



THE PERSONAL CLOUD: **Empowering** Users, **Enabling** Productivity



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Like it or not, personal technology has arrived in the enterprise.

Nearly half of all information workers, **48 percent, use their personal technology devices in the workplace**, and 12 percent of them do it despite IT prohibitions against the practice. What's more, 43 percent of employees say they use personal software at work, even though a quarter of the applications are not approved by IT.

These stats, from a 2012 Alcatel-Lucent study, make it clear that the bring-your-own-device (BYOD) era is upon us. Many of your employees, and virtually all soon-to-be college grads who will become your employees, have grown up around the Internet, video, social media and mobile devices that just keep getting more powerful. They are used to computing devices that are always on, constantly connected.

And their digital identities are not tied to any single device. They may check e-mail, Facebook and YouTube from a laptop, tablet or smartphone—it's all the same. Think of it as a personal cloud.

As we usher in the personal cloud, we also mark the end of the PC era. At work these employees expect the same level of simple, effective connectivity and communication from their desktop computer as well as the personal device of their choosing.

Rather than view this expectation as a problem to be dealt with, as many respondents to the Alcatel-Lucent survey apparently do, businesses should view it as an opportunity to be embraced. After all, there's a reason all these devices and services have become so popular: They're effective.

Embracing this new reality of the personal cloud requires IT to take a hard look at its network and data infrastructure to ensure that it is well suited to delivering on these new expectations while remaining secure and cost-effective.

Introducing the Personal Cloud

The personal cloud describes a mobile computing and communications environment in which users have several expectations, namely:

- ▶ The ability to seamlessly merge the personal and professional use of their various devices
- ▶ Easy access to the services and applications they've grown accustomed to, again across both their professional and personal lives—and yes, that includes social media sites
- ▶ The ability to easily move files from one device to another, a task that services such as Dropbox make quite simple in the consumer world
- ▶ Complete control over how they communicate, choosing from voice, video and text at will—meaning that all three must be available on all of their computing and communications devices

IT Challenges

Clearly, meeting these expectations presents challenges to IT. First and foremost is security. Although services such as Dropbox are great for sharing photos among devices or with friends, they don't have the kind of security that companies need in order to protect intellectual property and to ensure regulatory compliance.

The idea of users employing multiple devices day to day also dramatically multiplies the sheer number of devices that IT must secure. Clearly, the traditional model of security tied to the device will quickly become too complex. What's needed is security that's tied to the person, with policies that apply to whatever device that person may employ at any given time.

Bandwidth is another issue. In a world where most every device is video-capable, bandwidth requirements can increase dramatically. That goes for both wired and wireless networks, given that users expect to be connected no matter where they may be. IT needs a way to control bandwidth usage to ensure that business-related video sessions get preference over the ability of employees to check out the latest viral YouTube video. Such tools are crucial for ensuring that users consistently experience good response times no matter what application they're using, from any device and location.

In short, IT has several issues to confront and prepare for to be ready to support users in the era of BYOD and personal clouds.



Build Your Own Destiny

What's required is a new architecture that can meet the various demands of both the user and IT sides. It's an architecture that must be user-centric, not device-centric, meaning that it must be able to deliver applications, data and services to a user in the most appropriate fashion, depending on which device that person is employing at the moment and the type of connections.

The architecture must also be capable of handling multimedia sessions that include not only voice but also video and collaborative applications such as online whiteboards. This means that it has to support not only one-to-one communications but also one-to-many.

To bring real value to end users, these services must be inherently simple to use, just like their consumer counterparts. The days of spending the first 10 minutes of a meeting getting the video set up are over; today's users expect to be able to click and connect, no matter if it's a simple voice call or a videoconference with 10 colleagues.

At the same time, the environment can't introduce new complexity for IT. In an era of "do more with less," the tools have to be as simple for IT to deploy and manage as they are for employees to use.

The Personal Cloud Vision

When all the parts come together, the result is a powerful communications environment that enables employees to be more effective.

Imagine that an employee we'll call John needs to get in touch with a coworker, Jane, to ask a question. In his Favorites folder, John sees an image of Jane and a presence indicator showing she's available and not currently engaged in another conversation.

John sends Jane a quick text asking, "Got time for a quick chat?" Jane responds, "Sure," at which point John clicks the phone icon to call Jane. As the discussion progresses, they realize they need input from a third colleague, Kurt. John finds Kurt in the company directory. Kurt's presence indicator shows he's out of the office but available, so John swipes Kurt's image to drag him into the conference. Nobody is put on hold, and John and Jane keep talking the whole time. Soon Kurt picks up and is now conferencing with the other two.

As they discuss the issue, they realize it'd be helpful to draw some diagrams. With another couple of clicks, John launches a whiteboard. At the same time, the trio agrees that video might help them get to the bottom of the issue faster, so Jane clicks the video icon and, just like that, launches a three-way videoconference to go along with the whiteboard—even though Kurt is on the road, using a tablet at a client site. He has only a couple of minutes before a meeting, so he quickly offers his opinion and then drops off. John and Jane continue the discussion until the matter is settled. When they're done, John saves the whiteboard drawing to his desktop for reference.

In an era of “do more with less,” the tools have to be as simple for IT to deploy and manage as they are for employees to use.

OpenTouch comes with everything customers need for building a multimedia collaboration infrastructure that works with multiple end user devices. Yet it's inherently easy to deploy, because it includes profiling capability that makes it easy to configure as you add new users. A profile for “salesperson,” for example, automatically administers all the features and functions a salesperson needs. What's more, customers can implement features at their own pace. All the required software is included, but customers can pick and choose the features they want to implement, paying only for what they use.

Alcatel-Lucent Delivers

That's the kind of communication that's possible when you break down the silos of telephony, conferencing, collaboration, instant messaging and presence and bring them all together as part of one dynamic conversation flow. That's exactly what the Alcatel-Lucent OpenTouch family of products does.

OpenTouch offers the kind of collaborative communication experience that users are accustomed to in the consumer world but adds to it features and functions that make it suitable for the enterprise. Specifically, it brings five essential attributes to the business environment:

- ▶ Real-time, dynamic conferencing of the sort described above.
- ▶ User-centric connections, where you call a particular user, not a device; OpenTouch brings the call to whatever devices are available to the user at the time, and the user decides which one to answer. If the user answers on his desk phone but later wants to transfer to his cell phone, no problem—and no interruption.
- ▶ Meaningful presence information to put context around a contact's availability.
- ▶ Native video capabilities that take advantage of the video capabilities built into most devices and makes possible multiparty videoconferencing without the need for expensive, complex bridging equipment.
- ▶ Social knowledge and applications context, enabling users to tap into social networks to find contacts and link to outside sources.

OpenTouch Family

OpenTouch builds on the long history Alcatel-Lucent has in IP telephony with its OmniPCX Enterprise Communications Server. OmniPCX combines IP telephony and multimedia communications functions with unified messaging, a Web soft phone and personal assistant applications—more than 500 features in all.

OpenTouch Business Edition includes OmniPCX along with bridging software for voice and video, IM and presence capabilities—all on a single server. It's suitable for as many as 1,500 users. For larger organizations, the OpenTouch Multimedia Services edition is used in conjunction with OmniPCX.

The latest addition to the OpenTouch family is an iPad app, OpenTouch Conversation. It takes advantage of the Apple iPad user interface, enabling users to swipe through a highly visual list of contacts and past conversations, for example. Adding a contact to a conversation is as simple as dragging and dropping that person's contact card. The application is as easy to install as any other iPad app, because it's available from the App Store. And the iPad is just the first device for which Conversation will be available; others will be coming soon.

Enterprise Infrastructure

Ensuring that all these collaborative applications work as intended, with the appropriate performance, means building them on top of an enterprise infrastructure that's up to the task.

The solution has to be able to set up and tear down conversations that are tied to a user, not a device. That's the only way features such as the ability to transfer a call from a desk phone to a mobile phone will work. Similarly, the infrastructure has to be able to handle the ability to “upgrade” a conversation from voice to video as required, and back again.

And the infrastructure has to be intelligent enough to recognize and prioritize applications, to ensure that each gets an appropriate level of security, quality of service and bandwidth.

A Switch for All Reasons

Alcatel-Lucent meets all those requirements and more with its lineup of access and core switches, WLAN controllers and access points and management software.

At the network edge, options start with the OmniSwitch 6250, with its 10/100M user ports with 1Gbps uplink. Next up is the new OmniSwitch 6450 Layer 2+, which has “pay as you grow” options for 10/100/1000 with 1G or 10Gbps uplinks. At the high end is the 6850, a full-featured Layer 3 switch with 10/100/1000M user or server ports and 1G or 10Gbps uplinks. For wireless access, the OmniAccess Wireless LAN controllers and access points are likewise highly scalable to meet every customer's needs.

Eventually, traffic from all the edge devices feeds into the data center, where the servers that drive the virtualized cloud environment live. In today's virtualized environment, applications can communicate with one another, server to server, creating an "east/west" traffic flow that is dramatically different from the "north/south" trajectory of traditional client/server networks. This communication must occur quickly without end user awareness or disruption. Therefore, it's important to limit the latency of traffic between any two servers, especially when so much of that traffic is now delay-averse applications such as voice and video.

That's where the Alcatel-Lucent pod/mesh architecture shines. The pod/mesh architecture enables IT organizations to create an elastic switching fabric that is highly scalable, reduces the number of hops between servers and offers extremely low latency. For example, connecting six OmniSwitch 6900 switches together creates a "Pod" that provides 240 10Gbps server ports, with an aggregate of only 2 microseconds of latency between any two servers. If that's not enough, the technology scales upward so that a group of five Pods can be joined together into a "Super Pod" to provide 1,200 10Gbps server ports with an aggregate of as little as 4-microsecond latency between any two servers. Further still, Super PODs can be interconnected into the OmniSwitch 10K Modular LAN Chassis, which builds the Mesh and provides 14,400 10Gbps server ports with an aggregate of as little as 5-microsecond latency between any two ports. The OmniSwitch 6900 and 10K portfolio are also extremely energy-efficient, providing perhaps the highest port density at the lowest total cost of ownership in the industry.

In addition, Alcatel-Lucent's DataCenter suite of products includes a feature called Virtual Network Profile, which enables the switches to recognize and automatically provision ports based on virtual machine movement. This feature, along with Alcatel-Lucent's Virtual Mobility Manager, works with industry-leading virtualization software to enable easy and rapid changes to the virtual environment. They also enable IT to locate and track virtual machines as they move, easing the management burden and eliminating manual intervention by the server and network groups.

As virtual machines move, they carry with them various applications, all with different requirements in terms of quality of service, bandwidth, security and priorities, posing a significant challenge for the IT staff. The ideal is a network that dynamically adjusts to these changes without the need for manual intervention. In its latest generation of switches, this is exactly what Alcatel-Lucent provides with its Application Fluent Networking solution. This capability enables the network to recognize applications and their requirements so that as virtual machines move, the network automatically and instantly adapts.

Those that embrace the personal cloud will thrive, in that they'll have employees using the devices of their choice—the ones that make them most productive.

End-to-End Security

Finally, with its SafeNAC network access control software, Alcatel-Lucent is able to address what many consider the thorniest issue with BYOD: security. No matter how users connect to the network or what device they use, SafeNAC works in conjunction with the edge switches and wireless controllers to ensure that all users are who they say they are and are allowed access only to those resources for which they're authorized.

Edge switches contain a feature called Access Guardian that performs the initial access control checks. Higher-end edge switches such as the OS6850 contain a feature, User Network Profile, that works similarly to the Virtual Network Profile feature. User Network Profile enables the switch to identify and autoprovision ports based on the identity and role of the user who is connecting to the port, assigning each the appropriate quality of service, bandwidth, priority, VLAN and security. This sort of role-based access plays into Alcatel-Lucent's philosophy that the port or the device isn't as important as the identity and role a given user has.

Another optional, yet key, SafeNAC component is the InfoExpress CyberGatekeeper, which ensures that all devices are virus-free and meet corporate security policy in terms of antivirus software, patches and the like and remediates or quarantines any that don't. And that's not just a one-time check; users are continually checked while they're on the network, to ensure that they don't pick up any malware and infect the network once they pass their initial host integrity checks.

Embrace the Personal Cloud

That's the type of comprehensive security and performance that organizations are going to need in the BYOD and personal cloud era. Those that embrace the personal cloud will thrive, in that they'll have employees using the devices of their choice—the ones that make them most productive.

But it does require a shift in thinking about the way we build and operate networks, a shift to a user-centric, rather than device-centric, approach to communications. This new infrastructure has to include tools that are easy to use—for end users as well as IT—effective and adaptive to rapid and unexpected changes. And, of course, it has to provide the performance the cloud era demands and that the Pod/Mesh architecture delivers.

In short, Alcatel-Lucent has what you need in order to deliver on the vision of the personal cloud. To learn more, visit <http://enterprise.alcatel-lucent.com>. ■

CASE STUDY: **HIGHER EDUCATION**



Abilene Christian University Mobilizes Alcatel-Lucent Unified Communications ON APPLE IPHONES

Abilene Christian University provides its students iPods / iPhones supported by an Alcatel-Lucent network infrastructure

CHALLENGES

- Teaching tech savvy Generation Y students
- Next generation application enablement

SOLUTION

- Alcatel-Lucent OmniSwitch Chassis LAN Switches
- Alcatel-Lucent OmniAccess Wireless LAN Switches and Access Points
- Alcatel-Lucent OmniTouch My Teamwork and related applications

BENEFITS

- Mobility accelerated learning and collaboration process
- New style of learning supported leveraging the features of iPhone
- Achieve the goal of becoming a world leader in use of mobile devices in higher education

“Alcatel-Lucent has been one of the few partners we have had that opens their doors and says, ‘here is what we have got in the pipeline’. Alcatel-Lucent has definitely positioned us, and themselves, to be an innovation leader. We are happy with the access we’ve had to the day-to-day sales folks but also to the thought leaders that are in Bell Labs.”

Kevin Roberts, Associate Vice-President of Operations at Abilene Christian University

Abilene Christian University (ACU) is a vibrant, innovative, Christcentered community that engages students in authentic spiritual and intellectual growth, equipping them to make a real difference in the world. As part of a program using innovative technology to enhance learning, ACU is the first university in the United States to provide each incoming student with an Apple iPhone or iPod touch.

Founded in 1906, Abilene Christian University (ACU) is located 180 miles west of Dallas in Abilene, Texas. ACU is one of the largest private universities in the southwestern U.S. with an enrollment of about 4,800 students.

Alcatel-Lucent, a partner with Abilene Christian University since 2001, provides ACU a wired and wireless multimedia network environment that gives students unique services customized for these devices and access to information wherever and whenever they need it. Students can access course calendars, campus maps, receive homework alerts, security alerts, and answer in-class surveys and quizzes, among other ACU developed web applications. This business model at ACU represents a new way of thinking for communications providers. Rather than following a traditional model of building products and trying to find customers that will need them, Alcatel-Lucent is partnering with strategic customers to develop unique and innovative solutions from the ground up.

APPLICATION ENABLEMENT: CAPACITY REQUIREMENTS

To support these goals, ACU deployed an advanced fiber optic network that delivers campus-wide IP telephony with advanced calling features that includes support for the analog phones already on campus. It provides secure VLAN campus networking with intrusion detection and prevention, virus containment, and firewalls. Through strategic design, Abilene Christian has full wireless coverage across the 208-acre campus—covering in-building and outdoor spaces—to enhance students’ mobile learning experience.

The Alcatel-Lucent products deployed by ACU include network infrastructure components comprised of OmniSwitch LAN switches and the Omni-Access Wireless LAN product family. For application enablement, Omni-Touch My Teamwork was the linchpin of the entire project. The ability to use the My Teamwork APIs (application programming interfaces) to identify and integrate with critical subcomponents of other systems allowed multiple, multi-party innovations.

Mobilizing learning has become a campus-wide program called ACU Connected. Students and faculty have developed numerous ways to leverage mobile and revolutionize campus life at the university level and for K-12. New applications range from in-class learning tools to mobile interaction during theater productions. Abilene Christian launched a YouTube page to memorialize its efforts at: go.acu.edu/kpwgn. The university is now also exploring distribution and use of iPads, which have already been given to Physical Resources staff for managing work orders.

“As we started with a mobile device that is Wi-Fi enabled, it was significant for us to be able to provide and to engage Alcatel-Lucent in a process where we refocused our efforts on capacity as opposed to coverage when it came to the Wi-Fi system,” said Arthur Brant. With adding thousands of devices to the network, the system had to have the capacity to scale both in terms of user support as well as the number of applications.

CASE STUDY: HIGHER EDUCATION

"In that discussion, Alcatel-Lucent told us that they have a much broader feature set that ACU could benefit from so we started talking about communication enablement for applications such as web apps and support for the new iPhones and iPod Touches."

GENERATION Y – A DIFFERENT WAY OF LEARNING

Today's learners are different. This generation is different. They have grown up connected in ways that older generations cannot even imagine. They have always had the Internet, they have always had cell phones. They always need to be connected. Their learning styles are just as different. The world that this generation (Gen Y) is going to inherit is one that is increasingly mobile, and is increasingly reliant on converged media devices, accessing information anywhere, at anytime.

"We have considered providing laptops to all of our students but research showed that the vast majority of students were already bringing laptops with them to campus. We examined a number of handheld devices, but each presented significant adoption barriers. With the release of the Apple iPhone, and its fully functioning Web browser, we recognized the device as a tipping point. Our faculty tried them out and championed the decision to move forward with the iPhones."

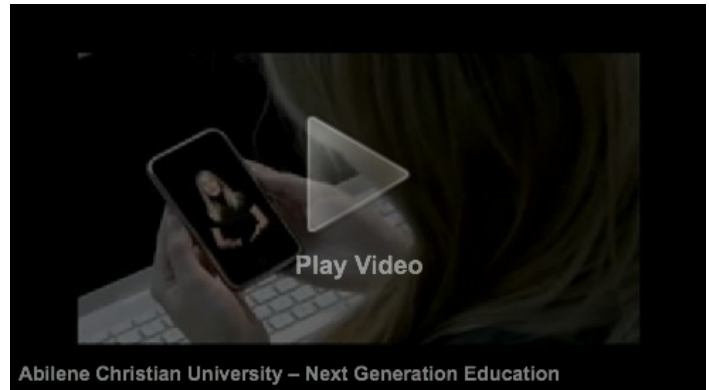
NEW STYLE OF LEARNING SUPPORTED

"So when you talk to parents and you help connect the dots for them and say this is why we are doing this, the response has been overwhelming. Parents of ACU students are very positive about the education their children are receiving at ACU from using the latest in technology to learn," said Kevin Roberts, ACU's Associate Vice President of Operations.

"I have been very proud to talk about this initiative over the past year or so because it was led by the faculty, influencing our learning outcomes," said Roberts. "We are a not-for-profit institution but that does not mean that we are not interested in revenue. 70 percent of our operating revenue comes from tuition revenue and every incremental new student represents about 60,000 dollars of additional revenue. A 1% increase in our retention rate represents about half a million dollars."

ACU has shown to be a true Dynamic Enterprise: by interconnecting their network, people, processes and knowledge, students are able to access the information they need, when they need it. The student's learning experience has been enriched by allowing them to share information and collaborate on projects. The Wi-Fi® access points deployed over ACU provide internet access to the students so they stay connected to the community. By connecting knowledge, ACU has been able to drive learning performance.

ACU was awarded the Dynamic Enterprise Award in 2009 for enhancing learning and supporting mobility with a secure infrastructure. In addition to this recognition, ACU was also selected by a panel of top-ranking industry analysts as the winner of the Dynamic Enterprise Analyst Choice Award. ACU was awarded the Dynamic Enterprise Award in 2009 for enhancing



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INNOVATION

"Alcatel-Lucent has repeatedly sat down and dreamed with us, which has really been refreshing. Those kinds of discussions have only really taken place with Alcatel-Lucent and that puts them in a very special category for us," said Roberts.

WORLDWIDE REACH

"ACU's student population is from around the world," said Arthur Brant. He continued, "this generation is the same wherever you are in terms of the idea of being connected while mobile. It is not limited to the United States. That's the way the world operates now and as a university we need to understand that and embrace it. It will help our students learn better and more while becoming aware of the global economy we live in today. And that is really what we are all about."

TRUE PARTNERSHIP WITH ALCATEL-LUCENT

"One of the things that I have especially appreciated from Alcatel-Lucent is really a partnership endeavor in this," said Kevin Roberts, Associate Vice-President of Operations at Abilene Christian University.

"It has not been a vendor relationship. We were the first school in the world to do anything like this so this was completely new for everyone involved with many unknowns. We solved each problem as it came along as a team. It's really been a very collaborative relationship and it's been a fantastic example of a corporate and educational institution partnership that can be beneficial to both organizations."

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SUCCESS STORY: **HEALTHCARE**



Children's Hospital of Pittsburgh of UPMC

World-class pediatric hospital turns to Alcatel-Lucent for its mission-critical network infrastructure

CHALLENGES

- Improve patient care and outcomes.
- Standardize and refine clinician workflows to allow clinicians to work efficiently and free them up to spend as much time as possible with patients and their families.
- Implement state-of-the-art network infrastructure for both voice and data communications.
- Ensure comprehensive wireless coverage in all care venues.
- Create a stress-free and comforting environment for patients.
- Create a 'quiet' campus with reduced noise levels.
- Create a 'greener' campus by ensuring a paperless environment.

SOLUTION

- IP Telephony Solutions
Alcatel-Lucent OmniPCX™ Enterprise Communications Server.
Alcatel-Lucent 8 Series IP Touch™ Extended Edition Telephones.
- Contact Center
Alcatel-Lucent OmniTouch™ Contact Center — Standard Edition.
- Data Network Solutions
Alcatel-Lucent OmniSwitch™ 9000.
Alcatel-Lucent OmniSwitch™ 9700.
Alcatel-Lucent OmniSwitch™ 6850.
Alcatel-Lucent OmniAccess™ WLAN wireless LAN switch.
Alcatel-Lucent OmniAccess™ WLAN wireless access point.
Alcatel-Lucent 7750 Service Router SR1s.
- Network Management Solutions
Alcatel-Lucent OmniVista™ 4760 Network Management System.
Alcatel-Lucent OmniVista™ 2500/2700 Network Management System.
Alcatel-Lucent OmniAccess™ WLAN [Management Solution].
Alcatel-Lucent OmniVista™ Mobility Manager.
Alcatel-Lucent VitalQIP™ DNS/DHCP IP Management Software.
- Mobility Solutions
Alcatel-Lucent OmniAccess™ Wireless LAN.
- Unified Communications Solutions.
Alcatel-Lucent OmniTouch™ My Teamwork.

ALCATEL-LUCENT PROVIDES NETWORK INFRASTRUCTURE FOR WORLD-CLASS PATIENT CARE

Children's Hospital of Pittsburgh of UPMC (Children's) is one of the top pediatric, research, and medical education facilities in the US. When it opened its new state-of-the-art campus, it turned to Alcatel-Lucent to supply an advanced voice, data, and wireless network infrastructure that would support the hospital's goals for care and research at the new campus.

In May, 2009, Children's Hospital officially opened its new, ten-acre campus in Pittsburgh's Lawrenceville neighborhood. Jacque Dailey, CIO at Children's, says the hospital had high ambitions for the new campus, aiming to set a benchmark for quality care built on some key goals. These include: improving patient care and outcomes; standardizing and refining clinician workflows to allow clinicians to work efficiently and to free them up to spend as much time as possible with patients and their families; creating a stress-free and comforting environment for patients; ensuring a 'quiet' campus with reduced noise levels; and bringing about a 'green' campus.

IP-BASED INFRASTRUCTURE PROVIDES RELIABLE, SECURE, WIRELESS ACCESS, WHEREVER, WHENEVER

Children's is a leading provider of pediatric care, renowned for its outstanding clinical services, research programs, and medical education. Its patients make more than one million visits to Children's main campus, its neighborhood locations, and its community pediatrics practices each year — including more than 65,000 visits annually to its emergency department, 13,000 inpatient stays, and 23,000 surgeries. Ranked among the top eight pediatric hospitals in the US, Children's is also among the top ten recipients of research awards from the National Institutes of Health.

The hospital is one of 20 within the UPMC group — one of the leading non-profit healthcare providers in the United States. A critical strategy for delivering the best possible patient care has been the implementation of HIMSS Stage 7, enabled from day-one by the hospital's network. The Healthcare Information and Management Systems Society (HIMSS) published its 'Electronic Medical Record Adoption Model' in 2005— Stage 7 is the pinnacle stage of a paperless healthcare environment, where paper charts are no longer used to deliver patient care.

"One of the fundamental building blocks for anything we were going to do on the campus was the infrastructure for both voice and data communications," explains Jacque Dailey. "The network is the backbone for all electronic health records, call systems, security systems, communication systems, building automation systems, and biomedical equipment — as well as systems for researchers in our state-of-the-art research center, which houses around 30 NIH-funded scientific research labs and our administrative staff. We wanted to be able to treat the infrastructure like a utility, knowing we would have reliable, secure, wireless access, wherever and whenever we need it."

Dailey says that meant, "at every point of the design, we were asking tough questions about quality of service and redundancy, because not only did the network in its primary configuration have to work, but there had to be redundant routes in the event of a switch failure or electrical outage. We also have to deal with the fact that many patient records, including imaging, are very voluminous, because those patients are very complex cases and have been with us for a long time. We needed extraordinary performance as well as availability from the network in order to pull records to the desktop in a timely manner."

SUCCESS STORY: **HEALTHCARE**

ALCATEL-LUCENT DELIVERS STATE-OF-THE-ART NETWORK INFRASTRUCTURE

To deliver a network with such demanding requirements, Children’s turned to Alcatel-Lucent, which has been providing infrastructure support to UPMC for more than six years. “Alcatel-Lucent was introduced to the project as the latest in the game of any of our key partners,” Dailey points out. “However, they handled the challenge of meeting our deadlines very well. They were able to create a design for the campus based on an Alcatel-Lucent infrastructure in record time, and were very competent in local recruiting and training adequate numbers of staff to get the cabling and server implementation, network validation, and final testing done. They also went through a certification process with every one of our application vendors — more than a hundred — in less than a couple of months in order to get all our applications up on the network. When there were any issues, Alcatel-Lucent addressed them quickly and completely, and the way they partnered with us was extremely positive. I have no regrets, about having selected them and about relying on them to implement at this level of complexity, especially during such a complex and busy time.”

The Alcatel-Lucent Voice over Internet Protocol (VoIP) network — based on a pair of Alcatel-Lucent OmniPCX™ Enterprise communications servers — that has now been implemented, connects users and systems in five buildings on the new campus, and links through UPMC’s Metropolitan Optical Backbone to Children’s offsite data center, which houses most of its applications.

With 400 miles of cabling in the 296-bed main hospital alone, and 2,000 wireless access points, the network provides access for more than 4,000 computers, including mobile monitor carts, and allows alerts and monitoring of patient vitals to be sent directly to nurses’ wireless phones. The network routes all voice and paging calls directly to wireless devices, virtually eliminating these from the public address system, thus making the hospital a quieter, less stressful environment. It also includes a medical Virtual Local Area Network (VLAN) for medical equipment such as Magnetic Resonance Imaging (MRI) scanners, but otherwise acts as a single network, managed by a single team, carrying traffic for all other equipment over the same network.

ELECTRONIC HEALTH RECORDS IMPROVE WORKFLOW AND REDUCE COSTS

The key application running on the network is the hospital’s electronic health record (e-record), which is available across all venues of care, from the emergency department, ambulatory clinics, and inpatient areas at the main campus to satellite locations in the surrounding area, allowing staff to work the same way no matter where they are. Children’s had already rolled out most of these components at its former Oakland campus, so staff would be used to the workflows in the new campus, but the Alcatel-Lucent network provides a comprehensive wireless coverage in all care venues that has allowed Children’s to take e-records to the next level. Children’s was the first pediatric hospital in the US to achieve Stage 7 recognition — the highest level — from HIMSS Analytics for its electronic medical record, and has been recognized by KLAS, an independent health care research organization, as the number one pediatric hospital in its use of healthcare IT.

Children’s has gained several benefits from being able to take use of e-records to the next level, as Dailey explains. “We have been able to reduce our records management footprint on this campus substantially, because we’re no longer storing paper records anywhere anymore. We’re able to use that space to open another revenue-producing depart-

ment, and we’ve been able to move staff that were filing and transporting charts to other roles. We’ve also eliminated the cost of long-term storage — in pediatrics, you have to store records for a further seven years past the time the child turns 18 and becomes old enough to request his or her own records — and this has also eliminated the very high cost of bringing those records back if a child returns to our campus for additional services.”

CLINICAL CARE QUALITY IMPROVEMENTS

On the clinical care side, Dailey says the applications and technologies supported by the network are allowing Children’s to deliver a range of quality improvements. “Because staff have access to the information that they need in order to make the next decision about each child’s care, we’re able to move more quickly for that child and family, and we’re safeguarded from making a potential mistake at the bedside,” she points out. “The [Alcatel-Lucent] network is supporting us to move in the right direction in areas such as reducing medication errors, improving communication, shortening lengths of stay, managing outpatient work, and improving continuity of care by knowing a child’s history in an emergency situation.” The network is also supporting improved workflow and access to systems in Children’s research center. “Many of those researchers are providing patient care, so they’re going back and forth between the hospital, the faculty building, and the research building. We provide them with a reliable service from wherever they are on the campus, or even wherever they are in the world, to whatever resources they need to get to in their labs,” Dailey says.

Finally the network supports administrative systems for both physicians in the campus’ Faculty Pavilion and administrative staff working in the administrative building. “We really do work online the majority of the time,” Dailey says. “Paper files and big file storage units were not moved to the new campus, and we’re managing our paper flows through online workflows and storage of appropriate files online as well.”

All of this is possible, Dailey says, because Children’s is able to “rely on the network to be a utility to our clinicians, researchers, and administrators. They’re able to do their work knowing they can rely on its performance and availability. We don’t have to wonder if it will support things, or if the wireless connectivity will be there; we just continue to add applications and equipment, almost without a second glance. That really helps us advance care in the organization.”

FUTURE DEVELOPMENTS

The hospital is now focused on developing support for the ambulatory side of its operations, where its business is growing rapidly. “We’re doing work both on this campus and to extend our services to further geographies in West Pennsylvania and bordering states,” Dailey explains. “We’re looking at providing access to specialists in pediatrics via telemedicine, and to host clinics in some of our partner adult hospitals. All of that work is very reliant on the network being available.” Dailey adds that Children’s is also looking at using all the data it has been able to acquire through moving to a paperless environment to help improve care. “We can use that data to identify areas for further improvements in workflow and efficiencies, and to identify areas for research projects for our researchers.”

As the hospital moves forward, the network will continue to play a key role. “We will carry on doing projects that are very much dependent on the success of the network that supports them,” Dailey says. “Because of the state-of-the-art network infrastructure we have in place from Alcatel-Lucent, we don’t need to consider additional infrastructure to do those things.”