right resolution for your picture represents a trade off between picture quality and file size/download time. This is represented graphically in Figure 1 below.

Figure 1: Image Quality vs. File Size



When scanning your picture, it is a good idea to scan at a medium to high resolution. This will give you a high quality picture to edit. You can shrink it down later.

Recommendations:

- Scan your images at around 300 Dots Per Inch (DPI) or higher if needed.
- Edit your image then shrink it using image-editing software (as opposed to the scanner itself).
- Experiment with the different scanner settings to see what works best.

- To insure speedy download times, do not use images that are over 150KB in size. 150KB is a good rule of thumb - it will provide adequate resolution and decent download times. If your audience is using modems to download your Web page, you may want to use images smaller than 150KB. If you know your audience is using a high-speed network, you can increase the file size.
- Place only a few images on a page. Download time will increase if you put a lot of images on a single page.

File Size and Scaling in HTML

When you install an image on your web page using the `` tag, it is best to include the *height* and *width* attributes within the image tag (values of the attributes are given in pixels). For example:

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When you include the *height* and *width* attributes in your image tag, they will allow both Netscape and Internet Explorer browsers to render your page much more quickly. The browser does not have to wait to download the complete image to figure out its pixel dimensions. However, you can use the *height* and *width* tags to distort the appearance of your image. For example, by entering different values for the *height* attribute, you can stretch or squash your image. The same goes for the *width* tag. Further, it means you could take a large image and make it appear small or a make a small image appear large. Changing the appearance of your image using the *height* and *width* attributes is called **SCALING**. Unfortunately, when you scale an image you do not change the fundamental size of your image file. If your image file is 10 megabytes in size, it will remain 10 megabytes in size regardless of what values you assign to the *height* and *width* attributes for your image on your Web page.

Given this, if you wish to change the size of your image, you should **RESIZE** it in an image-editing program, such as Adobe PhotoShop, PaitShop Pro, or MS Photo Editor. When you resize your image in an image-editing program, it will change the fundamental (file) size of your image. Thus if you want to use both a small version and a large version of your image on a Web page, you should create two separate image files and use them both on your Web page.

Anecdote:

We once had a student in the at UCLA who was working to post a professor's notes to a web page. The student scanned the notes at a very high resolution using a flat bed scanner. He needed the high resolution to capture the detail in the professor's penmanship. Without resizing his images in an image-editing software package, the student posted the image of the notes to the professor's Web page and scaled it down a bit using *height* and *width* attributes. Upon testing the download time of the Web page at home, to his surprise, the student found that it took 3.5 hours to download the professor's notes. He was flabbergasted. He could not figure out what was wrong; why was it taking so long to download the professor's notes? Upon talking with him, we found that the student had not resized the scanned image of the professor's notes. The image was 20 megabytes in size!

Moral:

It is very easy to produce extraordinarily large file sizes when scanning images. Pay close attention to image file size when installing images on your Web page, and always keep **Figure 1** above in mind.

Image File types - GIF, JPEG - what does it all mean?

The most widely used image file types in Web Page design and construction are *.gif (pronounced *jif* - like the peanut butter) and *.jpg (pronounced *jay-peg*). Both are raster type files; the image in the file is made up of a mosaic of pixels. Let's have a closer look at each one.

GIF (Graphics Interchange Format)

CompuServe, Inc originally developed the GIF format. It is a file format suitable for images that contain large areas of flat colors (that is no gradations). Examples might include simple graphics and single color line drawings. Below is a list of the major characteristics of the GIF format:

- Limited to 256 colors - it is best used for simple graphics with solid colors and line drawings
- Can be used for simple animation
- Images can have transparent backgrounds
- Not good for images which display gradations of color
- Files have the following form: *image.gif*

JPEG (Joint Photographic Experts Group)

This was (and is) a group of experts nominated by national standards bodies and major companies to work to produce standards for continuous tone image coding. JPEG is designed for compressing either full-color or gray-scale images of natural, real-world scenes. It works well on photographs, naturalistic artwork, and similar material; not so well on lettering, simple cartoons, or line drawings. Below is a list of the major characteristics of the JPEG format:

- Displays up to 16 million colors
- Best for full-color or gray-scale photographs
- Not good for line drawings
- Images can not have transparent backgrounds
- Images can not be animated
- Files have the following form: *image.jpg*
- Images can be compressed in the JPEG format, but image quality will degrade dramatically with higher compression levels.

Links:

Web Developers Virtual Library

<http://wdvl.com>

This is probably the best site on the net for learning about Web page construction, design, and Web programming. Ever wonder about HTML code, Java, CGI, Active Server Pages, or other Web and Internet technologies? This is the place to go. It also has a variety of information about image editing, image file types, and color. It is suitable for both beginners and advanced programmers. Best of all, everything at this site is free!

Webmonkey: The Web Developers Resource

<http://hotwired.lycos.com/webmonkey>

Like the WDVL above, Webmonkey offers a comprehensive selection of tips and tutorials for Web page design and construction. Under their section Design -> Graphics, you will find tutorials titled *Image Editing 101* and *Scanning 101*. A nice feature of this site is that the tutorials are written in an easy-to-understand casual style. You won't need a dictionary of technical terms to get through these tutorials. As with the WDVL, everything here is free!

David Eisenberg's "Why Good Images Go Bad: A Guide to the Effective Use of Images on Your Web site"

<http://www.catcode.com/imgguide/index.html>

At this Web site, David provides a detailed over view of the difference between GIF and JPEG image file types. Here you will learn about file sizes, colors, animation, and transparency.