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This has been a year of very significant achievement and even greater gathering momentum. I thank the staff in CIT and OIT for their energetic and talented pursuit of the major objectives in our strategic plan (www.cit.cornell.edu/oit/strategicplan.pdf). The quality of the CIT staff was once again noted as a significant strength of the organization in this year’s customer survey. All of the progress that follows came from their efforts.

To highlight their accomplishments, we have organized our annual report into eight chapters, corresponding to the strategic plan. Overall, five major themes characterize the year in my mind:

1) Significantly reengineering and improving the data communications infrastructure and the financial models supporting it.

2) Improving about 20 courses through the Faculty Innovation in Teaching Grants Program and successfully introducing the Student Technology Assistant program.

3) Getting organized to undertake several new PeopleSoft initiatives in support of administrative computing.

4) Dramatically increasing the attention paid to information technology security.

5) Improving the foundation for all that we do—CIT’s ability as an organization.

First, the data communications environment at Cornell now features switched 10/100 megabits per second connections in almost all locations, linked by a gigabit backbone network. Upgrading the edge to a switched configuration has provided much better performance all over campus. We saw one glitch at the start of the fall 2001 semester, when extraordinarily high levels of usage by returning students swamped the network. Several technical interventions and collaborative work with the Student Assembly re-established equilibrium (see page 8). Finally, a major effort resulted in the development of a brand-new model for recovering the costs of data communications (see page 3).

Second, the provost funded a series of grants to introduce major improvements in about 20 courses and to set up a program to provide trained student assistants to help faculty who want to explore technological enhancements for other courses (see page 11). Both programs were successfully established and are beginning to have an impact.

Third, the Cornell administration this year set aside $10 million per year for the next 5 years to...
support a major overhaul of our administrative information systems (see pages 16-17). This year we engaged in an important planning initiative aimed at organizing a 5-year picture of an integrated set of enhancements. An upgrade of the PeopleSoft Human Resources/Payroll system to version 8.0 will be followed very shortly by implementation of the PeopleSoft Contributor Relations module. In anticipation of these efforts, CIT migrated the underlying database platform of PeopleSoft from Informix to Oracle.

Fourth, all across the country this year, more attention has been paid to issues of IT security, and Cornell has been no exception. A task force evaluated our organizational structure and focus and recommended consolidating and “beefing up” our efforts in this important area (see page 24).

As the implications of the new USA-Patriot Act (see page 27) began to dawn on individuals and institutions nationwide, Tracy Mitrano, our policy advisor for information technologies, was called upon to explain and interpret the complex legislation and to help other institutions develop internal processes to comply.

Also on the national front is our partnership with EDUCAUSE, the association for information technology in higher education, to jointly support the Institute for Computer Policy and Law, an evolutionary step based on Cornell’s Computer Policy and Law Program (see page 29). The Institute will create a national dialog about legal and policy issues related to IT in higher education.

Finally, we are continuing the process of developing CIT’s infrastructure and processes so that they can support the highest level of performance (see pages 30-33). Over the last three years, CIT has reinvented its internal financial structure. In July 2002, we started the fiscal year with balanced, service- and project-based budgets. This infrastructure, which will continue to evolve, forms the platform on which many other improvements will be based.

We adopted a new mission and values to complement our strategic plan in guiding our activities (see page 32). This year our annual employee satisfaction survey showed significant improvement in several areas (see page 32). This organizational development work is paying off in that our customer satisfaction survey this year showed improvement in 9 out of 10 measures (see pages 30-31).

By this time next year, the PeopleSoft Human Resources/Payroll system will be running on its new Oracle platform in release 8.0, and we anticipate important enhancements in functionality for campus. The PeopleSoft Contributor Relations implementation will be well underway. Both projects will provide validation for the investments in process, structure, governance, technical skill, and project management that characterize the year we’re just finishing.

In the communications arena, we will be implementing a new network billing structure (see page 3) that includes usage-based charges for Internet traffic. We will also have restructured the IT security area and a new director will be in place.

These efforts will be accompanied by hundreds of other equally important steps forward in all of our service areas. Computers in student labs will be significantly upgraded. The e-mail system will be enhanced. We will have acquired dark fiber pathways to a number of “off-campus” locations to deliver service more cost-effectively. The HelpDesk will be restructured. And a number of improvements to our legacy student information systems are planned.

I dedicate this report to two groups: to the CIT staff whose talent and hard work allow us to do all that we do, and to our customers, whose support and participation mean so much to our success. Thank you all very much.

What Is CIT?
Cornell Information Technologies (CIT) is the university’s central information technology organization. It supports business infrastructure, informational software, and instructional and operational uses of video, data, and telecommunications at Cornell.

CIT consists of seven divisions under the leadership of the vice president for information technologies. It is housed in four campus locations: the Computing and Communications Center (CCC), Rhodes Hall, and 110 and 120 Maple Avenue.

• Business Administration Center
• Business Information Systems
• Customer Services and Marketing
• Distributed Learning Services
• Integration and Delivery
• Network and Communication Services
• Systems and Operations
Outlining University-Wide Technology Issues

**Straightening out our rates**

Two years ago, we embarked on a quest to straighten out the rates for network and phone services. Currently the university expects us to fund network services entirely from the fees we collect. So our primary goals were (1) to set rates that would reflect our true costs and also provide funding for needed improvements to the infrastructure and (2) to re-assess how costs for the data infrastructure could be most equitably apportioned to the campus community.

We have achieved the first goal by detailing the costs of our data and phone services—data ports; phone service; long distance service; AUDIX voice mail; call management systems; basic adds, moves, and changes to phone and data ports; special circuit charges; and EZ-Remote modem service—and eliminating subsidies.

Armed with that knowledge and working in concert with Cornell’s Executive Budget Group, we can now confidently set rates that enable us to invest in and support the contemporary data and voice services demanded by this world-class research university and that accurately reflect what it costs to provide those services. In short, now that we fully understand our costs, we can better manage them.

For fiscal year 2002/03, we increased most rates by 4.5 percent. Notable exceptions were the rate for single port gateways (SPGs) and the rate for the Residence Hall Network Service (ResNet). Both increased significantly when cross-subsidies were removed. The increase in the SPG rate also reflected a more accurate accounting of SPG usage of the wide area network (WAN), commonly known as the Internet and Internet 2.

But knowing what to charge is only half the picture. We also need to know how to charge. To date, our model for data rates has essentially been to divide the cost of providing network services by the total number of network ports. This method was reasonable early on, but it does an inadequate job in today’s environment of allocating network costs in a way that reasonably reflects usage by members of the community.

A Network Cost Recovery Task Force was convened to figure out a more equitable way to allocate costs. A dean and 8 directors and managers from around the campus joined four representatives from CIT/OIT.

Based on their recommendations, beginning in fiscal year 2003/04 (July 1, 2003), our rate structure will have three components:

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**Strategic plan:**
Map Cornell’s culture and requirements into an updated vision of computing at Cornell

**Progress:**
- New model for recovering data communications costs
- Position papers on e-mail, digital asset management, authentication and authorization, and network security
- Policy drafts on security, fair information practices, electronic messaging, and public key infrastructure

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**A selection of our publications**
• A network port fee to pay for the cost of LANs within buildings and their connection to Cornell’s central backbone network. This fee will be charged monthly to every network port and will be much lower than the current fee.

• An infrastructure fee to pay for the cost of the backbone network, including the fiber plant, routers, the Network Operations Center, and plant maintenance. This fee will be assessed through Cornell’s existing Campus Allocation Method, applied at the college and department levels.

• A usage fee to pay for the cost of Cornell’s connections to the WAN (Internet and Internet 2). This fee will be charged to every IP (Internet protocol) address that sends or receives traffic over the university’s Internet connections, and it will be based on consumption. A flat fee will cover usage up to a certain amount, and then additional usage will be billed per megabyte. The exact amount is still being determined but will cover the needs of 80 percent of the community. Measuring usage to this fine degree requires new tools; we are well underway in investigating those options.

The Residence Hall Network Service (ResNet) will use the same model except that the port fee will include the infrastructure fee. Funding for public ports will come from the infrastructure fee. A university-wide committee will determine what constitutes a public port. RedRover wireless service will also be funded by the infrastructure fee.
This new rate structure provides a broader, more accurate base for funding, and it gives the campus community a much-desired view into their particular usage patterns.

**Building foundations for technology decisions**

Through a series of position papers, we are continuing to facilitate understanding of and open dialogue about information technology trends among the university’s diverse constituencies. The papers also serve as helpful guides in making decisions about technology in light of Cornell’s size, decentralized, and research focus. Each paper represents the outcome of meetings and forums with campus constituencies; consultations with industry experts, organizations, and peer institutions; and formal requests for comments.

**2001-02 Position Papers**

- **E-mail at Cornell: To Serve or Not to Serve** e-mail services at Cornell and alternative approaches
- **Digital Asset Management: An Introduction to Key Issues** basic concepts and outline of challenges facing Cornell in storing and managing its digital information
- **Authentication is Not Authorization? And What Is a “Digital Signature” Anyway?** authentication and authorization architectures and technologies
- **Cornell Network Security: Big Red Doors II** security risks with the university’s “open” network architecture, options for enhancing security, firewall deployment issues, and recommendations
- **Filling in policy gaps and planning ahead**

Technology evolves so rapidly that it’s quite a feat to keep policies in step. Our strategy to craft broad policies that leave room for evolution has worked well, but inevitably some gaps develop or some areas clamor for clarification. This year, we have drafted five new policies. All are wending their way through Cornell’s policy approval process.

- **University Policy on the Security of Electronic Communications** responsibilities of different categories of users with regard to routine practices and what to do in response to a security breach
- **University Policy on Security Incident Reporting** procedures and policies for dealing with problem sources of traffic and for responding to requests made under the USA-Patriot Act
- **Policy on Mass Electronic Messaging** when and with what authority messages may be sent

**What Cornell’s IT Dollar Buys: Actual Expenses $42.6 Million (Fiscal Year 2001/02)**

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<tr>
<td>General Campus Applications Infrastructure</td>
<td>3%</td>
</tr>
<tr>
<td>Classroom Technologies and Distributed Learning</td>
<td>3%</td>
</tr>
<tr>
<td>Administrative Systems Development</td>
<td>4%</td>
</tr>
<tr>
<td>Customer Services and Marketing</td>
<td>4%</td>
</tr>
<tr>
<td>Distributed Learning and Development Support</td>
<td>4%</td>
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<tr>
<td>OIT Campus/National Programs</td>
<td>4%</td>
</tr>
<tr>
<td>VP Initiatives</td>
<td>5%</td>
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<tr>
<td>General Campus Services</td>
<td>6%</td>
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<tr>
<td>Designated Services</td>
<td>6%</td>
</tr>
<tr>
<td>Mainframe and Production Control</td>
<td>6%</td>
</tr>
<tr>
<td>Administrative Infrastructure, Applications, and Services</td>
<td>16%</td>
</tr>
<tr>
<td>Network and Communications Services</td>
<td>39%</td>
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in bulk to every member of a university constituency (faculty, staff, students); co-sponsored with Administration, Facilities, and Finance

- **Policy on Fair Information Practices** when and how third parties are authorized access to information transmitted or stored on CIT computers or network systems

- **Policy on Public Key Infrastructure** encryption and decryption of university records and institutional data; co-sponsored with University Counsel

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**Top Five Protocols on Cornell's Commodity Internet** *(Fiscal Year 2001/02)*

- **KaZaA** is a currently popular file-sharing application.
- **HTTP** is web sites.
- **NNTP** is USENET, or newsgroups.
- **FTP** is a file transfer protocol used to move files between systems.
- **Gnutella** is an older file-sharing application.

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- **Public computers supported by CIT’s lab group**: 856
- **NetIDs created**: 7,927
- **Servers maintained by CIT staff**: 234
- **Percent hosting non-CIT services**: 19.6
Updating Campus Networking and Phone Systems

Roaming with RedRover
www.cit.cornell.edu/redrover

In September 2001, Olin, Uris, Mann, and Kroch libraries debuted RedRover, the wireless Internet service managed by CIT and funded by the university and Cornell University Library. We’ve installed 135 access points in 43 buildings across campus, including most libraries, common areas in several residence halls, and several academic buildings. These access points connect laptops—and beginning in fall 2002, personal digital assistants (PDAs)—to the campus network.

As of May 2002, 942 unique computers belonging to 610 people (technically, NetIDs) were registered with RedRover. Some computers are part of the libraries’ extremely popular loaner laptop program, which lets students check out a laptop and take it anywhere in the stacks.

Today, students are using RedRover to surf the Internet, read e-mail, send in assignments, and synchronize computers. Faculty and staff are using it to boost productivity and change locations without losing any continuity in their work.

RedRover is also helping Cornell’s libraries become agile with new technologies. In libraries housed in older buildings, such as Olin and Uris, networking had been limited to a few areas. RedRover is now allowing library staff to experiment with technology in ways that were difficult before.

At Geneva’s Franklin A. Lee Library, RedRover is being used for meetings and class instruction. Staff demonstrate pertinent online resources and edit database files on the spot—saving hours of work overall. A laptop loaner program is being established here as well.

The precursor to RedRover was Project Nomad, a research project to test the benefits of having wireless access in class. The project involved students in professor Geri Gay’s communication class and professor William Arms’s computer science class in spring 2000.

Reining in file-sharing on ResNet
www.cit.cornell.edu/resnet

Network statistics tell us that Cornell students have been avid fans of file-sharing applications like Napster, Morpheus, and KaZaA for a few years.

Strategic plan:
Develop and execute a plan to modernize Cornell’s communication networks in order to meet the teaching, research, and outreach missions of the university

Progress:
• RedRover wireless service
• ResNet bandwidth management
• Elimination of shared networks
• Update on campus rewiring plan
• Cornell Cooperative Extension wide area network

E.D. Intemann, Theatre, Film and Dance resident lighting designer, uses RedRover to send updated lighting paperwork to the main computer in the light lab. E.D. will soon be able to write and update light cues for an entire show from any location with wireless access.
In the 2000-01 academic year, this activity had significant negative effects on performance within the Residence Hall Network Service (ResNet), and by September 2001, it was affecting the campus network as a whole.

ResNet, a CIT-provided service, is in most undergraduate residence halls and has about 5,900 subscribers. Given the demographics, it wasn’t news that file-sharing was clogging ResNet. What was surprising was the impact of a fraction of the subscribers—the top 25 users of ResNet bandwidth sent and received 27 GB (gigabytes) or more every 3 days. That’s equivalent to 40 CDs, more than fits on a typical hard drive, more than 200 times the amount used by a typical ResNet subscriber.

To address the situation, first, we restricted ResNet as a whole to 60 percent of Cornell’s available Internet bandwidth. We took this step to provide staff and faculty with adequate resources to get their work done.

Second, we deployed a tool called a Committed Access Rate (CAR) to keep bandwidth heavy-weights from affecting everyone else on their local area network. Working closely with the Student Assembly Committee on Information Technologies, we developed procedures to ensure that its application is fair.

In March 2002, we began assigning heavy users to the CAR, which limits their Internet access speed to 2 megabits per second (Mbps), shared with everyone else in the CAR. That’s faster than a 56 Kbps modem, but far slower than ResNet’s switched-10 Mbps service (100 Mbps in some halls). Students whose bandwidth usage exceeds 27 GB over a 3-day period go in the CAR for 3 days.

We only had two months to watch the CAR in action before the semester ended, but the results are encouraging. We saw improvements in ResNet performance and greater awareness among students about the effects of file-sharing applications. The upcoming academic year will be the real test. With the Student Assembly, we are also looking at packet-shaping and traffic-shaping alternatives that may replace the CAR in the 2002-03 academic year.

Bidding adieu to shared networks

This year, we finished upgrading the campus Ethernet equipment from shared-10 to switched-10 Mbps (megabits per second). In 6 months, we changed networking for about 10,000 data ports. The result? Faster, more efficient networking for all computers on the same local area network.

Why is switched networking better? The old shared networking was like an old-style, party-line phone system where only one individual could talk at a time. Switched networking functions like a modern phone system allowing multiple people to have simultaneous conversations.

Developing a foundation for rewiring campus buildings

We are continuing our quest to improve Cornell’s local area networks (LANs). These networks are within buildings, and most have Category 3 wiring.

- Number of individual hosts (users) assigned to the ResNet CAR between mid-March and mid-May 2002: 175
- Average number of times an individual host was assigned to the CAR: 2.3
at least 15 years old. In many areas, the LANs are still robust enough to do what people need. But their limitations will quickly become evident in the next few years as people increase their use of videoconferencing, virtual reality tools, and other bandwidth-intensive applications.

The bottom line is that most campus buildings will need to be rewired. With networks connecting some 30,000 computers and 700 other devices in 185 buildings, it will be a huge undertaking. Some buildings will be done in the course of planned renovations. The rest will need to be part of a special initiative, to be called EzraNet.

To prepare, we conducted a $6-million pilot rewiring of five buildings this year—Gannett Health Center, the Holland International Living Center, and Goldwin Smith, Myron Taylor, and Warren Halls. We hired LeChase Data/Telecom Services to survey each building, design how the wiring would travel through the building, and then install Category 6 wiring and strip out the old. LeChase worked closely with the building occupants, Cornell’s Planning, Design and Construction group, and the engineering firm Erdman Anthony.

The pilot project has given us solid financial details that had proven difficult to estimate in the past, given the diversity of Cornell’s buildings in architecture and function. We also have a firsthand understanding of other important rewiring concerns, from aesthetics to asbestos abatement to the challenges of working in occupied buildings.

With this knowledge, we have begun planning how to prioritize and rewire the rest of the campus buildings and how to fund it. We anticipate having the rewiring plan finalized in fall 2002 and then moving forward with funding discussions.

Connecting Cornell Cooperative Extension statewide

www.cce.cornell.edu

In support of Cornell Cooperative Extension (CCE) director D. Merrill Ewert’s “Committed to Excellence” revitalization plan, we partnered with CCE to design and implement a wide area network (WAN) for all 57 county extension offices (Fulton and Montgomery share an office).
The extension offices’ existing Internet access was through a variety of service providers, ranging from high-speed cable and DSL to low-speed dialup. In many offices, staff took turns using the Internet. CCE couldn’t take advantage of Internet-based learning opportunities, much less offer them. And CCE couldn’t effectively communicate internally or externally.

Merrill’s plan called for a common networking solution, to be deployed and maintained by a small, stable group of vendors. The answer was T1 lines, the only high-speed technology available to every extension office.

Craig Trowbridge and Glenn Applebee of CCE partnered with CIT’s Dave Barr to make it happen. Dave designed the WAN. Craig served as liaison between CIT, the vendors, and extension offices to coordinate installation and configure local area networks. Work commenced in March 2001. By May 2002, the 55th extension office had been connected. The remaining two will be done following planned relocations.

The communications company NextiraOne installed equipment and handles ongoing maintenance. T1 lines are provided by local exchange carriers, Internet connections by Sprint, and DNS/DHCP service and network monitoring by CIT’s Network Operations Center.

The CCE project is the largest WAN design project we have done. The networks are performing beautifully and every extension office can now access Cornell’s full suite of electronic services, just as if the office were located on the Ithaca campus.

The next step is outfitting 12 extension offices as distributed learning and videoconferencing centers. Craig is consulting with our Classroom Technologies staff on the design, selection of equipment, and support options.

“Before the WAN, a staff member once tied up his computer for almost 24 hours downloading a program and still did not get the program because he got disconnected. With our new WAN, the download was completed in less than 2 hours. Our ability to do COLTS and other interactions with Cornell has improved significantly.”

—Michele Ledoux, executive director, Lewis County Cooperative Extension

- Number of data ports: 30,000
- Number of subnets: 825
- Number of assigned phone jacks: 14,143 analog; 3,276 digital
- Phone calls made in a typical week: 108,800
- AUDIX messages sent or received in a typical week: 31,600
- Reliability of the phone system: 99.999 percent
Positioning Cornell to Expand Its Distributed Learning Venues

Making creative use of instructional technologies

www.cit.cornell.edu/atc/innovation

To help Cornell faculty evaluate and apply technological solutions to instructional challenges, university provost Biddy Martin, vice president for information technologies Polley McClure, and dean of the School of Continuing Education and Summer Sessions Glenn Altschuler launched two complementary programs last year: the Faculty Innovation in Teaching Grants Program and the Student Technology Assistant program.

Faculty Innovation Grants

The Faculty Innovation in Teaching Grants Program awards grants through a competitive process for projects that make creative use of instructional technologies—web sites, computer-based tools, video, PowerPoint, and so on—to achieve specific pedagogical goals. In fall 2001, 16 grants were awarded by the college and school deans and 4 by the Faculty Advisory Board on Information Technologies (FABIT).

Our Academic Technology Center staff is helping the grant recipients flesh out and develop their projects, along with our partners in CIT’s Classroom Technologies, Cornell University Library, the Center for Learning and Teaching, and the Web Production Group and Educational Television Center of Media and Technology Services.

In August 2002, many of the projects were released in either a beta or “version 1” form. The rest should be ready by spring 2003. The next call for grant proposals will be in fall 2002.

Strategic plan:

Develop Cornell’s capability to support distributed learning with appropriate infrastructure, facilities, and services

Progress:

- Faculty Innovation in Teaching Grants Program
- Student Technology Assistant program
- Video broadcasting, webcasting, and videoconferencing
- Instructional technology tools
- Global Seminar videoconferencing

Robert D. Miller, professor emeritus of crop and soil sciences, took advantage of the Academic Technology Center’s facilities to scan slides for a book he is writing.

Student Technology Assistants

The Student Technology Assistant program trains students in a wide array of instructional technologies so that they can help faculty with small-scale projects. Marge Wolff of our Academic Technology Center oversees the program with assistance from a cadre of student managers.

This year, 22 students completed our extensive training program, developed by Clare van den Blink. Key components of the curriculum are its equal emphasis on technical proficiency and ability to teach and consult, and its simulated and actual field work.
In January 2002, the students went to work with faculty in every college. Their projects included setting up databases and web sites, digitizing video, scanning, and creating images. The students function in two roles: helping faculty acquire skills and actually carrying out small projects for faculty.

Feedback has been overwhelmingly positive—faculty say the students are very well-trained, personable, and easy to work with. And the students are equally enthusiastic. We are expanding the program to 50 students in fall 2002.

Launching video services

www.cit.cornell.edu/services/av

If you said you wanted to

• View a live event that originates at Cornell or anywhere in the world from one of multiple locations around campus
• Prepare a video presentation to be viewed any time, anywhere, via the Internet
• Hold a meeting, conference, or interview with participants at two or more sites with video
• Or design a classroom or conference room to be used for distributed learning technologies

We could help you. In the past two years we have upgraded Cornell’s video and audio distribution and control system to support academic and special events.

Video broadcasting provides one-way, live distribution of high-quality audio/video to a room on-campus or off-site. Webcasting, or audio/video streaming, is a one-way broadcast available on demand to many viewers via the Internet. Finally, videoconferencing offers live, real-time audio/video/data interaction between two or more sites. Videoconferencing is now offered in many locations on campus using either fixed or portable systems.

We also evaluate and test tools that provide high-quality audio and video over the Internet. Today’s videoconferences are good quality, but not as good as cable TV. Our goal is to bring digital-satellite-TV quality to Cornell.

“Dale was a huge help in the Vet College Microcenter this semester. His performance was above the ordinary. He was friendly, professional, and always willing to help. I would love to have him return next semester.”

—College of Veterinary Medicine faculty member, commenting on a Student Technology Assistant
Finally, to increase the number of facilities that can support audio and video, we routinely consult on new construction and renovation projects. This year, we designed and contracted installation for an audio/visual equipment upgrade including videoconferencing services in G10 Biotechnology Building; consulted on a distributed learning room in Hollister Hall and on audio/visual design for the Hotel School addition; and did audio/visual design for the Martha van Rensselaer addition and Baker Institute for Animal Health. We are also designing videoconferencing facilities in Duffield Hall and for 12 of Cornell Cooperative Extension’s county offices (see page 9).

Expanding CyberTower’s scope

cybertower.cornell.edu

We are continuing to support the web-based CyberTower, a distributed learning service by Cornell’s Adult University (CAU) that offers directed non-credit study with Cornell professors. As of June 2002, CyberTower users included alumni, prospective students, incoming freshmen, and others interested in the university.

CyberTower was launched in summer 2001 with eight course-like “study rooms.” Each room features videostreamed lectures by a professor, along with images, charts, discussion boards, and recommended books and web sites. Since then, we have completed five more rooms, begun one-hour faculty forums on specific current events, and upgraded the infrastructure.

**It is clear that today’s students, who cannot imagine a world without the web, expect—and may soon demand—that their professors be much more than talking heads who occasionally scribble on the blackboard.**

—co-authors Glenn C. Altschuler, dean of the School of Continuing Education and Summer Sessions, and Polley McClure, vice president for information technologies, writing in the Jan. 18, 2002, issue of the Chronicle of Higher Education
Producing each room is a three-month collaborative effort among CAU, the faculty member, and three of our Instructional Design and Production staff. The one-hour forums feature dean of Continuing Education and Summer Sessions Glenn Altschuler conversing, TV-style, with a faculty member about a current event. Cornell’s Media and Technology Services records the video for the forums.

CyberTower’s infrastructure was completely rebuilt by a team from several CIT areas. Our goals were to support large numbers of users and rooms and to streamline room production. In April 2002, we moved CyberTower to the new infrastructure seamlessly and without interruption to the service.

Our next steps are to improve video quality for all users by standardizing on QuickTime 5. We are also working toward providing a larger video window for those who have a high-speed connection.

Providing tools for teaching with technology

www.cit.cornell.edu/ atc

Our Distributed Learning Services group is committed to supporting anyone who is teaching with technology. We receive an average of 400 inquiries per month. Our services range from do-it-yourself tools to consulting to start-to-finish development. Selected highlights of our work last year:

- **Electronic textbook for design course**: We helped Human Ecology professor Suzanne Loker illustrate her “Designers as Entrepreneurs” course with a web-based textbook that includes video clips from interviews with design professionals and case studies. The textbook will also be repackaged for use by small businesses through Apparel Industry Outreach, a Cornell Cooperative Extension program.

- **Survey tools**: We now offer three tools for creating web-based surveys. Our newest, Web-Surveyor, lets faculty create surveys for use on the web without doing any HTML coding or web editing. We partnered with the Hotel School and Johnson School to evaluate this tool and are jointly supporting it. The other survey tools are one included with Blackboard/CourseInfo and a do-it-yourself tool we built to provide maximum flexibility in designing a survey, setting the security level, and analyzing the results.

- **Course web sites**: Blackboard/CourseInfo continues to be our most popular tool for developing course web sites. It runs over 1,800 course

Forums on CyberTower This Year

- May 2002: Steve Squyres, Astronomy, discussing “The Mars Probe”
- April 2002: Alan Hedge, Design and Environmental Analysis, discussing “The Mysteries of Ergonomics”
- Feb. 2002: Thomas D. O’Rourke, Civil and Environmental Engineering, discussing “Earthquakes: How Big Can the Big One Be?”
- Dec. 2001: Larry I. Palmer, Law, discussing “Death and Dying: Medicine, Ethics, and Law”
- Sept. 2001: James Garbarino, Human Development, discussing “Parents Under Siege: Why Do Bad Things Happen to Good Parents and What Can We Do About It?”
sites for approximately 1,000 professors and lecturers. We estimate that over half the student population is using it. For faculty who prefer or need to build their own course sites, we offer a suite of other services, including server space, discussion boards, and security tools.

- **Videostreaming:** This year, we saw a large increase in demand for our video services, particularly videostreaming. In addition to the Global Seminar (see below), videostreaming has been used in some distributed learning courses offered by Cornell’s Adult University in summer 2002. It captured the remembrance ceremony held on the Arts Quad after the September 11 terrorist attacks. And it has supported numerous conferences and meetings.

- **ATC newsletter:** In September 2001, we rejuvenated our periodic e-mail newsletter on technology topics of interest to educators. Each issue is a short, lively compilation of practical tips, key web links, and insight into how technologies work.

**Supporting a class held ‘round the world**

www.globalseminar.org

In spring 2002, students, faculty, and leaders from Cornell and 15 other universities and community colleges around the world met 17 times to discuss the future of the environment and a sustainable food supply. How? Videoconferencing coordinated by CIT.

It’s all part of Global Seminar ALS 480: Environment and Sustainable Food Systems. This course, crossing 16 time zones and 7 countries, is linked through the Internet and phone lines. Before each seminar, CIT’s Tom Every and Jim Avery configure and test our videoconferencing equipment, and connect and test each of the 4 to 6 sites participating. Live webcasting (videostreaming) for each conference is produced by Jamie Kalousdian.

The course is led by associate dean and director of academic programs at the College of Agriculture and Life Sciences, H. Dean Sutphin, other faculty members at Cornell, and faculty members at institutions participating abroad.

“The challenge was to try something that had not been tried before, to see if we could connect our institutions when we’re on different schedules, different time zones, different technologies, different styles of teaching,” Dean said. “What was required was flexibility, patience, and a dedication to the vision which allowed us to move all those obstacles very quickly.”
Supporting Cornell’s Administrative Information Systems

Over the next five years, Cornell is investing $50 million on administrative systems development and associated ongoing support. Why so much money? It is important that Cornell take advantage of the benefits provided by technology advances, such as electronic payments and grant submissions. In addition, managers across the university can perform more effectively when information is knitted together from multiple systems and transactions are automated for “self-service.”

Cornell’s current administrative systems support a varied set of business practices, and reflect an equally varied set of decisions made through the years in response to technology choices, regulatory requirements, and changing business practices. Keeping them in synch with each other, with advances in technology, and with changing business requirements is a difficult challenge.

To move forward, we must modernize our administrative tools, some of which are over 15 years old. Each administrative area—infrastructure, Alumni Affairs and Development, Budget and Planning, Finance, Human Resources and Payroll, Sponsored Programs, and Student and Academic Services—has been allotted a portion of the funds. Oversight is provided by the Systems Management Group (SMG), Executive Sponsors, and the Administrative Systems Planning (ASP) group.

CIT, working with the ASP group, is developing a multi-year plan across this array of systems. The plan will be updated annually to reflect the changing landscape of technology and requirements. Where the university chooses to implement PeopleSoft applications, the plan will include those implementations and weave them into the overall fabric of administrative computing at Cornell.

Planning for PeopleSoft

Three major projects funded from these monies revolve around PeopleSoft: migrating the PeopleSoft database and interrelated systems to Oracle; upgrading the Human Resources/Payroll module to version 8; and investigating and likely implementing the Contributor Relations module for use by Alumni Affairs and Development.

To optimize our ability to meet the demands of the project plans, we realigned our administrative systems staff. We will continue to make staffing changes as needed.
The first major project—migrating several systems from Informix to Oracle—was a necessary precursor to upgrading PeopleSoft to version 8. PeopleSoft is discontinuing support for Informix. Oracle is a powerful, integrated way to store and manage large amounts of data and give access to thousands of simultaneous users from many types of computer operating systems.

In this $2-million project, a total of 60 staff from Human Resources, Payroll, and CIT spent most of January through July 2002 readying the core PeopleSoft application, the operational reporting provided by Actuate, and several systems closely tied to PeopleSoft—Kronos, COLTS, PEDL (Position and Employee Data Lookup), the Student Employment System, Employee Essentials, and the tools used to create NetIDs and to generate warning and termination letters for students who receive work-study financing. At the beginning of July 2002, the team successfully migrated these systems to Oracle.

**Updating records in record time**

At a decentralized place like Cornell, how do you keep information about faculty, staff, and students updated in all the right places? It’s not easy. We have a mix of systems we’ve built ourselves and some from commercial vendors. Until now, communication between those systems happened through homegrown tools at scheduled times. Consider Cornell’s electronic directory, for example. Employee records were updated once a night, and student records once a week.

Now we have webMethods, an integration tool that can transfer information between our administrative systems automatically and usually within seconds, without requiring any changes in those systems. We’re now busy sorting out business rules so that we can tell webMethods what to look for and do when it detects changed data.

In June 2002, we began using webMethods for two integrations. One is between the PeopleSoft Human Resources/Payroll module and the electronic directory (LDAP). The other is between Student Information Systems (in Adabas, where student records are stored) and the directory.

### Data in Cornell’s central administrative data marts
- 65 gigabytes

### Queries made each month against the Accounting Data Warehouse
- 42,000

### Human Resources/Payroll users
- 817

### Actuate Human Resources/Payroll reports delivered each month
- 2,642 (total of 230,623 pages)

### Human Resources/Payroll datasets delivered each month
- 6,795 (total of 481 megabytes)
Once these integrations are fully in place (planned for June 2003), updates made in Just the Facts or PeopleSoft will show up almost instantly in the electronic directory, instead of a day or week later. The directory is the first of many systems for which webMethods will help ensure data synchronicity and detect inconsistencies.

**Bringing data to the people who need it**

Though PeopleSoft tends to command a lot of attention on the administrative systems front, in reality, it is just one of many balls we are juggling. A brief summary of some other accomplishments:

- We added functionality to Employee Essentials so that faculty and staff could change their benefit options online, instead of submitting paper forms.
- We upgraded the Brio server. One benefit is that Macintosh is now supported. This ad hoc querying tool lets users ask central administrative data marts as well as local databases questions such as how much money we spent with a selected vendor in a certain timeframe.
- We upgraded Actuate, the system that delivers complex business reports such as monthly Human Resources/Payroll reports, student employment reports, internal CIT reports for the HelpDesk, telecommunications reports, and accounting statements. Reports can now be viewed on Macintosh and Unix systems using contemporary web browsers or downloaded as PDF documents.
- We created data marts for Student Financial Aid, Graduate Records, and the University Budget Office and a Capital Assets Planning data mart for Financial Affairs.

- Average times Bear Access (Cornell’s package of popular network and local administrative services) is used each month: 2.4 million
- Users of CorporateTime, a university-wide personal calendar and meeting scheduling service: 5,980
- Average visits to CUinfo pages each month: 5.37 million
Meeting Campus Needs for Tools and Services

CIT supports or provides over a hundred products and services used by the Cornell community—ranging from Bear Access to Brio, CUinfo to CU-Objects, WebEmail to wireless. This year, with Cornell’s hiring freeze, we regrouped to focus our energies on maintenance and planning for the following fiscal year. Just a few of the year’s projects are highlighted here.

Creating a web portal

uportal.cornell.edu

By fall 2002, we will launch a web portal for the university. A portal lets users go to just one web site to access a whole range of information and services that they can further customize to suit their particular needs.

With this portal, each user can define a unique and personal view of Cornell’s vast array of current web offerings. It also offers a launching point for Bear Access services. And it introduces a new way for faculty, departments, and clubs to present information to their particular audiences, by way of channels.

The underlying structure is uPortal, a free, open-source, sharable portal tool being developed by higher education institutions under the auspices of the Java in Administration Special Interest Group (JA-SIG). The XML- and JSP-based uPortal is a nice compromise between the overhead of a locally developed solution and the lack of flexibility found in commercial solutions.

It also enables us to reuse many infrastructure components already deployed in existing Cornell services, such as Employee Essentials, the Student Employment Service, and PEDL. Components in use include authentication, authorization, directory services, SALSA (Service and Licensed Software Acquisition), and other middleware.

With the benefit of object-oriented technology and Java, CIT and JA-SIG have a great opportunity in higher education to do things better as col-

Strategic plan:

Execute our current portfolio of services with a high level of performance and reliability while improving our efficiency and responsiveness

Progress:

- Web portal development
- Software licensing agreements
- Mainframe replacement
- 100 percent recycled paper in public lab printers
- E-mail system improvements
- Lower fees for backup service
- More space for personal web sites
- Emergency plans

Mark Bodenstein, CIT programmer/analyst, helped us replace our mainframe with one that is the same capacity but costs $275,000 less to operate annually.
leagues. As a member of JA-SIG, we can help influence the design and add components as the project moves forward.

**Saving 1.5 million on software**

[www.cit.cornell.edu/software/licenses](http://www.cit.cornell.edu/software/licenses)

Our Software Acquisition Service, led by Chuck Jes sop, has been extremely successful in negotiating attractive pricing for 22 software titles and packages, including three major contracts with Adobe, Microsoft, and Oracle (our newest contract). In 2001, the university saved approximately $1.5 million on software purchased under these agreements, compared to educational retail pricing. We are currently analyzing how we can streamline the purchasing process and facilitate license tracking, and expand software offerings to the Cornell community.

**Saving a quarter-million on CornellC**

This year, we replaced our Generation 4 IBM 9672-R25 mainframe (CornellC) with a new Generation 5 IBM 7060-H55. It’s the same capacity but costs $275,000 less to operate per year. We also upgraded Adabas, the database where all the data on CornellC is stored. And we deactivated 1,541 user IDs and renewed 3,100.

Except for the Human Resources/Payroll system, CornellC still runs most of the university’s central administrative systems. During prime-time hours, it is accessed simultaneously by an average of 600 people. Among the systems we host are student-related systems for admissions, financial aid, registration, and the bursar; financial systems for accounts receivable and payable, general ledger, and purchasing; and systems for Alumni Affairs, Sponsored Programs, Campus Life, Transportation, and a number of other departments.

**Making Net-Print greener**

[www.cit.cornell.edu/net-print](http://www.cit.cornell.edu/net-print)

In response to requests from the student group Society for Natural Resources Conservation, we investigated stocking our Net-Print printers with 100 percent post-consumer-waste recycled paper. Unlike the recycled papers we were already using, this type does not contain any scraps from trees used to make virgin paper. It’s made solely from paper that was once in someone’s recycling bin.

Over 2 million pages are printed in our public computer labs each year. Tests in our labs and the cost analysis convinced us to switch. By fall 2002, we will offer this paper exclusively in all of our labs. We are now looking at the feasibility of using this paper throughout CIT/OIT.

This year we also upgraded the Net-Print server and server software to boost the service’s speed and capacity, and added two color laser printers in our labs.

“A major advantage of web-based data collection is that we can evaluate what’s going on with bird populations at a continent-wide scale as soon as participants enter their observations.”

—John Fitzpatrick, director of the Cornell Lab of Ornithology, in the August 16, 2001, issue of the Cornell Chronicle. The lab’s servers are monitored and supported by CIT.

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**2020**

- Pages printed annually via Net-Print (CIT’s lab-based laser printing service) in CIT labs: 2.8 million
- Pages printed annually via Net-Print in non-CIT labs: 3.18 million
- Number of Net-Print printers (CIT and non-CIT): 85
Energizing the e-mail systems

Although we had planned to replace our e-mail servers beginning in this fiscal year and continuing into the next, the 20 percent jump in e-mail traffic following the September 11 terrorist attacks made it clear that we needed to take action sooner rather than later. We have replaced two servers and will replace the third and add another one by fall 2002. With four brand-new servers, e-mail performance will be greatly improved.

This year we also upgraded the hardware that supports Cornell’s 2,600 mailing lists. We can now deliver mailing-list messages more quickly and reliably, and can host all lists on the same server. In addition, we have begun investigating alternatives to ListProc, the software that runs the lists. The vendor discontinued ListProc development in 2001.

E-mail Traffic via CIT’s Postoffices (Fiscal Year 2001/02)

EZ-Backup protects over 16.5 terabytes of data on more than 2,400 laptops, workstations, and servers (including Cornell’s server “farm” in Rhodes Hall, home to critical university data) from the inevitable disasters that befall electronic equipment—from human error and viruses to theft and component failures to floods and fires.

“"It was with great pride that I accepted the 2001 American Association of Law Libraries Best New Product Award for our Internet product, Hein-On-Line: The Modern Link to Legal History.”

—Kevin M. Marmion, president, William S. Hein & Co., Inc. An extensive, web-based collection of legal periodicals, Hein-On-Line is hosted by CIT and was developed in collaboration with CIT and Cornell Law Library.

This year, we increased our capacity and performance with additional disk storage, a new automated tape library, and faster network access. We also increased the amount of storage that our base rate buys, and decreased the rates for additional storage and for long-term static storage.

- E-mail messages routed: 357.6 million
- Average cost of an e-mail message: $0.001
- Special mailboxes (e-mail accounts set up for a business purpose): 1,522
Giving CU People more space
www.people.cornell.edu

CU People provides free space for the personal web pages of faculty, staff, and students. To keep the service on par with other such services, we increased each user’s web space from 5 MB (megabyte) to 15 MB. More than 1,700 faculty and staff and 7,000 students have CU People pages.

Planning for emergencies

This year, we convened a committee of CIT staff from different areas to update our Emergency Preparedness Plan, first drafted in 1999. We have finished reorganizing and revising the plan in accordance with our current organization, and are now focusing on business continuity planning.

To gain external perspective, in October 2001, we hosted a seminar on business continuity planning with expert Rick Bellwood, infrastructure security specialist at Natural Resources Canada. In the upcoming year, we will be working with other campus units to ensure that we have fully evaluated the steps necessary to restore services after an emergency, in the order and at the level required for Cornell’s business to be conducted.

- CIT-Alert-L messages sent: 10 (this list notifies the community about computer viruses circulating on campus and significant service outages)
- Visits to Employee Essentials web pages annually: 3.4 million
- Number of jobs printed via EZ-Print (CIT’s high-speed laser printing service): 302,794
- EZ-Remote modems (paid, dialup service): 529
- Express Lane modems (free, time-limited dialup service): 69
- Requests for assistance from the HelpDesk (phone, e-mail, or walk-in): 31,866
- HelpDesk requests that required follow-up work: 2,995
- Callers to the HelpDesk who hung up after being put on hold: 9.2 percent
- Times Just the Facts is used annually: 811,700
- Students who took CIT’s 50-minute “Travelers of the Electronic Highway” orientation: 4,960

To help keep the campus informed about what CIT is doing, our documentation and marketing groups produced some 160 how-to booklets, news articles, lab desktop images, and mailings, in addition to maintaining and continuously expanding our comprehensive web site www.cit.cornell.edu.

To see at a glance which Eudora messages need attention, set up a color-coded system of priorities, such as red for “Act Now” or brown for “Review Eventually.” Eudora’s colored labels make this easy to do.

—organizational tip for Eudora users, in the Jan. 31, 2002, issue of PawPrint

Speedily set a date and time for a meeting: in your calendar, go to the desired day, click on the desired time slot (hold down the mouse button to select more than one slot), then double-click to open the New Meeting window.

—shortcut for CorporateTime users, in the March 21, 2002, issue of PawPrint
Managing who you are and what you can access

In 2001, we pulled together the CIT staff who focus on authentication, authorization, and the electronic directory to form a new Identity Management group. Authentication is how we ensure you really are who you claim to be—that’s what Kerberos and SideCar do. Authorization is how, once you’re authenticated, the system manages what services you can access.

The Identity Management group is responsible for the technology, policy recommendations, and issues regarding NetIDs, passwords, and the contents of the directory and who can access it. The group also investigates new technologies and recommends the course that CIT should take.

In addition to our work with the electronic directory (see below), we have begun investigating PKI (public key infrastructure) as a future complement to our current authentication and authorization systems. PKI is a developing technology that encrypts and decrypts sensitive data through a system of public and private encryption keys. It also allows users to digitally sign documents to guard against alteration or forgery en route.

PKI would give Cornell more flexibility in authenticating and authorizing users no matter where they are. As a stepping stone to PKI, we will launch a pilot PGP (Pretty Good Privacy) program in the upcoming year. PGP is an e-mail encryption program that uses a system of public and private keys, similar to PKI. This pilot will give us experience working with keys on a scale that will help us understand what policies and procedures we would need to support PKI.

Making the electronic directory do more

directory.cornell.edu

In 2001, we deployed a new electronic directory based on LDAP (Lightweight Directory Access Protocol). For nine months, it ran in parallel with our...
older directory system, QI. In January 2002, we retired QI and are now focused on enhancing the new directory's functionality.

One small enhancement we made at the faculty's request was to make student photos available through the Faculty Advisor application. We adapted a process we'd already been using to create PDF files of class lists containing student photos. To make the process work with Faculty Advisor, we imported the student ID photos from the Registrar's ID system into the directory, and are using a webMethods integration to keep the directory synchronized in near real-time.

Currently underway is a much bigger effort to establish business rules and policies about how data is entered and retained in the directory. Once we upgrade to PeopleSoft version 8, the directory will be used to authorize access to PeopleSoft.

To make this happen, we need the answers to many questions, such as which people are given permanent identifiers and thus entered in the PeopleSoft systems? What about identifiers for prospective members of the community or for visiting researchers? What information goes in the directory? What happens to an identifier when the person leaves or graduates? We are part of a Data Administration Committee that is tackling these issues. The committee is chaired by Mike Whalen of Cornell's Planning and Budget division.

We are also looking at how much information can be gleaned from the directory and by whom, both in response to privacy concerns and to e-mail spamming. And we are following the efforts of two Internet 2-sponsored initiatives to structure higher-education directory information in a reasonably common manner. EduPerson is focused on creating common data elements so that directories will be compatible. Shibboleth is tasked with making it possible for users who are authenticated at their home university to access protected resources at cooperating universities.

Building better defense mechanisms
www.cit.cornell.edu/computer/security

All it takes is a glance at the network logs to be convinced that network security must continue to be a top priority. Our networks are constantly being scanned by people looking for weak spots to break in. A brief review of our defensive tactics last year:

Single Point of Entry

Reported security cases jumped from 157 per month in 2000 to 426 per month in 2001. Our existing processes could not scale to that level, so we designated the Network Operations Center (NOC) as the single point of entry for abuse and security complaints. E-mail addressed to security@cornell.edu, abuse@cornell.edu, or noc@cornell.edu is routed to the NOC for initial triage and verification, then distributed to the appropriate CIT staff for resolution. All complaints are logged in Vantive, a tracking tool. The new process enables us to respond quickly and coherently.

Updates made to the electronic directory daily: 6,000
Directory searches per day: 1.5 million

• Complaints made about alleged computer violations, electronic copyright violations, and other types of computer-related abuse: 1,204
Security Vulnerability Assessments

Our Systems and Network Infrastructure Security Team performs, on average, 122 security vulnerability assessments each week for registered network administrators. Our tool is Internet Security Systems’ Internet Scanner, which can detect 1,100 vulnerabilities in Unix and Windows-based systems.

In addition to pointing out security problems and detailing how to correct them, these assessments can serve as a baseline from which to measure improvements, or document the need for funding security enhancements. The service is free of charge.

Code Red Containment

In summer and fall 2001, the Cornell community was heavily hit by two Windows worms—Code Red and Nimda. To detect infected computers, we identified the worms’ network “fingerprint” on outgoing connections. We could then block infected computers at Cornell from spreading these worms beyond the campus network, and we could notify the administrators of those computers. The blocks we imposed on the computers were so selective that infected web servers remained accessible even though the spread of the worms was intercepted.

Virus/Worm Management

Since spring 2001, we have seen a dramatic increase in viruses and worms circulating on Cornell’s networks. In response, we have synchronized the virus management procedures used by the Network Operations Center and the HelpDesk, and made the HelpDesk the primary point of contact.

We also notify the local network administrators about virus complaints or virus-infected messages received from their users, and we contact people who are propagating viruses, presumably unknowingly or unintentionally.

- Annual Norton AntiVirus application downloads: 13,788
- Phone calls answered by the Network Operations Center each month: 1,500
- Times Spamshield was activated: 400, 206 times in April-May 2002 alone. (Spamshield temporarily blocks most external sites sending us more than 400 e-mails in a 15-minute period.)
- Anecdotal estimate of spam volume at Cornell (e-mail content is not currently monitored in any way): 5-10 percent of messages, or up to 100,000 messages a day
“We’re currently discussing options for filtering out viruses. Spam filtering would be a similar effort, but in keeping with Cornell’s philosophy, it would need to be an opt-in/opt-out system and give users the ability to retrieve e-mail flagged as spam.”

—Don MacLeod, CIT assistant director of client systems, explaining some factors influencing how quickly we can implement a system to filter e-mail spam, in the March 14, 2002, issue of the Cornell Chronicle

For outbreaks, we have outlined our options for technological remedies and for communications with the campus, and have authorized a core group of CIT staff from different areas to assess the severity of the outbreak and help contain or mediate its effects.

Finally, we are investigating virus filtering tools to use with our central e-mail system. We hope to have both the tool and the supporting policies in place in the upcoming year.

Usage Anomaly Alerts

As a complement to our intrusion detection system, which detects probes and scans of Cornell’s network, we implemented a new system to detect usage anomalies, which are a common indicator that a system has been compromised. When a computer dramatically increases its off-campus network activity, we notify the network administrator for that computer. The system has detected a significant number of compromised systems that had been used to distribute software and data without the owners’ knowledge.
Enriching Cornell’s Leadership in Technology

Providing leadership in responding to the Patriot Act

www.cit.cornell.edu/oit/PatriotAct

Six weeks after Sept. 11, 2001, the U.S. Congress passed the USA-Patriot Act with the intent to help protect U.S. citizens from further terrorist attacks. Signed by President Bush on Oct. 26, 2001, the Act, among other things, amends the Family Education Rights and Privacy Act (FERPA) of 1972, the Foreign Intelligence Surveillance Act (FISA) of 1978, and the Electronic Communications Privacy Act (ECPA) of 1986.

Broadly speaking, the Patriot Act expands the circumstances under which law enforcement and intelligence agencies can lawfully request the contents of electronic communications, information about users of Cornell’s network services, and information from student and business records.

At the request of vice president for information technologies Polley McClure, Tracy Mitrano, policy advisor for information technologies, began studying the Patriot Act as it was wending its way through Congress. When it was signed into law, we were well ahead of the curve in understanding the Patriot Act’s implications for higher education and for information technology in particular.

With University Counsel, we rapidly developed protocols for responding to requests made under the Patriot Act’s exceptions to the Electronic Communications Privacy Act, putting Cornell at the forefront in this area. These protocols outline who should be contacted and under what circumstances. They also help to ensure that we reveal only information narrowly tailored to the legal request, which University Counsel vets.

In keeping with the university’s commitment to the free exchange of information, Mitrano has given presentations all over the country and been responsible for Cornell’s leadership in responding to requests made under the Patriot Act’s exceptions to the Electronic Communications Privacy Act.

“We don’t want people all over the university calling the FBI just because they feel it’s now legal to ask for federal intervention. We needed to set up the proper protocol in advance.”

—Tracy Mitrano, policy advisor for information technologies, explaining Cornell’s response to the USA-Patriot Act, in the May 2002 issue of University Business
cited for Cornell’s position on these protocols in numerous media articles. Our Patriot Act web site receives hundreds of hits a month and has assisted a number of other colleges and universities in developing protocols suited to the particular culture of their institution.

Teaching tomorrow’s architects to build virtually

Thirty years after first working with computers in architecture, professor Henry Richardson, with a little help from CIT, will teach architecture in virtual reality starting in spring 2003. A Faculty Innovation in Teaching grant (see page 11) titled “CAVE Technology in Teaching Architecture and Urban Design” is supporting his work.

Partnering with Henry are our Academic Technology Center’s Noni Korf Vidal and the Rhodes Hall CAVE (Cave Automatic Virtual Environment). A CAVE creates the perception of virtual reality through three-dimensional imagery involving sight, sound, and touch. It is the next best thing to being there.

In the CAVE, a student achieves full immersion by wearing special “stereoscopic” glasses and navigating with a hand-held pointing device. Images appear to float in space and the student can “walk” around them while maintaining a proper perspective. The 10 x 10 dimensions allow multiple students to immerse themselves in the same virtual environment simultaneously.

Noni arranged for the Theory Center to update the CAVE’s three-dimensional software and to add 8 to 10 workstations for architecture students. The Faculty Innovation in Teaching Grants Program and the Theory Center are working together to implement a new CAVE that will enable architecture students to make real-time rendering changes from within the CAVE. Students will be able to change brick walls into glass walls, for example, without having to return to their workstations.

“To create livable and memorable environments, designers must learn to transform abstractions of space and time into palpable experiences of place and occasion,” Henry said. “Short of building a full-scale mock-up of the environment, CAVE technology is currently the only promising and feasible means of simulating place and occasion.”

Augmenting the Advanced Placement curriculum in computer science

Faculty Innovation in Teaching grant winner David Gries, visiting computer science professor from the University of Georgia and a previous Cornell Weiss Presidential Fellow, has teamed up with our Academic Technology Center’s Clare van den Blink to create Advanced Placement Java instructional modules.

The project, “AP High School Computer Science—CU Support Modules,” is geared toward high school students taking an Advanced Placement course in computer programming and college freshmen taking Computer Science 100. David and Clare are developing a web site with several modules on various Java programming concepts—to augment the teaching materials in those courses.

“I know from having taught Computer Science 100 many times that students don’t get the practice and hands-on experience they need during the course,” David said. “If it were possible for a teacher to sit down one-on-one with each student for several hours, the students could learn far more effectively. But the number of students in our CS100 is so great this is impossible. In high school, there may be a better teacher/student ratio, but the teachers are often not expert enough in the subject.

“You have to recognize that in everything you do, you are creating a record that someone can access later on.”

A well-designed web site that helped the students do exercises interactively could take the place of one-on-one interaction. Any high school, or college, for that matter, could use the site.

Instructional challenges to be addressed include teaching how to approach programming and develop programs incrementally, and introducing object-oriented programming. Based on the success of this project, the idea could be expanded to other Advanced Placement courses.

Joining ranks with EDUCAUSE

In May 2002, vice president for information technologies Polley McClure announced the collaboration of Cornell’s Computer Policy and Law (CPL) program with EDUCAUSE, a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology.

The new organization, called the EDUCAUSE and Cornell Institute for Policy and Law in Information Technologies ("The Institute" for short), is jointly run by Tracy Mitrano, policy advisor for information technologies, and Steve Worona, director of Policy and Networking Programs at EDUCAUSE (and an OIT "alumnus").

The Institute supports the professional development of information technology, policy, and legal professionals within higher education and facilitates development of effective policy for higher education institutions.

Why did we merge? The CPL program is recognized as an authoritative resource for information and perspective on issues of policy related to information technologies. But it could not expand beyond its current effectiveness if we kept it under Cornell’s umbrella.

Both Cornell and EDUCAUSE can accomplish more by working together than either could alone. EDUCAUSE can broaden the scope of the CPL program without additional cost to Cornell by spotlighting the program in association with national and regional conferences and through EDUCAUSE’s extensive web presence.

Long-term plans for The Institute include devising a multi-year plan that would increase its visibility and value to higher education. Policy and law provide a centrifugal force for information technologies in higher education, and their forces will only increase in coming years.

Learning about the Laws of Technology

Computer Policy and Law seminars explore issues in information technologies through lectures and forums for the broader Cornell community.

2001/02 programs

- Sept. 2001: “The Microsoft Case: Information Technology and a New Era of Anti-Trust,” with George Hey, Cornell Law School and Economics; Michael Waldman, Johnson Graduate School of Management; and Ken Birman, Computer Science
- Oct. 2001: “Privacy: Do We Have Any? Do We Even Know What It Is?” with Robert Gellman, privacy and information policy consultant
- Feb. 2002: “Digital Copyright: The Downside of Downloading Audio, Video, or Software,” with Patricia McClary, University Counsel; Tracy Mitrano, policy advisor for information technologies and director of the Computer Policy and Law program; and Mary Beth Grant, Judicial Administrator
- April 2002: “Copyright in Cyberspace: The Digital Millennium Copyright Act: How Unconstitutional Is It?” with Georgia Harper, associate counsel, University of Texas at Austin

“I am concerned that copyright’s basic goal, to improve our society by supporting the development of knowledge, is endangered by the erosion of users’ rights in the digital environment.”

—Georgia Harper, associate counsel at the University of Texas, led a Computer Policy and Law seminar on copyright in cyberspace.

Georgia Harper, associate counsel at the University of Texas, led a Computer Policy and Law seminar on copyright in cyberspace.
Weathering the staff hiring freeze

From November 2001 through June 2002, Cornell instituted a staff hiring freeze as a proactive response to lower than expected levels of state funding, return on its endowment, and private giving in the upcoming year. The university also plans to conduct a thorough workforce review of each major administrative area, including information technologies.

Immediately after the hiring freeze was announced, we began an internal, bottom-up workforce review, looking at where we could operate with fewer staff or make better use of staff by reorganizing work groups, and identifying which programs needed additional staff to function even at a barebones level and which ones could limp along understaffed.

Over the course of the freeze, 43 existing CIT positions were affected, plus some planned new hires. We were granted freeze exemptions to hire for 21 critical positions, about half of which were in support of administrative computing.

In September 2002, a university-wide analysis of Cornell’s information technologies (IT) workforce is expected to begin. Vice president for IT Polley McClure will lead a campuswide effort to clarify the roles and responsibilities of IT staff, explore ways in which IT staff can work more efficiently, and develop levels of IT service expectations.

Preliminary data indicate that IT staffing throughout Cornell has increased by about 20 percent in the last 10 years, a rather modest gain for a period in which IT grew rapidly from being something of a novelty to essential in the daily work of most faculty, staff, and students.

Strategic plan:
Improve our service delivery models and skills

Progress:
- Response to staff hiring freeze and upcoming workforce analysis
- Annual customer survey results
- Seven organizational values established
- Quality of work life improvements
- Better internal business practices

Measuring how well we meet campus needs

Once a year, we do a customer survey among faculty, staff, and students on the Ithaca campus. With the help of the Office of Communication Strategies, we distributed a 10-question postcard in February 2002. Just over 19,000 surveys were sent out, and about 1,800 were returned.

Our 2002 results showed improvement in 9 of 10 areas surveyed. Five improved by 10 or more points. We are quite happy with these results and
2002 Customer Satisfaction Survey Results

**I feel well informed about CIT services and facilities.**
Other responses: 23.8 % neither disagreed or agreed (was 22.8 % in 2001); 28.0 % disagreed or strongly disagreed (was 38.1 % in 2001)

**I am satisfied with the speed and convenience of CIT services.**
Other responses: 16.8 % neither disagreed or agreed (was 17.8 % in 2001); 5.5 % disagreed or strongly disagreed (was 9.9 % in 2001)

**I can usually find the campus technology information I’m looking for in CIT printed and web resources.**
Other responses: 22.7 % neither disagreed or agreed (was 28.0 % in 2001); 13.8 % disagreed or strongly disagreed (was 21.5 % in 2001)

**When there is a fee for services, CIT provides fair value for the price.**
Other responses: 43.3 % neither disagreed or agreed (was 50.7 % in 2001); 32.3 % disagreed or strongly disagreed (was 23.9 % in 2001)

**When I need to contact someone at CIT, it’s easy to get in touch with the appropriate person or group.**
Other responses: 24.3 % neither disagreed or agreed (was 23.1 % in 2001); 16.3 % disagreed or strongly disagreed (was 27.7 % in 2001)

**CIT is an innovative university technology organization.**
Other responses: 41.6 % neither disagreed or agreed (was 44.0 % in 2001); 12.1 % disagreed or strongly disagreed (was 15.3 % in 2001)

**CIT staff members are usually responsive and customer-oriented.**
Other responses: 17.2 % neither disagreed or agreed (was 19.1 % in 2001); 7.7 % disagreed or strongly disagreed (was 12.9 % in 2001)

**Overall, I am satisfied with the variety of services and facilities CIT provides.**
Other responses: 29.3 % neither disagreed or agreed (was 36.9 % in 2001); 9.7 % disagreed or strongly disagreed (was 14.4 % in 2001)

**Overall, I am satisfied with the quality of services and facilities CIT provides.**
Other responses: 21.1 % neither disagreed or agreed (was 25.7 % in 2001); 11.6 % disagreed or strongly disagreed (was 17.0 % in 2001)

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**I am satisfied with the speed and convenience of CIT services.**

**I can usually find the campus technology information I’m looking for in CIT printed and web resources.**

**When there is a fee for services, CIT provides fair value for the price.**

**When I need to contact someone at CIT, it’s easy to get in touch with the appropriate person or group.**

**CIT is an innovative university technology organization.**

**Overall, I am satisfied with the variety of services and facilities CIT provides.**

**Overall, I am satisfied with the quality of services and facilities CIT provides.**
hope they reflect our efforts to improve the service we deliver to Cornell.

Setting values to guide our service to Cornell

This year, we developed a set of seven values to guide how we approach our work with each other and within the university. Developed by OIT/CIT senior management in fall 2001, the values were reviewed and refined by the entire staff in early spring 2002. Our seven values are:

1. Service, leadership, and stewardship: We exist to meet the information technology needs of Cornell as the university pursues its teaching, research, and outreach goals.

2. People: The heart of any organization is its people. A staff that is happy, secure, and respected is essential to the enduring success of the organization.

3. Trust and integrity: The trust that we seek is forged by both our personal integrity and that of our organization.

4. Effective communication: Clear, consistent, and honest communications serve to establish effective working relationships within OIT/CIT and the broader Cornell community.

5. Prudent risk-taking: Achieving balance between “creative innovation” and “enduring progress.”

6. Fact-based decision-making: Analytical due diligence is expected of all of us.

7. Results focused: We are judged by the results we achieve in the eyes of our customers.

Making CIT a better place to work

Every year, our staff are surveyed on how they feel about working at CIT. The survey reports on employee/supervisor relationships, opportunities for growth, job satisfaction, compensation, perceptions of trust and fairness, and the general quality of work life (QWL) at CIT.

Quality of Work Life: Areas of Staff Satisfaction and Dissatisfaction

Following the 2001 survey, a team of seven staff—representing 92 years of CIT experience—reviewed the results in detail and made recommendations for improvement. Pam Strausser of Cornell’s Office of Human Resources provided guidance on process.

The team determined that the top 12 areas of staff dissatisfaction could be addressed by focusing on communication and recognition. In early spring 2002, they presented over 45 recommendations for improvement to OIT/CIT’s senior managers, who selected 28 to begin working on immediately.

Among them are creating a staff feedback/discussion board; continuing the good communication practices started in the past year; enhancing
the orientation program for new staff; and providing CIT staff more information about internal job postings.

Even though the 2002 survey was conducted shortly after the recommendations were adopted, the results show substantial improvement in some areas as compared to the 2001 survey. On the previous page are the ratings for four questions, representing areas that we are doing well in and areas that need improvement.

**Taking care of business**

Being successful in providing excellent service to the campus starts with having solid internal business practices. This year, we made some changes in those practices to improve our efficiency and our ability to assess our performance.

- **Regular progress reports:** We have instituted several tools to keep close watch on the status and quality of our programs, services, and projects throughout the year. We revise our 3-year strategic plan annually. Then each unit develops annual service and project operating plans that will help meet the goals identified in the strategic plan.

  We measure our progress every quarter through standardized reports produced by each unit.

These quarterly checkups give us a global view of the organization and better visibility into where we need to adjust budgets, staffing, or expectations in order to accomplish our goals. Because the reporting focuses on metrics as well as milestones, this process also lets us routinely assess the quality of our programs. Finally, we tell Cornell’s senior management and the campus community how we’re doing through this annual report.

- **Administrative processes:** All of our units have begun engaging our Business Administration Center earlier in the transaction processing timeline, for tasks such as bidding, acquiring consultant services, issuing purchase and blanket orders, and making travel arrangements. As a result, we are more efficient and can avoid administrative red tape that sometimes held up projects in the past. And we’re leaving our technical staff free to focus on the projects themselves, and not on the administrative matters.

- **Policy interpretations:** The university’s administrative policies are usually very broad in nature. When these policies are issued or modified, our Business Administration Center creates or updates our internal policies to better apply the specifics of the policies to CIT, build new tools, and inform everyone who needs to know.

- **Office renovations:** This year we will complete our multi-stage withdrawal from a large portion of space we occupy in Rhodes Hall. Our move frees up more central campus space for academic programs. With the help of Cornell’s Planning, Design, and Construction group, we have finished renovating our 110 Maple Avenue facility and are converting the basement of the Computing and Communications Center from a machine room to staff space. We hope to have all construction completed and staff settled into their new homes by the end of 2002.

- **Refocusing Customer Services and Marketing:** This year, we took a close look at the objectives, processes, and interdependencies of this CIT unit, which runs the HelpDesk, provides general user training and documentation, and promotes our products and services. Major improvements include doing a monthly project status report; creating one process (instead of five) for accepting projects; and naming a single point of contact in the unit to coordinate each project. The unit now completes 30 projects a month instead of 8.

- **Number of CIT purchasing/accounts payable, payroll, capital assets, and facilities transactions processed:** 7,132

- **Staff hired:** 36 (27 new to Cornell)

- **Average years of service by our staff:** 11 (8.5 with CIT)

- **Number of staff with 10 years of service:** 144 ... with 20: 55
Acknowledgments

This annual report covers the July 1, 2001, to June 30, 2002, period. All staff listings reflect staff employed during that period.

Many thanks to

The annual report team: Teresa Craighead, Jim Lombardi, Mark Mara, Polley McClure, and Jason Rhoades.

Diane Sempler for gathering the metrics.

Jacqui Benedict, Jan Jesmer, Jennifer Johns, Kurt Larsen, Nadine Manning, and Donna Poole for their help with distribution.

Everyone who edited and reviewed content, and provided information for the charts and graphs.

Everyone we photographed to help show the diverse community we work with.

Mother Nature for giving us a 20-minute window between thunderstorms for our CIT group photo, which represents about half our staff.

The Creative Team

Leslie Intemann (left) and Beth Goelzer Lyons

Written by Beth Goelzer Lyons (lead) and Leslie Intemann of CIT
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Photography by Robert Barker of University Photography, except for the CIT group shot (opposite the inside front cover) by Jon Reis of Jon Reis Photography
“Crangles” by J. P. Crangle
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9/02 1.2m FLP MTS 10442
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