

# SUNY Cortland: Advancing Higher Education with an Award-Winning Converged Network

## Background

Located in central New York, the State University of New York College at Cortland (SUNY Cortland) was founded in 1868. Today, approximately 7,500 students annually pursue undergraduate and graduate degrees within the College's two academic divisions and 23 departments, encompassing more than 400 faculty. The College's main campus covers 191 acres and includes 30 traditional and modern buildings.

## Challenge

Many higher-education institutions are replacing outdated and inadequate communications networks, equipment, and services. This change is necessary to meet advances in educational requirements and technology, increase the productivity of users and IT staff, and better serve technology-savvy faculty and students. SUNY Cortland faced this challenge for both voice and data communications. For example, faculty wanted a network that could handle high-bandwidth video, multimedia applications, and file sharing for instructional use. The College also wanted to improve its ability to serve students and parents effectively with streamlined handling of voice calls. The existing network and communications systems at SUNY Cortland were not adequate to support these needs.

For nearly 17 years, SUNY Cortland used a time division multiplexing (TDM)-based private branch exchange (PBX) for voice communications, a system that was at 99 percent capacity and could not support growth in applications or users. At nearly \$500,000, the cost of upgrading the PBX was almost as expensive as installing a new solution. "We asked ourselves, do we want to spend this money on an old technology or invest it in a new network that will serve our needs well into the future?" said Daniel R. Sidebottom, Director of Administrative Computing Services at SUNY Cortland.

The College also had a six-year-old, 155-Mbps asynchronous transfer mode (ATM) backbone data network in a flat design with shared, 10-Mbps Ethernet links to user desktops. This network was built with components that were no longer supported by the vendor and could not provide the redundancy necessary for high availability. "When you rely on a data network to support your key mission of education, you want a network that is supportable and can grow to meet new academic requirements," said Sidebottom.



## Solution

Instead of upgrading the old networks and systems, College officials decided to implement a new, single network and new equipment for integrated voice, video, and data traffic. This IP network carries all communications over a single Gigabit Ethernet backbone built with hardware and software products from Cisco Systems. SUNY Cortland was nominated for the 2003 EDUCAUSE Award for Excellence in Networking in recognition for the innovation of this network.

To replace the PBX for voice communications, SUNY Cortland chose several products in the Cisco IP Communications system. Core call processing and central control is provided by Cisco CallManager, which extends enterprise telephony features and functions to packet telephony network devices such as IP phones, media processing devices, voice-over-IP (VoIP) gateways, and multimedia applications. This software-based system processes voice and fax calls for faculty and staff, and integrates with other telephony services such as messaging and contact center.

Cisco Unity Unified Messaging provides IP-based voice mail services for every faculty and staff phone. Where appropriate, the unified messaging features enable users to retrieve all messages (voice, e-mail, and fax) from a single inbox. This capability means that users can have e-mail messages read to them over the phone, and can listen to voice mail messages from their e-mail inbox.

Cisco IP Contact Center (IPCC) Express Edition gives SUNY Cortland an integrated, full-featured solution for managing small contact centers while delivering all the benefits of converged Cisco IP Telephony. This integrated, single-server platform for automatic call distribution (ACD), interactive voice response (IVR), and computer-telephony integration (CTI) supports location independence for agents and supervisors, improves deployment flexibility and scalability, and provides sophisticated, efficient customer contact management. At SUNY Cortland, Cisco IPCC Express Edition supports three distinct contact center applications on a single system: the Financial Aid department, Admissions Office, and the Hall-Net technical support center for voice and data communications in the student dormitories. In each of these applications, the College's objective is to better serve students, parents, and other callers who need information and assistance.

As the final component of the voice solution, Cisco Emergency Responder enhances the existing E911 functionality of Cisco CallManager and enables College police and the county dispatch center to identify the location of 911 callers—even in the campus parking lots. Working with Cisco CallManager, this system tracks detailed location information by physical port instead of telephone identifier, and uses enhanced routing capabilities that direct emergency calls to the appropriate Public Safety Answering Point (PSAP) based on the caller's location. This capability eliminates the need for any administration when phones are moved.

The new, campus-wide network is fully redundant and is comprised of 500 switches and other network devices that serve a potential of 11,000 voice/data ports. Today, these ports connect more than 5000 faculty, staff, and student computers in 100-Mbps LANs as well as 600 Cisco IP Phone 7960G units and 3500 analog phones. The Cisco Survivable Remote Site Telephony application provides back-up call processing capabilities to off-campus sites if a network link goes down, important for assuring continued communications.

The network is designed with three cores, each containing a Cisco Catalyst® 6509 switch and a Cisco VG248 Analog Phone Gateway. Cisco Catalyst 3550 switches provide user connections within each building and Cisco 7206 routers support the campus connection to the Internet.



Deployment and system integration for the new network and equipment was led by a Cisco partner, Ronco Communications, which continues to provide service and support. Working as a team, staff from Ronco, Cisco Systems, and SUNY Cortland completed installation of the new data infrastructure in time for fall semester 2002; the voice infrastructure cutover occurred in January 2003.

With combined expertise in both Cisco products and the college's previous PBX, Ronco staff brought high value to the planning and deployment activity for the new network. For example, Ronco personnel were able to retrieve PBX configuration information for key details on usage and needs for voice communications. "Ronco did their homework, spending hundreds of hours meeting with us, learning our environment, and understanding our needs," said Sidebottom.

## Results

The converged network and Cisco IP Communications solution has benefited SUNY Cortland in numerous ways. Outsourcing for certain tasks—such as moves, adds, and changes for telephones and voice mailboxes—is no longer needed, saving approximately 750 hours per year in staff time and approximately \$100,000 per year in expense. The College also expects to save approximately \$15,000-\$20,000 per year by using toll bypass—moving long-distance calls across its own wide area network (WAN) and using four-digit dialing within the campus.

SUNY Cortland staff considered a return on investment (ROI) analysis created with the Cisco Converged Network Investment Calculator (CNIC) prior to selecting the Cisco solution. This analysis found that replacing the outdated networks with an IP-based, converged network would ultimately yield savings of more than \$250,000 (net present value) over a five-year term as compared to the costs of purchasing, deploying, and supporting disparate voice and data networks. The analysis also anticipated a payback period of less than one year on the investment in the new network technology and associated facilities and equipment.

Productivity gains are also significant. The new network enables College staff, faculty, and students to communicate more effectively. Faculty and students can also use video, file sharing, and other high-bandwidth applications that increase value of the curricula and the educational experience. These applications run significantly faster than on the old 10-Mbps network, saving numerous hours per week for users.

## More Effective Voice Communications

A key benefit of the Cisco IP Communications solutions is that phone moves, adds, and changes are simpler and more cost-effective. Cisco CallManager enables a user to simply unplug, move, and plug-in a Cisco IP Phone at the new location—the phone automatically re-registers with Cisco CallManager. All settings, user profile information, and the phone extension are retained in the move. Previously, the College paid an outside vendor to come onsite and make manual wiring changes for every move. This service was expensive and time-consuming, with a cost of several hundred dollars per change and a delay of several days. These costs were compounded by the multiple changes required each week.

The Cisco IP Phones also give the College new ways to communicate with faculty and staff users. The Extensible Markup Language (XML) functionality and large LCD display on the Cisco IP Phones enable a variety of applications, such as current weather forecasts and news headlines; campus-wide phone directories; cafeteria menus; messages about computer technical support, class registration, and ticket purchasing for College events; and system and emergency announcements.



With Cisco Unity Unified Messaging, users can listen to e-mail over the phone and check voice messages from the Internet—a particularly attractive feature for faculty, who often work at home. When Cisco Unity is integrated with a third-party fax server, users can also forward incoming faxes to a machine in their own office, another building across campus, or a hotel across the country. Users will be able to boost productivity by retrieving messages from anywhere, using the method (phone or PC) most convenient at the time. Sidebottom indicated the College expects productivity increases comparable to those of other organizations, with approximately one hour per day saved per user.

Cisco Emergency Responder enables the SUNY Cortland police to remotely access 911 calls from anywhere on campus. The College is better able to meet its security needs because Cisco CallManager and Cisco Emergency Responder track phone locations automatically, even when the user moves the phone to a different port. This portability also enables a 911 command center to be mobile and set-up anywhere on campus, which could help campus police stay in operation during a large-scale emergency.

#### Improved Call Handling in the Contact Centers

Cisco IPCC Express Edition is increasing customer service and staff productivity in the Admissions, Financial Aid, and Hall-Net contact centers. Office managers can monitor the current queue times and use the skills-based routing features in Cisco IPCC Express to route calls to the best-qualified staff based on moment-by-moment availability. When appropriate, caller information and student records can be pushed to the staffer's PC simultaneously with a call to reduce call-handling times.

Cisco IPCC Express Edition gives managers in each contact center a variety of useful data on call activity, such as real-time queue waits, that was not available from the College's previous ACD system. Historical reports on call activity provided by Cisco IPCC Express enable managers to make better decisions on staffing levels for faster service to callers.

In addition, each office can record announcements in the IP-based IVR system, providing information to callers waiting in the queue about alternate contact channels and frequently asked questions.

#### A Streamlined Network Design and Management

The new network is fully redundant and designed for no single points of failure to ensure reliability. To achieve a user experience comparable to that of the prior voice network, Cisco Quality of Service features have been enabled on the Cisco Catalyst switches to deliver exceptional voice quality.

The converged solution has also enabled SUNY Cortland to bring selected off-campus buildings and locations onto the campus network—including the Raquette Lake Outdoor Education Center, located 160 miles from the main campus and connected by a T1 link. These remote network connections enable off-site users to enjoy four-digit dialing to all campus locations—saving time and toll charges as well as making the offsite locations feel more like a part of the campus community.

The converged network and the CiscoWorks applications for network management have enabled SUNY Cortland to decrease costs and increase the productivity of network administration staff. The previously separate data and voice networks required two different infrastructures and two different management staffs with different skill sets. Today, the converged network operates on a single infrastructure and uses the IP protocol for all traffic, which requires considerably less equipment, cabling, and staff to manage the entire network as it continues to grow.



SUNY Cortland chose the CiscoWorks applications to enable central monitoring, troubleshooting, and management of the converged network. Noted Sidebottom, “We knew a converged network would be complex and that we would need a management solution that was standards-based, easy to use, and would provide real-time statistical information about network performance.” For example, the Device Fault Manager, a component of CiscoWorks IP Telephony Environment Monitor (ITEM), and the IP Phone Information Utility enable network administrators to detect and resolve problems before they affect users campus-wide. Device Fault Manager provides real-time fault analysis for Cisco network elements. The IP Phone Information Utility presents on-demand configuration information for Cisco IP Phones; this software is a drop-in module for CiscoWorks ITEM.

The College did not reduce staff as a result of implementing the new network; today, four networking specialists and 1.5 telephony staff manage all aspects of the network and equipment. A single network means staff can be more easily cross-trained to manage both data and voice components, making IT personnel more effective and productive.

#### Future Plans

“The robust nature of the converged network, as well as its reliability and scalability, mean the College will be able to grow and adapt and provide all necessary communications capabilities to students, faculty, and staff for decades to come,” said Sidebottom. “With our new network and the Cisco IP Communications solutions, applications and technologies that previously weren’t feasible are now possible and will empower the entire College community.”

The network is scalable to 10 Gigabit Ethernet technology as the College’s traffic demand increase. It also supports leading-edge technologies such as wireless networks, which SUNY Cortland staff plan to implement in order to meet student and faculty demands for easy network access anywhere on campus.

In the future, SUNY Cortland also plans to add an off-campus student housing complex to the network and charge those residents for access to voice services, generating new revenue for the College. Additional revenues are possible from providing Cisco IP Phones and voice mailboxes on the Cisco Unity system to students in the on-campus dormitories.

#### Why Cisco Systems

Finding a truly converged solution for data and voice networking was a key factor for Sidebottom and his staff when they evaluated the offerings of different vendors. According to Sidebottom, “Only Cisco provided an IP voice solution that was truly integrated with the data network. And having a vendor that could supply everything from A to Z gave us more confidence in our decision to go with a converged network.”

Sidebottom was also impressed with the expertise of Cisco personnel and the resources they brought to the planning and cutover activity for the new network. Because of the extensive planning and preparation work conducted by the project team, the implementation process went smoothly, particularly for the data network. “I have been involved in a number of large projects and cutovers and I have never seen the impressive level of teamwork that we had with this project,” concluded Sidebottom.



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