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# Telecommunications and Networking Services

*A Unit of Information Technology Services*

2003-2004

Annual Report

July 1, 2003 to June 30, 2004

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*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.....230 Mbps

Overall Bandwidth to Gigapop.....622 Mbps

IB connections designed.....318

Total IB connection.....> 750

**Local Area Networks (LAN)**  
 LANs designed.....328

LANs upgraded (hardware).....80

Total TNS-Installed & Supported LANs.....457

**Residence Hall Ports Activated**  
 University Park..... 12,369

Non-University Park.....4,426

Total..... 16,615

**Voice Mail Subscribers**  
 Traditional Voicemail Service at University Park.....4,917

Voice over IP Unity Service at University Park.....1,667

**Voice over IP Transition**  
 Total IP Phone Sets at University Park.....2,354

## Annual Report 2003-2004 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), for the fiscal year from July 1, 2003, through June 30, 2004.

The year included a number of business and operational changes. In concert with the financial model previously developed by the committee of university executives, cost-cutting measures instituted within the unit enabled overhead and other rates applied to individual good services to be reduced at mid-year and at year-end, with collective savings estimated at over \$500,000 passed to those utilizing TNS services. Revised budgetary plans for common good services were reviewed and approved by the committee for the upcoming year, and reaffirmation given for established funding strategies for wireless services, infrastructure enhancement, and other aspects of the funding model, itself now changed from a 5-year model, to one that has been extended, and viewed as ongoing. Common good service was extended to include "Gigabit Ethernet" service, previously an individual good service.

Proposals were solicited for a variety of products and services during the year, including those for local phone services, and for long distance services. Along with related efforts to strategically position Penn State to change the nature of these services after 2006, contracts of appropriate length were awarded to Verizon and AT&T for services. Each contract reflected both flexibility and cost reductions, passed in the form of reduced rates to those using TNS services.

The use of TNS services continued to expand. The use of Voice over IP (VoIP) technology continues to displace the use of more expensive Centrex-based services, with over 2000 VoIP telephones now in use. Enhancements were made to the service to enable individuals to program their phones through their personal computers and to address anomalies. Virtual Private Network (VPN) servers were installed at several campuses to afford higher degrees of security to wireless Local Area Network (LAN) installations. In order to provide residence hall (RH) students a more secure networking environment to thwart viruses and to reflect the provisions of revised university security policies, a mid-year plan was developed to provide firewall services to each RH LAN, to be completed during the summer. The compressed timeframe, volume of work, and use of high-value but new and untested technology, along with the precedent-setting nature of determining exact software configurations needed, increased the associated degree of risk and resources. By the end of the reporting period, 85% of the RH student ports were protected by the service.

A variety of other accomplishments were realized, ranging from changes made to interactive video services and cabling standards, to introduction of "enterprise" service connections to the Integrated Backbone (IB), to expansion of bandwidth for redundancy purposes between certain campuses, to upgrade of dozens of LANs and associated IB connections. Interaction continued with peer organizations within the Committee on Institutional Cooperation (CIC), EDUCAUSE, those involved in new construction projects at Penn State locations, key product and service providers, and personnel from all campus locations. Plans were developed to obtain a "dark fiber" pathway to the Pittsburgh Gigapop, and discussions continued with the Commonwealth regarding cross-state pathways. To further improve communications with those using TNS services, and to leverage prior organizational changes, a plan was also developed to implement a "service management" function within ITS, for implementation during the upcoming year. Within the organization, a TNS channel was developed for the Penn State portal, Web pages were updated (many in conjunction with pending introduction of "service management", and Mozilla browser software was provided to all having TNS-managed desktops.

## II. Accomplishments

### Rate Reductions

Over the past year, progress has been made on reducing costs of telecommunications and networking services.

Three major changes that went into effect this year included:

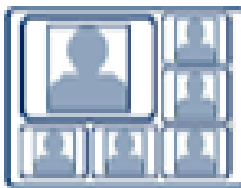
1. Elimination of the \$35 Telecommunications Service Requisition (TSR) fee.
2. Elimination of 22% overhead on purchased items.
3. Lowering the telephone equipment rates to 9% per year from 36% per year.

It is estimated that these reductions will allot users a total annualized savings of \$550,000.

Prior to the start of the new fiscal year 2004-2005, there have been a number of activities and contract negotiations, including those with Verizon for local service and with AT&T for long distance services, which have resulted in a number of changes, the majority of which have been additional service rate reductions. In addition, in an effort to accelerate the rate at which new levels of high-speed networking services are used, funds have been expended to accelerate a plan to incorporate services known as "Gigabit Ethernet", as common good services—resulting in reducing the cost of that class of service from \$6,000 to \$1,000, per connection and completely eliminating the recurring expense of \$290/month that was associated with that service. These changes will become effective July 1, 2004.

### Interactive Video Enhancements / Satellite / Cable TV

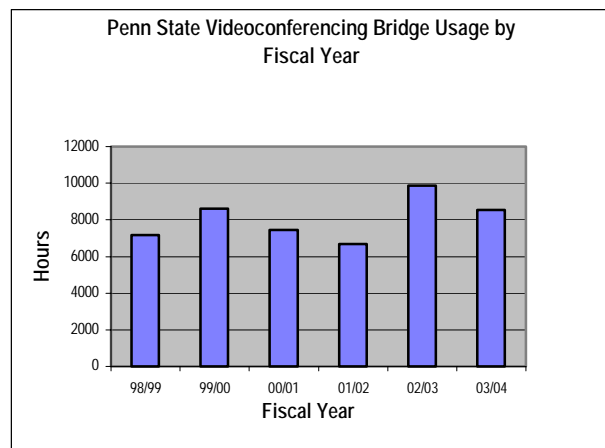
Penn State's Videoconferencing Bridge lets users host multi-location, multimedia seminars, group meetings, class instruction, and many other collaborative communications conferences—saving time and eliminating costly travel expenses. Changes made to the Bridge during this reporting year have provided noticeable transmission improvements to those campuses that have upgraded their Polycom videoconferencing equipment. The port capacity on the Bridge has also been increased from twenty-four 384 Kbps ports to forty-eight 384 Kbps ports, enabling more videoconferencing connections to occur. In addition to reducing transmission latency (the amount of time it



5 + 1 screen layout.

takes for videoconferencing signals to transfer back and forth between conferencing sites) and increasing the number of ports, the Bridge upgrade has also added on-screen visual effects that include highlighted colored borders and on-screen site identification for easier identification as to which site is speaking during a multi-point conference. It also affords a new specialized conference mode option that provides for a unique 5+1 screen layout, where a larger cell displaying the host site is surrounded by smaller cells displaying up to five other sites in the conference. These improvements enhance the

experience of videoconferencing by providing a "live" feeling and constant interaction with multiple sites. They also increase Bridge reliability and equip it to take advantage of future software enhancements.

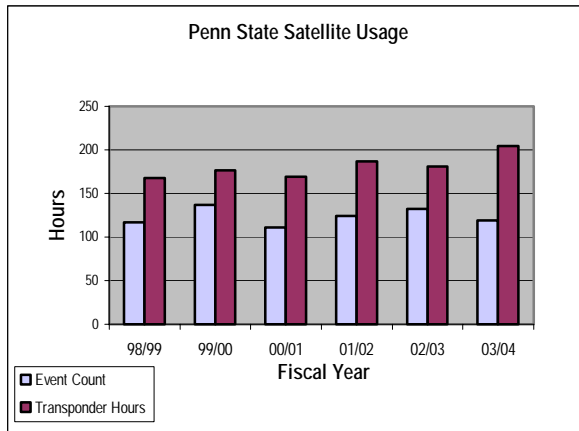


TNS installed five new videoconference rooms and upgraded seven systems during this reporting period bringing the total of Penn State videoconference rooms registered with TNS to 80. Of those, 41 rooms are located at Non-University Park campus locations and 39 at the University Park campus. A listing of Penn State Videoconference rooms is available at <http://www.tns.its.psu.edu/isdn/nmp.htm>

The Commonwealth College is in the process of upgrading all of their interactive video systems and has expressed an increased interest in desktop videoconferencing. In response, ITS will be evaluating multi-site desktop conferencing capabilities at Penn State.

Usage of the Penn State satellite uplink has been stable for the last five years. Over 60% of the use of the Uplink is to transport Penn State sport-related events and press conferences, with the next highest usage being video teleconferences.

The University Park Cable Television System distributes 73 channels to 144 buildings at the University Park Campus. System distribution was added to 10 additional buildings this year. In addition, *Tech TV*, *College Sports Network* and *News World International* were added to the channel line-up.



## Enterprise Service for connecting to the Integrated Backbone (IB)

An IB "enterprise" service was deployed that enables those providing enterprise-wide resources to connect the servers hosting them in a more direct fashion to the IB. The service involves the installation of a new 100 Mbps or Gigabit fiber path to the Enterprise Service segment, which is connected directly to the border router. Once installed, it provides an optimal communications pathway for enterprise server data, freeing up bandwidth on local networks and improving overall end-to-end performance. To ensure increased reliability, a separate 100 Mbps redundant connection is included as part of the service offering.

## Port Blocking

Due to the increasing level of hostile activity and security threats directed toward Penn State's computing resources, protective measures began during the beginning of this reporting year to block (filter) selected TCP/UDP ports from the campus border to the Internet. Traffic using the blocked ports, typically for Windows file and printer-sharing, were no longer permitted to pass through the border router, in either direction. The border router is where the Penn State networks connect to let all traffic exit and enter the University. Users were directed to access these services via the VPN—a free ITS service that enables a remote computer to appear to be part of the Penn State network. Even if no systems were vulnerable to password guessing and other exploits, these attacks sometimes resulted in congestion sufficient to slow local network and computer operations, and the port blocking will therefore continue as needed in order to help protect University resources as well as to maintain network performance.

## Firewall Service

The ITS Firewall Service was deployed this reporting period to provide University networks with cost-effective, practical, real-world protection from external attacks and internal abuses. The service enables increased levels of security to LANs, and is suitable for use on all local networks that are directly connected to the University's IB regardless of whether they are managed locally by individual organizations, or centrally by ITS. The service affords flexibility, while not impacting the provisions of ITS's LAN Maintenance service for

those who have elected to use that offering. Two different types of services, Basic Firewall and Custom Firewall, are offered. Both types of services define the rules for filtering inbound and outbound communications, however, for departments with more complex filtering requirements, the Custom service allows them to write tailored rule sets, specific to their individual needs.

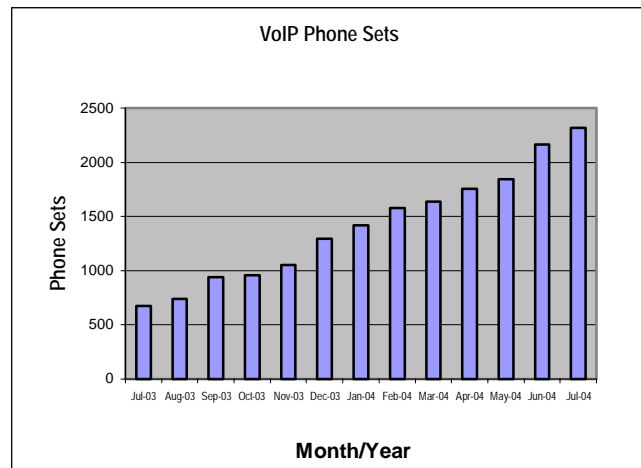
### Dynamic Host Configuration Protocol (DHCP) Service Extended

DHCP service was extended throughout Penn State during this reporting period and is being used by many University departments to dynamically connect to Penn State's IB in a more efficient manner. A dynamic connection, unlike a static connection, allows University departments to take advantage of IP addresses (a unique identifier for each computer connected to a network) that change every time a session is established, enabling network administrators to add computers or move computers around on their Local Area Network. Once the session is completed, the IP address is put back into the unallocated pool until the next DHCP session is requested. In addition to better utilizing the University's backbone resources, DHCP eliminates the need for certain types of IT administrative support and provides excellent security and control capabilities. A new Web-based process for DHCP-Server service requests was implemented during this reporting year. The process saves time and helps to eliminate processing errors.

### Voice over IP (VoIP) Technology

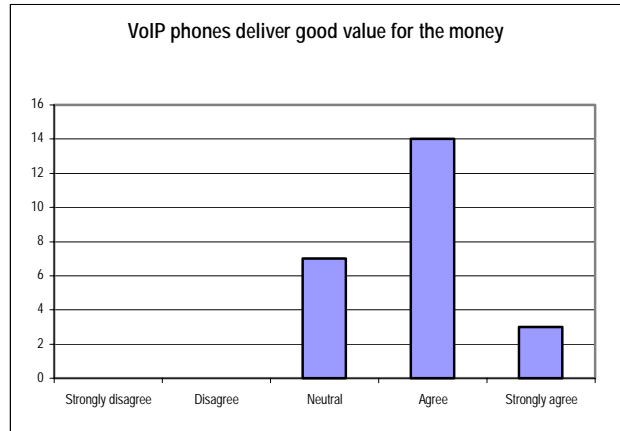
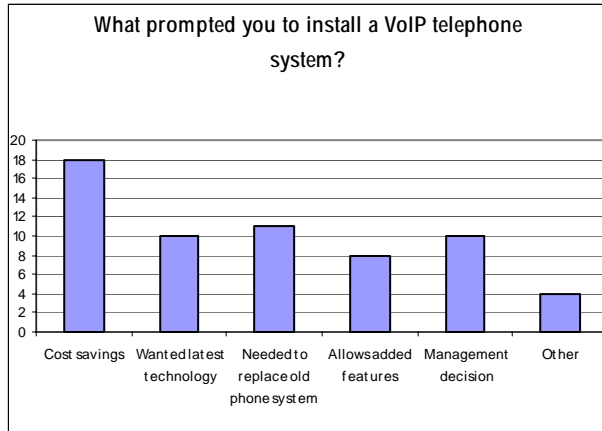
The University's traditional telephone communication services continue on the technological shift away from voice communications carried over a circuit-switched system based on a Verizon-provided Centrex service to having them carried over the Penn State IB—the Penn State IB employs the Internet Protocol, or IP). The VoIP service at Penn State is deployed as a distributed telephone switch, where gateways to the Public Switched Telephone Network (PSTN) and interfaces to the system's IP phones traverse the Penn State IP network rather than a backplane (a chassis where modules and cables are connected), such as in a legacy Private Branch Exchange (PBX). This method of distributed deployment provides the ability to create improved redundancy versus a centrally located, monolithic telephone switching device.

To date, over 2,000 IP phone sets have been installed in colleges and departments across the University Park campus. This represents an almost two-thirds increase in IP phone set installation from the previous reporting year. 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.

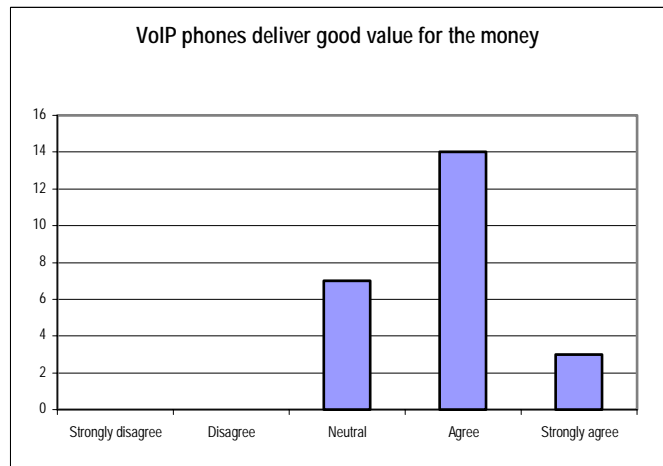


VoIP technology offers greater efficiency and opportunity for reducing costs for University departments and colleges, while at the same time establishing a basis for creation of innovative applications that take advantage of the University's network, such as the VoIP User Options Web interface application that was added to the service this reporting period. The new Web application/interface, included with the VoIP service, enables the user to change, update and customize certain VoIP feature applications through a Web browser via a personal computer. This application enables VoIP users to manage their telephone communications remotely and more effectively.

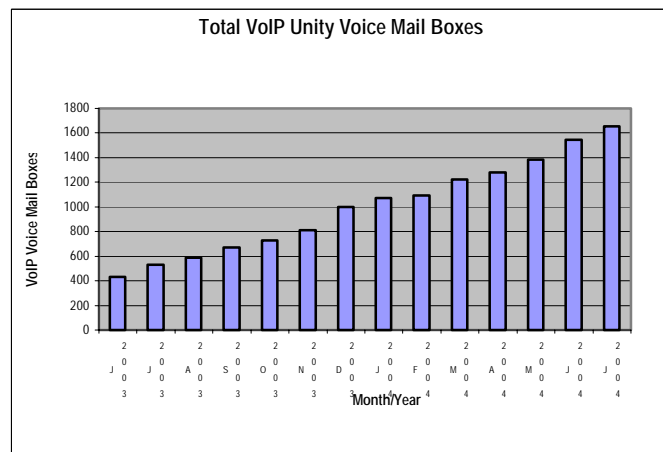
Customer surveys conducted by ITS Marketing and Communications have shown a consensus among new VoIP users that they are finding real cost savings in deploying IP phones and using IP to carry voice traffic.



The *Unity* voice mail system integrates with the VoIP service at Penn State. Improvements made to the system this reporting period provided for an enhanced Alternate Greeting feature that enables the mailbox owner to record an extended absence greeting indicating his/her special circumstances—such as when they are on vacation or away from the office. When the greeting is in effect, the caller will hear it but cannot leave a message, saving the mailbox owner from a deluge of messages upon their return. In addition, in response to customer needs, the zero-out option of the Alternate Greeting feature was modified to enable the caller to have the option of dialing “0”, to transfer the call to a live person for assistance when the Alternate Greeting feature is activated.



While the legacy voice mail service (provided on the Centrex system) has shown a slight decrease in its subscriber base, the IP voice mail service has more than doubled its subscriber base from the previous reporting year.



## Telecommunications Projects

### At University Park Locations

TNS has been actively involved in planning, design and construction of the telecommunications distribution systems for many construction projects completed or underway at University Park locations, including:

**New Fiber Installations** have been completed at Nittany Apartments, Tennis Court Building, Computer Building, Eisenhower Parking Deck, Eisenhower Auditorium, Landscape Depot, Nittany Parking Deck, Cedar Building, Moore Building, Rackley Building, Pond Lab, Arts Building, Forum Building, Mueller Lab, Wagner building, IM Building, Eastview Terrace Complex, West Campus Chiller, IST Building, Chemistry Building, Life Sciences Building, East Campus Parking Deck, Blue Band Building, and Hazmat Building.

The fiber serving some of the downtown facilities, and in particular the interface with State College Borough Building, was relocated to facilitate construction of the new community Library and Borough parking deck.

In addition, a multi-year project to upgrade the equipment room housing the University's primary IB equipment, interfaces to other campus locations, and the Internet and Internet2 interfaces was completed during this reporting period. The work this past year included relocating over 1000 fiber terminations and providing upgrades and expansion of the copper termination frame.

**Buildings Re-wired** include the complete re-wiring of Reber Building, Research West Building, EE West, Housing and Foods Building and Pond Lab.

In addition, all 30 of the Nittany Apartments buildings were wired and now have access to the University backbone.

#### **Additional Telecommunications Projects at University Park locations:**

##### **Completed Projects:**

- New Chemistry Building
- Life Sciences Building
- New IST Building

##### **Projects Underway:**

- Lot 80 Development (renamed to East Sub-Campus Development)
- Innovation Outreach Building (Research Park)
- Penn Stater Addition (Research Park)
- Pollock and Curtin Road Utility Upgrades

### At Non-University Park Locations

TNS has also been actively involved in planning, design and construction of the telecommunications distribution systems for many projects that have been completed or are currently underway at Non-University Park locations, including:

**Abington:** Single mode fiber was extended to the Sutherland Building.

**Berks/Lehigh Valley:** At Lehigh Valley, design and installation was completed for a new "Corporate Learning Center" in Bethlehem.

Also at Lehigh Valley, conduit, fiber and copper cable was extended to the Fitness Center, allowing this building to be connected to the Penn State IB and the Lehigh Valley telephone system.

At the Berks campus, fiber was extended to the Perkins Student Center and Library, and Single Mode fiber was extended to all existing residence halls. Work has been on-going to provide the main campus Switch Room renovations and upgrades. The existing residence halls at that campus were also re-wired.

#### **Additional Telecommunications Projects at Non-University Park locations:**

**Fayette:** Work is completing on the new Multi-Purpose Community Center. In addition, design is complete and installation is beginning for rewiring of the Williams Building.

**Harrisburg:** Completed rewiring of the Maintenance Building and the Capital Union Building.

##### **Re-wiring completed within various buildings at:**

Hazleton, McKeesport, Mont Alto and Wilkes-Barre campus locations.

**Behrend:** Carriage House West rewiring was completed as well as the renovation and rewiring of Perry Hall, Lawrence Hall, Niagara Hall and construction of Senat Hall (residence halls). Fiber and conduit were extended from the campus to serve Knowledge Park. Single mode fiber was designed and installed at all existing residence halls on that campus.

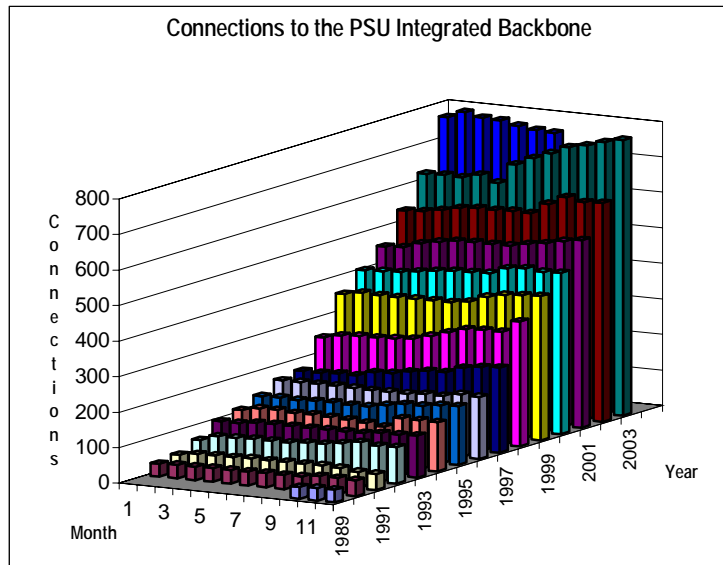
**Beaver:** Construction and move-in was completed for the new Administration Building. This project is notable because the main switch room for the campus (voice switch and data hub, and all services) is located in the basement of the old Administration Building, which was demolished. The design included encapsulating the existing switch room so that when the building was demolished around it, the switch room remained as a subsurface vault. A new entrance to the room was provided, and ultimately a Gazebo will be built on top of it, as well as landscaping around it.

In addition, the rewiring of the Lions Court Residence Halls on the Beaver Campus was completed.

### III. 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 LANs at Penn State, as well as providing access to Penn State computer resources and information available via the Internet. During this reporting period, 318 IB connections were designed, bringing the total number of IB connections to over 750.



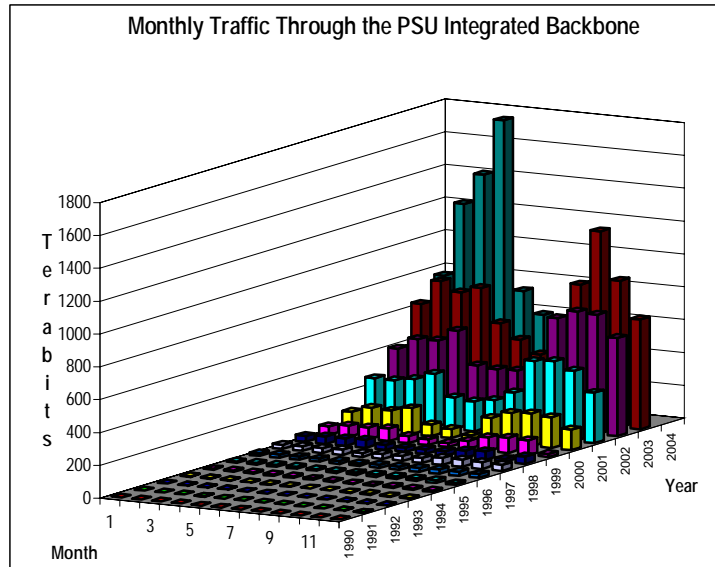
TNS is continually reviewing its service offerings and the underlying products used by them, to ensure that they are technologically advanced as well as robust and supportable. This process involves announcing new products and services and discontinuing older products and services that no longer satisfy these criteria. As a result, Asynchronous Transport Mode (ATM) service connections (both 155 Mbps and 622 Mbps) to the IB were discontinued at the end of this reporting period. With the discontinuation of ATM in the Penn State IB and the subsequent improvements in “edge” components, “repeated” hubs from the 3Com vendor, used in TNS supported LANs, have become obsolete and are discontinued as of June 30<sup>th</sup>. Routed 10 Mbps Ethernet service connections at University Park are also discontinued as of June 30<sup>th</sup>, with a 1-year discontinuation extension granted for those types of service connections at Non-University Park locations.

To increase the use of new levels of high-speed networking services, funds have been expended to accelerate a plan to incorporate services known as “Gigabit Ethernet” as common good services—expanding that class of service beyond the 155 Mbps level. Gigabit Ethernet signals at 1000 Mbps; it is currently the fastest connection speed available through the IB. (The IB itself signals internally at multiple times that rate,

expected to rise to 10 times that rate in the near future). Gigabit Ethernet enhances capabilities of those local networks capable of utilizing such speeds. As a result of this change, one-time connection cost of the Gigabit Ethernet service has been reduced from \$6,000 to \$1,000, and the associated recurring expense of \$290/month has been eliminated.

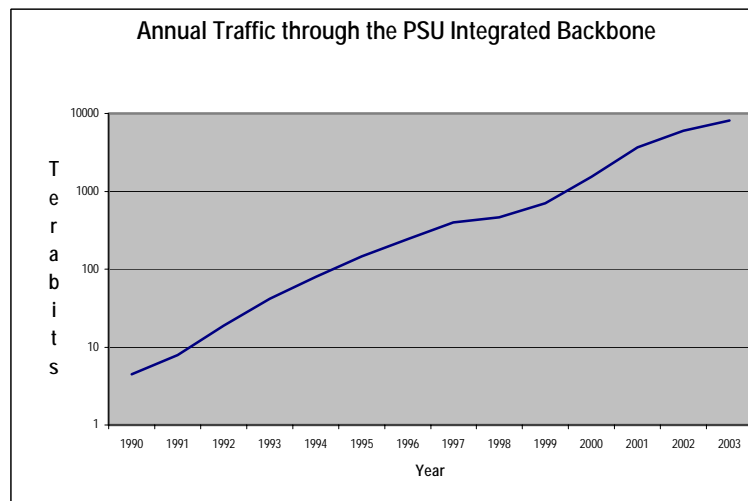
### Network Reliability

As data traffic moving through the IB continues to increase, TNS efforts to maintain a high level of core network reliability have resulted in an average total IB uptime of over 99%. Timely software upgrades, continuous support staff training, and regularly scheduled replacement of core network components with advanced technology, have all been important factors in keeping outages caused by equipment failures both low in number and short in duration.



### Inter-Campus Redundancy

The backup system for Penn State's IB was enhanced to allow for an increased flow of data in the event of a network outage. In order to improve the primary-to-redundant bandwidth ratio system wide, continue to operate within a budget that has only seen minor growth, and as a precursor to allocating bandwidth increases, system-wide measurements of network performance were conducted at each campus location. As a result of that analysis, several campus locations received one or two Primary Rate Interface (PRI) connections, (as opposed to four Basic Rate Interface (BRI) connections, as part of the upgrade. (Each PRI is the equivalent of roughly 24 BRI's). The redundancy project and bandwidth increases 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. Additional redundancy bandwidth will be allocated, utilizing the same system wide usage measurement process, as funding warrants.



### Internet Router Upgrades

The Cisco 7609 series router was upgraded from a nine slot chassis to a thirteen slot Cisco 7613 series chassis. This upgrade included the replacement of older electronic modules (the Supervisory2 module) with newer, faster and more powerful modules (the Supervisory720 module). In addition, the

backplane bandwidth (speed with which data can flow between various modules in the chassis) was increased to 720 gigahertz, which doubles the previous speed of the router. The router upgrade was the first step in a process that will see the upgrade of nearly all 7600 series core routers to the 720 gigahertz model. Along with the Supervisory module swap out, power supplies are also being upgraded to provide increased electrical power and new fan tray assemblies are being installed within the router to provide a sufficient air conditioning environment. When completed, the upgraded 7600 routers will be able to accommodate the new 10 Gigabit Ethernet (10GE) interface module. The new 10GE interface module will be used to increase the speed of the core IB from 2Gbps to 10Gbps in order to accommodate expected future demand for increased bandwidth-improved transmission quality.

## Internet Protocol Upgrade to IPv6

The Internet Protocol (IP)—a set of rules that controls the formatting of data on the Internet—is currently using the standard commonly referred to as IP version 4 (IPv4). A new version (IPv6), which better handles the rapidly increasing demand for IP addresses, is now in the early stages of replacing IPv4. It is expected that the transition to IPv6 will be a lengthy and complicated task that touches all organizations at Penn State. In the coming year, the IPv6 test network created by ITS will be transitioned to more directly and transparently connect with other IPv6 networks across the nation. TNS continues to offer participation in an engineering trial for transporting IPv6 packets over the IB, in an effort to encourage others at Penn State who offer Internet services, to begin to plan to deliver those services using the IPv6 transport method.

## High-Speed Wireless Networking Access Opportunities

More and more University computer users are unplugging their laptops and taking advantage of the high speed wireless access service available at Penn State. Since the service was deployed two years ago, a number of Penn State campuses have acquired an ITS wireless service, and many offices and departments University-wide are in the process of installing it. Organizations that want to acquire Penn State's wireless network can choose from two specific service packages depending on their individual needs. Offices that already have purchased or arranged for "outside" wireless services can make their network part of the University system (and also more secure) by augmenting their existing wireless LANs with Penn State's service-package, ITS Wireless: SecureNet Assist, which uses state-of-the-art encryption technology using the ITS VPN. Alternatively, those who want to set up the University's "turn-key" wireless service can select the ITS Wireless: SecureNet Complete service.

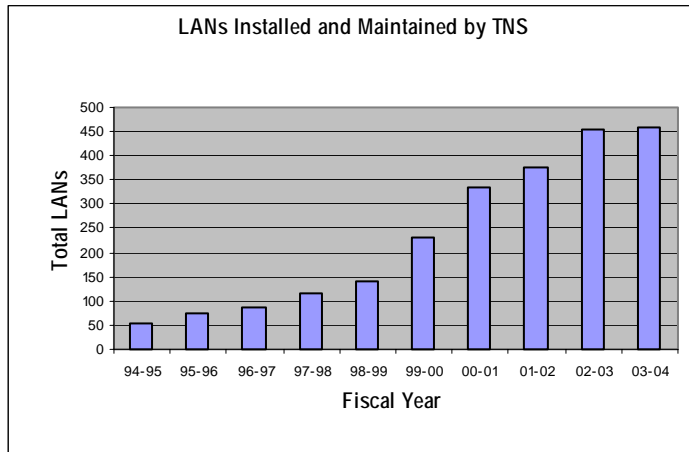
During this reporting period, VPNs were installed at Berks, Delaware, Lehigh Valley, McKeesport and York campuses as part of the ITS Wireless: SecureNet Assist service ordered by those campuses for use with their own wireless networks. To further increase the attractiveness of the Assist service, a recent improvement now permits a more seamless connection for wireless users in departments that offer their own, private wireless connections which use VPN. Prior to the change, users of a departmentally-managed wireless network had to re-configure their laptops when they transitioned between use of the ITS wireless network and their departmental wireless network.

Reports from departments, campuses and colleges that have installed the wireless technology are positive. At Penn State Harrisburg, faculty are using wireless networking in six classrooms to support teaching and learning efforts, and students at the campus School of Information Sciences and Technology program have had the opportunity to study the technology itself in a hands-on learning environment. Students at the Dickinson School of Law are able to hold study groups while they connect to the Internet via the new wireless network in the Cafe' Per Se, law library and various classrooms of Trickett Hall. In addition, wireless access points were installed to provide service throughout the IST building at the University Park campus. Wireless installations within Pattee and Paterno Libraries at University Park are underway, and will include both the East and West wings, Foster Auditorium, Paterno Library and the Paterno Reading Room.

As more faculty, staff and students use laptop computers and other devices which can use wireless services, new levels of convenience and "connectedness" in teaching, learning and research will be possible.

## Local Area Network (LAN) Services

During this reporting period, approximately 80 LANs were upgraded with hardware to enable support for new 100 Mbps backbone connections. Several other LANs operating at 10 Mbps, which had equipment that supported 100 Mbps capabilities, were upgraded. In addition, 328 designs were completed and one LAN was installed, bringing the total number of TNS-designed, installed and supported LANs to 457. Each TNS-supported LAN is serviced through an IB connection.



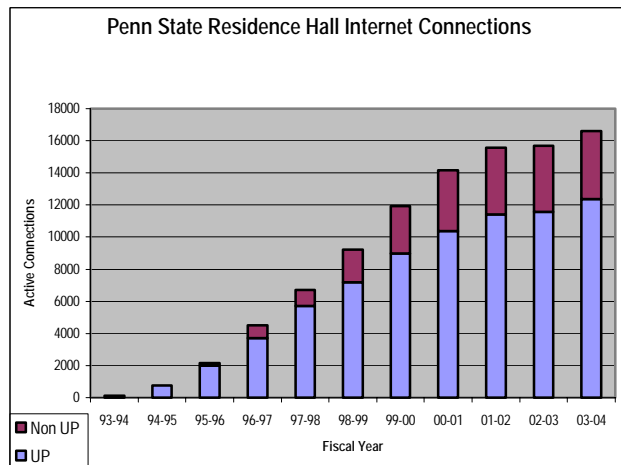
## IV. Student-Focused Issues

### Residence Hall Internet Services

Over 16,500 students who lived in Penn State "traditional" residence halls as of the end of this reporting period, and had their own computer, activated the Internet connection port(s) available in their room.

The residence hall students use 10 Mbps or 100 Mbps Ethernet connections to communicate over the Penn State network and with the Internet. However, a transition began this reporting period to offer only the faster, 100 Mbps connections. So far, 30 of the 90 residence halls at Non-University Park campuses have been upgraded from 10 Mbps uplinks to the 100 Mbps uplinks.

In addition, the LANs have been upgraded from repeated hubs to switches, which better improve performance. LAN upgrades to the remainder of the residence halls are expected to be completed by fall 2004.



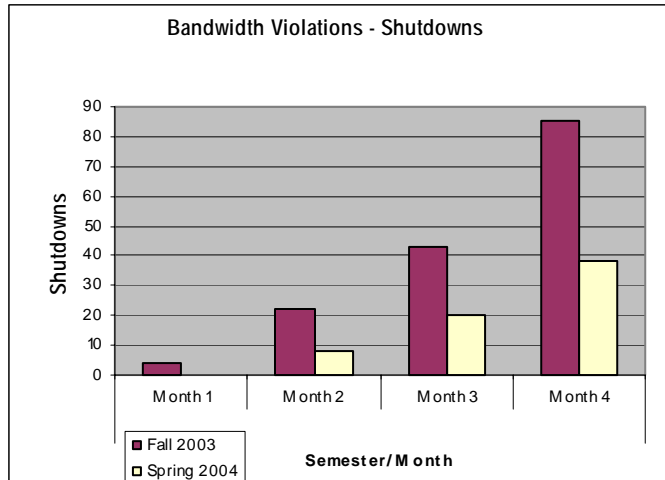
### Residence Hall Firewall Project

Along with the upgrade of the LANs within the residence halls, firewalls are also being installed to help protect computers on these LANs from becoming infected with the widespread network-propagated worms, computer viruses and Trojan horses. To date, firewall service for 85% of the residence hall ports has been installed, configured, and tested. Remaining installations are planned during the start of the next reporting period, with completion of the installations to coincide with the remainder of LAN upgrades. 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.

## Bandwidth Monitoring

In an effort to maintain bandwidth limitations imposed upon overall use of the Internet by residence hall students and upon individual consumption of bandwidth by those students occupying residence hall rooms, each residence hall port is monitored for total upload and download traffic to determine if a student is operating within the bandwidth limitation cap of 1.5 gigabytes (GByte) per week, as set by the University.

An automated monitoring program runs every 8 hours to compare a student's bandwidth totals with their individual bandwidth limit. If a student manages to exceed the 1.5 GByte/week limit 4 times in one semester, their residence hall connection is shut down for the remainder of that semester. Although many documents have been created to educate students on how to configure their computer and how to avoid consuming so much bandwidth, student connections continue to have to be shut down as a result of over-exceeding bandwidth limitations.



These restrictions have turned out to be extremely successful. Since the restrictions and monitoring were implemented several years ago, the demand for bandwidth through residence hall networks has been reduced, and the percentage of overall university bandwidth consumed by them has been maintained at a reasonable level.

## Residence Hall Long Distance Calling Changes

Due to declining usage by students and emergence of lower-cost alternatives, the AT&T College and University Service (ACUS) program previously available to campus residents was discontinued on May 15, 2004. While local service remains the same, students are now encouraged to use a less expensive alternative in the form of The Penn State Personal Prepaid Calling Card. Administered by AT&T, these cards have a cost of approximately 4 cents per domestic minute, as well as low international flat rates (rates differ by destination called), both which are less than most direct dial rates. There are no monthly fees or surcharges and minutes do not expire. The Prepaid Calling Cards can be used from anywhere in the United States, as well as from most international locations. They are available to all students, staff, and faculty to use at their desk, at home or while traveling, and can be purchased at the ITS Computer Store. Residence hall students are also be able to use other brands of personal calling cards, or alternative long-distance services, typically accessible by dialing a toll-free number.

## V. COI

### Service Management Process

A new function, known as "Service Management," will enable 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 goal of the change is to increase consistency and hands-on attention for those using TNS services.

The new process enables 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 will follow up on these contacts, working directly with individual University clients and managing the long-term service process.

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

Twelve services have currently been designated to transition to the new Service Management function on July 1, 2004. The remainder of the set of services provided by TNS will be similarly transitioned during fall 2004.

### Timely Notification of Telecommunications Work and Deadlines

One of the best practices developed by TNS during the past few years has been to request timely notification of telecommunications work that is needed by Penn State organizations during the summer months. Again this reporting period, notices of deadlines were distributed well in advance, for work to be billed during the remainder of the fiscal year, and for work that is to be completed during the summer months. Timely notifications provide a tremendous overall benefit for the University community, by enabling contacts to complete TSRs 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.

### TNS Web Site Re-design

The TNS Web site is in the process of being re-designed for a cleaner look and more intuitive navigation. An initial version went into production on July 1, 2004. The content of the new site will be re-written and re-organized to better assist customers in finding and requesting specific TNS services. While the site may look different, the home page address, <http://tns.its.psu.edu>, will remain the same. Those who currently use browser bookmarks of specific services within the TNS site will, however, need to re-mark those specific pages, as some directories and file names will be altered as a result of the redesign.

## VI. University Relations

### TNS Participation in the ITS Event 2004

A TNS staff person served on the core planning committee for this year's ITS Event. The multi-unit focus of the exhibits at this year's Event took a coordinated effort of folks from different ITS units working side-by-side to best present ITS services related to each exhibit topic. Over 100 ITS employees manned 13 different exhibit areas throughout the Event, with many of the exhibits being staffed by TNS personnel. In addition, TNS was instrumental in arranging for networking services during the event, and providing guidance and feedback on a variety of aspects. A key TNS staff member also conducted a presentation on interactive videoconferencing as one of the breakout sessions, organized and provided for the first time at the ITS Event.