

Fall 2008

ACUTA Journal of Telecommunications in Higher Education

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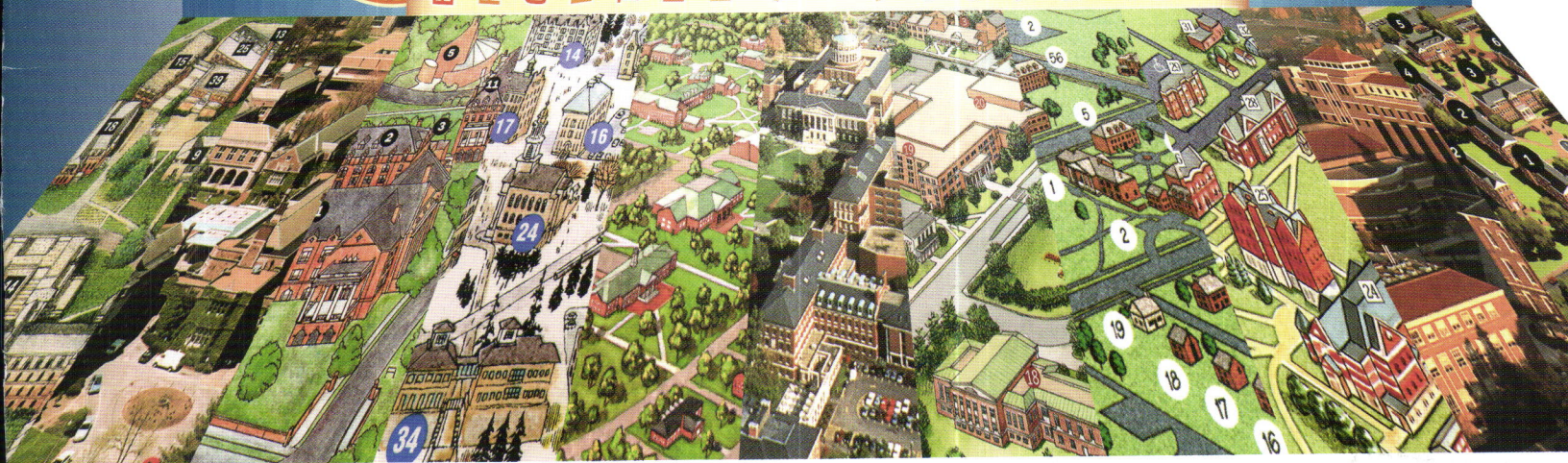
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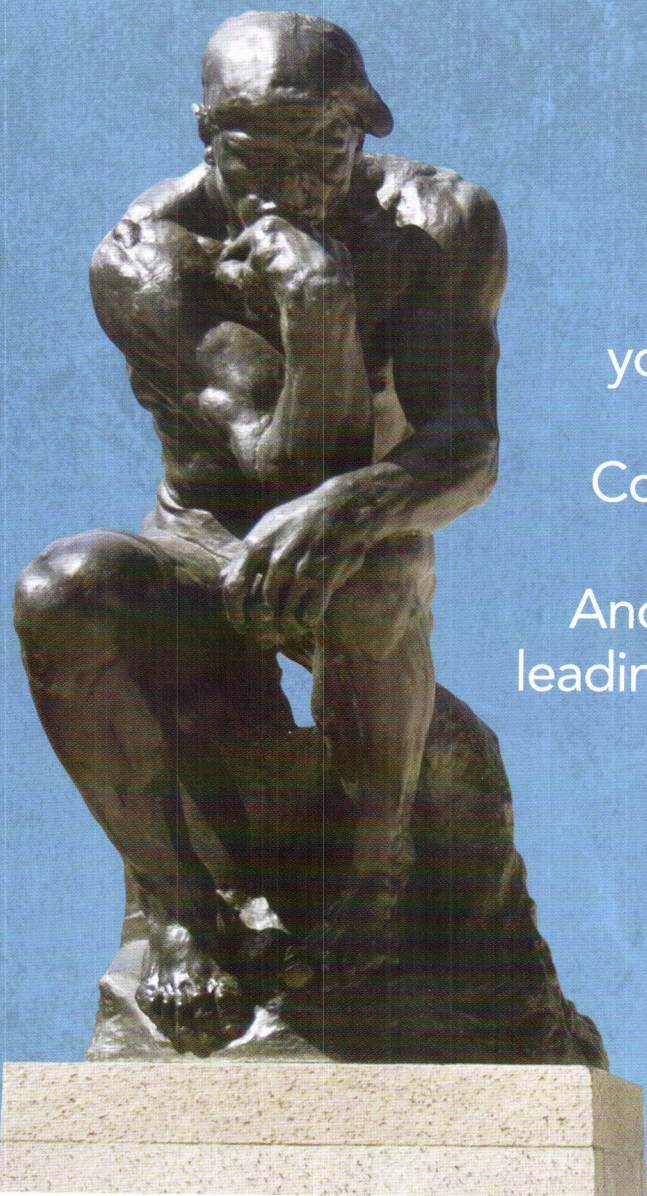
Journal

of Information Communications Technology in Higher Education

Published by The Association for Information Communications Technology Professionals in Higher Education



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Event	Date	Location
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Annual Conference	April 19–22, 2009	Hyatt Regency Atlanta, Georgia
Summer Summit	July 12–15, 2009	Marriott City Center Denver, Colorado

ACUTA's Core Purpose is to support higher education information communications technology professionals in contributing to the achievement of the strategic mission of their institutions.

ACUTA's Core Values are:

- Encouraging and facilitating networking and the sharing of resources
- Exhibiting respect for the expression of individual opinions and solutions
- Fulfilling a commitment to professional development and growth
- Advocating the strategic value of information communications technologies in higher education
- Encouraging volunteerism and individual contribution of members

The logo for ACUTA, featuring the word "acuta" in a bold, lowercase, sans-serif font. The letter "u" is stylized with a small square cutout in its center.

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A large percentage—maybe 80 percent—of IT time and energy is spent on infrastructure. The remaining time, maybe 20 percent, is spent on learning what people need technology to do. These percentages need to be reversed. Infrastructure is necessary to move information, a bit like a utility. But it isn't your mission.

—Warren Arbogast
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PRESIDENT'S MESSAGE



CORINNE HOCH
COLUMBIA UNIVERSITY
ACUTA PRESIDENT
2008-2009

What's New in Communications Technology?

Imagine that you are listening to Handel's Fireworks Music, or that you are celebrating a special holiday or other occasion that is augmented by a spectacular fireworks display. The music and the fireworks imagery are the audible and visual reflections of where I think we are in information communications technology today.

What's new in communications technology will be revealed in the articles you'll read in this issue of the *ACUTA Journal*. You may note that the arcs formed by the fireworks are representative of the new products and services that begin with such fanfare, yet, their success is contingent upon the rate of projection, support, and the gravity that helps the data stream realize that perfect arc.

As I reflect upon the most recent ACUTA event, the Annual Conference in July, I'll highlight some aspects of current communications technology and provide examples of where our members are positioned on the road to convergence:

- VoIP is a great excuse to improve your data network.

John Madey from the University of Florida shared his project management approach for providing a comprehensive E911 solution for a VoIP deployment. Joe Huang from Everett Community College, Josh Frank from Virginia Military Institute, Tim Williams from West Virginia University, and Richard Altheide from Missouri University of Science and Technology revealed where they are with VoIP today, steps they undertook to get where they are, and the challenges as well as the rewards. Ric Simmons from Louisiana State University showed us how he provides voice and data services to remote locations using VoIP technology.

We all learned from the ACUTA IP Summit in Baltimore last year that VoIP is now the industry standard for the new PBX manufacturers. The technology is maturing. Figure out the best way to integrate VoIP into your strategic planning.

- Unified messaging is a *killer* application for VoIP.

Mike Lucas and Jennifer Van Horn from Indiana University presented their unified communications solution that is based on a collaborative effort to deliver voice, video, and data communications on a single unified desktop platform. Jeanine Lee and Carma Shurley from DePaul University shared the lessons they learned from the replacement of their traditional voicemail system with a unified messaging solution.

From my own experience, with unified messaging I now get a WAV file on my Blackberry whenever someone leaves a voicemail message on the VoIP phone in my office. What a time-saver it is! I can respond to anyone at any time without having to overcome barriers. I wonder what else it can do for me.

- Emergency notification management, or what to do with the system you now have in place.

Emergency teams have been formed; policies have been written; students, faculty, and staff have opted in; templates have been created; and response support teams wait in the wings. Now what?

Sharlene Mielke from Northwestern University presented a case study in emergency planning—from emergency response notification to disaster planning and business continuity management. Annemarie Mountz from Penn State University helped orchestrate an integrated communications strategy that involved text messaging and

other communications tools and required “breaking through” organizational silos.

- Next-generation learning environments, including Web 2.0, provide more powerful collaborative opportunities.

Jim Gantt from Murray State University, representing ITERA, combined campus pioneering and current student issues to explore what it takes in 2008 to make a campus “cool” for students, faculty, staff, and administration.

We all share the challenge of making our campuses “cool,” engaging, and rewarding, and appreciated Jim’s examples aimed at attracting students, improving teaching/learning, improving overall electronic impact on campus operations, and attracting faculty.

- Next-generation wireless provides significantly greater speed and range.

Bill Farris from the University of Kansas challenged us with the question, “Cellular VoIP—Is It for You?” Chris Norton from Texas A&M University discussed how fixed-mobile convergence (FMC) can integrate a PBX with mobile phones, forecasting the long-term possibilities for FMC for educational institutions. Perhaps there will be fewer “dead spots” on our campuses in the very near future.

- Green engineering—enter the intelligent building.

How big is our footprint, and what are we doing about it? I now work in an intelligent landmark building, in Manhattan,

thanks to the joint forces of Facilities and IT at Columbia. From building automation systems and communications systems to video surveillance and access control, all are converged over a common infrastructure.

That’s where I think we’re all going today with information communications technology on our individual roads to convergence. For a long time VoIP appeared to be ephemeral; today it has become reality. To paraphrase the message delivered by Randy Pausch, professor of computer science at Carnegie Mellon, in his last lecture, “Always follow the power of your dreams.”

It’s all about the road to convergence... come to an ACUTA event to find out.



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FROM THE EXECUTIVE DIRECTOR



JERI A. SEMER, CAE
ACUTA EXECUTIVE DIRECTOR

Executive Director's Report to the 2008 Annual Business Meeting

Each year at the annual business meeting, I have the opportunity to report to the membership on highlights of the past year. For those who were not able to attend the business meeting in Las Vegas, I would like to share some of the highlights of activities by the professional staff in 2007-08.

The ACUTA professional staff remains focused on providing outstanding service to our members and the many corporate entities we work with on a daily basis. Last year, we also had the opportunity to work on a number of exciting new projects.

1. Strategic Planning

Our strategic planning efforts were two-pronged: continuing to implement the action items in the current ACUTA strategic plan and collaborating with ACUTA leadership in developing a new strategic plan for the next three years.

On June 2, I provided a final status report to the Board of Directors regarding all of the existing action items in the "old" strategic plan. Eighty percent of the action items in the plan were completed or are underway, and many have been incorporated into ongoing operations. Naturally, conditions and needs have changed since that plan was adopted in 2005, so a few of the planned action items were deemed no longer relevant by the committees charged with implementation. I believe that we can look back with pride on the completion of the 2005 plan, and look forward in anticipation of moving ahead on a solid base of accomplishment.

In November, we embarked on a new planning process. One hundred percent of

the Board of Directors, committee chairs, and staff participated in an intensive planning retreat in Lexington. What emerged from this effort was a fresh look at the ACUTA core purpose, core values, goals and strategies—and even a change in our "tag line" that acknowledges major changes in our members' professional world.

The full new plan is online for your review on the ACUTA website under "About ACUTA," but here are a few highlights:

- The ACUTA tag line is changed to "The Association for Information Communications Technology Professionals in Higher Education."
- The plan contains three *over-arching* strategies, pertaining to using Web resources and other technologies more effectively; establishing and maintaining strategic relationships with other associations and organizations; and developing a comprehensive marketing plan for ACUTA.

Five goals were developed, in the areas of: public policy, ACUTA as a recognized authority and resource, professional development for ACUTA members, the membership experience, and organizational capacity. A number of strategies were developed for each goal, but the Board made the wise decision to prioritize among those strategies. Action items for each of the *high priority* strategies have already been developed, and dollars have been allocated to these initiatives in the 2008-09 fiscal year budget. All staff members look forward to working with our elected and volunteer leaders on this ambitious but achievable series of projects.

2. Public Policy and Regulatory Affairs

As the staff liaison to the Legislative/Regulatory Affairs Committee, I continued to spend time monitoring and analyzing regulatory proposals and actions at the U.S. Federal level and working with the committee and legal counsel to plan our advocacy efforts. It has been another very active year, but despite a lot of activity, there were few major changes in telecommunications laws and regulations. Many important policy issues remain unresolved, including the adoption of a national broadband policy, peer-to-peer file sharing, universal service, emergency notification requirements, net neutrality, taxation of company-owned cell phones, and others. It appears that real movement on many of these issues may take place only after the national elections in the United States and a new administration is in place.

ACUTA continues to collaborate with other higher education and networking organizations on public policy issues. This has had positive results for both ACUTA and these other organizations. I have the opportunity to represent ACUTA on the Network Policy Council (NPC). This is a group within EDUCAUSE that is analogous to the ACUTA Legislative/Regulatory Affairs Committee and includes representatives of Internet2, higher education institutions, state and regional networks, consultants, and EDUCAUSE national policy staff. ACUTA has taken the lead in coordinating several issues at the national level, including universal service.

3. Media and Industry Relations

It has been another successful year for ACUTA in the media, with a steady flow of requests for comments and interviews with ACUTA officials. This continues to be a positive contributor to our long term strategic goal of positioning ACUTA as the preferred resource on communications technology in higher education.

3. Collaborations

ACUTA members benefit from our collaboration with other organizations with common goals and values. In addition to our federal policy collaborations with EDUCAUSE, Internet2, and others mentioned above, we note the following accomplishments:

- We worked with ITERA (the International Telecommunications Education and Research Association) on their student paper competition and other projects.
- We wrapped up a joint project with ATIS, the Alliance for Telecommunications Industry Solutions, to develop a hurricane preparedness checklist for colleges and universities.

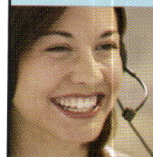
- We co-produced an audio seminar on the Digital Television Transition with AHECTA, the Association of Higher Education Campus Television Administrators.
- We were active members of CHEMA, the Council of Higher Education Management Associations, participating in research projects and programs designed to improve communication among association leaders in higher education.
- ACUTA representatives made presentations at various association meetings on our behalf, including ResNet, ITERA, NEAR-MUG, EDUCAUSE, Net@EDU, and others.
- We maintained communications with USTA, the United States Telecommunications Association, on federal policy issues—primarily broadband services.

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We will continue to reach out to other professional and industry organizations with mutual interests.

5. ACUTA Conferences and Seminars

ACUTA seminars in 2007-08 had excellent attendance and exhibitor support. Planning for 2008-09 seminars and the Annual Conference is well underway.

The major change we are making this year is the transition of the ACUTA Annual Conference to the spring, beginning in 2009. This change will affect nearly every aspect of the ACUTA annual calendar. I

hope you will join us next April for the first springtime ACUTA annual meeting—"Fresh Ideas ACUTA '09" in Atlanta.

For summer 2009, we will be building on the very successful format of our 2007 Summit on IP Communications, by planning the "Summit on Unified Communications and Collaboration" in Denver.

Conclusion

None of these actions could have been accomplished without the dedication and energy of every member of the ACUTA staff and volunteer leadership team. I would

like to thank every staff member for their professionalism and commitment to the continued success of ACUTA—and for the extra effort involved in making the transition to a spring Annual Conference with a compressed planning time line. I would also like to thank our elected and volunteer leaders, who continue to devote tremendous energy to guiding the association toward the accomplishment of its goals.

Contact Jeri Semer with any questions or comments at jsemer@acuta.org.



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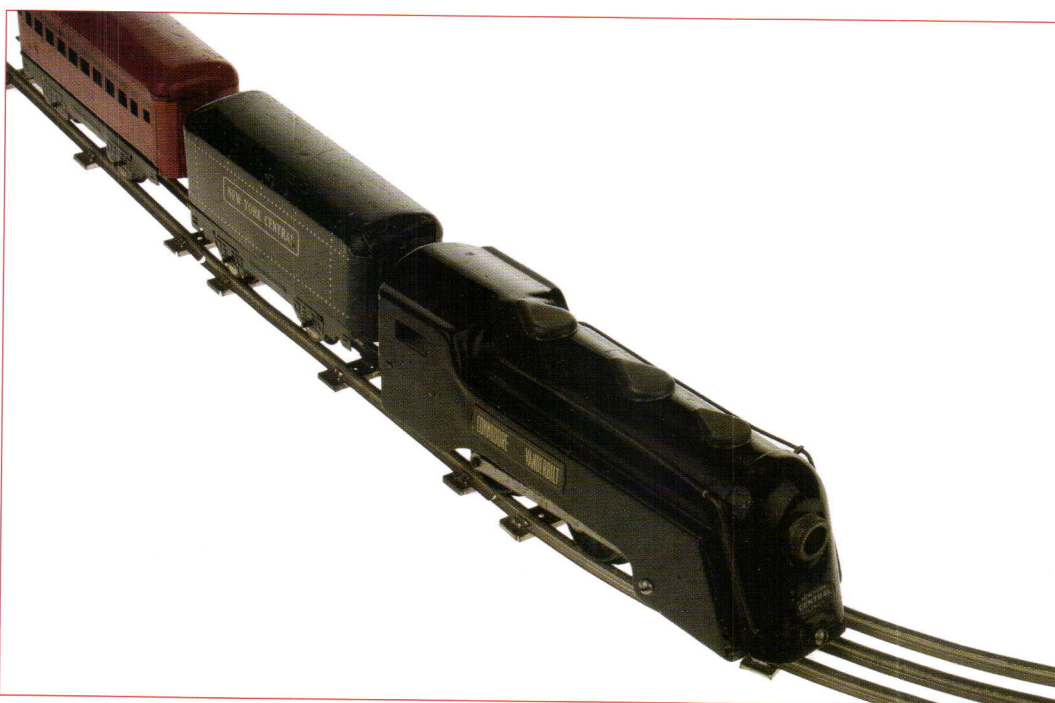
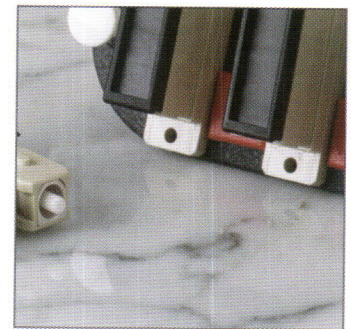
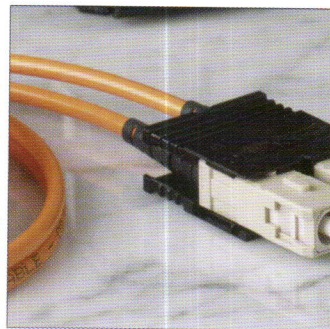
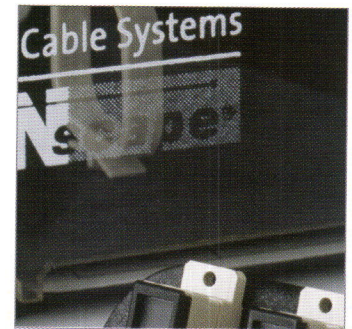
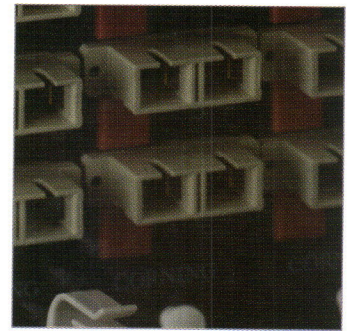
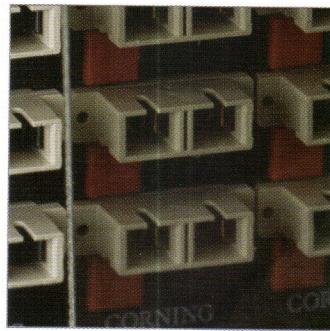
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Mobile Learning at ACU

Arthur Brant
Kevin Roberts
Abilene Christian University

Abilene Christian University (ACU) is a private, comprehensive university with roughly 5,000 students from across the United States and 60 nations. On August 16, 2008, we deployed more than 950 iPhones and iPod Touches—one to each of our incoming freshmen. The deployment of these converged media devices is part of our mobile learning initiative, and while it may seem dramatic, it is simply the next step in a long history of mobile learning (mLearning) research.

As a university, ACU has invested much energy in the consideration of emerging trends in education. We've done this because our ongoing goal to help prepare our students calls for a continual reevaluation of almost everything that happens in and out of the classroom—even a reevaluation of what constitutes the classroom itself.

In the spring of 2007, a group of educators, technologists, and administrators at ACU crystallized these ongoing discussions, producing a case for a new emphasis on mobile learning based on ubiquitous information access through powerful, portable, converged devices. This is made possible by the broad capabilities offered by a new generation of these devices, and we see the future of the university coalescing around the new opportunities that mLearning is bringing.

New Students with New Expectations

This year's entering freshmen were born in 1990. They come to us digitally native and oftentimes digitally naive. Students from this generation have spent the majority of their lives "time-shifting." They have always had the ability to pause, skip, shuffle,

and replay both music and video. When they were seven they were even introduced to digital video recorders (DVRs), which gave them the ability to do the same with "live" television.

In addition, they have always been connected with others in a myriad of ways. They have always had cell phones and pagers. For most of their life, they have been able to "poke" their friends on Facebook, check in using Twitter, and play video games with people from around the globe. This pervasive connectivity is not all fun and games, though. It also serves as a way to make sure everyone is safe. When these students were nine, the Columbine tragedy occurred. When they were eleven, they witnessed the 9/11 attacks. The ability to stay in touch became very important to them. It was a way to make sure everyone was okay in an unsure world.

Finally, their classrooms have always been wired, and most have grown up in households that have ready access to broadband connections. Today's students have never known a world without the Internet. Access to information has never been a problem. "Instead of having one or two sources for information, students today have thousands of resources at their fingertips," explains William Rankin, associate professor of English and one of the lead researchers in ACU's mobile learning initiative. "It is becoming our responsibility as educators to help them navigate the mountains of information and learn how to be selective."

Implementation Strategy

The convergence of these realities along with the introduction of Apple's devices

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led ACU to the decision to deploy them to the entire freshmen class. Rather than resisting a change that is already old news for today's students or passively waiting for the development of new pedagogical models, ACU is committed to embracing and nurturing the trends demonstrated by the 21st-century classroom.

Even before the iPhone was released, a team of faculty, technologists, and administrators formed to explore the "rumors" and what impact they might have on the classroom. From its very beginning, this effort at ACU has been academically focused. We have continued to approach this endeavor by engaging faculty and students to determine whether, in fact, these devices could be used in the classroom.

Shortly after the iPhones and iPod Touches were released by Apple, we invited our faculty to submit research proposals if they were interested in exploring how to use these devices in their classrooms. Amazingly, well over half the faculty responded. From that group, we identified 30 proposals that represented the best cross section of disciplines and use cases. We provided iPhones or iPod Touches to this group of researchers and asked for their feedback.

Within a matter of weeks we began to receive the preliminary responses, and they were overwhelmingly positive. Immediately plans began formulating to expand our pilot group to include students and to identify applications necessary to enhance the academic uses.

In February 2008 it was determined that the most viable pilot group was the entire freshman class. Although this represented a larger participant pool than what many had hoped for in an initial student group, it provided a wonderful opportunity to assess adoption and efficacy. At this point ACU publically announced our plans and continued to work in earnest to develop the supporting infrastructure.

Rollout

When the commitment to a broad-scale implementation was made, the Apple App Store and the iPhone SDK (software development kit) had not been announced. Therefore, we focused our development on creating a mobile portal for our students. This quickly evolved into a true mobile version of ACU's overall website along with some aspects of our student portal. (This website can be viewed at <http://m.acu.edu>.)

Great care was taken to make sure that we created a "mobile" website and not just a re-skin of our existing www.acu.edu offering. We constantly asked ourselves and our students, "What services and information do you need when you are on the go?" ▶

In addition, we created a suite of tools for our faculty to use in the classroom. These tools, called NANO Tools for “No Advanced Notice,” are designed to help the professor poll the class, solicit feedback, and brainstorm.

Further supporting these NANO Tools are integrations into our Google Apps calendars and our Xythos file storage system. All of the 150 faculty members using the devices in their classes this semester have agreed to use these tools in some aspect of their coursework this semester.

However, simply having a strong tool set for faculty and students is not enough. ACU had to make major investments in our existing network infrastructure to support these new devices.

Network Infrastructure

With the initial announcement that the university would provide incoming freshmen with converged media devices, one area of concern that immediately rose to the top of the list was the breadth and depth of the university’s wireless data network. In February 2008, the university was midway through a multi-year plan to deploy a campuswide wireless network. The residence halls and common areas, such as the library and campus center, had been addressed, along with the College of Business. However, the remaining facilities, including the majority of classrooms, had yet to receive wireless access. Paramount to the success of the mobile learning initiative was the requirement to have wireless network access available campuswide.

In addition to the need to accelerate the completion of the wireless network, university networking professionals also voiced concerns about the capacity to handle an increase in the number of wirelessly connected devices. The initial wireless deployment focused primarily on coverage. As the vision and details for the mobile learning initiative were unveiled, it quickly became apparent that coverage would not be sufficient to meet the goals of the initiative.

Network administrators responded with a revised plan that focused on capacity. The response considered the total capacity in classrooms, academic buildings, and residence halls with the assumption that every student would have a wireless connected device. With capacity numbers in hand, we engaged engineers from our wireless network equipment vendor to determine how best to construct a wireless network to support the numbers.

The result of these efforts was a dense deployment that called for 517 access points in addition to the existing 176 access points already installed. Given the limited timetable available to meet a mid-August deadline, priorities were set focusing on fresh-

man residence halls and academic spaces. Beginning April 1, 2008, the university embarked on installing 322 access points in 122 days.

Coupled with the dense deployment plan, engineers also focused on wireless congestion. With the installation of the initial wireless network, we observed that 95 percent of wireless devices were connecting to the 802.11g radios. Research revealed that laptop manufacturers were typically shipping dual-band wireless equipment, while the iPhone and iPod Touches only had wireless equip-

ment that operated on the 802.11g band. The decision was made to promote the 802.11a band for those devices that had this capability. This promotion was done automatically with a dense deployment, as the 802.11a radio signals would be stronger than those of the 802.11g radios. ACU also began configuring university owned and issued laptops to connect to the high-frequency radios before connecting to the lower-frequency radios. Early indicators suggest that these efforts have been successful, as the number of devices using the 802.11g radios has dropped to 70 percent of the total wireless connected devices.

Network Registration System

With the wireless network addressed, ACU networking professionals turned their focus to the network registration system. The



process of self-registering a network device had inconsistent results, and this caused a cascading ripple in the confidence of the individuals registering their devices and in the ability of technical support staff to respond to help requests.

With the assistance of the networking registration system vendor, significant strides were made to streamline the process of self-registration. To aid in this effort, the student technology team tested various scenarios and ultimately reduced the process to three steps, which proved easy to communicate and could be consistently reproduced whether the device was a computer, game console, or iPhone. Finally, to accommodate the smaller form factor of the iPhone Web browser, self-registration pages were optimized for the iPhone.

Initial responses to these changes have been very positive. During the initial weekend that freshmen moved in, over 650 iPhones and iPod Touches were successfully self-registered. More importantly, the number of calls to the student support team regarding network registration declined.

Conclusion

We are excited about what the future holds. We are excited to explore new technologies and help discover new ways they can be incorporated into the classroom. We are committed to finding innovative ways to educate and prepare our students for life in the 21st century.

Arthur Brant is director of networking services at Abilene Christian University. He can be reached at branta@acu.edu. Kevin Roberts is CIO at ACU. Contact him at robertsk@acu.edu.



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On Your Wish List: The Latest Toys for Your System

Curt Harler
Contributing Editor

Christmas may come early for network administrators at many colleges. Below is a wish list that only a communications technology manager could love. But, boy, what cool stuff there is on this shopping list!

Emergency and 911

Few topics are as hot in campus communications centers as emergency notification. Vendors have noticed, too, and are offering a host of new products.

BlazeCast from Benbria is a new cross-media mass notification offering (www.benbria.com) released this summer. It allows universities not only to send messages to their student body, faculty, and staff through mobile phones, desk phones, SMS, and e-mail, all at the same time, but also to broadcast the same message through loudspeakers spread across the campus.

“The integration of notification with IP paging is something only we offer,” says Alicia Liu, vice president of marketing.

On campuses where buildings are spread out, coordinating and instructing people is especially difficult. On a campus outfitted with VoIP-enabled loudspeakers, administrators can page across the campus, to a specific building (or even speaker), or to designated areas—for example, all residences. Paging is as simple as looking at a campus map, clicking the target areas, and speaking into a phone. This can be done from any connected computer and any available phone, Liu says.

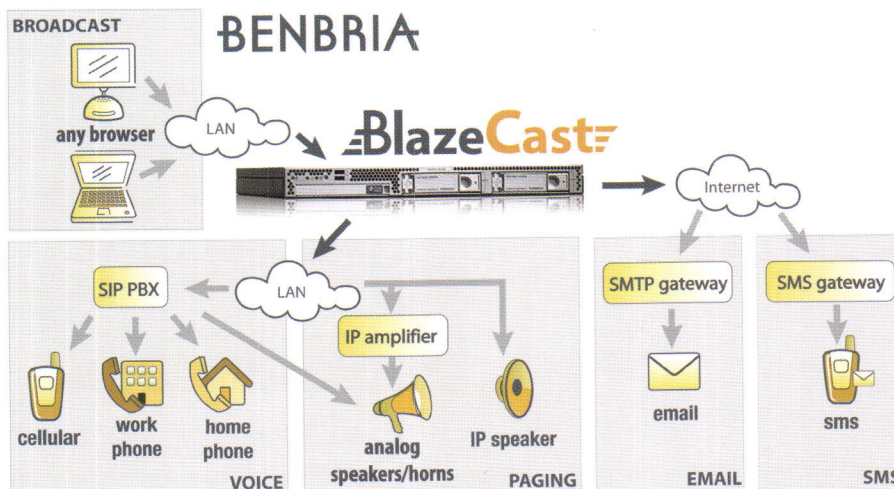
In an emergency, an administrator can use BlazeCast to send a message to the security team. Immediately after the team receives the message, the system automatically brings all recipients into a conference.

A computer-network-based alarm system will allow users to trigger an emergency alarm through their computers. The alarm would be sent, silently, to all other users logged into the same network. LANalarm from Pentad Systems (www.pentadsys.com) could be part of any school’s emergency notification system.

When an alarm is triggered, a panel flashes on users’ screens. At that point, only an IT administrator can shut the alarm off. This ensures that it will not be shut off without someone noticing it.

Nuance has a speech-enabled emergency/event notification system (EEN)

Figure 1. BlazeCast from Benbria is a new cross-media mass notification offering released this summer.



module that lets a college automatically and rapidly contact designated people (up to thousands) in the event of an emergency or significant event. A broadcast can be initiated and a message sent from any telephone, using speech commands.

This system features advanced voice biometrics technology that confirms the caller's identity to allow creation of the broadcast message. Speech is used instead of DTMF. Authorized personnel can send a broadcast message using only their voice. However, once the administration or security caller records the message, EEN broadcasts the information via multiple modes of communication—office phone, mobile phone, pager, e-

mail, SMS alert—until every recipient has been notified. The system gives full accountability with a documented notification audit log.

This system is faster than most others, says Hakan Kilic, Nuance product manager. "Simultaneous notification of key personnel is completed in minutes versus hours with manual call trees." In addition, it is easy: A single call from anywhere activates a notification scenario. Systems run about \$50,000 and, at the top end, can handle 100,000 users.

Security is provided both by PIN and voice biometrics recognition, Kilic says. In addition to follow-me hunt groups, the system allows active confirmation of message receipt.

Talk-A-Phone has a WEBS tower that integrates an ADA-compliant emergency phone and wide-area emergency broadcast capability into a single highly-visible tower. The unit features concealed high-powered speakers that provide 360-degree coverage. Their local announcement capability lets personnel unlock the local command station and make onsite announcements. WEBS works with analog, too, or IP-based systems.

"We're pushing people to IP if they have the backbone for IP phones already. It's less expensive to install and provides a more powerful solution," says Samuel Shanes, chairman of Talk-A-Phone.



BROADCAST NOTIFICATION

BE PREPARED.

Times have changed. The world is a different place. Communicating with large populations instantaneously is paramount.

This is especially true on college and university campuses where everything can change in a split second.

Campus leaders need to be prepared to not only respond to emergencies, but also to deal with crisis and risk management situations and the continuity of school operations.

PAETEC offers this level of security and service with Broadcast Notification. This powerful broadcast communications tool has one of the largest call-handling capacities in North America today. PAETEC's Broadcast Notification can launch thousands of simultaneous notifications via phone (cell or land line), text, fax and e-mail. It can reach thousands of students, faculty and staff in seconds. Immediately. No matter where they're located.

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- Fully redundant service
- Comprehensive reporting

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Each tower has an attention-grabbing blue light strobe mounted on top. The light is continuously lit, and its strobe is activated by an emergency button when a call is placed or by a command to a remote guard calling in to the emergency phone.

Pole-mount or fixed CCTV options are available. Units are made of 12-gauge stainless steel with an impact-resistant polycarbonate window. The light strobe is 1.5-million candlepower, and emits 70 flashes per minute.

So, you've notified 2,300 students and 1,100 staff...and every one (plus parents and spouses) has a question. How do you handle the inbound phone crush?

T-Metrics (www.tmetrics.com) has an emergency ACD service that distributes inbound calls to a predefined list of people (security, administration, and others) who can handle the crush. "You don't have to reprogram your switch. It uses normal phones and lines," says Terry Dunigan, director of the firm. Calls set to a defined DID or extension number automatically trigger the ACD. Prior to their being turned "live," the system notifies them about the incident and requires their permission before they are called.

The system will evenly distribute the calls to all available agents, Dunigan explains. There are six configurations that will determine the number of calls that can be processed and the total number of

agents available in each of the configurations.

Movius Interactive Corporation also has a solution for rapid notification. Rapid Alert is a carrier-grade messaging application for delivering alerts and personal notification content to subscribers. Developed in partnership with Velleros, it delivers mass notifications of news and alerts such as AMBER and severe weather to customers based on user-defined delivery options including SMS, synthesized voice, and e-mail.

Oscar Rodriguez, CEO of Movius, says traditional alert notification solutions may not offer comprehensive delivery options that focus on consumers' growing reliance on mobile phones. Instead they rely

Creating the New Educational Environment

Looking at new products that have recently moved into the market shows us the steps into the future; but there is also value to considering the environment or culture of the future, and that's exactly what Michael Wesch helped us do at the Annual Conference in Las Vegas.

Wesch is an assistant professor of cultural anthropology at Kansas State University. The future he described will mean "ubiquitous networks, ubiquitous computing, ubiquitous information at unlimited speed about everything everywhere from anywhere on all kinds of devices." How that will happen, Wesch says, will have a tremendous impact on your university and possibly your career.

More than a technology revolution, Wesch sees a cultural revolution because the changes he sees are not just about technology but about how that technol-

ogy is used by people. The revolution will be driven by people inventing solutions; but, he points out, anyone who has ever tried to invent a solution knows you're also mediated by legacy structures.

Looking at the classroom, Wesch sees a need to engage students who admit to being ready to learn but bored with current methodologies. Teaching has not changed, but learning has in this age of technology. "What the walls [of the classroom] are not currently saying is that to learn is to discuss or to challenge or critique or share or create information, and especially not to create meaningful connections—and that's the core of learning because to learn is to create significance, to find these meaningful connections between previously disparate elements.

"How can we leverage the tools around us to create a more participatory

environment?" Wesch asks. "We have to look beyond the rear-view mirror to harness and leverage the new media environment and, more importantly for higher education, to create those types of platforms that allow students to realize and leverage the emerging media environment."

Wesch closed his session with a "seven-minute tour of the future." It included embedded computing, context awareness, augmented reality, radical participation, and education based on an open, enabling platform. If you'd like to hear all of Michael Wesch's presentation (and [editor's note] you should!), visit the ACUTA website at <http://www.acuta.org/?2212>. You will also enjoy his own amazing video at <http://www.youtube.com/watch?v=6gmP4nk0EOE>.

on call-tree systems that take time to deliver messages and track results; e-mail distribution solutions that cannot reach impacted residents if they are not online; and voicemail distributions that only reach users who have been included in the system. This approach provides personalized content and automatic alerts to a user-defined distribution list for rapid communication of time-sensitive information and warnings. The system can support National Weather Service and Pacific Tsunami Warning feeds for voice and text-based notifications for tornadoes, tsunamis, hurricanes, and AMBER alerts.

It also supports community notification, which allows educational institutions to push alerts and provides response and feedback mechanisms. It has a call-attempt notification service that can trigger real-time automatic notification to friends and relatives when a user attempts to call 911.

Security Products

Perimeter eSecurity (www.perimeterusa.com) brought out its Remote Backup and Recovery (RBR) product, which provides a reliable, on-demand storage engine to securely back up and recover data. RBR is a fully digital service that allows organizations to maintain a regular backup schedule. It is an automated data backup solution that assures colleges that data will always be available and stored securely, and meet compliance requirements in the event of a major disaster or even a more common simple system failure.

Once set up, it requires no client time or effort and is not prone to human error or typical IT problems that in-house solutions can experience. Backups can be scheduled, in full, in part, or incre-

mentally, at any time, while simultaneously allowing customers access to other systems.

"People and data are an organization's two most critical assets. However, without the data both the people and the organization come to a standstill," says Doug Howard, chief strategy officer for Perimeter eSecurity. "Many organizations do not adequately protect against data loss and system failure risks caused by technical, human, and natural disasters. Conventional backup methods such as physical tapes and drives are inefficient, prone to error, and incur extensive administrative costs. A disk crash or inadequate backup procedure can cause material business disruption

and financial loss. If the prospect of a 'big disaster' doesn't concern an enterprise, just imagine the man-hours lost on PC failures around an organization."

RBR encrypts all files locally before they leave the campus, ensuring the privacy of the data. Each encrypted file is replicated and delivered to two off-site Level 3 data storage centers. All restored files remain encrypted and cannot be viewed until decrypted by the client using access key credentials.

T3 Telecom Software, Inc. (www.myt3.com), has a system that allows its voice-mail application to run through a clustering configuration of synchronized nodes that minimizes voice messaging downtime resulting from hardware failure,



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network outage, or system maintenance. Each node maintains a complete T3main voicemail application, database, and file system that resides on a single machine, rather than leveraging shared storage, which can be affected during a node or network outage. Proprietary software synchronizes the multiple databases asynchronously whenever a change occurs in one node.

“We’ve seen the need for disaster preparedness become more evident and have responded to market needs with a highly effective fault tolerance and redundancy solution,” says Yaniv Livneh, CEO of T3. “Direct Cluster Networking (DCN) eliminates dependencies on high-cost equipment and middleware software, is highly scalable, and operates in conjunction with most phone switches, both TDM and VoIP.”

The system is available in two configurations: Active/Passive for organizations that require a highly available system at a specific site and All Active for organizations that have multiple sites and require redundancy across the enterprise.

Livneh says there is no single point of failure. “There are no individual components within the T3main that can result in a voicemail application failure. Should a voicemail server within the cluster fail, or if the network becomes unavailable, another node will take over,” he explains.

Meanwhile, Niloc USA, Inc., made available this summer its NetAnchor CIS, a device-based identity and access management (IAM) appliance for securing critical infrastructure. It is aimed at securing remote data sites. As these remote networks increasingly intercon-

nect with IT networks, security solutions are required to prevent cyber-security threats from entering through these once isolated environments. NetAnchor CIS uses physical device recognition in addition to password-based authorization to ensure secure access to these critical infrastructure control systems.

According to a report by the National Institute of Standards and Technology entitled *Guide to Industrial Control Systems (ICS) Security*, “Threats to control systems can come from numerous sources, including adversarial sources such as hostile governments, terrorist groups, industrial spies, disgruntled employees,

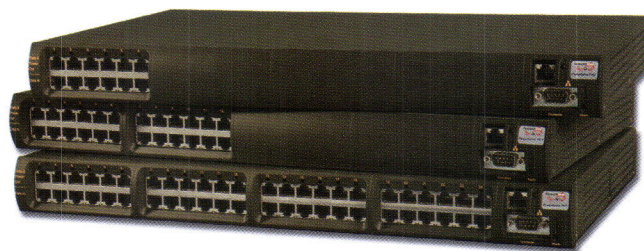


Figure 2. Microsemi’s PowerDsine Midspans, such as the PD-7000G family shown here, can provide up to 32 watts per port; enough power to drive pan-tilt-zoom (PTZ) security cameras, wireless access points, VoIP video phones and thin clients.

malicious intruders, and natural sources such as system complexities, human errors and accidents, equipment failures and natural disasters. To protect against adversarial threats (as well as known natural threats), it is necessary to create a defense-in-depth strategy for Industrial Control Systems.”

The same holds true for colleges with agricultural plots, remote sensing data for geology and meteorology, and other remote data-gathering equipment.

With NetAnchor CIS, an authorized user must be on an authorized device to access control system networks. It provides notification and the location of

unauthorized connection attempts to the NetAnchor CIS virtual private network (VPN) as well as attempted physical connection.

PTZ (pan-tilt-zoom) security cameras, 802.11n access points, WiMAX transmitters, thin clients, and video phones comprise Microsemi’s new line of PowerDsine high-power gigabit midspans and splitters (see Figure 2). These upgrade existing network infrastructures for Power over Ethernet (PoE) applications.

“PowerDsine high-power midspans and splitters provide immediate, simple, and safe PoE solutions, prior to ratification of the next-generation standard,” says Steve Litchfield, executive vice president at Microsemi.

They can inject up to 32 watts of power over existing Category 5 Ethernet cable, allowing end devices to receive safe power on the same line they receive data. By using a high-voltage output, they offer 802.3at prestandard solution that more than doubles the power allowed in the existing 802.3af standard.

The line includes 6-, 12-, and 24-port HiPoE midspans in the PD-7000G Series, the PD-7001G single-port HiPoE midspan, and the PD-AS-701 Splitter Series that provides a choice of 12-, 18-, and 24-volt output.

Now that the technical ducks are lined up, campus IT managers need to plan and monitor the entire alert management process. MIR3’s TelAlert 6e lets college IT managers not only plan and monitor the alert management process but also designate emergency campus contacts, arrange vacations, designate device-call-

ing plans for each person, and keep track of all events as they occur.

Wonder if it works? Currently, 80 percent of Fortune 100 companies utilize MIR3's TelAlert "blue-chip" notification platform. MIR3 now offers it to the education industry.

Key features and benefits include business-process-to-person communication; an intuitive, no-training-required user interface; comprehensive support for all mobile devices, services, and protocols; and certified integrations with university systems management applications, according to Ken Dixon, executive vice president at MIR3.

Colleges can configure and manage all handsets via a simple-to-user web interface with the MetaSwitch (www.metaswitch.com) SIP Provisioning Server. It provides a simple and consistent management interface across phones from a variety of vendors. This provides remote delegation and management to PBX administrators, allowing schools to configure and set features consistent with PBX settings. Since it works across multiple phone vendors, it also allows a college to select from a broad array of phone options—not just the models associated with the PBX manufacturer. The company's network diagnostics tool lets IT manage and deliver QoS for VoIP. This tool maintains a range of information regarding every call passing through the switch, including what caused a call set-up to fail, why a call was dropped, and more.

Going Mobile

The DiVitas Mobile UC solution (www.divitas.com) consists of the DiVitas Server, installed on the college LAN, and the DiVitas Client, installed on selected dual-mode handsets and smart phones.

The server product provides an IT-managed mobility service that integrates

with the university's PBX. Once installed, a smart phone handset behaves as a desk phone, providing a cost-effective option for adding mobile extensions without a system forklift.

Mobility Server Manager (MSM) is a service that monitors network connections with DiVitas Clients and proactively identifies the optimal network connections for each call. Roaming decisions, between WiFi and mobile networks, are made automatically by MSM to sustain highest call reliability and voice quality. No end user action is needed to identify WiFi boundaries because MSM heuristically learns and manages this information.

The Client gets installed on the user's mobile handset. It works either with the Nokia or the Windows Mobile platform. It gives users access to various Mobile UC features. The Client has an icon-driven interface to let users navigate quickly to needed functions.

The system works with a college's existing TDM or IPBX system. Once integrated, the Client behaves exactly like a

desk phone, providing the same capabilities. PBX integration provides IT equal control over desk and mobile phones by extending the existing PBX corporate rules and policies to calls made with the Client.

Standard PBX features such as call transfer, call waiting, call hold, extension dialing, and call conferencing are supported regardless of the wireless network connection. Users can access all PBX features regardless of their physical location. Call logging is similar to that with most mobile systems.

On the road and need virtual presence? Aastra ViPr™ (get it?) offers virtual presence functionality for video interaction. Based on the H.264 standard, ViPr provides high-quality video telephony that is fully interoperable with standard phone systems and legacy video conferencing. (See Figure 3.)

ViPr's intuitive user interface is simple. Even first-time users can establish multiple-party video conferences within a few minutes with minimal training. A Virtual Share package of optional col-



Figure 3. Aastra ViPr™ 4000

laboration tools allows conferees to share documents and applications, including electronic whiteboarding via Microsoft NetMeeting. Other optional components enable conferees to view live-broadcast TV, prerecorded video, or CCTV feeds during a ViPr call.

The system is plenty secure with management via HTTPS (Hypertext Transfer Protocol over Secure Socket Layer), the usual administrator passwords, and SIP digest authentication and user authentication, with access to contacts and settings protected via Transport Layer Security (TLS). Also included are Windows/server message block (SMB) server or Kerberos 5 server.

Aruba Networks lets IT provide the university network to users anywhere at any time by connecting an EV-DO or 3G USB network card to a standard Aruba access point (AP). Completely plug-and-play, the Aruba AP establishes a secure connection over the cellular network back to a central controller in the campus data center using IPsec. It then operates as if it were on campus, broadcasting campus SSIDs, authenticating through the standard campus authentication system, and giving an identical user experience. (www.arubanetworks.com)

There are no VPN client software or user behavior changes required, according to Robert Fenstermacher of the company's Global Higher Education Marketing department.

The system is ideal for first-responder and campus disaster recovery; sustainability initiatives that contain business continuity requirements; satellite campuses or ad hoc conferences that require connectivity; traveling researchers, faculty, administrators, or students; home access for administrators who need complete access to school resources; or for WiFi in campus shuttles or similar uses.

Network Based

The latest from ProCurve Networking by Hewlett-Packard is the QinQ technology. It is specifically aimed at campus applications (whether school or enterprise) and lets colleges that are heavily into Ethernet expand economically.

QinQ extends the virtual LAN (VLAN) tagging technology first embodied in the IEEE 802.1Q standard. VLAN tagging allows multiple logical networks to share a physical Ethernet LAN by defining a new type of Ethernet frame that has a tag field used for identification. Traffic in the same logical network or VLAN has the same VLAN number in this tag field.

QinQ creates a hierarchical structure that improves Ethernet's scalability and manageability, allowing Ethernet networks to be extended to connect many LANs in a large campus or metro area. Colleges can deploy Ethernet instead of MPLS, ATM, or frame relay and thus benefit from its established trends of decreasing cost and increasing speed.

ProCurve has implemented QinQ in the Switch 8200zl, 6200yl, 5400zl, and 3500yl series, according to Taufique Ahmed, solutions manager for convergence and infrastructure. In the 5400zl and 3500yl series, this feature is included in the premium license along with other aggregation layer features such as OSPF, PIM, and VRRP. In the 8200zl and 6200yl series, this feature is included as part of the base feature set since these switches are positioned primarily as aggregation layer and core switches.

UnifiedPosTrack from PosTrack (www.PosTrack.net) uses SIP trunking technology provided by Level 3 to deliver carrier service that appears as PRI or POTS to your existing PBX.

PosTrack Mobile FMC phones include a VoWiFi client, notes Chad Schumacher, director of marketing. It allows calls over

WiFi to hand over to cellular without dropping, and vice versa. "This is fixed-mobile convergence in its truest form," he says. "Level 3 hosts our data center, provides our SIP trunks, and provides ELS PSTN dialtone."

The campus assigns the DID number to the SIP portion of the device—thus regaining the control, connectivity, and revenue they lost when students migrated to mobile. PosTrack Trunking connects existing equipment to mobile or desktop lines on the same switch. Features such as four-digit dialing work seamlessly across the entire system. The SIP trunks that power PosTrack Trunking use the Internet to connect to their assigned device; incoming PRIs are eliminated, leveraging the school's existing data network.

With SIP trunks, bandwidth not being used by voice traffic is rerouted to support campus data network traffic.

The system's Desktop and Unified products expand the features available. Desktop is the second logical step in a VoIP migration. The SIP trunks travel over the campus's data network directly to a feature-rich desktop handset. The switching happens at the PosTrack server, similar to Centrex, but the college's IT staff has access to some control features that Centrex systems do not offer.

PosTrack Unified forms the voicemail backbone for the other PosTrack services, but is also available as a stand-alone. This system allows your campus to assign DID numbers to virtual mailboxes in order to keep large groups connected without hardware costs.

Nokia Siemens Networks (www.nokiasiemensnetworks.com) has a new system for the rapid integration of operations support systems (OSS) for networks, other OSS systems, and business process and business support systems (BSS) domains. Nokia Siemens Networks, Sun Microsystems, Tail-f Sys-

tems, and Xelas Software demonstrated their interoperability at a show in France in late May. The technology is now available for schools here.

Their mediation framework enables faster integration and will be introduced by Nokia Siemens Networks to its Open EMS Suite (OES) software development platform. The mediation demonstration is the first proof point for the next-generation OSS architecture, showing the power of mediation across the different Telecommunications Management Network (TMN) layers of business, service, network, and element management.

Mediation is software with functionality that allows different OSS systems to connect with other systems. Typically, mediations are built as one-off projects with limited reuse. This boosts integration costs as every user has to reinvent the wheel. For developers, a mediation framework provides tools and mediation components as building blocks for simple integrations. Mediations can be obtained from the OES-compatible mediation library, which promotes mediation reuse and reduces the integration risks.

"We are demonstrating a new way of approaching mediations in the OSS domain. This approach is based on openness and collaboration," says Kari Loukola, head of the Nokia Siemens OSS middleware business line. Sun's role in the demonstration was to show how the mediation framework supports service providers' business processes.

If you run telecom at a smaller school but want big bandwidth, or if you have your own large, legacy network, it might be worthwhile to talk to RAD Data Communications (www.radusa.com) about its solution for delivering maximum Ethernet bandwidth over low-speed T1 PDH (plesiochronous digital hierarchy) lines. PDH networks are nearly, but not perfectly, synchronized, as opposed to

synchronous digital hierarchy (SDH) equipment that is synchronized. This solution pairs the firm's Egate-100 gigabit Ethernet aggregation gateway with its RICi-16 Network Termination Unit (NTU).

"PDH is a veteran technology that was designed before the advent of Ethernet, back when data rates were slow in comparison to today's needs," explains Ami Barayev, product line manager at RAD. "But given that PDH reaches virtually everywhere, it can, with bonded T1 circuit technology, be turned into an excellent Ethernet transport mechanism anywhere over the service path, both for

incumbents that wish to use the deployed infrastructure for new Ethernet services and alternative operators whose fiber networks are not extensive enough to reach all potential customers (off-net)."

"The solution is also ideal for backhaul of WiMAX traffic as well as IP DSLAM extension," Barayev adds.

These are just some of the technology advances to file away for reference. Catch your school's CFO in a good mood and some of them may just show up in your 2009 budget.

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Virtual Hands-on Learning: The Aesthetic Camera in Second Life

John Fillwalk
Ball State University
and
Elwin McKellar

Walking about campus has never been like this. On a virtual campus, a visitor, student, or faculty member might well be able to fly from one location to another, walk under water, and even teleport from place to place. It certainly saves a lot of virtual shoe leather. Anyone who has visited Second Life (www.secondlife.com), created an account and an avatar (a character who represents you in the virtual world), and wandered about would be familiar with these modes

of travel as well as more mundane functions, such as walking, talking, sitting, and just looking around.

Sounds like an on-line computer game, right?

There are aspects of Second Life and worlds like it that are common to many games. These worlds are animated, three-dimensional, immersive environments, but the avatars in Second Life have considerable control over appearance (gender, clothing, hair, body shape) and live in a highly scalable environment that permits them to do and be almost anything, without the rules and the specific objectives and goals of a game.

The popularity of virtual worlds is surging exponentially, and many educational institutions and businesses are purchasing “land” and establishing locations, even virtual campuses. The Institute for Digital

Intermedia Arts and Animation (IDIAA) at Ball State University created a class in the techniques of filmmaking called The Aesthetic Camera on its virtual campus in Second Life. The one-credit course focuses on cinematography instruction in the physical world and the virtual world, where it is also known as “machinima.”

According to its website, “the institute is an interdisciplinary, collaborative research and studio environment that explores intersections between art and technology,” and it is a place where “students, faculty, and industry partners engage in a wide range of innovative digital media projects employing technologies such as virtual reality, visualization, simulation, human computer interface, and interactive art works.”

Starting at the Beginning

The idea is both radical and innovative: Teach students to make films, to use the equipment and skills involved in cinematography, but deliver it all online in an environment that stimulates creativity and interaction with fellow students and instructors. This environment includes virtual versions of all the necessary tools and some that do not exist in the real world—for example, a flexible shooting environment or holodeck.

Initial considerations when planning The Aesthetic Camera included defining the audience. Would students be primarily distance education students, or would on-campus students take the course as a lab or as an online supplement? The benefits to distance education students seem obvious, because of their limited ability to interact



with instructors and other students due to simple distance factors. However, on-campus students might also benefit from the asynchronous features of the course and a reduced need to travel to the campus to interact with colleagues and instructors.

The Aesthetic Camera modules are IDIAA's initial offerings—they were designed as a prototype that involved innovation in instructional design, bridging between the Web, Second Life, virtualization of instructional laboratory equipment, and multiple modes of delivery for supporting media content. The experience was to be available primarily to distance education students, but its potential as a supplement to on-campus experiences has also been considered.

Finding Programmers and Funding

Problems to be resolved included finding programmers and designers to help with the creation and maintenance of the virtual studio and equipment.

This project primarily involved faculty and students attached to IDIAA as well as several staff from university IT. This group brought expertise from a variety of disciplines to bear on the project, including modeling, animation, programming, instructional design, media, and project management. In modeling and programming in particular, there is a somewhat steep learning curve in transitioning to the Second Life environment. IDIAA also retained several external consultants for particular aspects of the project. The holodeck is a

commercial product IDIAA authors scenes for—but the institute did not build it.

Such projects nearly always face the challenge of finding the resources to fund research, development, and production. IDIAA was fortunate to obtain ready support. Its project was supported by the Office of the Provost, the Dean of the College of Fine Arts, the Vice President for Information Technology, and the Director of the Center for Media Design at Ball State University.

Of course, it is always a blessing to find outside funding for a worthy effort. The project was also awarded the Blackboard Greenhouse Grant for Virtual Worlds. Such a commitment from internal and external partners allowed IDIAA to explore the potential of virtual learning with a talented

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team of dedicated specialists. IDIAA director John Fillwalk and his team invested countless hours in the research, design, and production of *The Aesthetic Camera*. This included the considerable contributions of staff, software, and hardware resources committed to the development of this project.

Discoveries and Dialogues

Many other schools are experimenting with virtual environments as educational platforms. They have discovered that beginning a foray into the development process requires careful planning. From its experience, IDIAA has found that the first step is to identify an institutional leader who is passionate about the possibilities of instruction in online virtual worlds. And the second step is to assemble an interdisciplinary team of designers and technicians to explore the potential of the technologies. Integration is the key to making the student experience fluid and getting the various technologies involved to cooperate.

The dialogue continues, as IDIAA is also currently designing and building *Second Life* presences for a variety of external and internal partners.

Costly Connections

To effectively explore *Second Life* environments, high-speed Internet connections and newer computers capable of running contemporary games are requisite. At first, it might seem that some distance students are disadvantaged because they lack high-speed, reliable Internet connections and fire-breathing, massively powerful gaming computers. The connection, memory, and graphics requirements for efficient and comfortable navigation and interaction in *Second Life* is fairly high...beyond the dial-up connection and the family computer with an older processor.

Although it is true that older computers or dial-up modems would not provide a satisfactory experience, *Second Life* as a free client can be run at libraries, universities, or other public Internet facilities, thus increasing the potential for student access.

It does not appear to have been a problem or limiting factor for any prospective students.

There are measurable costs to be considered for a faculty member designing and teaching such a course, and for an interested faculty member beginning the process. Faculty members exploring online e-learning, virtual learning, or hybrid learning (a blend of virtual and physical) commit themselves not only to a course of study of new technologies, but also new paradigms of instructional design. There is also the issue of institutional support and maintenance, once the pioneering effort has been established.

One also needs to reckon with those who prefer to pioneer only on the trailing edge of technology. Blazing new trails typically goes against the grain of convention, often resulting in skepticism from colleagues, students, and administration.

Benefits

The institute has found measurable benefits for both instructors and researchers from this project. The focus is to explore the fusion of instructional modes, including physical, online, and virtual, with particular interest in the synergy of synchronous and asynchronous learning environments. Benefits have included the development and retention of an expert research team centered around simulation, visualization, and interaction. IDIAA is currently honing its business profile as clients contact it to secure product development, consultation, and services in simulation, visualization, and interactive interface design. Multiple opportunities for visibility and dissemination of the project have also been outcomes of these efforts.

There have been benefits for the students as well, some measurable and immediate, some only now recognized. Distance education students can participate in communal learning and synchronous dialogue with instructors and a peer group. The sense of isolation typically found in online asynchronous modes is alleviated by building a sense of community.

A secondary benefit of online learning environments now becoming increasingly important for students and faculty is a reduction in the cost of transporting one's body to and from a physical campus. Spiraling gas prices are making daily commutes increasingly expensive, and many schools are seeing an enrollment upsurge in distance education courses they attribute (at least partially) to this increased cost.

Panacea or Pandora's Box?

The IDIAA team members were not the first to enter *Second Life* with the idea of using that environment for educational purposes, but they have taken the process to a new level and opened the door to possibilities that did not exist prior to their efforts. Ultimately, of course, the promise of the program will be delivered by the performance of the students taking *The Aesthetic Camera* and other courses spawned by this virtual groundbreaking program.

Until time gives the final grade for this effort, the increasing levels of participation, the willingness of university administrations to invest time and money, the support of companies like Blackboard to recognize and support these efforts point toward future success.

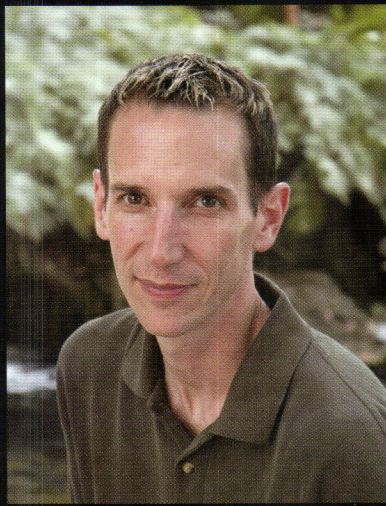
Going walkabout in the virtual worlds of *Second Life* can change your perception of reality. There is a strange and perhaps wonderful sense of connection that develops as one spends more time in the immersive environment and becomes increasingly comfortable with the experience. A true sense of existence in a different place develops and a host of possibilities seem eminently reachable. One begins learning the minute one enters *Second Life*, and it seems most natural to continue.

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Warren Arbogast

Boulder Management Group, LLC



Warren Arbogast is known as a creative visionary. An artist, writer, and communications expert, Arbogast has, for more than 20 years, consulted leaders of such organizations as Nike and Pfizer and institutions of higher learning such as Stanford and the University of Pennsylvania.

Arbogast helps his clients see the world differently, more clearly, and more creatively. In a 2004 article in *The Chronicle of Higher Education*, clients told a reporter that Arbogast served them as a technology therapist and translator. A Dutch web service dubbed Arbogast the “Dr. Phil for IT-use in Higher Education.”

But Arbogast talks about far more than education, technology, and organizational goal setting! Arbogast talks about dreaming, doing, and developing a passion for progress.

His career is rooted in the popular refrain “if you can dream it, you can do it.” As an undergraduate, he created his own major and “sold” his vision to a team of tenured faculty. Early in his career, Arbogast was nominated for a Congressional Award for Creativity. He’s taught in the MBA program at the University of Virginia’s top-ranked Darden School of Business; and he’s published a poetry book and edited a photography book.

Keynote speaker at ACUTA’s 37th Annual Conference in July was Warren Arbogast, creative visionary and motivational futurist and president of Boulder Management Group. His advice was well received by conference attendees, so we sat down with Warren and invited him to expand on some of the concepts he introduced. The following is that interview.

ACUTA: Your topic for our audience was Re-Thinking the IT Service Organization: Is Your College Getting a Solid Return on Its Investment? Looking behind the scenes at campus technology decision-making, you introduced a new concept: adhocracies. What does that mean, and what is its impact on ICT?

Arbogast: The IT setup is frequently characterized by people working in silos, making ad hoc decisions on their own, not related to a plan. This indicates a lack of understanding of the IT vision and mission. The model for distributing IT services in this way is the dandelion, whose seeds are scattered by the wind. Adhocracies are the result of that approach.

An adhococracy is the least effective, most expensive, and most common way for doing IT business on campus. The result is high cost, dissatisfaction, and unnecessary security exposure that fails to give technology professionals/ and campus executives a “fair chance” at success. It allows people to stay hunkered down in “how we’ve always done it” survival mode, and it is a barrier to future-thinking.

In my presentation, I spoke about implementing long-term transitive processes in five steps. In my mind, and from

my experience, this is what colleges and universities need to do in order to eliminate and address adhocracies and remake their IT organizations.

Step one: Clarify Purpose/Team Vision.

You must identify ways for ensuring that your institutional mission—the academic mission and administrative goals and targets—drives the technology decision making, not the other way around. This has to involve senior-level leadership, including the president, chancellor, provost, deans, and trustees. They must participate in owning and authoring the IT vision. Help them understand how much is spent on IT. It’s bigger than most would guess by the time you add up staff, equipment, benefits, and the rest. Putting a dollar sign in front of each piece helps you have the right conversation.

Step two: Remake Your IT Service Organization. Redefine your organization based on your services: Infrastructure includes utility services and security—e-mail, access, printing, and so on. Infostructure applies to specialized services and innovation: research, science, medical, and such.

A large percentage—maybe 80 percent—of IT time and energy is spent on infrastructure. The remaining time, maybe 20 percent, is spent on learning what people need technology to do. These percentages need to be reversed. Infrastructure is necessary to move information, a bit like a utility. But it isn’t your mission.

Meet with faculty to learn what departments are trying to do. Meet with students to learn what they are doing. These don’t

have to be formal meetings, just keep in touch. Get faculty and students involved and have them focus on teaching, learning, and research. Meaningful applications for technology will surface, and you will identify ways to foster innovation.

Another part of this step is redistributing the burden of technology. Everyone gets and stays involved. Faculty and staff must develop their role as customer and collaborator, not just “user.” Some faculty are still not comfortable with technology. Sometimes staff are viewed as “hired help.” What responsibilities do students have to the community resource? And how can we make technology absorb more of the load?

Step three: New Approaches to Communications. We have to cut through historical politics. Communications between chief executives and technology executives must be clear, honest, and, perhaps most of all, collaborative. Technologists must work with one another toward a common goal with shared incentives. We can no longer afford the silos; the dollar costs and security risks are simply too high.

How often does IT work with vendors in partnership? The vendor can be more than “who we buy from.” Collaborate to relieve the burden. Vendors want that. Take advantage of their insight and expertise. It’s not just what can you sell me, but how can you help me solve this problem.

Step four: Measure Success and Return on Investment (ROI). While the definition of success measurements will vary from one institution to another, if you don’t have a way to evaluate what you’re doing, you can’t succeed. Knowing the comprehensive costs and factoring in all the “silo” expenses is the place to start. Traditionally, ROI means cost savings and is calculated in dollars; but for higher education in general and IT specifically, we have to think in terms of dollars and *sense*.

Measuring the ROI demystifies technology, allows for a much more focused dialogue about resource allocation, and ensures that everyone gets on and stays on the same page. You must articulate your goals—when and how to measure and reward success, how to deal with something less than success.

Step five: Go for Low-Hanging Fruit. If all you want to do is eliminate “easy” fat from the budget, experience shows it will simply grow back, in another form, often hidden from view.

Use whatever present-day “low-hanging fruit” exists on your campus—equipment that sits about under-utilized, duplicated effort, proliferation of servers and “server wars,” redundant storage, multiple e-mail systems, and more—as simply another tool for the overall good, but don’t let it become your focus.

ACUTA: What is one of the most valuable lessons we should learn from recent IT developments and the history of our industry?

Arbogast: Planning for IT is not just a matter of choosing the right technology for those who use it. Selecting technology is a part of that picture, but we must figure out how we ensure that the academic mission and administrative goals of the college drive all IT strategy and the decision-making processes. If we don’t make time now to pick up the dandelion seeds—funding technology incentives and measuring success, we are doomed to repeat our mistakes. We must start ROI activities that measure success.

ACUTA: In your presentation you said there are only two industries that refer to their customers as users: IT and illicit drugs. Clearly that suggests that something is wrong with our approach. Can you elaborate on this?

Arbogast: For far too long we’ve referred to our customers as users. This signifies a reactive relationship. “See how they like this” becomes the approach to innovation and problem solving. We need to be more proactive and spend more time talking about their work, their challenges. When IT gets IT customers to talk, the answers clarify the needs. When we just put out today’s fires, we can’t see tomorrow.

Colleges and universities are robust with critical-thinking people. We must have conversations with them about our goals. The “here are the resources we need” approach simply won’t work. We must have the right conversation, build trust, and agree on a definition of success and what it takes to succeed. On campus, if you don’t define your technology doctrine, structure, and incentives, you’ll not be anywhere near as successful as you could be—and it will cost a lot more. And it’s harder the way we’re doing it.

ACUTA: Many of our members are experiencing a great deal of change due to converged technologies and merged departments. As they consider the ideas you have proposed, what barriers to success do you foresee?

Arbogast: Three barriers to doing things differently that I caution people to be on the lookout for are deny, decry, and delay. There are time-tested, proven barriers to doing things differently. Let me explain what each of them means.

Deny: Some try to *deny* there is a problem, stating flatly, “We don’t have this problem.” Or they say, “This problem isn’t as big as people might think it is.”

Decry: When somebody wants to do something differently in a college setting, often people object, “We have other things to focus on.” “That is not the way we do things here.” “That may be the way you did it somewhere else, but that’s not how we

do it here." "A larger university with greater resources might be able to do it that way." "We have always done it this way."

I actually heard someone say to a new-to-their-university recently, "Well, people might be pushy where you were before, but here we work a lot more slowly. We don't like to change." To this, I remind people: Campus IT as we have come to know it is really only about 25 years old, dating to when computers first started popping up on everybody's desks. It's not like we've been doing campus IT since the dinosaurs roamed the parking lot.

Delay: Everyone knows what happens to progress when they hear "Let's get a committee," "Let's schedule a meeting some

time," or "We'll get people together at some point in the future."

In one case I dealt with, a school wanted to put together a campuswide IT representation team, and there were more people on the team than there were legislators in the state.

Some ideas are dismissed with, "Great idea, but we don't have the money." A lot of the best ideas are not money driven; they are strategy driven and creatively considered from the start.

Those are the three big barriers to progress that I've seen in my time working with colleges and universities. Until folks get beyond those barriers, it's difficult to make any real progress.

At the ACUTA conference, I enjoyed talking with people in both the formal settings and the informal. I found them to be dedicated professional people who can see that the business model and services they offer will be different, but they are feeling some frustration and some trepidation about where telecom fits into IT. I saw people who are fully committed to their campus and their job. They seem open to examining how to work more effectively and efficiently.

ACUTA appreciates Warren Arbogast's willingness to share his time and thoughts with us. He may be reached at info@bouldermanagementgroup.com.

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Unified Communications—Coming Soon to the University of the Pacific

Faye Snowden
University of the Pacific

Pacific began its journey toward unified communications (UC) before the concept had been fully defined. While consultants, marketing types, and analysts struggled to nail down a definition, Pacific had already made a substantial investment in VoIP. A VoIP solution had been implemented as early as 2003 in some areas of the university's Stockton campus; and in 2006, OIT-Telecommunications replaced the McGeorge School of Law's Avaya and Nortel PBXs with a CallManager switch at that location.



Photo courtesy of University of the Pacific

By the time the concept of UC was being solidified as a way to integrate various modes of communication such as phone, instant messaging, and e-mail, into one usable interface, Pacific was looking into ways to leverage its current investment in VoIP technology.

These new developments allowed Pacific to include a path to UC in a strategic plan for a VoIP deployment that would benefit the McGeorge School of Law, the graduate and undergraduate programs on the Stockton campus, including the School of Pharmacy, and, eventually, the Dugoni School of Dentistry in San Francisco. This strategy included constructing a foundation that would enable the university to take advantage of emerging technologies such as UC while building a highly redundant VoIP infrastructure.

For example, the VoIP infrastructure strategic plan includes a VoIP switch at the university's disaster recovery facility and technology that will enable call processing on the Sacramento campus if phones cannot contact the Call Manager switch in Stockton. OIT-Telecommunications then developed a phased approach to implement the technology that will eventually comprise the new telephony infrastructure and lead to a UC environment.

The first phase was the implementation of unified messaging (UM) for faculty and staff on the Stockton and Sacramento campuses using Cisco's Unity 5 application. Stockton was first, followed by Sacramento. Voicemail for approximately 2,500 faculty and staff on both campuses had been housed on a Unity 4.x server in Stockton. Microsoft Exchange was also on the same server as Unity. The goal was to replace the hardware and install Unity 5 with fail-over. However, instead of placing Exchange on

the same box, Telecommunications planned to integrate voicemail with the university's Exchange cluster with the help of OIT's Systems team.

Complicating the project, a Call Manager upgrade was set to occur at the same time as the Stockton campus voicemail upgrade. The university was also in the middle of replacing the Avaya connected handsets on the Stockton campus with Cisco IP devices.

The Stockton project started in late August, 2007, and was completed on November 30. Sacramento started several months after Stockton was upgraded and was completed by June 2008. Though eventually Sacramento devices will register to the Call Manager in Stockton, Telecommunications decided to complete the move to a

single cluster Call Manager environment in a separate project.

Technically, upgrading to UM was relatively easy. Anticipating technical issues because of the complex nature of the project, the university brought in a consultant to provide technical and project management assistance during the Stockton upgrade. Telecommunications also relied on the technical expertise of the OIT Systems team to integrate with the Exchange cluster. Serious technical problems jeopardizing the completion of the project by the deadline did not materialize.

Two Challenges

Surprisingly, the two biggest challenges were not technical. The first was a data issue. Since voicemail and e-mail would

eventually live in the same message store, Telecommunications and Systems had to link voicemail boxes to e-mail accounts, and user IDs would have to be cross-referenced. This may sound easy, but consider this: Not all staff and faculty had voicemail boxes—some adjunct faculty and temporary staff shared voicemail, and other voicemail boxes were generic and did not "belong" to any one individual. Telecommunications discovered that linking voicemail boxes to e-mail accounts would not be a simple task.

Administrative assistants in each department were asked to be partners in the data cleanup that was required. They were able to verify information about existing voicemail boxes and corresponding e-mail

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addresses. They also confirmed whether or not generic department mailboxes were still needed and provided the correct e-mail.

The time it would take to complete the data cleanup was originally estimated in months, and, unfortunately, the need to do it was only discovered after the project was well under way. But meeting the tight deadline allowed only two weeks to distribute data that needed to be verified and receive the correct information back from the administrative assistants. Fortunately, because the university had anticipated another non-technical issue early, the hardworking administrative assistants were able to respond to the request for data verification within the two-week window.

The second nontechnical issue was user comfort level with the new technology, especially the idea of integrating voicemail with e-mail. Plenty of advance notification and training prepared the campus community for the new system and facilitated cooperation in the data cleanup. Since VoIP can be an expensive endeavor and UM would result in a considerable behavioral change for staff and faculty, Telecom-

munications dedicated some time to user notification and training.

After the original VoIP strategic plan was revised to reflect new funding and expansion, acceptance was obtained by taking the plan on the road to town house meetings and presentations to various campus groups and committees. The technologies on the strategic plan were also demonstrated during a tour of Cisco's Network on Wheels (NOW) van. This proved to be valuable because staff and faculty actually interacted with the technology to get an idea of what was coming. By the time plans and dates for UM were announced, the campus was well prepared and subsequently more accepting.

Staff and faculty were also informed early that they would have to change passwords and rerecord greetings on the new system and that they would be able to retrieve messages from the old system for two weeks after the upgrade. To ensure that they would be comfortable with the new system, Telecommunications enlisted the assistance of the IT trainer and the help

desk to incorporate a set of best practices for managing UM into existing classes. IT Training also developed a brand-new class based strictly on the upgrade. This class was held regularly in the weeks leading up to the change. However, only a few staff and faculty attended. The quick reference guides and FAQs on the OIT website were more useful.

Upgrade Goes Live

The weekend of the upgrade on both the Stockton and Sacramento campuses came and went with little difficulty. OIT staff provided day-one support, responding quickly to mailboxes that had been missed. Users who could not remember the randomly generated voicemail box password changed it themselves online or contacted the help desk, who walked them through the process. Others who expressed concern about managing voicemail in e-mail simply managed their e-mail from the phone and ignored the voicemail messages in their e-mail box. However, users quickly adapted to UM, especially the ability to listen to voicemail messages on Blackberries. Most have stopped accessing voicemail from the phones at all.

The implementation has not been completely without challenges, but no obstacle has been insurmountable. It did take time for staff and faculty to adjust to the MWI extinguishing if a message is previewed or "read" (i.e., listened to) from Exchange. However, the upgrade to UM has been successful.

Pacific sees UM as the first step toward UC. The lessons learned will be carried through to the next phases of the journey. Telecommunications expects to have desktop faxing integrated sometime this year, with a full move to UC next spring.

Faye Snowden is telecommunications manager at the University of the Pacific. She can be reached at fsnowden@pacific.edu.

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Reality Check on Virtualization

Gary Audin
Delphi, Inc.

Virtualization, one of the hottest IT technologies on the scene today, is not so new. IBM pioneered virtualization 40 years ago with mainframes (www.virtualization.info/tech-talk/2007/01/ibm-involvement-in-virtualization.html). So why is it hot now and what took it so long to heat up? According to Microsoft, "It's the confluence of challenging business demands and the emergence of virtualization technologies that span the entire stack [hardware and software], that is making virtualization so essential for today's organizations" (www.microsoft.com/virtualization/promise.aspx).

What is virtualization, and what is its impact likely to be on information communications technology in higher ed?

What Is Virtualization?

Virtualization is "a software technology that allows an operating system to run unmodified on an isolated virtual environment, called a virtual machine, where a platform's physical characteristics and behaviors are reproduced," (www.virtualization.info/glossary).

"Virtualization" relates to the creation of a virtual rather than a real version of an IT environment. This could be a virtual operating system, a virtual server, virtual storage, or a virtual network.

You probably have already set up some virtualization on your PC. You may have partitioned your hard drive into two logical divisions, primary and backup. You may access drive D, which is located in another PC or server, but behaves as if it were in your PC. Extend this concept to IP telephony (IPT) and unified communications (UC) resources,

the server, applications, storage, and the network and you get the idea.

The IT world is looking at virtualization for many reasons:

- Reducing hardware costs by eliminating servers and associated equipment
- Saving on OS and software licenses
- Spreading and balancing the workload across multiple resources
- Optimizing the use of existing hardware
- Increasing reliability and scalability
- Simplifying application management, upgrading, and migration
- Reducing electrical power consumption and cooling requirements

These goals will eventually impact IPT and UC. As IT and telecom departments implement IP-based PBXs, the IPT and UC system will be just another server with applications that will be candidates for virtualization.

As with any new technology implementation, there will be limitations and problems. I foresee more complex systems and network management, harder-to-diagnose problem troubleshooting, difficulty maintaining the QoS for voice and video, software licensing issues, and new security issues. It seems like every time a company offers a solution to a problem, it comes with new problems for which the company must then provide solutions—an endless cycle.

Forms of Virtualization

There are four forms of virtualization, all of which will affect the implementation of IPT and UC: ▶

• **Network virtualization** is a technique that combines the available resources in a network by dividing the bandwidth into channels. Each channel is independent. The channel can be assigned or re-assigned to a server or other endpoint in real time. This would be especially useful to assign channels to increasing voice traffic during busy hours and then reassigning the unused channels to data traffic during low call volume periods.

• **Server virtualization** is arranging resources (servers, processors, and operating system) so that the users do not see them as individual resources but as one collective resource. Since some IPT vendor software is operating on servers from third-party vendors (e.g., Cisco, 3Com, Intecom, and Siemens), there does not have to be a dedicated server for IPT or UC. This masks the user from the server details, increases resource sharing and load balancing, and evens out server utilization.

• **Application virtualization** is also known as application portability or application service virtualization. This is the practice of running a program from a remote server rather than running that program on the user's desktop. This eliminates the need for changes to the desktop operating system and allows computing resources to be allocated in real time. When this is an IPT application, the most available resource will support the IPT software without that software having to be dedicated on a particular server.

• **Storage virtualization** is relatively easy to imagine. It pools together the physical storage from multiple resources on the network into what appears to be a single storage system. This can be managed from a single console. This is also called a storage area network (SAN). This could be the storage for voice mail, messaging in UC, directories, and archiving.

Why Go Virtual?

Cost reduction is one of the most commonly cited benefits of virtualization. While this can be significant, it's only a part of the value delivered by virtualization. Many consider virtualization a "transformational technology" that, effectively employed, "can help create IT systems that are not only highly efficient and cost effective, but that have the self-awareness to adapt automatically and instantly to deliver the capabilities needed as business conditions change," (www.microsoft.com/virtualization/promise.mspx).

Virtualization has been adopted faster than many in IT thought it would be implemented. Although IPT may take a while before virtualization hits, I think that the UC applications will be prime candidates for virtualization. Then what happens to the telecom department and its staff? Will virtualization swallow up the server, applications, and network so that there is not a distinct IPT and UC system?

Speaking the Language of Virtualization

Bare Metal Environment

A virtual environment where the virtualization product is directly installed on physical hardware, acting like a host OS. The opposite of hosted environment.

Binary Translation (BT)

Technique used by virtualization softwares to translate instruction set guest OSes send to virtual hardware in instruction set understandable by physical hardware. It's an alternative approach to paravirtualization.

Capacity Planning

The operation of calculating how many resources a physical server will need for hosting a certain amount of virtual machines. It's a critical task to be achieved at very beginning of any virtualization project.

P2V (Physical to Virtual) Migration

The operation of migrating an operating system and every application installed on it from a physical computer to a virtual machine (or a partition), without reinstalling anything. The opposite of V2P (Virtual to Physical) migration.

Para-virtualization

An enhancement of virtualization technology, where guest OSes need to be adapted (recompiled) before being ready for installation inside virtual machines. It reduces virtualization overhead and improves performances. It's an alternative approach to Binary Translation (BT).

V2P (Virtual to Physical) Migration

The operation of migrating an operating system and every application installed on it from a virtual machine or a partition to one or multiple physical computers, without reinstalling anything. The opposite of P2V (Physical to Virtual). [Note that there is also V2V (Virtual to Virtual) migration.]

The source for these definitions is www.virtualization.info/glossary. This is only a sample of the terms defined on this site, plus there is other useful information. If you need to know more about virtualization, this is an excellent place to start.

Another excellent resource for information about virtualization is the CiRBA website (www.cirba.com/forms/category.cfm?c=1), where you can find several white papers on virtualization, including "How to Choose the Right Virtualization Technology for Your Environment" and "Transformation Analytics: Virtualizing IT Environments."

Figure 1. Virtualized Configuration

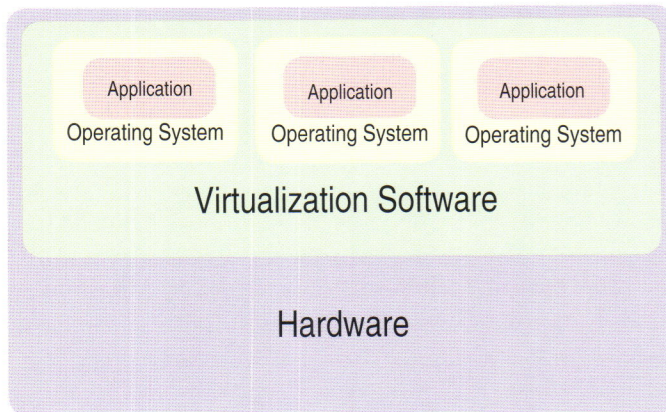
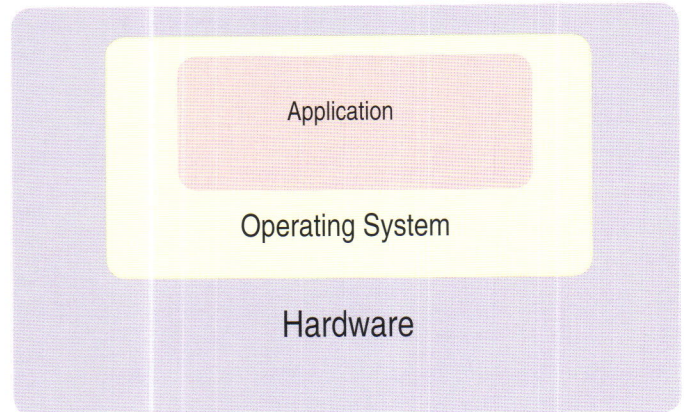


Figure 2. Computing Without Virtualization



Virtualizing VoIP

The PBX was once a stand-alone proprietary system. With the advent of VoIP and IPT, the PBX has become a server-based system. As the enterprise considers server virtualization, does the VoIP/IPT server fit into the server consolidation scheme? The answer is a qualified yes. The qualification depends on the vendor of the VoIP/IPT server software. Some VoIP software only runs on proprietary servers and is not a candidate for virtualization. Other vendors can run their software on standard Linux or Windows systems. Virtualization can reduce the number of servers and minimize the electrical power and cooling requirements. It is also less expensive to back up VoIP/IPT through virtualization. The introduction of unified messaging (UM) and UC will present more possibilities for virtualization.

The IP PBX vendors are finding that the server is not the moneymaker. The software is where the profit is to be made. These vendors, therefore, look to producing software that can run on multiple vendors' server platforms. The proprietary server is losing ground to the generic server, making it easier for the enterprise to consider VoIP virtualization.

The call manager, the server that controls VoIP, is not busy for the majority of a VoIP call. It is primarily busy for the first few seconds of the call setup and at the end of the call but is essentially dormant during the call. The call manager is underutilized during the call, which makes it a candidate for virtualization.

First, let's look at the functions of the call manager (VoIP/IPT server). A concept that is different for IT to grasp is that the VoIP/IPT server is *not* a telephone switch like the old PBX. The

server is only a controller of calls. The server communicates with the endpoints, IP phones, softphones, and gateways to establish the phone call. The endpoint communicates with the server, requesting a phone call connection using a signaling protocol such as the H.323 and SIP standards or a proprietary protocol such as Cisco's SCCP (Skinny).

The endpoint sends a call-request packet to the server. The server then contacts the other endpoint to establish a call. A server contacting an endpoint is unusual for most IT applications. Once the server has been able to get both endpoints to accept the call, the server steps aside and the phone call is established as a peer-to-peer connection that *does not* pass through the server. The server's primary role is call setup. The talk/speech path does not use the server at all. The server is essentially dormant during the call.

The sizing of the server is usually based on the number of endpoints connected: 500, 2,500, 7,500, 12,000. There is no standard size. Depending on the vendor, a server can establish 25,000 to 300,000 calls per hour, called Busy Hour Call Completions (BHCC). The server handles three to six short packets for a call attempt—not much traffic. Assuming that the server will set up 1,000 calls in one hour, this is an average of one or two packets per second. The server also receives two to four packets when the endpoints hang up. Therefore, one call completion is 5 to 10 short packets processed per call—not much of a load. The BHCC would be much higher, 5 to 20 times, in a call center compared to the normal telephone use in an enterprise. Even in a call center, this is not a significant load. The BHCC required will decrease for longer

phone calls. This is less call completion operation that the server has to support.

The server also receives and sends “keep alive” packets about once a minute for every endpoint to ensure that everything is working properly. Again, not much traffic. Some servers collect a call performance packet at the end of the call from each endpoint. In total, a single call completion is about 8 to 12 packets. What this all demonstrates is that the server is not heavily utilized for VoIP/IPT operation.

The second part of virtualization is the vendor software and the operating system used. Linux is one of the more popular VoIP/IPT operating systems. IP PBX vendors such as 3Com, Cisco, Intecom, Siemens, and Broadsoft all operate on IBM servers running Linux. 3Com and Siemens can also run on the IBM System i computers. Some vendors use Hewlett Packard (HP) servers. Others can also run their software on Linux, but users need to check with them to ensure that their software can operate on the Linux already in house. One smaller IP PBX vendor uses its own version of Linux that must be downloaded with the IP PBX software. In this case, the IP PBX software may not operate in a virtualized environment.

The Cisco version 4.X software runs on Windows. The Avaya IP Office and most of the smaller IP PBXs, serving several hundred stations, also run on Windows. So for those who have a virtualized Windows environment, virtualization is possible.

Conclusion

There are two conclusions to draw for VoIP/IPT virtualization. First, the server (call manager) is usually not a busy machine and is probably underutilized. The second conclusion is that IP PBX vendors are becoming software vendors whose products can run on third-party platforms such as IBM's and HP's, making virtualization attractive. It is not guaranteed, but the VoIP/IPT vendors are moving from a hardware model to a software model that encourages virtualization.

Gary Audin has more than 43 years of computer, communications, and security experience. He has planned, designed, specified, implemented, and operated data, LAN, and telephone networks, including local area, national, and international networks. Reach Gary at delphi-inc@att.net.

Portions of this article were previously posted at www.nojitter.com.



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Fixed Wireless at NYULMC

Lance Portland
PAETEC Wireless

As the healthcare industry grows, successful organizations must constantly assess whether investment in a particular technology will help them reduce operational costs and enhance the delivery of care to patients. Over the past several years, New York University Langone Medical Center (NYULMC) has successfully incorporated a series of fixed wireless transport systems into its communications network, helping achieve both of those goals.

NYULMC, comprised of Tisch Hospital, Rusk Institute of Rehabilitation Medicine, NYU Hospital for Joint Diseases, and NYU School of Medicine, is one of the premier centers of excellence in healthcare, biomedical research, and medical education in the world. NYULMC employs more than 10,000 people, making it one of New York City's largest employers.

In 2004, as NYULMC continued to expand the size and scope of its operations, a recurring challenge was the task of upgrading the networking infrastructure available at each of its numerous locations. This became particularly important as NYULMC began to move more functions into leased facilities remote from its main "Superblock" campus in Manhattan.

Charles Bridgeman, NYULMC's director of information technology, identified a need to increase the data network capability available to administrative offices housed on Park Avenue approximately half a mile away. Bridgeman knew that the leased lines he had in place were not providing enough bandwidth to the offices. After researching the costs of provisioning higher-bandwidth circuits through his

ILEC, he determined that the monthly charges would not offer the best value to his organization.

Bridgeman envisioned a transport solution that would reliably provide NYULMC greatly enhanced data capability, with the option to extend the TDM voice network as well. While a private fiber build would certainly address the bandwidth need, it also appeared that right-of-way challenges would make this a costly and complex option.

As an alternative to leased lines or fiber, Bridgeman researched transport systems based on fixed wireless technologies. After considering the possible solutions, he concluded that a digital microwave radio system operating in the FCC-licensed 23 GHz frequency band would best meet his needs.

"With so many types of fixed wireless systems on the market," explained Bridgeman, "we really looked for a technology that predicted high levels of reliability under all sorts of conditions. This eliminated the free-space optics (FSO) and license-free RF systems from consideration. For our team, a licensed microwave system offered NYULMC confidence that our transport link could have an availability greater than five 9s without the risk of interference from neighboring wireless systems."

After carefully considering the available equipment options, NYULMC selected the Ceragon Networks FibeAir 1500P system, configured to provide both data and voice transmission capabilities over a single

link. This equipment supports a 100 Mbps Ethernet data rate through the main payload interface, with incremental T1 circuits offering a direct TDM voice interface.

Bridgeman noted, "Having the ability to route both our Ethernet and voice traffic over the same link seemed very efficient. This configuration gave us the flexibility to postpone a complete migration to VoIP until we are ready to go. It also helped that several colleagues at other institutions had incorporated these radios into their network and were very pleased with the field performance."

Throughout the project design and implementation process, Bridgeman worked with a fixed wireless engineering team from PAETEC. The team identified the building in the "Superblock" with the clearest line of sight to the Park Avenue location and planned the physical requirements of installation at each building. It also handled all aspects of licensing the appropriate FCC frequency on NYULMC's behalf. After successfully installing and testing the radio system, PAETEC configured the system interfaces required to operate the link within the NYULMC network.

Bridgeman was very pleased with the results. "As soon as we put the microwave link into service, our Park Avenue staff noticed a significant 'quickenings' of the network," he said, noting that he was one of the users who benefited from the increased band-

width. "All aspects of our deployment went smoothly and, once we cut over to the new system, we felt like we had our own private fiber line, but without any of the associated headaches."

As part of the project, NYULMC contracted with PAETEC to provide a comprehensive set of maintenance, emergency response, and remote monitoring services. Taking advantage of the remote management capabilities in the Ceragon 1500P radio system, PAETEC is able to monitor key radio performance parameters in its wireless network operations center and proactively communicate with Bridgeman's team in case of any issues.

Bandwidth for PACS

With the initial fixed wireless system performing successfully, NYULMC partnered with PAETEC to incorporate the technology into more applications:

- In 2005, the team installed a Ceragon 1500P system to primarily transport Picture Archival and Communications System (PACS) information between the Hospital for Joint Diseases (17th Street) and a smaller medical center located on 2nd Avenue. This connection provides 155 Mbps of capacity over a gigabit Ethernet interface and operates in the licensed 18 GHz frequency band.
- In 2006, they installed a Bridgewave Communications AR-60 between the Rusk Institute and a suite of offices on 34th

Street. The AR-60 provides 1.25 Gbps of capacity over a gigabit Ethernet interface and operates in the 60 GHz frequency band.

- In 2007, NYULMC replaced an old FSO link and installed a Ceragon FibeAir 4858 system to extend the LAN from Rusk to an office suite across the street. The FibeAir 4858 is a "value" product that offers 18 Mbps of connectivity over a 10/100BaseTX Ethernet interface and four T1 interfaces for voice. The link operates in the license-free 5.8 GHz band.
- In 2008, a second AR-60 GigE link was deployed between Rusk and a building planned to house the Day Surgery and Musculoskeletal Center on East 38th Street.

According to Bridgeman, NYULMC has several additional requirements that he expects to address in the coming months with microwave radio systems.

"Clearly, my team and I have become very comfortable with the idea of utilizing microwave radio systems in our network infrastructure," Bridgeman commented. "NYULMC operates in a metropolitan area that lends itself very well to the use of fixed wireless networking. We are able to reliably provision our transport circuits on our timetable and at a good value. The research, clinical, and administrative groups we support are happy with the results they see, so it's a winning scenario all around."

Lance Portland is director, PAETEC Wireless. Reach him at lance.portland@paetec.com.

ACUTA Events Calendar

Winter Seminar
January 11–14, 2009
Palm Springs, CA

1. Unified IP Communications Applications across the Enterprise
2. Preparing Communications Technologies for Emergencies & Disasters

38th Annual Conference & Exhibition
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Institutional Excellence Award

Wayne State University

Award sponsored by PAETEC



From Wayne State: Richard McCreedy, IT Director III; Irvin Reid, President; Daren Hubbard, PMP, IT Director I; Joseph Sawasky, CIO and Associate Vice President; Patrick Gossman, Deputy CIO and IT Director II

Leslie Mertz, Ph.D.

The in-house computing and information technology (C&IT) staff at Wayne State University (WSU) in Detroit met communications challenges head on and developed a system that seamlessly provides emergency alerts and other campus information to its students, faculty, and staff. Unlike typical commercially available communication systems, the WSU Broadcast Messaging Service allows its users to set their personal preferences for both the types of messages they wish to receive and the manner in which they receive them, whether via e-mail or instant messaging to a computer or text messaging to a cell phone.

ACUTA recognized the WSU Broadcast Messaging Service by awarding WSU officials with its prestigious Award for Institutional Excellence in Communications Technology on July 16, 2008.

“Wayne State’s project team researched and created an innovative and flexible system to meet the current and

evolving communication needs of the university and the people whom we serve. Not only does the new Broadcast Messaging Service meet our emergency communication needs, it also gives our students a convenient way to receive timely and important messages about classes, financial aid, and registration,” said WSU president Irvin Reid¹, who accepted the award with Daren Hubbard and Joseph Sawasky of WSU C&IT. Hubbard is the director of academic and core applications, and Sawasky is chief information officer for WSU and associate vice president for C&IT.

Key Benefits

The WSU Broadcast Messaging Service, which needed only a modest capital investment and demands very low operating expenses, has several key benefits:

- Through emergency alerts to all members of the Wayne State community, the service heightens overall campus safety.
- It strengthens student links to campus by providing a means for university offices to communicate directly with students on their terms. This includes administrative information that is directed to specific individuals. For example, targeted students can now receive a notification that a financial aid award is available or an announcement that the classroom for a course has changed.

¹Editor’s note: Irvin D. Reid is now President Emeritus, Eugene Applebaum Chair in Community Engagement, and Director of the Forum on Contemporary Issues in Society at Wayne State University.

- The WSU Broadcast Messaging Service improves communication and awareness of campus events within the university community.
- It makes it possible for faculty members to inform students about class cancellations, assignments, and other class-related matters. For this purpose, faculty can simply use the same Blackboard Learning System that they have already been using for their classes.
- To facilitate the sending of emergency messages to subscribers, the service provides message templates so that message writers can quickly and efficiently circulate all the necessary information.
- Via an established RSS feed, emergency notices can also be directed to WSU's public website to help spread the word quickly.
- To secure the trust of users, the service identifies only one authorized sender of emergency alerts. That sender is the WSU police chief. It also, however, allows the chief to delegate this authority at his discretion. For added validity, emergency alerts also carry a portion of the employee or student ID number so that the user can immediately verify the authenticity of the message and respond accordingly.

In addition, the WSU Broadcast Messaging Service addresses the ever-changing communication needs and preferences of students and other users, because it accesses multiple communication channels to disseminate information: SMS text messaging to cell phones or instant messaging or e-mail to a desktop computer or a WiFi-enabled laptop. With the new service, individuals can easily set their personal preferences by accessing the service through WSU's secure Web portal. Users also have the option of pausing or delaying the delivery of nonemergency WSU text messages to their cell phones so they arrive during a specific time of day.

An Integrated, Flexible System

Using a team approach, Wayne State's C&IT staff developed a service that is tightly integrated with WSU's enterprise information and networking systems, and is carrier-neutral, advertising-free, flexible, and scalable. The messaging service also is economical and efficient for the university and its subscribers.

Carrier neutral. While commercial alert systems are available, they typically carry restrictions on the type of cell phone and service users must have, and in some cases require a long-term contract with a designated service provider. The WSU system, in contrast, is carrier neutral and therefore does not demand that its cell-phone users purchase a particular mobile device or subscribe to a certain service to receive alerts on their cell phones. An added advantage is that because Detroit is a very competitive cell phone market, users can find strong signals in most of the common areas on campus.

Advertising-free. The service carries no advertising, and also respects and protects the privacy of its subscribers.

Flexible and scalable. The Broadcast Messaging Service has a flexible framework, which allows the university to modify the service as different needs and opportunities develop. Scalability built into the service has already permitted nonemergency messages, such as Blackboard course announcements from faculty, to be added as the need arises. WSU C&IT staff are continuing to expand the delivery component of the service so that messages can be sent to multiple and targeted audiences.

Economical and efficient for the university. From a single platform, the WSU service quickly and simultaneously disseminates a core message through multiple commonly used communications channels. This was

an essential requirement of the emergency alert system. Hardware and software needs were low, and operating expenses are minimal.

Economical and efficient for subscribers. The WSU Broadcast Messaging Service reaches members of the university community through the same communications devices and tools that they already use on a regular basis. Users have no additional equipment to buy or systems to learn. Wayne State does not charge any fees to register a mobile phone number or to have text messages sent through its Broadcast Messaging Service. As with any incoming calls, of course, per-message fees from cellular service providers may apply and are the responsibility of the user.

Planning, Leadership, and Support

The use of innovative technology is one of the four "foundations" that together shape the Wsu Strategic Action Plan for 2006–2011. The strategic plan states, "Technology has become an essential component of higher education.... Responding to the university's evolving needs for technology will help achieve our academic objectives, provide exceptional student services, and advance our capacity for research."

For this technology initiative, WSU president Reid called for the creation of a university team to consider a messaging service for Wayne State. An applications development team within C&IT was formed and began reviewing various commercially available services, but ultimately decided that it had the expertise in-house to develop a service with a feature set that would be a much better fit for the university than other systems currently on the market.

As the team began its work, news broke of the April 2007 tragedy at Virginia Tech. This created a sense of urgency to deploy an emergency alert system at Wayne State,

and eyes turned to the C&IT development team and its ongoing messaging project. The team pressed on in its efforts to develop a service that would:

- communicate effectively and when necessary, on an emergency basis, with an increasingly mobile and connected community;
- give the users control over the relevant messages they want to receive, as well as the channel through which they receive them; and
- take fully into account university budgets, resources, and requirements.

"The entire team began to share and collaborate so well that you would never know the team members had been working together for only a short time," said C&IT's Hubbard, who is also the project manager. "They were genuinely excited about the project, and each one wanted it to be a success. Watching them become a cohesive unit reinforced my belief that having fun and doing work are not mutually exclusive."

As the project progressed, Patrick Gossman, who was interim chief information officer at the time, also stepped up to the plate and not only became the team's liaison with university executives, but also carved out a space for the team to work and allocated funds for the needed hardware and software.

With this type of support from university executives and from C&IT itself, the project team was rapidly able to develop Broadcast Messaging Service for Wayne State.

The Service Is Launched

Soon, team members were confident that the WSU Broadcast Messaging Service was ready to be launched. The challenge then became one of determining the best way to

encourage the 50,000 members of the WSU community to subscribe to the service and to set their messaging preferences. This was a daunting task. At other universities that had previously tried marketing such a service through advertisements and requests for voluntary participation, the subscription rates were only about 25 percent.



The central mall on Wayne State University's main campus, with the Medical School campus in the background
Photo by Mary Jane Murawka, Photography@Wayne

Knowing this history, the WSU team tried a different approach. It decided to incorporate automatic subscription into the campus portal log-in process, which is used by all members of the university community. WSU's portal, the SunGard Luminis Platform, is supplemented by an account administration suite (also developed in-house) that captures each logon transaction and allows for branch processing. The project team used this facility to drive each

student, faculty, and staff member through the Broadcast Messaging Service subscription process in early August 2007.

By tapping the talents of the WSU Office of Marketing and Communications, the team publicized the automatic subscription process through a comprehensive communications plan, including e-mail announcements, signs on campus, and a variety of online and print advertisements. The results were impressive. After just one week of availability, more than 60 percent of the university community had subscribed to the service, and nearly 45 percent of subscribers had registered a cell phone number.

Since then, the university has continued to encourage subscription to the service by intercepting new students and employees during the log-in process and by communicating about new features. Currently, more than 95 percent of WSU students, faculty, and staff have set their preferences, with nearly 30 percent registering a cell phone number and about 28 percent requesting alerts via text messaging.

Since the system went online in August 2007, the university has already tested the Broadcast Messaging Service several times and has continually improved its efficiency. In February 2008, for instance, the project team felt it could reduce the time required for processing cell phone messages and, by modifying the code, was able to decrease that time by 85 percent.

With the WSU Broadcast Messaging Service off to a very good start, the project team is now working to publicize the general administrative messages that are available for students, faculty, and staff, as well as other messages. This includes those sent by WSU faculty. Faculty who teach a course in the Blackboard Learning System can reach their students by sending a broadcast message from inside their Blackboard course,

and many have already taken advantage of this capability. As an example, a student last winter received this message from his professor:

"I'm stuck in traffic in snow a long way from the university. There's no way I can make it to class today in time. Apologies to those of you who struggled to get in for my class. I am also sending this message to the cell phone of everyone who registered for broadcast messaging from the university. Please share this information with your classmates."

Student-services information is also now available through the Broadcast Messaging Service. This encompasses electronic notices about degree status, course location and time changes, course cancellations, grade postings and changes, degree postings, and other academic and course-related information. Additional messages tell of such matters as financial aid notifications and tuition account activity. Since the system is scalable, the future is wide open and, as the need arises, the team will be adding other communication capabilities.

The Nitty Gritty

The system that runs the WSU Broadcast Messaging Service screens and processes messages from two authorized sources: SMTP and the specialized Emergency Communication Tool. Messages to be broadcast are stored in the local "incoming messages" database. Criteria from the message preference database—including message categories, cell-phone numbers, e-mail addresses, and instant-message accounts—are applied to the queued broadcast message. Once the message is complete, it passes to another local database for delivery to the designated communication channels.

The WSU Broadcast Messaging Service is tightly integrated with several already ex-

isting systems. These include the university's enterprise resource planning system, which is Banner from SunGard Higher Education; the campus Web portal; and the online learning management system, which is Blackboard Academic Suite. All these systems rely on Oracle RDBMS, and C&IT enjoys considerable technical expertise in Oracle database technology. This in-house expertise proved to be invaluable throughout the development of the messaging service.

The project team had a minimalist system-design philosophy and worked diligently to reduce the system dependencies required to issue emergency alerts. For instance, it designed the service so that nightly batch jobs are run against Banner and Blackboard data and then used to populate the system database tables. In this manner, the Broadcast Messaging Service does not need to spend time extracting addresses to issue emergency alerts. Instead, it can utilize a list that is refreshed each night and stored in an Oracle database expressly for the Broadcast Messaging Service.

When all was said and done, the team was able to develop the WSU Broadcast Messaging Service with an extremely modest capital- and operating-expense budget:

- approximately \$40,000 for hardware, which included two servers;
- about \$50,000 for software, which included ColdFusion licenses; and
- operating expenditures of \$535 a month for SMS aggregation services, and about \$500 a month for SMS messages (10 cents each for an estimated 5,000 messages per month).

The in-house solution has worked extremely well for the university. Even though it demanded substantive indirect costs, it also established an esprit de corps for a newly organized application develop-

ment team. The team now has synergy and a close working relationship, a benefit that the university believes trumps any indirect cost concerns.

In its development of the service, the project team had help from many units within the university. These included Wayne State's Office of Marketing and Communications, which helped with communication efforts; the WSU Police Department and the WSU Crisis Management Team, which were involved in the campus-safety aspect of the project; and the Office of the Executive Vice President and Chief of Staff, the General Counsel, the Office of the Dean of Students, and several student-services departments, which all participated during the implementation and testing of the Broadcast Messaging Service.

"Enthusiastic Support"

Since its launch in August 2007, the WSU Broadcast Messaging Service has been well received by students, faculty, staff, university executives, and members of the Wayne State Crisis Management Team, which oversees the institution's emergency response.

C&IT's Sawasky said, "The Broadcast Messaging Service has received enthusiastic support from all areas of the university. It is another example of WSU's commitment and support in response to our community's evolving technology needs." He added, "Wayne State University views students, faculty, and staff as an extended family. We endeavor to stay connected and to keep the university community informed using the best and latest technology available to us."

For more information about WSU's Broadcast Messaging Service, contact Daren Hubbard, PMP, IT Director I, at daren@wayne.edu. This article was written by Leslie Mertz, Ph.D. Reach her at www.nasw.org/users/lmertz/.

Bill D. Morris Award Garret Yoshimi



Garret Yoshimi, director of technology infrastructure for the University of Hawaii System, is this year's recipient of the Bill D. Morris Award. This award is one of ACUTA's two prestigious individual awards. It is presented annually to an ACUTA member deemed by the president to best exemplify the dedication, vision, professionalism, and leadership brought to ACUTA by the late Bill Morris. Bill, who was the director of operations analysis at the University of Central Florida, was president of ACUTA in 1988-89, and this award was established in his memory in 1991.

In his remarks leading to the announcement of Yoshimi as this year's winner, ACUTA President Walt Magnussen said he gave a great deal of thought to choosing the recipient of the award. "When I looked deeper into the characteristics ascribed—dedication, vision, professionalism, and leadership—[selecting this year's recipient] became a little easier.

"Dedication. When I came up with a really silly idea and I needed someone to help make it happen, who was the first person I would call on?"

"Vision. Where could I go to get great input on a topic, regardless of what it was?"

"Professionalism. What individual would be equally comfortable working with a wire installer or a campus president?"

"Leadership. Who did I feel was always pushing their institution to be on the leading edge?"

"Thinking of it in these terms, a logical candidate came to mind."

Garret has been at the University of Hawaii System for six years and is responsible for all of the higher ed IT infrastructure in his state, including the multi-agency fiber-optic infrastructure. His boss refers to him as the consultant's worst nightmare.

When asked about winning the award, Yoshimi said, "Winning the Bill D. Morris Award was a wonderful (and complete!) surprise. There are so many long-time members of ACUTA that are so much more deserving of this award. I am touched and truly honored to be this year's Bill D. Morris Award recipient. Having served in a number of industries, I can definitely say that my ACUTA family is by far the strongest and most caring network of professionals, bar none! I look forward to continuing my professional growth with my extended family of outstanding and talented individuals."

ACUTA is proud to honor Garret Yoshimi in recognition of his contributions to ACUTA and ICT in higher education in the past and in anticipation of great things in the years to come.

ACUTA Ruth A. Michalecki Leadership Award Geoffrey C. Tritsch

After considering many deserving candidates, the Awards Committee selected Geoff Tritsch, Vice President of Vantage Technology Consulting Group, as the recipient of the 2008 ACUTA Ruth A. Michalecki Leadership Award.

Geoff has been a member of ACUTA for more than 33 years, serving as a consultant focused on higher education institutions for that entire time. He has been a staunch supporter of—and participant in—ACUTA throughout his career. He has been a constant contributor to ACUTA's educational programs and publications, serving as a speaker at seminars and conferences and authoring articles too numerous to mention. There hasn't been a single year throughout his long career that Geoff has not contributed to ACUTA in some way, through speaking, writing, committee service, and active participation on the ACUTA listserv.

Geoff's expertise and viewpoints are valued by many ACUTA members, past and present, and are a testimonial to his professional accomplishments and many contributions to ACUTA and the higher education community.

"It is wonderful to be recognized by my ACUTA peers and colleagues—especially for something I genuinely enjoy doing," Geoff says. "I am further honored by this award in that the late Ruth Michalecki was a client, a colleague, and a friend."

The member who nominated Geoff for this award wrote, "Geoff has always been a great teacher, mentor, colleague and friend who knows what he's talking about, walks the walk, and always, always keeps things real. During my 26 years as a member of ACUTA, Geoff has been a consistent and constant contributor, providing leadership and relevance in this crazy world of communications technology in higher ed."

The ACUTA Ruth A. Michalecki Leadership Award was created in 2001 to recognize outstanding leadership among the ACUTA membership. The award honors the memory of ACUTA Past President Ruth A. Michalecki, University of Nebraska Lincoln, for her leadership of ACUTA and the communications technology profession. Nominees must be ACUTA institutional members, associate members or corporate affiliates. The person selected for this award:



Geoff Tritsch (left) was congratulated by Chris Muller from PAETEC, sponsor of the award.

- motivates and fosters collaboration to accomplish the goals, objectives and mission of their institution or company;
- actively participates in the education, professional development, and mentoring of other professionals;
- demonstrates initiative in creating programs, projects, or activities that impact the community; and
- engages in activities that directly benefit ACUTA or the broader higher education community.

The award consists of a beautiful crystal sculpture and a complimentary registration to the ACUTA Annual Conference, along with air fare and hotel expenses. This is consistent with the principles of Ruth Michalecki, who was a true believer in the value of professional development and lifelong learning.

ACUTA is pleased to honor Geoff with this award, and we look forward to continuing to work with him in the future.

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Q. Aside from funding, what issue are you, as the CIO, currently spending most of your time addressing?

A. The “aside from funding” removes the number one issue that I spend most of my time addressing. Most of the other issues quickly come down to budget implications.

For instance, refresh of technology is a critical issue. We have been fairly successful in keeping desktop computers from getting too old and hope to have a fully funded plan in place this year. We are also trying to go further. What about the classroom technology? Or the infrastructure? We currently replace much of this equipment when support is no longer available or the technology can no longer keep up. Neither is a good long-term strategy. We hope in the near future to have a defined replenishment cycle for all of these items. The primary barrier to this, however, is funding.

Another issue that is consuming a great deal of not only my time but others on campus is emergency planning and business continuity. At SPSU, we conducted two tabletop exercises this summer. As in any disaster, real or an exercise, several weaknesses were exposed. From an IT perspective, we would like much better survivability in case the disaster strikes the data center. (Yes, the first exercise was a fire in the building housing the data center, including its total destruction.) As a result, we are in the process of leasing a remote managed hosting site with capacity to house a “warm” back-up of our website (along with other critical data) and building a back-up data center. We are also spending time ensuring that we can communicate with the campus community, both on and off campus, throughout an emergency.

Q. What is the impact of this issue for your campus? What is your strategy for addressing this issue?

A. Obviously, emergency planning and business continuity are not new topics. They merely get a lot more attention on a given campus during certain times. It is critical to

take advantage of the attention when it comes to put the organization in the best position to survive any emergency. In our case, we have identified the vendors and are in negotiations for remote managed hosting. This will have an immediate effect on our response in the event of an emergency.

The impact of the back-up data center, while a little longer term, is huge. Although bringing it online all at once will be economically impossible, over the next few years we can enhance the ability of the campus to survive a disaster and return to full IT operations in a timely fashion by orders of magnitude. Just the planning is extremely exciting. What system does it make sense to run in a load balancing environment? How about “hot spares”? What is the network survivability? And more... The approach we are taking is asking the questions, prioritizing the answers, and then developing the data center as the budget allows.

The question of technology refresh will require a complete change in strategy. Our current strategy, from a funding perspective, is to keep everything until it is impossible for that equipment to do the job and then look for funds to replace it. That is pretty risky. Changing the strategy to one of planned replacement takes a budgetary commitment on the part of the institution. We are in the early stages of this process.

Q. Given that a key function of the CIO's responsibility is preparing the campus to support future technologies, what technology changes do you see for your campus as you look forward five to seven years?

A. Wow, five to seven years. Are you sure you don't want me looking out five to seven months?

I see two technologies that I believe will change the way all campuses will do business, from an IT perspective, and one fundamental change that I think will change the way we all go about the business of education.

The two changing technologies in IT, and I will mention them separately but discuss

them collectively, are 3g (and 4g) wireless and cloud computing. Both of these will have tremendous implications for what we do as IT managers on a college campus. Imagine not needing to provide network connections for your students because they are getting it from their cellular provider. Think it can't happen? In the hey-day of student resale, say seven to ten years ago, how many of us thought there was any chance of providing residence hall rooms without university-owned voice lines? How many campuses have oversized switches now because they purchased their current system under the old paradigm? I think if we don't watch the development of high-speed cellular data over the next few years, we may find ourselves in the same position, with overbuilt and underutilized wired and wireless networks on campus.

Cloud computing, getting all primary computing applications over the Internet, is similar from an application standpoint. Think of how much less infrastructure we will need if the only service we need in our labs is connectivity to the Internet and the campus server hosting the discipline-specific software.

The change I foresee in the classroom has to do with video. The real-time collaborative tools that are available for distance education are already having an effect. As we become more and more in tune to video everywhere, with YouTube, video on demand, and so on, I think distance learning will become more and more any place at a specific time. The only thing missing will be everyone physically in the same classroom. At SPSU, we are already experimenting with video-based real-time labs in our engineering technology programs.

While anytime, any place distance learning will continue to grow (of course, the real-time classes can be archived for playback for those not able to attend a specific class), I think the possibility of interacting with the professor and fellow students will add another dimension.

Reach Bill Gruszka at gruszka@spsu.edu.



BILL GRUSZKA, CIO
SOUTHERN POLYTECHNIC STATE UNIVERSITY

Southern Polytechnic State University is a comprehensive university with a unique purpose. Through a fusion of technology with the liberal arts and sciences, SPSU creates a learning community that encourages thoughtful inquiry, diverse perspectives, and strong preparation of its graduates to be leaders in an increasingly technological world.

Southern Polytechnic is located in historic Marietta, Georgia. Approximately 4,600 students attend day, evening, and weekend classes on a campus of naturally wooded landscape with modern facilities and on-campus apartment housing.

The institution was founded in 1948 at the request of Georgia business and industry as a two-year division of The Georgia Institute of Technology, originally called The Technical Institute and soon thereafter the Southern Technical Institute. It became an independent college in the University System of Georgia in 1980. The college became a university in 1996 with the new name of Southern Polytechnic State University.

The university offers bachelor's and master's degrees and continuing professional development in science, engineering, technology, business, architecture, and related fields, with a focus on how to apply knowledge and use technology to solve real problems. Dedicated and experienced faculty teach in the university's four schools: The School of Arts and Sciences; the School of Engineering Technology and Management; The School of Architecture, Civil Engineering Technology, and Construction; the School of Computing and Software Engineering; and the Division of Engineering.

Q & A from the CIO

Q. Much of the technology we now support in higher education is driven by consumer electronics. What decisions about your technology infrastructure have been impacted by this and how?

A. Obviously the largest impact to our infrastructure over the last few years has been wireless. Consumers are used to wireless everywhere in their own home with connections to a variety of consumer devices.

In the not-too-distant past, wireless was a "nice-to-have," and campuses that had a few "hot spots" were thought to be advanced. Now, ubiquitous wireless is an expectation. At SPSU, we have deployed wireless in as secure a fashion as possible, utilizing 802.1x authentication and tunneled-tls for security. The end users have been known to complain because it is much easier at Starbucks, but so far we have held firm. We take security seriously.

Q. Freshmen at most institutions today are far more extensive users of technology than those of even five years ago. What is the most challenging technical aspect this presents for your campus?

A. The most challenging expectation to meet is the never-ending thirst for bandwidth. Residential students just don't understand that they have to share with 1,100 of their peers. All of the applications from downloading movies and music (of course, all of this is *legal* downloading) to YouTube consume bandwidth. We continually monitor and prioritize the traffic to ensure that educational applications get the highest priority, but it is a constant struggle.

The other issue with more technologically advanced students is that they have become more sophisticated in the mischief they can create. While I don't think this is unique to SPSU, the technology focus of our programs and, consequently, our students probably makes it a little worse. Many businesses put up a firewall and they are done. In higher education, the threat often lives inside of the firewall. We have 5,000 sophisticated

users, 1,100 of whom are on campus 24x7. We have to continually protect the campus information assets from what one of my staff members refers to as "2:00 in the morning boredom syndrome." That, as I'm sure all of my peers will attest, is a real challenge!

Q. In what ways has this impacted how you deliver support services?

A. The challenge is to continually provide the resources required to fulfill our primary mission—educating students. One thing we have done is separate the residential network from the rest of campus to try to maintain adequate bandwidth in the classrooms and labs, including the virtual ones.

Still, when managing the entertainment needs get in the way of the mission, we have to look at the delivery methods, even in the residence halls. In our case, I mentioned monitoring and managing bandwidth issues. In the past prioritizing traffic based on the protocol was enough. This would limit the entertainment traffic while giving a priority to educational traffic. Now the lines between the two have been blurred enough to make this approach marginally effective, and we have had to take monitoring to another level.

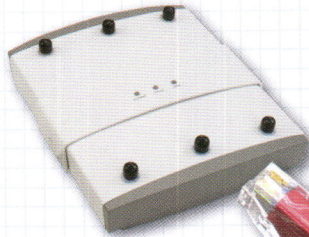
We are now devising schemes that monitor at the port and user levels to ensure that individual users don't abuse the network. We have the ability to restrict a specific user or port for a specified period of time for overusing the bandwidth over a finite time period. This is in its early stages but appears to be a great approach to the problem.

In terms of how the mischievous student affects our service delivery, the time we spend keeping these students out of our systems is time taken away from providing other services. It is another financial issue, this one manpower related. It is imperative to keep up on patching and firewalls, not to mention monitoring, so that any breaches can be mitigated ASAP.

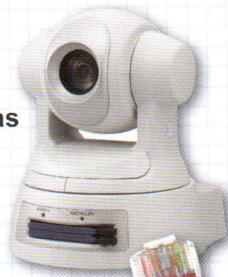
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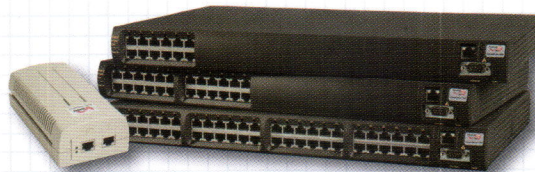
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