

Podcast-Ready Network Prepares UC Berkeley for Next-Generation Campus

Executive Summary

CUSTOMER NAME

University of California, Berkeley

INDUSTRY

Higher Education

CHALLENGES

- Prepare the campus for next-generation, multimedia learning
- Expand reach to enable public access to classroom content
- Ensure campus network will accommodate increased demand

SOLUTIONS

- Deploy Podcast Producer to simplify and accelerate podcasting
- Make educational content available through iTunes U
- Provision hierarchical network architecture design

RESULTS

- Increased podcast production by faculty; enhanced student study time and organization
- Enabled public access to classroom lectures via podcasts
- Assured that network is ready for next-generation campus

Podcasting impacts the learning environment for both on-campus students and life-long learners as universities share educational content with the world; however, video-heavy podcasting and distribution through Apple's iTunes U require a stable, comprehensive network. With a reliable and interoperable Cisco® network provisioned with a hierarchical network architecture design, University of California, Berkeley has raised the bar for campuses looking to maintain competitiveness through a next-generation, multimedia learning environment.

Challenges

University of California, Berkeley, one of the oldest educational institutions in the state, is the flagship for California's public university system. With more than 33,000 students, 2,000 faculty members, and a mission to share learning with the general public, UC Berkeley is committed to excellence in student education and dissemination of knowledge for the betterment of society.

In an age of rich multimedia and collaborative applications—such as YouTube, iTunes U, Facebook, gaming, and virtual reality—Berkeley's mission becomes more challenging, as higher-education institutions struggle to meet the expectations of technology-savvy students. These students expect their schools to keep pace with the same advanced technologies they as consumers use at home to enhance the learning experience on campus and allow them to access educational content wherever they are, whenever they want. Developing a technology-enhanced environment that meets student demands for using multimedia in learning is critical for higher-education institutions to attract and retain students and faculty.



Keeping Pace with a Next-Generation Learning Environment

For more than a decade, Berkeley has offered a variety of educational content to a worldwide audience on topics ranging from astronomy to psychology, through its locally managed Website, <http://webcast.berkeley.edu>.

“We’ve been Webcasting for about 12 years,” says Adam Hochman, Webcast co-manager and technical project manager, UC Berkeley. “Our present program derived from a research initiative started by Professor Larry Rowe, called the Berkeley Internet Broadcasting System. In 2001, Educational Technology Services (ETS) adopted this initiative and offered course Webcasting as a campus service. ETS built one of the original automated systems to capture and deliver content from the classroom.”

Although the concept was innovative for its time, it was labor-intensive, costly, and no longer met the needs of a new student body arriving on campus expecting to access and download podcasts of class lectures and other content.

“We conducted a study on incoming freshmen and learned that they rated podcasting as important as wireless technology and access to e-mail,” Hochman says. “These are ‘digital natives’ who communicate in this realm. They understand the medium and grew up with it.”

The university began reviewing podcasting systems that would meet the expectations of its student population and encourage faculty members to create podcasts by simplifying the process. The campus also wanted to enable a wider distribution to give life-long learners outside the school the opportunity to access class lectures that had been recorded and stored as podcasts.

“We are a public university with limited funding,” says Sergio Feria, lead software engineer, UC Berkeley. “We need to create a next-generation system that is scalable, sustainable, and provides easy high-volume capture, transfer, and postprocessing.”

Evolution to Podcasting Requires Careful Planning and a Comprehensive Network

Cisco recommends that following a hierarchical network model is essential for achieving the level of high availability, network reliability, and scalability required to support advanced applications like podcasting. In a hierarchical design, the capacity, features, and functionality of a specific device are optimized for its position in the network and the role that it plays. If the foundation is not deployed correctly, the performance of advanced applications that depend on network services will eventually suffer.

Berkeley's goal is to implement an iTunes U initiative to expand podcasting to more than 200 classrooms in conjunction with other multimedia applications that would run over the campus network. Because the university had already provisioned a hierarchical network model with podcasting in mind, the IT staff was assured that the network would fully support the expansion of its multimedia campus learning environment to meet student expectations and community learning.

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Cliff Frost, Director
IST Infrastructure
Services
UC Berkeley

"We see many universities who desire to enable a next-generation campus, but often they do not have a robust network or a plan, budget, or strategy in place that includes discussions among the key stakeholders [educators and IT]," says Dr. Tracey Wilen-Daugenti, Higher Education Practice lead, Global Education group, Cisco Internet Business Solutions Group. "Berkeley had the foresight to put the foundation in place that would let them expand and scale with a stable, reliable network."

Cisco Key Architectural Principals:

- **Modularity**—the building blocks of modular networks must be easy to replicate and expandable, eliminating the need to redesign the entire network when additional capacity or capabilities are needed.
- **Deterministic Behavior**—the network must react in a predictable fashion to scheduled and unscheduled outages.
- **Availability**—the network must provide optimum convergence in the event of a link or node failure utilizing redundant paths, network components, and intelligent Cisco IOS® networking software features like Non-Stop Forwarding, Stateful Switch Over, Equal Cost Multipath Recovery, and Gateway Load Balancing Protocol (GLBP).
- **Scalability**—capacity, features, and functionality of specific devices must be optimized for their role and position in the network, promoting stability and scalability.
- **Manageability**—the network must enable ease of management in order to minimize maintenance and operations overhead while increasing operator visibility and contributing to overall network availability.
- **Secure and Resilient**—the network must be engineered to survive both attacks directed at the infrastructure and collateral damage related to unexpected events like computer worms and viruses. Cisco IOS security features, such as control plane policing, quality of service, DHCP snooping, Dynamic ARP Inspection, IP Source Guard, and port security, among others, must be utilized to secure the network.

Podcast files move through the network prolifically before they reach their final destination and are captured, reviewed, processed, published, and distributed to a wide array of distributions channels to be used on portable devices. The process is dependent on a stable network that is comprehensive enough to handle increased demand.

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For more information, see “Design Implications of Rich Media (Podcasting) in a Campus Network” on Cisco’s Website.

Solutions

Berkeley Integrates Apple’s Podcast Producer

Berkeley has begun to integrate Apple’s new Podcast Producer application, a comprehensive solution for producing and distributing high-quality podcasts. Podcast Producer is a key component of a next-generation podcast capture and delivery system, and provides the necessary framework for recording content, encoding, and publishing podcasts for playback on various devices.

Within its instantiation of Sakai¹, Berkeley will build a community source learning management system that orchestrates Podcast Producer services and enriches its relevance and capabilities within higher education. The marriage of Podcast Producer and Berkeley’s next-generation system will allow the capture of high-quality audio and video from local and remote cameras and screencasting, and enable the uploading of existing content into Podcast Producer for encoding and redistribution. The IT team is especially pleased with this hybrid model because it lowers the barriers to entry and creates a user-friendly environment for faculty.

Podcast Producer is a natural extension of Berkeley’s adoption of iTunes U as a distribution channel for audio and video content—such as presentations, performances, lectures, demonstrations, debates, tours, and archival footage—to students and to the world.

“In spring 2006, we launched a podcast pilot program,” says Hochman. “We found that podcasting brought a wider array of instructors into the fold and has galvanized interest in our program. iTunes U has given our world-class faculty a worldwide stage.”

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¹Sakai is an online collaboration and learning environment providing a free and open source product that is built and maintained by the Sakai community.

Because Berkeley's existing network had originally been designed and implemented well, and follows Cisco's hierarchical network model, it is fully capable of evolving to meet changing business requirements. Not only was the network ready to run high-bandwidth applications such as podcasting, it would also handle the large file transfers to and from iTunes U for storage and distribution as well as many high bandwidth applications on campus.

"This is a time of change for IT, in all its forms across campus," says Kelly Haberer, interim deputy CIO of Information Services and Technology, UC Berkeley. "We were moving to a much more services-oriented model of delivery as a better strategy to meet the demand we're seeing from our constituents."

Results

UC Berkeley on Track to a Next-Generation Learning Environment

Today, Berkeley can easily meet student and faculty expectations for a next-generation campus through a comprehensive network that enables the creation and delivery of podcasts.

"The combination of iTunes U, Podcast Producer, and Berkeley's next-generation system will provide the necessary foundation to build powerful media for today's and tomorrow's students," says Hochman. "Our network infrastructure really makes the dynamic needs of this combination possible."

Berkeley's next-generation campus vision has resulted in the following achievements:

- Podcasting is planned for 70 classrooms (one-third of UC Berkeley's course catalog) in the next one to two years.
- Two million iTunes U downloads occurred within the first year.
- More than 160 courses are available to the public for free.
- More than 200 special events, with prominent speakers such as Jane Goodall, are available.
- Faculty use has increased due to easier podcast production.

With a comprehensive campus network in place and a plan for how to expand as applications require, UC Berkeley is positioned to continue its mission as a public institution focused on providing a next-generation learning environment to students and making higher education available to a global community.

More Information

The Cisco Internet Business Solutions Group (IBSG), the global strategic consulting arm of Cisco, helps Global Fortune 500 companies and public organizations transform the way they do business—first by designing innovative business processes, and then by integrating advanced technologies into visionary roadmaps that improve customer experience and revenue growth.

For further information about IBSG, visit <http://www.cisco.com/go/ibsg>



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