ILLINOIS STATE
UNIVERSITY

VoIP at
Illinois State University
Executive Summary

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VoIP at Illinois State University – Executive Summary

1.0 – Introduction

This document is an executive summary that describes the criteria for evaluating VoIP (Voice over Internet Protocol) as a strategic technology and the process that has thus far taken place to identify, select, and prepare for the implementation of VoIP at Illinois State University.

2.0 – VoIP

VoIP is a technology that allows a communications device (such as a telephone) to be connected to a datacommunications network (such as ISUnet, residential broadband, or a WiFi hotspot) and perform the functions of a traditional telephone instrument (such as placing and answering calls). The end user experience is as if the instrument was connected to a conventional telecommunications network (such as the campus phone system, residential phone service, or commercial cellular service). The device can be a self-contained instrument (like a VoIP telephone) or software (that emulates a telephone) running on a personal computer. Alternatively, an adapter can be used to plug a standard analog telephone, fax machine, or modem into a datacommunications network using VoIP technology. More importantly, a VoIP device has more features than a conventional telephone because applications available on the datacommunications network (such as video) can be integrated into the VoIP instrument.

3.0 – Adoption

There are a number of factors that are driving the adoption of VoIP technology. These include but are not limited to the following:

- all new products that are being developed by telephony vendors are based on VoIP technology
- many legacy voice products (such as the Ericsson phones we now use) are no longer available on the market
- many of the features being offered with VoIP products cannot be delivered using legacy voice technologies

For those organizations that possess a legacy phone system, as does ISU, it will be important to choose between upgrading this system to support VoIP or purchasing a separate VoIP phone system and then integrating the two. Factors such as cost, features, and maintainability will drive this decision.

4.0 – Challenges

There are a number of challenges related to the implementation of VoIP. All can be overcome through proper planning, appropriate resources, and sufficient time. These challenges include but are not limited to the following:

- providing and maintaining power to VoIP phones (conventional phones are powered through phone lines from one or more centralized locations)
- supporting our obligations for E911 with mobile VoIP instruments (E911 requires demographic information for each phone number)
- integration into an existing telephone system, the public telephone network, and voicemail servers
- protecting VoIP from network based security threats
- ensuring the quality of VoIP communications (so that it is equal or superior to that of the current phone system)

5.0 – Benefits

There are a number of benefits of VoIP technology. These include but are not limited to the following:

- convergence of data and voice infrastructures to reduce cost and complexity
- integration of voice, data and video services into a single instrument or software application to increase features and flexibility
- devices can be mobile (depending upon how power is supplied to the instrument)
- a single number can be assigned to multiple instruments concurrently (such as a stationary deskphone and a mobile softphone)

- a history of received, placed, or missed calls can be retrieved on a VoIP phone (similar to a cellular phone)
- directory integration (allowing users to directly query the campus LDAP directory or maintain personal directories through the VoIP instrument)
- web-based management of features (such as message greetings, call forwarding, and so on)
- placing local calls from remote locations (ex: using a softphone on a business trip to place or receive a call as if on campus)
- there can be many "lines" on a single instrument

It should be noted that VoIP technology does not inherently provide free long distance service such as the those offered by commercial VoIP carriers like Vonage. VoIP only creates an environment where such opportunities exist. Through VoIP, the University may be able to offer free long distance to targeted markets sometime in the future.

6.0 – VoIP in Higher Education

In April 2007, ACUTA (the Association for Communications Professionals in Higher Education) released a *Survey on VoIP Deployment in Higher Education* designed to measure the validity of this technology within academia. This study includes responses from nearly 300 institutions across North America. The following themes emerged from this study:

- 43% of responding institutions reported that they are currently using VoIP
- VoIP currently covers less than 25% of their campus population
- most frequently mentioned benefits of VoIP were improved end-user features, cited by 46% of the users; cost savings, cited by 31%; and overall network efficiency, cited by 23%
- among their concerns: security was named by 77%, with quality-of-service and emergency 911 issues cited by 69%. Sixty-two percent pointed to management as an issue. Other challenges cited were cost, user training, complexity and help desk issues.
- 77% of the responding colleges and universities using VoIP are planning to expand its share of their networks in the next six months to two years
- among the colleges and universities that are not using VoIP, 70% say a migration is planned anywhere within the next six months to three or more years

In addition to this work, Educause (which represents all information technology professionals in higher education) conducted a survey in 2006 which referenced the topic of VoIP. The following themes emerged from this study:

- of the 962 respondents, 36.8% have already started to deploy VoIP technology on their campuses, 17% were piloting, 9.7% were preparing to test the technology, 26.3% were still researching the technology, while 10.2% had no immediate plans
- of the seven Illinois State University benchmark institutions responding to the survey, 57% have already started to deploy VoIP, 14% were piloting, no one was in the stage of preparing to test, 14.3% were still researching, while 14.3% had no immediate plans

This data suggests that VoIP is seen as a viable technology that can be effectively implemented within higher education today. As with most technologies, the key to a successful rollout is to effectively exploit the benefits of this technology while mitigating the challenges it presents.

7.0 – VoIP at Illinois State University

During the summer of 2006, the University was developing plans for the extension of data and voice technology into the newly acquired facility at 1101 N Main (now called the Alumni Center). While researching costs associated with this project, Telecommunications learned that it was not possible to provide the same Ericsson telephones used elsewhere on campus for this facility. Ericsson is now only selling their new VoIP products. To integrate these new products into the current telephone system a $200,000 hardware and software upgrade is required. If the University chose to upgrade, it would then be possible to purchase and integrate Ericsson VoIP telephones into this environment.

Due to the high cost of this upgrade and the lack of compelling features with the new Ericsson VoIP phones, other products and configurations were explored. The following process took place once the decision to examine other solutions was made.

- product research and reviews from vendors such as Nortel, Avaya, Cisco, and Ericsson were conducted throughout the fall 2006 semester
- product evaluations were performed at the beginning of the spring 2007 semester (Cisco was the only vendor that responded to the evaluation request as other vendors expressed concerns about integrating their solutions into the existing phone system)
- a VoIP pilot was conducted between March and May of 2007 by placing a dozen or so Cisco VoIP instruments in targeted environments on campus to gauge the viability and usability of this technology at Illinois State University (participants were asked to use these phones extensively and report problems when they occurred)
- an evaluation of the pilot was performed between May and June of 2007 to seek feedback from the participants on the pilot (the response was overwhelmingly positive with many of the comments stating that the Cisco VoIP system had many more features in addition to superior voice quality when compared to the current Ericsson system)
- following the evaluation, a recommendation was made to the Associate Vice-President for Academic Information Technology that the University implement Cisco's VoIP solution for use at the new Alumni Center (concurrence was then received from that office for this proposal)
- preparing for the production implementation of VoIP technology at the new Alumni Center

Since then, plans have been developed to bring this technology to additional environments such as Stevenson, Vrooman, Turner, and the new School of Kinesiology and Campus Recreation building. If this schedule is followed, there will be more than 300 VoIP phones in use on campus by August 2008.

8.0 – Cost

The current campus phone system was purchased in 1991 from Ericsson to replace an older party line system that had served the campus for many years. Since this time, the Ericsson product has served the campus well by delivering quality voice service at a reasonable cost. By the end of 2007, this system consisted over 8,000 lines to support faculty, staff, and students throughout campus. While researching the future of this product, Ericsson made it clear that this our current phone system is quickly approaching end of life and that it will not be supported indefinitely. When this occurs, the University will not be able to call on the vendor to purchase additional compatible phones, replace failed hardware, or resolve software problems. Because more than 70% of what was purchased in 1991 from Ericsson is still in use today, the University would be very vulnerable to future phone outages due to the age of the current system if support was no longer available. Since the campus phone system is absolutely critical to the operational needs of the University, this would be an untenable situation.

To replace the current Ericsson telephone system, it is estimated that a new system would cost in excess of $5,000,000. To avoid support problems, this transition would need to be completed sometime before the anticipated withdraw of support by the vendor (expected to occur sometime in the next 5 years). It should also be noted that this cost is based solely on replacing the more than 4,000 phones that service the academic and administrative buildings. It is not yet clear how much of the nearly 4,000 phones that service the residence halls will remain in service to support future student needs beyond the University's obligation to provide E911 service in that environment due to the continued growth of cell phone usage.

Currently, the University spends nearly $900,000 each year to maintain and support the Ericsson phone system. This cost includes staffing, service provider contracts for local and long distance service, vendor maintenance contracts, maintaining facilities where telecommunications equipment resides, and so on. Whether the University chooses to seek VoIP technology or not, this annual cost will likely not change substantially for the foreseeable future. With the implementation of VoIP, some of these operational costs would begin to decline over time as the University would be able to focus maintenance costs on a single communications network instead of two.

But, the major difference between the Ericsson PBX and the Cisco PBX is capital cost. To upgrade the Ericsson switch to support VoIP (to deliver phone service to the new Alumni Center and beyond), a $200,000 software

upgrade would be required. At that point, the University would then be able to purchase VoIP hardware for the current phone system (estimated at $100,000 for the new Alumni Center). The downside is that the Ericsson VoIP phones would have nearly the same features as the current digital phones in use and little more. Thus, the University would spend nearly $300,000 to deliver the same type of phone service to the Alumni Center compared to what is available elsewhere on campus. More importantly, this investment will not likely extend the life of the current phone system making this expense offer little more than a short term gain.

Alternately, the University could spend around $200,000 to build a parallel VoIP system. This cost includes all of the backend equipment and VoIP phones for the new Alumni Center and can easily scale for thousands of VoIP instruments. This solution would be based upon new technology with a life span that is far in excess of the current Ericsson system and would have many more features with the promise of yet more to come. The cost would then become incremental as the VoIP system was expanded over time. More importantly, this investment will begin the process of replacing a system that is nearly 17 years old with a new product that has substantial market share. By the time the current phone system needs to be completely replaced, VoIP products will already have been deployed in select environments throughout campus. Based upon these factors, the decision made by the University is to establish a parallel VoIP system from Cisco and integrate it with the existing Ericsson phone system to support the new Alumni Center. This work will then become the foundation of extending VoIP service to other facilities on campus in the future.

9.0 – Futures

Beyond the initial deployment of VoIP, there are many directions that should be considered to leverage the value of this technology. These include but are not limited to the following concepts:

- extension mobility which allows a phone number to move from one instrument to the next
- mobility handoff which allows a call received on one instrument (such as an office phone or cell phone) to be handed off to another
- unified communications which integrates voice and video communications at the desktop
- unified presence which is software that runs on a personal computer that can be used to make users aware of the status of other users (such as whether or not their phone is busy) and identify the form of communications that is preferred by the receipient (such as a phone, video conferencing, email, or instant messaging)
- WiFi-cellular integration (being able to place, receive, and handoff calls between a wireless and cellular network)
- toll bypass (placing phone calls to long distance markets as if the call was local)

10.0 – Strategic Directions

Because the current system is expected to be viable for at least the next 5 years, the University should not try and replace the Ericsson phone system immediately. Instead, the deployment of VoIP should be based upon a longer term transition composed of the following elements:

- build the infrastructure for VoIP and integrate into existing Ericsson phone system
- deploy VoIP phones wherever there is new construction or renovation work
- provide targeted rollout based upon the availability of funds
- staged transition from the current phone system based upon a 5 year (or greater) window

11.0 – Conclusion

VoIP has become a viable technology and is being deployed widely throughout higher education. However, very few institutions are outright replacing their current phone systems due to the enormous capital costs. Instead, this technology is being introduced over time using opportunities such as new facilities, renovation, or targeted funding to help support this migration. The convergence of voice and data networks and applications to create new features and provide greater flexibility are the key drivers behind this adoption. The question is no longer if the University should consider VoIP as a strategic technology. Instead, the question is when and how should the University begin to leverage VoIP as a strategic opportunity. At Illinois State University, these investments should begin now to soften the cost to make this transition over time.