

Appendix H

What's New in QuickTime 6

This appendix covers all the new features of QuickTime 6. Most of these features are integrated into the parts of the book where they belong, such as audio compressors, video enhancements, or EMBED tag extensions.

So why this appendix?

Mainly for the convenience of loyal readers familiar with QuickTime 5 and earlier, who want a quick guide to the new additions.

But also because, as QuickTime evolves, new features and capabilities are added that don't always fit into existing categories. It's becoming clear, for example, that MPEG, XML, and scripting are going to need their own sections. I resisted the temptation to completely reorganize the third edition of *QuickTime for the Web*, and settled for putting a few of the new features here. These aren't duck-billed platypus features in a Miscellaneous bin, however; they're fish with feet and lungs, and they're opening up new environments that will call for new classifications.

Hey, building the future is messy work at the edges, but it's exciting.

And speaking of excitement, within a few weeks of sending this book to the printer, QuickTime 6.3 was released. This appendix describes the new features of QuickTime 6.3 that don't appear elsewhere in the book.

These are the new features of QuickTime 6:

- MPEG-4 import, playback, editing, encoding, streaming, and export
- Support for 3GPP import, playback, editing, encoding, export
- New media types, audio and video codecs from outside Apple
- Flash 5 import, playback, and editing
- New wired actions and events
- ActiveX and plug-in scriptable in IE/Windows and Mozilla

- AppleScript recordability and enhancements
- QuickTime menu in Windows system tray
- Improvements to full-screen mode
- New XML importer to test for QuickTime components

All About MPEG-4

To say that MPEG-4 is an important addition to QuickTime would be a major understatement. QuickTime doesn't just play MPEG-4 files. It imports, plays, edits, encodes, exports, and streams MPEG-4. It works with MPEG-4 audio and video both in native .mp4 file format and as media in QuickTime movies. Consequently, MPEG-4 is discussed in several parts of this book.

These sections contain additional information about MPEG-4:

- "MIME Types and File Extensions" (page 134)
- "Checking for QuickTime Components" (page 169)
- "Recorded Music on the Web" (page 193)
- "I Want My MP3" (page 199)
- "Audio Codecs" (page 221)
- "Popular Audio Formats" (page 235)
- "Compressing Your Movie" (page 327)
- "Other Movie Formats" (page 357)
- All of Chapter 14, "Gently Down the Stream" (page 417)

What's So Great About MPEG-4?

Three things: the file format, the codecs, and the open standard.

MPEG-4 is both a file format and an expandable set of compressors and media types. It's based on the QuickTime file format, and has the same robust expandability and modular flexibility. It's designed for the future.

MPEG-4 provides new high-quality audio and video codecs that work beautifully for local, fast-start, video-on-demand streaming, and live streaming, from slow dial-up to fast DVD data rates.

MPEG-4 video compares well to the latest efforts from Sorenson, Microsoft, and Real. MPEG-4 audio (AAC) is better and faster than MP3, delivering higher quality at lower bandwidths. It's even designed to handle 5.1 surround sound for home theaters. These are outstanding codecs for Web, CD, DVD, or LAN delivery.

You can use MPEG-4 audio and video in QuickTime movies, or you can use the native .mp4 file format—you can export to .mp4 from QuickTime, stream hinted .mp4 files from QuickTime Streaming Server, and play .mp4 files and streams in QuickTime Player or the QuickTime browser plug-in.

MPEG-4 is an open standard that puts all the streaming audio and video players on a level playing field—you can stream MPEG-4 from QuickTime Streaming Server, or stream from any ISO-compliant source, and your streams will play in almost any media player: QuickTime, Real, Windows Media (with the appropriate plug-in), Envivo, and other players.

The Tricky Bit

The only tricky thing about MPEG-4 is remembering that .mp4 files *aren't* QuickTime movies, even though they're quite similar. QuickTime imports and exports .mp4 files, and can also use MPEG-4 compression for media in QuickTime movies, but those are two different things. You can't change a file from one format to the other by changing the file extension—you need to convert the actual file.

Important Never give a QuickTime movie the .mp4 file extension, even if it contains only MPEG-4 audio and/or video. Never give an MPEG-4 file the .mov file extension, even though it plays in QuickTime. They are separate file types. Mislabeling them will cause you nothing but heartache and grief (well, heartburn and gripes, at the very least).

.Mov or .MP4?

If you want to mix MPEG-4 video or audio with other QuickTime media, you should use the QuickTime file format (.mov files) for final delivery. A skinned QuickTime movie makes a great customized player for MPEG-4 streams, and MPEG-4 audio makes a great sound track for QuickTime movies.

If streaming audio and video are enough, and you want to reach the broadest possible audience, use the .mp4 file format—it will reach anyone with QuickTime, Real, Envivo, or any of the new MPEG-4 players coming out, including Windows Media Player (currently requires a plug-in).

Tip Have you noticed how many new DVD players (MPEG-2 encoding) now play MP3 CD-Rs as well? Don't be surprised when new MP3 and DVD players start handling MPEG-4.

Of course, you may want to use the .mp4 file format and still play Web content in QuickTime. That way your audience can transfer your file to other MP4 players (if you allow it), but you still control the appearance and behavior of the media; you can use the QuickTime `<EMBED>` parameters to define the presentation's look and feel. And QuickTime supports progressive download (fast-start) as well as streaming, so your .mp4 can go a little (or a lot) over the bandwidth limit without worry.

If you want to be sure your .mp4 files play in QuickTime, use `SRC` and `QTSRC` (and optionally `<OBJECT>` with `CLASSID` and `Codebase`) to direct the browser to use QuickTime. It's the same technique you'd use to play an MP3 file in QuickTime. For details, see "Using QuickTime to Play Files in Other Formats" (page 32).

Creating .mp4 Files

To create .mp4 files from QuickTime Player, choose **Export** (File menu), "Movie to MPEG-4", (pop-up menu), and click the **Options** button. This opens a dialog box with tabs for **General**, **Video**, **Audio**, **Streaming**, and **Compatibility**.

General

The **General** settings allow you to export audio, video, or both. You can make some choices about audio and video compressor settings here as well. One of your compression choices is **Pass Through**. Use this setting to export a QuickTime movie with MPEG-4 compression to the .mp4 file format without recompressing the data. This is a very fast operation and doesn't degrade audio or video quality at all.

The **Size** pop-up menu gives you three choices in the current release of QuickTime 6--**Current**, **320 x 240**, and **160 x 120**. If you need a different frame size, you can resize the movie and choose **Current**.

Note In QuickTime Player, you can resize a movie by opening the properties window (Movie menu, **Get Movie Properties**), choosing a video track from the left pop-up menu, and choosing **Size** from the right pop-up. Click the **Adjust** button and resize the track by dragging with the mouse (the properties pane shows the pixel dimensions as you drag). Click the **Done** button when you have the correct size. If there are multiple video tracks, resize the largest track and repeat as necessary until all the tracks are within the desired bounds.

Video

The Video settings allow you to set a video bitrate limit, frame rate, and keyframe rate. QuickTime 6.1 and later have a pop-up menu selection for Basic or Improved video compression as well.

Audio

The Audio settings allow you to set an audio bitrate limit, quality, sampling rate, and number of channels. You're currently limited to the low-complexity audio compressor and a choice of stereo or mono, but the MPEG-4 specification allows for more advanced audio compression, special voice compression, and 5.1 surround sound (among other things).

You'll find that MPEG-4's simple audio compressor allows only certain sampling rate and bitrate combinations. If you choose a bitrate inconsistent with your sampling rate, you'll see the sampling rate change; this causes your audio to be resampled during compression.

Tip Resampling sometimes degrades audio noticeably; you might get better sound by selecting a lower bitrate compatible with your actual sampling rate.

Compatibility

Text at the bottom of all the panels changes as you choose settings, to help you understand your choices and monitor ISO compliance. The Compatibility pane lets you override the selected audio and video settings to ensure ISO compliance. For more information, see "ISO Compliance" (page 722).

Streaming

The Streaming settings let you create a fast-start or streaming .mp4. If you choose streaming, QuickTime will add a hint track. You can choose this option with the codecs set to Pass Through to turn a fast-start movie with MPEG-4 compression into a hinted .mp4 without recompressing. For more information, see "Hinting for MPEG" (page 425).

You can stream .mp4 files using the QuickTime Streaming Server (version 4 or later), the Darwin Streaming Server (version 4 or later), or any ISO-compliant streaming server. QuickTime 6 can also play MP4 streams from any ISO-compliant source.

ISO Compliance

QuickTime will happily play any .mp4 file it can create. When you choose to make your .mp4 file ISO-compliant, you ensure that it can be played by any complaint MP4 player, not just by QuickTime. This restricts you to certain combinations of features that correspond to the feature sets defined for MP4 players.

The MPEG-4 specification covers more than just a video codec or an audio codec. It defines a rich set of multimedia, including such things as text and facial animation. No software is currently able to display all the different media described in the MPEG-4 specification, and the MPEG-4 specification is designed to grow. Consequently, MPEG-4 also defines feature sets, called Profiles, that list the subset of MPEG-4 features a particular player is guaranteed to support. This profile is also used to describe the feature set needed to play a particular movie.

A Profile 0 player, for example, can play simple MPEG-4 video at speeds up to 64 kbit/second and AAC audio at 44.1 and 48 kHz in mono or stereo. A Profile 0 movie doesn't require any other features for correct playback. Therefore, a Profile 0 player can play any Profile 0 movie.

A Profile 1 player has a larger required feature set that includes everything in Profile 0 as well as features such voice compression and higher bitrate video (up to 1.544 Mbits/sec).

QuickTime 6 is a Profile 0 player. It can play any Profile 0 movie.

QuickTime 6 also has some features of a Profile 1 player, such as the ability to handle higher bitrate video and improved video compression, so it can create and play many ISO-compliant Profile 1 movies. But it doesn't have the full Profile 1 feature set, so there are some Profile 1 movies QuickTime 6 can't play.

Similarly, you can create MPEG-4 files in QuickTime Player with video encoded at higher bitrates than 1.544 Mbits/sec. These files are not ISO-compliant Profile 1 movies, but if you know they're going to be played in QuickTime, you can use them anyway.

To ensure full interoperability with other players, create only ISO-compliant MP4 files, and use only profiles supported by your target audience's players—if your target is a profile 0 MP4 player on a game machine, create only profile 0 .mp4 files.

The 3GPP Story

The new 3GPP (3rd-generation partnership project) file format is, like MPEG-4, based on the QuickTime file format. It specifies the audio, video, and text formats for third-generation cellular phones that can display data as well as make telephone calls. QuickTime is an outstanding authoring platform for 3GPP.

QuickTime does not automatically include the 3GPP component. To add 3GPP capability to QuickTime, download the QuickTime 3GPP component from: www.apple.com/quicktime/products/ .

3GPP video can be compressed using the MPEG-4 or H.263 video codecs. It is limited to low bitrates and a selection of pixel dimensions suitable for small screens and busy wireless networks. QuickTime already includes the MPEG-4 and H.263 codecs. Exporting from QuickTime to .3gp brings up an export dialog that allows you to select from a set of valid compressors, screen sizes, and bitrates.

3GPP audio uses either the AAC audio codec or the AMR audio codec (a very low-bitrate codec specialized for realtime voice transmission). Install the QuickTime 3GPP component to add the AMR codec. Exporting from QuickTime to .3gp brings up an export dialog that allows you to select from a set of valid compressors, sample rates, and bitrates.

3GPP text (TX3G) is a time-based text format, similar in many ways to QuickTime text tracks, that allows text to be synchronized with audio or video, or to be scrolled at a controlled rate. The 3GPP component allows you to import text from .3gp files into QuickTime, and to export QuickTime text to 3GPP format. It also includes a new XML importer that allows you to author 3GPP text using QuickTime. This can also be used to create QuickTime text tracks that use Unicode text (UTF-8 or UTF-16).

Note Unicode normally uses 16 bits to represent a text character. Most PC and Mac text encoding uses only 8 bits, which is fine for the small character sets used in English and other Roman languages, but inadequate for the large character sets used in Japanese and Korean. Unfortunately, 16-bit encoding causes problems with some operating systems, such as UNIX, that expect 7-bit encoding and treat an 8-bit zero as the end of a text string. UTF-8 uses 7-bit encoding for the first 127 characters in a set, and uses a string of up to six bytes with the high-bit set to encode characters 128 -65535. It's backward-compatible with 7-bit encoding, and it's efficient for English and other languages with small character sets. It's inefficient for languages with large character sets, however, compared with UTF-16. QuickTime now supports both UTF-8 and UTF-16 versions of Unicode.

One way to create 3GPP text is to simply create a QuickTime text track and export to 3GPP using File > Export in QuickTime Player. Another way, which you might prefer, is to export QuickTime text to XML. This creates an editable XML file that tells QuickTime how to construct a text track using 3GPP syntax. You can modify this file in any way that 3GPP text supports, import it into QuickTime, and export it to 3GPP. This is a good way to specify vertical (top-to-bottom) text flow instead of horizontal (left-to-right) text flow, for example.

The XML specifications are documented on the Apple website at: developer.apple.com/documentation/QuickTime/whatsnew.htm.

Hey, you probably noticed that 3GPP can use the MPEG-4 audio and video codecs, as well as H.263 video and AMR audio. That's because what would have been yet another standard, Mobile MPEG-4, has been happily absorbed into 3GPP. The former Mobile MPEG-4 format is now a valid subset of the 3GPP format. Just in case you ever need to know.

By the way, some mobile phones can store video on SD compact memory cards. These use the .sdv file format. An .sdv file is essentially a different wrapper for 3GPP video.

You can open and play 3GPP files in their native .3gp or .sdv format using QuickTime. This is primarily useful for testing 3GPP material before putting it on the network. (Who really wants to use a 17" monitor and a stereo amplifier to emulate a 2" cell phone screen and 1" speaker?)

You can export any QuickTime movie to .3gp format, but the format supports only small screens, low bit rates, and a few codecs; for good-looking results, start with suitable material and compress directly to 3GPP. Also, remember that the format supports only video, audio, and text, so any other media, such as Flash, VR, and sprites, are discarded during export.

New Media Types and Codecs

The component download program and modular architecture of QuickTime are beginning to pay huge dividends. People and companies outside of Apple are adding surprising new capabilities to QuickTime even as you read this.

There are interactive 3D modeling media types, interactive ray-trace rendering media types, immersive 360° movie media types, advanced audio and video codecs, multiple-resolution codecs that download visual detail on demand, popular Windows Media codecs, open source codecs—the list just keeps growing. Some are part of the QuickTime component download program, others are completely independent.

The media types and codecs on the component download program have copies of their decompressors (and sometimes more) on Apple's Internet file servers. If someone in your audience tries to play a movie that needs the component, and they don't already have it, QuickTime offers to get it, install it, and let them play the movie. This lets you author and distribute movies with these new media types and codecs without worrying about whether your audience has them—if they need them, QuickTime will get the components for them.

For a current list of components on the QuickTime component download program, visit the Web at

www.apple.com/quicktime/products/qt/components/

Other components need to be either downloaded by your audience ahead of time or distributed by you. Even so, this lets you add anyone with QuickTime to your possible audience, without having to write your own player applications or browser plug-ins for Windows and Macintosh, and it makes it possible to add sound, still images, video, text, and any other QuickTime media to your specialized content without having to do any of that yourself.

For a partial list of third-party components now available, see:

- "QuickTime-Compatible Codecs" (page 349)
- "Vector Graphics" (page 482)
- "Popular Audio Formats" (page 235)
- "Creating QTVR Panoramas" (page 565), especially "Zoomify It?" (page 582)

Flash 5

QuickTime 6 allows you to add Flash 5 (and earlier, of course) .swf files to your QuickTime movies as Flash tracks. This includes the greatly expanded set of Flash actions and action scripts in Flash 5. With additional software, such as LiveStage Pro, you can add QuickTime actions and event handlers to Flash media.

There's also a new "Enable Mouse Capture" checkbox in the Properties panel for Flash tracks (QuickTime Player > Movie Menu > Get Movie Properties). Because some new Flash actions capture mouse events that take place outside their track areas, it's possible to create obstructions between Flash tracks, QuickTime sprites, and movie controllers. If you find one track is blocking access to an underlying track, you can try rearranging the layers. If that doesn't resolve things, use the new Properties entry for your Flash track to disable mouse capture.

For more about QuickTime and Flash, see

- “Vector Graphics” (page 482), especially “Flash Vectors” (page 484)
- “Flash Sprites” (page 493)
- “Flash Tracks” (page 429)
- “Shocking Behavior with Flash Tracks” (page 463)

New Wired Actions

QuickTime 6 adds some significant new wired actions.

Note You need either prebuilt wired sprites (“widgets”) or software that supports QuickTime scripting to create movies that use these actions.

- **Dynamic image loading for sprites**
Wired actions now allow QuickTime movies to load and unload sprite images dynamically. For example, if you superimpose your sponsor’s logo on the corner of a video track using a sprite, you can specify the sprite image as `http://yourserver.com/TodaysSponsor.psd`. The image can be in any format that QuickTime can read.
- **Mouse capture**
Sprite tracks, as well as individual sprites, can now have mouse-event capture turned on or off. This allows you to capture mouse events or pass them through on a track-by-track or sprite-by-sprite basis. A track will capture mouse events only over a sprite in that track; a sprite will capture mouse events only over its own display area.
- **Bit depth**
You can set the preferred bit depth for a sprite track using the Properties 2 panel (in the Movie Properties window), to tell QuickTime to use 8-bit, 16-bit, 24-bit, or 32-bit pixels. Animated GIFs, for example, can be set to 8 bits to conserve memory and guarantee proper color, while images that contain alpha channels need 32 bits. QuickTime generally does the right thing automatically, but this setting lets you tell QuickTime your preferred bit depth. Once in a while, QuickTime fails to take the hint; in that case, hold the Option key (Mac OS) or Alt key (Windows) when you open the sprite track’s Properties 2 panel. This lets you specify the Actual bit depth in Quick-

Time 6 and later. (The setting reads "Actual" instead of "Preferred.") Sometimes you have to be firm when you're talking to a machine.

- Chapter actions
QuickTime 6 introduces new actions that allow you to go to a chapter by name, number, or relative position (next, previous, first, last).

JavaScript Control of ActiveX and Plug-in

The QuickTime plug-in has been scriptable using JavaScript since QuickTime 4.1, but only using the LiveScript interface developed by Netscape. You couldn't control QuickTime using JavaScript from Internet Explorer for Windows. QuickTime 6 adds scriptability to the QuickTime ActiveX control using Microsoft's COM interface, and also adds scriptability of the plug-in using the XPCOM interface supported by Mozilla.

You can now control QuickTime using JavaScript from Netscape or Mozilla type browsers on the Mac OS or Windows, or from Internet Explorer on Windows—any browser that supports scripting of plug-ins using the COM, XPCOM, or LiveScript interface. For details, see "QuickTime and JavaScript" (page 476).

AppleScript Enhancements

QuickTime Player is now a recordable application in Mac OS X. This means you can open the AppleScript editor, hit the Record button, perform a series of actions in QuickTime Player, then hit the Stop button and save your actions as an editable AppleScript. Letting QuickTime Player and AppleScript write your scripts for you can save a lot of time and trouble.

There are also several new and enhanced Applescript commands:

- EnterFullScreen
- ExitFullScreen
- Replace (same as Replace command in player's Edit menu)
- Invert (inverts a black and white or color image)
- Save export settings
- Export has been enhanced to include fast-start QTVR, MPEG-4, inter-frame-compressed VR object movies, and QuickTime Media Links

- Make has been enhanced to make a new movie, new track, or new favorite item

QuickTime 6 adds movie properties that can be read and/or set using AppleScript:

- bass gain
- treble gain
- audio gain
- audio balance
- current chapter track (there can be alternate language tracks)
- current movie matrix
- current alternate (which of a group of alternates is selected)
- track mask, matrix, and transfer mode (graphics mode)

QuickTime Menu in Windows System Tray

There is a new QuickTime menu in the Windows system tray. The menu includes the following items in QuickTime 6:

- About QuickTime—Opens the About QuickTime dialog box
- QuickTime Website—Opens the Apple QuickTime website in a browser
- QuickTime Preferences—Opens Browser Plug-in control panel
- QuickTime Info—Launches QTInfo
- Open QuickTime Player—Launches QuickTime Player
- Open Picture Viewer—Launches picture viewer
- Check for QuickTime Updates—Opens QuickTime Update control panel
- Favorites—Hierarchical menu of your favorites
- Open Recent—Menu of recently opened items
- Exit QuickTime Task—Quits the `qttask.exe` background task that checks for changes in the MIME type registry

There is also a new item in the control panel: a QuickTime system tray icon. If unchecked, the tray icon will never appear. If you choose to exit from the menu, it will exit, and when you reboot your computer, it will reappear.

Improvements to Full-Screen Mode

In the past, QuickTime would sometimes change the resolution of your monitor during full-screen playback to achieve higher performance. For example, if you played a 640 x 480 movie on a 1024 x 768 screen, setting full-screen mode could cause QuickTime to reset your monitor to 740 x 480 resolution. This is still how QuickTime behaves when you choose Present Movie from the Movie menu in QuickTime Player.

If you choose the new Full-Screen menu selection, however, QuickTime uses your computer's hardware accelerator (assuming you have one) to scale a 640 x 480 movie up to your screen dimensions. This makes entering and exiting full-screen mode much faster and smoother, and often results in a better image. Performance may increase or decrease, depending on the resolution of your display and the speed of your graphics devices.

When invoking full-screen mode from the Web, the new behavior is the default.

You can enter the new full-screen mode at any time in QuickTime Player by pressing the hot key combination `command-f` (Mac) or `control-f` (Windows).

The new full-screen mode is more versatile than the old full-screen mode. You can pause and restart the movie using the spacebar, without exiting full-screen mode. When the movie is paused, you can advance or rewind on a frame-by-frame basis using the arrow keys. The movie still exits full-screen mode when the movie ends (unless it is set to loop) or when the user presses the escape key.

XML Importer for Component Check

QuickTime can open certain XML files and create movies based on their contents. These XML files are simply text files that use XML syntax and are saved with the `.mov` file extension. Your browser and the filing system for your OS treat these files as QuickTime movies, which allows you to direct them to the QuickTime browser plug-in or QuickTime Player. You generally create these XML files using a text editor or a script, but QuickTime Player can generate some of these files for you using the Export command in the File menu.

Any XML file that QuickTime has an importer for can be saved using the `.mov` file extension. The XML file for a particular importer may be saveable using an alternate file extension as well. For example, a SMIL file

can be saved as a `.mov` file or a `.smil` file. Browsers and operating systems often treat the file differently based on this file extension.

For example, QuickTime Player will happily open a SMIL file, whether its file extension is `.mov` or `.smil`. Your operating system will launch QuickTime Player when you double-click a `.mov` file, but may open a `.smil` file using a different application, and your browser will probably pass the `.mov` file to the QuickTime plug-in but not the `.smil` version. The file extension doesn't matter to QuickTime, but it often determines whether QuickTime is used to handle the file.

There are currently three XML importers included with QuickTime Player:

- SMIL importer (`.mov`, `.smil`)
This importer tells QuickTime to create a movie containing a set of movie tracks. The movie track contents are specified by URLs, and the track characteristics are passed as SMIL attributes. For details, see Chapter 18, "SMIL for the Camera."
- Media link importer (`.mov`, `.qtl`)
This importer tells QuickTime to open a movie located at a particular URL and play it using the specified settings (autoplay, full-screen mode, and so on). QuickTime 6 adds a simple way to generate `.qtl` files automatically using QuickTime Player. For details, see "Making a QuickTime Media Link (`.qtl`) File" (page 105).
- Component Preflight Importer (`.mov`)
You can use the component preflight importer to test for the presence of specific QuickTime components. QuickTime will offer to automatically download and install any that are needed. This can be a useful filter if your website includes movies that use components not included in the minimal QuickTime installation or components introduced in a recent release of QuickTime. For details, see "Checking for QuickTime Components" (page 169).