
ITD The Information Technology Division

**2000 - 2001
ANNUAL REPORT**

EMORY





2000-2001 Annual Report of the Emory University Information Technology Division

EXECUTIVE SUMMARY

If there is a word to describe information technology at Emory it is ubiquitous. IT resources are an ever-present and vital aspect of almost all areas of the life of the institution. As a result the need for robust and stable services from the IT Division has never been greater. This annual report provides details on how ITD worked toward that end in the 2000-2001 academic year.

Academic

Almost all students now bring a computer to campus. Many undergraduates also participate in the "connect" program that allows them to join a virtual community as soon as they are accepted for admission. To say that these students hit the ground running is an understatement. Students expect that IT resources will be available throughout the campus and that these resources will be integrated into the academic program. ITD has been working with academic units to meet these expectations.

The work carried out this past year was similar to that done in the previous year. Classrooms were outfitted with modern technology, computer labs were upgraded, training programs were held with faculty, and new facilities were brought on-line. We continue to see substantial growth in the use of IT resources that serve the academic community. With LearnLink, for example, 18,000 accounts were maintained, 750 classes used conferencing software, and the average number of e-mail messages (just in LearnLink) was 250,000 messages per day. With Blackboard software 300 courses had materials on the Web, often utilizing creative approaches to learning and interaction among students and between students and faculty.

In addition to supporting increased use of IT resources, staff worked to create new and innovative facilities. One example of this is the 4th floor of the Center for Library and Information Resources. This new space includes a

language lab and classroom, a music and media library, and spaces for group study and multimedia production. ITD staff worked with the Library and Emory College staff in developing these new resources and will help support faculty who integrate these resources into their teaching.

Administrative

ITD provides support for a variety of administrative systems, some of which serve the entire Emory "enterprise," which includes entities of Emory Healthcare such as the University Hospital and Crawford Long Hospital. This past year systems in finance and human resources were maintained for the enterprise, and enhancements to these systems were implemented. A few of these enhancements included making financial reports available via the Web, implementing a Web module for a new hire process, and implementation of the time and attendance system.

The completion of the PeopleSoft Student Systems project indicated a major milestone for the University. This system provides Web access to information and processes and has been greatly utilized by students, faculty, and staff. Other systems such as Resource 25 for facility scheduling, and document management, saw increased usage throughout the institution. In addition, a few Web-based systems were developed in-house to support budget development, campus-community partnerships, and University events. These new systems

were well received and are currently in use at the University.

Infrastructure

This past year ITD made substantial progress toward improving the IT infrastructure that supports a wide range of applications. For example, all production UNIX Solaris and NT servers were replaced or upgraded. A test and development lab was created. Upgrades were made to operating systems, database management software, and system management tools. New software was added to allow end users to review the use of Web statistics. Upgrades were made to better support key services like audio and video streaming. And a major project was begun to upgrade the helpdesk software. The result of these activities is stable IT services and an infrastructure that is able to grow with customer use.

The Customer Support Center continued to see a high volume of activity this past year. Over 51,000 calls were logged on a wide range of topics. Because calls often are reporting problems in network communications or healthcare services, better routing processes were developed between the CSC and NetCom and Healthcare IS. To improve communication the CSC developed new features on its Web page that showed status, recently reported service problems, and a history of service problems.

Two other major projects should be noted in infrastructure improvements. Funding was received for a new initiative in IT security that was begun this

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past spring. This project will provide improved intrusion detection, virus scanning, vulnerability scanning, Web access control, and other security services to the campus. In another project ITD is working with our storage vendor (EMC) to replace old technology with a new state of the art storage system. This is just another example of how ITD is trying to stay ahead of the curve in providing stable and robust IT systems to the campus.

Progress Toward Programmatic Goals

Last year ITD identified six programmatic goals. They were 1) upgrade the University e-mail infrastructure, 2) further develop IT resources for the academic community, 3) begin the implementation of a security project, 4) work toward the development of a campus-wide IT architecture initiative, 5) continue to implement PeopleSoft and other administrative systems, and 6) further develop a strategic partnership with the University Library. These goals have clearly been addressed in the work of this past year.

Organizational Changes

It should also be noted that ITD underwent some major organizational changes this past year. Paul Morris resigned his position as vice provost and CIO and after a period of transition Don Harris was named to the position. The multi-team approach was consolidated into a more streamlined director model with five functional units. This approach reduced management and will hopefully allow the division to operate in a more coordinated fashion in the coming days.

As digital content and networked applications continued to transform teaching across the nation, ITD responded by teaching Emory faculty ways that information technology (IT) could forward academic goals. Technology in classrooms was upgraded; technology-enabled teaching facilities were created. The Web course management tool, Blackboard, was tested in courses across campus. Demand for iMovie, digital video playback, and emerging teaching technologies prompted the transformation of traditional classrooms into “smart classrooms,” equipped with multimedia features in multiple formats.

Supporting the educational needs of Emory faculty and students remained a priority. The division worked to enable faster access to information, improve methods of academic communication, assist with information problem-solving efforts, expand learning resources, and evaluate the effectiveness of IT solutions.

In collaboration with other Emory departments and divisions, technological advances were incorporated into the university’s learning resource operations. Services were upgraded to satisfy additional demand and improve capabilities. ITD also provided classroom media services and equipment, Emory Cable Television, streaming audio and video, residential network support, computing labs, kiosks, training classrooms, satellite services, and teleconferencing. Pervasive availability of information technology in classrooms, residence halls, and common areas, combined with assigned use in classes created a learning community for Emory students. Academic use of information technology increased communication, collaboration, productivity, and competency.

Classroom Support

Emory College classrooms were upgraded to keep pace with demand for the use of emerging technologies for teaching, e.g., Blackboard, iMovie, and digital video playback.

SMART technology extended media presentation capabilities, adding wireless touch control panels, SMART boards, and technology-enabled podiums, lecterns, and credenzas.

New language facilities were created to serve the Emory College Language Center (ECLC). The ECLC, a unit of the Institute for Comparative and International Studies, was designed through the collaborative efforts of the dean of Emory College and Emory College language faculty, the General Libraries, and ITD in direct response to the need for enhanced language studies for economic and social globalization.

ITD partnered with the General Libraries to insure that the right technologies

were accommodated and installed into the technologically sophisticated Marian K. Heilbrun Music and Media Library.

This facility offers 40 fully-equipped computer workstations for music and media viewing, listening, and research, as well as state-of-the-art viewing rooms for classes. Dataport connections are available for laptops, with wireless connectivity to be put in place during the Fall 2001 semester. A digitizing suite provides students access to digitized, streamed audio resources that faculty place on Emory’s electronic reserves.

Equipment installed in the facility by ITD included video and audio stations for converting analog content to digital content and network routers specifically designed for on-line video.

<http://www.emory.edu/COLLEGE/LANGCTR/classrooms.html>

<http://info.library.emory.edu/musicmedia/>

ACADEMIC SERVICES

Cox Computer Lab was heavily used, with an average of between 5 and 17 visitors entering per hour. Peak use at the end of semesters brought 261 visitors per day in November 2000 and 416 per day in April 2001.

There were a total of 319,248 logins (up from 257,905) from InfoCommons computers; 5,794 classroom/event requests filled by Media Services; and 53,637 accesses to Harris, Thomas, Thomson, Turman, UA Tower, and Woodruff Labs.

98% of the Residence Network SupportMagic calls were responded to within 24 hours.

Emory’s on-line learning environment, LearnLink, was used by more than 18,000 faculty, staff, and students and in over 750 university classes for academic conferencing (50%).

Highlights

- Renovated and modernized four language classrooms in the Woodruff Library Stack Towers.
- Designed rooms 875 and 975 using state-of-the-art technology, tailor-made for language studies. Equipped media walls with SMART boards, G4 computers, multi-standard VCRs, DVD/laser disk players, and document cameras.
- Adapted, in collaboration with Emory College, Woodruff Library seminar rooms 774 and 775 for language studies by implementing acoustic, aesthetic, and audiovisual improvements.
- Upgraded touch panel control in two classrooms on the 8th and 9th floors of Woodruff.
- Installed a SMART technology 300i unit in the teaching space in the Educational Studies Department, which has strong ties to the K-12 community.
- Renovated and modernized teaching spaces in the Sanford S. Atwood Chemistry Center and outfitted six new chemistry classrooms with SMART lecterns.
- Integrated classroom multimedia systems and SMART technology into seminar rooms and classrooms in the new Cherry Logan Emerson Hall.
- Added a 67" SMART board projection system and wireless, remote control touch panel to the presentation room of the nationally recognized Emory Center for Interactive Teaching (ECIT), which provides expertise and facilities where Emory faculty learn to incorporate interactive multimedia technologies into the teaching experience.
- Installed a SMART lectern in White Hall room 207. Prior to this installation, the only permanent audiovisual equipment in the room was an overhead projector.

<http://www.emory.edu/ITD/LT/MEDIA/Roomsandlevels.html>

Emory College Desktop Support

Emory College Language Center (ECLC). Using the Instructional Computing Development Fund (ICDF), a new language lab and collaborative classroom were established as part of the ECLC in the recently dedicated Marian K. Heilbrun Music and Media Library on the fourth floor of the Woodruff Library's Center for Library and Information Resources (CLAIR).

The new language lab features on-line language materials and special language software. It is equipped with 18 PC and Macintosh computers with flat panel monitors; comfortable, well-designed workstations, and a host of software resources. The new collaborative classroom features digital computer projection equipment, wireless connectivity, and other media resources that enhance language study and research.

Emory College Web

Projects. The Emory College Web team continued their review of all departmental sites within Emory College with an eye toward improving the look and feel of visiting the academic departments on-line. Additionally, they offered a sustained effort to aggregate all learning resources on-line for the Language Center and to focus on renovating and improving the functionality of academic Websites, including:

- Emory College Language Center Website: <http://www.emory.edu/COLLEGE/LANGCTR/>
- The English Department's Shakespeare Website: <http://shakespeare.cc.emory.edu/pindex.taf>
- Emory College Website: <http://www.emory.edu/COLLEGE/>

Department Lab Support

Instructional Computing Development Funds (ICDF) were used to **upgrade over 125 computers in instructional labs**, and Emory College funds were used to replace over 200 faculty computers as part of Emory College's three-year replacement cycle.

Courseware Development and Assistance

Using Blackboard and WebCT software, ITD assisted faculty with incorporating interactive technologies into their classes, seminars, and training modules. **Blackboard use was 25 times greater than last year, growing from use in 12 to over 300 courses** in Emory College, the School of Medicine, the Nursing School, Candler School of Theology, and Goizueta Business School. Courses hosted by WebCT for Emory College and the School of Medicine had **over 2,000 active accounts**.

Highlights

- Coordinated an eight-part series of faculty training modules through the Center for Teaching and Curriculum (CTC) at Emory's Center for Interactive Teaching (ECIT).
- Hosted three-week seminars on bringing course content on-line for twelve Emory College faculty members and four Candler School of Theology faculty members. Candler faculty were the first Emory professional school members to participate in the seminars. College faculty created nineteen courses for Biology, English, Environmental Studies, the Graduate Institute of Liberal Arts, the Graduate School, History, Journalism, Music, Psychology, Sociology, and Spanish. <http://www.emory.edu/COLLEGE/ECO/>

University Web Support

In addition to Emory College Web support, ITD provided ongoing support for other Websites, such as the Michael C. Carlos Museum (<http://carlos.emory.edu/>), and assistance in designing and implementing Websites for:

- The Graduate School of Arts and Sciences:
<http://www.emory.edu/GSOAS/>
- Candler School of Theology:
<http://candler.emory.edu/> (site under development)

LearnLink

Peak simultaneous connections to LearnLink **increased more than 28% to over 800**, and on-line messages (including conferences) **grew to 250,000 a day (7.5 million per month over last year's 5.2 million)**, requiring greater than 185 GB of data storage space.

Library Server Support

The software for the on-line library catalog was upgraded, and ITD and the General Libraries added a media scheduling capability to catalog requests. The library server system provided dependable service 99.9% of the year for the software databases accessed by library researchers.

Residence Hall Network (ResNet)

Emory On-Line CD service. Each year the Emory On-Line CD is updated to adapt to hardware and software advancements. Access to recommended campus software was made easier by enabling the software installers to be run from the Web browser without having to be copied to the desktop first. ITD worked with the Network Communications Division (NetCom) and Residence Life to bring port-per-pillow network access to all undergraduate residence halls and some graduate housing. Port-per-pillow access for all residence housing will be in place when the

renovation of the University Apartments Tower is complete.

Configuring Freshmen

Workstations. Greater than 94% of last year's entering freshmen brought their own computer to campus. Of that number, approximately 75% were laptops. On their arrival to campus, ITD staff and volunteers connected 609 computers, distributed software CDs, and taught the new students how to configure their computers to the Emory network.

Emory Connect2005. Emory Connect2005 was an ITD initiative in partnership with Emory College and the Admissions Office that offered LearnLink accounts to all accepted freshmen. Prematriculants had the opportunity to get to know Emory, each other, and ITD's information resource systems as they were making the decision on which college to attend. Those who elected Emory then had at least six months to form a community and establish social and personal relationships as a class before arriving on campus.

Over 4,000 accounts were created. Students had access to e-mail, real-time chats, and LearnLink conferencing for on-line discussions with classmates. The professional schools and Oxford are considering adopting this initiative for their prematriculants.

Multimedia Training

More than 140 faculty and staff were instructed in digital image editing techniques and in Web development for the Emory environment in a series of workshops offered at the Multimedia Center (MMC) in CLAIR.

ITD assisted faculty with IT resources, consulted on best practices for integrating Web technologies into course assignments, and conducted customized Web training sessions for students as part of their for-credit course work. In the Spring 2001 semester, 12 faculty

used this resource for 16 courses serving over 225 students.

The MMC supported, with campus groups, Emory Web initiatives by working with ECIT educational analysts and other ITD staff to teach Web development courses. Participating groups included the CTC, Department of History, Division of Campus Life, General Libraries, and Black Graduate Student Alliance.

The center also inaugurated training in streaming audio and video development.

Teaching and Research Software Tools

Additional software tools were made available for research and teaching by expanding the Matlab offering, in cooperation with the Math and Computer Science Department, and by adding Endnote, the bibliographic management software, to Emory OnLine software distribution.

Student Computing Lab Support

ITD expanded student access to campus computing by increasing the pool of kiosks while continuing to support other student computing facilities in Cox Hall, the Language Lab, the MMC, Residence Halls, and the InfoCommons in CLAIR. At the same time, ITD planned for the next generation of labs on campus by reviewing student lab facilities. The Cox Hall and Residence Hall labs continued to be heavily used, with monthly accesses in Cox ranging from 4,198 to 12,500 (average 6,892) and Residence Labs ranging from 3,018 to 9,422 (average 5,745).

Cable TV and Videoconferencing

During 2000–01, Internet and traditional phone-based videoconferencing delivered real-time communication from Emory classrooms and research laboratories to students, colleagues, and researchers across the United States

and internationally to China, England, France, Germany, Japan, Eastern Europe, and South Africa. Throughout the university, teleconferencing opened new arenas for collaboration and the development of global community and added cultural and intellectual scope to classrooms by offering expert lecturers and opportunities for international exchange not otherwise possible.

Students from Emory language classes refined their conversational skills in videoconferenced exchanges with students in China, Hungary, France, Russia, and Japan. Scheduled during the evening hours to accommodate time-zone differences, these cultural, political, and religious discussions opened windows into the lives of foreign students.

Outside the classroom, teleconferences saved time and cut travel expenses for Emory. Videoconferences were used to schedule planning meetings and interviews with colleagues and students, to conduct long-distance grant planning meetings, and to participate in national healthcare and professional associations while eliminating the need to travel.

Internet2. Emory is one of 181 universities (as of December 2000) to partner with corporations and the government to develop and advance Internet2 (I2), the Internet-based, “next generation” research and education network. As demands increased for faster and more reliable computer-based communication systems, ITD explored ways to use I2 connections between Emory and other research institutions.

In the fall of 2000, with the ending of the NSF grant that partially funded Emory’s I2 connection, ITD transferred the service and resources to NetCom as a production service in a way that provided financial support for the link for a few years into the future.

Highlights

- Set up a two-way, high-quality video link between the Marriott Marquis and Emory campus for the I2 Annual Conference in Atlanta, 29 October - 1 November. Children from the Atlanta area, including Robert Shaw Elementary School, talked with each other in “real time” using the connection between Emory and the hotel for a staged simulation of communication with children from cultures thousands of miles apart.

The demonstration was sponsored by WorldPlay, a nonprofit corporation that envisions this technology being used to provide direct contact between children of different countries, so that they can learn from and teach each other.

- Assisted with classroom video-conferences using I2 connections during the year, including a seminar with Russia, sponsored by Emory’s Russian and East European Studies and Halle Institute and a session with students in a Stanford University seminar.
- Produced the final report for NSF.

Wireless Network Access

ITD and the General Libraries tested wireless access to the Emory network in the Woodruff Library Stack Towers, CLAIR, Candler Library, Dobbs University Center Coca-Cola Commons, and the Quadrangle. The technology tested is the developing industry standard, 11 megabits per second Ethernet (802.11b). The results helped determine the reliability of the technology, range of the transmitters, and whether the current installations will support wireless access from other buildings on the Quadrangle.

To better support excellence in teaching, research, and learning at Emory, the division worked to streamline and improve the IT systems needed for business and administrative processes. Every functional unit saw improvement: business, human resources, payroll, student administration, alumni/development, purchasing, Web application development, document management, and space and resource management.

Keeping the development of business and administrative systems in pace with the university's growing technological needs meant responding to new and changing business requirements, meeting federal requirements, and accommodating to organizational changes. Effective support was a balancing act of managing constant change while providing stable production environments. Users request new functionality and enhancements to systems and processes. Technologies require frequent fixes, patches, and minor upgrades from the vendor. These must be analyzed, tested, and implemented. Maintaining the layers of infrastructure – database, application servers, middleware, and hardware – requires additional patches and upgrades. ITD successfully met these needs.

Accounts Payable and the Financial Accounting System

The Wesley Woods general ledger was added to the Financial Accounting System (FAS) and Accounts Payable (AP) applications, which increased efficiency and reduced complexity in managing university financial accounts.

Working with the Controller's Office, departmental financial reports were made accessible for viewing on the Web, which reduced paper costs and speeded information delivery.

PeopleSoft Human Resources Management System (HRMS)

Successful production support for Human Resources yielded 161 scheduled payroll cycles, quarterly tax updates to systems, and calendar year-end activities such as W2's, 1099's, and benefit statements.

Highlights

- Completed automated electronic fund transfers for the Emory Federal Credit Union and automated billing for Retiree Benefits.

- Implemented, with Human Resources, automatic termination of benefits for terminated employees.
- Worked with Human Resources Data Services and the Financial Aid Office to design, create, and implement a Web-based student new hire process.
- Executed an automated leave payout for Emory University Hospital and Crawford Long Hospital.
- Assisted Human Resources with the successful implementation of the PeopleSoft Training Module, which includes training management and delivery; skills and competency management; and career and succession planning.
- Assisted the university and Emory Clinic in upgrading and implementing DDI Vista, a time and attendance system.
- Implemented a quarterly mock year-end process to review and resolve potential year-end problems.
- Created a link between PeopleSoft Student Administration and HRMS to check for duplicate employee identification numbers at HR Data Entry.

ADMINISTRATIVE SERVICES

This year, enhancements were made to more than 16 administrative systems.

Accessibility to student services was improved by providing Web access to the following: financial aid and awards information, registration status, monthly and pre-term bills, and class permission numbers for department liaisons.

ITD responded to IRS audit requests, working closely with customers and the IRS to provide the information necessary to satisfy audit report requirements.

PeopleSoft Infrastructure

Multiple servers and software applications function in a tiered framework that supports and includes user interface, application logic, data location, data organization, and data storage components. Databases and additional software (middleware) implement shared services, such as communication between components. The infrastructure also supports development, testing, staging, and production environments. Regular maintenance – including frequent patches, fixes, and upgrades – kept the university's administrative infrastructure functioning smoothly and reliably all year.

Highlights

- Upgraded all databases to Oracle 8i.
- Optimized Web access to Emory's on-line student information system (OPUS), including the capability to balance the load across multiple Web servers.
- Upgraded file servers to provide more stability.
- Automated refresh and cloning of databases to support the development environment.
- Implemented the software and hardware environment for a new time and attendance system.
- Migrated the test system to new hardware that better replicates the production environment.

PeopleSoft Student Administration (PS SA)

Achieving the goal of improving service for students and streamlining administrative processes for the university began four years ago with the initial implementation of the PeopleSoft system. The fourth and final module, Financial Aid, was implemented on 4 December 2000.

Because it is an integrated system, information is entered only once but is available to various functional units; the

need for bubble sheets is eliminated; and the information is available for immediate viewing by staff. The Web interface gives students access to the system from any location that has network connectivity and an Internet browser, whether they are applying locally or from abroad.

Ongoing improvements were made to the university's functional processes for the admissions, financial aid, student financials, and student records modules.

Highlights

- Stabilized the process for creating a copy of PS SA data to be used for daily reporting.
- Increased efficiency by making improvements to the annual admissions purge process and the processes associated with late fees, deferral accounting, credit history, and payment plans.
- Automated processes for posting advanced placement transfer credit and the nightly running of awards and reports.
- Reconfigured the feed of information to the Post Office to include only those students who are housed in on-campus facilities.
- Created interfaces to provide student information to Student Health Services, Blackboard course management system, the Mathematics and Computer Science Department, and the Anthropology Department.
- Improved accessibility to student services by providing Web access to the following: financial aid and awards information, registration status, monthly and pre-term bills, and class permission numbers for department liaisons.
- Improved quality through initiatives that included detection of duplicates when entering new prospects into the system and the creation of a Web test environment.

- Enhanced communication between students and central service areas by adding: access and access limits to OPUS accounts for newly accepted students; student account funds disbursement; software to produce letters and forms; a "Student aged Receivables" report; a report to facilitate monthly balancing of the general ledger; functionality to confirm receipt of posted transactions; the grade roll and class roll; the dean's letter and transcripts; the Web form for requesting transcripts; and the capacity to send mass e-mails.

Administrative Application Collaborations

Although most administrative information system projects involved partnerships with functional units, two collaborative highlights include:

- **PS SA system.** The implementation and support of this system was the result of a partnership between: functional leadership and representation from the Provost's Office and other student support areas; and technical leadership and resources from ITD.
- **Time and Attendance (DDI) system.** The implementation and rollout of this timekeeping system for university departments represented a partnership between the Payroll Office and ITD. The Payroll Office provided project leadership and ITD contributed technical support.

Resource 25 (R25)

R25 currently serves as an electronic hub for event scheduling for the Emory community. Classes, events, conferences, and meetings are scheduled for all spaces and rooms identified in the R25 database. Event and space preferences by organizations such as academic departments and student groups can be automatically programmed. Space features such as ADA accessibility, special equipment, and layout are also

part of the system. A Web interface was implemented in addition to an interface to PS SA.

<http://www.emory.edu/ITD/R25/>

Document Management

With real estate at a premium on campus, technology that reduces physical paper storage requirements becomes a valuable asset. So too is the automation of document management, because it advances educational administration and research capabilities.

IT document management resources were first activated in September 2000 using the Optix system. Optix provides a full suite of document management and workflow tools that include copying to CDs and the capacity for document scanning, indexing, and retrieving. A Web interface for the service was implemented this year. After one full year of operations, registered users of the service **increased approximately 98% from 277 to 549.**

New users of Optix included the School of Law, Office of Sponsored Programs, Yerkes Regional Primate Research Center, Student Financial Services, and Emory University Hospital's Accounts Payable department. Document management for the Rollins School of Public Health is currently in development and document management workflow was implemented in Emory Accounts Payable in a testing phase.

<http://www.emory.edu/ITD/DI/>

Web Services

The World Wide Web is a growth resource for facilitating administrative and educational transactions within the university and with the greater educational community. ITD implemented Web-based applications and managed the content of Websites, which built on the use of the Web as a tool for consolidating information, broadening access, and streamlining educational processes.

Highlights

- Created, with the Budget Office, Web-based budget distribution and projection systems. Web applications that are intuitive, quick, and easy to use were designed to replace the previous error-prone, cumbersome, and time-consuming paper and diskette-based systems.

The Web applications combined data from the mainframe FAS (account numbers and past-year budget details) with newly keyed information. This gave a single point through which every department and division could provide the Budget Office with their proposed and projected budget data and from which the Budget Office could balance, reconcile, and prepare the information for uploading to FAS.

- Added community-focused teaching and research projects to the database that serves the Office of University-Community Partnerships. This application serves as a central data repository for three separate university offices on campus.
- Managed Web content for Commencement; the *Annual Report of the President*; the President's Commission on the Status of Women; *The Academic Exchange*; the university secretary, officers, deans, and trustees; the Emory University organization chart; and the Symposium on Commercialization of the Academy.

INFRASTRUCTURE

Storage for e-mail folders grew 1 GB every five days; inboxes 1 GB every 6.32 days.

Messages delivered to “emory.edu” inboxes on the delivery server totalled 108,061,256 (total for 353 days). The maximum number of messages on a single day was 1,515,606.

By implementing the Control M scheduling software, the Data Center was able to reduce staff time required to run production and reduce operational errors. A new printer solution was implemented. These and other efficiency measures enabled a reduction in overtime and a reduction in the Data Center’s budget.

Behind the scenes, ITD’s infrastructure ensures reliable, secure, and cost-effective IT services for Emory. Threats and opportunities for the academic and medical community are identified and managed. At the “command central” location, the heart of Emory’s IT infrastructure beats 24 hours a day, monitoring, troubleshooting, and assuring continuous coverage for vital systems and services. Software, databases, servers, customer support, and training form the IT framework that supports teaching, research, and healthcare goals at Emory.

Security

The protection of information, data, software, and hardware from threats of accidental or intentional disclosure, modification, or destruction is a serious responsibility for IT professionals. Throughout the year, ITD focused on researching, developing, and deploying technological and organizational solutions to better protect information systems, mitigate risks, and minimize the impact of hostile attacks upon Emory’s critical IT infrastructure. Information was safeguarded from potential and actual breaches ranging from user error to enterprise-wide threats, natural disasters, hackers, sabotage, theft, invasion of privacy, and viruses.

Day-to-day operations meant collaboration with other units to coordinate IT security across the Emory enterprise; administer account access control; establish policies, procedures, and guidelines; and track and coordinate response to security incidents.

Firewall, Intrusion Detection, and Virus Scanning Implementation Project. A strategy for securing the Emory enterprise network was formulated by an IT architecture team representing ITD, NetCom, Emory Healthcare, and campus schools and divisions. The plan created “zones of trust” using firewalls, intrusion detection, and vulnerability scanning. ITD produced a detailed project plan and assisted the School of Public Health (SPH) in redesigning their network as the first implementation zone. The hardware and software to implement a firewall for SPH were purchased and are being installed by NetCom. Software for

intrusion detection and virus scanning was tested.

Vulnerability Scanning Service. An Internet Security Systems (ISS) Internet Scanner product was purchased to check server and desktop vulnerabilities in systems on the network. The service was offered to Local Support Administrators (Local Ls), Local Area Network Administrators (ELANA), departments, divisions, and other Emory groups.

Testing was provided on request and at no cost whenever a security incident was identified. In the 11 months since the product was put into service, 29 customers requested scans and 155 scans were completed for the Health Sciences (52%), ITD (22%), university departments (19%), and Oxford (7%).

Web Server Access Control. The Web security product Netegrity SiteMinder was purchased and tested for securing Web-based applications in the first quarter of academic year.

Account Access Control and Administration. Account-related requests for faculty, staff, and students **increased 21% (from 1,169 to 1,420)** over last year. Over 4,000 accounts were deleted or created.

Policies and Guidelines. The access policy, conditions of use, and ethical use policies were combined into a single “use policy.” Four new policies set guidelines for resource security classification; unattended computer and terminal equipment; account management and passwords; and physical and environmental security. Fifteen additional policy and guideline areas were identified for future action, including virus,

e-mail, security incident response, Web, and wireless security.

Security Incident Reporting.

Reported security incidents **increased 96.9%** this year, climbing steeply **from 31 last year to 64** this year. Major incidents included a hacker attack, spamming, the Code Red worm, and the SirCam virus. Procedures were developed to avoid duplication of efforts and to provide coordinated response when multiple ITD groups and NetCom receive the same security complaint.

E-mail Infrastructure

Dooley-Eagle e-mail was heavily used, **averaging approximately 306,122 messages per day** and peaking on one day at over 1.5 million messages. Total disk space for in-box and other mailbox storage **grew 60% to 176 GB** by August 2001, and in the last few months of the fiscal year was **increasing at over 9 GB per month**.

Highlights

- Improved hardware increased e-mail availability and performance. Two servers each for inbound and outbound "emory.edu" e-mail were added to the architecture to provide load balancing and fault tolerance.
- Created links from the relay servers to the directory service that looks up the target mailbox for incoming mail. This allowed mail to "user@emory.edu" addresses to be delivered to the e-mail address of the user's choice on or off campus.
- Replaced outdated hardware with new hardware, which reduced maintenance costs.

Data Services

The Data Warehouse. The data warehouse provides a repository for data from operational systems. The data is used to produce analyses and reports without impacting operational systems. During the year, use of the Data Warehouse outgrew the capacity of existing hardware. Additional hardware to

accommodate the increased use, as well as allow for growth, was needed if the warehouse was to keep pace with service delivery demands.

Patterns of use also changed: analyzing student data decreased and analyzing and reporting on financial data increased. With the help of a consulting firm, customers were interviewed to establish levels of service that needed to be provided and to recommend a phased improvement approach. New hardware was ordered and migration planning began.

World Wide Web. A statistical package was installed for the user community, which allowed them to collect usage data independently.

The Customer Support Center (CSC)

The CSC logged **51,548 calls** from faculty, staff, and students who needed help with issues ranging from network connection problems and desktop setup issues to software application questions.

Highlights

- Reorganized the system status page on the ITD Website.
- Created two self-subscribe e-mail mailing lists for distribution of proactive information about service outages and changes. Over 200 status messages were distributed to these lists.
- Improved operational procedures for routing calls to Healthcare IS and NetCom services.

Calendaring Software

The enterprise calendaring and scheduling application, Meeting Maker, supported shared calendars for 4,000 users and facility locations. The operating system software was upgraded to Windows 2000 and the database purged of old data, which improved performance and stability and reduced the number of servers needed from three to two.

Software Licensing/Distribution

The Software Distribution Center issued packages and volume discounts on commercial software, including 5,738 software licenses, and 5,025 Emory On-line CDs.

Computer Training

Computer training, oriented to the needs of Emory, was arranged with certified contract instructors who offered over 30 classes tailored to the Emory environment at significant savings to schools and departments. All training costs were recovered. A library of more than 300 computer-based training courses was established for use by the Emory community.

Server Support

The delivery of reliable IT services to the Emory community requires reliable hardware and software of adequate capacity that can be affordably maintained, easily managed, and adequately tested.

Directory Services. Additional random access memory (RAM) and newer versions of the operating system and application software dramatically improved performance and stability of the Netscape Directory Servers that provide PeopleSoft authentication; phone directory lookups for the campus and external guests; and e-mail lookup of the target mailbox for incoming mail.

LearnLink. To support the increased demand and continue to provide a stable environment, ITD created more flexible backup procedures and migrated the service to an enhanced environment that **supports up to 1,500 simultaneous connections** (an increase from 700 simultaneous connections in 1999-2000).

The application and operating system software were updated to provide more robust e-mail delivery, enhance Web services, and improve recovery of space

from deleted files. The hardware was upgraded to maximize server uptime by adding redundant power components and allowing disks to be replaced without taking down the server.

Data and storage improvements included establishing procedures to clean up user data, examining more than **185 GB of data belonging to more than 18,000 users** to remove corruption, and using the EMC¹ system for data storage.

LISTSERV. LISYSERV continued to be in demand to support e-mail lists. There are approximately 480 lists: 26 that have more than 1,000 members; 4 with more than 10,000 members; and one that approaches 28,000 members (Atlanta alumni). The number of messages sent in any month peaked at **over 2.4 million, a 23% increase** over last year. The largest number of messages sent during any one day was 274,839 on 13 August 2001, **an increase of almost 72%** over last year's peak day.

Streaming Audio and Video. The streaming audio and video server was upgraded and enhanced to support its increased use across the Emory campus. The number of simultaneous connections averaged **over 2,000 per week with a peak of over 6,200**. There were 18 weeks that registered simultaneous connections of over 1,000 and five weeks with over 5,000.

The service delivered over 40 live streaming events including Emory's commencement ceremony and the diploma ceremonies for Emory College and the Business School.

The number of active developers **increased from 35 to 87 (an increase of 149%)**, and disk space usage increased from **21 GB** in June

of 2000 to **61 GB** in June 2001 (an **increase of 191%**).

Major users this year included Emory College, Goizueta Business School, the School of Medicine, Emory Healthcare, the Law School, and Yerkes Regional Primate Center. Administrative departments also added streaming content to their Web sites.

To support growth in use, the hardware was upgraded to increase processing speed, disk space was added, and the server software license was increased from 200 to 300 concurrent users. Also, QuickTime streaming was added as a production-level service in addition to the Real streaming format.

Support Magic. Work began and a consultant was hired to oversee the upgrade of the Support Magic "help desk" server hardware and software and to move the Support Magic database to the EMC enterprise storage system. Anticipated benefits are increased capacity, usability, and availability; equipment inventory to support system scanning by the ITD security group; and cost savings through consolidation of the university and healthcare licenses to one system and license.

System Refresh. All production Solaris (UNIX) and NT systems were replaced or upgraded, and new hardware was obtained for the Data Warehouse and for the Blackboard course management system. The decision was made to refresh these systems every two to three years based on need.

Test Lab. For smooth and reliable service, system changes must be tested before putting them into production. A test and development lab was created using purchased and vendor-donated hardware and software.

Database Support

Databases provide an environment in which to store, protect, and organize data for users. Applications use databases to store and access their operational data. Individuals use them for entry, update, analysis, and reporting. In response to service demand and ongoing efforts to take advantage of technological improvements to increase efficiencies, new databases were added and existing databases were updated.

New databases. ITD provided support for the creation, conversion, hosting, and administration of 15 new databases. Support for the development and administration of databases was given to the Office of Community Partnerships and the Emory Budget Office.

Other databases created were: Emory Shared Data; the On-Call list; and the Enhancement Tracking databases; and the Post Card Application database, which holds information about ePostcards sent from Emory's Website.

Consulting and assistance was provided for an upgrade to the current Support Magic system and to developers from the School of Medicine for conversion of their data. In addition, ITD provided support for the administration of the Web access control (Netegrity SiteMinder) security system, current and future Data Warehouse systems, the Purchasing Card system, the DONOR system, the Facility Information Management System, the R25 classroom scheduling system, and the Optix document management system.

Improvements to existing databases. ITD implemented adding "future hire" employees to the shared data as many as 14 days prior to their start date and updated Support Magic

¹EMC. Supplier of intelligent enterprise storage used by the ITD Data Center. Their products allow consolidation of disk storage of multiple enterprise systems into one system for efficiency of storage management (backups, adding disk space), increased performance (caching and switching), and higher availability and reliability (RAID, mirroring, and hot swap).

to include equipment inventory to support system scanning by the ITD Security Services group.

Also implemented were additional nightly feeds: from the mainframe DB2 database to the Parking System and Netegrity and from the Personics recruitment system into the shared data.

Operational Support Services

The Data Center met its goal of 99% uptime for ITD and Emory Healthcare systems. For many systems the goal was exceeded: the EMC storage system goal is 99.5% uptime; it was up 99.93% of the time. In addition, the Data Center improved service efficiency and reduced costs through a number of projects.

EMC Storage Upgrade

With the assistance of its vendor, the EMC storage system was upgraded to the latest hardware and software, which added networking capabilities and allowed provision of disk storage for many different kinds of systems.

The following new systems were moved to EMC over the summer: e-mail, LearnLink, streaming audio and video, Support Magic, the “www.emory.edu” Web server, and HNA². Moving to the EMC storage provided these systems with better data availability through use of its on-line mirroring and disaster recovery capabilities. Using the same storage for multiple systems provided more efficient disk storage management.

²HNA (Healthcare Network Architecture). A project to upgrade and augment Emory’s healthcare information systems using a product called HNA Millennium from Cerner Corporation. Millennium is an architecture that integrates component applications to disseminate clinical and financial information across an entire health system.

INTERNAL PARTNERSHIPS

General Libraries

ITD worked with the Emory University Libraries to maintain the InfoCommons area in CLAIR and the Integrated Library Management System (Unicorn), which includes Emory's EUCLID on-line library catalog. The collaboration extended as well to management of the Frye Leadership Institute and to the execution of numerous ongoing projects and initiatives, including the coordination of an exhibition featuring digital and interactive artwork, "Science and Art: Shared Frontiers." The exhibition, displayed in Schatten Gallery, explored connections between science and art in the scientific, artistic, and scholarly work of Emory faculty, staff, and students.

Network Communications

ITD and Network Communications (NetCom) collaborated in the triage and solution of technical problems, in developing Emory's security environment, in testing the use of the Lightweight Directory Access Protocol (LDAP) to support telephony services, and in supporting authentication when connecting as an Emory network device from other Internet Service Providers (ISPs) using the Virtual Private Network (VPN) service.

Emory School of Medicine

ITD and the School of Medicine explored the possibility of ITD's providing data services and support to the School of Medicine staff. This would involve converting their Microsoft Access databases to ITD's standard database environment, Oracle, on an ITD-supplied and administered server and mentoring them in the use of the converted databases in their applications.

ITD worked with the School of Medicine staff and NetCom to deliver VPN services to Grady campus as well as the Atlanta Veterans Administration hospital. This connection gave Emory's medical researchers who are located off-

campus access to proprietary databases and information resources via the campus network.

Healthcare Information Systems

ITD continued to collaborate with the Healthcare Information Systems on a range of issues including data center operations, security, and support for faculty and researchers in the health sciences.

Council on Information Resources and Technology (CIRT)

Chartered to provide policy and planning guidance for the use of information resources and technology at the university, the committee met to discuss a range of topics.

Committee on Information Technology Architecture (ITA). ITD

contributed principal staff to the ITA, a subcommittee of CIRT, to lead the process of creating an IT architecture for Emory. The committee completed the second of its public documents, "Document 2: Designing Emory's IT Architecture," and chartered two task forces to create IT architectures for security and the Directory Service.

The ITA committee and task forces had wide campus representation, including members from NetCom and Emory Healthcare. "Document 2" was reviewed by the provost's office. All three documents were made widely available for review within Emory, were revised in response to feedback, and were sent to CIRT to be considered for adoption. The Security Architecture is in the process of being implemented.

Groups at Emory who received drafts for review included campus IT directors, local support providers, participants of the Digital Futures Seminar, members of CIRT, constituents of ITA committee members, and a self-subscribe LISTSERV group registered to receive

IT architecture documents for review. Emory's META Group Enterprise Architecture Strategies consultant also reviewed all the architecture documents.

"Document 2" provides general principles for an IT architecture that supports, in the needed time frame, Emory's mission, goals, and priorities.

The Security and Directory Services architectures provide specific guidelines, based on "Document 2" principles, for the technologies, standards, standard products, and configurations needed for these domains.

The Security Architecture domain covers the processes, data feeds, and deployed hardware and software that serve to electronically protect, preserve, and control access to Emory's IT assets. The Directory Service domain offers a means to find information about Emory people, places, and things that is of Emory-wide applicability and that Emory has determined that authorized people or IT systems should have access to from any location on the Emory network or the Internet.

<http://www.emory.edu/EITA/>

Seminar on the Digital Future

The seminar, a small group of scholars and administrators, spent the year examining the role of electronic publishing in higher education. The group met on a monthly basis with guest speakers who led facilitated discussions.

IT Advisory Committee

This committee met on a monthly basis to share information on IT issues and advise the vice provost/CIO on recommendations being brought to decision-making bodies at the university.

EDUCAUSE

ITD continued to maintain a strong membership presence in EDUCAUSE, a nonprofit consortium of colleges,

universities, and other organizations that provides leadership on the role of IT in higher education. At the annual conference, ITD led the Multimedia Constituent Group and was selected to present position papers on wireless technology and on SmartCards at the Evolving Technologies Committee panel discussion. The paper on wireless, "The Wireless War Dance," was published in the January 2001, issue of *EDUCAUSE Review*.

The Southeastern Universities Research Association (SURA)

Emory continued its active membership in SURA and is one of a group of members who aggregate their I2 traffic through the Southern Crossroads, located at Georgia Institute of Technology.

EXTERNAL PARTNERSHIPS

LOOKING AHEAD

In the coming year ITD will focus on a number of goals. Specific plans to support these goals are found in unit plans within the IT Division. Some goals depend on additional funding and resource allocation, as well as involvement of key personnel outside of the division.

1. **Strategic Planning.** Work with CIRT and strategic partners in developing an IT plan for the University. Use this process as well as plan to educate and involve senior administration in setting a course for IT resources in the coming years.
2. **Support Teaching Excellence.** Utilize resources like LearnLink, Blackboard, image database software, and faculty training programs to support the use of IT resources in teaching across the University.
3. **Academic Facilities and the Web.** Redesign the technology centers in the Library, the Cox Hall space, and create new space on the Clairmont campus. Recreate the ITD Website and take a more institution wide approach to IT information.
4. **Administrative Data.** Enhance the access to institutional data and ad hoc reporting via the web. This goal includes easily accessible standard reports as well as tools for a variety of end user needs.
5. **Replacement or Upgrades to Major Administrative Systems.** If funding is provided begin work toward replacing systems like Alumni/Development with vendor support products. Continue to upgrade PeopleSoft HR and Student as well as seek to implement these systems according to the priorities set by the governance committees.
6. **Reduce Dependence on Legacy Infrastructure.** Seek to reduce use of legacy infrastructure software such as DB2, Sybase and QMF. Participate in plans to review steps toward replacement of remaining mainframe applications such as FAS and AP.
7. **Improve Helpdesk and Local Support Model.** Improve focus of the helpdesk in call routing and tracking. Utilize software to improve communication between ITD and other IT providers.
8. **Improve Efficiency in the Data Center.** Seek ways to reduce printing, replace older technology, and support efforts to upgrade applications. Upgrade/enhance enterprise storage infrastructure to support SAN³ and NAS and educate others on storage systems.
9. **Improve Network Security.** Complete the four phases of the security project funded in FY01. Work with academic and administrative units in determining what next steps should be taken to improve security for the institution.
10. **Implement Other Infrastructure Initiatives.** Implement the IT architecture that was defined by the directory services domain group. Work on other infrastructure projects that pertain to the web and other areas.

³SAN (Storage Area Network). Disk storage (typically RAID) is accessed by an application server's file system over a network. Benefits compared to DAS and NAS are storage resource pooling and LAN-free backup. DAS (Direct Attached Storage) is a model for accessing disk storage in which the file system resides on the application server and storage is attached directly to the server (there is no network between them). NAS (Network Attached Storage) allows an application server's file system to be located or mounted remotely and accessed over a network, instead of residing on the application server.

Human Resources/Payroll

PeopleSoft

Alumni/Development

In-house

Enterprise E-Mail, Calendaring and Collaborative Software

Emory E-mail and Meeting Maker

Student Systems: Admissions, Financial Aid, Student Records, and Student Financials

PeopleSoft

Accounts Payable/General Ledger

Information Associates

Academic Systems

LearnLink, Blackboard

Electronic Research Administration/Grants & Contracts

Post award on Information Associates; pre-award on in-house PC supported by Office of Sponsored Programs

Purchasing/P-Card

ProcureNet

Facilities Management

CSI Maximus and Facilities Info Systems

Housing

In-house application

Document Management

MindWrap (Optix)

Time and Attendance

DDI

Classroom Scheduling

Universal Algorithms (Resource 25/Schedule 25)

APPENDIX: Index of Enterprise Systems