
Telecommunications and Networking Services

A Unit of Information Technology Services

2004-2005

Annual Report

July 1, 2004 to June 30, 2005

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.

- I. Summary 2
- II. Accomplishments..... 2
- III. Infrastructure Upgrades 6
- IV. Network Enhancements 8
- V. Student-Focused Issues 12
- VI. CQI 12

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..... 280 Mbps

Overall Bandwidth to
 Gigapop 622 Mbps

IB connections designed 235

Total IB connections to date..... >851

Total IB Interface Connections 798

Breakdown as follows:

Gigabit..... 51

100 MB..... 701

10 MB..... 46

Local Area Networks (LAN)

LANs designed..... 94

LANs upgraded..... 125

Total TNS-Installed & Supported
 LANs..... 441

Residence Hall Ports Activated

University Park 12,618

Non-University Park 4,306

Total..... 16,924

Voice Mail Subscribers

Traditional Voicemail Service at
 University Park 4,499

Voice over IP Unity Service at
 University Park 3,782

Voice over IP Transition

Total IP Phone Sets at
 University Park 5,000

Annual Report 2004-2005

Telecommunications and Networking Services

I. Summary

This report summarizes the achievements, activities, and ongoing projects of the Telecommunications and Networking Services (TNS) unit of Information Technology Services (ITS) from July 1, 2004, through June 30, 2005.

Efforts during the year focused upon expanding use and developing services, especially of those already offered by the unit. A program was developed to leverage the amount of funding allocated to expand wireless services, by offering "matching" funds to those campuses, colleges, and other entities willing to support installations to serve student-centered areas. Several campuses and colleges elected to participate in that program, expanding the number of areas throughout Penn State in which wireless coverage is or soon will be available and registered. A decision was made near the end of the year to delay the plan to develop a "wireless corridor" at University Park, and instead develop plans to service general purpose classroom areas in buildings such as Forum and Boucke, based upon the provision of wireless services within classrooms having been endorsed mid-year, for new building construction. Plan development for those and other buildings was started, and a decision made to delay "corridor" development until a later date.

To address an expressed need for more direct interaction between those requesting services, and designers and others within TNS, a transition to a "service management" approach was completed during the first half of the period. After initial set-up and refinement of the associated processes by first addressing the less complex services, all other services were also transitioned, with voice services such as those based upon the more complex Voice-over-Internet Protocol (VoIP) technology, being among the final services that were transitioned mid-year. Reaction to the change continues to be favorable, with most lingering issues being resolved by year-end.

Deployment of VoIP technology and enhancement of associated voice services continued, with the number of VoIP connections doubling to 5000 by year end, with two-thirds of the growth occurring during the last half of the year. At the same time, service enhancements such as music-on-hold, Automatic Call Distribution (ACD), abbreviated dial, direct transfer, and other value-added features were refined or developed for the VoIP technology.

Preparation was made for a "dark fiber" connection to the National LambdaRail (NLR), with a contract developed to cover initial installation as well as ongoing maintenance and co-location support. Associated work was undertaken to define the network architecture and components which will initially be utilized, including coordination with the Committee on Institutional Cooperation (CIC), the Three Rivers Optical Exchange, Internet2, participating vendors, and others involved with NLR development. The contracted dark fiber is to be available by the end of 2005, with activation of services which will traverse the fiber to occur some weeks thereafter. An update of connection plans for NLR and the University's Integrated Backbone and related services was presented to ITS executives during the final days of the reporting period.

II. Accomplishments

AT&T Service Contract Lowers Rates

Penn State's new Long Distance calling contract with AT&T, signed at the beginning of this reporting year, provides for the continuation of administrative direct long distance dialing, administrative toll free 1-800 number dialing services, ISDN video/data service, calling card and network remote access service (through

the Penn State Travel Calling Card), operator and directory assistance service. Under this contract, the University's current administrative long distance direct dial rates at University Park and Penn State Travel Card rates have been reduced by 12.5%.

Coincidentally, the Travel Calling Card was recommended to Penn State campuses, colleges, and departments as a replacement for the University Corporate Calling Card (used at University Park locations) and the ExecuBill Calling Card (used at Non-University Park locations) for providing domestic calling at a much lower rate. In addition, an International Prepaid Calling Card was also made available to enable global access at affordable rates. Both Calling Cards - Travel and International Prepaid - were made available for general use and administrative units were advised to replace their more expensive ExecuBill and Corporate Calling Cards with the newer, more economical options.

The new long distance contract also includes, among other things, the addition of incoming calling station ID service (Caller ID) to the Penn State Centrex telephone system at University Park. Caller ID lets you see the telephone number of the person who is calling you before you answer the phone. To enable this service, the telephone circuits connecting the Penn State Centrex system to the AT&T long distance provider were converted. The new service change affects incoming long distance calls only and are only noticeable by Penn State Centrex users if their telephones include a display screen and if Caller ID service is enabled on their Centrex line. Also, for Centrex telephones, Caller ID is only presented if the person calling has not chosen to "block" their number from showing on the display, or has not chosen to insert a fictitious number. In addition, some outlying telephone facilities are not capable of providing Caller ID. For these instances, the Centrex telephone display screen will be blank or may insert asterisks such as; "*****".

Rate Reductions

In addition to the above, the following is a summary of other telecommunications rate changes that went into effect during this reporting year. These reductions are the result of a variety of budgetary changes, including internal cost control and reduction initiatives, with the savings passed onto those using these services:

- Voice mail costs dropped from \$8 per month to \$3 per month.
- Centrex voice rates (at University Park only) dropped from \$18 per month to \$15.50 per month.
- VoIP services (at University Park only) dropped from \$11 per month to \$9.50 per month.
- VoIP voice mail (at University Park only) dropped from \$4 per month to \$2.50 per month.
- TNS overhead rate, applicable to monthly service fees, dropped from 22.0% to 15.0%.
- TNS equipment monthly maintenance fee dropped from 0.75% of acquisition cost to 0.50% of acquisition cost.

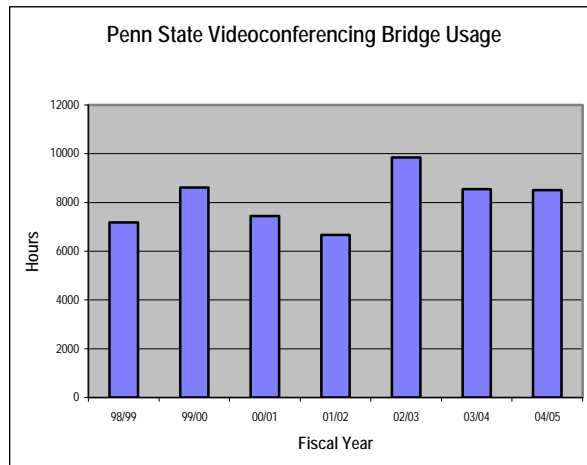
In concert with a new funding model developed by a committee of executives, budgetary plans for "common good" services were revised and given funding strategies to include infrastructure enhancements, among other service aspects. As a result, "common good" service was extended to include "Gigabit Ethernet" service which was previously an "individual good" service. As a result, the monthly cost for Gigabit Ethernet service was reduced from \$290 to \$0, with the one-time costs for installing this service dropping from \$6000 to \$1000.

Video Bridge Service Enhancements / Satellite Upgrades

Service enhancements to the Penn State Video Bridge have made it easier to schedule a multi-site videoconference and made such conferences seem more life-like than ever before. A Videoconferencing Bridge is a device that enables users to host multi-location, multimedia seminars, group meetings, class

instruction, and many other collaborative communications conferences—saving time and eliminating costly travel expenses.

The new On-Demand Video Bridge Conferencing service, launched this reporting period, offers freedom of scheduling for impromptu videoconferencing meetings by providing conferee-initiated access to the Penn State Video Bridge. The On-Demand service provides the freedom to connect three or more videoconference rooms or desktop systems on an as-needed basis without the need to make formal reservations. On-Demand Video Bridge conferences require an initial conference set-up in the Penn State Video Bridge. Once the profile is established, conferees can use the Bridge, as needed, to schedule conferences on their own. There is currently no accurate method of calculating and reporting usage of the On-Demand service at this time. However, it is estimated that the service was utilized approximately 240 hours during the first 6 months of the On-Demand launch.



In addition to the new On-Demand Video Bridging service, a new conference mode screen layout option has been added to multi-point Video Bridge conference calls. The new layout option, called Dynamic Continuous Presence, automatically selects the conference mode layout based on the number of participants in the conference. For example, with Dynamic Continuous Presence selected, two sites connected to the Bridge will see a full screen at each end. As soon as a third site connects, a side-by-side screen is seen at each site. When a fourth site connects, the Bridge switches to four sites, and so on up to nine sites. The Bridge dynamically changes the screen layout based on the number of sites connected to the conference. This new option is ideal for the On-Demand conference.

The On-Demand Video Bridge Conferencing service was a direct outcome of recommendations expressed by the Information Technology Services Desktop Videoconferencing Committee and is an ideal service for desktop videoconferencing users.

Penn State's satellite uplink facility, located at the Telecommunications Building at the University Park campus, was upgraded during this reporting period. The uplink facility, whose functions include helping to distribute TV programs such as Penn State's basketball games, received new high power amplifiers and a new redundant change-over system to assure continued reliability of its services. Through the associated use of a geostationary satellite, the uplink allows Penn State information to reach multiple national or international receiving locations.

The satellite uplink service is available to those within Penn State requiring satellite broadcast television distribution of live or taped programming, sporting events, conferences, interviews or classes. The uplink was initially installed at the University in 1987.

The University Park Cable Television System distributes 73 TV channels and local FM radio stations to 159 buildings at the University Park Campus. System distribution was added to eight classroom buildings and seven residence buildings during this reporting year.

Native IPv6 Upgrade

A successful native IPv6 field trial was conducted during this reporting period, and plans to make this new version of Internet Protocol available to Integrated Backbone customers at Penn State are forthcoming.

IPv6 is the "next generation" protocol designed to replace the current version Internet Protocol, IP Version 4 ("IPv4"). IPv6 fixes a number of problems in IPv4, such as the limited number of available IPv4 addresses. It also adds many improvements to IPv4 in areas such as routing and network auto-configuration. IPv6 is expected to gradually replace IPv4 at Penn State with the two coexisting for a number of years during a transition period.

Voice over IP (VoIP) Technology

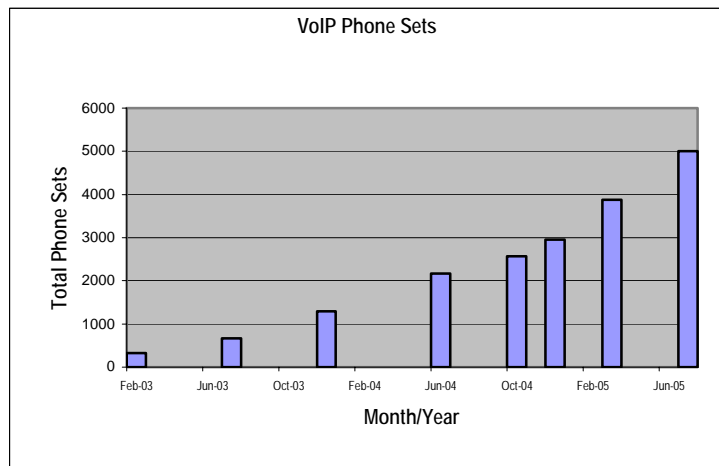
TNS is in the midst of a multi-year conversion from Centrex telephone service to Voice over Internet Protocol (VoIP) technology. The conversion includes the replacement of approximately 15,000 legacy telephone sets at the University Park campus as well as development of additional VoIP system features. The University Park five-digit dialing plan is maintained by VoIP and will continue until the transition from Centrex is completed. Centrex users are able to dial those who have migrated to VoIP as though no changes have occurred. VoIP users who have migrated will maintain their original Centrex telephone number, now re-homed to the circuits connecting VoIP to the public telephone network.

The VoIP transition is moving forward at a satisfactory pace as installation and distribution of IP phone sets have more than doubled from the previous reporting year with 5,000 VoIP phones now installed among 72 buildings across the University Park campus.

Six new telephone feature additions were added to the VoIP system and made a part of the standard VoIP features set and include: Abbreviated Dial, Barge, Call Back, Conference List, Direct Transfer and Join. These new

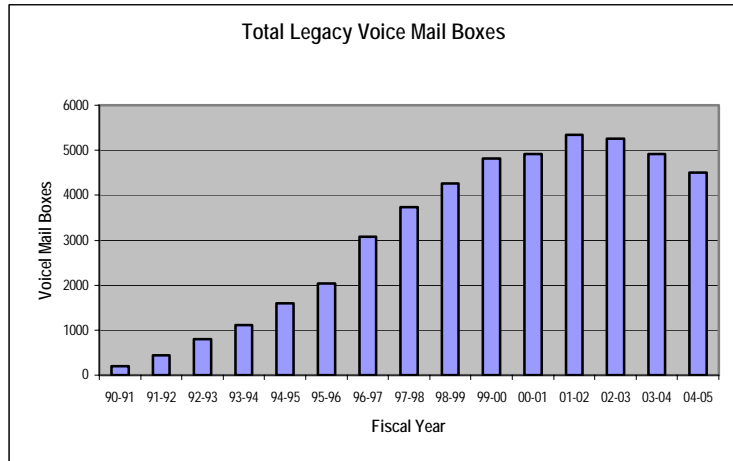
features were added to a new end-user Telephone Quick Reference Card created and customized specifically for the Penn State University Park VoIP system. In addition to the new calling features, three additional ring tones were made available on the 7940G and 7960G VoIP phone models, and service enhancements that enable greater flexibility and effectiveness through new Call Routing improvements were added to the system. Call routing provides a method where calls are distributed by a set of rules that enable them to be routed automatically without delaying the caller or placing them in a queue or menu. With the VoIP-enhanced call routing features, departmental telephone administrators can work with ITS personnel to develop call routing schemes that best meet their needs.

A new VoIP telephone model, the Cisco 7905G, was introduced and offered to new and existing customers of the VoIP service. The 7905G is a cost-effective, basic IP phone that provides a core set of features that were previously only available on higher-end models.



While the legacy voice mail service (provided on the Centrex system) has shown a decrease in its subscriber base, the *Unity* voice mail system, integrated with the VoIP service, has more than doubled its subscriber base from the previous reporting year with over 3,700 Unity subscribers.

VoIP Analog technology was made available at University Park at the end of the reporting period to further facilitate the use of telephone services which are based on VoIP technology. VoIP analog enables analog devices such as common analog telephones, cordless analog phones, and fax machines to connect to the VoIP-based technology at a lower rate than available through the University's standard Centrex telephone line. However, these analog devices will not be able to use voice mail and other system features afforded by the University's digital VoIP system. With VoIP Analog, participants will be able to retain their existing telephone numbers and will not incur a one-time installation or conversion charge unless additional wiring is needed.



Development of a VoIP mobility solution began this reporting period. The strategy, which enables VoIP users to acquire more ports than VoIP phones, would allow users to simply unplug their IP telephone from their installed IP port location and plug it into another appropriate IP port location, thus simplifying office moves. This solution will only work on TNS-supplied IP phones and can be very useful for IP-based conference phone that are often moved from room to room.

The University's contract with Verizon for Centrex services at the University Park will expire on December 31, 2006. In anticipation of that event, TNS provided steps that colleges and departments should take to minimize complications and delays that may result from a large number of last-minute requests for conversion to the lower-cost VoIP-based services. The steps encourage orderly transition, and afford up to five additional months of monthly-fee based maintenance, for those groups not able to transition to VoIP before this period.

III. Infrastructure Upgrade

Several buildings have been rewired as part of an ongoing plan to upgrade telecommunications infrastructure, including extension of single mode fiber, for all buildings at Penn State. The plan includes both University Park and Non-University Park locations and has been centrally funded as part of the revised TNS funding structure. In total, 15 buildings were rewired and fiber was extended to 29 buildings at 12 different campuses in the past year.

Telecommunications projects completed this past year are listed below:

University Park Projects

The following buildings received new fiber installations under the Telecommunications Infrastructure Upgrade project:

- Sacket, EE East, EE West, Steidle, Hosler, Deike, Reber, Power Plant, Rider I, SC Borough Building, Scott Building, ARL West (Science Park), 328 Innovation Blvd, Mueller Lab, and the Life Sciences Building.

The following buildings were completely re-wired under the Telecommunications Infrastructure Upgrade project:

- Sacket, Transportation Research, Pine and Spruce Cottages, Eisenhower Parking Deck, James, and Weaver Building.

Non-UP Projects

Telecommunications Infrastructure Upgrades have also taken place at Non-University Park campus locations as follows:

- **Berks/Lehigh Valley** – Completed rewiring of the Peiffer Building. Extended duct bank and Single Mode fiber to the Janssen Conference Center.
- **Behrend:** Extended fiber and conduit from the campus to serve Knowledge Park and extended fiber to serve the new REDC Building.
- **Wilkes-Barre:** Completed rewiring of the ARB Building. Extended single Mode fiber to the ARB Building, Food Services Building, Hayfield House and the Nesbit Library.

Rewired building:

- **Fayette:** Williams Building.
- **McKeesport:** Frable Building.
- **New Kensington:** Administration and Science Buildings.
- **Schuylkill:** Completed rewire of the Student Center and Celetti Memorial Library
- **York:** Main Building.

Single Mode Fiber:

- **Delaware:** Extended Single Mode fiber to the Library Building.
- **Harrisburg:** Extended single mode fiber to the Library Building.

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, the building wiring and ultimately

activation of data, voice and video services to each office, classroom, lab and other specialty spaces. Major telecommunications projects completed this past year include:

- Stuckeman Family Building
- New Business Building
- Outreach Innovation Building
- Leete Hall
- 328 Innovation Blvd
- Technology Center Expansion
- Demolition of Engineering Units D & E
- Pollock Road Utility Upgrades

Network Redundancy

In an effort to eliminate any single point of failure and increase network reliability and redundancy, a project to construct physically redundant fiber paths between the network distribution routers (IB hub sites) and the redundant Commodity Internet/Internet2 and voice services provider interfaces on the University Park campus was completed. This major fiber path and duct bank project was completed at a cost of over a half million dollars and helps provide continuous services through an improved redundant data communications path.

Air Conditioning, Electrical and UPS Upgrades

As network use and equipment continue to grow and expand, the heat and electrical loads in existing Telecommunications Rooms has become more problematic. TNS has begun to address this issue, and this past year, has provided upgraded air conditioning and electrical services in ten existing Telecommunications Rooms at University Park, and in six Telecommunications Rooms at Non-University Park locations. In addition, Universal Power Supply systems were added or upgraded at all Non-University Park locations, and remote temperature monitoring capability was added.

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 numerous Local Area Networks (LANs) at Penn State, as well as providing access to Penn State computer resources and information available via the Internet. During this reporting period, 235 IB connections were designed, bringing the total number of IB connections to over 850 (an increase of over 100 connections from the previous reporting year).

10 Gigabit Ethernet to the Core IB

TNS is continually and carefully reviewing reports of connections to the IB as well as data traffic moving through the IB to ensure that the core network is able to meet the technological advancements of today's bandwidth needs and high-end applications. TNS has always taken a proactive stance to meet this end. As a result, in order to accommodate expected future demand for increased bandwidth-improved transmission quality, a new 10 Gigabit Ethernet (10GE) inter-IB upgrade is underway to increase the speed of the core IB from 2Gbps to 10Gbps.

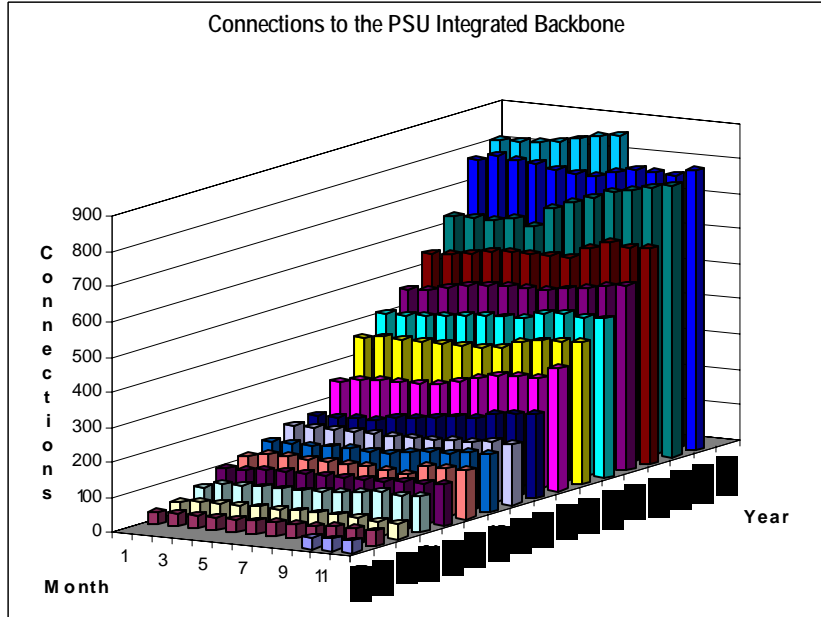
Changes in the core IB Network during this reporting period included completion of an upgrade of nearly all Cisco 7600 series routers to double the backplane bandwidth speed (speed with which data

can flow between various modules in the chassis) from 256 gigahertz to 720 gigahertz (GHz). The router upgrade was the first step in a process to upgrade the core distribution routers at the University Park campus location to the 720 (GHz) model. By increasing the backplane capacity, the routers will be able to accommodate the new 10 GE interface module.

Routed 10 Mbps Ethernet service connections at Non-University Park locations are discontinued as of June 30, 2005.

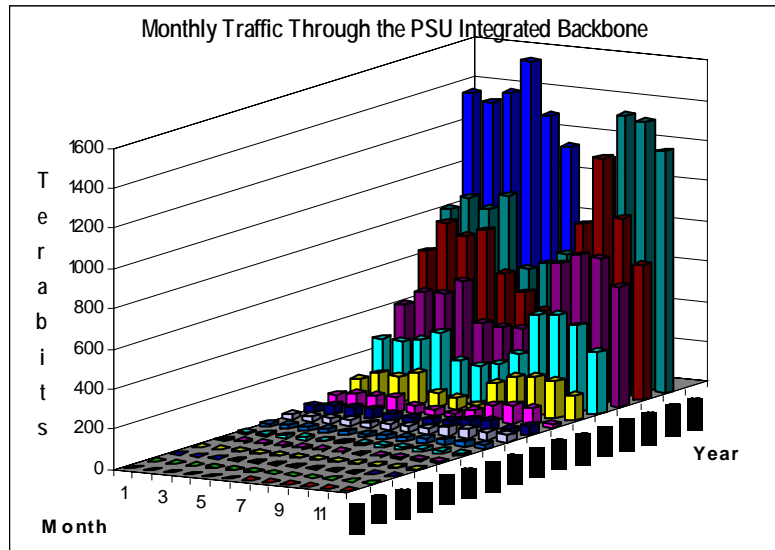
Inter-Campus Bandwidth Upgrade

The 45 Megabyte (Mbps) DS3 network connection from University Park to the Harrisburg campus location has been upgraded to a faster 155 Mbps (or OC3) connection. As part of the continuation of inter-campus bandwidth upgrades, additional OC3 upgrades are planned for Abington, Hazleton, and McKeesport campus locations. The 55% increase in inter-campus bandwidth capacity will be made possible at only a 25% increase in cost.



Inter-Campus Redundancy – Real Time Measurement

The backup system for Penn State's Integrated Backbone has been enhanced to allow for an increased flow of data in the event of a network outage. This bandwidth increase at several campus locations will lessen the likelihood of an interruption of network-based communication services and will improve the performance of the University's overall network system. ITS staff conducted system-wide measurements of network performance this spring to determine where to allocate these bandwidth increases.



Better measurement tools are being used to monitor real-time network performance on the IB. The Real-Time Measurement service is a Web-based interface which enables Penn State Backbone Contacts to monitor various network parameters that could cause network congestion, impede data flow, and slow application response time. The data gathered is translated into graphs and charts and made

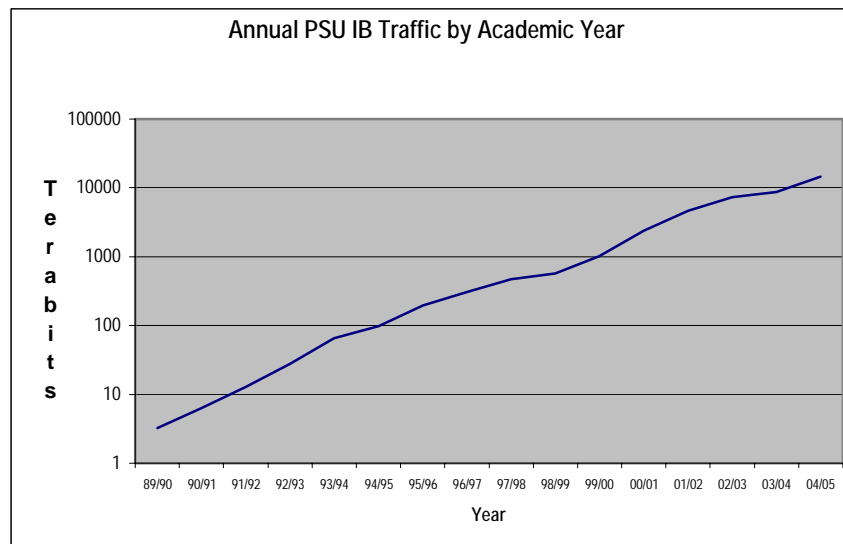
available to Contacts through a secure server. This graphical perspective of real-time measurements is available to assist network managers in identifying possible trouble spots and also provides a means for proactive monitoring of the network for capacity planning strategies involving network upgrades. The measurement process is being used to determine primary-to-redundant bandwidth ratio system wide and as a precursor to allocating bandwidth increases.

Commonwealth Campus Reorganization / Circuit Re-Homing

The re-structuring of the 12 campuses that make up the Commonwealth College has resulted in a realignment of Penn State's campuses to form the Commonwealth Campuses, effective July 1, 2005. As a result, the current pairings of the Berks and Lehigh Valley campuses and the Harrisburg and Schuylkill campuses

will change, with all four campuses operating separately with their own chancellors. Since the four campuses will no longer be academically connected under the new Commonwealth Campus structure, the telecommunications circuits connecting those campuses are in the process of being re-homed (moved) back to

their original home central office wire center so that they no longer cross LATA (Local Access and Transport Area; i.e. local telephone company) boundaries. Re-homing these circuits so that they remain in their LATA will provide the campus with a savings in interLATA service costs. InterLATA services are telecommunications between a point in a local calling area to a point located outside such area.



High-Speed Wireless Networking Initiatives

The capability of ITS 802.11b Wireless SecureNet Complete Service was upgraded to include 802.11a and 802.11g support during this reporting period. 802.11 refers to standards developed for wireless networks. The "a", "b", and "g" notations identify different "flavors" of the 802.11 standard. The "b" specification provides a data transmission speed of up to 11 Mbps. The new service upgrades to "a" and "g" provide the same functionality as "b" but, at 54 Mbps, the transmission speed is up to five times faster—enabling ITS to provide the highest performance currently available for wireless computing today. An "a", "b" and "g" wireless network was installed in the HUB on the University Park campus. TNS will design, implement and maintain 2.4GHZ, 54Mbps maximum "g" wireless LAN service in all new ITS SecureNet Complete locations. Additionally, existing ITS SecureNet Complete customers may also request 5GHz, 54Mbps maximum "a" coverage in any or all locations covered by "g".

Wireless computing is becoming more readily available in general purpose classrooms (GPC) 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. Discussions continue regarding the possibility of replacing mobility port services with wireless technology for instructor podiums in existing GPCs.

In an effort to further develop and expand the use of ITS wireless computing services at Penn State, a program was created to offer "matching" funds to expand wireless services to those campuses, colleges and other entities willing to support wireless installations to serve student-centered areas. As a result, partnerships established with several colleges and campus locations during this reporting period have increased the number of areas throughout Penn State in which wireless coverage is, or soon will be, available and registered.

Wireless connection points between buildings are being planned in the East Sub-Campus Development project. As a result, wireless access points will be designed to be placed between the newly constructed Forestry, Smeal and Creamery buildings to enable wireless computer users to sit outside and eat their Penn State Creamery ice cream or seamlessly roam between the buildings while accessing the Network on their wireless-accessible computers.

Wireless installations were completed within Pattee and Paterno Libraries at University Park and include both the East and West wings, Foster Auditorium, Paterno Library and the Paterno Reading Room.

In an effort to assist The Penn Stater Hotel and Conference Center with their heavy spring seminar and conferencing season, The Penn Stater was installed with the ITS Wireless Computing service to ensure that events taking place during that period were not hampered by a lack of wireless computing services. Arrangements for the transition of the installation of a vendor-owned wireless service were later negotiated following the conferencing season.

Virtual Private Networks (VPN), required to authenticate and connect to the ITS Wireless network, were installed at 13 Non-University Park campus locations to support ITS Wireless Computing at those campus locations.

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 new ITS Wireless system.

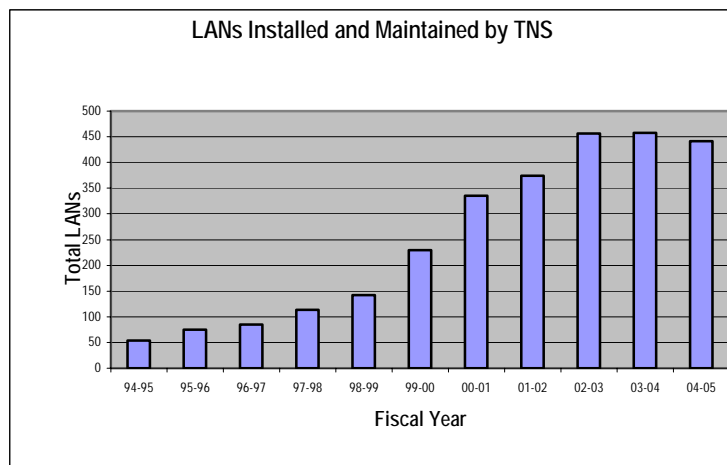
Local Area Network (LAN) Services

During this reporting period, approximately 125 LANs were upgraded and 94 designs were completed bringing the total number of TNS-designed, installed and supported LANs to 441.

Each TNS-supported LAN is serviced through an IB connection.

Mobility Ports

The ITS mobility service (live and unauthenticated wired Ethernet ports) is based on a technique that uses a commercial Ethernet "bridge", called a Karlbridge, and a Penn State developed authentication mechanism. This technique was considered adequate at the time of its creation but it is now known to have several drawbacks and its replacement has long been desired. The new TNS Advanced Features Edge Switch has been tested



and found acceptable as a replacement for the Karlbridge. This new switch will be used as a Karlbridge replacement for some yet to be determined length of time, and will use the same authentication technique currently used by the Karlbridge. The new switch offers significantly improved performance and the elimination of some undesirable attributes in the Karlbridge.

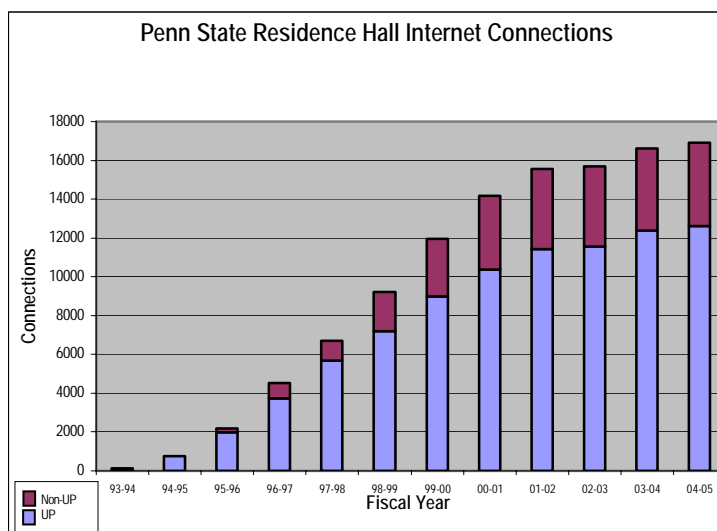
V. Student-Focused Issues

Residence Hall Internet Services

Over 16,900 students, who had their own computer and lived in Penn State “traditional” residence halls as of the end of this reporting period, activated the Internet connection port(s) available in their room.

As the result of the residence hall bandwidth upgrade from 10 Mbps uplinks to the 100 Mbps uplinks completed at the beginning of the reporting year, these students were able to use the faster Ethernet connection to communicate over the Penn State network and with the Internet.

In addition to the bandwidth upgrade, the LANs in the residence halls have also been upgraded from repeated hubs to switches, which provide improved performance.



Residence Hall Firewall Project

Along with the upgrade of the LANs within the residence halls, firewalls have also been installed to help protect computers on these LANs from becoming infected with the widespread network-propagated worms, computer viruses and Trojan horses. In addition to protecting computers on the residence hall LANs, the firewalls will also limit the ability of residence hall computers to act as servers. Many of the harmful viruses and worms propagate through computers that are acting as servers, often without the knowledge of the owner of the computer. The firewall service is designed to be able to be updated quickly to continue to provide protection as new forms of attack are discovered.

VI. CQI

Service Management Process

The “Service Management” transition period— a process that 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—has been

completed. All services provided by TNS have been transitioned successfully to the new Service Management function within TNS. The goal of the Service Management model is to increase consistency and hands-on attention for those using TNS services.

The new 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.

With the new process, ITS Consultants will continue their role as an overall initial point of contact for Penn State customers of ITS services. However, the new process will free ITS Consultants' time to enable them to more actively promote the broad range of ITS services to students, faculty and staff.

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 (TSR) 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 departments.

New TSR Form

A newly redesigned Telecommunications Requisition Form (TSR) was introduced at the end of the reporting period and will be phased into use. The new form will better accommodate the frequent need for multiple budgets to be charged for services provided for a single project or service area, as well as reduce time for service delivery. Enhancements to the form allow easy separate identification of monthly, one-time, or other cost categories, while also encouraging use of electronic ordering processes already in place. The new form is available directly through the TNS Web site as well as via the GURU forms locator.

Migration to Oracle Calendar System

TNS implemented Oracle Calendar (an ITS service) as its official scheduling application. The transition from using the embedded calendaring/scheduling capability in Outlook to Oracle Calendar was driven by the desire to improve efficiency and timeliness in setting up meetings and coordinating schedules with ITS staff who also subscribe to this ITS service. Basic user training was offered by ITS Teaching and Learning with Technology and was provided to the TNS staff members.

Diversity Training

Many TNS employees participated in Sexual Harassment Awareness and Prevention Training conducted by Penn State's Human Resource Development Center. The program provides basic guidelines for understanding and preventing sexual harassment in the workplace. Third-level managers also participated in a secondary awareness program designed for individuals with supervisory or management responsibilities. This program covered basic information concerning the legal and procedural basis of sexual harassment; specifically the role of the supervisor in preventing and resolving issues related to sexual harassment.