

# Cisco and The University of Oregon: Taking the Lead with Cisco Content Delivery Network Technology



The University of Oregon has long been a leader in the use of computers and the Internet. Recent awards include a \$1.2 million grant from the United States Defense Advanced Research Projects Agency to conduct research on technologies related to the next-generation Internet (Internet2, a consortium of U.S. universities, corporations, and government to develop and implement advanced network applications and technologies) and recognition from the United States National Science Foundation for supporting the development of technology in education. The university has also appeared twice on Yahoo Internet Life's annual list of "Top 100 Most Wired Colleges."

Always looking to the future, the university decided to deliver even more educational and technological services to students and communities everywhere. "We wanted to reach out to different audiences and communicate more effectively with the Internet2 community," says Joanne Hugi, Director of Computing at the University of Oregon.

University staff evaluated technology from Real Networks, Microsoft, and Cisco with several criteria in mind: High-quality video delivery that didn't affect network performance, simple implementation, ease of use, interoperability, and cost. "Previously, we could only broadcast several streams of low-quality, herky-jerky video," says Hans Kuhn, Academic User Support Specialist at the university. "We wanted to lay the groundwork

for the future and offer distance learning. So our primary requirement was the ability to deliver high-quality MPEG-1 video and audio without exhausting the network. We wanted something that would be simple to deploy on campus. It had to interoperate with other tools. We wanted to avoid the need for any reverse engineering. And cost was also important."

Cisco's Content Delivery Networks (CDN) solution emerged as the clear winner. Cisco's Enterprise CDN, a component of the overall Content Networking strategy, enables the University of Oregon to broadcast MPEG video and audio, including major events, speeches, and lectures, as well as offer distance learning. "The Cisco Content Delivery Network (CDN) technology offered exceptional quality and performance," says Kuhn. "Only Cisco offered true IP multicast delivery of video and MPEG-1 quality. Cisco would scale perfectly from campus-size audiences all the way up to Internet-size audiences. We knew that we could deploy the Cisco solution with a minimum of time and effort. In fact, no integration was necessary since our campus was already multicast-enabled. Given our strong relationship with Cisco, we felt sure that we would be able to give feedback directly to developers and engineers. With Cisco's established presence in the marketplace, we knew that the products weren't going to fade away. Plus, Cisco expressed a strong interest in helping us succeed."



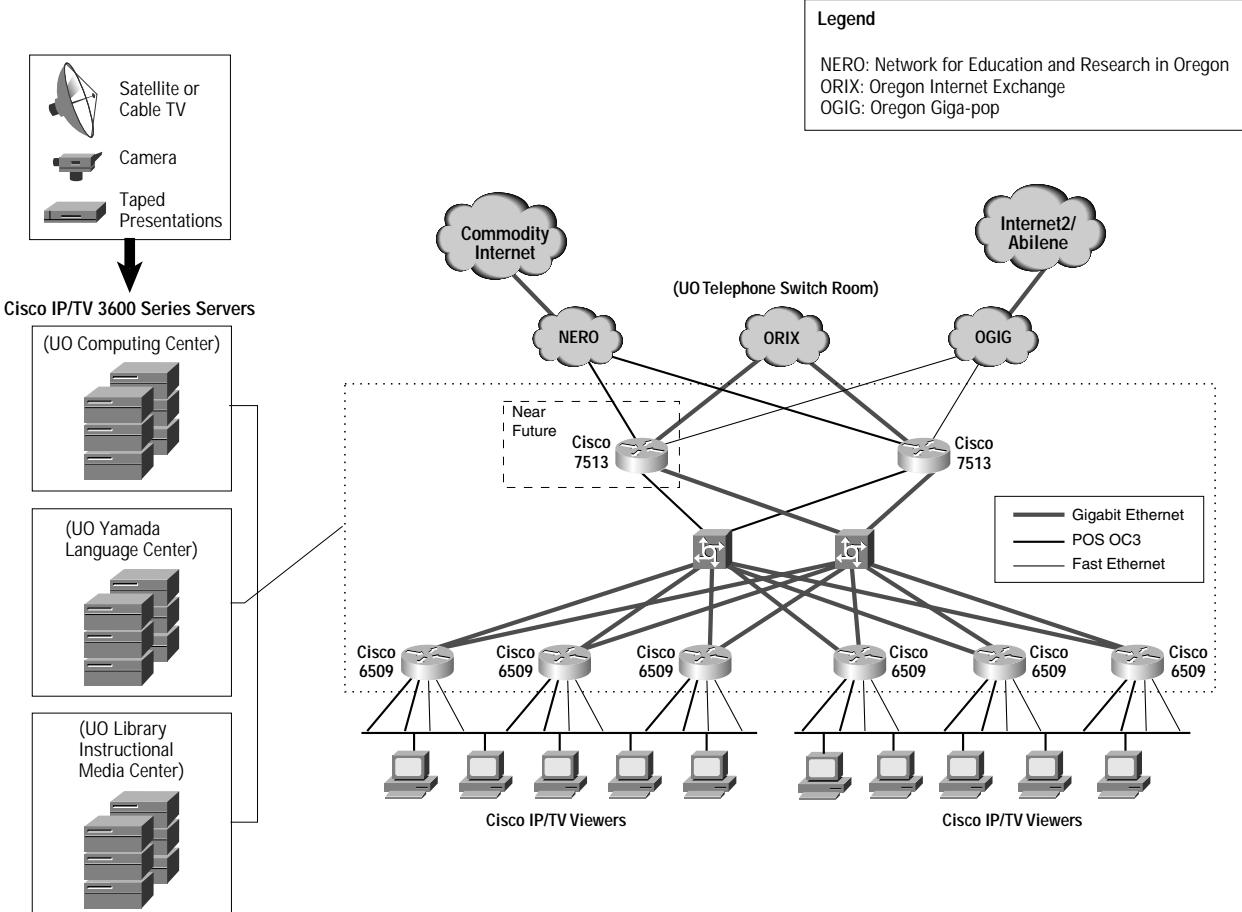
Over the next three months, university staff implemented six high-performance Cisco IP/TV® 3400 Series Servers with robust IP/TV Server software and IP/TV Client Software for client PCs. The university is using MPEG-1 at 1.5 Mbps and H.261/PCM at 512 kbps. The servers are located in the university's Advanced Network Technology Center, library, and language lab. (The campus backbone is Fast Ethernet, and has between 6000 and 7000 Cisco Routers, which also serves as a hub for the entire state of Oregon's IP network).

You might say that the world has become a smaller place in Eugene, Oregon. The university now broadcasts a wide range of special worldwide events to students. Netaid—a concert hosted by the Internet community to recognize pressing social issues such as extreme poverty—was

broadcast on November 9, 1999. "We sourced the event using multicast," says Kuhn. "We never saw a hiccup in performance. We could have handled a much larger audience than the 2000 or so people who attended."

Closer to home, the university uses Cisco's Enterprise CDN technology to broadcast class content and speeches by visiting researchers. Students can also tune into foreign language programming, access a library of educational material, and watch taped interviews. Meanwhile, students and other university supporters have watched the football team play for a spot in the Rose Bowl and track stars compete in the Prefontaine Classic without having to travel to the events. Access is available from numerous on-campus locations such as the library and language lab as well as students' own computers.

**Figure 1**



Since implementing the Cisco IP/TV solution four years ago, the University of Oregon has seen numerous benefits. "We now have the high-quality video and audio needed in higher education," says Kuhn. "Cisco IP/TV's multicasting capabilities and simple integration make it incredibly network-efficient. Because the Cisco solution is true one-to-many delivery, we don't have to worry about our network overhead at all. And since Cisco is open, we were able to write our own Linux client. We didn't have to do any reverse engineering. Cisco has always done a good job of carrying the torch for standards..."

Meanwhile, our users are really excited by its high quality and simplicity. Everyone says, 'I want my IP/TV.' The interface is easy enough that anyone can use it. That's why we thought it would be a huge success. And it is."

Indeed, the technology is having a ripple effect. "The biggest benefit of using the Cisco technology is the fact that it conserves bandwidth," says Hugi. "It's much more efficient than streaming. While streaming media creates a new stream for each viewer, Cisco IP/TV uses a single shared stream for one viewer or a hundred viewers or a million viewers. So the source of the content never notices if additional viewers are watching."

The university's investment in Cisco's CDN technology has also allowed the school to interact with a broader audience. "Since we're in the education business, we need to reach audiences all over the world," says Hugi. "With Cisco, we are able to offer richer course content to those students as well. At the same time, we have a strong commitment to K-12 programs, many of which are eager to receive video around topics such as teaching high school equivalency to migrant farm workers and their children. In fact, we are working closely with other members of OPEN, the Oregon Public Education Network, to provide a variety of resources to K-12 schools. Cisco will help us deliver content quickly and seamlessly to all of those audiences who aren't on campus."



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