



Strategic Plan for
Information Technology
Services, 2008-2013

Fulfilling the Promise of
Information Technology

June 30, 2008

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Acknowledgments

ITS would like to thank the Penn State community for helping us create our strategic plan. Because we learned so much from this input, we would like to describe our process of listening to our community and framing our strategies in light of their greatest needs.

In January and February, we held four open forums for ITS staff and three open forums for both ITS staff and the University Libraries. We captured the dialogue of these meetings and published the summaries in a wiki open to everyone at Penn State. In this same wiki (<https://wikispaces.psu.edu/display/stratplan/Home>) we hosted discussion forums and shared working drafts of our plan as it developed through many discussions (<https://wikispaces.psu.edu/display/ITSULStratPlan/Notes+for+Feb+19+Forum>). In February Kevin Morooney outlined our approach to IT planning in a Quality Advocates session (<http://www.psu.edu/president/cqi/advocates/2008/02/06/index.html>).

In March, we worked with the University Libraries and the Faculty Advisory Committee on Academic Computing to survey 12,000 users in a random sample of faculty, staff, and students (<http://tit.psu.edu/surveys>). From January through April, we interviewed every ACUE dean and every chancellor about strategic directions for e-learning and training, and we shared the results with many university-wide committees.

We sought guidance from our advisory committees: the e-Education Council, the University Research Council, the directors of IT for colleges and campuses, the Faculty Advisory Committee on Academic Computing, the Integrated Administrative Systems Steering Committee, and many deans and executives. Late in the spring we met with the leadership of Outreach and the Controller's office to share information in our respective plans. Throughout the year we worked very closely with the leadership of the University Libraries because we share so many critical goals.

We want to thank all of the faculty, staff, and students who helped us plan the future of information technology at Penn State.

Executive Summary

The strategic plan for Information Technology Service reflects very significant engagement with the key stakeholders of the University – faculty, staff, and students – as we seek to leverage the extraordinary resources of the digital era. Fifteen years ago Penn State put up its first home page on the World Wide Web. Today we envision a Penn State that will use information technologies to transform our business processes, enhance teaching and learning, strengthen our research enterprise, and build new kinds of collaborative tools and new kinds of communities. We will accomplish all of these goals in ways that protect privacy and include appropriate kinds of security for every transaction.

We identified seven drivers of change that will challenge how we do our work: (1) e-learning and on-line presence; (2) cyberinfrastructure; (3) mobility, bandwidth, and service convergence; (4) management of information and innovation; (5) security, regulatory mandates, and business continuity; (6) resource constraints and energy efficiency; and (7) internationalization and globalization. These drivers affect all of higher education, not just Penn State. These drivers are part of the climate of change.

We face five critical challenges. Our greatest challenge is securing adequate space to provide the University's IT infrastructure. Without adequate infrastructure (which includes space, technology, and staff), Penn State researchers cannot compete successfully. Our second challenge is to secure adequate funding for our enterprise systems and for security while also supporting critical initiatives in teaching and research. Our third challenge is to strengthen identity management and data security without losing the best qualities of openness that have characterized higher education for decades. Our last two challenges deal with collaboration, partnerships, IT leadership, and change management. These challenges acknowledge that IT at Penn State is much larger than a single unit like ITS. We need to find better, more efficient ways to collaborate, communicate, and plan. The challenges we face are too complex to be solved in silos, and the sharing of "best practices" must become routine. We need to find new ways to strengthen IT leadership in all units so that we can manage change effectively.

We propose six strategies to achieve our vision: (1) enhance discipline-appropriate support for teaching and learning; (2) strengthen discipline-appropriate support for research; (3) secure University systems and information; (4) manage IT investments cost-effectively; (5) foster improvements in communication and collaboration; and (6) promote university-wide IT leadership, governance, and professional development.

Our funding requests will enable ITS to implement these strategies and to help Penn State achieve its strategic vision and goals.

I. Vision for Information Technology Services, 2008-2020

To describe a vision for Information Technology Services a decade from now is to glimpse a very different Penn State. While some of the drivers of change will be external (new technologies, new regulatory expectations, and new fiscal pressures), the most dramatic drivers will be social expectations. Our students will expect a different kind of learning environment from the one we provided ten years ago – or even today. All of our students will be digital natives, and they will expect Penn State to be as responsive as the best Web sites and services they use. As Penn State continues to become more and more student-centered, technology will support our efforts to transform the old Penn State into the new Penn State. As Alan Kay observed some years ago, the best way to plan for the future is to invent it.

The new Penn State will be defined by its IT infrastructure. IT at Penn State is larger than ITS, and we know that shared responsibility will be a mantra of success. As the largest IT provider, we believe that ten critical environmental features will differentiate us from peer universities. In the next decade, the issue will not be how to envision our transformation; the issue will be how to implement it. Let us touch briefly on these ten features. Penn State will be distinguished by:

1. Enriched communication tools and connectivity options for all Penn Staters and those with whom they are working and collaborating throughout the world;
2. Enhanced security of personal information by leveraging our strategies for identity management;
3. Increased flexibility, personalization, and effectiveness of learning environments inside and outside of our classrooms, labs, and libraries;
4. Improved strategies for assessing and supporting students' academic and co-curricular development;
5. Expanded access to the world's information sources through the Libraries and other networked resources;
6. Advanced tools for doing research and sharing discoveries from the undergraduate experience to our most advanced research labs;
7. Increased efficiency and effectiveness in managing Penn State's business operations and enterprise systems;
8. Enriched climate for collaboration and innovation among the colleges, campuses, business units, and ITS, especially as we face such common challenges as data center floor space, security, and desktop management;
9. Increased access to IT training for faculty, staff, and students at all locations and discipline-appropriate pedagogical and research support for faculty and teaching assistants;
10. Heightened sensitivity to the global environment in which Penn State competes and to which it will contribute through its international programs, scholarly exchanges, and educational partnerships.

Information Technology Services will play a critical role in helping the new Penn State flourish through our leadership role in supporting the key initiatives of our plan.

Trends, Forces, and Drivers of Change

Multi-year predictions of new technology devices or services are difficult to do. Who could have predicted ad-based revenue models for on-line business, the success of the iPod and iPhone, the viral marketing of social networking sites, consumer acceptance of short videos on the Web, and digital cameras embedded in cell phones? These are but a few examples that were not recognized until they appeared.

We begin this section with the executive summary of what we learned about how Penn Staters use technology in our 2008 FACAC Survey (<http://tlf.psu.edu/surveys>). Our plan for the future must recognize where we are today.

Typical Penn State computer users consider themselves average in terms of computer expertise. Eighty-eight percent (88%) of them use laptops (mostly Windows), though the use of Macintosh continues to rise. Most use anti-virus software that is set to automatically update as well as having adware or spyware removal software on their computers. Most have never had a problem with computer security. Roughly half of them connect to Penn State's wireless network.

They store files and file backups in a wide variety of ways, ranging from "on my computer," using a flash drive or burning it onto CDs, to uploading onto a departmental or Information Technology Services (ITS) server. Staff members are more likely to back up onto a departmental or local server. Students are less likely to back up their files than are faculty or staff. A surprisingly high percentage of faculty, staff, and students do not back up their computer files.

Almost everyone owns a cell phone that they use for calling, sending text messages, or sharing photos. Fewer respondents subscribe to any service that provides alerts or bulletins and only 11% use their phone to send e-mail. Among the different groups, more students than faculty or staff send text messages or take and share photos. Students are also more likely to own an iPod original, classic, or nano; however, ownership of Shuffles and Touches are even across the groups.

For email, Penn State WebMail is the leading client, followed by Microsoft Outlook. Faculty and staff also use Eudora, while students also use Google mail. Electronic calendaring focused on Outlook, Google Calendar, Oracle Calendar, and the ANGEL calendar. Only about a third of the students use an electronic calendar. Other popular means of collaborating and communicating were face-to-face meetings and telephony, followed ANGEL and Adobe Connect. The ANGEL Community Hub is the most popular of the Penn State hubs.

Social computing is important. More than half of all the respondents have a Facebook account and approximately a third have MySpace accounts. 83% of students, 34% of faculty, and 23% of staff have Facebook accounts. Approximately one-third of faculty reported the use of YouTube for teaching purposes.

Most faculty (80%) use technology classrooms, though more than 21% find it increasingly difficult to be scheduled into such classrooms. Faculty communicate with students in many ways, though e-mail and ANGEL are most common. Newly introduced Penn State resources for teaching, such as iTunes U, blogs, and streaming services are used by the early adopters.

Most faculty use the CAT online library catalog and the academic databases, but only half are familiar with Google Scholar. Most faculty seek help from the University Libraries by e-mail, while students prefer getting help in person.

Staff reported that 28% of them had some responsibility for maintaining Web pages, and 89% believe their skills are adequate for the job. Most felt that their employment unit was generally supportive of their professional development. They are beginning to use videoconferencing to communicate and collaborate, with use split between Polycom and Adobe Connect.

A majority (88%) of students had laptops and 42% carried them on campus. They spend their time reading and writing e-mails, watching television, writing papers and working on projects for class, and reading assignments. They also spend some time listening to music on portable devices. Although they all have cell phones, only 40% have subscribed so far to PSUTXT.

Students use technology to do online searches and research, communicate with classmates and instructors about assignments, and access online course resources. A quarter of them take courses online. They take online quizzes more than five times each semester and receive prompt feedback on their learning. More than half of them play video or computer games with others. About 20% use student-response systems (clickers) in class. Students would like to be able to print from their laptops in ITS labs and to access Classroom and Lab Computing (CLC) lab software from home and to practice presentations with large monitors in the computer labs or Learning Spaces.

They use the CAT to search holdings in the Libraries and access the online databases to retrieve documents. Approximately half have used the "Get It @ Penn State" feature to obtain articles. They maintain multiple accounts or profiles on social Web sites and 20% forward their PSU e-mail elsewhere.

For planning purposes, we identify seven drivers of change that will shape technology directions locally and nationally.

1. **E-learning and On-line Presence.** Global flatness and Penn State's e-initiatives will increase our non-residential and international student populations. This will challenge traditional semester schedules, billing requirements, grading, and daily hours of operation. More and more academic units will be offering courses and programs online to meet students' expectations for convenience and relevance. We

can expect to serve students in all time-zones, and they will expect our services to be available when they need them. In 2008, about 25% of full-time Penn State undergraduates have completed at least one online course (2008 FACAC Survey). The World Campus hopes to increase enrollments to 50,000 by 2014, but many online courses will be offered in resident education. The concept of “office hours” will be radically re-defined as faculty and students become more mobile. IT will be enable new modes of instruction.

2. **Cyberinfrastructure.** Our research competitiveness and national rankings will be shaped by faculty engagement in national and international research programs that respond to the grand challenges of this century. We will need great expertise in creating, analyzing, managing, and sharing enormous datasets and in deploying new kinds of research tools to support and communicate discovery. Cyberinfrastructure, which includes hardware, software, people, organizations, and policies, is the most rapidly changing aspect of computing; it has the greatest potential to define new research agendas. A critical component will be support for specific communities that require unique tools or services as part of the infrastructure; virtual environments and and discipline-based social networks will be routine.
3. **Mobility, Bandwidth, and Service Convergence.** Mobile subscribers in North America are expected to reach 300 million in 2008, and with the increased spectrum that will be available in 2009, mobile devices will become the accepted way of working from anywhere and at anytime. Nearly 90% of full-time Penn State undergraduates own a laptop and a cell phone (2008 FACAC Survey). Formerly independent services like email and social networks will converge with voice and video. Portable devices that support multiple applications will continue to emerge. Increasing bandwidth will allow richer flow of information to and from Penn Staters. We will be increasingly connected to the world – and to each other – where we live, where we work, where we learn, and where we do research. Both the sense of time and location will alter. Managing the promise and peril of continuous connectivity will challenge us technically and culturally.
4. **Management of Information and Innovation.** The growing body of digitized information will exacerbate the need for better storage, archiving, retrieval, and management of information. Increased use of social networking will require modifications to the way we market the University to prospective students and the way we communicate with students, alumni, partners, vendors, and friends. Within the Penn State community, we will find more efficient ways of sharing best practices to reduce needless duplication of effort. **Innovation** will be driven in part by user-developed applications, not just by central services. The drive to use open standards and provide interoperability will allow individual choice yet collective utility. We must expect that the rate of technological change will continue, not diminish. New technologies will force us to find ways to manage them successfully for teaching, learning, and research. New business models for service providers will change the delivery paradigm: the service provider develops software, hosts this software on machines it provides, and offers the service to customers for use over the Internet.

“Web services” will become the norm for serving faculty, staff, students, customers, vendors, and partners.

5. **Security, Regulatory Mandates, and Business Continuity.** We will need to comply with external policy and regulatory requirements, and we will need to be involved to the extent possible in shaping these external requirements. Information Privacy and Security (IPAS) is a current initiative that reflects these pressures. Every institution faces increased threats from cyber-criminals and cyber-terrorists. Penn State will strengthen its programs to safeguard the privacy of our faculty, staff, and students and also ensure that we can perform our core business functions despite unanticipated disruptions.
6. **Resource Constraints and Energy Efficiency.** Shrinking financial resources will force greater levels of collaboration across the University and among universities to realize even greater levels of efficiency and harvest the effectiveness of previous technology investments. "Green computing" will become increasingly important. From using equipment that is more energy efficient to utilizing IT in applications that reduce carbon emissions, it will become increasingly important to be "green." Information technologies will be critical in reducing the need for travel and improving operational efficiency.
7. **Internationalization and Globalization.** The mission of Penn State in teaching, research, and service will take on an increasingly global urgency as we sustain partnerships with international students, companies, and institutions. Critical to our success will be our responsiveness to new opportunities and our deployment of the right technologies. Higher education is one sector where American universities have a lead over others, and there is a huge demand for American-style education all over the world. The biggest pool of new students is outside the United States. Several colleges and campuses have made international recruitment a strategic goal, and IT will play a prominent role in supporting these initiatives.

II. Strategies to Achieve Our Vision

To support the mission of Penn State in the next decade, ITS must successfully address a handful of critical issues and challenges. How we define the issues shapes our strategies.

Critical Issues and Challenges

1. **Space and Infrastructure.** The renovation of the Computer Building will be complete in March 2009, and the improvements in electrical power and HVAC are critical to the IT services provided from that building. This renovation does not, however, address the need for a data center adequate for enterprise systems and especially for research computing. Securing laptops and workstations is part of our security strategy, but no less important is having the kind of space needed both for mission-critical servers and the staff who support them. **Only with adequate infrastructure can we support the strategic goals of the University.**
2. **Funding for Core Services.** Funding our infrastructure within ITS and across the university is a daunting challenge. In the next decade we need to replace or augment some parts of our enterprise systems. New regulatory policies will require significant upgrades to networking and security. We must fund these core services while also funding other critical initiatives in teaching, research, and security.
3. **Identity Management and Data Security.** While championing innovation in teaching and research, Penn State also must protect information about our users as well as our confidential administrative and research data. Even as we secure some data, we will want to expose other data (e.g., course materials or research findings) to users inside or outside the University. We will need to make it easy for individuals, departments, or colleges to implement “granular access” to their data, but we must also ensure that **every** laptop, workstations, and server has an appropriate level of baseline security (e.g., disk drive encryption for laptops). Security must become a mindset, not something that is bolted on after a project begins.
4. **Collaboration and Partnerships.** At Penn State, responsibility for IT is highly distributed. Some colleges have very strong IT units and mature frameworks for making policy decisions and implementing them. Other colleges and most campuses are staffed more leanly and do not have the resources to provide rich support for teaching, research, or administration. Collaboration and partnerships make good sense, but they also require a great deal of energy and commitment. Jointly funded and supported initiatives will be critical in light of scarce resources. The concept of “shared responsibility” will need to supplement or replace the practice of local autonomy.
5. **Management of Change and Workforce Planning.** In the next decade faculty and staff will find a very new set of applications and interfaces on their desktops. Staff

may be working with “managed desktops,” and their files may not be stored locally but on a centrally managed server. Faculty will face a rich set of new tools for both teaching and research, and like the staff, they may feel overwhelmed by the rate of change. Penn State will face formidable challenges in training users and supporting all of the new applications and processes for doing business. At the same time, the IT **staff** is “graying.” Within ITS alone, there will be a high degree of turnover in its senior leadership. About one third of the staff in ITS are age 50 or older, and twelve percent of the staff could retire within the next five years. Similar statistics probably apply to the IT staff in the colleges and at the campuses. The University will need to be very intentional in hiring, retaining, and developing future IT staff, especially those in leadership roles.

Strategies

ITS will respond to these challenges by focusing our efforts on improved support for teaching, research, security, business processes, collaboration, and IT leadership. Our new initiatives will build upon a long history of success in these areas and will position Penn State for success in the decades to come.

1. **Enhance discipline-appropriate support for teaching and learning.** While most faculty are using ANGEL adequately, we know that many courses could be improved if faculty knew how to better exploit new pedagogical tools and multimedia. Most of our undergraduates are savvy participants in the Web 2.0 world of social networking, continuous communication (cell and IM), and multitasking. Visualization, simulations, gaming, and rich collaborative environments – all should become resources that faculty can deploy easily and effectively. We will find ways to help faculty share ideas, course materials, and best practices. We will leverage the insights of other practitioners, both inside Penn State and throughout higher education, for new pedagogical strategies to engage learners. Penn State will become far more student-centered as we use new tools more effectively.
2. **Strengthen discipline-appropriate support for research.** We will aid researchers through collaborative approaches to providing cyberinfrastructure and new tools for communicating discovery. These efforts will support the data management needs of e-science and e-research. Services will include building and operating large compute engines as well as preserving, archiving and storing data in the humanities, science, engineering, and the social sciences.
3. **Secure University systems and information.** We will develop a culture of security through communications programs, procedural and technical measures, and policy changes. This culture will become integrated into the core of our daily activities and will be supported through new technology tools and services. A balanced approach will support research and discovery while protecting and securing information that cannot be shared with all.
4. **Manage IT investments cost-effectively.** We will make both one-time and ongoing investments with complete life-cycle analysis so that we understand the actual costs

to the University over time. We will develop and deliver cost-effective services to meet our users' needs. We will incorporate ease of use into service design and deployment.

5. **Foster improvements in communication and collaboration.** We will develop and support services that assist in discovery, communication, and sharing across disciplines, campuses, and beyond campus borders. We will offer services, technologies, and memberships based on identity information. We will integrate identity management into the workflow of all university processes to improve efficiency and the security of transactions.
6. **Promote University-wide IT leadership, governance, and professional development.** We will facilitate University-wide IT planning, strategies, and results-oriented implementation and deployment partnerships. We will anticipate evolving technology trends and respond to emerging user requirements. We will provide leadership and management of a University-wide training and certification program, and we will promote practices that foster the retention and development of IT staff.

III. Learning Outcomes Assessment

Because Information Technology Services is an academic support unit and not a college, we do not play a direct role in assessing learning outcomes. Our role has been to support the efforts of colleges and campuses to use technology in improving assessment. We summarize below a few of our major efforts.

For more than a decade, ITS has played an important role in encouraging the use of e-portfolios (<http://portfolio.psu.edu>). In 2008-09 students will find the e-portfolio system easier to use because it will have the potential for serving as a blog as well as an e-portfolio. ITS led a university-wide effort to determine our need for an enterprise e-portfolio system (<http://tlt.its.psu.edu/about/reports/2006/e-Portfolio-Report.pdf>), and while we have not found a product that has the functionality we require, we continue to talk both with vendors and with the colleges about opportunities and needs.

For several years ITS has run the Turnitin program (<http://turnitin.psu.edu>), which helps assess the originality of students' written work. Since the introduction of the program, about 1,300 faculty have used it with 17,000 students, who have submitted about 94,000 papers.

More recently, we have played a leadership role in creating and managing a high-stakes testing facility (<http://testing.psu.edu>) for University Park students. In the first semester of operation, we gave more than 19,000 high-stakes tests. In collaboration with the Schreyer Institute, we are helping faculty develop innovative ways to assess students' learning. ITS has actively supported the use of student response systems ("clickers") in the classroom as a way for students to receive low-stakes assessment of their understanding of the course. At the end of the first year of this service, more than 25% of undergraduates report using the system.

ITS looks forward to helping Penn State assess students' learning inside and outside of the classroom and will continue to support efforts to assess learning.

IV. Strategic Performance Indicators

There are many ways to measure the impact of technology on Penn State, but the traditional quantitative measures do not tell a very meaningful story. Technology is ubiquitous and pervades all of the activities of the University. We describe below only a few of the metrics we will use to assess our efforts in the next five years.

Metrics for Teaching, Learning, Communication, and Collaboration

1. **ANGEL:** In 2007-2008, 67% of sections used our course management system (CMS). By 2013, 80% of the sections will use our CMS. In 2007-2008, 1% of the SRTEs were submitted electronically. By 2013, 100% of the SRTEs will be submitted electronically.
2. **Pollock Testing Center:** In the spring semester, 19,208 exams were given in Pollock, including 2,500 during final exams week. In the spring semester, 2013, more than 140,000 exams will be administered in Pollock, and “secure testing” will have been extended to other classrooms at University Park and the campuses.
3. **E-Portfolios and Academic Web Publishing:** In 2007-2008, ~25% of students had e-portfolios or academic content in their personal web space. By 2013, 50% of students will have e-portfolios or academic content in their personal web space or blog.
4. **Collaboration and Communication:** In 2007-2008, 2% of faculty used Adobe Connect (desktop videoconferencing) for instruction. By 2013, 20% of faculty will have used such technology for instruction. In 2007-2008, 11% of faculty and 29% of staff used Adobe Connect for communication, collaboration, meetings, and training. By 2013, 30% of faculty and 60% of staff will have used desktop videoconferencing for these purposes. By 2013, a large percentage of students will have used Adobe Connect or related technologies to achieve non-travel-based international or collaboration experience.
5. **On-line Courses:** In 2007-2008, 25% of undergraduates had completed at least one on-line course. By 2013, 50% of undergraduates will have completed at least one on-line course.
6. **Student Response Systems:** In 2007-2008, 20% of undergraduates have used student response systems. By 2013, 85% of undergraduates will have used such response systems.
7. **Digital Expression:** In 2007-2008, 42% of undergraduates produced a multimedia project as a class assignment. By 2013, 75% of undergraduates will have completed a multimedia project as a class assignment.

Metrics for a Safer Computing Environment

1. **Desktop Security:** In 2007-08, 92% of Penn Staters had anti-virus software and about 65% had spyware and adware detection software. By 2013, 100% of Penn Staters will have anti-virus software, spyware, and adware detection software.
2. **Laptop Security:** In 2007-08, less than 1% of faculty-staff laptops had full disk-drive encryption. By 2013, 100% of faculty and staff laptops will be encrypted.
3. **File Backups:** In 2007-08, nearly 30% of faculty and staff did not back up their computer files. By 2013, 90% of faculty and staff will back up their computer files.
4. **Information Privacy and Security Metrics:** As important as applying technology is the need for appropriate policies and practices. By 2013, a data classification scheme will define the level of protection required for data, and security standards will identify required practices to protect that data. Scanning of systems to find sensitive data will be routine, and encryption will be widely deployed to protect data if computers are lost or stolen. Specific metrics include:
 - a) 100% of Penn State's merchants will be Payment Card Industry (PCI) compliant;
 - b) 100% of University units will be upgraded to meet current security standards;
 - c) IPAS Phase II Recommendations will be approved and implemented.

Enterprise security services will be readily available to all units, including

- a) Consulting and configuration assistance will be available for key security hardware software (e.g., firewalls, virtual environments);
 - b) Disk encryption services will be available to all colleges, campuses and departments;
 - c) Scanning services for detection of personal identifiable information will be available to all colleges, campuses and departments;
 - d) Production-quality intrusion detection and prevention systems will be available to all units;
 - e) System and network administrator training and certification programs will be implemented;
 - f) Risk assessment processes and tools will facilitate accurate depiction of risk and allow for effective risk mitigation before the introduction of new systems or applications.
5. **Identity and Access Management Metrics:** Identity and Access Management is a new effort that expands beyond the boundaries of IT and is pervasive in our environment. Performance indicators will measure the progress in creating an IAM environment. By 2013, we will have a three-tier approach for identity and access management. This will include a group of IT staff to provide the infrastructure supporting the IAM effort, a University advisory group to make recommendations and respond to the changes and compliance issues, and an IT policy position, creating and evaluating policies related to security, identity, and access to University information. We will also have improved processes for adding students, staff, and faculty to a central person registry. We will have established Levels of Assurance, or degree of certainty, that individuals are who they say they are.

Metrics for Support of Users

1. **Improved Help Services:** As our on-line community grows (approximately 100,000 users in 2007-08), requests for Help services will become more round-the-clock. By 2013, we will have extended hours of support to provide a nearly 24 hours by 7 days a week service.
2. **Increased Usage of University Libraries at University Park:** In 2007-08, student traffic in some areas of the University Libraries at University Park increased by approximately 30%; this increase is attributed to moving to ITS workstation management and ITS printing services in 2007-08, effectively offering students a seamless experience between ITS public labs and UL computing facilities. Collaborative workspaces are now being installed across many library branches and departments at University Park and several campus library locations; a Digital Commons multimedia production facility is also under development for Pattee/Paterno library, and several such facilities are already present at the campus library locations. In addition to the collocation of technical, reference, and consultative services in the planned Knowledge Commons in Pattee/Paterno Library, we anticipate that these new services will cause further increases in traffic and qualitative enhancements to the student experience in Penn State libraries.
3. **Support for Faculty and Staff Development:** While the distributed IT environment allows “best practices” and innovative approaches to develop in some parts of the University, we need to find ways to share these innovations. ITS will continue to assist professional development for faculty and staff by hosting seminars and conferences such as the Teaching and Learning with Technology symposium, the Web Developers Conference, the User Services Conference, and the ITS Road Shows, which take ITS staff to campuses. Our metric will be the number of participants in these events. ITS will continue to develop “hubs” for services most heavily used by faculty, staff, and students (e.g., ANGEL, Adobe Connect, etc.), and we will track usage of these services. Finally, we will increase the number of our very popular IT Professional series of workshops, seminars, and “hubs” by at least 25% .

Metrics for Cost-Effective Management of Our Infrastructure

1. **Reducing travel costs and carbon emissions:** Effective use of IT can help reduce the University’s carbon emissions through the reduction of travel. Between January 2007 and May 2008, we estimate that the use of Adobe Connect for meetings has saved Penn State about \$2.6M in travel costs and reduced our carbon footprint by 1,670 tons. We also note that reducing travel time for PSU faculty, staff, and student increases their time to focus on other work. By 2013, we seek to reduce travel by 40%.

2. **ITS Disaster Recovery/Business Continuity (DR/BCP) Services Effectiveness:** ITS has developed a variety of DR/BCP-related services. The most important measure of success is the number of both academic and administrative departments and units that complete the services engagement and develop DR/BCP plans. Our deliverables include:
 - a) Risk Assessment (RA) - An identification of the risks associated with the disruption of key services of the department or unit. We will complete at least eight assessments per year.
 - b) Business Impact Analysis (BIA) - A study of the impact to the department or unit if one of the higher risk events/actions were to happen. We will complete at least eight analyses per year.
 - c) Business Continuity Plan - The plan needed to resume key services that might be disrupted due to an identified event (risk). We will complete at least eight plans per year.
 - d) Disaster Recovery Plan - An IT-centric plan to recovery key IT services that might be disrupted. We will complete at least eight plans per year.
 - e) COOP - A Continuity of Operations Plan that is required to fully understand, plan for, and recover the operation of a department or unit faced with a major disruption. We will complete at least four plans per year.
3. **Systems Development Modernization:** ITS will 're-tool' the professional IT staff members, University-wide, who develop and deploy administrative/business systems and services. The initial survey completed in 2003-04 identified 165 professional IT staff members who develop such systems and services. The two-track JAVA training program began in January 2008 with ten staff members in the basic track and ten staff members in the advanced track. With current funding we will complete four rounds of each track over the next few years. The measure of the success will be the number of staff members who complete the training and return to their department ready to exploit the new development technologies.
4. **Enterprise Change Management:** The AIS Change Management System will be implemented in phases. By June 30, 2008 we will implement a centralized Production Change Recording and Approval System, have all of our mainframe system hardware and software changes flowing through this system, and establish a plan for migrating all other production change processes to this new system.
5. **EASY (IBIS) Forms Replacement and Re-Engineering:** Launched as a result of the Workflow (University Process Management) Project, this initiative promises greatly improved efficiencies in the processing of the University's business forms by replacing the 70+ older 'Green Screen' client/server-based IBIS Forms with 20 Web-based business processes over the next 3-5 years. These Web-based processes will also support the immediate availability of all information and/or previously scanned images for viewing by the individuals involved in the process flow, thus greatly improving staff efficiencies. Progress will be measured by the number of EASY Forms replaced each year.
6. **Imaging Services:** As the ITS Imaging Service is further adopted by additional Penn State departments, the cost savings and/or cost avoidance in each such unit will be quantified by such measures as:

- a) Total number of documents scanned from paper to computer-stored images;
- b) Number of departments or units that converted files from paper to images;
- c) Physical space recovered by reducing paper files;
- d) Improved efficiencies, such as time to process a request for a copy of a required document.

These metrics can be estimated by departments and units using this service and reported annually.

7. **Network Bandwidth:** In 2007-08, bandwidths between University Park and the other campuses (exclusive of Penn College) varied from 45 Mbps to 1000 Mbps, with the aggregate totaling over 2600 Mbps. By 2013, the aggregate amount will be increased by 35% (an average of 5% compounded each year), with the amount of bandwidth available through alternative pathways put into an always-active state and doubled in volume.

Metrics for Research Computing and Cyberinfrastructure

1. **Research Computing:** Between 2008-2013, Research Computing and Cyberinfrastructure (RCC) will have assisted in the awarding of 12-16 government- and industry- sponsored grants.

Metrics for IT Governance, Leadership, and Professional Development

1. **Governance, Leadership, and Professional Development:** Information Technology is widely distributed throughout the University. While decentralization can respond to area-specific needs and can foster innovation, there are benefits of having a higher-level advisory group that helps to shape strategic IT directions for the whole University. By 2013 a new advisory group will provide University-wide advice about IT directions and funding priorities.
2. **Professional Development of IT Staff:** ITS will provide leadership for the development and deployment of IT training programs, especially in the area of security and systems administration. Such programs will benefit our other efforts to enhance privacy and security.

V. Diversity

A healthy climate for diversity encourages the affirmation, understanding, and equitable treatment of all individuals, recognizing that all have unique differences. These differences include but are not limited to race, ethnicity, gender, sexual orientation, socio-economic status, age, physical abilities, language, level of work responsibilities, family responsibilities, religious beliefs, political beliefs, or other ideologies. Embracing diversity means that no one should be defined or narrowly perceived by these terms.

ITS believes that a healthy climate for diversity contributes to a welcoming climate and facilitates communication and collaboration. This climate provides all employees with opportunities to express and share their ideas, beliefs, and values. The breadth of opinions and experiences shared by members of the ITS community will foster a richer work environment for everyone and more relevant solutions for those we serve. Embracing, encouraging, and inviting diversity will lead to more creativity and higher productivity.

ITS strongly supports the goals of inclusiveness in the University's *Framework for Diversity*. We will provide an inclusive work environment that is safe, positive, nurturing, and encompasses acceptance and respect for all. As a member of the wider world community, we will continue to strive for a workforce that reflects the global environment.

To establish a baseline snapshot of the current climate in ITS, a survey of all staff was conducted through the Survey Research Center in early 2008. More than half (52%) of the ITS staff responded. Three-quarters of the respondents indicated that ITS offers a *very comfortable* or *comfortable* work environment.

The data also indicate several areas for improvement:

- a) Communications - We should improve the flow of information to staff about ITS projects, plans and general University information and facilitate information sharing and discovery.
- b) Collaboration - We should encourage staff to propose cross-unit projects and to place greater management emphasis on such projects.
- c) Overall environment - We should build a sense of trust by being more open and transparent and showing appreciation for work accomplishments.
- d) Management skills - We should provide strategic directions and goals, demonstrate openness, fairness and accountability.
- e) Better communication about staff resources - We should create awareness of funding for various projects and initiatives and strive for consistency across units for professional development and other opportunities and resources.

In the next five years we will address these issues. In addition, we will continue to support and expand these diversity initiatives:

- a) Provide opportunities for under-represented groups to gain experience with various ITS work groups and technical skills through our Professional Development Program;
- b) Use hiring opportunities as a way to build a diverse work force and provide Office of Human Resource programs (e.g., the Hire Power program) to middle and senior management;
- c) Support the ITS Climate and Diversity Team, which is comprised of representatives from all workgroups, and encourage the Team to recommend ways to improve the climate within ITS;
- d) Play a leadership role in building and sustaining a University-wide network of the chairs of diversity teams from academic and administrative areas to facilitate a sharing of best practices.

ITS will continue to assess progress on improving the work climate through future surveys: the University-wide staff survey scheduled for 2010 and a second administration of our recent ITS staff survey in 2012.

ITS also recognizes that demographics will enable us to renew our staff. Like other units at Penn State, ITS is facing the “graying” of its workforce. In December 2007, 31% of our employees were at least 50 years old. Sixty-one of these employees may retire within the next five years since 28 employees have 30 or more years of service and 33 employees have 25-29 years of service. This represents approximately 12% of our staff and provides a real opportunity to increase our diversity. ITS will aggressively seek venues for posting staff vacancies in various diversity publications and Web sites as a method for increasing our applicant pool of qualified minority candidates.

Finally, in addition to aggressively working to expand the diversity of our staff, we have fostered a healthy workplace climate to create future leaders – a succession pipeline of internal candidates. ITS continues to emphasize staff development through training and attendance at national conferences. One successful program is an IT Leadership Program, which has been offered to IT staff University-wide. More than 100 IT staff from UP and the campuses have now completed this year-long program, which challenges them to think more broadly about leadership, not just management. Through such programs ITS seeks to encourage continuity, foster creativity, and strengthen the development of future leaders throughout the university.

VI. Five-Year Recycling Plan

ITS will internally recycle one percent (\$315K) of its permanent operating budget each year through the following strategies.

2008-09 \$315,000

Reduction in general administrative expenses \$54,000.

Reduction in printing costs \$20,000.

Modem bank reduction \$60,000.

Wireless matching funds eliminated \$73,000.

Staff position eliminations \$108,000.

2009-10 \$315,000

Google Search reduced costs \$20,000.

Delay of network upgrades \$74,000.

Infrastructure cost reductions \$101,000.

Staff position eliminations \$120,000.

2010-11 \$315,000

Student email outsource \$50,000.

Infrastructure cost reductions \$195,000.

Staff position eliminations \$70,000.

2011-12 \$315,000

Student email outsourcing \$50,000.

Infrastructure cost reductions \$205,000.

Staff position eliminations \$60,000.

2012-13 \$315,000

Modem bank elimination \$60,000.

Infrastructure cost reductions \$135,000.

Staff position eliminations \$120,000.

VII. Joint Initiatives, Collaborative Opportunities, and New Strategic Investments

While recycling is painful for all units, it is especially difficult for ITS. Recycling forces ITS to support larger portions of eligible core services with IT Fee support, thereby increasing our infrastructure reliance on temporary budget resources. The IT Fee is based solely on enrollments, and while we have enjoyed higher enrollment levels and temporary resources for the past two fiscal years, we have also had permanent recycling in the IT Fee in the recent past. Reliance on temporary funding may be necessary sometimes, but it is a risky strategy for funding central core services. As a result, ITS is developing new processes for defining, accounting for, and reporting of cross-unit services to allow for maximized resource allocation and expenditure. Because of the complexity of our funding model, we should first summarize how Penn State supports central information technology.

The Information Technology Services budget comes from six different sources. Each source has external pressures related to the threat of shrinking resources. The 2006-07 budget for ITS was over \$86M, supported by Production Services income (2%); Self-supported services income (22%); IT Fee (22%); Telecommunication Access Fee (2%); Special Projects funding (4%); and Other General Funds (48%). The IT Fee (<http://its.psu.edu/itsfinancial/finpolicies/itfeeall/itfeeall.html>) is explained in more detail on the ITS Financial Services website, but the central concept is that the fee provides both central services and campus-specific services.

For the 2006-07 fiscal year, the IT Fee supported Networking, Security, and Infrastructure Services (16%); the University Libraries (19%); centrally provided IT services (35%); and IT services provided by specific campus locations (30%).

Our strategy for enhancing Teaching and Learning depends on the continued, modest increases in the IT Fee. Both the IT Fee and the Telecommunications Access Fee are needed to enhance our local, inter-campus and international network connections in support of our six strategies.

Budget Scenario #1: Retaining Our Recycled Dollars

We outline below five initiatives essential to meeting the strategies identified in our strategic plan. In each of the five years covered by this plan, we have identified **one** critical area for use with retained recycled dollars whether those retained dollars are one-half of our recycling requirement or the total amount of the recycling requirement.

2008-09 Enhanced Effectiveness of Penn State's Web Presence

It is crucial that Penn State websites respond to the expectations, needs and capabilities of users, including faculty, current and prospective students, parents, and

alumni. New resources will enable WebLion (<http://Weblion.psu.edu>) to help Penn State partners learn about what works on the web for their customers, and reflect that in the design, information architecture, and functionality of their sites.

2009-2010 Improved Privacy and Security

In roughly mid-year 2008-09 we will present a new multi-year IPAS budget. By sharing some of these requests through our own recycling dollars, we will reduce the pressure for central dollars, increase the probability of receiving the IPAS dollars needed, and perhaps suggest that colleges/campuses be allowed to keep recycling dollars for this critical need.

2010-11 Cyberinfrastructure, e-Content, and Data Stewardship

We continue to work with the University Libraries on plans for a cyberinfrastructure, e-content, and data stewardship program. By 2010, we will have much more refined plans. The timing will also allow a strong show of partnership to the UL leadership.

2011-12 Enhanced Support for Research

ITS must collaborate with faculty across all colleges, understanding their research computing and storage needs and building a strong, well-defined focus in consulting support. These funds will be used to allow joint positions between ITS and other departments to ensure the proper focus is present to determine the specifications for building and operating new compute engines and in providing central support for research.

2012-13 Enhanced Support for Teaching and Learning

ITS will pursue next-generation tools for teaching and learning. We will find ways to promote the sharing and reuse of high-quality course materials, personalize learning for students by building on the insights of cognitive scientists, and leverage the proliferation of new “edge devices” (like the iPhone) to promote deeper engagement of students with course materials inside and outside of the classroom. We will also extend the insights from the Pollock Testing Center to support many campuses that want to administer high-stakes testing.

Budget Scenario #2: How ITS Would Invest a 5% Budget Increase

This section summarizes the most important opportunities for strategic investment. Such investments will enable the strategies presented in our plan. We note, however, two important projects that have been developing external to this plan. The first is the Information Privacy and Security project. In agreement with the President’s Office and the Budget Office, a separate IPAS budget will be presented mid-year 2008-09. The second is a comprehensive plan for meeting the data center needs of the University. A consulting group will complete a plan during 2008-09. Based on the acceptance of these recommendations, updates to our investment requests may be required.

In the next section we summarize some of our current cross-unit collaborations that support the core missions of the university. We mention these initiatives because they illustrate how strongly ITS is committed to cross-unit collaboration. Within this framework of successful collaboration, we seek funding for new initiatives and to expand or enhance current initiatives.

Cross-Unit Collaborations Currently Underway

ANGEL: ANGEL is far more than a course management system. ITS works collaboratively with many units to provide unique services. We work with Student Affairs to support student clubs, the Schreyer Institute to support disciplinary communities, the Provost's Office to administer AD-14 and online SRTEs, the Faculty Senate to support online course and program submissions, and many others. ANGEL works collaboratively with colleges that have developed their own content-management systems (Arts and Architecture, EMS), and it works extensively with the University Libraries to support instruction.

Business Continuity Planning (BCP): ITS has taken a leadership role in helping administrative departments and academic units to create IT Disaster Recovery plans and to conduct Business Impact analyses and Risk Assessments. The services and tools offered are Business Continuity Consulting, Offsite Data Storage, Local Server Recovery Center, BCP Training Curriculum, the Living Disaster Recovery Planning System (LDRPS) software tool, and the Business Impact Analysis (BIA) software tool. Currently, sixteen departments and campuses are using the BCP services. Over the next two years, customers will be brought on in a sequence to ensure we can provide the services, training and tools as they are needed.

Business Intelligence: Business Intelligence helps the University community to plan, design, develop, and implement an infrastructure for transforming administrative data into information and for making the right information available to the right Penn State stakeholder at the right time and in the right delivery media. The Business Intelligence effort will deploy the Institution Insight System. Key components of that system are:

The **Institution Data Warehouse** is a centrally hosted data repository that will contain an institution-wide view of Penn State data. The Institution Data Warehouse will consist of an integrated repository of key Penn State data, meaning data that are needed by a large number of Penn State constituencies and are core to the Penn State mission.

The **Information Hub** will be a centrally hosted and supported environment that is metadata driven and provides analysis and distribution of information. This system will support multiple data sources and will make information available through many channels. The Information Hub will be available for all Penn State constituencies to use and may eventually become the point of entry for the majority of data access and analysis at Penn State. In addition, a centrally

supported, integrated, and clean view of Penn State's core mission data should be available through the Institution Insight Hub.

College/Campus Director Structures: ITS meets with IT Directors responsible for colleges and campuses each semester. Originally established as a mechanism to share information, these meetings have evolved to include shared tasks and projects. One project currently in progress is addressing a uniform method for managing desktop computers. This project will provide a more efficient means of acquiring, configuring, maintaining, and securing desktop computers across the University. Successful implementation will lower the total cost of ownership, reduce local staff time spent on managing these computers, and increase security.

Data Center Modernization: Over the past decades, numerous Penn State units have assumed the responsibility to provide IT services. This decentralization has resulted in the creation of many local data centers, many of which may not have a support infrastructure consistent with the level of service (reliability) expected or required by customers. Through the use of a competitively selected consultant, the Data Center and Server Room Master Plan project will evaluate Penn State's existing data centers and server facilities at all locations and recommend improvements so that Penn State can meet current and future data and computing requirements for administrative, instructional, research and outreach activities. The master plan will identify urgent/critical objectives, short- and long-term goals along with proposed plans, activities and tasks necessary to achieve these objectives. The master plan will also define data center and server room standards that will aid in planning, design and implementation of future data centers and upgrades to existing facilities.

General Purpose Classrooms at University Park: Since 1985, ITS has collaborated to enhance teaching and learning by renovating classrooms and introducing new classroom technologies. This effort is primarily through participation on the University Committee on Instructional Facilities (UCIF) and its Operations and Technology Subcommittee. The UCIF is chaired by the Assistant Vice President and Associate Dean for Undergraduate Education, and includes representatives from ITS, Office for Disability Services, Office of Physical Plant, Administrative Council on Undergraduate Education, Finance and Business Commonwealth Operations, University Libraries' Media and Technology Support Services, Schreyer Institute for Teaching Excellence, and the Faculty Senate. These classrooms provide more than 16 million hours of instruction each year.

Identity and Access Management (IAM): IAM (<http://its.psu.edu/IAM/>) provides a conceptual framework to address the apparently competing goals of providing greater security for our digital assets and computer systems while also improving customer service, encouraging collaboration, facilitating online learning, and engaging new categories of customers. Challenges include cultural issues arising from a legacy environment where identity and access management procedures and policies were radically different from those we operate under today, and the requirement for potentially significant human and financial resources. Successful implementation will

yield significant returns: not only will the security of our digital assets be increased and the risk of breach mitigated, but we can also achieve significant operational efficiencies, improve customer service, and enable the delivery of new online services.

Imaging: In 2006 ITS launched a centralized Image Hosting Service. Implementing this service enables departments without the necessary resources (both human and financial) to take advantage of the University's site license of Optical Image Technology. For subscribers to this service, ITS provides the servers and data storage for the images and indexes; manages the installation and maintenance of OIT software; handles backup, recovery, and disaster recovery; provides consultation and advice regarding how to set up indexes for most efficient retrieval of the images; and installs the client scanning software. Departments are responsible only for providing a "scanning station" (a desktop computer and scanner) and technical support for the maintenance of the software on the scanning station.

Information Privacy and Security 2: The Information, Privacy and Security team (<http://ipas.psu.edu/>) was formed in 2006. The primary goal is to assure the privacy of critical information and to comply with internal policies and regulations affecting Penn State. The Information Privacy and Security (IPAS) Project is sponsored by Security Operations and Services (SOS), a unit of ITS, and the Privacy Office, a unit of the Corporate Controller. As a University-wide effort much like the Social Security Number conversion project, the IPAS has two phases. Phase I deals with ensuring that all locations accepting credit card payments meet the Personal Card Industry standards. Phase II will focus on internal policy requirements and other statutory compliance obligations relative to personally identifiable information. The IPAS team will work closely with IT professionals in every college and campus to implement the plan.

Learning Management System/Talent Management System: To meet the growing need for centralizing the tracking and certification of professional development activities, a committee consisting of staff members from ITS, Outreach, and Student Affairs was formally charged with researching Learning Management Systems (LMS). In parallel, OHR was investigating systems that would perform recruiting, performance management and succession planning functions. Since many Talent Management Systems also include much of the functionality found in an LMS, ITS and OHR decided to partner on the effort to research an integrated suite that would meet the greater goal for Penn State of a comprehensive talent management system.

Research Computing and Infrastructure: RCC collaborates with faculty in many departments across all colleges. The services offered by RCC are shaped by the demands coming out of such collaborative work. For example, RCC builds and operates large compute engines, each system consisting of 100 to 200 high-end servers, high-speed interconnections, and storage. Each of these systems has several faculty partners who invest their research funds alongside ITS, and they receive priority access on these systems. The nature of research computations carried out by each set of faculty partners determines the specifications for each of the compute engine RCC builds and operates, usually for a for a period of three to five years. In its visualization work, RCC builds strong partnership with departments in Arts and Architecture,

Engineering, and Health and Human Development. In these partnerships we seek to create finely targeted facilities where both teaching and research missions are being served successfully. RCC is also collaborating by working on some jointly funded positions with other departments so that there is strong and well-defined focus in all of its consulting support.

Training and Certifying IT Professionals: For many years, Training Services, Security Operations and Services, the Privacy Office, and ASET have sought a Penn State certification program for IT professionals. Today, with phase 2 of the Information Privacy and Security (IPAS) project at hand and the proposed licensing of a comprehensive learning management system under consideration, this certification program is feasible. Training is currently being tracked through various means, including ANGEL. The certification process will ultimately be a comprehensive and collaborative effort between departments and will likely include ITS, OHR, and other units. The goal is to assess the knowledge of IT-Professionals across the University and provide learning tracks for employees, based on their role and current assessment level. Furthermore, departments will be able to use the certification(s) as criteria to qualify IT staff and make hiring and personnel decisions. In addition to the benefits of certification, risk avoidance is a large driver as well.

University Libraries: ITS and the University Libraries (UL) have a strong and fruitful history of partnership and collaboration. In this strategic planning cycle, we have worked together to build on our existing partnership and respective strengths to jointly develop strategies in two key areas:

Service delivery: ITS and the UL will coordinate appropriate services to provide transparent, seamless, and cost-efficient support to our users at their point of need. A major focus for our joint efforts in the next three years will be the implementation of the Knowledge Commons facility in the Pattee/Paterno Library. The Knowledge Commons will provide students with access to coordinated delivery of reference, IT support and academic consultation services as well as access to a variety of technical hardware and software, and information resources.

Cyberinfrastructure, e-Content, and Data Management Program: Complementing ITS's existing high performance computing and networking infrastructure and the University Libraries' developing scholarly communications program, we will partner to develop a Cyberinfrastructure, e-Content, and Data Management program. E-science, e-content, or e-research is typically defined as collaborative, distributed, large-scale and data-intensive. ITS and the UL will develop sustainable strategies for the stewardship of the outputs of e-science over its lifecycle – providing a cohesive suite of access, discovery, preservation, curation, repository, archival and storage services. Our phased approach will initially entail needs assessments and prototyping of beta services while building out infrastructure that can be extended to other areas of digital content management.

Web Presence Enhancements: In conjunction with University Relations, ITS will help redesign the University homepage. We recognize the importance of seeking input from many University stakeholders. At the same time, we do not want to lose sight of the opportunity to make better use of the homepage as a marketing tool to reach Penn State's many constituencies and customers. We must consider how to get the greatest promotional impact using the homepage as a branding tool while not negatively impacting users' ability to easily navigate the University "system." We believe there are lessons that can be learned from the corporate sector in this regard, and particularly the service sector. To increase its effectiveness as a branding tool, the homepage needs to offer some level of interactivity to actively engage visitors in the life of the University. We need to spend the next year investigating the efforts of equally complex organizations and corporations as well as determining a process for the redesign. Currently, we see the effort being driven by a relatively small steering committee with representation from University Relations, ITS, faculty, and central units. We will seek steering committee members who are predisposed to change and new perspectives on the best way to design the homepage.

New or Continuing Initiatives, 2008-2013

We identify below the strategic initiatives that will be enabled by increased central funding in the next five years. All of the initiatives focus on our core strategies: **improving security, business processes, research, and teaching.**

Fiscal Year 2008-09

Permanent Funds	Continuing Temporary Funds	Temporary Funds	Strategic Investment
\$172,000		\$494,000	Continue the systems modernization program that is replacing aging hardware and software and retraining staff to work with modern and efficient programming languages.
\$100,000	Provide		staff to update the University's payroll system.
\$30,000	\$35,000		Provide staff and staff training to continue progress in converting IBIS to use web-based input. (Workflow)
\$44,000			Provide staff who will train existing programmers in more modern and efficient programming languages.
\$290,000	Provide		staff to enhance the privacy and data security services.
\$120,000	\$67,000	\$93,500	Provide initial funds for encryption capability to protect data on laptops and other portable devices, software and hardware licenses, and acquire software and hardware (IPAS Phase 2)
	\$19,000	\$56,000	Fund equipment maintenance and life cycle funding for servers that provide access to the University's critical information (Business Intelligence program).
		\$200,000	Provide funds for final year of the Information Privacy and Security program (IPAS phase 1).
		\$90,000	Provide funds to continue anti-virus and other software licenses provided to faculty and staff.
		\$410,000	Renovate the cooling capacity in the Shields Building server room and enhance physical security as recommended by a University audit.

Fiscal Year 2009-10

Permanent Funds	Continuing Temporary Funds	Temporary Funds	Strategic Investment
\$24,000		\$15,000	Provide funds to aid in extending Help Desk Support to a 24x7 continuous service operation.
\$220,000		\$400,000	Provide staff to develop and implement enhanced identity and access management services as recommended in the Identity and Access Management final report, Feb. 2008. (IAM)
\$60,000			Add staff in support of research.
\$350,000	Enhanc		e research cyberinfrastructure.
TBD	TBD	TBD	Renovate space for research cyberinfrastructure. No projections of cost are known at this time.
\$218,000		\$89,000	Continue a multi-year program that will provide access to information that will allow more data driven decisions (Business Intelligence Program). Funding will provide staff, maintenance funds, servers, and storage.
\$30,000		\$245,000	Continue the program to allow web access to IBIS. Funding will provide specialized software, staff, training materials, and software maintenance.(Workflow)
		\$820,000	Fund additional storage for administrative systems. As increasing amounts of data are created, these must be digitally stored, requiring disk space and software to allow archiving and retrieval.
TBD	TBD	TBD	To support the development of the Knowledge Commons facility with the (University Libraries. Project details will be developed in 2008-09.
\$75,000	\$140,000		To support cyberinfrastructure, e-content, and data stewardship program with the University Libraries.

Fiscal Year 2010-11

Permanent Funds	Continuing Temporary Funds	Temporary Funds	Strategic Investment
\$180,000		\$400,000	Provide staff to develop and implement enhanced identity and access management services as recommended in the Identity and Access Management final report, Feb. 2008. (IAM)
\$165,000			Enhance learning in high-enrollment, high-impact courses at University Park
\$186,000	Provide		staff for research support.
\$350,000	Enhanc		e research cyberinfrastructure.
\$120,000		\$125,000	Continue the systems modernization program. Funds will be used for advanced JAVA training, additional software licenses, and other recurring costs.
\$200,000			Implement IT security training and certification program for sys admins
\$61,000		\$111,000	Continue support of the business continuity program. Funding will provide software, maintenance, and staff to help academic and administrative units develop and document business continuity plans.
\$176,000			Provide funding for licenses and maintenance for the storage hardware and software acquired with 2009-10 requested investments.
	\$280,000		The University Libraries and ITS will jointly provide technical infrastructure with data management, repository, and data curation services as well as preservation and storage services for research data.
TBD	TBD TBD Knowledg		e Commons initiative (University Libraries and ITS) will coordinate services to provide transparent, seamless, and cost-effective support to students and faculty. Project details will be developed in 2008-09.

Fiscal Year 2011-12

Permanent Funds	Continuing Temporary Funds	Temporary Funds	Strategic Investment
\$240,000		\$200,000	Provide staff to develop and implement enhanced identity and access management services as recommended in the Identity and Access Management final report, Feb. 2008. (IAM)
\$192,000	Provide		staff for research support.
\$350,000			Provide funds to enhance research cyberinfrastructure.
\$50,000	Allow		faculty buy-out for a semester to support the high-enrollment course initiative.
\$23,000	\$100,000	\$113,000	Fund system and software purchases, maintenance and new staff to continue the Business Intelligence program.
\$99,000		\$494,000	Provide funds for the continuation of the Enterprise Storage program.
\$120,000		\$250,000	Funding for improvements in the management of changes to administrative systems and software (Enterprise Change Management)
\$200,000			Implement IT security training and certification program for sys admins
\$700,000	The		University Libraries and ITS will jointly provide technical infrastructure with data management, repository, and data curation services as well as preservation and storage services for research data.
TBD	TBD TBD	Knowledg	e Commons initiative (University Libraries and ITS) will coordinate services to provide transparent, seamless, and cost-effective support to students and faculty. Project details will be developed in 2008-2009.

Fiscal Year 2012-13

Permanent Funds	Continuing Temporary Funds	Temporary Funds	Strategic Investment
\$240,000	Provide		staff to develop and implement enhanced identity and access management services as recommended in the Identity and Access Management final report, Feb. 2008.
\$198,000			Provide staff to support research.
\$350,000	Enhanc		e research cyberinfrastructure.
\$90,000			Fund core infrastructure support by adding a data base administrator and improving security on enterprise servers.
\$150,000		\$250,000	Ensure that administrative services are efficiently utilized by improving the usability and performance testing of these services. Funding will provide staff, testing software, and software maintenance.
		\$576,000	Improve service reliability by upgrading uninterruptible power supplies and back-up generator capability and reclaiming raised floor area for computing machinery expansion in the Shields Building.
		\$237,000	Fund core infrastructure support by improving security on enterprise servers in the Shields Building and adding additional optical fiber capacity to a back-up site.
\$200,000			Implement IT security training and certification program for sys admins
	\$100,000		Fund system and software purchases, maintenance and new staff to continue the Business Intelligence program.