SANavigator Helps Manage SAN-based Webcasts for Leading Public Policy Institute

Rice University's James A. Baker III Institute for Public Policy, in Houston, Texas is one of the nation's leading centers for the study of public policy issues. The Institute, named for James A. Baker III, Secretary of State under former President George Bush Sr., is dedicated to bridging the gap between the theory and practice of public policy. It does this by drawing together experts from academia, government, the media, business and nongovernmental organizations for symposia, speeches and other events.

Many of the Institute's events, which have included speeches by Mikhail Gorbachev, Madeline Albright, Nelson Mandela and Kofi Annan, are recorded on videotape and/or audiotape. When the Institute sought a way to make these events available to the widest possible audience, the web seemed an ideal medium. However, Rice University IT specialists knew that making webcasts available on the University's IP network, which would involve storing large video and audio files and distributing them over the web on demand, would surely overwhelm the network and degrade the service available to other users in the University community.

The IT specialists realized that establishing a Storage Area Network (SAN) would make it possible to handle the significant amounts of data the project would require. A SAN using Fibre Channel technology, a controller, switches, storage arrays, host bus adapters – and managed by comprehensive SAN management software – could function independently of the University's IP-based information systems. And, it would make it possible to transmit large files, including streaming video, without encroaching on the performance of the IP-based system.

Implementation of the webcasts of Institute events over a SAN began as a research project. Eventually, the SAN-based webcasts became a University-wide

resource. Webcasts of numerous institute events from 1997 to the present are now available as streaming video and/or audio on a web-accessible archive at www.rice.edu/webcast/archive.html. Video and audio of Rice University events from other departments are available at this site as well.

Hubert Daughtery is the Rice University Media Systems Designer who designed and manages the SAN. "We chose a SAN configuration over other storage models because a SAN enables us to have one computer stream out of our storage array onto the Internet, and several other computers for editing or preparing raw video assets into finished or completed assets."

At present, Daughtery uses an FC 4500 Series DPE controller and 7 additional shells of DAE drives from EMC Clariion to store just under a terabyte of data. In front of the controller and drives, he employs two Brocade SilkWorm 2800 Fibre Channel switches. The SAN's computers include two Sun devices, running Solaris for the streaming application, and three NT and two Windows 2000 machines to prepare and edit the videos. He also uses Emulex LP8000 Host Bus Adapters. The SAN is managed with SANavigator® 2.5. The hosts on the SAN are connected together on a gigabit hub from Packet Engines. The link into the campus backbone is also gigabit.

Daughtery utilizes MPEG 1, RealVideo System 8 and Windows Media Version 7 for a variety of applications. The RealVideo system is used for encoder, server and client applications. The current publication method employs RealVideo and Windows media encoders to stream live. Daughtery records the live event in MPEG1, and then uses the MPEG file as the source material for a high quality 2 pass encoding into RealVideo. He is in the process of changing over to DV as the recorded file format. This will allow him to create derivative MPEG1, MPEG2, RealVideo and Windows media files.

Large Audience for Webcasts

"Our setup has worked very well," says Daughtery. "We average about 400 visitors a week to the webcast site, with peaks as high as 2,500 per week during academic 'crunch time.' Very soon we'll be taping Alan Greenspan, Chairman of the Federal Reserve, when he speaks at the Institute, and will be adding that asset to our archive."

According to Daughtery, the webcasts are intended not only to make these events available to off-campus users, but are also an important resource within the Rice University community. A number of multimedia classes use the servers to transmit video or audio over the University's intranet. It is helpful to be able to transmit the video and audio over the intranet, because the copyright on some of the assets prevents Rice from transmitting outside of a classroom setting.

"There is an additional advantage to our setup," Daughtery continues. "It makes it unnecessary to bring videotapes to class." The instructor goes to the private web space, clicks on a URL, and video is delivered to the desktop immediately. "What's more," says Daughtery, "this method eliminates the wear and tear tapes would suffer from being played again and again."

SANavigator a Key Management Tool

With a complex SAN such as this, it's important to have a powerful SAN management tool. "We rely on SANavigator 2.5 for a wide variety of management functions," says Daughtery.

"I was able to use SANavigator to discover all the devices in the SAN, and did not have to waste a lot of time configuring the network. For example, I simply pointed at the Brocade switch. SANavigator found and identified all the components of the

SAN on its own. Later I went in and indicated that an HBA (Host Bus Adapter) belongs to a particular machine. SANavigator automatically discovered the topology."

Daughtery notes that the user interface is very intuitive. "You can configure it and modify it to your preference using SANavigator drawing tools. For example, you might want to use it to connect servers in a cluster. One of its nicest features is the ability to monitor data flow on a moment-to-moment basis. If there is a hardware failure, or a disconnect, SANavigator will identify the link that has failed. This feature will become increasingly important as we increase the size and complexity of our SAN."

According to Daughtery, "SANavigator makes it very easy to monitor the SAN. Using only one keyboard mouse and monitor I can oversee the entire SAN from my desktop. I leave the SAN up and running on the console, and simply look at the console to get an instant update on the health of the network."

Even though SANavigator already plays a key role in managing the SAN, Daughtery notes that there are many SANavigator features he hasn't needed to utilize yet. For example, he hasn't yet taken advantage of its ability to set SNMP traps. This feature would alert him to the occurrence of certain defined events in the network, for example, when traffic exceeds a certain level on a particular segment. With this feature, an agent running in a device "traps" an event and then sends a report to management stations. "In the future, I expect to make use of the full range of SANavigator's resources," said Daughtery. He may well need them: because of the growing demand for webcasts, Rice University will add DataDirect Network's SAN DataDirector and an additional 3.6 terabytes of storage in the near future, all of which will require the management advantage of the most powerful SAN software available.

"Our SAN has given the Baker Institute the opportunity to share with a large number of people appearances by very significant public figures," said Daughtery. "As

people have heard about our installation, we've received calls from other organizations that want to know how we've implemented our program. We even received a call from one of the world's largest music and entertainment companies, inquiring about the combination of SAN and webcast technologies we employ. We hope that with the resources we are adding, we'll be able to serve an even larger audience in the future."