Colorado State University—

University Uses Cisco IP/TV Solution for Online Education and Multicasting of Special Events

EXECUTIVE SUMMARY

Background

In late 1999, Colorado State University (CSU) in Fort Collins, Colorado, began looking for a network-based approach to delivering course-related video content that could serve as a communications medium for students, teachers, and administrators. CSU began looking for solutions that would be cost-effective and would take advantage of its existing IP and ATM-based network infrastructure.

Challenge

The network video solution had to be easily accessible by students via the Web. It also had to enable easy integration with WebCT, the online course software used by the university. IT staff at CSU hoped to enable use of network video features by the largest number possible of faculty, students, and administrators, so the solution had to be able to scale cost effectively.

The Cisco Solution

CSU chose the Cisco IP/TV® Solution, a comprehensive network video streaming solution. It delivers TV-quality video programming to desktop PCs via Cisco IP/TV Software and Cisco IP/TV 3400 Series Servers. The Cisco IP/TV system distinguishes itself by offering high-quality video broadcasting and video-on-demand services, industry-leading management capabilities, built-in scalability, network-friendly technologies such as IP multicast, and an easy-to-use viewer interface.

Results

Installed in late 2000, the Cisco IP/TV Solution features will be available first to students in computer science, engineering, communications and journalism, and business information systems departments, beginning in early 2001. Network staff at CSU are very pleased with the ease, versatility, and performance of the Cisco IP/TV system and anticipate rapid adoption among students and teachers throughout the campus-based and distance learning curricula.

The broad availability of more Internet bandwidth and network technologies to support video streaming and multicast applications has influenced Colorado State University (CSU) to move its video library and closed circuit TV system to the Internet via the Cisco IP/TV Solution. CSU is using the new multimedia network infrastructure for its e-learning initiative, geared to computer science, engineering, communications, and information systems majors at the Fort Collins, Colorado, campus. The university may also expand access to Cisco IP/TV product applications to students around the world who study through CSU's distance learning program, Educational Outreach.

Video Enhances Personalized Learning

Many academic subjects are better conveyed with visuals than with the written word alone, believes Pat Burns, Director, Academic Computing and Networking Services at CSU. With visuals that move, the benefits are further enhanced.

"With video streaming, you can play a video clip that demonstrates how something evolves in three dimensions rather than two. It's much more compelling," says Burns. "The Cisco IP/TV product has given us a complete, end-to-end network video system that makes this kind of audiovisual aid possible. It effectively replaces our World War II-vintage closed circuit TV and video system."

In 1999, when CSU began shopping for a campus video solution, the Cisco product was the only one on the market that offered Motion Picture Experts Group (MPEG) 1, 2, and 4 technology. MPEG 1 is suitable for transmission over T1 lines. MPEG 2 requires high-speed fiber LANs and delivers VCR quality video.

"MPEG 4 is the newest technology and the one we were most interested in because it offers better compression at lower bandwidths for modem speeds," says Burns, "You can decode it in software, whereas MPEG 2 decoding requires hardware. And MPEG 4 decoders are standard in current Windows operating systems."

Three Solutions in One

The Cisco IP/TV product provides an end-to-end, complete network video solution. It includes high-performance Cisco IP/TV Solution 3400 Series servers preconfigured with robust server software and client software for desktop PCs. The IP/TV Solution 3400 Series supports live videoconferencing, broadcast video, and video-on-demand.

These three types of networked video add significant features and options for users and network administrators. Videoconferencing allows one or more participants to collaborate with others in different locations. By far the most bandwidth intensive, it requires two-way, high-bandwidth network connections. Video broadcasting uses network-friendly Cisco IP multicast protocols and is extremely efficient for large audiences. One stream of data per program is sent to an unlimited number of viewers simultaneously. Video-on-demand, the primary mode used by students via the CSU e-learning initiative, allows students to request programs at their convenience, receiving a unicast stream of video.

The Cisco Infrastructure at CSU

A Cisco 7507 Router serves as the point of presence for the CSU campus. A Cisco LightStream® 1010 Switch serves as the ATM aggregation point for the wide area network. Cisco 5500 and 6500 switches connect each building to several Cisco 6500 switches, which provide redundancy in the core. The Cisco IP/TV product works on any IP network including 10BaseT or 100BaseT Ethernet or Gigabit Ethernet networks. It also works well over cable and asymmetric digital subscriber line (ADSL) modems and ATM networks with LAN emulation.

User-Friendly Content Streaming

First installed for testing in late 2000, the Cisco IP/TV Solution 3400 Series will be available to students beginning in early 2001. Each student will then be able to download the Cisco IP/TV Viewer from his or her Web browser connected to the CSU site, where course-related video content will be available for streaming on demand.

"We use WebCT course management software for about 550 courses," says Burns. "Some of the content lets us link users back to the Cisco IP/TV Video Server. We're hoping that an increasing number of courses will integrate online video with online testing, threaded discussion groups, and chat sessions."

Burns' staff plans to feature the university president's commencement address via multicast and broadcast features of Cisco IP/TV Solution beginning in 2001. "We're hoping to show the whole university how effective and versatile network-based video can be in an educational setting," says Burns.

There are 9000 titles in CSU's video library that may be digitized for delivery through the Cisco IP/TV system. CSU already digitizes content for T1, local-area-network, and regular modem reception.

Following the pilot rollout of the Cisco IP/TV system at CSU, the school will review the policies and procedures for video-on-demand, multicasting, and videoconferencing that have been defined. "We have to provide support for both the user and for those posting new content," says Burns. "We have to know and manage who is putting up the content and who takes care of bugs when they come up. Plus, we have to keep track of the cost of disk space. For example, right now at CSU it costs us about $120 to store an hour's worth of VCR quality video."

Despite these questions, Burns is enthusiastic about the potential features and reach of network-based video at CSU. Thanks to IP multicast, the Cisco IP/TV Solution can transmit a scheduled video broadcast to an unlimited number of viewers without straining network performance. The Cisco IP/TV Question Manager allows any viewer watching a live broadcast program to submit a text-based question on-line. The Question Manager's moderator presents the questions to the speaker for immediate response or archives them for follow-up later. These and many other features offer creative, new options to teachers, curriculum developers, students, and the administration of CSU.

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