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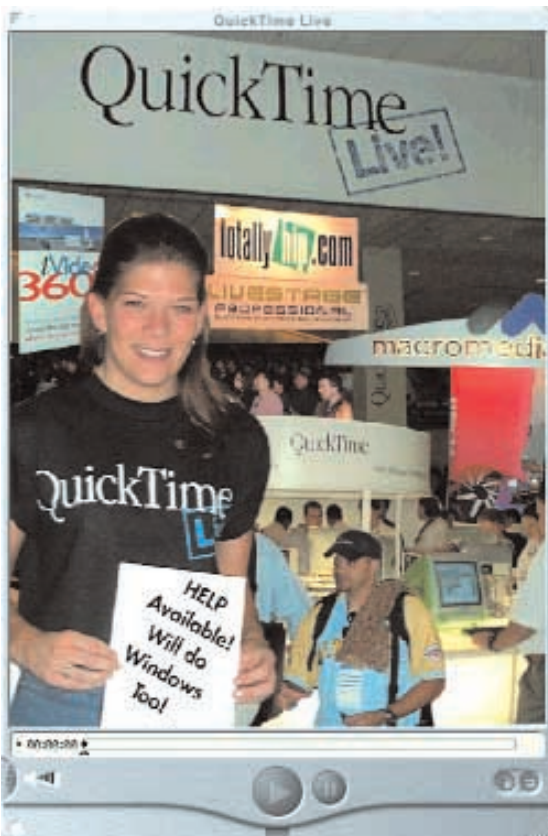


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QuickTime

drives the broadband highway

BY BOB CONNOLLY The first annual QuickTime Live! conference, held in Los Angeles November 7 to 11, featured four days of lectures targeted directly at individuals who want to master Apple's digital media technology. The cost to participate in the event was around \$2,000 — even the press had to pay to get the lowdown on what Apple had up its sleeve. To my surprise, there were even a large number of Windows portable PCs being carried by attendees, who totalled about 3,000.



As I'm sure everyone is aware, Microsoft has been found accused of prohibiting the growth of innovative computer applications which could challenge its dominance. The U.S. justice department contends that QuickTime is one of those innovative technologies and that it should be available to everyone without interference from Microsoft.

Apple would be happy to have QuickTime preinstalled on new PCs, but that would surely upset Microsoft's plans for its digital media systems such as Net Show and Media Player. If you're a professional in the digital video industry, it's pretty easy to see that QuickTime is light years ahead of its competition when it comes to the big picture. QuickTime media layers allow for interactive capabilities inside video frames, which is probably the major feature which clearly demonstrates why it's the choice of professionals for advanced Internet web site development.

Virtually every Windows developer at the QuickTime Live conference said that it was "the boss" who wanted to use Microsoft's Net Show or RealVideo because of their wide availability. But they all knew that QuickTime is better looking and much more interactive. The new upcoming MPEG 4 Internet video standard will be based upon QuickTime's interactive architecture.

BROADBAND IS HERE!

The buzzwords at this conference were broadband DSL and cable modems. The fast 1-megabit per second download deliv-

ered by broadband Internet service providers will soon change the face of the web.

Canadian companies such as Nortel now show healthy profits as their shares skyrocket, all because of their high speed Internet solutions that will form the backbone of the broadband information highway. QuickTime content developers were advised by panelists to start producing Internet web pages containing "rich media" elements, including audio, video and complex *Flash* animations.

Get rid of the browser overhead, they said. Use interactive *Flash* animations combined with Sorenson compressed digital video. Link digital videos to other digital videos. Get rid of the ugly HTML text and use Qualcomm compressed narration. Create interactive QuickTime movies that play inside Apple's *QuickTime Player* application instead of the web browser.

STAR WARS KICKSTARTS THE PROCESS

This kind of delivery may seem almost impossible right now because of the limitations of the 56k bandwidth which the masses are bound by, but attendees were constantly reminded that eighty percent of those who use the Internet to view video prefer to wait for downloads of high quality video over poor quality postage-stamp five frame per second versions. And the statistics are there to support those statements.

According to Apple, the Star Wars movie trailer was viewed by significantly more Windows users than Mac users. George Lucas wanted his special effects to be delivered over the web and look just as special on computer monitors as they did on the big screen. He preferred QuickTime's Sorenson compression codec to all others. The fans wanted a movie theatre experience and as often as not downloaded the 25 megabyte file to get the full screen version. Broadband modems can download 25 megabytes in about 10 minutes.

REAL NETWORKS VS QUICKTIME

There is a larger installed base of Windows *Media Players* and *RealVideo Players* but statistics show that when users are offered QuickTime movies as an alternative to RealVideo, 60% will choose the QuickTime for Windows version because the quality is superior. Many believe that the only thing holding back QuickTime is the long wait from the Apple site for the initial QuickTime install (about 5 to 10 megs). But those waits will all change with broadband Internet delivery.

If the justice department succeeds with its case against

Microsoft, it's a good possibility that QuickTime will be bundled with every new computer sold. The message at QuickTime Live! was loud and clear: broadband services are just around the corner. Good video content combined with interactive *Flash* material will drive the masses to the next tier of the Internet: broadband ADSL and cable modems. A recent CNBC poll reports that 200 million users will have access to broadband connections to the Internet in their homes within the next two years. And Hollywood, too, is now serious about delivering broadband content.

Start producing killer content now. Build it and they will come, so we were advised.

Okay. So how do we build a broadband web site?

The easiest way to get started is to create a high-speed edition of your client's current site. If you're making web sites, offer your client a second tier. Don't destroy or re-engineer the text based, GIF/JPEG creation that you have worked so hard to speed over 56k phone lines. Offer the user a high speed broadband version.

SHOCKWAVE REVISITED

Many *Director* developers abandoned ShockWave because the CD-ROM business died as the Internet took hold. The ShockWave format is a compressed web version of the *Director* projector but it's still too big to fit down 56k telephone lines. However — with broadband speeds of 1-megabit per second, 300k per second streams work just fine.

A popular CD-ROM magazine called LAUNCH has now re-



QuickTime movie with interactive Flash elements

formatted its titles for broadband delivery. If you have cable or ADSL, check out www.launch.com to see the capabilities of Shockwave used as Macromedia intended. Macromedia was looking far ahead and *Director* developers can look forward to supplying their services for web-based applications.

FLASH — A NEW INTERNET STANDARD

Flash, another Macromedia product designed for Internet use, has merged the vector-based graphics of *Illustrator* and the interactive timeline interface of *Director* to create an application that produces incredibly small files, so small that you won't believe what can be done with 20K.

As of version 4, *Flash* imports and exports QuickTime 4 .mov files that can contain video and interactive *Flash* vector graphics. This allows for embedded hot spots in the video



portion of the movie. Vector graphics can be in sync with the video as well as programmed to control the video. It's now possible to create a very large QuickTime video, for example 600x400, that contains a 320x240 video over a 600x400 JPEG background. Only the video portion updates at video frame rates; the background is frozen. Add some *Flash* vector animations and control buttons to make the video interactive and your final file size will be slightly larger than the original 230x240 video. But, with the application of a bit of creative talent, users will think they're viewing a full screen video running at 15 frames per second.

According to Apple, this data should be delivered via the Internet by the *QuickTime 4 Player* application. In a *Director*-based Internet application that contains video, you display the data via the Shockwave player, but you need to have Shockwave and QuickTime to view the movie. With a *Flash* exported QuickTime 4 movie, you just need QuickTime 4.

THE QUICKTIME AUTHORIZING APPLICATION: LIVE STAGE PROFESSIONAL

Live Stage is a QuickTime 4 authoring tool that can create very compelling interactive applications. It can do almost everything *Director* does, except that *Live Stage* does it all using QuickTime's wired sprite technology.

It's easy to use for simple tasks like making buttons to control video or adding backgrounds. It can also control QuickTime VR or *Flash* animations and launch web pages. *Live Stage* is much more robust than *Flash* when attempting to create complex interactions between all the wired sprites

how they all behave within the scope of the application. They must be enabled in a certain order or scripting errors will not allow the behaviors to function. In comparable terms, if you can master *Director*, you can master *Live Stage*.

WHY LIVE STAGE OVER DIRECTOR?

Live Stage loves QuickTime. But in *Director*, QuickTime is an afterthought.

If you're planning to deliver Internet broadband media that contains video via QuickTime, you should buy *Flash* and *Live Stage*. If you're planning to produce a game that requires a lot of interactivity and animation but doesn't need digital video, *Director* via ShockWave may be a better choice.

Movie studios like Disney and Warner Brothers are producing great *Live Stage* applications for their movie trailer and music sites. The biggest advantage that QuickTime has over



an http web page is that the media sits in layers. It's very frustrating to produce a nice looking web page that contains video because all the elements must be beside each other. Tools such as Fireworks divide the artwork so that web browsers can reassemble the elements. QuickTime allows for layers to be stacked on top of each other, just like the layers in *Photoshop*. These separate layers can then stream into the web browser (or preferably into Apple's *QuickTime Player* application).

Live Stage is a great page makeup program for QuickTime. Background picture goes here. Text over graphic there. Video with drop shadow over background there. Add buttons and rollovers that change the cursor.

That procedure is a lot easier than using an HTML authoring package like Adobe *GoLive*. Producing a broadband web site using only QuickTime is a real possibility. The tools inside *Live Stage* allow for e-commerce and http linking to other web sites.

TO STREAM OR NOT TO STREAM, THAT IS A BIG QUESTION

The definition of streaming media can be confusing. Most people think that the term "streaming" means to deliver data from the host computer to the client computer without giving the user the capability of saving the information to the hard drive. Real Networks was a pioneer with streaming technology that provides long form live broadcasts of audio and video. Unfortunately, the image quality is usually poor because in order to do live broadcasts, the information must be compressed down to very small on-the-fly data rates.



that might be included in a single QuickTime movie. It is also a lot harder to use when attempting complex interactivity because you need to learn a scripting language that resembles *Director*. *Live Stage* offers drag-and-drop prebuilt scripts called *behaviors*, but you really need to understand

Apple has entered the game with its QuickTime Streaming Server using Sorenson's Broadcaster application. To deliver this type of video, a live or prerecorded video and audio signal are fed into an ICE card for assisted compression using the Sorenson codec. However the quality is not nearly as good as the frame by frame software method used by the professional version of Sorenson companion applications



such as Media Cleaner Pro.

To compress on-the-fly, redundant data is discarded and compressed for a very small bandwidth stream of data. For an uninterrupted experience, the data stream needs to be constant, with speeds well under the modem speed of the end user.

The protocol that is used to deliver the data is called RTSP, which stands for Real Time Streaming Pro-

col. Quite frankly, even over broadband it looks like s**t. It looks better than RealVideo, mind you, but live compression for the Internet doesn't really cut it.

The best webcasters at the conference also said that they would deliver a live feed to a Media 100 workstation for digitization and then compress it after the live broadcast was complete using Sorenson's variable bit rate encoding method.

In variable bit encoding, the entire video is first analyzed and its video data is saved to a file. When a scene needs more or less compression because of the fast or held motion in the picture, the data file tells the compressor to vary the rate of compression to compensate for the fast or slow motion in the image.

This process takes a lot of time, sometimes even days. The final production is then posted in the web site's archives section and streamed via RTSP or http to users that missed the live performance. These webcasters also noted that most people prefer to view the higher quality Variable Bit Rate (VBR) encoded streams simply because it looks much better. The live experience is not as important to them as good quality video.

HTTP VS RTSP STREAMING

So, if the majority of the public enjoys a better quality picture, why stream?

Most of the time the pros say that long form videos will fill up users' hard drives. Using http streaming, the data is downloaded to the user's drive. If you have a fast connection to the Internet, you can view the video in real time as it downloads and then discard or save the video after viewing it. But if you're not worried about whether users save your video to disk, there's no reason to use RTSP streams, so go ahead and deliver the video via http on regular servers. Your audience wants high quality video and clear sound.

SERVERS: THE BROADCASTING NIGHTMARE

You may have a great idea for a Video on Demand (VOD) web site, but you must think clearly about how to deliver your broadband video into the homes of millions of people around the world. You need to find a way to allow many simultaneous connections to your broadband data. That means several 300k streams at the same time will leave your server. The possibilities for disaster are enormous if several people decide to log on at the same time.

One alternative is to host your material on a dedicated fast server connected to a fiber optic backbone — which will cost you a fortune each month if you intend to provide unlimited downloads. But if your client wants to view the video from his home in Japan, even the fastest server may get gridlocked during the student rush hour.

A company called Akamai has solved that problem. You can host your material on a server in your basement using an ISDN or ADSL line and subscribe to Akamai, which has thousands of localized servers installed around the world. Its specialty is serving data from RAM instead of hard drives. For example, if your server starts to get too many requests for the same video material, your computer sends out a "help" signal to an Akamai server that is located in a city near by. That Akamai server loads the requested video into its RAM buffers and from that point on takes over and feeds the signal to clients who want that video. The video data stays in RAM for two days after the last request has been made.

If there are several requests coming from Japan for your data, an Akamai server in Japan loads your video data from your host and feeds it to your clients in Japan. Again, the video data stays in RAM in Japan for two days after the last request. This process is called localized distribution and is the best way to get your material anywhere without delay or traffic congestion. You pay a monthly fee for the service and an additional usage fee. That fee can range from a few hundred to thousands of dollars for heavy demand such as those placed on Hollywood movie studios.

THE FINAL PATH: CABLE VS ADSL

I have personal experience with both cable modem and ADSL. When I lived in Brampton (on the outskirts of Metro Toronto), cable modem was my only choice. In fact, even now ADSL is still not available there.

Although I lived in a brand new house with cable, the installer decided to run a new wire outside the house and drill through a brick wall into the den to bring in the new connection. It didn't work, so he said that he would notify the central office about the problem. The signal wasn't strong enough and the green light would flash on and off.

After several days I got a call to say that the problem was being corrected at the server. For several days it worked, until a message came up telling me that the line was busy and another person was using my IP address. The numbers

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which the installer had typed into my TCIP control panel were wrong, and I was using another person's address. And when they were surfing the Internet, it meant that my connection was busy.



Entering the right numbers corrected the problem and suddenly I was surfing — fast. Or so I thought. I never got to speeds of more than 20 kilobytes per second, but to me 20kb was much faster than the 3k I usually got with Sympatico dialup. I lived with it, and 90% of the time it worked.

Then I moved to Toronto. Now I was in an area serviced by Sympatico's high-speed edition, so I decided to try ADSL. When the package came by courier, I just plugged the ADSL modem into my Ethernet port; the software configured the computer by itself, and it was running — and I mean running! Instead of the 20kb bandwidth that I was accustomed to, it delivered over 50 kilobytes at all times.

Now I constantly run at over 50kb per second, although I have even seen speeds of up to 90kb (don't confuse bits with bytes! 56k modems are 56 kilobits). Now Internet video runs in real time with virtually no wait — maybe about five seconds. Downloading a one megabyte file takes about 30 seconds.

To me, the difference between cable and ADSL is clear: ADSL is much better — at least in my area. Nortel is currently trying to fill orders for ADSL equipment to the rest of the country. It's sort of like the days when cellular telephones were introduced and the broadcast area was limited to corridors of high traffic like the 401 highway in Toronto.

Now digital telephone lines are going through the same expansion. Soon, ADSL (or perhaps even a better cable delivery method) will become the standard, just as 56k is today. Look no farther than the money being thrown at companies like Cisco and Nortel Networks.

One final startling observation I made during the Quick-Time Live conference was not at the conference itself but during the drive to the LA Convention Center each morning. The radio stations were saturated with commercials related to commercial web sites — toys.com, jobs.com, cars.com, etc. It was speculation madness. Eighty per cent of these commercials were for web sites.

Watching TV was the same. Television commercials promoting web sites were everywhere! The city has gone Internet crazy.

It usually takes a few years for a fad that starts in California to get to Canada, but with the speed of the approaching electronic revolution, I don't dare make any predictions about where it's going. Surfing the Internet may soon be like surfing a tidal wave off the coast of California. *

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