Top Ten Trends in Streaming Media Application Development

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from The Rational Edge: Two experts in streaming media discuss the top ten trends that will advance the place and quality of streaming media over the Internet.

In the late 1800s, during the early days of cinema, pioneer filmmakers such as Thomas Edison and the Lumiere Brothers developed the core technology that made it possible to capture images and project them before an audience. These early filmmakers filmed scenes such as "Record of a Sneeze," made in early January 1894 using Edison's Kinetoscope, which showed a man, Fred Ott, sneezing. Another popular early film was created with the Lumiere Brothers' Cinematograph, showing a train entering a station. This clip was famous for causing many in the audience to rush from their seats to the exit doors, terrified that the train was about to run them over.

Although streaming media content today is not evoking similar reactions from viewers, video and audio are becoming increasingly popular Web site components. This article concentrates on the network, software, and hardware systems that are changing the way we experience video and audio in the enterprise.

The reality is that streaming media is still in the very early stages of development. The state of the art today is a small video image, going out of focus, stopping and starting again a few
seconds later in response to network congestion. It is not much better than the Kinetoscope peep shows people were watching over a century ago. Fortunately, the technology continues to improve. Eventually, a majority of viewers will watch streaming video that looks more like television. Additionally, features such as high-resolution graphics, interactivity, and personalization will ultimately make the delivery of streaming video over digital networks and the investment in high-powered computers and high-capacity networks worth the wait.

The question remains: When?

Although we can't accurately predict when that day will arrive, we can expect to see analog video creation and viewing systems gradually replaced by enhanced digital versions. We will wake up one morning to realize that the way we watch video has no connection to the way our parents used to watch video, and whether we are watching a movie on television in the living room or a CEO address on the computer in the home office, it will look and sound great.

As application developers, we don't have the luxury of waiting for what might be. We can only consider available technologies and plan for what is coming in the future. We have identified the top ten trends that will affect application developers over the next few years, as streaming media becomes more prevalent in the enterprise.

1. Dynamic Content Will Replace Static Content

Today, streaming media content creation is where Web authoring was in the mid-nineties. Most of us remember the early days of the Web, when sites were built by hand. Skilled artisans dutifully churned out HTML, page by page, to build a site. The resulting Web sites looked good at first glance. Very quickly, however, companies realized that these sites were difficult to maintain without a great deal of manual intervention. Furthermore, presenting unique pages to individual visitors based on backend databases or user preferences was impossible. Although GUI tools emerged to help Webmasters quickly create individual pages, they alone were not enough. Companies realized that a data-driven approach to building Web sites was needed. Shortly thereafter, application servers that built individual Web pages from data stored in a database and an explosion of personalization technologies began to hit the market.

As people begin to scale up their efforts with streaming content, the need for better ways to create and manage content will become critical. Your marketing department, for instance, is going to ask for ways to target streaming messages to specific customers, and current authoring technologies are not going to cut it. More products will emerge that support the dynamic creation of streaming content and work in concert with application servers, Customer Relationship Management (CRM), and Knowledge Management (KM) systems.

2. Streaming Media Will Become More a Web-based Technology Than a Video-based Technology

Currently, most streaming content is created in the same way that corporate marketing videos are produced. A small crew #perhaps a producer, cameraman, and soundman #show up with a Betacam to capture the event on tape. After editing, digitizing, and encoding, the company ends
up with a stream ready for the Web. The trouble with this approach, however, is threefold. It is too costly, it doesn't scale, and it isn't optimized for the Web.

One emerging strategy for creating better Web content is known as "guerilla streaming." A single person with a "prosumer" (PROfessional quality conSUMER electronics) digital video camera (using the MiniDV format) quickly captures the event in one or two takes. Post-production takes place on a PC with standard software like Adobe Premiere. The result is content that is developed specifically for the Web in a fraction of the time that it would take a traditional filming crew. We have seen Webmasters create complete video presentations with PowerPoint slides in less than one day. These new technologies allow existing Web team staff with minimal training in video production to create high-quality streaming content.

3. The Current Standards Battle Will Produce One or Two Winners

Real Networks, Windows Media Player, Apple QuickTime, MPEG4, MPEG7, SMIL, SMIL 2. OK, so who is going to win the standards battle? Today, most sites use either Real only or both the Real and Windows Media formats. It appears that, for the foreseeable future, Real Networks and Microsoft will control streaming on the desktop. Like the browser wars, this one will take a while to work itself out. Even if one standard "wins," it is clear that companies will still have to support more than one media format. Right now it looks as if we are heading for an Internet Explorer-Netscape type of battle # approximately an 80-20 split. Both companies are pushing their own proprietary formats. What matters to the application developer is that companies will need to support both standards and think about technologies that work seamlessly with both.

What about all the new media players that provide "near TV experiences at dial-up speeds"? While the benefits of these products are compelling, they face major hurdles in the form of getting a critical mass of content encoded and desktop players installed.

4. Streaming Content Will Become More Synchronized with Other Media

Web users are accustomed to the rich experience of browsing through pages and drilling down into information. Sadly, most streaming content on the Web today consists of standalone video or audio files delivered through a media player.

More and more, however, companies are creating "synchronized content." For example, presentations that include a talking head video with PowerPoint slides that change along with the speaker are becoming more popular. As streaming synchronization technologies improve, people will see more content that fulfills the Web's promise of interactivity, such as video programs that respond directly to individual user interaction and educational courses that build in real-time feedback. Today, Web developers lack the development tools to create these rich experiences and link them with existing backend systems to create these types of data driven, dynamically assembled experiences.
5. Live Media Will Make Way for On-Demand (Pre-recorded) Content

If you have ever priced the cost of a live streaming event, you know how expensive it can be when all costs are included. The question is which communications must be live. Time-sensitive events like financial earnings calls or critical corporate information delivery require live streaming. Beyond that one must weigh the benefits of real-time information with the price and performance pressures of a live event. Today, many companies are realizing that they can get many of the same benefits of live streaming by using on-demand content, and they can do so at a fraction of the cost of doing it live. By adding interactive elements like chat, polling, and phone-in teleconferencing, you can create the illusion of a live event without the on-the-spot performance pressures and expenses.

Think back to the early days of television when most shows were live performances. Contrast that with today when few programs, other than news and sporting events, are delivered live. The Web is inherently an asynchronous medium, and on-demand content will ultimately become prevalent.

6. Video Search and Mark-up Technology Will Continue to Improve

As corporations increase their use of streaming, applications that can search (find the appropriate clip) and mark up (identify keywords, concepts, and scenes) video will become more important to managing the knowledge embedded in the content. Video search and markup could be the topic of a long article; there are a range of technologies you can implement today. Most current search applications are based on two basic technologies: image searching and voice recognition. Image searching packages do a passable job of identifying scene changes and patterns in a video. Speech recognition continues to improve as CPUs get faster and data busses wider. Although most companies are thinking only about how to get streaming media online, tomorrow's challenge lies in managing that streaming online content as another valuable piece of corporate data. Expect to see XML as a way to facilitate the exchange and re-purposing of content.

7. The Last Mile Will Continue to Be a Barrier for the Consumer

Now and for the foreseeable future, the ability to view high-quality streaming requires a broadband connection. Companies can still stream audio to the average AOL user, but streaming video to 56K users is limited as smaller video sizes, lower frame-rates, and buffering all lead to a low-quality experience. Obviously, audio streaming is one solution that is attractive for lower bandwidths audiences. We are, however, starting to see some organizations (see NFLFilms.com) putting disclaimers on their homepages that say the site is designed for broadband users. Some developers are starting to segregate their audiences rather than develop to the lowest common denominator.

Given the recent telecommunications meltdown, it also appears that the last mile will still be a barrier for the consumer market. Fortunately, most if not all enterprises have broadband connections to the desktop, making streaming even more attractive to the business user.

8. True Convergence Will Continue to Be a Mystery

While people are still smarting from failed efforts in the early 1990s to develop interactive television, many talented teams continue to experiment with television/Internet simulcast events.
No one is sure, however, where these efforts are heading. We recently visited a major ad agency in New York City, which handles the branding for many of the biggest household brands in the US. They had assembled a team to experiment with a wide range of events for "Enhanced TV"-like programming during football games and synchronized Web content during educational shows. They freely admitted, however, that they didn’t really know where convergence was heading. They only knew that they needed to be a part of it.

What does this mean to the enterprise application developer? Expect the marketing team to dream up new ways to use Web content alongside traditional media. Although existing video and audio assets will eventually find their way to the corporate Web site, it remains unclear what business case will drive the mass adoption of "converged" technologies. Nevertheless, the consensus is that Internet and television technologies are on a crash course, and we can expect to see new applications that test the limits of current technology and capture our imagination. As businesses test these technologies, new business cases are likely to emerge and drive their adoption.

9. Corporations Will Continue to Improve Network Infrastructure

Despite the recent high-technology slowdown, the network has become the circulatory system for corporate information. Dependence on information technology is only increasing, and network infrastructure will grow along with it. The greatest challenge with streaming in the enterprise is bandwidth. New products are emerging to overcome problems associated with running bandwidth-intensive applications such as streaming media. Low-cost stream caching devices can reduce the network load and move the content to the edge of the network. Advances in switching coupled with smart caching can only help improve bandwidth-intensive applications.

10. Entertainment Will Be Out, Positive ROI Projects Will Be In

While the entertainment industry is still licking its wounds from numerous failed, ad-driven business ventures, business managers have found that streaming media is a cost effective way to train staff and partners, qualify sales leads faster, and enhance existing relationships. For example, one of our clients estimates that it costs them between three and five thousand dollars to send a single person on one trip to Europe to train sales partners. So as an alternative, they are creating an on-demand streaming presentation that can get the message out for less than the cost of that single trip. Measuring return on investment is simple in a case like this; not only are you reducing travel costs, but you are also capturing an event and archiving it for reuse. With a clearer business case in hand, expect businesses to increase the amount of streaming.

Conclusion

Today, businesses and consumers face a major bottleneck in terms of how to create and integrate content with existing infrastructure, which will inhibit widespread use of streaming media for the immediate future. Java and XML are becoming essential to building streaming media applications; yet most streaming media is developed with desktop tools by skilled artisans and "creative" teams as opposed to software engineers. The next generation of streaming applications will demand better development environments as well as tools that treat rich media content as another business critical data type.