

INFORMATION TECHNOLOGY SERVICES
Communications Network Services
Annual Report 2007

The Communications Network Services Department (CNS) within Information Technology Services (ITS) is responsible for providing and maintaining all voice, data network and alarms services for the University of New Mexico and for providing voice services for the University Of New Mexico Hospital and the Health Science Center. At the end of fiscal year 2007, there were approximately 25,000 ports (11,964 analog, 8,578 digital) telephone lines in UNM's system and more than 8,600 incoming, outgoing, and intranet work individual trunks (1,000 DID (direct inward dial), DOD (Direct outward dial) distributed by 19 individual telephone switches and thousands of miles of cable. Over 1500 cellular phones and 2000 pagers are also managed by the department. The alarms group monitors and maintains over 900 different accounts (fire alarms, intrusion alarms and notifiers).

There are currently 564 data switches, 15 routers, and 350 wireless access points installed at UNM. 20,613 active switch ports connect customers on campus to services such as E-mail and the Internet. The core UNM network consists of a 10GB/s Ethernet network with 1 Gb/s Ethernet connections feeding buildings off of the core network. 248 main, north, and south campus building networks are maintained by the Data Services group. Primary Commodity Internet service is provided at 300 Mb/s with 100 Mb/s secondary Internet available as a backup. The five branch campuses of Taos, Gallup, Valencia, Los Alamos, and Los Alamos-Bernalillo are operated at speeds ranging from 1.5 Mb/s to 16 Mb/s. In addition 10 remote sites in the Albuquerque Metropolitan Area are serviced by DSL or Point-to-Point 1.5 Mb/s connections. 48 dialup lines are provided for public use and 24 lines are used for the LoboWeb network used by students. 389 network plate activations were completed for an average of 32 per month in 2007

During 2007, ITS/CNS focused on completing projects that supported the IT Strategic Plan along with improving the department's operational efficiency and supporting the needs of customers.

Significant Activities

The majority of activities and accomplishments were in support of IT Strategy 1-- **Grow the IT capacity**, services and partnerships that further UNM's ability to serve our mission and lead innovation.

IT Strategy 5, Initiative 5A—Leverage existing IT infrastructure

- **Telephone Switch Upgrades and Replacements**—In July 2006, CNS completed the nine month project to replace the main 11,000 line, 20 year old telephone switch on campus located in building 256 (now encapsulated within the Bill and Barbara Richardson Pavilion). In addition, the 10,000 line Cancer Research Treatment Center switch was upgraded a few months earlier. These switches were replaced with a next generation phone system capable of providing either traditional circuit based service or providing service via Internet Protocol (IP). As part of this project, implemented a pure

IP trunking backbone between the largest switches. A new copper frame was installed in building 256 and the old frame and old switch were demolished/removed.

This platform allows ITS to support longer term goals for the integration of services such as mobile/cellular phones and videoconferencing in the evolution of enterprise communications in an IP network-enabled environment.

One result of switch project is a 70 percent reduction in trouble tickets. The old switches were plagued with chronic problems causing an inordinate number of trouble tickets.

Since the completion of the two main switches, nine smaller switches have been upgraded or replaced—Popejoy, Lobo Center, Novitski, Southeast Heights, South Golf course, 700 Lomas, AMCI, Caasa ASAP and Caasa Research. Slated to complete by December 2007 are Westside, Academy, and CDD.

- **Convergence of Voice and Data Network Staff under CNS management**—In order to continue to build a robust, resilient and ubiquitous enterprise network, and to continue to implement the Internet Protocol telephone applications, often called Voice over IP (VOIP), the voice and data network staff members were converged in July 2006. This convergence is essential to prepare and cross train for the coming integration of previously separate systems and services. It will allow UNM to avoid wasteful duplication of services and overlapping functionality among “unconverged” systems which would increase costs and create additional administrative burdens for users and the staff members who have to manage these systems.
- **Business Center Telephone Switch Expansion and Elimination of Medical Arts switch**--The Rehabilitation, Dermatology, Sleep Disorders, Integrity and 1101-4 Medical Arts buildings were moved to the UNM Business Center PBX. The old telephone switch serving those buildings and associated circuits were removed and some of the circuits and equipment will be reused as needed.
- **Implementation of Wired and Wireless VOIP phones in CNS building**—twenty wired and four wireless VOIP phones were implemented in CNS as a pilot prior to installing wireless VOIP phones in the Bill and Barbara Richardson Pavilion. The installation of the SV7000 (a pure IP telephone switch) allowed the provision of the NEC SIP phones (four each) and the SIP Polycom phone (one).
- **Implementation of Wireless VOIP Phones in UNMH**—In a collaboration between CNS and UNMH, the initial implementation of fifty plus wireless VOIP phones was completed including push-to-talk and wireless headsets. This implementation allows UNMH to utilize the data network infrastructure for this service rather than installing a proprietary, separate network for the service.
- **Installation and Implementation of Voice Services in the Bill and Barbara Richardson Pavilion**—after two years of preparatory planning and design, the

installation of over 200 new phones and move of 700 phones to the BBRP was completed in June, 2007.

- **Digital Subscriber Line (DSL) Project**—DSL was installed and trialed with the goal of evaluating the potential to provide this service to off-campus locations or remote campus locations where data network access is insufficient and for use as a backup to the data network. The trial was successful and service has been installed at the ticket office and Caasa Research.
- **Higher Education Department Facilities Study**—CNS worked with 3DI and PPD to plan and assist in providing the assessment for IT facilities for end of life replacement cost for the HED study. IT systems and cabling have a 10 to 12 year life cycle according to the American Hospital Systems Booklet which is the basis for this study. This project also included the branches of the University. The cost assessment of IT facilities resulting from the study will provide the basis for future funding requests from the Legislature.
- **Commissioning and Acceptance**—CNS developed and issued an RFP for commissioning of IT infrastructure in major building projects at the end of FY 06. Four firms were selected to provide testing and acceptance services and CNS developed and issued an RFP for commissioning of IT infrastructure in major building projects at year end of FYI 06, four firms were selected to provided testing and acceptance services. In FY 07, CNS implemented a commissioning and acceptance project for the Barbara and Bill Richardson Children's Hospital. The commissioning effort was successful in identifying significant quality control issues and finalizing the testing requirements that required corrections from the contractor. Nine recommendations were made by the commissioning agent that resulted in uniform testing and rework of optical fiber and high speed copper cabling.
- **Fiber Mesh Project Completion**—In order to provide redundant high speed data connectivity to major University network hubs as required for Project Link, a high speed optical fiber project was initiated in 2005. Phase 1 was completed in July 2006, Phase 2 was completed in February 2007 and Phase 3 completed in May of 2007. This joint project between CNS Data Networking and Technical Operations exceeded it goals and added a long needed high speed connection to South Campus. This project was completed on time and on budget.
- **Residence Hall Wireless**—Secure wireless data networking was implemented for the 23 residence halls and administration building. This was the first major wireless implementation on campus and the resulting success and lessons learned provide a basis for further implementations.
- **Wireless Network Management and Expansion**—Funding was received from the New Mexico Educators Federal Credit Union (NMEFCU) to improve wireless coverage across the main campus. Staff developed a detailed work plan and began implementation in March 2007 with a goal of completing coverage in one of six clusters prior to school starting in the fall.

Two secure wireless management devices were purchased and installed to enable enhanced security and a unified experience for UNM. There are now three of these devices in the network. One of the devices was purchased with funds provided by Zimmerman Library due to a successful partnership with them.

- **Wireless Standard Approved**—In May 2007, the draft wireless standard developed in 2006 was revised by CNS with input from network administrators, reviewed and endorsed by the IT Cabinet and signed by the CIO under the auspices of UNM Business Policy 2560—Information Technology Governance.

The goals of the standard are to reduce the potential security risks that may be associated with wireless network technologies; to reduce potential interference and performance issues on the UNN wireless network; and to assure that all users with proper equipment can access the wireless network and are presented with a uniform interface.

- **Emergency Operations Center (EOC) Communications Improvements**—Communications for the two EOC's (one in Hokona and one in UNMH) were improved by installing redundant dial tones, emergency generator connections for the ITS data equipment to assure full support during a power outage. The EOC's now have communications redundancy.
- **Scholes Hall Network Zone Hub Improvements and Redesign and Remodel of the Communications Rooms** —Due to the Scholes remodel project, it was necessary to completely redesign and renovate the main communications entrance facility as well as all communications rooms in the building. This 10 month fast tracked project required indepth planning and coordination with other groups involved in the project. Working with Purchasing and PPD Remodel, a team of contractors was assembled to relocate the fiber hub, recable essentially the entire building to the desktop, build new communications rooms and remove the old frame making it ready for future work. The entire frame with 100 services was relocated with only one service problem reported. The fiber hub was relocated with minimum out of service time. A new uninterruptible power supply was installed for the fiber zone hub. The remodel required coordination of multiple moves of voice and data lines and shifting deadlines. It was necessary to reterminate 576 critical fiber optic cables during one weekend. These fibers provide network services to 31 buildings including Zimmerman/Parish libraries, Anderson School of Management, and Dane Smith Hall.
- **IT Infrastructure Estimates, Plans and Oversight in Building and Remodel Projects**—CNS provided IT Infrastructure services to over 100 projects during the fiscal year including: Cancer Research Center - Las Cruces, Gallup Vocational Health Care, Scholes Hall Renovation, School of Architecture and Planning, Centennial Engineering, Communications and Journalism, Sevilleta, Taos Klauer Campus, Turner Ford Demolition, and Ronald Mc Donald House.
- **Draft UNM Business Policy and Procedure 5310—Information Technology in Facilities** —This policy was developed over 18 months with CNS leadership and representatives from Facility Planning, Physical Plant Department, UNM Hospital, ITS

Computing Services, and the Policy Office. The policy defines the roles and responsibilities of CIO, ITS and FREM in project budgeting, programming, design and construction. At fiscal year end, it had been reviewed and endorsed by many campus groups and was awaiting approval by the University President.

- **Branch Campus Network Security Enhancement and Router Upgrade**—The UNM branch campuses were placed behind an Intrusion Protection Device to provide the same threat and vulnerability detection as main campus. In addition, the router was upgraded to provide threat/vulnerability protection. This added security will maximize the capacity of the network connection bandwidth by eliminating unnecessary compromised traffic.
- **Redundant Internet 1**—In cooperation with the ABQ-G group, a secondary Commodity Internet connection was tested to provide backup Internet 1 connectivity to a different service provider and path than the primary connection.
- **ABQ-G Dark Fiber Connection**--Data connectivity was provided in support of the ABQ-G team to provide the main campus leg of the first dark fiber connection from the ABQ-G site to UNM. This connection has been a bandwidth limited vendor-provided service and the new connection will allow much higher data throughput from UNM to Internet2/National Lambda Rail and to national and state partners.
- **UNM-ABQ-G 10 Gbs Link**—10 gigabit per second network connection was installed between ITS-South and the ABQ-G Marquette facility in preparation for the increased Copan Remote Storage and Internet 2/National Lambda Rail bandwidth requirements.
- **Ciena Equipment**-- Installed Ciena (Lambda) equipment in building 256 (the main telephone switch room) connected via fiber with Comcast to 505 Marquette, site of the Albuquerque Gigapop. This is the first of multiple sites where Ciena equipment will be installed for the Albuquerque Gigapop.
- **PPD and Northrup Fiber Zone Hub Generated Power**—A failover switch was installed at the Physical Plant data network hub and at the Northrup Hall hub to allow the automatic failover to generated electrical power during loss of building and UPS power. These two hubs provide data network connectivity to thirty two buildings including the Observatory, PPD, KNME, CAR's, Old Education, UNM Business Center, Fine Art's, SUB, Journalism, Art and Art History, Bookstore, and Biology.
- **Reduction in Dial-Up Modem Lines**—In March 2007, an analysis of the dial-up modem lines revealed that due to increased broadband usage, the traffic on the dial-up lines was significantly reduced. Because of large numbers of idle lines and modems throughout the day and the cost to provide them, a reduction in the lines was initiated in April after discussion with several IT governance groups. Cost savings from this effort will be used for supporting other IT priorities.
- **Music On Hold Improvement**—The implementation of the new telephone switches has made several operational efficiencies possible. One example is in loading and unloading

holiday music. The new system allows CNS to do this without dispatching a technician for one or more days to twelve telephone switch sites to perform the work manually. The changes are now made centrally saving staff time.

- **Redundant T1 for Valencia**—A second T1 circuit to Valencia campus was installed for redundancy for voice traffic. This allows the Valencia campus to continue to make voice calls if one of the circuits fails.
- **New Cabling RFP**—CNS developed, evaluated and awarded a new cabling RFP. The goal of the RFP was to identify qualified vendors for project work, refine invoice and payment procedures and obtain more competitive pricing. The new RFP went into effect on January 1, 2007, and results are positive.
- **Taos Circuits Conversion**—CNS developed and implemented a conversion of the Taos voice circuits to PRI at the request of the Taos campus. The benefit to Taos is sending and receiving caller ID.

Long Distance Authorization Code Project—The project to convert all long distance users to a random, individually assigned long distance authorization code was substantially completed by June 2007. Over 3100 new codes were added and over 1800 unused codes were deleted from the system.

- **Student Services ACD Standardization** – CNS working in conjunction with the leadership from the Student Services organization, standardized the parameters associated with the different ACD groups associated with Student Services. The objective of the standardization was to provide better service and easier navigation of the system for students. This included reprogramming the ACD system, providing training to the agents in each department and reviewing progress with the management team.

Migration to FastInfo – The CNS customer service group implemented FastInfo to replace an outdated process of accepting customer requests via email. This project included developing information for the knowledgebase, working with Computing Services to create custom forms for requesting services.

- **Competitive Pricing For Project Materials:** CNS working with UNM Purchasing and ITS Administrative Services studied using existing governmental RFP's to procure materials. It was determined that we would qualify for internal procurement of project materials. This method of internal procurement was included as a University option within RFP 779 Information Technology Structured Cabling, Equipment Installation, Maintenance and Repair.
- **Zimmerman Library Fire Restoral**--All CNS workgroups were involved in planning and restoring communications and alarm services to Zimmerman. The alarms group provided the original “on call after hours response” (May 1, 2006), providing key access and information from the building fire alarm system and building configuration to the emergency responders (Fire Department, State Fire Marshall's office, UNM Police, investigators). In the immediate aftermath, the group assessed damage to the building

fire alarm system, providing that information to all pertinent personnel (Listed agencies as well as PPD, OCP and Risk Management). The group coordinated temporary repairs to the system in order for the building re-occupancy to occur. The CNS facilities group is providing design and installation services to support the completion of this project.

IT Strategy 3

Develop UNM-wide **IT security policies, procedures and practices** that protect the privacy of the university community, enable appropriate access and ensure the integrity of information

The **Wireless Standard** paragraph could go here instead of in Strategy 5

IT Strategy 4

Position IT as a strategic resource for UNM and the state in a way that **acquires funding** required to grow and sustain those strategic IT services

- **ITS Cost Study**—The ITS strategic planning effort identified a comprehensive financial analysis and the development of a new business model for ITS services as its highest priority.

The purpose of the study is to determine the cost of central ITS services (including ITS, MTS, and the campus network, which includes UNMH and HSC) and develop a sustainable business model that assigns cost and identifies funding for those services so that ITS management has sound information with which to make informed IT decisions. Goals include education of stake holders, diversify funding sources, better fund ITS in the short term and IT University-wide in the longer term, and ultimately bring the University up to best practices for the funding of IT services in higher education.

Because CNS has an existing business model and funding method, the study began with CNS in 2007 and the cost portion of the study for the department is expected to be substantially complete by September 2007.

Significant Plans for 2008

- **Complete the CNS portion of the ITS cost study and jointly develop alternatives for funding/revenue based upon the study**
- **Obtain approval of UBPP 5310 and collaborate with the CIO and FREM to improve work processes relating to the policy and IT infrastructure**
- **Investigate cellular antenna site hosting through various vendors in order to improve cellular coverage and capacity**
- **Collaborate with the Policy Office and Controllers Office to develop mobile device policy**

- **Collaborate with the Office of Planning and Space Management to develop comprehensive project programming and budgeting**
- **Develop ITS Master Infrastructure Plan in conjunction with the University Master Plan**
- **Complete the next revision of the ITS Design Guidelines for Facilities**
- **Deploy additional forms of IP technology such as SIP based VOIP**
- **Plan redundancy, resiliency, and functionality improvements to the data network and budget accordingly**
- **Investigate options for improved wired and wireless network security and budget accordingly**
- **Complete the wireless network expansion on main campus and begin work on north campus if funding is available**
- **Reengineer telephone system incoming and outgoing trunk lines to reduce costs and improve call handling**
- **Continue work on process improvements to drive efficiencies and increase customer satisfaction**

Significant IT Infrastructure Projects

- **Cancer Research Center II**
- **Centennial Engineering**
- **Success Learning Center**
- **College of Education Facility**
- **Lands West Utility Expansion Project**
- **Research Incubation Building II**
- **Castetter Expansion**
- **Taos Branch Infrastructure**
- **Science and Math Learning Center**
- **Pit Renovation**
- **Interdisciplinary Film and Digital Media Center**

CNS Customer Support Group Summary

The ITS CNS group has several accomplishments of note for the fiscal year 2006/2007. The primary accomplishment is the migrating away from a process of accepting requests from customers via an overloaded email address that often failed due to the volume of messages. The

new solution was to adopt FastInfo as a tool for accepting and processing requests. Fast Info provided the advantages of expanding our service level by offering chat, online requests forms, a mechanism for providing feedback upon order completion and a searchable knowledgebase.

Another accomplishment includes the completion of the occupancy of the BBRP which involved relocating over 700 phones, many of which were critical to patient care and installing over 200 new phones. This project involved coordination with over 14 different departments including UNMH IT.

The customer service group was also involved in:

- ✓ upgrading all the remaining DTerm 2 telephones that are not ADA compliant;
- ✓ renumbering and restructuring the programming and extensions associated with the Novitski and Lobo Center switches;
- ✓ beginning to use the MA4000 to complete simple programming changes to increase service to customers;
- ✓ working with the Student Services departments to standardize ACD programming to provide a more consistent experience for callers and improve service levels.

CNS Facilities Group Support

The Facilities group responsibilities are to plan, design, construct and maintain Information Transport Systems for the University of New Mexico, Health Sciences Center and the University of New Mexico Hospital.

The completion of RFP 779 Information Technology Structured Cabling, Equipment Installation, Maintenance and Repair was a major effort in 2007. The group developed and awarded this service agreement that includes all types of telecommunications work including but not limited to adds, moves changes, documentation, demolition, design, estimating, surveying, auditing, code compliance, repair, maintenance, construction and other telecommunications projects. These awards also qualify IT contractors for FREM projects.

The group completed Fiber Mesh Project on time and within budget including additional work not originally planned for. This project involved the installation of the high speed optical fiber network that provides the redundant support necessary for the Banner Financial Management System. These phases provided redundant optical fiber to the eastern side of Central Campus. This project exceeded its initial goals and additionally completed the high speed connection to South Campus within the initial project budget.

The staff worked as a team member with FREM and provided IT design and construction oversight for Domenici Education Center, Scholes Hall Renovations, Zimmerman Fire Restoration, Centennial Engineering, The Surface Mapping and Aerial Photography Project, Castetter Renovation and Expansion, Indoor Practice Facility, Sevilleta Field Station, Communications and Journalism, School of Architecture and the Lands West Utility Expansion Project. The group also provided for the commissioning and acceptance of the UNMH Children's Hospitals cabling systems. Working with the Office of Planning and Space Management, staff developed a program outline to capture ITS requirements for new

construction. They also provided programming support to the College of Education, CRTC II, and the Science and Mathematics Buildings.

Voice and Data Network Group Summary

In July of 2007, the voice and data groups converged under the management of Communications Network Services. The convergence of the voice and data groups created a collaboration of expertise and synergy that has proven to be a good model. Projects engineered, installed and completed with the newly converged group were wired and wireless VoIP, softphone technology, and establishing the QOS (quality of service) baseline for the backbone network.

The next step for the converged group is to have “voice” training for the data network staff and start the process of establishing a cross trained data network group that could eventually support the voice services. This cross training will set the baseline for a “new generation” network analyst. In today’s environment knowing multiple facets of the networking business is critical to building and sustaining a reliable, resilient network that supports both voice and data technologies.

A major effort this year has been the design and installation of wireless network access on main campus. The funding received from New Mexico Federal Educators Credit Union allowed ITS to begin installation of wireless across campus. Installation in the first cluster of buildings was started in April of 2007 and slated to be completed by August 2007. The main campus wireless will be completed by December of 2009.

The telephone systems are being migrated to a complete “hybrid PBX system”. The hybrid allows for the further deployment of multiple technologies with IP trunking, IP telephony and a migration path for TDM and analog existing technologies and best use of the existing technology.

The largest project completed this year was the replacement and upgrade of the two largest PBX systems for the University and Hospital, totaling over 20,000 ports. The project was a huge success and with a health care component made this project and end result something that the ITS CNS group is very proud of.

Included also in the large project was the installation of a new E911 system for the Campus Police Department, a PBX management system for staff and a new server that provides reports on ACD (automatic call distribution) traffic flow.

The alarm group spent a significant amount of time on the Zimmerman Library project along with the Fire Marshal and the Physical Plant Department after the fire to restore services. With two personnel in the alarms group, the ability to provide this level of service and the coordination shows the dedication and talent they provide.