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Computer experts work on casting another Net; Internet2's promise excites users

By William Glanz, The Washington Times

You're 30 minutes late getting home because of traffic and miss your favorite television show.

If you didn't set the VCR, you probably have to wait for the rerun.

Once Internet2 arrives, you won't have to worry about traffic jams - either on the road or on the Internet backbone, the network carrying data. Video on demand will be just one new application supported by the next Internet.

And the best stuff probably hasn't been dreamed of yet.

While academics are hard at work leading research into the new Internet, technology companies are eager for the day it emerges from colleges and universities and goes public.

Wide deployment of Internet2 may not happen for up to four years, but companies have started coming up with new ways to use its ability to merge text with video and voice and transfer the data up to 45,000 times faster than a standard 56 kilobytes per second modem does now. The new system is being developed to replace what some call the "World Wide Wait" as the existing Internet gets increasingly bogged down by too much traffic and too many bottlenecks in its data-transfer system.

Not only will Internet2 breathe new life into the Internet by creating a faster, more powerful backbone, it's expected to give rise to technology businesses by leading to development of new applications.

"I think it is an exciting time," said Andre Choo, product development manager for advanced routing services at Reston-based Teleglobe Communications Corp., which connects users to the Internet backbone. "Several years back the issue was not having enough bandwidth to carry Internet traffic. What we have now is a different scenario and bandwidth is available and what one finds is that the catch-up is on the application side."

Bandwidth, the capacity of wires to carry data, is the key is the new Internet2's expanded ability. It will be able to transmit the contents of an encyclopedia in under a second.

A New Internet
It didn't take long for the current Internet, developed in the 1970s, to choke with data.
Now researchers and a handful of private companies are casting a new Net.

Public and private sector partners are investing about $500 million a year in cash and equipment into Internet2, said Douglas Van Houweling, president of the District-based University Corporation for Advanced Internet Development (UCAID). The consortium is made up of 155 U.S. research universities and a handful of private companies doing Internet2 research.

Local universities participating in projects to test the new network include Gallaudet University, George Mason University, Georgetown University, George Washington University, University of Maryland, University of Virginia and Virginia Tech.

Researchers at Georgetown, George Washington, University of Maryland and Virginia Tech are working on a high-speed connection - called a gigaPop - to be the backbone underlying Internet2. The universities developing the gigaPop have appointed University of Maryland professor Tony Conto to head the effort.

Georgetown and Gallaudet will collaborate on distance-learning applications for American Sign Language that takes advantage of the expanded ability to deliver high-quality video.

Virginia Tech and University of Virginia researchers are working on advanced video applications.

Mr. Van Houweling directs the researchers from the University of Michigan, where he's on leave from his post as dean for academic outreach and vice provost for information and technology.

Making It Work
The big question about Internet2 is how consumers will use the new technology. Researchers are just now exploring its potential.

"The most exciting application is almost certainly the one we haven't predicted yet. No one predicted the World Wide Web," Mr. Van Houweling said.

But there are some clues.

The ease of transmitting video and voice over Internet2 will make the Web a broadcast medium, not merely a means of transmitting text, the reason the Internet was created.

Internet2's ability to transmit video data easily will likely open the door for wide deployment of applications such as telemedicine, distance learning, two-way video conferencing and phone service over the Internet.

"We still don't know what the killer application will be," said Joseph Mouhanna, manager of Microsoft Corp.'s architecture group.

All of those applications are available now, but the original Internet's limited bandwidth often keeps the applications restricted to private networks with greater capacity than the public network.
When they are deployed on the Internet, video applications are spotty at best.

"It doesn't do video well at all. You get grainy, jerky pictures," said Joe Mambretti, director of the International Center for Internet research at NORTHWESTERN University, one of the Internet2 universities.

The difference between video on the original Internet and Internet2 is most noticeable when a film or video clip includes a lot of action, said Patricia Jackson, director of Virginia Tech's Internet2 studio.

"You just get better motion resolution. When you have fast action, you get more clarity with Internet2," Mrs. Jackson said.

Colleges that are using existing technology to teach students who never show up on campus are expected to be among the beneficiaries.

Caliber Learning Network Inc., the adult training arm of Baltimore-based Sylvan Learning Systems Inc., on Wednesday announced plans to begin offering adult education courses over the Internet using a satellite-based system.

The Internet training market is expected to grow from $92 million in 1997 to $6 billion by 2002, according to Sylvan's projections.

"What this means is we will be able to simulcast over PCs and reach people in the home," Caliber spokesman Brady Locher said. "It's all about bandwidth. As public bandwidth continues to expand, learning over broadband will expand beyond private networks."

Video On Demand
Because video is expected to thrive on the new Internet, Minneapolis-based Ancept Inc. is one company hoping to flourish when Internet2 goes public.

Ancept is a 2-year-old private company involved in the Digital Video Project at NORTHWESTERN University, a project associated with UCAID's Internet2 efforts.

Ancept digitizes video - converts video images into digital code, allowing them to be transmitted over the Internet. That's significant, Ancept president Jeff Stromberg said, because when Internet2 gets out of the research labs and into the hands of the public, television viewing will change dramatically.

Internet2 will let people watch on PCs the same things they watch on television now, with picture quality similar to a television's and sound quality matching CD sound.

"Customized delivery of high-quality video will be here. If you want to see a movie, you can. This will change the way television and other video is viewed," Mr. Stromberg said.

Television shows won't be the only programming available for Internet viewing. Movies and training videos, for instance, also will be digitized.
With that change, people will have the freedom to watch digitized programming when they want to, not when television networks want them to, Mr. Stromberg said.

"Once this starts to happen, the Web will become video-tized," said Michael Nelson, District-based program director for Internet technology at IBM Corp.

"This is the start of 270 million channels - one for each person."

Chip Cox, coordinator of Vanderbilt University's Internet2 initiative, is anxious to see digitized video available for viewing on PCs because he wants to use Internet2 to send and receive information from the university's Television News Archives.

Vanderbilt has collected all news broadcasts from the major networks since 1968.

The archives - 40,000 hours' worth - are on videotape now, and employees in the news archive go through a lengthy process each time someone places an order to buy news clips on tape.

The school wants to digitize the collection so it can transfer the video data over Internet2 and speed up delivery of information.

"We can imagine a whole new audience that has quick, easy access to the information," Mr. Cox said.

Any company with an archive of video that could be transferred to digital code for Internet2 viewing is likely to do just what Vanderbilt will do. They will compete for the eyes of Internet2 surfers.

"Companies that generate a lot of video, like news organizations, are realizing they're sitting on a gold mine, I'm just not sure they know how to mine it," Mr. Nelson said.

Once the world's video archives are translated to digital code, it will have to be stored somewhere.

Guy Cook, vice president of Internet services at Denver-based Qwest Communications, said companies likely will form digital libraries so they can sell space to store what could be digital reams of data.

Qwest, which is building a switching center in the District, helped start the Internet2 effort by investing an estimated $500 million worth of fiber-optic cable.

What's Behind It
Development of new applications for Internet2 has happened slowly so far because most attention has been paid to starting the backbone, known as Abilene.

Abilene, switched on Feb. 24, is so powerful it's capable of transmitting the entire Encyclopaedia Britannica in under a second.
"Now that it's up and running, it's time to see what future applications can be developed to take advantage of it," said Allan Weis, chief executive officer of Armonk, N.Y.-based Advanced Network and Services, a nonprofit corporation working on virtual video conferencing technology it hopes to deploy in 2000.

Despite the slow start, Mr. Nelson said development of applications in the era of Internet2 likely will be significantly faster than development was for the original Internet.

"I think applications will come quickly and I expect to see a shorter gap between experimental prototypes and applications," he said.

"The private sector is very excited about this," said Mr. Van Houweling of UCAID. "This will open so many opportunities for them."