

Popular File Formats

4.1 Image File Formats

Selecting an appropriate file type for saving an image is crucial. For images intended for web pages, a small file size is preferred to ensure fast loading. The choice of file type also depends on the desired image quality that the format can support. Another important factor is the portability of the file, referring to how easily it can be transferred, displayed, or used across different devices, platforms, and applications. The main factors to consider when choosing an image file type include:

1. The file size (large or small)
2. The image quality supported by the file type
3. The portability of the file across various platforms

4.2 Standard System-Independent Formats: are image file types that can be used across different platforms, operating systems, and software without relying on specific hardware or OS-dependent programs. These formats maintain compatibility, quality, and accessibility regardless of the system being used. Some of the most widely used system-independent image formats include:

- 1. Graphics Interchange Format (GIF):** It is a bitmap image format developed in 1987 and is widely used on the web. **Its file extension (.gif)**, GIF uses **lossless** compression through the Lempel–Ziv–Welch (LZW) algorithm, which means that image quality remains the same as the original after compression and allowing it to reduce file size without sacrificing image quality. **GIFs support up to 8 bits per pixel**, meaning they can display up to 256 colors from a 24-bit RGB color space. This limited color depth makes it best suited for **simple graphics, logos, and icons rather than complex photographs**. One of GIF's most popular features is its support for animations. GIFs support single-bit transparency as explain in Figure The main drawbacks of **GIFs are the limited**

color depth and lack of support for partial transparency, making them less suitable for high-quality images and complex graphics.

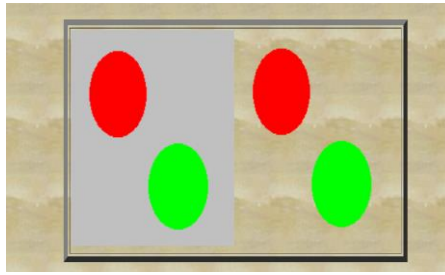


Figure 1. GIFs support single-bit transparency

- 2. Portable Network Graphics (PNG):** it is a popular, versatile image format known for its **high-quality compression and support for transparency**. It was created as an **improved to the GIF format**. PNG uses zip technology for compression. Its **file extension** is (.png). PNG uses **lossless compression**, supports a wide range of color depths, from 8-bit (256 colors) to **24-bit** (16 million colors) and even (**48-bit** colors) for high-color images. This broad support makes it ideal for both simple graphics and complex images with rich color. PNG supports full alpha transparency, allowing images to have varying degrees of opacity. This means parts of a PNG image can be fully or partially transparent. PNG is not the best choice for photographs, as the files can become quite large compared to formats like JPEG. It's also not suitable for animations, as it lacks built-in animation support.
- 3. Joint Photographic Experts Group (JPEG/JPG):** It is one of the most popular image formats, particularly for photographs and complex images with many colors. Its file extension is (.jpg or .jpeg). JPEG uses **lossy compression**, which significantly reduces file size by discarding some image data. JPEG supports **24-bit color**, allowing it to display over 16 million colors, making it ideal for images with complex color variations, like photographs. JPEG **does not support** transparency. Every pixel is opaque. The main limitation is its lossy compression. This "lossy" nature means that JPEG is not ideal for images

needing repeated editing and saving or requiring high precision and does not support animation.

- 4. Tagged Image File Format (TIFF)** is a flexible, high-quality image format commonly used in photography, publishing, and professional graphics. Its file extension is (.tif). TIFF supports various compression methods: Lossless compression (like LZW), Uncompressed options for maximum image. TIFF files support a wide range of color depths, including: 8-bit (256 colors per channel), 24-bit (16 million colors), 48-bit and even 64-bit (for high dynamic range and color accuracy), making it ideal for detailed, professional-grade images. TIFF supports transparency and multiple layers. TIFF files are generally larger than other formats like JPEG, due to their high quality. This makes them less suitable for web use and in mobile applications. TIFF is widely supported across graphic design, photo editing, and support animation.

4.3 System Dependent Formats

1. Microsoft Windows: BMP

A system standard graphics file format for Microsoft Windows. Used in Many PC Graphics programs. It is capable of storing 24-bit bitmap image.

2. Macintosh:

PAINT and PICT

- PAINT was originally used in MacPaint program, initially only for 1-bit monochrome images.
- PICT is a file format that was developed by Apple in 1984 as the native format for Macintosh graphics. The PICT format is a meta-format that can be used for both bitmap images and vector images though it was originally used in MacDraw (a vector based drawing program) which means could store complex graphics, including shapes, text, and bitmap data, using a format that represented graphic commands (meta-commands), which allowed for highly structured and detailed images.