4.4 Data System - Files

Files

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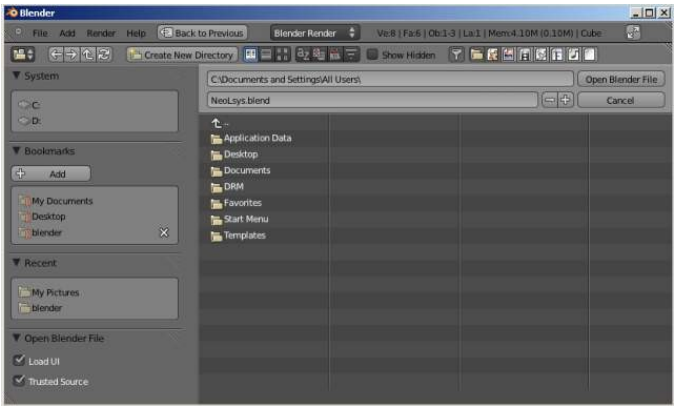
Introduction

The options to manage files are:

New
Clears the current scene and loads startup.blend
Open
Open a blend file
Open Recent
Displays a list of recently saved .blend files to open
Recover last session
This will load the quit.blend file Blender automatically saves just before exiting. So this option enables you to recover your last work session, e.g. if you closed Blender by accident
Recover Auto Save
This will open an automatically saved file to recover it.
Save
Save the current blend file.
Save As
Opens file browser to specify file name and location of save.
Save Copy
Saves a copy of the current file.
User Preferences
Opens the user preferences dialog.
Save User Settings
Saves the current scene and preferences to startup.blend.
Load Factory Settings
Restore the default scene to the factory settings.
Link or Append
You don’t have to load a complete file, you can load in only selected parts from another file if you wish.
Import
Blender can use information stored in a variety of other format files which are created by other graphics programs.
Export
Normally you save your work in a .blend file, but you can export some or all of your work to a format that can be processed by other graphics programs.
External Data
Pack into .blend
Pack all used external files into the .blend
Unpack into Files
Unpack all files packed into this .blend to external ones
Make all paths Relative
Make all paths to external files relative to current .blend
Make all paths Absolute
Make all paths to external files absolute
Report Missing Files
Report all missing external files
Find Missing Files
Try to find missing external files

Opening Files



Usage

Reference
Menu: File ‣ Open Hotkey: `Ctrl-O` or `F1`

The upper text box displays the current directory path, and the lower text box contains the selected filename.

Warning

For Linux and Mac-OSX users:

When existing you are **not** asked to save unsaved changes to the scene you were previously working on. So take care to save your work.

On MS-Windows there is a Save & Load option to warn on exit.

Options

Load UI
: Inside each .blend file, Blender saves the user interface arrangement. By default, this saved UI is loaded, overriding any user defaults or current screen layouts that you have. If you want to work on the blend file using your own defaults, start a fresh Blender, then open the file browser and turn off the *Load UI* button, and then open the file.

Trusted Source
: When enabled, Python scripts and drivers that may be included in the file will be run automatically. Enable this only if you created the file yourself, or you trust that the person who gave it to you did not include any malicious code with it. See *Scripting & Security* to configure default trust options.

Other File Open Options

From the *File* menu, you can also open files with the following tools:

Open Recent
: Lists recently used files. Click on one to load it in.

Recover Last Session
: This will load the `quit.blend` file Blender automatically saved just before exiting. This option enables you to recover your last work session if, for example, you closed Blender by accident.

Recover Auto Save
This will allow you to open an automatically saved file to recover it.

See also
Auto Saves

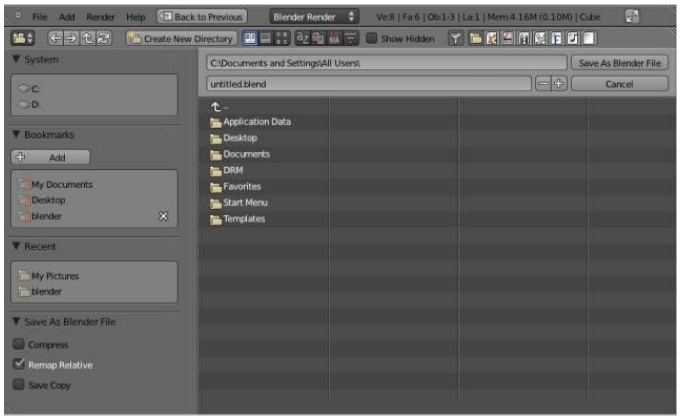
Saving Files

Reference
Editor: Info Menu: File

There are a number of slightly different methods you can use to save your blend file to your hard drive:

Save (`Ctrl-S`, `Ctrl-W`)
Save an existing blend file over itself.
Save As (`Ctrl-Shift-S`, `F2`)
Choose a file to save the blend to.
Save Copy (`Ctrl-Alt-S`)
Choose a file to save the blend to, but return to editing the original file upon completion. This can be used to save backups of the current working state without modifying the original file.

If the file name doesn't end with `.blend`, the extension is automatically appended. If a file with the same given name already exists, the text field will turn red as a warning.



Tip
Use the **plus**/**minus** buttons to the right of the file name, or `NumpadPlus`/`NumpadMinus` to increase/decrease a number at the end of the file name (e.g. changing `file_01.blend` to `file_02.blend`).

Options

The save options appear at the bottom of the sidebar.

Compress File
When enabled, the saved file will be smaller, but take longer to save and load.
Remap Relative
This option remaps *relative paths* (such as linked libraries and images) when saving a file in a new location.
Save Copy
This option saves a copy of the actual working state, but does not make the saved file active.
Legacy Mesh Format
Save the blend file, but ignore faces with more than 4 vertices (“ngons”) so that older versions of Blender (before 2.63) can open it.

See also
Auto Save

Importing and Exporting Files

Blender supports import and export to and from other file formats (e.g. OBJ, FBX, 3DS, PLY... etc).

These formats can be accessed from the menus: File ‣ Import and File ‣ Export.

Popular formats are enabled by default, other formats are also supported and distributed with Blender, these can be enabled in the user-preferences through the use of *Add-ons*.

A list of these add-ons can be found on the Blender Add-ons Catalog

Relative Paths

Many Blender files reference external images or other linked `.blend` files. A path tells Blender where to look for these files. If the external files are moved, the blend file that references them won’t look right.

When you specify one of these external files, the default option is to make the path relative. Blender stores a partial path evaluated relative to the directory location of the referencing blend file. This choice helps when you need to reorganize folders or move your files.

With a relative path you can move the `.blend` file to a new location provided the externally linked files are moved along with it. For example you could send someone a folder that contains a .blend file and a sub-folder of external images that it references.

Most file selection windows provide a *Relative Path* check box, or when you type in a path into a text field, use a double slash prefix (`//`) to make it so.

Relative paths is the default but this can be changed in the *File Preferences Tab* of the User Preferences Editor.

Note
You can’t enter relative paths into a new *untitled* blend file. Save it before linking to external files.

Hint

If it's necessary to relocate a blend file relative to its linked resources, use Blender's File *Save As* function which has an option to *Remap Relative* file links.

Supported Graphics Formats

Image Formats

This is the list of image file formats supported internally by Blender:

Format	Channel Depth	Alpha	Metadata	DPI	Extensions
BMP	8bit	✗	✗	✓	`.bmp`
Iris	8bit	✓	✗	✗	`.sgi .rgb .bw`
PNG	8, 16bit	✓	✓	✓	`.png`
JPEG	8bit	✗	✓	✓	`.jpg .jpeg`
JPEG 2000	8, 12, 16bit	✓	✗	✗	`.jp2 .jp2 .j2c`
Targa	8bit	✓	✗	✗	`.tga`
Cineon & DPX	8, 10, 12,16bit	✓	✗	✗	`.cin .dpx`
OpenEXR	float 16, 32bit	✓	✓	✓	`.exr`
Radiance HDR	float	✓	✗	✗	`.hdr`
TIFF	8, 16bit	✓	✗	✓	`.tif .tiff`

Hint

If you aren't interested in technical details, a good rule of thumb for selecting an output formats for your project is:

Use OpenEXR
: if you intend to do compositing or color-grading on these images.

Use PNG
: if you intend on-screen output or encoding into multiple video formats.

Use JPEG
: for on-screen output where file size is a concern and quality loss is acceptable.

All these formats support compression which can be important when rendering out animations.

Note

Quicktime

On OSX, Quicktime can be used to access file formats not natively supported (such as GIF).

Channel Depth

Image file formats support a varying number of bits per pixel. This effects the color quality and file-size.

Commonly used depths:

8 bit ***(256 levels)***
: Most common for on-screen graphics and video

10,12,16 bit ***(1024,4096,65536 levels)***
: Used for some formats focusing on photography and digital film formats (such as DPX and JPEG 2000).

16 bit half float
: Since full 32bit float is often more than enough precision, half float can save on disk-space while providing high dynamic range.

32 bit float
: Highest quality color depth.

Internally Blender's image system supports either:

- 8 bit per channel (4 x 8 bits).
- 32 bit float per channel (4 x 32 bits) - *using 4x as much memory.*

  Images higher than 8 bits per channel will be converted into float on loading into Blender.

Note

Floating point is often used for HDRI,

When an image has float colors, all imaging functions in Blender default to use that. This includes the Video Sequence Editor, texture mapping, background images, and the Compositor.

Metadata

Blender can save details such as render-time, marker, camera... etc, into the file. See: *Render Metadata*.

Only some files support this however.

Format Details

Cineon & DPX

Cineon is Kodak's standard for film scanning, 10 bits/channel and logarithmic. DPX has been derived from Cineon as the ANSI/SMPTE industry standard. DPX supports 16 bits color/channel, linear as well as logarithmic. DPX is currently a widely adopted standard used in the film hardware/software industry.

DPX as well as Cineon only stores and converts the "visible" color range of values between 0.0 and 1.0 (as

result of rendering or composite).

OpenEXR

ILM's OpenEXR has become a software industry standard for HDR image files, especially because of its flexible and expandable structure.

An OpenEXR file can store multiple layers and passes. This means OpenEXR images can be loaded into a compositor keeping render layers, passes intact.

Output Options

Available options for OpenEXR render output are:

Half
: Saves images in a custom 16 bits per channel floating point format. This reduces the actual "bit depth" to 10 bits, with a 5 bits power value and 1 bit sign.

Zbuf
: Save the depth information. In Blender this now is written in floats too, denoting the exact distance from the camera in "Blender unit" values.

Preview
: On rendering animations (or single frames via command line), Blender saves the same image also as a JPEG, for quick preview or download.

Compression

: *This button is below the Image menu button, default set to "None"*

`PIZ`
: lossless wavelet compression. Compresses images with grain well.

`ZIP`
: standard lossless compression using zlib.

`RLE`
: runlength encoded, lossless, works well when scanlines have same values.

`PXR24`
: lossy algorithm from Pixar, converting 32 bits floats to 24 bits floats.

Radiance HDR

Radiance is a suite of tools for lighting simulation. Since Radiance had the first (and for a long time the only) HDR image format, this format is supported by many other software packages.

Radiance (.hdr) files store colors still in 8 bits per component, but with an additional (shared) 8 bits exponent value, making it 32 bits per pixel.

Supported Video Formats

Video Formats

These formats are primarily used for compressing rendered sequences into a playable movie (they can also be used to make plain audio files).

A codec is a little routine that compresses the video so that it will fit on a DVD, or be able to be streamed out over the Internet, over a cable, or just be a reasonable file size. Codecs compress the channels of a video down to save space and enable continuous playback. *Lossy* codecs make smaller files at the expense of image quality. Some codecs, like H.264, are great for larger images. Codecs are used to encode and decode the movie, and so must be present on both the encoding machine (Blender) and the target machine. The results of the encoding are stored in a container file.

There are dozens, if not hundreds, of codecs, including XviD, H.264, DivX, Microsoft, and so on. Each has advantages and disadvantages and compatibility with different players on different operating systems.

Most codecs can only compress the RGB or YUV color space, but some support the Alpha channel as well. Codecs that support RGBA include:

- animation (quicktime)
- PNG TIFF Pixlet - not loss-less, and may be only available on Mac-OSX.
- Lagarith Loss-less Video Codec

AVI Codec
: AVI codec compression. Available codecs are operating-system dependent. When an AVI codec is initially chosen, the codec dialog is automatically launched. The codec can be changed directly using the *Set Codec* button which appears (*AVI Codec settings.*).

AVI Jpeg
: AVI but with Jpeg compression. Lossy, smaller files but not as small as you can get with a Codec compression algorithm. Jpeg compression is also the one used in the DV format used in digital camcorders.

AVI Raw
: Audio-Video Interlaced (AVI) uncompressed frames.

Frameserver
: Blender puts out frames upon request as part of a render farm. The port number is specified in the OpenGL User Preferences panel.

H.264
: Encodes movies with the H.264 codec. See Advanced Encoding.

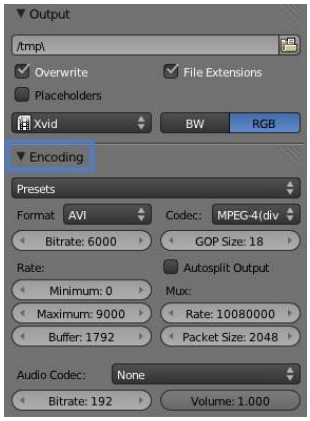
MPEG
: Encodes movies with the MPEG codec. See Advanced Encoding.

Ogg Theora
: Encodes movies with the Theora codec as Ogg files. See Advanced Encoding.

QuickTime
: Apple's Quicktime `.mov` file. The Quicktime codec dialog is available when this codec is installed on OSX. See *Quicktime* in Video Formats.

Xvid
: Encodes movies with the Xvid codec. See Advanced Encoding.

Advanced Encoding



If the *H.264*, *MPEG*, *Ogg Theora*, or *Xvid* codecs are chosen, an *Encoding* panel becomes available. This has settings for encoding these file types, and other formats using FFmpeg.

FFmpeg, short for Fast Forward Moving Pictures Expert Group, is a collection of free and open source software libraries that can record, convert and stream digital audio and video in numerous formats. It includes libavcodec, an audio/video codec library used by several other projects, and libavformat, an audio/video container mux and demux library.

Video Settings

Here you choose which video codec you want to use, and compression settings. With all of these compression choices, there is a tradeoff between file size, compatibility across platforms, and playback quality.

When you view the *System Console*, you can see some of the output of the encoding process. You will see even more output if you execute Blender as `blender -d`.

You can use the presets, DV, SVCD, DVD, etc. which choose optimum settings for you for that type of output, or you can manually select the format (MPEG-1, MPEG-2, MPEG-4, AVI, Quicktime (if installed), DV, H.264, or Xvid (if installed). You must have the proper codec installed on your computer for Blender to be able to call it and use it to compress the video stream.

Video Containers

MPEG-1: `.mpg`, `.mpeg`
: A standard for lossy compression of video and audio. It is designed to compress VHS-quality raw digital video and CD audio down to 1.5 Mbit/s.

MPEG-2: `.dvd`, `.vob`, `.mpg`, `.mpeg`
: A standard for “the generic coding of moving pictures and associated audio information”. It describes a combination of lossy video compression and lossy audio data compression methods which permit storage and transmission of movies using currently available storage media and transmission bandwidth.

MPEG-4(DivX): `.mp4`, `.mpg`, `.mpeg`
: Absorbs many of the features of MPEG-1 and MPEG-2 and other related standards, and adds new features.

AVI: `.avi`
: A derivative of the Resource Interchange File Format (RIFF), which divides a file’s data into blocks, or “chunks.”

Quicktime: `.mov`
: A multi-tracked format. QuickTime and MP4 container formats can use the same MPEG-4 formats; they

are mostly interchangeable in a QuickTime-only environment. MP4, being an international standard, has more support.

DV: `.dv`
An intraframe video compression scheme, which uses the discrete cosine transform (DCT) to compress video on a frame-by-frame basis. Audio is stored uncompressed.

H.264: `.avi` *for now.*
A standard for video compression, and is currently one of the most commonly used formats for the recording, compression, and distribution of high definition video.

Xvid: `.avi` *for now*
A video codec library following the MPEG-4 standard. It uses ASP features such as b-frames, global and quarter pixel motion compensation, lumi masking, trellis quantization, and H.263, MPEG and custom quantization matrices. Xvid is a primary competitor of the DivX Pro Codec.

Ogg: `.ogg`, `.ogv`
A free lossy video compression format. It is developed by the Xiph.Org Foundation and distributed without licensing fees.

Matroska: `.mkv`
An open standard free container format, a file format that can hold an unlimited number of video, audio, picture or subtitle tracks in one file.

Flash: `.flv`
A container file format used to deliver video over the Internet using Adobe Flash Player.

Wav: `.wav`
An uncompressed (or lightly compressed) Microsoft and IBM audio file format.

Mp3: `.mp3`
A highly-compressed, patented digital audio encoding format using a form of lossy data compression. It is a common audio format for consumer audio storage, as well as a de facto standard of digital audio compression for the transfer and playback of music on digital audio players.

Video Codecs

None
For audio-only encoding.

MPEG-1
See Video Formats.

MPEG-2
See Video Formats.

MPEG-4(DivX)
See Video Formats.

HuffYUV
Loss-less video codec created by Ben Rudiak-Gould which is meant to replace uncompressed YCbCr as a video capture format.

DV
See Video Formats.

H.264
See Video Formats.

Xvid
See Video Formats.

Theora
See Ogg in Video Formats.

Flash Video
See Video Formats.

FFmpeg video codec #1
A.K.A. FFV1, a loss-less intra-frame video codec. It can use either variable length coding or arithmetic

coding for entropy coding. The encoder and decoder are part of the free, open-source library libavcodec in FFmpeg.

Options

Bitrate
Set the average bitrate (quality), which is the count of binary digits per frame. See also: ffmpeg -b:v

Rate

The bitrate control also includes a *Minimum* and a *Maximum*.

Buffer
The decoder bitstream buffer size.

GOP Size
The number of pictures per Group of Pictures. Set to 0 for “intra_only”, which disables inter-frame video. From ffmpeg docs: “For streaming at very low bitrate application, use a low frame rate and a small GOP size. This is especially true for RealVideo where the Linux player does not seem to be very fast, so it can miss frames”

Autosplit Output
If your video is HUGE and exceeds 2Gig, enable Autosplit Output. The main control over output filesize is the GOP, or keyframe interlace. A higher number generally leads to a smaller file, but needs a higher-powered device to replay it.

Mux

Multiplexing settings.

Rate
Maximum bit rate of the multiplexed stream.
Packet Size
(Undocumented in ffmpeg)

Note
Standards Codecs cannot encode off-the-wall video sizes, so stick to the XY sizes used in the presets for standard TV sizes.

Audio Settings

Audio is encoded using the codec you choose.

Audio Codecs

MP2
A lossy audio compression format defined by ISO/IEC 11172-3.

MP3
See MP3 in Video Formats above.)

AC3
Audio Codec 3, an audio compression technology developed by Dolby Laboratories.

AAC

Advanced Audio Codec,” a standardized, lossy compression and encoding scheme for digital audio.

AAC generally achieves better sound quality than MP3 at similar bit rates.

Vorbis

An open-standard, highly-compressed format comparable to MP3 or AAC.

Vorbis generally achieves better sound quality than MP3 at similar bit rates.

FLAC
Free Loss-less Audio Codec. Digital audio compressed by FLAC's algorithm can typically be reduced to 50-60% of its original size, and decompressed into an identical copy of the original audio data.

PCM
Pulse Code Modulation, a method used to digitally represent sampled analog signals. It is the standard form for digital audio in computers and various Blu-ray, Compact Disc and DVD formats, as well as other uses such as digital telephone systems

Bitrate
For each codec, you can to control the bitrate (quality) of the sound in the movie. This example shows MP3 encoding at 128kbps. Higher bitrates are bigger files that stream worse but sound better. Stick to powers of 2 for compatibility.

Samplerate
Samplerate controls the number of samples per second of the audio. The default, 44100, is standard for many file types, including CD audio, and produces a high quality sound.

Volume
Set the output volume of the audio.

Tips

Choosing which format to use depends on what you are going to do with the image.

If you are animating a movie and are not going to do any post-processing or special effects on it, use either **AVI-JPEG** or **AVI Codec** and choose the XviD open codec. If you want to output your movie with sound that you have loaded into the VSE, use **FFMPEG**.

If you are going to do post-processing on your movie, it is best to use a frame set rendered as **OpenEXR** images; if you only want one file, then choose **AVI Raw**. While AVI Raw is huge, it preserves the exact quality of output for post-processing. After post-processing (compositing and/or sequencing), you can compress it down. You don't want to post-process a compressed file, because the compression artifacts might throw off what you are trying to accomplish with the post-processing.

Note that you might not want to render directly to a video format. If a problem occurs while rendering, you have to re-render all frames from the beginning. If you first render out a set of static images (such as the default PNG, or the higher-quality OpenEXR), you can stitch them together with an Image Strip in the *Video Sequence Editor (VSE)*. This way, you can easily:

- Restart the rendering from the place (the frame) where the problem occurred.
- Try out different video options in seconds, rather than minutes or hours.
- Enjoy the rest of the features of the VSE, such as adding Image Strips from previous renders, audio, video clips, etc.