

THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY



LOCATION:
*Baltimore, Maryland,
United States*

YEAR:
2006

STATUS:
Laureate

CATEGORY:
Education and Academia

NOMINATING COMPANY:
Nortel

ORGANIZATION:

Coppin State University

PROJECT NAME:

Wireless IP Telephony Supporting “Smart Classrooms”

Summary

Coppin State University, a Historically Black Institution, viewed a severely deteriorated infrastructure as an opportunity to completely rethink the entire technology stack from architecture and provisioning of the wiring plant all the way through services and support. Rather than upgrading an obsolete network, Coppin reinvented campus technology to be a platform for institutional change. The project is implemented in three phases over three years. Realizing the emergence of the Net Generation, we implemented an IT program, layered on an accessible, secured, reliable, flexible, scalable, convergent network infrastructure that exceeds expectations, nurtures potential, and transforms our students to savvy web citizens and enthusiastic power users. It energized faculty pedagogical creativity and research, empowered the staff, drove down the business decisions to the department level, improved processes efficiencies, and enhanced staff productivity.

Introductory Overview

Coppin State University set forth to transform its teaching, research and administrative environment through the strategic deployment of IT. The voice and data network supporting its business operations was no longer capable of addressing the academic and administrative pressures it faced; a major upgrade was needed. The academic and IT leaders had an ambitious objective to make Coppin State’s technology infrastructure a competitive differentiator, helping to attract new net-generation students, retain top faculty and optimize the operational efficiency of its administration. The leadership team conceived of a “Technology Fluency Program” which would immerse students in a sophisticated, rich technology environment which would provide them with the necessary skills, conceptual understanding and intellectual capabilities to render them technology fluent. Having such robust infrastructure enabled us to launch several technology initiatives that enhanced students success such as the Tegrity Campus, where classroom instruction is recorded, uploaded to our CMS for later review and synchronization to the students digital notes taken synchronously or asynchronously, deploy a Web centric Enterprise Resource Planning system, manage campus security, deploy a one card system for faculty and staff access to classrooms parking areas, etc, and for students use in the Residence facilities and meal plans.



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The robust infrastructure enables the campus wide deployment of decision support systems, data analyzers, and a data warehouse. Tie-in campus servers with secured, robust network infrastructure enable the deployment of e-provisioning system, work flow, and web self services. The network infrastructure enables us to utilize IP SANs for better and less expensive data storage on campus and remotely for Disaster Recovery purposes.

The work required to achieve the goal was significant. The entire core campus network infrastructure needed to be upgraded. The plan included deployment of a new telephony platform including traditional and IP telephony along with unified messaging capabilities. The data network needed to be upgraded to provide greater bandwidth, reliability, redundancy and quality of service features. Solutions for physical and cyber security were needed and the plan also needed to encompass a wireless mobility campus-wide rollout. In short, the goal was to rollout a state-of-the-art network infrastructure that would energize the faculty pedagogical creativity, foster research innovation, streamline administrative efficiency and enable learning and success. Leveraging the power of our infrastructure, we deployed a web centric Enterprise Resource Planning system with portal technology that gave secured access to our students, faculty, and staff to our enterprise resources utilizing the Internet through e-self-services. Deploying an SSL VPN solution enabled our students, faculty, and staff to remotely and wirelessly have secure access to their home, departmental, school, and campus wide data storage areas. Deploying IP SANs (iSCSI) enabled faster, larger, cost effective storage capacity. We are currently deploying IP SAN to replicate our mission critical data to a remote site for disaster recovery purpose. Wireless VOIP phones are deployed to our Help Desk, IT Support staff, housekeeping, and public safety.

Coppin began executing on its vision by deploying a high performance converged IP infrastructure that would support all voice, data and video communications over a common IP gigabit backbone. The network implementation needed to be scalable, easy to maintain, reliable, secure, flexible, futuristic, and cost effective. All of these objectives were achieved and the significant cost savings included both reduced upfront capital requirements as well as lower ongoing operational costs. The deployed IP network is highly redundant with the quality of service features needed to support traffic prioritization and a growing array of sophisticated services, e.g., streaming video, learning-on-demand. A wireless LAN was implemented campus-wide to support both indoor and outdoor mobile access. All of the equipment in "smart classrooms" across campus (AV projectors, VHS/DVD equipment, desktop PCs, wireless microphones etc) is centrally monitored and managed. So if any equipment malfunctions occur, an alert is generated motivating an immediate response. Should any equipment be removed from the "smart classrooms" an alert is generated and facilities management are notified immediately on their wireless 802.11 phones. A new PBX was installed to support both traditional and IP telephony. Unified messaging was provided to all faculty and staff. The consolidation of all email, voice mail and fax communication over the IP network resulted in significant improvements in user satisfaction and productivity. Enhanced network security and data center infrastructure was deployed, encompassing new advanced switched firewalls, L4-7 switches for load balancing of web servers, SSL acceleration devices, an SSL VPN for secure remote access to campus resources. Solutions for end-user device scanning, intrusion detection and policy management were also implemented. A PeopleSoft ERP system was deployed. Secure remote access to this system is enhancing the productivity of students, faculty and staff. Students have access to online course registration solutions, online counseling, financial aid, grades etc. and faculty can work effectively off campus with full access to the complete ERP system.



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Benefits

Prior to the network upgrade, daily network outages were not uncommon. The upgrade had become mission critical to the institution's survival and growth. The network transformation has brought about fundamental changes to the Coppin State learning environment. Three years later, the institution can proudly say they have created a milieu for the technology-savvy. Increased student enrollment and satisfaction is attributed to the broad spectrum of solutions available. Students can access resources from anywhere on campus over the wired and wireless infrastructure. The ubiquitous wireless coverage has untethered the learning process, creating learning communities anywhere on campus. This is fostering teaching innovation as classes like Geography are moving outdoors. Instructors have the option of uniting a class anywhere on campus and students can easily collaborate with one another. Class lectures are now being recorded in multimedia formats for easy access by students enabling learning-on-demand. Secure remote access to the campus portal and ERP environment is simplifying the performance of administrative functions and boosting the productivity of students, faculty and staff. Students can access their progress reports on line, check the status of financial applications, and register for a course or access counseling. This has contributed to high levels of satisfaction amongst students. The voice over the WLAN infrastructure enables faculty, campus security and administrative staff to carry 802.11 wireless phones enabling them to respond instantly to campus issues and emergencies. Physical security has improved through the deployment of a network-based swipe-card security solution. A secure connection to the Baltimore City Police is enabled by the SSL VPN solution which allows the Coppin State public safety department to access required police databases expediting background checks, incidence reporting. Some HVAC functions are now controlled centrally over the IP network saving both time and expense and the rest is to be completed in fall 2006. All faculty have been given unified messaging which provides them with a single IP interface for all their voice mail, email and faxes. This is enhancing staff productivity and has received rave reviews from users. Remote access to the campus IT infrastructure enables information and learning-on-demand 24 hours a day, 7 days a week. The residence halls are well equipped with both high speed wired and wireless access. As a result of this deployment, the campus is now highly connected with a 5:1 student to computer ratio. Coppin State University is catering to a technology-savvy web generation with a learning infrastructure that is flexible, secure and always-on. When we implemented IP telephony we elected to deploy 80% VoIP and 20% traditional digital telephony. In hindsight, we would have elected to increase the VoIP rollout as it has proven both highly stable and scalable. In the last three years, there has not been a single network failure.

Coppin State's converged campus infrastructure is entirely standards-based. As such, all elements of this implementation could be replicated by other institutions given similar resources, commitment and passion. We have spoken to other Higher Education institutions about our vision and plan and participate regularly in IT industry forums. There has been significant interest in particular in our VoIP and campus-wide wireless deployment. We have been visited by several other institutions to show case our technology infrastructure and share our experiences.

The Importance of Technology

The technology used to rebuild the campus infrastructure was essential to the success of rejuvenating Coppin culture, business goals, and achieving its mission. Because of the stability, reli-



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ability, and accessibility of the network infrastructure the users trusted the technology and felt comfortable to run their business applications on the campus network. The technology use was very important to the success of our Campus.

Originality

Coppin State University viewed a highly deteriorated core infrastructure as an opportunity to completely rethink the entire technology stack from architecture and provisioning of the wiring plant all the way through services and support. Rather than evolving an obsolete approach, we reinvented campus technology to be a platform for institutional change.

Having this vision, and making use of our status as a HBI, we formed unique partnerships with several corporations to help implement the core components of our infrastructure, switched gigabit backbone, VOIP, converged media services, campus wide wireless network, and instructional technology systems.

With a capable core infrastructure assured, Coppin moved forward with investment in newly higher level services. These include new communication services and one of the first implementations of IP based PeopleSoft web centric ERP in the country.

These enhanced technology services have subsequently been a platform for redesigning both academic and business processes at Coppin.

Coppin realized the emergence of the Net Generation, and accordingly implemented an IT network that exceeds its expectation, nurtures it's potential, and transforms their lives to savvy Web citizens and enthusiastic technology power users. This network also energizes the faculty pedagogical creativity and research innovation.

The moment a faculty, staff or a student steps foot on Coppin Campus, he/she is connected to a wealth of information and instructional technology resources.

One of the key areas of innovation involved providing both voice and data network infrastructure to a university affiliated Nursing center physically located across the street from campus. Using a WLAN bridge the Coppin state IT infrastructure was extended to this remote campus, enabling them to take advantage of IP telephony, unified messaging, wireless data, etc. This enabled the Nursing centre to eliminate costly Centrex services thereby improving their bottom line. Another key area of innovation is the learning-on-demand and information-on-demand infrastructure encompassing the availability of recorded multimedia lectures, student, faculty and staff access to campus portals and ERP systems anytime from anywhere via the secure VPN infrastructure. This has translated into improved end-user satisfaction as they enjoy the convenience, connections and control this enables. The ubiquitous rollout of wireless LAN access, including wireless voice, across campus is enabling new modes of instruction as classroom instruction become mobile, and in some cases moves outside the traditional campus walls. Wireless IP telephony supports improved accessibility of public safety; facilities management and IT support staff. Unified messaging for all faculty is yielding productivity improvements and improving their responsiveness to students and staff. The ability to monitor and manage all equipment in the "smart classrooms" via the IP network by one person is resulting in a highly cost-effective and efficient support model.

Our VoIP was the largest of its kind on any Higher Education campus in USA. Our wireless



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solution granted us a top ranking in USNEWS and World Report. NBC reported on one of our projects in their news (see CD). Several local and national articles reported our success. We were the first in MD to have VoIP services to connect two buildings across a main avenue over a wireless bridge.

Success

(Please see CD for Video, PP, and NBC report)

Dr. Stanley Battle, President of Coppin State University provided the following quote: "Because of our new infrastructure, we are able to achieve our goals of preparing our students for a technology rich world. We are able to provide several e-self services to our students, such as on-line registration, on-line advising, on-line career change what-if analysis, students billing and financial services, financial aid applications and follow up, library services and research port capabilities, learning on-demand for our students, smart classrooms and campus wireless access to our instructional resources. I just started my fourth year as president of Coppin State University. From the beginning, I was impressed with the wealth of information technology services that are available to the University community, some of which were not available to me at the much large institution, the University of Wisconsin-Milwaukee, where I was previously employed as Vice Chancellor of Student Affairs. Using Coppin's virtual private network, I am able to access all my network resources in a secured manner any time anywhere. My Call Pilot application enables me to manage all my messages in a much more efficient way. With my wireless phone, I am in touch with the campus, especially my senior staff, anywhere any time. Our IT infrastructure enables us to address these urban ills. The network infrastructure has facilitated several avenues by which we communicate any time with the community. The Coppin State University Web site is a two-way communication channel with our community, alumni, students, and parents. Our electronic forums, e-mail and telecommunications systems facilitate continuous communication channels with potential students and their families. The "Ask the President" feature on our Web site works well to keep me close to our constituents, facilitating one on one dialogue. With a commitment to develop a savvy web citizenry and in preparation of the incoming Net Generation, Coppin State University made substantial investments in its information technology infrastructure. The result is a globally renowned information technology program that supports academic excellence, student access and academic success, facility development, external relations, and efficient and effective administrative operations. Dr. Sadie Gregory, Provost and VP for Academic Affairs, provided the following quote: The network enabled our faculty to explore different learning styles for students using multimedia presentations that excited our students and improve retention of information in the teaching and learning process. The network infrastructure enabled us to produce technology fluent graduates. It also enabled academic affairs to provide learning and teaching tools such as simulated software, classroom recoding of lectures (video and audio), digitized synchronized note taking by students, web enhanced courses, hybrid course, online courses. We organized two summer mini-grants to foster using the network and other technologies in teaching and learning. Our IT programs enabled us to have access to data warehouse online thus enabling chairs, deans and faculty from anywhere and make informed decisions. We are able to meet the accreditation requirements by Middle States, and specialized accreditation agencies. We used our IT infrastructure as a strategic niche for Academic Affairs to attract high caliber new faculty and students to the University. The Network Infrastructure enabled us to flatten the organizational structure of



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Academic Affairs and enabled better communications with Chairs and Faculty. It gave access to online just on time accurate financial/budget information from anywhere anytime. Our newly implemented online requisition expedited purchasing process. Roland Collins, Chief of Public Safety provided the following quote: I have been the Director of Public Safety for approximately ten years. In that time our networking infrastructure has grown and improved immensely. Our campus wide e-mail and internet capabilities have improved my ability to instantly communicate critical information to our campus, administrators and student body. Because our campus security and Homeland security efforts do not occur in a vacuum, it is extremely important for me and my staff to have instant access to other security and police organizations in our University System and Baltimore City government. Our network improvements have enabled me to conference, meet with other police executives and administrator and share information without leaving my office. Ursula Battle, Director of Public Relations, provided the following quote: In addition to publicizing new infrastructure and service changes through various media entities, our network infrastructure plays an absolutely crucial role in how we deliver information to the campus community and beyond. I consistently use the Coppin Website to post news stories, photos, and other information via the Datamanager Portal. The network infrastructure also allows us to streamline video and audio on the Coppin Website, which makes it possible for Communications and Public Relations to post radio and television interviews. The utilization of campus email also provides an outstanding communications vehicle to disseminate information to the campus, alumni, and others. This includes the dissemination of our new, online email newsletter, The Talon, which is distributed by the Office of External Affairs (OEA). The responses to these changes have been overwhelmingly favorable. Users of the technology thoroughly appreciate the convenience and time-saving advantages that the on-line self-service functions affords them. Examples include the paperless ease of being able to register for classes online, being able to process a purchase order online, and even being able to vote on issues affecting the campus online via the Coppin Website. Smart Classrooms and Wireless Technology are among the many new innovative technological advances on campus that are changing the way our faculty teach and our students learn. Both allow instruction to extend beyond the walls of a classroom. There has been a monumental impact on the external community that we serve as a result of these changes. For example, we have a new marquee in front of the campus near the North Avenue entrance. The individual who enters the information that will be included on the marquee can conveniently enter that information from her desktop computer. The messages that are posted on the marquee are read by the hundreds of commuters and pedestrians that pass by it daily. Another example is the Coppin Website, which serves as a non-stop communications vehicle that allows us to tell the world 24-hours a day, seven days a week and 365 days a year about the wonderful things that are happening here at Coppin State University. Dr. Habtu Braha, Professor of Economics said: "This new information technology that we are using will help us improve the retention and graduation rates". Keyon Johnson, Computer Science Student, said: "The role of information technology in my education is very very powerful". Vell Lyles, Associate VP for Enrollment Management said: "Our network infrastructure is so reliable; our network did not go down for the last three years"

Our users adapted our technology very rapidly, mainly due to the robustness and reliability of our Network infrastructure. For example: During the months of December 2005 and January 2006 (where most of the students are accessing our systems for Spring 2006 enrollment and Fall 2005 grade checks) we had 95,880 hits to our portal utilizing our secured network access. On March 2006 we had 31,143 hits from 3009 distinct users. Our secured network intrastate



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enabled access to our services 24x7. In the month of January 2006, we had, on average, a low of 2,410 hits on Saturday to a high of 15,892 on Tuesdays. On 24 hours, we had on average a low of 205 hits at 2:00 p.m. to a high of 2,849 at 11:00 p.m.

In the first 8 weeks of the Spring 2006 our secured campus network infrastructure provided remote access to our Tegrity Campus system to 40 faculty in 80 courses. 1,950 students gained extra contact hours of 1,147 on a 24x7 basis. Due to our successful technology fluency program, our students' computer ownership rose from 55% in 2001 to 82% in 2004. Coppin students to computer ratio improved from 26:1 to 5:1.

Difficulty

The high incidence of network troubles and outages prior to the upgrade made the network transformation critical versus discretionary. The strategic IT vision for the institution was driven by a cooperative model involving input from the IT and academic leadership as well as from students. The IT governance model consists of an Information Resource Management Committee chaired by the CIO and includes all VPs, the Associate VP for Accreditation and Long Range Planning, the Associate Director of Capital Planning, and the Chair of the Faculty Information Technology Committee, thereby effectively representing both senior academic and IT interests. In addition input is solicited from students via the IT Student Advisory Committee and the Faculty Information Technology committee. This decision making process and governance model ensures that the IT vision is developed cooperatively and guided by the academic requirements of the institution. There is no room for technology implementations solely for the sake of the technology. All implementations involve thoroughly tested, standards-based technologies. At the end of the day all IT directions and investments advance the common vision of the university to energize the learning process through the effective and affordable deployment of IT. The campus transformation has helped to land new government grants and financial support from alumni. The infrastructure has proven to be very cost effective. The IP telephony in particular and its rollout to the remote Nursing campus has resulted in communications cost savings. The investment required to continue to maintain and improve the network is allocated and budgeted for centrally, thereby ensuring the ongoing sustainability and growth of the infrastructure.

Our project is so innovative in the higher education arena. We were able to get the approval, support and funding through our innovative IT Governance structure. Having the program clearly built around Coppin mission, putting the academic/faculty initiatives at first, following that with the students IT Fluency Policy resulted in minimal resistance. Massive training programs helped overcome the technology phobia for our faculty, staff, and administrator. Creating innovative partnership with leading IT businesses helped fund our project. Our willingness to be on the bleeding edge and take risks paid off financially. We also navigated the State finance maze very creatively, which secured the needed Capital funds for our projects.