Internet2 Pumps Streaming Media

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LOS ANGELES -- For most Internet users, streaming media means sound that cuts in and out and a choppy picture viewed in a window the size of a deck of cards. But for Internet2 users, it's a different story.

On a lightning-fast network like Internet2, the streaming media experience can take place at 70 Mbps, blaring from a 12-speaker surround sound system and sharp video on a 30-by-17-foot screen.

In a demonstration of futuristic streaming media capabilities at the University of Southern California, Internet2 Member Meeting attendees were treated to a satellite-quality audio and video feed streamed over the Web.

Of course it's not the Web most people are used to. Internet2 is a test bed for new technologies that will eventually be rolled out on the general Internet. Almost 500 universities, businesses and research institutions work cooperatively on new ways to boost performance and usage. It's walled off from the main Internet, keeping it free from spam, porn and file trading.

One of those new technologies, called selective retransmission, was part of the demonstration at USC. In an Internet stream, if some packets go lost or missing, the recipient's computer has to wait for them to arrive or request the stream again. That usually means an interruption in playback.

Selective retransmission manages lost packets more intelligently.

"Instead of stopping and waiting for the missing packets or asking for everything to be sent down again, it requests only the packets that are missing," said Chris Kyriakakis, a professor of electrical engineering who runs the Immersive Audio Lab at USC and helped develop the demonstrations.

The stream also sends audio and video in two separate streams, rather than in one the way Microsoft Windows Media Player and RealNetworks RealOne player do. At the

USC demo, special software received the two streams, which were time-stamped, and matched them up to sync the sound and picture.

The event's highlight was a live performance of Aaron Copland's Symphony No. 3 by the New World Symphony from Miami Beach, Florida. Before the performance, symphony artistic director Michael Tilson Thomas spoke in a taped video (he was working in London).

"Perhaps some day, when this Internet2 is more tightly wound into our everyday lives, we won't be forced to go to tape," remarked Howard Henry, president and CEO of the New World Symphony.

The symphony's performance -- which the audience took in on a 30-by-17-foot screen -- wasn't marred by any breakup. Best of all, it put the Bing Auditorium's 12-speaker surround sound system to good use. The only problem was the noise from the fans used to cool the electronic equipment.

"In the future, immersive technology like this could be used for lots of things," said Dr. Sandy Sawchuk, a professor of electrical engineering and deputy director of the Integrated Media Systems Center. "Some of the obvious applications are in education and even medical procedures."

Interactivity naturally follows immersion. "To go interactive, you need to cut down on the latency, which is very hard to do on a shared network," Sawchuk said.

The problem with moving technologies like those demonstrated with the streamed symphony performance to the public Internet, is that it just doesn't have enough bandwidth. The Internet's backbone consists of some lines running at a mere 2.5 GB, which is not enough.

"Some of the backbones are moving to 10 Mb. As that happens, then we'll see some of this technology moving over (to the Internet)," said Sawchuk.