Summer 2016

ACUTA Journal of Telecommunications in Higher Education

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The Value of IT

Make Your IT Organization a Strategic Enabler
Cybersecurity Outlook 2016
The IoT Locomotive Quickly Gaining Steam
Outsourcing Wireless
UConn CITU Creates Campus App Store
1,200+ Educational Institutions Rely on AVST

Interoperability
Future-proof both today and tomorrow's telephony platform choices - Premise to Cloud

Resiliency
IT continuity assured - unmatched scalability, virtualization, disaster recovery

Voice
Speech auto-attendant and secure voice messaging for regulatory compliance

Mobility
Best-of-breed unified messaging and first context-aware personal assistant

For over 30 years, AVST has been Unifying Communications
The value of IT is unique to each higher education organization; it is not only a function of investment and payback periods but the perceptions of the organizational community, institutional culture, leveraging technology across the institution, and rate of innovation and change.

Joanne Kossuth
Vice President for Operations & CIO
Olin College of Engineering

The higher education market today is fiercely competitive. Attract and retain is mantra, and differentiation is survival. IT is no longer simply operational support but a leading differentiator. From prospective student inquiry through academic engagement, from data analytics through program and process realignment, and from school-community partnerships to industry leadership, IT is the core value proposition.

David O’Neill, PhD
CIO
Community Colleges of Spokane

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**Core Purpose and Values**

ACUTA’s mission is to advance the capabilities of higher education communications and collaboration technology leaders.

ACUTA’s core values are to:
- encourage and facilitate networking and sharing of resources
- exhibit respect for the expression of individual opinions and solutions
- fulfill a commitment to professional development and growth
- advocate the strategic value of communications and collaboration technologies in higher education
- encourage volunteerism and contributions by individual members
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As we think about the value of our departments and specifically how we build credibility with our campus communities, let us recognize that it can be the little things ... such as sharing perspectives on which home router to purchase, which cell phone carrier has an attractive package for family needs, or how certain smartphone applications can help to organize busy schedules ... that afford us an opportunity to raise awareness of what we do, what we know, and how we can strategically benefit our institutions.

Arthur Brant
Abilene Christian University

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SNAPSHOTS

We congratulate those who agreed that it's time to pat yourself on the back for a change! We asked you to share some examples of how IT/Telecom demonstrated its value on your campus, and this is what you said. (We think there are a lot more of you who deserve recognition, by the way, and we'd love to hear from you, too!)

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The budget process concentrates on the service, not the underlying technology. Technology investments become a derived result of the prioritized services. These two business principles of "IT service broker" and "investment-based budgeting" complement each other to dramatically change the value perception of IT.

Larry Foster

Welcome to the ACUTA Journal!

We hope you find our digital format convenient and enjoyable, the content interesting and useful. We welcome your comments at any time.

To share a story with our audience, please contact Pat Scott, ACUTA communications director, at 859-721-1659 or pscott@acuta.org.

For the remainder of 2016, our Journal will focus on the following topics:

Fall: POTS and PANS: What's Cooking in the IT Kitchen?
Winter: 2020: Vision of the Future

Do a Friend a Favor: Invite a Colleague to Join ACUTA!
In early May, I had the opportunity to hear Manjit Singh, senior vice president and CIO for the Clorox Company, participate on a panel addressing the topic of "The CIO's role in Driving the New Customer Experience."

One of the things that stuck with me during this session was a story Manjit shared on how his internal information technology team was influential in the product development cycle for the Internet of Things water pitcher produced by Brita. In fact, Manjit described that it was his IT team that "helped to paint the picture of how this type of product could move the brand forward."

What an impactful and inspiring statement. What an incredible charge for each of us who work inside information technology departments. Rather than simply focusing on being a cost center, deploying wireless access points, provisioning telephone lines, or managing servers in the data center, what if we recognized and capitalized on our knowledge and experiences to move our organizations forward?

Such a charge seems like a lofty goal. Some might even dismiss it, considering the incredible effort necessary to push the envelop to be strategic partners in the conversations where organizational forward progress is discussed. To Manjit's credit, he shared that the contribution his team made wasn't necessarily welcomed with open arms. He characterized the initial interaction between the product development team and his own internal IT team as contentious. Manjit continued, stating that the IT team bore the responsibility to persuade and convince the product development folks that a connected water pitcher was something that would appeal to consumers and alter the perception associated with the Brita brand. In describing this interaction between the Brita product development team and his IT team, Manjit offered the insight that "IT does a lousy job talking about what we do." He advised those attending the session that IT needs to learn how to speak the language of the business and demonstrate how IT's knowledge benefits individuals.

I completely agree with this latter point. I characterize this sentiment by saying that we, in IT, struggle with need, know how, and timing associated with telling our story. Broadcasting our successes and exhibiting our proficiencies isn't something most of us in IT were taught, or expected, to do. As a result, often we are overlooked or relegated to an afterthought.

At ACUTA's Annual Conference this past April, I shared a lunch with other professionals who offered horror stories describing how IT wasn't invited to construction or project meetings until after contracts were signed or it was essentially the eleventh hour. The consensus shared by my table companions was that had IT been brought to the table sooner, we could have been a force multiplier in these significant projects. However, since the invitations were last minute, the input resulted in considerable scope and cost creep.

I often wrestle with the question "How can IT be involved in these discussions earlier in the process?" How can we change perceptions to the extent that IT is thought of as a strategic contributor to the organization's mission and direction? Personally, I believe this comes back to the idea that we need to be prepared, equipped, and positioned to tell our story.

**IT needs to learn how to speak the language of the business and demonstrate how IT's knowledge benefits individuals.**

This past year, the operations division at Abilene Christian University—which includes the IT department—has been crafting a new mission statement. One of the tenets of the mission is to articulate and demonstrate how our knowledge benefits individuals. To this end, each operations employee has been challenged to identify a subject or advice that we could share with others across the campus. The goal in this exercise is to find an area where we are "experts" and develop some kind of workshop or brief presentation for the campus community, which would be applicable for these folks in their
personal lives. For instance, our budget director developed a personal finance workshop. I’ve been asked to develop a “home networking guidance” workshop. Our grounds manager is considering a workshop addressing grass selection and watering advice. Our energy management specialist is pulling together resources for a workshop on how to reduce utility bills. All of these have potential impact in people’s personal lives.

The corresponding assumption is that if we can help people where they live, they will be more likely to see how our expertise could affect where we collectively work.

Cameron Evans, chief technology officer for Microsoft Education, shared an interesting perspective on innovation at this year’s Annual ACUTA Conference. Attempting to debunk the idea that innovation only occurs with the “next big thing,” Cameron offered the opinion that it is lots of little things that together have the effect of moving the innovation needle.

As we think about the value of our departments and specifically how we build credibility with our campus communities, let us recognize that it can be the little things ... such as sharing perspectives on which home router to purchase, which cell phone carrier has an attractive package for family needs, or how certain smartphone applications can help to organize busy schedules ... that afford us an opportunity to raise awareness of what we do, what we know, and how we can strategically benefit our institutions.

Share your comments and ideas with Arthur at branta@acu.edu.

ACUTA

Events Calendar 2016-2017

Fall Seminar
Denver, Colorado
Grand Hyatt
October 16–19

Winter Seminar
Orlando, Florida
Wyndham Grand Hotel
January 8–11

46th Annual

Conference & Exhibition
Chicago, Illinois
Chicago Hilton
March 19–22, 2017

Watch for Details

www.acuta.org
From supporting academia in the classroom to preparing for the unknowns of the Internet of Things, there is an increasing demand on the IT organization to support a large and diverse group of constituents with a growing list of needs.

Today's students, faculty, and administrators all bring their own desktops or laptops as well as other devices. Now, IT must also navigate the complexities of wearables, share-ables, and the like, all while supporting the ever-changing higher-education technology landscape.

As IT rapidly evolves from the "Information Organization" to the "Technology Experience Organization" and certainly more than just programmers and networkers behind a keyboard, there is more pressure on leadership to navigate and translate the needs of the business.

Welcome to the modern IT organization where titles such as analyst, project manager, and change agent are the new norm. As new technologies emerge, higher-ed IT professionals must have a much stronger understanding of the business they support. From admissions to advancement, the student life cycle is stronger but less clear than ever before.

How does this exponential pace of change affect the IT professional in higher education? What you have to know as well as what you have to do is probably very different from what you knew and did even five years ago. The challenge to keep up with new technologies even as you handle each day's responsibilities can be overwhelming.

This issue of the Journal looks at how IT adds real value to today's campus; but I want to remind you that ACUTA also adds real value to your career. Do you need in-depth information in a hurry? Experts are just a keystroke away on the ACUTA listserv. Are you planning to implement a new strategy or a new technology in the coming year? Look at ACUTA events for educational sessions that provide lessons from other campuses that have already been there. ACUTA provides a variety of resources including, best of all, a network of terrific people who are extremely intelligent, genuinely interested, and always ready to help.

My column in the June 2016 ACUTA eNews provides an overview of the extensive benefits that you receive as an ACUTA member. I encourage you to read through the list to be sure that you are taking advantage of all the benefits of your ACUTA membership.

The ACUTA-MICTA Grant

I would like to highlight a new benefit that we were able to provide this year—adding more value to your ACUTA membership as it contributes to your professional development.

In 2015, MiCTA's chief operating officer, Tim Von Hoff, attended the ACUTA Annual Conference in Atlanta and proposed an inspirational idea. What if MiCTA provided the funding for a technology research grant, and what if we were to offer to give it away to one or more of our shared members?

I was intrigued by the idea and perplexed by Tim's statement, "It isn't easy to give money away." But I did immediately recognize that the proposal was a huge win-win-win. I loved the concept of being in a position to GIVE money away to our members! Having spent 25 years with Columbia University in the City of New York, I recognized the importance of available funding for research technology projects, especially in this challenging economic time. So Tim and I put our heads together and set to work.

Getting Started

What were our first steps? First, Tim needed approval from the MiCTA Board of Directors for the grant—which he obtained. Then I needed ACUTA Board approval to proceed. So in September I presented a formal proposal explaining that MiCTA would like to work with ACUTA on a technology research grant project in the areas of higher-education IT and telecommunications. The grant or grants, depending upon who applied for what, would be funded by MiCTA, they would be broad in size, and they would provide enough support to enable some worthwhile projects.

A few elements of the proposed grant program would include the following:
They would provide competitive opportunities. We anticipated high interest from our collective members.

- Grant amounts would be based on available funds at MiCTA and determined before promotions could begin.
- Promotions would be through both ACUTA and MiCTA via email, listservs, social media, websites, and any additional marketing outlets deemed appropriate.

Promoting the Opportunity

The ACUTA Board approved the request unanimously, and once we developed all the behind-the-scenes support, we established aggressive deadlines and planned to announce the grant at ACUTA’s Winter Seminar in January.

Since our deadlines were tight, we decided to begin with a small review committee, chaired by Dr. Ron Kovac, and was released during our seminar to help with the launch. Check it out on the MiCTA Radio site: https://soundcloud.com/mictate/acuta-micta-technology-research-grant.

Tim and I were also interviewed that morning by Doug Green, editor of Telecom Reseller, and that podcast was also released during the seminar: http://telecomreseller.com/2016/01/22/acuta-and-micta-announce-research-grant/.

Considering the Applications

We received numerous inquiries about the research technology grant, and we received applications that met the established criteria from Morgan State University, Stevens Institute of Technology, Texas A&M University, the University of Nebraska at Kearney, and the University of Scranton. Honestly, all the projects were impressive, which made the selection process challenging.

- Morgan State submitted its vision of a recording studio where students, faculty and staff could create presentations, lectures, and online education that would change the way information is stored and consumed. Their Record and Go Studio project will improve pedagogy, competency-based education, and enhance student and employee professional development.
- In support of its strategic plan that includes technology at its core, student centricity, collaboration impact and excellence in all they do, Stevens sought to create an updated space for promoting the use of innovative technologies.
- Texas A&M requested funding for an undergraduate applications engineering student to support its Fixed Mobile Convergence Testlab initiative that has the capability of revolutionizing the future of fixed mobile convergence on campuses in the United States and across the globe.
- The University of Nebraska request was also to support a blended research team with a hands-on information networking and telecom student to expand its Networking and Telecom Lab.

- Proposals would be reviewed by a committee of representatives from both ACUTA and MiCTA.
- Project results would be publicized and shared through both organizations. Results would be produced as white papers or case studies and as content for ACUTA and MiCTA websites and publications. We would also ask that grant recipients present the results at an ACUTA event as well as discuss the project on MiCTA Radio.
- Applicants must be non-profit, institutional members of both ACUTA and MiCTA.

ACUTA past president and IT director and professor at Ball State University. Other committee members include Chris Megill, ACUTA director-at-large, from The Georgetown University; Scott Claverie, ACUTA Awards Committee member representing the University of California at Chico; and Tim and me. The Committee is supported by ACUTA’s chief strategy officer, Lisa Thornton.

One of the most fun promotions was the interview that Tim and I did with John Tanner, host of MiCTA Radio. That was done as soon as I arrived in New Orleans for ACUTA’s Winter seminar.

MiCTA awarded the grants to Texas A&M University and Morgan State University. Left to right: Jason McConnell, Texas A&M; Mark Burger and Brad Bouwkamp from MiCTA; Dr. Adelbisi Oladipupo from Morgan State University; and Michele Morrison, BGIT, ACUTA president.
Creating a consolidated data repository was the goal of the University of Scranton to improve location and contact information accuracy, critical to 911 and emergency response teams.

After intense review and deliberation, we selected two schools, Morgan State University and Texas A&M, to receive a grant of $12,000 each. Stay tuned for project details as the research unfolds. Many future papers, presentations, and publications have been promised not only by the winners, but by all the applicants. There will be much more grant information in the near future.

Award Day
How exciting it was to share the opening of ACUTA’s 45th Annual Conference with Mark Burger and Brad Bouwkamp from MiCTA as well as with both grant recipients, Dr. Adesibi Oladipupo from Morgan State University and Jason McConnell from Texas A&M University! The grant recipients received large replicas of the award checks and distinguished-looking award certificates from MiCTA and ACUTA, presented by Michele Morrison, ACUTA President from British Columbia Institute of Technology.

To date, both Morgan State and Texas A&M have provided proof of project initiation and have received their first real checks. Morgan State has also provided sufficient documentation of progress toward project completion, so has also received its second and final grant funds, and I have confidence that Texas A&M will soon follow their lead.

As the ACUTA Publications Committee points out in the editorial calendar, “In 2016 and beyond, IT professionals will be found in the trenches, behind the desks, and seated at the table planning strategies for the future. Hiring for a specific skill set? Think again. This issue will explain why the IT ‘hat rack’ is very crowded on today’s campus.” And I hope I have explained how ACUTA is always there to support you— with excellent educational content, with funding, and with an ever-expanding variety of resources to help you do your job better.

Reach Corinne at choch@acuta.org.
To help meet their goals for student recruitment, satisfaction and retention, more universities and colleges are placing a strategic priority on their residential networks (ResNets). This is why leading professional organizations (ACUTA and ACUHO-I) have partnered to survey business, IT and housing officers to produce the fifth annual study of ResNet practices. ResNets provide wired Internet, Wi-Fi, cable TV services and more to students living on campus. The following infographic summarizes the "State of the ResNet" for 2016.

**CAMPUSSES' #1 PRIORITY: WI-FI & BANDWIDTH**

The number of schools that provide robust wireless coverage and gigabit speed bandwidth has doubled in the past four years.

- Nearly two thirds dedicate 1 Gbps or more to the ResNet, whereas in 2012, most colleges (54.6%) offered 500 Mbps or less.
- 29% of institutions are committing 5 Gbps or more today.

83% of college campuses provide robust wireless coverage throughout 81-100% of their campus, nearly doubling in the past four years.

**RESNET BUDGETS RANGE FROM <$750k to >$2.5M**

- 22.5% have more than $2.5 million annual budget.
- 33.3% of institutions have between $750,000 and $2.5 million.
- 44.2% of schools have annual budgets of less than $750,000 a year.

**WI-FI COSTS EXPECTED TO RISE, YET FEWER SCHOOLS INCREASE RESNET FUNDING**

62% expect the cost of wireless network services to increase over the next two years with half of the institutions expecting an increase in cost of 5% or more – a 10% rise from nearly 39% last year.

2015
- 54%

2016
- 47%

2016 saw a 7% drop in schools that increased ResNet funding.
DOING MORE WITH LESS, LET US COUNT THE WAYS

Schools are adopting a range of tactics to contain spiraling costs, from adding student fees to combining network with IT services, and shaping bandwidth.

Addressing the Cost of ResNet

- 9% are increasing or adding new student/user fees to address the rising costs of ResNet, and 29.9% are considering it.
- 47.8% are combining network services with other Campus IT services.
- 41.6% are shaping bandwidth.
- 29.2% are considering all three actions.

MORE SCHOOLS CONSIDER OUTSOURCING TO TRIM COSTS

The number of schools who are outsourcing all or some of their ResNet services to trim costs doubled from 2013 to 2016.

Presently 44% of schools are outsourcing or considering outsourcing some or all of ResNet services to trim costs, doubling from 22% in 2013.

IPTV ON THE RISE

Schools are transitioning from traditional cable TV in favor of IPTV to meet student demand for mobile access and content.

- Three out of four schools (75%) are considering all three actions.
- 9% of colleges and universities have transitioned from traditional cable television in favor of IPTV, IP video, etc.

24/7 SUPPORT STILL SCARCE

Better support is still needed. For 76% of schools, the only 24/7 support available are online resources such as wikis or FAQs.

- Only 13.6% of schools provide 24/7 support, a 5% increase from 2012. The only resource available to students at a majority of schools (76.5%) is access to online resources such as a wiki or online FAQ.

ABOUT THIS YEAR'S SURVEY:

The survey was conducted from November 2015 through January 2016. A total of 406 respondents representing 365 institutions participated. Reflecting its growing reputation, this year's study received a 59% increase in completion rates since the initial 2012 study.

Read the full report at www.acuta.org/resnet

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Cybersecurity Outlook 2016:
Institutions chase the ever-nimble hacker as they strive to keep the network safe

Institutions still reeling from seemingly endless reports of hacker break-ins last year should brace for even more sophisticated capers in 2016, according to cybersecurity experts.

"It's a preparation against the inevitable," says Christian Aldridge, a Web developer for George Washington University's libraries. "We have several forms of backup and a process to quickly wipe and restore sites and their associated data."

Donald J. Welch, Ph.D., chief information security officer at University of Michigan, adds: "Universities have resources that are very valuable to many different types of attackers. Cyber criminals can make money from stolen identities, credit cards, university resources as well as intellectual property."

Meanwhile, many national intelligence agencies are after intellectual property stored on university servers, Welch says. And hacktivists like to poke around university networks to gain publicity for their causes.

Indeed, security experts say the image of yesteryear's hacker—the pimply faced teen on a lark for grins-and-giggles—has been replaced by organized crime teams bent on stealing and monetizing data.

"Select any economic sector at random, and the chances are high that you'll find something in the media about a cybersecurity incident or problem," says Aleks Gostev, chief security expert, Kaspersky Lab, a security software maker.

Moreover, the impact of hackers' antics has never been greater. Witness: a string of suicides that were attributed to the hack of Ashley Madison—a Web meeting place for cheating spouses—which revealed the identities of 30 million spouses who had joined the website, according to "Hazards Ahead," a November report released by security software maker Trend Micro.

"The evolution of breaches is beginning to take a turn toward real-world effects on enterprises' bottom lines and people's lives," says Raimund Genes, CTO, Trend Micro.

BYOD = High Risk
High on the list of cyber risks institutions need to watch out for are mobile device break-ins, including those running the Android operating system, according to the Trend Micro Report. "Organizations should expect to be hit," says Tom Kellermann, chief cybersecurity officer, Trend Micro. "Preparing to overcome this challenge will become the mantra in the winter of 2016."

Included among those mobile devices are all bring-your-own-device (BYOD) units that students, staffers, and virtually everyone associated with the university are linking up to institutions' networks.

"BYOD exacerbates the already considerable need for internal security," says Dr. Bryson Payne, director, University of North Georgia's Center for Cyber Operations. "In the '80s and '90s, we often thought of security as keeping the bad guys out, usually at the firewall. Security today includes both internal and external sensors and controls—the security-in-depth approach."

Melissa Z. Y. Woo, vice president, information technology at State University at Stony Brook, agrees: "The more devices on campus, the higher risk of a data breach. However, BYOD is a way of life on a university campus. So it requires user information security and privacy awareness and training, as well as vigilant protection of institutional data."

Adds Bob Andersen, director, Instructional Technology, Saint Mary's University of Minnesota: "In order to adequately secure BYOD devices, we must enter a partnership with the student. We rely on standard controls such as encryption and access controls. We also try to limit what information is placed on mobile devices, and we purchase software from suppliers whose products are mobile aware/ready."

"We have also devised policies to hold our BYOD users accountable and provide security awareness training. Dollar for dollar, an investment in training may be the most effective investment we can make in BYOD security."

Meanwhile, hackers are expected to spend more time plundering home computers—student and otherwise—The reason: These often easy knock-offs are gateways to what hackers are really looking for—easy entry into bigger networks, like those housed at institutions, according to the McAfee Labs Threats Predictions Report, released in November by Intel Security.

The IoT and More
Also vulnerable at colleges and universities will be all those wondrous devices connected to the much-ballyhooed Internet-of-Things—including your campus' vehicles, according to the Intel report. Unfortunately, just like any other computerized device, cars, trucks, and other motorized vehicles can be hacked, as security researchers Charlie Miller and Chris Valasek—who now work for
Uber—proved with chilling certainty this past summer, when they wirelessly hacked a Jeep. Incredibly, Miller and Valasek's infiltration into the Jeep's computer systems, which they hacked via the Sprint Network, gave them complete control over the vehicle's steering, transmission, brakes, and dashboard. Chrysler gulped, and within weeks the company rushed out a software update on a USB drive to 1.4 million Jeep owners to correct the problem.


Adds Saint Mary's Andersen: "The emerging Internet-of-Things model informs us that computing will not be limited to people with computers. Intelligence embedded in everyday objects will be imbued with features and services that are only beginning to be imagined. Experts suggest it will be a security nightmare."

Increasing Vulnerability

Expect that same kind of Internet-of-Things vulnerability for many of those brand spanning new devices that professors and students are wearing, such as activity trackers, smart watches, and other computerized sensors. Most of the gadgets are long on the gee-whiz factor, but short on hacker protection, according to the Intel report.

Meanwhile, hackers are also expected to increasingly drill-down much deeper into computers in 2016, bypassing software and operating systems like Windows, and instead infecting the machine's BIOS or firmware—systems that until recently, were considered impenetrable, according to the Intel report.

Case-in-Point: Equation Group Malware, which is capable of reprogramming a hard disk, even after the infected computer has had its operating system erased and its hard drive completely reformatted. Such feats, according to the Intel report, were "stunning" to uncover. Incredibly, the coming year is also expected to give rise to the hacker-as-information-broker, with hackers amalgamating data they've stolen about your institution from more than one database, repackaging it, and then selling the resulting much more dangerous and much more potent invasion of your institution's privacy at a higher price.

Intel researchers say hackers in 2016 will also be stealing personal data stolen from major security breaches during the past few years to steal even more data by phone or over the Internet, given that the same data is often used in challenge questions companies use to identify you.

Essentially, typical security questions protecting your institution's data, which often includes student credit card data, like "What's your social security number?" or "What street did you grow up on?" will be child's play for hackers who may already have this info on your students from previous data breaches.

Moreover, would-be hackers without the technical wherewithal to break into your institution's computer network unfortunately have an easy alternative. There's already a thriving market for off-the-shelf hacker software, which is specifically designed for the nontechnical criminal, a market that is only expected to grow, according to "Kaspersky Security Bulletin: Predictions 2016," released in December by Kaspersky.

Fighting Back

But even while increasingly sophisticated hacker-break-ins appear inevitable, IT security experts don't plan on taking the onslaught lying down. Google, for example, has announced that it will issue regular security updates for its Android software, after being repeatedly stung by a series of hacks in 2015.

Plus, antivirus makers like Symantec, for example, which has candidly admitted that antivirus software is becoming increasingly ineffective against hackers, have added Behavioral Analytics to their arsenal.

Essentially, Behavioral Analytics scouts your PC for signs of unusual behavior or the installation of unknown programs and offers you quick tools and/or advice for how to (hopefully) neutralize the problem.

"Integrating breach detection systems with intrusion prevention systems is fundamental to decreasing the time hackers dwell on their networks," says Trend Micro's Kellermann.

Finally, the Cyber Threat Alliance, including Intel, has been formed to foster the sharing of info about hacker techniques and exploits between business, governments and security vendors.

Joe Dysart is an Internet speaker and business consultant based in Manhattan. Reach him at joe@joedysart.com.
The IoT Locomotive Quickly Gaining Steam

New applications emerge as technology creates a bevy of new data sources

Paul Korzeniowski

A freight train may soon crash into campus networks. By 2020, Gartner Inc. predicts that 26 billion new devices will be connected to those networks. That massive influx is coming from the Internet of Things (IoT), a movement that adds intelligence to traditionally dumb end points. Communication managers need to be prepared for the change, so the data generated from those devices can be carried over their networks, stored in their data centers, protected, and analyzed.

So, what is the IoT? IoT is a broad term used to describe networks connecting physical objects (meters, sensors, buildings, personal health monitors, and vehicles) rather than people to campus networks. These devices collect information and provide universities with more visibility and ideally more control over the end points.

The change offers a number of potential benefits. Schools gain a clearer picture into the operation of infrastructure items, like power, lighting, water, cooling, and alarm systems. Ideally, they take that data, identify trouble spots, automate various processes, decrease costs, and increase productivity. For instance, data center cooling systems can be programmed to automatically adjust to the rise and fall of local temperatures.

Warning: Trouble Ahead

However, as these features make their way onto campus networks, new challenges arise. Communications managers will need to ward off potential problems such as insufficient network bandwidth, inadequate storage and server capacity, mediocre security, and a lack of privacy. IoT will change network dynamics. Existing campus networks are sized for the moderate-bandwidth requirements generated by humans interacting with applications. IoT promises to dramatically change these traffic patterns. As these systems take root, massive amounts of small sensor message data will travel from end points to various locations for processing. "IoT threatens to generate massive amounts of input data from sources that are globally distributed," stated Joe Skorupa, vice president and distinguished analyst at Gartner Inc.

Network reliability is another potential issue. Campuses have been moving from wired to wireless connections, which are easier to deploy and maintain. IoT devices need to interface with various wireless data sources and beam data directly to the network. On current networks, meeting that requirement is difficult because problems arise with data speeds, data drops, and latency.

Speed is an issue because more information will be transmitted. IoT data may bump into large amounts of bandwidth-intensive traffic, such as video or health-care images, and create delays. Drops occur for a couple of reasons. In dense areas with lots of big, signal-blocking structures, wireless connections are not powerful enough to penetrate thick objects, like walls. Also, no matter how good a network is, latency issues arise. With more information being transmitted, such problems become more likely. For some applications, such as monitoring of electrical power, latency cannot be tolerated.

Checking Out New Options

A few new networking options are emerging to address those problems. Wi-Fi has been a popular campus network option, and this long-standing standard is being enhanced to support IoT. In fact, the Wi-Fi Alliance, a consortium that has been operating since 1999 and has more than 600 members, developed the new 802.11ah standard, known as HaLow. This specification extends Wi-Fi’s reach down into the 900MHz band and is designed to place the 802.11 family at the center of the developing IoT movement. The emerging approach combines lower power requirements with a lower frequency and changes design so signals propagate better. Those features offer much larger effective ranges than current Wi-Fi standards, which operate on 2.4GHz and 5GHz frequencies, and penetrate walls and doors more easily.

Moreover, HaLow is based on the 802.11ac standard and will interoperate with existing 802.11x devices. Like current Wi-Fi systems, 802.11ah provides IP-based connectivity, allowing devices to communicate with a broad range of other hardware. Bringing IoT solutions firmly into the 6.8-billion-strong Wi-Fi device ecosystem makes it likely that communication managers will be able to find add-ons and management tools to manage these solutions.

ZigBee is a Good Fit with Sensors

Conceived in 1998, ZigBee has been a popular choice in the sensor market. The standard, which is based on the IEEE
802.15.4 specification, creates personal area networks (mainly for home use) supported by low power digital radios. Applications include wireless light switches, electrical meters with in-home displays, traffic management systems, and other consumer and industrial solutions that require short-range, low-rate wireless data transfers.

ZigBee is typically used in applications that require long battery life and secure networking connections. These networks are secured by 128 bit symmetric encryption keys. Low power consumption limits transmission distances to short distances and requires line-of-sight connections. ZigBee devices transmit data over long distances by passing data through mesh networks.

However, this approach has a few downsides. Its maximum speed is just 250 kbps. Also, ZigBee solutions have emerged with a vertical market focus, products designed for specific types of applications. Consequently, mixing and matching ZigBee devices has been difficult. The ZigBee 3.0 specification, which operates in the 2.4 GHz frequency band and was announced in November 2014, was designed to unify the different options and make the solution more attractive to IoT suppliers.

A Bluetooth Alternative

Finally, a Bluetooth IoT option has also taken shape. Invented by telecom vendor Ericsson in 1994, the specification was originally conceived to provide a wireless alternative to RS-232 data cables. The standard has been used to exchange data over short distances using the 2.4 GHz band. The standard is used with many mobile device add-ons, like headsets.

Bluetooth Low Energy (BLE), also known as Bluetooth Smart, was built for the IoT market. By sending small bursts of data instead of continuous streams, BLE consumes just a small fraction of the energy required for full-blown Bluetooth solutions, making the technology a potential fit for battery-operated devices, such as sensors.

Data Center Servers Struggle

In addition to networking, IoT will strain many schools' server resources. "IoT deployments will generate large quantities of data that need to be processed and analyzed in real time," said Fabrizio Biscotti, research director at Gartner. These requirements will increase data center workloads, so many schools will need to expand their existing systems or buy new ones to support the new requirements.

IoT will have a similar impact on storage infrastructure. Market research firm ABI Research estimates that the volume of data captured by IoT-connected devices will grow from 200 exabytes (1 billion gigabytes) in 2014 to more than 1,600 exabytes—or 1.6 zettabytes—in 2020. Colleges face a few challenges in working with so much data. First is capturing it and finding places to store it, so IoT will mean more spending on storage systems.

Where will IoT information be stored? Not necessarily in the data center. The IoT movement may force companies to look at a decentralized approach to data storage and networking. "Transferring the entirety of the IoT data to a single location for processing will not be technically and economically viable," said Gartner's Skorupa. Colleges may be decide to aggregate data in multiple distributed mini data centers where initial processing occurs and then relevant (or summary) data is forwarded to a central site for additional processing. Consequently, communications managers may need to reevaluate their current network design and make changes so they are IoT friendly.

Tackling New Security Challenges

Nowadays, security is job 1 for communications managers, and the IoT represents a fresh venue for hackers who use holes in systems to steal individuals' personal and financial information. Significant security challenges will arise from IoT applications for a variety of reasons. The deployment of a myriad of devices will drastically increase security complexity: campus networks will have significantly more entry and exit points.

Data connections will need to be protected. IoT devices often communicate through the use of unencrypted channels, sometimes via Wi-Fi networks that can be easily snooped. The devices may be susceptible to cross-site scripting, where an active agent, input in the manner of legitimate user data, is picked up by a second device that functions intrusively.

An Uneasy Feeling

Communication managers seem to be aware of the potential problem. AT&T's Cybersecurity Insights Report, which included a survey of more than 5,000 enterprises worldwide, found that 85 percent of enterprises are in the process of or are planning to deploy IoT devices, but only 10 percent feel confident that they can secure those devices against hackers.

Those feelings appear warranted. Many IoT device manufacturers and service providers are failing to implement common security measures in their products. Hewlett-Packard Enterprise's (HPE) Fortify security software unit tested 10 popular devices likely to be included on the IoT deployments and found that 70 percent of them contained security exposures. On the average, each device had 25 holes, with varying risks of compromising the network.

Communication managers must remember that securing the IoT devices means more than just securing the devices themselves. They must also build security into the software applications and add-ons that link to those devices. IoT devices often have a connection to an internal application provided by the manufacturer or third parties. Ninety percent of the systems collected at least one piece of personal information, and 80 percent of the IoT solutions (sensors along with their central system, cloud, and mobile application components)
used featured passwords lacking recommended complexity and minimum lengths, according to the HPE report.

Further, 70 percent of devices of the solutions allowed an attacker to identify a valid account through account enumeration. Here for example, an attacker learns users' names and tries to use them to break login systems. The device's response tells the hacker that the account name already exists and then requests a password. The criminal then gains a rough road map of the accounts and uses that information to plan the attack.

**Keeping Data Private**

Consumer privacy is a related issue. As is already the case with smart metering equipment, wearables, and digitized automobiles, IoT applications collect vast amounts of information about users' interactions. If that information is not secured, privacy breaches can occur. With regulations, like FERPA (Family Educational Rights and Privacy Act) and HIPPA (Health Insurance Portability and Accountability Act of 1996) in place, academic institutions need to be especially careful in protecting personal data or they may find themselves involved in messy lawsuits.

Given the many potential problems, traditional IT security practices, like network segmentation and monitoring, will become even more critical as schools deploy IoT devices. In addition, colleges will need to invest in IoT security solutions, and many seem to be willing to take that step. BI Intelligence estimates that investments in security on IoT devices will account for 30 percent of the overall cybersecurity market in 2020.

The IoT movement represents a significant change in how schools oversee system endpoints and will have a dramatic impact on the academic community. International Data Corporation projects that IoT spending will increase from $1.9 trillion in 2014 to $7.1 trillion in 2020.

Because these systems are complex, a wide variety of vendors are vying for attention. Established vendors, like Cisco Systems, Dell, Hewlett-Packard, Intel, and Microsoft, are adding IoT tools to their product lines. In addition, companies, such as AGT International, Eurotech, Kepware Technologies, OSIsoft, and Panduit are taking on the development work.

**Final Thought**

There is no doubt that the IoT train will impact universities. As this technology takes root, communications managers need to be aware of its potential and start putting the pieces in place to account for its long-term impact. The locomotive is quickly gaining momentum, and communications managers who are not prepared just might be run over.

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**Kudos to Penn State IT**

The Pennsylvania State University has initiated a multi-year, telephony-expansion project of its Cisco VoIP service. Initially the VoIP service was provided at the University Park campus, and now this capability is being deployed statewide to an additional 21 campus locations, replacing legacy analog on-premises PBX systems.

This is a multi-faceted initiative, requiring close coordination and collaboration among the central IT organization, the IT organizations at each campus, campus administrators, and local public safety. The statewide VoIP deployment has been made possible through past investments in a resilient statewide network, SIP core, and SIP trunks. Once complete, there will be a single VoIP telephony service delivering an overall lower cost to Penn State as well as a common user experience from campus to campus.

As one campus representative stated, "This effort gave Hazleton IT staff the freedom to work on other campus-focused initiatives and no longer resource the maintenance of the phone system." Additionally, this initiative will lay the foundation toward moving to unified communications.

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As one campus representative stated, "This effort gave Hazleton IT staff the freedom to work on other campus-focused initiatives and no longer resource the maintenance of the phone system." Additionally, this initiative will lay the foundation toward moving to unified communications.
“The student comes first” is our mantra at James Madison University (JMU), a public comprehensive university located in Harrisonburg, Virginia. With this singular focus on the mission—“preparing students to be educated and enlightened citizens who lead productive and meaningful lives”—we’ve garnered a 92 percent retention rate and a six-year graduation rate above 80 percent.

When our 20,000 mostly undergraduates started demanding comprehensive wireless access, we listened. In today’s competitive higher-ed landscape, students will go elsewhere if we don’t have the amenities that meet their growing standards.

With time a critical factor, we embarked on a complete re-implementation of the campus residence hall network. As a team, we concluded that outsourcing, instead of handling this in-house, would ensure a speedy rollout and greater student satisfaction, and would be the most cost-effective option. Ultimately, we saved significantly in equipment costs, were able to reduce staffing costs, attained excellent connectivity (despite significant density challenges), and installed the network quickly and efficiently. And best of all, student complaints about connectivity in the residence halls are now almost non-existent.

The Road to Re-implementing Our Residence Hall Network

JMU was an early adopter of wired Internet access years ago. But in recent years, we faced increasing pressure from students and parents to upgrade our wireless technology in the residence halls to provide seamless and robust access. This situation worsened with campus smartphone penetration doubling in three years—from 46 percent to 90 percent. In addition, parents complained that their students were using up their cellular data plans rapidly and incurring extra charges.

Outsourcing was the Best Deal

IT started building a business case for the overhaul and modeled the cost of infrastructure and support. Internally, we worked with JMU’s senior vice president of administration and finance, Charles W. King, Jr., as this decision had to make sense from a financial perspective. We also talked to other state schools, asking for feedback on how they did it, success rates, and downfalls.

When determining whether to outsource or bring the project in-house, we asked ourselves:

• What can we save?
• How much of it is cash out-of-pocket?
• What other options exist?
• Will there be an adjusted fee for internet connectivity?
• How can we maximize cost avoidance in the long run?
• How long will it take to install and deploy?

Since we were able to utilize an existing state purchasing contract, we didn’t need an RFP. This allowed us to select a partner quickly and speed up implementation dramatically. And so, after some due diligence, in early 2015 JMU signed an agreement with Apogee, the largest residential network provider in the U.S.

There were several reasons for the decision: We adopted a strategic approach to ResNet and developed three budgeting models over a five-year period. We learned which performance and usability issues were costing money, and prioritized fixes and enhancements that would deliver the most value to the school.

All of our requirements were met when it came to cost avoidance, budget stability, risk management, and time to deployment. With rapid changes in wireless technologies, no one can predict what’s going to happen, but our partner took on all the risk with built-in replacement costs, thus ensuring budget predictability.

By outsourcing our ResNet, we were able to:

• Save substantially on equipment costs. We reused some network equipment. We removed our JMU-owned access points from the residence halls and re-allocated them to other campus buildings.
• Enjoy substantial manpower savings. We eliminated a full-time support position from the ResNet program and reassigned that person to other important work. We were also able to eliminate ResNet student support staff.
• Provide 24/7 support. We knew our students would need support beyond 9-5 hours. With our new service, students can reach someone around the clock via phone, chat, email, and text anytime.
• Overcome challenges to build a broad support structure and provide excellent

Outsourcing Wireless
JMU overhauled the campus residence hall network to achieve greater student satisfaction

by Dale B. Hulvey & Dick Johnson
connectivity in the residence halls. Our 28 residence hall buildings had a density issue; so we worked to make a number of adjustments to capacity and bandwidth, leading to additional savings. With guaranteed bandwidth, we never have to worry about installing additional equipment to keep up a level of service.

- Create a separate residential network. We created a brand new network for the residence halls that is separate from the faculty/staff network. This removed thousands of devices from the faculty/staff network and reduces the risk of security threats.
- Complete the install quickly and effectively. Installation was completed over the summer. If we undertook this in-house, this project could not have been completed by our fall deadline and may have required many more university resources.
- Provide proactive monitoring and troubleshooting. If something breaks or service is interrupted, Apogee is entrusted to proactively monitor and fix issues as they arise. This frees up internal resources so that they can be reallocated to other priorities.

**It's Showtime: Ensuring a Speedy, Safe Installation**

Several weeks before the 2015 fall semester was to start, our new ResNet was ready. We leveraged best practices from other schools that smoothed the process, sped up installation, and helped avoid delay-causing pitfalls. For example, we learned early on to plan for access to the buildings during installation. And indeed we found this the most challenging issue—trying to coordinate the installation of a whole new infrastructure with maintenance schedules, construction projects, and summer conferences and camps, some of which also expected a certain level of connectivity.

To protect all those involved, we worked closely with the installation team so that they understood JMU's security and access policies, and we knew when and where they were going to be so that we could acquire the proper access. The deployment teams held weekly conference calls with 15 stakeholders from various parts of the campus to ensure all were "in the loop" and the project could proceed efficiently with minimal disruption to other departments.

**Fewer Complaints, Greater Student Satisfaction**

The performance of our new network has exceeded our expectations, and is better than what we could have done ourselves. The proof is in greater student satisfaction. Today, calls to the IT Help Desk about ResNet issues are down 95 percent, and the number of open support tickets is extremely low. With outsourcing, we found a cost effective method to provide sustainable, robust and secure Resnet services for current and future students.

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Dick Johnson is JMU's director of technical services. Reach him at johnsvr@jmu.edu.

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**Snapshot**

**Restoring Dial Tone to LSU's Vet School**

Recently we had a small disaster at our Veterinary School of Medicine: A UPS failure took down a telephone module that provided dial tone to hundreds of phones, including the Vet School and surrounding area.

As our team scrambled to resolve the UPS issue, there were critical areas within the building that needed dial tone immediately—specifically the large and small animal clinics.

In the old days, providing dial tone from alternate sources (e.g. a telephone module in another building via copper cable) would have required many hours or days of rewiring depending on the quantity of phones needed. Since our PBX is capable of both TDM and VoIP, our crews were able to provide VoIP dial tone to critical locations within an hour.

We appreciated this feature of VoIP the last time we experienced a hurricane. LSU is a "shelter in place" for the state government. We host disaster response agencies as well as evacuees in need of medical attention when hurricanes affect the Louisiana coast. Prior to the availability of VoIP, we spent days wiring locations for dial tone in order to provide services for multiple government agencies. With the availability of VoIP, the time was cut to hours.

This particular value of IT – the ability to quickly deploy dial tone – certainly saves money in labor costs, but most importantly it saves time.
Together, the men’s and women’s basketball teams at the University of Connecticut have taken the school to 14 NCAA championships, providing a reliable blueprint for success in hoops. The trip that the university took to roll out its UConn AnyWare campus app is a great blueprint for other colleges seeking best management practices (BMPs) to migrate the virtual infrastructure for student services.

“A lot of our challenges revolve around mobility,” says Mick DiGrazia, manager of server infrastructure at the University of Connecticut at Storrs. Mobility is a fact of college life, and it’s only going to increase the management challenges for college technology managers.

The answer for UConn is application virtualization with its UConn AnyWare service. (http://anyware.uconn.edu)

Time for a Change

The program began in 2011 with desktop virtualization targeted to students via UConn’s SkyBox service. Other application virtualization was provided with Citrix’s XenApp, delivering applications to faculty and staff.

“These two approaches have independently and successfully serviced their respective communities while virtualization technologies for teaching, learning, and research evolved,” DiGrazia says. “Both uses remain critical to our community, but the university is now at a juncture where the service offerings must also evolve. Our goal is to develop these offerings in concert to build on their respective strengths and to ensure that their collective benefit is greater than the sum of their individual benefits.”

Much of the reason for the evolution is the universal move by students and staff to mobile devices. “Mobile platforms are an absolute staple in the academic environment these days,” DiGrazia continues. People expect access to their data anywhere they can get a network connection. Mobility has become a game-changer, and one indicator is the number of devices in everyone’s hands. The Pearson Student Mobile Device Survey looked at changes from 2013 to 2014 and found tablet penetration up from 40 to 45 percent, smartphones from 72 to 83 percent, and laptops being nearly ubiquitous.

An EDUCAUSE study found that 58 percent of students own three or more devices because they see their smartphone, tablet, and laptop each having its own use. In fact, the study found that only one student in 10 carries just one or two devices. Three in 10 own four or more such devices. It should go without saying that nobody in academia (except, maybe, that irascible Luddite of an English professor) has no mobile devices. In fact, the only device category that seems to be declining is desktops...and that is likely because they are tethered to the desk.

The upshot of mobility and BYOD (bring your own device) is platform sprawl. “The expectations of students are changing. Students want their data and applications everywhere. Higher-education leaders agree,” DiGrazia says, noting a poll from University Business. The study said 94 percent of education leaders feel students should have access to their information, data, and software, on any device, with a consistent experience that does not change based on user location. “Attitudes are shifting,” he says. “We want to be able to satisfy the need of a learner in 2016 to access his or her data from AnyWare on any platform at any given time of day,” he says.

But as soon as the door is open to myriad devices, IT loses control of what is out there and requires support. The solution demands a robust platform to deliver applications. The AnyWare platform is supported on the device itself, so the hardware being used becomes less of a concern.

That is the charm and practicality of UConn AnyWare. It works anywhere as its name implies, and it works with almost any OS and most common software.

The initiative presented a challenge for the Central IT Unit (CITU). UConn AnyWare gives virtual access to UConn licensed software applications to everyone in the university community. They pick the applications they want, customize them to meet their needs, and retain those custom settings. Through the virtualized applications, students and staff can access printers, local hard drives, USB drives, and file shares.

Virtualization

“We have a long history with virtualization,” DiGrazia relates. “At this point, we are close to 90 percent virtualized.”

It used to be that new students went to the campus bookstore and purchased something like MiniTab and installed it on their desktops. “That is inefficient and
difficult to manage," DiGrazia maintains. "Our virtual desktop services implementation makes it easier for students to get access to software packages they need in order to get their work done and focus on their academics."

Both DiGrazia and UConn have deep experience with virtualization. "I'm coming from a place with a long history and direct experience with virtualization," he says. He has 17 years in IT at UConn working with CITU. The campus is highly diversified.

One challenge with traditional computing is pushing out patches, updates, and new license files on personally owned computers. Schools either rely on the students/users to take all of the necessary steps to stay current (right!) or update them when they hit a snag and contact the help desk.

Add to that the difficulty of riding herd on off-campus users. DiGrazia has colleagues in CITU who work remotely whom he has never seen face-to-face. Many faculty travel the world. Students can be anywhere and everywhere. IT must deal with what DiGrazia terms "weird edge cases"—cheap laptops with knock-off software. Their users need to log-on just as much as those with the fanciest, most-current IOS system. It is important to make all clients successful...and not dictate how the users must configure their computer if they want to work within the school's environment.

Gartner Group says 75 to 80 percent of applications in an environment typically can be virtualized. That means IT can do a better job of managing software, producing a better experience for the end users—as well as cutting the total cost of ownership for the school. "Platform independence is an important factor," DiGrazia says.

UConn has five distributed campuses, a law school, and medical school. There are 35,000 people on campus, with 22,000 undergrads and 8,000 graduate students. Most students are on IOS with Android in second place. DiGrazia notes that CITU has to be well prepared whenever Apple makes a new release. "It is an event on campus," he laughs.

Each student has unique requirements for software for their classes. Distributing software to students, faculty, lab, and staff involves a host of administrative challenges. "Making sure you control where the licenses and software end up is an important responsibility for someone who is a custodian of the software on behalf of the institution," DiGrazia says. CITU takes that responsibility seriously.

The following software was available to students or staff for testing on the UConn AnyWare platform:

- Access 2016
- Excel 2016
- IBM SPSS Statistics 23
- Maple 2015
- Minitab 17 Statistical Software
- Notepad
- OneNote 2016
- Outlook 2016
- Paint
- PowerPoint 2016
- Project 2013
- Publisher 2016
- Visio 2013
- Word 2016

"Getting it into peoples' hands and installed on their computers is just one aspect," he says. Maintaining software is another consideration. There are service packs and updates and security fixes.

As soon as software is published, it is sure to be followed with patches. On administrative computers, the task is fairly straightforward. On lab computers, there is a controlled population that they can target in off-hours. It becomes difficult on personally owned computers in a distributed environment.

"Version control is a challenge," DiGrazia says. "We don't want a class-room of 100 students with 30 using one version, 30 using another, and 30 using last year's version that is un-patched."

With new versions comes new functionality, efficiencies, and abilities to do things like share files with other students or tie into cloud services. That means assuring that each faculty member who uses software to teach is aware of all functionality and the students are able to utilize that functionality. "The only way to do that is to control what versions they are in the environment," DiGrazia says.

A student who comes to a lab and uses a thin terminal often will work on a paper and then save it. But if they do not save it in the right place and log off, that customization or school work is lost. "We let the student down every time that happens," DiGrazia says, acknowledging that, while it may be an unreasonable expectation on the student's part, they try to avoid the situation.

"We've learned that the hard way. Solving the problem has not been easy without significant investment in more infrastructure," he says. Likewise, access to local devices like printers and USB drives is not easy, either.

Legacy applications may be critical to the university's mission, but typically nobody wants to pay for the upgrades. "That happens more often than folks are comfortable to admit," DiGrazia says. Legacy applications often have legacy requirements. What does CITU do with software that needs Internet Explorer 7.0 when IE gets upgraded?

Hoping distributed computers do updates on their own is the IT equivalent of the wild, wild West. Throw in complex client applications that work well for one particular college or department but are horrendous for IT since they lack a regular installer, require cross-platform support, or lack documentation. The more that kind of software is deployed, the more difficult management becomes. "We realized that application virtualization is a good solution that helps with a lot of these problems," DiGrazia says.
Gartner Group says that application virtualization can reduce operational overhead by 60 percent and total cost of PC ownership by six to seven percent.

**Maintaining an Image**

Maintaining the university’s image online is a major responsibility that falls on CITU even though it is not strictly computer science. The new UConn AnyWare handles that challenge nicely. But it wasn’t always so.

Targeted application installs were a bugbear under their old desktop virtualization (VDI) system. VDI might support 80-90 percent of general use cases by UConn students. It becomes a problem when the School of Business or the School of Engineering wants specialized software for its students. CITU finds itself unable to maintain a single image that gets apportioned or provisioned based on that user’s role at the university. Instead, each extra software requires them to maintain another monolithic image specifically targeted to that school or college, he finds. Today, they are up to six images...including a general-use image plus multiple targeted images. “That becomes a real bear to manage over time,” DiGrazia says.

With an application virtualization platform, many of the new challenges that arose as part of their VDI model are solved. For one, it used to be that a monolithic image had to be maintained every time a software license changed. “That goes out the window,” DiGrazia says. “We don’t have that problem any longer.”

They now host an application in one location, and for every new user, a new instance of that application is spawned. This allows IT to manage the software installation rather than the software image. An installation can be re-used in multiple ways. Some application virtualization applications can be deployed to a VDI image, allowing them to benefit more from the application virtualization infrastructure.

**Technology Package**

The Storrs campus has a stretch data center, divided into two locations. 500 meters separate the two. There is Layer 2 network adjacency.

University information technology services has 170 employees in CITU and almost as many in distributed IT. There are 12 units, headed by a CIO who reports to the provost. Connecticut Education Network reports through the same CIO. DiGrazia has five teams that report to him, with 25-35 full-time staff plus some student labor. They have Windows and Linux teams, systems management, messaging, and collaboration teams.

They use Cisco VCS 5100-series servers. There are 16 dedicated blade servers, eight in each location, with 10 GB connections to the Citrix NetScaler SDX 11515s. Users can log in through a single gateway. That allows them to access resources they would use at the university to any location.

Currently, they support 717 concurrent users. The plan is to add 100 to 200 additional licenses per year.

At the moment, they are looking for GPU (graphics processing unit) hardware to support graphics-intensive applications and for expanded file-storage applications.

One of the early lessons DiGrazia learned is that any major initiative like this has to integrate into the larger IT strategy. Pitching a project as a one-off initiative will be difficult in front of most CIOs.

Organizational partners are important, too, DiGrazia says. They worked closely with Citrix, who has partnered with UConn for years. “We started virtualization in 1983,” he says, noting that M.A.S.H. and Happy Days were then popular on TV.

This started on mainframes and UConn still has some legacy mainframe services but most are being decommissioned and moved to virtualization.
A piece of software targeted to only five users requires minimal effort to deploy. The setup is simply a role-based access control challenge rather than maintaining another image.

A good example is the handful of IT staff who like to use Visio. While they never would buy the expensive software for the whole campus, there are some who have a legitimate use for Visio. CITU installs it in the virtualization environment and provisions it only to the users who need it. When a distributed IT unit wants Visio, all they do is drop the names and IDs of the new users into a group. Voila! They get Visio.

Last year UConn went with XenApp and this year is moving to Microsoft Hyper-V deployment for their centralized enterprise services. It will be split between VMware and HyperV.

Citrix helped UConn with the design work. The vendor actually sent a film crew to Storrs for three days to video and photograph landmark areas on the campus that could be used as part of the AnyWare branding. It is something DiGrazia knows CITU never would have pulled off with as much class and professionalism on its own.

That is not to say there are not potential traps in a move to virtualization.

"Double-check your software licenses," DiGrazia cautions. "Just because you have a site license does not necessarily mean you can virtualize it. You may need to renegotiate contracts." One example, perhaps less obvious than some others, is Microsoft licensing for remote desktop services.

One area where there was no surprise with AnyWare was publicity for the roll-out. CITU worked closely with the school’s communications office to be certain users were well aware of what was planned. The logo and vision were trumpeted around campus well before the application software went live. Students were invited to beta test AnyWare.

Help desk staff were made vividly aware of what was coming since they must understand it intimately in order to support it effectively. As with other key clientele, they were in on the testing and provided comment on the move.

Now, peoples' mobile devices can be used handily for academics. "They are integrated into curriculum and used as part of academic pursuits," DiGrazia says.

Users can customize their Outlook and, the next time they log-in, their own profile will be there. Not only does application virtualization allow retention of user customization, it also permits integration into their environment.

With app virtualization, IT can deploy and get functionality into the hands of the users more quickly and more reliably. "You don’t have to go through the pains," he says.

"Our virtualized applications become just another thing running on the computer," DiGrazia adds. With VDI there is separation between the user’s own computer and some other computer, entirely. Both sides need to have distinctly different things managed. With application virtualization, it looks like a native application whether it is IOS, Android, or Windows.

"You can access local devices," he says enthusiastically. "You go to the file-print menu and you can print from the printer you use every day in your office. You can save files to the local hard drive, edit and save changes natively. It feels like an integrated experience," he says.

"That is exactly in line with CITU’s strategy to drop the boundaries and deliver things seamlessly to our users," DiGrazia concludes.

Curt Harler is a contributing editor to the ACUTA Journal and a freelance writer based in Ohio. Reach him at curt@curtharler.com.
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Summer 2016 ACUTA Journal 25
How to Make Your IT Organization a Strategic Enabler

Some new ways of thinking will change the value perception of IT

by Larry Foster

Does the IT organization have a strategic leadership role on your campus? If not, and if you'd like to change that, there are two principles you will want to implement. One principle clarifies a set of value propositions that require evolving the operating culture and leveraging new business skills not often found in traditional IT organizations. The second principle clarifies how changing the long-established budget process is critical to guaranteeing the appropriate funding is established to support prioritized initiatives.

Current State of the Industry

The “consumerization of IT” is forcing every technical support organization to embrace a new way of doing business. The term “Shadow IT” has been coined to describe the often ad-hoc and uncoordinated adoption to on-demand cloud services outside the domain of IT operations. Many institutions are reallocating traditional IT funds to departments to improve fiscal responsibility and responsiveness. Unfortunately, too many department-based managers are inadvertently falling into the costly mis-

Enabling on-demand, secure, self-service insight is the ultimate strategic value proposition the IT department can provide an organization.

take of thinking it is no longer necessary to work with IT in this era of “infrastructure-less” cloud-based solutions that can be acquired and quickly activated from a vendor portal.

In actuality, the inefficiencies of this unplanned approach are recognized 6-to-12 months later when the client department finds itself mitigating unbudgeted initiatives whose popularity and operational dependencies have grown well beyond their initial pilot project. As institutions navigate through this paradigm shift, they are architecting a new IT organization that is centered on the principles outlined in this article.

Jettison the Dreadful Budget Process

The traditional budget process involves an extremely poor method of allocating hardware, software, and personnel resources. In fact, it is often very difficult to identify direct correlations of improvements in student experience and institutional efficiencies with financial allocations.

Many would agree with what is lacking in how most institutions complete their annual budget process. It starts with the “Idealistic Dreamer Phase” where managers forecast their expenditures in each of the major general-ledger expense categories—planned costs of compensation, travel, training, vendor services, and more. Every seasoned manager knows their proposed budgets are likely to be cut, so they bake in additional “fat.”

Next, in the “Incoherent Weed Wacker” phase, the review committees and the institution’s top executives require technology managers to indiscriminately cut their budgets by some percentage without any related reduction in their deliverables—this is often associated with the perennial “do more with less,” quasiharmonious, pep-talk mandate.

The final “Disillusionment of Reality” phase is usually attained without a focus on achieving greater levels of institutional success or improved student experience, but rather on sustaining previous year funding or even reducing annual spend.

The entire draw-out and painfully inefficient budget process must be replaced by centering the entire budget process on institutional services and budgeting the necessary resources as a derivative of the prioritized services. Services must be articulated in terms of business objectives and not the underlying technology service such as “email” and “storage.” Dean Meyer provides an excellent blueprint to lead any organization through this transformation in his book Internal Market Economics. This new approach will require establishing new partnerships with client departments to fully understand the purpose of each service. Once this is achieved, IT can architect a sustainable and optimized shared platform that provides the best capable service for all users.

The Choices – Let This Change Define, Destroy, or Strengthen Your Institution

Leading institutions are capitalizing on this inevitable transformation by adopting a new service-broker approach to deliver technology-enabled services in the most cost-effective and timely manner by integrating the appropriate mix of internal and external tools and resources.
In addition, fiscal managers are embracing investment-based budgeting to ensure the investments in services are aligned to achieve the most valuable outcomes for their institution. Managers still forecast their costs, but they lead the process by deriving costs from the specific services they are affecting such as improving graduation rates, enabling particular research initiatives, improving special scholar programs, expanding network access, enhancing the learning experience, improving school ranking, streamlining decision making, and more.

You’ll notice that none of the approved services specify hardware, software, or people.

In this manner, institutions are making fact-based fiscal decisions about the most valued investments. The budget process concentrates on the service not the underlying technology. Technology investments become a derived result of the prioritized services. These two business principles of “IT service broker” and “investment-based budgeting” complement each other to dramatically change the value perception of IT.

Seven Key Value Propositions to Being an IT Service Broker

The primary value propositions that a service broker must provide are leadership, accountability, procurement, expertise, education, insight, and partnership. The individual words are not new; however, when the activities are combined, they will create the unique capabilities to become a strategic enabler for your institution.

The following list outlines the seven value propositions the IT leadership must institutionalize and promote to transform from a legacy perception of tactical and reactionary to being recognized as a core strategic partner.

- Leadership. IT must own the planning, implementation, delivery, and production support of the shared resources and infrastructure underpinning the services.
- Accountability. IT manages the systems (e.g., ERP, CRM, TEM, MMS, ITSM, ITAM, ITFM, etc.) and supplier relationships to ensure users are paying only for the services they consume by associating ownership for every service and automating the lifecycle of integrated workflows from activation through disconnection, vendor payments, and financial allocations.
- Procurement. IT maximizes the buying power of the institution by negotiating the best rates based on the aggregate usage of all represented client departments and managing the contractual commitments.
- Expertise. IT subject matter experts (SMEs) continually conduct the technical research and assess opportunities to help users maximize the technology investments required to support their services.
- Education. IT develops the thought leadership and provides the formal, informal, and ad-hoc user training necessary to help the institution maximize its capabilities.
- Insight. IT organizes and unifies the raw data from all the enterprise systems so that users can analyze and derive actionable information to make informed business decisions in a more timely, efficient, and effective manner.
- Partnership. IT SMEs work collaboratively with user clients to understand their backgrounds, philosophy, business needs, and tactical and strategic objectives, and to offer transparency and viable options by conveying requirements about costs, resources, delivery, and support.

The Challenge - Achieving All Strategic Value Propositions

Of course, while it’s not that difficult to outline a string of core value propositions that any IT organization can offer, actually crafting the culture and simultaneously executing those propositions takes focus and exceptional, dedicated leadership. The reality is that not all institutions today are necessarily capable or ready to live up to these values and may be missing key systems to bring the value of unified business analytics (BI) to fruition.

For instance, while many IT leaders will state that they help their users get organized, in practice, many project managers actually focus on the “what” and “how” something needs to be done by requiring and “forcing” their clients to achieve a certain level of organization without understanding “why” a service is being implemented. The strategic planning for every initiative requires gathering the necessary information to understand “why” and turning the interactive data gathering into a client-centric approach in order to execute the published business objectives that are mutually agreed upon and used to measure the success of the outcome.

Similarly, to truly be an effective expert partner for clients requires helping them to prioritize what can sometimes be an overwhelming list of planning recommendations, and then actually coming into every planning meeting with a clear agenda that includes tracking what was supposed to be done by that meeting to ensure nothing slips through the cracks.

In addition, for IT to be a committed expert business partner for the client department and not just focused on the technology, it must work collaboratively in real time with them, not just manage to the project tasks and tell them what needs to be done next.

The New Multi-Dimensional IT Resource

Key outcomes from the 2016 Nemertes Research initiative “Building a Case for a Changing UC Architecture” by Robin Garreiss include a set of common themes and impacts on budgeting and staffing. The key themes of the research concluded:

- Digital transformation initiatives are changing the composition of IT.
- OPEX spending will continue to rise, with most going to new types of cloud service providers.
- Adoption of IT applications is stifled by lack of internal marketing and training.
- Partnership management is crucial—both internal and contracted suppliers.
Companies are reporting difficulty finding the right kind of IT talent.

IT is looking for new skills including an understanding of business, contracts, industry and more.

The table in Figure 1 from the Nemertes Research publication summarizes the distinctions between legacy and emerging skills for IT resources and underscores the challenges organizations are facing evolving from a tactical-based organization and into a strategic partner that manages external resources.

**The Economics of the IT Transformation**

The set of skills required to be a strategic partner are more extensive and inevitably more expensive than skills required of the traditional tactical-based technologist. In addition, as previously stated, institutions can inevitably end up with higher costs if they do not take a forward-thinking and holistic approach to progressively adopting the appropriate hybrid of cloud and premise-enabled services. "Shadow IT" organizations can quickly find themselves as disconnected islands, even within the same cloud service provider, unable to exchange documents and freely access information to the level they had with shared internal environments from which they just migrated. One of the initial findings an IT organization discovers after being asked to help resolve these issues is the substantial cost of unused and underutilized IaaS and SaaS subscriptions.

A few key points from the 2016 research published by PKE Consulting about "The Cloud and Your Costs – Understanding the Changing Business Model" indicated that the average decline in cloud computing costs was 26 percent in 2014. The drops will continue at a slower pace as new competitive options enter the industry. However, this drop in costs doesn't necessarily mean institutions are spending less because more activities are being supported by cloud service providers.

The 2016 Cloud Service report indicated that the average user relies on six different cloud solutions. It is very common for institutions to purchase overlapping services and unnecessary excess capacity when an objective and incentivized partner is not managing procurement and monitoring on behalf of the entire client organization.

**Unified BI – The Unique Value Proposition IT Can Provide**

Enabling on-demand, secure, self-service insight is the ultimate strategic value proposition the IT department can provide an organization. Strategic decisions are predicated on leveraging a multi-dimensional holistic view that has been tested against many different "what if" scenarios. In this manner, each client organization depends on the shared services managed by IT to bring everything together. Figure 2 illustrates the value of leveraging IT to manage all the internal and external systems. Unification of information is predicated on a centralized coordinated shared service.

**Building Alignment and Support**

Institutions can reap the benefits of making IT their trusted strategic partner and creating a powerful unified BI architecture by adopting the following recommendations:
• Take the time to create a sustainable business case.
• Be willing to evaluate the cloud, but realize that it’s not for everything.
• As you adopt cloud services, be prepared for substantial organizational changes.
• Be ready when the cloud requires a retooling of your expertise and fundamental skills.
• Program management must support the entire lifecycle of interactions with stakeholders, internal marketing, and client partners from ideation phase through production support.
• Ensure that departmental managers, executives, and IT leadership are informed of the needs, the potential upside, and the pitfalls.
• Document the intended outcomes and value attainment along the way.
• Leverage your suppliers to help build your business case and marketing materials to educate your management and end users.

**Conclusion**

The current business transformations have created seismic power shifts and new roles for IT organizations. For those who choose to resist change, it won’t end well. Instead, the agile IT organization that embraces its new roles, responsibilities, and challenges will be rewarded with becoming a core strategic partner for the institution. IT management must be willing to adapt and adopt new skills outside their typical comfort zone to ensure the IT organization stays relevant. Evolving into a service-broker operating culture in conjunction with adopting investment-based budgeting are two key principles that can help transform the perception of IT from tactically reactive to strategically enabling.

Larry Foster is executive vice president, product strategy, at Calero Software, and an active participant in ACUTA. Learn more about Calero at www.calero.com.
Revisiting the Spec: The Underpinning of Network Infrastructure Modernization

Florida Tech is now well on their way to completing a campus-wide infrastructure upgrade

Founded in 1958 to provide advanced education for professionals working in the space program at what is now Kennedy Space Center, Florida Institute of Technology (Florida Tech) has increased in size and reputation to where it now serves 16,000 students and is ranked among the top 20 best small universities in the world, according to Times Higher Education’s World University Rankings. With the increasing enrollment and subsequent expanding campus has also come the demand for both faster network speeds and pervasive wireless.

As a leading engineering technical university, Florida Tech acknowledges the importance of maintaining a high quality IT infrastructure to support advancing technology and remain competitive. In response, the institute is embarking on a network cabling infrastructure upgrade across its campus of nearly 75 buildings. At the same time, Florida Tech has been challenged with connecting directly to the Florida LambdaRail education network and setting the foundation to remain technologically competitive.

Having seen various infrastructure standards come and go over the past few decades, Florida Tech did not want to build yet another building or remodel yet another space amid the headache of mismatched components and performance uncertainty. Additional considerations were the proliferation of power over Ethernet (PoE) to more devices than ever before, imminent plans to build a new state-of-the-art data center, and the need to upgrade its telephony system and expand its wireless footprint.

Throughout the process of analysis and evaluation, Florida Tech has ultimately discovered that revisiting the cabling specification and settling on a single high-performance copper and fiber cable and connectivity solution would ensure a higher quality end-to-end infrastructure with application assurance, better pricing and availability, more efficient inventory management, ongoing technical support, and ultimately easier upgrades.

Time for a Refresh

As is the case with most colleges and universities today, the availability and speed of the campuswide network is critical to remaining competitive and attracting the best students, with pervasive Wi-Fi as one of the top demands among students. Florida Tech is no exception. Just a few years ago, the campus offered very limited Wi-Fi, and some buildings were still wired with outdated category 3 twisted-pair copper cabling. With a maximum frequency of just 16 MHz, category 3 cables can only handle network speeds of about 10 Mbps, which can require nearly an hour to download an average 4.5 gigabyte video.

Colleges and universities ranked by the Princeton Review as “connected campuses” are no longer based on every dorm room having its own phone line like they were two decades ago. Considered the benchmark by which many students evaluate their choice of higher education, the Princeton Review now bases their ranking on factors such as the level of wireless network access and
bandwidth, as well as technology services such as remote access to email and online course offerings and administrative and registration functions.

"Like most universities, our network definitely needed a refresh, including upgrading from traditional PBX telephony and overhauling our network security. From a student perspective, the expectation for pervasive Wi-Fi is the biggest driver—lack of Wi-Fi in any area on campus is the number one complaint we see from today's younger demographic who, on average, all carry a minimum of two devices," says Eric Kledzik, CIO and vice president for information technology at Florida Tech. "Everyone today is looking at technology, and we need to keep up."

To improve communications, support advancing technology, and enable pervasive Wi-Fi and higher speeds across campus, Florida Tech realized the need to upgrade cabling infrastructure across campus from existing category 3, 5 and 5e cabling to category 6 cabling capable of supporting speeds of 1 Gbps.

Eliminating the Hodgepodge

While Florida Tech has a list of preferred contractors, over the years those contractors have quoted a variety of cable and connectivity solutions for the infrastructure. As a result, Florida Tech ended up with a hodgepodge of inventory and mismatched components. For in-house smaller projects and moves, adds, and changes performed by the institution's own infrastructure team, this hodgepodge of components caused headaches.

Having a variety of products can be extremely frustrating for campus technicians. While cables and connectors may all be interoperable and standards based from a performance standpoint, components such as patch panels and faceplates are typically designed to work with their specific manufacturer’s connectors. "When you need to replace a jack and it doesn't fit in a faceplate, it can be a frustrating and time-consuming process for our team," says Hilary Schrey, operations manager for Florida Tech telecommunications department, which is responsible for establishing cabling plans for new buildings and remodels, as well as assuring that all cabling standards are in compliance and overseeing quality assurance.

In addition to mismatched components, Florida Tech acknowledges that certain products are tuned to work together in ways that can exceed standards-based performance parameters and provide more headroom. In contrast to mixing and matching various components, end-to-end systems also typically come with a warranty and a certain level of application assurance. Overall quality and reliability can also vary from system to system, not to mention price.

When it comes to selecting an end-to-end system, one of the more difficult tasks is sorting through manufacturer-provided data, including independent test results, warranty claims, and available support services. While independent testing goes a long way to ensure validity of performance claims, it leaves some holes. For instance, results can be based on different channel lengths, and manufacturers can choose to hand pick the components used in the testing or use pre-terminated solutions rather than field termination. Unless testing procedures mimic typical field installations, such as testing components procured through distribution and terminated on site, performance values in independent test reports may not be representative of actual field performance. While some institutions perform their own “bake-offs” rather than relying upon independent test reports, having several different components already installed across campus allowed Florida Tech to see firsthand how the various systems performed in a real-life scenario.

At a time when Florida Tech did not have a standard in place, SENA-TECH, one of the institute's preferred low-voltage installers responsible for much of Florida Tech's network infrastructure upgrades and new builds, chose to deploy higher quality infrastructure components that offered superior performance. This ultimately demonstrated that quality and performance matter when striving to deliver a certain level of network service to students and staff.

"We have had various standards in place, and a significant portion of our network was made up of components from one manufacturer whose pricing worked well for us," says Schrey. "But in some locations, we saw that network links comprised of the higher-end components were outperforming the others and providing us with more headroom. In those locations, we did not have to drop below the level of service that we were aiming to deliver." Having enough headroom was especially a concern for longer links and environments subjected to interference from electrical transformers and other equipment.

Beyond the Headroom

While Florida Tech recognized the higher performing areas of the network, there were some limiting factors that prevented them from standardizing on the higher performing systems, primarily concerns surrounding pricing and availability. SENA-TECH and the manufacturer of the higher performing products worked together to address Florida Tech's concerns, including working with the local distributor to establish special fixed pricing and inventory that allowed Florida Tech to stay within budget and ensure available product when needed.

While network performance, pricing, and availability are the top concerns when it comes to specifying one manufacturer's components, other considerations include the quality and availability of training programs, value-added support services, and warranties. Services such as design assistance, contractor referrals, and installation audits can also be beneficial to educational institutions—
and when these services are developed and funded by the manufacturer rather than fee-based, it shows a certain level of customer support and commitment. These services can especially be of value when an institution is planning a significant upgrade or new build. With several major projects on the horizon, including the new data center, Florida Tech realized the benefit of partnering with a manufacturer who was committed to helping them throughout the entire process.

In addition to design services, the manufacturer provided certified installer training for Florida Tech’s infrastructure team. “We enjoy partnering with institutions that take an active role in fully understanding the various components that make up their network infrastructure,” says John Kwong, senior technical service manager for Siemian, who provided the on-site training. “One of the main advantages of certifying Florida Tech’s IT staff is that it allows the institution to conduct its own moves, adds, and changes and still maintain the system warranty.

“With much of their inventory consisting of another manufacturer’s cable and connectivity,” says Steven Terry, owner of SENA-TECH, “I remember Florida Tech at first being hesitant about revisiting their spec. But with our continued advocacy for higher performance components and the ability to work with the manufacturer and distribution to deliver the right pricing and availability, the institute took a closer look at the additional value-added services available and realized that the decision was a no-brainer. There was also the fact that the manufacturer is a family-owned company with components made in America, and they really demonstrated an interest in helping Florida Tech fulfill their future technology plans and goals.”

In addition, a breadth of product was also part of the decision to revisit the spec and settle on a single end-to-end system. One area on campus that needed an infrastructure upgrade included the Clemente Center. Home to the Florida Tech Panthers, this state-of-the-art athletic facility includes several areas subjected to harsher elements. For example, rolling network equipment carts for outdoor events need to plug into outside weather-tight connections for network access. The manufacturer also provided ruggedized fiber and copper solutions with connectors and patch cords that provide an IP66/IP67-rated seal to protect plugs and outlets. Offering total protection against dust and water ingress, the IP66/IP67 rating is a standards-based rating for ingress protection (IP) developed by the European Committee for Electro Technical Standardization (CENELEC).

Progress Well Underway
Florida Tech is now well on its way to completing a campus-wide infrastructure upgrade to category 6 cabling and 1 Gbps speeds to client devices, including the brand new 11,500-square-foot Student Design Center for Florida Tech’s Colleges of Engineering and Science. Throughout the campus, the cabling is being used to connect everything from the new unified telephony platform, computers, and wireless access points to surveillance cameras, access controllers, and even building-automation controllers. Many of the devices, including all of the new VoIP phones and wireless access points, are also remotely powered over the cabling using PoE technology.

“We are rolling out a lot more PoE than ever before,” says Scott McGill, senior network engineer for Florida Tech.

While category 6A cabling is the latest standards-based cabling available to support speeds of 10 Gbps, Florida Tech does not yet have the need for these speeds to the desktop or end device. “Currently, everything we do in the horizontal infrastructure is fully supported by category 6 cabling and 1 gigabit speeds to all client devices. We also have a 10 gigabit backbone fiber ring between core switches,” explains McGill. “When we need to deliver 10 gigabit speeds to the desktop, we will then need to upgrade our core switches and backbone speeds. Given our needs, renovation timeline and expected infrastructure lifespan, we are at least 5 to 7 years out from needing to upgrade.” Pathways at Florida Tech would also need to be upgraded in many locations to support the larger diameter of category 6A cable.

Supported by the cabling upgrade, Florida Tech has also made significant progress in improving Wi-Fi access across campus. While they have successfully increased the number of wireless access points from 325 to approximately 1,400, students are still demanding Wi-Fi in more unusual spaces, which does present a challenge moving forward.

“When it comes to student demand, it’s all about Wi-Fi, and many of our wired connections go unused. We now have Wi-Fi access for all indoor locations and outdoors in common areas,” says McGill. “We are doing our best, but deploying prevalent outdoor Wi-Fi in additional uncommon areas is a bit trickier as it can be difficult to find a means for mounting and connecting wireless access points and delivering power.”

Fiber Link to Florida LambdaRail
One of Florida Tech’s biggest technology projects currently taking place is the deployment of fiber from the campus to the Florida LambdaRail (www.flrnet.org), an independent research and education network. Florida LambdaRail is owned and operated on behalf of partner institutions, including Florida Tech, who is an equity partner in the network and currently sits on its Board of Directors. The Florida LambdaRail provides an ultra-high speed, inter-connected, broadband service delivery network that enables Florida’s higher education institutions and partners to collaborate, connect, utilize, and develop new, innovative broadband applications and services in
support of scientific research, education, and 21st century economy initiatives.

"Internet service providers are no longer interested in selling dark outside plant fiber links, and we are currently paying a transfer fee to use someone else's fiber. So we essentially need to become a private utility and deploy institution-owned direct fiber links to the Florida LambdaRail network," says Kledzik. "The LambdaRail network is rated for 100 gigabit capacity—it's where we get our Internet service and how we communicate with other universities."

This significant undertaking involves the deployment of approximately 17,000 feet (more than 3 miles) of 24 strands of outside plant singlemode fiber from the campus to the closest LambdaRail connection point. "Deploying outside fiber links involves underground directional boring and a lot of logistics coordination with the city of Melbourne and Florida's department of transportation," explains SENA-TECH's Steven Terry. "We are installing four 1.5 inch conduits to connect an off-campus building and the main feed to the LambdaRail, and we have to be very careful to stay away from other underground services, such as gas, water, and other fiber links." Considering the disruption and cost to deploy more than three miles of underground fiber, Florida Tech has ensured a future-proofed installation, using just one of the four conduits for current needs and saving the remaining three for the future.

With its revised spec in place that standardizes on a single high-performance cabling system with a variety of value-added services, Florida Tech's next big project is already on the right path. Over the next few years, the institute will embark on building a new data center from the ground up, which will consolidate many systems, improve the overall performance of the network, and provide the scalability for the institute to continue keeping up with technology. The data center will also be a key showcase for the institute and included in future campus tours.

"While we are still a ways out from completion of the new data center, our decision to revisit the spec has already paid off," says Kledzik. "The same manufacturer of the higher quality components actually had one of its data center experts come to our facility to help us with the planning and design and to highlight some key considerations that will help ensure scalability, performance, and reliability. We have never received that type of service before from a network infrastructure provider."

**Final Thought**

It seems right that a technical university would lead the way to a successful educational experience via technology. Florida Tech and its industry partners are moving the bar a notch higher.

Daniel Flores joined Florida Tech in early 2012. He has more than 15 years of experience in the IT industry with extensive knowledge of infrastructure planning and implementation. He can be reached at dflores@fit.edu.
2016 Award Winners

At the Annual Conference each year, ACUTA is proud to recognize some members who have contributed their time and talents in very special ways. Here are the two people who were honored in 2016 for giving their best efforts to strengthen ACUTA and make the association more valuable for everyone.

Bill D. Morris Award
Matt Arthur
Washington University in St. Louis

As ACUTA members know, the Bill D. Morris Award represents our highest level of recognition. The recipient, in the estimation of the president, exemplifies the dedication, vision, professionalism, and leadership that Bill brought to this organization as ACUTA president.

The winner of this award for 2016 is Matt Arthur, director of Incident Communications and Media Services at Washington University in St. Louis. Since joining ACUTA in 2000, Matt has presented at seminars, conferences, and webinars and has served the association as program chair, director-at-large, and eventually as president. He continues to volunteer on the Ambassadors Task Force, Awards Committee, and the Journal Editorial Review Board.

During his year as president, Matt was called upon to support the organization in a way that could not have been anticipated. ACUTA CEO Jeri Semer became ill and was unable to fulfill her duties. Before her unfortunate passing in April 2011, Matt spent countless additional hours as president mentoring and supporting the staff and making sure that ACUTA was running smoothly during a difficult time.

Presenting the award at the Annual Conference, President Michele Morrison said, "When I think back to how Bill D. Morris led the association through the hiring of full-time staff, I truly believe that it is even more fitting to award this honor to someone who stepped up to support our staff in a time of crisis."

ACUTA is proud to recognize Matt Arthur, and expresses our appreciation for his commitment and service.

Jeri Semer Volunteer Recognition Award
Neal Tilley
Alcatel-Lucent Enterprise

This award is granted to a member who has provided extraordinary service during the year but is not a board member or a committee chair. The award was established in 2012 to honor the late Jeri Semer, ACUTA executive director from 1994 to 2011, who saw the future of the organization reflected in its active members, and who did much to foster the growth of our extensive volunteer program.

This year's award goes to Neal Tilley, who, in the opinion of ACUTA's president, president-elect, and CEO, has surpassed expectations in volunteering time and efforts for ACUTA. He has only been a member since 2013, but if you have attended an ACUTA event in the last year, odds are that you have met him. An enthusiastic supporter of ACUTA, Neal says he wants to watch us grow. He likes to bring to us new marketing and promotional ideas as well as member prospects, and he often shares membership and event information with people he meets at other industry events.

An active member of the Program/Content Committee, Neal frequently recommends and helps secure presenters for ACUTA events, not only from the existing ACUTA family, but new presenters, sometimes even from nonmember institutions, which helps us build our network and brand reach.

Neal has truly gone above and beyond to serve ACUTA and bring new ideas and opportunities to the entire ACUTA membership, and we are proud to honor him with this award.
Institutional Excellence Award

In this year's competition for ACUTA's highest institutional award, Northeast Community College and California State University at Fullerton won top honors. An honorable mention was also presented to North Dakota State University. In future ACUTA Journals, each of these projects will be featured to provide detailed descriptions of the exciting things Telecom/IT is doing on these campuses. We congratulate the three schools and encourage every school to consider submitting a project from its own campus in the 2016-17 competition.

Awards Committee
Chair: Mark Reynolds, Univ. of New Mexico
Eric Alborn, Univ. of Wisconsin–Madison
Matt Arthur, Washington University in St. Louis
Christian Bonforti, Lynn University
Frank Cafasso, Wagner College
Scott Claverie, California State Univ., Chico
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Joe Harrington, Boston College
Christopher Megill, The George Washington Univ.
Christine Mulvey, Marist College
Ex-Officio
Michele Morrison, ACUTA President
British Columbia Institute of Technology
Corinne Hoch, ACUTA CEO
Lisa Thornton, Staff Liaison

Invite a Nonmember to Join

The ACUTA awards program is just one of many benefits of the association. If you know a campus that is not a member of ACUTA, invite your counterpart to become a part of our network. Although your invitation to your peers is much more significant, the office staff will be happy to follow up on your suggestions for new members. Just call Lori Dodson at 859/721-1658 or email ldodson@acuta.org.
The ACUTA Journal Wants Your Story!

For 19 years (that's 79 issues now), the ACUTA Journal has brought you the insights and experiences of campuses from coast to coast about every imaginable topic of relevance to higher ed technology.

We consistently hear that campus case studies are the most useful articles of all. You like to know what others are doing—what has worked and not worked—to help you make important decisions.

Has your campus implemented a new procedure or a new strategy?

Have you discovered a shortcut that might benefit others?

Is there an application or program that resolved some really tough issue for you?

The next few issues of the Journal will consider some very interesting topics:

2016
- Fall: POTS and PANs: What's Cooking in the IT Kitchen?
- Winter: 2020: Vision of the Future

2017
- Summer: Student Services: Meeting Needs and Expectations
- Fall: Providing Telephony on Today's Terms
- Winter: The Business Side of the IT/Telecom Office

You are cordially invited to share your own campus story with other members via the ACUTA Journal. If you don't have time to write it, just contact editor Pat Scott at pscott@acuta.org, and she will connect you with someone who will work with you to get this done.

It's an opportunity for excellent visibility and recognition for your school, your department, and yourself.

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Thank you for reading the ACUTA Journal!

We hope you found our digital format convenient and enjoyable and the content interesting and useful. We welcome your comments at any time. To share a story with our audience, please contact Pat Scott, ACUTA Communications Director, at 859-721-1659 or pscott@acuta.org.

For the remainder of 2016, our Journal will focus on the following topics:

Fall: POTS and PANs: What's Cooking in the IT Kitchen?
Winter: 2020: Vision of the Future

Tell your story in the next ACUTA Journal!