

Computing and Information Technology [CIT] Annual Report for FY 2000

This annual report for FY00 chronicles the continuing efforts within CIT to provide computing and information technology support for faculty, students, and University staff. After more than 10 years of effort, the entire campus community now has access to a rich array of networking and computing resources. Information technologies are becoming well integrated in University research and instruction. Nearly every discipline has come to depend upon information technology in ways that are fully integral to the mission of their departments and the University. CIT continues to provide support for the depth and breadth of these activities and to search for ways to improve that support.

The reorganization of Computing and Information Technology in April, 1999 created a new set of directorates with three distinct goals. First, it created a new directorate and dedicated new resources to assist and encourage faculty to integrate high network bandwidth, other new technologies, and rich electronic repositories more fully into their research methodologies and their teaching. Second, the reorganization focused on the development of client/server applications that will leverage the processing power inherent in the workstations on staff desktops. Third, the reorganization brought together in one group all units dedicated to providing customer support.

The new organization made substantial progress towards these three goals. The report chronicles the activities during FY00. The most significant accomplishments are highlighted below.

Y2K

Princeton's campus passed uneventfully into the year 2000. CIT spent more than three years upgrading hardware, systems software, database software, and applications to be ready for January 1, 2000. More than 3 million lines of program code were reviewed and fixed for the calendar change. Y2K fixes from PeopleSoft, IBM, and SUN were received as late as November of 1999. They were installed and tested in December.

Minor problems found in Tesseract and Alumni Development were fixed the first day. All other applications tested successfully. Other remnants of the calendar change were quickly corrected.

Building Rewiring

The University is upgrading the internal wiring in several campus buildings in order to provide high capacity, fiber optic connections to the desktop. At the same time, CIT is redesigning the network infrastructure within the buildings in order to support high speed, 100Mbs service. Staff have completed such improvements within Jadwin Hall, Bowen Hall, Guyot Hall, and Peyton Hall. Lewis Thomas, Shultz, Moffet, and Eno are scheduled for the summer.

Switched Ethernet service provides increased network performance and a higher degree of network security. The Computing Center, 120/126 Alexander, Nassau Hall, Robertson Hall, and the renovated floors of New South have been converted to switched Ethernet.

Planned summer projects include 75 miles of new cabling and the general upgrades of major sections of the campus from shared to switched networking.

Wiring is being completed as part of the renovation of Blair Hall, the first residential space converted to switched ethernet service.

Mail Migration

Migration to the new high performance mailserver was completed during early February. More than 13,500 user accounts (approximately 80 Gigabytes of mail) were moved. The new IMAP mailserver provides a ten-fold improvement in performance and is capable of supporting more concurrent users. The new server currently supports more than 3,300 concurrent IMAP user connections. More than 8,000 individual users connect every day.

Upgrades

The central Unix clusters have been upgraded to substantially more powerful processors and to newer Y2K compliant operating systems. The upgrades will accommodate future network growth. The new network topology increases the total bandwidth available to service Dormnet from 70Mbs to 400Mbs. The Nassau Hall network infrastructure has been upgraded from a shared Ethernet topology to switched Ethernet in order to improve performance and security.

Information Systems

A number of administrative systems have been created or upgraded. Employees can now use Open Enrollment, a web-based service for staff, to modify their health care plan coverage. Staff can also use My Personal Record, a web-based application that replaces the personal data forms previously sent to staff on paper. Students can now gain access to their student accounts via the web. IS staff have also created a new version of Labor Accounting and a new Occupational Health database. A new Medical Benefits system was implemented in Java.

Wireless

A pilot project covering the area from Firestone Library to Alexander Beach is examining how wireless technology can best be used for campus network access. The Computing Center at 87 Prospect Street is the first building on campus to be entirely covered by wireless networking.

Distributed Media Centers

The DMCs are specialized computing clusters that provide high speed access to CD-quality audio and video material. The availability of such facilities in the Residential Colleges have permitted faculty to accelerate the integration of such materials into the curriculum. The first two Distributed Media Centers opened in the Wilson-Butler and Forbes Libraries during FY00. The two centers offer computers that are connected via very high-bandwidth networking to a streaming digital video server. The centers will permit students to view very high quality video (DVD) on demand, 24-hours a day, 7 days a week. Assignments for eight courses are currently stored on the video server. A new computer cluster facility with DMC capabilities is being built now in the Rocky-Mathey café. Two additional such facilities are planned for the Library and the Graduate College.

Tivoli/Enterprise Systems Management

Tivoli Enterprise Management provides the ability for centralized control and monitoring of administrative systems. University administrative servers now have the Tivoli framework software installed and are being monitored at the operating system level. Additional monitoring (for services and applications such as Oracle, web, mail, and Help Desk) has also been installed. Data gathered by Tivoli is being used by systems administrators, production control, and help Desk staff to detect early warnings of problems and provide data for capacity planning.

The new Dazel Output Management System is being used by UNIX machines and by major P2K (Partnership 2000) applications (STRIPES for Development, and Campus Receivables) for printing and central faxing. Dazel's many features and functions have already replaced a number of error-prone manual processes and provide new capabilities for the P2K applications.

Help Desk

The Help Desk installed and put into production an ACD (automatic call distribution) system. The ACD facilitates the routing of calls. Customers are connected to the next available consultant. Customers have begun to realize that if they stay on the phone they will get more prompt service.

More than 250 campus support staff are using the TPM (Tivoli Problem Management) system written by the Help Desk. New groups, both internal to CIT and external (Development) have adopted the system for their problem tracking.

During the month of April, the CIT Help Desk assisted approximately 1,000 customers a week. Of the 2,000 customers who called the Help Desk, 86% were able to talk directly to a consultant after waiting an average of 20 seconds. (The other 1,000 customer contacts were made through e-mail, appointment, and walk-up customer service.) The

Help Desk web site recorded 160,000 hits, representing 8,600 visits from 2,700 different computers.

Dormnet

Dormnet provides connections to the campus network in student dormitory rooms. During FY00, there were a record number of Dormnet subscribers, 4414, (more than 90% of all students housed in campus living space) including 985 in the Class of 2000, 1001 in the Class of 2001, 1098 in the Class of 2002, 1091 in the Class of 2003, and 239 Graduate students.

CourseInfo

The University purchased a site license for CourseInfo, a course web server that has helped staff and faculty to assemble more than 300 course web pages. The server has been installed, tested, debugged, and placed. The pages provide syllabi, course readings, discussion groups, online surveys assessments, and electronic access to reserve readings. Princeton has been selected as beta site for Blackboard latest version and testing has begun. The new version offers a broad range of enhancements and additional features and will be available in the fall term of 2000.

Virtual Democracy

During the spring term, the students in POL450 (Professor Tim Feddersen) wrote a constitution on-line using new web-based (<http://maestro.princeton.edu/OnlineDemocracy/>) interactive Virtual Democracy software developed by CIT's Academic Applications. Students, whose real identity is kept secret, interacted only electronically to make proposals, to amend them, to sign on to support them, and finally to vote on them. The system includes the ability to have electronic forums, chat groups, and e-mail lists. The effort resulted in a draft constitution developed completely on-line, and also an understanding of how an electronic democratic deliberative body might work in the near future.

Distributed Computing Support

The University's SCAD [Support for Computing in Academic Departments] program permits departmental consultants to provide tailored support for departments as well as priority access to the CIT Help Desk and special opportunities for training and access to CIT's knowledge base and tracking system. 30 SCAD Consultants assist 40 participating academic departments.

A new pilot program for administrative departments parallels the SCAD. Six departments are now taking part in the pilot. The program will be formally established over the summer.

Graduate Student Computer Clusters

Two new computer clusters were added at Butler and at Lawrence. The facilities are in constant use and the printers in each location are being used very heavily (10,000 pages per month per printer).

Private Network Services

Members of the campus community can use a new service, Virtual Private Network [VPN] to gain secure access to campus network resources even when using a commercial Internet provider (such as AT&T, Netcom, AOL, etc.). VPN permits such users to appear to be a part of the campus network in order to gain access to Princeton-only resources (such as Lexus-Nexus, Britannica Online, and shared servers). Currently, a VPN connection can be established from Windows 95/98 and Windows NT computers. Other platform support is under investigation. PPPL users will also be able to use VPN to gain secure access to University data and applications.

Information Kiosks

Two information Kiosks were placed at Chancellor Green and at the Computing Center. The Kiosks provide access to campus information and services. Such Kiosks will be placed in other locations around campus, including the new student center.

OnTime

Nearly 300 administrative users are now using the OnTime calendaring system to schedule daily appointments, tasks, and coordinate meeting schedules.

Academic Services

Following the reorganization of 1999, FY00 was the first year for the Academic Services Directorate of CIT. Academic Services focuses in one directorate all of CIT's direct support for Academic IT activities.

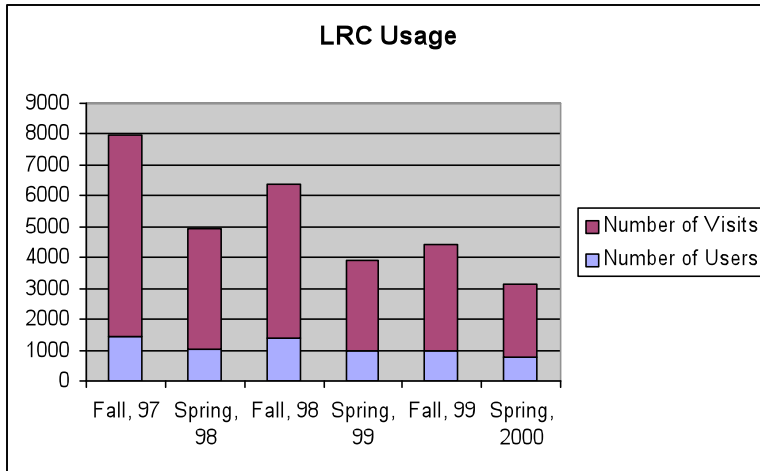
Academic Services consists of four groups:

The Language Resource Center is responsible for all of the University's foreign language teaching support. Media Services handles all of the University's A/V support. A new group, Academic Applications provides programming support for faculty IT projects. Formerly Instructional Technology Services, Academic Technology Services supports the creation and management of faculty and student multi-media efforts, including course web pages.

The groups accomplished much during FY00, but the Directorate's single most significant accomplishment was the re-emphasis upon support of Academic IT within CIT. The renewed focus is expected to continue in the years to come, as AS works closely with the new eTc department, and strengthens its ties to other IT providers, such as the library.

Language Resource Center [LRC]

In a recent survey of 42 universities, Princeton was one of only 4 that provide the highest percentage of online audio materials. The availability of material over the internet has resulted in a decline in the actual number of students visiting the LRC facility in Jones Hall.



As a result of the opening of the Forbes/Butler media clusters, the use of videos (2802) in the LRC decreased by one fourth. Use of multimedia (1509) remained constant, as did the number of videos placed in the reserve collection (225) and the number of videos signed out by faculty (640).

Distributed Media Centers [DMC]

Construction of a second DMC with 10 client stations was completed at Wilson College. Staff resolved initial problems with an Alex video server. The server environment remained stable throughout the spring term. Staff digitized films for 20 courses placed them on the server. Students in Forbes, Butler and Wilson accessed the material mostly between midnight and 7 am.

Video Library

The University video library holdings increased by 300 videos and 25 laserdiscs, for a total of 1,560 videos and 205 laserdiscs. The LRC is acquiring films in DVD format whenever possible. The collection currently stands at 17 DVDs.

Foreign Language Channels

The LRC has launched two foreign language TV channels, French and Japanese, via the Dish Network.

LRC Goals for FY01

During FY01, the LRC expects to make the DMC video server more accessible to faculty and students. A media center will be built in Rocky/Mathey this summer in order to improve student access to the server.

Upgrades to the CIT cluster in McCosh Hall will ease student access to online videos. The CIT cluster group will manage the clusters. The LRC will continue to administer the server and its content. A number of classrooms in McCosh and the Frist Campus Center will also be connected to the video server.

FY01 should see an increase in the number of language channels available via the Dish Network connection. Negotiations are in progress to add Arabic, Portuguese, Italian, and Spanish channels.

The LRC will continue to serve as the prime location for all language IT support, even as it makes more and more material accessible via the Web. Many language resources are not suitable for Web distribution, or are restricted from such distribution due to copyright concerns.

Media Services

Media Services continues to provide both academic and special events support to the University community. FY00 witnessed a continuing increase in the use of laptop and data display technologies. MS Staff is providing more setup and training of users in integrating various laptops. Media Services staff spend an ever-increasing amount of time training campus users in new presentation display systems.

During FY00, there was a dramatic change in in-class support.. With the increase of user-operated systems on campus, staff became less involved in setting up equipment and more involved in training and "triaging" problems for users. During the year under review, Media Services began to track its non-billable hours for the first time. Staff broke down service types into consultations, training users, maintenance of systems, and prep time needed for setting up of more extensive support events. Non-billable services totaled 299 events involving more than 837 hours of non-cost recovery time. The non-billable services performed become important when examining the number of billable events, which appear to be on the decline over the last few years.

During FY00, Media Services provided coverage of 182 Alumni Council events, including continuing series of on-campus lectures. Media Services also provide a range of other services, including video recording, digital audio tape recording, and presentation support for on-campus classes and those for web casting. The staff continued ongoing media support of Alumni Day, Freshman Parents Day, Reunions, Baccalaureate, and Commencement '00.

Classroom and Special Events

Media Services provided multimedia support, video recording, simulcasting over the campus' Tiger TV and into town, and the web casting of 23 University Public Lectures. Each lecture was held in Helm Auditorium in order to take advantage of the unique AV system and recording capabilities within the room. The staff also provided web casting for all of the Alumni Studies events. The staff provided video recording services for 45 Center for Teaching and Learning recordings as well as 12 week course-long recording of all classes in HIS 520, CIV 102 and Art 101.

Media Services provided support for 1,050 academic and 2,096 non-course events. The staff provided 35MM projection support setups for ten film showings of a Japanese film series, Canadian film festival print, Visual Arts and RLL showings. Media Services provided 16MM projection services for film festivals showing multiple films for RLL, Visual Arts, International Graduate Student Association, Canadian Film Festival, LGBA, and the Student Film Society.

Media Services provided consultation on design and installation of data projection systems in 15 seminar rooms, and large lecture hall in the new Frist Campus Center. Additionally, Media Services provided final checkout and training in system operations of McCormick 102, 103, Fine 214, 314, McCosh 62, 64, and Architecture 106, 107. Media Services not only developed the instructional documentation for each system, but also provided one-to-one faculty training and support. Staff provided on-going support for data display in courses taught by Professors Bogan, Gleason, Silver, Mendelberg, Seleny, Curran, Howarth, Levin, Feddersen, Saguy, Litman, Rooks, Danson, Rheinhardt, Gould, Wang, and Farber.

Satellite Channel Support

University satellite services continue to provide foreign language programming. During FY00, two new channels were added over the digital DISH network and 13 special teleconference events were carried for departments such as CIT, Office of Physical Planning, Athletics, Health Services, Conference Services, and Planned Giving. Tiger TV continued to provide 24 hour programming to the community with programs including the International Center Forum, the Undergraduate Student Government, student programming, and a newly updated Bulletin Board program, including live special events simulcasting.

Media Productions Services

Baccalaureate and Commencement exercises were again recorded, simulcasted, and webcasted using the broadcast production van. When off-line, the van equipment assisted in the transference of many master tapes to a more widely distributed VHS format. The staff provided Betacam and SVHS single camera mastering and several live Web casting of various venues including EEB seminars; Student Bioethics Forum; Fall

Assembly, and Diversity lecture; SHARE programs “Sex on a Saturday night; four special lectures by Sir Martin Rees, and the celebratory series of lectures for the 10th anniversary of the Center for Human Values, including panels with President Shapiro, Toni Morrison and Peter Singer.

MS staff have continued to be involved in the effort to upgrade campus audiovisual systems. During Fall 00, the University will open upgraded systems in six areas in the Frist Campus Center, Wallace Social Science, Dial Lodge, Joseph Henry House, Blair, McCormick 101, Jones 113, Marx 101, Peyton and McCosh 60.

FY01 Goals

During FY01, Media Services will expand the capabilities for web casting lectures and special events by on-site streaming of video and audio program material. New capital spending, the acquisition of digital recording and editing equipment will permit Media Services to provide even greater options to faculty and student in producing materials in support of the academic program. On-going goals include finding new space for Media Services operations; allowing staff fully to incorporate the production vehicle in a acclimatized environment; assembling a small studio area; and providing for more efficient equipment and parts storage.

Academic Applications

Academic Applications, a new group formed in the 1999 CIT reorganization, creates information technology applications in support of research and instruction at the University. Much early effort was directed to completing legacy Advanced Applications efforts. All staff effort is now being devoted to the mission of the new group.

CourseInfo

New versions of CourseInfo are now being investigated and special Princeton features have been added. For example, University course web pages include student pictures and special precept features. Efforts will be made in FY01 to produce web pages for half of all University courses.

Virtual Democracy

Support for Professor Tim Feddersen’s course in virtual democracy involved a complex web-based simulation of a virtual legislation. The new application permitted students to assume various roles. The project required the integration of on-line voting, electronic discussion groups and forums, along with controls that permitted the instructor to change the rules as necessary.

Psychology Experiment Participant Scheduling

The group produced a web based lab-scheduling system for psychology professor Kinchla. The new software replaced bulletin boards and tedious clerical work by administrators and graduate students. The general-purpose system will be used by all psychology majors to enable those running experiments to obtain human subjects and to ensure that psychology undergraduates participate in these experiments.

Unix Support

Academic Applications assumed responsibility for many Unix applications. Staff obtained and renewed licenses, installed software, and assisted faculty and CIT staff with maintaining these software libraries.

Academic Technology Services

Academic Technology Services [ATS] provides scalable tools, advice, training, and walk-in access to specialized hardware/software at the media development lab, the PLACE. Owing to its small size (4 FTE's) ATS relies extensively on cooperation of other CIT groups and employment of part-time help.

Blackboard CourseInfo

ATS conducted a successful rollout of Blackboard CourseInfo, which has quickly become the predominant way of publishing course web sites at Princeton. This past year there were 435 course web sites and 338 of them were created with CourseInfo (78%). ATS also ran a faculty office visit program, where faculty could request CourseInfo orientation by trained graduate students who visited them in their offices. We made 89 such office visits, for a total of 132 hours. In addition to training our own employees in CourseInfo, we made the same training available to interested PU graduate students, faculty and staff. ATS also handled many behind-the-scenes development issues and production tasks associated with creating new courses and populating them with students. ATS is also the primary source of support for people creating CourseInfo sites. We marketed CourseInfo and our faculty office visit program with an ad campaign consisting of postcards, posters, and targeted e-mail.

Courseware Development

During FY00, ATS staff participated in several custom courseware development efforts

The Dante project

A major push got this project up and running in time for Professor Hollander's fall 1999 Freshman Seminar.

Online Poetry

This 1998 summer project presents synchronized text/audio using Flash. Staff are finalizing the design templates for all of the related projects below. Many faculty have seen the project and are integrating its techniques into instruction.

Classics Language Instruction Project (CLIP): Prof Christian Wildberg is working with ATS to produce Flash modules for Greek and Latin readings.

Online Arabic Poetry: Language Instructor Nancy Coffin and ATS are producing a set of 5 Arabic poems this summer. When the project is complete, it will be the only example of online Arabic poetry. There are no copyright problems associated with the effort because the poems are 1,000 years old and instructor is doing her own translations.

Musical Tour of the Arab World: Based on our Arabic Poetry prototype, Nancy Coffin was able to get a Language Consortium grant to produce 10 additional modules highlighting popular Arab music. Copyright is an issue here, restricting distribution.

Project Eclipse: ATS staff worked with Prof Dworkin (ENG) to define his vision of preserving small volume publications for future research. Staff researched many avenues, including adapting our earlier work for creating online books. Prof Dworkin has received an Anniversary Fund grant and work on his project and will continue under the auspices of eTc.

Electric Shakespeare: ATS helped Prof Danson adapt his Electric Shakespeare course website to use streaming video.

The Princeton Shahnameh Project: ATS staff collaborated with Prof. Clinton (NES), the McGraw Center, and the Library to produce this prototype of a database of Persian Miniatures, illustrations of the Persian book of Kings.

PLACE Consulting and Equipment Access

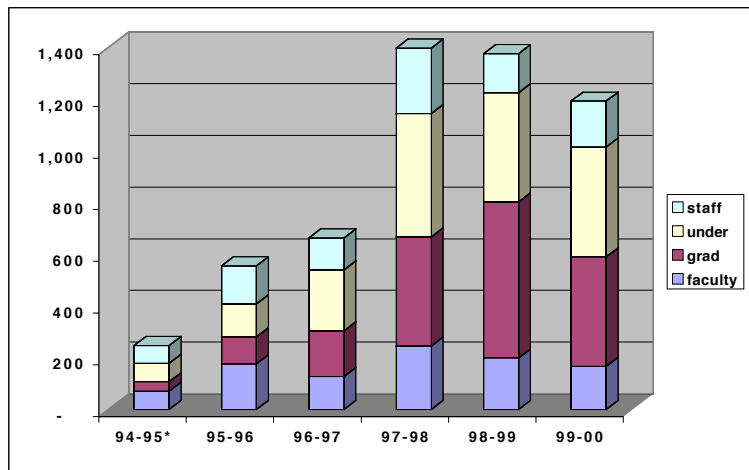
The ATS PLACE has walk-in consulting and equipment access during the afternoons year-round. The PLACE provides members of the University community with a forum to ask questions about new media and instructional technologies and with a place to use equipment not generally available, such as slide scanners or digital video.

The PLACE is also a resource for Princeton courses. During the Spring Term, for example, the following courses met at the PLACE: VIS315, HUM307, and HIS380. The PLACE also hosted several meetings of the Language Consortium Workshop.

PLACE walk-in visits declined by approximately 13% over last year's figures (see figure below). The PLACE experienced a decrease in the number of faculty and graduate student visits. Undergraduate visits remained the same. There was a slight increase in

the number of staff visits. The decline in faculty usage is largely attributable to the success of expanded staff outreach effort with CourseInfo. The decline in graduate student usage may be attributed to the cessation of free color printing support (it was financially unfeasible to continue as the only campus site providing free color printing).

PLACE WALK-IN VISITS by customer type and year



| year | faculty | grad | under | staff | total |
|------------|---------|------|-------|-------|-------|
| 94-95* | 71 | 37 | 72 | 68 | 248 |
| 95-96 | 178 | 104 | 127 | 148 | 557 |
| 96-97 | 129 | 176 | 236 | 123 | 664 |
| 97-98 | 247 | 422 | 477 | 254 | 1,400 |
| 98-99 | 200 | 604 | 422 | 151 | 1,377 |
| 99-00 | 167 | 424 | 425 | 178 | 1,194 |
| % increase | (17) | (30) | 1 | 18 | (13) |

*Oct - June in first year.

In addition to keeping all the machines in the PLACE in working order, ATS staff also provided hardware and software support for the LRC and DMC efforts.

Goals for FY01

ATS will continue to improve CourseInfo services and to actively promote its use by Princeton faculty. ATS is aiming to have at least 50% of all Princeton courses (approximately 400/semester) using CourseInfo by spring, 2001.

ATS will seek to increase its ability to handle walk-in digital video projects. ATS will enhance its ability to handle large volumes of video data through a dramatic increase in disk storage space. New computers and software will ease routine video editing, as well as high-end video projects.

ATS looks to establish a positive working relationship with eTc and to establish clear project guidelines so that the two groups can work together with minimal duplication of effort.

Administrative Services

After a year of great change in FY99, Administrative Services experienced a year of relative stability in FY00, the first year for the new director, Andrew Rosenau. Following the CIT reorganization during FY 99, Telecommunication Services, and Policy and Security completed their first full fiscal year as part of Administrative Services.

Human Resources

FY00 was again a busy year with staff arrivals and departures. During the past year, there were 13 new hires and 14 departures as compared to 21 new hires and 20 departures in FY99.

FY00 was the second year of the pilot CIT bonus program. In order to remain competitive in the marketplace and to retain our staff, CIT initiated a new pilot bonus program in December 1998. The new program offers new compensation strategies in order to reward CIT's HR and DOF employees. The two main components of the bonus program include spot bonuses, which are small bonuses up to \$500 for going above and beyond the call of duty, and project bonuses, which can be up to \$10,000 for completion of large-scale projects. CIT can also use the program for staff retention purposes. During the past year, 25 CIT staff members were awarded a total of \$41,350 in bonuses as compared to 19 CIT staff members and \$38,000 in bonuses last year. Project bonuses account for 59% of the dollars given while retention bonuses accounted for 27% and spot bonuses 14%. Funding for these bonuses comes from the salaries from vacant CIT positions.

During the spring, a new project team led by Andrew Rosenau and Jane von Oehsen and comprised of staff members from CIT and Human Resources began to develop a new classification structure for all University staff members who have primary IT responsibilities. The new classification system will solve the long-standing CIT issue of having IT staff on both the DOF and HR payrolls. The new system will place DOF and HR IT workers throughout the University under a new structure that will provide managers with more flexibility in compensation and other HR issues. The project will be completed by July of 2001.

CIT Space Planning

The April, 1999 reorganization necessitated an analysis of CIT office space and a recommendation of a new space allocation plan. Originally expected to be completed before the 2000 school year, the removal of asbestos and needed ventilation improvements delayed the completion date to August, 2000. The new space plan will consolidate CIT technical staff into 87 Prospect St. In order to accommodate the move, the Budget and Finance directorate as well as a majority of the Administrative Services directorate will move to 116 Prospect.

Vendor Relations

Student Computing Initiative (SCI)

Funded by the Provost and managed by CIT, SCI permits undergraduates and first year graduate students to buy quality personal computers at favorable prices. During this third year for SCI, and like the previous two years, there were problems in implementing the program. Owing to recurring problems with Dell Computers, CIT, through an RFP process, awarded the contract to IBM. The SCI bid actually came from GE Capital because IBM will only sell through a re-seller.

In late April, the University awarded the SCI contract to GE Capital. However, in early June, during the time period that all of the SCI processes and marketing materials are finalized, GE Capital informed the University that they were completely backing out of the deal and would not be participating in SCI at all.

While University lawyers pondered the legal ramifications, CIT staff moved quickly to find an alternative before it was too late to meet the University's strict timelines. Fortunately another vendor, College and University Computers (CUC), quickly came forward as a viable alternative. CUC had responded to our RFP as a Compaq representative, although they resell many computer brands including IBM.

Remaining complications prevented the inclusion of an alternative plan for the sale of Apple computers. The University will advise students of the minimum requirements and will point them to the online Apple Store. However, the Student Computing Initiative will not subsidize Apple purchases this year.

Microsoft Purchasing Agreement

During the year, the University adopted the Microsoft Campus Agreement which covers both institutional and student computers. Owing to internal funding issues, there was no publicity for the purchase and, indeed, the University continued to operate as in the past under the Microsoft Select program in which departments were charged as they purchased software. Fortunately, the Campus Agreement will be centrally funded during FY01. Departments can now freely download the Campus Agreement products and/or purchase media through CIT Software Sales.

An important consideration in deciding to renew the agreement for FY01 was the cost of the agreement. Given how Microsoft determines the price of the agreement, it was not fully clear whether the University ought to proceed with the new licensing model. A reduction in the University's count of "knowledge workers," the key variable in determining the cost, from was 3325 to 2439, permitted the University to save considerably. For students, Microsoft has reintroduced Student Select, a two-year pilot that appears to be much better suited to University student needs for Microsoft software.

University Calendaring

After several months of looking at the alternatives the University purchased OnTime, a calendaring program from Open Text. Cit staff determined that the program best fit the University's needs at this time. CIT was successful in negotiating a site license with Open Text.

Vendor Relations has begun to witness a trend towards multi-platform software licensing. In the past, most software programs were licensed on a per platform basis. Vendors sought to collect money for each platform. The result was usually that the University acquired a license for a program on only one platform. Prices for multi-platform licenses are now very attractive, and often very cost effective. During the year under review, the University has acquired multiplatform licenses for Mathematica, Matlab and S+. Faculty members seem especially pleased to be able to access these software programs using UNIX, Linux, NT and Mac platforms.

ID Cards

FY00 was a busy one for the ID Card Office. There were no major changes to the ID program, but staff were involved in planning two major projects: Campus Community and the new AT&T system for Dining Services. Efforts were made to educate others about the data requirements of the ID Office and to make sure that ID data requirements interface with those of other offices.

The AT&T system is not expected to require a new ID card; the contract stipulates that if a current ID does not work in the AT&T system then AT&T will pay for a replacement card. A few issues regarding the encoding and activation of the ID card, as it relates to Dining Services, have posed problems for the ID Office. During the year ahead, such issues are expected to be addressed and the system will be refined to better suit the University's needs.

During the next year, a recommendations for a new access system for the University will be made. The current access system is at capacity and is considered outmoded. Vendor presentations will begin shortly. The projected date for submission of a proposal is October 2000.

The TESA door lock pilot is on hold. A proposal, prepared by Facilities, calls for the installation of TESA locks in all dormitories. However, the proposal also calls for the ID Office to be the center of management for this project. Clearly, the single staff person in the ID Office cannot take on the administration of TESA without additional staff and new space. The proposal for a new access system will also need to address the issue of system administration. Access requirements are growing steadily; each new building and each renovated building are wired into the access system. Public Safety cannot keep up with the demands placed on them to administer this system, and the ID Card Office clearly cannot take on this additional responsibility without additional staff. A broad review of

the issue of card use and system administration related to card use will be needed on a broad level.

University Printing and Mailing Services

The Printing and Mailing office provides four major services for departments and authorized organizations of the University:

- **Printing Production:** Manufacturing of a wide variety of printed work, envelopes, stationery, brochures, flyers, saddle stitched and perfect bound booklets.
- **Graphics:** Macintosh and PC based layout and design. Color scanning, halftone and line scanning. 18 x 24 -inch film imagesetting at resolution to 2450 dpi. Quark, PageMaker and Adobe Illustrator are the primary desktop layout software.
- **Digital Printing:** Xerox Docutech 6180 featuring 600 dpi high speed network printing, Minolta 400 dpi toner based color printing, Encad 600 dpi large format network poster printing up to 60 inch x 8 feet and Heidelberg DI computer to press process 4 color digital printing.
- **Mailing Services:** Pre-sorted first class, permit mailings, addressing, inserting and metering services. Also, through mailing services various variable data printing formats are available.

During the past year total income for Printing and Mailing Services was \$2,439,000, expenses were \$2,070,000 for a net margin of \$369,000. A major activity this year was the administrative review of Printing & Mailing. Completed under the auspices of the Vice President for Finance and Administration, a consultant from PriceWaterhouseCoopers analyzed the strategic directions as well as the day-to-day operations of the department. The report, while generally quite positive, offered recommendations that will improve the level of service while reducing overall costs. These recommendations will be implemented over the coming months.

Looking ahead, the department expects further growth of color and variable data printing and will try to phase in equipment to meet the requirements. Equipment under consideration includes a new signature booklet maker that will go on line with the Docutech 6180. Printing and Mailing Services is also aggressively pursuing the new Xerox 2060 color digital press in the hope of building "on demand" capability to serve both the Alumni Council and Annual Giving printing needs. This initiative will eliminate the need to inventory pre-printed letterheads. The group also will stabilize its offset printing area by replacing two presses with a new automated Sakurai 20 x 28 two color perfecter.

Although FY00 was another financially successful year for the department, there are concerns on the horizon:

- Increased use of the World Wide may result in decreasing use of printed work. While Printing and Mailing has anticipated a drop in revenue owing to use of the WWW, staff have yet to observe any financial effect.
- Qualified and stable staffing continues to be a challenge. During FY00, the group added a qualified staff person owing to a vacancy caused by retirement. Future openings will require the recruitment of committed and talented staff to meet a constantly changing University environment.

Telecommunications Services

Telecommunications Services provides total telecommunications services to the members of the University community reliably and cost-effectively. With FY00 revenues of slightly more than \$3,000,000, Telecommunications Services is the largest cost recovery unit within Computing and Information Technology.

The group maintains 2,860 student telephone lines, approximately 6,700 academic and administrative lines, and 14,000 voice mailboxes. During FY00, more than 3,650 work orders were issued for telephone work that involved some 4,150 changes to telephone service or equipment. In addition, the group processed 1,800 orders for voice mailboxes, and 5,000 student mailboxes were removed in June and added in September.

The monthly service rate for telephone service continues at \$21.55 for a fully featured telephone line with voice mail. This rate is 45 cents per month less than the rate from NJ Bell in 1986 when the University began operating its own telephone switch.

Although long distance rates, egress revenue, and Zero plus calling revenue remained relatively constant this year, recent FCC regulations and the turmoil in the local service and long distance industries are likely to reduce revenues over the next several years. Egress revenue (renamed Direct Termination) is on the increase as revenue is being generated on outbound 800 calls. However, increased competition among the external telephone providers is also likely to reduce Princeton's expenses for local and long distance service. As the convergence of voice, data and video becomes economically feasible and reliable, the telecommunications industry will be transformed. Staff must closely monitor industry developments to stay competitive.

New long distance rates became effective July 1, 1998. The major benefits are for FY01: domestic usage a reduction of \$.09/minute anytime/anyplace; International rates have also been reduced and are in line with competitive prices offered by the IXC's (interexchange carriers). A few examples of the new rates are: \$.13/minute to Canada; \$.15/minute to the United Kingdom; \$.25/minute to France and Germany.

Use by departments of an internal telephone conference bridge will continue at no charge. Combined with the use of University issued calling cards, departments are able to conduct audio conferences at dramatically lower costs than commercial offerings. One

high use department has indicated that they have saved over \$20,000 this past year using that service.

Telecommunication Services is currently undertaking or has recently completed many important projects. The group installed a new Year 2000 compliant Management system. Electronic billing for academic and administrative departments continues through the use of Princeton's Data Mall. Primary Rate Interface trunking was installed in October 1998. As a result, the trunking will be able to provide faster call setup and breakdown as well as ANI (automatic number identification) for proprietary sets.

This summer, Telecommunication Services is participating in the renovations of eight dormitories, and many, other buildings in addition to bringing online two new buildings and an extensively renovated New South Building..

As part of the construction of the Frist Campus Center, Telecommunications Services has been temporarily housed in trailers adjacent to their current offices in Palmer Hall. Existing offices are being renovated as part of the campus center project. The group expects to occupy the Frist Campus Center by early September. As a result, the Manager of Telecommunications Services will be co-located with the entire unit for the first time in 14 years.

During FY00, an outside consulting firm conducted an Administrative Review. The final report will soon be out.

In a major change in the local services arena, Princeton has signed with a CLEC (Competitive Local Exchange Carrier). As a result, the University will replace Bell Atlantic for most local services by the end of the calendar year 2000. Some of the changes include;

- 1) a new phone exchange for the students (986-xxxx) effective by August 25, 2000;
- 2) dramatically reduced rates for trunking (transport paths into and out of Princeton University);
- 3) Direct Termination revenue for all inbound traffic;
- 4) Porting of existing phone exchange (258-xxxx) to new company with dramatically lower number use/reservation charges.

Finally, two of our three managers have indicated they are seriously considering retirement at the end of the calendar year. Were this to occur, the department will have the opportunity to combine the results of the Administrative Review and reshape this department. The challenge is to reshape it without diminishing the department's quality of service provided (voted #1 of all CIT services in a student poll in FY00).

Policy and Security

The CIT reorganization in April of 1999, created a Policy and Security group. During the year, the Policy and Security Officer coordinated a panel of University officials and student representatives to create the revised Guidelines for use of Princeton University information technology resources and Internet access. The Policy and Security Officer then consulted with deans, directors, department heads and other appropriate University officials regarding breaches and violations of these guidelines and related University policies during the year, and provided appropriate support and information for use in subsequent disciplinary hearings and personnel decisions.

An initial focus of this position has been to increase awareness of security-related issues and to educate users. To this end, the Policy and Security Officer created a "Protection" web site (www.princeton.edu/protect) which is maintained with information regarding basic security for campus platforms prepared both for technicians and for owners/users of the systems. The site also contains information on viruses, including news on recent sightings at Princeton, on threatening or "spam"-type e-mail, on e-mail hoaxes, and other topics related to network and system security.

The Policy and Security Officer also prepared and submitted to Department of Public Safety daily reports on campus cybercrime incidents observed by CIT and reported to CIT by others within the University community, and cooperated with DPS in investigating cases with cyberspace involvement. After careful planning and preparation, CIT and DPS jointly announced the initiation of an "electronic patrol" of the campus which is intended to detect vulnerabilities hackers might exploit, so those responsible for the respective systems can eliminate or secure those means of access to the Princeton domain. A memorandum to all members of the campus community announced the service, and also raised awareness of the need for improved security and drew attention to the CIT protection web site.

The Policy and Security Officer also circulated relevant bulletins, alerts and advisories to campus computing support personnel to keep them current with new threats to systems and services. This person also served as a resource to assist and/or refer members of the campus community and departments who experienced break-ins or expressed other security concerns.

During FY01, the group will continue efforts to protect University's information technology resources against deliberate or accidental damage, both by outsiders and by members of the University community. Two major challenges related to this goal are the lack of definition by institutional officials regarding just what institutional information should be secured, and obtaining accurate information from all concerned regarding what safeguards and procedures currently are in place. A second major goal is to increase the level of support available to the computing support people in the field; i.e., assigned to academic and administrative departments which manage their own instructional technology resources, for drafting and interpreting local guidelines and policies. A third important goal is to penetrate deeper into the community to raise awareness of electronic security concerns and the importance of individual responsibility in protecting the University, its departments, and its faculty, students and staff.

Beginning last summer, Andrew Rosenau became a founding board member of the New Jersey chapter of InfraGard. Although InfraGard is a project initiated by the Federal government through the National Infrastructure Protection Center in Washington D.C., it is run and administered locally by its membership, composed of corporations and businesses large and small, educational institutions, and others interested in protecting their information systems. InfraGard sponsors monthly meetings for its members and prospective members with speakers presenting on security related topics of current interest.

Enterprise Services

Enterprise Services provides the software infrastructure and middle-tier services for CIT's server and desktop computing environments. Supported services include: Web and streaming media, departmental calendaring, netnews, e-mail, directory services, authentication, desktop deployment, and enterprise management. Enterprise Services strives to enable the delivery of reliable mission-critical computing services to the campus community in as transparent a fashion as possible and includes the following groups:

- Enterprise Systems Management
- Collaboration Services
- Technology Integration Services
- Web Services

Enterprise services completed its first full year of operation with an impressive number of gains and accomplishments, in spite of industry-wide difficulties in filling technical staff positions, and prolonged delays in the consolidation of office space to the 87 Prospect Computing Center.

Staffing

ES successfully filled positions in Enterprise Systems Management and the Collaboration Services Group [CSG]. The CSG Manager position was not filled but rather combined with that of the manager of Technology Integration Services, leaving an additional open CSG position. Finding (and retaining) qualified technical staff remains a major challenge industry-wide, and especially in higher education where it is difficult to meet highly competitive salary demands.

Space

Continued construction and asbestos abatement delays kept the Director and some Enterprise Services staff at 116 Prospect, while the majority of staff were located at 87 Prospect. The result was a continuing management challenge. Several interim steps were taken, including moving ESM staff temporarily to 116, and making use of vacated 87 Prospect space to attempt to keep groups together.

Y2K

Several major systems, including the fax server, list server, and Maestro job scheduling system, all needed Y2K remediation. The fax server, which included a good deal of custom-built code, had to be integrated with the Dazel Output Management fax software when the original Siren Fax vendor could not provide Y2K compliant code. In addition, WSG staff provided migration solution for Novell web users who were dependent on a non-Y2K-compliant NeXT computer. In addition, several large departments were migrated from a non-Y2K-compliant calendaring package. Web Services staff also

provided a temporary web server during the university's "off air" period during the end of year transition.

Email Migration and Calendaring

Negotiations were completed for email and calendaring software, and both systems were in operation by early in the calendar year 2000. The email migration, which took us from a system which was beyond its performance limits, transparently moved 13,500 accounts and over 80 billion bytes of email, to the new server, which now supports some 8,000 users (over 3,000 simultaneous) per day. The OnTime calendar has been deployed to several dozen departments and over 400 active administrative users. The ES/Web Services Manager is also co-leader of an Administrative Process Team working on a campus-wide events calendar.

Systems Management

In addition to completing rollout of the Maestro Job Scheduling and Dazel Output Management software, the Tivoli Enterprise Systems Management distributed management software was deployed on over 140 administrative and academic servers, using both standard and custom-developed monitors.

Student Computer Initiative (SCI)

TIS and WSG staff worked with other CIT staff to bring the SCI program back on track when our partner, GE Capital, pulled out just days before the deadline for the summer student mailing, successfully identifying a new partner and putting a replacement program in place in a matter of weeks.

Goals and Challenges for the coming year

A Public Key Infrastructure (PKI) initiative will provide a centralized service to provide "certificates" or electronic IDs that can be used to authenticate, digitally sign and even encrypt sensitive information. A second mail server will be added for increased reliability and redundancy, in addition to an off-site directory server. Additionally key services will be duplicated and deployed behind switches that will all for near 7x24 uptime of crucial communication and authentication services.

Windows 2000 presents challenges for both desktop deployment and server rollout. ES will be working with users and CIT staff to address plans for both environments, as well as understanding the interrelationships between Windows 2000 services and those currently being offered by ES and CIT (e.g. directory services, authentication, host naming and addressing, etc.).

While much has been accomplished in rolling out basic framework for Distributed Monitoring (Tivoli), Output Management (Maestro) , and Job Scheduling (Dazel), much remains to be done in adding new machines and services to be monitored. Oracle,

PeopleSoft, and client monitoring will be examined. In addition, the user base will be expanded to include the Help Desk and other application staff. A fuller functioning version of Maestro, and completion of the fax gateway conversion are also scheduled for next year.

In the web area, the most important challenge will be a review and test of portals, with possible deployment next year. Staff will reconfigure the main web site to remove external dependencies and to improve reliability. ES is also investigating additional ways to provide more responsive service within web-based server environments. There are, for example, inexpensive "web-in-a-box" solutions that provide virtual web hosts and simple web-based site management for end-user departments, and "virtual machine" environments that provide complete isolation of multiple sets of users and processes within a single physical machine.

ES remains committed to its goal of providing responsive, robust, reliable end-to-end infrastructure service for its users.

Enterprise Systems Management

This was the first full year of existence for the Enterprise Systems Management [ESM] group. During the year, the group brought about major changes to all three of the services for which the group is responsible.

ESM's largest responsibility is the Tivoli monitoring system. During the last fiscal year, ESM staff extended Tivoli monitoring coverage to more than 70% of all CIT's production systems. All system administrators have access to the Tivoli desktop client. ESM staff developed an automatically updated Web display that makes Tivoli status information on University systems more easily accessible. Serious reliability problems that affected the Tivoli system at the beginning of the year have been rectified.

During FY01, staff aim to achieve 100% coverage of CIT production systems, to communicate Tivoli events to the Help Desk, to filter truly critical events from the larger number of valid events that don't require immediate attention, and to monitor critical applications such as E-mail, Web servers, and PeopleSoft.

The "Maestro" job scheduling system is the second major service for which ESM is responsible. Staff installed a new version of Maestro that provides Y2K compliance, as well as significant functional enhancements. ESM staff moved the Maestro master server to a dedicated system to allow for more flexible security arrangements.

During FY01, ESM staff will implement the next version of Maestro which improves user access to Maestro and which separates the Maestro system into separate production and development domains.

ESM is also responsible for the Dazel output management system, which was purchased and installed during FY00. The Dazel implementation began with the transition of the

campus FAX gateway from the original non Y2K compliant application. ESM then implemented Dazel printing for the Development office and for Loans and Receivables and other P2K applications.

During FY01, ESM will install the next version of Dazel, implement the Output Distributor capability which provides for automatic splitting and distribution of reports, and convert the campus FAX gateway and the Unix Printserver functions to a supported platform.

Technology Integration Services

The Technology Integration Services [TIS] group provides superior computing technologies, enterprise-wide services, and high level, escalated assistance to faculty, staff and students. TIS strives to

- Provide project management, coordination, and “packaging” for several specialized programs that relate to faculty, staff and student computer deployment.
- Provide project management, coordination, and “packaging” for the technologies and applications delivered by the Collaboration Services Group.

Student Computer Initiative

The Provost’s Office Student Computer Initiative is a cross-campus effort to make available for purchase specially priced computers for Princeton’s students. Through the efforts of the offices of the Treasurer, Admissions, Financial Aid, and Computing and Information Technology, incoming undergraduates and Ph.D. students can acquire standard, high performance personal computers from selected vendors. The computers are pre-registered for use on the campus network, have a core set of software productivity tools, and a Princeton-specific customization tool. This program, in its second year:

- Alleviates long lines of new students requiring help with the configuration and set up of personal computers.
- Ensures a significant proportion of the incoming undergraduate class use the same level of technology and software, easing electronic sharing of information and creating an environment of peers helping peers.
- Encourages a standard hardware and software platform which helps contain the increasing costs for computer support resources.

Technology Integration Services provides the coordination and project management for this complex undertaking.

The SCI 1999-2000 vendors were Dell Computer and Apple Computer. A total of 978 computers were purchased, a decrease of 3.2% from the previous year. Table 1 summarizes SCI purchases. The ratio of laptop to desktop purchases was 64:36.

Table 1. SCI Purchases, 1999-2000

| Class | Total | Apple | Dell |
|--------------------|-------|------------|------------|
| 00 | 34 | 4 | 30 |
| 01 | 25 | 2 | 23 |
| 02 | 32 | 0 | 32 |
| 03 | 747 | 79 | 668 |
| Graduate Students | 140 | 36 | 104 |
| Total | | 121 | 857 |
| Grand Total | | | 978 |

In FY00, the Office of the Provost extended the special pricing to the incoming Ph.D. students. During the year under review, 140 Graduate Students participated in the SCI program.

Dahn
Comment: A total of 140 grad students participated, but just 109 were subsidized PhD candidates

Dormnet Services

FY00 Dormnet subscriptions rose 9.5% from FY99, totaling 4,495 members (4,238 undergraduates, 257 graduate students). Table 2 contains additional subscriber information. Figure 1 illustrates the total increase in subscribers during the period from 1995 through the present. The increase reflects continuing growth in the number of subscribers in each year's incoming class. During FY00, 93% of the undergraduate students were Dormnet subscribers. Table 3 depicts the increase in the subscribers in each class (1996 through 2003).

Table 2. Total Dormnet Subscriptions, 1999-2000

| CLASS | MEMBERS | NEW | RENEW | MACHINES | MACS | PCS | OTHERS |
|---------------|-------------|-------------|-------------|-------------|------------|-------------|-----------|
| 2000 | 998 | 115 | 883 | 1007 | 160 | 841 | 6 |
| 2001 | 1034 | 89 | 945 | 1045 | 123 | 919 | 3 |
| 2002 | 1106 | 48 | 1058 | 1116 | 69 | 1043 | 4 |
| 2003 | 1100 | 1100 | 0 | 1106 | 98 | 1001 | 7 |
| Other | 257 | 186 | 71 | 261 | 43 | 216 | 2 |
| Totals | 4495 | 1538 | 2957 | 4535 | 493 | 4020 | 22 |

During FY00, CIT introduced an enhancement to Dormnet Services, the Temporary Unregistered Device (TUD), which permits students to subscribe to Dormnet from their own machines and even to display the machine's Ethernet address as part of the registration process. The new process eliminated the need for new subscribers to determine their own Ethernet address, which had generated in considerable confusion. Unregistered devices were also granted a grace period of campus network access in order to encourage undergraduates to register their machines.

Figure 1. Undergraduate Dormnet Subscribers, 1995-2000

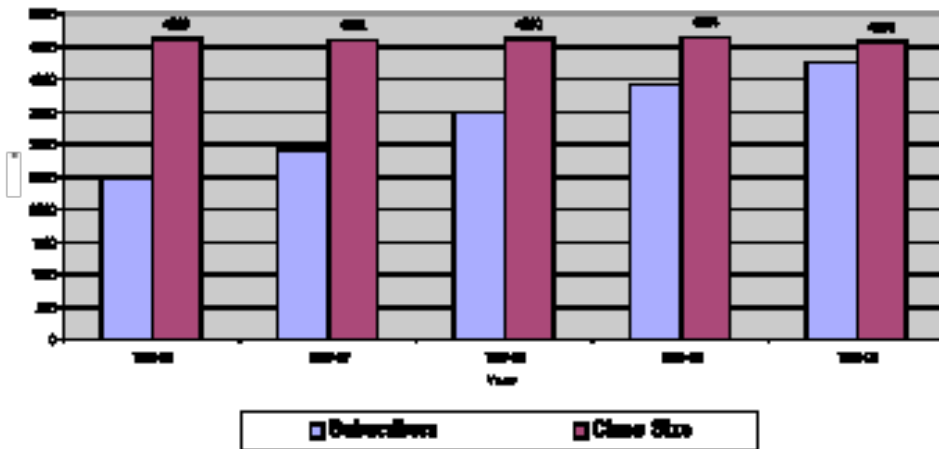


Table 3. Dormnet Undergraduate Subscription Rates, as a percent of total class size, 1996-2003

| Class | Academic Year | | | | |
|-------|---------------|-----------|-----------|-----------|-----------|
| | 1999-2000 | 1998-1999 | 1997-1998 | 1996-1997 | 1995-1996 |
| 2003 | 96% | - | - | - | - |
| 2002 | 95% | 93% | - | - | - |
| 2001 | 92% | 89% | 85% | - | - |
| 2000 | 89% | 84% | 82% | 79% | - |
| 1999 | - | 70% | 67% | 68% | 73% |
| 1998 | - | - | 69% | 64% | 69% |
| 1997 | - | - | - | 41% | 41% |
| 1996 | - | - | - | - | 32% |

E-mail Migration

TIS staff also played an important role in the campus e-mail migration project and general e-mail second tier support. Staff continue to provide Netscape Overview sessions to faculty, students, and staff. A total of 321 people attended 14 sessions during the period July 1999 through September 1999. Staff also handled more than 300 e-mail transition related questions via the CIT Tivoli Problem Tracking System and sent regular communications to those whose accounts were scheduled for migration (TIS staff sent more than 16,000 e-mail communications on migration related matters).

Authentication and Security Strategies

TIS staff are investigating two technologies that are critical to the overall goal of preventing individual passwords from going across the network in the clear.

Staff developed materials to encourage the use of Secure Sockets Layer (SSL) technology within e-mail. SSL provides a secure channel between the client and the e-mail server.

Staff also tested and published the first documents about using another security protocol called SSH (also known as Secure Shell). SSH provides a secure channel between the client and remote Unix servers.

Faculty Computer Program (FCP)

The Faculty Computer Program is another program of the Office of the Provost. TIS staff assist in providing computer model information, in working with the Purchasing department to establish FCP computer kits, and in working with vendors to offer a computer customized to Princeton's requirements at the factory. Staff also field questions from departmental managers regarding the application process. During this year, staff in Web Services and TIS worked together to enhance the on-line application process. Data about the program awards is maintained in the Office of the Provost.

Desktop Systems Council (DeSC)

Staff in Technology Integration Services played a major role in the Desktop Systems Council. The mission of the council is to maintain and enhance the NT workstation environment that was established by the 1997 Princeton Desktop Initiative.

During 1999-2000, the council strived to increase communications and gather more input from the departments participating in DeSC. TIS staff actively contributed to that goal. Across the year, weekly focus group meetings were held with the DeSC departmental contacts. Feedback from the meetings was forwarded on to appropriate areas in CIT as well as in other campus departments. Table 4 summarizes departmental attendance at the focus group meetings. Many department contacts attended with their computing support staff member, and so the total attendance was over 100 people.

Table 4. Departments Attending DeSC Focus Groups, 1999-2000

| | |
|----------------------------|-----------|
| Academic Departments | 45 |
| Administrative Departments | 38 |
| Total Departments | 83 |

TIS staff worked with the DeSC council and its sub-committees to make enhancements to the DeSC core software set and coordinated the efforts with the Purchasing department and the vendor to build computers customized to Princeton's requirements at the factory.

TIS staff work closely with colleagues in PC Systems to coordinate, schedule, and communicate information about software deliveries to the nearly 2,000 DeSC machines. The software delivery success rate is typically 85%. This rate compares very favorably to other organizations using software push technology. For complete information about the software delivered during the 1999-2000 year, please see the DeSC web page. Staff in TIS manage this page and all of the DeSC communications to the departmental contacts.

TIS takes a leadership role in facilitating DeSC sub-committees and work in CIT. These include the Windows 2000 Technical Group and the Software Push Group. During this year, TIS established a software testing area in CIT and has used the resources to test and verify DeSC-related software issues.

At the request of the council, TIS staff, in conjunction with the Partnership 2000 office and the CIT Help Desk, offered a pilot program for a weekly CBT drop-in training. The pilot was discontinued due to low attendance (15 people attended over 8 weeks).

TIS staff also responded to the request of the Documentation Management Team and offered a presentation on the NT Shared Server.

OnTime Calendaring Administration and Rollout

Within the ES directorate, TIS shares the responsibility for user administration for the OnTime calendaring service. During the spring, TIS staff provided 2 overview sessions for departmental staff who expressed interest in using the product. 51 University staff attended the sessions.

Software Licenses Database Project/Software Team

TIS worked closely with CIT Vendor Relations and Web Services to build the campus software license database. The database information is currently under development. TIS staff facilitated the formation of a CIT software working group, a cross-organizational group that will strive to improve communications about software versions used and supported by CIT support groups, technical groups, SCI, DeSC, and FCP.

Second Tier Support: SCI, Dormnet, E-mail, Remote Access

During FY00, TIS staff handled 861 CIT Help Desk questions that could be answered via existing documentation or by Help Desk staff. Often these questions have led to new documentation or interface improvements. TIS staff regularly maintain several web sites as a way of publishing general information about services. TIS staff also contribute regularly to the Help Desk Knowledge Database.

Goals for 2000-2001

During FY01, TIS will provide the second tier support, planning, and rollout coordination for the upcoming migrations and new services from CIT Collaboration Services Group.

TIS will also provide the rollout planning and coordination for the migration to Windows 2000 infrastructure. Finally, TIS will develop, plan, and rollout a campaign for improved computing security on campus.

Collaboration Services Group [CSG]

The Collaboration Services Group (CSG) provides reliable, robust, and scalable mission critical applications and enterprise-wide systems, notably e-mail services, electronic mail lists, directory services, and authentication services. The group also contributes escalated assistance to colleagues, faculty, staff and students.

This year was an important one for CSG. Despite significant staff turnover and staff shortages, the complex e-mail migration project moved forward and was completed successfully.

E-mail Services

During FY00, CSG staff completed the consolidation of e-mail accounts from several systems to IMAP. Soon after the consolidation, all IMAP accounts were migrated to a new, faster server. Staff developed a system architecture to facilitate the migration and also to facilitate future system changes. During the period December 1999 through February 2000, more than 14,000 accounts were moved to the new server without significantly disrupting e-mail services. Table 5 summarizes the extent of central e-mail services used each day.

Table 5. Daily E-mail usage

| Average daily usage of e-mail services on campus: |
|--|
| 8000 unique IMAP connections/day |
| 2500 unique POP connections/day |
| 2GB+ mail injected into Princeton.EDU/day |

Improved SMTP with Authentication and Virus Checking

IMAP provides the service for accessing and reading e-mail. Another service, Simple Mail Transfer Protocol (SMTP), is responsible for the delivery of e-mail. CSG began work on an important enhancement to SMTP, SMTP with authentication. In the initial phase, two potential solutions are under test.

The goal of the project is to provide SMTP services only to those individuals with a Princeton issued NetID and password and to stop computer viruses “at the door” before they are delivered to individual e-mail boxes. The process will ensure that the campus SMTP service is available to Princeton faculty, students, and staff, and not anonymous users who may be sending junk mail, computer viruses, and SPAM through the University’s SMTP resource.

Improved Computer Security with SSH, Kerberos, SSL

CSG staff began work on improving the computer security environment. The projects underway are designed to achieve three goals:

1. Eliminate sending passwords in the clear.
2. Eliminate the other ways that hackers can crack passwords.
3. Provide the option of synchronizing passwords across centrally managed systems.

For these goals, CSG is developing the back-end pieces for wide spread use of three security features: SSH, SSL, and Kerberos. The SSL and Kerberos systems are in place. The SSH work is expected to be finished in September 2000.

Public Key Infrastructure Project

In March 2000, CSG commenced a public key infrastructure (PKI) project. PKI, or digital certificates, is another system that can help improve computing-related security. PKI permits individuals to identify themselves without having to transmit their NetID and password across the network. Much development is underway in the field of PKI but much more work will be needed before this service can be extensively used in higher education. During the spring, CSG staff set up a test PKI environment and invited several groups to help test this early version.

Second Tier Support

During FY00, CSG staff responded to 974 CIT Help Desk “problem tickets.” These problems typically cannot be answered via existing documentation or by Help Desk staff. Such questions have often resulted in new documentation or interface improvements.

Goals for FY01

In addition to the work of maintaining and enhancing the core services, CSG will:

- Provide new authenticated SMTP service.
- Increase campus usage of security protocols for access to centrally managed servers (SSL, SSH, Kerberos).
- Deploy web-based electronic mail list management software.
- Bring up production PKI infrastructure.

Web Services Group

The Web Services Group [WSG] provides consultation, technical support, and leadership in the creation of web-based materials and technologies for the University. Web Services supports the software infrastructure of the University’s main web site, as well as

enterprise-wide services that support administrative and academic web sites. The group also serves as the gateway for public inquiries that come to Princeton University by way of the main web site.

WSG Applications Development

Web Services has developed, contributed to, and upgraded many web-based applications, including DormTV, Dormnet and the Student Computing Initiative, the Dante Project, Financial Aid Calculator, Annual Giving Stock Gift Calculator, Enterprise Services Order Form, Faculty Computer Program, Messaging , and Fleet Maintenance.

Web Services also developed many customized web-based surveys, including

- 2000 CIT Undergraduate Survey
- ACHA Survey
- Class 02 Survey
- Visions Of Princeton
- Health Services
- Mefloquine Princeton Survey
- Ombuds Survey

Web Site Publishing and Maintenance

In addition to changes made to the main PU website (at the request of the Office of Communications), the WSG has been sharing its site publishing expertise more widely with the University community. Sites and "clients" have included the Administrative Process Team, the Vice President's Office, Housing, and Community and State Affairs. A pilot program with the Program in Law and Public Affairs investigated the possibility of offering such services to the University at large.

Consultation Services

WSG staff have served as technical consultants on a number of campus-wide initiatives, including committees to investigate e-commerce for the University and a campus-wide events calendar. Web Services staff have also provided web-oriented technical advice for a scheduling system application and PeopleSoft's portal application.

WSG staff also monitor and install web server software for various applications. During FY00, WSG staff installed and maintained http service for the Open Enrollment server and the server supporting the Index of Christian Art. WSG maintains streaming media servers on three platforms, Real, Microsoft and QuickTime, for Athletics, musical programming and University archiving.

WSG staff now support OnTime Personal Calendaring, a Y2K compliant application now used by several organizations and more than 400 users on campus.

Until this year, WSG maintained announcements that appear on the University home page. WS recognized the need for a more robust and user-accessible system and created Web Announce, a service is used by Communications, the Help Desk, and the WSG. The new interface for adding messages is more user-oriented, and automates the archiving of all web page items.

DBToolBox, WSG's web-database publishing facility, continued to find many customers during the year under review. The facility was used by more than 20 departments to create more than 50 new web applications, including:

- Web-based applications that permit faculty to apply for computer equipment online;
- Online Position Documentation Questionnaire for Bi-weekly staff;
- Online surveys conducted by Alumni Council, Career Services, Dining Services, CIT Media Services, Human Resources and Woodrow Wilson School;
- Online registration and ticket ordering for Athletics, Dining Services, the Office of the Vice President and Secretary (for Commencement and the Convocation Honoring Nelson Mandela), and Plasma Physics Library.

WSG staff have consistently moved towards automating the "look and feel" of University web pages.

WSG has also maintained a News facility for the past two years. This year, a much-delayed upgrade of the news software brought that service up to the most current version.

Special Projects

WSG staff have been involved in many research and development and other special projects during FY00.

Since January, in response to requests from administrative users, WSG conducted an exhaustive investigation of commercial portal products. Following several vendor demonstrations, three products (GoCampus, Hummingbird, Sequoia) were installed for on-going, hands-on evaluation. Aside from the technical research, WSG brought together those on campus who are initiating portal efforts of their own, and those who might have a vested interest in portals.

Y2K focused considerable attention upon all servers and software. For example, the NeXT server that had been serving departmental, Novell pages, was not Y2K compliant. WSG brought in a new web facility to replace this server. In addition to providing the same Web publishing services as its predecessor, the new server offers a range of new services, including support for web publishing capabilities from the desktop and improved access to departmental Web content.

In order to increase server space for campus users of CGI and other privately developed scripts, WSG purchased VmWare and a Linux machine that offers IP-based virtual hosting for up to 200 sites

Computer Science also asked WSG to provide web server access data to the Computer Science department for their Monitor Array Project. In support of the project, WSG staff write scripts that would "clean" web access logs in order to conceal user and system identity.

WSG members supplied many hours of ad hoc, unanticipated support to projects not normally part of the group's responsibilities. USG needed immediate help with their Student Election Code last fall. Though they are expected to maintain this code themselves, upgrades to CIT's server environment caused their code to malfunction. For example, WSG staff helped to debug the USG problem at the "eleventh hour", keeping the election schedule on track.

Budget and Finance

The Budget and Finance Directorate is responsible for long- and medium-range planning for all the CIT departments as well as budgeting for the current fiscal year and monitoring performance to ensure that budgets are not exceeded. The mission of the directorate is to provide financial support to CIT operations. FY00 brought additional challenges, including a total reorganization of CIT, upgrades to two existing financial systems, and the buyout of the telephone switch.

Reorganization of CIT

Implementation of the CIT reorganization was the primary challenge for the Budget group in FY00. The reorganization completely restructured CIT Directorates and established new projects and grants. Budget and Finance moved the entire CIT staff to new departments in Tesseract and then assigned to the new project/grants through Labor Accounting. New capital project/grants were also established and more than 2,000 pieces of equipment were reassigned to those new capital accounts. An audit of the equipment was conducted to ensure that it could be located.

In addition the Budget and Finance group redistributed the budget to the new CIT departments. In many cases, shared expenses had to be redirected to more than one group. From the results of FY00 financial performance, it is clear that each Directorate was provided with sufficient funding to perform their responsibilities.

Finally, Budget and Finance identified all outstanding purchase orders and recurring expenses and acted to change coding to charge the new project/grants. To guard against errors, old project grants were closely monitored each month.

The Physical Inventory

The Budget group provides control over the inventory used by the Technical Support Group for repairs of computers and printers and upgrades to the campus network infrastructure. FY00 showed a marked increase in inventory activity over prior years. The parts charged from inventory have grown to about \$1.6 million, up approximately \$400,000 over previous years. The increase owes primarily to growth in network activity associated with the wiring upgrade, an effort that began at the end of the prior fiscal year. In addition, the composition of the network electronics has shifted away from shared ethernet toward switched ethernet. The Cabletron and Bay Network hubs have been replaced by 10/100 MB 3Com switches.

Upgrade of Inventory Software

The new Peoplesoft financial system required that changes to the CIT inventory software. This legacy system did not support the new structure of the account including: organization, project/grant, fund, and other additional fields. The Inventory group worked with their consultant to design the upgrade. In addition, the IDES legacy system

running on the mainframe will no longer exist after FY02. The Inventory group is working with its Consultant to address this problem. Meanwhile, a P2K Project group is looking into the scope of all of CIT billing. The group expects resolution to these concerns and additional software upgrades in FY01.

Telephone Switch

A ten year operating lease for the Northern Telecom telephone switch ended in December, 1999. The terms of the lease called for a buyout at the fair market value of the switch at the termination of the lease. The group gathered information, worked with legal council, and prepared for negotiations. Working closely with the Treasurer's Office, the group obtained a favorable buyout after several months of tough negotiations.

Telemanagement Software

A new telephone billing system was needed to address an existing Y2K problem. During the first half of FY00, staff tested the new system that was scheduled for December implementation. The project group used design scripts and tested the software. Results were then reviewed to determine the functionality of the system. In December the system went live; emphasis was placed on reporting functions. Additional training scheduled for summer of FY01 will be required to produce some of the more difficult reports.

The new Mysoft telemanagement system permits the Budget and Finance Group to reconcile internal billings to the vendor invoices, a major improvement. Credit card billings are no longer run from mag tapes provided by the vendor but rather from an ATT CD and downloaded directly into the Mysoft system. The data is balanced to the bill every month. A more difficult effort to balance the long distance and international tolls into the vendor invoice will be completed in FY01. Owing to features of Mysoft, the Budget Group has taken responsibility for the rate tables and established control criteria. As a result, rejected calls are handled more expeditiously and financial scrutiny has been added to the previously existing operational scrutiny. The group expects that additional financial controls will be added in FY01.

Information Systems

Information Systems supports the networking, computing and administrative information requirements of the University community. During FY00, IS concentrated its efforts upon the following tasks:

- Providing a reliable and cost effective data network capable of supporting the University's academic and administrative needs;
- Sustaining reliable, responsive and consistent computing, database, and file services by installing, maintaining and supporting central hardware and operating systems for both administrative and academic computing;
- Providing a single enterprise-wide computing environment for administrative systems;
- Facilitating the use of central information resources in accordance with P2K data principles;
- Maintaining current information systems at the highest possible operational level;
- Supporting and facilitating the successful implementation of Partnership 2000;
- Preparing the University for Y2K

The following sections give a more detailed description of the activities and accomplishments of each group within Information Systems during FY00.

Network Group

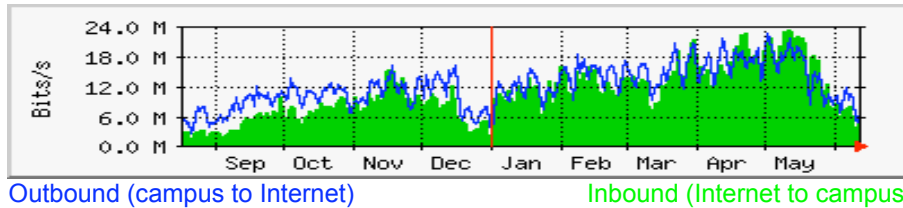
The Network Group provides the University with a cost effective data network capable of meeting its academic and administrative needs. The primary tasks of the group are:

- To insure the correct and efficient operation of the campus network;
- To maintain the University's access to the Internet and other external networks;
- To manage the various remote access facilities.

In addition, the group works closely with other CIT groups as well as academic and administrative departments to evaluate network related needs and to apply network technologies to address those needs.

The campus network supports approximately 15,000 hosts. This figure includes 4,530 Dormnet subscribers or approximately 95% of all student capable of connecting to the campus network. In addition, approximately 1,775 people connect each month to the

campus via the University's dial-in remote access service. During the year under review, the amount of data transferred between the Internet and the campus doubled reaching a peak utilization of 45Mbs.



The campus network, including remote access connectivity, connections to the Internet and to Internet2, provides the foundation for many common campus applications such as electronic mail, world wide web access, scientific collaboration, and campus client-server implementations such as PeopleSoft. Network Group is committed to sustaining a reliable and usable campus data network.

During the past fiscal year the Network Group focused on the following activities:

Y2K

As a result of extensive planning and preparation, the rollover to the year 2000 occurred without any disruption in networking or computing services.

Network Upgrades

Network infrastructure upgrades begun in earnest during FY00. Specific buildings, based on need, were selected for re-wiring with high capacity copper and fiber optics to every desktop. Rewiring was completed during FY00 in Jadwin Hall, Peyton Hall, Guyot Hall, and Bowen Hall. In addition, administrative buildings such as Nassau Hall, 120/126 Alexander, and renovated segments of New South were upgraded to switched Ethernet to extend the life of the existing building network infrastructure. Such networking and wiring upgrades will continue for the next few years.

Wireless LAN

During FY00, staff implemented a wireless LAN technology pilot project in order to gain experience in the deployment, operation, and maintenance of a wireless network and to gauge the value of the service to the campus community. The pilot project, with some limited expansions, will continue into the coming year.

Internet 2

Use of the University's high-speed Internet 2 connectivity continues to expand as other universities and research organizations become active participants in the I2 network.

VPN and MTS Services

Two new services have increased the usability of network-based applications and data. With VPN (Virtual Private Networks), users gain a secure method from off-campus to access campus network resource. MTS (Microsoft Terminal Server) provides access to specific administrative applications over slow-speed (dial-up) communications.

Disaster Recovery Plan

CIT continues to develop a disaster recovery plan in case of destruction of 87 Prospect. Reviews of the initial plans have resulted in a number of additions, refinements, and enhancements. One important addition would enable critical administrative systems to be restored quickly.

DSL Service

Digital Subscriber Line [DSL] supports connections at speeds that are significantly faster than dial-up connections. Several types of DSL are available. CIT has deployed a number of these solutions in order to meet the needs of the campus. Network Services expect the use of DSL to grow significantly over the next year as commercial providers make DSL services available in the Princeton area for home use.

Platform Services Group

Platform Services supports the University's central computing requirements by providing reliable, responsive and consistent computing services. Services include installing, maintaining and supporting central hardware, operating systems and databases for both administrative and academic computing. The focus of the group's activities has been in four main areas: Database Administration, IBM Mainframe, PC Systems, and Unix Systems.

Database Administration

The Database Administration group has been through a number of dramatic changes during the past year including a major reorganization, the Year 2000 change and a doubling of the number of systems on which they work.

The group provides installation, configuring, monitoring and tuning of the central Oracle database systems. The database administrators are also responsible for the backing up and, if necessary, recovering of the data stored in these systems.

During the past year, like all Platform Services group, the Database administrators (DBA's) were focused on both the Year 2000 transition and support of Partnership 2000 projects.

The DBA's have also participated with the Unix Group in the design of a more reliable server configuration. They have also presided over the ten-fold increase in disk storage on the central systems as the Partnership 2000 systems development has continued. The group has also instituted automatic monitoring of critical database systems.

IBM Mainframe Group

The IBM Mainframe group supports three IBM System/390 processors, PUCC, PUNFSV2, and PPLACS (at the Plasma Physics Laboratory).

The group provides a highly reliable and efficient environment for production applications and for those users who have not yet moved their personal computing to the desktop environment. The group aims to provide a service that is so reliable and fast that users are never affected by outages or delays. The group also provides education and training for users and other members of the CIT staff on the use of mainframe systems and servers, and the group assists in debugging applications that run on the University's mainframe systems.

The Mainframe group's primary focus during FY00 was preparation for the year 2000. The group installed new versions of all of the operating systems and most of the software packages that run on the three System/390 processors.

During the past year, the VM systems were upgraded to the latest release for Year 2000 readiness. Staff implemented fixes right up to our predetermined cutoff date. The University successfully crossed the date change boundary without a system malfunction.

During FY00, another important improvement to the University's ADSM service (which backs up 5,200 desktop machines and servers around the University) was the migration of user data from 40,000 low-density cartridges to 1,000 high-density cartridges. As a result of the change, users of the service find that they can restore their files much more quickly.

PC Systems

PC Systems supports the shared CIT Novell NetWare servers for file sharing, Microsoft Windows NT servers, and provides general PC system guidance. The group aims to provide a stable, reliable, scalable platform for file, print, and application services to CIT and University customers.

The group works with others throughout CIT to provide and improve the platform on which to build systems and services offered to the University.

During FY00, the group focused upon on the following activities:

- Keeping current systems operational at the highest possible level;

- Utilizing Systems Management Server, SMS, in the management of approximately 1,800 DeSC machines. SMS is installed on every Windows NT computer in the Princeton Domain, including PDI computers. SMS permits automated, unattended installation of new software as well as system auditing.
- Supporting the platform needs of Partnership 2000 projects.

The PC Systems group provides file and print service to all faculty, staff and students. The group has established a Microsoft Terminal Server service in order to provide remote access to the PeopleSoft and Labor Accounting applications. Working in conjunction with Network Services, the group also provides the infrastructure to support VPN (Virtual Private Networks) service. The group has begun to provide Linux desktop support to the Help Desk and Desktop support units of CIT. PC Systems has also deployed 15 NT servers in support of streaming media for the Web Services Group.

Unix Systems

UNIX Systems support the University's Unix computing and file services environment. The group aims to provide a stable, reliable and scalable environment for distributed database systems, mail service, web services, and general Unix with minimal disruptions. The group also serves as a consulting resource for the Unix systems run by other campus departments.

During FY00, the group's main concern was preparation for the year 2000. The group installed new versions of the operating systems on all of the servers. Fixes were installed right up until the predetermined cutoff date. The group successfully crossed the date change boundary without a system malfunction.

During the past fiscal year, Unix systems staff focused on several key activities:

- Keeping current systems operational at the best possible level;
- Development of a new, more reliable system configuration with no single point of failure to improve the availability of the University's most critical services;
- Standardization of the system environment to accommodate more than 80 central systems and more than 3 terabytes of disk storage.

Administrative Systems Integration Group

The Administrative Systems Integration Group [ASIG] integrates the multiple computing environments that support Princeton's administrative applications into one comprehensive Princeton-wide computing environment.

ASIG provide application middleware, including security, messaging, data base access, and computer architecture; the group provides basic training in these technologies to many University constituencies; and the group conducts research and evaluates new technologies and tools.

During the past fiscal year ASIG focused on the following activities:

Y2K compliance

ASIG coordinated administrative application and system migration testing efforts before and during the Y2K weekend.

Medical Benefits

ASIG built a receivables system for medical benefits for retirees and non-active employees with a new tool set and a new computer architecture for distributed computing ("enterprise Java beans").

Student Employment

ASIG built a Java replacement for an old, unsupported Lotus Notes Student Employment system. As a result, students can now use the web to access employment information.

Open Enrollment

ASIG developed a web alternative to paper forms for benefits open enrollment.

Student Billing

Staff built a web application that permits students to use the web to access their student account information securely.

Web Applications for Admissions

ASIG developed a web application that permits prospective student applicants to contact Undergraduate Admissions and receive customized output. The University in turn can routinely collect data that the applicants willingly provide.

Portals/DEMAND investigation

Staff are researching an open architecture solution to providing departmental managers a portal-like view of the job opportunities available at the University.

Overall, ASIG has been responsible for most of the Java development of administrative systems at the University and has built eight web applications that improve service to students, prospective applicants, administrators, and employees.

Administrative Applications Support Group

The Administrative Application Support Group [AASG] is responsible for the maintenance, enhancement and operational support of all production administrative systems that support the business of the University in such areas as Housing, Food Services, Payroll, Benefits, Graduate School, Finance, and Student Services.

Production Support

AASG is responsible for completed P2K projects and attaining competencies in critical skill areas. During FY00, AASG successfully “readied” all administrative information systems for Y2K. Staff established a process for requesting enhancements to existing systems. All such requests require approval by the Associate Director of Partnership 2000 before moving forward. The new process ensures that resources are focused on the highest priorities across the University. The major tasks completed and migrated to production this year include:

- IRS Compliance Testing for DCE
- Updated UFINSI 6.0 enhancements including Y2K patches
- Palmer House billing interface
- Library Payables interface
- FoodPro Payables interface

A redesigned “Skills Inventory” system for IS staff has helped to identify gaps between existing and needed skills. In response, IS has offered several classes including an "Introduction to Unix" class and SQR training. A component of the training was to "train the trainer" in order to spread new skills efficiently.

Documentation, Standards

Staff worked in conjunction with technical and administrative staff in order to produce complete, accurate and usable system documentation. The Documentation & Standards group produced user documentation, training guides, and online Help for administrative systems and P2K projects. Staff also produced a Production Control Handbook and VMLib documentation and upgraded “TimeSheet,” a software tool that is used internally by IS staff to track time spent on specific tasks.

Production Control

The group assisted in the creation of a production distributed computing environment and a process for all new systems migrating from development to production. Aside from enhancements to existing systems, the group also handled all routine maintenance associated with Princeton's production systems, including any failures or externally mandated changes, such as new tax regulations, as well as making improvements in performance and reliability.

Staff in the production control function oversaw the move of the Operation Center from the 6th floor to the 'A' floor of New South. They also began assisting P2K projects in planning for the transition of their development systems into production.

Data Mall

Staff migrated existing DataMall stores such as the Telephone Store to WebDB, a supported vendor product and created new stores for administrative applications. Staff developed a standard model for creating a Data Mall Store. The group also acquired Oracle Reports product in order to enable more meaningful reporting from Data Mall information.

Project Development Group

The Project Development Group [PDG] implements new administrative information systems in support of the University's business goals. Typically, a business project manager takes responsibility for each project and works in collaboration with a technical project manager from IS with support from a cross-functional team. Most of the projects are Partnership 2000 (P2K) projects

STRIPES Project

The P2K project team successfully implemented Phase I of STRIPES, a new system to improve the productivity of volunteers and staff involved in alumni relations and fund raising. STRIPES is now being used as the primary desktop tool during the final and most intensive year of the 250th Anniversary Campaign.

The new client/server system permits frontline fundraisers to run their own queries and reports. Users are now able to use the prospect tracking subsystem to manage more than 18,000 prospects and associated tasks, contacts, and assignments.

STRIPES is also used to administer more than 220 Annual Giving Phonathons, retiring a previously used stand-alone PC system. The new system tracks caller statistics and success rates. The data can now be historically preserved and integrated with other data within a single database.

To better serve the volunteer community, STRIPES supports virtual bursting of critical daily reports. Off campus volunteers can use a web browser to access the data remotely.

The application now includes a calendar function that can schedule report execution days or weeks in advance.

STRIPES was also used during FY00 to automate production of the Woodrow Wilson School directory. STRIPES data was pipelined directly into an Access database, from

which questionnaires and reports were generated in camera ready format. The result is a significant savings of staff time for both the WWS and Printing Services.

PDG staff implemented more than 60 other enhancements to improve access, reporting, and work flow.

During FY00's "shakedown" period when the new system moved from development into production, approximately 200 bugs were reported. Nearly all problems were resolved within the same day.

Progress was also made during FY00 on an Events Management system. Princeton/Dartmouth/MIT are collaborating on the project with Business Systems Resources (the consulting partner on the STRIPES project). A final functional test will occur early in FY01. IS staff are currently working with Business Systems Resources to debug the interface scripts that move data between Advance C/S (STRIPES) and Events Management products.

Initial Planning for the next project, STRIPES II, will be completed during FY01 and will result in a Project Initiation Report. STRIPES II will replace the remaining functions of Advance/IDMS. STRIPES II will be comprised of the four phases: Data Conversion, Frontline Staff Reports; Maintenance Policies, Gift Stewardship, Alumni Career Services; Data Maintenance Operations, Interfaces; and Year End Reports, Departmental Access, Parallel Entry

Assets & Equities Project

The new Assets and Equities system will manage Princeton University investments. The new system will enable the Office of Investments to track the performance of the investments, to ensure that the funds are used for specific purposes as specified by donors, and to re-allocate the funds as necessary to meet the given objectives.

The current Assets & Equities system exists in an IBM mainframe environment. The new P2K project will re-platform the system to a Unix server using an Oracle database. The code will be written in Java and the application will be Web-based in order to permit users to take advantage of a Graphical User Interface environment.

Staff initiated the project in March, 2000. Hexaware Technologies, Inc. is providing vendor support. User interviews have been on-going and the legacy code is being reviewed. A Functional Specifications document is being produced and should be completed by the beginning of FT01. Design and development will be completed at Hexaware's offshore site in India. Testing will take place offshore and acceptance testing by Hexaware will take place at the University. The project is scheduled for completion by the end of November, 2000.

Telephone Management System Project

During FY99, the University purchased a new Telephone Management System, an administrative software package that maintains all records for University telephone services. The system maintains inventory, tracks cable routing, manages trouble-ticket reporting and work-orders, collects all call activity from the telephone switch, updates the switch as necessary, and tracks and bills all student and administrative office telephone charges.

After running in parallel test mode with the legacy system during October and November of 1999, the system went live in December and University sent out the first student bills at the end of that month.

During FY00, IS staff designed, coded, tested, and implemented Maestro schedules, Maestro jobs and Unix scripts to work with vendor developed processes for call costing, payment updates and billing. Staff installed NT scripts that permit the telephone office staff to initiate billing and related processes on the server. Staff also created and installed procedures for Lockbox, Loans & Receivables, PeopleSoft Financials, and a Data Mail Telephone store.

Campus Receivables Project

The new Campus Receivable System will replace the current receivables systems with a flexible and efficient Client/Server system. IS is providing project management support, conversions of current system data, interfaces with existing systems, reporting needs, system integration, and the development of an application environment.

During FY00, expanded the Client Database with all loan participants and employees. During the year, the database increased from 12,000 to more than 36,000 clients. The database is updated daily on-line and via scheduled updates using Maestro.

In October, 1999, staff converted the Student Loan portfolio of more than \$25M representing approximately 6,900 loans. More than 200 Short Term Computer Loans were converted in December 1999. Some 400 Monthly Payment Plans valued at \$4M and 1,600 Princeton Parent Loans valued at \$34M were converted in March 2000 and 1,600 Rentals were manually converted with IS assistance in May.

During the year under review, Princeton Billing and Salvage were removed from the scope of the project. All new receivables will be created in the Campus Receivable application.

Employee Parent Loans and Mortgages were tested and steps are now being taken to convert these loans early in FY01.

During the next fiscal year, staff intend to complete delivery of Receivables in the new Campus Receivable System; bring the application to steady state by completing the transition to production process; complete all tasks transferred from SPL (our outside

consulting partner) to Princeton in negotiations; and transfer knowledge to the production support team.

PeopleSoft Human Resources Project

The PeopleSoft Human Resources Management System (HRMS) version 7.6 project, a P2K project, began in June, 1999. The new system will replace Tesseract, Princeton's current Human Resources, Benefits, and Payroll centralized mainframe system. The project aims primarily to improve functionality of HR applications, to eliminate shadow HR systems, to maintain data quality and integrity, to distribute functionality to academic and administrative departments, and to provide management and employee access to HR data.

The HRMS implementation team consists of representatives from HR, Payroll, the Graduate School, Dean of Faculty, Departmental representative, IS and consultants from Peck Group, GRS Associates Inc., and Hexaware. During FY00, the team completed a five-month analysis of how the PeopleSoft HRMS product will fit with existing or new business practices at the University. The team also built a working prototype of the system, finalized the scope of the project and developed a comprehensive project plan. Strategies for conversion, reporting, interfaces, customizations, workflow and securities were also addressed.

After analyzing the PeopleSoft-delivered module of Time and Labor, the team decided it does not fit the Princeton business model and established another Partnership 2000 project, the Time and Collection project.

During FY01, the team will complete the conversion of Tesseract data into PeopleSoft; write all interfaces, reports, and work flows; build security; and provide training and documentation to the central offices employees and departmental managers who will use the PeopleSoft HRMS system. There will also be extensive unit, integrated and parallel testing of Tesseract and PeopleSoft data and processes before the new system is turned over to production during the summer of 2001.

PeopleSoft Student Administration Project

The Peoplesoft Student Administration Project is working towards an implementation of an integrated Student Information system for Registrar, Student Life, and the Graduate School. During FY00, project objectives and scope were narrowed to exclude Undergraduate Admissions and Undergraduate Financial Aid. Both of these offices have deferred a decision on implementing PeopleSoft Student Administration.

During FY00, the project "core team" has built a cohesive project group comprising 34 members, including consultants. Team members have attended a wide variety of training sessions, both technical and functional. Several Fit/Gap sessions were completed, including Admission, Academic Structure, Course Offerings and much of Student

Records. The team has restructured its methods and schedules to the needs and abilities of team members.

The new Graduate Admission system is planned for implementation in October 2000. Most customizations have been completed and are on schedule. Course Information System (CIS) is planned for implementation in January 2001. Most customizations have been completed and are on schedule.

Course data from legacy systems are being converted, as part of the CIS implementation. Mainframe IMS, DBIII (Clipper) and Abode PageMaker are the diverse sources of these data.

The team has updated the original 7.5 version of PeopleSoft to version 7.6, and has installed the HTML Access web front end. The team is up to date with mandatory PeopleSoft patches and fixes.

Production Control Process Development Project

The Production Control Process Development Project was completed in the third quarter of FY00. The project established a production control process at the University that currently supports new projects in transition from development to production. The new process will ensure that new systems will be adequately supported once they have been accepted into production.

Princeton Project Office (PPO)

Princeton Project Office [PPO] is a joint initiative between IS and the Partnership 2000 Office. PPO enables the successful implementation of Partnership 2000 projects by establishing a project management culture. Throughout the year, PPO worked closely with all P2K projects to refine the Princeton Project Management Methodology (PPMM) and to support and mentor new projects in the use of PPMM. PPO also offered training on project management topics and conducted monthly project audits and reviews.

Support Services

In many respects, Support Services is the “face of CIT.” The directorate provides customer support for the University computing community. Support Services is comprised of five groups, all committed to providing quality and timely support.

Desktop Computing Support

Desktop Computing Support provides quality and timely walk-in and in-office hardware and software computing support as well as CATV services to the University community. Other services include in-depth computing needs analysis and guidance on strategic planning. IN addition, the Desktop Computing Support group provides analysis and advice on new technologies and determines the best methods for providing ongoing support. Desktop Computing Support has two subgroups, Software Support and Hardware Support.

A special effort of Desktop Computing Support during FY00 was a wireless computing pilot program. The pilot phase provided wireless access for the entire outside area in central campus (from Firestone Plaza to Blair Arch) as well as select indoor areas.

Software Support Group

During FY00, the Software Support Group handled 4,663 requests (“tickets”) for service from 141 departments. The top five departments served were Mechanical and Aerospace Engineering (5.3% of all tickets), Physics (2.75%), Office of Dean of Student Life (2.55%), Romance Languages (2.1%), and Office of the Dean of the Faculty (1.9%).

Some of the highlights of this year's activities included:

- Providing various support for Y2K issues around campus;
- Designing and Deploying information kiosks at 87 Prospect and Student Center;
- Completing a campus-wide conversion to IMAP email;
- Providing various instruction including several NT training sessions for new and current SCAD members, basic computing skills for Building Services forepersons, and Netscape, e-mail, calendaring, and web page design for Academic Managers;
- Evaluating Windows 2000;
- Providing Linux support for the Geowulf Supercomputer Project at Geosciences;
- Creating a special Linux security script installer to help campus Linux users;
- Assisting Physics department with the beginning setup of their Linux cluster;
- Working with the Provost's office to update computer equipment and software in the Disabilities Resource Room at Firestone Library;
- Assisting with the network resubnetting for Robertson, Fisher, Bendheim, Corwin, Notestein, 169 Nassau Street, 5 Ivy Lane, the Center for Jewish Life, Eno, Guyot, Lewis-Thomas, Schultz Laboratory, Moffet Laboratory, 126 Alexander, Dillion Court Trailers and the Frist/Jones complex;

- Beginning work on the new campus Alarm monitoring system;
- Providing DESC with special SMS reports on the status of the current DESC inventory;
- Updating older DESC images with latest software updates.

Hardware Support Group

During FY00, the Hardware Support group continued to provide a wide range of services to a growing community of computing and Cable TV clients. Services include: installation, upgrade and repair of microcomputers; connections to the campus data and CATV networks; and maintenance and ongoing improvements to the TigerNet infrastructure.

Building Renovation Support

Hardware Support assisted the Facilities Planning Office during the renovation of campus buildings. Renovation support usually involved removing old data wiring, network equipment, or PC clusters, and eventually reinstalling new infrastructure components. The list of areas renovated this year include:

- Patton Hall: 160 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.
- Palmer House: 15 data and phone cables were installed in office and bedroom locations. The University network was extended to this building via DSL technology.
- Fine Hall: Data cabling was removed from an old wiremold system and reinstalled in a new wiring system. Data cables were installed in classrooms 214 and 314 providing network access to every seat.
- McCarter Theatre: 70 category 5 cables were installed and terminated for this private network.
- Little Hall: 8 new data cables were installed during a 2 bedroom suite mockup in July 99. All data and video equipment was removed from the building in June 00 as it went under full-scale renovation.
- Blair Hall: 120 data cables have been installed thus far in this dormitory renovation. When completed, 160 + cables will be installed with Dormnet and Dormvideo services activated in every bedroom and common room.
- Frist Campus Center: Nearly 500 data cables have been installed. All closet termination is complete and 90% of the wallboxes have been terminated. In the renovation section, 200 ethernet connections were activated with 130 in the classrooms alone.
- Wallace Building: 300+ data cables have been installed and terminated. Fiber and broadband satellite cables were pulled into the building from Frick Hall. Occupants begin to move in July 2000.
- Henry House: 20 data cables have been installed in all office and seminar room locations. Termination and activation of these cables will be completed by August 2000.

- Architecture: Data cables were installed in N106 and N107 as part of this building classroom renovation.
- Madison Hall: 7 data cables were installed, terminated and activated with data services during this Rockefeller College renovation.
- Bowen Hall: 19 data cables were installed on the 4th floor as part of the Computation Center project. 10 data cables were installed during the 1st floor renovation.
- 87 Prospect: Renovation of rooms throughout most of the ground and first floors happened over the course of the year. Room G-15 was rewired for the Software Support Staff. Rooms G25 and 18A were rewired for the Help Desk staff. Rooms 106 and 105 were completely rewired for other CIT member. Hardware Support was also involved in the construction of the Computational Center in the Machine Room. Technicians assisted by setting of racks, switches, and cat5 wiring and coordinating the installation of electrical panels, lighting and walls.
- New South: Data cables were installed and terminated on floors 4, 5 and A. The wiring of the 3rd floor is in progress. Hardware Support assisted in the move of staff to the 4th and A floor locations. A second fiber satellite cable was installed owing to the high volume of fiber equipment location in the Operations Group
- Robertson Hall: All data equipment was removed from floor 1, 2, 3 & 4 leaving only the basement active. Hardware Support assisted in moving equipment of the displaced staff to 179 Nassau, Dillon Court Trailers and to the basement of Robertson.
- Campbell/Joline Halls: 192 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.
- Edwards Hall: 88 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.
- 1927/Clapp Hall: 56 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.
- Walker Hall: 72 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.
- Feinberg Hall: 31 data cables were installed and terminated. Dormnet and Dormvideo services were activated in every bedroom and common room.

Network Upgrades

Hardware Support continues to implement improvements to the design and performance of the campus data network. Some examples during past year included:

- McCosh Hall: The building pipe was upgraded to 100 Mbps for classroom to video server traffic
- Wilcox Hall: The building pipe was upgraded to 100 Mbps for DMC cluster bandwidth requirements.
- Bowen Hall: The building pipe was upgraded to 100 Mbps for PMI's Computational Center usage. In addition, CIT upgraded all building wiring to new cat5/fiber standard and convert all building occupants over to new 10 Mbps switched network system

- Frick Hall: The building pipe was upgraded to 100 Mbps in support of the PMI Computational Center project.
- Palmer/Jones: New subnets were created to support the large amount of needed IP addresses.
- 120/126 Alexander: All networking was changed from 10meg shared to 10 Mbps switched. The building pipe was upgraded to 100 Mbps.
- Robertson Hall: Installed new subnets off Fishnet.
- 126 Alexander: New subnets were installed to put the building on the same network as 120 Alexander.
- Jadwin, Peyton and Guyot Halls: CIT upgraded all building wiring to new cat5/fiber standard and converted all building occupants over to new 10 Meg switched network system

Preventive Maintenance

The group implemented numerous preventive maintenance plans throughout the year. Such time-consuming but critical effort ensure the integrity of computer cluster equipment and alarm systems, the Tigernet Broadband (CATV) backbone, the Tigernet uninterruptable power supplies (UPS), and the wiring distribution closets.

Special Projects

Hardware Support was also involved in many special projects during FY00

The group established wireless computing zones at 87 Prospect, Firestone Plaza, Cannon Green, Student Center, and Alexander Beach. Wireless antennas were installed on top of Fine Hall and Grad College's Cleveland Tower.

The group installed 389 Limited Basic, 669 Basic and 56 Total Dormvideo connections and completing 384 video repairs during the school year.

The group replaced missing hub components in dorms rooms in August of 99 and completing 157 Dormnet repairs.

The group installed a 30-inch DBS dish in the satellite yard for foreign language programming.

Staff worked with Dishnetwork (Echostar) to receive TVFrance and TVJapan and directed their channels over fiber infrastructure to the CableTV headend. These programs were then rebroadcasted on TigerTV's free tier channels.

Hardware Support staff also delivered hundreds of computers to Faculty and Research staff as scheduled.

Staff also installed 20 new data cables and 130 Ethernet connections to provide network access in Registrar controlled classrooms.

Desktop Support Goals

During FY01, the Software Support group will continue to play an integral role in the successful implementation of administrative computing standards (DeSC) and deployment of new P2K applications. SWS personnel will also play an instrumental role in deployment of Windows 2000 and Office 2000. Continuing support for the growing Linux user community will remain a priority.

The Hardware Support group expects to be intimately involved in network infrastructure upgrades including complete rewiring of buildings such as Lewis Thomas, Moffett/Shultz, Eno, Frick, Fischer, and a several dormitories. As in past years Desktop Support will assist major Facilities projects such as the Frist Center, the Friend Center, a new Genomics building and renovation sites including Little Hall and Edwards Halls. The group will continue to support the deployment of wireless technology and the installation of a new microwave link between PPPL and main campus.

CIT Help Desk

The CIT Help Desk provides quality and timely telephone, appointment, e-mail and web-based computing support for the University and serves as the single point of contact for all campus computing inquiries.

During FY00, the University installed an Automatic Call Distribution (ACD) system to provide a more sophisticated method of receiving and routing customer calls, generating statistics, and monitoring performance.

The Help Desk also improved communication with 2nd- and 3rd-tier support personnel by migrating Help Desk software from Apriori to Tivoli Problem Manager, a web-based communication tool for technical support of customers. The tool assists the sharing of technical questions and answers within CIT as well as throughout departments, giving support consultants quick access to every major group within CIT. The web-based tool also improves reporting and real-time statistical components.

The Help Desk shares its entire Knowledge Base with the Princeton computing community through the Help Desk web site, helpdesk.princeton.edu. During FY00, the web site received 2,349,662 hits from more than 15,600 unique IP addresses. In total, there were more than 142,900 visits (A visit is a set of requests from a computer made over a 3-minute period).

Help Desk staff redesigned the Help Desk web site to conform to the campus design standard.

Help Desk Goals

During FY01, the Help Desk expects to pursue the following goals

- Improve service to the campus computing community by increasing the average percentage of incoming calls handled by live consultants to 86%. (Over the past six months, the average percentage of incoming calls handled by live consultants has been 83%.)
- Creatively staff the incoming lines during the heaviest demand time (beginning of academic year) to improve service to the student body by maintaining a high percentage of incoming calls handled by live consultants during this extremely busy time.
- Improve the training of new consultants, both student and staff, by compiling all training, lab and testing material into a CourseInfo course, HelpDesk101.
- Develop a “Help Desk Road Show” and deliver it to at least 30 departments to increase awareness of available Help Desk services.

Student Computing Service

Student Computing Services [SCS] maintains 30 computing and printing facilities with a total of 196 Windows machines, 60 Macintoshes, 36 UNIX workstations, 43 mobile networking drops, and 33 printers. 6,358,729 pages were printed on SCS printers during FY00. During the year, SCS opened two new clusters specifically for Graduate Students, one in the Butler Apartment complex and one in the Lawrence Apartment building. SCS staff installed a second printer in Scully Dormitory in order to increase printer availability for upperclass students.

During FY00, SCS upgraded a significant percentage of cluster hardware. Most of the changes occurred during summer of 1999 in preparation for the academic year. SCS staff installed new PCs in the clusters located in the E-Quad, in the Center for Jewish Life, and in East Pyne. SCS installed new iMac computers in the Brush Gallery cluster in McDonnell Hall, in the two new clusters (Butler and Lawrence), the Green Hall cluster, and the 87 Prospect Avenue cluster. Staff installed Mobile network drops in most of the clusters, as well as next to some of the dormitory printers. Members of the University community with laptops will, as a result, gain access to the campus network from these facilities. During the Spring semester, SCS began a transition to Windows 2000 with a pilot program in the E-Quad D229 cluster.

During FY00, 34 students worked as Residential Computing Consultants (RCCs). The RCCs provided computing support to their peers in the dormitories, including the Graduate College. Twenty of the RCCs were new to the program. Prior to the start of the school year, RCCs took part in a two-day intensive training program. During the first full week of classes, the RCCs visited every room in the Residential Colleges to ensure that all first and second year students subscribed to Dormnet were successfully connected. In addition to this outreach, RCCs opened 1,356 tickets in the job tracking system.

During FY01, Student Computing Services will work toward the following goals:

- Install 18 PC workstations, 10 campus kiosks and 1 printer in the Frist Student Center Combine the Madison and Joline clusters in one cluster located in the Rocky-Mathey Café. Open a new cluster in the New Graduate College. Install high speed networking enabling streaming video in these two new facilities. Also upgrade the network capability in the McCosh cluster to allow for streaming video
- Assume responsibility for the Distributed Media Clusters in Forbes, and Butler Wilson
- Implement Windows 2000 on all cluster PCs; migrate to Mac OS 9.0 for the '00-'01 academic year
- Upgrade approximately one third of current computing and printing infrastructure to maintain performance of cluster hardware
- Continue progress on the implementation of printing accountability to reduce paper waste in the clusters and dormitories
- Continue researching ways of improving control over cluster machines so that they require less software maintenance, and continue researching ways to restore machines more easily and quickly
- Provide RCCs with better tools for checking dormitory network drops. Increase training opportunities for the RCCs.

Departmental Computing Support

Departmental Computing Support's [DCS] primary focus is to provide oversight for the Support for the four-year-old Computing in Academic Departments (SCAD) program. Of the 50 eligible Academic Departments, 41 departments are now part of the program. Ten of the 41 departments joined SCAD during FY00. Twenty-nine SCAD representatives support the 41 departments. The participating departments are:

Applied & Computational Mathematics, Architecture, Art & Archaeology, Astrophysics, Atmospheric and Oceanic Studies, Chemical Engineering, Chemistry, Civil and Environmental Engineering, Classics, Comparative Literature, Computer Science, East Asian Studies, Ecology and Evolutionary Biology, Economics, Electrical Engineering, English, Geosciences, Hellenic Studies, History, Jewish Studies, Latin American Studies, Mathematics, Mechanical & Aerospace Engineering, Molecular Biology, Music, Near Eastern Studies, Office of Population Research, Operation Research Financial, Philosophy, Physics, Politics, Psychology, Princeton Material Institute, Princeton Environmental Institute, Religion, Romance Languages and Literature, Sociology, Theater and Dance, Visual Arts, Woodrow Wilson School.

The ten departments that joined the SCAD program during FY00 are

East Asian Studies, Hellenic Studies, Jewish Studies, Latin American Studies, Mechanical & Aerospace Engineering, Physics, Princeton Environmental Institute, Romance Languages and Literature, Theater and Dance, and Visual Arts.

In addition to the academic departments, CIT has begun to pilot a parallel program for administrative departments. Five departments are now part of the pilot program:

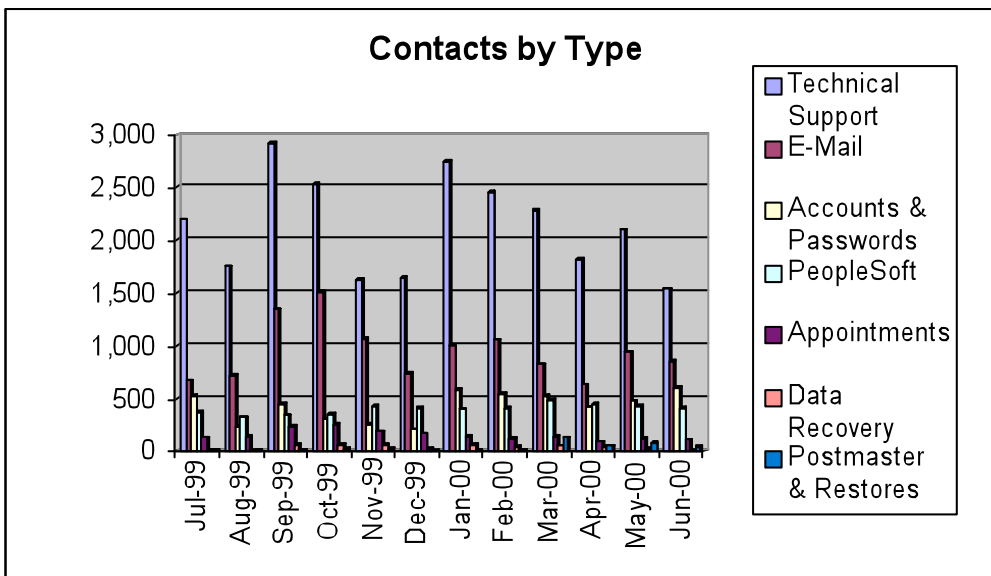
Firestone Library, General Council, Health Services, Human Resources, and Undergraduate Admissions.

The administrative program, Distributed Computing Support (DCS), will move from the pilot phase during FY01. The goal is to have ten participating departments by the end of FY01.

In addition to the monthly meeting and monthly training opportunities, a third meeting, focusing on technical problem solving was added during FY00. This breakfast meetings attract SCAD, DCS, and CIT Technical staff for a free-form exchange of ideas, problems, and solutions.

Help Desk
Problem Reports

| | Technical Support | E-Mail | Accounts & Passwords | PeopleSoft | Appointments | Data Recovery | Postmaster & Restores | Total |
|------------|-------------------|--------|----------------------|------------|--------------|---------------|-----------------------|--------|
| Jul-99 | 2,193 | 671 | 522 | 370 | 126 | 6 | 14 | 3,902 |
| Aug-99 | 1,748 | 721 | 239 | 323 | 142 | 8 | 15 | 3,196 |
| Sep-99 | 2,919 | 1,343 | 446 | 341 | 241 | 60 | 11 | 5,361 |
| Oct-99 | 2,534 | 1,515 | 302 | 353 | 259 | 57 | 17 | 5,037 |
| Nov-99 | 1,621 | 1,070 | 249 | 430 | 185 | 59 | 18 | 3,632 |
| Dec-99 | 1,641 | 740 | 204 | 408 | 165 | 20 | 3 | 3,181 |
| Jan-00 | 2,746 | 998 | 580 | 397 | 143 | 60 | 11 | 4,935 |
| Feb-00 | 2,455 | 1,054 | 550 | 407 | 114 | 45 | 15 | 4,640 |
| Mar-00 | 2,279 | 825 | 522 | 488 | 143 | 49 | 127 | 4,433 |
| Apr-00 | 1,816 | 633 | 419 | 442 | 93 | 43 | 50 | 3,496 |
| May-00 | 2,096 | 943 | 477 | 430 | 117 | 20 | 80 | 4,163 |
| Jun-00 | 1,537 | 850 | 599 | 412 | 112 | 3 | 37 | 3,550 |
| Total | 25,585 | 11,363 | 5,109 | 4,801 | 1,840 | 430 | 398 | 49,526 |
| % of Total | 51.7% | 22.9% | 10.3% | 9.7% | 3.7% | 0.9% | 0.8% | |



Help Desk
 ACD Statistics
 Call Activity (Jan 1 - Jun 30, 2000)

| Group | Calls Recv'd | Calls Answered | % Answered | Calls Aband'd | % Aband'd | Opted for VoiceMail | % Opted for VoiceMail | Avg Time to Answer | Avg Time to Abandon | Avg Talk Time/Call |
|----------------------|--------------|----------------|------------|---------------|-----------|---------------------|-----------------------|--------------------|---------------------|--------------------|
| Technical Consulting | 12,929 | 10,696 | 83% | 1,230 | 10% | 998 | 8% | 0:28 | 1:18 | 5:45 |
| Accounts/ Passwords | 3,147 | 2,791 | 89% | 248 | 8% | 104 | 3% | 0:11 | 0:59 | 1:46 |
| PeopleSoft | 2,576 | 1,938 | 75% | 223 | 9% | 360 | 14% | 0:22 | 1:11 | 3:16 |
| Totals | 18,652 | 15,425 | 83% | 1,701 | 9% | 1,462 | 8% | 0:24 | 1:14 | 4:43 |

Appendix I

Hosts in Tivoli as of April 3, 2000

| Group | Host | OS | Status | Destination | Notes |
|---------------------|---------------|------------|---------------|--------------------|----------------------------|
| Tivoli | tiv-1 | Solaris | QA | QA | QA TEC Server |
| | tiv-2 | Solaris | Production | Production | Production TMR Server |
| | tiv-3 | Solaris | Development | Development | NetView |
| | tiv-4 | Solaris | Production | Production | Production TEC, SD app/GUI |
| | tiv-5 | Solaris | Service Desk | | |
| | tiv-6 | Solaris | QA | QA | QA TMR Server |
| | tiv-7 | Solaris | Development | Development | Development TEC server |
| | tiv-8 | Solaris | Development | Development | Development TMR server |
| Quark | bottom-quark | Solaris | Production | Production | |
| | charm-quark | Solaris | Production | Production | |
| | down-quark | Solaris | Production | Production | |
| | strange-quark | Solaris | Production | Production | |
| | top-quark | Solaris | Production | Production | |
| Sunlab | up-quark | Solaris | Production | Production | |
| | sunlab1 | Solaris | Production | Production | |
| | sunlab2 | Solaris | Production | Production | |
| | sunlab3 | Solaris | Production | Production | |
| Arizona | sunlab4 | Solaris | Production | Production | |
| | mesa | Solaris | Production | Production | |
| | phoenix | Solaris | Production | Production | |
| | tucson | Solaris | Production | Production | |
| Workstations | yuma | Solaris | Production | Production | |
| | falcor | Solaris | Development | | |
| | sunburns | Solaris | Production | Production | |
| clusters | timpanogos | Solaris | Production | | |
| | bathe | Solaris | Production | Production | |
| | beam | Solaris | Production | Production | |
| | bird | Solaris | Production | Production | |
| | bonnet | Solaris | Production | Production | |
| | bow | Solaris | Production | Production | |
| | burn | Solaris | Production | Production | |
| | burst | Solaris | Production | Production | |
| | dae | Solaris | Production | Production | |
| | der | Solaris | Production | Production | |
| | dew | Solaris | Production | Production | |
| | dial | Solaris | Production | Production | |
| | drops | Solaris | Production | Production | |
| | dry | Solaris | Production | Production | |
| | fish | Solaris | Production | Production | |
| | flower | Solaris | Production | Production | |
| glasses | Solaris | Production | Production | | |
| lamp | Solaris | Production | Production | | |
| light | Solaris | Production | Production | | |

| Group | Host | OS | Status | Destination | Notes |
|--------------------|------------------|----------|-------------|-------------|-----------------------|
| | lit | Solaris | Production | Production | |
| | rise | Solaris | Production | Production | |
| | roof | Solaris | Production | Production | |
| | room | Solaris | Production | Production | |
| | screen | Solaris | Production | Production | |
| | set | Solaris | Production | Production | |
| | shade | Solaris | Production | Production | |
| | shine | Solaris | Production | Production | |
| | spot | Solaris | Production | Production | |
| | stroke | Solaris | Production | Production | |
| | tan | Solaris | Production | Production | |
| Misc Server | hotwire | Solaris | Production | Production | |
| | monback | Solaris | | | |
| | monback2 | Solaris | | | |
| DMS server | advq@katharine | Database | Production | | |
| | dmsdrop | Solaris | Production | Production | |
| | erlang | Solaris | Production | Production | Telephone |
| | katharine | Solaris | Production | Production | Managed Node |
| | landr | NT | Production | Production | Loans and Receivables |
| | landrt@katharine | Database | Production | | |
| | mtest | Solaris | Development | Development | |
| | orville | Solaris | Production | Production | |
| | prudence | Solaris | Production | Production | |
| | SALVO | NT | | | |
| | SALVODEV | NT | | | |
| | sears | Solaris | Production | Production | |
| | stella | Solaris | Production | Production | |
| | wilbur | Solaris | | | |
| NT | ANTIGONE | NT | Production | | |
| | AYUDA | NT | Production | Production | |
| | CDOM1 | NT | Production | Production | |
| | CLUSTERS | NT | Production | | |
| | DDOM1 | NT | Production | Production | |
| | DDSP | NT | Production | | |
| | DMSNV12 | NT | Production | Production | |
| | DORMPRINT | NT | Production | Production | |
| | JSTORNT | NT | Production | | |
| | NETGENESIS | NT | Production | | |
| | ntfileshare | NT | Production | Production | |
| | ntprintserver | NT | Production | Production | |
| | NTSERVE1 | NT | Production | Production | Managed Node |
| | OCR | NT | Production | | |
| | OCRHIRE | NT | Production | | |
| | ONTIME | NT | Production | Production | |
| | PDOM1 | NT | Production | Production | |
| | PDOM2 | NT | Production | Production | |
| | PSWEB | NT | Production | Production | |

| Group | Host | OS | Status | Destination | Notes |
|---------------------|-----------------|-------------|------------|---------------------|---------------------|
| | RESTRAC | NT | Production | | |
| | STREAMER | NT | Production | | |
| | TERMSERV | NT | Production | Production | |
| | VPN | NT | Production | Production | |
| Web Services | AUDIO1 | NT | Production | | |
| | AUDIO2 | NT | Production | | |
| | AUDIO3 | NT | Production | | |
| | AUDIO4 | NT | Production | | |
| | AUDIO5 | NT | Production | | |
| | AUDIO6 | NT | Production | | |
| | AUDIO7 | NT | Production | | |
| | AUDIO8 | NT | Production | | |
| | avserver | Solaris | Production | Production | |
| | campuscgi | Solaris | Production | Production | |
| | CBT | Netware 4.0 | Production | | |
| | CNN | Solaris | Production | Production | |
| | courseinfo | Solaris | Production | Production | |
| | Hulk | Solaris | Production | Production | |
| | Orac18@storacle | Database | Production | | |
| | Oracle | Solaris | Production | Production | |
| | Storacle | Solaris | Production | Production | Managed Node |
| | Sweb | Solaris | Production | Production | |
| | VIDEO1 | NT | Production | | |
| | VIDEO2 | NT | Production | | |
| | VIDEO3 | NT | Production | | |
| | VIDEO4 | NT | Production | | |
| | VIDEO5 | NT | Production | | |
| | VIDEO6 | NT | Production | | |
| | Web | NT | Production | Production | |
| | Webdb | NT | Production | Production | |
| | Winscape | NT | Production | Production | |
| | Winweb | NT | Production | Production | |
| ESM | Dazelsrv | Solaris | Production | Production | Dazel Output Server |
| | Karma | NT | Production | Production | Dazel MetaWeb |
| | Maestrosvr | Solaris | Production | New Maestro master | |
| | Printserver | SunOS 4 | Production | Printserve/faxserve | |
| CSG | alumni | Solaris | Production | Production | |
| | csgtest2 | Solaris | Production | Production | |
| | daneel | Solaris | Production | Production | |
| | directory | Solaris | Production | Production | |
| | forward | Solaris | Production | Production | |
| | lager | Solaris | Production | Production | |
| | lists | Solaris | Production | Production | |
| | mailserver | Solaris | Production | Production | |
| | mailserver2 | Solaris | Production | Production | |
| | mmp | Solaris | Production | Production | |
| | postoffice | Solaris | Production | Production | |
| | still | Solaris | Production | Production | |

| Group | Host | OS | Status | Destination | Notes |
|---------------|-------------|--------------|---------------|--------------------|--------------|
| Novell | ARACHNE | Netware 4.1 | Production | | |
| | ARAGON | Netware 4.1 | Production | | |
| | ARELIA | Netware 4.1 | Production | | |
| | ARIEL | Netware 4.1 | Production | | |
| | ARUNDEL | Netware 4.11 | Production | | |

APPENDIX II

Servers Administered by Web Services

| Name | Model | CPU(s) | RAM | Storage | OS | FY 2000 Requests / Plans | Acc |
|------------|------------------------|---------------------------------|--------|--|--|--|--|
| AV Server | Sun Ultra 2 Model 1296 | 1 - 296 MHz SUNW, UltraSPARC-II | 640 MB | 49.7GB Disk Media Storage capacity (of which 49.7GB is usable) | SunOS 5.6 | No upgrades. Will become Verity indexing engine when we migrate completely to the NT Real Media server. | Rea Auc Stre |
| CampusCGI | Sun Ultra 1 | 1 UltraSPARC | 128 Mb | 491 MB disk (163 used) & 674 Mb disk (263 used) | SunOS 5.6 | Replace with E450, 2x400 Mhz CPUs, 1 Gb RAM, 2x18Gb HD, 3x560w Power Supplies. | Use |
| CNN | Sun Ultra 1 | 1 UltraSPARC | 241 Mb | 47.2GB Disk Media Storage capacity (of which 34GB is usable) | Sun OS 5.6 | Upgrade to 1 Gb RAM | Nei |
| Hedgehog | Sun Ultra 1 | 1166 MHz UltraSPARC | 192 MB | 3.5 GB Local Disk Capacity | Sun OS 5.6 | Add 18 Gb disk. | Wel Env |
| Hulk (www) | Sun Ultra 2 Model 2295 | 2 - 295 Mhz UltraSPARC-II | 576 Mb | 29.4GB Disk Media Storage capacity (of which 21.2GB is usable) | SunOS 5.6 | Replaced with two E250s - 2 CPUs, 1 Gb RAM 2 18 Gb HD. In addition, two of the same configuration will serve ~ pages, making the total 4 machines. | Hos Uni UN Use Wel Sea |
| Netgenesis | Dell PowerEdge 2400 | 2 600 Mhz Pentium III | 1 GB | RAID 5 64 GB | Windows NT Server Version 4.0 | Add 2 18 GB drives internal storage, 165 GB Raid 5 ext disk capacity. | Wel Dat |
| Oracle | Sun Ultra 2 Model 1200 | 1 200 Mhz UltraSPARC | 128 Mb | 4 disks @ 4 Gb | SunOS 5.6 | Replace with E450w/2x400Mhz CPUs, 512 Gb RAM, 6x18Gb HD, 3x560w Power Supplies. | Cor Ser Aln Adr , Stu Initi (We Sur |
| Storacle | Sun Ultra 510 | 1 300 Mhz UltraSPARC-Iii | 384 mb | 8 Gb | SunOS 5.6 | Add 2xA5200 (200 Gb mirrored disk space). | Ora Prir inst lear |
| Streamer | Dell PowerEdge 6300 | 2 550 Mhz Pentium III Xeon | 1 GB | RAID 5 132 GB | Windows NT Server, Enterprise Edition Version 4.00 | Add 256 GB additional ext Raid 5 disk capacity. | Wir Stre |
| Sweb | Sun Ultra 1 Model 170 | 1 Model 170 | 128 Mb | 2GB Disk Media Storage capacity (of which 1.5GB is usable) | SunOS 5.6 | Replace with E250, 1x400 Mhz CPU, 512 Mb RAM, 2x18 Gb HD. | Hos and acc Ser |
| Web | Dell Poweredge 2300 | 1 PII 333 Mhz | 128 Mb | RAID 5, 3 - 4.5 Gb SCSI (8 Gb usable) | NT 4.0 | Increase RAM to 512 Mb, increase to maximum amount of disks. | adr Wel NTI Wel |

| Name | Model | CPU(s) | RAM | Storage | OS | FY 2000 Requests / Plans | Acc |
|----------|---------------------|---------------|--------|--------------------------|--------|---|-----------------------|
| Webdb | Dell Poweredge 2300 | 2 PII 300 Mhz | 256 Mb | RAID 5 3-4 Gb SCSI, 7 Gb | NT 4.0 | Increase RAM to 1 Gb.; increase to maximum amount of disks. | runs dev; gro; DB |
| Winscape | Dell Optiplex HxPro | 2 PII 200 Mhz | 196 Mb | 2 Gb | NT 4.0 | Replace machine. | ASI "tex and use; Ser |
| Winweb | Dell Dimension XPS | 1 PI-166 | 64 Mb | 2 Gb | NT 4.0 | Replace machine. | ASI mac |

New Servers FY 2000

| Name | Model | CPU(s) | RAM | Storage | OS | FY 2000 Requests / Plans | Acc |
|---|---------------------------|---|------------|--|--|---------------------------------|---|
| Portal Server 1 | E250 | 1 400 Mhz? | 1 Gb? | 2 x 8 Gb HD? | Solaris | | Hos app con exp as tl cho. |
| Portal Server 2 | E250 | 1 400 Mhz? | 1 Gb? | 2x18 Gb HD? | Solaris | | Mir in a cap: |
| NT Server 2 | Dell? | Dual Pentium III Xeon (best current processor speed) | 1 Gb | 64 Gb RAID 5 | Windows NT Server, Enterprise Edition Version 4.00 | | Mir in a cap: |
| Streamer2 (not yet officially named) | Dell PowerEdge 6300 | 2 Pentium III Xeon at best current processor speed | 1 GB | 128GB Internal Raid 5 + 180GB External Raid 5 for total of 308GB Raid 5 disk storage capacity | Windows NT Server, Enterprise Edition Version 4.00 | | Rea |
| Streamer3 (not yet officially named) | Dell PowerEdge 6300 | 1 Pentium III Xeon at best current processor speed | 1 GB | 70GB Internal Raid 5 | Windows NT Server, Enterprise Edition Version 4.00 | | Rea Me supj Aca |