The University of Louisville: Fulfilling the Promise of VoIP

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The University of Louisville: Fulfilling the Promise of VoIP
EDUCAUSE is a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology.

The mission of the EDUCAUSE Center for Applied Research is to foster better decision making by conducting and disseminating research and analysis about the role and implications of information technology in higher education. ECAR will systematically address many of the challenges brought more sharply into focus by information technologies.

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Preface

The EDUCAUSE Center for Applied Research (ECAR) produces research to promote effective decisions regarding the selection, development, deployment, management, socialization, and use of information technologies in higher education. ECAR research includes

◆ research bulletins—short summary analyses of key information technology (IT) issues;
◆ research studies—in-depth applied research on complex and consequential technologies and practices;
◆ case studies—institution-specific reports designed to exemplify important themes, trends, and experiences in the management of IT investments and activities; and
◆ roadmaps—designed to help senior executives quickly grasp the core of important technology issues.

As part of its 2009 research agenda, ECAR recently published a study, Spreading the Word: Messaging and Communications in Higher Education,1 written by Mark C. Sheehan with Judith A. Pirani. The study examines current practices and future directions related to EDUCAUSE members’ use of e-mail, telephony, mobile communications, and crisis communications.

Literature Review

A literature review helped identify and clarify issues, suggest hypotheses for testing, and provide supportive secondary evidence. Besides examining articles and studies from journalistic, academic, and IT practitioner sources, we consulted with practicing CIOs experienced in IT governance to develop study objectives and survey questions.

Online Survey

We designed and administered a web-based survey that was distributed to institutional representatives (mostly senior IT leaders) at 1,694 EDUCAUSE member institutions in July 2008. We received 351 responses (a 20.1% response rate).

Interviews

We conducted follow-up telephone interviews with 37 senior IT leaders from a mix of institutions to gain deeper insights into findings from the quantitative analysis and to capture additional ideas and viewpoints.

Case Studies

ECAR researchers conducted this in-depth case study to complement the core study. We assume readers of this case study will also read the primary study, which provides a general context for the individual case study findings.
We undertook this case study of the University of Louisville (UofL) to study how it leveraged its VoIP (voice over Internet protocol) implementation into a university-wide emergency notification system. ECAR owes a debt of gratitude for their time and insights to James R. Ramsey, President, University of Louisville; Richard D. Clover, Dean, School of Public Health and Information Sciences and Associate Vice President for Health Affairs/Health Informatics; Michael Dyre, Director of IT Planning and Finance; Priscilla Hancock, Vice President for Information Technology and Chief Information Officer; Thomas R. Jackson, Vice President, Student Affairs; Frank A. Mianzo, Assistant to the Vice President, Student Affairs; Larry Owley, Vice President for Business Affairs; Jenny Sawyer, Executive Director of Admissions; Tom Sawyer, Assistant Vice President for Information Technology; and Jay Vetter, Director, Communications Services.

Introduction

This case study focuses on the challenges of introducing a new technology to cautious administration officials, their subsequent conversion, and the eventual benefits experienced by all. The UofL’s IT organization encountered considerable resistance when it first proposed the migration of its Centrex-based phone service to a campus-wide VoIP implementation in 2003. At the time, few, if any, universities of similar size had converted their entire campus phone network to VoIP. Yet the IT organization persevered, believing VoIP to be the correct strategic direction for the university’s telecommunications services. The unit worked for two years with the senior administration to prove the technical and fiscal viability of VoIP, and in 2006 it received project approval.

Today, UofL operates approximately 10,000 VoIP phones, saving the university approximately $1.5 million annually in telecom costs. In addition, UofL’s IT organization created an institution-wide emergency notification system that can transmit audio and text messages to every one of its 10,000 VoIP handsets in under two minutes. As a result, the VoIP phones are now recognized as an important element of UofL’s multipronged emergency notification strategy. “While emergency notification did not factor in our original reasons to install VoIP, its capability is now key in our overall strategy to communicate quickly with our students, faculty, and staff,” states UofL President James Ramsey. Its success prompted the adoption of VoIP phones in each student’s residence hall room at a time when many institutions are disconnecting residential phone services, and plans are under way to install the VoIP phones in the UofL classrooms, too.

This case study details the evolution of VoIP at the UofL from a dubious concept to a valued asset, focusing on the IT organization’s underpinnings and planning and implementation strategies, as well as the role of VoIP in emergency notification.

Background

The UofL can trace its roots to 1798 when eight men decided to form the Jefferson Seminary in Louisville. Over time, UofL evolved to its present three-campus structure: its main Belknap campus located near downtown Louisville, the Health Sciences Center situated in the heart of downtown Louisville, and the Shelby campus located 12 miles east of the main campus. Ramsey presides over the institution’s schools and colleges: the College of Arts and Sciences, Brandeis School of Law, College of Business, School of Dentistry, College of Education and Human Development, Graduate School, Kent School of Social Work, School of Medicine, School of Music, School of Nursing, School of Public Health and Information Sciences, and Speed School of Engineering. In fall 2007, almost 21,000 students were enrolled at UofL, and nearly 6,200 faculty and staff work at the university.
Priscilla Hancock, vice president for IT (VPIT) and CIO, heads UofL’s seven-unit IT organization. Tom Sawyer, assistant vice president for IT and a 22-year veteran at UofL, manages IT’s Communication Services. Sandra Johnson-Byers heads IT’s support services areas: Academic and Technology Support, and Consulting. Enterprise Security reports directly to Hancock. When longtime VPIT Ron Moore retired in 2006, Sawyer served as interim head of IT until UofL hired Hancock in 2007.

**UofL’s VoIP System**

UofL’s IT organization moved gradually toward an institution-wide VoIP implementation. VoIP’s genesis at UofL stems from a Cisco Systems, Inc., grant in 2002 to fund a pilot VoIP conversion of all the IT organization’s phone lines. “There were lots of issues back then, as VoIP was brand new,” recalls Sawyer. But as the IT organization learned more about the technology and gained operational experience, staff members came to realize that the VoIP phones “were basically a mini PC sitting on your desk,” continues Sawyer. “If we bought the right handset, we would be able to write and deploy our own applications.” This, along with VoIP’s cost savings, were major drivers to expand VoIP services throughout the entire UofL campus. IT negotiated with Cisco to purchase a campus-wide VoIP system at a discounted price and became a reference site for the vendor.

To fully appreciate UofL’s achievement, one must look back to the IT organization itself and understand how its structure and accomplishments made possible the project’s planning and implementation phases. This section discusses all three phases: background, planning, and implementation.

**IT Organization Background**

IT implemented VoIP during 2006–07, but the organization itself had evolved in several ways to create a supportive environment for its VoIP project.

**Attitude of Senior Administration**

The IT organization’s development led the senior administration to perceive IT as a unit with a strategic and holistic outlook. This attitude evolved over the course of many years. UofL took the first step with former IT leader Moore’s promotion to a vice president position, resulting in a place on the university’s senior leadership team. When Moore first started at UofL 24 years ago, he reported directly to Larry Owsley, vice president for business affairs. Owsley later recognized the need to promote the university’s IT leader to a VP-level position and recommended the appropriate change in reporting structure.

The second half of this significant transformation occurred during the recruitment for Moore’s replacement. As head of the VPIT search committee, Richard D. Clover, dean of the School of Public Health and Information Sciences and associate vice president for health affairs/health informatics, sought to use this opportunity to transform the senior administration’s perception of “UofL’s leader of information technology,” he states. “It is important for the people in leadership positions to understand the difference between just running an IT operation [and] truly having a CIO that can be a resource to the entire university. Such a change really eases the implementation of new technology.” Clover hired a consultant to educate the president, the provost, and the president’s senior leadership team, and the consultant’s project summary served as a resource for the VPIT/CIO recruitment process to emphasize the position’s institutional focus. “It was a slow educational process that took about a year to complete,” continues Clover, “but I think the investment was well worth it.” Today, the VPIT/CIO reports directly to the provost.

**Broad IT Perspective**

When Sawyer tackles a project, he sees himself as focusing not just on the technical issues. He also looks broadly at who is
affected by IT and at what the ramifications are outside the IT organization. “The technology is the easiest part of the process,” he states. “I can tell you that having done it, the technology implementation is the simplest part of the process. It either works or not, and if it doesn’t, you make it work. The strategy, the politics, the communication, and the building of your support groups are the interesting parts to me.”

When he managed UofL’s enterprise resource planning (ERP) implementation, Sawyer used a series of strategies that later guided subsequent IT projects: Present a realistic picture of the project—bad points as well as good; build a network of project advocates; and generate a favorable reputation through good project management, which results in on-time and on-budget implementation.

**Robust IT Infrastructure**

For more than a decade, UofL has made a concerted investment in the university’s campus network. “We did not want to penalize the university due to lack of technology,” states Sawyer. “So every time we could get funding, we made huge investments to develop a campus infrastructure that would allow us to take advantage of new technologies.”

As part of this initiative, the university went through a major network conversion in mid-2003 to become a site that demonstrated Cisco’s networking solutions in a higher education setting. Over an 18-month period, IT swapped out, building by building, every piece of network electronics in the university, upgraded the IT operations center, and improved the IT security infrastructure. Today, the main campus backbone network runs at 4 Gbps over a city-wide fiber-optic network. Departments can order IP (Internet Protocol) networking for computers and servers at data rates of 10/100 Mbps. Residence halls provide a 10/100-Mbps Ethernet connection for each resident. “That project prepared our campus infrastructure and our community to benefit from new technologies like VoIP,” says Sawyer. Indeed, several senior UofL administrators concurred with this view. “One factor in our decision to fund VoIP was that the current IT infrastructure was in place,” states Owlsley. “If we had to completely redo the infrastructure, the proposed VoIP implementation would not have made sense.” Clover concurs, stating, “Our ability to talk about a campus-wide VoIP system was effectively tied to our network. Our robust network allowed us to consider the project that would otherwise have been outside our capacity.”

**Centralized Network**

UofL’s IT organization maintains a strong centralized network infrastructure. Nothing can be attached to the campus’s wired and wireless networks without prior approval; IT turns off rogue hubs and devices. IT controls upgrades, too. University policy dictates that all departments identify their mission-critical data and maintain them in the campus data center, which currently houses more than 50 department servers. Departments may maintain non-critical data on local servers that meet university standards. Despite faint rumbles for more local control, university-level IT security issues override departmental interests.

**IT Governance**

UofL has an active and strong IT governance structure. At its apex is the Strategic Technology Executive Committee (STEC), composed of many of the university vice presidents and deans, faculty representatives, and a student representative. STEC advises the IT organization on its technology investments for research, education, and administrative purposes. “We look very aggressively at the future of IT and the future of those three content areas, to identify the ripe opportunities for the university,” states Clover, who chairs STEC. Hancock finds STEC’s composition to be ideal. She states, “We work out
the issues, and by the time the IT proposal gets to the senior leadership group, half of its members have already vetted it in the STEC meetings. By then, the initiative is so well vetted that it becomes the obvious course. All relevant areas have reviewed the proposal: for example, student affairs, communications and marketing, finance, facilities.”

Faculty representatives on the Academic Technology Committee advise Hancock on academic technology issues. The Tier One Advisory Group of department liaisons confers with the IT organization monthly about relevant issues and initiatives. “All of these advisory organizations have enabled us to look at newer technologies,” states Sawyer. “The first thing we do is to engage these committees and present our ideas. We want to make sure they are plugged in and can voice support to the rest of the university community. This has paid tremendous benefits to us over the years.” Hancock meets with other committees across the university every six months. “I believe in being an open CIO to learn directly what should be in a strategic plan, to confirm I understand those needs correctly, and to report back on our progress. It is important to keep everyone in the loop.”

Project Planning and Approval

IT leadership was satisfied with its internal VoIP pilot, but UofL senior management’s buy-in to the VoIP project did not occur quickly. Two years of review and negotiation were required to clarify the funding and to gain administration support. “It was a tricky process, as we were on the bleeding edge, and we believe we were the largest university to convert entirely over to VoIP at the time,” states Sawyer. “There was a lot of hesitation and cultural issues for the university to overcome.” Several elements factored into the project’s eventual approval.

Setting Realistic Expectations

From the beginning, IT presented both VoIP’s advantages and shortcomings, emphasizing from the outset that it differs from traditional-carrier telephone service. VoIP was to be a part of the UofL-managed network infrastructure, and as with any data network, there would be some downtime. IT originally projected that the VoIP service would experience three to four hours of outage per year. “A person’s reliability expectation for his/her computer is still less than for his/her telephone,” states Sawyer. “This is one of the reasons that during our original presentation, we set a similar outage expectation as for any computer. The administrators balked at the whole idea initially, but they warmed up to the VoIP concept when they learned about the economics of the idea.”

Providing a Proof of Concept

Senior administrators seemed troubled that no comparable institutions had chosen a VoIP implementation. “The administration questioned whether the UofL could or should convert to VoIP when other comparable universities hadn’t or couldn’t do it,” states Sawyer. When researching a proof-of-concept VoIP installation at a large university, UofL’s IT leaders found that the largest identified higher education site totaled fewer than 2,000 lines, a considerable contrast with UofL’s proposed 10,000-line implementation.

So UofL’s IT organization elected to demonstrate VoIP’s viability locally by gradually expanding its internal pilot throughout the campus. As the UofL community learned about the IT pilot and VoIP’s advanced features, some areas began to request VoIP phones. IT began to install VoIP in major building renovations and new construction, including the conversion of two large buildings. The pilot gradually encompassed approximately 900 phone lines.

IT’s efforts received a boost when Clover, as STEC’s chair and the dean of public health and information sciences, decided to implement a 100-line VoIP pilot in his own school. “I
was concerned about the projected difference in downtime between traditional and VoIP telephones as well as the faculty’s and staff’s abilities to realize all of VoIP’s advantages,” states Clover. But training addressed the latter problem, and over time Clover found the former not to be an issue. “We learned the VoIP’s reliability exceeded our expectations,” he states. “That and the phones’ robustness were selling points to move ahead.” His faculty and staff responded favorably to VoIP, and after two or three months, Clover began to share his school’s experiences with the central administration.

“The pilot study was beneficial because the Health Sciences Center was very pleased with it. We began to put VoIP into our buildings, and it continued to work,” stated Owsley. “When the pilot worked, we pushed for it.” Not only did the VoIP pilot prove its viability on campus, but it also created a group of project advocates.

Hammering Out the Financial Issues

Functionality wasn’t the only barrier. Senior administrators were concerned with financial issues. This was a sensitive subject, “especially when the VoIP business case forecasted cost savings and UofL’s central administration had never seen any cost savings from IT in its history,” states Clover. “When IT is not your business, understanding IT costs can be difficult.” Timing was not optimal either, because budget pressures were increasing. “Here we are submitting a multimillion-dollar proposal to put nice phones on every desk at a time when people are getting limited pay raises and budgets are getting squeezed,” states Jay Vetter, director, Communications Services. “I think there was concern about the message this project sent to the university. In truth, it was one of the real-dollar return-on-investment projects that the university looked at to improve services outside of the context of an ERP. We proposed and projected significant dollar savings.”

For Ramsey, whose background includes positions as senior policy advisor and state budget director for the Commonwealth of Kentucky, financing for VoIP was a critical issue. “I understood that it would take a while to amortize some of the capital costs and realize some of the potential savings,” he states. “I am an old budget guy, and I want to see savings that I can realize. You can say x will save people money, and that is good, but a lot of times x gets lost in the budget process. To be candid—in all fairness to Tom [Sawyer] and others—I was probably the biggest cynic, because I did not think that they had made an effective case early on, and some of our IT folks at that time were known for overselling some ideas.” The IT organization revised its business model several times and slowly and surely worked with the administration to create an acceptable one.

The university senior administration approved a VoIP business plan that proposed investing an up-front cost of $4.5 million for the project, which IT would pay off in a four- to five-year recovery period. The recurring cost savings to be realized from the VoIP implementation would fund the payback. Upon repayment to the university, IT planned to reinvest the ongoing cost savings into other IT-related projects, enhancing the area’s fiscal independence from central administration funding.

After the university switched to VoIP service, IT became the university phone service provider. IT would continue to charge university units for phone service and would use the revenue to offset VoIP infrastructure costs instead of paying its Centrex service provider. “We were paying a certain amount every month for phone charges anyway,” explains Michael Dyre, director of IT Planning and Finance. “Within that amount of money, we were willing to finance the project. No one had to come up with the $4.5 million. The university just had to let us continue the
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existing phone service chargeback system in order to pay off the project investment.”

**IT Leadership**

The primary vetting of the VoIP project occurred during the transitional period between Moore’s and Hancock’s VPIT tenures. “If we had transformed the institutional thinking to regard IT as a critical university resource when we first started the vetting process, VoIP would have been easier to sell,” recalls Clover. But he took the initiative. With his links to the senior administration, his chairmanship of STEC, and his sponsorship of a pilot within the School of Public Health and Information Sciences, Clover demonstrated VoIP’s role as an institutional resource. “From a technical user perspective, Dr. Clover stepped forward and provided a strong endorsement,” states Ramsey. “STEC’s endorsement brought credibility to the VoIP proposal, providing due diligence as well as a voice of reason and credibility. We take seriously their recommendations.”

**Implementation**

With the business case set, the technical due diligence completed, and a growing chorus of institutional advocates, the senior administration approved the VoIP implementation in June 2006. And as Hancock says, “When UofL decides to do something, they are going to do it.”

So the IT organization began to expand its Cisco VoIP system campus-wide. The IT organization completed the conversion itself, promoting two IT staff members to handle the actual implementation. BellSouth was hired to assist as needed on the project.

It took 12 months to convert the remaining 8,500 campus phone lines to VoIP. Sawyer and his team developed a systematic approach, converting the campus to VoIP on a building-by-building basis. IT published an online schedule that was updated weekly for the four phases of the project:

- **Notification:** Thirty days before conversion, IT notified building occupants about the IT staff members’ pending arrival.
- **Design:** IT staff members surveyed and designed each department’s phone environment.
- **Conversion:** On the day of conversion, IT staff members were available to train people and answer questions.
- **Follow-up:** IT resolved any follow-up issues identified by users.

“We learned early on to administer satisfaction surveys after we finished each building,” states Vetter. “Their feedback gave us a chance to tweak the process. By the time we ended, we were getting a 90%+ satisfactory rating with our implementation.”

Sawyer felt it was especially important to complete the VoIP project in a timely fashion. “It goes back to your credibility,” he explains. “If we don’t have a good track record in meeting our deadlines, how can the senior administration believe our promises to save $1.2 million annually? Our good reputation gives them a higher level of confidence that we will meet our cost-savings goals.” The installation team picked their deadlines but could not modify them once the IT organization published them online.

IT completed the campus VoIP conversion approximately 20 days early, in June 2007.

**User Experience**

Implementation is only part of—and perhaps the easiest part of—any project. The next challenge is to encourage users to understand and to embrace the additional functionality that VoIP offers. The selection of the VoIP handset was an important and deliberate strategy to speed user adoption; UofL decided to invest in a more expensive, highly featured VoIP handset, choosing Cisco’s Unified IP Phone 7941G. “Using the
more featured phone was a selfish move on our part,” states Sawyer. “We knew it was a risk to implement VoIP, and it is a big cultural shift to change telephones, so we decided to put a more expensive, sophisticated phone on everyone’s desk. If the users liked the phones, they might be willing to overlook some other issues—as, for example, a rare power outage.”

UofL’s pre-VoIP phones resembled, as one IT staffer described, “vintage Princess phones dating from the 1960s.” The new handsets symbolized VoIP’s advanced capabilities, containing such features as a speakerphone, an LED display, and several one-button features including voicemail access, mute, transfer, call forwarding, and hold. They were new toys to play with, much like a new computer. “Our VoIP phones provide all the information that a person expects to find on their cell phone and feels a desktop phone should offer, too,” states Vetter.

The one-button features enabled users to experience VoIP capabilities from the first day of use. “The user does not have to learn how to use the phone,” states Sawyer. “There are many advanced [VoIP] features available, but they would require users to learn how to operate the handset. We give each user an owner’s manual with the set, but I bet only 20% of the people crack it open. You pay a little bit more for the handset, but if people can just push a button for a feature, it aids acceptance/adoption of the new phone.”

The more sophisticated phones enable the IT organization to create and push out customized features. Most enhance productivity. For example, a university phone directory provides the same information found in the university e-mail directory. A user types in a person’s name on the phone, the entry comes up, the user presses a button, and the number is dialed. But other features lighten the mood of the work environment—for example, displaying the UofL Cardinal mascot on the phone’s LED screen.

The speakerphone sound quality is such that most people no longer use the conference phones found in the meeting rooms; some departments have removed the conference phones altogether.

Jenny Sawyer, executive director of admissions, described the VoIP phones as “amazing. For someone who is trying to be responsive in customer service, they are a wonderful tool.” She and her staff can easily forward their phone calls to their cell phones, which enhances their responsiveness when traveling. Jenny Sawyer habitually scans her missed calls to learn who telephoned while she was out of the office. She estimates she uses the speakerphone about 90% of the time. “I can get so much more done, particularly when I’m talking to a student and looking at his electronic file online,” she continues. “It has enhanced my ability to work more efficiently and effectively.”

Interestingly, the two biggest user complaints were

- “When I pick up the phone, the dial tone is instantaneous now, unlike the former experience of hesitation, click, and then the dial tone.” IT explained to the complainants that this was VoIP’s modus operandi.
- “If I place a caller on hold, the caller experiences dead silence, prompting him/her to believe his/her call was disconnected and to hang up.” To address this complaint, IT asked the UofL School of Music to donate a music CD to play during hold periods.

Concerns versus Actualities

During ECAR’s qualitative research for Spreading the Word: Messaging and Communications in Higher Education, interviewees from several institutions articulated concerns about VoIP’s financial, reliability, and infrastructure aspects. This section describes UofL’s experiences in these problematic areas.
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Reliability

This is a common concern for VoIP because unlike the traditional telephone network, VoIP telephony relies on the somewhat less reliable data network. As noted earlier, IT set realistic expectations up front during the vetting process, projecting three to four hours of outages per year. Tom Sawyer notes that “the reality is that VoIP exceeded expectations—just a few outages and not as many problems as expected.”

But on the basis of its experiences, IT offers two tips to ensure reliability. The first is not to skimp on an uninterruptible power supply (UPS) solution. During planning, IT presented options for 20 minutes, one hour, or two hours of backup power, and UofL opted to save money by investing in the first solution. Unfortunately, UofL’s first power outage after the VoIP implementation exceeded 20 minutes. The campus deluged the IT organization with complaints about phone service disruption, and the UofL senior administration authorized a quick $200,000 infusion to upgrade the UPS to provide two hours of backup power. The second tip is to carefully monitor the UPS batteries, because IT discovered that some batteries registered as fully charged but in reality were unable to generate enough power to keep the router running.

Infrastructure

Many institutions have already invested significantly in their copper infrastructure for current phone service. UofL was in a similar situation, but as Vetter observed, “Some of our copper cable had sat in the ground for 30 to 40 years and was in pretty bad shape.” He cited water damage and performance issues and the need for replacement. “Bottom line is you do save some of those maintenance resources that can be reallocated to VoIP,” he continued.

Other institutions have chosen to take a more gradual route to VoIP, installing it only in new buildings or during major renovations, as UofL’s IT did during its pilot phase. The result is a dual telecom infrastructure that can be costly to maintain. Vetter recommends a “doing more with less” scenario with a single voice/data environment, which enabled him unexpectedly to streamline his staff by four people while expanding the scope and capacity of IT’s project work, as well as to reallocate his excess resources to other areas.

From Telephones to Emergency Notification Devices

As with many colleges and universities, UofL’s current emergency management and response activities stem from the campus shooting at Virginia Tech on April 16, 2007. Before the tragedy, UofL’s Department of Public Safety and the Department of Environmental Health and Safety handled emergency management with minimal institutional input. But the day after the tragedy, Owsley convened a broad meeting...
of university departments to assess the institution’s emergency management and response capabilities.

The initial meeting led to today’s Emergency Prevention, Preparedness, and Response Group, a 20-member, university-wide committee that plans, manages, and coordinates emergency response. It is chaired by Owsley, and other members include the assistant vice president for IT; associate vice president for communications and marketing; associate vice president for facilities; senior program assistant; director, Department of Environmental Health and Safety; director, Department of Public Safety; director, IT Communications Services; director, residence administration; director, risk management; assistant director, Department of Public Safety; vice president of student affairs; director, communications and marketing; coordinator of computer operations, business affairs; emergency manager; program director, undergraduate affairs; supervisor, Department of Public Safety Communication; and university fire marshal. The group meets monthly.

Supporting this strategic committee are several task groups to address specific facets of emergency response. For example, a technical group meets every other week to discuss technology solutions. Its composition mirrors that of the Emergency Prevention, Preparedness, and Response Group, but it is manned by staff members who work a level down in their respective organizations.

VoIP and Text Messaging Working Hand in Hand

One of the Emergency Prevention, Preparedness, and Response Group’s first priorities after the Virginia Tech incident was to evaluate UofL’s emergency notification capabilities. Eventually, the UofL administration developed a multipronged strategy. “Because no single system is perfect, we took the position that we should overcommunicate,” states Ramsey. “If we installed just one piece, we would have gaps in our emergency notification.”

UofL currently uses a broad array of emergency communication protocols, including outdoor warning sirens, digital signs located on nearby interstate highways, the local news media, and web-page messages. But the two most personal emergency notification methods are the VoIP phones and text messaging, both launched at UofL within six months of the Virginia Tech incident.

Attention focused on VoIP when the Emergency Prevention, Preparedness, and Response Group determined that UofL lacked reliable emergency notification systems. Tom Sawyer envisioned a possible solution using the thousands of speakerphone-enabled VoIP phones sitting on people’s desks around the campus. IT located a software solution called InformaCast, sold by CDW Berbee, which broadcasts an audio and/or text message to IP-enabled devices, including VoIP phones. By early July, the UofL senior administration decided to purchase an unlimited growth site license for this software. “Having our VoIP infrastructure made a huge difference because it did not take long to purchase and implement the InformaCast solution,” states Hancock.

Currently, the InformaCast system is programmed to transmit to four groups: all phones, phones by campus, phones by buildings, and phones of all Emergency Prevention, Preparedness, and Response Group members. The system can transmit to an individual phone, too.

Every emergency notification message is preceded by a loud beep on the phone, which then plays the message audibly via the speakerphone and displays a text version on the LED display. The system routes a message to UofL’s approximately 10,000 VoIP phones in less than a minute and a half. In an open office environment, the message literally rolls from phone to phone.
phone, attracting considerable attention from everyone in the immediate area. “The impact is different from receiving an e-mail or phone call,” states Jenny Sawyer. “When your phone talks to you directly, you feel you have to do something immediately.”

A complementary emergency notification capability of the VoIP handsets is a one-button Enhanced 911 (E911) feature that enables people to dial out easily for emergency assistance. Upon installing VoIP service, IT worked with MetroSafe, the city of Louisville emergency response network, to install E911 service to process emergency calls and to locate the caller’s geographic location. Both features work to speed up campus emergency response times. Previously, police, fire, and rescue services responded to calls directly and then tried to contact UofL’s Department of Public Safety (DPS). Now, calls are dispatched automatically from MetroSafe to DPS, and dispatchers know the exact building and room number from which a 911 call originates.

Another tip that IT learned from its experiences is that VoIP technology recognizes when users unplug their phones and switch ports; the phone number is unchanged, as it is routed to the data port. This enables users to switch phones without technical assistance, but 911 location information may not transfer to the new port. Early on, IT decided to map the E911 emergency responders to the data port, so regardless of phone number, the E911 call is tracked by the data port from which the call originates, rather than by the handset.

For the other personal emergency notification method—text messaging—UofL contracts with Rave Wireless, Inc., to send text and e-mail messages for emergency notification. It is mandatory that all university-owned cell phones be enrolled in the Rave system; students, faculty, and staff can opt-in to receive messages on their personal devices. As of December 2008, more than 10,000 people had signed up for the Rave emergency alerts. IT promotes opting-in at campus events. Currently, the Rave system is for emergency-only applications, to avoid diluting the messages’ impact.

UofL has used both VoIP phones and text messaging notification in tandem approximately 15 times in the past year to alert students, faculty, and staff to a broad array of incidents, including two bomb threats, a hostage situation, a tornado warning, an actual tornado hit, urban flooding, a major snowstorm, and a chemical spill. This extraordinary use of its notification systems has reportedly given the institution a competitive edge for admissions, as discussed in the next section. Many of the case study participants cited how this has greatly increased satisfaction with the VoIP application because the phones inform the university community quickly and succinctly about a situation and the best course of action—for example, to take shelter due to a pending tornado, to avoid a campus area that is experiencing a crisis, or to go home due to expected poor road conditions during an ice storm.

During an incident, designated personnel from either the DPS or the Department of Communications and Marketing send the emergency message. The Emergency Prevention, Preparedness, and Response Group has approved canned emergency messages, which are used as applicable, though some situations may require a unique message. The group created a hierarchy of personnel authorized to send an emergency message, depending on the severity of the emergency, the threat to life and safety, and the time needed to communicate to the university community. For the VoIP notification, the person transmits a prerecorded message or a live broadcast message along with the accompanying text to a password-protected website or the IP phone services menu. For text messaging, the person transmits that same text message to the Rave website, which in turn will send the emergency message as both text message and
VoIP at the University of Louisville

VoIP Extends Emergency Notification to Residence Hall Rooms

With survey after survey showing nearly universal student ownership of cell phones, many institutions have discontinued phone service in residence hall rooms due to lack of use and to save costs. The UofL community debated deactivating its residence hall room phone jacks for the same reasons. But instead, parental concern for student safety after Virginia Tech’s incident persuaded the senior administration to install VoIP phones in UofL’s approximately 1,800 residence hall rooms for emergency notification. “We debated whether to put VoIP in the halls because we were of the opinion, and still are, that a growing majority of our students rely upon their cell phones,” states Thomas R. Jackson, vice president, student affairs. “We debated whether it was worth the cost. Ultimately, what drove the equation is the importance of safety. No matter what circumstance we were in, if UofL is investing in university-wide VoIP to give immediate access to emergency notification across the entire campus, we thought we should not put a price on safety. We invested in it when the university went down that path.” Unlike the Rave text messaging service, wherein accessibility varies by a person’s opt-in status and the availability of cell service, the in-hall VoIP phones provide a fixed emergency notification capability in the student residential setting.

All UoL departments, including Housing and Residential Life, pay the same monthly access fee as they did with the more expensive Centrex services. The funds generated from the differential between the lower VoIP operating costs and the higher Centrex service costs were used to finance infrastructure upgrades and the procurement of the VoIP handsets.

IT installed the same Cisco Unified IP Phone 7941G handset in each residence hall room, which houses the student’s network connection jack, too. Most residence hall rooms already had network wiring, so IT bolted the handset to the wall and ran a wire from it to the existing network jack. Students plug their computers into the network via a jack on the VoIP phone. Every fall and spring semester, IT
staff members visit the residence halls to help students plug in and sign on to the network if needed.

The students view the VoIP phones more as a notification device than a phone. “The phones are helpful because no matter what residence hall room you are in, you receive the emergency message whenever the phones go off,” states a student. She recalls receiving alerts about class cancellations and a robbery at a nearby fast-food restaurant.

One additional benefit of the residential VoIP emergency notification is the positive reaction it gets from parents of prospective and current students. “Being a metropolitan institution, we focus on safety and security throughout the recruitment process,” states Jenny Sawyer. “The in-room VoIP phone emergency notification enables us to say that UofL is on the leading edge and we are doing everything we can to provide a safe environment for our students.” As a student observed, “It makes me feel safer because I come from a small town. The [VoIP] phones and text messaging make my mom feel better because she is not always there to protect me.”

According to Jackson, the students “take the in-room emergency notification for granted now because we implemented it last year. Just one year later, it is considered the norm. They are used to the phone going off in their rooms as well as receiving a text message on their cell phones.”

**Future Directions**

The IT leadership could not have anticipated the range of uses they would find for VoIP when they developed the strategy several years ago. But the benefits of its adoption continue to roll out, at least in part because the application is rooted in robust network, management, and governance structures. Several additional projects related to the implementation are described in this section.

**Filling in the Gaps with IP Solutions**

Two areas that lack IP-based emergency notification are the classrooms and the outdoor campus areas. UofL plans to fill both gaps in the near term. The classrooms are the first priority because of their vulnerability: They lack phones, they may experience poor cell phone reception, and faculty may require students to turn off their cell phones during class, thereby blocking text message notifications temporarily. Additionally, the VoIP phones provide two-way emergency notification capability, so installing them in the classrooms would enable a faculty member to initiate a distress call quickly via the phone’s one-button E911 capability. Otherwise, the phones will not allow users to place outgoing calls. IT will finance the project with end-of-year money on hand. The VoIP emergency notification solution works with any IP-addressable device, so connection to IP-addressable outdoor loudspeakers is also under consideration.

**New Technology Needs New Funding Model**

Hancock notes that UofL’s integrated data/voice capabilities bring out other issues, especially the need for a new network funding model. “Telecommunications helped to finance our network, and, in the past, we avoided a network connection charge,” she explains. “Now all services originate from the VoIP phones. So once we pay off our VoIP implementation, our next big challenge is to create a network chargeback model that enables us to invest in new technology and make transitions without cutting our wrists.”

**Enhanced Education Efforts**

The advanced features of the VoIP phones helped to sell the whole project to campus users who learned about them from various pilot projects, and the institution’s
IT staff have learned to make increased use of the system for emergency notification. However, some users report a lack of training on how to use the phones to improve work performance and customer service. Although some information is provided to new students in their general orientation to the university, unfamiliarity with the use of the phones in the dormitories is also reported. The relatively new technology may require further training for users at all levels.

**Lessons Learned**

UofL’s experience offers lessons relative to its VoIP implementation as well as more broadly applicable words of advice.

*Patience is a virtue.*

The road from concept to implementation was as difficult as the IT leadership feared it would be, but the roadblocks were generally those that could be anticipated. Had the IT leadership been easily discouraged, VoIP would not have become a reality on the campus. The patient efforts to convince others of the technology’s advantages were grounded in a firm belief that this was an appropriate step for the institution. As the initiative gained advocates and as institutional leaders came to know the application and its potential, the roadblocks were overcome.

*Map IT projects to institutional strategy.*

Of any major initiative, ask the question, “How does this fit into our long-term plans for IT at this institution?” The leadership at UofL looked at the potential for VoIP, given the network infrastructure, existing phone system, related revenues and costs, campus building expansion plans, and other factors. This enabled them to discuss the project with people across the campus who represented different interests with different agendas and who were often absorbed in issues other than IT.

*A robust IT governance structure facilitates project vetting.*

The governance structure of IT at UofL is quite robust, with committees drawn from constituencies across the colleges of the campus and across the segments of the community—students, faculty, administrators. Further, these committees represent power centers in the institution, places where major policy issues are discussed. As the VoIP initiative gathered support, actions in the governance structure made favorable decisions “up the line” more likely. Although such a structure may be difficult to develop, it can support innovation for units such as IT.

*Prepare for surprises.*

Major initiatives often require years of discussion before implementation is possible, and implementation itself often stretches beyond the current year. A strong initiative, such as VoIP at UofL, is able to withstand budget changes, political winds, conflicting plans, and personnel changes. Few such surprises are subject to planning, but almost any of them can derail an innovation that fails to be ready for them.

*Use your web of internal communications.*

Communication within an institution is usually very complex. Leaders of IT organizations in large institutions are not always well informed about plans in student housing or in athletics or in major academic program shifts. Strong internal communication—often through committees or over lunch as well as through formal channels—allows IT organizations to anticipate both needs and pitfalls. At UofL, the very complex net of relationships in a stable institution placed the IT leadership in a position to know most of the foreseeable changes that favored VoIP, and a few that didn’t.

*Emergency notification requires continual refinement.*

Each incident provides new opportunities for UofL to enhance its emergency notification...
efforts. For example, UofL incorporated silent VoIP phone transmission into its emergency notification decision tree after its success during UofL’s recent hostage crisis. “We had a tense situation that an audible emergency notification could have accelerated,” states Hancock. “You think you understand all events, but you can’t think of all situations. So when something unexpected happens, you have to rethink things.” UofL has also worked to prune the emergency notification decision tree, for example, narrowing the set of people authorized to send a message and creating scripts and canned messages. “You don’t want any of this to happen, but you feel better prepared when you plan,” Hancock continues.

Don’t skim on investment.

IT has realized considerable savings on its VoIP implementation in part because it installed a robust system. The underlying network infrastructure was in place, and UofL invested in high-end phones to facilitate user adoption. When IT skimmed—on backup electrical power—it learned the hard way not to shortchange the system. “VoIP has great value, but do not implement it on the cheap,” advises Hancock. “Once you are up and running, you will get vast rewards. Some people are still looking for their rewards from their ERP systems; that will not be the case with VoIP.”

Conclusion

Several major steps led to the implementation of VoIP at the UofL. In the eyes of the participants, all of these steps contributed significantly to the implementation and to all of the benefits of that project. Strengthening of the IT network and the reorganization of the CIO position were accompanied by the development of a broad system of IT governance. The course of VoIP implementation included several rejections by the senior administration until pilot projects and revisions of the business plan led to acceptance of the plan. Approval of the initiative by various IT governance bodies was a major factor in convincing senior administrators to accept the plan. The relationship with the major vendor, Cisco, also helped to move the project.

And despite the initial qualms, VoIP has proved to be a winning proposition for UofL. The cost savings that resulted from the move to VoIP were accompanied by significant benefits from the new VoIP handsets as emergency notification devices. Today, VoIP is regarded as an institutional asset and has enhanced the IT organization’s reputation on campus. This case study truly follows the adage, “‘Tis a lesson you should heed, try, try again. If at first you don’t succeed, try, try again.”

Endnotes


Citation for This Work