

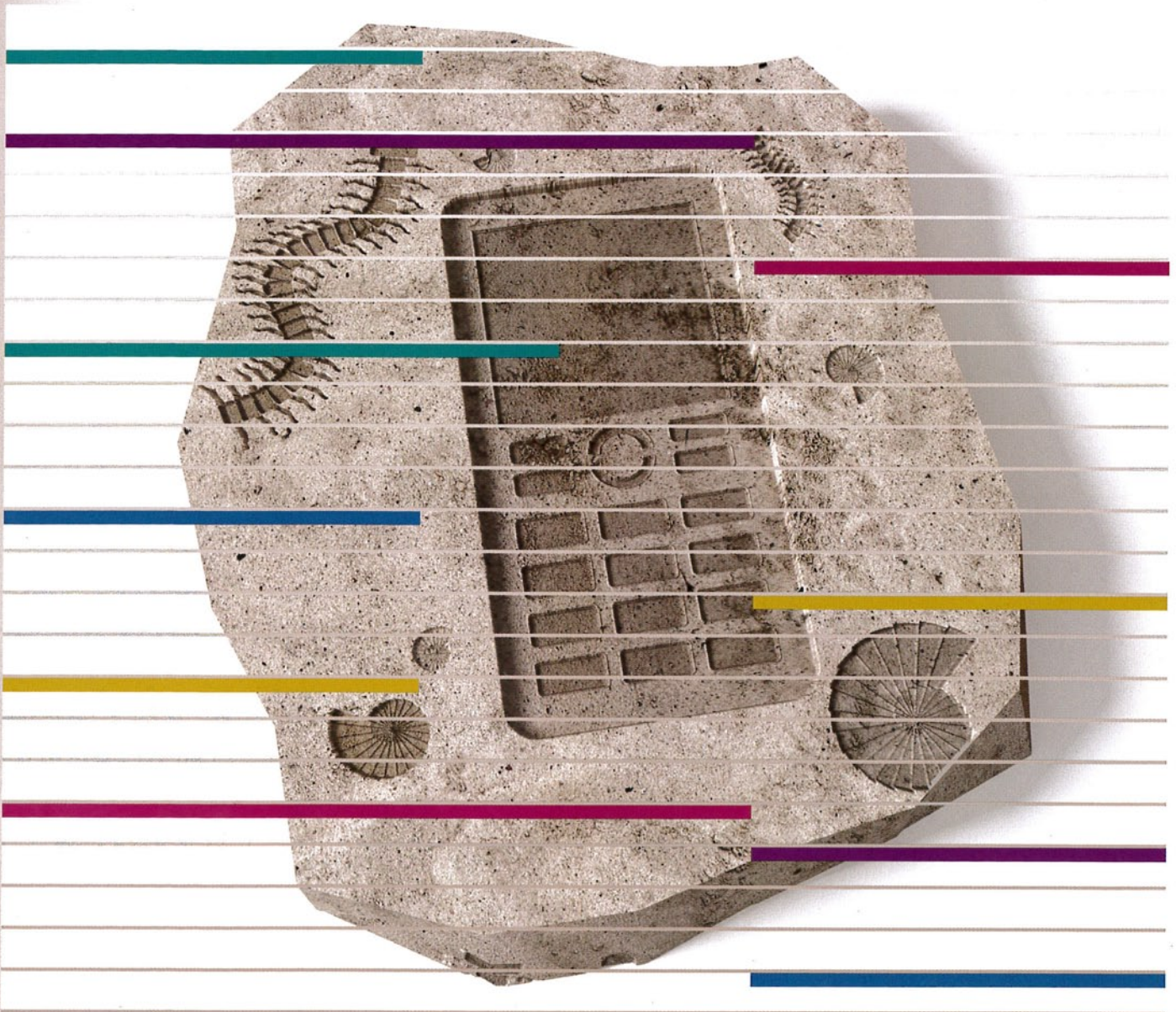
Winter, 2011
Vol.15, No.4

acuta

Journal

of Information Communications Technology in Higher Education

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



This Issue: The Future of Voice Communications

Dual-Mode Smartphones Are Shaping the Future of VoIP

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Today's college students are increasingly learning from settings that don't meet the traditional definition of a classroom. The new educational reality takes the lecture hall and makes it available as a real-time video stream or an on-demand download, while the ubiquitous availability of conferencing applications—many with video and voice capabilities—has enabled students to collaborate across the data network as easily as meeting for a study group. As innovation in classroom technology rapidly moves student learning onto the Web, lecture streaming and other academic advancements are joining the already media-rich landscapes of entertainment and social media vying for valuable bandwidth on the campus network. Now a new take on the traditional application of voice over IP promises to bring the services of yet another industry onto the residential network as advances in mobile VoIP technology allow many users to bypass cellular carriers and use their existing phones and phone numbers to make and receive calls over the wireless network.

The Proliferation of Smartphones

Telecom pundits have long forecasted this *democratization* of communication services, but it's interesting to note how we arrived there. The catalyst is actually clutched in the palm of almost every student's hand—the now-ubiquitous dual-mode smartphone. Dual-mode devices enable students to automatically roam between cellular data networks and campus Wi-Fi networks.

This ability to switch from cellular data to Wi-Fi has become standard fare on most smartphones today. Research firm In-Stat

projects that by 2013 there will be well over 400 million smartphones in active use, capable of utilizing both cellular and broadband wireless networks. This rapid adoption will enable more people to use VoIP over wireless technology, leading researchers to forecast that more than 50 percent of users will use VoIP services to send and receive telephone calls instead of relying on their mobile wireless carrier (projected to soon account for less than 30 percent of voice communication).

Mobile usage of the network has grown rapidly on university campuses since the introduction of the Apple iPhone and Android phones. Students are sophisticated users of multiple platforms, interfaces, and devices, and at any one time, they can use a complex combination of online VoIP providers, traditional cellular plans, online chat, text messaging, mobile VoIP applications, and voice-enabled apps to communicate. We expect this trend to continue and are planning accordingly to support the additional demands on our campus and residential networks.

The Advantages of Cellular Convergence

For IT decision makers already challenged to keep up with skyrocketing bandwidth and mobility demands, the latest trend in a seemingly endless series of “game-changers” may not seem like a welcome development. With a strong network in place, however, the convergence of cellular and VoIP can bring welcome amenities to students frustrated by poor service or restrictive minute allotments. Many college residence halls receive weak cellular reception, creating enormous day-to-day

frustrations for students, almost all of whom use a cell phone as their only means of communication.

The ability to switch from cellular to network communication eliminates the problem of poor in-building cellular coverage, thereby significantly improving resident satisfaction. VoIP communication also bypasses minute limitations imposed by cellular companies, effectively providing unlimited voice calling. Residents can now receive a consistent user experience for their voice and data services as they transition between networks. In addition, students will be able to avoid the significant expense of skyrocketing cellular and international call charges by routing their calls through the lowest-cost devices/applications.

Rapid Adoption Rates for Mobile VoIP

Mobile VoIP's popularity among students indicates a larger trend embraced by enterprise markets. From handheld VoIP applications to desktop videoconferencing, all signs suggest that the broadband network is the new frontier for digital communication, replacing legacy PSTN connectivity more rapidly than ever. Infonetics Research predicts that mobile VoIP subscribers will grow from 47 million in 2010 to almost 410 million by 2015. Indeed, there's been a corresponding boom in the spectrum of mobile VoIP players, including startups, online VoIP providers, and the mobile carriers themselves. Thanks to the convergence of Web 2.0 architecture and ever-increasing bandwidth, new VoIP and IM providers are now jostling for dominance with legacy carriers. Unlike traditional telecom operators, these new knights of conversation come armed with an arsenal that includes global capabilities, "always-on" accessibility, and business models unimaginable just a few years ago.

Another key driver of mobile VoIP proliferation within the student population has been the blending of mobile and Wi-Fi experiences: Voice, text, and chat are now add-on or embedded services in popular applications such as Facebook and games, as well as in newer mobile video and location-based services, such as ChatSquare (for four-square). With the release of iOS 5, Apple's new operating system for the iPhone, users are further able to bypass the traditional text-messaging components of their cellular plan and send unlimited "iMessages" across the data network.

And the potential for application development doesn't end there. As the commoditization of VoIP services (such as basic Skype) continues, providers will explore additional revenue streams from enhanced abilities such as HD voice, video, voice recording, and voice/video conferencing.

Potential Risks for VoIP over Wireless Networks

IP-enabled voice applications are now pervasive throughout campuses and bring the promise of greater interactivity and collaboration at faster speeds than ever before. However, there is a price to pay for "anytime-anywhere" connectivity. Dangers include no call logging or integration with resnet security and compliance capabilities. Like all VoIP services, these applications can also expose the resnet to security breaches such as brute-force attacks on passwords using botnets and cloud-based services; viruses; call or data snooping; spoofing student identities and using illegal accounts; "vishing" (the VoIP version of phishing); and denial of service attacks. There is also generally little coordination or integration with emergency services. When students dial E-911 services, they must be able to identify their locations because it is difficult to keep track of and pinpoint exact user locations. To address these concerns, there will be a

need for formal education at the institution to ensure the safety of the network and its compliance with emergency requirements.

Maximizing the Wireless Network through Fixed Mobile Convergence

So what's today's IT administrator to do? Banning the use of these applications is not a viable long-term solution. Whether your resnet provides wireless voice capabilities or not, students will seek these services out on their own. The goal is to make it easy for students to connect with the right person at the right time, and then use the best form of communication to collect information and collaborate in real time. This requires a stable, robust, and scalable resnet infrastructure that meets the demands of high-bandwidth applications and rich media-hungry devices.

IT administrators should consider voice over WLAN (VoWLAN) an increasingly popular FMC (fixed mobile convergence) solution, as a competitive differentiator and enhancement to core resnet services. Research firm Frost & Sullivan defines an FMC solution as "any feature, service or product that allows a mobile device to connect with the corporate PBX or WLAN to extend telephony features and applications and deliver cost related benefits through the integration of wired and wireless networks."

In addition to maximizing existing resnet investments such as WLAN infrastructure, VoWLAN enables resnet administrators to better manage, monitor, and integrate VoIP usage with existing data stores or back-end applications.

At select schools, IT administrators have worked to strengthen weak cellular coverage by deploying distributed antenna systems (DASs) to extend cellular signals across campus. While these DAS installations may well meet that goal in certain

campus environments, even a perfect DAS deployment is significantly more costly, not to mention frequently carrier specific, than the route of FMC. Even then, while coverage may no longer be an issue, the limitations of bandwidth capacity often remain. Too many mobile devices using bandwidth on a cellular data network will still overload capacity, regardless of how many different ways it is distributed.

An investment in a robust mobile IP network will accomplish the same goal and also create an exponential return on that investment down the road. Being able to rely on high-capacity, high-density wireless coverage throughout the residential community adds value across the entire spectrum of academic use, entertainment, resident retention, and student satisfaction. Having a reliable Wi-Fi network is no longer a luxury but a necessity in student residences. Integrating FMC into the existing wireless network resolves coverage issues, bypasses minute and data caps on student cellular plans, and introduces an attractive, leading-edge amenity to the residence hall.

To gain further perspective on the best complement to the cellular data network, we need only look as far as the cellular carriers themselves. According to DSLReports.com, several major carriers have begun investing heavily in “massive free Wi-Fi zones” in New York City and other high-traffic areas like hotels, stadiums, and public parks, “in order to help take some of the [data burden] off of their historically-strained 3G network.”¹ An article in the July issue of *Forbes* further acknowledged this practice by cellular carriers. “The idea of automatically connecting smartphones to Wi-Fi, when available, appears to be gaining support,” wrote staff writer Elizabeth Woyke. “The appeal, to telcos and other companies that offer cellular service, is the ability to move costly traffic off their

networks while still providing good connectivity to customers.” She continues, “It’s an issue of growing importance as mobile devices chew up an increasing amount of bandwidth.”²

Building a Successful VoWLAN Strategy

Nationwide, an increasing number of higher educational institutions have successfully set up, or are considering setting up, VoWLAN systems for their residential networks and academic buildings. Before deployment, administrators should conduct a site survey and determine if their current resnet/WLANs are able to provide and sustain voice traffic while taking into account facility constructions and potential obstacles to signal coverage. The next step is to determine the requirements for performance, security, implementation, testing and compliance. ROI evaluation is also a must, and both capital and operational costs (including installation, training, and ongoing maintenance) must be balanced against the possible benefits. The project phases and milestones should be clearly laid out and agreed to by all stakeholders, and regular coverage testing should be conducted even after installation.

As with most major technologies, VoIP arrived with much celebration and then receded to the background, a technology still seeking its niche. Now, with the ubiquity of dual-mode smartphones on campuses nationwide, voice-over-IP may have finally found its place through a technology so subtle most people won’t even realize they’re using it. If history is any indication, we’re likely to see VoIP slowly and silently gobbling up its predecessors until we look up one day and realize that it’s suddenly become a dominant form of digital communication. The key for college administrators is to ensure that their mobile IP infrastructure is ready for this

quietly advancing technology. As lectures, television, movies, and videoconferencing all move onto the wireless network, fixed mobile convergence is only the latest trend on the horizon to demonstrate the absolute necessity of deploying tomorrow’s robust wireless network today.

¹ Karl Bode, “Carriers Offloading More Mobile Traffic to Wi-Fi.” DSLReports.com, July 6, 2011, <http://www.dslreports.com/shownews/carriers-offloading-more-traffic-to-wifi-115021>.

² Elizabeth Woyke, “U.S. Service Providers Preparing Wi-Fi Offload Rollouts.” *Forbes*. <http://www.forbes.com/sites/elizabethwoyke/2011/07/05/u-s-service-providers-preparing-wi-fi-offload-rollouts/>.

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