

Common File Formats

Definitions:

- *CODEC* : *software* that compresses and decompresses digital media--usually videos. Each file format has a related CODEC a computer uses to play or record the media presentation. Video CODECs most often use a lossy compression format.
- *Compression*: computer reduces the size of a file by replacing redundancies found in the file with mathematical notations. Compressed files must be "uncompressed" before they can be used. As a result, compressed files can take more time to open and save, but take up less space.
- *Digital Rights Management*: used to support copyrighted materials by providing access control to restrict usage of media to specific computers with owners who have paid for the right to use the related materials.
- *Lossless compression*: accounts for all the data bits when compressed. This results in a somewhat larger file, but the quality does not degrade when it is compressed many times. Examples: GIF and PNG.
- *Lossy compression*: each time a file is compressed, some of the data bits are discarded. This results in smaller files. The first few times this happens, it doesn't really detract from the file's content, because the human eye or ear cannot distinguish such a small loss of data. But when the data is repeatedly compressed, the file's quality will discernibly degrade. Examples: JPG and MP3
- *Read-only file*: file that can be viewed, printed and copied, but cannot be changed. Example: PDF
- XML (EXtensible Markup Language): a set of coding rules used to identify a document's critical elements: headings, footers, page layout, author, etc.
- *IMB (Megabyte)*: one million storage locations. For example, the word "hello" takes up 5 storage locations on your hard disk or USB drive.

IMAGE FORMATS

JPEG (Joint Photographers Experts Group)

JPEG supports either 8-bit or 24-bit color, employs lossy compression, and uses the `.jpeg` or `.jpg` filename extensions. Digital cameras often save images in a JPEG file format.

PNG (Portable Network Graphics)

PNG supports both 8-bit and 24-bit color, employs lossless compression, and uses the `.png` filename extension. It is currently an open standard, which means that anyone is free to use it.

GIF (Graphics Interchange Format)

GIF supports 8-bit color, employs lossless compression, and uses the `.gif` filename extension. There are three forms of the GIF format:

1. Plain GIF, in which the picture looks like a snapshot.
2. Transparent GIF, in which the background is invisible, so the image seems to be painted directly on the page.
3. Animated GIF, in which a series of still GIF images are quickly changed to create simple animation.

One concern about using this format is that from time to time Unisys begins to talk about charging royalties for using their compression software. In industries that depend upon graphical content, that is a serious threat and as a result the PNG (see below) lossless compression format has been developed.

BMP (Bit Mapped Picture)

BMP supports 1, 4, 8, and 24-bit color, does not employ compression, and uses the `.bmp` filename extension. It is a standard Windows image format that is created using Microsoft's Paint or Paintbrush programs. Windows desktop wallpaper uses BMP files. Since no compression is used, BMP files are very large.

SVG (Scalar Vector Graphic)

SVG files use the `.svg` filename extension and are based on mathematically determined points, lines and curves, rather than a grid of pixels. As a result a SVG file is physically small, while the image is easily scaled either larger or smaller without losing clarity. This graphic format includes text and designers can make these images interactive by allowing users rotate them with a mouse. A SVG can even be animated. This is a new file format (since 2001) and not widely used.

TIFF (Tagged Image File Format)

TIFF supports 1, 4, 8, and 24 bits per pixel and uses the filename extensions of `.tif` and `.tiff`. This file format was once commonly used to exchange documents between different computer platforms. There are six different "flavors" of TIFF files, so any one TIFF file may not be correctly displayed if the user's viewing software expects one of the other "flavors."

EXIF (Exchangeable Image File Format)

EXIF is incorporated in the JPEG writing software of many cameras. It contains metadata about the image captured. The file may contain information about shutter speed, exposure, image size,

compression, and other camera settings and details. The purpose is to standardize the exchange of images with image metadata between digital cameras and viewing and editing software.

Raw

Raw refers to a family of image file formats that are options on some digital cameras. Raw image files contain minimally processed image data from the image sensor of a digital camera or a scanner. These image files are not yet processed and are not ready to be printed or edited with a graphics editor. The purpose of raw image formats is to save, with minimum loss of information, data obtained from the sensor, and the conditions surrounding the capturing of the image (the metadata). Each manufacturer uses its own file extension name. For example Sony uses `.arw`, Kodak uses `.dcr`, and Nikon use `.nef`.

EPS (Encapsulated Post Script)

EPS files use the `.eps` or `.epsf` file name extension and are more or less self-contained, reasonably predictable PostScript documents that describe an image or drawing and can be placed within another PostScript document.

AI (Adobe Illustrator Art Work)

An adobe proprietary file type using the `.ai` file extension that represent single-page vector-based drawings created using Adobe Illustrator.

SWF (Originally ShockWave Flash, now means Small Web Format)

SWF files use the `.swf` file extension and is a format for multimedia, vector graphics and ActionScript in the Adobe Flash environment. SWF files can contain animations or applets of varying degrees of interactivity and function. Currently, SWF functions are the dominant format for displaying "animated" vector graphics on the Web.

PSD (Photoshop Document)

Photoshop documents can come with the `.psd` or `.psb` extension. As Photoshop's native format, stores an image with support for most imaging options available in Photoshop. These file formats can be exported to and from Adobe Illustrator, Adobe Premiere Pro, and After Effects, to make professional standard DVDs and provide special effects services, such as backgrounds, textures, and so on, for television, film, and the Web.

AUDIO/SOUND/MUSIC FORMATS

MPEG (Moving Picture Experts Group) Audio

MPEG files employ lossy data compression and use the `.mp3` filename extension. Digital music, pod casts and audio books are often saved as MPEG3 files. Older MPEG files are usually designated with an extension of `.mp2`. Computers using MPEG3 need a 16-bit sound card. One minute of music takes up approximately 1MB of storage space.

WAVE (Resource Interchange File Format Waveform)

Wave files employ an uncompressed audio format that uses `.wav` filename extensions. This file format is a proprietary format that was sponsored jointly by Microsoft and IBM. The `.wav` format can support both monaural (single-channel) and stereo (multichannel) audio. One minute of stereo music takes up approximately 10MB of storage space.

MIDI (Musical Instrument Digital Interface)

MIDI files are very small, but are not compressed. They use `.mid` or `.midi` filename extensions. A MIDI file is not a recording of music being played; it is a description of how to create the sound based on predefined sounds, like a 6-string guitar or pipe organ. A MIDI recording never contains the human voice. A 10KB (10,000 storage locations) MIDI file could easily hold more than a minute of music.

WMA (Windows Media Audio)

WMA file formats use a lossy compression developed by Microsoft and is widely recognized by a variety of players and jukeboxes, like Winamp and MusicMatch. Windows Media Audio files use a `.wma` filename extension. However, I would recommend using the non-propriety MP3 format for saving and storing music files.

AIFF (Audio Integrated File Format)

AIFF uses the `.aiff` file extension and is the native audio file format developed by Apple for the Macintosh computer platform. It is an uncompressed audio format. This means that it is much larger in file size than MP3 but can support the highest possible audio recording quality as well as lower quality settings. AIFF can support music from the highest quality 48K recording through to lower quality recordings.

Ogg

Ogg is an audio compression format that uses the `.ogg` file extension. It's used to store and play digital music, but it differs in that it is free, open and unpatented.

Real Audio

Real Audio is a proprietary file format that uses `.rm`, `.ram`, `.ra` as file extensions. Used mainly for real-time streaming of audio and video it requires RealPlayer (Windows and Mac) software.

AAC (Advanced Audio Coding)

This is a standardized lossy compression and coding scheme for audio files that uses the `.aac` file extension. Intended to be the successor to MP3 format, AAC generally has better audio quality and is the default format for many digital audio players like the iPod, iPhone, iPad, Nintendo DS and others.

VIDEO FORMATS

MPEG (Motion Picture Experts Group) Video

MPEG files are also a common format for digital videos and movies and use the filename extensions of `.mpg` or `.mpeg`. The latest MPEG version, MPEG4, uses the `.mp4` filename extension. Don't confuse `.mpg` or `.mp4` video files with the popular `.mp3` audio (sound only) files.

MOV (QuickTime Movie)

The QuickTime video and movie file format was originally developed for the Apple Macintosh, but is now recognized by all personal computers. QuickTime movies use the `.mov` filename extension. Sometime you will see the `.qt` filename extension used as an alternative.

AVI (Audio/Video Interleave)

The AVI video and movie file format was originally developed by Microsoft for Windows-based personal computers and uses the `.avi` filename extension. It is the nominal standard for personal computers using Windows.

WMV (Windows Media Video)

WMV file formats are propriety to Microsoft licensed products and are not widely recognized by non-Windows players. Windows Media Video files use a `.wmv` filename extension. Files stored in this format are intended to be played, not edited.

RealVideo

RealVideo is a proprietary file format that uses `.rm`, `.ram`, `.ra` as file extensions. Used mainly for real-time streaming of audio and video it requires RealPlayer (Windows and Mac) software.

Shockwave Flash

See **SWF** under Image Formats above

TEXT FORMATS

DOC/DOCX (Word Document)

Microsoft's Word (word processing) software saves documents using the .doc filename extension. These files contain special formatting codes that identify how the text will look (bold, italic, color, typeface, etc.) as well as how the page lays out (margins, indentation, pagination, etc.). This file format was superseded in Word 2007 with the .docx filename extension. DOCX files incorporate XML (EXtensible Markup Language) coding rules that help integrate a document with Internet applications. As a result, earlier versions of Word cannot read DOCX documents, but Microsoft does provide software that converts DOC documents into a DOCX format. Word 2007 can read DOC documents and is able to save new documents in a DOC format when using the Save As option.

RTF (Rich Text Format)

RTF documents are designed to transfer documents between word processing software. These files use .rtf filename extensions. While the text formatting options are as "rich" as those used by Word, RTF files have limited page layout options. For example, you cannot create columns, add page numbers, headers, or footers. The WordPad word processor included with Windows defaults to creating RTF documents.

TXT (Text Only)

TXT documents only contain text. No formatting options, like bold or center, are available. Any computer can read a TXT file, but don't expect it to look pretty. The Notepad text editor included with Windows defaults to creating TXT documents.

OTHER FORMATS AND BROWSER PLUGINS

HTML (HyperText Markup Language)

HTML files contain codes that browsers, like Internet Explorer or Safari, translate into Web pages and use either `.htm` or `.html` filename extensions. You can examine a Web page's HTML code by opening the browser's View menu and selecting the Source or Page Source option.

PDF (Portable Data Format)

PDF files use a `.pdf` filename extension and are created using a software package from Adobe called Acrobat. This software must be purchased and converts files created by other software, like Microsoft's Word, into a read-only PDF file. These files are viewed using a software package called Adobe Reader, once called Acrobat Reader, which must be independently obtained (for free) and installed. You need to have a copy of Adobe Acrobat to change a PDF file.

ODF (Open Document Format)

The Open Document Format for Office Applications is an XML-based file format for representing electronic documents such as spreadsheets, charts, presentations and word processing documents. The file extensions used for the different types of documents are `.odt` (text documents), `.ods` (spreadsheets), `.odp` (presentations), `.odb` (databases), `.odg` (graphics) and `.odf` (mathematical formulae). Most commonly, the free OpenOffice suite of software is used to create these types of files. Just about all office productivity software programs can open and/or edit these types of files.

ZIP (Created by WinZip)

ZIP files are compressed data files that use the `.zip` filename extension. A popular shareware program called WinZip originally used this format. At one time you needed to use WinZip to compress (zip) and uncompress (unzip) ZIP files, but many personal computers now recognize this file format and will unzip the files. ZIP files can contain several compressed files under one filename, called an archive, when using the WinZip software. As a result you could unzip a file (archive) named `testbank.zip` and find it contains 12 unique files for a 12-chapter textbook.

.NET

According to Microsoft, the .NET framework is an integral part of many applications running on Windows and provides common functionality for those applications to run. Programs written for the .NET Framework execute in a software environment, as contrasted to hardware environment).

JAVA PLUGIN

The Java Plugin allows you to view Java applets. Applets are used to provide interactive features to web applications that cannot be provided by HTML alone.

FLASH PLAYER PLUGIN

The Flash Player Plugin is required for viewing animations and movies using computer programs such as a web browser. Flash Player runs SWF files that can be created by the Adobe Flash authoring tool, by Adobe Flex or by a number of other Macromedia and third party tools.