
Telecommunications and Networking Services

A Unit of Information Technology Services

2005-2006

Annual Report

July 1, 2005 to June 30, 2006

Penn State's Telecommunications and Networking Services (TNS) is responsible for developing, designing, installing, and maintaining comprehensive telecommunications services within and among University locations and outside networks to accommodate the communications needs of the University's students, faculty, and staff.

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Acknowledgments:

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A copy is available at <http://tns.its.psu.edu>, under "About TNS"

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At a Glance
Highlights and Latest Numbers

Integrated Backbone (IB)

Commodity Internet
Bandwidth..... 333 Mbps

Overall Bandwidth to
Gigapop 622 Mbps

IB connections designed 219

Total IB connections to date..... >962

Total IB Interface Connections 752

Breakdown as follows:

Gigabit..... 51
100 MB..... 701
10 MB..... 0

Local Area Networks (LAN)

LANs designed & Installed..... 108

LANs upgraded.....55

Total TNS-Installed & Supported
LANs..... 472

Residence Hall Ports Activated-Peak Period

University Park 13,859

Penn State Campuses 4,822

Total..... 18,681

Voice over IP Transition

Total IP Phone Sets at
University Park 8,404
In 119 buildings

Voice Mail Subscribers

Voice over IP Unity Service at
University Park 6,204

Annual Report 2005-2006 Telecommunications and Networking Services

I. Summary

This report summarizes the achievements and activities of the Telecommunications and Networking Services (TNS) unit of Information Technology Services (ITS) from July 1, 2005, through June 30, 2006.

There were a number of notable achievements during the year. Activation of fiber optic pathways from University Park to the Altoona campus and to Pittsburgh's Three Rivers Optical Exchange (3ROX) enabled 10 Gbps (10 giga (billion) bits-per second) connections to be established to those locations. This afforded additional capabilities at the Altoona campus, including those related to disaster recovery planning, by extension of Integrated Backbone (IB) services at connection speeds otherwise only available within the University Park Campus. Through interconnection at Pittsburgh by 3ROX to National LambdaRail (NLR), NLR's PacketNet service was added to the Internet2 and commodity Internet services TNS already provides throughout the University via the Integrated Backbone.

In addition, further advantage was taken of the fiber pathway to 3ROX by adopting it as the primary pathway for Internet2, in turn tripling Penn State's Internet2 connection speed to 1 Gbps. Resultant effects further included an increase in commodity internet connection speeds, and an increased degree of redundancy for Internet2 and commodity services.

Since NLR, by design, is not a "production" network and lacks redundancy, TNS put provisions in place to enable those at Penn State using PacketNet, to "fall back" to Internet2 services, should the NLR service from 3ROX be interrupted. While the complex networking issues to establish the overall arrangement resulted in challenges to 3ROX, Cisco, TelCove, and others engaged in the overall project, steady-state service of the entire arrangement was attained by fiscal year-end. The result is that Penn State is among the relatively small group of institutions thus far using NLR services, and the first of the CIC institutions to do so. As other NLR services become accessible, Penn State is well-positioned to take advantage of them.

Another form of achievement was conversion of over 3000 more voice lines to the use of Voice-over-Internet Protocol (VoIP) technology at the University Park Campus, where the current total of over 8400 users of VoIP technology makes Penn State's deployment the largest VoIP installation within higher education, according to Cisco. Considerable progress during the year was attributed to an ITS-wide focus being placed upon the effort, close attention afforded to issues as they arose, process improvements afforded by the "service management" approach developed last year, and continued enhancement of the features afforded by the technology. Early in the year, a target was established by TNS, of 12,000 phones to be deployed by 2007. Work continues toward that goal, and to enrich the set of features available.

Instrumental work with VoIP technology was also undertaken with the Dickinson School of Law, to enable use of similar VoIP services in the Advantica Building, at Carlisle, using services of an outside provider. It is hoped that the model developed at Carlisle may prove to be an approach viable at other Penn State locations. Activation of that service is scheduled in mid-July. Similarly, identification of potential options available to other Penn State campuses continued, with further review of external services, equipment offerings by various vendors, and software-based and other approaches that are emerging.

Wireless network coverage area was also increased during the year, with the ongoing impetus of the "matching" program for funding and of service activation within new buildings together

resulting in ITS "Complete" service being added in over a dozen buildings, and ITS "Assist" service being installed within several additional buildings, many at campuses other than University Park. A map-based display showing coverage of wireless systems registered with ITS, was added to the program previously developed by TNS to capture that information. Of a more strategic nature, plans were finalized for use of "802.1X" standards to be accommodated, enabling eventual displacement of the present "VPN" technology and its inherent limitations in Penn State's large-scale, security-oriented environment.

There was ongoing activity relative to disaster recovery, with a Continuity Of Operations Plan (COOP) plan drafted and plans initiated for further development of Altoona as ITS's disaster recovery site and commensurate utilization as an alternative to University Park for intercampus networking. Emergency power and network planning aspects as related to disaster recovery were presented to executives late in the year.

A high level of interaction continued with the Office of Physical Plant, in working to mitigate the financial and schedule impacts of decisions by the Commonwealth that affected availability of electrical services. Arrangements were made to clear work that had been queued, and to enable new installations to be done under prior regulations, in turn enabling most lead times published for services offered by TNS, to remain intact.

A number of activities continued, including involvement by various staff within TNS with organizations such as Educause, Internet2, ACUTA, Net@Edu, and BICSI, on topics ranging from policy and regulatory issues, to network neutrality, to convergence of services, to standards development. Focus upon leadership training through MOR Associates' Information Technology Leadership Development program continued, with the Senior Director, two Directors, and several others having leadership responsibilities being among those participating and deriving value from the program, for the University.

New activities undertaken included planning and network architecture development to enable an increase in core network signaling speed by several multiples of the current 10 Gbps rate, assessment of the use by TNS of new services being introduced, recruitment of a Director to replace one who retired, and initiation of a long-term strategic planning activity for telecommunications and networking services.

II. Accomplishments

Voice over IP Technology

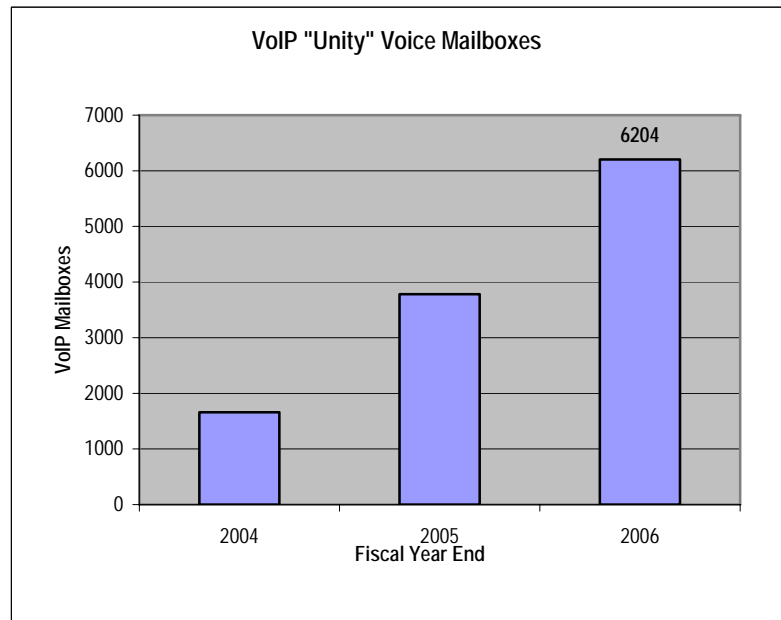
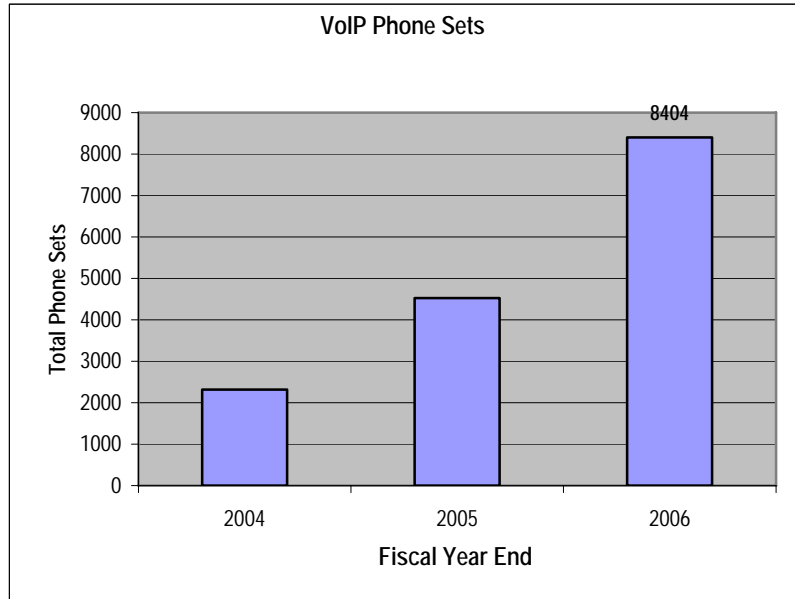
The University's traditional telephone communication services continue on a technological shift away from voice communications carried over a circuit (Verizon's Centrex) to having them carried over the Penn State Integrated Backbone (the Internet Protocol, or IP). The drive to shift more of Penn State's phones to VoIP is driven by the economics of technology convergence as well as end of support issues surrounding older, legacy telephone devices and systems. The conversion includes the replacement of approximately 15,000 legacy telephone sets at the University Park campus as well as development of additional VoIP system features.

As of June, roughly 50% of all the phones on campus were VoIP, with an anticipated 75% VoIP adoption rate by year's end. According to the telecommunications supplier Cisco Systems, Penn State now has the largest installation of VoIP in higher education.

Most of the legacy devices currently in use with Centrex are old technology (typically, Merlin or Meridian devices). As a result, they are becoming increasingly difficult for TNS to support. In order to facilitate a smooth transition, and to accommodate those departments who choose or need to delay conversion to VoIP-based services, a plan was developed to phase out such devices. The plan includes a time and material (T&M) based maintenance model for Meridian devices. The T&M model will replace the monthly fee-based maintenance on these legacy telephone Instruments. To further assist departments with the adoption of VoIP, an ITS VoIP Project Team was formed during this reporting year. The team has recommended changes to the VoIP work flow process and customer service enhancements which have improved the VoIP migration process for both the customer and ITS.

At Penn State, the VoIP system is built within the University's own infrastructure because it allows for better handling and managing of service quality and reliability issues. By using our own network, we have more control in ensuring that voice quality is as good as, if not better than, the traditional phone system. From a design standpoint, the VoIP system at the University has been designed and implemented to meet or exceed the reliability of the traditional phone system. The system is able to survive power outages and can continue to function in emergency situations because its infrastructure is protected from power fluctuations at all strategic points with 100% emergency power back-up and because its network architecture is fully redundant and will continue to function in case of a loss or cut in the connection. In addition, all system records and configurations are backed-up on a regular basis and saved to an off-site location so that the system can be fully restored to its original state if any system degradation or disruption should occur.

A new, highly anticipated feature that was added to the VoIP system this reporting year enables VoIP users to access the Penn State Directory through their telephone sets. With this new feature, users may search the full directory by entering a person's name with the telephone keypad, and then dial that person with the touch of one



button or by picking up the handset. All Penn State persons with published telephone numbers are searchable through the VoIP telephone directory feature, in turn linked to the University's overall electronic directory.

New express messaging features were added to the VoIP *Unity* voice mail service. These additions to the voice mail service enable VoIP voice mail subscribers faster and more immediate ways to transfer calls and access voice mail. Voice mail subscribers can now use the new Direct Transfer to Voicemail feature to directly transfer a call to another person's voice mail box, and not ring their phone. In addition, by dialing the *Unity* express message number, 36200, voice mail subscribers can instantly deposit a message directly in to another *Unity* subscriber's mailbox without having to call in to the *Unity* system and log in. These new features are standard and available on all VoIP phones and provide a quick way to leave messages for people without ringing their phones or logging in to their mailbox.

In addition to the above service and feature improvements, new IP phone instruments were made available that offer larger high-resolution displays and lighted line keys, as well as additional internal memory to support future enhanced features and applications and conformity to power over Ethernet standards. The new sets replace older models and receive the same subsidy of \$100 each as all the other initial VoIP installations. At about the same time the new phones were announced, CISCO announced a May 1, 2006 end-of-sale date for the basic VoIP-based phone instrument. A new phone model, similar in form, function and cost to the discontinued model was made available, but included additional internal memory to support future enhanced features and applications, and conformed to more generalized standards for powering it through the Ethernet connection. The three new models are now being used for new VoIP installations.

With the development of an analog VoIP service, common analog telephones, cordless analog phones, fax machines, and other analog devices can connect to the VoIP-based technology at a lower monthly service fee than available through the University's standard Centrex telephone line. These analog devices are not able to use voice mail and other system features afforded by the University's digital system. Participants of the VoIP analog service are able to retain their existing telephone numbers and do not incur a one-time installation or conversion charge unless additional wiring is needed

Telephone Contracts Extended

Earlier this reporting year, as part of the long term plan for the multifaceted evolution of voice services at University Park, ITS began developing a Request For Proposal (RFP) to replace the University's expiring contracts for Centrex and long distance service. During the course of development of this RFP, unsolicited proposals were received from the current service providers and offered unexpectedly attractive rates for continuing their services beyond December 31, 2006. In addition, both providers (Verizon and AT&T) offered to put their rates in effect prior to the December 2006 expiration of the current contracts. As a result of these offers, after coordinating with key stakeholders (including Housing and Purchasing), ITS agreed to extend both contracts at the reduced rates for an additional 24 months, and with the reduced rates associated with AT&T's services going into effect on February 1, 2006 and those with Verizon's services going on July 1, 2006.

Subsequent rate reductions proposed by Verizon resulted in savings from student lines which will be passed directly to Housing. Similarly, through early adoption of the AT&T contract extension, long distance savings will be reflected in billed amounts to those using such services. The total savings to the University due to these rates during 2006 will be approximately \$300K. These savings will continue throughout the extended life of the contract (which continues through December 2008).

Videoconferencing / Satellite Service Enhancements

A technology that enables the ability to present high-resolution data while on a videoconference call - and view both the data and the meeting participants at the same time – became available during this reporting period. The technology enabling this, referred to as H.239, provides the capability to send and receive two channels within the videoconferencing transmission standards that are widely used at Penn State (IP and ISDN). Use of H.239 reduces setup time and greatly improves presentation quality and the feel of "being there" by enabling conferees to see both the presentation and presenter at distant locations. Because presentations can be sent in SXGA resolution (with the proper equipment in place), distant sites can see the same presentation detail as the originating site. SXGA resolution offers crisp, clean images of financial spreadsheets and other material requiring precise display of detail.



New technology improves presentation quality during a videoconference

A new service that delivers satellite TV programming through videoconferencing technology was developed this reporting year. Campuses without a satellite downlink facility can now view local or satellite-delivered programming through their videoconferencing units via the new Video Gateway Service. The service, offered in conjunction with WPSU-TV, provides a satellite-to-videoconferencing method that transports National Television System Committee (NTSC) standard broadcast TV programs and University Park-originated programming over existing videoconferencing systems. The Video Gateway Service is also a cost-effective and efficient way to disseminate multiple simultaneous satellite-delivered programming requests to students, faculty and staff at non-University Park locations. On November 30th, a videoconference was broadcast to seven campus videoconference rooms by IP and to sixteen locations by satellite. This conference, coordinated by TNS, used the Video Gateway Service. The conference, about University budget issues, originated from WPSU-TV studios.

Native IPv6 Upgrade

Internet Protocol version 6 (IPv6) addressing became available to Integrated Backbone customers at Penn State. IPv6 is the next generation of the Internet's main communications standard that governs the addressing and transport of data traffic through a network. The use of IPv6 will enable Penn State to accommodate the anticipated growth in the number of registered computers on the Internet by exponentially increasing the number of available IP addresses. It is the "next generation" protocol designed to replace the current version Internet Protocol, IPv4 addresses. IPv6 addressing also paves the way for future service enhancements that will better allow Penn State students, faculty and staff to conduct real-time communications and applications over the University's network. IPv6 is expected to gradually replace Ipv4 at Penn State with the two coexisting for a number of years during a transition period.

III. Telecommunications Infrastructure Upgrade

As part of an encompassing plan to upgrade telecommunications infrastructure of University buildings, the extension of single mode fiber, and replacement of internal wiring, have been

completed at several buildings during the year. The plan includes both University Park and other Penn State campus locations and has been centrally funded as part of the funding structure for telecommunications. Projects completed this year are listed below. In total, 15 buildings were rewired and fiber was extended to 29 buildings at 12 different campuses during the past year.

University Park Projects

The following 25 buildings received **new fiber installations** under the Telecommunications Infrastructure Upgrade Project:

- Agriculture Administration
- Agriculture Sciences and Industries
- Buckout Lab
- Burrowes
- Calder Square II
- Carpenter
- Fenske Lab
- Ferguson
- Grange
- Health and Human Development East
- Hamer/Heinz Center
- Hetzel Union
- James
- Mateer
- McAllister
- Materials Research Institute
- Noll Lab
- Old Main
- Oswald Tower
- Pine Cottage
- Rider II
- Spruce Cottage
- Technology Center
- Tyson
- White



Old Main was one of the 25 buildings at the University Park campus to receive new fiber installations as part of the Telecommunications Infrastructure Upgrade Project

The following 9 buildings were **re-wired** under the Telecommunications Infrastructure Upgrade Project:



Old Botany Building was completely re-wired as part of the Telecommunications Infrastructure Upgrade Project. Built in 1887, it is the oldest academic building on the University Park campus

- Agricultural Sciences and Industries
- Buckout Lab
- Health and Human Development East
- Mateer
- Old Botany
- Rider I
- Technology Center
- Thomas
- Warnock Commons

Other Telecommunications Projects at University Park

New construction projects consume a significant amount of time and effort from TNS staff as part of the planning, design and construction process. Each new building requires significant planning and design to coordinate the fiber and copper services to the building, complete the building wiring and ultimately activate data, voice and video services to each office, classroom, lab and other specialty spaces.

Major projects completed during this reporting year include:



Medlar Field-Lubrano Park Baseball Stadium

Medlar Field-Lubrano Park Baseball Stadium
(New) Forestry
(New) Food Services
Holmes Hall
Carnegie (Renovation)

Other Penn State Campus Projects

Telecommunications Infrastructure Upgrades have also taken place at other Penn State campus locations. Ten buildings were re-wired and 11 received new fiber installations as part of the Telecommunications Infrastructure Program at those Penn State campuses.

Rewired Buildings include:

Beaver: Study Learning Center

Berks-Lehigh Valley: Hintz bookstore

Fayette: Fayette House

Mckeesport: Ostermyer Lab

Mont Alto: Science, Tech Center, Library, and upgrades and Conklin Hall

New Kensington: Gym, Science

Wilkes-Barre: Science

Single-Mode Fiber Extensions to the following campus buildings include:

Berks-Lehigh Valley: Hintz Bookstore, Community Center, Pfeiffer House, Greenhouse

Behrend: New REDC, Knowledge Park (conduit)

DuBois: All buildings

Harrisburg: Library

Air Conditioning, Electrical and UPS Upgrades Increase Network Reliability

As network and equipment use grows and expands, the heat and electrical loads in existing Telecommunications Rooms can become problematic. TNS addressed this issue last year by bearing the cost of upgrading the air conditioning and electrical services in several Penn State Telecommunications Rooms. To continue this trend, upgraded air conditioning and electrical

services were installed in 7 existing Telecommunications Rooms at University Park, as well as in 5 Telecommunications Rooms at other Penn State campus locations during this reporting year. In addition, as part of an ongoing effort to maintain or improve network reliability, aging Universal Power Supply (UPS) systems were replaced at the Telecommunications Building and University Support Building 2. A new UPS and emergency power was added to serve the Integrated Backbone hub site at Paterno Library

IV. Network Enhancements

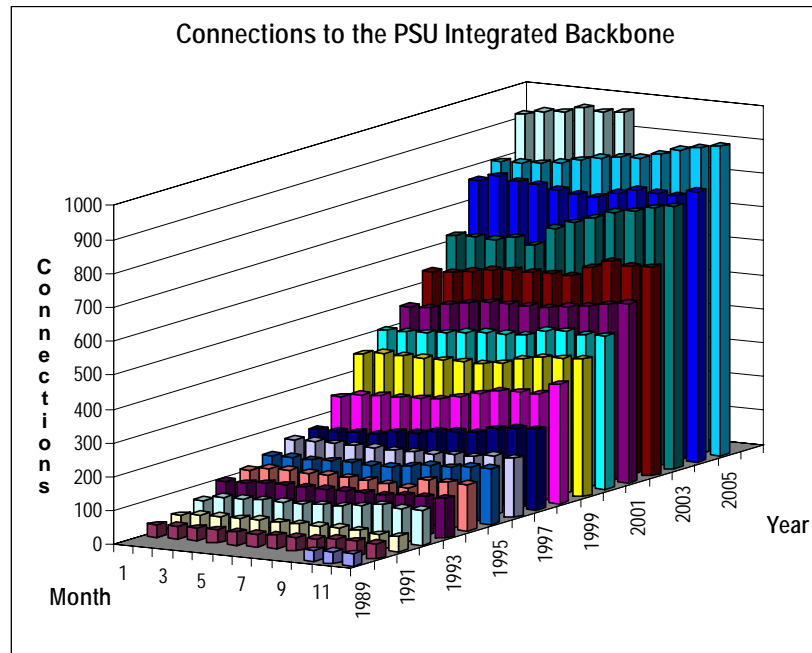
Integrated Backbone (IB) Services

The IB is the IP network that enables the efficient transmission of voice, video and data among students, faculty and staff—not only within University Park—but with 22 other Penn State campus locations

across the state, and to the Internet. The IB supports

interconnectivity of over 750 Local Area Networks (LANs) at Penn State, as well as providing access to Penn State computing resources and information available via the Internet.

During this reporting year, 219 IB connections were designed, bringing the total number of IB connections to 962, an increase of over 100 connections from the previous reporting year.



10 Gigabit Ethernet implementation

In order to accommodate expected future demand for increased bandwidth-improved transmission quality, a new 10 Gigabit Ethernet upgrade to increase the speed of the core of the IB from 2Gbps to 10Gbps has been completed. Plans are underway to develop multi-Gigabit customer connection offerings to the IB.

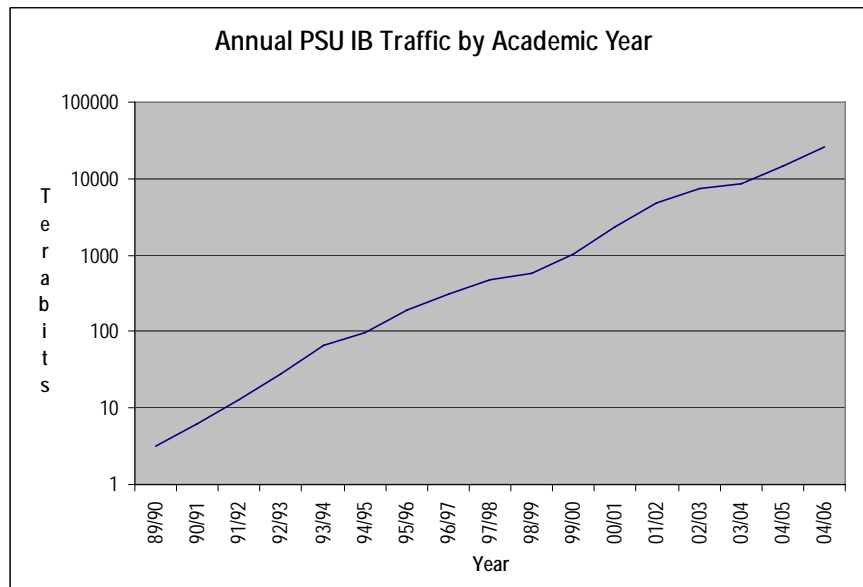
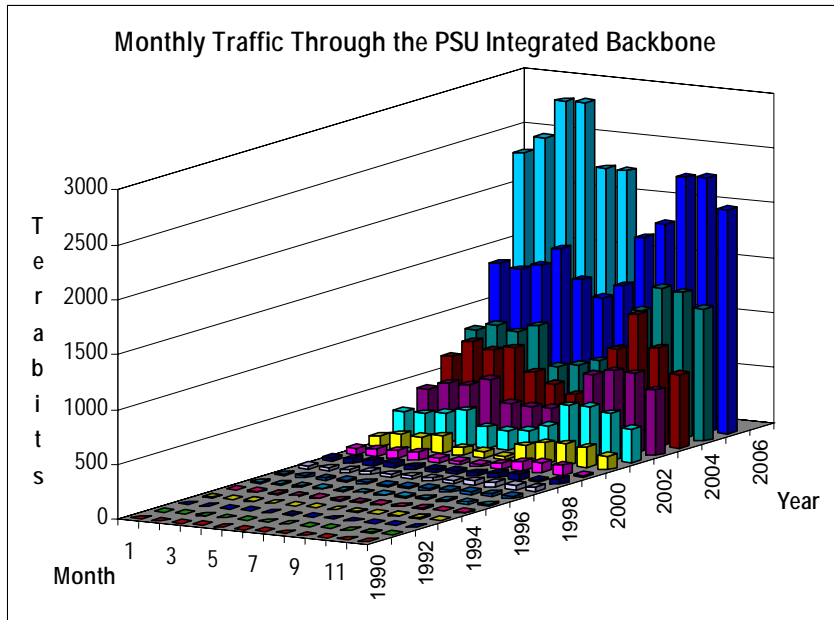
3 Rivers Optical Exchange and National LambdaRail (NLR) Network

The activation of the recent fiber optic path from University Park to 3 Rivers Optical Exchange (3ROX) in downtown Pittsburgh represented a number of firsts for Penn State. It is the first time that Penn State has signed

a long term lease of a communication facility with an outside vendor, signing an "Indefeasible Right to Use" (IRU) agreement with TelCove for "dark fiber." It was the first use of Dense Wave Division Multiplexing (DWDM) technology by TNS, with the deployment of five Cisco 15454 ONS multiplexers. Three of the Cisco multiplexers are being installed in TelCove "communication huts" in Altoona, Johnstown and Greensburg, as part of a collocation agreement that was included in the IRU.

Training on the new Cisco hardware was performed last summer, while deployment activities began in earnest in late 2005. Telcove completed installation of the fiber in early December. TNS operations staff made numerous trips to the three collocation huts as well as to 3ROX's facility in Pittsburgh to install, test and activate the DWDM network. Since the completion of that work in April of 2006, the new fiber path and hardware is being used

to provide NLR PacketNet Service at 10 Gbps, Internet2 connectivity at 1 Gbps, and a backup redundant path for commodity Internet traffic in case of failure of our primary OC-12 circuit.



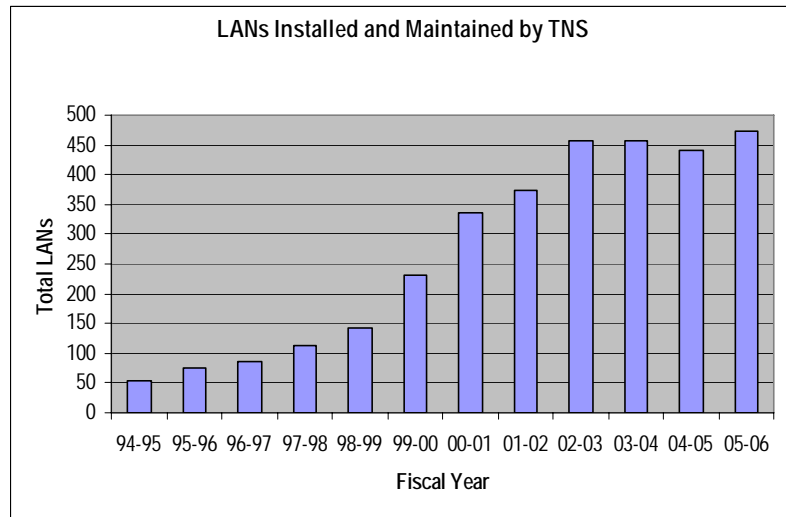
Local Area Network (LAN) Services

During this reporting period, 55 LANs were upgraded and 108 LANs were designed and installed; bringing the total number of TNS-designed, installed and supported LANs to 472. Each TNS-supported LAN is serviced through an IB connection.

Next Generation ITS Wireless Service

A TNS staff member is chairing a committee of ITS staff who has been tasked with investigating and

proposing changes to enhance the existing ITS wireless service and oversee the implementation of those changes. The committee is also in the process of establishing requirements for the next generation of ITS wireless service, which entails selecting components for the new service and developing a plan for transitioning from the existing system to the next generation ITS Wireless system. The committee authored and released a Request For Proposal (RFP) for the required components. The responses to that initial RFP were evaluated and components from several vendors were brought in for further testing. Unfortunately, none of the proposals were found to be suitable for deployment in the next generation 802.1X ITS wireless service at Penn State. In an effort to move forward, the committee released a second RFP to find a suitable component vendor. This effort proved positive and a suitable vendor was identified and a contract was awarded to 3Com during this reporting period. Operational trial sites of the 3Com components have been implemented in the Computer Building and Telecommunications Building at the University Park campus.

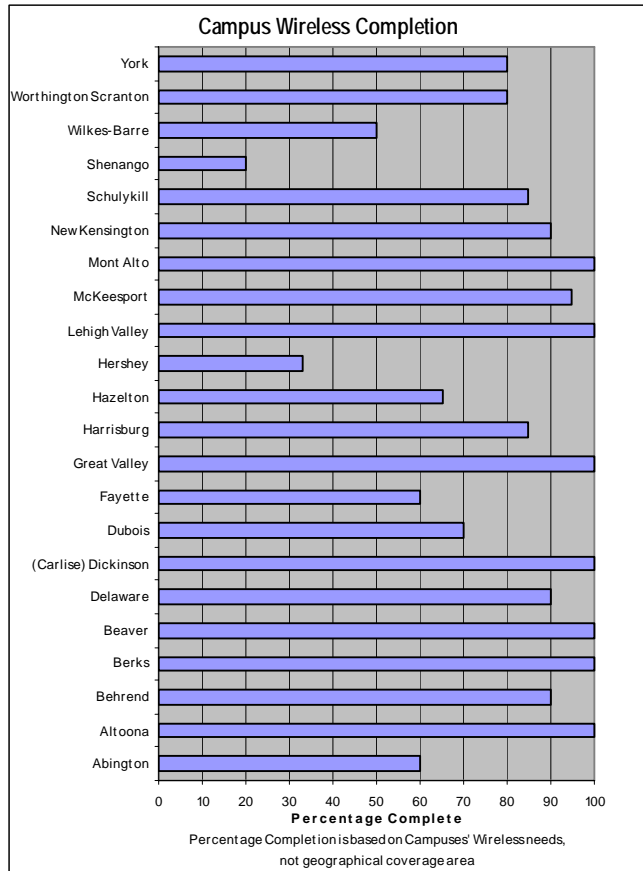


Penn State Wireless Networking Initiatives

The Penn State Wireless initiative of "matching funds" is a cost-sharing program started last year with the intent of encouraging colleges, departments, campuses and administrative units to deploy Penn State Wireless access in their spaces. Initially, the focus was on student and common areas of buildings, but has recently been expanded to include any building or exterior space. At University Park, the College of Education deployed wireless in Chambers, Cedar and Rackley Buildings through this program. Other Penn State campus locations took extensive advantage of the programs with "Assist-type" installations funded at Dubois, Hazelton, Mont Alto, and New Kensington. Wireless "Complete" services were deployed at the Library at Shenango; the Commons, Tech Center, and Multi-purpose Buildings at Wilkes-Barre; Dawson and Gallagher Buildings at Scranton; and Lares, Sutherland and Woodland Buildings at Abington. Projects in Sharon Hall at Shenango Campus and in 9 buildings at Beaver Campus were funded within this fiscal year (although they were not finished at Beaver this fiscal year because of construction work at Sharon Hall and delayed funding at that campus). This program will continue through at least fiscal 06/07, with funding still available.

Currently, one-third of the roughly 200 academic and administrative buildings at the University Park campus have registered their wireless networks on the TNS "wireless locations database." Many of the locations serviced at University Park are the result of individual efforts undertaken by Colleges and departments. In addition, based on information provided by other campus IT

Directors, all other Penn State campus locations now have wireless network coverage in areas deemed most necessary to have wireless coverage. Many of those networks have subsequently also been registered. At a growing number of Penn State campus locations, wireless network connections are available in student gathering areas, student food courts and coffee and snack bars on campus. Wireless access to the Penn State network is now available in several outdoor areas at on the University Park campus. Those areas include the HUB Plaza, Willard Plaza, Thomas Plaza and the outdoor area surrounding the new Business Building. Waring Commons and Redifer Commons (at the University Park campus) became the first commons areas with wireless capability at the beginning of this reporting year, when University Housing installed the first wireless access points on the first two floors of those Commons. Housing is investigating potential wireless deployment in lounges in McKee, Beaver, Runkle, Holmes, Leete and Simmons halls. Of particular note is that wireless access is becoming more readily available in general purpose classrooms (GPCs) on the University Park Campus due to the fact that all newly constructed buildings are installing wireless connectivity that includes coverage in the new GPCs. Currently, at University Park, 374 GPCs are divided among 55 buildings across the campus; wireless access is available in 251 GPCs in 27 buildings on the University Park campus.



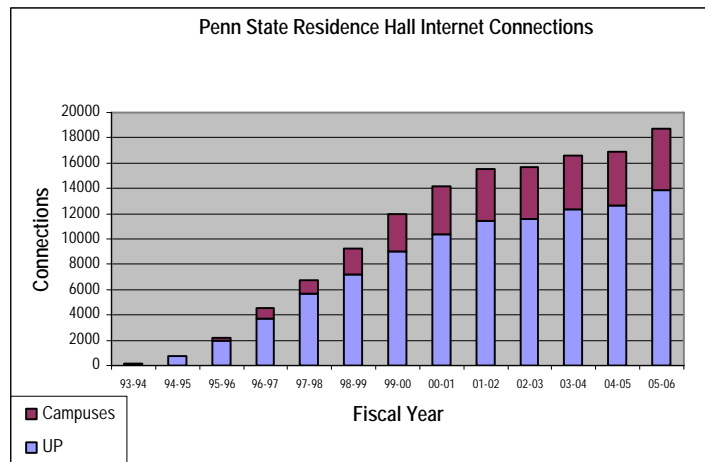
ITS Firewall Service Hardware Upgrade

A change to one of the hardware equipment offerings available via the ITS Firewall service was made during this reporting period. The new device provides improved data throughput of combined inbound and outbound communications by achieving even higher firewall data transfer speeds than originally offered by the fastest ITS Firewall option. There are several options for the ITS firewall hardware device, each with increasing data throughput and total IP address capacity. All three devices use the same firewall software, Firewall-1 by CheckPoint Software.

V. Student-Focused Issues

Residence Hall Internet Services

Over 18,000 students, who had their own computer and lived in Penn State residence halls, activated the Internet connection port(s) available in their room.



VI. CQI

Service Management Process

As part of ITS' continued provision of better service to Penn State community members, TNS and the Consulting and Support Services (CSS) unit of ITS developed process improvements last year. The resultant new internal TNS function known as "service management" enables TNS staff members who perform design and installation roles to more directly manage interactions with clients, for aspects such as usage analysis, service customization, component selection, service advice, service ordering and service delivery. The process provides those familiar with these services a direct voice, email, or Web-based communication path with those in TNS who perform the types of tasks previously listed. TNS staff within specific design groups follow up on these contacts, working directly with individual University clients and managing the long-term service process.

Timely Notification of Telecommunications Work and Deadlines

As in previous years, notices of deadlines were distributed well in advance, for work to be billed during the remainder of the fiscal year, and for work to be completed during the summer months. Timely notifications provide a tremendous overall benefit for the University community by enabling contacts to complete the required Telecommunications Service Requisition form prior to the deadlines, so that work can be scheduled and completed in an orderly fashion. This eliminates many of the disruptions stemming from high-priority, last-minute requests. The practice also minimizes the amount of extra-cost overtime needed to accommodate these efforts, leading to overall savings to the University, as well as to individual Colleges and departments.

TNS and Contingency Planning

A variety of activities continued in the general context of disaster recovery/preparedness. These ranged from working with those involved with the connection to the 3 Rivers Optical Exchange

(3ROX) in Pittsburgh to reviewing and continuing plans to improve the robustness of telecommunications and networking services within and between campuses.

ITS Event

ITS hosted the third ITS Event, which was attended by more than 1,100 people. The “Event” was held in conjunction with an ITS-sponsored Security Conference featuring national speakers from the federal Bureau of Investigation among others. Remarks from Penn State President Graham Spanier were one of the highlights of the Event. Over 140 ITS employees manned 14 different exhibits areas, with several of the exhibits being staffed by TNS personnel. A TNS staff member served on the core planning committee. TNS was instrumental in arranging for networking, including both wired and wireless services, during the Event, and for providing guidance and feedback on a variety of networking aspects.

Assistance to Katrina Victims

TNS staff offered good will and assistance by assembling and donating sixty “Health Kits” that were delivered to Hurricane Katrina victims shortly after the disaster. The Health Kits provide personal hygiene products to help sustain everyday life.

VII. Closing

As exemplified by the particular achievements and activities cited above, TNS continues its mission to develop, design, install, and maintain comprehensive telecommunications and networking services, within and among University locations and outside networks, to accommodate University communication needs. To that end, we look forward to embarking upon another year of continued accomplishments and advances of the services offered.