

# Information Technology

## Study Report

**Iowa State University**

**December 16, 2004**

*"Gathering is intrinsic to a university. IT needs to propel the gathering."*

*Dean Mark Engelbrecht, College of Design, Iowa State University*

Iowa State University will always be a gathering place for learning and discovery. While much of the discussion during this study focused on information technology as an enabler of "anytime anywhere" scholarly work, universities continue to be places where students, faculty, staff, and others gather to share ideas, enabled by technology, both face-to-face and virtually.

Presentation software, course management systems, the Internet, email, instant messaging, text messaging, and mobile computing are examples of a rapidly growing suite of information technologies that are expected in university gatherings. The following report outlines a vision and direction of information technology at Iowa State University that will support the University's long-standing goal of encouraging students, faculty, and staff to become their best.

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## Table of Contents

- I. Executive Summary
  - II. Background
    - a) Overview
    - b) IT Study Objectives
    - c) Current Campus IT Providers
  - III. IT Study Process
  - IV. Governance
    - a) Restructuring the Central IT Providers
    - b) Participatory IT Committee Structure
    - c) Relationship of Central IT to Other Campus Providers
  - V. Enhancing Communication Between IT Providers and the User Community
  - VI. Recommended Information Technology Initiatives
    - a) Security of Information and Protection of Resources
    - b) IT in Support of Teaching and Learning
    - c) IT in Support of Research and Creative Endeavors
    - d) IT in Support of University Leadership
    - e) Enterprise IT Initiatives
  - VII. Setting a Clear Direction for Information Technology
- Appendix A. New Central IT Organization Chart
- Appendix B. Focus Group Summaries
- Appendix C. List of Recommendations

## I. Executive Summary and Key Recommendations

On July 1, 2004, Iowa State University (ISU) established the office of the Chief Information Officer. The primary objective as stated by Vice President for Academic Affairs and Provost Benjamin Allen was "...to better coordinate campus IT providers to improve service, satisfy unmet needs and maintain or lower costs." Paramount to achieving this goal is ensuring that ISU's information technology (IT) infrastructure is optimized over the entire University to best support learning, research and creative endeavors, and organizational leadership.

As a first step towards that goal, a study was carried out to evaluate the current state of information technology in the context of the IT needs of faculty, staff, and students. The process was inclusive and collaborative, engaging key constituent groups as well as the broader campus community.

This report describes the processes used and summarizes key recommendations that when enacted will enable support of the University's strategic goals with a comprehensive, coordinated, and robust information technology infrastructure. The recommendations offered are congruent with and supportive of the major findings in the 2001-2003 IT Strategic Plan<sup>1</sup>.

### Key Recommendations

During the course of the study, several themes emerged as consensus items for consideration. Not surprisingly, much of the focus was on specific technological enhancements to the campus computing and communication infrastructure. Perhaps less expected was the strength and consistency of concerns with the overall *culture of computing* at Iowa State University. Focus group participants spoke with one voice in saying that information technology has become a necessary enabler of almost every facet of daily life at the University, affecting teaching, research, communication, institutional management, and more. Furthermore, end users feel considerable ownership for the IT applications they need to be effective. While there is a belief that campus IT providers individually do a first-class job with the components they oversee, there is a perception that overall services could be better aligned with needs through increased interagency coordination. Further, there is a strong desire expressed by focus group participants to strengthen two-way communication between IT providers and the campus community so that faculty, staff, and students are able to provide input on IT directions. The IT Study committee endeavored to capture the spirit of improving the culture, community, and communication in the recommendations presented.

The key recommendations presented in the report are:

1. Combine IT providers Academic Information Technologies (AIT), Administrative Technology Services (ATS), Instructional Technology Center (ITC), and Telecommunications into one organization, and define the relationship between the new organization and other campus IT providers.
2. Adopt inclusive and participatory ways to engage the campus community in IT issues.
3. Set a clear direction for information technology at Iowa State University.
4. Investigate new models for delivering and funding core IT services that support research and creative endeavors, learning, outreach, and University leadership.
5. Plan and implement new campus IT services, beginning with: email and calendaring for interested faculty and staff, a single help desk, continued expansion of wireless access in gathering places, a data warehouse supporting user-designed queries, a web portal for user-customizable access to IT resources, and development of comprehensive IT information resources delivered through the web.

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<sup>1</sup> "Building a Competitive Future for Information Technology for the Iowa State Community: A Vision and Strategic Plan 2001-2003", developed by the Information Technology Planning Committee. August 31, 2000. <http://www.provost.iastate.edu/documents/itplan/>

## II. Background

### A. Overview

On July 1, 2004, Iowa State University (ISU) established the office of the Chief Information Officer. A prime motivation for doing so was to ensure that ISU's information technology (IT) infrastructure is optimized over the entire University to best support learning, research and creative endeavors, outreach, and organizational leadership.

The concept of consolidating leadership for information technology has had a long history at Iowa State University. A 1988 external review of the (then) Computation Center noted "There is a structural problem with computing at Iowa State University. Key information resource providers report to different vice presidents. Competition for scarce resources could be a problem. ... Possible solutions are the creation of a chief information officer who, along with the present service providers, would report to one vice president (in this case we recommend the Provost)."

More recently, the 2001-2003 IT Strategic Plan for information technology states "...the plan recommends that the University consider creating the position of the Chief Information Officer, A President's Cabinet level position. The CIO would serve as an IT advocate on and off campus. ...From an organizational point of view, the CIO would oversee the central IT providers, potentially resulting in administrative restructuring of these administrative units."

The 2001-2003 IT Strategic Plan offers insightful recommendations for improving IT support for teaching and learning, research, and engagement. Specific areas identified in the report included IT leadership and organizational structure, services, funding models, and new initiatives. Progress has been made in achieving many of the goals in the 2001-2003 IT Strategic Plan, however enterprise level issues cannot be fully addressed until the organization changes proposed in the plan are implemented.

After filling the Chief Information Officer position, IT Directors Davis, Hope, and Kingland were tasked with performing an IT needs assessment that engaged the campus community to determine the most pressing needs, and then to develop a set of first steps that will align IT providers with campus computing and communication needs. The process was inclusive and collaborative, engaging key constituent groups as well as the broader campus community.

This report describes the processes used, and summarizes key findings and recommendations that when enacted will enable support of the University's strategic goals with a comprehensive, coordinated, and robust information technology infrastructure.

### B. IT Study Objectives

During the IT study, the campus community was engaged in an exploration of the following issues:

- a) Determining the perceived value and efficacy of the current portfolio of IT services;
- b) Identifying unmet information technology needs and barriers to effective use of IT;
- c) Learning how participants are currently using IT to support research, learning, and University leadership, and how their IT needs will evolve over time.

Input from participants provided insights on:

- a) Which services should be offered centrally and which can be localized
- b) Whether the current portfolio of services provided centrally should be realigned or expanded to better support the IT needs of campus
- c) How the IT providers might be reorganized to create synergies that lead to improved services

- d) Identifying ways that participants would prefer to interface with IT providers
- e) Identifying the need for new funding models for selected IT services

### **C. Current Campus IT Providers**

Information technology in its many forms is supported by a multitude of campus organizations. The central IT organizations are Academic Information Technologies, Administrative Technology Services, the Instructional Technology Center, and Telecommunications. Additionally, information technology infrastructures and local expertise can be found in University Extension, the Library, Colleges, many academic departments, research centers, administrative units, and the Ames Laboratory.

#### ***Central IT Organizations***

##### Academic Information Technologies (AIT)

The Office of Academic Information Technologies began as the Computation Center in 1962 and reported to the then Vice President for research and Dean of the Graduate College. The advancements in technology since 1962 have been staggering, with a million-fold improvement in processing speeds, storage capacity, and communication speeds and with adaptation to a paradigm shift from a centralized computing structure to a model with distributed interdependent technology and staff. Through all of these changes over more than four decades, the organization remains steadfastly committed to advancing the mission of the University by providing state of the art technology in support of learning and research. AIT is housed in the Durham Center and is staffed by 65 full-time and 25 student FTEs. Services include: Internet bandwidth management; security of the campus network and academic computing systems; email and file storage for faculty, staff, and students; web servers, authentication, WebCT, and other infrastructure services; computer sales and repair; high performance computing and GIS; IT training; and liaison with College and Unit IT specialists.

##### Administrative Technology Services (ATS)

Automated processing of administrative information began at ISU in 1942 when punched card machines were installed in the university's business office in Beardshear Hall. In 1947 a separate university department named the IBM Service Unit was formed. The IBM Service Unit grew steadily, adding more sophisticated equipment and developing more systems as the university's need for administrative processing increased. In 1958, the name was changed to Data Processing Service and again changed to Administrative Data Processing (ADP) Center in 1972. In 1998, the ADP Center moved its primary facilities in Pearson Hall to its current location on the second floor of the Administrative Services Building. On July 1, 2003, the ADP Center was renamed Administrative Technology Services (ATS) as a result of a client survey. The evolution of technology has taken Iowa State University from punch cards in 1942 to delivery of interactive web applications starting in 1998 to the current AccessPlus portal servicing students, faculty, staff, and alumni.

Today, ATS is a major information technology service center with a staff of 125 full- and part-time employees providing a wide range of services. These services include developing and supporting mission-critical software solutions on enterprise and departmental servers for business, student, and e-commerce applications. Database design along with backup and recovery service play a critical role in business continuity for the university. Data security practices enable the university to meet compliance regulations and protect individuals' privacy. Value added services are available for Exchange email and calendaring, file and print sharing, and individual desktop support through the ATS Help Center and onsite technical support. The growing contracted support services provide consulting, analysis, software development, and operations support for departmental applications. Most of these applications are provided by third party software packages and have interfaces to the enterprise systems and databases.

ATS receives 30% of its budget from general fund allocations and the balance through user charges. The central funding is allocated to the salaries and benefits of staff supporting enterprise systems for business and student services.

### Instructional Technology Center (ITC)

The Instructional Technology Center's roots go back to 1915 when the Visual Instruction Service (VIS) started on campus. VIS's initial charge was to create 4-inch glass lantern slides for instructional support. Today, providing visual support for effective instruction and communication is the primary mission of the ITC, which has reported to the Provost's Office since 1990. Operating with a \$1.3 million budget for FY05, the ITC has a staff of 20.

Presentation support is provided via the media enhanced classroom system on campus. Currently, 136 general-purpose classrooms are outfitted with instructional technology equipment such as data projectors, playback devices, and overhead cameras. The ITC also helps departments and non-central areas with the support and management of their media technology. For areas without installed technology, equipment distribution is managed for faculty and staff. ISU students are able to check out instructional technology equipment via a GSB sponsored system, and computer laptops via Computation Advisory Committee (CAC) funding.

The ITC also provides production support for the creation of new instructional materials. A professional staff produces DVDs, CDs, streaming video files, and other interactive products. The ITC also offers on-location and portrait photography, graphic design, and publications layout services.

### Telecommunications

In a bold and innovative organizational strategy, Iowa State University created the Telecommunications Office in 1985 and charged it with responsibility for all campus voice, data, and video communications. Before 1985, there were several unconnected departmental data networks using a variety of proprietary technologies. Communication between these networks was nearly impossible. Telephone service was provided by an aging and severely inadequate Centrex telephone service provided by the local exchange carrier. The University saw divestiture of the then regulated telephone monopoly as an opportunity to create a new and dramatically different campus telecommunications enterprise. The legacy Centrex was replaced with University-owned and operated state-of-the-art digital software controlled private branch exchange (PBX) technology. A new campus-wide data communications network was created using the newly installed fiber-based solutions connecting all major campus buildings. Entertainment video (CATV) was installed primarily in student residences and outsourced to the local cable provider. On campus, point-to-point video solutions were implemented using the new University fiber optic infrastructure. The technologies implemented for voice and data communications were innovative emerging technologies and Iowa State University offered its campus as a demonstration site. Board of Regents revenue bonds were used on two occasions to finance significant capital projects including installation of duct bank, fiber, wire, and switch and router electronics both within and between all campus academic and administrative buildings, University-owned student residences, Ames Laboratory, the Iowa State Center, and the Iowa State University Research Park.

Telecommunications was established and remains today entirely self supported through user charges. Services include 10/100/1000 Ethernet to the desktop, data network backbone infrastructure and routing, network security and Virtual Private Network capability, modem pools / PPP (Point-to-Point Protocol) service, analog and digital telephone service, voice messaging, PBX administration, video services, and cable plant management. Telecommunications employs a staff of 29 including professional engineers, customer service/support staff, technicians, University operators, and administrative leadership. Iowa State University's telecommunications cable plant infrastructure and switching/routing technologies are continually upgraded and remain a strategic strength of the University.

## ***Unit IT Expertise***

### University Extension

Extension Information Technology (EIT) supports the information technology needs for outreach activities at Iowa State University. Services include web and application development, training, desktop, network and application support, and technology planning. Services are provided to on-campus Extension units such as the State 4H office, Extension administration, University Conference Services, and off-campus credit courses as well as 110 off-campus Extension offices. In 2004, ISU Extension in cooperation with ISU Telecommunications and AIT contracted with the Iowa Communications Network (ICN) to provide a statewide private T-1 network supporting the outreach mission of ISU. EIT works with Extension staff to develop state-wide, distributed solutions for content management, videoconferencing, event calendaring, and web-based systems for managing, delivering and marketing educational products and activities. Other services for ISU Extension include hotline telephone support, hardware and software troubleshooting, office moves, training, and conference registration support. EIT has 14 full-time professional staff and 15 student workers with an annual budget of approximately \$670,000.

### Library

The ISU Library system (Parks Library and branch facilities) provides access to numerous electronic information resources and services via the e-Library website. The e-Library provides web-based access to more than 6,000 full-text electronic journals, along with thousands of other online resources such as indexes and abstracts, standard reference tools, conference proceedings, and e-books. A federated search engine known as "Find it!," currently in development, allows users to search multiple e-Library collections with one query and view search results in a single, organized presentation. The e-Library also serves as gateway to a growing number of electronic services, including a synchronous digital reference service called "Ask a Librarian," and provides access to the online tutorials that support the University's mandatory library skills course, Library 160. With the recent addition of digital image collections and streamed audio, the e-Library is rapidly evolving from a static, text-based website to a more dynamic and interactive tool for teaching, learning, research, and outreach. The physical library facilities also support approximately 250 public PC workstations, intended primarily for e-Library access.

### College and Unit Information Technology Support Efforts

All Colleges and many departments and units fund their own IT staff who provide services for local faculty, staff, and students in support of learning, research, and outreach. Services include support for laboratory and faculty computers, acquisition and installation of technology, development of new applications or support for purchased solutions (e.g., email and calendaring), backups, file storage, printer management, and personalized assistance for members of their units. There has been a significant growth in funding for local support staff, as evidenced by a 64% increase in non-central IT expenditures since 1999, now at \$27 million. The FTE count is approximately 135, which includes only those positions recognized as IT-related in the Human Resources system. Many others likely exist without an identifiable IT title in Merit, P&S, and faculty ranks. Even with the increases in spending, some Colleges and units continue to lack adequate staffing to support IT services that are considered fundamental to delivering teaching and research programs. Careful coordination of staff and resources between central IT and the units will become an important strategy to ensure Iowa State University realizes the full potential of IT expenditures.

The perceived benefits of local support are two-fold: faculty, staff, and students value easy access to staff who are experienced with key technologies and understand the local problem domain. Second, unit support staff are skilled at tailoring IT services to the precise needs of their customers. Moving forward, it is vital that this level of end user support be maintained if not strengthened. The vision put forth in this report is one where unit IT support staff will continue to have a key role in IT leadership at Iowa State University. Through better coordination of core IT services, unit staff will focus on meeting the needs of their local clients and avoid expending limited resources on duplicated services. New and needed

technologies are often explored at the unit level first, and it is anticipated that stronger collaborations among all IT providers will accelerate the adoption of leading edge technology.

### Ames Laboratory

Ames Laboratory is a government-owned, contractor-operated research facility of the U.S. Department of Energy that is run by Iowa State University. For more than 50 years, the Ames Laboratory has sought solutions to energy-related problems through the exploration of chemical, engineering, materials, mathematical and physical sciences. Established in the 1940s with the successful development of the most efficient process to produce high-purity uranium metal for atomic energy, the Lab now pursues a broad range of scientific priorities. Ames Laboratory is a member of Iowa State University's Institute for Physical Research and Technology (IPRT) a network of scientific research centers at Iowa State University. There are strong partnerships between Ames Laboratory staff and the campus community in which IT is a key component (e.g., the Applied Mathematics program). Central IT provides all telephone services for the Ames Laboratory and data network services in University buildings. Looking forward, there will be opportunities for campus IT providers to collaborate with Ames Laboratory IT staff as the campus infrastructure is strengthened to support research computing. Potential areas for partnerships include high performance computing, high bandwidth network connections both across campus and between research Universities and National Laboratories, and security of research information.

### Computation Advisory Committee (CAC)

The University Computation Advisory Committee has the responsibility of overseeing the expenditure of the computer fee assessed to all students and advising the Provost and AIT on instructional and research computation. Faculty and staff are selected to represent each college, AIT and the Parks Library. A number of students equal to the number of faculty and staff members are selected to represent each college, Government of the Student Body (GSB) and the Graduate and Professional Student Senate (GPSS). CAC advises the Provost on policies related to the collection, distribution, and use of student computer fees.

While CAC is not a provider of IT services, the student computer fees fund about \$6,000,000 of enhancements to IT each year and therefore have a significant role in supporting IT on campus. Approximately 90% of the student computer fees are allocated to colleges, AIT, and the Parks Library, with 10% being allocated by CAC through a proposal process.

The Computation Advisory Committee annually undertakes an extensive proposal process where colleges and other organizations can submit requests for funding for projects that directly benefit the student computing experience. CAC members review and rank proposals and make funding recommendations to the Provost, who has final authority for the expenditure of all computer fee funds.

### Summary

Many separate IT organizations provide information technology services to the campus community. It is evident that the delivery of services across campus must be better coordinated so that duplication, inefficiencies, and incompatibilities can be addressed. In a new service model, the IT providers will each have a unique and important role allowing them to become collectively responsive to campus needs. Subsequent sections of this report recommend organizational changes that promote coordination and strengthen interdependence among the IT providers.

### III. IT Study Process

The primary goals of the IT Study were to assess the efficacy of information technology services in the role of enabling learning and creative endeavors and to establish future needs so that key initiatives could be identified. In the absence of established metrics that quantify the alignment of IT services with campus needs, it was determined that engaging with a broad set of constituent groups would provide the most accurate appraisal of the current environment.

The IT Study process was greatly assisted by the IT Study Advisory Task Force that provided oversight, advice, and assistance in identifying participants. The Advisory Committee consisted of:

Benjamin Allen, Vice President for Academic Affairs and Provost  
Thomas Hill, Vice President for Student Affairs  
Warren Madden, Vice President for Business and Finance  
James Bloedel, Vice Provost for Research  
Olivia Madison, Dean of Library Services  
Srinivas Aluru, Associate Professor of Electrical and Computer Engineering

The method chosen to engage the campus in a dialog on information technology was through focus groups for identified segments of the campus community and open forums for faculty, staff, and students who were not part of a focus group. Focus group participants, who were identified in part with the assistance of the IT Study Advisory Task Force, were personally invited to take part and a time was selected that best fit the schedules of the group. The focus groups are listed below, and participants are identified in Appendix B.

Business & Finance Directors (held September 10, 2004)  
Research Faculty and Staff (held September 17, 2004)  
New Faculty (held September 30, 2004)  
Student Affairs (held October 11, 2004)  
E-learning and Distance Education (held October 15, 2004)  
Academic Administration (held October 21, 2004)  
Follow-up for all focus groups (held November 17, 2004)

Four open forums were held:

Faculty and Staff (held October 28, 2004)  
Students (held November 8, 2004)  
Campus IT Support Staff (held November 12, 2004)  
Staff of the four central IT organizations (held November 15, 2004)

Dr. Barb Licklider (Department of Educational Leadership and Policy Studies, College of Education) designed the structure and activities of the focus groups and also facilitated each of the meetings. A variety of methods were used during a two-hour focus group session to engage participants in addressing set questions about information technology. For each question, a small group of 4-5 participants processed the question, first individually and then with their small group. Each participant explained his/her response and through the ensuing small group discussions, consensus responses emerged. Each small group then posted their responses in gallery fashion and the focus group as a whole

compared and contrasted the lists. Remaining unique ideas were prioritized through a weighted voting protocol. At the end of the focus group session, the most common themes and concerns emerged at the top of the lists; however, all ideas remain as part of the group's work product.

Focus groups processed the following questions:

- a) Related to information technology, what is working well for you right now? (In other words, if changes are made, what should be left alone?)
- b) What are your major issues and frustrations with information technology? What is getting in your way or keeping you from most effectively and efficiently accomplishing your responsibilities?
- c) If you could make two immediate changes to information technology over the next year to better meet your needs, what would they be?
- d) Looking past the next two years, if you had two wishes for information technology at Iowa State, what would they be?

Ideas were captured through a gallery of posters that participants wrote out for each question. Group discussions were also recorded in notes that were distributed to all participants shortly after the meeting. Each group selected a spokesperson to present the top ideas on each of the questions to an all-focus group forum held November 17, 2004. Participants of forums were also invited to this summary forum, and a sizeable number attended. Interestingly enough, a number of individuals with high interest attended several focus groups and forums to observe and listen. Summaries of the presentations are provided in Appendix B.

The open forums were processed in a similar way. Careful notes were taken, but in some cases, resulting ideas were not prioritized due to the size of the group.

IT Directors Jim Davis, Maury Hope, and John Kingland attended the focus groups and forums to hear the dialog first-hand and internalize the climate of the groups, but they purposely did not participate in the discussions.

### Summary

The focus groups and open forums provided an efficient, participatory, and fully transparent method to sample the opinions of a diverse campus community. The input provided will be extremely helpful as priorities are set for information technology at Iowa State. Perhaps surprisingly, it quickly became apparent that the different focus groups share a need for many of the same cross cutting IT services.

The information obtained was so useful, and the engagement so positive, that it is recommended that information technology providers continue to convene focus groups periodically to better gauge alignment of IT services with needs.

## IV. Governance of IT Providers

In this section, it is proposed that the central IT providers be reorganized into a single unit and that the roles of all campus IT providers be clarified. Additionally, it is proposed that new University information technology committees be created in order to better engage the campus community in IT issues.

### A. Restructuring the Central IT Providers

Information technology services are provided to campus through an amalgam of four Central IT organizations, College and department IT support staff, and even by individual faculty and staff. The central IT units are Academic Information Technologies (AIT), Administrative Technology Services (ATS), Instructional Technology Center (ITC), and Telecommunications (Telecom), all described in Section II.

The central IT providers do have a small degree of overlapping responsibilities, but they mainly provide complimentary services to campus. AIT and the ITC report to the Vice President for Academic Affairs and Provost through the CIO, and ATS and Telecom report to the Vice President for Business and Finance. AIT's budget is predominantly centrally funded, Telecom is completely funded by fees charged for services, and ATS and ITC have a mix of both.

Across the board, the IT providers support campus with quality service and IT leadership in their respective areas. However, additional improvements to information technology will be achieved by combining the four central IT units into one organization because:

- a) The study confirms that there are unmet IT needs. Bringing providers together with similar roles may uncover synergies yielding savings that can be applied to new IT projects.
- b) In this cycle of declining financial resources, it is essential that resources be allocated in a coordinated way that yields the most benefit for the enterprise. Although each of the providers is a good steward of its resources, the planning processes are disjointed and can lead to the suboptimal allocation of resources.
- c) Combining the central IT providers will allow the campus community to interface with one organization. Similarly, the committee structure proposed in this report will be much more effective if participants are able to address the full range of IT issues rather than those owned solely by one of the current organizations.

Creating a new IT organization has many complex facets that will require detailed planning. It is recommended that the combination of the current four central organizations be completed by July 1, 2005, including adjustments in reporting structures, identification of new internal IT groups, and reevaluation of staff PIQs. IT groups internal to the four organizations that have minimal overlap or where a new structure is readily apparent will be established without delay. Other combinations will need to be studied carefully to capture and maximize any synergies. The expertise and input of personnel in the central IT organizations will be of great value when restructuring.

The proposed committee structure (described in the next section) will enhance opportunities for the campus community to have input in IT decisions.

#### Recommendations:

1. It is recommended that AIT, ATS, ITC, and Telecommunications combine to form one new IT organization that reports to the Office of the CIO by July 1, 2005. An organization chart is shown in Appendix A. It is recommended that the Office of the CIO facilitate coordination of the functions of

enterprise planning, budgeting, project management, and HR across the individual IT organizations during this transformative process.

2. By July 1, 2006, the budgets of the Central IT organizations will be combined in support of the new IT organization. Additionally, processes used to solicit, prioritize, develop, and track campus IT projects will be modified to reflect the new IT organization focus on enterprise computing. A revised funding model will be developed for the new IT organization to better support enterprise initiatives.
3. It is recommended that the Office of the CIO assume responsibility for enterprise planning, budgeting, and project management as well as accountability and oversight for the IT initiatives proposed here.
4. The combined IT organization should develop a mission statement.

## **B. Participatory IT Committee Structure**

Information technology is a key enabler of learning and research at Iowa State University. In order to provide needed and effective services to the campus community, the operations of IT providers must be coordinated with each other and aligned with the needs of campus. Effective communication between providers and end users, and between IT providers themselves, is paramount to an efficient campus IT operation. Focus group and forum participants spoke with one voice about the need to address communication shortcomings and create more opportunities for the campus community to participate in IT planning and decision processes.

It is proposed that the IT Steering Committee in place today be replaced with multiple but focused IT committees that will more effectively take on the issues of segments of the campus IT community. The benefits of creating focused committees rather than consolidating this function into a single committee include the ability to engage a broader campus population through more opportunities to participate, and the identification and coordination of a group who brings considerable expertise in areas of IT use. Additionally, it is envisioned that the proposed committees will become proactive in promoting the use of technology in advancing the mission of the University.

The proposed committees are:

a) Information Technology Executive Committee

The IT Executive committee would consist of the Vice President for Academic Affairs and Provost, Vice president for Business and Finance, Vice President for Student Affairs, CIO, and Associate CIOs. The IT Executive Committee would meet monthly and discuss issues related to strategic and financial aspects of IT.

b) Student/Faculty Information Technology Advisory Committee

It is proposed that the current Computation Advisory Committee be renamed and given the additional duty of creating periodic opportunities for students and faculty to provide input to IT issues. The committee would report to the CIO and continue its primary function of disbursing the student technology fee funds. The CAC committee has historically been sensitive to issues of fair representation of faculty and staff, and it is proposed that the committee continue to self-regulate membership.

c) Faculty Senate IT Committee

The Faculty Senate IT Committee is a new and welcomed effort aimed at increasing communication between the IT community and the Faculty Senate. Committee members will advise the CIO on IT issues affecting the faculty and receive briefings on campus IT initiatives.

d) Research Computing Advisory Committee

The Research Computing Advisory Committee will provide a forum for discussing research computing needs, and work to develop strategies for meeting those needs. It is envisioned that the committee will consist of 6-10 faculty and research staff who bring expertise in applying computer and

communications technology to their research efforts. While the committee is advisory to the CIO, it is recommended that the Vice Provost for Research (or designee) participate in the committee. Meeting would occur quarterly, unless projects emerge that require more engagement (e.g., developing a proposal to address high performance computing).

e) IT Support Staff Advisory Committee

It is proposed that the IT Support Staff Advisory Committee be created to facilitate communication between the CIO and lead IT staff on campus. Membership would consist of the CIO and one or two other senior IT staff from central IT, the lead IT specialists from the Colleges, the Library, University Extension, and Ames Laboratory. Additionally, other IT staff selected from departments and units could serve terms on the committee. Among the many valued perspectives this group would bring to the dialog is an informed view of services needed to best support students, faculty, and staff in departments and units. It is expected that the IT Support Staff Advisory Committee would meet at least bi-monthly, and more often if needed.

f) e-Learning Advisory Committee

The e-Learning Advisory Committee would comprise faculty and staff who are working to leverage technology to enhance learning, either on-campus or through distance education. Examples include using personal responders to improve engagement in large lectures, and further enhancement of Iowa State's course management support. The CIO will work closely with the Center for Excellence in Teaching and Learning, the Distance Education Council, and staff from the Instructional Technology Center as the agenda and the focus of the e-Learning Advisory Committee are developed. The committee will meet quarterly, unless projects emerge that require more engagement. While the committee is advisory to the CIO, it is recommended that the Associate Provost for Academic Programs (or designee) participate in the committee.

It is noted that the Business & Finance units and the Student Affairs units are prime users of information technology services provided by the central IT organizations. Because they already have cabinets where IT issues are discussed, it is proposed that each cabinet add one senior IT representative. It is further proposed that the senior IT representative conduct an annual workshop to identify and prioritize projects of interest to the cabinet.

Recommendation:

1. Implement the proposed committee structure as soon as possible and no later than July 1, 2005.

### **C. Relationship of Central IT to other Campus IT providers**

Colleges and some departments and units have developed their own local computing infrastructure, complete with core services (e.g., email) and staff to support members of the unit. The motivation for establishing a local IT support operation varies from unit to unit, but common themes include a desire to customize services locally, the ability to offer tailored services at a lower cost than central IT, and the desire to maintain control of services.

Focus group participants that have local IT staff nearby were strong in their endorsement of maintaining the status quo in their units. While participants were quick to rank outsourcing some services (like email and calendaring) to central IT as a priority, they do not want to lose access to local IT staff.

The vision put forth here promotes an active and symbiotic partnership between central IT and unit IT staff. The primary role of the proposed central IT organization is to provide the core technologies that support the mission of the University. The unit IT specialists then have the key role of working with faculty, staff, and students in the unit to use technology in learning, research, and outreach activities.

To some degree, this structure is in place currently, but it has not been an effective partnership for all participants. The absence of a shared vision for IT that clearly defines how constituent groups collaborate has fostered an environment where collaboration is not the standard.

Two themes emerged from the focus groups that addressed the need to strengthen connections between central IT providers and staff supporting IT in other units. First, it was noted that communication between all IT providers needs to improve, and several example strategies were offered by focus groups. (These form the basis for the recommendations Section D below.) Second, because IT providers have been operating in a “silo” fashion over the years, some care must be taken to improve the culture of the community by removing barriers for cooperation.

Several focus groups suggested that formally making College and unit IT providers part of the central IT organization could be a way to address these issues. Two approaches to accomplishing this were discussed. The method mentioned most frequently was moving towards the so-called “Foundation Model.” In the Foundation Model, Foundation staff members are located in the units they support, yet they are full-time Foundation employees. The concept here is that some or all IT support staff would become employees of the central IT organization yet continue to work in the units they serve. The prime benefit of this approach includes better alignment of the IT infrastructure with the needs of faculty, staff, and students and the ability to plan and budget as a single unit across the enterprise. Additionally, those support staff that become part of the IT organization would have unrestricted access to the resources they need to support their clients. Correspondingly, staff in central IT would gain an in-depth understanding of end-user computing and communication needs, which would have a positive effect in shaping future service offerings.

Another strategy to help bridge the gap between IT providers is for central IT to offer training to new full-time staff and students who maintain unit IT operations. This would provide an opportunity for new employees to become familiar with central IT staff and services and with University policies relating to security incident response, protection of sensitive information, and handling breaches of the Code of Computer Ethics and Acceptable Use Policy<sup>2</sup>.

The University Library provides IT services to faculty, staff, and students with open computer labs as well as the information services available through the e-Library and digital archive service. It is expected that future IT initiatives in the Library will require substantial support from central IT in terms of storage, systems support, identity management, and expertise in database design. It is recommended that central IT staff partner with Library IT staff to coordinate efforts and jointly plan for new Library IT initiatives.

### Recommendations

1. Identify a model that clearly defines the roles and responsibilities of campus IT providers.
2. Determine the benefits and challenges of assigning unit IT support staff to the central IT organization, yet ensuring that staff remain accessible to the faculty, staff, and students that they serve.
3. As recommended in Section IVB, establish the IT Support Staff Advisory Committee.
4. Strengthen collaboration between Central IT and the Library by including Library representation on the IT Support Staff Advisory Committee. It is anticipated that the Library and Central IT will collaborate in planning and implementing institutional repositories, including centralized storage space, format guidelines, metadata, and technological migration.
5. It is recommended that the all-University IT specialist group, CCSG, continue to provide a forum for IT issues and an interface to Central IT personnel.

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<sup>2</sup> The Code of Computer Ethics and Acceptable Use Policy is located on the Iowa State University policy web page at <http://policy.iastate.edu/>

## V. Enhancing Communication between IT Providers and the User Community

One of the reoccurring themes expressed by focus group participants is the need for improved communication between central IT and other campus IT providers and between all providers and end users. With the creation of the Office of the CIO and the desire to move campus IT forward in a coordinated effort, it is essential that the culture of the IT providers support a transformation from independent IT shops to a structure of interdependent colleagues. Open communication is a foundation to building the level of trust needed to make the transformation successful. In the absence of effective communication, it will continue to be difficult to find and exploit the synergies of working together. It is expected that the creation of the IT Support Staff Advisory Committee recommended earlier will help in facilitating communication.

Another communication need identified in focus groups is improving access to technical information. End users have requested that helpful resources be placed on searchable web pages. Examples cited included assistance in determining whom to contact for problems, a well developed catalog of services, tutorials and training material, and best practice guides. Partner IT providers requested support for web pages to collect detailed technical information and archived searchable bulletin boards. Significant progress has been made in developing procedures to notify the community about interruptions in services, and it is important to continue strengthening that interface to users.

### Recommendations

1. Coordinate and communicate the availability of and need for campus site software licenses.
2. Continue to replace operational IT policies found on various University web pages with formal policies developed and communicated using the University policy development process.
3. Ensure that College and Unit IT support specialists have rapid access to the IT assistance they need to support end users. Determine if licensed resources, e.g., a help desk knowledge base, can be shared with IT support.
4. Develop IT orientation and training for new faculty and new IT support staff.
5. Make IT resources easier to find by continuing development of the new IT web pages and using better search technology.
6. Create a web interface for a searchable database with public computer labs, noting their hardware, software, hours of operation, and a trouble contact.
7. Collect and communicate contact information for the lead IT support staff member for each unit.

## VI. Information Technology Initiatives

This section recommends actions that will accelerate current information technology initiatives important to the enterprise, and sets the direction for new initiatives that address computing and communication needs on campus.

### A. Security of Information and Protection of Resources

Our large and complex web of computer and communication systems at Iowa State University store, process, and transmit information whose confidentiality, integrity, and availability must be ensured. Examples include student records, research data sets, personnel records, and more. Additionally, our community depends on the University to provide a growing set of services through the Internet, which in turn requires a secure and dependable information technology infrastructure.

Securing information in a large heterogeneous computing environment is a challenging endeavor. Commercial solutions using contemporary technology are often effective only for known attacks and vulnerabilities, thus technology is only one part of a layered approach to protecting information assets. Crucial to a successful effort is active event monitoring, established response procedures, effective and enforced policies, a well-trained staff, and a security-aware community that will work together to prevent incidents from happening, and mitigate damage when they do occur.

The computing infrastructure of a university in particular brings additional facets to the problem. While corporate networks are able to standardize on a small set of supported technologies, it is appropriate in our environment to embrace a diversity of computing platforms (hardware and software) that best support the mission of the University. Some standardization is recommended by recognizing a few supported platforms, but there is little to be gained with regard to security by moving towards a single vendor of software or hardware. Issues related to openness of the network to new applications versus maintaining the integrity of a shared network will need to be addressed on a case-by-case basis as policy is developed.

The creation of the CIO office and the transformation in the structure of information technology at Iowa State University positions us to be proactive with information security because (a) there is a single point of accountability for information security, and (b) it is feasible to bring together key information technology specialists from the central IT organizations and across campus to determine a direction for information security. To date, the lack of a comprehensive security plan and the authority to enforce recommendations has impeded progress.

#### Recommendations

1. Identify a central IT security lead who will work with campus through a security round table to develop an operational security plan encompassing policy development as well as technology.
2. Put into place an education and awareness program, frequent communication to faculty, staff, and students about protecting their own computers, and about their responsibilities under the new computer use policy.
3. Continue to move to secure end-to-end network protocols and harden user systems. Balance security with interoperability by choosing solutions that support multiple platforms and offer effective communication tools that have security integrated into them. Support secure access to remote systems.
4. Develop a plan to manage risk in campus information technology, and assign staff to initiate ongoing audits to improve our risk posture.

## **B. IT in Support of Teaching and Learning**

Information technology can become an enabler in the learning process in a variety of ways. Faculty at Iowa State University use technology to:

- facilitate quick classroom assessments of key concepts through personalized responders;
- provide rich collections of instructional material 24x7 through the Course Management System (CMS) WebCT;
- provide access to a wealth of resource materials through the e-Library portal;
- view best practice advice for teaching through streaming video of colleagues captured by the the Center for Excellence in Teaching and Learning and the Instructional Technology Center;
- provide opportunities for students to learn outside the classroom through distance education, and much more.

Information technology additionally assists faculty in managing classes by way of up-to-date electronic class lists, grade submission, student submission of work, and email contact with their students.

There continues to be a need for well-equipped classrooms capable of supporting innovative pedagogy with appropriate technology. Installation and maintenance of equipment as well as faculty training for classroom technology require investing in support staff. Additionally, assistance for creating quality instructional materials (from the ITC, for example) should be available yet funding for such activities is difficult to locate. It is proposed that limited funding be made available to support faculty who desire to investigate improving learning by integrating technology into their curriculum. Support could be in the form of assistance from the ITC, release time to develop new instructional materials, or equipment.

### Recommendations

1. As recommended in Section IVB, establish an e-Learning Advisory Committee.
2. Determine the direction for continued use and expansion of a course management system. Issues to be addressed include: (a) funding periodic upgrades to hardware and software due to a rapid increase in adoption by faculty and a desire for new features; (b) increased opportunities for faculty to learn how to effectively use a CMS; and (c) better access to assistance for a CMS for faculty, staff, and students through extended hours at a help desk.
3. Assess current and near-term needs for classrooms equipped with various types of technology, and identify a source of sustained funding to provide necessary facilities.
4. Recognizing that learning also takes place outside of the classroom, create opportunities for students to have access to open study and group meeting space that supports mobile computing devices.
5. Support faculty who commit to redesigning their courses to use appropriate technology through a fellowship program that provides release time and IT support staff time.
6. Continue to explore the use of emerging technologies that enhance learning at a distance. One example is the Access Grid technology (being tested by the College of Engineering and AIT) that facilitates real-time voice and video interactions with distance participants through the Internet.
7. Collaborate with University Extension to explore information technologies that enable extended learning, assist with vendor selections and contracting, and to identify responsibilities for user support.

### **C. IT in Support of Research and Creative Endeavors**

Supporting world-class research programs requires a robust information technology infrastructure and a staff who work on the forefront of technology. Key components include access to high-speed research networks, support for large-scale computations, tools to facilitate distance collaboration with peers, updated equipment with local support, and an environment where experimentation with innovative technology is encouraged.

Participants in the Research focus group were unequivocal about the importance of IT and IT support in their success. Common themes noted were a reliance on stable and sufficient core IT services, the need for local IT support personnel who understand the application of a particular technology, and a desire for central IT organizations to update services in a timely manner and embrace new technology.

Also mentioned was the important role of administrative systems for research, such as grant accounting systems that produce monthly account statements, and the LiquidOffice (proposal gold sheet) system. Both received comments for improvement. Members of the focus group suggested that a database of faculty activity should be developed so multiple units are not requesting the same information and that the process for purchasing hardware and software should be reviewed to see if it can be simplified for the initiator. It is recommended that these types of issues become part of the work agenda of the Research Computing Advisory Committee.

#### Recommendations

1. As recommended in Section IVB, establish the Research Computing Advisory Committee.
2. Identify unmet needs for high performance computing and develop a plan to meet those needs.
3. Evaluate the need for new computing models, such as shared workstation resources through grid computing.
4. Continue to explore opportunities for Iowa State University to connect to national research networks (e.g., Lambda Rail).
5. Deploy new technologies, such as the Access Grid, that facilitate research collaboration at a distance.
6. As part of an effort to improve authentication services through a study of identity management, ensure that new technology facilitates university-to-university collaboration. An example emerging technology that should be reviewed is the Shibboleth middleware project supported by the National Science Foundation, Internet2, and a consortium of universities.

### **D. IT in Support of University Leadership**

Information technology plays a central role in organizational leadership, and University leaders must have access to accurate and timely information on which to base decisions. The foundation for collecting and organizing this information comes from the University information systems that record the transactions and support the daily activities of students, faculty, and staff. The campus has many sources of information, but critical to having accurate and timely information is having one authoritative institutional source that can provide consistent and accurate information. This information must be available to all who have authority to access the information whether it be central or college administrative offices, distributed department faculty and staff, or entities external to the campus community.

Administrative computing functions at Iowa State University are provided in the aggregate by an amalgam of systems on various computing platforms. Most enterprise systems have been designed and developed by University staff. This form of development has allowed the systems to be adapted to the current business processes. Great effort has been invested to ensure that the systems are as strongly coupled as possible and that information flow across platforms is seamless for users. Even in the context of the current stability of administrative systems, however, it is fair to ask if this is a sustainable model that will carry Iowa State University forward through the next decade.

One option is to consider the deployment of a commercial Enterprise Resource Planning (ERP) system to better integrate administrative functions and information flow. Implicit with an ERP system are the best practices for common business functions. Typically, ERP systems for higher education have three major components that are adaptable for business processes in financial, human resource/payroll, and student areas. Each area can be considered independently, but advantages come from the integration that is available due to the common databases used across the systems. An ERP represents a major commitment of funds, staff, and time and is best approached through a careful study by consultants who are experienced in academic business and student systems. It is recommended that Iowa State University retain a consultant to determine the impact and cost of an ERP implementation.

Another emerging option is to look to the open source community for ERP. A possibility of an ERP open source solution for higher education is in a discussion phase with a few major universities. Iowa State University could benefit by participating in these discussions.

A complementary path to explore is the development of a data warehouse that specifies a standardized data model for University information and provides a single repository for information on students, curriculum, human resources, building space, and financials. When coupled with a user interface capable of dynamic reporting, an integrated data warehouse will provide the ability to perform real-time queries across University datasets. Efficient and timely responses to external requests for information (e.g., Board of Regents) could be facilitated by data consistently collected and stored in data warehouses. Collaboration with the University of Iowa and the University of Northern Iowa will be important. The consolidation of data and the definition of a standard data model will also be beneficial should Iowa State University determine that an ERP is in its best interest.

Focus groups for Business and Finance and Student Affairs indicated that they have increasing need for application developers to satisfy demands for processing data. One example is a need for assistance with web page development and related applications, which have become a primary method for interacting with students, faculty, and staff. With reductions in budgets over the past few years, some units do not have adequate resources to contract with central IT and instead either delay updating key systems or hire their own staff, often students, in the role of IT developers. It is recognized that funding of information technology is a complex issue that deserves a detailed look to determine if affordable services can be matched with the most pressing needs.

### Recommendations

1. As recommended in Section IVB, include an IT representative on the Business and Finance cabinet and on the Student Affairs cabinet. The IT representative would gain first-hand knowledge of the day-to-day challenges of the units and be in a better position to recommend solutions, help set priorities, and report IT activities. One responsibility of the IT representative would be facilitating an annual process that would identify cross-department and unit-IT related projects that would benefit the unit and the University. The IT representative would work with the IT teams supporting the information systems and directly with the Office of the CIO.
2. Develop a data warehouse with reporting and analysis tools.
3. Engage a consultant to study the benefits and estimate the costs associated with an Enterprise Resource Planning package for Iowa State University.

4. Coordinate and collaborate with Regents Universities in the selection of systems and development of data elements and databases to ensure consistency of data when responding to inter-institutional requests.
5. Identify and remediate unmet IT needs in units that administer the academic enterprise, for example, the office of the Vice Provost for Research.

## **E. Enterprise IT Initiatives**

One of the major goals of this study was to determine unmet IT needs. Although the constituent groups who participated in the focus groups represented diverse sectors of campus, many similar needs frequently ranked high. Many of the larger projects are listed below. Other issues that could easily be addressed by operational changes are under consideration now.

### Recommendations

1. Provide common email and calendaring services to interested faculty and staff.

Email and calendaring services are essential tools for carrying out the business of the University. It is recommended that these two core services be funded centrally.

2. Develop a portal for access to Iowa State resources.

A portal provides easy-to-use and personally customizable access to IT services. Users log into the portal using a secure authentication method and obtain access to a variety of services without the need for additional logins or passwords. A user's portal interface can be personalized with dynamic content, such as news from Iowa State or the user's home department, weather, messages from instructors or home departments, and much more. When coupled with identity management, members of the larger Iowa State community (e.g., parents or alumni) will be able to access different types of information depending on their role. It is recommended that the feasibility of implementing a portal be investigated along with the level of interest in such an implementation.

3. Implement single sign-on authentication for enterprise systems.

Single sign-on facilitates access to a collection of computer systems in a secure way with one login. Its benefits are most apparent in a portal environment where users can seamlessly access information hosted on systems supported by different units on-campus or off. Single sign-on will require the development of a uniform authentication scheme for participating computers. It is further recommended that the feasibility of moving away from passwords and towards stronger methods of authentication be investigated.

4. Deploy identity management as a core IT service.

Identity management is the process of determining the identity and role of a user in the larger Iowa State community when the user logs in to a computer. Now, and into the future, IT resources support a broader constituency than just faculty, staff, and students. Increasingly, new groups require access to a subset of our information assets. Examples include potential students who have accepted an offer of admission from Iowa State but are not yet enrolled in courses, or recent graduates who have a need to keep their portfolios active.

5. Develop a service model that provides support for public computer labs as well as faculty and staff desktop computers.

6. Focus campus support on three software computing platforms: Microsoft Windows, Linux (PC), and Mac OS X. Determine the viability of supporting a campus license for faculty, staff, and students for Microsoft Windows and utilities, RHEL Linux, and Mac OS X.
7. Continue to expand the campus wireless network in gathering places and with central funding.
8. Develop a strategic plan for information technology.
9. Deploy a central system that facilitates individual web authoring capabilities.
10. Develop a database to store faculty productivity information so that curriculum vitae, promotion and tenure documents, annual reviews, and other reports can be easily generated.
11. Provide central support for institutional repositories (such as those used by the Library) including centralized storage space, format guidelines, metadata, and technological migration.
12. Continue to upgrade the campus communications infrastructure to ensure adequate connectivity.
13. Explore possibilities to better utilize space in the Durham Center and elsewhere so that more information technology services can be located near central campus.

## VII. Setting a Clear Direction for Information Technology

Recent events in information technology at Iowa State University have encouraged a renewed commitment to building an IT organization that propels the campus community forward in our endeavors to achieve the mission of the University. We reasonably expect that a leading research and teaching university like Iowa State will have a culture of innovative and efficient information technology along with adequate resources capable of applying considerable expertise on the problems of computation and communication. The commitment of the University is evident through the creation of the Office of the CIO. Faculty, staff, and students have signaled their commitment through engagement in the IT Study process and through continued contributions to standing committees and other forums that help manage information technology on campus. We have arrived at a point in our history where change for the better is possible in information technology, and the message sent by IT Study participants is that we should proceed with a thoughtful but deliberate course of action.

When enacted, the initiatives offered in this report will set into motion the development of organizations, technologies, and methods of engagement that will better serve campus IT needs. In that regard, the recommendations contained here provide a 2-3 year roadmap for campus IT that will establish the direction until the next IT Strategic Plan is developed. Some of the recommendations, most notably those that initiate a transformative change in the current IT structure, should occur as soon as possible. Others requiring more investigation and planning by the broader campus community can be initiated later.

The realignment of central IT into a single organization will occur in phases, with the major personnel and structural changes to be completed by July 1, 2005. Financial, service, and funding models will be developed by July 1, 2006. The IT committees proposed in the report will begin early in 2005. Innovative partnerships between central IT and unit IT staff, including the possibility of sharing staff, will be explored through the 2005 calendar year. Major cross cutting IT initiatives will be started when changes to the central organization are complete.

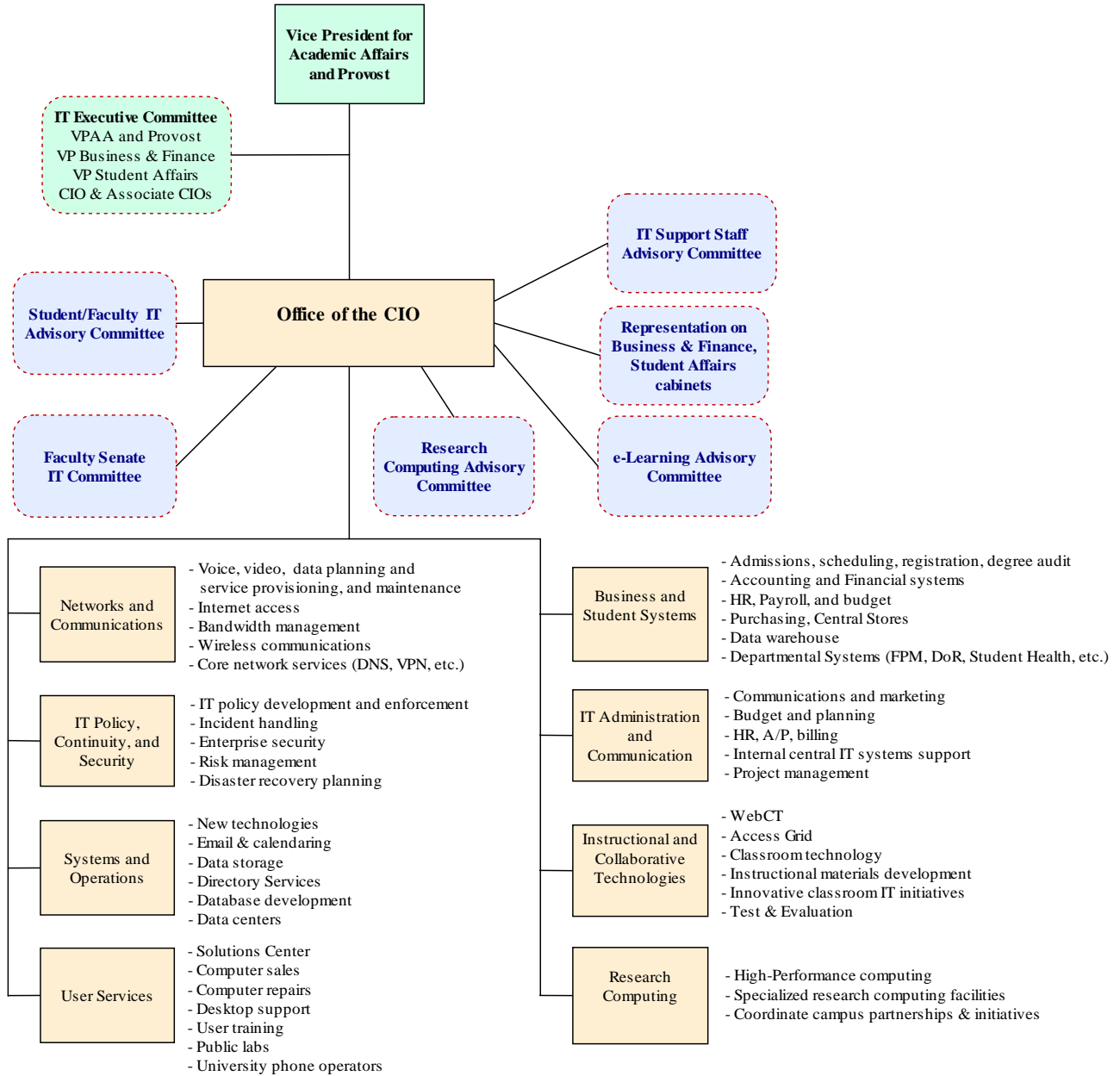
Continual and rapid change in information technologies fosters continual change in user expectations and priorities. The IT study revealed many diverse expectations for IT that will change over time. Even after the focus group prioritization process, remaining initiatives require more IT resources than are currently available. It is recommended that the CIO be responsible for providing ongoing campus-wide review processes for prioritizing work, measuring progress, and identifying changing or new expectations. The CIO is in a position to have a comprehensive view of campus IT and see that IT resources are doing the right things. Determining which technologies and services to discontinue or sunset is as important as identifying new expectations or desires for innovative initiatives. Advisory committees, focus groups, user surveys, and other tools can continually identify needs and provide a basis for reprioritizing University initiatives. Project management tools can be used to track milestones and measure progress. It is important to document achievements and clearly communicate them to the University community. User surveys should be used continuously to measure satisfaction with the services being provided.

The study made it clear that creating an office of the CIO and reorganizing existing IT resources cannot satisfy all IT needs and expectations without the infusion of additional IT resources. However, the CIO and a reorganized IT structure can serve to identify, funnel, and prioritize IT initiatives to enable effective assignment of IT resources. Major investments in future institutional IT initiatives will have awareness and guidance from the IT Executive Committee.

Consistent with the University's vision "to be the best at advancing the land-grant ideal and putting science and technology to work," we envision a new information technology organization and culture where all IT staff across the University are working together to ensure that our information technologies and infrastructure are optimized over the entire University to best support learning, research and creative endeavors, outreach programs, and organizational leadership.

Collaborations are strategic in the arena of wide-area information technology. The Board of Regents is stressing collaboration and increased efficiency among the three universities. As a first step, we have met twice with our counterparts from the University of Iowa and University of Northern Iowa in daylong working sessions. We have identified five interinstitutional information technology work teams and tasked each team with areas for collaboration. Examples are common definitions and databases to be used when generating data for comparison and analysis, contract sharing, joint purchases of hardware and software, and combining forces for better pricing on site licenses. Other opportunities include sharing experiences, staff, and expertise and joining together in developing new initiatives such as security policies and best practices. Regional collaborations with peer institutions are necessary for Iowa State University to be competitive among Carnegie Research I universities. A current strategic opportunity is collaboration with the University of Wisconsin, the University of Minnesota, and the University of Iowa in the purchase and operation of a regional fiber optic network that will secure adequate bandwidth for research collaborations and other high bandwidth applications. The organizational restructuring proposed here allows Iowa State to more seamlessly align with IT organizations at peer institutions and will facilitate collaborations and decision-making.

## Appendix A. IT Organization Chart



Note: The configuration of groups within the central IT organization will be designed spring 2005. It is anticipated that the structure will be dynamic in the near term, but will solidify as the organization aligns with funding models and changes to the portfolio of services.

## Appendix B. Focus Group Summaries

Six focus groups and four open forums were held between September 2004 and November 2004. As described in Section III, focus groups averaged about 14 invited participants who engaged in a two hour facilitated workshop on IT issues. Each group selected a member to prepare a summary of the group's discussion, which follows on subsequent pages. An all focus group meeting was held November 17, 2004 where the group summaries were presented and discussed. The focus groups are:

- Business & Finance Directors (held September 10, 2004)
- Research Faculty and Staff (held September 17, 2004)
- New Faculty (held September 30, 2004)
- Student Affairs (held October 11, 2004)
- e-learning and Distance Education (held October 15, 2004)
- Academic Administration (held October 21, 2004)
- Follow-up for all focus groups (held November 17, 2004)

Additionally, four open forums were held. Due to an anticipated large number of participants, it was decided beforehand that all forums would be facilitated, but unlike the focus groups, there would not be time during the session for participants to vote as a large group to rank their priorities. Because items were not ranked, summaries are not included here. However, input was carefully recorded and considered, and forum group participants will recognize their role in shaping the recommendations contained in this report. Most notable is the need to improve communication, participation, and culture of the IT community. The four forums are listed below. Two did have significant participation.

- Faculty and Staff (held October 28, 2004)
- Students (held November 8, 2004)
- Campus IT Support Staff (held November 12, 2004)
- Staff of the four central IT organizations (held November 15, 2004)

## Focus Group

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Business & Finance Directors

September 10, 2004

### Participants

Joan Thompson	Treasurer
Christopher Ahoy	Associate Vice President for Facilities Planning & Management
Vicki Brubaker	Associate Director, Human Resource Services
Judy Hankins	Assistant to the Vice President for Business & Finance
Arlo Meyer	Director of Business Affairs, Purchasing Department
David Miller	Director of Facilities, Facilities Planning & Management
Mark North	Executive Director, Iowa State Center
Johnny Pickett	Associate Vice President for Business and Finance and Controller
Lynn Seiler	Associate Director, Facilities Planning & Management
Jerry Stewart	Director of Public Safety
Don Wirth	Associate General Manager, WOI Radio

### Perspective

Participants include both end users and designers of administrative information systems.

### Group Discussion

#### IT Services that Work

- Responsiveness - we get what we need
- Desktop support – remote access, back-ups, help desk
- AccessPlus - expanded web-based applications increase speed, improved security/authentication
- Adaptability - homegrown systems can be changed and adapted to our “culture”

#### Frustrations with IT

- Integration – different applications not talking to each other
- Data Mining – too difficult and not widely available
- Passwords – too many
- E-mail crutch – we don't communicate with each other like we used to

#### Needed IT Changes

- Standardization – all systems on same platform (e.g. Gold Sheet)
- Standardization – within ATS (e.g. same look and feel to screens)
- More programmers and expertise
- Better communication about services available through ATS and AIT

#### Short-term IT Wishes

- A “Webmaster” who can facilitate process changes as we move from ADIN to web
- Complete (beginning to end) transaction record including approvals
- Policies – address policies and make sure everyone understands them

#### Long-term IT Wishes

- Replace legacy systems with integrated applications suite – preferably open source but possibly purchased ERP package
- Better collaboration and integration through a global IT vision
- Wireless everywhere
- Improved data and expanded access

#### Final Comments

- We say we want standardization, yet we want flexibility.
- Our daily routines are controlled by technology (email), but we say we want more technology.
- Funding Model: Charge based systems creates “haves” and “have nots,” more central funding of IT services is desirable.

## Focus Group

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Research Faculty and Staff

September 17, 2004

### Participants

Srinivas Aluru	Associate Professor, Department of Electrical and Computer Engineering
Holly Bender	Associate Professor, Department of Veterinary Pathology
Cinzia Cervato	Assistant Professor, Department of Geological and Atmospheric Sciences
Carl Chang	Chair, Department of Computer Science
Rohan Fernando	Professor, Department of Animal Science
Bruce Harmon	Distinguished Professor, Department of Physics and Astronomy, and Ames Laboratory
Vasant Honavar	Professor, Department of Computer Science
Robert Jernigan	Professor, Department of Biochemistry, Biophysics & Molecular Biology
Fritz Keinert	Associate Professor, Department of Mathematics
Rick Kendall	Scientist, Ames Laboratory
Sarah Nusser	Professor, Department of Statistics
James Oliver	Professor, Department of Mechanical Engineering, and Director of the Virtual Reality Applications Center
Bruce Thompson	Distinguished Professor, Department of Materials Science Engineering, and the Center for Non Destructive Evaluation
Judy Vance	Chair, Department of Mechanical Engineering
James Vary	Professor, Department of Physics and Astronomy

### Perspective

Participants of the Research Faculty and Staff focus group provided insights into the types of IT services needed to better support their research programs.

### Group Discussion

#### IT Services that Work

- Centrally managed facilities for basic IT needs -- basic network infrastructure, wireless access, email, domain names for web servers
- Flexibility to maintain departmental facilities or research laboratories for groups that need them (e.g., computer science, human-computer interaction) with associated support staff
- Access to high performance computing facilities
- Access-Plus, Web-CT, etc.
- Modern IT-equipped classrooms (in some of the newer buildings)

#### Frustrations with IT

- Poor integration of systems around campus – e.g., separate passwords for different systems – Access Plus versus Liquid Office
- Lack of robustness of some systems e.g., Liquid Office; Sometimes unreliable email
- Accessing ISU systems from off campus can be difficult
- Organization of IT service providers unclear -- Not always clear which entity to approach for different needs or what software is available – especially difficult for new faculty and students
- Lack of specialized support staff that understand the specific needs of departments and programs and are co-located with the faculty, labs, and students
- Poor physical infrastructure for IT-intensive research and education programs

#### Short-term IT Wishes (1 year)

- Improved organizational structure and resources to provide support needed by various units – colleges, departments, research laboratories – locate some of the support staff at the units they serve
- Better integration (without centralization) of IT services and facilities on campus, improved access (including from off campus), campus wide licenses for software that has a large user base – and better inventory of all available licenses
- Better support for heterogeneous computing environments –Windows, Linux, MAC, etc. – one size does not fit all!
- Better access to IT-equipped classrooms and lecture halls for courses or seminars that need them
- Secure and controlled access to faculty schedules, calendars, etc. to individuals and units for efficient scheduling of meetings, etc.

#### Short-term IT Wishes (2 years)

- Seamless access to IT resources from on- and off-campus, including distance learning facilities
- Central IT support for large IT-intensive research projects that involve significant development (beyond research prototypes), and dissemination of IT artifacts (e.g., software, demos)
- Steps toward sustainable mechanisms for funding, establishing, maintaining, and upgrading of instructional and research computing facilities in departments, dormitories, research laboratories
- Plans for adequate IT-friendly physical infrastructure - laboratory and office space, classrooms for IT-intensive research and education programs in general and computer and information sciences in particular

#### Long-term IT Wishes (beyond 2 years)

- A comprehensive, secure, searchable information system for faculty, staff, and administration – for grants, publications, courses, graduates, alumni etc. – for multiple uses - for generating CV in various formats, reports, web pages, etc.
- Working mechanisms for funding, establishing, maintaining, and upgrading of instructional and research computing facilities in departments, dormitories, research laboratories
- Establishment of IT-friendly physical infrastructure - laboratory and office space, classrooms for IT-intensive research and education programs in general and computer and information sciences in particular
- Agile IT support infrastructure to meet evolving needs of academic, administrative, and support units, faculty, students, research groups

## Focus Group

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New Faculty

September 30, 2004

### Participants

Kristjan Bregendahl	Assistant Professor, Department of Animal Science
Ying Cai	Assistant Professor, Department of Computer Science
Yu-Che Chen	Assistant Professor, Department of Political Science
Jin Feng	Associate Professor, Department of Art & Design
Monica Haddad	Assistant Professor, Department of Community & Regional Planning
Brian Hornbuckle	Assistant Professor, Department of Agronomy
Gillian McLellan	Assistant Professor, Department of Veterinary Clinical Sciences
Geoffrey Sauer	Assistant Professor, Department of English
Kevin Scheibe	Assistant Professor, Department of Logistics Operations & Management Information Systems
Hilary Seo	Assistant Professor, Library
Kelly Strong	Associate Professor, Department of Civil, Construction, & Environmental Engineering

### Perspective

Participants were faculty members in their second year at Iowa State University. As such, they were able to comment on strengths and opportunities for improvement in the ISU IT infrastructure as compared to the environment of their PhD graduate school and from a perspective of what IT resources they need to be successful faculty members at Iowa State.

### Group Discussion

#### IT Services that Work

- Free software (site licensed software for faculty, staff, and students)
- Autonomy of system design and support at college/departmental level
- Access to library resources
- WebCT for course delivery
- Accessibility/mobility of data on campus

#### Frustrations with IT

- Lack of information available online – POS, grant fund reports, library renewals
- More decentralized or distributed technical support for daily operational issues
- More available software with fewer restrictions
- Hazardous waste tax on computers (needs to be eliminated)

#### Short-term IT Wishes

- Improve off-campus accessibility – cheaper, better, faster connections in Boone and Story counties, including wireless
- More site licenses for software
- More IT support distributed across campus
- More library resources available online

#### Long-term IT Wishes

- More/better management and problem solving skills from IT support people – i.e. I have a problem, not my computer.
- System for providing free computer upgrades and replacements for faculty over time while improving selection
- Faculty development incentives for continuous improvement and training in IT
- Better collaboration between IT and the library

## Focus Group

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Student Affairs

October 11, 2004

### Participants

David Aves	Systems Analyst, Department of Residence
Lenore Binen	Psychologist, Student Counseling Service
Phillip Caffrey	Associate Director of Admissions
Sherry Cronin	Minority Student Affairs
Larry Dau	Associate Registrar
Laura Doering	Associate Registrar
Marc Harding	Director, Admissions
Roberta Johnson	Associate Director, Financial Aid
Connie Lastine	ATS/Student Health support
Rebecca Matters	Program Coordinator, International Education Services
James Nelson	Director, Student Health
Richard Reynolds	Director, Memorial Union
Kerri Stover	Program Coordinator, Admissions
Julia Sullivan	Financial Aid
Ann Wessman	Financial Aid
Scott White	Associate Director, Recreation Services
Darin Wohlgemuth	Program Coordinator, Enrollment Services

### Summary

Participants include both end users and designers of student information systems.

### Group Discussion

#### IT Services that Work

- Committed staff in Administrative Technology Services
- AccessPlus
- Custom systems for student information
- Development of customer-focused, priority-driven systems (specified by the departmental offices)

#### Frustrations with IT

- ATS billing model
- System integration
- Data Warehouse initiative
- ATS resource constraints

#### Short-term IT Wishes

- Quality assurance and testing environment (ATS)
- System integration, "real-time data"
- New employee registration, better coordination between ATS services and Active Directory/Net-ID registration (reduce time required for this process)
- ATS billing model, begin analysis
- Data Warehouse initiative; reduction of data silos, common dataset for analysis

#### Long-term IT Wishes

- Student information systems, common demographic data
- Adequate ATS analysts for systems development; number of analysts and appropriate skill-set
- Equitable and flexible ATS billing system
- Data Warehouse

## Focus Group

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e-learning and Distance Education

October 15, 2004

### Participants

John Boysen	Senior System Analyst, Office of Academic Information Technology
James Campbell	Associate Professor, Department of Textiles & Clothing
Niki Davis	Professor, Department of Curriculum and Instruction, and Director of the Center for Technology in Learning & Teaching
Donald Draper	Associate Dean, College of Veterinary Medicine
Suzanne Hendrich	Associate Dean, College of Family & Consumer Sciences
Thomas Ingebritsen	Associate Professor, Department of Genetics Development & Cell Biology
Paul Jewell	Program Coordinator, Engineering Distance Education
Craig Ogilvie	Associate Professor, Department of Physics & Astronomy
Allan Schmidt	Instructional Development Coordinator, Center for Excellence in Learning and Teaching
Jim Twetten	Interim Director, Instructional Technology Center
William Tysseling	Director of Continuing Education and Communication Services, University Extension
Loren Zachary	Assistant Dean, College of Engineering

### Perspective

Focus group participants have a long standing commitment to teaching and learning by supporting systems or administering programs that focus on improving student learning, or by developing innovative pedagogy for their own classes.

### Group Discussion

#### IT Services that Work

- Web CT – administration, teaching, workshops, support, grade reporting
- Campus network and infrastructure is stable
- Classroom and IT support is good
- Wireless connections
- E-library
- Collaboration across units is good

#### Frustrations with IT

- Lack of integrated student database software system – Registrar's Office
- No centralized portal/authentication
- Lack of strategic IT direction
- No long-term online course management system strategy
- Lack of universal wireless access
- Multiple barriers to adopt IT
- Lack of tracking system for learning outcomes

#### Needed IT Changes

- New Registrar software system
- Portal/simplified authentication
- Dynamic IT strategic plan
- Online course management strategy
- Increased wireless zone access/quality

#### Short-term IT Wishes

- Seamless integration of IT into learning and teaching
- Classroom IT adaptable to multiple learning and teaching strategies
- IT to enhance learning in large classes
- Portfolio system for students, faculty, and scholarships
- Assessment, outcomes, and knowledge management tools

#### Long-term IT Wishes

- Intergalactic recognition of IT at ISU
- Digital library of learning objectives that can be shared
- Access to learning resources anytime, anywhere
- ISU a hotbed of instructional innovation
- IT Teaching “Operating System” – consortium to develop standards, engineer and “plug & play” modular ability to integrate teaching/learning components, learning objects for reuse

## Group

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Academic Administration

October 20, 2004

### Participants

James Bloedel	Vice Provost for Research
Mark Engelbrecht	Dean, College of Design
Douglas Epperson	Associate Dean, College of Liberal Arts & Sciences
Patrick Halbur	Associate Dean, College of Veterinary Medicine
Labh Hira	Dean, College of Business
David Holger	Associate Provost for Academic Programs and Dean of the Graduate College
Olivia Madison	Dean, Library Sciences
Gerald Miller	Associate Dean, College of Agriculture
Ellen Rasmussen	Assistant Provost
Diane Rover	Interim Associate Dean, College of Engineering
Jerry Thomas	Interim Dean, College of Education
Pamela White	Interim Dean, College of Family and Consumer Science

### Perspective

The academic administration focus group has a detailed understanding of the IT services needed to support faculty and staff. Participants also brought expertise in the use of information to administer an academic program.

### Group Discussion

#### IT Services that Work

- Contract Services from the university including email, schedules, and IT support are generally effective.
- University IT structure is generally sensitive to collegiate requirements.
- Collaboration between various campus IT providers is valued.
- Online systems such as WebCT, Gold Sheets, AccessPlus, and electronic approval protocols work well.
- Certain centers of excellence related to IT are widely recognized.

#### Frustrations with IT

- IT providers lack organized, understandable structure.
- Integration of information systems is incomplete, requiring multiple password entries.
- Access to information from off-campus is difficult.
- Storage and retrieval of information has problems with space, security, and access.
- More flexibility and diversity is required for IT hardware and software.

#### Short-term IT Wishes

- Create a structure to provide units appropriate IT support.
- Plan for all public areas to be provided proper IT infrastructure.
- Improve convenience of off-campus IT access for faculty and staff.
- Increase central IT storage, integrated databases, and software agreements.
- Establish a central IT consulting group to examine system-wide and unit-based issues.

#### Long-term IT Wishes

- Provide a centralized data system that is easily searchable by faculty and staff.
- Construct seamless, real-time connections on and off-campus for learning at a distance and remote access.
- Develop a totally wireless campus.
- Become nationally distinguished for our "digital culture."

#### General Observations

- Consult veteran administrative support staff more broadly on IT matters.
- Analyze administrative protocols for appropriateness of IT solutions.
- Examine ISU Foundation model for a “decentralized” IT structure.
- Promote IT issues as integral to collegiate and departmental planning.

## Appendix C. List of Recommendations

	<b>Report Section</b>	<b>Recommendation</b>	<b>Time Table</b>
1	Governance, IV A	Combine the four central IT units into one IT organization	Complete by July 1, 2005
2	Governance, IV A	Combine the budgets and business processes of the four units	Complete by July 1, 2006
3	Governance, IV A	Assign selected IT staff to the CIO office to assume responsibility for enterprise budgeting, planning, and project management	Complete by July 1, 2005
4	Governance, IV A	Develop a mission statement for central IT	Complete by July 1, 2005
5	Governance, IV B	Implement recommended IT committees	Complete by July 1, 2005
6	Governance, IV C	Explore benefits and challenges in a model where some Unit IT staff are employed by central IT	Decide by Jan 1, 2006
7	Governance, IV C	Strengthen collaboration between central IT and the Library	
8	Governance, IV D	Better coordinate and communicate the availability of and need for campus site software licenses	July 1, 2005
9	Governance, IV D	Continue to update IT policies	On going
10	Governance, IV D	Ensure that College and Unit IT support specialists have rapid access to the IT assistance they need to support end users	
11	Governance, IV D	Develop IT orientation and training for new faculty and new IT support staff	
12	Governance, IV D	Make IT resources easier to find by continuing development of the new IT web pages and using better search technology	
13	Governance, IV D	Create a web interface for a searchable database with public computer labs, noting their hardware, software, hours of operation, and a trouble contact	
14	Governance, IV D	Create and post a list of IT support personnel for each unit	

15	IT Initiatives, V A Security	Identify a central IT security lead	
16	IT Initiatives, V A Security	Develop an education and awareness program for the campus community	
17	IT Initiatives, V A Security	Continue to move to secure end-to-end network protocols and harden user systems	
18	IT Initiatives, V A Security	Develop a campus information technology risk management plan	
19	IT Initiatives, V B Teaching & Learning	Determine the direction for continued use and expansion of a course management system	
20	IT Initiatives, V B Teaching & Learning	Assess classroom IT needs, and develop plan to sustain service	
21	IT Initiatives, V B Teaching & Learning	Strive to create open study and group meeting space for students to use laptops and other mobile computing devices	
22	IT Initiatives, V B Teaching & Learning	Support faculty who commit to redesigning their courses to use appropriate technology through a fellowship program	
23	IT Initiatives, V B Teaching & Learning	Continue to explore the use of emerging technologies that enhance learning at a distance	
24	IT Initiatives, V C Research Computing	Identify unmet needs for high performance computing and develop a plan to meet those needs	
25	IT Initiatives, V C Research Computing	Evaluate the need for new computing models, such as shared workstation resources through grid computing	
26	IT Initiatives, V C Research Computing	Continue to explore opportunities for Iowa State University to connect to national research networks (e.g., Lambda Rail)	
27	IT Initiatives, V C Research Computing	Deploy new technologies that facilitate research collaboration at a distance, such as the Access Grid	
28	IT Initiatives, V C Research Computing	As part of an effort to improve authentication services through a study of identity management, ensure that new technology facilitates University-to-University collaboration	
29	IT Initiatives, V D University Leadership	Develop a data warehouse with reporting and analysis tools	

30	IT Initiatives, V D University Leadership	Engage a consultant to facilitate a study of the benefits and costs associated with an Enterprise Resource Planning (ERP) package	
31	IT Initiatives, V E Enterprise	Provide a common email and calendaring service to interested faculty and staff	
32	IT Initiatives, V E Enterprise	Develop a portal for access to Iowa State resources	
33	IT Initiatives, V E Enterprise	Implement single sign-on authentication for enterprise systems	
34	IT Initiatives, V E Enterprise	Deploy identity management as a core IT service	
35	IT Initiatives, V E Enterprise	Develop a service model that provides desktop computer support for faculty and staff	
36	IT Initiatives, V E Enterprise	Determine if it is feasible to create a software license package of Windows, Linux, and Mac OS X, for faculty, staff, and students	
37	IT Initiatives, V E Enterprise	Continue to expand the campus wireless network in gathering places, and with central funding	
38	IT Initiatives, V E Enterprise	Develop a strategic plan for information technology	
39	IT Initiatives, V E Enterprise	Deploy a central system that facilitates individual web authoring capabilities	
40	IT Initiatives, V E Enterprise	Develop a database to store faculty productivity information so that CVs, promotion and tenure documents, annual reviews, and other reports can be easily generated	
41	IT Initiatives, V E Enterprise	Centralized support for institutional repositories – including centralized storage space, format guidelines, metadata, and technological migration	
42	IT Initiatives, V E Enterprise	Continue to upgrade the campus communications infrastructure to ensure adequate connectivity	