Four of the most common file formats for compressing or encoding and storing digital images are JPEG, PNG, GIF, and BMP. This article provides a quick comparison of these four by discussing their key features and differences in terms of image quality, file size, and usability.

Take note that JPEG stands for Joint Photographic Expert group while PNG stands for Portable Network Graphic. GIF is an acronym for Graphics Interchange Format while BMP is short for bitmap image file or device independent bitmap.

**JPEG VS. PNG VS. GIF VS. BMP: WHICH ONE IS BETTER?**

**Advantages and Disadvantages of JPEG**

**1. Image quality:** The JPEG image format is recognized for compressing and encoding high-resolution digital images. It supports 24-bit color with up to 16 million colors. This is the reason why this format is very popular on the Internet, in digital cameras, and desktop publishing.

However, a notable drawback of JPEG is that it is a lossy compression. This format compresses digital images by dropping unneeded color data that are undetectable by the human eye. Furthermore, editing and resaving a JPEG image leads further to quality degradation.

**2. File size:** One of the notable advantages of JPEG over the PNG format is that it can achieve a smaller file size for a relatively similar image quality and resolution. This is ideal for storage and online content consumption.

Another remarkable advantage of JPEG is that its degree or level of compression is adjustable. This adjustability enables a user to control or balance the tradeoff between image quality and file size.

**3. Usage:** JPEG is ideal for images with smooth variations of colors. However, unlike PNG and GIF, it is not ideal for images with texts or objects with sharp lines and edges between colors. This file format creates artifacts that are noticeable within the sharp edges between two or more different colors.

Because of the smaller file size of JPEG as compared to PNG, it is ideal for use in the web, as well as for storing professional print-quality graphics taken using a digital camera or produced using a graphic design software. However, unlike GIF, it does not support animation.

**Advantages and Disadvantages of PNG**

**1. Image quality:** A considerable advantage of PNG over JPEG is that it is a lossless compression. This means that image data and details are retained after compression. It also supports 24-bit RGB color images.

Another advantage of PNG is that it supports grayscale images and transparency. Note that the JPEG format does not support transparency and instead, renders the supposed transparent area of an image with a solid white color.

**2. File size:** There is one critical drawback of PNG: It is not good for large or high-resolution images because it generates a large file size. Remember that JPEG generally generates a smaller file size than PNG for a similar image with the same resolution.

**3. Usage:** Take note that PNG is an image format specifically designed for the web and as a replacement for GIF. However, unlike JPEG, it is not ideal for storing and printing digital image because of its file size and lack of CMYK support.

PNG has other notable advantages. It has better transparency than GIF. Compared to JPEG, it is very ideal for images with texts or those with sharp lines and edges between colors. These texts and edges will look crisp and clean. However, it does not support animation.

**Advantages and Disadvantages of GIF**

**1. Image quality:** The main disadvantage of GIF is that it only supports 8-bit color and a 256 color palette. Hence, when compared to other file formats, GIF images tend to appear pixelated and less vibrant.

GIF is still a lossless type of compression despite its limited color support. It is very ideal for compressing images with a single solid color.

**2. File size:** The main advantage of GIF over JPEG and PNG is that it compresses digital images to a smaller file size by reducing the number of colors and replacing multiple occurring patterns into one.

Similar to PNG, it supports transparency. Nonetheless, the most notable advantage of GIF is that it supports brief animation by essentially looping different images into a single file and small file size.

**3. Usage:** GIF was the standard file format for the web. It became a standard format during the era of dial-up connections when the loading speed for generating an image was crucial to overall website performance.

Today, GIF is widely used online for producing and presenting animated images or animated GIFs that quickly load due to their small file size.

**Advantages and Disadvantages of BMP**

**1. Image quality:** BMP supports 8-bit to 24-bit colors. Images rendered under this format are very high in quality. This quality is actually very similar to JPEG and PNG.

Significant losses are noticeable when resizing a bitmap image to a smaller or larger size. This is because resizing the entire image is akin to resizing the individual pixels. Resized BMPs look fuzzy and jagged.

**2. File size:** The BMP format is not a compression standard. Images encoded as a bitmap are very large in terms of file size. Hence, the notable disadvantages of BMP over JPEG and PNG include poor scalability.

However, BMP can still be compressed and effectively stored using other file compression standards or archiving formats such as zip and RAR.

**3. Usage:** BMP is a format native to the Windows operating system that is independent of the display device such as a graphics adapter. However, because of the large file size it generates, it is not suitable for online use.

**CONCLUSION:** **JPEG VS. PNG VS. GIF VS. BMP**

In conclusion, JPEG wins in terms of file size and in consideration of high-resolution images. It is ideal for both web and print. On the other hand, PNG has an advantage with regard to versatility. It is a lossless compression and ideal for images with text or sharp lines and edges between colors.

GIF and BMP are obsolete in modern computing. BMP does not have real advantages over JPEG and PNG because it is an uncompressed format that generates a larger file size. Meanwhile, GIF has made a comeback, especially in social networking sites in which animated GIFs provide an entertainment value to online users.

So, you pic lovers out there....get ready with your cameras. Click, click, done!  Let's post 'em, download 'em, print 'em...make some graphic tees...all the rest of it...

But wait....When I'm saving my pic, what format should I be using?  .bmp?  .png?  .jpg?

Not .gifs right?  those things are so er....pixel-ey.  Um....what's a .tiff?  and is it a .tif or a .tiff?

Here's what I found:

2 types...Raster Graphics and Vector Graphics.

Raster Graphics = Pixels (little tiny squares)
Vector Graphics = Paths (drawing lines and curves...usually using maths)

Of the Raster type:

JPG/JPEG/JFIF imagesFull form: Joint Photographic Experts Group.
Extension: .jpg/.jpeg

The commonest image file format that digital cameras save their images in. JPEG files apply the lossy compression method which can help reduce the file size significantly without compromising the quality. This is the default format for Microsoft Paint files.
Cons: This format is not immune to generational degradation. This means with every edit and resave; the image quality will deteriorate.
Application: Still images, image capture device storage, light, and darkness focused images.
PNG image formatFull form: Portable Network Graphics
Extension: .png
This free open-source alternative to GIF offers 16 million colors. This is the best file format for true-color images that need perfect tone balance. The animated file format of PNG is available with the APNG format. These files have a transparent background.
Cons: Works best with larger file sizes. The PNG format itself doesn’t support animated graphics.
Application: Image editing, web images, images involving layers, like transparency or fading effects. It creates [web friendly images](https://www.thewindowsclub.com/create-web-friendly-images-bzzt-image-editor).
TIF file extensionFull form: Tagged Image File Format.
Extension: .tif/.tiff
Flexible and easily extensible file format capable of handling device-specific color spaces. These files have a transparent background. They are perfect for company logos.
Cons: Not ideal for web browsers.
Application: Photographic file standard in print. OCR software packages.
GIF file formatFull form: Graphics Interchange Format
Extension: .gif
Though this one has a low compression ratio than most video formats, it is the most common image animation format.
Cons: Limited to the 8-bit palette (256 colors), not suitable for photographic images or dithering.
Application: Graphics that require few colors, for example simplistic diagrams, logos, and animations that have large portions of a single color.
BMP image file formatFull form: Stands for Bitmap
Extension: .bmp
These large uncompressed files are associated with graphic files inside the Windows OS.
Cons: This format is lossless, meaning it cannot be compressed.
Application: Their simplistic structure makes them ideal for Windows programs.
These are the commonest image file formats we use. Now that you know which one is ideal for what purpose, you will be able to manage your image files better.

**SVG** - Lossless / Vector

A filetype that is currently growing in popularity is SVG, which is different than all the above in that it's a [vector](https://en.wikipedia.org/wiki/Vector_graphics) file format (the above are all [raster](https://en.wikipedia.org/wiki/Raster_graphics)). This means that it's actually comprised of lines and curves instead of pixels. When you zoom in on a vector image, you still see a curve or a line. When you zoom in on a raster image, you will see pixels.

This means SVG is perfect for logos and icons you wish to retain sharpness on Retina screens or at different sizes.

Additionally, SVG files are written using XML, and so can be opened and edited in a text editor, that it can be manipulated on the fly, if you wish. For example, you could use JavaScript to change the colour of an SVG icon on a website much like you would some text (ie. no need for a second image).



## BMP:

* Old format. No loss of data.
* Not compressed - Stores value of each pixel. Hence pictures of the same dimensions have same filesize (kilobytes/megabytes). E.g., 800×600 BMP images are always 1.37 MiB like the popular WinXP wallpaper "Bliss" rolling hills.
* Transparency/translucency not supported
* Not recommended for anything

## JPG:

* Lossy compression.
* Loss amount can be set, e.g., while creating a graphic & saving in Photoshop.
* Saving as higher quality means less loss of colours/depth and high filesize, and vice versa.
* Transparency/translucency not supported
* Recommended for photographs, not for graphics/icons

## PNG:

* Lossless compression (yeah, best of both WORDS/worlds)
* Supports transparency AND translucency, both are different
* Recommended for static graphics/icons, not for photographs

## GIF:

* Supports transparency but not translucency
* Recommended for ANIMATED graphics/icons only
* Maybe the moving photographs in frames in Harry Potter are GIFs :D
* **JPEG**: up to 24-bit color (possibly more?), variable (usually high) compression, lossy, no alpha support
* **PNG**: up to 48-bit color, moderate compression, lossless, alpha support
* **BMP**: up to 24-bit color, very little compression, lossless, alpha support
* **GIF**: up to 8-bit color, little compression, lossless, transparency support, animation support

**Color Depth**

* 8-bit color == 256 colors
* 24-bit color == 16,777,216 colors
* 48-bit color == 281,474,976,710,656 colors

Most computer monitors run at 24-bit color depth. The human eye can distinguish about that many colors. Additional color depth is mostly to be able to retain information from a sensor so that manipulation of a photograph has more data to work with. Trying to represent a photograph in 8-bit color is going to result in graininess.

PNG is a newer format, and PNG-8 (the indexed version of PNG) is really a good replacement for GIFs. Sadly, however, it has a few drawbacks: Firstly it cannot support animation like GIF can (well it can, but only Firefox seems to support it, unlike GIF animation which is supported by every browser). Secondly it has some support issues with older browsers like IE6. Thirdly, important software like Photoshop have very poor implementation of the format. (Damn you, Adobe!) PNG-8 can only store 256 colours, like GIFs.

GIF uses lossless compression, meaning that you can save the image over and over and never lose any data. The file sizes are much smaller than BMP, because good compression is actually used, but it can only store an Indexed palette. This means that [for most use cases](https://webmasters.stackexchange.com/a/39904/7654), there can only be a maximum of 256 different colours in the file. That sounds like quite a small amount, and it is.

GIF images can also be animated and have transparency.

Good for: Logos, line drawings, and other simple images that need to be small. Only really used for websites.

* **Lossless** means that the image is made smaller, but at no detriment to the quality.
* **Lossy** means the image is made (even) smaller, but at a detriment to the quality. If you saved an image in a Lossy format over and over, the image quality would get progressively worse and worse.

## TIFF:

TIFF is a very adaptable format that allows for multiple pages in a single file, similar to a PDF document. TIFF also supports both lossless and lossy compression, allowing for each page to be compressed differently. Of all the image formats, this one is the best solution for digitizing workplace documents.

TIFF can be compressed using JPEG compression, which is lossy but combines the reduced file size with the ability to have multiple images in one file.

When comparing TIFF vs PNG, similar to PNG, TIFF can be a lossless format, which means that essentially, what you see is what you get. It is commonly used in the layout of newspapers, magazines and the like, because a TIFF (or TIF) will appear on the printed page just as it appears on a computer monitor. That also makes it a good choice for scanned documents – and actually, that’s exactly what the format was first developed for in the 1980s.

**BENEFITS:**Can have more than one page per file (multipaged); can be lossless to allow editing and re-saving without losing image quality; the choice of document archiving and publishing professionals worldwide.

**DRAWBACKS:**Not all TIFF image viewers support viewing multipage TIFF images.

## RAW Image Files (.raw, .cr2, .nef, .orf, .sr2, and more)

RAW images are images that are unprocessed that have been created by a camera or scanner. Many digital SLR cameras can shoot in RAW, whether it be a .raw, .cr2, or .nef. These RAW images are the equivalent of a digital negative, meaning that they hold a lot of image information, but still need to be processed in an editor such as Adobe Photoshop or Lightroom.

**Compression:** None
**Best For:**Photography