

Frame rate: Frame rate is the number of individual images shown every second. Standard (NTSC) video has a frame rate of 29.97 frames per second (fps), and the standard for film is 24 fps. The European standard (PAL) is 25 fps. If you are not overly concerned with how big your file is, leave the frame rate at the default — “Current” — for the best quality. This will make the frame rate of your encoded file the same as the frame rate of your source material. However, you can choose to use a lower frame rate if you need to reduce bandwidth and CPU requirements for playback. Movies with higher frame rates show motion better but have larger file sizes. If you choose a frame rate that’s lower than the movie’s current frame rate, frames will be deleted. If you choose a number that’s higher than the movie’s current frame rate, existing frames will be duplicated (not recommended, since it increases file size without improving quality). When choosing a frame rate less than that of your source, use a simple fraction of your current frame rate, such as 1/2, 1/3 and so on. For example, if your current frame rate is 30 (29.97), use 15 or 10. But again, for best quality with H.264, leave the setting at “Current.”

c. Key Frames: Many compressors use “frame differencing” to compress moving images. Frame differencing is the process of determining what information has changed from a starting frame (called a “key frame”) to subsequent frames. The key frame contains all of the information for an image. Subsequent frames contain only the information that has changed. Depending on the compressor you use, you can specify how often you want key frames to occur. If you don’t have enough key frames, the quality of your movie might be lower because most frames are generated from others. On the other hand, more key frames result in a larger movie with a higher data rate. With some compressors, an additional key frame is inserted automatically if too much of the image has changed from one frame to the next. A good rule of thumb for general use is to have one key frame every 5 seconds (multiply the frames per second by 5). If you are creating a file for RTSP streaming and have concerns about the reliability of the delivery network (as with the public Internet), you may want to increase key frame frequency to one key frame every 1 or 2 seconds. To leave the key frame interval up to the compressor, select Automatic. For H.264, we recommend leaving the key frame interval up to the compressor; so you should choose “Automatic” for the best quality result.

d. Frame Reordering: Some more advanced compressors use “frame reordering” to more efficiently represent movie data. Frame reordering is the concept of allowing frames to be decompressed in a different order than their display order. For almost all cases, leave this box checked for H.264 encoding. The only time you would uncheck this box is if you are creating an H.264 movie that needs to be played back by an application that does not understand frame reordering, i.e., an application that does not yet use the new Frame Reordering APIs of QuickTime 7 or if someone asks you to create your content with “B-frames turned off.” If your audience will play back your movie with QuickTime 7 Player,

you should leave the box checked.

e. Data Rate (bit rate): In general, the higher the data rate, the better the quality, but the bigger the file. In most cases, you'll want to set a data rate based on the way your movie will be viewed. For example, for streaming to 384K broadband connections, you need to limit the data rate to around 350–360 kilobits per second to leave room for network traffic. If the file will be downloaded for playback, the data rate can be much higher (the higher the data rate, however, the longer a slow-connection user has longer to wait before playback begins). In addition, remember in this dialog you're setting the video data rate. You also need to leave some room for audio.

For H.264, here are some general guidelines:

- For a frame size of 1920 x 1080 (full high definition), choose a data rate of 7,000–8,000 Kbps.
- For a frame size of 1280 x 720 (commonly-used high definition), choose a data rate of 5,000–6,000 Kbps.
- For a frame size of 640 x 480 (standard definition), choose a data rate of 1,000–2,000 Kbps.
- For a frame size of 320 x 240 (Internet-size content), choose a data rate of 300–500 Kbps.
- For a frame size of 176 x 144 (3G), choose a data rate of 50–60 Kbps for 10–15 fps content, or up to 150–200 Kbps for 24–30 fps content.

As mentioned in the 3G example, it's important to keep in mind that the data rate of a movie is also affected by other compression options you set, such as the frame rate. So the higher your frame rate, the higher your data rate needs to be. If your data rate requirements aren't this strict and you'd just like QuickTime to give you a beautiful video, you can let the H.264 codec choose an appropriate data rate for your movie by selecting "Automatic." The codec will pick it's own data rate based on the Size you've chosen and your choice of Quality on the Quality slider (see below).

f. Optimized for: If you've entered your own data rate rather than choosing an Automatic data rate, you have the option to choose your intended delivery method from the "Optimized for" pop-up menu. This setting tells the codec how much the data rate can vary above and below the data rate you choose. For the best quality, choose Download. If you intend to deliver your movie via CD or DVD, choose CD/DVD where the data rate needs to be somewhat constrained so that the disc reader can keep up with reading and passing the data on to your viewer's computer. If you intend to deliver your movie via RTSP streaming, choose Streaming where the data rate will be most constrained. This

option is available only for compressors that can apply limits, such as H.264.

In the Compressor area, you'll find settings specific to each codec. For H.264 there are two settings:

g. Quality: As mentioned above, if you choose an Automatic data rate you must choose the level of quality you would like. If you type in your own data rate, the Quality slider is disabled.

h. Encoding mode: Finally, you need to choose encoding mode. It's highly recommend that you use Best quality (multi-pass) encoding for H.264. However, this option does take some time as the codec executes multiple passes to optimize your movie file for quality and efficiency. So if you're in a hurry or need to do a "draft" version of your encode, you can select the single-pass option for a faster encode.

Step 7. Click ok, and then click save.

Congratulations. You are now one of the thousands of people creating video with this brand new pristine standards-based format.

This is how to create beautiful H.264 video in the QuickTime Movie, or .mov format, which will play back using QuickTime 7 on Mac OS X v10.3.9 or later and Windows 2000/XP. If you need to create H.264 content to be played back by another company's device or software product, you'll need to create H.264 video in the MPEG-4 or .mp4 format. While most of the options are the same as above, you should know a few things.

To create an MPEG-4 file, choose Movie to MPEG-4, click options, choose MPEG-4 as the file format, H.264 as the video format, etc. Click video options, where you can choose what MPEG-4 profiles you'd like your file to comply with and choose multi-pass for the best quality. Remember, back on the main screen, Optimized for Download will give you the best quality, but if you plan to deliver your movie via RTSP streaming, you should change that setting to Streaming for a smoother playback experience.

In addition to H.264 being delivered in a .mov and .mp4 file, QuickTime 7 Pro also allows you to create H.264 for playback on upcoming new mobile phones. The incredible quality and efficiency of H.264 really brings video to life on mobile phones. The standard for video and audio on mobile phones is called 3G and, with QuickTime 7 Pro, here's how you create H.264 inside a 3G file. Just choose Movie to 3G, select the generic 3GP file format and then all the settings are the same as previously explained.

Also, because QuickTime is not just a product, but an architecture, H.264 is available for encoding in many applications from Apple and third parties.