The reality of residential networking is that you have residence halls occupied by new students each year with a wide variety of hardware and software that all want to get on the network immediately after arriving in the Fall. The misconception about residential networking is that the majority of the work is the installation of the physical networking in the residence halls. The other major misconception is that you will not need your computer labs once the residence halls are networked. But enough about reality.

The really cool part of residential networking is the electronic community you have created. ResNet is not that different from the future of the Internet in our homes. Imagine, a 10BaseT Ethernet connection in your home 24 hours a day. Imagine, all of your friends and neighbors have the same thing. Just think what you could do with this type of fast, constant, reliable access. Then, look at your networked residence halls to see what they are up to.

Northwestern University is in its fourth year of having all residence halls networked. We have watched our connection rates climb each year along with the amount of support required. Our goal has been to develop scaleable systems that keep pace with the increasing number of networked residents. The vast majority of network support occurs in the early Fall. This is good because the rest of the year you will spend preparing for the next Fall. At Northwestern, we have a name for our technical orientation of new students: New Student Month.

The purpose of the Technology Support Services’ New Student Month (NSM) project is to assimilate a large number of arriving students, especially new students, onto the network. Successful implementation is considered the connection of network-ready residential student computers to the network via Ethernet and utilization of the network by the students for academic purposes. By these criteria, NSM 97 was a huge success. At this time, Northwestern University (NU) currently has over 5,500 students connecting to
The Reality of Residential Networking

the network via Ethernet from the residence halls. As of October 31, 1997, 86% of undergraduate residential students have an Ethernet-networked computer in their dorm room.

This line graph depicts the rate at which students networked their computers during New Student Week 97.

This paper will review the major aspects of the New Student Month project. The process will be reviewed in chronological order.

Marketing Communications

The marketing theme for NSM 97 was “One World, Our World, The Internet”. The marketing theme is used as a cohesive device to help our customers identify our services and products.

Technology Support Services (TSS) introduces itself to entering students through a summer newsletter, Getting Connected. The newsletter gives an overview of technology at the university. The most important information contained in Getting Connected are the
TSS Computer Purchasing Guidelines. Publishing *Getting Connected* may be our most critical step for NSM. If students purchase what TSS has tested and know will work, our job is considerably easier.

The purchasing guidelines for computers, Ethernet adapters and modems are on a bi-annual review cycle in April and October. TSS has adopted two separate purchasing guidelines: one for departmental purchases and the other for student/home purchases. Our Fall 1997 student purchasing guidelines recommended a 200 MHz machine with 32 MB RAM and 2 GB hard drive. We recommend good quality manufacturers such as Apple, IBM, Dell, Toshiba, USR Modems and 3Com or Farallon Ethernet adapters.

We are considering development of a “student workstation” where a manufacturer pre-configures an approved model with a customized NU hard drive.

**Planning Cycle**

Planning for NSM 97 began in January 1997. The timeline for NSM revolves around the arrival of the Chicago campus graduate students in mid-August and the Evanston campus Freshmen during New Student Week (NSW) in mid-September. The arrival of the students seemed to be the only certainty at times. Almost all other deadlines revolved around the development of the One World Computer Based Tutorial (CBT) and the NU Internet Software Installers.

The New Student Month project is managed by the Student Computing Coordinator (SCC), Lida Miller. The SCC tracks initiatives in all areas of IT to coordinate the culmination of many different groups’ progress and new offerings. The project was defined in Claris MacProject and tracked in Microsoft Excel. After digesting the successes and challenges from NSM 1996, the SCC writes an analysis of NSM. From this report grows the changes necessary to continue to assimilate larger groups onto the network quickly and easily.

The first half of the calendar year is spent in development and the second half in execution. ResCons must be recruited and selected by April. TSS Information Center (IC) and Lab Cons must be re-staffed by June. Fall NU Installer development is in full swing by March. By July 1, the NU Internet Software Installers must be finished to allow for CD-ROM duplication, documentation by TSS on their use and troubleshooting and training of technical support staff across the University. Once the NU Installers and documentation are finished, all installer packet materials must be duplicated and assembled.

The first group of students to arrive were the law students on August 14. The law students are quickly followed by the medical and dental students. The beginning of September brings various graduate student constituencies to the Evanston campus. ResCons are brought back to campus four days prior to NSW to prepare them for the task that lays ahead.

This year, NSW began on a Friday to allow the Freshmen to attend a home football game on Saturday. This slight extension of the new student period allowed the ResCons one
additional day to get people connected before classes started. This was beneficial both for the Freshmen and the ResCons.

We will continue our efforts to redistribute technical change from the Summer to throughout the school year to accommodate the vast changes necessary to continue to provide this high level of service. Whereas before, it was thought that most changes could only be implemented during the Summer, we now ask, when else can we implement this? Installer development is still the most difficult part of NSM. Attempting to combine many different software products into the NU Installers with release dates in no way related to our cycle proves to be a nightmare for the programmers. The development of the two Windows Installers, 95 and NT, simultaneously has been especially difficult for the Windows programmer. An evaluation should be made again of the commercial software products available for Internet connectivity. Previously, these products were found to be inferior to the NU Internet Software Installers. However, a current evaluation of the software available needs to be made again before major development efforts are underway.

**Project Logistics**

The NSM logistical issues comprise a large component of the project. Ten thousand packets were created for the start of NSM. In the past, there was an FTP installer and a CD-ROM installer. For NSM 97, only CD-ROM Installers were produced. The initial decision to create an FTP single disk installer and a CD-ROM installer was made to reduce costs. A single disk installer costs $0.70 as opposed to $1.20 for CD-ROM. This change to all CD installers increased media costs but reduced labor costs. The larger quantity of CD Installers brought the per piece cost down. A CD duplication company with less production time was obtained.

Once everything is duplicated; CD installer software, documentation and the folders, the packets need to be assembled. The assembly task was outsourced for the first time for NSM 97. The issues of quality control, packet making, storage space, and necessary personnel to supervise the assembly, all contributed to the decision to outsource this task.

**TSS Summer Staffing**

During the Summer TSS relinquishes its large part-time student staff and flourishes with 17 full-time student Summer staff. These students bring new life and vitality to the spirit of TSS. TSS picks their most talented and dedicated school year student employees and promotes them to a new level of responsibility. Even though it is Summer, TSS is frequently abuzz with activity late at night during the months of June, July and especially August.

Two Senior ResCons were chosen to work full-time during Summer 1997. Their primary responsibility was preparation for NSM. The majority of their time was spent testing the NU Internet Software Installers. They set-up as many different configurations of operating system and modem/Ethernet connection methods as they could find and ran the NU Installers. Their results were communicated back to the programmers who made any necessary adjustments. They also wrote the documentation on using and troubleshooting the Mac, Windows 95 and Windows NT installers.
A nice complement to the Summer Senior ResCons were the Summer Cons, the majority of whom are Con Leaders. These students work full-time in the Information Center and labs during the Summer. Summer Cons also participated in the testing and development of the Installers. Con Leaders are responsible for training other Cons and their installer expertise was beneficial in this regard. Given that the Summer Cons will begin supporting the installers from the IC before the return of the rest of the Cons; it is not only beneficial, but necessary for them to be the first to be proficient on the use and troubleshooting of the NU Installers.

**NU Internet Software Installers**

The proudest accomplishment of NSM, besides our fabulous connection rate, is the NU Internet Software Installers. Due to the talents of two gifted programmers, NU has produced a “best-in-class” Internet connection tool. The installers are tailored to the NU network environment so the user only has to answer a few questions at the beginning to install personalized client software and all of the major network tools; Eudora Pro, Netscape, a news reader, Ph, FTP, Adobe Acrobat, First Class, Anti-Viral software (MacAffee & Dr. Solomon’s), NCSA Telnet, TN3270 and the custom NU Internet Software Installer update utility.

The NU Internet Software Installers are written for Macintosh, Windows 95 and Windows NT. Support for Windows 3.1 was discontinued in June 1997. The installers require a valid Northwestern network services account and its initial password. The user is queried about their location to determine if it is a modem or an Ethernet install. The machine is then configured for either PPP (modem) or TCP/IP (Ethernet) access.  

<www.at.nwu.edu/etg/macsoft/> –and– <www.at.nwu.edu/etg/psoft/>

The applications are customized for the NU environment: Netscape bookmarks, Email nicknames, FTP sites, etc. The client applications are configured for the **individual** user. Eudora Pro is configured automatically to send and receive mail from the user’s new email account on a UNIX email host. A default signature file is created. The automation of installing multiple applications and then customizing them not only for the NU environment but for the individual user has reduced the support load on the Information Center (IC) and Residential Networking Consultants (ResCons).

**New Student Orientation**

For NSM 97 we significantly reduced the number of hands-on training sessions for the Freshmen. This decision was based on the continuing improvement in incoming students’ computer knowledge and the lack of hands-on computer training facilities available. Limited introductory hands-on sessions were available during NSM to accommodate new students who are new to computing and the Internet. The attendance was light at the introductory sessions.

Two things replaced the previously large (2,000 students in one week) hands-on training sessions; a Computer-Based Tutorial (CBT) and the introduction of a new class, Electronic Ethics Education (EEE). The CBT orients the student to the network at NU, installation of their Ethernet adapter or modem, and the use of the NU Internet Software Installers. CBT development was accomplished by the TSS Training and Education group.
Since students were given their email account information and the NU Installer Software upon room check-in, we did feel it was necessary to offer an educational component in addition to the introductory class. Electronic Ethics Education (EEE) was developed to address the issues students may be confronted with immediately upon using the Internet. The class was designed to teach students things to do (change your password), things not to do (anything illegal) and things that may be done to them (hackers). Real life scenarios were used to bring issues to light and the students discussed their potential responses to them.

**Troubleshooting Support**

The ResCons are charged with supporting the Ethernet networking of residence hall computers. The Information Center is charged with supporting the off-campus modem clients. Full-time Units Representatives support the networking of departmental staff and faculty computers.

The NSM 97 NU Internet Software Installers and systems were well-publicized and well-received. Help desk and support staff on the Chicago and Evanston campuses were trained in half day training sessions covering the Mac, Windows 95 and Windows NT NU Internet Software Installers. Information Center Consultant training classes were held to prepare the main University help desk for the installation support questions which would begin immediately in mid-August. The ResCons were brought back to campus on Sept. 7 and attended 4 days of training from Sept. 8-11.

The Remedy Action Request System was purchased in March 1996 and developed for five months before being implemented in July, 1996. The initial implementation began in the TSS Information Center. The IC logs all calls received at our main help desk. The TSS Call Schema was adapted for use by ResNet in tracking support requests from the residence halls.

A new residence hall support number was created, R-ESCON. When dialed from on-campus, the call rolls to a special staff/faculty only help desk. The RESCON number was designed to reduce client wait times by re-routting residence hall calls from the TSS IC when requesting support. The IC is frequently flooded with calls during peak installation periods. Once the Fall rush is over, the RESCON number is routed back to the IC to give the users phone support when they call instead of just receiving a ResCon referral. <www.nwu.edu/resnet/>

Another change in the support structure of the residence hall users was the shift to referring support requests to the ResCons based upon platform expertise. In residence halls where there are more than one ResCon, the call is referred via the Senior ResCon to the ResCon who is most expert on the operating system involved.

Remedy aided TSS in tracking that support requests were being fulfilled. An escalation path and time frame were set to notify the proper people if user problems were not being resolved in a timely manner. Previously, users contacted the IC or the ResCons but there was no formal system for tracking the response time and outcome of the request. The use of Remedy has provided valuable information concerning support given from the ResCons and the IC.
The other information used to quantify NSM progress is the number of dynamic IP addresses assigned by the DHCP server.

**Summary**

The networking of Northwestern students each year cannot be underestimated both as a necessity in preparing them for their classes and as an attractive quality increasingly evaluated by perspective students. The fact that Northwestern has an 82% residential student connection rate combined with the widespread use of the network in the classroom, dorm room and library, has made Northwestern a leader in residential networking and the virtual classroom.

The New Student Month initiative is one that touches all areas of Information Technology (IT). Without the cooperation of all IT groups we would not be able to achieve the positive results of NSM. Going forward, there will be new challenges each year as technology advances and student computing keeps pace. This year, the support of the Windows NT operating system was added and with it a new installer and platform to support. The support of students with Windows 3.1 was discontinued. IT will continually need to make trade-offs such as these to keep pace with progress and serve the greatest number of people with the highest level of service.

All of IT will be called upon once again to plan and prepare for the arrival of 4,000 new students each Fall. An awareness of the Fall start-up process and it’s hard deadlines should be considered in the planning of all major IT initiatives. If we want students to take advantage of a new service, the best time to introduce it is in the Fall. Ongoing assessment of changes and improvements will need to be made throughout IT in order to support the educational mission of the university through technology.

Sincere gratitude is offered to all involved for their valuable contribution and continued support. Many individuals performed complex tasks under rigid timeframes without complaint. Through the tremendous efforts of these people we have achieved what is the enviable position of having integrated technology, learning and teaching.