QuickTime 3 – More Than Just Digital Video

by Laurence Tietz, StudioSoftware

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There is no doubt that QuickTime is the digital video format of choice for Mac OS, Windows 95 / 98 and Windows NT Platforms. It is estimated that QuickTime is installed on 24 Million Macintosh's worldwide. And according to New York based market research company Media Metrix Inc.[1] QuickTime is installed on nearly 70 percent of the 35.3 million Intel-standard PC's in the U.S. Developers have employed QuickTime in almost every multimedia CD-ROM title, kiosk and desktop presentation since it's introduction in 1991. And now On the World Wide Web QuickTime has become the standard format for streaming digital video and VR content. One of the reasons for QuickTime's popularity is standards. Developers like standards. While cross-platform support is important to developers we also need technology that gives us flexibility and the features necessary to excel in our design decisions. This is why I like QuickTime. I've found a host of solutions to design problems that I've faced in my multimedia productions through using QuickTime.

QuickTime is really much more then a digital video format. QuickTime is a flexible multimedia container that holds several media types including text, still graphics, animated graphics, vector graphics, audio, MIDI data, 3D Objects, Virtual Reality Panoramas and Objects. In this paper I'll discuss the many media types and features available in QuickTime 3 and some of the novel ways that I've made use of QuickTime.

Audio Only QuickTime Movies

Perhaps the trick that I make the most use of is to author all of my audio files as QuickTime Movies. This may seem a bit strange. After all QuickTime is a digital video technology. In reality QuickTime is an architecture for storing and retrieving time-based media. This media is not always a series of video frames. But regardless of the media type stored within a QuickTime movie, the data is always stored as "temporal data". In other

[1]Mac Week 8/3/98

words, the data is always stored as a function of "Time". Therefore, if we create an audio track only QuickTime movie, what we really end up with is an audio file format that contains time-code relative to the audio data stream. Lets take a moment and consider what this does for us. If we were previously storing our audio data as an AIF file or a WAV file we would be limited in our control of this data stream within our application. We would be able to start the audio file playback, we could stop the audio file playback, and we would be able to tell if the file is being played back but we would never be able to know where within the file the playback "head" is. What this means to us as authors of multimedia content is that we are not able to program changing graphics or text or any visual material relative to audio cues. Once you have time-code you can cue any event to a specific audio event! I've used this technique to create scrolling lyrics that are synchronized to the audio track, sub-titles that are synchronized to the audio track, a series of photographs synchronized to the audio track and on and on. Assume that you have a large number of audio sound bytes that form a library of all of the public statements by artist Pablo Picasso and you wish to create a multimedia title that allows the user to access each sound byte by clicking on an item in a menu. You could author each sound byte as an AIF file and play each file when the user clicks on the corresponding menu item. This will work but you will need to manage a large set of individual audio assets. If you were to string each sound byte into one large QuickTime Audio Track only movie you can access each sound byte by knowing the in-point and out-point of the corresponding sound byte. This technique gives you great flexibility and complete control over the play back of the sound file yielding such features as pause, play and looping of the track. And since all of the audio tracks are "packaged" into one MOV file it is much easier to manage than hundreds of individual AIF files.

Audio-Only QuickTime movies are also great candidates for use on the WEB. Since QuickTime 3 now supports multi-bandwidth Alternate Movies. Using a Media Cleaner Pro from Terran Interactive, http://www.terran.com/products/, you can drag a movie and specify that different versions be created for 14.4, 28.8, 56K, ISDN, etc. users. Each version can have its own settings for data rate, frequency, mono/stereo, etc. Media Cleaner Pro will then create all the versions and automatically produce the appropriate Alternate Movies, ready to upload to your web page. The end result is that everyone gets the best possible experience, regardless of their connection speed!

Audio Only Tools:

Any QuickTime editing tool can be used to create Audio Only MOV files including: Apple's Movie Player + Goodies + Authoring Extras which can be downloaded along with a Copy of QuickTime at: http://www.apple.com/quicktime. Adobe's Premiere, After Effects and Terran Interactive's Movie Cleaner Pro are just a few of the tools available to developers.

Advantages:

Adds Time-Code to audio files. Allows precise control of "playback", cueing of graphics and other events to audio passages. Author multi-bandwidth Alternate Movies for use on the WEB (Movie Cleaner Pro only).

Examples:

Can be used to create Sub-Title systems for audio tracks. Useful when creating games and other interactive products that will be required to playback audio sound bytes and streams based upon user's interaction with product.

Multiple Audio Tracks

Another great feature of QuickTime is its ability to store and access multiple audio tracks. This feature is ideal for systems targeted for multi-language installations or distribution. Imagine a CD-ROM disk that is targeted for distribution in Europe. All of the video content, as well as your audio only QuickTime movies, can contain language tracks for each of the countries that you wish to address. Using an authoring tool such as Macromedia's Director you can program your application to access each track on the fly. This works well for audio only movies as well as digital video. The alternative is to author separate digital video files each with it's own language specific audio track. Since digital video tends to consume large amounts of disk storage this technique is wasteful and sometimes not practical when space is at a premium (and when is it not!). This feature clearly places QuickTime head and shoulders above the competition, which only allows one audio track per digital video file.

Multiple Audio Tract Tools:

Adobe's Premiere, After Effects and Terran Interactive's Movie Cleaner Pro are just a few of the tools available to developers.

Advantages:

By "packaging" multiple sound tracks within a single digital video application space is saved while providing the developer for programmatic control of the audio track

Examples:

Create localized multimedia content via multiple language tracks. Can be useful in games and other interactive products that will need to "mix" one or more audio tracks dynamically.

MIDI Data Tracks

Storage space is always at a premium. No matter how large the storage media that your project will be delivered on you will be frequently asked to fit more content than is possible on that medium. When this happens we need to look at all of our media formats to see if there is some way that we can reduce the amount of data without sacrificing quality. Converting all of our music audio tracks to MIDI data gives us an excellent opportunity to do just that. MIDI data is not a facsimile of the audio file. Rather it is a notation system that records the information necessary to recreate the audio on the fly using digital musical instruments and voices. One of the great new features of QuickTime 3 is the complete cross-platform support for MIDI data (previous versions of QuickTime supported MIDI for the Macintosh but not for Windows). It is now a fairly simple task to convert your digital audio files (AIF ,WAV, etc.) to MIDI format and import them into QuickTime as MIDI data track. Once you have created your MIDI MOV files they can be included in your multimedia projects and played back using the same command that you would use to play a digital video file.

MIDI Data Track Tools:

Media Cleaner Pro 3.0 reads a wide range of audio formats, including AIFF/AICF, AU, DV, MPEG Layers 1 and 2, Sound Designer II, System 7 Sound, WAV, QuickTime Audio-Only Movies, Standard MIDI, and General MIDI. Media Cleaner Pro 3.0 outputs QuickTime Movies (including Qdesign's Music Codec), RealAudio, AIFF, DV, and WAV file formats.

Advantages:

For multimedia delivery systems that are byte space limited the use of MIDI data for your audio tracks will yield the highest quality for the smallest storage requirements.

Still Graphics

QuickTime is a great container to store a series of still graphics which all relate to each other in some way and that you will need to access in an algorithmic or indexed fashion.

QuickTime offers superior compression for still images giving the author control over quality. By combining images into "sets" you can reduce the number of media assets that you will need to track. The QuickTime format gives you a single media asset that contains all of our images (within a given category) providing an important media management tool as well as a handy way to program the image selection/search engine.

Perhaps an example will make this application clearer. Assume that I am working on a visual database of tropical sea life as part of a multimedia CD-ROM title and that I have thousands of images of fish, coral, shells and plants. In the final product I want to build an interface that will allow the user to search for a particular item by region, Island, name or category. I can arrange my images into logical groups, such as type or region. These groups can then be combined in to a single .mov file. Next we can build a look-up table of image names vs. timecode (where each individual image and image block has a specific time-code associated with it). I can now build a very friendly and flexible user interface that allows users to access specific topics via a menu system or search engine.

Still Graphic Tools:

Media Cleaner Pro 3.0 can now process still images for use in multimedia projects and web sites. Media Cleaner Pro reads a wide range of still image formats including BMP, GIF, JPEG/JFIF, MacPaint, Photoshop, PNG, QuickDraw GX Picture, QuickTime Image File, Silicon Graphics Image File, Targa Image File (TGA), and TIFF. Media Cleaner 3.0 writes JPEG, PICT, GIF, and QuickTime Image Files (QTIF).

Advantages:

Manage a set of related graphics as a database indexed via a lookup table of images vs. Time-Code. Allows easy management of a large number of graphics stored in one media asset.

Examples:

Visual Databases and interactive games.

Vector Graphics

Vector graphics are quite different from bit-mapped graphics. Bit map graphics store information for each pixel in a more-or-less one for one relationship with bytes in memory. More pixels mean more bytes. Vector graphics are mathematical descriptions of images. This allows for smaller storage size, quick loading and flexible scaling without losing

quality. This is ideal for the WEB and other bandwidth or memory limited applications. It is also possible to combine vector graphics with other visual data types within QuickTime.

Advantages:

Vector Graphics are very efficient using little memory space and needing little bandwidth for loading, making them an excellent choice for WEB-based content.

Examples:

http://www.apple.com/quicktime/
http://www.larisoft.com

Vector Graphic Tools:

Terran Interactive's Movie Cleaner Pro and Larisoft's Electrifier Pro.

Sprite Tracks

One of the great new features that you will find in QuickTime 3 is the ability to add a sprite track. Sprites are graphic overlays that you can assign to the video frame(s). These sprites can be animated on top of the video image and can provide a number of unique effects and features. The feature that I like the most is the ability to create "Wired Sprites" or hot spots that can trigger events and URL's. This ability gives developers the technology to create interactive digital videos.

Advantages:

Add special effects and interactive hot spots to digital video.

Sprite Tools:

You can create Sprite Movies using Macromedia's Director and an Xtra, "QuickTime Sprite Export", from Apple Computer available at: http://www.apple.com/quicktime

Examples: http://www.apple.com/quicktime
http://www.larisoft.com/Products/ElectrifierStudio/Showcase/index.html

Text Rolls

All multimedia productions need to acknowledge the wonderful creative people that help to produce it. And there is no better way to create this credit roll then with QuickTime. By using QuickTime for your credit rolls you will have complete control of fades, transitions

and roll speed. And once again, your final product will need to manage only one asset containing the entire credit roll.

Advantages:

Easy to manage assets, as well as complete control over timing and interactivity.

Tools:

Adobe Premier 5.0

Example:

http://www.adobe.com/prodindex/premiere/feature3.html

QuickTime VR

QuickTime VR (Virtual Reality) is a special kind of QuickTime movie. The images stored in the movie vary relative to the viewer's perspective. A typical Panorama QTVR movie is composed of images that were photographed in 360 degrees centered upon the focal point of the camera. When processed into a QTVR movie the user is able to rotate the image space. These virtual reality movies can have interactive hot spots and multiple nodes allowing you to create interactive environments. You can also create QTVR Object movies. Object movies are similar to Panorama movies but instead of the viewer spinning in place we create a movie that contains an object, such as a book, that is rotated in space. This is a great way to give your audience an interactive "hands-on" feel for your subject

Advantages:

Gives the user an immersive experience.

Tools:

Apple computer's QuickTime VR Authoring Suite.

Examples / Links:

http://www.apple.com/quicktime/qtvr/index.html

3D Objects

A true 3D object is not just a 2D projection of a rendered 3D model. Rather it is a fully realized 3D model with a width, length and depth. This allows us to rotate our object in a 3D space and see it from all sides. This is not the same as QTVR which uses pre-rendered or photographic images that are stitched together to form a QTVR Panorama or Object movie. 3D Objects are true 3D models that are imported into and rendered in QuickTime. Where this difference may seem slight in theory t is a very different in practice. QT 3D

Object movies are much smaller in size compared to QTVR Object movies. This size difference is due to the object being described as a 3D object (a mathematical description and texture maps) as opposed to the series of graphics that show the object from all sides for QTVR. Where the technology used for QTVR object movies is different than QuickTime 3D objects the final visual effect can be very similar. You need to determine the requirements associated with your project and select the technology that is appropriate. The designer needs to be aware of each of these technologies and compare results in order to determine which is the best solution for their project.

Tools:
There is a tool available on Apple's WEB Site that lets you convert QuickDraw 3D files into a QTVR Panorama movie. You can down load it from the tools listed in the QTVR section at: http://www.apple.com/QuickTime/developers/tools.html#qd3d. Media Cleaner 3.0 can read certain animation and 3-D formats including 3D Meta File (3DMF), Animated GIF, FLC/FLI, and PICS.

Advantages:
3D Object movies are much smaller in size than their counter part, QTVR Object movies and are useful when storage space is limited.

Conclusion

The rich media formats supported by QuickTime 3.0 give the creative developer a powerful tool to visualize exciting solutions for their multimedia productions. Seeing QT as a multimedia container architecture and applying it to a range of media types gives the developer a true advantage. Understanding this technology and the available tools is essential to developers that desire to stay on the cuttingedge of technology and ahead of their competition.

Resources

http://www.adobe.com/prodindex/premiere/feature3.html
http://www.apple.com/quicktime/
http://www.apple.com/quicktime/qtvr/index.html
http://www.apple.com/QuickTime/developers/tools.html#qd3d.
http://www.larisoft.com/http://www.larisoft.com/Products/ElectrifierStudio/Showcase/index.html/
http://www.terran.com/products/

About the Author

Laurence Tietz is co-founder and Director of StudioSoftware, a Los Angeles multimedia design and production studio. Laurence earned his BS degree in engineering form Pratt Institute (NYC) and his MFA from the San Francisco Art Institute. Laurence began his career as a software designer for Hewlett Packard. Combining his strong interest in design and software he served as senior programmer for Amazing Media, one of the early developer of consumer entertainment an educational CD ROM. With Leslie Safarik, he founded StudioSoftware in order to pursue their vision for interactive media. Laurence has positioned StudioSoftware as one of the industries leading multimedia studios. He was honored by Multimedia Producer Magazine as one of the top 100 multimedia producers for 1995.

StudioSoftware Multimedia is a multi-platform, full service multimedia design and production studio located in Los Angeles, California. StudioSoftware provides complete multimedia design and production services including content development, creative direction, interface, graphic design and software development to clients in the entertainment, advertising and publishing industries. From CD-ROMs to the World Wide Web, StudioSoftware has been a pioneer in interactive design and innovative content - while pushing the boundaries of production value.

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Interactive Media Resources Include:

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- **Market Research Reports**
- **Survival Guides—Technical "How To" Guides**
- **Comarketing Opportunities**
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Apple Developer Connection

As Apple technologies such as QuickTime, ColorSync, and AppleScript continue to expand Macintosh as the tool of choice for content creators and interactive media authors, the Apple Developer Connection continues its commitment to provide creative professionals with the latest technical and marketing information and tools.

Interactive Media Resources

Whether looking for technical guides from industry experts or for market and industry research reports to help make critical business decisions, you'll find them on the Interactive Media Resources page.

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